

STATEMENT OF WORK

January 2023

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1 – Objectives

Parks Canada Agency (PCA) is seeking the services of a Building Science consultant firm recognized and licensed to practice in Alberta and the Northwest Territories with experience in residential energy retrofits.

The objective of the project is to generate a set of documents for each of 14 houses in 3 remote, northern communities that will describe and detail all energy retrofit and repair work required to extend their service life, significantly improve their energy efficiency, meet the requirements of the Greening Government Strategy and improve them to Net Zero or Net Zero Ready where possible.

Retrofit and repair work on the homes is expected to be done gradually over the course of a number of years, and therefore Construction Administration is not included in this Scope.

2 – Background

The Southwest Northwest Territories Field Unit owns 27 staff houses across the region, 14 of these have been identified for deep energy retrofits. There are 4 houses in Fort Chipewyan, AB, 6 houses in Fort Smith, NWT, and 4 houses in Fort Simpson, NWT.

In addition to being older homes that are not very energy efficient, a number of them also have maintenance issues or repairs that are also required including, leaking skylights, windows that no longer function, evidence of moisture issues, and pest infestations.

See Appendix A for information on these houses.

3 – Scope of Work

The scope of work includes the following:

A. Housing Condition Assessment – Fort Chipewyan (Required Service):

- include all houses on the list in this community.
- Review available information, which may include: photos and inspection reports.
- Consult with PCA Team as required regarding requirements, current issues, and concerns.
- Visit each house to confirm existing conditions, constraints, and opportunities. Site Survey and field work to be completed to collect information and data that will provide sufficient information for detailed designs and drawings for these particular sites. It is the consultant's responsibility to ensure they have all of the information they require for each house. Site visits to be scheduled in the most efficient and cost effective manner possible.
- At a minimum, information gathered for each house must include:
 - Existing structure and construction
 - Insulation types and any concerns with condition



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- Air/vapour barrier type and any concerns with condition
 - Mechanical systems
 - Fuel type/power source
 - Dimensions of house, windows, doors etc...
 - Potential locations for HRV or ERV Equipment
 - Repairs and/or maintenance work that is currently required.
 - Evaluate the grading around each house to confirm that water will drain away from all foundations
 - Hazardous Materials evaluation where existing information is lacking
- B. Options Analysis – Fort Chipewyan (Required Service):
- include all houses on the list in this community.
 - Provide options, analysis, and recommendations for each house to the project team
 - Provide advice and direction regarding best methods of testing contractor work to confirm that they have achieved the goals as set out, such as air tightness requirements
- C. Life Cycle Cost Analysis - Fort Chipewyan (Required Service):
- Use a Life Cycle Cost Analysis including energy modelling to compare the options. Follow guidelines as per Appendix B.
- D. Development of Retrofit Construction Documents – Fort Chipewyan (Required Service):
- Provide a set of documents for each house that provides sufficient information to complete retrofits as required. At a minimum, documents will include:
 - specifications for materials, equipment & testing
 - drawings for important details such as air barrier and vapour barrier installation and continuity at intersections, and openings.
 - Engineering and/or Architectural seals to be included as required depending on the design.
 - Provide Cost Estimates for the design at each stage of drawing submittal.
- E. Final Construction Package – Fort Chipewyan (Required Service):
- Based on feedback from draft documents, provide a set of documents for each house that can be provided to contractors and suppliers for pricing and estimating
 - A detailed estimate is required for each house
- F. Baseline Air Tightness Testing and Thermal scans for air leaks as part of the Housing Condition Assessment - Fort Chipewyan (Optional Service)
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- G. Housing Condition Assessment – Fort Smith & Fort Simpson (Optional Service):
 - Requirements as noted above for Fort Chipewyan
- H. Baseline Air Tightness Testing and Thermal scans for air leaks as part of the Housing Condition Assessment - Fort Smith & Fort Simpson (Optional Service)
- I. Options Analysis – Fort Smith & Fort Simpson (Optional Service):
 - Requirements as noted above for Fort Chipewyan
- J. Life Cycle Cost Analysis - Fort Smith & Fort Simpson (Optional Service):
 - Requirements as noted above for Fort Chipewyan
- K. Development of Retrofit Construction Documents – Fort Smith & Fort Simpson (Optional Service):
 - Requirements as noted above for Fort Chipewyan
- L. Final Construction Package – Fort Smith & Fort Simpson (Optional Service):
 - Requirements as noted above for Fort Chipewyan
- M. General:
 - Schedule and attend regular meetings from Contract Award through completion of IFT documents. Consultant responsible for taking meeting notes and distributing to all attendees.
 - Review requirements for each house based on current standards, codes, and Parks Canada specific requirements

The Consultant must consider all applicable standards and codes including, but not limited to, the following technical documentation and associated codes. All documentation and codes must be the current federally approved edition:

- Canada National Parks Act and Regulations
- Applicable Parks Canada Directives, Policies, Guidelines, & Standards
- Greening Government Strategy
- National Building Code of Canada (2020)
- National Energy Code (2020)
- Canadian Environmental Protection Act
- Energy Efficient Housing Retrofit Guide for Yukon, December 2021
- Local Provincial and Municipal Codes, Standards and Regulations accepted as having jurisdiction in the National Parks where work is being performed and for which the requirements are more stringent than those named above, shall be followed



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- Metrification: Projects shall be in accordance to Metric Drawings Practice and S.I. units as issued by the Metric Commission of Canada. Imperial units to be included for overall dimensions and areas.

4 – Deliverables

- The Consultant will prepare and submit condition assessment and options analysis reports, construction documents, as well as cost estimates.
- Attend meetings, take notes and distribute record of meetings to all attendees within 48 hours of meeting.

1. Condition Assessment & Options Report:

The consultant will be required to prepare condition assessment and options reports for each community. The report will be sufficient to allow PCA to make sound decisions on design options. The report must be clearly divided to show the individual requirements and analysis for each house in the community, or be separated into multiple reports, with one report for each house.

Reports must be completed and submitted for each community. It is preferred that we receive each report as it is completed rather than waiting for all reports to be complete. PCA's priority is: Fort Chipewyan, Fort Smith, and then Fort Simpson.

At a minimum, this report will include:

- Condition Assessment of each house including repair work required
- Results of air tightness testing and thermal scans (if this Optional Service is exercised)
- Results of the Life Cycle Cost Analysis (see Appendix B for requirements), comparing 4 different options for each house using a 40-year life expectancy and shadow carbon pricing of \$300/ton:
 1. Baseline retrofitted to 25% better than NBCC 2020
 2. Cost Neutral GHG Reduction
 3. Maximum GHG Reductions
 4. Optimized GHG Reduction (Hybrid)
- Each option will be accompanied by an evaluation of the options. List advantages, disadvantages, and the consultant's recommendation for a preferred option.
- Class 'D' estimates for construction cost of each option. Cost estimate to include all demolition costs associated to the retrofit as well as the new construction aspects.



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2. Draft Retrofit Construction Documents:

Upon PCA's approval of options for each house as laid out in the Options Analysis report, proceed with development of the Construction Documents. Drawings and specifications will be developed that provide sufficient information and detail for all of the required retrofits and repairs and how they are to be constructed and installed. For each house:

- Provide draft documents at approximately 50% and 95% completion. Incorporate feedback from the PCA team into each successive revision.
- Include complete detailing for any construction work to the building envelope, especially the air barrier and requirements for continuity. Provide a drawing that clearly defines the entire building envelope and the assemblies for each part indicating the air barrier and vapour barrier.
- Provide required details for envelope continuity at intersections of assemblies as well as all openings.
- Include detailing of HRV/ERV installation as well as mechanical and electrical system upgrades.
- Ensure that the goals of the project are clearly communicated through the drawings and specifications provided to the potential contractors.
- Include requirements for any mock-ups and/or testing that may be required to confirm achievement of goals
- Estimates are required at each stage (Class C at 50%, Class B at 95%).

3. Final Construction Package:

- After review by the Parks Canada team, and incorporation of feedback, provide a tender-ready set of drawings and specifications as well as a Class 'A' estimate
- At this stage, all drawings that required Architectural Design or Engineering will need to be stamped by the appropriate person(s).
- Provide additional documentation as required by PCA and the contracting department for the tender process such as bid breakdown forms.

Where deliverables and submissions include summaries, reports, drawings, plans, specifications and schedules, one (1) copy shall be provided to the PM in electronic PDF format; original format and hard copies might be required as requested.

Deliverable submissions must be in a format that is accessible to all team members such as PDF. Design work shall be completed in AutoCAD or Revit, and must be available upon request. All drawings and specifications will follow Government of Canada standards, including title blocks. This information will be provided.

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Staff Housing Energy Retrofits –
Assessment, Options Analysis, & Design



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5 – Project Administration / Responsibilities

The Consultant will:

- Act as the Prime Consultant, coordinating the work of the entire team including any required sub-consultants;
- Provide rigorous quality assurance reviews during the planning and implementation phases, including the application of value engineering reviews during the design process.
- Prepare and provide regular updates on the progress of the work being conducted;
- Attend meetings as required in person or virtually;
- Submit and maintain a project execution plan/schedule to clarify how the work will be conducted.

6 – Environmental Impact

Parks Canada's mandate is to protect and present nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure the ecological and commemorative integrity of these places for present and future generations on behalf of the people of Canada.

While these houses are not located in National Parks or Historic Sites, consultant will design for construction work that has minimal impact on the environment.

7 – Cultural Resource Management and Archaeological Impacts

We do not anticipate that there are any cultural resources or archaeological artifacts that will be found on these properties.

8 – Location of Work and Travel

Consultant will be required to visit each of the houses that are included in this project to perform assessments and investigations into the work required. It is expected that there will be at least one site visit to each house, but additional visits may be required to ensure the consultant has all of the information that will be required.

The majority of the design work can be completed primarily from the Consultant's office. It is expected that the majority of meetings, such as kick-off meetings, progress update meetings, and any other meetings as required can be done via conference calls.

9 – Schedule

We would like to complete as many Required and Optional Services as possible by **March 31, 2023**.

Consultant to provide schedule upon award of contract. Continuously monitor and update schedule as required throughout design and construction.

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10 – Design Requirements & Considerations

The following needs to be considered when designing the work on these houses:

- Parks Canada is committed to having our buildings net zero or net zero ready and the design for the retrofits will reflect that goal.
- The locations of these houses in remote, northern communities
- Air Tightness goal is 1 ACH (air change per hour)
- Addition of maximum practical outboard insulation on exterior walls
- Additional of maximum practical attic and/or ceiling insulation
- Replace all windows with USI 0.9 to 0.77 or better & improve air tightness
- Replace all doors that don't meet U-0.175 and improve air tightness
- Improve HVAC by installing HRV/ERV systems with thermal efficiencies of 95 or better.
- Construction work on the houses is expected to be done in phases

11 – Green Building / Sustainable Design

Parks Canada is committed to reducing our environmental impacts and has developed a Departmental Sustainable Development Strategy as well as a Greening Government Strategy. the project intent is to achieve the most sustainable structure possible within the defined budget. It is also important to consider availability of materials and equipment for the different communities included in this scope.

The strategies for this project, at a minimum, will include:

- a. Diverting Waste from Landfills.
 - i. **Contractor will be required to divert as much non-hazardous waste from the landfill as is possible and feasible in each community.** Design considerations must include ways to reduce waste through strategies such as efficient use of construction materials, and packaging of materials that is reusable, recyclable, and/or minimal.
- b. Low Carbon Building Materials:
 - i. Consideration of Embodied Carbon in materials when deciding between options
 - ii. Reduction of Carbon emissions related to this project by considering extraction and manufacturing processes as well as transportation requirements for each material used.
- c. Minimize Ecosystem Impacts by considering construction methods and access to the sites.
- d. Choosing sustainable materials where possible.
 - i. Consider materials that are: renewable, sustainably harvested, locally available, and/or durable, as well as materials that contain recycled material and/or are recyclable.

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- ii. Choose Materials that will provide durability and longevity of the houses to increase their useful life. This in turn reduces the life cycle carbon and environmental impacts

12 – Additional Information

The following information is included with this Statement of Work.

- Representative photo of each house
- General maps showing approximate locations of the houses
- General information for each house

The following information is available and will be provided to the successful consultant.

- Inspection Reports
- Other information that may be available that will assist with assessment and design work
- Hazardous material assessments where available (7 of 14 houses have assessments complete, but do not include insulation assessment)