



Engineering Services

TERMS OF REFERENCE



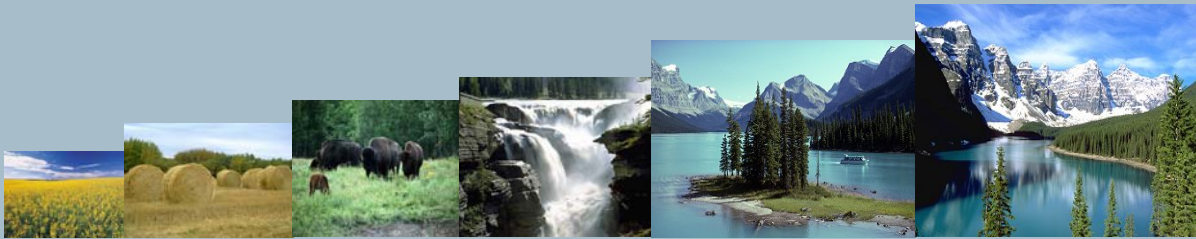
Comprehensive Detailed Traffic Inspection of St. Andrews Lock & Dam Bridge

For: Public Works & Government Services Canada
Site Location: St. Andrew's Lock & Dam, Lockport Mb.

Public Works and Government Services Canada
Real Property Services
Western Region
Project No. R.0.055339.002

July 26, 2013





Terms of Reference

Engineering Services

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1 PROJECT DESCRIPTION

1.1 TERMS OF REFERENCE

1.1.1 PURPOSE

- .1 Public Works and Government Services Canada (PWGSC) intends to retain a firm of consulting structural engineers, having considerable experience in detailed inspection, capacity evaluation and bridge renovation, for the provision of the services required for this project.

1.1.2 THE PWGSC GENERAL PROCEDURES AND STANDARDS DOCUMENT (GP&S)

- .1 The Terms of Reference document must be used in conjunction with the GP&S, as the two documents are complimentary
- .2 The TOR describes project-specific requirements, services and deliverables while the GP&S document outlines with minimum standards and procedures common to all projects.
- .3 In the case of a conflict between the two documents, the requirements of the TOR override the GP&S Document.

1.2 PROJECT INFORMATION

| Project Information | | |
|---------------------|---------------------------------|---|
| .1 | Project Title: | Comprehensive Detailed Inspection of Traffic Bridge Components of St. Andrews Lock & Dam. |
| .2 | Project Location: | Lockport, Mb |
| .3 | PWGSC Project Number: | R.055339.002 |
| .4 | User Department: | PWGSC |
| .5 | User Department Representative: | |
| .6 | PWGSC Project Manager: | Bobby Jaikaran |
| .7 | Contracting Officer | TBD |

1.3 PROJECT BACKGROUND

1.3.1 SERVICES

- .1 The services of an engineering firm, acting in the capacity of *Prime Consultant*, together with a multi-disciplinary team of sub-consultants, are required to undertake the comprehensive bridge inspection and testing of the concrete bridge deck to determine the degree of salt penetration and corrosive activity.
- .2 As *Prime Consultant* the selected engineering firm will provide a full consulting team including the required expertise in Civil & Structural, inspection engineering services.

1.3.2 CONTEXT

- .1 The project consists of Inspection of the existing St. Andrews Lock & Dam for the User Department.
- .2 The project is a multi year project to carry out and report on the comprehensive detailed inspection of the east approach, main truss span and west approach of the traffic bridge from the top of the piers upward and testing of the concrete deck. **Not included in this inspection are the moveable dam frames, fish ladder or adjacent structures.**

1.3.3 USER DEPARTMENT

- .1 The User Department referred to throughout the TOR is Public Works Government Services Canada.



1.3.4 BRIDGE HISTORY

The St. Andrews Lock and Dam was constructed in the early 1900's with the opening of the facility in 1910. The prime function of the facility is to facilitate commercial navigation from Lake Winnipeg to the City of Winnipeg which is accomplished by drowning Lister Rapids to a depth of 2.7 metres during the navigational season which generally occurs from mid May to mid October, depending on river flow conditions. The west approach bascule span over the lock and the east and west approaches were completed and the roadway paved in 1913.

Major changes made to the structure which are currently in place are as follows:

- In 1949, the west approach was realigned along the present configuration.
- In 1976, the east approach was rebuilt to the present grades.

In 1993, the west approach and bascule span were demolished with the present galvanized steel thru-truss installed from a reconstructed west abutment to the main dam trusses on the east side of the lock. At the same time, traffic deck repairs were carried out on the main truss spans, floor beams were modified on the main truss section and the entire deck of the east approach was replaced. New expansion joints were installed on the traffic deck and a new sidewalk was constructed on the east approach and main truss spans connecting to the new sidewalk on the thru-trusses. New highway lighting was installed across the structure.

From 1994 to 1996 the steel decks of the working and main decks were replaced with hot dipped galvanized steel decking.

In 1996, span 7, (the most easterly of the main truss spans) and the east approach were cleaned to commercial blast standards and Bridgecote applied to the steel. Minor structural repairs were undertaken at that time.

In 1998/99 main truss spans 1 through 6 inclusive and the top portions of the moveable dam frames were cleaned to white metal and coated with 85 percent zinc, 15 percent aluminum sprayed metalized coating. A small amount of steel repairs were carried out as part of this project.

The bridge is 454 meters long consisting of three distinct steel construction types as follows:

| | |
|--------------------------------|---------|
| East Approach Spans | 73.2 m |
| 7 Main Truss Spans (7 @ 41.7) | 291.9 m |
| West Thru Truss Spans | 88.9 m |

- The bridge is lighted with the power supplied from Manitoba Hydro power source.

The bridge (particularly the main truss spans) has considerable historic value. Rehabilitation recommendations should reflect the historic nature of the bridge



1.3.5 SITE SAFETY

.1 Health and Safety

Before the Consultant performs an examination of the bridge structures, a health and safety plan shall be developed and submitted to PWGSC prior to the site assessment and implemented during the field activities. The Consultant should prepare a traffic control plan based on Manitoba Traffic Control Manual and submitted to PWGSC for review and approval prior to working on the bridge. No work shall be allowed on the traffic deck surface of St. Andrews Lock and Dam during peak hours (6:00 to 9:30 and 15:00 to 18:30) without the permission of the PWGSC Project Manager. The consultant shall be responsible for making all employees, specialists and others at the site, aware of the examination, and for ensuring the health and safety of all personnel at the site. Appropriate protective barricades and danger notices shall also be required around all equipment used by the Consultant for carrying out the examination.

.2 Authorization

.1 Before proceeding with any examination that may interrupt vehicular traffic and/or pedestrians traffic, the Consultant shall obtain approval from the PWGSC Project Manager.

.3 Site Regulations

.1 The Consultant undertakes and agrees to comply with all regulations, federal and provincial, in force on the site where the services are to be performed, relating to the safety of persons on the site or the protection of property against loss or damage from any and all causes

1.4 PROJECT OBJECTIVES

1.4.1 GENERAL SCOPE

- .1 Retain a Structural Engineering consultant to carry out a comprehensive detailed inspection of the traffic bridge portion of St. Andrews Lock and Dam, Lockport Manitoba and testing of the concrete deck.
- .2 Prepare a Final Report (4 copies) to be submitted to PWGSC by **May 16, 2014**.
- .3 Submit (2) copies of the draft report for PWGSC review by **April 16 2014**.
- .4 Report submitted should include an executive summary with key recommendations and priorities complete with corresponding class "D" cost estimates or better.
- .5 Allow 3 weeks for review.
- .6 Once approved, submit final report modified as per review. Where deliverables and submissions include summaries, reports, drawings, photos, plans or schedules, four (4) hard copies of each task shall be provided. In addition, one (1) copy for each task shall be provided in electronic format unless otherwise specified.

1.5 SCOPE OF SERVICES

1.5.1 OVERVIEW

- .1 The consultant team for this project must provide the following services:
 - .1 To carry out a comprehensive detailed examination of the superstructure above the tops of the piers for water based components and from ground line on land based components for their functional and physical defects as required under Part 2, Detailed Inspections in PWGSC 2010 Bridge Inspection Manual (B.I.M.).



- .2 This comprehensive inspection constitutes an in-depth close-up examination of all components of the structures including those which may require the use of specialized access equipment to view.
The detailed inspection shall be in accordance with Detailed Component Inspections Appendix A. The type and extent of deterioration shall be recorded for every component. The component shall be given a condition rating and a priority code based on the material and performance condition of the component. All this data shall be recorded in the inspection forms and completed in accordance with - Inspection Report Appendix B. Color photographs shall be taken of all significant defects and included in the final report.
- .3 All inspection must conform to the most current (B.I.M) or better.
- .4 Final draft report must be signed and sealed by a registered Professional Engineer.
- .5 The structures to be inspected in the Comprehensive Detailed Inspection are as follows:

Substructures/Superstructures

- a) Abutments, land based piers, bearings and bearing seats and condition of anchor bolts.
 - b) Bents, columns, bracings, column bases, beams, stringers and girders.
 - c) Main structural members and connections for trusses and deck support members.
 - d) Bracing members and connections.
 - e) Expansion joints and guide rail systems.
 - f) Extent of corrosion activity and condition of protective coating systems are to be noted on all steel members.
 - g) Include the condition of rivets, bolts and welds in all members.
 - h) Check defects in all concrete elements such as delamination, spalling, cracking, etc.

 - i) Deck and Roadway Inspection
 - a) All joint systems
 - b) The bridge deck top surface, sides and soffit
 - c) Check asphalt deck for wear and deterioration
 - d) The curbs, drains, sidewalk, barrier walls and light standards
 - e) Roadway pavement, profile, drainage and geometry.
- .2 Tests to be conducted on the bridge decks:
 - .1 Delamination testing of the deck and sidewalk surfaces
 - .2 Equipotential survey over 50% of the bridge decks to assess the corrosion potential of the deck reinforcement
 - .3 Chloride testing of the bridge decks to determine the depth of chloride penetration and level of concentration.
 - .3 **Notify: PWGSC immediately if any items critical in nature are found during the inspection that requires urgent or immediate repairs.**

1.5.2 DELIVERABLES

- .1 There shall be two (2) separate reports
 - .1 A Comprehensive Detailed Inspection of the Traffic Bridge in accordance with PWGSC's BIM and
 - .2 A Bridge Deck Testing and Assessment Report



- .2 For the Comprehensive Detailed Inspection of the Traffic Bridge
 - .1 Draft Report - the following information are the minimum requirements
 - .1 Produce drawings/sketches for bridge structure inspected in Auto Cadd format with a summary of information on which the drawings are based;
 - .2 Provide as a minimum, plan, an elevation view and a cross-section view of each structure;
 - .3 Provide pictures of the site in general and of the inspected bridge structure and its components
 - .4 All data shall be recorded in the inspection forms and completed in accordance with Inspection Forms in PWGSC Bridge Inspection Manual (B.I.M.)
 - .5 Colour photographs shall be taken of significant defects
 - .6 Summary of the inspection of the structure with recommendations and class “D” cost estimates for repair/rehabilitation grouped into appropriate B.I.M. Priority Codes
 - .2 Final Report (As per section 2.8 of the 2011 Version GP&S Document)
- .3 For the Bridge Deck Testing and Assessment Report
 - .1 Draft report to include as a minimum the following sections
 - .1 Introduction - describing the purpose and scope of the report
 - .2 Existing Conditions – description of tests performed and location, results of the tests and consequences of the results
 - .3 An update of the costs and timing of the Alternate Repair methods described in AECOM’s “St. Andrews Lock and Dam - 2008 Bridge Deck Testing & Assessment Report”
 - .4 Recommended Repairs and scheduling based on the latest test results
 - .2 Final Report as per section 2.8 of the GP&S Document
- .4 Provide final reports with information as indicated from above and in 1.5 Scope of Services. Notify PWGSC immediately of any item of a critical nature found during any part of this project. The reports submitted must include an executive summary. They should address all items requiring attention, provide estimates for budget purposes, and include updated priority ratings, repair programs and a ten (10) year Management Plan for the Bridges

1.5.3 COST ESTIMATING WORK

- .1 Provide a Class D cost estimate or better for all potential repairs or rehabilitation works.

1.5.4 PROJECT MONITORING AND CONTROL WORK

- .1 Provide a ten year Management Plan for the St. Andrews Lock & Dam Bridge.

1.6 PROJECT DELIVERY

1.6.1 GENERAL

- .1 This project is considered to be a comprehensive detailed inspection of the traffic Bridge Components of the St. Andrew’s Lock & Dam.
- .2 The work will be carried out during normal operating hours 7:00 am-5:00pm.
- .3 The Peak traffic hours for the St. Andrews Lock and Dam traffic bridge are 6:00 to 9:30 am and 15:00 to 18:30 pm. Traffic is very heavy on Friday afternoons or Holiday Mondays. Disruption to traffic during these hours is not permitted without prior permission from PWGSC Project Manager who will arrange to notify Manitoba Transportation.



1.7 PROJECT SCHEDULE

1.7.1 GENERAL

- .1 The project is to be completed, in accordance with the project milestone listing identified below.
- .2 Completion dates shown are relative to an assumed start date of November 28, 2013
- .3 Prepare a Project Planning Schedule, in accordance with the milestone list.

1.7.2 ANTICIPATED MILESTONE DATES

| Project Phase | | Milestone Date |
|---------------|---------------------------|----------------|
| .1 | Award Consultant Contract | November 2013 |
| .2 | Mobilization Consultant | December 2013 |
| .3 | Submit Draft Report | April 2014 |
| .4 | Submit Final Report | May 2014 |
| .5 | Close out Contract | June 2014 |

1.8 EXISTING DOCUMENTATION

1.8.1 DOCUMENTS AVAILABLE FOR THE CONSULTANT

- .1 Copies of all pertinent documentation will be made available to the successful *Consultant*.
- .2 Limited as-built drawings and Operation & Maintenance Manuals will be available and the Proponent will be responsible for verifying the accuracy of the information incorporated into the final report.
- .3 2009 Comprehensive Detailed Inspection of Traffic Bridge St. Andrews Lock & Dam Final Report AECOM (CD)
- .4 2011 Comprehensive Detailed Inspection of Traffic Bridge St. Andrews Lock & Dam Final Report AECOM
- .5 St. Andrews Lock and Dam – 2008 Bridge Deck Testing & Assessment Report by AECOM
- .6 All necessary and available existing documents will be made available to the successful proponent for reproduction. The time and cost to reproduce the documents is the responsibility of the consultant.
- .7 PWGSC Bridge Inspection Manual (B.I.M) 2010

1.8.2 DISCLAIMER

- .1 Reference information will be available in the language in which it is written.
- .2 The documentation may be unreliable and is offered, “as is” for the information of the *Consultant*.

1.9 CODES, STANDARDS & GUIDELINES

1.9.1 GENERAL

- .1 In addition to applicable codes and regulations, the PWGSC documents listed below apply to this project.

1.9.2 PWGSC DOCUMENTS

- .1 The National Project Management System (NPMS)
- .2 PWGSC Bridge Inspection Manual (B.I.M) 2010



.3 General Procedure & Standards Documents.(GP&S)

2 PROJECT ADMINISTRATION

2.1 GENERAL REQUIREMENTS

2.1.1 SITE OFFICE

.1 The Site Superintendent Office for this project is located at 625 River Rd Lockport Mb.

2.1.2 MEETINGS

- .1 The *Departmental Representative* will arrange meetings, monthly, throughout the project.
- .2 Meetings will normally be held onsite at 625 River Rd, Lockport Mb or PWGSC downtown office- Suite 100-167 Lombard Ave Winnipeg Mb.
- .3 When urgent problem-solving meetings are required, the *Consultant* shall be available to attend such meetings in the PWGSC downtown office within two working day notice.
- .4 The key personnel of the prime *Consultant* and sub-consultants or specialist firms must be available to attend meetings or respond to inquiries within two working days.

2.2 ROLES AND RESPONSIBILITIES

2.2.1 CONSULTANT

- .1 The “*Consultant Team*”
 - .1 All team members must be eligible to work in the province of Manitoba.
 - .2 In addition to the responsibilities outlined in the GP&S document the *Consultant* shall:
 - .1 Attend meetings,
 - .2 Record the issues and decisions,
 - .3 Prepare and distribute minutes within two working days of the meeting,
 - .4 Ensure all meetings are green i.e. using electronic documents or double -sided hard copies and
 - .5 Ensure sub-consultants attend required meetings.

2.2.2 PWGSC RESPONSIBILITIES

- .1 In addition to the general responsibilities outlined in the GP&S document, PWGSC is also responsible for:

PWGSC Project Management

The Project Manager assigned to the project is the Departmental Representative. The Project Manager is the Departmental Representative directly concerned with the project and responsible for its progress. The PWGSC Project Manager is the liaison between the Consultant

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

Lines of Communication

Unless otherwise arranged with Project Manager, the Consultant shall communicate with the PWGSC Project Manager only. The consultant shall not respond to requests for project related information or questions from the media. Such inquiries are to be directed to the Project Manager.



2.2.3 USER DEPARTMENT

- .1 Unless directed otherwise, all communications with the User Department is through the PWGSC Project Manager.

2.3 PROJECT REVIEW AND APPROVAL

2.3.1 GENERAL

- .1 In addition to the review procedures outlined in the P&S document the *Consultant* shall ensure that the reports will undergo the following review and approval.

2.3.2 REVIEWS, APPROVALS AND PRESENTATIONS

- .1 Senior PWGSC Management Approval
 - .1 The project is subject to approval by senior managers of PWGSC and other relevant departments. These authorities are responsible for final decisions on the project.
 - .2 These authorities will require formal submissions at the completion of each key project phase.

3 REQUIRED SERVICES

3.1 GENERAL REQUIREMENTS

3.1.1 GENERAL

- .1 For this project, provide:
 - .1 Structural Inspection Services.
 - .2 Testing Services
 - .3 Draft Reports
 - .4 Final Reports
 - .5 Class D or better Cost Estimates

3.2 PROJECT CLOSEOUT PHASE

3.2.1 SERVICES

- .1 Before handing over the final product to PWGSC, the *Consultant* shall:
 - .1 Revise all documentation to reflect all changes, revisions and adjustments after completion of PWGSC review of the submitted draft document.