



Respect

Excellence

Integrity

Leadership



Engineering Services

# TERMS OF REFERENCE



## Engineering Services for Final Design and Rehabilitation of Highfield Dam Project No. 01R11-150205

Site Location: Highfield Dam  
Rush Lake, Saskatchewan

Agriculture and Agri-Food Canada  
Water Infrastructure Division  
Saskatchewan

February 2015



Agriculture and  
Agri-Food Canada

Agriculture et  
Agroalimentaire Canada

Canada



# Terms of Reference Engineering Services

## Table of Contents:

<b>1</b>	<b>PROJECT DESCRIPTION</b>	<b>3</b>
1.1	GENERAL .....	3
1.2	BACKGROUND INFORMATION .....	3
1.3	SUMMARY OF SERVICES .....	5
1.4	SCHEDULE .....	6
1.5	EXISTING DOCUMENTATION .....	8
1.6	CODES, ACTS, STANDARDS, REGULATIONS .....	8
<b>2</b>	<b>REQUIRED SERVICES - Final Engineering Designs and Tender Package Creation for All Components PLUS Construction management Services for West Spillway and Toe Berm</b>	<b>10</b>
2.1	GENERAL REQUIREMENTS .....	10
2.2	FINAL ENGINEERING DESIGNS AND TENDER DOCUMENTS FOR CONSTRUCTION .....	10
2.3	ENVIRONMENTAL SERVICES AND REGULATORY COMPLIANCE .....	12
2.4	GEOTECHNICAL INVESTIGATION .....	13
2.5	TENDER SERVICES .....	14
2.6	CONSTRUCTION SUPPORT SERVICES (NON-RESIDENT) .....	15
2.7	CONSTRUCTION SUPPORT SERVICES ON SITE (RESIDENT) .....	16
2.8	POST CONSTRUCTION SERVICE .....	18
2.9	PROJECT MANAGEMENT SERVICES .....	19
<b>3</b>	<b>OPTION TO EXTEND SERVICES – Construction Management Services for Embankment, East Spillway and low level outlet and RM road raise</b>	<b>20</b>
3.1	TENDER SERVICES .....	20
3.2	CONSTRUCTION SUPPORT SERVICES (NON-RESIDENT) .....	21
3.3	CONSTRUCTION SUPPORT SERVICES ON SITE (RESIDENT) .....	22
3.4	POST CONSTRUCTION SERVICE .....	24
3.5	PROJECT MANAGEMENT SERVICES .....	25



# 1 PROJECT DESCRIPTION

## 1.1 GENERAL

### 1.1.1 SERVICES

- .1 Agriculture and Agri-Food Canada (AAFC) requires the services of an Engineering firm experienced in Civil (Hydro-technical) design, Geotechnical/Foundation design, and Environmental services acting in the capacity of the coordinating Engineer of Record, together with a multi-disciplinary team of sub-consultants for the provision of service required for this project.

### 1.1.2 PROJECT INFORMATION

Project Information		
.1	Project Title:	Engineering Services for Final Design and Rehabilitation of Highfield Dam
.2	Project Location:	Highfield Dam, Rush Lake, Saskatchewan
.3	Project Number:	01R11-150205
.4	User Department:	Agriculture and Agri-Food Canada (AAFC)
.5	User Department Representative:	Serena Ward
.6	PWGSC Contracting Officer:	Hank Bartkiewicz
.7	AAFC Project Manager:	Serena Ward

## 1.2 BACKGROUND INFORMATION

### 1.2.1 NEED

- .1 To complete the final engineering designs and tender packages for a complete rehabilitation at Highfield Dam.
  - .1 Final engineering designs and tender packages are required for all components of the Highfield Dam Project except the **West** Low Level Outlet works.
- .2 To undertake a geotechnical site investigation so as to identify and confirm suitable borrow and waste areas
- .3 To provide environmental and regulatory advice
- .4 To provide tender and construction monitoring services during and post construction for the Highfield Dam Project
  - .1 Construction monitoring services includes environmental monitoring and assistance in obtaining all required approvals to complete the works and post-construction documentation.

### 1.2.2 USER DEPARTMENT

- .1 The User Department referred to throughout the TOR is Agriculture and Agri-Food Canada.

### 1.2.3 EXISTING CONDITIONS

- .1 Highfield Dam, originally constructed in 1942, is located on Rush Lake Creek (NE 36-15-11 W3M) approximately 28km east of the City of Swift Current, SK; 10.4km south of the Hamlet of Rush Lake, SK; and, 8 km south of the TransCanada Highway. The dam creates a reservoir with a total storage of 14,895dam<sup>3</sup> and flooded area of 517ha (at FSL). The basin upstream of the dam has a gross drainage area of 450 km<sup>2</sup> and an effective drainage area of 372 km<sup>2</sup>. The components of the project include a 1040m long earthfill embankment, a 20m wide earthcut spillway around the west abutment, a low level outlet located near the west abutment of the embankment (West LLO) and a low level outlet located near the east abutment of the embankment (East LLO). The downstream water users include the Herbert



and Rush Lake Irrigation Projects.

- .2 The Dam Consequence Classification is “Significant”, as established in 2011. This corresponds to loss of life – none; downstream economic damages by flooding - \$7.5 M; other economic losses - \$0.5 M.
- .3 AAFC’s internal dam safety program, supplemented by additional, external consultant assessments determined that there is a number of potential dam safety deficiencies associated with Highfield Dam as follows
  - .1 Inadequate freeboard allowance;
  - .2 Inadequate spillway (outlet) capacity to safely route, attenuate and discharge the Inflow Design Flood deemed appropriate for this dam;
  - .3 Insufficient factors of safety regarding the embankment stability consistent with CDA Dam Safety Guidelines;
  - .4 Inadequate provisions in the design and construction of the embankment for proper seepage control measures; and
  - .5 Concrete elements of the conduits and gatewells of both east and west low level outlet having structural capacity below structural design codes.
- .4 AAFC commissioned an external consultant to develop a feasibility level solution to these issues, estimate costs and develop a delivery schedule recognizing environmental and operational constraints; construction constraints and AAFC departmental cash flow constraints. The following are the main elements of that pre-design:
  - .6 Raise the embankment by approximately 0.9 m and incorporate flatter downstream slope and an extensive toe filter to address freeboard, stability and seepage control issues;
  - .7 Strengthen the West LLO and gatewell by inserting a grouted liner and replacing the control gate (*note this work was initiated under a separate contract in 2014*);
  - .8 Construct a new service spillway on the east abutment. The works, known as the East Spillway & Low Level Outlet, will include a drop inlet pipe spillway constructed in combination with a concrete gatewell and low level intake pipe which discharges into the barrel of the drop inlet conduit;
  - .9 Enhance the earth spillway, now referred to as the West Spillway. The proposed enhancements include: a fuse plug near the entrance, a riprap and gabion structure at the spillway outfall to the Herbert Main canal, and a gabion and rock side channel spillway to convey water to the downstream flood plain;
  - .10 Decommission the existing East LLO following completion of construction of other components;
  - .11 Raise a section of the local RM road which crosses the upper end of the reservoir;
  - .12 Apply best management practices through the design and construction to address potential adverse environmental effects; and
  - .13 Comply with applicable regulatory requirements.

#### 1.2.4 CONSTRAINTS AND CHALLENGES

- .1 The Consultant will be required to become familiar with the project site and obtain local information as required.
- .2 All site visits, after contract award, must be arranged through the Departmental Representative
- .3 All Work must comply with good Surveying and Design Practices for water infrastructure design and construction and meet all applicable Codes and Standards.



- .4 The designs and construction must allow for normal operations at Highfield Dam to continue, as well the project must be kept in partial operation prior to or during construction (i.e. any unexpected flood waters must be able to be stored or passed).
- .5 Diligent cost estimating, scheduling and cost control is required.

### 1.2.5 PROJECT DELIVERY APPROACH

- .1 This project will use a design-bid-build approach.

## 1.3 SUMMARY OF SERVICES

### 1.3.1 GENERAL

- .1 Goals
  - .1 AAFC requires professional engineering services to complete the final engineering designs and tender packages for the Highfield Dam Project. These services include a geotechnical investigation in order to identify/confirm appropriate borrow and waste areas. The consultant shall also provide all related construction monitoring services which includes environmental monitoring and assistance in obtaining all required approvals to complete the works.
- .2 Design Intent and Performance
  - .1 The final design must be carried out in accordance with the Highfield Dam – Pre-Design Report and these Terms of Reference. The work shall be done in such a way that it:
    - .1 Is effective and efficient,
    - .2 Meets current Codes, Standards and guidelines,
    - .3 Minimizes long-term maintenance costs through provision of suitable corrosion prevention and durability features, and
    - .4 Uses industry proven materials and avoid experimental materials.
- .3 Sustainability
  - .1 Adheres to all required regulatory approvals

### 1.3.2 CONSULTANT TEAM

- .1 Expertise and relevant experience requirements for this project are as follows:
  - .1 Hydrology/Hydraulic Design for water infrastructure systems
  - .2 Geotechnical and Foundation Analysis and Design for water infrastructure systems
  - .3 Construction monitoring including geotechnical testing specialists
  - .4 Environmental and regulatory specialists

### 1.3.3 ENGINEERING WORK

- .1 Engineering services will consist of two phases:
  - .1 Phase A: Required Services - Final Engineering Design and Tender Package Creation for remaining components PLUS Engineering Services during and post Construction of West Spillway and Toe Berm
  - .2 Phase B: Option to Extend Services– Engineering Services during and post construction of Embankment, East Spillway and low level outlet and RM road raise
- .2 **Phase A: Required Services, Final Engineering Design and Tender Package creation for all components plus construction management services of the West Spillway and Toe Berm**
  - .1 AAFC requires that the final design and tender packages be delivered in the following order:



Task 1: **Toe Berm**

Task 2: **West Spillway**

Task 3: **Embankment**

Task 4: **East spillway and Low Level Outlet**

Task 5: **RM road raise**

- .2 Construction of the **West Spillway** and the **Toe Berm** will be planned to occur during the 2015 construction season. Thus the consultant shall be required to provide the engineering services during construction and post-construction documentation of these components (end date March 31, 2016)
- .3 **Phase B: Option to Extend Services – Construction Management Services for Embankment, East Spillway and low level outlet and RM road raise**
  - .1 AAFC plans on constructing the remaining components (Embankment raise, East spillway and low level outlet and RM road raise) in the consecutive fiscal year; however AAFC first requires internal approvals. Thus if such approvals are received, AAFC will exercise the Option to Extend so that the consultant will provide the quality assurance services associated with construction and post-construction documentation of the remaining components. AAFC will notify the consultant of the implementation of this option on or before March 31, 2016.

## 1.4 SCHEDULE

### 1.4.1 GENERAL

- .1 The project is to be delivered, ready for acceptance and in accordance with the project milestones identified below.
- .2 Completion dates shown are relative to an assumed start date of **April 7, 2015**
- .3 Prepare a Project Schedule, in accordance with the milestone list.

### 1.4.2 ANTICIPATED MILESTONE DATES

Task	Deliverable	Deadline	Additional details
Start up (kick- off) meeting and site visit	Meeting minutes prepared by Consultant; an overall work plan, updated cost and schedule.	Within 2 weeks of contract award	Can be done via video or teleconference or at location mutually agreed upon.
Updated work plan	Detailed work plan including schedule of services. Provide a breakdown of estimated cash flow to AAFC to include engineering design services, construction oversight professional services and construction activities including environmental services and regulatory compliances.	Within 2 weeks of kickoff meeting	Provided in a combination of MS Word format and/or MS Project/Excel
Design and tender package for <b>toe berm</b>	Technical specifications must be compatible with the General Contract Provisions of PWGSC standards. Specifications are to be prepared to National Master Specification format.	<b>May 22 2015</b>	Copies provided in MS Word format and Adobe PDF. Drawings also provided in





	Drawings and reports shall be signed and sealed by professional engineers registered or licensed to practice in the Province of Saskatchewan. All drawings must be approved by AAFC and contain AAFC drawing number		AutoCAD
Design and tender package for <b>West Spillway</b>	Technical specifications must be compatible with the General Contract Provisions of PWGSC standards. Specifications are to be prepared to National Master Specification format. Drawings and reports shall be signed and sealed by professional engineers registered or licensed to practice in the Province of Saskatchewan. All drawings must be approved by AAFC and contain AAFC drawing number	June 30 2015	Copies provided in MS Word format and Adobe PDF Drawings also provided in AutoCAD
Geotechnical Investigation to identify borrow and waste areas	Drawings and reports shall be signed and sealed by professional engineers registered or licensed to practice in the Province of Saskatchewan. All drawings must be approved by AAFC and contain AAFC drawing number	July 15 2015	Final report to be provided in MS Word and Adobe PDF formats. Drawings depicting test holes locations and borrow and waste area delineations provided in AutoCAD.
Design and tender package for <b>embankment raise</b>	Technical specifications must be compatible with the General Contract Provisions of PWGSC standards. Specifications are to be prepared to National Master Specification format. Drawings and reports shall be signed and sealed by professional engineers registered or licensed to practice in the Province of Saskatchewan. All drawings must be approved by AAFC and contain AAFC drawing number	Sept.30 2015	Copies provided in MS Word format and Adobe PDF Drawings also provided in AutoCAD
Design and tender package for <b>East Spillway and Low Level Outlet</b> and design and tender package for <b>RM road raise</b>	Technical specifications must be compatible with the General Contract Provisions of PWGSC standards. Specifications are to be prepared to National Master Specification format. Drawings and reports shall be signed and sealed by professional engineers registered or licensed to practice in the Province of Saskatchewan. All drawings must be approved by AAFC and contain AAFC drawing number	March 31 2016	Copies provided in MS Word format and Adobe PDF Drawings also provided in AutoCAD



Construction Management services (engineering and environmental) for construction of <b>West Spillway and Toe Berm</b>	Refer to Sections 2.5-2.9 of Required Services	Ongoing until March 31 2016	Copies provided in MS Word format and Adobe PDF Drawings also provided in AutoCAD
OPTION TO EXTEND: Construction Management services (engineering and environmental) for construction of <b>Embankment Raise, East Spillway and RM Road Raise</b>	Refer to Sections 3.1 – 3.5 of Option to Extend Services	Ongoing until March 31 2017	Copies provided in MS Word format and Adobe PDF Drawings also provided in AutoCAD

## 1.5 EXISTING DOCUMENTATION

### 1.5.1 DOCUMENTS AVAILABLE FOR THE SUCCESSFUL PROPONENT (*CONSULTANT*)

- .1 AAFC has commissioned and/or undertaken a number of engineering and environmental studies which are pertinent to the work. Copies of all pertinent documentation will be made available to the *Consultant*. At a minimum the consultant can expect to review:
  - .1 Updated Flood frequency analysis of Highfield Dam (AAFC, November 21, 2007)
  - .2 Rare Plant, Wildlife, Fish and Habitat Assessments for the rehabilitation of Highfield Dam (KGS, 2010)
  - .3 Highfield Dam - Spillway Pre-Design Completion (Northwest Hydraulic Consultants in association with MDH Engineered Solutions, December 2011)
  - .4 Highfield Dam - Dam Classification and Hydro-Technical Study (Golder Associates, November 2011)
  - .5 Highfield Dam Embankment Foundation Assessment (Golder Associates, January 2012)
  - .6 Highfield Dam – Project Rehabilitation, Pre-Design Report (Golder Associates, March 2013) *herein referred to as the Pre-Design report*
  - .7 Highfield Dam – complete in-fill ground surveys (AAFC, 2013)
  - .8 Highfield Dam – Final design and rehabilitation of West Low Level Outlet (AMEC, 2014)
  - .9 Limited as-built drawings.

### 1.5.2 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*.

## 1.6 CODES, ACTS, STANDARDS, REGULATIONS

### 1.6.1 GENERAL





- 
- .1 The Work shall, unless otherwise specified, be designed, constructed, and commissioned in a manner which:
    - .1 Is compliant with all applicable federal, provincial, municipal, and regional laws, acts, regulations, and codes.
    - .2 Minimizes disruption and interference with operation of the site.
  - .2 Adherence to all applicable codes and standards and without limiting the generality of the foregoing, shall include the following:
    - .1 The Canadian Dam Association, Dam Safety Guidelines 2007,
    - .2 The Canadian Standards Association,
    - .3 Canadian Environmental Assessment Act 2012,
    - .4 The NRC National Building Code of Canada 2005,
    - .5 Canada Occupational Health and Safety Regulations,
    - .6 Canada Labour Code (including latest revisions of all regulations)
    - .7 American Society for Testing and Materials (ASTM)
    - .8 Local and/or municipal codes and bylaws
      - .1 In the event of a conflict between codes, the more stringent shall take precedence.

#### 1.6.2 PWGSC DOCUMENTS

- .1 In addition to applicable legislated codes- and standards, the PWGSC documents listed below apply to this project:
  - .1 The PWGSC General Procedures and Standards Document (P&S)
    - .1 The P&S document delineates such requirements as;
    - .2 In the case of a conflict between the two documents, the requirements of the TOR override the P&S Document.
  - .2 Commissioning Manuals and Guidelines as further described in the P&S document.



## 2 REQUIRED SERVICES - FINAL ENGINEERING DESIGNS AND TENDER PACKAGE CREATION FOR ALL COMPONENTS PLUS CONSTRUCTION MANAGEMENT SERVICES FOR WEST SPILLWAY AND TOE BERM

### 2.1 GENERAL REQUIREMENTS

#### 2.1.1 PHASES

- .1 Final Engineering Designs and Tender Documents for Construction of all remaining project components
  - .1 Design brief
  - .2 66% Submission
  - .3 99% Submission
  - .4 100% Submission
- .2 Environmental Services and Regulatory Compliance
- .3 Geotechnical Investigation.
- .4 Tender Services
- .5 Construction Support Services (Non-resident).
- .6 Construction Support Services on site.
- .7 Post Construction Services.

### 2.2 FINAL ENGINEERING DESIGNS AND TENDER DOCUMENTS FOR CONSTRUCTION

#### 2.2.1 GENERAL

- .1 The object of this phase is two-fold:
  - .1 To develop the final engineering designs which consist of drawings and other documents to describe the scope, quality and cost of the project in sufficient detail to facilitate design approval, confirm code compliance and User Requirements.
  - .2 To translate the final design documents into construction drawings and specifications, to communicate design intentions and to guide the Contractor.
- .2 The final engineering designs and tender documents for the project shall be prepared in the following order:
  - .1 Toe berm
  - .2 West spillway
  - .3 Earth-fill embankment
  - .4 East spillway and low-level outlet
  - .5 Raise of a local, rural municipality (RM) road (herein referred to as RM road raise)
- .3 The Consultant shall follow the above-mentioned order when preparing designs and tender documents and shall seek authorization from AAFC before commencing each design and tender package
- .4 AAFC is in the process of procuring granular materials, designated for use in the toe berm at Highfield Dam. Therefore, for the **toe berm design**, the consultant shall use the following gradation as the free-draining granular material:

Sieve Size	Percent Passing by Mass
25.4 mm	100%



---

19.05 mm	90% - 100%
4.75 mm	70% - 100%
2.00 mm	55% - 100%
0.840 mm	30% - 75%
0.250 mm	0% - 40%
0.105 mm	0% - 15%
0.075 mm	0% - 5%

---

### 2.2.2 SCOPE AND ACTIVITIES

- .1 Conduct a site visit to the project to become familiar with the layout of existing works and to assist in establishing contractor and consultant camp, plant, and storage areas
  - .1 Site visit can be done in conjunction with the project kick-off meeting
- .2 Review previous reports, background materials, data and information so as to:
  - .1 Provide comments on the hydraulic, structural and general engineering designs as outlined in the Pre-Design Report
  - .2 Identify any short comings and/or possible optimisation opportunities to AAFC
  - .3 Analyse the constructability of the Project and advise on the construction phasing and process and duration
- .3 Undertake all required engineering analysis and investigations necessary to complete the final engineering designs
- .4 Develop the final engineering designs and tender packages for all hydraulic, structural and general engineering components.
  - .1 Prepare a design brief to document the method and procedures for the planned work.
  - .2 After receiving approval from AAFC on design brief, the Consultant shall prepare construction documents in accordance with the General P&S Document.
    - .1 Drawings shall have sufficient detail to clearly identify the site, all the elements in the design and allow for accurate quantities to be established
    - .2 Drawings and other reports shall be signed and sealed by Professional engineers registered or licenced to practice in the Province of Saskatchewan
    - .3 Specifications are to be prepared to the National Master Specification (NMS) format
    - .4 Update Cost Estimate, Project schedule and risk analysis to identify any conflicts and/or items that will need to be addressed with respect to scope, quality, schedule, cost, source of material.
- .5 Final engineering designs and tender packages shall be completed in a fashion which allows AAFC to manage the reservoir normally to the extent practical and cost effective. Designs and tender packages shall be completed in the following order:
  - .1 Toe berm
  - .2 West Spillway
  - .3 Earth-fill embankment raise
  - .4 East Spillway and Low Level Outlet
  - .5 RM Road raise

### 2.2.3 DELIVERABLES

- .1 Design Brief:
  - .1 Shall be submitted for each component of Highfield Dam with sufficient time for review and acceptance by the Departmental Representative. The Design Brief will contain at a minimum:



- 
- .1 An Executive Summary
    - .2 Necessary sections to document and present the items listed in the Scope and Activities section,
    - .3 Engineering Calculations confirming the suitability/adequacy of design elements chosen
  - .2 Construction Documents, to be submitted for each project component:
    - .1 66% complete Construction Documents.
      - .1 A Class “B” Estimate
      - .2 An updated project schedule
      - .3 Construction Drawings
        - .1 Drawings should reflect 66% completeness with all Plan, Elevation, Details, and Sections shown.
      - .4 Specifications
        - .1 Index to specifications
        - .2 Draft Division Specifications
    - .2 99% complete Construction Documents, fully coordinated as if ready for tender.
      - .1 This submission incorporates all revisions required by the review of the previous submission.
      - .2 The Consultant shall submit documents to the AAFC Departmental Representative, local municipality, or any other Authority Having Jurisdiction.
      - .3 The submittal shall include:
        - .1 A Class “A” Estimate
        - .2 An unit price table,
        - .3 An updated project schedule
        - .4 Construction Drawings, should reflect 99% completeness with a complete design without any unfinished details.
        - .5 Complete Specifications, complete with all sections and thoroughly coordinated with the Drawings.
        - .6 Written response to AAFC comments on previous submittal.
    - .3 Final (100%) Construction Documents ready for tendering.
      - .1 This submission incorporates all revisions required by the review of the previous submission.
      - .2 The Consultant shall submit documents to the AAFC Project Manager, local municipality, or any other Authority having jurisdiction.
      - .3 The submittal shall include:
        - .1 An updated Class ‘A’ cost estimate.
        - .2 A unit price table
        - .3 An updated project schedule
        - .4 Construction Drawings & Specifications
        - .5 As per the General P&S Document..
          - .1 Response to AAFC written comments of previous submittal
          - .2 Advise the PWGSC Departmental Representative of all issues raised by other officials and all Consultants’ responses.

## **2.3 ENVIRONMENTAL SERVICES AND REGULATORY COMPLIANCE**

### **2.3.1 GENERAL**



- .1 The rehabilitation of Highfield Dam is to be undertaken in compliance with the Canadian Environmental Assessment Act (2012), as well as other applicable federal and provincial acts and legislation.
- .2 Previous studies identified on-site environmental data and recommended a number of environmental best management practices (BMPs) that shall be incorporated in the various design and construction aspects of the project. Some of these BMPs will require approvals from various regulators and a pre-construction survey, as identified in the pre-design report
- .3 The Saskatchewan Water Security Agency (WSA) is the provincial regulatory body responsible for the approval to construct or modify water control structures and the issuer of Aquatic Habitat Protection Permits. At this point, AAFC foresees a requirement for a regulatory submission for an “Approval to construct or modify water control structures” from Saskatchewan Water Security Agency and for an “Aquatic Habitat Protection Permit”.

### 2.3.2 SCOPE AND ACTIVITIES

- .1 In undertaking the design, the Consultant shall:
  - .1 Review existing information about on-site environmental data. This includes, but is not limited to:
    - .1 Rare plant, Wildlife, Fish and Habitat Assessments for the Rehabilitation of the Highfield Dam Project (KGS 2010)
    - .2 Highfield Dam – Project Rehabilitation – Pre-Design Report (Golder 2013);
  - .2 Incorporate the appropriate and applicable environmental best management practices, as outlined by the pre-design report and/or as otherwise stipulated by appropriate federal and provincial regulatory agencies into the final design, tender specifications and construction contract requirements
  - .3 Provide advice to AAFC on any environmental aspect that will require monitoring in the final construction contract(s) and/or post-construction
  - .4 Assist AAFC in preparing submissions to the WSA and other regulatory agencies in the form of overall drawings showing the principle features of the work and advice on completing the application process correctly.
    - .1 Note AAFC will remain responsible for making any required applications
  - .5 Undertake any required environmental monitoring activities prior to, during and post-construction, as determined from the above-mentioned activities.

### 2.3.3 DELIVERABLES

- .1 A workplan outlining the required environmental monitoring activities required for each portion of construction.

## 2.4 GEOTECHNICAL INVESTIGATION

### 2.4.1 GENERAL

- .1 The object of the Geotechnical Investigation is to identify and confirm suitable borrow areas and waste areas for toe berm and embankment construction.
  - .1 Note the Geotechnical Investigation Report will be made available to future construction Contractors to assist them in preparing a tender for work.
- .2 The Consultant must obtain written authorization/approval of the Geotechnical Investigation Plan from the Departmental Representative before proceeding with Field Work and subsequent activities.
- .3 Geotechnical Investigation shall be planned to occur as soon as possible in **2015** in order to identify as early as possible borrow and waste locations and extents.



---

## 2.4.2 SCOPE AND ACTIVITIES – GEOTECHNICAL

- .1 The Scope of Work listed below is not considered exhaustive and modifications will be considered. All revisions or modifications to the Scope of Work must be justified by the Proponent and approved by AAFC prior to implementing.
- .2 Study Corridor for investigation – borrow and waste areas should be located **within the vicinity of Canada-owned lands** and as close as possible to the construction site in order to optimize travel distances. Geological maps and aerial photography interpretation should be used to locate and identify potential borrow sources as a first step.
- .3 Field program – should include test drilling and sampling **at a minimum of five (5) locations**. Standard Penetration Tests will be recorded at appropriate intervals. Following completion of drilling and sampling the test hole shall be backfilled. All holes shall be logged on site with emphasis on recording soil conditions and depth of groundwater encountered. Disturbed samples representative of in-situ soil gradation shall be taken at each significant change in soil strata or otherwise at one (1) m intervals. Samples shall be packaged and stored so that moisture content determinations of in-situ conditions can be undertaken. The Geotechnical Consultant is to record the location of all test holes in UTM (zone 13) – NAD 83 coordinates and the geodetic elevation of the existing ground surface at the top of the test holes. Wooden markers/lath shall be left in the field indicating the location of the test hole. The consultant shall be responsible for obtaining all necessary permissions from land owners to access the proposed site.
- .4 Storage, identification, transport and subsequent Laboratory testing of samples shall be carried out. Laboratory Testing shall consist of visual laboratory identification, determination of moisture content, sieve and hydrometer analysis, Atterberg Limits and Proctor tests. Enough Laboratory testing shall be performed to confirm visual field classification and likely strengthens of the soil type(s)/horizons encountered.

## 2.4.3 DELIVERABLES

- .1 A plan (ACAD Drawing and PDF format) showing the location of all test holes drilled.
- .2 Drawings should indicate extent of borrow area, depth of assumed borrow extraction, suitability of borrow for placement and a reclamation plan
- .3 A detailed soils log sheets shall be prepared for each test hole and information and data provided shall be descriptive or factual in nature i.e. “auger refusal”, “cohesionless”, “rock”, “moisture content above Plastic Limit”
- .4 The Geotechnical Investigation Report shall detail the investigation methodology; its findings and recommendations for borrow and waste areas. It shall also include a reclamation plan for any areas disturbed by removal of borrow.

## 2.5 TENDER SERVICES

### 2.5.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with and during the tender period, including the approval of equals
- .2 For the period extending until March 31, 2016, tender services will be provided for the construction of:
  - .1 Toe berm
  - .2 West Spillway

### 2.5.2 SCOPE AND ACTIVITIES

- .1 When requested, the Consultant will be required to;
  - .1 Provide the Departmental Representative with information required by bidders to interpret construction documents.





- .2 Prepare addenda, in response to all questions within two (2) business days during the bidding period and submit to Departmental Representative,
- .3 Attend pre-tender site visit,
- .4 If AAFC decides to re-tender the project, or any specific tender package, provide full services to the Departmental Representative,
- .5 During Bid Review and Analysis, assist the Departmental Representative, as required, by analyzing and reconciling any differences between pre-tender estimates and submitted bids.

## 2.6 CONSTRUCTION SUPPORT SERVICES (NON-RESIDENT)

### 2.6.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with the construction phase and ensure the quality, budget and schedule of the project.
- .2 For the period extending until March 31, 2016, construction support services (non-resident) will be provided for the construction of:
  - .1 Toe berm
  - .2 West Spillway

### 2.6.2 SCOPE AND ACTIVITIES

- .1 The Consultant shall:
  - .1 Conduct a minimum of six (6) site visits during construction activities, to monitor performance of the Contractor and review work at regular intervals to determine conformity with the contract documents and keep *Departmental Representative* informed of work progress,
    - .1 Reject unsatisfactory work,
    - .2 Provide written reports.
  - .2 Authorize special tests, inspections and minor works that do not impact project cost and schedule,
  - .3 Review shop drawings and/or other submittals of reinforcing steel, gates, miscellaneous metals- to ensure they reflect the intention of the final design and provide copies to the Departmental Representative.
    - .1 The review should identify any errors before the construction works start.  
Approve shop drawings using an appropriate shop drawing stamp
  - .4 Review concrete and grout mix designs submitted by construction contractors to ensure compliance with applicable codes and intended final structural designs and provide review comments when submissions are inadequate or incomplete
  - .5 Review cast-in-place concreting and grouting procedures, forming requirements, reinforcement placement and detailing to ensure the work is being undertaken in compliance with the final engineering designs as well as applicable codes, standards, procedures and protocols.
  - .6 Provide an updated project schedule, based on Contractor's submissions and on-site performance
  - .7 Interpret contract documents as required and provide any additional drawings or specifications required to clarify, interpret or supplement Construction Documents,
  - .8 Furnish supplemental instructions to the Contractor with reasonable promptness or in accordance with a schedule for such instructions agreed to by AAFC and the Contractor,



- 
- .9 Review and comment on various documents such as Contractor's Progress Claims and updated schedules,
  - .10 Offer timely technical advice time on all disputes and claims between AAFC and the Contractor,
  - .11 Recommend the amounts owing to the Contractor based on work progress,
  - .12 Prepare and sign the Certificate of Substantial Completion,
  - .13 For Changes to the work:
    - .1 Prepare CCN's and COs, to be issued by the *Departmental Representative*.
  - .14 For Cost Estimating Services:
    - .1 Evaluate change orders; claims, work completed and cash flow.
    - .2 After issue of contract provide details for evaluating the project's cost performance
  - .15 For Scheduling Services:
    - .1 Review contractor's monthly schedule report and report findings and recommendations to the Departmental Representative for further discussion with the Contractor.

## 2.7 CONSTRUCTION SUPPORT SERVICES ON SITE (RESIDENT)

### 2.7.1 GENERAL

- .1 The object of the Resident Site services is to ensure the presence of the Consultant's representative on site to inspect, co-ordinate, measure for payment and monitor certain aspects of the work during the construction of the project, and liaise with the Contractor, AAFC and other agencies as appropriate to the work.
- .2 It is anticipated that AAFC will provide some of the resident engineering services during construction. Specifically, AAFC will
  - .1 Provide on-going or day-to-day on-site inspection services to monitor the overall progress of the work,
  - .2 Maintain daily and weekly construction progress reports and provide copies of same to the consulting engineer
  - .3 Provide the consultant with specific inspection reports of unusual conditions that may require follow-up by the consultant
  - .4 Communicate with Contractor's site superintendent any issue of non-conformance to the plans and specifications as identified by the consultant or consultant's resident technical staff
  - .5 Provide general monitoring of environmental best management practices on the construction site in accordance with the plans and specifications, seek clarification from the consultant on issues of potential non-compliance and communicate confirmed non-compliance issues to the Contract for rectification
  - .6 Review Contractor's monthly progress claim and prepare request for contract payments in accordance with Government of Canada requirements
  - .7 Conduct surveys of a minor nature to verify Contractor construction is in accordance with plans and specifications
  - .8 Ensure that the Contractor is aware that the work is to be undertaken in compliance with Federal Labour Code and Provincial Occupational Health and Safety
  - .9 Ensure that the Contractor is recording details of the construction necessary to modify contract drawings to Record Drawings



**.10 Provide all site office facilities, sanitary facilities and safety management provision for both AAFC and the consultant's resident engineering staff**

- .3 For the period extending until March 31, 2016, construction support services on-site (resident) will be provided for the construction of:
  - .1 Toe berm
  - .2 West Spillway

## **2.7.2 SCOPE AND ACTIVITIES**

- .1 The Consultant will be required to provide resident inspection, co-ordination and monitoring during the construction work for all services except those previously mentioned which will be undertaken by AAFC. In addition, the Departmental Representative may delegate additional responsibilities and/or other time periods as directed by the Departmental Representative, subject to Consultant's agreement
- .2 The Consultant Resident Site representative shall:
  - .1 Be directly responsible to the Consultant.
  - .2 Become thoroughly familiar with the Contract documents and be aware of all Provincial and Municipal standards for the health and safety of construction workers
  - .3 Become thoroughly familiar with the requirements of the Consultant's Terms of Reference and Project responsibilities of Others, which relate to his/her services.
  - .4 Ensure that all technicians performing testing have at least 2 years related experience in materials testing. In the case of concrete testing, the Consultant shall have a qualified testing technician on site for each and every pouring day
- .3 Specific Duties and Responsibilities shall include, but not necessarily be limited to:
  - .1 Arranging for and carrying out all necessary environmental monitoring activities
  - .2 Arranging for and carrying out all necessary field-testing of equipment installed
  - .3 Arranging for and carrying out all necessary field and laboratory testing for quality assurance with respect to the materials identified in the borrow source
  - .4 Arranging for and carrying out all necessary field and laboratory testing for concrete and/or grout materials, gradation analysis for pervious materials; compaction testing of impervious materials; and rock riprap gradation assessment
  - .5 Undertaking laboratory and field tests of concrete and grout in accordance with the requirements of the most recent versions of CSA Standard A23.2, except as otherwise noted herein or in the project specifications, by personnel certified under CSA Standard A283
  - .6 Performing laboratory testing to assess concrete quality at a testing laboratory facility certified in accordance with the requirements of CSA Standard A283
  - .7 As a minimum the concrete testing shall include:
    - .1 slump, air content, and temperature for each truck-load delivered to the site;
    - .2 one set of three compressive strength test cylinders for each 60 m<sup>3</sup> or less of concrete placed, with a minimum of one set per placing day, sampled and tested in accordance with the most recent versions of CSA A23.1 at the age of 7 days (one cylinder) and 28 days (two cylinders).
    - .3 one additional cylinder per placing day cast as a companion to a set of (three) strength test cylinders, when cold weather concreting conditions predominate, as determined by the Resident Engineer, which will be cured on site under the same conditions as the concrete in place
    - .4 The AAFC Resident Engineer and the Consultant is to be informed as expeditiously as possible of the results of the field and laboratory tests.



---

Complete set of records of the test results shall be maintained on a daily basis and be available to the Consultant. These records will become the property of Canada

- .8 Investigating, reporting on and advising AAFC on unusual circumstances which may arise during construction
- .9 Ensuring that the Contractor is recording details of the construction necessary to modify contract drawings to Record Drawings
- .10 Undertake a final project inspection, deficiency identification and rectification; recommend final certificate of completion and warranty inspection post construction

## 2.8 POST CONSTRUCTION SERVICE

### 2.8.1 GENERAL

- .1 The purpose of this phase is to support the Departmental Representative in obtaining all final documents required for project close out
- .2 For the period extending until March 31, 2016, post construction services will be provided for the construction of:
  - .1 Toe berm
  - .2 West Spillway

### 2.8.2 SCOPE AND ACTIVITIES

- .1 Project Close-out Services
  - .1 Revise documentation to reflect all changes, revisions and adjustments after completion of commissioning
    - .1 Documentation of the design and construction of the project shall be done in sufficient detail to form part of the project records which may become part of subsequent Dam Safety Reviews conducted or commissioned by AAFC
    - .2 Procedures and documentation for the on-going operation, maintenance and surveillance for the project components
  - .2 Prepare record drawings and specifications based on Contractor's and Resident Site representatives as-builts; Provide 5 hard copies and digital pdf version of record drawings.
  - .3 Prepare and submit Final Certificate of Completion, Post-occupancy inspection report and final records Project Plan.
  - .4 Participate in Lessons Learned workshops if requested
- .2 Warranty Services
  - .1 Monitor and certify rectification of deficiencies before expiry of warranties
  - .2 Monitor environmental and life safety system checks to be carried out by Contractor/O&M staff before expiration of warranties
  - .3 Sign off on the Final Completion of the construction contract,
  - .4 Participate in warranty inspections with *Departmental Representative* and Contractor
  - .5 Provide warranty deficiency list,
  - .6 Provide Final Warranty Review report.

### 2.8.3 DELIVERABLES

- .1 Warranty Deficiency List
- .2 Final Certificate
- .3 Construction report



- .4 As-Built and Record Drawings and As-Built Specifications.
- .5 Sign-off on Warranty

## **2.9 PROJECT MANAGEMENT SERVICES**

### **2.9.1 GENERAL**

- .1 In addition to adhering to the general project administration requirements contained in Section 2.1 of the P&S document, the Consultant shall manage the service contract using appropriate Project Management principles and practices

### **2.9.2 MEETINGS**

- .1 Budget to include the minimum:
  - .1 Project start-up meeting with AAFC staff,
  - .2 A minimum of six (6) site meetings during active Construction period, interspersed with bi-weekly teleconferences
  - .3 On site Substantial/Final Completion Inspection
  - .4 On site Warranty Inspection

### **2.9.3 CONSULTANT RESPONSIBILITIES**

- .1 The responsibilities identified in this section are in addition to the requirements in the P&S Document
- .2 The Consultant shall:
  - .1 Ensure that the team at all times includes qualified professionals with extensive relevant experience, capable of providing all required services eligible to work in the Province of Saskatchewan.
  - .2 Include systems and processes to manage and resolve issues in a timely manner
  - .3 Include systems and processes to identify, manage and mitigate project risks both in the delivery of the engineering services but also for the actual construction of project components
  - .4 Facilitate regular, effective and timely communication with AAFC to ensure that AAFC is aware of the design, problem area, concerns or assumption. Ensure that issues requiring AAFC participation are identified in a timely manner and supported by appropriate and detailed documentation to outline the scope of the issue as well as proposed method(s) of resolution
  - .5 Project start up (kick-off) meeting
    - .1 To be held within two (2) weeks after award of the service contract at which time detailed work plan including schedule of services will be presented and discussed
    - .2 Prior to, or within one (1) week after start-up meeting, provide a breakdown of estimated cash flow to AAFC to include engineering design services, construction oversight professional services and construction activities including environmental services and regulatory compliances
  - .6 During the design and geotechnical investigation phases
    - .1 Attend Meetings/Chair meetings as required
    - .2 Record the issues and decisions
    - .3 Prepare and distribute /agenda/minutes within two (2) working days of the meeting
    - .4 Ensure sub-consultants attend required meetings
    - .5 Provide monthly status reports to AAFC progress and quality of the work. Status reports to include accomplishments since last report, anticipated



accomplishments in next reporting period and a listing of outstanding issues

.7 During the construction phase

- .1 Provide storage for testing devices such as concrete testing equipment or nuclear density testing equipment
  - .2 Attend all meetings and provide site inspection services (chair meetings as required)
  - .3 Ensure sub-consultants (if used) provide site inspection services and attend required meetings
  - .4 Record the issues and decisions
  - .5 Prepare and distribute /agenda/minutes within two (2) working days of the meeting
- .8 The Consultant does NOT have authority to change the work or the price of the Construction Contract. Change Orders approved by the Departmental Representative must be issued to cover all changes, including those NOT affecting the cost of the Project, such as schedule, substitutions, etc.

#### 2.9.4 TECHNICAL AND FUNCTIONAL REVIEWS

- .1 The Consultant in its scheduling is to allow for each submission a two (2) week turnaround time for AAFC review/comments.

#### 2.9.5 DELIVERABLES

- .1 The schedule of service and estimated cash flow should contain as a minimum:
  - .1 Timelines associated with each engineering design and tender package creation, construction schedule, post-construction documentation

### 3 OPTION TO EXTEND SERVICES – CONSTRUCTION MANAGEMENT SERVICES FOR EMBANKMENT, EAST SPILLWAY AND LOW LEVEL OUTLET AND RM ROAD RAISE

#### 3.1 TENDER SERVICES

##### 3.1.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with and during the tender period, including the approval of equals
- .2 Optional tender services would commence post-March 2016, and be provided for:
  - .1 Embankment raise
  - .2 East Spillway and low level outlet
  - .3 RM road raise

##### 3.1.2 SCOPE AND ACTIVITIES

- .1 When requested, the Consultant will be required to;
  - .1 Provide the Departmental Representative with information required by bidders to interpret construction documents.
  - .2 Prepare addenda, in response to all questions within two (2) business days during the bidding period and submit to Departmental Representative,
  - .3 Attend pre-tender site visit,





- .4 If AAFC decides to re-tender the project, or any specific tender package, provide full services to the Departmental Representative,
- .5 During Bid Review and Analysis, assist the Departmental Representative, as required, by analyzing and reconciling any differences between pre-tender estimates and submitted bids.

## 3.2 CONSTRUCTION SUPPORT SERVICES (NON-RESIDENT)

### 3.2.1 GENERAL

- .1 The object of this phase is to support the Departmental Representative with the construction phase and ensure the quality, budget and schedule of the project
- .2 Optional construction support services (non-resident) would commence post-March 2016, and be provided for:
  - .1 Embankment raise
  - .2 East Spillway and low level outlet
  - .3 RM road raise

### 3.2.2 SCOPE AND ACTIVITIES

- .1 The Consultant shall:
  - .1 Conduct a minimum of six (6) site visits during construction activities, to monitor performance of the Contractor and review work at regular intervals to determine conformity with the contract documents and keep *Departmental Representative* informed of work progress,
    - .1 Reject unsatisfactory work,
    - .2 Provide written reports.
  - .2 Authorize special tests, inspections and minor works that do not impact project cost and schedule,
  - .3 Review shop drawings and/or other submittals of reinforcing steel, gates, miscellaneous metals. to ensure they reflect the intention of the final design and provide copies to the Departmental Representative.
    - .1 The review should identify any errors before the construction works start. Approve shop drawings using an appropriate shop drawing stamp
  - .4 Review concrete and grout mix designs submitted by construction contractors to ensure compliance with applicable codes and intended final structural designs and provide review comments when submissions are inadequate or incomplete
  - .5 Review cast-in-place concreting and grouting procedures, forming requirements, reinforcement placement and detailing to ensure the work is being undertaken in compliance with the final engineering designs as well as applicable codes, standards, procedures and protocols .
  - .6 Provide an updated project schedule, based on Contractor's submissions and on-site performance
  - .7 Interpret contract documents as required and provide any additional drawings or specifications required to clarify, interpret or supplement Construction Documents,
  - .8 Furnish supplemental instructions to the Contractor with reasonable promptness or in accordance with a schedule for such instructions agreed to by AAFC and the Contractor,
  - .9 Review and comment on various documents such as Contractor's Progress Claims and updated schedules,



- 
- .10 Offer timely technical advice time on all disputes and claims between AAFC and the Contractor,
  - .11 Recommend the amounts owing to the Contractor based on work progress,
  - .12 Prepare and sign the Certificate of Substantial Completion,
  - .13 For Changes to the work:
    - .1 Prepare CCN's and COs, to be issued by the *Departmental Representative*.
  - .14 For Cost Estimating Services:
    - .1 Evaluate change orders; claims, work completed and cash flow.
    - .2 After issue of contract provide details for evaluating the project's cost performance
  - .15 For Scheduling Services:
    - .1 Review contractor's monthly schedule report and report findings and recommendations to the Departmental Representative for further discussion with the Contractor.

### 3.3 CONSTRUCTION SUPPORT SERVICES ON SITE (RESIDENT)

#### 3.3.1 GENERAL

- .1 The object of the Resident Site services is to ensure the presence of the Consultant's representative on site to inspect, co-ordinate, measure for payment and monitor certain aspects of the work during the construction of the project, and liaise with the Contractor, AAFC and other agencies as appropriate to the work.
- .2 It is anticipated that AAFC will provide some of the resident engineering services during construction. Specifically, AAFC will
  - .1 Provide on-going or day-to-day on-site inspection services to monitor the overall progress of the work,
  - .2 Maintain daily and weekly construction progress reports and provide copies of same to the consulting engineer
  - .3 Provide the consultant with specific inspection reports of unusual conditions that may require follow-up by the consultant
  - .4 Communicate with Contractor's site superintendent any issue of non-conformance to the plans and specifications as identified by the consultant or consultant's resident technical staff
  - .5 Provide general monitoring of environmental best management practices on the construction site in accordance with the plans and specifications, seek clarification from the consultant on issues of potential non-compliance and communicate confirmed non-compliance issues to the Contract for rectification
  - .6 Review Contractor's monthly progress claim and prepare request for contract payments in accordance with Government of Canada requirements
  - .7 Conduct surveys of a minor nature to verify Contractor construction is in accordance with plans and specifications
  - .8 Ensure that the Contractor is aware that the work is to be undertaken in compliance with Federal Labour Code and Provincial Occupational Health and Safety
  - .9 Ensure that the Contractor is recording details of the construction necessary to modify contract drawings to Record Drawing
  - .10 Provide all site office facilities, sanitary facilities and safety management provision for both AAFC and the consultant's resident engineering staff



- 
- .3 Optional construction support services on-site (resident) would commence post-March 2016, and be provided for:
    - .1 Embankment raise
    - .2 East Spillway and low level outlet
    - .3 RM road raise

### 3.3.2 SCOPE AND ACTIVITIES

- .1 The Consultant will be required to provide resident inspection, co-ordination and monitoring during the construction work for all services except those previously mentioned which will be undertaken by AAFC. In addition, the Departmental Representative may delegate additional responsibilities and/or other time periods as directed by the Departmental Representative, subject to Consultant's agreement
- .2 The Consultant Resident Site representative shall:
  - .1 Be directly responsible to the Consultant.
  - .2 Become thoroughly familiar with the Contract documents and be aware of all Provincial and Municipal standards for the health and safety of construction workers
  - .3 Become thoroughly familiar with the requirements of the Consultant's Terms of Reference and Project responsibilities of Others, which relate to his/her services.
  - .4 Ensure that all technicians performing testing have at least 2 years related experience in materials testing. In the case of concrete testing, the Consultant shall have a qualified testing technician on site for each and every pouring day
- .3 Specific Duties and Responsibilities shall include, but not necessarily be limited to:
  - .1 Arranging for and carrying out all necessary environmental monitoring activities
  - .2 Arranging for and carrying out all necessary field-testing of equipment installed
  - .3 Arranging for and carrying out all necessary field and laboratory testing for quality assurance with respect to the materials identified in the borrow source
  - .4 Arranging for and carrying out all necessary field and laboratory testing for concrete and/or grout materials, gradation analysis for pervious materials; compaction testing of impervious materials; and rock riprap gradation assessment
  - .5 Undertaking laboratory and field tests of concrete and grout in accordance with the requirements of the most recent versions of CSA Standard A23.2, except as otherwise noted herein or in the project specifications, by personnel certified under CSA Standard A283
  - .6 Performing laboratory testing to assess concrete quality at a testing laboratory facility certified in accordance with the requirements of CSA Standard A283
  - .7 As a minimum the concrete testing shall include:
    - .1 slump, air content, and temperature for each truck-load delivered to the site;
    - .2 one set of three compressive strength test cylinders for each 60 m<sup>3</sup> or less of concrete placed, with a minimum of one set per placing day, sampled and tested in accordance with the most recent versions of CSA A23.1 at the age of 7 days (one cylinder) and 28 days (two cylinders).
    - .3 one additional cylinder per placing day cast as a companion to a set of (three) strength test cylinders, when cold weather concreting conditions predominate, as determined by the Resident Engineer, which will be cured on site under the same conditions as the concrete in place
    - .4 The AAFC Resident Engineer and the Consultant is to be informed as expeditiously as possible of the results of the field and laboratory tests. Complete set of records of the test results shall be maintained on a daily



basis and be available to the Consultant. These records will become the property of Canada

- .8 Investigating, reporting on and advising AAFC on unusual circumstances which may arise during construction
- .9 Ensuring that the Contractor is recording details of the construction necessary to modify contract drawings to Record Drawings
- .10 Undertake a final project inspection, deficiency identification and rectification; recommend final certificate of completion and warranty inspection post construction

### 3.4 POST CONSTRUCTION SERVICE

#### 3.4.1 GENERAL

- .1 The purpose of this phase is to support the Departmental Representative in obtaining all final documents required for project close out
- .2 Optional post construction services would commence post-March 2016, and be provided for:
  - .1 Embankment raise
  - .2 East Spillway and low level outlet
  - .3 RM road raise

#### 3.4.2 SCOPE AND ACTIVITIES

- .1 Project Close-out Services
  - .1 Revise documentation to reflect all changes, revisions and adjustments after completion of commissioning
    - .1 Documentation of the design and construction of the project shall be done in sufficient detail to form part of the project records which may become part of subsequent Dam Safety Reviews conducted or commissioned by AAFC
    - .2 Procedures and documentation for the on-going operation, maintenance and surveillance for the project component
      - .1 This shall include rating tables and curves to allow AAFC Project Operators to determine flow release criteria for various reservoir elevation
  - .2 Provide training session to AAFC Dam Safety and Operations staff on the safe operation of the control gate, and general operation of the rehabilitated outlet works. Guidance shall also be provided on the frequency of reading required instrumentation for the embankment including a description of various alert level for Dam Safety Emergency Response Plans
  - .3 Prepare record drawings and specifications based on Contractor's and Resident Site representatives as-builts; Provide 5 hard copies and digital pdf version of record drawings.
  - .4 Prepare and submit Final Certificate of Completion, Post-occupancy inspection report and final records Project Plan.
  - .5 Participate in Lessons Learned workshops if requested
- .2 Warranty Services
  - .1 Monitor and certify rectification of deficiencies before expiry of warranties
  - .2 Monitor environmental and life safety system checks to be carried out by Contractor/O&M staff before expiration of warranties
  - .3 Sign off on the Final Completion of the construction contract,
  - .4 Participate in warranty inspections with *Departmental Representative* and Contractor



- .5 Provide warranty deficiency list,
- .6 Provide Final Warranty Review report.

### 3.4.3 DELIVERABLES

- .1 Warranty Deficiency List
- .2 Final Certificate
- .3 Construction report
- .4 As-Built and Record Drawings and As-Built Specifications.
- .5 Sign-off on Warranty

## 3.5 PROJECT MANAGEMENT SERVICES

### 3.5.1 GENERAL

- .1 In addition to adhering to the general project administration requirements contained in Section 2.1 of the P&S document, the Consultant shall manage the service contract using appropriate Project Management principles and practices

### 3.5.2 MEETINGS

- .1 Budget to include for the following:
  - .1 A minimum of six (6) site meetings during active Construction period, interspersed with bi-weekly teleconferences
  - .2 On site Substantial/Final Completion Inspection
  - .3 On site Warranty Inspection

### 3.5.3 CONSULTANT RESPONSIBILITIES

- .1 The responsibilities identified in this section are in addition to the requirements in the P&S Document
- .2 The Consultant shall:
  - .1 Ensure that the team at all times includes qualified professionals with extensive relevant experience, capable of providing all required services eligible to work in the Province of Saskatchewan.
  - .2 Include systems and processes to manage and resolve issues in a timely manner
  - .3 Include systems and processes to identify, manage and mitigate project risks both in the delivery of the engineering services but also for the actual construction of project components
  - .4 Facilitate regular, effective and timely communication with AAFC to ensure that AAFC is aware of the design, problem area, concerns or assumption. Ensure that issues requiring AAFC participation are identified in a timely manner and supported by appropriate and detailed documentation to outline the scope of the issue as well as proposed method(s) of resolution
  - .5 During the construction phase
    - .1 Provide storage for testing devices such as concrete testing equipment or nuclear density testing equipment
    - .2 Attend all meetings and provide site inspection services (chair meetings as required)
    - .3 Ensure sub-consultants (if used) provide site inspection services and attend required meetings
    - .4 Record the issues and decisions
    - .5 Prepare and distribute /agenda/minutes within two (2) working days of the meeting



- .6 The Consultant does NOT have authority to change the work or the price of the Construction Contract. Change Orders approved by the Departmental Representative must be issued to cover all changes, including those NOT affecting the cost of the Project, such as schedule, substitutions, etc.

#### **3.5.4 TECHNICAL AND FUNCTIONAL REVIEWS**

- .1 The Consultant in its scheduling is to allow for each submission a two (2) week turnaround time for AAFC review/comments.