



**Fort George NHSC
Dry Ditch Palisade Installation – FII Stage II
Terms of Reference September 2017
PRO001504-003**

1.0 Purpose

The object of this project is to remove existing and replace with new, dry ditch palisade walls in five bastions at Fort George National Historic Site as per drawings.

2.0 Site Location

The site includes Fort George National Historic Site.
51 Queens Parade, Niagara on the Lake, Ontario

3.0 Site Description

Fort George National Historic Site is a historic military structure at Niagara-on-the-Lake, Ontario, that was the scene of several battles during the War of 1812. The fort consists of earthworks and palisades, along with internal structures, including an officer's quarters, blockhouses to accommodate other ranks and their families, and a stone powder magazine, which is the only original building on the site.

4.0 Description

This specification covers the requirements for the furnishing of all labour, materials, tools, equipment, plant, power, systems, transportation and supervision necessary to completely perform the work, as described by the drawings and specifications.

The work includes, but is not necessarily confined to the following:

1. Dismantling of all existing exterior bastion dry ditch palisades with exception to the north-east bastion and rebuilding with new material as described and as shown on the drawings.
2. Preform locates for utilities has been carried out prior to commencement of work.
3. Excavation and subsequent backfilling of soil as required to perform the work.
4. Installation of anchor posts encased in concrete (32MPa type C2 concrete or acceptable alternate).
5. Installation of Geotextile Prior to installation of drain.
6. Draining bed of Granular B to be installed underneath palisade.

The site is a National Historic Site recognized in Canada and must be treated as such. Excavation beyond the immediate work area as outlined by the scope of work is strictly prohibited. Buildings on site cannot be used.

4.1 Drawings: See Attached

5.0 Definitions

Unless the context clearly indicates otherwise, the following definitions apply:

1. *Bastion* - earth mounds which contain cannon emplacements.
2. *Palisade* - exterior wall of the fort extending between bastions.
3. *Picket* - individual vertical logs which make up the palisades.



Parks
Canada

Parcs
Canada

4. *Dry Ditch Palisade* - typically palisade/fence at the locations where the bastion and palisade meet. For the north east bastion the dry ditch palisade extends around the complete exterior of the bastion as shown on drawings.
5. *Ribband* - the horizontal rails along the palisades used to keep pickets in alignment.

6.0 Access to the Site

1. Work required will take place on the exterior of the Fort. Interior site access will not be necessary. If required, Contractor to obtain approval from Departmental Representative or designate.
2. Secure the work area. At minimum install continuous 2.4m construction fencing around areas of work complete with warning signs. This includes the construction site work area and staging area to prevent public access to any areas where construction activities occur.

7.0 Fire Safety Requirements

Comply with the following Human Resources and Social Development Canada (HRSDC), Fire Commissioner of Canada (FCC) standards. These are available from HRSDC or may be downloaded from the internet at: www.hrsdc.gc.ca.

1. No. 301: Standard for Construction Operations.
2. No. 374: Fire Protection Standard for General Storage (Indoor and Outdoor).

8.0 Standards

1. Reference is made to CGSB, ASTM, CSA and other national and international standards. These standards when quoted form an integral part of and are to be read in conjunction with the specification as if reproduced herein.
2. Standards and guidelines for the Conservation of Historic Places, 2nd edition.

9.0 Protection of the Work

Protect the work from damage by ice, water and/or other adverse climatic conditions.

10.0 Responsibilities of Contractor

1. Contractor to provide proof of good standing with the Ontario Construction Safety Association once the contract is awarded and requested by Departmental Representative or designate.
2. Contractor is responsible to verify all dimensions on site and report discrepancies to the Departmental Representative prior to commencement of work.
3. Contractor responsibility to attend/host bi-weekly project construction meetings and including preparing and distributing meeting minutes.
4. Contractor must submit technical data sheets and SDS for all products to be installed as part of the completed work. Contractor must not proceed with work until approval of products is provided by Departmental Representative.

11.0 Responsibilities of Parks Canada

Provide on-site direction by Parks Canada.

Provide access to locations associated with project.

Provide on-site review of work to ensure conformance with project documents.

Provide written site instructions to address contractor requests for information.

Provide to locations outside the project area of work.

Attend project meetings.



12.0 Schedule

Provide within 10 working days after Contract award, schedule showing start date, dates for submissions (if required), material lists and samples, anticipated progress stages and date of final completion of work within time period required by Contract documents.

Provide within 10 working days after Contract award, gantt chart construction schedule for work, indicating anticipated progress stages within time of completion. Show proposed beginning and completion dates of activities. When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

13.0 Use of Site Facilities

1. Execute work with least possible interference or disturbance to the normal use of premises and visitor and staff movement. Access to all buildings must be maintained at all times. Make arrangements with Departmental Representative to facilitate work as stated.
2. Contractor will be responsible for any snow removal required in the area of the work. Contractor will be instructed where to dump snow on site.

14.0 Products

14.1 Acceptance of Materials

1. Where materials and equipment are specified to CSA, CGSB, or similar standards, submit written request to the Departmental Representative for approval of the relevant items.
2. Include with each request relevant test data bearing a recent date of test, manufacturer's details, and any other document which will substantiate its quality and conformance.
3. Cost of additional work and modifications to the design due to use of alternatives will be borne by the contractor.
4. Do not use materials or products in the work until written approval has been received from the Departmental Representative.

14.2 Rectification of Existing Surfaces and Materials

1. Repair, replace and refinish, to the Departmental Representative's approval, existing surfaces and items damaged in connection with the work, at the contractor's expense.
2. The repaired, replaced and refinished items to be at least equal to those that existed immediately before damage occurred.

14.3 Securing Work Area

1. Secure the work areas in each stage in an approved manner.
2. After award, Contractor to meet with Project Manager to establish acceptable storage and staging areas for the work.

15.0 Health and Safety Requirements

15.1 References

1. Province of Ontario:
 - a. Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter 0.1 as amended, and Regulations for Construction Projects, 0. Reg. 213/91 as amended.
 - b. Workplace Safety and Insurance Act, 1997.
 - c. Municipal statutes and authorities.



15.2 Submittals

Submit site-specific Health and Safety Plan:

Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

1. Results of safety and health risk or hazard analysis for site tasks and operations.
2. Provide a Fire Safety Plan, specific to the work location. The plan shall be coordinated with, and integrated into, the existing Facility Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Facility Emergency Procedures and Evacuation Plan.
3. Contractor's and Sub-contractors' Safety Communication Plan.
4. Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Facility Emergency Response requirements and procedures provided by Departmental Representative.

15.3 Work Permit

Obtain all permits related to project prior to commencement of work.

Contractor to submit copy of notice of project to Departmental Representative.

15.4 Compliance Requirements

Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

15.5 Work Stoppage

1. Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for work.
2. Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop work for health and safety considerations.
3. Contractor to advise departmental representative of all significant work stoppages.

16.0 Environmental Procedures

16.1 Description

This section describes requirements for the protection of the environment that apply to the work. These requirements apply to all sections of this specification, without limiting the conditions and approvals imposed by statute.

16.2 Sediment, Dust, and Erosion Protection

1. Before starting work that will create dust or debris, (such as improvements to access, wood sawing, excavation, backfilling, etc.), install effective mitigation techniques for sediment, dust, debris and erosion control to the satisfaction of Departmental Representative. Maintain these protective measures at all times, including shut down periods.
2. Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

16.3 Operation and Maintenance of Equipment

1. Equipment and heavy machinery used shall meet or exceed all applicable emission requirements.



2. Provide drip trays to prevent the discharge of oil, grease, antifreeze, or any other materials into the ground.
3. Leave machinery running only while in actual use, except where extreme temperatures prohibit shutting machinery down.
4. Conduct all vehicle/equipment maintenance and refueling over impermeable/absorptive material situated at a designated site where all precautions have been made to prevent the discharge of oil, grease, antifreeze or any other materials into the ground. The contractor will be responsible for all costs of cleaning up any spills to the satisfaction of the Departmental Representative.

16.4 Fires

Fire and burning of rubbish on site are not permitted.

16.5 Disposal of Waste

1. The existing timber has been pressure treated with creosote and is considered hazardous industrial waste. Handling, storing and transportation of must be carried out as specified.
2. Creosoted timber will be stored on-site at a location designated by the Departmental Representative.
3. Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
4. Do not bury rubbish and waste materials on-site.

16.6 Drainage

1. Should water be encountered in excavations construct sedimentation basin, sized and located by Departmental Representative to ensure effective settling of suspended solid sand that water discharged into municipal sanitary sewer meets Niagara-On-The-Lake Sanitary Sewer By-law 767B-08. Keep excavations and site free from water.
2. Do not pump water containing suspended materials into waterways, sewer or drainage systems.
3. Provide temporary drainage and pumping as required to keep excavations clear of water.

16.7 Clean Up

1. Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.
2. Permit no undue amounts of debris, trash or garbage to accumulate.
3. Do not bury rubbish on site.
4. Separate and recycle all materials that can be recycled.
5. Dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner by taking them to a special designated waste facility. Do not dump these into waterways, storm or sanitary sewers.
6. Ensure all emptied containers are sealed and stored safely for disposal away from the public and particularly children.
7. Spills:
 - a. Report all spills immediately to the Departmental Representative and to the Ontario Spills Action Centre (Telephone No. 1-800-268-6060).
 - b. Using appropriate safety precautions, collect liquid or solidify liquid with an inert, non-combustible material and remove for disposal.



- c. Be responsible for all costs of cleaning up any spills to the satisfaction of the Departmental Representative.
- d. Must have an environmental emergency response plan in place and a spill kit readily available.
- e. Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.

17.0 Cast-In-Place Concrete

17.1 Reference Standards

- 1. Canadian Standards Association (CSA)
 - a. CAN/CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
 - b. CAN/CSA-A3000-08, Cementitious Materials Compendium.
 - c. CAN/CSA-G30.18-M92(R2007), Billet-Steel Bars for Concrete Reinforcement.
- 2. Reinforcing Steel Institute of Canada (RSIC)
 - a. RSIC-2004, Reinforcing Steel Manual of Standard Practice.

17.2 Construction Quality Control

- 1. The concrete mix designs are the responsibility of the Contractor.
- 2. Submit details of proposed quality control procedures for the Departmental Representative's approval.
- 3. Departmental Representatives will identify and pay for the services of an accredited testing agent, frequency of testing will be determined following approval of the contractors' quality control procedures. The contractor is responsible to inform the testing agency 24 hours prior to placement of concrete and provide access to testing agent for the purpose of gathering samples and conducting field test.

17.3 Placing Concrete

- 1. Place concrete continuously from start to finish:
 - a. At such rates as to permit satisfactory placing and compaction - plan the work and use such methods and performance rates as to allow no cold joints and/or honeycomb;
 - b. During clement weather or with protection;
 - c. During daylight hours;
 - d. Without unscheduled construction joints.
- 2. Do not commence placing concrete until the Departmental Representative has inspected and approved forms, bed, conveying, spreading consolidation and finishing equipment, and curing and protective methods.
- 3. Contractor to ensure curing of concrete in with CAN-CSA A23.1 Type 1 basic curing procedures.

18.0 Metal Fabrications

18.1 References

Canadian Standards Association (CSA International)

- 1. CSA G164-M92 (R2003), Hot Dipped Galvanizing of Irregularly Shaped Articles, Metals and Metal Products.



18.2 Materials

All steel materials to be hot dip galvanized to CAN/CSA G164-M92 (R2003).
Carriage bolts and spikes to be galvanized steel.

18.3 Damaged Galvanizing

Touch up damaged areas of galvanizing with 2 coats of galvaform as manufactures by Fosroc International or acceptable alternate in accordance with manufacturer's requirements where directed by Departmental Representative.

19.0 Rough Carpentry

19.1 Lumber Material

1. Ribband to be select structural grade Douglas fir or acceptable alternate.
 - a. Rough sawn full size specified.
2. Palisade/pickets to be common grade Red Pine or acceptable alternate.
3. All timber to be pressure treated with ACQ in accordance with CSA 080-08 use category UC4.1. Treatment to be done to refusal. The timber is **NOT** to be incised.

19.2 Workmanship

1. Fabricate work square, true, straight and accurate to required dimensions.

19.3 Installation

Layout and dimensions shown are approximate only. Fabricate and erect using dimensions measured in the field.

19.4 Erection

1. Cuts, holes and exposed end grains above grade to be treated with Clear Wood Preservative. Apply by brush in accordance with manufacturer's requirements.

20.0 Excavating, Trenching and Backfilling

20.1 Protection

1. Prevent damage to existing structures, utilities, trees, landscaped areas and site appurtenances which were to remain. Make good any damage.
2. Verify locations of utilities shown on the drawings prior to commencing any excavation.
3. There are significant archaeological resources on site. Departmental Representative will monitor work to ensure no archaeological resources are damaged. Be aware that work could be stopped in the area where such resources are found and redirected elsewhere until situation is resolved to satisfaction of Departmental Representative.

20.2 Backfill Materials

Granular Loose backfill: Granular "B" to Ontario Standard Specification (OPSS) 1001 and 1010

20.3 Geotextile

Geotextile material: Terrafix, non-woven 200R with Apparent Opening Size of 0.3 mm. or equal as approved by Departmental Representative.



21.0 Soil Preparation Services

21.1 Subsoil Preparation

1. Grading on the areas to be top soiled must conform to drawings, specifications, or as otherwise specified.
2. Debris and stones of 2" or more must be removed from the subsoil to a depth of 8".

21.2 Topsoil Material and Application

1. Topsoil shall be free of tree roots, stumps, building material, and trash and shall be free of stones larger than 1.5" in any dimension. Topsoil shall be free of quack grass rhizomes and nut-like tubers of nut sedge.
2. Grading: The topsoil shall be uniformly distributed on the designated areas. Any irregularities in the surface resulting from top soiling or other operations shall be corrected in order to prevent the formation of depressions or crowns. Topsoil shall not be placed while in a frozen or muddy condition or when sub-grade is excessively wet.
3. Clean up: After topsoil has been spread and the final grades approved, the area shall be cleared of all grade stakes, surface trash and other objects. Paved areas over which hauling operations are conducted shall be cleaned as soon as the job is completed.

22.0 Hydroseeding Services

22.1 Administrative Requirements

1. Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.
2. Scheduling
 - a. Schedule hydraulic seeding to coincide with preparation of soil surface.
 - b. Schedule hydraulic seeding using grass mixtures and mixtures containing #1 Kentucky bluegrass.

22.2 Action and Informational Submittals

Submit in writing 2 days prior to commencing work:

1. Volume capacity of hydraulic seeder in litres.
2. Amount of material to be used per tank based on volume.
3. Number of tank loads required per hectare to apply specified slurry mixture per hectare.

22.3 Warranty

For seeding, a 12 month warranty period from time of acceptance applies. The Contractor hereby warrants that seeding will remain free of defects for 12 months.

22.4 Materials

1. Seed: "Canada pedigreed grade" in accordance with Government of Canada Seeds Act and Regulations.

Grass mixture: "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".

1. Mixture Composition:

- a. Rye
- b. Fescue
- c. Kentucky Bluegrass

2. Mulch: specially manufactured for use in hydraulic seeding equipment, non-toxic, water activated, green colouring, free of germination and growth inhibiting factors with following properties:



Type I mulch:

1. Made from wood cellulose fibre.
 2. Organic matter content: 95% plus or minus 0.5%
 3. Value of pH: 6.0.
 4. Potential water absorption: 900%
3. Tackifier: water dilutable, liquid dispersion.
 4. Water: free of impurities that would inhibit germination and growth.
 5. Fertilizer:
 - a. To Canada "Fertilizers Act" and Regulations.
 - b. Complete synthetic, slow release with 35% of nitrogen content in water-insoluble form.

22.5 Protection of Existing Conditions

1. Protect structures, signs, guide rails, fences, plant material, utilities and other surfaces not intended for spray.
2. Immediately remove any material sprayed where not intended and also when directed by departmental Representative.

22.6 Preparation of Surfaces

1. Do not perform work under adverse field conditions such as wind speeds over [10] km/h, frozen ground or ground covered with snow, ice or standing water.
2. Fine grade areas to be seeded free of humps and hollows.
 - a. Ensure areas are free of deleterious and refuse materials.
3. Cultivated areas identified as requiring cultivation to depth of [25] mm.
4. Ensure areas to be seeded are moist to depth or [150] mm before seeding.
5. Obtain Departmental Representative's approval of grade and topsoil depth before starting to seed.

22.7 Preparation of Slurry

1. Charge required water into seeder. Add material into hydraulic seeder under agitation. Pulverize mulch and charge slowly into seeder.
2. After materials are in seeder and well mixed, charge tacktifier into seeder and mix thoroughly to complete slurry.

22.8 Slurry Application

1. Hydraulic seeding equipment:
 - a. Slurry tank.
 - b. Agitation system for slurry to be capable of operating during charging of tank and during seeding, consisting of recirculating of slurry and/or mechanical agitation method.
2. Slurry mixture applied per hectare.
 - i. Seed: Grass mixture 75 kg.
 - ii. Mulch Type I, 1150 kg.
 - iii. Fertilizer: 150 kg.
3. Apply slurry uniformly, at optimum angle of application for adherence to surfaces and germination of seed.
 - i. Using correct nozzle for application.
 - ii. Using hoses for surfaces difficult to reach and to control application.



Parks
Canada

Parcs
Canada

4. Blend application 300 mm into adjacent grass areas or sodded areas to for uniform surfaces.
5. Re-apply where application is not uniform.
6. Remove slurry from items and areas not designated to be sprayed.

22.9 Acceptance

Seeded areas will be accepted by Departmental Representative provided that seeded areas are free of rutted, eroded, bare or dead spots.

23.0 Restrictions

Vehicle access is restricted when the site is open

Site is Historically Significant and precaution shall be shown when accessing grounds area.

Buried artifacts, the remains and evidence of ancient persons and peoples, and any objects of historic value and worth remain the property of the crown, any and all such objects shall be protected and immediately brought to the knowledge of the Project Manager

Archaeologists or designate may be on site to monitor work to ensure no archaeological resources are damaged. Advise project manager and receive direction regarding protection of such resources should any be discovered by either archaeology or the contractor. In such a case the contractor should be prepared to stop work on the area affected and redirect work elsewhere until the issue is resolved to the Project Managers satisfaction.

The gates in existing palisade wall are also emergency entrances and should not be blocked or restricted in any way.

24.0 Property Damage

The contractor will be required to repair any damage to and any other property caused as a result of work carried out.

25.0 Reference Documents

Reference Parks Canada Standards and Guidelines

<http://www.historicplaces.ca/media/18072/81468-parks-s+g-eng-web2.pdf>