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SPECIFICATION PACKAGE
FORT GEORGE NHSC, PARKS CANADA
Roadway Washed Concrete Contract
Pathways and Accessibility Project



**Specifications
Fort George NHSC
Roadway Washed Concrete Contract
Pathways and Accessibility Project PRO0000809**

1.0 Purpose

To supply all labour, equipment and supervision to prepare and install washed concrete to existing path system as per attached drawings and specifications. Contractor is expected to adhere to the Ontario Provincial Standards, washed concrete installation to match existing exterior pathways.

2.0 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.

3.0 Responsibilities of Contractor

The contractor must be in good standing with Ontario Construction Safety Association

4.0 Responsibilities of Parks Canada

Provide on-site direction by Parks Canada Project Manager or Designate.

5.0 Schedule

The contractor must coordinate work with Project Manager or Designate.

Schedule to be submitted to PCA before commencing work on site in the form of a GANT chart with defined start and end date.

6.0 Restrictions

1. Vehicle access is restricted when the site is open
2. Be aware of the firing of cannons and rifles during interpretation program
3. The Site is historically significant and precaution will be shown when accessing grounds area.
4. The site is a National Historic Site recognized in Canada and must be treated as such. Excavation beyond the immediate work area as outlined in the drawing is strictly prohibited. Buildings on site cannot be used.
5. The project is located within a National Historic Site of Canada, therefore, it is essential all existing features remain as found. Consequently, standards for environmental protection and for visual aesthetics of final product shall be of a quality standard. Contract limits shall be strictly adhered to and Contractor is to take special care to minimize damage and disruption as well as, protect existing features. The Departmental Representative or Designate is to be notified immediately if any historic or natural resources are located during construction.

8.0 Reference Documents

Reference Parks Canada Standards and Guidelines

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

PART 1 - GENERAL

1.1 Submittals

- .1 Submit to Departmental Representative or designate copies of the following documents, including updates:
 - .1 Site Specific Health and Safety Plan.
 - .2 Name and qualifications of person to be retained full time as H&S Co-ordinator.

1.2 Compliance Requirements

- .1 Comply with the Occupational Health and Safety Act for the Province of Ontario, and the Occupational Health and Safety Act Regulations made pursuant to the Act.
- .2 Comply with Canada Labour Code Part II, and the Canada Occupational Safety and Health Regulations made under Part II of the Canada Labour Code.
- .3 Observe and enforce construction safety measures required by:
 - .1 National Building Code of Canada;
 - .2 Provincial Worker's Compensation Board;
 - .3 Municipal statutes and ordinances.
- .4 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.
- .5 A copy of the Canada Labour Code Part II may be obtained by contacting:

Canadian Government Publishing
Public Works & Government Services Canada
Ottawa, Ontario, K1A 0S9
Tel: (819) 956-4800 (1-800-635-7943)
Publication No. L31-85/2000 E or F)

- .6 Maintain Workers Compensation Coverage for duration of Contract. Submit Letter of Good Standing to Departmental Representative upon request.

1.3 Responsibility

- .1 Be responsible for health and safety of persons on site, of property and for protection of persons and public circulating adjacent to work operations to extent that they may be affected by conduct of the Work.
- .2 Enforce compliance by all workers, sub-contractors and other persons granted access to work site with safety requirements of Contract Documents, applicable Federal, Provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.4 Site Control and Access

- .1 Control work site and entry points to construction areas.
 - .1 Delineate and isolate construction areas from other areas of site Facility by use of appropriate means.
 - .2 Post notices and signage at entry points and at other strategic locations identifying entrance onto site to be restricted to authorized persons only.
 - .3 Signage must be professionally made, bilingual in both official languages or display internationally understood graphic symbols.
- .2 Approve and grant access to site only to workers and authorized persons.
 - .1 Immediately stop non-authorized persons from circulating in construction areas and remove from site.
 - .2 Provide site safety orientation to all persons before granting access. Advise of site conditions, hazards and mandatory safety rules to be observed on site.
- .3 Secure site at night time to extent required to protect against unauthorized entry.
- .4 Ensure persons granted access to site wear appropriate personal protective equipment (PPE) suitable to work and site conditions.
 - .1 Provide such PPE to authorized persons who require access to perform inspections or other approved purposes.

1.5 Protection

- .1 Carry out work placing emphasis on health and safety of the Public, Facility personnel, construction workers and protection of the environment.
- .2 Erect safety barricades, lights and signage on site to effectively delineate work areas, protect pedestrian and vehicular traffic around and adjacent to work and to create a safe working environment.
- .3 Should unforeseen or peculiar safety related hazard or condition become evident during performance of work, immediately take measures to rectify the situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.6 Filing Of Notice

- .1 File Notice of Project and other Notices with Provincial authorities prior to commencement of Work.

1.7 Permits

- .1 Post on site permits, licenses, compliance certificates specified in section 01 10 10.
- .2 Where particular permit or compliance certificate cannot be obtained at the required stage of work, notify Departmental Representative or designate in writing and obtain his/her approval to proceed before carrying out that portion of work.

1.8 Hazard Assessments

- .1 Conduct site specific health and safety hazard assessment before commencing project and during course of the work. Identify risks and hazards resulting from site conditions, weather conditions and work operations.
 - .1 Also, conduct assessment when the scope of work has been changed by Change Order and when potential hazard or weakness in current health and safety practices are identified by Departmental Representative or by an

authorized safety Representative.

- .2 Record results in writing and address in Health and Safety Plan.
- .3 Keep copy of all assessments on site.

1.9 Project/Site Condition

- .1 The following are known or potential project related health, environmental and safety hazards at site which must be properly managed if encountered during course of work:
 - .1 Existing hazardous products are:
 - .1 work within and adjacent to roadway
 - .2 work adjacent to streams and water
- .2 Above list shall not be construed as being complete and inclusive of potential health, and safety hazards encountered during work. Include above items into hazard assessment process.
- .3 Obtain from Departmental Representative, copy of MSDS Data sheets for existing hazardous products stored on site or used by Facility personnel.

1.10 Health And Safety Meetings

- .1 Attend pre-construction health and safety meeting conducted by Departmental Representative. Have following persons in attendance:
 - .1 Site Superintendent.
 - .2 Contractor's designated Health and Safety Site Supervisor.
 - .3 Health & Safety Site Coordinator.
 - .4 Departmental Representative will advise of date, time and location.

1.11 Health And Safety Plan

- .1 Develop written site-specific Project Health and Safety Plan, based on hazard assessments, prior to commencement of work.
 - .1 Submit copy to Departmental Representative within 5 calendar days of

- acceptance of bid.
- .2 Submit updates as work progresses.
- .2 Health and Safety Plan shall contain three (3) parts with following information:
- .1 Part 1 - Hazards: List of individual health risks and safety hazards identified by hazard assessment process.
 - .2 Part 2 - Safety Measures: engineering controls, personal protective equipment and safe work practices used to mitigate hazards and risks listed in Part 1 of Plan.
 - .3 Part 3a: Emergency Response: standard operating procedures, evacuation measures and emergency response in the occurrence of an accident, incident or emergency.
 - .1 Include response to all hazards listed in Part 1 of Plan.
 - .2 Evacuation measures to complement the Facility's existing Emergency Response and Evacuation Plan. Obtain pertinent information from Departmental Representative.
 - .3 List names and telephone numbers of officials to contact including:
 - .1 General Contractor and all Subcontractors.
 - .2 Federal and Provincial Departments as stipulated by laws and regulations and local emergency resource organizations, as needed based on nature of emergency or accident.
 - .3 Officials from Parks Canada Agency (PCA) and site Facility management. Departmental Representative or designate will provide list.
- .3 Part 3b - Site Communications:
- .1 Procedures used on site to share work related safety issues between workers, subcontractors, and General Contractor.
 - .2 List of critical tasks and work activities, to be communicated with the Facility Manager, which has risk of affecting tenant operations, or endangering health and safety of Facility personnel and the general public. Develop list in consultation with the Departmental Representative or designate.

- .4 Prepare Health and Safety Plan in a three column format, addressing the three parts specified above, as follows:

Column 1	Column 2	Column 3
Part 1	Part 2	Part 3a/3b
Identified Hazards	Safety Measures	Emergency Response & Site Communications

- .5 Develop Plan in collaboration with subcontractors. Address work activities of all trades. Revise and update Plan as Sub-contractors arrive on site.
- .6 Implement and enforce compliance with requirements of Plan for full duration of work to final completion and demobilization from site.
- .7 As work progresses, review and update Plan. Address additional health risks and safety hazards identified by on-going hazard assessments.
- .8 Post copy of Plan, and updates, on site.
- .9 Submission of the Health and Safety Plan, and updates, to the Departmental Representative or designate is for review and information purposes only. Departmental Representative or designate's receipt, review and any comments made of the Plan shall not be construed to imply approval in part or in whole of such Plan by Departmental Representative or designate and shall not be interpreted as a warranty of being complete and accurate or as a confirmation that all health and safety requirements of the Work have been addressed and that it is legislative compliant. Furthermore, Departmental Representative or designate's review of the Plan shall not relieve the Contractor of any of his legal

obligations for Occupational Health and Safety provisions specified as part of the Work and those required by provincial legislation.

1.12 Safety
Supervision and
Inspections

- .1 Designate one person to be present on site at all times, responsible for supervising health and safety of the Work.
 - .1 Person to be competent in Occupational Health and Construction Safety as defined in the Provincial Occupational Health and Safety Act.
- .2 Assign responsibility, obligation and authority to such designated person to stop work as deemed necessary for reasons of health and safety.
- .3 Conduct regularly scheduled informal safety inspections of work site on a minimum bi-weekly basis.
 - .1 Note deficiencies and remedial action taken in a log book or diary.
- .4 Keep inspection reports on site.

1.13 Training

- .1 Ensure that all workers and other persons granted access to site are competently trained and knowledgeable on:
 - .1 Safe use of tools and equipment.
 - .2 How to wear and use personal protective equipment (PPE).
 - .3 Safe work practices and procedures to be followed in carrying out work.
 - .4 Site conditions and minimum safety rules to be observed on site, as given at site orientation session.

1.14 Minimum Site
Safety Rules

- .1 Notwithstanding the requirement to abide by federal and provincial health and safety regulations, the following safety rules shall be considered minimum requirements to be obeyed by all persons granted site access:
 - .1 Wear personnel protective equipment (PPE) appropriate to function and task on site; the

minimum requirements being hard hat, safety footwear and eye protection.

.2 Immediately report unsafe activity or condition at site, near-miss accident, injury and damage.

.3 Maintain site in tidy condition.

.4 Obey warning signs and safety tags.

.2 Brief workers on site safety rules and on disciplinary measures to be taken by Departmental Representative for violation or non compliance of such rules. Post rules on site.

.3 The following actions or conduct by Contractor, workers and subcontractors will be considered as non conformance with the health and safety requirements of the contract for which a Non-Compliance Notification will be issued to the General Contractor by the Departmental Representative or designate:

.1 Failure to follow the minimum site safety rules specified above.

.2 Negligence resulting in serious injury or major property damage.

.3 Deliberate non-compliance with Federal and Provincial Acts and Regulations.

.4 Falsification of information in Workers Compensation Reports, safety reports and other health and safety related documents submitted to Departmental Representative or to Authority having jurisdiction.

.5 Possession of firearms on site.

.6 Possession of non-prescriptive illegal drugs or alcohol.

.7 Action, or lack thereof, resulting in the issuance of Warnings, Fines or Stop Work Orders from a Provincial Authority having jurisdiction.

.8 Violation of other specified health and safety rules and requirements as determined by Departmental Representative or designate.

.4 See elsewhere in this section for details on Non-Compliance Notifications and resulting disciplinary measures.

1.15 Accident

.1 Investigate and report the following incidents

Reporting

and accidents:

.1 Those as required by Provincial Occupational Health and Safety Act and Regulations.

.2 Injury requiring medical aid as defined in the Canadian Dictionary of Safety Terms-1987, published by the Canadian Society of Safety Engineers (C.S.S.E) as follows:

.1 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.2 Property damage in excess of \$5000.00,

.3 Interruption to Facility operations with potential loss to a Federal Dept. in excess of \$5000.00,

.4 Those which require notification to Workers Compensation Board or other regulatory agencies as stipulated by applicable law or regulations.

.2 Send written report to Departmental Representative for all above cases.

1.16 Tools and Equipment Safety

.1 Routinely check and maintain tools, equipment and machinery for safe operation.

.2 Conduct checks as part of site safety inspections. When requested, submit proof that checks and maintenance have been carried out.

.3 Tag and immediately remove from site items found faulty or defective.

1.17 Hazardous Products

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site. Post on site. Submit copy to Departmental Representative upon receipt.

1.18 Confined
Spaces

- .1 Carry out work in confined spaces in compliance with:
 - .1 Provincial Occupational Health and Safety Regulations and;
 - .2 Canada Occupational Safety and Health Regulations (COSH) made under the Canada Labour Code - Part II.
- .2 Conduct hazard assessment and address in Safety Plan before entering confined space.

1.19 Posting of
Documents

- .1 Post on site safety documentation as stipulated by Authorities having jurisdiction and as specified herein. Place in a common visible location.

1.20 Site Records

- .1 Maintain on site a copy of all health and safety documentation and reports specified to be produced as part of the work and received from authorities having jurisdiction.
- .2 Upon request, make available to Departmental Representative or designate and to other authorized safety representative for review. Provide copy when directed by Departmental Representative.

1.21 Non Compliance
and Disciplinary
Measures

- .1 Immediately address and correct health and safety violations and non-compliance issues.
- .2 Negligence or failure to follow occupational health and safety provisions specified in the Contract Documents and of those of applicable federal and provincial laws and regulations could result in disciplinary measures taken by the Departmental Representative against the General Contractor.
- .3 PCA uses a system of Non-Compliance Notifications and Disciplinary Measures on projects as follows:
 - .1 A non-compliance notification will be

issued to the General Contractor, by the Departmental Representative or designate, whenever there is a violation or failure to follow any of the project's occupational health and safety requirements by a worker, subcontractor or any other person to whom the Contractor has granted access to the work site.

.2 Non-Compliance notifications are progressive in nature resulting in increased disciplinary measures imposed depending on the frequency, nature and severity of the infraction.

.3 Disciplinary measures could include:

.1 Removal of the offending person or party from site;

.2 Financial penalties in the form of progress payment reduction or holdback assessments made against the Contract and;

.3 Taking the Work Out of Contractor's Hands in accordance with the General Conditions.

- .4 Departmental Representative or designate will make final decision as to what constitutes a violation and when to issue a Non-Compliance Notification.
- .5 Non-compliance Notifications issued by Departmental Representative or designate shall not be construed as to overrule or disregard warnings, orders and fines levied against Contractor by a regulatory agency having jurisdiction.
- .6 Details of the Non-Compliance Notification and Disciplinary Measures system will be provided by Departmental Representative or designate upon acceptance of bid and prior to commencement of work.
- .7 Further details on the disciplinary system will be provided at the pre-construction Health and Safety meeting.
- .8 Be responsible to fully brief workers and subcontractors on the operation and importance of this system.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

1 General

1.1 SECTION INCLUDES

- .2 Waste management plan.
- .3 Third party responsibilities.
- .4 Storage, Handling and Protection
- .5 Waste management plan implementation.
- .6 Disposal of waste.

1.2 WASTE MANAGEMENT PLAN

- .1 Draft Waste Management Plan: Within twenty (20) days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner.
- .2 Contractor to submit a Draft Waste Management Plan to the Department Representative for review, refer to sample attached to the end of this Section.
- .3 Draft Plan shall contain the following:
 - .1 Analysis of the proposed site waste generated, including types and quantities.
 - .2 Landfill Options: The name of the landfill where trash will be disposed, the applicable landfill fees, and the projected cost of disposing of Project waste in the landfill.
 - .3 Alternatives to Landfill: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling versus landfill each material; "Net" means that the following have been subtracted from the cost of separating and recycling:
 - .1 Revenue from the sale of recycled or salvaged materials, and
 - .2 Landfill tipping fees saved due to diversion of materials from the landfill. The list of these materials is to include, at minimum, the following materials:
 - .1 Cardboard.
 - .2 Clean dimensional wood.
 - .3 Beverage containers.
 - .4 Plastic buckets; waste can be reduced by using plastic lined cardboard dry packed materials instead of premixed moist packed materials where this option is available.
 - .5 Paint.
 - .7 Packaging, where recycling programs are available.
 - .8 Rigid plastic foam insulation, where recycling programs are available.
- .4 Resources for Development of Waste Management Plan: The following sources may be useful in developing the Draft Waste Management Plan:
 - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into Waste Management Plan.
 - .2 Recycling Economics Information: Information available to bidders with regards to estimating the value of recyclable costs is included in Waste Reduction Information for Bidders.

.5 Final Waste Management Plan: Once the Owner has determined which of the recycling options addressed in the draft Waste Management Plan are acceptable, the Contractor shall submit, within ten (10) calendar days a Final Waste Management Plan, containing the following:

- .1 Analysis of the proposed jobsite waste to be generated, including types and quantities.
- .2 Landfill options: The name of the landfill where trash will be disposed of, the applicable landfill tipping fees, and the projected cost of disposing of all Project waste in the landfill.
- .3 Alternatives to Landfill: A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.
- .4 Meetings: A description of the regular meetings to be held to address waste management, refer to Section 013100.
- .5 Materials Handling Procedures: A description of the means by which any waste materials identified in 1.5.3 above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
- .6 Transportation: A description of the means of transportation of the recyclable materials, whether materials will be site-separated and self-hauled to designated centres, or whether mixed materials will be collected by a waste hauler and removed from the site, and destination of materials.
- .7 Where requirements are more stringent than the specified waste management plan the contractor shall conform to the following policy:

In addition all waste will be qualified by type of material and its weight. At a minimum the following products must be recycled: beverage containers, clean dimensional wood, corrugated cardboard, glass, metals and plastic.

After acceptance of their project proposal and before starting work, contractors must submit to the Departmental Representative a partially completed Waste Management Form. The form must include a list of expected waste materials and the recycling facilities to which contractors will take the waste. Contractors must also identify any waste materials that cannot be recycled or reused and must be disposed of in a landfill. If the contractors believe that they will not be able to recycle at a minimum to 50% of the project waste, they must receive written exception prior to beginning work.

1.3 THIRD PARTY RESPONSIBILITY

- .1 Subcontractors shall cooperate fully with Contractor to implement the Waste Reduction Plan.
- .2 Failure to cooperate may result in the Owner not achieving their environmental goal requirements and may result in penalties being assessed by the Contractor to the responsible Subcontractors.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Store materials to be reused, recycled and salvaged in locations as directed by Consultant.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and

- deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.
- .7 Protect surface drainage, storm sewers, sanitary sewers, and utility services from damage and blockage.

1.5 WASTE MANAGEMENT PLAN IMPLEMENTATION

- .1 Manager: Contractor to designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- .2 Distribution: Contractor to distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor and the Departmental Representative.
- .3 Instruction: Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- .4 Separation facilities: Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- .5 Hazardous wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- .6 Application for Progress Payments: Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Project:

- .1 Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment.
- .2 The Summary shall be submitted on a form acceptable to the Owner and shall contain the following information:
 - .1 The amount in tonnes or cubic metres of material land filled from the Project,
 - .2 The identity of the landfill, the total amount of tipping fees paid at the landfill, and
 - .3 The total disposal cost. Include manifests, weight tickets, receipt, and invoices.
- .3 For each material recycled, reused, or salvaged from the Project, the amount tonnes or cubic metres, the date removed from the job site, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling each material.
- .4 Attach manifests, weight tickets, receipts, and invoices.

1.6 DISPOSAL OF WASTE

- .1 Burying of rubbish and waste materials is prohibited unless approved by authority having jurisdiction.
- .2 Disposal of waste into waterways, storm, or sanitary sewers is prohibited.

End of Section



Parks Canada Basic Impact Analysis

1. Pathway Accessibility and Lighting Improvements at Fort George National Historic Site

The project will take place around the existing roadways, pathways, and buildings from the visitor parking lot to the Visitor Centre (VC) and public washrooms, and into and around the interior of the fort (Appendix 1).

2. PROPONENT INFORMATION

Walter Willms
Technical Service Officer – Project Manager
Niagara National Historic Sites
PO Box 787, 26 Queen Street
Niagara-on-the-Lake, ON, L0S 1J0
905-468-1871
walter.willms@pc.gc.ca

3. PROPOSED PROJECT DATES

Planned commencement: August 2015
Planned completion: October 2015

4. INTERNAL PROJECT FILE

FGNHS-2015-03

5. PROJECT DESCRIPTION

Several roadway/pathway accessibility and lighting improvements are scheduled at Fort George National Historic Site. The majority of the project works will occur between August and October 2015, with the remainder taking place in the near future. The contractors will: harden the existing roadways/pathways with a new single stone chip seal asphalt surface or washed concrete; remove a redundant entrance path from the north side bus parking lot to the where it meets the town's trail; grade and landscape (seed) this old path area; maintain/widen portions of the pathways to a ~1.8m (6') width (i.e. widen near the 1815 Cottage and Powder Magazine) and roadways to ~2.4m (8'); redesign, extend, and reduce the slope angle of the pathway down to the Powder Magazine; remove the old lighting system components; and supply, service, and install the electrical system for the new LED lights along the roadway from the parking lot to the fort and onto several of the buildings (Appendix 1). This project will allow the national historic site (NHS) to: meet accessibility standards and guidelines for the roadway/pathway system; reduce the footprint at the site's entrance area; support the new and growing list of events/programs offered during the evening hours; reduce power usage/costs and intrusion on heritage resources; and improve site conditions (i.e. drainage), maintenance operations (i.e. snow and ice removal), occupational health and public safety, and visitor experience.

Stone dust materials will be removed from the redundant entrance path, the area will be graded/backfilled, and then landscaped (i.e. seeded as needed). Where roadways/pathways are to be widened, excavation will be necessary utilizing a grader and/or small excavator. The remaining roadways/pathways will be graded or topped up with the new materials to re-establish the original grade and drainage. The top up materials within the fort will consist of a new single stone chip seal asphalt surface, while outside the palisade walls they will either consist of the single stone chip asphalt or washed concrete (i.e. requires washing the day after it's poured to expose the textured pebble aggregate). Minimal backfilling may be required in some locations. Asphalt materials from the old roadway/pathway system will be reused where applicable. Other machinery/equipment required to complete these works may include a backhoe, bobcat, roller, asphalt machine, and concrete pumper, sanitation, and other trucks (i.e. to deliver stone chip asphalt/concrete materials).





For the lighting project, several (0.96m high) bollards will be placed adjacent to the roadway from the parking lot to a location near the fort's entrance, and flood/spot/strip lights will be placed on the buildings throughout the NHS. The bollards are 20cm in diameter, and constructed of aluminum, copper, and stainless steel. Underground wiring may need to be completed if electrical equipment is required (i.e. may use directional boring or plowing technique to implement the work). Concrete bases will be poured to anchor the bollard bases flush with the grade. Machinery/equipment required to complete these works may include ladders, hand tools, a mechanical lift, and trucks.

Contractors will use the public washroom facilities, and the visitor parking lot or Byron Street as a staging-storage area. Portions of the roadways, pathways, and buildings will be closed off while under construction. Foot traffic will be redirected into/around the fort and away from work areas in order to maintain the site's safety conditions.

6. VALUED COMPONENTS LIKELY TO BE AFFECTED

Fort George National Historic Site is a historic military structure 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.

Most of the parade surface and fort is a reconstruction dating to the 1930s. Since that time, numerous utilities lines (i.e. some installed parallel to the roadways/pathways) and fort improvements have further disturbed the underlying archaeological resources. Parks Canada Agency (PCA) has found undisturbed culture layers intact at various depths beneath these fill and reconstruction layers, and there are no "cleared" archaeological areas.

Aspects of the project have the potential to have impacts on the cultural resources at the site, including its overall appearance and subsurface archaeological artifacts (Appendix 2). Due to the majority of the work taking place in previously disturbed areas around the roadways/pathways and buildings, it is unlikely there will be effects on the archaeology at these locations within the NHS. In addition, from a cultural resource management (CRM) perspective, the nature of the roadway/pathway surfaces and the hidden and/or subdued lighting are such that they will not detract from the historic appearance of the site.

Although the majority of the proposed works will not affect the cultural resources of the site, the Parks Canada Terrestrial Archaeology Representatives (PCTAR) and Southwestern Ontario Field Unit (SOFU) CRM Advisor have concerns for certain proposed aspects of the project:

- 1) In the area outside of the fort where the roadways/pathways and ramp extension near the visitor parking lot and VC will be upgraded, there are important undisturbed archaeological remains or cultural resources of national historic significance that have been noted (e.g. American trenches);
- 2) In the area where the proposed new electrical line may be placed from Blockhouse 1 to the Cottage, there are important buried cultural resources, including the 1815 House; and
- 3) The Powder Magazine is a cultural resource of national significance and any proposed works around this structure are of most concern. In 1993, the NHS attempted to remedy the pathway accessibility issue by lengthening the path, creating a switchback, and decreasing the slope. PCA excavated three test units to understand the stratigraphy of this area and found a 1937 fort reconstruction layer at ~40-50cm below the 1993 surface. This would indicate fills were used to increase the grade of the pathway at or since the reconstruction. *No excavation units have occurred off the pathway in the actual talus slope.*





These issues will be addressed with CRM/PCTAR input for mitigation measures as the project designs and/or plans for the possible laying of new washed concrete roadways/pathways, placement of new electrical lines, and redesign of the Powder Magazine pathway are further finalized.

Overall, the project will improve the safety for staff and visitors, providing a uniform, stable, more easily maintained surface to get around on. Visitor experience and safety will improve with better accessibility for people with physical disabilities as well as for families wishing to use children’s wagons and strollers around the site (especially down to the hill to the Powder Magazine, which is currently too steep and potentially unsafe). The new lighting will allow for safer access around the fort during evening and overnight programming/events.

One of the main effects from the project will be to visitor experience while these temporary works take place. Visitors will need to be redirected away from the machinery/equipment for safety reasons, and the noise from the works may detract from the public’s enjoyment of the site.

Due to the timing/location/nature of the roadway/pathway/lighting works, it is not anticipated there will be any significant adverse effects on natural resources [i.e. wildlife, habitat, landscape features, species at risk (SAR), air/soil/water quality and/or water quantity, etc.] as long as the mitigation measures are adhered to.

7. EFFECTS ANALYSIS

Potential Key Effects:	<i>Components of the environment that may be affected:</i> The project environmental effects will vary depending on the type of work and where it is taking place within the national historic site.
<i>Cultural Resources</i>	<p>Potential adverse effects to cultural resources, as well as the heritage values of the NHS during the project, which could be as a result of:</p> <ol style="list-style-type: none"> 1. Trampling/parking/vehicles/temporary facilities/equipment; 2. Use of cultural resources as supports for signage, and project-related machinery/equipment/infrastructure; 3. Damage to the landscape and landscape features in the case of an accidental spill of fuel, oil, diesel, chemicals, etc.; and 4. Adverse effects to the sense of place for the NHS from the noise, additional machinery/equipment/infrastructure, and the contractors on-site. <p>Potential adverse effects to unknown archaeological resources, resulting from:</p> <ol style="list-style-type: none"> 1. Trampling/parking/vehicles/temporary facilities/equipment; 2. Excavating/directional boring or plowing/grading/backfilling/paving/laying and washing concrete; 3. Puncturing the ground for the installation of signage or other items; and 4. Redesigning the pathway to the Powder Magazine (i.e. could potentially affect subsurface archaeological resources and/or the building).
<i>Flora, Fauna, Species at Risk</i>	<ol style="list-style-type: none"> 1. Trampling/destruction primarily in the mowed areas from equipment/machinery, parking, and people on-site; 2. Machinery/equipment that are not properly cleaned before going on-site, as well as soil/aggregate/other materials that are used for site preparation/construction could potentially introduce invasive and/or exotic species to the NHS; 3. Potential harm to wildlife from chemical use or accidental spill(s) (e.g. machinery and equipment fuel, diesel, concrete wastewater, etc.) (N.B. Concrete wastewater is considered deleterious substance under the <i>Fisheries Act.</i>); 4. Noise and human presence may disrupt wildlife in the area; 5. Access of wildlife to human food, garbage, and recycling; and





	<p>6. Adverse effects to small animals nesting, feeding, and/or sheltering around the NHS infrastructure. Barn swallows (<i>Hirundo rustica</i> – COSEWIC: THR) could potentially nest, take shelter, and/or feed around the NHS buildings. The little brown myotis (<i>Myotis lucifugus</i> – END), northern myotis (<i>Myotis septentrionalis</i> – END), and tri-colored bats (<i>Perimyotis subflavus</i> – END) could migrate through, feed, and take shelter around the NHS (i.e. in tree holes, around the buildings, etc.). These animals could be disturbed by nearby project works. It is possible, but not anticipated, that these SAR will be affected by this project.</p>
<p><i>Air & Soil Quality, Water Quality & Quantity (Surface/Ground), Drainage, Erosion</i></p>	<ol style="list-style-type: none"> 1. Potential for increased dust, greenhouse gas, and other exhaust emissions from the machinery/equipment used during works associated with the set-up, construction, and demobilization of the project; 2. Potential for soil/water contamination as a result of refuelling and accidental fuel/oil/diesel/oil-based asphalt/other chemical spills, concrete wastewater, and refuse. Generated concrete wastewater and other construction related sediments, chemicals, wastes (e.g. metals), and harmful substances may enter the soil, water, and nearby water bodies (~160-300m from the Niagara River/Lake Ontario) after rainfall events or watering procedures, which could result in impacts on soil and water qualities; 3. Temporary effects to soil quality and drainage due to compaction from machinery/equipment as well as from people on-site; 4. Soil compaction may result in reduced water/soil infiltration rates increasing surface runoff and potential siltation to surface water (e.g. in drainage systems during wet weather events); 5. Potential for erosion in areas where people have been redirected away from the construction work; and 6. Refuse from the project will add to waste generation and ultimately consume more landfill space.
<p><i>Visitor Experience, Safety, Socio-economics</i></p>	<ol style="list-style-type: none"> 1. Potential for short-term, negative effects to visitor experience as a result of the project (i.e. changes in the views, reduced access to certain areas in the NHS, noise from the project set-up, construction, and demobilization, and the presence of machinery/equipment/debris/contractors on-site). Some visitors may feel the work detracts from the NHS experience. Effects are expected to be temporary and could be used as a learning opportunity about how the NHS is working towards achieving long-term improvements to visitor experience and safety; 2. There is potential for an increased risk to the public and staff if the work area is not well fenced, signed, and/or closed off, and to the workers if they are not wearing personal protective equipment. The risks to occupational health and public safety increases with the movement of machinery/equipment/materials to and from the work area, heavy equipment operations, possible storage of materials on-site, handling of chemicals, exposure to inclement weather; and from accidents and malfunctions; and 3. Positive effects to visitor experience and socioeconomics may arise as a result of the NHS infrastructure/facility improvements (i.e. the new lights will better delineate the upgraded roadways/pathways, providing a more effective method of directing visitors around the fort).

8. MITIGATION MEASURES



	<p>resources should be protected by specifically excluding them from the project works, preventing unauthorized access to them, and/or PCA staff diligently monitoring them;</p> <ol style="list-style-type: none"> 2. Under PCA's direction, areas with known cultural resources (including archaeological resources and historic objects) will be demarcated and protected to prevent unauthorized access and adverse effects from the project's works. This may include flagging tape, above-ground fencing, or other temporary structures, padlocks, and/or signage to avoid sensitive areas as indicated by PCA officials and/or archaeologist; 3. Excavation, directional boring or plowing, grading, backfilling, paving, laying/ washing concrete, and puncturing the ground for the installation of light posts or any other items is prohibited without an assessment or discussion with a CRM functional specialist, except in areas that have been reviewed by an archaeologist (i.e. to ensure that no adverse effects to subsurface cultural resources). Non-intrusive temporary fencing, signage, or structure stabilizing mechanisms (that do not puncture the ground) are recommended; 4. The project locations/types of works will be reviewed by PCA CRM specialists to ensure they will not cause significant adverse effects to cultural resources and the overall commemorative integrity of the site (e.g. type/size/location of new lighting will be minimally visible and not interfere with the heritage nature of the NHS); 5. Use of cultural resources as supports for signage and machinery/equipment/ infrastructure is strictly prohibited; 6. Care will be taken when operating heavy machinery/equipment. If the work has the potential to cause soil compaction in areas not previously assessed by an archaeologist, an archaeologist should be contacted to provide direction about how to mitigate impacts on potential archaeological resources; 7. If archaeological resources are uncovered during the project (e.g. anything out of the ordinary, artifacts, wood, stone from possible foundations), then the contractors will isolate the specific area and restrict access until a PCA archaeologist is notified to provide further direction. Additional mitigation measures may be provided to prevent any damage to these resources. Remediation activities may be required; 8. Should the remains of ancient persons be discovered, work will stop and the remains shall be protected. A knowledgeable PCA representative shall be notified and the <i>Management Directive 2.3.1 for Human Remains, Cemeteries, and Burial Grounds</i> will be followed; 9. Contractors shall protect subsurface infrastructure, historical features, profiles, and ground features as directed by a PCA representative; and 10. Adhere to the PCTAR and SOFU CRM Advisor's recommendations regarding: any expansions of the roadways/pathways beyond their existing footprints/gravel bed depths; any new electrical line placements for the LED lighting system; and the redesign of the pathway to the Powder Magazine: <ol style="list-style-type: none"> a. Conduct in-depth CRM/PCTAR investigations of the currently unknown aspects of the project once they are designed and planned in detail. Specifically the powder magazine pathway redesign will undergo a Cultural Resource Impact Analysis (CRIA); b. Staff vehicles should to park outside of the fort whenever possible to prevent ruts on the parade surface; c. Heavy equipment and construction vehicles should remain on the established path surfaces as much as possible, or preferably off-site (i.e. in the visitor parking lot or Byron Street area); d. The use of a pump-crete or directional pump will help to move the concrete to the precise locations while the vehicle stays on the road or in the parking lot.
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	<p>Alternatively, wheel barrelling the cement into place along the extant pathways will help decrease concerns regarding the additional vehicular traffic on-site;</p> <ul style="list-style-type: none"> e. If the construction excavations are limited to the 150mm depth noted in Ainley’s report, then there may be limited archaeological concern within the interior of the fort; however, an archaeologist should be present during the excavations in case cultural resources are uncovered; f. Caution must be taken to remove <u>only</u> the extant gravel bedding on the redundant pathway from the bus parking lot to the town trail. Excavation must stop above the undisturbed soil; g. The 9-16” of gravel noted in the other roadways/pathways will be adequate protection for the cultural resources from the planned (re)paving or washed concrete and bollard light/electrical line installation works as long as they <i>follow the current path’s footprint and do not exceed the extant gravel bedding</i>; h. To avoid impact on cultural resources for the proposed new electrical line from Blockhouse 1 to the Cottage, archaeological mitigation should be sought prior to the work, particularly if entry/exit pits are dug for boring/plowing. Once a final method and depth of excavation are known, the PCTAR will do a final assessment for archaeological mitigation; and i. Attempt to build up (i.e. not dig down) to correct the pathway slope to the Powder Magazine and keep within the footprint of the extant path.
<p><i>Flora, Fauna, Species at Risk</i></p>	<ul style="list-style-type: none"> 1. No vegetation is to be removed from the site (except for portions of lawn that require removal to expand the roadways/pathways); 2. Machinery/equipment/contractors will be restricted to the defined work area to minimize any further impacts to the surrounding vegetation. Any significant damage to the surrounding manicured lawns or vegetation will be restored to prior or better site conditions by the contractor under the direction of the PCA staff. In the case of herbaceous or woody vegetation, native species should be used; 3. Machinery/equipment should be properly cleaned before going on-site, and only clean, local soil/aggregate/other materials should be utilized to avoid the potential introduction of invasive and/or exotic seeds to the NHS; 4. Any materials that pose a hazard to wildlife must be stored in secured buildings or containers as directed by PCA; 5. All concrete waste water must be collected from the site and prevented from entering any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake); 6. Contractors must notify PCA staff immediately of any problem wildlife encounter; 7. The feeding, enticement, or harassment of wildlife is prohibited; 8. PCA staff will monitor for wildlife during the project. When possible, wildlife will be given the opportunity to escape the work area to the surrounding area to seek new shelter. If any wildlife is discovered that cannot escape quickly enough, then all work in the immediate area will cease until the PCA representative is consulted; 9. Garbage and recycle receptacles should be utilized to prevent wildlife access to waste products; and 10. PCA staff will hold a briefing to inform contractors of the potential SAR that may be encountered during project. It is illegal to harass or harm SAR. PCA will inform contractors of the requirements they must undertake should SAR be encountered during the project (e.g. protective measures such as the use of barriers).
<p><i>Air & Soil Quality, Water Quality & Quantity</i></p>	<ul style="list-style-type: none"> 1. Use of ethanol blended fuel/biodiesel is encouraged for all machinery/equipment; 2. Vehicles, machinery, and equipment must not be left to idle; 3. During all relevant phases of structure/component removal and construction, surfaces will be wetted to minimize dust as appropriate; 4. Dust from excavations should be monitored and controlled;





<p>(Surface/ Ground), Drainage, Erosion</p>	<ol style="list-style-type: none"> 5. The operating, refueling, and maintenance of construction machinery/equipment, and the handling and storage of toxic materials (e.g. fuels) will be carried out in such a way as to avoid contamination of soils and water; 6. PCA will determine if a Spill Response Plan must be provided by the contractor prior to the commencement of work. If required, then this plan will be subject to the approval of the site. The contractor is responsible to have appropriate containment, spill kit, and clean up equipment on-site in accordance with the approved Spill Response Plan to ensure a rapid response to any spill. Report spills to Environment Canada – Environmental Emergencies (613-239-6065), the Ontario Ministry of the Environment and Climate Change – Spills Action Centre (1-800-268-6060), and Parks Canada Agency; 7. All refueling of the machinery/equipment is restricted to designated areas (over an impermeable, paved area, if available) and will be at least 30m from any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake); 8. Use new or well-maintained machinery/equipment, preferably fitted with fully functioning emission control systems/mufflers/exhaust systems, engine covers, etc., to avoid introducing pollutants to the site; 9. Control the disposal or runoff of water into any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake) containing harmful substances and sediment at all open excavation areas, disturbed areas, stockpiled or excavated materials, and construction watering or dewatering activities. Only clean material, free of particulate matter, shall be placed in the water; 10. In work areas, should there be a significant rain event, silt curtains or screens must be installed in adjoining drainage ditches in order to control siltation. If silt screens are required, then they must be checked daily to ensure they are in good working condition; 11. As concrete leachate is alkaline and highly toxic to fish and other aquatic life, ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials will not deposit (directly or indirectly) sediments, debris, concrete, leachate concrete fines, wash, or contact water (including precipitation) into or about any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake); 12. Provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment; 13. All concrete wash water will be disposed of in a location where it will not enter any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake); 14. Prevent any water (including precipitation) that contacts deleterious uncured or partly cured concrete (during activities like exposed aggregate wash-off, wet curing, or equipment washing) from directly or indirectly entering any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake); 15. Cast in place concrete materials must remain isolated from water (especially precipitation) inside sealed formed structures until cured (~48-72 hours); 16. Isolate and hold any water (including precipitation) that contacts uncured or partly cured concrete until the pH is between 6.5 and 8.0 pH units, and the turbidity is less than 25 nephelometric turbidity units (NTU), measured to an accuracy of +/- 2 NTU; 17. Storage of hazardous materials must comply with the <i>Canadian Environmental Protection Act</i>; 18. Store all fuels and chemicals 30m from any drainage system (i.e. storm water drains) or water body (i.e. creek, river, lake) in secure areas on impermeable pads/surfaces; 19. Potentially hazardous wastes will be separated from normal waste through segregation of storage areas and proper labeling of containers;
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	<p>20. All compounds used for this project shall be utilized and stored according to the manufacturers' Product Technical Data Sheets, stating guidelines and methods for proper use and storage;</p> <p>21. No waste is permitted to be buried or burned on-site; and</p> <p>22. Recyclable materials and all waste debris shall be removed from the work area and disposed of off-site, in accordance with all federal, provincial, and municipal regulations, to appropriate disposal facilities licensed to receive them.</p>
<p><i>Visitor Experience, Safety, Socio-economics</i></p>	<p>1. There will be short-term minor impacts on staff, visitors, and other contractors accessing the NHS due to the influx of contractor machinery/equipment/ vehicles and project construction. Appropriate signage and area closures will be in place for higher risk works (e.g. excavating, paving, etc.). Circulation around the facilities (i.e. including wheelchair access) will be maintained to the greatest extent possible;</p> <p>2. The work will be conducted so as to minimize impacts on the interpretive programs;</p> <p>3. PCA staff will be briefed on the project so they can provide information to visitors;</p> <p>4. All works pursuant to the project shall be governed by and constructed in accordance with all laws of Canada and the Province of Ontario (e.g. <i>Canada Labour Code, Workplace Safety and Insurance Board of Ontario, Occupational Health and Safety Act, National Fire Code of Canada</i>);</p> <p>5. Access to PCA staff and representatives to the site will be maintained;</p> <p>6. Appropriate safety precautions and safe work practices will be implemented; and</p> <p>7. All stored/stockpiled materials will be kept in a safe and secure location for security and public safety reasons. All construction equipment will be secured to ensure public safety when workers are not present on-site.</p>
<p><i>General Effects</i></p>	<p>1. Contractors must comply with all federal, provincial, regional, and municipal legislation applicable at the NHS;</p> <p>2. Parking and access routes to the work area must only be in PCA designated areas;</p> <p>3. Vehicles are restricted to paved, graveled, and level-grass surfaces, or as directed by PCA officials; and</p> <p>4. Machinery/equipment/materials must be stored at a location approved by PCA.</p>

9. PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION

9 a) Indicate whether public/stakeholder engagement was undertaken in relation to potential adverse effects of the proposed project:

- No
- Yes

9 b) Indicate whether Aboriginal consultation was undertaken in relation to potential adverse effects of the proposed project:

- No
- Yes

10. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Following the application of mitigation measures, residual effects to the natural and cultural environments are not expected to be significant. Positive residual effects are anticipated as a result of the provision of a safe visitor experience as well as the reduction of site's operational costs and maintenance issues.

1. Minor, short-term impacts on wildlife and visitor experience during the physical works;
2. Slight increase in greenhouse gas emissions from machinery/equipment;
3. Some increase in sediment concentration in surface runoff to the creek/river/lake/drainage systems from physical works/use of machinery/equipment;





4. Increased soil compaction from the use of heavy equipment;
5. Possibly some residual soil/water contamination from an accidental spill;
6. The immediate changes in national historic site's appearance from the new stone chip or washed concrete roadways/pathways and LED lighting system.

FOR CULTURAL RESOURCES:

- *In considering residual adverse effects to cultural resources, the cultural resource management advisor and/or CRM functional specialist supporting this analysis will evaluate the degree of change to determine significance:*
 - *No change*
 - **Negligible to minor changes (very minor changes/slight changes to the resource)**
 - *Moderate change (resource is clearly modified)*
 - *Major change (resource is totally altered and removed/destroyed)*

11. SURVEILLANCE

- Surveillance is not required
- Surveillance is required

As needed, PCA staff will be monitor the project to ensure the mitigation measures (i.e. particularly those for CRM/archaeology resources) of this Basic Impact Analysis are enforced, and to handle and note any situations as they arise.

12. FOLLOW-UP MONITORING

Follow-up monitoring is:

- not required
- legally required (e.g. under the *Species at Risk Act* or *Fisheries Act*)
- required in accordance with the *Parks Canada Cultural Resource Management Policy*

13. SARA NOTIFICATION

Notification is:

- not required
- required under the *Species at Risk Act*

14. EXPERTS CONSULTED

Department/Agency/Institution: Parks Canada Agency	Date of Request: May 4-June 23, 2015
Expert's Name & Contact Information: Rachel Brooks & Stacey Taylor Archaeology & History Branch Heritage Conservation & Commemoration Directorate 111 Water Street East, Cornwall, ON, K6H 6S3 613-938-5762; rachel.brooks@pc.gc.ca 613-938-5794; stacey.taylor@pc.gc.ca	Title: Archaeologists
Expertise Requested: Expertise about the potential effects on the site's archaeological resources from the upgraded roadways/pathways, the removal and expansion of portions of the roadway/pathway system, and the addition of the new light bollards (i.e. along the roadway from the parking lot to the nearby the fort's entrance).	
Response: There are no issues with the standard paving of the roadway, pathway, and lighting improvements. The PCTAR needs to be consulted for further mitigation measures once the project	





17. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

- not likely to cause significant adverse environmental effects
- likely to cause significant adverse environmental effects

FOR SARA REQUIREMENTS:

- There are no residual adverse effects to species at risk and therefore the SARA-Compliant Authorization Decision Tool was not required*

OR, the SARA-Compliant Authorization Decision Tool was used and determined:

- There is no contravention of SARA prohibitions*
- Project activities contravene a SARA prohibition and CAN be authorized under SARA*
- Project activities contravene a SARA prohibition and CANNOT be authorized*

18. RECOMMENDATION AND APPROVAL

Prepared by: Kelly Scott Resource Management Officer II – EA Coordinator, Point Pelee National Park	Date: 2015-06-25
Recommended by: Walter Willms Technical Service Officer, Niagara National Historic Sites	Date: 2015-06-26
Approved by: Jarred Picher Field Unit Superintendent, Southwestern Ontario Field Unit	Date:
Signature:	





Appendix 2 Environmental Impact Analysis Tool: Effects Identification Matrix

A. Direct Effects		Valued components potentially directly affected by the proposed project							
X – Indicates a potential scoped in effect – could be positive or negative in nature		Natural Resources					Cultural Resources		
		Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora (specify, including SAR)	Fauna (specify, including SAR)	Cultural resources	Archaeology	
Phase	Examples of Associated Activities/Works								
Project Components	Preparation / Construction / Operation / Decommissioning	Supply/Storage of Materials	<input type="checkbox"/>	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Set-up/Use/Removal of Temporary Facilities	<input type="checkbox"/>	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Removal of Old and Placement of New Lighting Systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	X	X
		Excavation	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	X	X
		Grading	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	X	X
		Backfilling	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	X	X
		Directional Boring or Plowing	<input type="checkbox"/>	X	X	<input type="checkbox"/>	<input type="checkbox"/>	X	X
		Paving/Concrete Work	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	X	X
		Drainage	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Seeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Use of Equipment/Machinery	X	X	X	X	X	X	X
		Transport of Materials/ Equipment/ Machinery	X	X	X	X	X	X	X
		Waste Disposal/ Recycling	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Wastewater Disposal	<input type="checkbox"/>	<input type="checkbox"/>	X	<input type="checkbox"/>	X	<input type="checkbox"/>	<input type="checkbox"/>
		Use of Chemicals	X	X	X	X	X	X	X
		Maintenance	X	X	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	





B. Indirect Effects (all phases)							
X - Indicates a potential scoped in effect – could be positive or negative in nature		Impacts as a result of changes to the environment					
		With respect to non-Aboriginal peoples:	With respect to Aboriginal peoples:			With respect to visitor experience	
		Health and socio-economic conditions	Health & socio-economic conditions	Current use of lands and resources for traditional purposes	Access & services	Recreation & accommod'n opportunities	Safety
Phase	Natural resource components affected by the project						
Preparation /construction operation/implementation/decommissioning	Could impacts to <u>air</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>soils and landforms</u> lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	X	X
	Could impacts to <u>water</u> (e.g. surface, ground water, and water crossings) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	X	X
	Could impacts to <u>flora</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

