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BY COURIER

July 18, 2016

Sheri Young
Secretary
National Energy Board
517 Tenth Avenue SW
Calgary, AB
T2R 0A8

Dear Ms. Young:

OF-Fac-IPL-H117-2016-01 01 – Hydro One Networks Inc.'s Approved Application to Perform Work on International Power Line J5D under sections 21(2), 45, and 58.27 of the *National Energy Board Act* – Update

Please find attached Hydro One's updated Environmental Specification Document pertaining to Hydro One Networks Inc.'s Application to perform work on International Power Line J5D for the undergrounding element of the project, approved by the Board on April 13, 2016 under file OF-Fac-IPL-H117-2016-01 01.

The NEB requested Hydro One provide a copy of this document after including feedback received from Environment & Climate Change Canada.

An electronic copy of this submission has been filed using the National Energy Board's electronic submission system and one (1) hard copy will be sent to the Board shortly as per the Board's instructions regarding an electronic submission.

Sincerely,

ORIGINAL SIGNED BY JOANNE RICHARDSON

Joanne Richardson



HYDRO ONE NETWORKS INC.

Gordie Howe International Bridge – Project 1A

Environmental Specification

May 2016 R1

AR# 18144

Hydro One Networks Inc.
Environmental Engineering & Project Support
483 Bay Street, North Tower, 14th Floor
Toronto, ON, M5G 2P5

Prepared By:
Jennifer Salton – Environmental Field Planner

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1.0 INTRODUCTION

This Environmental Specification details how environmental protection will be achieved on this project by describing government legislation, commitments, company policy and special mitigative procedures to be undertaken. All Hydro One Networks Inc. (Hydro One) staff, contractors and sub-contractors on this project are responsible for implementing all components of, and adhering to all requirements of this Environmental Specification.

2.0 SCOPE OF WORK

The Gordie Howe International Bridge ('GHIB') - Project 1A is for the relocation of a portion of Hydro One's C21J/C22J, J3E/J4E and J5D circuits to underground cable, which is required to accommodate the construction of the Windsor Detroit Bridge Authority's ('WDBA') Gordie Howe International Bridge in the City of Windsor. The WDBA will be responsible for installing the underground cables and potheads at the junctions and Hydro One will responsible for the remaining portion of the project.

The present Scope of Work document contains the specifications required for the GHIB - Project 1A. Refer to the latest scope of work document under AR# 18144 for a detailed list of work to be completed. Work to be completed that has environmental implications includes, but is not limited to the following:

Scope of Work for Project 1A is as follows:

1. Locate all existing utilities
2. Construct drying pad – C21J
3. Remove asphalt
4. Grading, installation of grounding grid, sub base, surface stone and fencing at the Junctions
5. Classify the waste soil and slurry materials
6. Install fuel dispensing areas
7. Install construction offices/trailers/parking areas
8. Removal of existing transmission structures, lines and foundations (No. 1, 2, 3, 34, 35, 36A, 36B, 37A, 37B, 605, 606, 607)
9. Installation of new micro pile foundations and transmission structures (No. 3, 34, 605)
10. Install temporary wood pole bypass line to allow construction of new tower No. 34, 605.
11. Installation of BPD structures (WDBA will install foundations)
12. Stringing conductor from BPD structures to tower structures
13. Dispose of asphalt, soil and slurry
14. Surplus construction materials
 - a. Soil
 - b. Slurry
 - c. Concrete
 - d. Asphalt
 - e. Metal
 - f. Insulators
 - g. Electrical equipment

- h. Sewage / greywater
- i. General

See **Figure 2-1** for a Location Map of the Site and **Figure 2-2** for a Construction Activity Map.

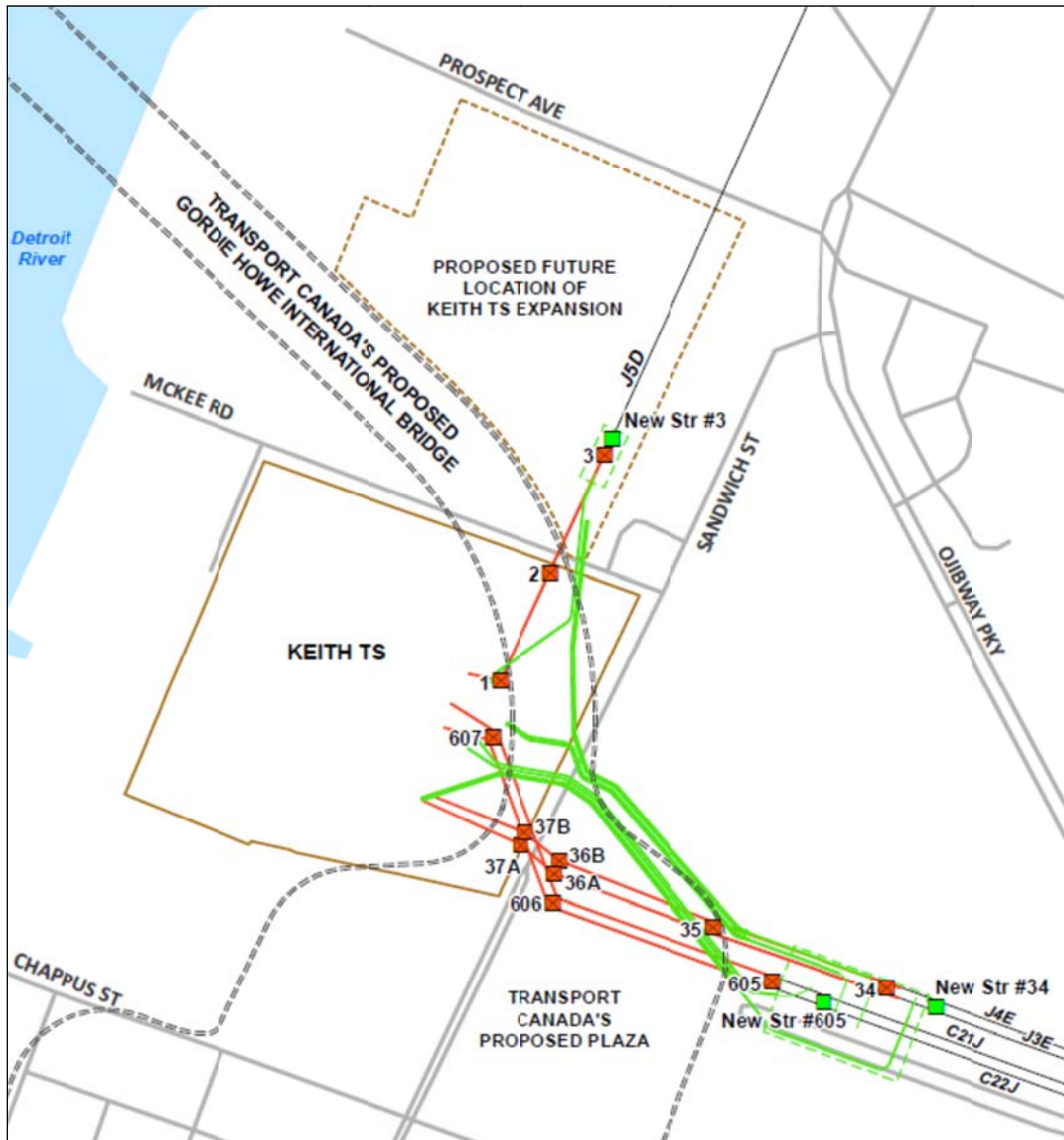


Figure 2-1 Location Map of GHIB – Project 1A

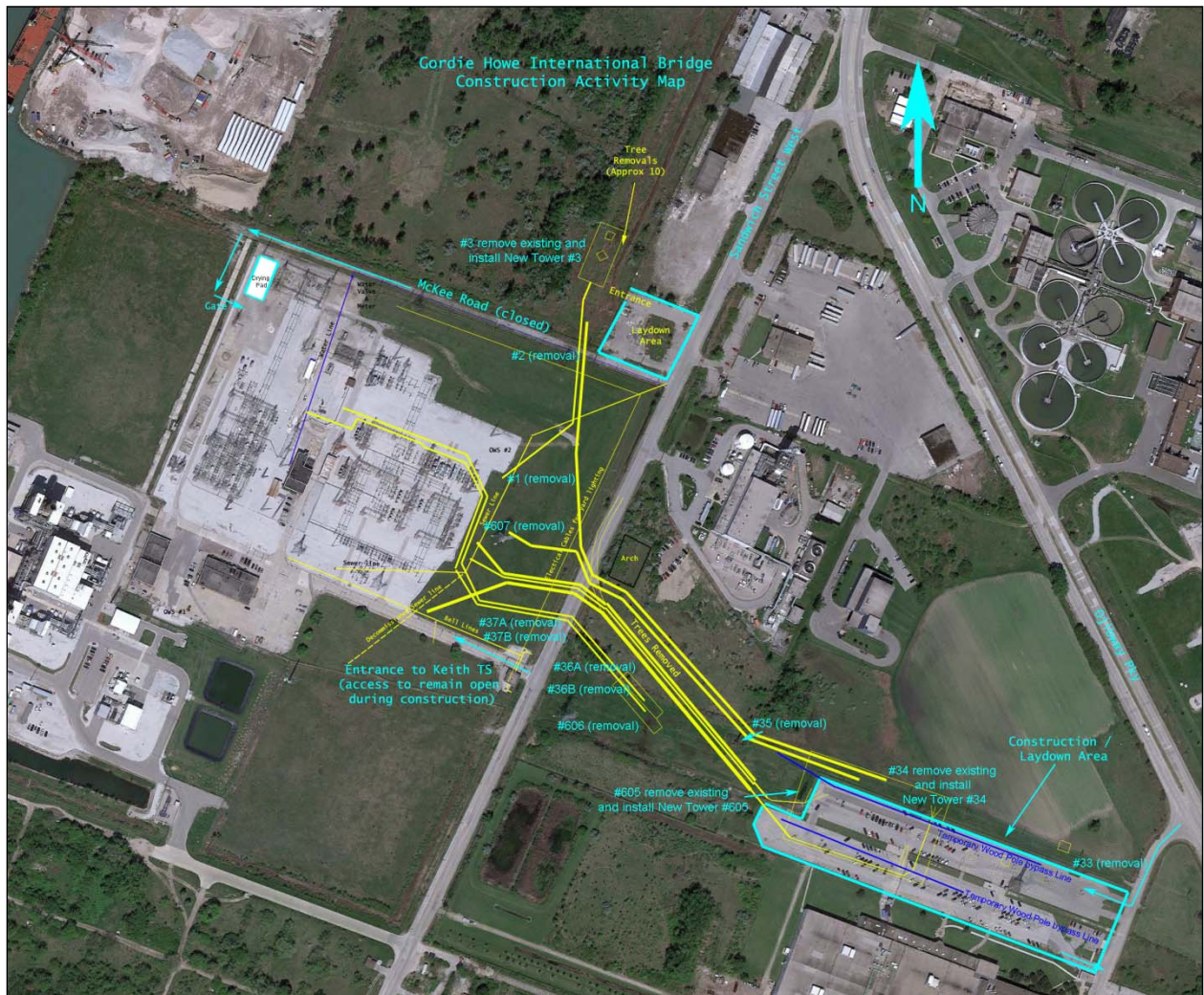


Figure 2-1 Construction Activity Map – Project 1A

3.0 COMMUNICATION

All communication related to environmental issues with municipal, provincial or federal agencies, the public and First Nations and Métis, or other external stakeholders will be directed through the Environmental Planner.

3.1 Environmental Crew Briefings

The Construction Site Supervisor or their designate shall conduct daily safety reviews commonly called “Tailboards” with all personnel. Tailboards must also cover environmental issues and may include:

- Identify and minimize environmental risks and address health and safety concerns related to environmental issues;
- Alert crew(s) to other sensitive environmental situations not previously identified; and Encourage crew(s) to report any observations of new issues/potential impacts/incidents not included in previous tailboards to the Construction Site Supervisor immediately.

4.0 PERMITS, APPROVALS AND ASSESSMENTS

The following provides a status of the various permits, approvals and assessments that are required for this project. If any of the required documentation listed below has not been received, contact the Environmental Planner to supply the documentation.

NOTE: Certificates and Permits must be posted at site.

Table 4-1 Required Permits, Approvals and Assessments

REQUIRED	STATUS
Archeology Assessment(s)	An archaeological assessment was completed as part of the WDBA's Environmental Assessment
Class Environmental Assessment Screening	Completed January 2016
Document review of Environmental Site Assessments (Phase 1, 2 or 3)	See section 5.5
National Energy Board Approval for the J5D circuit	Filed February 2016 - waiting for approval
Municipal Site Plan	TBD
EASR Registration (if taking over 50,000L water/day)	<ul style="list-style-type: none"> • Hydro One will register for the foundation removals of the existing towers (see Section 7.3). • WDBA has obtained a site-wide Permit To Take Water for their work.
In-situ Bulk Analysis & TCLP (for the management of soil)	As needed
Landscape Plan	TBD
Tree Removal	WDBA will be responsible for the tree removals within the GHIB project area including the trees by Tower #3.

TBD – to be determined

5.0 SITE SPECIFIC ISSUES

The following represent the Site Specific Issues.

5.1 Archaeology

An archaeological assessment was completed as part of the WDBA's Environmental Assessment.

If artifacts, potential remains, or other archaeological or heritage resources are encountered at any stage of construction:

- Stop work in immediate vicinity of any discovery of potential artifact(s) and contact the Construction Site Supervisor;
- Construction Site Supervisor is to contact the Environmental Planner and Project Manager;
- Environmental Planner is to contact local office of Ministry of Tourism and Culture; and
- Do not continue work in the area until the site has been cleared and authorization has been given by Ministry of Tourism and Culture through the Project Manager or Environmental Planner.

5.2 Breeding and Migratory Birds

Hydro One must comply with Environment and Climate Change Canada's *Migratory Birds Convention Act* (MBCA). If work must be done within the migratory bird breeding season (~March 31 to August 31), a pre-construction area search for evidence of nesting (e.g., presence of birds in breeding habitat through observation of singing birds, alarm calls, distraction displays) should be conducted.

Nest survey methods outlined in Hydro One's "SP 1259 – Active Bird Nest Management" document (see **Appendix A**) can be used in the following types of habitats where there are only a few likely nesting spots:

- an urban park consisting mostly of lawns with a few isolated trees;
- a vacant lot with few possible nest sites;
- a previously cleared area where there is a lag between clearing and construction activities (and where ground nesters may have been attracted to nest in cleared areas or in stockpiles of soil, for instance); or
- a structure such as a tower or a building.

It is assumed that the WDBA will be clearing vegetation in the corridor prior to Hydro One construction. Therefore, the work area would be a "previously cleared area where there is a lag between clearing and construction" and a nest survey outlined in Hydro One's SP 1259 – Active Bird Nest Management" document would be appropriate (see **Appendix A**).

Otherwise, a non-intrusive search method should be used to prevent disturbance to migratory birds. In the case of songbirds, for example, “point counts” (a technique to locate singing territorial males) may provide a good indication of the presence of nests of these birds in an area. Please contact the Environmental Planner for further details if a non-intrusive nest search is required.

Any nests found should not be disturbed until all young have left the nest. As an avoidance tool, a buffer zone determined by a setback distance appropriate to the species, the level of the disturbance and the landscape context should be implemented for nests that are easily identified. Buffer requirements can be found in Table 3 of Hydro One’s “SP 1259 – Active Bird Nest Management” (see **Appendix A**). Note that identified nests should not be marked as it increased the risk of nest predation.

Contact the Environmental Planner if active nests were identified and can be monitored without disturbance to the nest. The Environmental Planner will determine if nest records can be completed and provided to the Ontario Nest Records Scheme.

If no bird nests are observed during the pre-construction area search, construction must commence within **three days** of the survey. Any subsequent nests that are encountered during construction that were not identified during initial surveys are still subject to the MBCA.

If migratory birds are present in Hydro One’s work area, the Environmental Planner will also refer to the WDBA’s mitigation plan for migratory birds and may request crews implement the WDBA’s mitigation, as appropriate.

5.3 Rare and At Risk Species

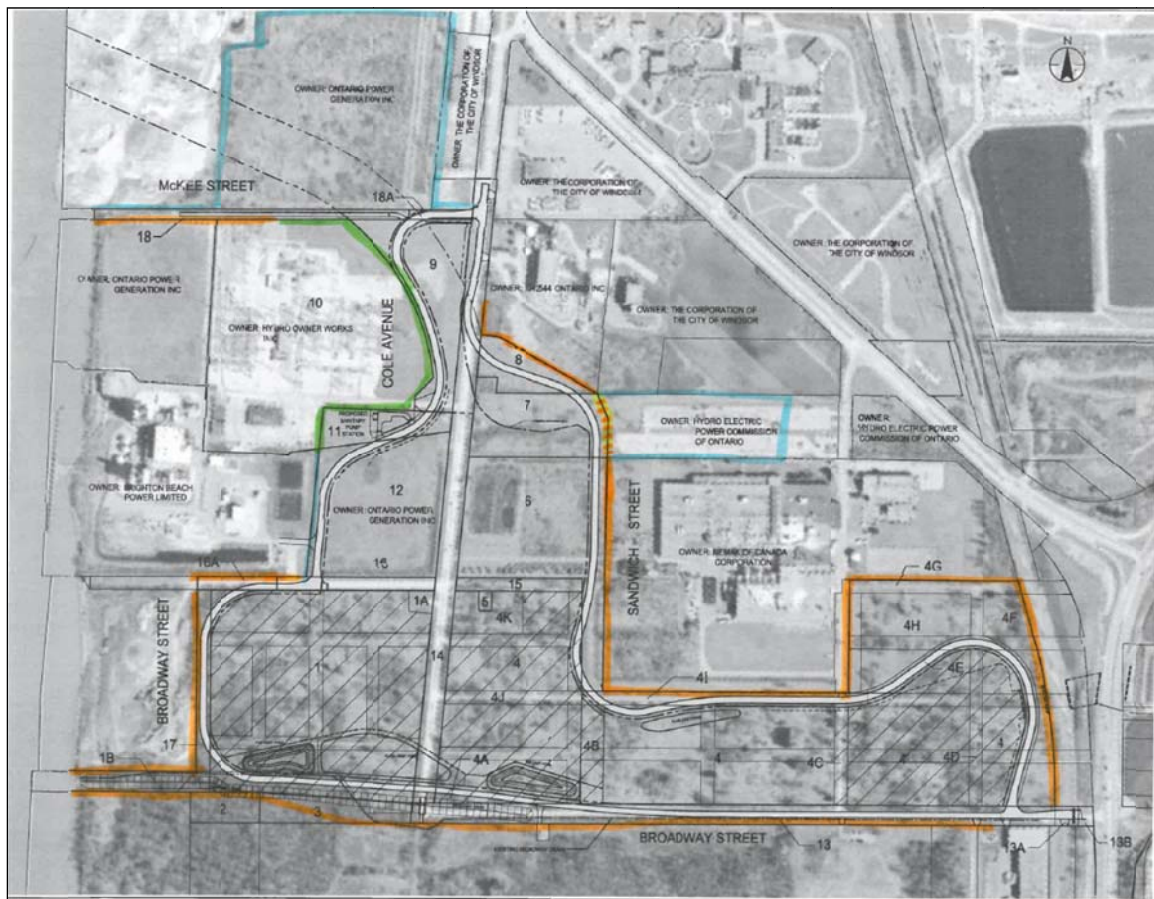
The WDBA has proposed to erect and maintain snake exclusion fencing around the perimeter of the GHIB project; including Hydro One’s work areas (see **Figure 5-1**). Fencing will be present for the duration of construction activities as such; Species at Risk (‘SAR’) are not anticipated to be present during construction.

An identification card is provided for the Butler’s GarterSnake and Eastern Foxsnake in **Appendix A** and should be reviewed by all crews working in areas where there is potential to encounter these SAR.

As a precaution, the following practices should be adhered to during construction:

- Use caution and only access Right-of-Way (‘ROW’) using service roads.
- Do not use nylon erosion fencing.
- Conduct a visual examination of machinery left idle to ensure no SAR present.
- Cease all activities within 30 meters of the SAR encountered and contact the Hydro One Environmental Planner, who will contact Environment & Climate Change Canada.

Figure 5-1 WDBA's Snake Exclusion Fencing Map



Note: Orange = permanent, Blue = temporary, Green = TBD if necessary

5.4 Invasive Species

Invasive species are exotic plants, animals and insects that have the potential to spread rapidly throughout the landscape and cause harm to the environment, the economy and/or society (i.e., human health).

Hydro One's primary objective related to invasive species is to prevent the movement or spread of invasive species to other properties. The primary mechanism for the spread of the invasive plants identified in the area is by seeds and pieces of rhizome (stem) that adhere to dirty vehicles and equipment and are then transported from one work site to another. Some species are able to begin new populations if just a small piece of stem is transported to a new area. The major invasive species identified in and around the GHIB project:

- European common reed (*Phragmites australis*)
 - o Tall reed with a diamond-shaped plume at the top (see **Appendix A**).

- Objective: Prevent Phragmites from establishing in the GHIB project area. Wet areas (marsh wetland areas, drainage ditches and ravines) are most susceptible.

The WDBA is responsible for vegetation clearing on the Ontario Power Generation ('OPG') property located north of Keith Transformer Station ('TS'), including the Phragmites present on the J5D corridor.

5.4.1. Education and Awareness for Construction Crews

The best way to address an environmental issue such as invasive species management is to ensure that the work crews are aware of the issue and have the proper resources and tools at their disposal. Hydro One has begun to compile a series of invasive species fact sheets that will eventually form a comprehensive Invasive Species Field Guide (similar to the existing Species at Risk Field Guide) so that work planners and crews can pick and choose the fact sheets about the invasive species that are believed or known to occur in work areas. These fact sheets provide information on identification of each species, as well as how and when the species spreads to new areas. Fact sheets for the invasive species found at the GHIB project site are provided in **Appendix A**. The Environmental Planner can also provide additional resources to aid in identification upon request, and will discuss invasive species at a pre-job tailboard meeting and/or pre-mobilization site visit.

For the purposes of this Project, the objective of crew awareness and education is to have the construction personnel be reasonably adept at identifying the invasive species known to be on the site, and to become aware of the means in which these species spread.

If invasive species are identified by construction crews, the Environmental Planner should be notified and crews should avoid contact with the species to the extent possible. If contact is unavoidable, equipment and/or vehicles should be thoroughly washed immediately afterwards to minimize the risk of spreading the invasive plant to a new area (see **Section 5.4.2** below).

5.4.2. Vehicle and Equipment Cleaning

As part of their efforts to control the spread of invasive species, the Ontario provincial government has recently published a document titled the "Clean Equipment Protocol for Industry". This protocol document outlines the best management practices for cleaning construction vehicles and equipment to prevent the accidental propagation and spread of invasive plant species. In order to prevent the accidental spread of invasive species via dirty construction vehicles, the protocol document provides guidance on the following best management practices:

- When and how to inspect vehicles and equipment for seeds/stems/clods of dirt that could potentially spread invasive species;

- How to locate and set up an equipment and vehicle cleaning station, to ensure that the process of cleaning the equipment does not itself contribute to accidental spread; and
- How to properly clean vehicles and equipment to remove any invasive species seeds/stems.

Refer to the “Clean Equipment Protocol for Hydro One” in **Appendix A**. The province’s full protocol document can be provided by the Environmental Planner on request.

5.5 Environmental Site Assessments Document Review

Ontario Power Generation Inc. (OPG) Property

A Phase II Environmental Site Assessment (‘ESA’) was completed at the OPG property to the north of Keith TS in June 2015. As part of the Phase II ESA, soil and groundwater samples were collected and submitted to a laboratory for the analysis of metals and inorganics (including pH), petroleum hydrocarbon fractions (F1 to F4), volatile organic compounds (‘VOCs’) (including benzene, toluene, ethylbenzene, xylenes), semi-VOCs (including polycyclic aromatic hydrocarbons), polychlorinated biphenyls, conductivity and sodium adsorption ratio.

Based on the soil analytical results, all analyzed parameters had concentrations below the 2011 MOECC Table 3 standards, with the exception of arsenic, barium, boron, selenium, thallium and vanadium at 20 of the 26 sampled locations and conductivity at 3 of the 26 sampled locations.

Based on the groundwater analytical results, all analyzed parameters had concentrations below the applicable 2011 MOECC Table 3 standards, with the exception of PHC F2 fraction and vinyl chloride at the eastern and northern Site/Property boundary, respectively.

Eastern Portion of Keith TS

A Phase II ESA was completed on the eastern portion of the Keith TS in 2015. As part of the Phase II ESA soil and groundwater samples were collected and submitted to a laboratory for analysis of one or more of the following: metals and hydrides (including arsenic), petroleum hydrocarbon fractions (F1 to F4), VOCs (including benzene, toluene, ethylbenzene, xylenes), semi-VOCs (including polycyclic aromatic hydrocarbons), polychlorinated biphenyls, conductivity and sodium adsorption ratio.

Based on the soil analytical results, all analyzed parameters had concentrations below the applicable 2011 MOECC Table 3 standards, except arsenic. The arsenic impacts have been identified near the northern, eastern and southern boundaries.

Based on the Phase II ESA groundwater analytical results, there was no evidence of groundwater impacts.

J5D Corridor

In conjunction with the geotechnical investigation, environmental soil analysis was completed for select boreholes along the J5D corridor to determine soil quality within the boreholes and assess option for excess soil disposal.

Based on the soil analytical results, several boreholes within the J5D corridor contained concentrations of arsenic, selenium, vanadium, 1,2-Dichloroethane and boron above the applicable 2011 MOECC Table 3 standards.

5.6 Hydrogen Sulphide (H₂S)

In 2015, Inspec-Sol Inc. was retained to complete a Geotechnical Investigation within the GHIB project area. The report can be referenced by internal Inspec-Sol Inc. project no. T041237a1 and is entitled “Geotechnical Investigation, Keith Transformer Station, Prospect Avenue and Sandwich Street, Windsor, Ontario”. A copy of this report can be provided by the Project Manager upon request.

The findings of the aforementioned report identified that groundwater within the study area contained dissolved hydrogen sulphide which was liberated from the groundwater on exposure to atmospheric pressure. H₂S gas was also noted by its characteristic odour (rotten eggs) in the areas of New Tower #3 and New Tower #605 when the bedrock and artesian water pressures were encountered at approximate depths of 27.4 m and 28.0 m below ground surface (bgs) respectively.

If the removal of existing tower foundations and/or the installation of micropiles involve depths ranging towards 27 m bgs in the areas of New Tower #3 and New Tower #605, H₂S monitoring is recommended during excavation/micropile installation. If dewatering should be required, the management of H₂S will be critical to the safe completion of the project.

Refer to the H₂S fact sheet in **Appendix A**.

6.0 EROSION AND SEDIMENT CONTROL

Hydro One will ensure that there is no off-site movement, sedimentation, or contamination occurring from soil excavation activities, and will ensure proper import and storage of clean fill, contaminated fill, construction pump-out water, etc., will be conducted, since there could be a direct impact to not only water quality but also to soils of neighboring properties. Where soil is stockpiled it shall be left in a stable condition (e.g., within sediment fence and covered with tarpaulins), so there will be no adverse effect on the local environment.

See **Appendix B** for examples of erosion and sediment controls.

Stone or other aggregates applied at the site are to contain minimal fines to reduce nuisance dust and to reduce potential for off-site movement of sediment.

7.0 SOIL, SLURRY AND WATER MANAGEMENT

7.1 Soil

Before excavating, consideration should be given to all possible hazards within the planned impacted area of excavation. The planned area of impact not only includes the area of immediate excavation, but also the location of stockpiling or loading and possible receptors in the event of unforeseen eroding of material (such as private or municipal property, drainage courses etc). Environmental specific hazards to consider include, but are not limited to:

- Buried utilities;
- Buried drainage (such as weeping tile, pipes);
- Buried infrastructure (such as oil pipelines); and
- Soil contamination (such Arsenic).

When stockpiling excavated and imported materials, consideration should be given to the risk of contamination within the soil and the risk of sediment to be carried offsite or to an undesirable location (such as wind, private property, drainage courses etc). The risk of contamination onsite can be assessed to a degree by reviewing site historical records. Depending on available historical information, it may be necessary to obtain soil samples prior to excavation to determine the level of contamination present. With increasing risk, greater care should be taken with stockpiles. Best practices are to have stockpiles placed on top of an impermeable liner (in such a way that the liner also acts as a berm around the perimeter of the pile) and covered with tarpaulins until sampled, analyzed and disposed of.

To reuse excavated soil on Hydro One owned property, complete the checklist in **Appendix C**. DO NOT REUSE spoil materials without testing if you have prior knowledge of site contamination or if any of the following is detected during excavation:

- Staining or discoloration;
- Visible sheen on liquid or solid surfaces;
- Odour (e.g., aromatic hydrocarbons such as benzene); and/or
- Marked change in soil texture/consistency (pockets of wetness due to spills of chemicals may cause clumping or aggregation of spoil).

If any of these signs are obvious, or if you are otherwise unsure about site contamination, solid spoil must be properly stockpiled, sampled and analyzed.

Contact the project Environmental Planner to coordinate all sampling. To dispose of excess soil refer to **Section 8**.

When using imported material as backfill, all material should be verified as originating from a clean borrow pit (see **Appendix C** – Hydro One Backfill Testing Procedure). Contact your vendor, purchaser (i.e. Inergi) or project Environmental Planner should there be any concern with the quality of backfill material. All backfill material should be as outlined on applicable engineered drawings.

7.2 Slurry

Soil/water slurries are generated through the use of high-pressure water assisted vacuum excavation. Slurries are accumulated in the vehicle mounted tank and are considered Liquid Industrial Waste. If the area to be excavated using a vacuum truck is suspected of containing PCBs, pre-testing of the area should be done. Contact the project Environmental Planner to discuss this. Slurries can be handled in one of three ways:

- Drying pad - See **Appendix B** for details on constructing a drying pad. A drying pad can be constructed onsite. Slurries can then be dumped into the drying pad and allowed to settle. Water should separate and evaporate from the slurry leaving a solid soil. Soil and residual water should then be analyzed for contamination. Soil can then be disposed of accordingly (see **Section 8**).
- Containment pit with sawdust - A temporary containment pit can be constructed using gravel, sand or geotextile to temporary hold the slurry while sawdust is mixed in to create a solid waste. Analysis of the solid waste should be conducted to determine appropriate disposal.
- Direct disposal as Liquid Industrial Waste - Sufficient analytical testing of the excavation area should be performed prior to excavation with the vacuum truck to determine the resultant waste classification of the liquid industrial waste to be shipped directly offsite. The site must be registered with the MOECC and all loads manifested. The Liquid Industrial Waste must be transported directly to a destination that has an MOECC Environmental Compliance Approval to receive such waste (see **Section 8**).

Review **Appendix B** for sediment removal methods. Contact the project Environmental Planner to arrange all sampling.

7.3 Water

Any dewatering (groundwater, stormwater or water in structures such as vaults or cable ducts) must be directed into tanks or impermeable structures until samples are collected and analyzed to characterize the liquid to be disposed of. Ground waters/pump-out waters are classified as liquid industrial wastes. If after analysis, pump-out water does not require special handling, it can be directed to station surfaces, stone pads around tower sites or through filtration devices (see **Appendix B**). At no time should water be directly discharged to adjacent ditches, watercourses, manholes or sewer drains as typically this water contains sediment that exceeds regulatory criteria.

In the event that dewatering is expected to be between 50,000L/day and 400,000 L/day, an EASR Registration will be required. In the event that dewatering is expected to be over 400,000 L/day, a Permit to Take Water issued by the MOECC will be required.

Contact the project Environmental Planner to discuss.

8.0 WASTE MANAGEMENT

Spoil includes all soil, gravel, concrete, pump-out waters and slurries to be disposed of offsite. All pump-out water and spoil is to be handled as if it were contaminated. The Environmental Planner will ensure that all sampling is completed to classify the waste, prior to disposal.

GENERAL WASTE MANAGEMENT CONTACTS

WASTE HOTLINE: 1-866-782-4489

GARBAGE & RECYCLING: Call WASTE HOTLINE

CONSTRUCTION SOIL/SPOIL: Call the WASTE HOTLINE.

OIL, PCB AND OTHER SUBJECT WASTES: Call the WASTE HOTLINE for disposal.

MITIGATION – WASTES

MINIMUM ACCOUNTABILITIES: Construction Site Supervisor and WASTE HOTLINE

- Minimize wastes produced and maximize reuse of assets;
- Store wastes securely on-site in appropriate storage containers/facilities;
- Segregate all wastes stored by Class;
- Maintain current inventory of all wastes stored on-site;
- Mark and label wastes to be disposed of offsite;
- Complete Part A of Manifests for wastes transported off-site as required. Manage Manifest copies (White mailed to the MOECC immediately, Green filed for at least 2 years).

8.1 Non-Hazardous (and Non-Recyclable) Solid Industrial Waste

These wastes are comprised of soil, spoil, gravel, road building materials, concrete and any other materials that are NOT commonly considered to be recyclable.

Any excess soil that does not meet the MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (Table 1: Full Depth Generic Site Condition Standards - non agricultural use dated April 15, 2011)* must be disposed of at a waste disposal site with a MOECC Environmental Compliance Approval to receive this type of waste.

8.2 Pump-Out Waters

Any dewatering (groundwater and/or stormwater) must be directed into tanks or impermeable structures until samples are collected and analyzed to characterize the class of waste to be disposed of. Ground waters/pump-out waters are classified as liquid industrial wastes. See **Appendix B** for sediment removal methods.

If pump-out water does not require special handling, it can be directed to station surfaces, stone pads around tower sites or through filtration devices. At no time should water be directly discharged to adjacent ditches or watercourses as typically this water contains sediment that exceeds regulatory criteria.

8.3 Liquid Industrial and Hazardous Waste

If Liquid Industrial and Hazardous Solid Wastes are generated, they must be registered under the MOECC Waste Generator Site Registration.

If there is no existing Waste Generation Number, and one is required contact Pete Roelofsen at 1-800-565-2660 or e-mail Waste.Management@HydroOne.com to make arrangements for the transportation and disposal of this type waste.

8.4 General Waste and Recycling (Not soil or water)

The Construction Site Supervisor, with input from the WASTE HOTLINE, must ensure wastes are managed in accordance with Regulation 347, “General - Waste Management”, under the *Ontario Environmental Protection Act*.

8.5 Transportation of Dangerous Goods (TDG) and Hazardous Products

The Construction Site Supervisor, with input from the WASTE HOTLINE, is to ensure that all dangerous goods (as defined in the *Federal Transportation of Dangerous Goods Act* and the attendant “Regulations”) and Hazardous Products are managed (i.e., handled, stored, transported and shipped) in compliance with legislation.

MITIGATION – TDG (MINIMUM ACCOUNTABILITIES: Construction Site Supervisor and WASTE HOTLINE

- Use only those dangerous goods that are absolutely necessary on-site;
- Maintain current inventory of all dangerous goods stored on-site;
- Ensure all dangerous goods stored on-site are in marked containers/facilities;
- Maintain all records and documentation, as required;
- Complete all required documentation (Bills of Lading) for all dangerous goods transported/shipped; and
- Ensure all staff involved in transporting dangerous goods, are adequately trained.

9.0 NOISE AND DUST

MITIGATION – NOISE

MINIMUM ACCOUNTABILITY: Construction Site Supervisor

- The local Noise By-law (Bylaw-6716) for the City of Windsor states there are no restrictions related to the operation of any equipment in connection with construction in commercial areas.
- Consult with local municipal officials for By-Law deviations/exceptions.

<http://www.citywindsor.ca/cityhall/By-laws-Online/Documents/By-law%206716.pdf>

10.0 WET WEATHER DELAY

In the event that a wet weather construction delay is necessary, work stoppage will be decided upon between the Environmental Planner, Construction Area Superintendent, Construction Site Supervisor and Project Manager.

11.0 SITE RESTORATION

Any exposed soils resulting from Hydro One's construction activity is to be grass seeded and protected from erosion.

12.0 ENVIRONMENTAL MONITORING

Compliance monitoring, as per the "Hydro One Networks Services Standard 4208-84200-01 R0 Environmental Monitoring Standard," is to be carried out by the Hydro One Environmental Monitor, who will plan periodic site visits based on the project activity schedule and work location of the construction crews. The timing of the visits will be discussed with the designated construction contact.

The responsibilities of the Environmental Monitor are to achieve one or more of the following goals:

- To foster open and constructive relations with the communities potentially affected by the project and identify any issues;
- To demonstrate compliance with all project commitments and legislative requirements;
- To document effects on the environment;
- To minimize effects on private properties and agricultural operations;
- To minimize environmental effects on natural habitats, flora and fauna;
- To minimize health and safety risks to local residents and construction staff;
- To document that required mitigation was implemented;

- To confirm that mitigation was implemented and effective;
- To identify unforeseen effects and ensure appropriate remedial action;
- To assess the effectiveness of mitigative measures in support of a continual improvement process;
- To confirm contractors and staff are working in compliance with environmental requirements;
- To confirm compliance with all appropriate environmental quality standards; and
- To comply with monitoring requirements as a condition of approval.

Appendix A Site Specific Issues

Appendix A1 - Bird Nest Management



Document Number: **SP 1259 R0**
Document Name: **Active Bird Nest Management**
Issue Date: **April 2011**

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<i>The requirements of this document are mandatory.</i>
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Purpose

While the Migratory Bird Convention Act (MBCA) and associated regulations prohibit harming migratory birds or their eggs/chicks some required work activities may have adverse impacts on birds, their nests and eggs.

The purpose of this document is to outline process to follow minimize adverse impacts when birds and/or active bird nests are encountered during work activities, or observed on Hydro One assets.

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1.0 Scope

This document applies to all lines of business within Hydro One Networks including staff involved in construction (capital), operation & maintenance, or emergency response activities (e.g. forestry and vegetation management, site maintenance, line work, access road construction etc), and to staff who observe active nests that may adversely impact the safe operation of assets.

2.0 Definitions

The following definitions apply to items in this document.

Active Nest	A nest that contains eggs or chicks that have not fledged. Nests may be located within vegetation (tree branches, tree cavities, shrubs, etc) or on the ground
Lead Role Person	Person who guides work on site (may be a UTS, Supervisor, Designated Crew Leader, etc.).
MBCA	Migratory Bird Convention Act
Migratory Bird	This document applies to all birds situated within the province.
Practical Mitigation	Practical steps that can be implemented to protect birds and their nests/eggs without jeopardizing system safety/reliability.

3.0 Accountabilities

Table 1: General Accountabilities

Responsible Party	Activity
LoB Leaders/BU VP Director/Manager	<ul style="list-style-type: none"> Ensure that staff are aware that harming migratory birds, their nests or eggs, is prohibited under the MBCA.
VP - HSE	<ul style="list-style-type: none"> As required, review and/or update procedures required to protect nests and eggs.
Directors - Forestry Director – Provincial Lines Director – Station Maintenance Director - ECS	<ul style="list-style-type: none"> Ensure the requirements in this document are communicated to staff members within their respective lines of business, and that supervisors and staff fulfill their obligations.
Lead Role Person	<ul style="list-style-type: none"> Ensure staff are assigned to conduct foot patrol surveys prior to work activities. When nests are discovered, examine and arrange to implement practical mitigation measures to protect active nests or eggs.
Station Services Specialist.	<p>When Nests or eggs discovered within a station environment:</p> <ul style="list-style-type: none"> determine if removal other practical mitigation is required. arrange for mitigation or permits/exterminators as required.
Employees	<ul style="list-style-type: none"> Be familiar with requirements of MBCA and the Practical Mitigation Options outlined in this document to protect eggs/nest As required: <ul style="list-style-type: none"> conduct pre-work foot patrol prior to work Implement corrective actions suggested by Lead Role person If previously undetected nest or eggs discovered during work, discuss and implement practical mitigation options to minimize impacts.

4.0 Management of Raptor Nests on Transmission and Distribution Assets (Bald Eagles, Golden Eagles, Red Tailed Hawk, Ospreys)

Consult [Forestry Practice FP 1015 Bird Nest Management](#) [1] for steps to take when raptor nests are discovered on Hydro One assets (i.e. assessing compatibility of a nest, how to protect compatible nests, specifications for nesting box, etc).

5.0 Management of Woodpecker Nests on Hydro One Assets

Consult [SP 0304](#) - Requirements for Handling Woodpecker Nests in Poles [2] for requirements on handling woodpecker nests in poles (i.e. assessing hazard, notification and permit requirements when nest removal is required, pole protection, etc.).

6.0 Management of Bird Nests Near or On Rights-of-Way.

Table 2: Locating Nests and Developing Mitigation - Accountabilities and Instructions

Accountability		Instruction
	1	For work occurring between Feb 1st & August 31st - Conduct pre-work Foot Patrol to locate active Nests
Lead Role Person	1.1	<ul style="list-style-type: none">Prior to commencement of days work - assign staff to conduct quick foot patrol within the defined work area to locate active nests in surrounding vegetation (shrubs/trees), or on the ground.
Staff assigned to conduct foot patrol to locate nests.	1.2	<ul style="list-style-type: none">Conduct site survey as outlined in Section 6.1
Lead Role Person	1.2	<ul style="list-style-type: none">Determine practical mitigation steps as per Section 6.2.Document options in local work plan.If required, assign specific duties to staff to implement practical mitigation option.
Staff assigned to implement protection requirements.	1.4	Implement actions required to protect nests, eggs, chicks.
All Staff	1.5	Conduct work activities in accordance with work plan.
	2.0	Nests Not Found During Foot Patrol, but Discovered During Work.

All Staff	2.1	<ul style="list-style-type: none"> • Refer to practical mitigation options in section 6.2 to minimize impacts on nest site. • Select option that will minimize impacts on nest site without compromising system security. • Inform Lead Role Person On Site of proposed mitigation.
Lead Role Person On Site	2.2	<ul style="list-style-type: none"> • Confirm mitigation option with staff. • If required, document option in work plan.

6.1 Foot Patrol to Locate Birds/Nests

Between Feb 1st and August 31st, conduct a quick foot patrol on a daily basis at the beginning of the day/prior to work activities. The surveyor shall:

1. Walk through the immediate area where work is to occur (or staff/equipment need to travel) to determine if active nests are present on the ground, in vegetated area (grass, brush, trees), or on other structures (poles/towers, man-made structures, etc). The sighting of adult birds, or listening for adults or chicks, may help identify the location of active nests.

Attempt to determine if nests may be located within the zone sizes noted in Table 3. These may range from 3 metres (for Song Birds) to several hundred meters for larger species.

Click to view: [Table 3: Buffer Zones \(meters\) for Select Birds.](#)

2. Document location of active nests, and if possible note the species.
3. Notify Lead Role Person of survey findings.

6.2 Practical Mitigation Options for Nests Near or On Distribution or Transmission Rights-of-Way.

For nests discovered during survey, or previously non-observed nests found after work has begun, the following practical mitigation should be utilized to protect nests with eggs or chicks.

- Delay Activity in the area if doing so will not compromise system security (i.e. safety or reliability). Reschedule work after chicks have fledged (approximately three weeks following hatching).

Establish buffer zone around nest site if the work can't be delayed (e.g. emergency response situation, or imminent threat to system security). Consult Table 3 for suitable buffer sizes. Once work is complete and access to the area is no longer required, materials used to mark the buffer zone must be removed.

6.2.1 Additional Mitigation Options for Nests in Trees.

If the mitigation measures outlined in 6.2 cannot be implemented (i.e. activity cannot be delayed) and the activity may directly impact an active nest in a tree, the following options should be considered to minimize impacts:

- Whenever possible use an aerial device to work on the tree
- If required to climb the tree, tie in and climb as far away as possible from the nest.
- Where possible, avoid tying to a limb that supports the nest or tying in a way that causes a rope to brush by a nest.
- Where possible, avoid climbing on the limb that supports the nest.
- On trees, only trim necessary branches and attempt to leave the branch with the nest intact.
- When performing trimming work, use the tool that will cause the least disruption to the nest, considering noise, vibration and length of time to perform the work.
- When practical, do not drop limbs/wood within the canopy of the tree containing the nest.

7.0 Management of Bird Nests within Distribution or Transmission Stations.

Table 4: Bird Nests in Stations Accountabilities and Instructions

Accountability		Instruction
	1	Nests in Stations
All Staff	1.1	Notify Station Services Specialist if nests are located on station property.
Station Services Specialist.	1.2	When nest discovered within a station: <ul style="list-style-type: none"> Assess nest to determine if it may create a hazardous situation such as an outage.
	1.3	<ul style="list-style-type: none"> Leave Non-hazardous intact and protect if required (e.g. establish buffer zone).
	1.4	<ul style="list-style-type: none"> If a nest is deemed hazardous arrange for a licensed contractor/exterminator to: a) obtain permit from the Canadian Wildlife Service (905) 336-4464 (905) 336-4533, and b) remove nest/ undertake additional actions, and.
	1.5	<ul style="list-style-type: none"> If required arrange for the installation of nesting deterrent devices (see HO0366 - R2 Installation of Anti-Animal Device for Capacitor Banks [4]).

8.0 References

1. [FP 1015 Bird Nest Management](#) (includes specifications for Raptor nests)
2. [SP 0304](#) - Requirements for Handling Woodpecker Nests in Poles
3. “*Forest Management Guide for Conserving Biodiversity at the Stand and Site Scales* Forests Branch Ontario Ministry of Natural Resources March 18, 2010” Summary of Section 4.2.2 Bird Nest Sites (pgs 62-90); and Appendix 4.2 Assessing the Potential Impact of Forest Management Operations on Nesting Birds (pgs 192-193).
4. [HO0366](#) - R2 Installation of Anti-Animal Device for Capacitor Banks

9.0 Document History

This document will be reviewed every five years or more frequently as required.

Version #	Date	Brief Description of Revisions
R0	April 11, 2011	New - This procedure was created to establish the Networks requirements for protecting bird nests and eggs.

10.0 Document Authorization

Recommended Jim Ferguson, Sr. Network Management Eng/Officer, Sept 24, 2015
by:

Approved by: Mary Gordon, Director Environment, Sept 24, 2015

Effective Date: Sept 24, 2015

Appendix A2 - Rare and At Risk Species

Butler's GarterSnake **(*Thamnophis butleri*)**

1.0 Status

COSEWIC: Endangered

SARA: Threatened

OMNR/SARO: Endangered



2.0 Description

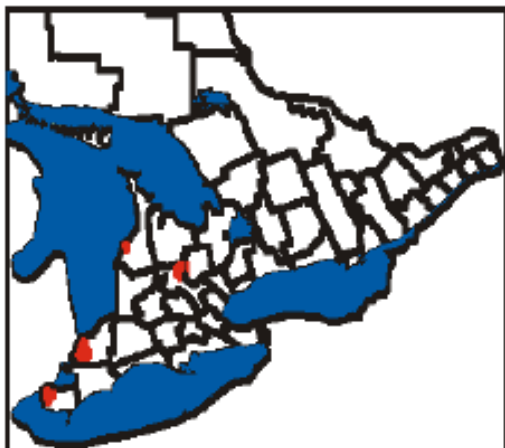
- Butler's Garter Snake is a small snake growing to about 50 cm in length
- It has the vertical striping of most garter snakes but it is smaller, especially its head
- Back is black with a yellow stripe on either side and a tan stripe down the middle as well as a brown checkered pattern below each yellow stripe
- When moving on a hard surface it 'side-winds' across moving forward very slowly compared to its side to side motion

3.0 Life Cycle

- Prey upon earthworms, leeches, insects, mice or salamander
- Active from April to September and hibernates during the winter
- Mating occurs in April and females will lay 8-10 eggs in June/July

4.0 Habitat and Distribution

- Ontario distribution of Butler's Garter Snake is patchy and limited to the South-western portion of the province
- Habitat consists of tall-grasses, open fields with seasonally wet areas, small marshes and may be found under rocks, debris and around old foundations
- Uses burrows made by small animals and crayfish for hibernation sites (hibernacula)
- Can travel up to 300m within their home range



5.0 Factors Affecting Population

- Mortality due to road kills
- Reduction in habitat due to wetland drainage and loss of open areas such as prairies also limits its population

Eastern Foxsnake (Pantherophis gloydi)

1.0 Status
Endangered



2.0 Description

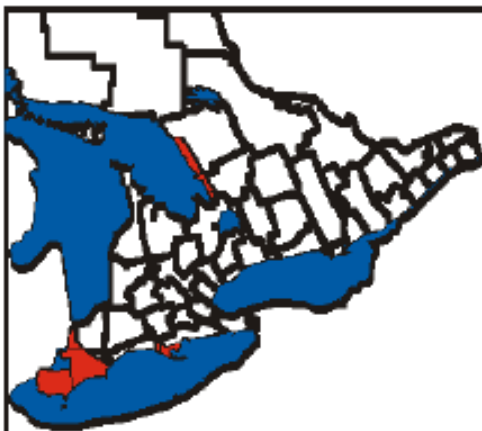
- Ontario's second largest snake reaching 1.75 m in length
- Copper or yellowish-brown in colour with dark blotches along its back and sides
- The young are usually grey
- Often mistaken for the Massasauga Rattlesnake due to its similar appearance and vibrating tail when threatened however, it is not venomous and usually quite passive

3.0 Life Cycle

- Preys upon small mammals and birds
- Mating occurs in June and females lay 6-29 eggs in June and July
- Hibernation occurs from October to April in animal burrows, bases of utility poles, canals, wells, building foundations and large, composted woodpiles

4.0 Habitat and Distribution

- Usually found near water in wetlands, woodlands, prairies and hedgerows and they will enter barns, ditches and cross roads when hunting
- Takes shelter in brush piles, tree stumps, root systems and bask on rocks or driftwood
- Good swimmers; can swim 2 km between wetland habitats
- About 70% the global range of the Eastern Foxsnake is found in Ontario in Essex-Kent and Haldimand-Norfolk counties (Carolinian) and another population on the shores of Georgian Bay (Great Lakes/St. Lawrence)



5.0 Factors Affecting Population

- Habitat loss from wetland drainage and cottage construction on shorelines
- Often victims of road mortality and the illegal pet trade
- Sometimes deliberately killed because they are thought to be dangerous and are confused for venomous snakes like copperheads and rattlesnakes

Appendix A3 - Invasive Plants

Phragmites (*Phragmites australis* subsp. *australis*)

(also known as Common Reed)



1.0 Status

- Invasive Species

2.0 Description

- Perennial, wetland grass; similar to native species (subspecies *americanus*)
- Up to 5 m in height; produces dense monoculture (native variety does not form monoculture and does not grow higher than 2 m).
- Stems: beige, tan in colour, rough and dull, rigid.
- Leaves: blue-green, leaves remain attached are difficult to remove
- Large, dense triangular to diamond-shaped seedhead

3.0 Life Cycle and Dispersal

- Reproduces by dispersing seeds, by roots via rhizomes, or by stolon fragments. Even small fragments of live *Phragmites* vegetation can grow into dense stands if transported to new habitats.
- Dispersal through water, air, or animal movement, and through human actions and equipment.
- Dormant: November – March
- Flowering: August – September

4.0 Habitat and Distribution

- Southern Ontario, as far north as Georgian Bay and Lake Superior.
- Much of the biomass is found underground, in an intricate system of roots and rhizomes.
- Thrives in disturbed habitats (such as roadside ditches) and is often among the first species to colonize a new area.
- Prefers areas of standing water but the roots can grow to extreme lengths allowing the plant to survive in low water areas.

5.0 Methods of Removal

Control	Description	Timing	Type of Control
Herbicide	<ul style="list-style-type: none"> • Most effective; Cost effective. • Do NOT spray if there is standing water in the area where phragmites exist. Best applied as a spot application using a backpack sprayer. • In North America, there are two herbicide active ingredients shown to be effective in Phragmites control: glyphosate and imazapyr. 	<ul style="list-style-type: none"> • Apply early spring, when plants begin to emerge, until late fall, when the first heavy frost causes significant die off. • Depending upon the type and density of wildlife usage, may be best left for late summer or fall when wildlife usage is generally far less. 	Removal
Cutting	<ul style="list-style-type: none"> • Low cost; labour-intensive • Ineffective as standalone method; effective only with other methods (i.e., herbicides or tarping). 	<ul style="list-style-type: none"> • Late July to early August (flowering/seed production phase) 	Seed population control

Pulling/ Excavation	<ul style="list-style-type: none"> • Not recommended; very labour intensive, • Only recommended when can be assured that no plant material remains onsite (i.e., mechanical excavation) • When hand-pulling is the only option, it is most effective on plants that are less than two years old and found in dry, sandy soils. 		Seed population control
Tarping	<ul style="list-style-type: none"> • Before tarping, cut plants to less than 10 cm, and remove or flatten dead biomass. • Cover with anchored dark plastic tarp or geotextile sheets. • Only effective in areas with high sun exposure; May not be effective in standing water 	<ul style="list-style-type: none"> • Tarp must stay in place for minimum of 6 months 	Seed population control

6.0 Disposal

- Clippings should not be composted; cut plants should be bagged in thick plastic bags, and allowed to dry out or decay in the sun to kill all viable seeds and rhizomes.
- Dried and dead *Phragmites* plants can be burned or the bags must be disposed at an appropriate municipal staging or disposal location.

7.0 Special Considerations

- When leaving an area containing *Phragmites*, be sure to brush off clothing and clean off equipment on-site to avoid the transfer of seeds or plant fragments to new sites.

Appendix A4 - Clean Equipment Protocol

Clean Equipment Protocol for Hydro One

This is a guideline on how to keep construction equipment and other business-related vehicles clean, to minimize and the unintentional spread of non-native invasive species (NNIS) within Ontario.

Who:

Any employee, consultant or contractor of Hydro One who is responsible for operating heavy equipment, a fleet vehicle, or a privately owned/rental vehicle for Hydro One business.

When:

Cleaning is required when an inspection identifies visible dirt clods and plant material or when moving from one area to another. Depending on the invasive species present, vehicles may need to be cleaned even when deep snow is present (some NNIS can still spread in packed snow).

Inspect:

Inspect the vehicle thoroughly inside and out for where dirt, plant material and seeds may be lodged or adhering to interior and exterior surfaces (attention should be paid to the underside of the vehicle, radiators, spare tires, foot wells and bumper bars).

If clods of dirt, seed or other plant material are found, removal should take place immediately.

Clean:

Interior - Clean by sweeping, vacuuming or using a compressed air device. Particular attention should be paid to the floor, foot wells, pedals, seats and under the seats.

Exterior - Knock off all large clods of dirt. Use a pry bar or other device if necessary. The vehicle should be turned off for cleaning.

- Clean the areas that may require cleaning with compressed air, such as radiators and grills, prior to using water.
- Clean the vehicle with a high pressure hose in combination with a stiff brush and/or pry, work from the top down to the bottom.
- Emphasis should be placed on the undersides, wheels, wheel arches, guards, chassis, engine bays, radiator, grills, etc.
- When the cleaning is finished avoid driving through the waste water when removing the vehicle or equipment from the cleaning site.

Conduct a final inspection to ensure no clods of dirt are visible, and radiators, grills and the interiors of vehicles are free of accumulations of seed, soil, mud and plant material parts.

Where:

Where practical and feasible, a cleaning staging area may be set up to control debris removed from the vehicles (refer to Figure 1) a minimum of 30 metres away from any watercourse, and must be adequately located away from any identified hazards. Ideally this area should be mud free, gravel covered or a hard surface. If this option is not available, choose a regularly mowed grassy area.

Figures



Figure 1 - Example Cleaning Staging Area

4WD VEHICLE WITH KEY SPOTS TO CHECK AND CLEAN

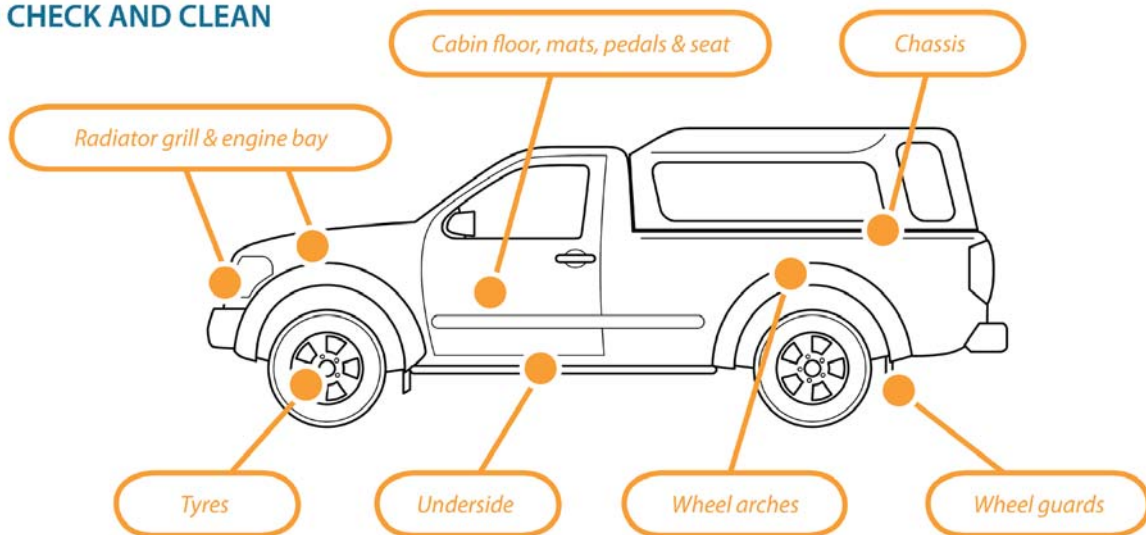


Figure 2 - 4WD Vehicle with Key Spots to Check and Clean

EXCAVATOR WITH KEY SPOTS
TO CHECK AND CLEAN

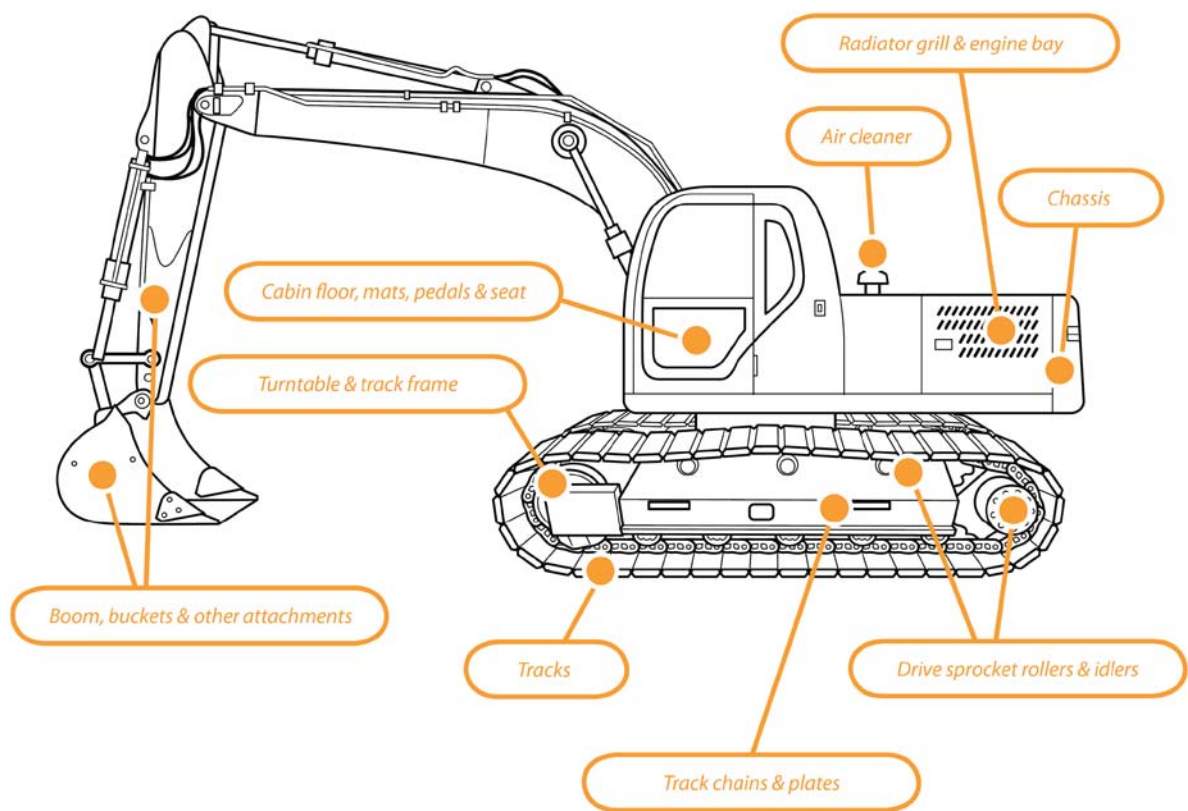


Figure 3 - Excavator with Key Spots to Check and Clean

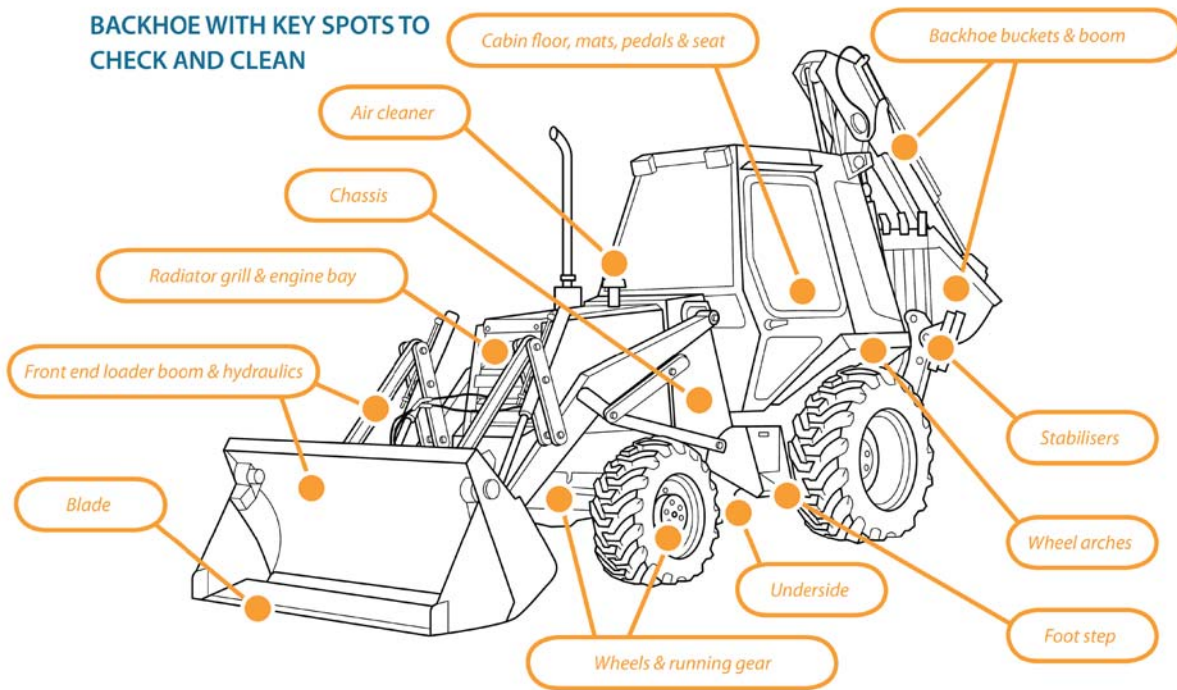


Figure 4 - Backhoe with Key Spots to Check and Clean

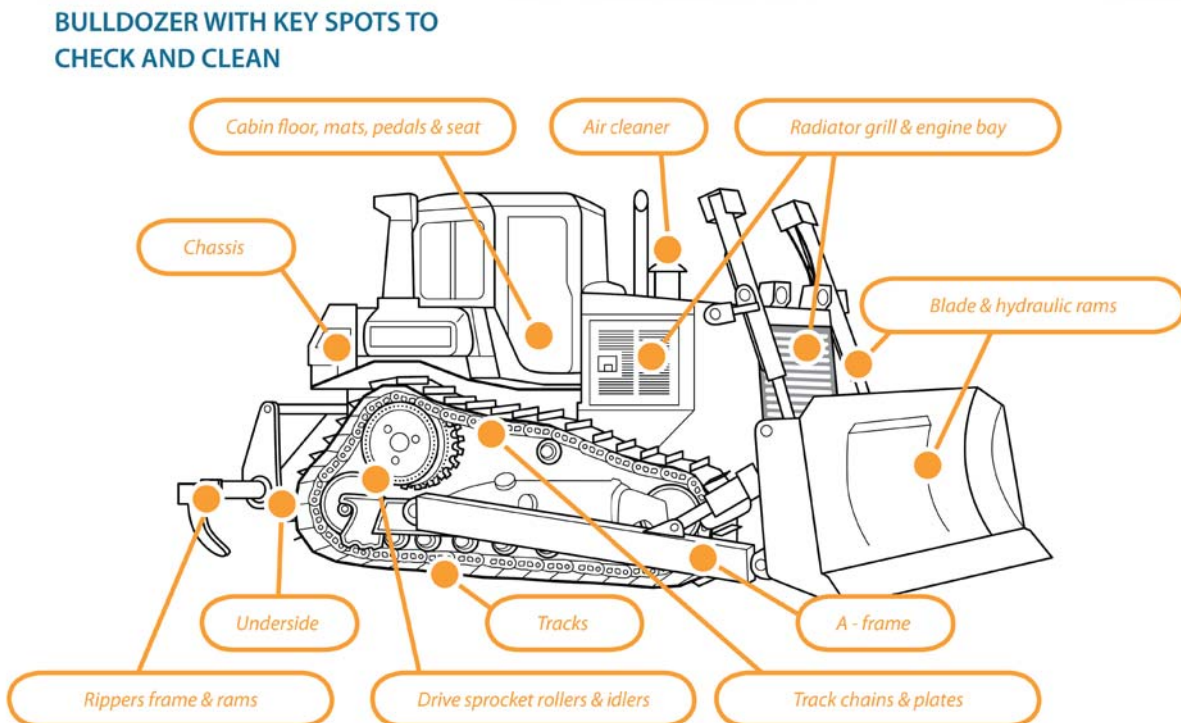


Figure 5 - Bulldozer with Key Spots to Check and Clean

BEST MANAGEMENT PRACTICES FOR PREVENTING THE SPREAD OF INVASIVE PLANT SPECIES DURING CONSTRUCTION



Invasive plant species are non-native plants that out-compete native plant communities for essential elements necessary for survival. They are a significant threat to Ontario's native biodiversity, and natural areas. Invasive plant species can spread through a variety of vectors. Soil disturbance associated with construction sites is one vector that makes our native plant communities vulnerable to invasive plant species. Prevention is the best approach to this issue and can be achieved with a variety of Best Management Practices (BMP's).



Phragmites australis

By following these BMPs, the real costs are addressed up front, assisting municipalities, landowners, consultants and contractors in avoiding additional and often much greater costs for post-construction invasive species management.

To be most effective it is recommended that the suggested techniques be incorporated at pre, during and post stages of construction.

Please visit the Central Lake Ontario Conservation's website for a full version of the BMP document and additional resources on Invasive Species identification and management.



100 Whiting Avenue, Oshawa,
ON L1H 3T3
Tel: (905)-579-0411,
Fax: (905) 579-0994,
E-mail: mail@cloca.com
Web: www.cloca.com

ADDITIONAL RESOURCES

Ontario Invasive Plant Council
www.ontarioinvasiveplants.ca
OFAH Invading Species Awareness Program
www.invadingspecies.com
North American Native Plant Society
www.nanps.org

PRE CONSTRUCTION

Inventory

- conduct baseline surveys prior to construction to determine presence of invasive plant species and extent of the population
- photographically document with dated digital images

Control of existing populations

- invasive species populations that cannot be avoided should be controlled where possible
- management techniques generally need to be continued for several years (at least 5 years) to exhaust the seed bank in the soil
- visit www.cloca.com for information on current management techniques

Clean Fill

- Source out clean fill from a reliable source, ensuring it is free of non-native seed.

DURING CONSTRUCTION

Sanitizing Equipment

- Earth moving and excavation equipment (motorized or hand powered) should be cleaned and inspected prior to entering and exiting the site
- Use a pressurized washer if possible
- Clean footwear and tools properly before entering and exiting the site
- Handheld cleaning brushes work well as portable boot and tool scrubbers

Seed Mix and Timing

- Reseeding a construction site restores and stabilizes disturbed soils and prevents erosion
- Reseed all disturbed sites immediately following completion of each phase of the project, preferably with native locally sourced seed
- Visit www.cloca.com for information on seed sources and types

POST CONSTRUCTION

Monitoring

- Conduct follow-up inspections to ensure invasive species have not become established or spread
- Photographically document with dated digital images
- Take immediate remedial actions if there is an increase or new presence of an invasive species

Appendix A5 – H₂S Fact Sheet

OSHA FactSheet

Hydrogen Sulfide (H₂S)

Hydrogen sulfide is a colorless, flammable, extremely hazardous gas with a “rotten egg” smell. Some common names for the gas include sewer gas, stink damp, swamp gas and manure gas. It occurs naturally in crude petroleum, natural gas, and hot springs. In addition, hydrogen sulfide is produced by bacterial breakdown of organic materials and human and animal wastes (e.g., sewage). Industrial activities that can produce the gas include petroleum/natural gas drilling and refining, wastewater treatment, coke ovens, tanneries, and kraft paper mills. Hydrogen sulfide can also exist as a liquid compressed gas.

Hazardous properties of H₂S gas

Hydrogen sulfide is heavier than air and may travel along the ground. It collects in low-lying and enclosed, poorly-ventilated areas such as basements, manholes, sewer lines, underground telephone vaults and manure pits.

For work within confined spaces, use appropriate procedures for identifying hazards, monitoring and entering confined spaces.

The primary route of exposure is inhalation and the gas is rapidly absorbed by the lungs. Absorption through the skin is minimal. People can smell the “rotten egg” odor of hydrogen sulfide at low concentrations in air. However, with continuous low-level exposure, or at high concentrations, a person loses his/her ability to smell the gas even though it is still present (olfactory fatigue). This can happen very rapidly and at high concentrations, the ability to smell the gas can be lost instantaneously. Therefore, **DO NOT** rely on your sense of smell to indicate the continuing presence of hydrogen sulfide or to warn of hazardous concentrations.

In addition, hydrogen sulfide is a highly flammable gas and gas/air mixtures can be explosive. It may travel to sources of ignition and flash back. If ignited, the gas burns to produce toxic vapors and gases, such as sulfur dioxide.

Contact with liquid hydrogen sulfide causes frostbite. If clothing becomes wet with the liquid, avoid ignition sources, remove the clothing and isolate it in a safe area to allow the liquid to evaporate.

Health effects of H₂S exposure

Hydrogen sulfide is both an irritant and a chemical asphyxiant with effects on both oxygen utilization and the central nervous system. Its health effects can vary depending on the level and duration of exposure. Repeated exposure can result in health effects occurring at levels that were previously tolerated without any effect.

Low concentrations irritate the eyes, nose, throat and respiratory system (e.g., burning/tearing of eyes, cough, shortness of breath). Asthmatics may experience breathing difficulties. The effects can be delayed for several hours, or sometimes several days, when working in low-level concentrations. Repeated or prolonged exposures may cause eye inflammation, headache, fatigue, irritability, insomnia, digestive disturbances and weight loss.

Moderate concentrations can cause more severe eye and respiratory irritation (including coughing, difficulty breathing, accumulation of fluid in the lungs), headache, dizziness, nausea, vomiting, staggering and excitability.

High concentrations can cause shock, convulsions, inability to breathe, extremely rapid unconsciousness, coma and death. Effects can occur within a few breaths, and possibly a single breath.

Protection against H₂S exposure

Before entering areas where hydrogen sulfide may be present:

1. Air must be tested for the presence and concentration of hydrogen sulfide by a qualified person using air monitoring equipment, such as hydrogen sulfide detector tubes or a multi-gas meter that detects the gas.

Testing should also determine if fire/explosion precautions are necessary.

2. If the gas is present, the space/area must be ventilated continually to remove the gas.
3. If the gas cannot be removed, the person entering the space/area must use appropriate respiratory protection and any other necessary personal protective equipment, rescue and communication equipment.

OSHA's Confined Spaces standard contains specific requirements for identifying, monitoring and entering confined spaces.

Entering dangerous H₂S atmospheres

A level of H₂S gas at or above 100 ppm is Immediately Dangerous to Life and Health (IDLH). Entry into IDLH atmospheres can only be made using: 1) a full facepiece pressure demand self-contained breathing apparatus (SCBA) with a minimum service life of thirty minutes, or 2) a combination full facepiece pressure demand supplied-air respirator with an auxiliary self-contained air supply.

If H₂S levels are below 100 ppm, an air-purifying respirator may be used, assuming the filter cartridge/canister is appropriate for hydrogen sulfide. A full facepiece respirator will prevent eye irritation.

If air concentrations are elevated, eye irritation may become a serious issue. If a half-mask respirator is used, tight fitting goggles must also be used.

Workers in areas containing hydrogen sulfide must be monitored for signs of overexposure.

NEVER attempt a rescue in an area that may contain hydrogen sulfide without using appropriate respiratory protection and without being trained to perform such a rescue.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:



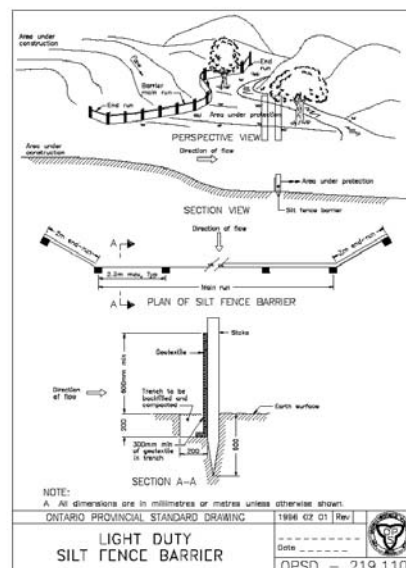
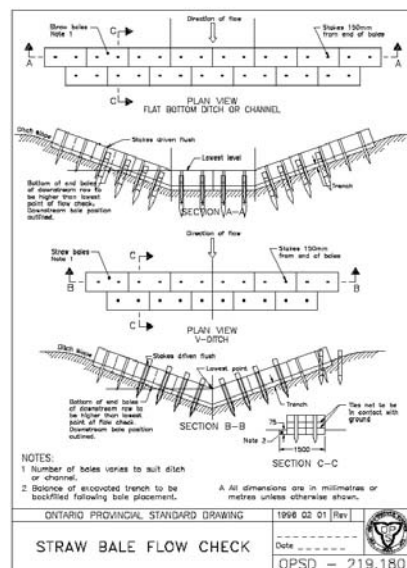
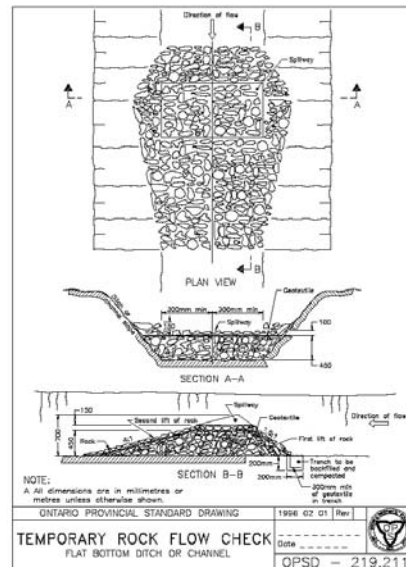
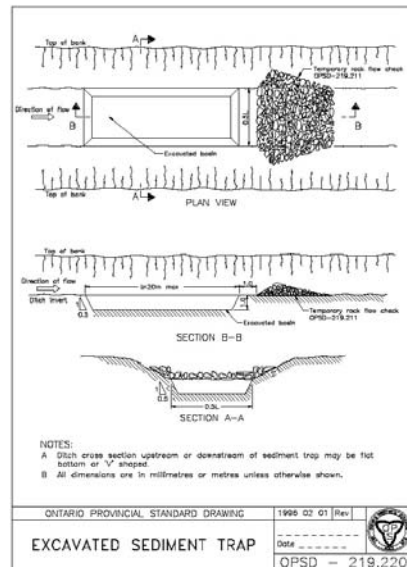
U.S. Department of Labor

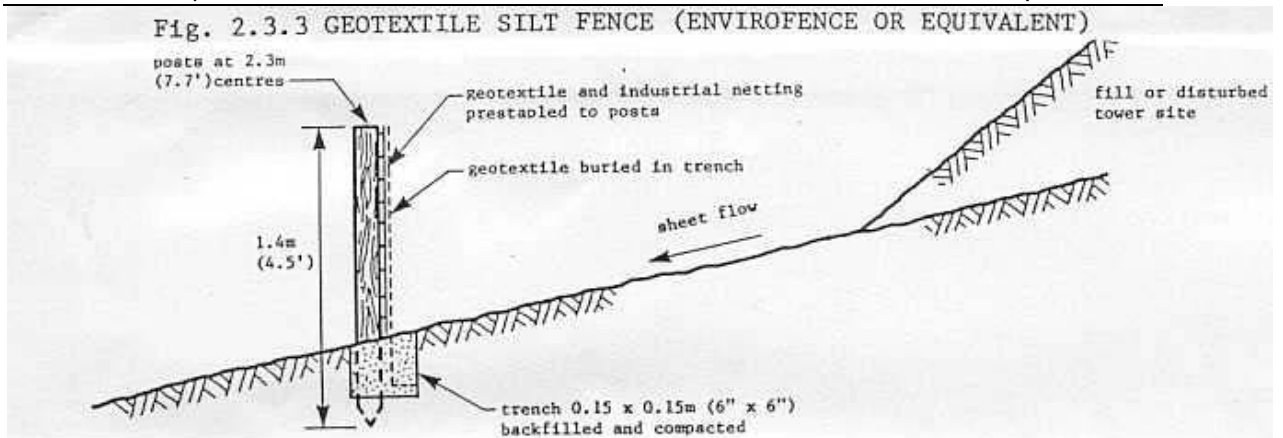
www.osha.gov

(800) 321-OSHA

DSG 10/2005

Appendix B Erosion and Sediment Controls

Sediment & Erosion Control Plans**Sediment and Erosion Control Plan**



Appendix C

Criteria to Re-Use Contaminated Soil on Hydro One Owned Property

RE-USE OF CONTAMINATED SOIL ON HYDRO ONE OWNED PROPERTY

Excavated soil may not necessarily be classified as a "waste" if it has a purpose (i.e. to be used as backfill). **All** criteria below must be met to re-use contaminated material as backfill. **Criteria are met if the shaded box is marked.**

	Yes	No
1. The material consists solely of earth and does not include aggregate, rock, bituminous material, coal or coal residue, concrete, masonry, wood, debris, metal, plastic, or any other waste material or construction debris.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Potential for off-site migration of contaminants (soil or groundwater).	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Adverse effect (specifically this would pertain to off-site given that on-site, workers would be equipped with appropriate PPE).	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. The material removed will be re-used for the purpose of backfilling.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. The material will be backfilled in the same location from which it was removed and not transported to another part of the site.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. The material will be backfilled within 100 m of water wells.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. The material will be backfilled within 100 m of residences.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. The material removed is located in close proximity of a fence line and/or property line where the potential for adverse effect would be greater.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Groundwater encountered during excavation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. The material is backfilled around perforated drainage pipes.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. The contaminated material will be used as backfill providing the surrounding soil is also contaminated or assumed/expected contaminated based on knowledge of the site and results of previous subsurface investigations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. The contribution of the contaminated materials increases the likelihood of contamination going off-site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. There are waterbodies, catchbasins, manholes, drainage swales etc. within 30 m of the location where the contaminated material will be used as backfill.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Appendix D Hydro One Backfill Testing Procedure

Backfill Testing Procedure



The following procedure is intended to address that the quality of all backfill (granular, topsoil etc.) material.

1. Remedial Contractor identifies all backfill sources (origin site(s)) to be used.
2. Contractor physically goes to the origin site(s) and takes 2 – 3 composite samples of the backfill material and submits to the lab for analysis.
 - Granular backfill; analysis should consist of a full ICP metals including arsenic and PHC in the F1 to F4 ranges;
 - Topsoil will be analyzed for full ICP metals including arsenic, semi-volatiles (PAHs) and volatile organic compounds (EPA 624). The topsoil will not be analyzed for PHC given the organic nature of topsoil.

The backfill analytical results will be compared to the Table 2 potable criterion. Please note some Ministry of the Environment jurisdictions request that backfill be of pristine quality (i.e., Table 1); however, this may not be practical as elevated concentrations of certain metals in some areas of the province exceed Table 1 criterion.

3. The Contract Monitor and Consultant will review the analytical results and provide their collective approval to the Contract Administrator (Project Coordinator) for the final review and approval...
4. Contractor obtains a sample of the first delivery (topsoil or granular) and sends to lab for analysis as per item 2.
5. Contractor obtains samples from 5% of the first 100 deliveries (topsoil or granular) and 2% of the remaining deliveries. Topsoil will be analyzed as per item 2 however granular will be only tested for ICP metals including arsenic.
6. Contract Monitor will observe the delivery of fill to flag potential problems.

Appendix E Excavation/Testing/Disposal of Excess Spoil

Excavation/Testing/Disposal of Excess Spoil

NOTE: SPOIL INCLUDES – soil, soil/water slurry, gravel, fines, access road materials, jackhammered concrete chunks, etc.

1.0 SIGHT AND ODOUR TEST AND PRIOR KNOWLEDGE:

DO NOT REUSE spoil materials without testing if you have prior knowledge of site contamination (see Environmental Specification, **Appendix E - Sediment Removal Methods** or if any of the following is detected during excavation:

- Staining or discoloration;
- Visible sheen on liquid or solid surfaces;
- Odour (e.g., aromatic hydrocarbons such as benzene); and/or
- Marked change in soil texture/consistency (pockets of wetness due to spills of chemicals may cause clumping or aggregation of spoil).

If any of these signs is obvious, or if you are otherwise unsure about site contamination, solid spoil must be stockpiled within properly “toed-in” sediment fences and covered with waterproof tarpaulins, such that the stockpiles cannot slump or otherwise erode or enter into any water, drainage, ditch or sewer/drainage grate.

Note: Spoil from Lines Construction projects shall be assessed jointly by the CSS and the EP prior to disposal. Low risk spoil may be disposed of as per Section 3.1 below.

2.0 SOLID SPOIL

2.1 REUSE IN MINOR (NARROW/SHALLOW/SHORT) EXCAVATIONS

If solid spoil excavated from minor (narrow/shallow) excavations (trenches, post holes, etc.) passes the “sight and odour test” (i.e., no obvious signs of contamination), backfilling of such material into the excavations of origin in stations or on rights-of-way is permitted. Compact all backfilled material.

- Stations: Apply 7-10 cm (3-4 inches) of appropriate gravel cover on top of backfill to prevent movement of untested and potentially contaminated sediment.
- Lines: Use spoil to backfill around footings/foundations/poles/etc. where possible. Excess may be spread around excavation areas and “feathered” to surrounding grade. If this is done, final treatment shall consist of stabilizing the spoil surface via top-soil (if needed), grass seed, sod and/or erosion control blankets.

NOTE: If such spoil can/will not be reused as outlined above, call the Environment Planner for sampling/testing/disposal options.

2.2 REUSE/DISPOSAL FROM MAJOR (WIDE/DEEP/LONG) EXCAVATIONS

Solid spoil from major (wide/deep/long) excavations for foundation installation, spill containment, building installation, etc. shall be temporarily stockpiled within properly toed-in sediment fences and covered with waterproof tarpaulins if contaminant levels are unknown, such that these stockpiles can not slump or otherwise erode or enter nearby water, drainage ditches or sewer/drainage grates.

- Stations: Backfilling of “major” excavations with excavated soil/spoil from the same location is not permitted, unless the soil/spoil is tested and contaminant levels are below appropriate

Ministry of the Environment Standards. Contact the Environment Planner for sampling/testing/disposal options.

- Lines: Backfilling of “major” excavations with excavated soil/spoil from the same location is permitted provided the CSS and EFS have agreed that the risk of contamination is minimal and the potential for deleterious environmental effects is negligible.

3.0 LIQUID SPOIL

A NOTE ON WATER/SLURRY CONTAMINATION

Construction pump out water/slurry may be contaminated with substances either in solution or in suspension, and is classed as a “liquid industrial waste”. Remember that sediment trapping devices/ponds are NOT adequate to contain contaminants in solution (unless waterproof) – secondary containment is required under these circumstances. They must, therefore, be initially pumped directly into full containment while awaiting sampling and testing, unless the CSS and EFS have agreed that the risk is low. Note: “Clouded” (sediment-laden) waters shall only be pumped through sediment trapping devices.

3.1 Pump out Waters (from “natural” environment)

- Stations: **All pump out waters are “LIQUID INDUSTRIAL WASTES”** and shall be directed into full containment until samples are collected and analyzed, and laboratory testing has confirmed that contaminant levels are low enough to permit pumping onto immediately adjacent stoned surfaces. If waters are pumped onto station surfaces, they must be directed away from all points of drainage. Pumping of such waters into storm and/or sanitary sewer systems and any manner of drainage or waterway is prohibited unless such waters have been tested, and (for sanitary sewers) permission is obtained from the municipality/government having jurisdiction.
- Lines: **All pump out waters “ARE LIQUID INDUSTRIAL WASTES”** and shall be directed into full containment unless the CSS and EP have agreed that the risk of contamination is low and that pumping onto adjacent ground surfaces will not result in deleterious environmental effects (erosion, sedimentation, siltation, etc.). Such waters shall not be discharged into storm and/or sanitary sewer systems or into local points of drainage without the express permission of the municipality/government having jurisdiction.
- **Reference:** Ministry of the Environment - *Registration Guidance Manual for Generators of Liquid Industrial and Hazardous Waste, 2001*

3.2 Slurries

Slurries are generally generated via a “hydro-jet” excavating process, and are immediately pumped back into the vehicle-mounted tank. **ALL SUCH SLURRIES ARE CONSIDERED “LIQUID INDUSTRIAL WASTES”.**

- Stations: Slurry containing only sediments (and contaminants below Ministry of the Environment Standard levels) may be deposited, if desired, on THE SAME STATION PROPERTY, and must be directly deposited into a waterproof liner to allow all water to evaporate. When water has evaporated, the remaining material (usually non-hazardous solid industrial waste) must be tested and disposed of in full compliance with legislated requirements. Sediment fences and sediment ponds (see Environmental Specification **Appendix E – Sediment Removal Methods**) shall be installed at locations where sedimentation/sheet erosion could cause movement of such soil. **NOTE: If such slurries are removed from the station site by the contractor (e.g., Badger), the site must be registered and a Waste Manifest must be completed. The slurry must be transported to a destination that has a C of A authorizing it to accept such materials (Waste Class 146L).**

- Lines: All slurries generated at Lines Construction sites shall be removed by the Contractor.
NOTE: All sites where such slurries are generated shall be registered, and a Waste Manifest must be completed.

3.3 Pump out Waters (from “man-made” structures)

Catchbasins, vaults, cable ducts, etc. often must be pumped out during construction operations. These structures may contain both liquids and solids (in suspension or as deposited sediments). These materials are usually vacuumed out. All such materials, if not sampled and analyzed prior to vacuuming, shall be contained within the vacuum truck. **NOTE: Each site where such materials are generated must be registered and a Waste Manifest completed.**

Appendix F Requirements for Secondary Containment Structures

Secondary Containment of Oil Filled Equipment

Material Handling

- Create a containment area with bermed edge, lined it with a minimum of 6 ml polyethylene plastic for large equipment. All waste in temporary storage must be covered and contained.
- All decommissioned equipment containing 50 ppm or more PCBs must be sent directly to a destruction facility or stored in a PCB storage site within 30 days.



- Segregate all PCB waste from all other waste classes before placing into containment.
- Store all PCB liquid (>50 ppm), on a floor or surface that is made of steel, concrete, or any other similar material and that is constructed with curbing or sides that are capable of containing
 - If one piece of equipment being stored, 125% of the volume of the equipment;
 - If more than one piece of equipment being stored, twice the volume of the largest piece of equipment or 25% of the volume of all the PCB liquid stored.
- Drain all oil out of the oil level indicator glass as well as any equipment that is leaking.



- Site crew will be responsible to provide the requested information, assist/arrange for packaging and loading of the PCB waste equipment.