



SOUTH NATION  
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## South Nation River Conservation Authority (SNC)

### Bid Document

## Request for Quotes (RFQ)

### Oak Valley Streambank Restoration

#### Opening Date

**Date: January 19, 2024**

#### Closing Date

**Date: February 2, 2024**

**Time: 4:00 p.m. local time**

Submit Electronically to: [mcavanagh@nation.on.ca](mailto:mcavanagh@nation.on.ca)

Attn: Michelle Cavanagh,  
Team Lead, Special Projects

#### **Late bids will not be accepted.**

SNC reserves the right to accept or reject all or part of any Bid and also reserves the right to accept other than the lowest Bid and to cancel this Call for Bids at any time.





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## 1. Purpose and Introduction

South Nation Conservation (SNC) is planning to complete erosion control and streambank restoration along the South Nation River in Oak Valley, Inkerman, North Dundas Township. SNC is seeking a qualified contractor to complete the construction of the pre-designed project.

The proposed project includes site preparations and tree removal from the banks of the South Nation River. Reshaping and excavating will be completed along the banks of the South Nation River to reduce erosion and bank slumping. Terraces along the river will be shaped, seeded, and covered with erosion control blankets. Finally, live staking and a conifer bank treatment will be applied. An approximate route for access to the sites is included in **Appendix E**.

The contractor will be tasked with fulfilling a construction and site design plan prepared by others and removing all erosion control measures and materials when the site has been deemed stabilized by SNC.

Please note that SNC reserves the right to terminate the contract with the Vendor if weather or site conditions do not permit fulfilling the construction design.

For detailed requirements of the project, please refer to **Appendix B, Specifications**.

In this RFQ, the successful Bidder shall be referred to as the “**Vendor**”.

### 1.1 Appendices

- ‘Appendix A’ – Acknowledgements
- ‘Appendix B’ – Specifications
- ‘Appendix C’ – Design Drawings and Details
- ‘Appendix D’ – Pricing Form
- ‘Appendix E’ – Site Location and Access Route
- ‘Appendix F’ – Clean Equipment Protocol for Industry

## 2. Closing Time

One copy of the RFQ Bid Document properly signed is to be submitted to SNC **prior to 4:00 p.m. on Friday, February 2, 2024 (the “Closing”)** as outlined in Section 5.2.



Time registered on SNC's email system will be considered the official time to determine exact time of submission.

Submissions received after the Closing will not be accepted.

### **3. Opening**

All Submissions received on time will be opened after **4:00 p.m. Friday February 2, 2024.**

### **4. Contact Information and Questions**

#### **4.1. Contacts**

Bidders may only contact Michelle Cavanagh, Team Lead, Special Projects **in writing only**, by email at [mcavanagh@nation.on.ca](mailto:mcavanagh@nation.on.ca) related to this Request for Quotes.

Michelle Cavanagh is SNC's official contact person for this RFQ. All other SNC employees and Board Members are not permitted to discuss this RFQ process with a potential Bidder from the time the RFQ is issued until such time as an award report has been prepared and submitted to the appropriate approval authority.

Bidders are cautioned therefore, to deal exclusively with the SNC contact person referenced in this section.

#### **4.2. Errors, Omissions and Questions**

SNC accepts no legal liability for any errors or omissions in any part of this RFQ.

Bidders with questions related to this RFQ, finding errors in, or omissions from the Document, or having doubt as to the meaning or intent of any part of this Document, must contact the SNC contact listed in Section 4.1, **before 4:00 p.m. on January 25, 2024.** [To allow sufficient time to respond to or prepare and distribute an addendum as necessary, and to allow time for Bidders to receive any new information.]



Bidders should accurately reference the numbered item of the solicitation to which the enquiry relates. Care should be taken by the Bidders to explain each question in sufficient detail in order to enable SNC to provide an accurate answer. No questions will be accepted **after 4:00 p.m. on January 25, 2024.**

There will be no consideration of any claim after submission of the Bid, that there is any misunderstanding respecting conditions imposed by the RFQ.

## **5. Instructions to Bidders**

### **5.1 Addenda**

The RFQ may be amended only by an addendum in accordance with this section. If SNC, for any reason, determines that it is necessary to provide additional information relating to the RFQ, such information will be communicated to all Bidders through the SNC Contact by addenda. Each addendum forms an integral part of the RFQ.

SNC will issue all written addenda to the RFQ by e-mail to each bidder who has provided an e-mail address.

Such addenda may contain important information, including significant changes to the RFQ. It is the Bidder's responsibility to ensure all addenda have been received and are reflected in their Bid submission.

### **5.2 Bid Submission**

The Submission shall be in digital format. It shall contain original signatures where required; and shall include all requirements of this RFQ, as set out in **Section 8.0 "To Include in RFQ"**.

Offers made in the Submission will be considered by SNC to be binding and irrevocable and shall remain open for acceptance by SNC for a period of ninety (90) days from the Bid closing.

A Submission shall be considered only if sent via email to Michelle Cavanagh at [mcavanagh@nation.on.ca](mailto:mcavanagh@nation.on.ca). It should be marked **"Request for Quotes: Oak Valley Streambank Restoration"** and include the name and address of the Bidder.





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### **5.3 Adjustments to Submissions**

Adjustments to submissions by telephone or fax will not be considered.

#### **5.3.1 Request to Adjust a Submission Before Closing**

A Bidder wishing to adjust a Submission must supersede it with a later Submission, which must be received by the closing time.

#### **5.3.2 Request to Withdraw a Submission Before Closing**

A Bidder who has submitted a Bid may request that their Submission be withdrawn before the closing time. The request must be provided in writing, on company letterhead, and include contact information for verification. Authenticity of the request may be confirmed by SNC. Submissions withdrawn under this procedure cannot be reinstated.

#### **5.3.3 Request to Withdraw a Submission During Bid Opening**

No request for withdrawal of a Submission shall be permitted during, or at any time after, the opening process.

### **5.4 Insurance**

#### **5.4.1 General Liability Insurance**

The Vendor shall procure and maintain Comprehensive General Liability Insurance:

- a) Having a limit of liability of not less than **five million dollars (\$5,000,000)** inclusive for any one occurrence;
- b) Including insurance against liability for bodily injury and property damage caused by vehicles or equipment owned by the Vendor;
- c) Being endorsed to provide that the policies will not be altered, cancelled, or allowed to lapse without thirty (30) days prior written notice to SNC;
- d) Name SNC as an additional insured party; and
- e) Contain a cross-liability clause.

The Vendor shall pay for all premiums and expenses incurred for the insurance.

Should any claim(s) arise, the Vendor shall be financially responsible for paying for



any amount(s) up to and including the deductible amount under their policy.

#### **5.4.2 Proof of Insurance**

The Bidder shall provide proof of insurance required in Item 5.4.1 with their Bid.

In the event that satisfactory proof of insurance cannot be provided, a letter from the Bidder's insurance company confirming that the Bidder will be able to obtain the required insurance will suffice. The insurance company must be satisfactory to SNC.

#### **5.4.3 Certificate of Insurance**

Within ten (10) working days of notification of award of this RFQ and prior to the start of any work, the Vendor shall file with SNC, together with the signed Contract, a Certificate of Insurance, clearly stating that all the insurance coverage required complies with all requirements listed in **Item 5.4.1**.

If the Vendor fails to file the Certificate of Insurance with SNC within ten (10) working days of notification of award of this RFQ, SNC reserves the right to cancel the award.

### **5.5 Workplace Safety and Insurance Act and Employment Insurance**

The Bidder must submit with their Bid a valid and current "Clearance Certificate" from the Workplace Safety and Insurance Board ("WSIB"), or a letter from the WSIB confirming their exemption. This information is available to the Bidder on-line at **wsib.on.ca**.

The Vendor, within ten (10) working days of notification of award of this RFQ and prior to the start of any work, shall provide SNC with a valid and current Clearance Certificate from the WSIB.

**If the Vendor does not provide a valid and current Clearance Certificate as herein requested, or proof of exemption, or proof of application for exemption, SNC reserves the right to cancel the award.**

The Vendor shall be responsible for providing Worker's Compensation coverage for their employees, and no extras will be allowed for such items.



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The Vendor clearly understands and agrees that they are not, nor is anyone hired by them, covered by SNC under the **Workplace Safety Insurance Act**, **Employment Insurance Act**, or any other act, whether provincial or federal, in respect of themselves, their employees and operations, and shall, upon request, furnish SNC with satisfactory evidence that they have complied with the provisions of any such acts.

### **5.6 Contract**

Once the RFQ is awarded, this RFQ, all addenda issued and the Bid submitted by the successful bidder will become the Contract. SNC will issue a formal Purchase Order as confirmation of the award of Contract. The successful bidder must accept SNC's Purchase Order/Contract, which will supersede all other contracts.

Failure to execute the Contract or to file any of the required documentation required in this RFQ, within the specified time period, shall be just cause for the cancellation of the award.

## **6. General Terms and Conditions**

**The following terms and conditions are deemed accepted by all Bidders in response to this RFQ and are deemed incorporated into every contract resulting from this RFQ:**

### **6.1 Freedom of Information**

All information obtained by the Bidder in connection with the preparation of this RFQ is the property of SNC and must be treated as confidential. It may not be used for any purpose other than for replying to this RFQ, and for fulfillment of any subsequent contract. Any Bidder who requires that the information in its Bid be kept confidential must explicitly advise SNC of that fact.

The Bidder may declare confidentiality of their Bid; however, SNC is required by law to adhere to the requirements of the Municipal Freedom of Information and Protection of Privacy Act, as amended from time to time.

### **6.2 The Occupational Health and Safety Act**

The Vendor shall comply with all conditions and regulations of the Occupational Health and Safety Act 1990 and amendments thereto, any other Federal or



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Provincial statute or local bylaw concerning safety or any other phase of work on this contract.

### **6.3 Compliance with Codes, Regulations and By-Laws**

The Vendor agrees to obey all government, municipal and underwriters codes and regulations, etcetera and perform all work in accordance with the requirements of bylaws in force in the area where the work is to be carried out. All permits or licenses are the responsibility of the Vendor.

### **6.4 Required Warranties**

Each Bidder expressly declares and warrants that;

- a) This Bid submission is in all respects fair and without collusion or fraud.
- b) There has been no violation of copyrights or patent rights in manufacturing, producing or selling the materials and/or services shipped or ordered as a result of this Bid, and the vendor agrees to hold SNC harmless from any and all liability, loss, expense, action or suit occasioned by any such violation.
- c) All materials and/or services proposed to be supplied to SNC conform in all respects to the standards set forth by Federal and Provincial agencies.
- d) The Bidder:
  - a) is competent to perform the work described in this RFQ;
  - b) has the necessary qualifications, including knowledge, skill and experience to perform the services, together with the ability to use those qualifications effectively for that purpose;
  - c) shall supply everything necessary for the performance of the work;
  - d) shall carry out the work in a diligent and efficient manner;
  - e) ensures the work is of proper quality, material and workmanship; is in full conformity with the specifications; and meets all other requirements of this RFQ and any subsequent contract.

### **6.5 No Obligation to Contract**

The Bidder's RFQ submission does not constitute the acceptance of a contract with SNC. Submissions constitute offers which SNC may or may not accept in its sole discretion.

SNC further reserves the right to accept or reject any or all Bids or parts of Bids, or to accept any Bids considered in SNC's best interest, and to request re-submission on the required materials and/or services. SNC also reserves the right to waive



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irregularities and technicalities and to do so in its sole discretion.

SNC also reserves the right to cancel and reissue the RFQ as deemed necessary and in the best interest of SNC.

SNC reserves the right not to accept a Bid from any person or corporation which includes all non arms length corporations who, or which, has a claim or legal proceeding against SNC or against whom SNC has a claim or legal proceeding with respect to any previous contracts, bid submissions, or business transactions who is listed as either the Bidder or sub-contractor within the submitted Bid.

The Bidder's RFQ submission is deemed an irrevocable offer which may be accepted, at the sole option of SNC with or without negotiation, only by entering into a formal contract upon such acceptance the terms, responsibilities, and specifications as required by SNC including but not limited to those set out herein.

SNC reserves the right to reject an offer to supply goods and services presented in response to SNC's procurement processes where SNC determines that the person making the offer is in any way indebted to SNC and in its sole discretion is of the opinion that it is in SNC's best interests that the offer be rejected.

## **6.6 Assignment**

The Vendor shall not assign the Contract or any portion thereof without prior written consent of SNC. Such consent shall not release or relieve the Vendor from any of their obligations or liabilities under this Contract.

## **6.7 Costs Incurred**

SNC will not, under any circumstances, be responsible for any costs incurred by the Bidder in the preparation of the Bid submission, including, but not limited to: costs to prepare documentation; travel; attendance at any site meetings; or interviews (if required).

## **6.8 Pricing and Taxes**

The Bid submission amount must include: all applicable excise taxes; customs, freight; exchange and all other charges. HST is extra.

## **6.9 Terms of Payment**



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Invoices will be paid net thirty (30) days from date of invoice and verification that goods/services listed have been provided to the satisfaction of SNC.

#### **6.10 Rights of South Nation River Conservation Authority (SNC)**

SNC retains the right to ensure that an acceptable standard of use, service, and operation is maintained. SNC also reserves the right to communicate with one or more Bidders (following the RFQ closing date) to clarify elements of the submission.

#### **6.11 SNC's Right to Terminate Contract Under Certain Conditions**

SNC has the right to terminate the Contract immediately and without penalty, with written notice to the Vendor, if:

- a) The Vendor makes an assignment for the benefit of creditors or becomes bankrupt or insolvent, or an order is made for the winding-up of the Vendor, or if a receiver is appointed on account of the Vendor's insolvency; or
- b) The Vendor refuses or fails to supply sufficient properly skilled employees or proper materials at all times to perform the Work in the manner and to the standards required under this Contract, or the vendor fails to observe and comply with any provisions of law, including, without limiting the generality of the foregoing, all requirements of all governmental authorities including federal, provincial, and municipal legislative enactments, by-laws and other regulations now or hereafter in force which pertain to or affect the services or the conduct of the Vendor's business; or
- c) The Vendor fails to institute appropriate corrective action within three (3) days after verbal notification by SNC (which will be confirmed subsequently in writing), of any failure on the part of the Vendor to comply with the terms and specifications of the Contract; or
- d) The Work performed is not satisfactory; or
- e) Delivery requirements are not met.

SNC reserves the right to terminate this contract at anytime without cause with thirty (30) days written notice.

Immediately following, the termination of the Contract, for any reason, the Vendor shall provide to SNC all of their financial records specific to this Contract, concerning the conduct of the operations and a statement of all outstanding accounts.



#### **6.12 Remedies for Non-Performance**

In the event that the Vendor fails to perform any obligations hereunder, SNC shall be entitled to exercise any one or more of the following remedies:

- a) SNC may with-hold any payment due hereunder until the Vendor has remedied their failure;
- b) SNC shall be entitled, in the event that the Vendor does not remedy their default within three (3) working days of a request, SNC be entitled to engage other vendors to complete the work of the Vendor and to deduct the cost of obtaining such other vendors from any amounts owing to the Vendor hereunder;
- c) SNC may terminate this Agreement if the Vendor does not remedy their default within three (3) working days of a request that they do so from SNC in writing; and,
- d) SNC may exercise any other right available to it in law or equity.

A failure of SNC to exercise any of the foregoing remedies, or the granting of any extension or indulgence, shall not be prejudicial to the right of SNC to subsequently obtain such remedies.

#### **6.13 Failure to Execute Contract**

Failure to execute the Contract or failure to file any of the required documentation required in this RFQ within the specified time period is cause for the cancellation of the award.

#### **6.14 Indemnification**

The Vendor shall indemnify and save harmless SNC, from and against all claims, actions, losses, expenses, costs or damages of every nature and whatsoever which SNC, its employees, officers or agents may suffer, to the extent the Vendor is legally liable as a result of the negligent acts of the Vendor, their employees, officers or agents in the performance of this Contract.

#### **6.15 Ownership of Documents**

All information and data developed and used by the Vendor in connection with this Contract will be wholly owned by SNC.



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#### **6.16 Governing Law**

This RFQ and subsequent contract shall be governed by the law of the Province of Ontario.

#### **6.17 Venue for Litigation**

The Vendor and SNC agree that the venue for any litigation shall be Ottawa, Ontario.

#### **6.18 Force Majeure**

Neither party shall be held responsible for any remedy arising from delay or failure to perform obligations under this RFQ or the Services to be provided when such delay or failure is due to fires, strikes, floods, acts of God or the Queen's enemies, lawful acts of public authorities, or delays or defaults caused by common carriers, which cannot reasonably be foreseen or provided against.

#### **6.19 Confidentiality**

The Vendor recognizes that it will, by the nature of the goods and services being provided to SNC, have access to confidential information. It is understood and agreed that the Vendor, its employees, agents, representatives and officers, (the "Vendor") shall hold all information, whether confidential or not, in the strictest confidence. The Vendor shall not disclose, nor permit by any act or failure to act, the disclosure of any information to any third party at any time during or after the term of its contract with SNC. Nor will the Vendor use any information however obtained as a result of performing duties for SNC for its own commercial, financial, or personal advantage.

The Vendor also acknowledges that it may be held both criminally and civilly responsible for any breach of confidentiality.

#### **6.20 Employees**

In the performance of this contract, the Vendor shall be an independent Vendor. Neither the Vendor nor any of their employees shall be deemed to be employees of SNC.





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## 7. Specifications

The Bidder will review the Specifications listed (***Appendix B***) as part of the Bid Submission.

## 8. To Include in RFQ

### 8.1 Acknowledgement

The Bidder shall complete and submit ***Appendix A***.

### 8.2 Specifications

The Bidder shall ensure all Specifications listed in ***Appendix B*** have been considered as part of the Bid Submission.

### 8.3 Pricing

The Bidder shall complete and submit ***Appendix D*** (the Pricing Form) as per the Specifications in ***Appendix B***.

### 8.4 Other

- All addenda issued; and
- Bid submission as per **Section 5.2**

## 9. Award and Approval

This RFQ will be awarded based on the following:

- a) Proper Completion of all submission requirements (Section 8);
- b) Compliance to specifications and deadlines as listed in ***Appendix B***;  
and
- c) Price (as a clarification, should all other evaluations appear equal, at the sole discretion of SNC, lowest Total Price shall govern award).

SNC reserves the right to reject any Bid if the evidence submitted by, or investigation of such Bidder, fails to satisfy SNC that the Bidder is qualified to carry out the



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obligations of the contract.

The decision of South Nation Conservation shall be final. The Bidder shall not make any claims for additional costs or expenses due to the delay in, or cancellation of the award of this RFQ, due to the approval process.



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## **‘APPENDIX A’**

### **ACKNOWLEDGEMENTS**

**I/WE ACKNOWLEDGE** that this Bid is made without any connection, knowledge, comparison of figures or arrangements with any other company, firm or person submitting a Bid for the same goods/services and is in all respects fair and without collusion or fraud.

**I/WE ACKNOWLEDGE** that all matters stated in the said Bid are, in all respects, true.

**I/WE ACKNOWLEDGE** that, having read and understood the Oak Valley Shoreline Restoration Document, I/WE have satisfied ourselves as to the terms, conditions and specifications and do hereby submit a Bid for the work to be completed.

**I/WE ACKNOWLEDGE** that it is the Bidder’s responsibility to ensure all addenda issued have been received.

**I/WE ACKNOWLEDGE** that acceptance of this Bid and the execution of an Agreement shall be considered a binding Contract upon both parties. If specified at any time by SNC, it is agreed that the terms and conditions and the representations made in reference to this Request for Quotes shall be incorporated in the Contract to be executed by the parties once SNC has formally accepted the Bid.

Dated at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_ 2024.

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Firm or Organization Name

Signing Authority

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Street Address

Signature

---

City

Postal Code

Telephone Number



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## **‘APPENDIX B’**

### **SPECIFICATIONS**

#### **Purpose**

The Vendor will be tasked with providing a range of services to prepare the site, complete construction of the project, and stabilize the site with erosion and sediment control as specified in the design. The design drawings and details are included in **‘Appendix C’** and will be referred to as the ‘Contract Drawings’.

It should be noted that the site is within the floodplain of the South Nation River and is subject to *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses* Regulation 170/06. Further, the project has the potential to impact fish and fish habitat as per Fisheries and Oceans Canada (DFO) legislation.

SNC will coordinate, apply for, and hold all required regulatory permits for the project.

#### **Work Area and Access**

The work area and site will be along the north bank of the South Nation River at Oak Valley Pioneer Park (3324 Baldwin Road, Inkerman). Fill placement will be at a second SNC property on County Road 5 (see ‘Appendix E’ for location). The Vendor will be required to stage works within Oak Valley Pioneer Park to complete the project.

SNC will coordinate park closures and communication with the public regarding the project.

#### **Pricing Form Items**

Specifications for Items 1. through 11. are outlined below. The Pricing Form in **‘Appendix D’** includes reference to Items 1. through 11.



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## **ITEM 1. – DESIGN LAYOUT**

Reference: Contract drawings

Also include:

- .1 Locate on site property bars, baselines, and benchmarks that are necessary to delineate the working area and to layout the work, as shown on the Contract Drawings.
- .2 Layout and establish all lines and grades necessary for construction.

Note:

- .1 The Contractor is responsible for the preservation of all property bars while the work is in progress, except those property bars that must be removed to facilitate the work. Any other property bars disturbed, damaged, or removed by the Contractor's operations shall be replaced under the supervision of an Ontario Land Surveyor, at the Contractor's expense.
- .2 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the work.

Basis of Payment:

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and material to do the work.

## **ITEM 2. – MOBILIZATION/DEMOBILIZATION**

Reference: Contract drawings

Also include:

- .1 The mobilization and demobilization of the Contractor's forces and the equipment necessary for performing the work required under the Contract.
- .2 Activities and costs for transportation of personnel, equipment and materials not used in the Contract, including the disassembly, removal and site cleanup of any offices, buildings or other facilities assembled on the site for the Contract.

Note:

- .1 This item includes mobilization and demobilization required by the Contract at the time of award. If additional mobilization/demobilization is required during the performance of the Contract due to changed, deleted or added items of work, for which the Contractor is entitled to an adjustment in the Contract Price, compensation for such costs will be included in the price



- adjustment for the item or items of work changed or added.
- .2 The Contractor is responsible for security of the Contractor's equipment while on site.
- .3 Oak Valley Pioneer Park will be closed to the public for the duration of the construction works on site.

**Basis of Payment:**

- .1 Payment of the lump sum Contract Price for mobilization and demobilization will constitute full compensation for the work outlined herein.

**ITEM 3 – TREE REMOVAL/SALVAGE**

Reference – Contract Drawings

Also include:

- .1 Harvesting of all trees indicated and flagged by SNC along the north bank of the South Nation River to allow equipment access along the riverbank.
- .2 Salvage, preparation, and storage of harvested trees for later use on site as detailed in the Contract Drawings.

**Note:**

- .1 Approximately 70 trees of various species and sizes are to be removed from the banks of the river. Most of the trees are mature white pine to be reused in the project. Some areas of shrubs and brush is present along the shoreline.

**Basis of Payment:**

- .1 Payment of the lump sum Contract Price for Tree Removal/Salvage will constitute full compensation for the work outlined herein.

**ITEM 4 – GRADING/TERRACING**

Reference – Contract Drawings

Also include:

- .1 Soil testing at the site of soil to be excavated as required under O.Reg.406/19.
- .2 Topsoil stripping to a depth of 300 mm and stockpiling for reuse.
- .3 Excavation of the channel bed to install bank terraces to the elevations shown on the Contract Drawings.



- .4 Removal and offsite disposal of all excavated concrete, asphalt, wood, abandoned services, utilities and other debris that cannot be reused to construct the proposed channel treatment.
- .5 Transport and placement of unused excavated fill to SNC property situated 2.5 km from work area (see PESC-1 for direction).

Note:

- .1 The contract quantities for earth excavation have been determined from existing ground cross-sections and theoretical design sections.
- .2 SNC will outline the area in detail where soil is to be placed at the SNC property.

Basis of Payment:

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work.

**ITEM 5 – TOPSOIL**

Reference: Contract drawings,  
OPSS 802

Subsection 802.07.03 of OPSS 802 shall be deleted in its entirety and amended with the following:

Do not spread, cultivate or otherwise handle topsoil while in a frozen or muddy condition. Topsoil shall be placed to a uniform depth of 150 mm, or as otherwise specified, in the areas specified in the Contract Documents.

Note:

- .1 Topsoil shall be harvested from approved source locations that comply with all regulations governing the removal of topsoil.
- .2 Topsoil may be purchased from a source of collected topsoil from development sites provided the sources of the topsoil stockpile is of similar textures and meets the requirements of this specification.
- .3 Topsoil shall not be a soil mix including any combination of sand, fertilizer, or organic matter or compost added to mineral soil to meet the texture, chemical or organic requirements for topsoil. The organic matter content of the soil shall be residue of long term, natural soil building processes and not from added organic matter or compost.
- .4 Topsoil shall be naturally occurring soil, harvested from the O or A horizon of the soil profile, suitable for the germination of seeds and the support of vegetative growth.



- .5 Topsoil shall not contain materials and contaminants at levels that would be harmful to plant growth; or impair drainage, installation, or maintenance of the resulting growing medium; or adversely impact its intended use.
- .6 Topsoil shall not be screened through sieves or screens smaller than 50 mm to avoid eliminating the required soil elements.

Measurement for Payment:

- .1 Measurement shall be in cubic metres.

Basis of Payment

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment and materials to do the work as specified herein and as shown on the Contract Drawings.

#### **ITEM 6 – RIPARIAN SEED MIX**

Reference: Contract drawings,  
OPSS.MUNI 804

Subsection 804.05.01.04 of OPSS.MUNI 804 is amended as follows:  
Permanent seed mix shall be as specified on the Contract Drawings.

Subsection 804.05.02 of OPSS.MUNI 804 is amended as follows:  
Nurse seed crop shall be as specified on the Contract Drawings.

Subsection 804.05.02 of OPSS.MUNI 804 is amended as follows:  
Application rates for the permanent seed mix, nurse crop seed and fertilizer shall be as identified on the Contract Drawings.

Note:

- .1 Riparian seed mix must be applied along the channel banks and proposed terrace.
- .2 Seeding shall be carried out during periods that are most favourable for the establishment of a healthy stand.
- .3 Seeding shall not be carried out under adverse weather conditions such as high wind or heavy rain or when field conditions are not conducive to seed germination such as frozen soil or soil covered with snow, ice or standing water.

Measurement for Payment:





- .1 Measurement shall be in square metres.

#### Basis of Payment

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work as specified herein and as shown on the Contract Drawings.

### **ITEM 7 – LIVE STAKING**

Reference: Contract drawings

Include:

- .1 Supply and installation of live stakes as specified on the Contract Drawings.
- .2 Harvest and reuse of existing live brushings or stakes on site, as available.

Note:

- .1 Live stake cuttings must be 20 to 40 mm in diameter, approximately 1.0 m in length and reasonably straight.
- .2 The species approved for use are specified on the Contract Drawings. Alternative species may be used if approved in advance by the Conservation Authority or the designer.
- .3 Harvesting and planting operations must be completed during the plant material's dormant period.
- .4 The basal (bottom) ends should be tapered to a point to facilitate insertion into the soil. The top should be cut smooth and square. All cuts must be smooth and the cut surface must be kept small.
- .5 All branches must be trimmed without damage to the bark. Plant materials with excessive damage to the bark are not acceptable.
- .6 Buds on the live stakes must be orientated upward when installed.
- .7 Live stakes should be installed at a right angle to the surface and such that 80% of their length is buried.
- .8 If a pilot hole is required for live stake installation, the holes must be filled with loose soil after installation.

Measurement of Payment:

- .1 Measurement shall be by individual quantity.

#### Basis of Payment



- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work.

## **ITEM 8 – EROSION CONTROL BLANKET**

Reference: Contract drawings,  
OPSS.MUNI 804

Also include:

- .1 Check the erosion control blanket (ECB) upon delivery and assure that the proper material has been received and that it is manufactured from 100% biodegradable materials.
- .2 Prevent excessive mud, wet cement, epoxy and like materials which may affix themselves to the gridwork, from coming into contact with the ECB.
- .3 Roll ECB for storage and handling.
- .4 Apply seed prior to placing ECB over prepared topsoil. Seed over non-germinated areas through blanket if necessary.
- .5 Layout ECB at the proper elevation and orientation as shown on the Contract Drawings and as directed by the Contract Administrator.
- .6 Unroll ECB down slope or in direction of water flow. Bring ECB down to level area, fold 150 mm under soil and secure with 100% biodegradable or wooden stakes prior to termination.
- .7 Overlap blanket a minimum of 150 mm along edges. At the end of each roll, fold back 100 mm to 200 mm of the matting. Overlap this 100 mm to 200 mm over the start of the next roll. Use 100% biodegradable or wooden stakes to fasten the two layers to the ground securely.
- .8 Secure top of blanket in trench according to Clause 804.07.05.04 of OPSS.MUNI 804 and reinforce with a row of wooden or biodegradable stakes spaced 300 mm apart prior to covering with soil.

Note:

- .1 Terrafix Coir Mat (400 g/m<sup>2</sup>) or an equivalent product is approved for use.
- .2 An equivalent ECB may be used, but must meet the following requirements:
  - 100% straw or coconut fibre
  - Longevity: 3 years
  - Maximum cover factor: 35%
  - Minimum permissible velocity: 2.44 m/s
- .3 ECBs with photodegradable material is not acceptable.



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Measurement of Payment:

- .1 Measurement shall be in square metres.

Basis of Payment

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work as specified herein and as shown on the Contract Drawings

### **ITEM 9 – SILT FENCE/SILT SOCK**

Reference: Contract drawings,  
OPSD 219.130 or 219.110

Also include:

- .1 Supply of fence barrier and stakes as well as materials to secure the barrier to the stakes.
- .2 Installation and maintenance of fence barrier along toe of terrace to isolate grading activities from active watercourse.
- .3 Removal and disposal of fencing at the end of construction after the site is deemed stable by the Contract Administrator.

Measurement for Payment:

- .1 Measurement of the silt fencing will be in metres.

Basis of Payment:

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work.

### **ITEM 10 – CONIFER BANK TREATMENT (PROVISIONAL)**

Reference: Contract Drawings

Also include:

- .1 Bank excavation and backfill required for installation and embedment of conifer treatment.
- .2 Salvage trees disturbed by proposed work or existing disturbed trees (as selected by Conservation Authority staff)
- .3 Supply and installation of 3ft duckbill type earth anchors (two anchors per tree).

Note:



- .1 Extent to be determined based on available trees or as directed by SNC.

Measurement for Payment:

- .1 Measurement of the treatment will be in metres.

Basis of Payment:

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work.

### **ITEM 11 – METRE BAG COFFERDAM (PROVISIONAL)**

Reference: Contract Drawings  
OPSS 805

Also include:

- .1 Supply and installation of metre bags filled with clean pea gravel.
- .2 Supply and installation of an anchored impermeable membrane to ensure water tightness.
- .3 Relocation of cofferdams as required.
- .4 Maintenance of cofferdam during construction.
- .5 Removal of bags offsite or release of pea gravel into the watercourse upon completion of the Work, as directed by the Contract Administrator.
- .6 Disposal of empty bags off site, as needed.

Note:

- .1 The ends of the cofferdam must be placed against the banks to limit water entry to the isolated in-stream work area.
- .2 Bags must be butted tightly against one another without gaps.
- .3 Single row of metre bag cofferdam assumed.
- .4 Allowance for the removal of any entrapped fish by SNC before and during dewatering (if dewatering is required).

Measurement for Payment:

- .1 Measurement of the treatment will be in metres.

Basis of Payment:

- .1 Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and materials to do the work.

**Available Information for Vendor**



SNC will provide the following information to the Vendor to assist with completion of the project:

1. Specifications and project design, including Contract Drawings.
2. Erosion and sediment control plan included within the Contract Drawings.
3. Conservation Authorities Act permit.
4. Ministry of Natural Resources and Forestry Fish Collection permit.
5. Fisheries and Oceans Canada (DFO) Request for Review.

### **Timelines and Restrictions**

This timetable reflects SNC's intent in issuing, receiving, and evaluating the RFQ and is subject to change at SNC's discretion.

January 19, 2024	Request for Quotes issued
January 25, 2024	Deadline for questions from bidders
February 2, 2024	Closing Date for Request for Quotes
February 6, 2024	Contract awarded to successful bidder

Note: The project must be completed by March 22<sup>nd</sup>, 2024. Frozen work conditions will be favourable for the current project given its location adjacent the South Nation River. Warm and/or wet weather conditions will cause the South Nation River to rise rapidly and may require adjustments to erosion and sediment control measures.

### **Inspections**

The Contractor and SNC's representative shall survey all areas included in '**Appendix E**' to determine pre-start conditions of all work areas. The Contractor and SNC's representative will document any pre-existing conditions or damaged areas prior to commencement of work.

The Contractor and SNC's representative shall survey all areas included in '**Appendix E**' to ensure satisfactory completion of the work.

Any damage or excessive soil disturbance is to be repaired by the contractor prior to leaving the work site.

### **Invasive Species and Clean Equipment Protocol**



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All equipment and machinery to be used at the site shall be clean and free of soils or seed from previous work to prevent the importation of invasive species. Several invasive species, such as *Phragmites australis* (European Common Reed), readily establish in riparian areas and it is pertinent that offsite soils and seed are not imported into the site. The Clean Equipment Protocol shall be followed and is included in '**Appendix F**'.

### **Spill Kits and Environmental Protection**

Construction activities are taking place within sensitive ecosystems (aquatic) where surface water and groundwater interact. Consequently, the contractor shall maintain equipment and machinery in good working condition that is free from fuel and fluid leaks.

The contractor shall supply and keep on hand an environmental spill kit that is ready at all times.

SNC reserves the right to stop work at any time should equipment or machinery be found to not be in good working condition.

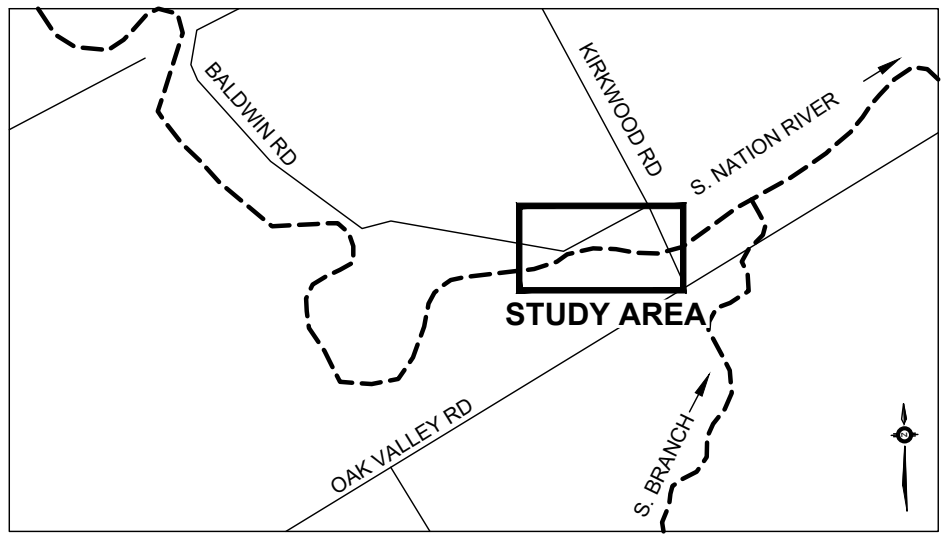
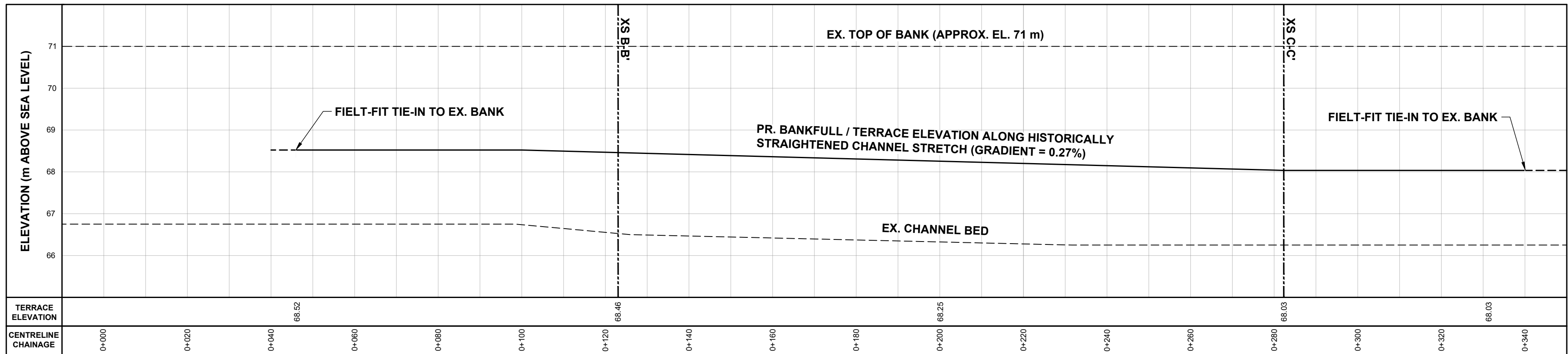
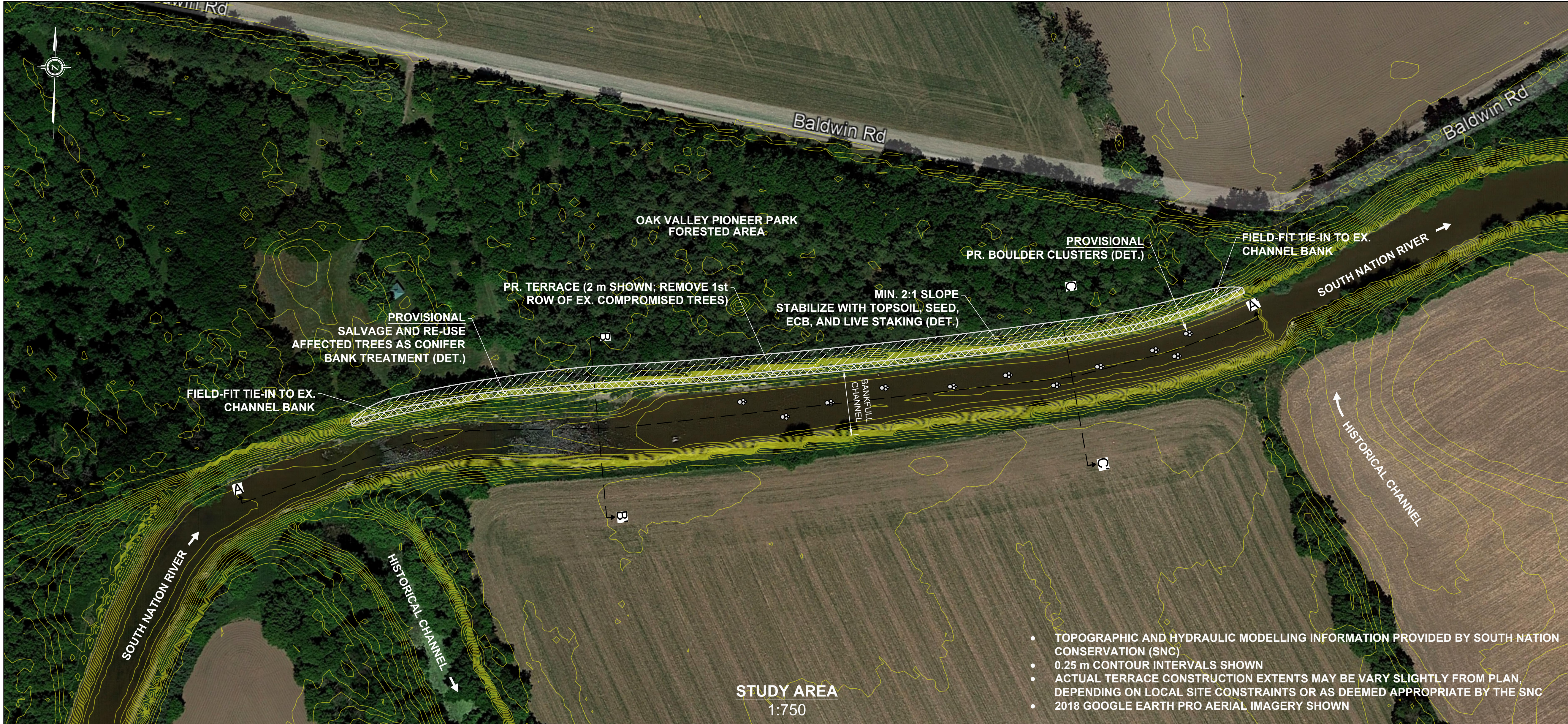


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## **‘APPENDIX C’**

### **DESIGN DRAWINGS AND DETAILS**





**GENERAL NOTES**

1. THE ACCOMPANYING CHANNEL REALIGNMENT TECHNICAL DESIGN BRIEF PREPARED BY GEO MORPHIX LTD. (2023) PROVIDES ADDITIONAL DESIGN DETAILS AND DIRECTION FOR IMPLEMENTATION AND IS TO BE REVIEWED IN CONJUNCTION WITH THIS DRAWING SET.
2. ALL CONTRACT DRAWINGS, SPECIFICATIONS AND APPLICABLE PERMITS MUST BE KEPT ON SITE DURING CONSTRUCTION FOR REFERENCE.
3. THE CONTRACTOR MUST NOTIFY THE DESIGNER AND CONTRACT ADMINISTRATOR OF THE INTENT TO COMMENCE WORK AT LEAST 48 HOURS IN ADVANCE.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATES.
5. LAYOUT MUST BE REVIEWED AND APPROVED BY THE DESIGNER / DESIGNER REPRESENTATIVE, DESIGNATED ENGINEER, AND THE CONTRACT ADMINISTRATOR.
6. CONSTRUCTION OBSERVATION IS TO BE PERFORMED BY A CERTIFIED FLUVIAL GEOMORPHOLOGIST OR EXPERIENCED ENVIRONMENTAL INSPECTOR UNDER DIRECTION FROM THE DESIGNER.
7. ON-SITE SUPPORT FROM PROJECT ENGINEER (E.G., GEOTECHNICAL, HYDROGEOLOGICAL, AND/OR WATER RESOURCES ENGINEER) REQUIRED TO ASSESS AND ENSURE FAVORABLE SURFICIAL AND SUBSURFACE CONDITIONS TO SUPPORT CHANNEL REALIGNMENT CONSTRUCTION.
8. BE ADVISED THAT THE LOCAL REGULATORY BODY MAY, AT ANY TIME, WITHDRAW THIS PERMISSION, IF, IN THE OPINION OF THE AUTHORITY, THE CONDITIONS OF THE PERMIT ARE NOT BEING COMPLIED WITH. THIS APPROVAL DOES NOT EXEMPT THE PROPERTY OWNER/APPLICANT/AGENT FROM THE PROVISIONS OF ANY OTHER FEDERAL, PROVINCIAL, OR MUNICIPAL STATUTES, REGULATIONS OR BY-LAWS, OR ANY RIGHTS UNDER COMMON LAW.

**TIMING OF WORKS**

1. WORKS SHALL BE COMPLETED DURING THE DESIGNATED IN-WATER WORKS WINDOW SET OUT BY MNRF/DO.
2. TREE CLEARING IS TO BE COMPLETED OUTSIDE THE BIRD NESTING SEASON (APRIL 1ST TO AUGUST 1ST) TO COMPLY WITH THE FEDERAL MIGRATORY BIRDS CONVENTION ACT. ANY TREES THAT REQUIRE REMOVAL OUTSIDE OF THIS TIMING WINDOW MUST FIRST BE INSPECTED BY A QUALIFIED BIOLOGIST TO DETERMINE THE PRESENCE OF NESTING BIRDS.
3. THE WEATHER FORECAST SHOULD BE CONTINUALLY MONITORED TO ENSURE THAT WORKS ARE UNDERTAKEN ONLY DURING FAVORABLE WEATHER CONDITIONS.
4. COMPLETE THE WORKS WITH MINIMAL AVOIDABLE INTERRUPTIONS ONCE THEY COMMENCE.

**SITE AND MATERIAL MANAGEMENT**

1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
2. IN THE EVENT OF AN UNEXPECTED STORM, ALL UNFIXED ITEMS THAT HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW MUST BE MOVED TO A STABLE AREA ABOVE ACTIVE FLOODPLAIN.
3. STOOPSIES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
4. STABILIZE, TEMPORARILY OR PERMANENTLY, ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW.
5. MINIMIZE THE AREA OF DISTURBANCE TO THE EXTENT POSSIBLE. ALL DISTURBED GROUND LEFT INACTIVE FOR MORE THAN 30 DAYS SHALL BE STABILIZED USING APPROPRIATE EROSION CONTROL MEASURES AND AN APPROPRIATE SEED MIX AS NOTED WITHIN THE FINAL APPROVED RESTORATION PLAN.
6. ALL VEGETATION, ADJACENT TO THE WORK AREA, MUST BE PROTECTED AND DELINEATED WITH CONSTRUCTION FENCING OR TREE PROTECTION BARRIERS.
7. ALL GRADERS IN THE AREA REGULATED BY THE CONSERVATION AUTHORITY MUST BE MAINTAINED OR MATCHED, UNLESS OTHERWISE AUTHORIZED IN THE APPLICABLE PERMIT.
8. AN AFTER-HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE NAME AND CONTACT INFO OF THE PERSON RESPONSIBLE FOR ESC MEASURES.

**EROSION AND SEDIMENT CONTROL**

1. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSTALLED PRIOR TO START OF WORKS.
2. FOLLOWING INSTALLATION OF THE PROPOSED ESC MEASURES, A QUALIFIED AGENT OF THE PROPONENT (E.G., CAN-CISEC CERTIFIED MONITOR) WILL CONDUCT REGULAR SITE VISITS TO MONITOR ALL WORKS, PARTICULARLY THE CONDITION OF THE ESC MEASURES, DEWATERING, AND IN- OR NEAR-WATER WORKS. SHOULD CONCERNS ARISE, THE ENVIRONMENTAL MONITOR WILL CONTACT THE PROPONENT, THE CONSERVATION AUTHORITY, AND ANY OTHER APPROPRIATE PARTIES.
3. EROSION AND SEDIMENT CONTROLS MUST BE MAINTAINED DURING CONSTRUCTION, AND ANY REQUIRED REPAIRS OR REPLACEMENTS MUST BE COMPLETED WITHIN 24 HOURS AFTER THEY HAVE BEEN IDENTIFIED DURING THE MONITORING.
4. EROSION AND SEDIMENT CONTROLS MAY REQUIRE PERIODIC ADJUSTMENTS TO REFLECT CHANGING SITE CONDITIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR THESE ADJUSTMENTS TO ENSURE PROPER FUNCTION.
5. ANY CHANGES TO THE EROSION AND SEDIMENT CONTROL PLAN BEYOND MINOR ADJUSTMENTS MUST BE APPROVED BY THE CONTRACT ADMINISTRATOR.
6. ADDITIONAL EROSION AND SEDIMENT CONTROL SUPPLIES MUST BE KEPT ON SITE IN ORDER TO FACILITATE IMMEDIATE REPAIRS AND/OR UPGRADES AS NEEDED.
7. ALL TEMPORARY SEDIMENT CONTROLS MUST BE REMOVED AFTER THE CONTRACT ADMINISTRATOR DEEMS THE SITE TO BE STABLE.
8. THE PROJECT PROPONENT OR THEIR REPRESENTATIVE IS ULTIMATELY RESPONSIBLE FOR CONTROLLING SEDIMENT AND EROSION WITHIN THE CONSTRUCTION SITE FOR THE TOTAL PERIOD OF THE CONSTRUCTION.
9. IF EXCESSIVE SILTATION RESULTS FROM THE CONSTRUCTION ACTIVITIES, THE ON-SITE SUPERVISOR/INSPECTOR AND/OR THE LOCAL REGULATORY BODY RESERVE THE RIGHT TO REQUEST ADDITIONAL ESC MEASURES WHICH WOULD BE INSTALLED PRIOR TO FURTHER CONSTRUCTION ACTIVITIES.

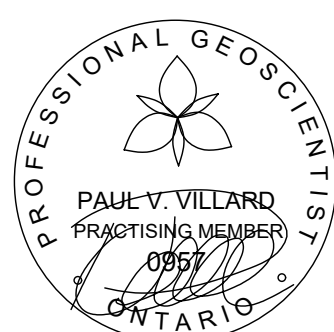
**DELETERIOUS SUBSTANCE CONTROL/SPILL MANAGEMENT**

1. PREVENT THE RELEASE OF SEDIMENT, SEDIMENT-ADEN WATER, RAW CONCRETE, CONCRETE LEACHATE OR ANY OTHER DELETERIOUS SUBSTANCES INTO ANY WATERBODY, RAINE OR STORM SEWER SYSTEM.
2. ENSURE EQUIPMENT AND MACHINERY ARE IN GOOD OPERATING CONDITION (POWER WASHED), FREE OF LEAKS, EXCESS OIL, AND GREASE.
3. NO EQUIPMENT REFUELLING OR SERVICING SHOULD BE UNDERTAKEN WITHIN 30 m OF ANY WATERCOURSE OR SURFACE WATER DRAINAGE.
4. A SPILL CONTAINMENT KIT MUST BE READILY ACCESSIBLE ON-SITE IN THE EVENT OF A RELEASE OF A DELETERIOUS SUBSTANCE TO THE ENVIRONMENT. ON-SITE STAFF MUST BE TRAINED IN ITS USE.
5. THE CONTRACT ADMINISTRATOR MUST BE NOTIFIED IMMEDIATELY IN THE EVENT OF A SPILL OF DELETERIOUS SUBSTANCE. ANY SEDIMENT SPILL FROM THE SITE SHOULD BE REPORTED TO MINISTRY OF ENVIRONMENT (SPILL ACTION CENTER) AT 1-800-268-6060.

**WORK AREA ISOLATION**

1. ALL WORK IN ISOLATED WORK AREAS MUST BE COMPLETED IN THE DRY. AN ADEQUATE NUMBER OF PUMPS MUST BE USED FOR UNWATERING.
2. CROSSING AN ACTIVE WATERCOURSE OR WETLAND BY EQUIPMENT, VEHICLES, PERSONNEL, ETC. IS NOT PERMITTED UNLESS APPROVED BY THE CONSERVATION AUTHORITY. ALL ACCESS TO WORK SITES SHALL BE FROM EITHER SIDES OF THE WATERCOURSE OR WETLAND.
3. THE UNWATERING DISCHARGE LOCATION MUST BE LOCATED AT LEAST 10 m FROM ANY WATERCOURSE OR WETLAND IN AN AREA WITH DENSE VEGETATIVE GROUND COVER, AND WHERE THE DISCHARGE CAN RETURN TO THE WATERBODY DOWNSTREAM OF THE WORK AREA OVER THE GROUND COVER.
4. FISH MUST BE REMOVED FROM THE WORK AREA ONCE ISOLATED. FISH SALVAGE MUST BE COMPLETED BY A QUALIFIED TECHNICIAN WITH A LICENSE FROM THE ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY.

3.	2024-01-17	BM	ADDRESS SNC COMMENTS (WORK LIMITED TO NORTH BANK ONLY)
2.	2023-12-22	BM	DETAILED DESIGN SUBMISSION TO SNC
1.	2023-02-28	BM	CONCEPTUAL DESIGN SUBMISSION TO SNC
#	DATE	BY	REVISIONS
DESIGNED BY: B.M./P.V.		CHECKED BY: P.V.	
DRAWN BY: B.M.		DATE: JANUARY 17, 2024	



**GEO MORPHIX**

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Earth Science  
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JANUARY 17, 2024

**SOUTH NATION CONSERVATION**

**OAK VALLEY PIONEER PARK**

**SOUTH NATION RIVER RESTORATION**

**PLAN AND PROFILE**

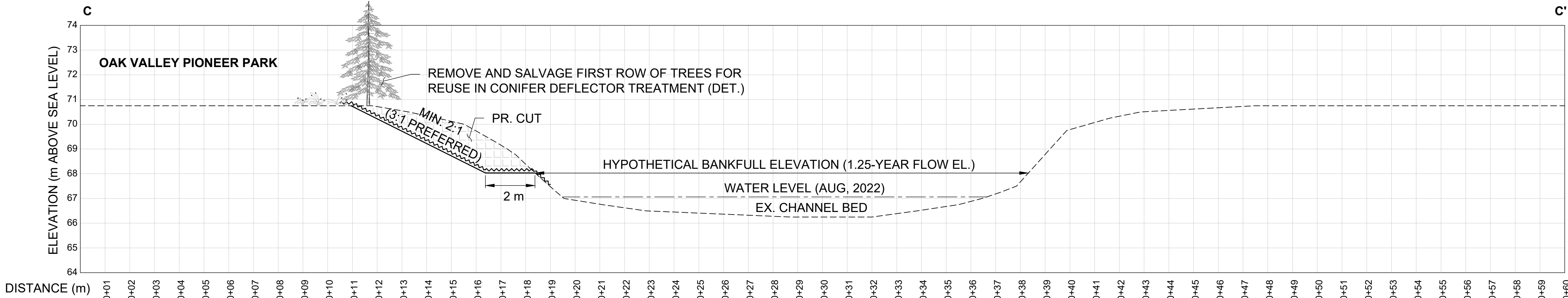
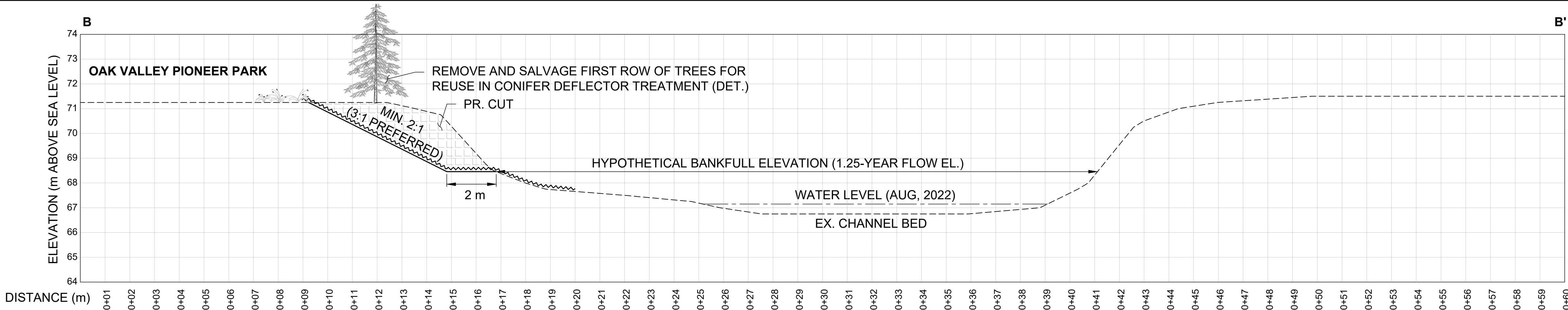
PROJECT No.: PN23110

DRAWING No.: GEO-1

SCALE: AS NOTED

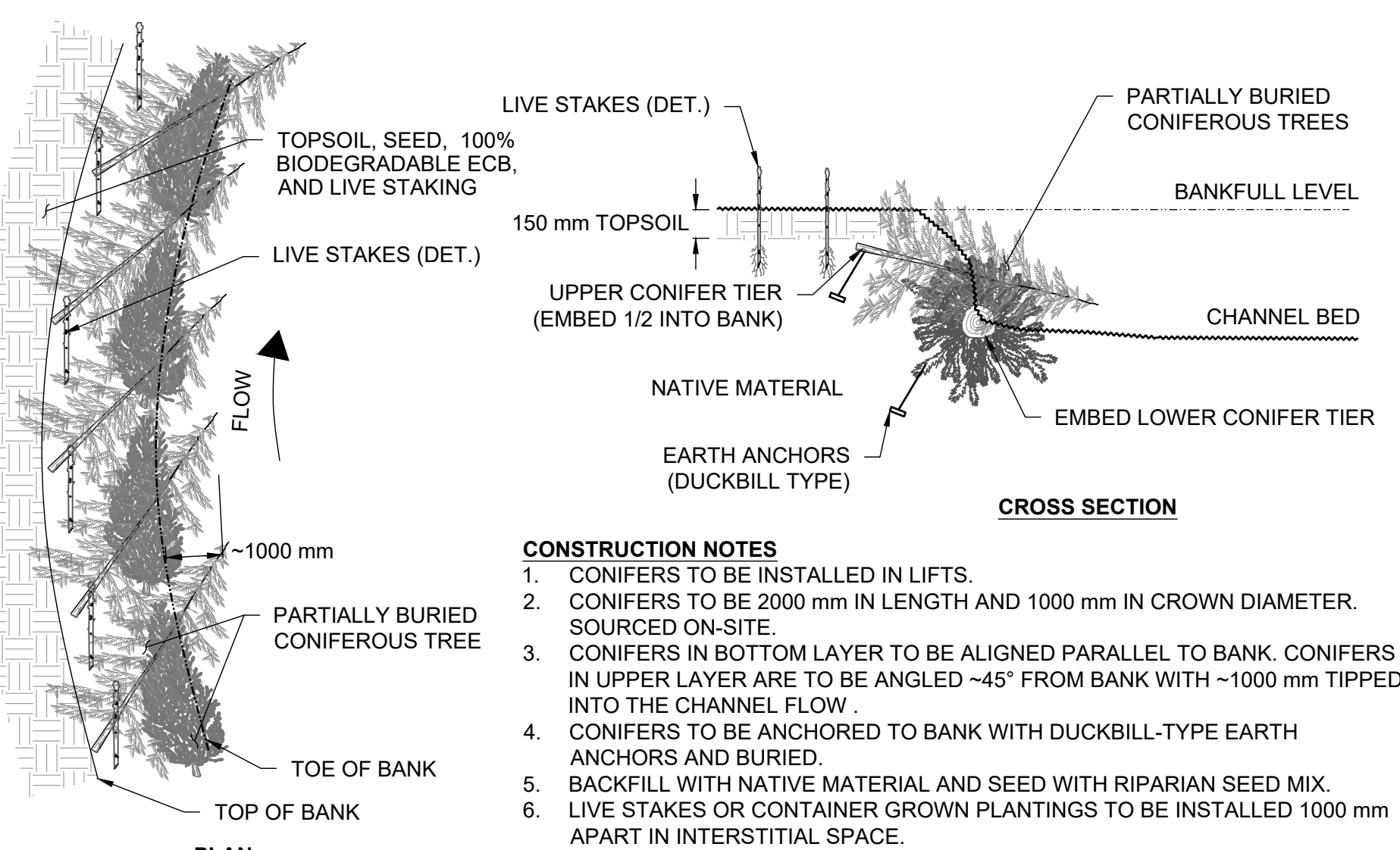
SHEET 1 OF 3





\* TERRACE INCORPORATION AND/OR WIDTH MAY VARY DEPENDING ON LOCAL SITE CONSTRAINTS

RESTORE SURFACE WITH 150 mm LAYER TOPSOIL, RIPARIAN SEED MIX, 100% BIODEGRADABLE EROSION CONTROL BLANKET, AND LIVE STAKING (DET.)



**CONIFER DEFLECTOR TREATMENT (PROVISIONAL)**  
N.T.S.

**EROSION CONTROL BLANKET SPECIFICATIONS**

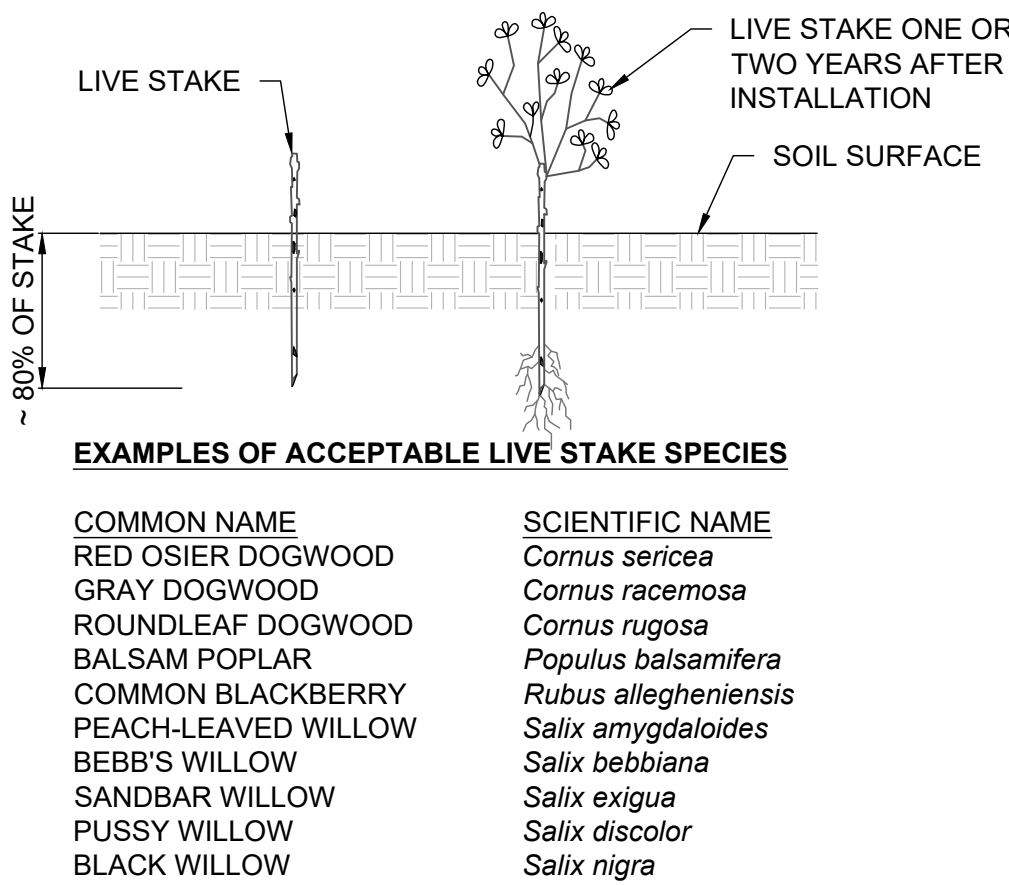
1. A BIODEGRADABLE EROSION CONTROL BLANKET (ECB) SHALL BE INSTALLED ON ALL DISTURBED NATURAL SURFACES FOLLOWING THE PLACEMENT OF TOPSOIL AND APPLICATION OF THE NATIVE SEED MIX.
2. THE ECB MUST BE CONSTRUCTED OF 100% WOVEN COCONUT FIBRE (E.G., COIR) OR STRAW MAT WITHIN A GEOJUTE NETTING (TOP AND BOTTOM) WITH BIODEGRADABLE THREAD. NON-BIODEGRADABLE MATERIAL INCLUDING POLYPROPYLENE OR PLASTICS WITH A BIODEGRADABLE RATING ARE NOT ACCEPTABLE. THE MINIMUM WEIGHT OF THE ECB MUST BE 400 g/m<sup>2</sup> (12 oz./yd<sup>2</sup>).
3. TO INSTALL, THE ECB MUST BE UNROLLED DOWNSLOPE OR IN DIRECTION OF WATER FLOW. ADJACENT ECBs SHOULD OVERLAP A MINIMUM OF 150 mm ALONG THE EDGES. AT THE END OF EACH ROLL, FOLD BACK 100 mm TO 200 mm OF THE ECB. OVERLAP THIS 100 mm TO 200 mm OVER THE START OF THE NEXT ROLL. SECURE THE TWO LAYERS TO THE GROUND SECURELY.
4. BIODEGRADABLE OR TAPERED WOODEN STAKES SHALL BE USED TO SECURE THE BLANKET. STAKES SHALL BE INSTALLED AT THE SPACING RECOMMENDED BY THE ECB MANUFACTURER TO PREVENT SURFACE RUNOFF FROM ERODING THE UNDERLYING SOIL.

**RIPARIAN SEED MIX**

COMMON NAME	SPECIES	% OF MIX
FOWL MANNA GRASS	<i>Glyceria striata</i>	2
FOWL BLUEGRASS	<i>Poa palustris</i>	30
FOX SEDGE	<i>Carex vulpinoidea</i>	30
PATH RUSH	<i>Juncus tenuis</i>	8
VIRGINIA WILD RYE	<i>Elymus virginicus</i>	30

**NOTES**

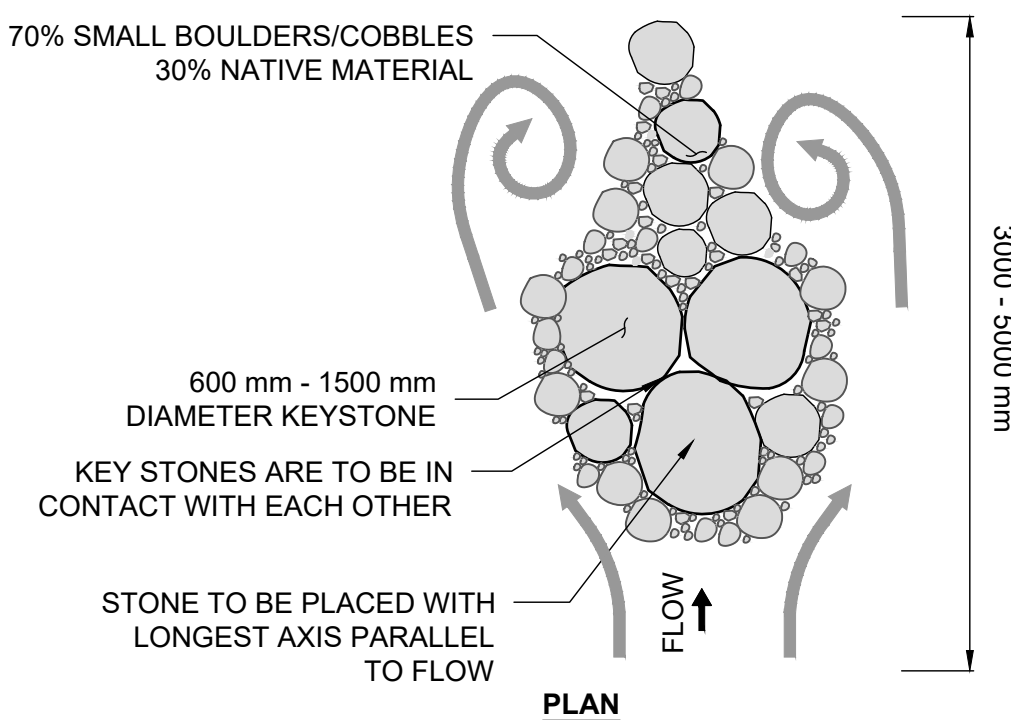
1. RIPARIAN SEED MIX TO BE USED ALONG CHANNEL BANK OR IMMEDIATE OVBANK AREA NEAR CHANNEL.
2. SEED MIX TO BE APPLIED VIA TERRASEEDING, WHERE POSSIBLE.
3. APPLY SEED MIX AT A RATE OF 25 kg PER HECTARE.
4. SEEDING SHALL OVERLAP ADJACENT GROUND COVER BY 300 mm.
5. APPLY COMMON OAT (AVENA SATIVA) NURSE CROP AT A RATE OF 22 kg PER HECTARE.
6. WATER SOIL AFTER SEED APPLICATION.



- GRUB/SOURCE LIVE STAKES ON-SITE TO THE MAXIMUM EXTENT POSSIBLE
- ALTERNATIVE NATIVE SPECIES OR POTTED PLANTINGS MAY BE APPROVED FOR USE IF CONFIRMED IN ADVANCE BY SOUTH NATION CONSERVATION

**LIVE STAKING**  
N.T.S.

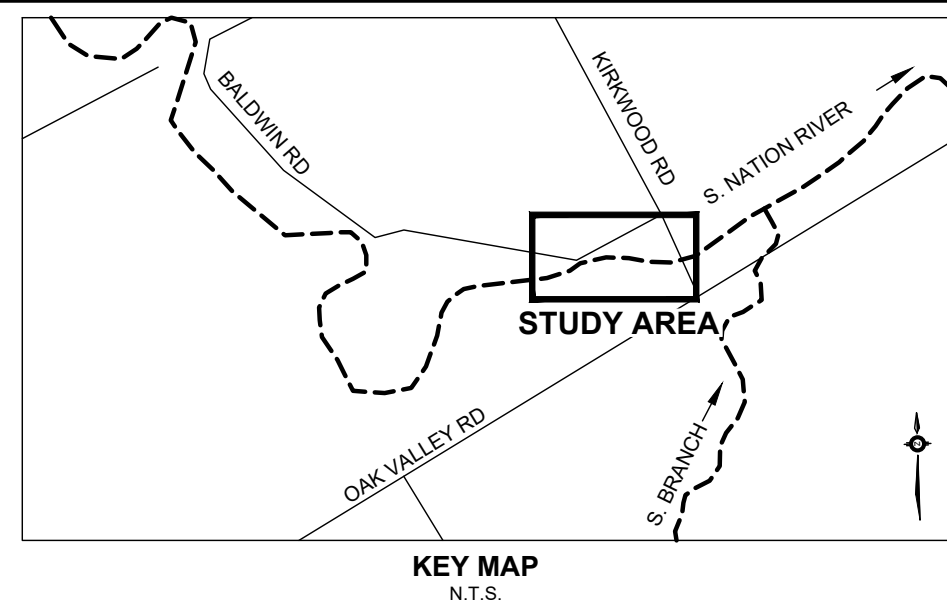
- NOTES**
1. QUANTITY TO BE DETERMINED BASED ON AREA OF DISTURBANCE TO BE RESTORED
  2. LIVE STAKES SHOULD BE FROM AT MINIMUM 2-YEAR OLD STOCK.
  3. LIVE STAKES ARE TO BE INSTALLED AT A DENSITY OF 2 STAKES PER SQUARE METRE.
  4. LIVE STAKES SHOULD BE PRE-SOAKED (SUBMERGED IN WATER) FOR AT LEAST 24 HOURS AFTER HARVESTING AND IMMEDIATELY BEFORE INSTALLATION.
  5. LIVE STAKES SHOULD NOT BE STORED FOR A PERIOD LONGER THAN 2 DAYS, UNLESS THEY ARE BEING SOAKED.
  6. THE CONTRACTOR SHALL PROTECT PLANT MATERIALS FROM DRYING FROM THE TIME OF HARVEST UNTIL INSTALLED.
  7. LIVE STAKES ARE TO BE A MINIMUM OF 25 mm IN DIAMETER AND CUT TO A LENGTH OF 1000 mm.
  8. CUT ANGLE AT THE BOTTOM OF THE STAKE AND FLAT ON THE TOP.
  9. TRIM ALL SIDE BRANCHES WHILE TAKING CARE NOT TO DAMAGE THE BARK.
  10. INSTALL STAKES WITH BUDS POINTING UPWARDS AND THICKER STEM IN THE BED.
  11. LIVE STAKES SHOULD BE INSTALLED USING A LARGE RUBBER Mallet.
  12. 80% OF THE STAKE IS TO BE BELOW SURFACE.
  13. TAMP THE LIVE STAKE INTO THE GROUND AT RIGHT ANGLE TO THE SURFACE.
  14. IN COMPACT SOIL A PILOT HOLE SHOULD BE USED TO LIMIT DAMAGE TO THE STAKES.
  15. IF USING A PILOT HOLE REPACK SOIL AROUND THE LIVE STAKE.
  16. LIVE STAKES SHOULD STAND FIRM FROM THE SOIL FOLLOWING INSTALLATION.
  17. ALL STAKES NOT PLANTED TO THE SPECIFICATIONS ABOVE WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE.



**NOTES**

1. STONE TO BE SOURCED FROM SITE, AS AVAILABLE.
2. NUMBER OF CLUSTERS WILL DEPEND ON AVAILABLE STONE.
3. BOULDER CLUSTER IS TO BE INSTALLED IN A HYDRODYNAMIC SHAPE (SEE ABOVE SECTION).
4. FIRMLY COMPACT STONE MIX TO MITIGATE THROUGH FLOW.
5. BURY 1/3 TO 1/2 OF KEYSTONES INTO CHANNEL BED.

**BOULDER CLUSTER (PROVISIONAL)**  
N.T.S.



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**SITE AND MATERIAL MANAGEMENT**

1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
2. IN THE EVENT OF AN UNEXPECTED STORM, ALL UNFIXED ITEMS THAT HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW MUST BE MOVED A STABLE AREA ABOVE ACTIVE FLOODPLAIN.
3. STOOPLES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
4. STABILIZE, TEMPORARILY OR PERMANENTLY, ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW.
5. MINIMIZE THE AREA OF DISTURBANCE TO THE EXTENT POSSIBLE. ALL DISTURBED GROUND LEFT INACTIVE FOR MORE THAN 30 DAYS SHALL BE STABILIZED USING APPROPRIATE EROSION CONTROL MEASURES AND AN APPROPRIATE SEED MIX AS NOTED WITHIN THE FINAL APPROVED RESTORATION PLAN.
6. ALL VEGETATION, ADJACENT TO THE WORK AREA, MUST BE PROTECTED AND DELINEATED WITH CONSTRUCTION FENCING OR TREE PROTECTION BARRIERS.
7. ALL GRADERS IN THE AREA REGULATED BY THE CONSERVATION AUTHORITY MUST BE MAINTAINED OR MATCHED, UNLESS OTHERWISE AUTHORIZED IN THE APPLICABLE PERMIT.
8. AN AFTER-HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE NAME AND CONTACT INFO OF THE PERSON RESPONSIBLE FOR ESC MEASURES.

**EROSION AND SEDIMENT CONTROL**

1. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSTALLED PRIOR TO START OF WORKS.
2. FOLLOWING INSTALLATION OF THE PROPOSED ESC MEASURES, A QUALIFIED AGENT OF THE PROPONENT (E.G., CAN-CISE CERTIFIED MONITOR) WILL CONDUCT REGULAR SITE VISITS TO MONITOR ALL WORKS, PARTICULARLY THE CONDITION OF THE ESC MEASURES, DEWATERING, AND IN- OR NEAR-WATER WORKS. SHOULD CONCERNS ARISE, THE ENVIRONMENTAL MONITOR WILL CONTACT THE PROPONENT, THE CONSERVATION AUTHORITY, AND ANY OTHER APPROPRIATE PARTIES.
3. EROSION AND SEDIMENT CONTROLS MUST BE MAINTAINED DURING CONSTRUCTION, AND ANY REQUIRED REPAIRS OR REPLACEMENTS MUST BE COMPLETED WITHIN 24 HOURS AFTER THEY HAVE BEEN IDENTIFIED DURING THE MONITORING.
4. EROSION AND SEDIMENT CONTROLS MAY REQUIRE PERIODIC ADJUSTMENTS TO REFLECT CHANGING SITE CONDITIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR THESE ADJUSTMENTS TO ENSURE PROPER FUNCTION.
5. ANY CHANGES TO THE EROSION AND SEDIMENT CONTROL PLAN BEYOND MINOR ADJUSTMENTS MUST BE APPROVED BY THE CONTRACT ADMINISTRATOR.
6. ADDITIONAL EROSION AND SEDIMENT CONTROL SUPPLIES MUST BE KEPT ON SITE IN ORDER TO FACILITATE IMMEDIATE REPAIRS AND/OR UPGRADES AS NEEDED.
7. ALL TEMPORARY SEDIMENT CONTROLS MUST BE REMOVED AFTER THE CONTRACT ADMINISTRATOR DEEMS THE SITE TO BE STABLE.
8. THE PROJECT PROPONENT OR THEIR REPRESENTATIVE IS ULTIMATELY RESPONSIBLE FOR CONTROLLING SEDIMENT AND EROSION WITHIN THE CONSTRUCTION SITE FOR THE TOTAL PERIOD OF THE CONSTRUCTION.
9. IF EXCESSIVE SILTATION RESULTS FROM THE CONSTRUCTION ACTIVITIES, THE ON-SITE SUPERVISOR/INSPECTOR AND/OR THE LOCAL REGULATORY BODY RESERVE THE RIGHT TO REQUEST ADDITIONAL ESC MEASURES WHICH WOULD BE INSTALLED PRIOR TO FURTHER CONSTRUCTION ACTIVITIES.

**DELETERIOUS SUBSTANCE CONTROL/SPILL MANAGEMENT**

1. PREVENT THE RELEASE OF SEDIMENT, SEDIMENT-ADEN WATER, RAW CONCRETE, CONCRETE LEACHATE OR ANY OTHER DELETERIOUS SUBSTANCES INTO ANY WATERBODY, RAINE OR STORM SEWER SYSTEM. ENSURE EQUIPMENT AND MACHINERY ARE IN GOOD OPERATING CONDITION (POWER WASHED), FREE OF LEAKS, EXCESS OIL, AND GREASE.
2. NO EQUIPMENT REFUELLING OR SERVICING SHOULD BE UNDERTAKEN WITHIN 30 m OF ANY WATERCOURSE OR SURFACE WATER DRAINAGE.
4. A SPILL CONTAINMENT KIT MUST BE READILY ACCESSIBLE ON-SITE IN THE EVENT OF A RELEASE OF A DELETERIOUS SUBSTANCE TO THE ENVIRONMENT. ON-SITE STAFF MUST BE TRAINED IN ITS USE.
5. THE CONTRACT ADMINISTRATOR MUST BE NOTIFIED IMMEDIATELY IN THE EVENT OF A SPILL OF DELETERIOUS SUBSTANCE. ANY SEDIMENT SPILL FROM THE SITE SHOULD BE REPORTED TO MINISTRY OF ENVIRONMENT (SPILL ACTION CENTER) AT 1-800-268-6060.

**WORK AREA ISOLATION**

1. ALL WORK IN ISOLATED WORK AREAS MUST BE COMPLETED IN THE DRY. AN ADEQUATE NUMBER OF PUMPS MUST BE USED FOR UNWATERING.
2. CROSSING AN ACTIVE WATERCOURSE OR WETLAND BY EQUIPMENT, VEHICLES, PERSONNEL, ETC. IS NOT PERMITTED UNLESS APPROVED BY THE CONSERVATION AUTHORITY. ALL ACCESS TO WORK SITES SHALL BE FROM EITHER SIDES OF THE WATERCOURSE OR WETLAND.
3. THE UNWATERING DISCHARGE LOCATION MUST BE LOCATED AT LEAST 30 m FROM ANY WATERCOURSE OR WETLAND IN AN AREA WITH DENSE VEGETATIVE GROUND COVER, AND WHERE THE DISCHARGE CAN RETURN TO THE WATERBODY DOWNSTREAM OF THE WORK AREA OVER THE GROUND COVER.
4. FISH MUST BE REMOVED FROM THE WORK AREA ONCE ISOLATED. FISH SALVAGE MUST BE COMPLETED BY A QUALIFIED TECHNICIAN WITH A LICENSE FROM THE ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY.

3.	2024-01-17	BM	ADDRESS SNC COMMENTS (WORK LIMITED TO NORTH BANK ONLY)
2.	2023-12-22	BM	DETAILED DESIGN SUBMISSION TO SNC
1.	2023-02-28	BM	CONCEPTUAL DESIGN SUBMISSION TO SNC
#	DATE	BY	REVISIONS
DESIGNED BY: B.M./P.V.		CHECKED BY: P.V.	
DRAWN BY: B.M.		DATE: JANUARY 17, 2024	

**PROFESSIONAL GEOSCIENTIST**

PAUL V. VILLARD

PRACTISING MEMBER

ONTARIO

JANUARY 17, 2024

**GEO MORPHIX**

Geomorphology  
Earth Science  
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36 Main Street North, PO Box 205  
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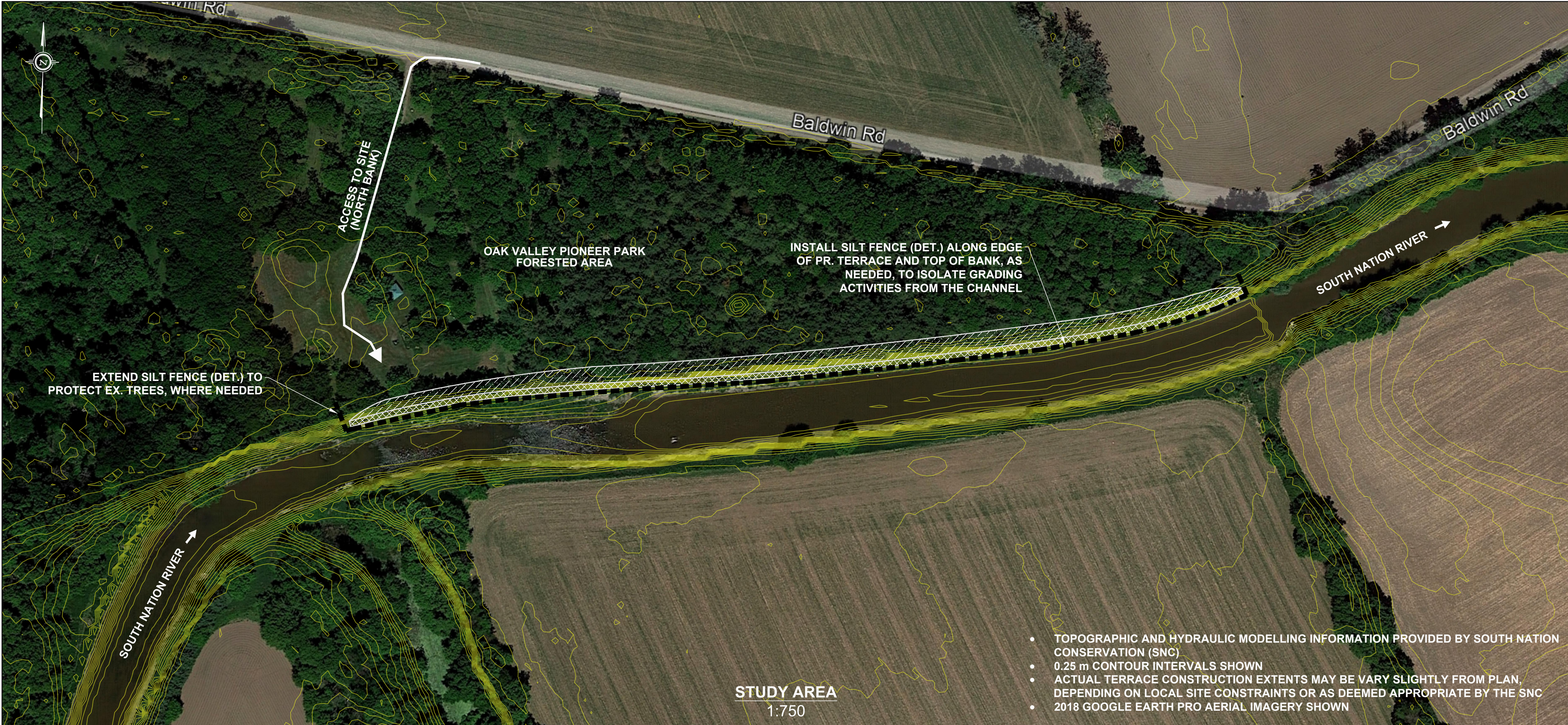
T: 416.920.0926  
www.geomorphix.com

**SOUTH NATION CONSERVATION  
OAK VALLEY PIONEER PARK**

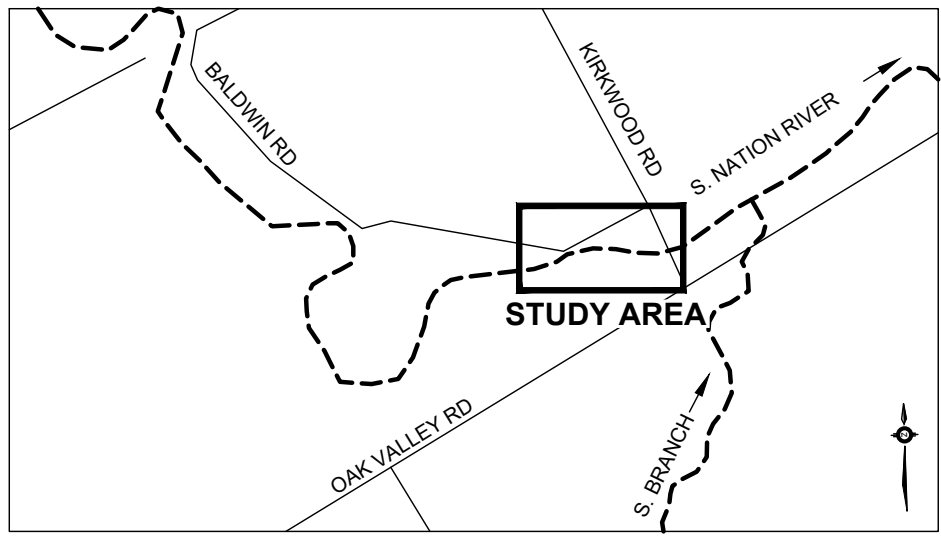
**SOUTH NATION RIVER RESTORATION  
CROSS SECTIONS AND DETAILS**

PROJECT No.: PN23110	DRAWING No.: DET-1
SCALE: AS NOTED	SHEET 2 OF 3





- TOPOGRAPHIC AND HYDRAULIC MODELLING INFORMATION PROVIDED BY SOUTH NATION CONSERVATION (SNC)
- 0.25 m CONTOUR INTERVALS SHOWN
- ACTUAL TERRACE CONSTRUCTION EXTENTS MAY BE VARY SLIGHTLY FROM PLAN, DEPENDING ON LOCAL SITE CONSTRAINTS OR AS DEEMED APPROPRIATE BY THE SNC
- 2018 GOOGLE EARTH PRO AERIAL IMAGERY SHOWN



- GENERAL NOTES**
1. THE ACCOMPANYING CHANNEL REALIGNMENT TECHNICAL DESIGN BRIEF PREPARED BY GEO MORPHIX LTD. (2023) PROVIDES ADDITIONAL DESIGN DETAILS AND DIRECTION FOR IMPLEMENTATION AND IS TO BE REVIEWED IN CONJUNCTION WITH THIS DRAWING SET.
  2. ALL CONTRACT DRAWINGS, SPECIFICATIONS AND APPLICABLE PERMITS MUST BE KEPT ON SITE DURING CONSTRUCTION FOR REFERENCE.
  3. THE CONTRACTOR MUST NOTIFY THE DESIGNER AND CONTRACT ADMINISTRATOR OF THE INTENT TO COMMENCE WORK AT LEAST 48 HOURS IN ADVANCE.
  4. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATES.
  5. LAYOUT MUST BE REVIEWED AND APPROVED BY THE DESIGNER / DESIGNER REPRESENTATIVE, DESIGNATED ENGINEER, AND THE CONTRACT ADMINISTRATOR.
  6. CONSTRUCTION OBSERVATION IS TO BE PERFORMED BY A CERTIFIED FLUVIAL GEOMORPHOLOGIST OR EXPERIENCED ENVIRONMENTAL INSPECTOR UNDER DIRECTION FROM THE DESIGNER.
  7. ON-SITE SUPPORT FROM PROJECT ENGINEER (E.G., GEOTECHNICAL, HYDROGEOLOGICAL, AND/OR WATER RESOURCES ENGINEER) REQUIRED TO ASSESS AND ENSURE FAVORABLE SURFICIAL AND SUBSURFACE CONDITIONS TO SUPPORT CHANNEL REALIGNMENT CONSTRUCTION.
  8. BE ADVISED THAT THE LOCAL REGULATORY BODY MAY, AT ANY TIME, WITHDRAW THIS PERMISSION, IF, IN THE OPINION OF THE AUTHORITY, THE CONDITIONS OF THE PERMIT ARE NOT BEING COMPLIED WITH. THIS APPROVAL DOES NOT EXEMPT THE PROPERTY OWNER/APPLICANT/AGENT FROM THE PROVISIONS OF ANY OTHER FEDERAL, PROVINCIAL, OR MUNICIPAL STATUTES, REGULATIONS OR BY-LAWS, OR ANY RIGHTS UNDER COMMON LAW.

- TIMING OF WORKS**
1. WORKS SHALL BE COMPLETED DURING THE DESIGNATED IN-WATER WORKS WINDOW SET OUT BY MNRF/DO.
  2. TREE CLEARING IS TO BE COMPLETED OUTSIDE THE BIRD NESTING SEASON (APRIL 1ST TO AUGUST 1ST) TO COMPLY WITH THE FEDERAL MIGRATORY BIRDS CONVENTION ACT. ANY TREES THAT REQUIRE REMOVAL OUTSIDE OF THIS TIMING WINDOW MUST FIRST BE INSPECTED BY A QUALIFIED BIOLOGIST TO DETERMINE THE PRESENCE OR NESTING BIRDS.
  3. THE WEATHER FORECAST SHOULD BE CONTINUALLY MONITORED TO ENSURE THAT WORKS ARE UNDERTAKEN ONLY DURING FAVORABLE WEATHER CONDITIONS.
  4. COMPLETE THE WORKS WITH MINIMAL AVOIDABLE INTERRUPTIONS ONCE THEY COMMENCE.

- SITE AND MATERIAL MANAGEMENT**
1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
  2. IN THE EVENT OF AN UNEXPECTED STORM, ALL UNFIXED ITEMS THAT HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW MUST BE MOVED A STABLE AREA ABOVE ACTIVE FLOODPLAIN.
  3. STOCKPILES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
  4. STABILIZE, TEMPORARILY OR PERMANENTLY, ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW.
  5. MINIMIZE THE AREA OF DISTURBANCE TO THE EXTENT POSSIBLE. ALL DISTURBED GROUND LEFT INACTIVE FOR MORE THAN 30 DAYS SHALL BE STABILIZED USING APPROPRIATE EROSION CONTROL MEASURES AND AN APPROPRIATE SEED MIX AS NOTED WITHIN THE FINAL APPROVED RESTORATION PLAN.
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  2. ENSURE EQUIPMENT AND MACHINERY ARE IN GOOD OPERATING CONDITION (POWER WASHED), FREE OF LEAKS, EXCESS OIL, AND GREASE.
  3. NO EQUIPMENT REFUELLING OR SERVICING SHOULD BE UNDERTAKEN WITHIN 30 m OF ANY WATERCOURSE OR SURFACE WATER DRAINAGE.
  4. A SPILL CONTAINMENT KIT MUST BE READILY ACCESSIBLE ON-SITE IN THE EVENT OF A RELEASE OF A DELETERIOUS SUBSTANCE TO THE ENVIRONMENT. ON-SITE STAFF MUST BE TRAINED IN ITS USE.
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DRAWN BY: B.M.		DATE: JANUARY 17, 2024	

**PAUL V. VILLARD**  
PRACTISING MEMBER  
JANUARY 17, 2024

**GEO MORPHIX**  
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www.geomorphix.com

## SOUTH NATION CONSERVATION OAK VALLEY PIONEER PARK

## SOUTH NATION RIVER RESTORATION PHASING, EROSION AND SEDIMENT CONTROL PLAN

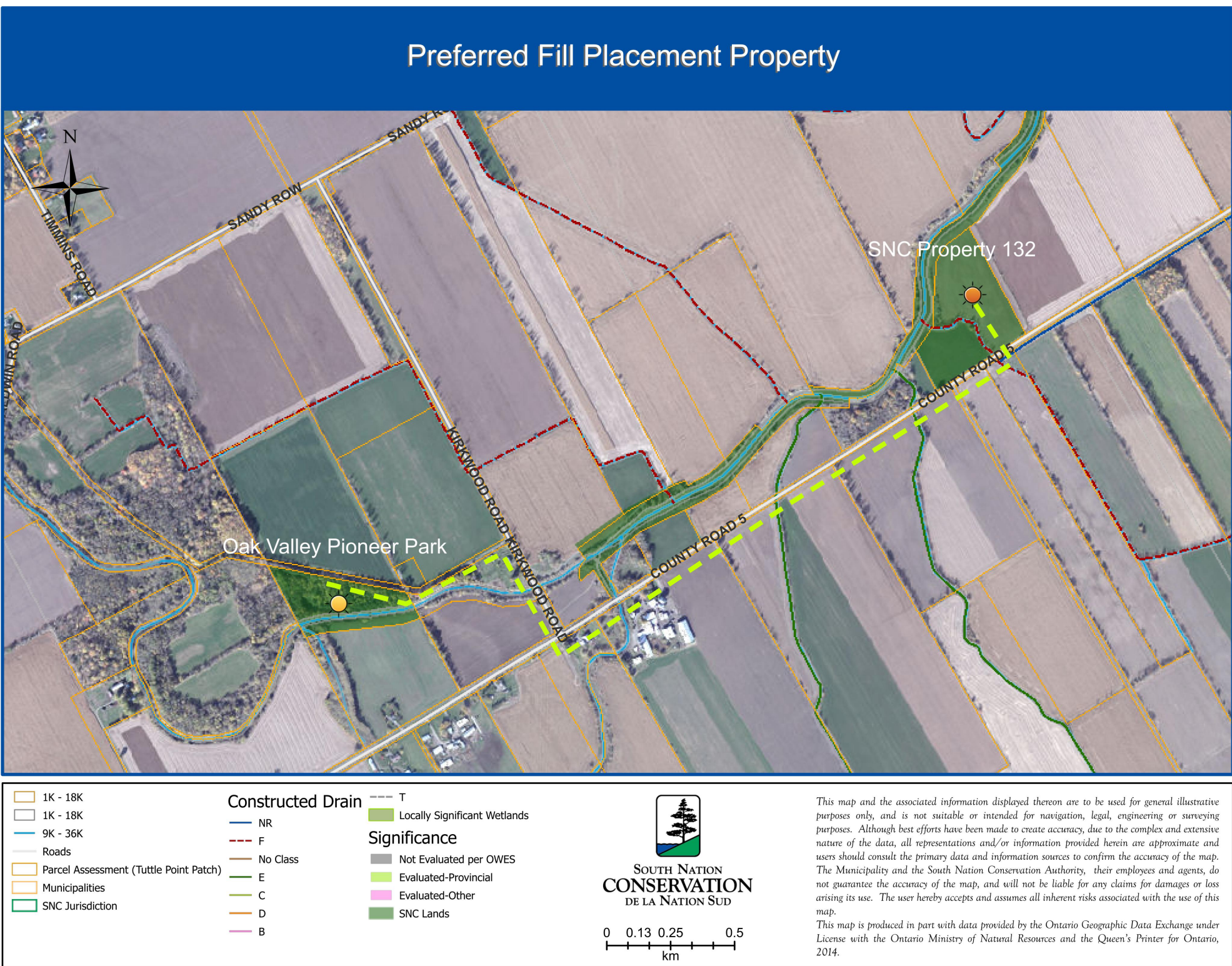
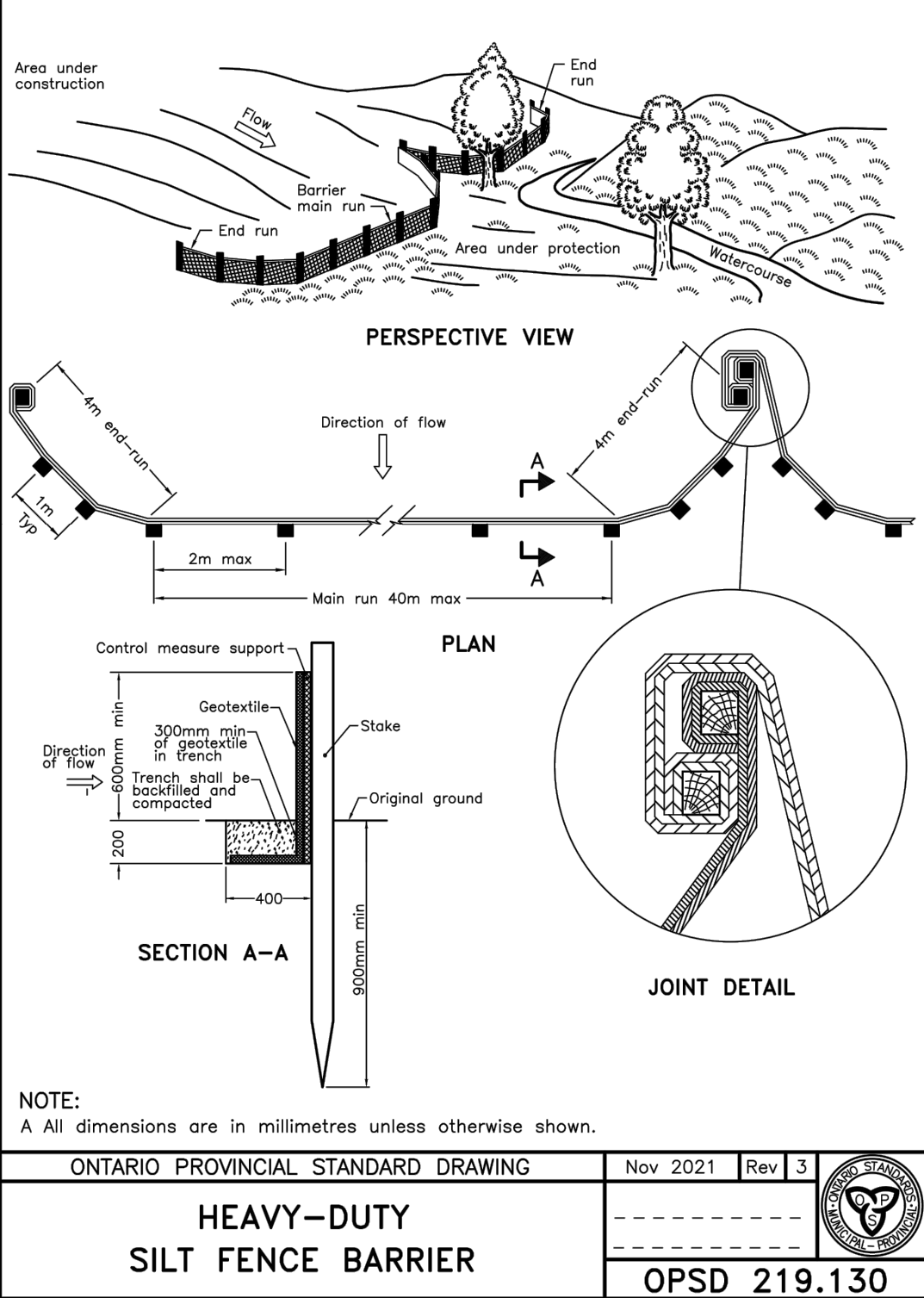
PROJECT No.: PN23110	DRAWING No.: PES-C-1
SCALE: AS NOTED	SHEET 3 OF 3

### SEQUENCE OF CONSTRUCTION

#### DESIGN DRAWINGS TO BE REVIEWED IN TANDEM WITH TECHNICAL DESIGN BRIEF (PREPARED BY GEO MORPHIX, 2024)

1. CONSTRUCTION IS SET TO OCCUR IN EARLY 2024, DURING FROZEN SOIL CONDITIONS AND PRIOR TO THE SPRING FRESHET.
2. CONSTRUCTION OBSERVATION TO BE UNDERTAKEN BY A GEOMORPHOLOGIST OR AN INSPECTOR WITH EXPERIENCE OVERSEEING FLUVIAL CONSTRUCTION.
3. PREFERRED SITE ACCESS ROUTE AND STAGING/STOCKPILE AREAS TO BE DETERMINED BY SOUTH NATION CONSERVATION (SNC).
4. ISOLATE NATURAL AREAS FROM WORK AREA, AS NEEDED, WITH SILT SOCK (DET.), HEAVY DUTY SILT FENCE (DET.), OR COFFERDAMS, AT ON-SITE DISCRETION OF SNC.
5. SNC TO CONDUCT FISH AND WILDLIFE RESCUE FROM ISOLATED WORK AREAS, AS REQUIRED. IN-WATER WORK AND/OR UNWATERING IS NOT RECOMMENDED OR EXPECTED TO BE REQUIRED.
6. CONSTRUCT PROPOSED CHANNEL ELEMENTS IN DRY CONDITIONS.
7. FOR PROVISIONAL BOULDER CLUSTER INSTALLATION, BOULDERS MAY BE PLACED INTO THE CHANNEL FROM THE OVERBANK AND ADJUSTED USING MANUAL LABOUR, AS NEEDED.
8. RESTORE DISTURBED SURFACES OUTSIDE DESIGN EXTENTS WITH 150 mm LAYER OF TOPSOIL AND NATIVE SEED, OR AS DIRECTED BY DESIGNER OR DESIGNER REPRESENTATIVE.
9. WE RECOMMEND THAT SNC MONITOR THE CONDITION OF THE COMPLETED WORK AND VEGETATION HEALTH (SEE TECHNICAL DESIGN BRIEF FOR DETAILS).

EXCESS SOIL MANAGEMENT PLAN TO BE  
COORDINATED AND IMPLEMENTED BY OTHERS.







SOUTH NATION  
**CONSERVATION**  
DE LA NATION SUD

## **‘APPENDIX D’**

### **PRICING FORM**

**a) Total Price:**

**SUBTOTAL**                      \$ \_\_\_\_\_

**HST**                                \$ \_\_\_\_\_

***GRAND TOTAL***                \$ \_\_\_\_\_



**b) Pricing Breakdown:**

ITEM	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	TENDER PRICE
1	Design layout	1	L.S.		
2	Mobilization/Demobilization	1	L.S.		
3	Tree Removal/Salvage	1	L.S.		
4	Grading/Terrace (include excavated fill placement at adjacent SNC property)	2400	m <sup>3</sup>		
5	Topsoil (quantity assumes 40% on site reuse)	200	m <sup>3</sup>		
6	Riparian seed mix	2400	m <sup>2</sup>		
7	Live staking (grub on site, as available, and import remaining)	4000	ea		
8	100% biodegradable erosion control blanket	2400	m <sup>2</sup>		
9	Silt fence/silt sock	315	m		
10	Conifer bank treatment (Provisional)	TBD	m		
11	Meter bag cofferdam (Provisional)	TBD	m		
<b>SUBTOTAL:</b>					<b>\$</b> <b>-</b>



SOUTH NATION  
**CONSERVATION**  
DE LA NATION SUD

**NOTES:**

1. The unit rates include all labour, materials, installation, overhead, taxes, profit and other charges of the Contractor.
2. The cost assumes reuse of on-site materials to maximum extent possible (topsoil, conifer trees).
3. 40% reuse of on-site topsoil material is assumed.

**COMPANY NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

\_\_\_\_\_

**TELEPHONE:** \_\_\_\_\_

**FAX:** \_\_\_\_\_

**SIGNATURE OF BIDDER:** \_\_\_\_\_

**PRINT NAME:** \_\_\_\_\_

**DATE SIGNED:** \_\_\_\_\_

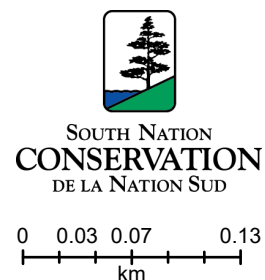
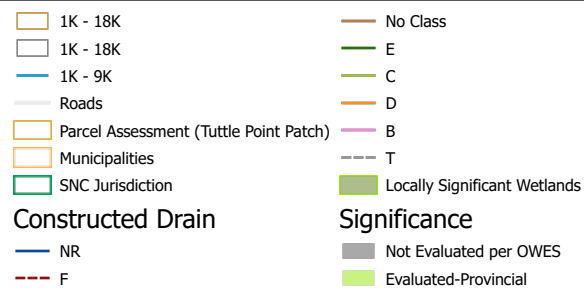


SOUTH NATION  
**CONSERVATION**  
DE LA NATION SUD

## **‘Appendix E’**

### **SITE LOCATION AND ACCESS ROUTE**

# Site Access

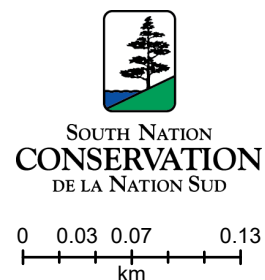
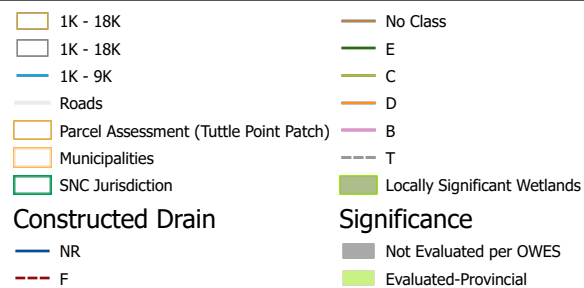


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# Topsoil and Tree Storage Location



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SOUTH NATION  
**CONSERVATION**  
DE LA NATION SUD

## **‘Appendix F’**

### **CLEAN EQUIPMENT PROTOCOL FOR INDUSTRY**

# Clean Equipment Protocol for Industry

Inspecting and cleaning equipment for the  
purposes of invasive species prevention



*Catalyst for research and response*



#### Publication Information

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Peterborough, Ontario

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Phone: (705) 748-6324

Email: [info@ontarioinvasiveplants.ca](mailto:info@ontarioinvasiveplants.ca)

For more information on invasive plants in Ontario, visit [www.ontario.ca/invasivespecies](http://www.ontario.ca/invasivespecies), [www.ontarioinvasiveplants.ca](http://www.ontarioinvasiveplants.ca), [www.invadingspecies.com](http://www.invadingspecies.com), or [www.invasivespeciescentre.ca](http://www.invasivespeciescentre.ca).

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# Introduction

## Why Invasive Plants are a Problem

Invasive alien species are “a growing environmental and economic threat to Ontario. Alien species are plants, animals and microorganisms that have been accidentally or deliberately introduced into areas beyond their normal range. Invasive species are defined as harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health (Government of Canada 2004).” (Ontario Invasive Species Strategic Plan, 2012). The great majority of plant invasions occur in habitats that have been disturbed either naturally or by humans (Rejmanek 1989; Hobbs and Huenneke 1992; Hobbs 2000).

The ecological effects of invasive species are often irreversible and, once established, they are extremely difficult and costly to control or eradicate. According to Pimental et al. (1999), invasive species in the U.S. cause economic and environmental damages totalling over \$138 billion per year, with agricultural weed control and crop losses totalling approximately \$34 billion per year. Exact figures for the total economic and environmental damages are not available for Canada. In Ontario however, the costs of dealing with just one invasive species is astonishing; Zebra Mussels cost Ontario power producers who draw water from the lake \$6.4 million per year in increased control/operating costs and about \$1 million per year in research costs (Colautti et al. 2006).

Invasive species can spread to new areas when contaminated mud, gravel, water, soil and plant material are unknowingly moved by equipment used on different sites. This method of spread is called an unintentional introduction, and is one of the four major pathways for invasive species introduction into a new area of Ontario (Ontario Invasive Species Strategic Plan, 2012).



**Buckthorn removal, Lynde Shores Conservation Area.**

Photo by: Central Lake Ontario Conservation Authority

Invasive plant seed and other propagules (plant material, i.e. rhizomes) have the ability to travel sight unseen in mud attached to or lodged in various parts and spaces between parts of vehicles, machinery and other mechanical equipment. A recent study at Montana State University found that most seeds (99% on paved roads and 96% on unpaved roads) stayed attached to the vehicle after traveling 160 miles (257 km) under dry conditions.

Invasive plant species are commonly transported on or in vehicles and construction equipment when they are moved to new locations. Those vehicles include four-wheel drives, excavators, tractors, loaders, water trucks and all-terrain vehicles. Failure to properly clean vehicles and machinery of soils, mud, and contaminated water that may contain invasive species seed and propagules can result in permanent, irreversible environmental impacts. These impacts can mean substantial cost to the landowner, land manager and/or the user. Businesses may also face liability issues for activities and operations that result in the introduction of invasive species.

Some of the invasive species in Ontario which have been known to spread through equipment transfer include:

- **Common Buckthorn** (*Rhamnus cathartica*)
- **Dog-strangling Vine** (*Cynanchum rossicum*)
- **Garlic Mustard** (*Alliaria petiolata*)
- **Giant Hogweed** (*Heracleum mantegazzianum*)
- **Glossy Buckthorn** (*Frangula alnus*)
- **Japanese Knotweed** (*Polygonum cuspidatum*)
- **Miscanthus or Chinese Silver Grass** (*Miscanthus sinensis*)
- **Invasive Phragmites or Common Reed** (*Phragmites australis subsp. australis*)
- **Reed Canary Grass** (*Phalaris arundinacea*)
- **Wild Parsnip** (*Pastinaca sativa*)
- **Wild Chervil** (*Anthriscus sylvestri*)



**Dog-strangling Vine**  
(*Cynanchum rossicum*)  
Photo by: Hayley Anderson



**Garlic Mustard**  
(*Alliaria petiolata*)  
Photo by: Ken Towle



**Invasive Phragmites**  
(*Phragmites australis subsp. australis*)  
Photo by: Michael Irvine

These plants impact biodiversity by out-competing native species for space, sunlight, and nutrients. They can also have impacts on road and driver safety by physically blocking intersection sightlines, and in the case of invasive *Phragmites* and *Miscanthus*, may fuel intense grass fires if ignited, which can damage utility stations and hydro lines.

### The harmful effects of invasive species include:

- Physical and structural damage to infrastructure
- Human health hazards (i.e. giant hogweed and wild parsnip exposure)
- Delays and increased cost in construction activities
- Environmental damage (i.e. erosion)
- Aesthetic degradation
- Loss of biodiversity
- Reduced property values
- Loss of productivity in woodlots and agriculture



# Why Cleaning Vehicles and Equipment is Important

Passenger and recreational vehicles as well as heavy machinery are major vectors for spreading terrestrial invasive species into new areas.

Preventing the spread of invasive species has proven to be considerably more cost effective than controlling established populations. The spread of invasive species through unintentional introduction can be minimized significantly by the diligent cleaning of vehicles and equipment when leaving one site and moving to the next. In the case of large properties, cleaning before moving to a new site is recommended, even if it is within the same property.

This guide has been developed for the construction, agriculture, forestry, and other land management industries, to provide equipment operators and practitioners with tools and techniques to identify and prevent the unintentional introduction of invasive species. It establishes a standard for cleaning vehicles and equipment and provides a guide where current codes of practice, industry standards or other environmental management plans are not already in place.

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## Passenger and recreational vehicles include:

- 2WD and 4WD cars
- 2WD and 4WD trucks
- All Terrain Vehicles (ATV's)
- Motorbikes
- Snowmobiles

## Heavy machinery includes:

- Trucks
  - Tractors
  - Mowers
  - Slashers
  - Trailers
  - Backhoes
  - Graders
  - Dozers
  - Excavators
  - Skidders
  - Loaders
  - Water Tankers and Trucks
- 



**Dog-strangling Vine plants attached to ATV.**

Photo by: Francine Macdonald



**Plant material attached to bobcat.**

Photo by: TH9 Outdoor Services

# Impacts of Invasive Species on Industry

## Construction

In the UK, Japanese Knotweed (*Polygonum cuspidatum* or *Fallopia japonica*) is classified as a hazardous material. When construction occurs in established Japanese Knotweed stands workers sift the soil to remove root fragments and institute treatment plans to ensure that the Knotweed does not re-sprout, as it can damage housing foundations by growing through concrete and asphalt. The contractors must also thoroughly clean their equipment, and dispose of the contaminated soil at biohazard waste sites. While we do not have these requirements in Ontario, Japanese Knotweed is present here.

Invasive plant species can also increase site preparation and weed control costs, and reduce property values. For example, in Vermont the presence of the aquatic invasive plant Eurasian Watermilfoil (*Myriophyllum spicatum*) depressed shoreline residence property value by as much as 16.4% (Zhang and Boyle, 2010).

## Forestry/Agriculture

Invasive plant species which become established in forests will out-compete native species and prevent forest re-generation after logging or natural disturbance. Dog-strangling Vine (*Cynanchum rossicum*) is of particular concern in conifer plantations. This species thrives in the filtered light and open soils of mature plantations, and suppresses seedling establishment of native hardwoods. If its invasion continues, very few juvenile trees will survive to fill the shrinking canopy of over-mature pines. Reforestation sites are also susceptible; the thick mats of vegetation and aggressive competition from Dog-strangling Vine decrease available planting space and increase costs as more mature vegetation needs to be planted in order to ensure the new vegetation can outcompete the invasive plant. As a result, expensive control programs are often required.

## Land Management (Trail Use/Maintenance)

Recreational trail use and the maintenance of trails can facilitate the transport of invasive plant material and seeds, and create open and disturbed sites that are prime locations for the establishment of invasive species. Studies have proven that trails act as corridors which assist in the spread of invasive plant species. Humans, their pets, and vehicles such as ATV's can be vectors of invasion along trails because seeds and plant pieces can be carried on equipment and clothing. In addition, frequent trampling along trails alters soil properties, limits the growth of some native species, and creates conditions that may favour the growth of non-native species (Kuss et al. 1985; Marion et al. 1985; Yorks et al. 1997).

## Roadsides/Utilities

Invasive species can increase the cost of roadside and utility maintenance by requiring additional maintenance and control efforts. The presence of invasive species can also provide a safety hazard. In the case of Phragmites and Miscanthus (invasive grass species), along with interrupting sight lines, the dead stalks which remain standing each autumn also provide combustible material. Fires in these stands burn intensely, and can damage utilities and hydro lines. Phragmites along roadsides is generally assumed to be spread through the transport and burial of rhizome fragments through ditching, ploughing, and other human activities that transport rhizomes on machinery. Studies have shown that vehicles and road-fill operations can transport invasive plant seeds into uninfested areas, and road construction and maintenance operations provide optimal disturbed sites for seed germination and seedling establishment (Schmidt 1989; Lonsdale & Lane 1994; Greenberg et al. 1997; Trombulak & Frissell 2000).



# Steps to Prevent the Unintentional Introduction of Invasive Species from Equipment

Inspection and cleaning of all machinery and equipment should be performed in accordance with the procedures, checklists and diagrams provided in this protocol.

When visiting more than one site, always schedule work in the sites that are the least disturbed and free of known invasive species first, and visit sites with known invasive species infestations last. This will greatly reduce the risk of transferring plants to new locations.

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## When to Inspect

### Inspection should be done before:

- Moving vehicles out of a local area of operation
- Moving machinery between properties or sites within the same property where invasive species may be present in one area, and not in another
- Using machinery along roadsides, in ditches, and along watercourses
- Vehicles using unformed dirt roads, trails or off road conditions
- Using machinery to transport soil and quarry materials
- Visiting remote areas where access by vehicles is limited

### Inspection should be done after:

- Operating in areas known to have terrestrial invasive plants or are in high risk areas (i.e. recently disturbed areas near known invaded areas)
- Transporting material (i.e. soil) that is known to contain, or has the potential to contain, invasive species
- Operating in an area or transporting material that you are uncertain contain invasive species
- In the event of rain. If mud contains seeds, they can travel indefinitely until it rains or the road surface is wet, allowing for long distance transport. This may result in transporting seeds to areas where those species did not previously exist

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## How to 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.
- Remove any guards, covers or plates that are easy to remove.
- 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, using the techniques outlined below.

## When to Clean

Vehicles and heavy equipment that stay on formed and sealed roads have a low risk of spreading invasive species. Cleaning is only required when 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. Invasive *Phragmites*, for example, can still be spread, even in packed snow because the seed heads are usually above the surface of the snow. Other plants, such as dog-strangling vine, will be contained beneath deep snow.

*\*Regular inspection of vehicles and machinery will identify if any soil or plant material has been collected on or in vehicles and machinery.*

## Where to Clean

Clean the vehicle/equipment in an area where contamination and seed spread is not possible (or limited). The site should be:

- Ideally, mud free, gravel covered or a hard surface. If this option is not available, choose a well maintained (i.e. regularly mowed) grassy area.
- Gently sloping to assist in draining water and material away from the vehicle or equipment. Care should be taken to ensure that localized erosion will not be created, and that water runs back into the area where contamination occurred.
- At least 30m away from any watercourse, water body and natural vegetation.
- Large enough to allow for adequate movement of larger vehicles and equipment.

*\*Safely locate the vehicle and equipment away from any hazards. If mechanized, ensure engine is off and the vehicle or equipment is immobilized.*

## How to Clean Inside

Clean the interior of the vehicle 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.

## How to Clean Outside

Knock off all large clods of dirt. Use a pry bar or other device if necessary.

Identify areas that may require cleaning with compressed air rather than water such as radiators and grills. Clean these areas first prior to using water.

Clean the vehicle with a high pressure hose in combination with a stiff brush and/or pry bar to further assist the removal of dirt clods.

Start cleaning from the top of the vehicle and work down to the bottom.

Emphasis should be placed on the undersides, wheels, wheel arches, guards, chassis, engine bays, radiator, grills, and other attachments.

When the cleaning is finished avoid driving through the waste water when removing the vehicle or equipment from the cleaning site.

For equipment such as water trucks that may be exposed to aquatic invasive species, trucks should be disinfected with bleach solution before conducting work in a new area. For further information please refer to the Invading Species Awareness Program's Technical Guidelines listed under Contacts and Resources.



**Hosing down a vehicle in Queensland, Australia**

Photo by: TH9 Outdoor Services

# Final Inspection Checklist

**Conduct a final inspection to ensure the following general clean standard has been achieved:**

- No clods of dirt should be visible after wash down.
- Radiators, grills, and the interiors of vehicles should be free of accumulations of seed, soil, mud and plant material parts including seeds, roots, flowers, fruit, and or stems.

Diagrams have been provided to assist in quickly identifying key areas to inspect and clean on a variety of vehicles associated with the targeted industries. These can be used in combination with vehicle checklists to ensure all areas of the vehicles have been inspected and cleaned.

## Equipment Required

- A pump and high pressure hose OR high pressure water unit
- Minimum water pressure for vehicle cleaning should be at least 90 pounds per square inch. Water can be supplied as high volume/low pressure or low volume/high pressure (NOAA Fisheries Service).
- Air compressor and blower OR vacuum
- Shovel
- Pry bar
- Stiff brush or broom



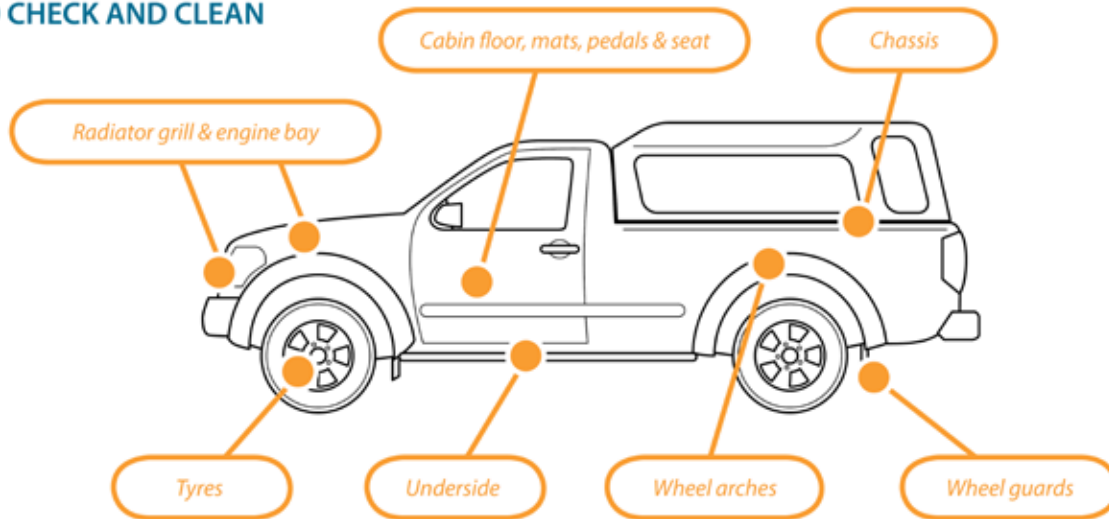
**Cleaning station at construction site.**

Photo by: Mark Heaton, OMNR

# Inspection and Cleaning Diagrams and Checklists

## 2WD and 4WD Vehicles

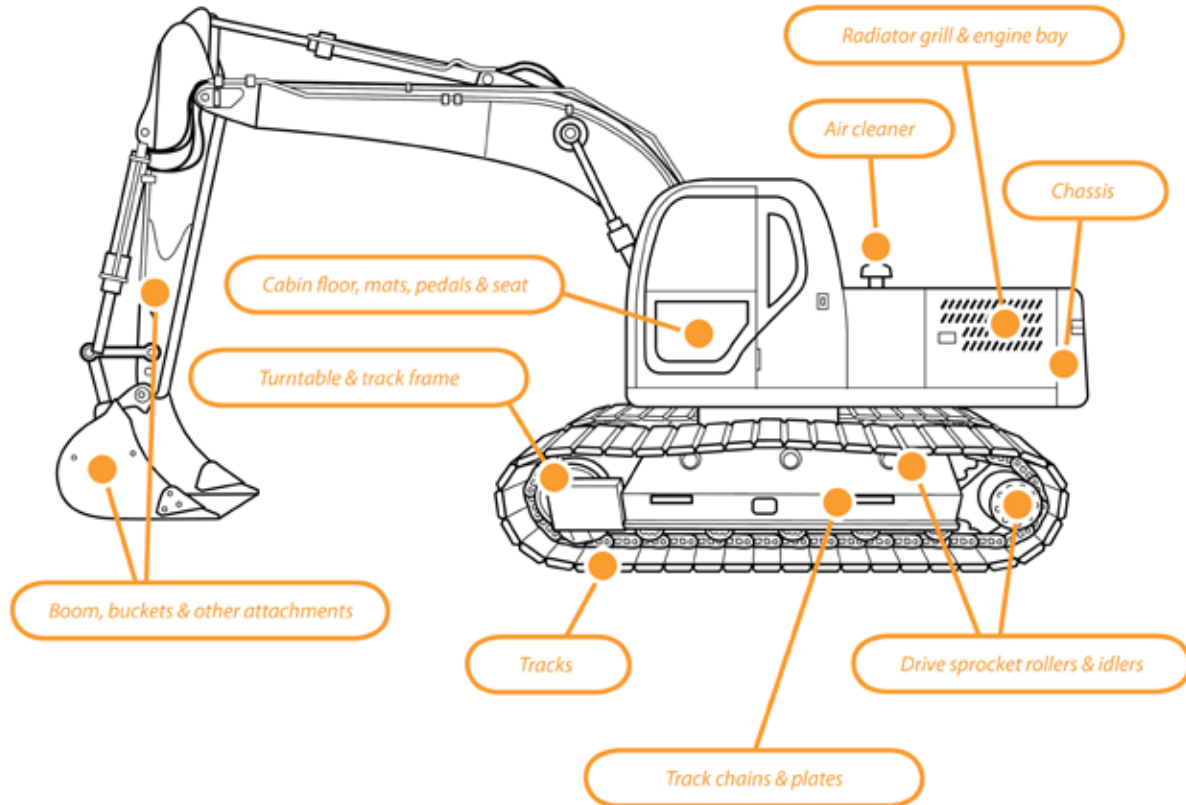
### 4WD VEHICLE WITH KEY SPOTS TO CHECK AND CLEAN



		✓
<b>Cabin</b>	Floor, mats, pedals, seats	
<b>Engine</b>	Radiators, engine bay, grill	
<b>Body</b>	Underside, chassis, crevices, ledges, bumper bars	
<b>Wheels</b>	All wheels (including spare), wheel arches, guards	
<b>Tray</b>	Floor, canopy (if included)	

# Excavator

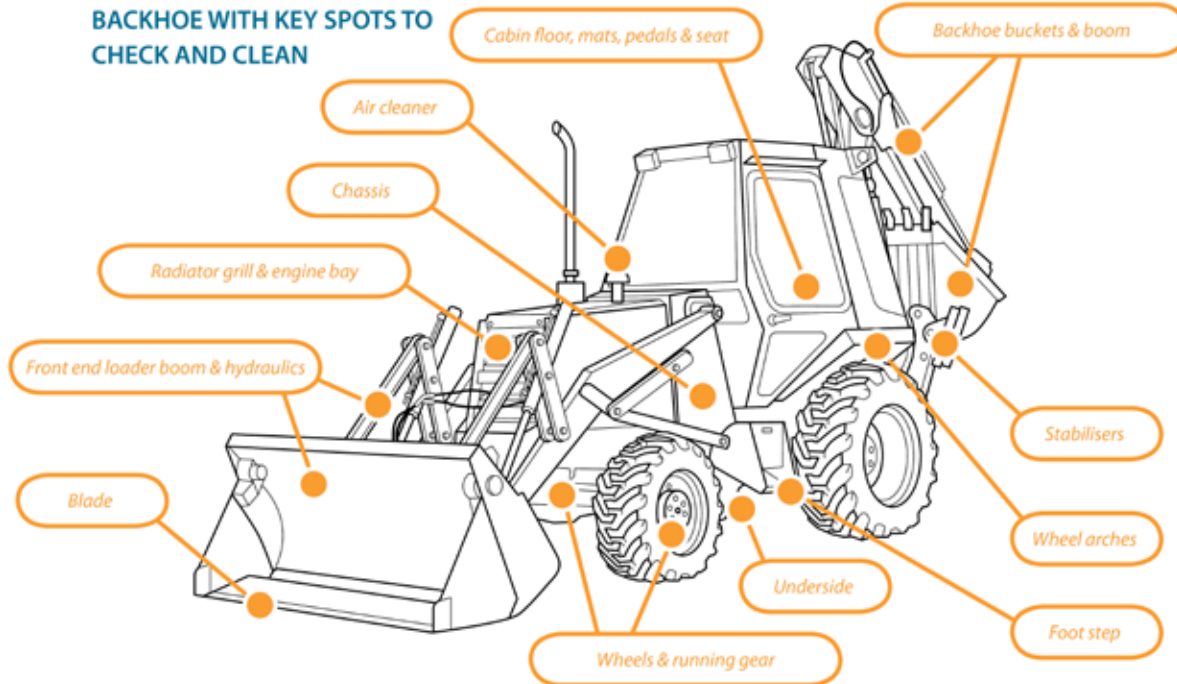
## EXCAVATOR WITH KEY SPOTS TO CHECK AND CLEAN



		✓
Cabin	Floor, mats, pedals, seats	
Engine	Radiators, engine bay, grill, air cleaner	
Tracks	Tracks, track frame, drive sprocket rollers, idlers	
Body Plates	Plates of cabin	
Body	Ledges, channels	
Bucket		
Booms		
Turret Pivot		

## Backhoe

### BACKHOE WITH KEY SPOTS TO CHECK AND CLEAN

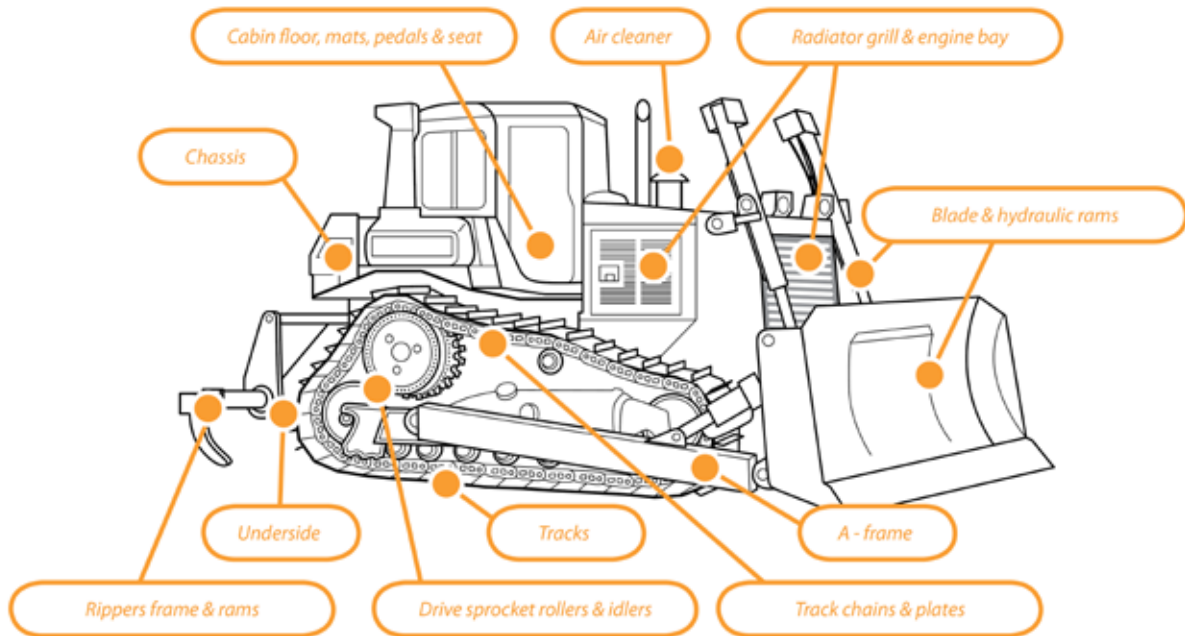


		✓
Cabin	Floor, mats, pedals, seats, foot step	
Engine	Radiators, engine bay, grill, air cleaner	
Wheels	All wheels (including spare), wheel arches, guards	
Front end loader	Blade, hydraulics, booms	
Backhoe	Buckets, boom, hydraulics, stabilisers	



## Bulldozer

### BULLDOZER WITH KEY SPOTS TO CHECK AND CLEAN



		✓
Cabin	Floor, mats, pedals, seats	
Engine	Radiators, engine bay, grill, air cleaner	
Tracks	Tracks, track frame, drive sprocket rollers, idlers	
Body Plates	Belly plates, rear plates	
Body	Ledges, channels	
Blade	Pivot points, hydraulic rams, a-frame	
Ripper	Ripper frame, ripper points	

# Contacts and Resources

Ontario Invasive Species Strategic Plan 2012. Government of Ontario. Online, accessed May 8, 2012.

[http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@biodiversity/documents/document/stdprod\\_097634.pdf](http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@biodiversity/documents/document/stdprod_097634.pdf)

Invasive Species Management for Infrastructure Managers and the Construction Industry 2008. Wade, M. Booy, O. and White, V. Online, accessed April 27, 2012.

[http://www.ciria.org/service/Web\\_Site/AM/ContentManagerNet/ContentDisplay.aspx?Section=Web\\_Site&ContentID=9001](http://www.ciria.org/service/Web_Site/AM/ContentManagerNet/ContentDisplay.aspx?Section=Web_Site&ContentID=9001)

T.I.P.S (Targeted Invasive Plant Solutions) Highway Operations. British Columbia Invasive Species Council. Online, accessed May 8, 2012.

[http://www.bcinvativeplants.com/iscbc/publications/TIPS/Highways\\_Operations\\_TIPS.pdf](http://www.bcinvativeplants.com/iscbc/publications/TIPS/Highways_Operations_TIPS.pdf)

Invading Species Awareness Program Workshop Manual: Aquatic Invasive Species: An Introduction to Identification, Collection and Reporting of Aquatic Invasive Species in Ontario Waters (includes information on decontaminating equipment).

<http://www.invadingspecies.com/download/publications/manuals/WorkshopManual.pdf>

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## Reporting Invasive Species

To report invasive species, or view maps of existing records, visit the Invading Species Awareness Program website [www.invadingspecies.com/report/](http://www.invadingspecies.com/report/) or [www.eddmaps.org/Ontario](http://www.eddmaps.org/Ontario).

Or call the OFAH/MNR Invading Species Awareness Program Hotline at **1-800-563-7711**.

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## Acknowledgements

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### Clean Equipment Protocol Working Group:

Diana Shermet, Central Lake Ontario Conservation Authority; Paula Berketo, Ontario Ministry of Transportation; Travis Cameron, Ontario Ministry of Natural Resources; Jennifer Hoare, Ontario Parks; Michael Irvine, Ontario Ministry of Natural Resources; Alison Kirkpatrick, OFAH/MNR Invading Species Awareness Program; Erika Weisz, Ontario Ministry of Natural Resources; Amanda Chad, Ontario Power Generation; Nancy Vidler, Lambton Shores Phragmites Community Group; Nigel Buffone, Du Pont Canada Company; Ewa Bednarczuk, Lower Trent Conservation Authority

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### More Information:

Ontario Invasive Plant Council: [www.ontarioinvasiveplants.ca](http://www.ontarioinvasiveplants.ca)

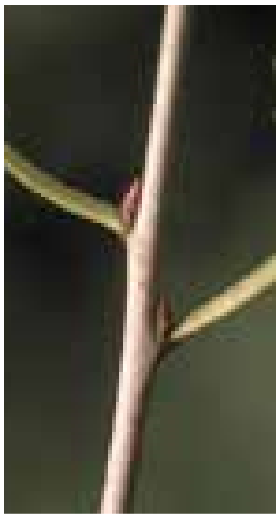


# Appendix A: Identification of Invasive Plants Found in Ontario

- **Common Buckthorn** (*Rhamnus cathartica*) and **Glossy Buckthorn** (*Frangula alnus*)
- **Dog-strangling Vine** (*Cynanchum rossicum*)
- **Garlic Mustard** (*Alliaria petiolata*)
- **Japanese Knotweed** (*Polygonum cuspidatum*)
- **Phragmites or Common Reed** (*Phragmites australis subsp. australis*)
- **Giant Hogweed** (*Heracleum mantegazzianum*)

## common & glossy buckthorn

(*Rhamnus cathartica* & *R. frangula*)



**Plant type:** Shrub/small tree

**Arrangement:** Common buckthorn are sub-opposite (almost opposite). Glossy buckthorn are alternate.

**Leaf:** The common buckthorn leaf is egg shaped, edge of the leaf is “pebbled” (small rounded teeth). Veins converging toward leaf top. The glossy buckthorn leaf is more slender (tear drop shaped) and smooth margined.

**Bark:** Smooth, young bark with prominent raised patches or lenticels; rough texture and peeling bark when mature.

**Seed/Flowers:** Flowers are green-yellowish, small and inconspicuous. Green berries becoming purplish/black in late summer, berry > 1 cm in diameter.

**Buds/Twigs:** Common buckthorn has thorn-like tip on many twigs. Glossy buckthorn buds have no bud scales and lack thorny tips to twigs.

**Habitat:** Various - forest, thickets, meadows, dry to moist soils.

**Similar native species:** Native dogwoods, which lack the thorny “tip”. Native dogwoods are truly opposite in arrangement of twigs; only alternate leaved (pagoda) dogwood has alternate branching.

## dog-strangling vine

(*Cynanchum rossicum* & *C. nigrum*)



**Plant type:** Herb, twining vine

**Arrangement:** Opposite

**Leaf:** Lance shaped, smooth margin (edge)

**Bark:** n/a

**Seed/Flowers:** Bean shaped seed pod with seeds attached to downy 'umbrellas'. Flowers - pink (*C. rossicum*) or purple (*C. nigrum*) with five petals.

**Buds/Twigs:** n/a

**Habitat:** Dry to moist soils; more dominant in meadows and woodland edges.

**Similar native species:** Swamp milkweed (*Asclepias incarnata* spp.), is an upright plant, typically found in wetland habitats.

## garlic mustard

(*Alliaria petiolata*)



**Plant type:** Herb

**Arrangement:** Alternate

**Leaf:** Saw tooth like edge, elongated heart shape. Garlic/onion smell when crushed. Leaves are kidney shaped with prominent veins.

**Bark:** n/a

**Seed/Flowers:** Cluster of small white flowers with four petals. Small black < 1 mm rounded seed found in elongated 'tube-like' seed pods (similar to a bean pod).

**Buds/Twigs:** n/a

**Habitat:** Various – dry to moist soils, in all habitat types, less often in meadows.

**Similar native species:** n/a

## japanese knotweed

(*Polygonum cuspidatum*)



**Plant type:** Herb, 2 - 4 m in height.

**Arrangement:** Alternate

**Leaf:** Tear drop shaped, sharp pointed, dark green, flattened at base.

**Bark:** n/a

**Seed/Flowers:** Flowering stalk of many small greenish-white flowers.

**Buds/Twigs:** Large plant with a 'bamboo-like' stem. Stem light green maturing to tan colour.

**Habitat:** Moist to wet soils found in wetlands, water-courses and roadside ditches.

**Similar native species:** None.

## common reed

(*Phragmites australis*)



**Plant type:** Grass

**Arrangement:** Alternate

**Leaf:** Broad leaf > 1 cm wide.

**Bark:** n/a

**Seed/Flowers:** Dense cascading 'broom-like' flower head. 'Cottony' in appearance when mature.

**Buds/Twigs:** Stems rough and ridged, ligule a densely hairy band. Mature plants > 3 m tall.

**Habitat:** Moist to wet soils. Found in wetlands, water-courses and road side ditches.

**Similar native species:** Species of mannagrass (*Glyceria* sp) including tall northern, eastern and rattlesnake grass. A native common reed exists but has a smooth stem and the ligule is not hairy. It is also quite rare.



# giant hogweed

(*Heracleum mantegazzianum*)



**Plant type:** Herb. Mature plants can be over 3m tall.

**Arrangement:** Alternate

**Leaf:** Lobed leaf 1-2 m wide, lobes sharp-pointed.

**Bark:** n/a

**Seed/Flowers:** Small, white flowers in a large umbrella-shaped cluster, .75 m wide.

**Buds/Twigs:** Hairy stem with purple spots.

**Habitat:** Fresh to wet soils in forests, swamps, meadows, marshes.

**Similar native species:** Cow parsnip (*Heracleum maximum*) – has smaller flowers, no purple spots on stems. Angelica (*Angelica atropurpurea*) has a rounded-topped flower cluster and leaves divided into many leaflets.

**Do not touch this plant because it is poisonous. If you do, wash your skin immediately in cool soapy water and do not expose the area to sunlight.**

**Seek professional advice before removing.**

## Identification of Invasive Plants found in Ontario Photos by:

Credit Valley Conservation, Greg Bales, Ken Towle, Patrick Hodge,  
Ontario Federation of Anglers and Hunters, Francine Macdonald, Matt Smith



