



London
CANADA

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Chapter 10

Erosion and Sediment Control

Design Specifications & Requirements Manual

October 2003

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City of London

Design Specifications and Requirements Manual

The design information contained in this manual is intended to provide guidance beyond legislative and standard design practices for use in the City of London (the City). There will be site specific situations where the design will depart from these practices as it is not possible nor is it the intention of the City to anticipate every situation. The City intends to review and revise the Manual from time to time. The City also acknowledges that other references such as the ‘Standard Contract Documents for Municipal Construction Projects’ are to be used in conjunction with this manual. The 2024 update of this Chapter further clarifies existing ESC standards and practices and incorporates design information from the Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019) to provide consistent and current design information for development and City Infrastructure projects.

The City of London maintains its right to accept or refuse any design submissions and requires an acceptable design for any given circumstance.

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10 Erosion and Sediment Control

10.1 Introduction

Construction Sites by their nature result in the disturbance of the on-site existing vegetation and soils. Erosion Sediment Control measures are intended to mitigate transfer of sediment and reduce erosion to protect adjacent properties, infrastructure and the natural environment. Sediment and erosion control measures are to be used on ALL construction sites and shall be designed and implemented to mitigate all types of erosion such as Splash, Sheet, Rill, Gully, Gravitational, Channel and Wind. The City of London requires an Erosion Sediment Control (E&SC) Plan be designed for most Developments, city Capital and Operational Projects. The complexity of the E&SC PLAN is determined by the scope of the proposed works, the specific soil characteristics of the site and the sensitivity of the area including all natural heritage features.

10.2 Reference

The following guidelines rely on the Ministry of Natural Resources Guidelines on erosion and sediment control for urban construction sites. The Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019), Municipal Ontario Provincial Standards and Drawings (MUNI OPSS, OPSD, Appendix D) which all provide information on the design, installation and maintenance of erosion and sediment controls.

Erosion Sediment Control (E&SC) Plan:

The requirement for an E&SC Plan within the City of London has developed through the City's ongoing commitment to ensure water quality protection in all sewers, downstream stormwater management facilities, open watercourses/ditch systems and any other natural heritage features within the City's boundaries is achieved. More information relating to the E&SC Plan policy can be found in:

- i. Planning Committee Report, June 20, 2005, Agenda Item # 3; and
- ii. Joint ETC/Planning Committee Report, June 18, 2007, Agenda Item # 12.

10.3 E&SC Design Requirements

10.3.1 Erosion Risk Assessment (ERA)

For development sites or projects greater than 10.0 hectares or for any development (regardless of size) that is adjacent to or has a potential to outlet concentrated or surface flows to a natural heritage feature(s), an Erosion Risk Assessment (ERA) must be prepared by a qualified person for the complete site/project under design. The ERA

shall be provided at the preliminary stage of the development application process or project and shall form the base framework/information in the preparation the detailed E&SC plans and details for the proposed development/project. The ERA shall be completed in accordance with [Section 6 of the Erosion and Sediment Control Guidelines for Urban Construction \(TRCA, 2019\)](#). (See **Appendix C** for ERA Decision Tree Flowchart).

10.3.2 E&SC Plan

An E&SC Plan for all Capital Works, Operational, and Development Projects is to be designed ensuring that all the requirements identified in the General Requirements for Erosion Sediment Control Plan (E&SC Plan) chart (see **Table 10.1**) and this chapter are addressed. For all construction projects, all reasonable protective measures must be taken during construction to control sediment and prevent erosion from occurring.

- i. For Site Alteration Agreements, the E&SC Plan is to be provided as part of the application.
- ii. For Subdivision related developments, the E&SC Plan is to form part of both the Servicing Report and Engineering Design Drawings for the project.
- iii. For Capital Works and Operational Projects, the E&SC Plan is to be submitted during detailed design.
- iv. Unless otherwise stated, all designed, installed and maintained Erosion and Sediment Control measures shall be in conformance with this section of the Design Specifications and Requirements manual, OPSS.MUNI 805 specifications (Temporary Erosion and Sediment Control Measures), have regard to Canadian Standards Association (CSA) W202 Erosion and Sediment Control Inspection and Monitoring Standard (as amended), The Erosion and Sediment Control Guidelines for Urban Construction (TRCA, 2019) and shown on all ESC plans and servicing drawings.

The complexity of the project will determine the required complexity of the E&SC Plan.

10.3.3 Servicing Drawings

Erosion and Sediment Control measures, details and notes must be identified on a dedicated E&SC engineering plan. For additional clarity, components of the E&SC measures can also be shown on all other pertinent servicing drawings and must be consistent with the requirements identified in the dedicated E&SC Plan. To convey the E&SC strategy effectively, the E&SC drawings shall be in conformance with **Appendix A Table 10.1 and Appendix E Typical ESC Engineering Drawing Notes**.

10.3.4 Anionic Polyacrylamide (PAM) and Construction E&SC measures

Anionic Polyacrylamides or PAM is a group of high molecular weight/water soluble molecules formed by the polymerization of the monomer acrylamide and has been used as an effective erosion and sediment control solution on active construction sites. PAM is also used in the purification process for potable water treatment systems.

PAM is another tool that is available in the development and implementation of E&SC plans and helps to augment E&SC treatment train solutions for ensuring the proper runoff water effluent criteria is achieved from the site that is under construction. (See **Appendix F** for additional Design and Monitoring details).

10.3.5 E&SC Inspection and Reporting Requirements

The inspection and maintenance of the site selected erosion and sediment control measures is a critical and proactive component to the overall success of the E&SC design and implementation. Regular inspection of the site E&SC measures shall be performed on a regular basis and after all significant¹ rainfall events, by applicable parties (inspector and/or contractor).

A compiled monitoring report shall be provided to the City April 1st, July 1st, and November 1st of each calendar year until all the works and services of the development/Municipal Project are assumed by the City or end of warranty. The compiled monitoring reports shall include but not limited to the following information.

1. All inspection records/logs for the applicable submitted time periods. (Minimum 1 (one) log per week for the specified time period during active construction and monthly for inactive areas or after a significant rain event has occurred)
2. Summary page of all breaches and remedial action provided to correct any deficiencies including any spill occurrences and if the MECP, UTRCA, City were involved with any remediation efforts.
3. All associated major E&SC design changes from the original accepted E&SC plan(s).
4. Title page and description of the subdivision (phase) that was inspected in the report.
5. Identify any areas that were decommissioned due to construction phasing or due to final lot grading and stabilization.

¹ A rainfall event should be considered **significant** when either of the following criteria are met:

- An event during which ≥ 15 mm have been received within 24 hours; or
 - An event with an intensity of ≥ 5 mm/hr. and during which at least 10 mm have been received.
- [Section 10.1.2 of the Erosion and Sediment Control Guidelines for Urban Construction \(TRCA, 2019\).](#)

6. Detailed logs of all effluent monitoring results where required and applicable.
7. Date stamped photographs from every inspection. (These can be added as additional appendices to the report template)

The inspection template is used for daily, weekly, or monthly logs of ESC activities onsite. The required report submissions shall include all the completed logs compiled into a report and shall include a summary of any ESC issues and events that occurred for the specific reporting period.

An example of the City of London inspection report template is in **Appendix B**.

10.4 Review and Acceptance of Erosion and Sediment Control Plans

The City of London, Environmental and Infrastructure service area is responsible for reviewing and accepting the E&SC Plan. Consultation with the local Conservation Authority will be conducted as required.

10.5 Conservation Authorities

Approvals and any required permits are to be obtained from the Conservation Authorities (UTRCA and KCCA) for works which are within, or adjacent to, the UTRCA and KCCA's regulated areas prior to City approval of the engineering plan/drawings and construction.

10.6 Parks and Open Spaces

Approvals are to be obtained from the Planning Division for sediment and erosion control measures adjacent to any open space areas – flood plain, Environmentally Significant Areas, natural areas, ravines, parks, etc., prior to “Site Alteration”, construction of services or approval of engineering plans.

10.7 Erosion & Sediment Control Measures Typical Notes

The sediment and erosion control measure notes are to be shown on the engineering construction drawings, either on the plan that details the sediment and erosion control measures, or on the associated E&SC notes and details drawing. Please refer to **Appendix E** for these typical notes. Please note that Appendix E are the minimum required notes and additional notes may be required to suit the individual project.

10.8 Site Alteration Agreement

If a site alteration agreement is requested prior to the Subdivision Agreement being signed and executed, then the **site alteration agreement** shall include but not limited to the following:

- A proposed temporary site grading and drainage design that identifies site alteration parameters and any impacts on the adjacent lands and Natural heritage features, must be reviewed and accepted by the City prior to the agreement being finalized.
- A detailed E&SC plan designed in compliance with the design specifications in this chapter.
- An Erosion Risk Assessment analysis and report shall be submitted and reviewed in relation to the E&SC plan (**see Appendix C flowchart**).
- The proposed site grading/drainage design and all proposed alteration activities shall incorporate and follow all the applicable hydro geotechnical and geotechnical recommendations.
- The Consulting Engineer provides formal “certification” via a stamped signed letter/memo that all **initial** E&SC measures were properly installed in accordance with the accepted E&SC plans and details on file with the City.
- Changes in the field by the contractor shall be confirmed and documented by the Consulting Engineering via the ESC inspection logs.
- All ESC measures shall be regularly inspected, maintained, and documented in the logs per City of London standards.

10.9 Final Servicing Drawings Review

At the **final servicing drawings review stage** for various land development applications and City Municipal Infrastructure projects, all required E&SC measures, details and procedures shall be identified on these drawings and shall be in compliance with the approved E&SC plan and applicable standards, all to the specifications and satisfaction of the City Engineer.

10.10 Roles and Responsibilities

The roles and responsibilities of various parties involved in the design, implementation, maintenance, and removals of ESC’s is outlined in the table of **Appendix G**. This table provides clear division of ESC roles and responsibilities for Owners, Municipalities, Agencies, Consultants and Contractors.

Appendix A: General Requirements for Erosion and Sediment Control Plans

Notes:

1. For Development Projects with a Functional SWM Report – the E&SC PLAN is to be included in the Functional SWM Servicing Works Report.
2. For Development Projects with no Functional SWM Report component – the E&SC PLAN is to be included in the Servicing Report for the Project.
3. For Operational & Capital Works Projects – the E&SC PLAN is to be submitted prior to detailed design.
4. *** Amended July 2019**

Table 10.1 – General Requirements for Erosion and Sediment Control Plans (E&SC)

#	Proposed Measures and Site Conditions	Comments
1	Identify all types of “erosion/sediment control (E&SC) devices” that are selected for the proposed construction activities.	<p>E&SC devices/measures must be listed and identified in detail including, but not be limited to:</p> <ul style="list-style-type: none"> • the type of silt fences and/or link silt fences (silt/robust/heavy duty or others), • the proposed berms in relation to the identified areas <p>All this information is required to be identified on the E&SC’s attached plan as part of the engineering drawings, the storm/drainage section, and SWM Functional Design Report.</p>
2	Identify the land slopes and proposed land alterations.	<p>The relation of these recommended control devices to the proposed storm/drainage flow routes and grading on the attached plan shall be clearly established. All temporary fencing, rock check dams, and swales, where appropriate, are intended to attenuate flows and to provide sediment depositing. All these measures should be identified and attached to the E&SC PLAN in order to ensure that the ecological health of the system will be well protected and not compromised. During construction activities, any proposed diversion swales/channels, berms, or silt fencing must direct all surface runoffs to the temporary sedimentation/settling basins or perimeter ditches in order to minimize sediment loading to the open watercourses or municipal system.</p>



#	Proposed Measures and Site Conditions	Comments
3	Identify when and where these devices are to be installed	The relation of these identified control devices to the proposed storm/drainage flow routes and grading on the attached plan shall be clearly established. All recommended temporary swales shall be identified on the plan and the detailed information should be included in the report (locations, elevations, geotechnical conditions and separation distances should be identified).
4	Identify the potential downstream sensitivity of water resources.	All applicable and relevant background information related to the Official Plan (OP) Natural Heritage System (NHS) requirements, the Subwatershed Studies, Environmental Impact Studies, the City's Design Standards and Requirements and the No cost implications requirements must be identified.
5	Identify the proximity to Environmental Significant/Sensitive Areas.	All applicable and relevant background information related to the Official Plan (OP) Natural Heritage System requirements (NHS), the Subwatershed Study, Environmental Impact Studies, the City's Design Standards and Requirements and the UTRCA (or other Conservation Authority) requirements must be identified.
6	Identify the proposed infiltration measures and E&SC measures being proposed for the protection of infiltration measures.	Compliance with the Hydro geotechnical report recommendations for the subject lands.
7	Identify dewatering requirements, the type of permits and existing groundwater and open watercourses levels.	Compliance with the Hydro geotechnical report recommendations for the subject lands and the MECP's Permit to Take Water (if it is applicable).
8	Identify the type(s) and predominant characteristics of the soils within the area (e.g. particle size/structure, moisture content and compactness).	Compliance with the Geotechnical report recommendations for the subject lands.

#	Proposed Measures and Site Conditions	Comments
9	<p>Provide specific provisions for all disturbed areas that are left inactive for 30 days or more. If >30 days the contractor to provide a workplan to address E&SC concerns in disturbed areas.</p> <p>These areas must be re-vegetated or suitably protected in order to minimize the soil to be exposed and washed out by the storm flows.</p>	<p>The areas where the vegetation was removed for the proposed construction activities should be minimized and the phasing approach should be considered and discussed. The time period between the initial vegetation removal and final grading/seeding should be kept to a minimum. Temporary soil stabilization measures should be implemented where practical.</p>
10	<p>Identify the need for enhanced E&SC measures that may be warranted by the site conditions and/or the proximity to Environmental Significant/Sensitive Areas and/or open watercourses.</p>	<p>The requirement to provide various levels of the enhanced E&SC measures that encompass:</p> <p>a multi-barrier approach that will collect the sediment at the source first rather than through conveyance; and end-of-pipe controls that will collect the sediment within the proposed perimeter ditches and settling/contingency detention basins to protect ecological health of the system.</p> <p>Enhanced E&SC measures should include the use of sediment control socks (or equivalent filtration system) adjacent to watercourses and other critical areas as part of the multi-barrier approach.</p>
11	<p>A Contingency Plan must be included in the E&SC PLAN and is required to address potential non-typical site and weather conditions, the efficient reporting system and the emergency contact list including all applicable agencies.</p>	<p>The need for enhanced and sustainable E&SC measures using the multi-barrier approach should be implemented. The main objectives of these measures are to provide the required control and containment of the sediment at the source within the proposed perimeter ditches and settling/contingency detention basins. The by-pass channels must be designed for a minimum of the 10-year storm event unless otherwise agreed to in writing. (external flows traversing through the development site during servicing)</p>
12	<p>The Owner's Engineer will be responsible to inform the Owner of any required approvals and/or permits for the project and obtain all approvals for the proposed E&SC Plan (including a Contingency Plan) for any construction. (sites, subdivisions and linear construction projects).</p>	<p>The commencing of any construction activity at the subject lands is not allowed to proceed without all approvals and/or permits being in place including the E&SC Plan and the dewatering permits</p>

#	Proposed Measures and Site Conditions	Comments
13*	<p>A cost estimate for the E&SC PLAN's security allocations for potential remediation works is required to be calculated based on approximately 15% of the total projected cost for the Storm/Drainage and SWM Servicing Works.</p> <p>For Site development, a cost estimate of the proposed E&SC measures can be provided to the City and a percentage of that cost (to be determined based on-site specific conditions) could be retained for security purposes.</p>	<p>It is required that the E&SC PLAN's security allocations for potential restoration works be included in the Subdivision security and should the Owner fail to provide the adequate implementation of the approved E&SC Plan, the City would use the security to undertake the remediation works.</p>
14	<p>The Owner's Engineer (CA) and Owner's Contractor responsibilities for any proposed modifications that deviate from the originally approved E&SC Plan.</p>	<p>Where required by the Owner's Engineer, the (CA) is to design, specify and relay any required modifications to the contractor for implementation for any new E&SC measures and confirm the E&SC measures were installed correctly in the ESC inspection logs. These changes must support the subject site conditions, sensitivity, and proximity to watercourses and/or Environmental Significant Areas (ESA).</p> <p>E&SC modifications:</p> <p>Minor changes to the originally approved E&SC plan can be made in the field by the Contractor without City approval but must be reported to the Contract Administrator to ensure the modified E&SCs are appropriate and meet the intent of proper E&SC design and installation for the project site.</p> <p>Major changes to the originally approved E&SC plan.</p> <ol style="list-style-type: none"> 1. Proposed changes to the original E&SC plan by the Owner's Engineer (CA) must be submitted for review and acceptance by the City Engineer. The Owner's Engineer (CA) must oversee the contractor's implementation of these changes, all to the specification of the City Engineer. 2. Proposed changes to the original E&SC plan by the Contractor due to construction phasing, methodology or changing site conditions, the Contractor must provide a workplan identifying the proposed E&SC changes for approval by the Owner's Engineer (CA) and the City.



#	Proposed Measures and Site Conditions	Comments
15	The Owner's Engineer will be required to confirm the implementation of the E&SC PLAN by the Owner's Contractor and to assign inspection throughout all construction stages. Also, the Owner's contractor shall undertake decommissioning of all E&SC measures under the supervision of the Owner's Consulting Engineer when the removal of the E&SC measure is deemed warranted by the Owner's Consulting Engineer.	Control features that fail should be repaired and evaluated as to whether, or not, additional measures are required, and prior to removal of any E&SC measures, joint inspection may be required to be conducted with the applicable City staff in proximity to sensitive areas. Contractor is responsible for the required inspections, maintenance and decommissioning of all E&SC measures with control of the work site per OPSS GC7.

#	Proposed Measures and Site Conditions	Comments
16	<p>The Owner's Engineer will be required to incorporate the following main components of the E&SC Plan's reporting system: Suitable inspection (considering part or full-time contracts) on all days of the construction (failure of any E&SC Plan shall be reported immediately within a period of 2-3 hours during active construction, or within a reasonable timeframe after regular working hours), Inspect after all *significant rainfall events; Inspection logs must be reviewed on a regular monthly basis.</p> <p>The E&SC inspection reports (containing all the inspection slogs) shall be submitted to the City in accordance with section 10.3.5.</p> <p>Private, small-scale projects will require the Owner's Consulting Engineer to provide proactive inspection of all E&SC measures to confirm they are in good working order, maintained and installed in accordance with the current accepted E&SC plan(s) on file with the city.</p>	<p>The Owner/Subdivider to implement, maintain and ultimately decommission the E&SC measures contained in the approved E&SC Plan and their Consulting Engineer will be required to comply with the following requirements:</p> <ol style="list-style-type: none"> 1. Confirm that all initially proposed E&SC measures on the accepted servicing drawings on record at the city were installed prior to construction. <p>Confirm that all E&SC measures are being maintained and operating as intended; submit E&SC monitoring reports. They are to be submitted by April 1, July 1, and November 1 of each year until all works and services of the plan are assumed. Confirm that E&SC measures are suitably decommissioned at the various stages of the project.</p>

Appendix B: Inspection Template Examples

Erosion and Sediment Control Inspection Log



Inspection Template - Erosion and Sediment Control Inspection Log

London
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Development Details		Inspection Details	
Subdivision Name/Project:		Inspection Date:	
39T or M Plan Number:		Inspection Time:	
Developer:		Inspection Duration(hrs):	
Consultant:		Reason For Inspection:	
Servicing Contractor:			

Site Data			
Site Area (Ha):		Stage of Construction:	
Site Outlet Receiver (creek, storm sewer)		Current construction activities onsite:	

Inspection Conditions			
Current weather conditions:		Current temperature(°C):	
Date of last rainfall:		Rainfall amount(mm):	
Last rainfall duration(hrs):		Snowmelt amount(mm):	

Item	Item Description	Y	N	N/A	Inspector's Action(s)/Comments
1	Are offsite flows currently entering the site?				
2	Is there evidence of, or the potential for, pollutant discharge from the site? (fuel, concrete washout, portable toilets, sediment, etc.)				
3	Is installation, repair and/or maintenance of erosion controls required?				
4	Is installation, repair and/or maintenance of sediment controls required?				
5	Is installation, repair and/or maintenance of in-stream controls required?				
6	Is there evidence of sediment discharging off the construction site into the identified receiver(s)?				
7	Are construction vehicles tracking sediment/debris off the construction site?				
8	Is soil, construction materials, or other construction debris on the ROW?				
9	Are there areas of concern that would require additional ESC measures?				
10	Are there areas where ESC measure could be removed/eliminated?				
11	Have all previous inspection items been addressed from previous reports?				
12	Is there a need to formally update any ESC plans on file with the City?				
13	Is a photo inventory part of this report?				



Erosion and Sediment Control Inspection Log



Inspection Template - Erosion and Sediment Control Inspection Log



Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (colour, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.

Inspection Time and Location	Corrective Action Needed	Date Corrected (with initials)
<u>Location No. 1</u> Time: _____ <input type="checkbox"/> Discharges are Occurring		
<u>Location No. 2</u> Time: _____ <input type="checkbox"/> Discharges are Occurring		
<u>Location No. 3</u> Time: _____ <input type="checkbox"/> Discharges are Occurring		
<u>Location No. 4</u> Time: _____ <input type="checkbox"/> Discharges are Occurring		

Title of the Inspector: CAN-CISEC, P.Eng., LET, C.E.T., Other

Print Name

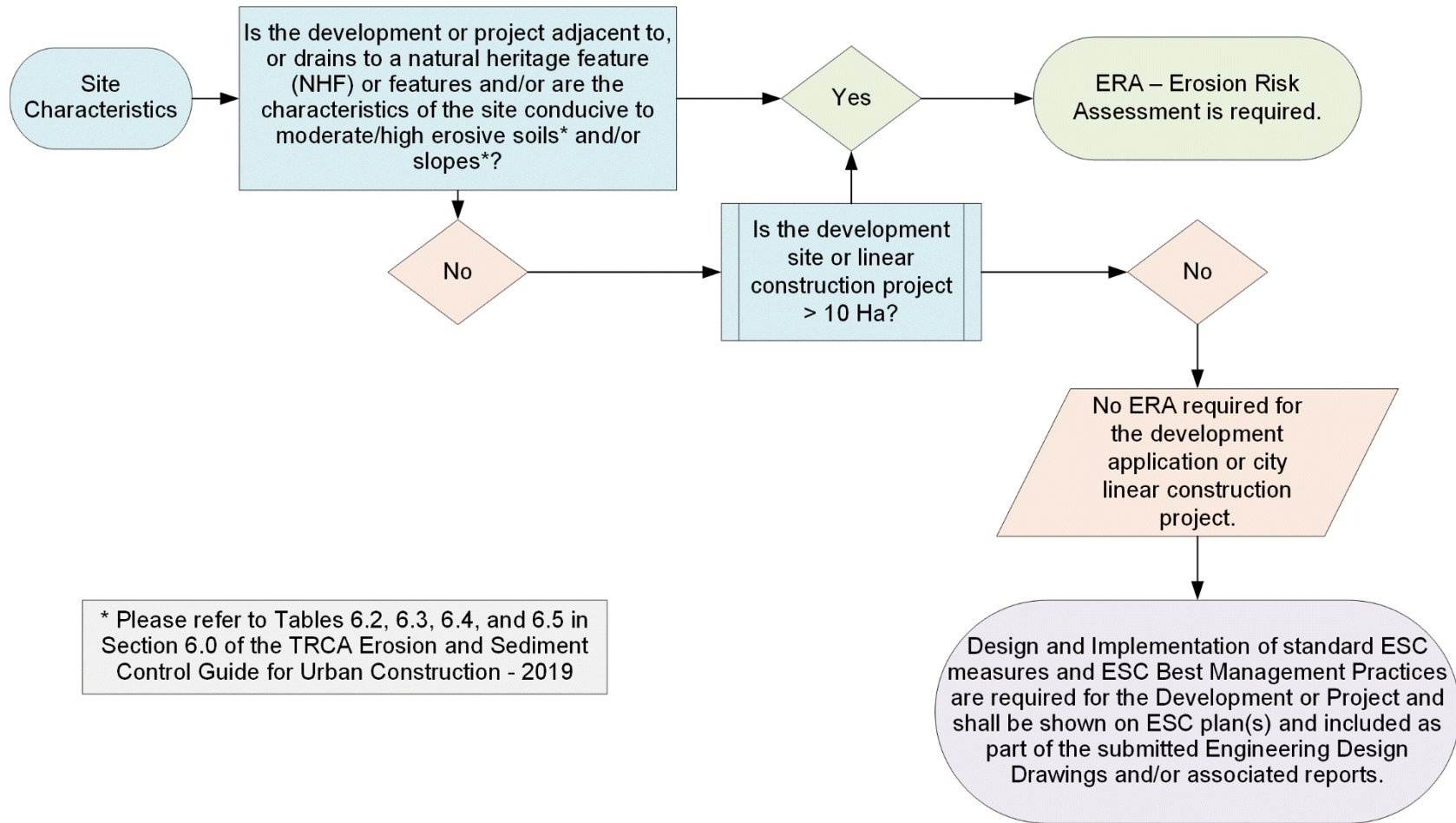
Signature of Inspector

Date

Attach additional pages if needed (documentation, pictures, etc.)

Appendix C: Erosion Risk Assessment (ERA) Decision Tree Flowchart

Erosion Risk Assessment (ERA) Decision Tree Flowchart for Development Applications and City Linear Construction Projects



* Please refer to Tables 6.2, 6.3, 6.4, and 6.5 in Section 6.0 of the TRCA Erosion and Sediment Control Guide for Urban Construction - 2019

Appendix D: Standards and Details List

Table 10.2 - Ontario Provincial Standard Specifications

OPSS MUNI #	Revision Year *	Title
182	Nov 2021	General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks
506	Nov 2017	Construction Specification for Dust Suppressants
802	Nov 2019	Construction Specification for Topsoil
805	Nov 2021	Construction Specification for Temporary Erosion and Sediment Control Measures
1860	Nov 2018	Material Specification for Geotextiles

Table 10.3 – Ontario Provincial Standard Drawings

OPSD #	Revision Year *	Title
219.100	Rev 3 Nov 2021	Light-Duty Straw Bale Barrier
219.110	Rev 3 Nov 2021	Light-Duty Silt Fence
219.120	Rev 1 Nov 2021	Light-Duty Fibre Roll Barrier
219.130	Rev 3 Nov 2021	Heavy-Duty Silt Fence Barrier
219.131	Rev 1 Nov 2021	Heavy-Duty Wire-Backed Silt Fence Barrier
219.150	Rev 2 Nov 2015	Sandbag Barrier
219.160	Rev 1 Nov 2021	Fibre Roll Grade Breaks
219.180	Rev 3 Nov 2021	Straw Bale Flow Check Dam
219.191	Rev 1 Nov 2021	Fibre Roll Flow Check Dams
219.200	Rev 2 Nov 2015	Sandbag Flow Check Dam
219.210	Rev 2 Nov 2015	Temporary Rock Flow Check Dam – V-Ditch
219.211	Rev 3 Nov 2021	Temporary Rock Flow Check Dam – Flat Bottom Ditch
219.220	Rev 2 Nov 2015	Sediment Trap in Ditch
219.230	Rev 4 Nov 2015	Temporary Slope Drain for Sediment Trap
219.231	Rev 1 Nov 2015	Temporary Berm Barrier for Slope Drain
219.240	Rev 2 Nov 2015	Sediment Trap for Dewatering
219.260	Rev 2 Nov 2015	Turbidity Curtain
219.261	Rev 2 Nov 2015	Turbidity Curtain, Seam Detail
221.010	Rev 1 Nov 2021	Temporary Flow Passage System (Culvert in Watercourse)
221.020	Rev 1 Nov 2021	Temporary Flow Passage System (Pumping and Piping)
221.030	Rev 1 Nov 2021	Temporary Flow Passage System (Temporary Channel or Culvert Outside Watercourse)
221.040	Rev 1 Nov 2021	Temporary Waterbody Crossing – Fill and Culvert

***Revision Year** referenced for the above noted OPSS and OPSDs are based on the current versions at the time of publishing this document. Designers must ensure that the current versions are used for design and engineering drawings and specifications which can be verified by visiting [MTO Technical Publications](#).

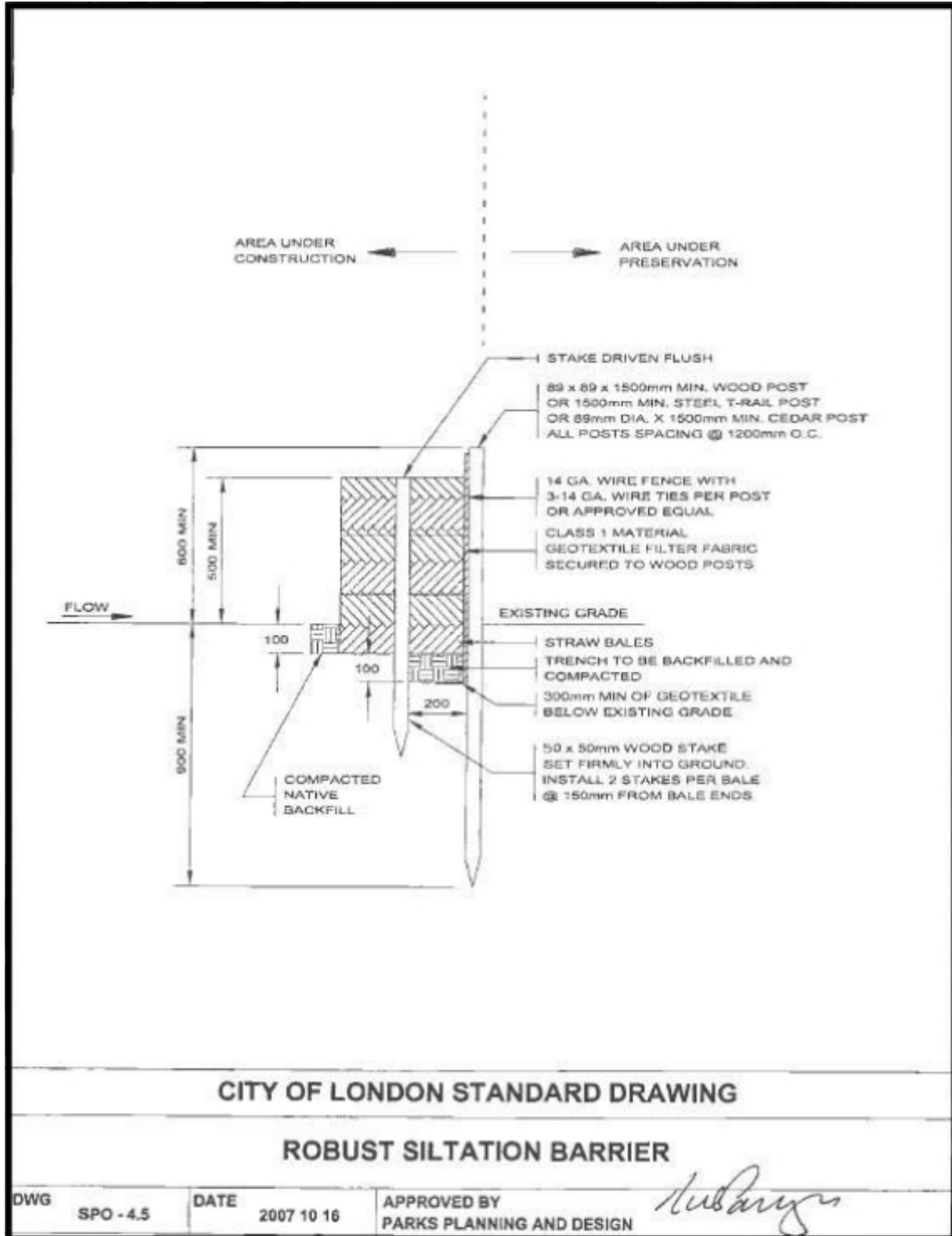
Table 10.4 – City of London Standard Drawings

City SP	Revision Year	Title
SPO-4.5	Oct 2007	Robust Siltation Barrier
ESC 1.0	Jan 2023	Medium Duty Straw Bale Barrier (Modified OPSD 219.100)
ESC 2.0	Jan 2023	Light Duty Fibre Roll Barrier (Modified OPSD 219.120)
ESC 2.1	Jan 2023	Fibre Roll Grade Breaks (Modified OPSD 219.160)
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ESC 3.0	Jan 2023	Temporary Concrete Washout Facility Notes
ESC 3.1	Jan 2023	Below Grade Temporary Concrete Washout Facility
ESC 3.2	Jan 2023	Above Grade Temporary Concrete Washout Facility

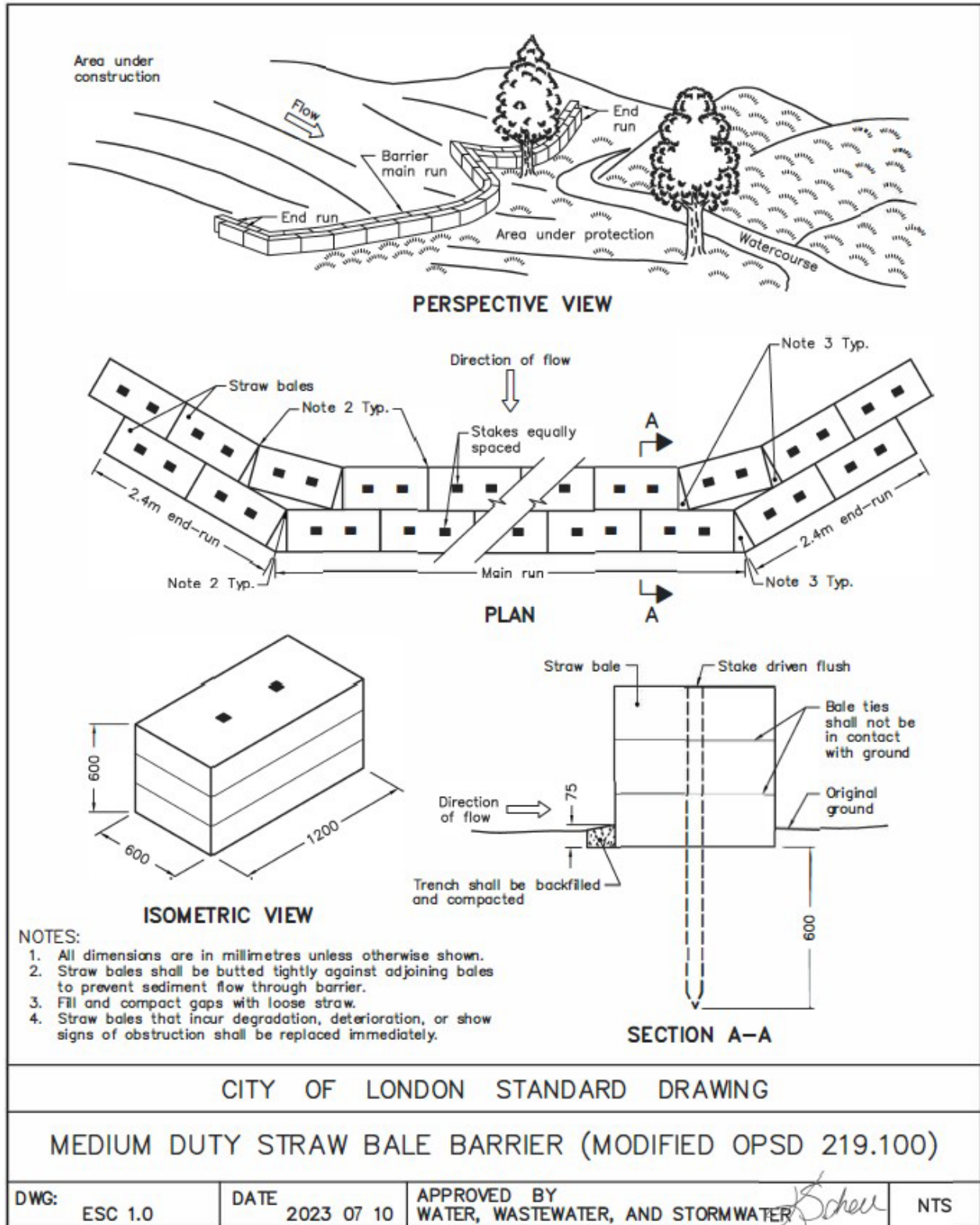


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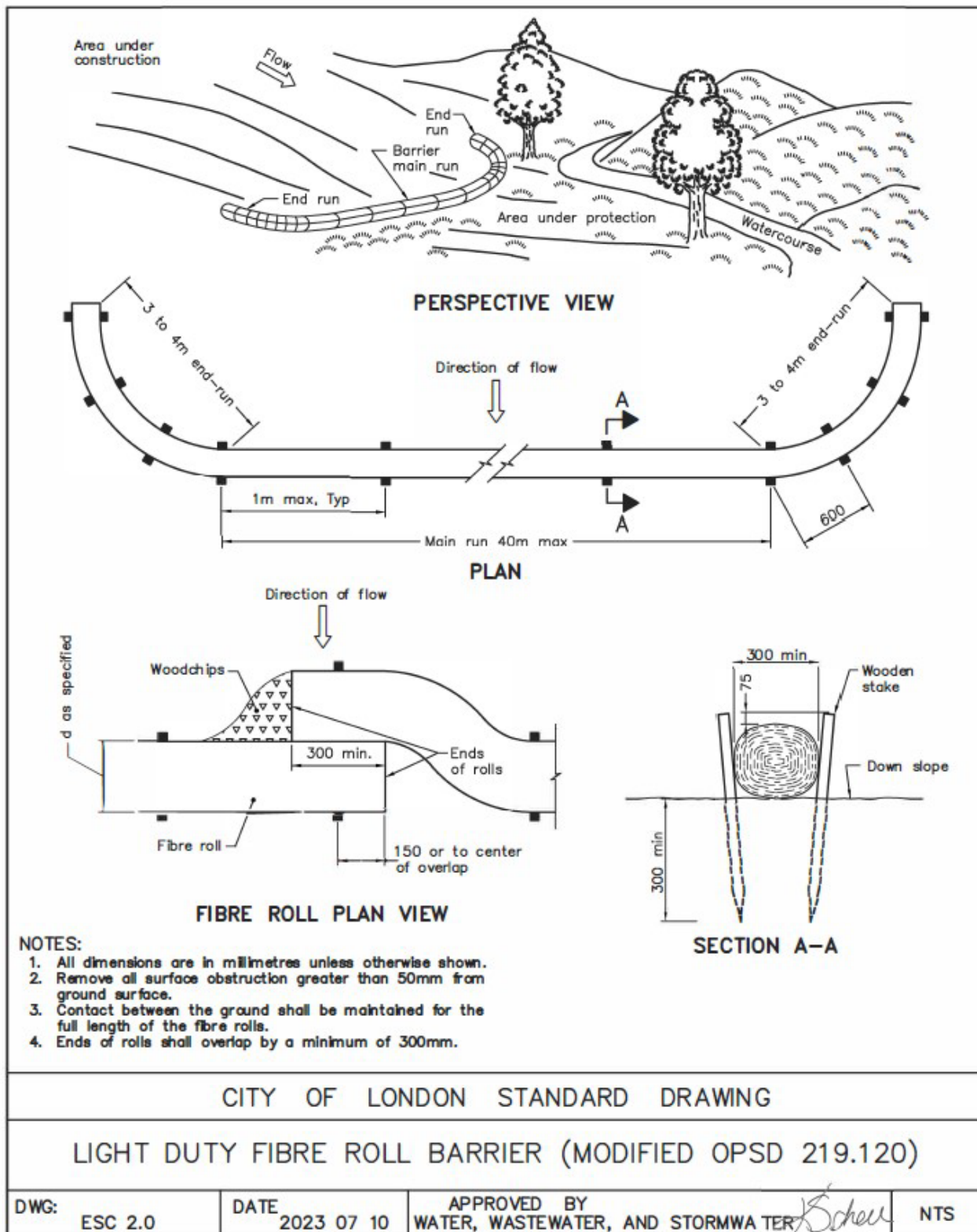
SPO-4.5 Robust Siltation Barrier



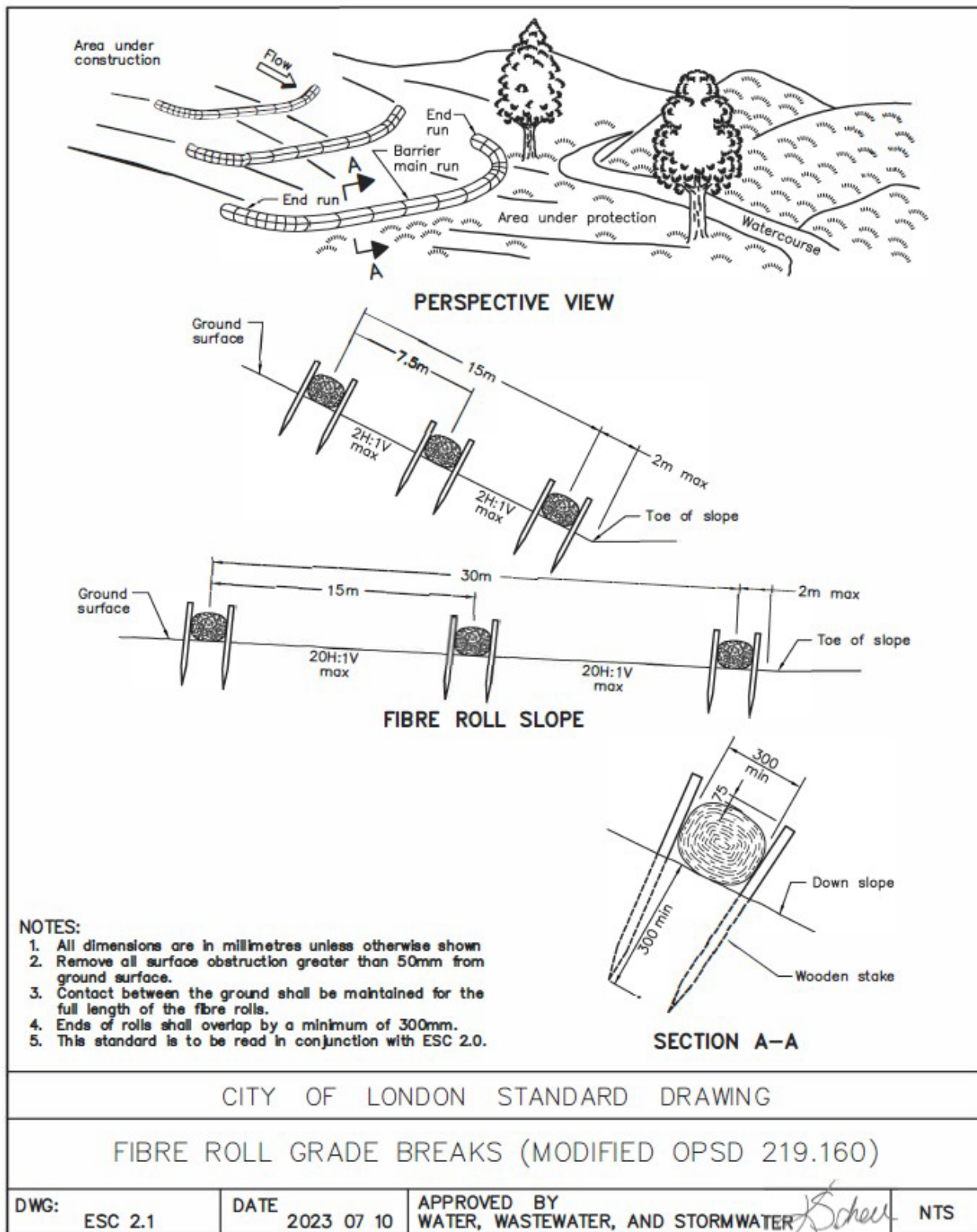
ESC 1.0 Medium Duty Straw Bale Barrier (Modified OPSD 219.100)



ESC 2.0 Light Duty Fibre Roll Barrier (Modified OPSD 219.120)



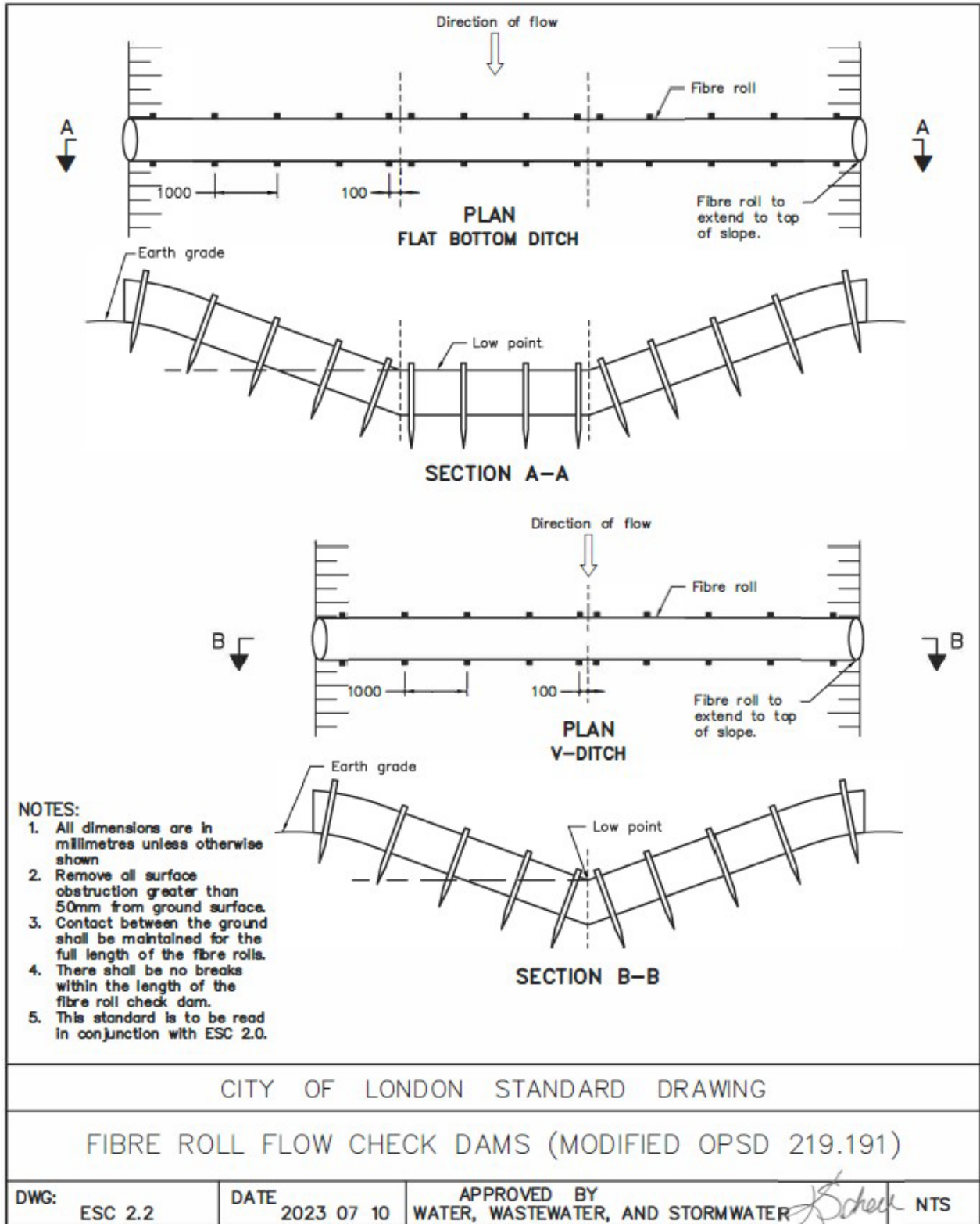
ESC 2.1 Fibre Roll Grade Breaks (Modified OPSD 219.160)



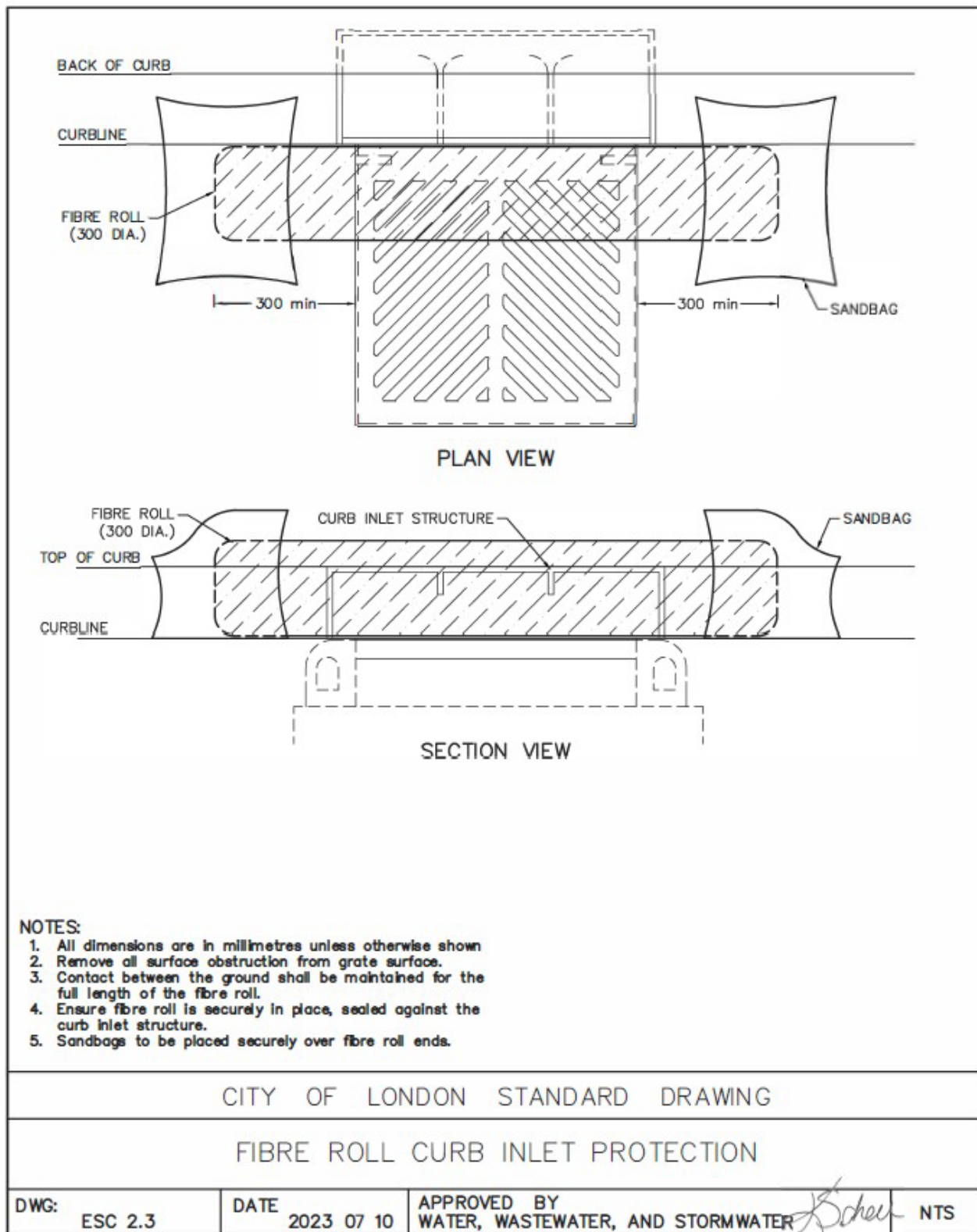


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ESC 2.2 Fibre Roll Flow Check Dams (Modified OPSD 219.191)



ESC 2.3 Fibre Roll Curb Inlet Protection



ESC 3.0 Temporary Concrete Washout Facility Notes

CFW INSTALLATION NOTES: -

1. BEST MANAGEMENT PRACTICE IS TO NOT LOCATE A CWF WITHIN 120 METRES OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 300 METRES OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWF MAY REQUIRE ADDITIONAL PROTECTIVE MEASURES AS PART OF A MULTI-BARRIER APPROACH , AND/OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES SHOULD BE USED.
2. THE CWF SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
3. IMPERMEABLE LINER INSTALLED IN PARALLEL REPLACEMENT SHOULD BE INITIATED UPON SHALL HAVE A MINIMUM OVERLAP OF 450mm.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWF, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWF TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.

ALTERNATIVE CONCRETE WASHOUT MANAGEMENT:

1. CONTRACTOR MAY ALTERNATIVELY UTILIZE A PRE-FABRICATED WASHOUT CONTAINER. REFER TO FIG. 10.1 IN THE DESIGN SPECIFICATIONS AND REQUIREMENTS MANUAL.
2. ANY PREFABRICATED WASHOUT CONTAINER MUST BE SPECIFICALLY DESIGNED AS A CONCRETE WASHOUT CONTAINER.

CFW MAINTENANCE NOTES .

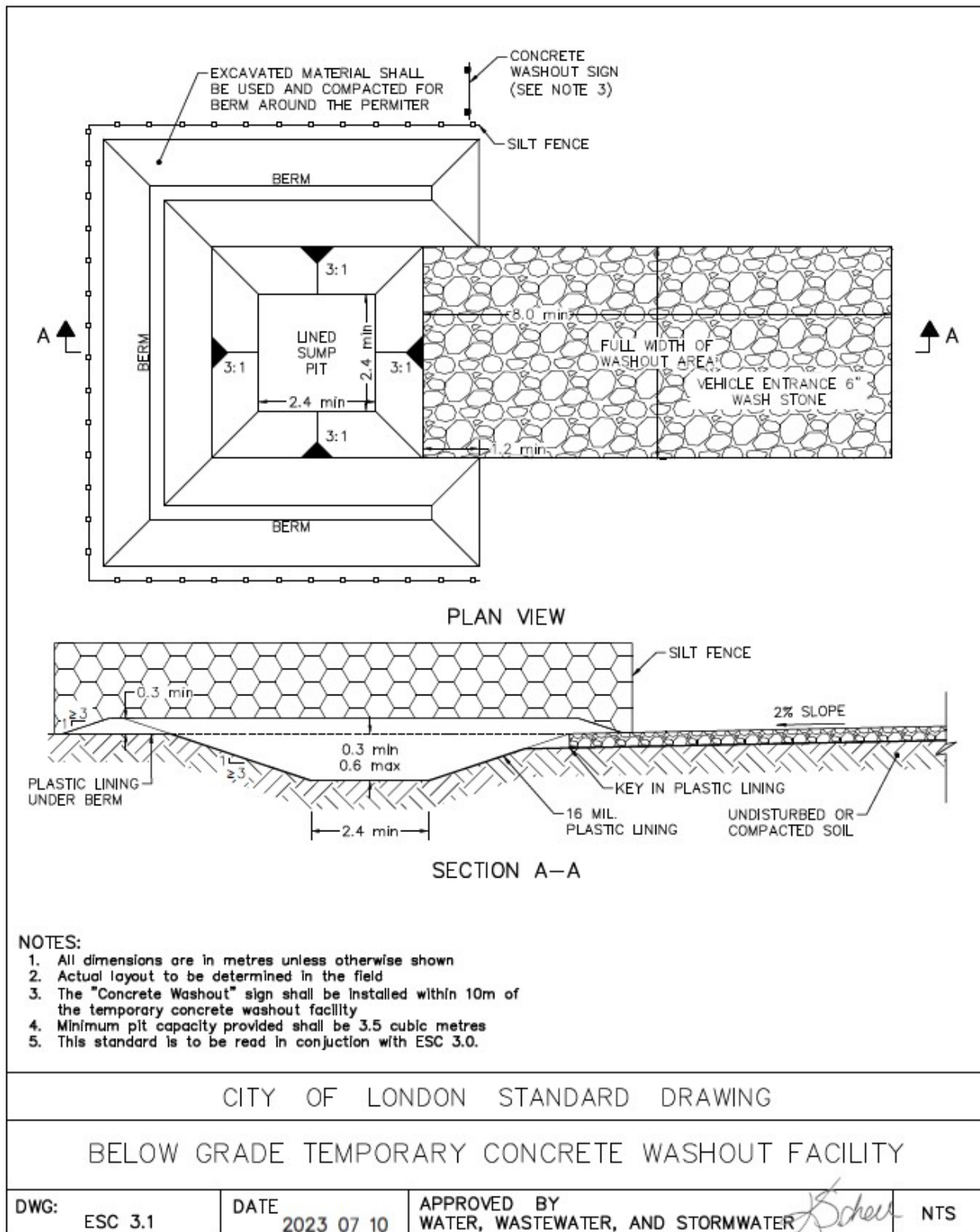
1. INSPECT BMPs AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. THE CWF SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED 75% OF THE CWF CAPACITY, OR A DEPTH OF 600mm, WHICHEVER IS THE LESSER.
5. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
6. THE CWF SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
7. WHEN THE CWF IS REMOVED, COVER THE DISTURBED AREA WITH TOPSOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN ACCORDANCE WITH CITY STANDARDS.

CITY OF LONDON STANDARD DRAWING

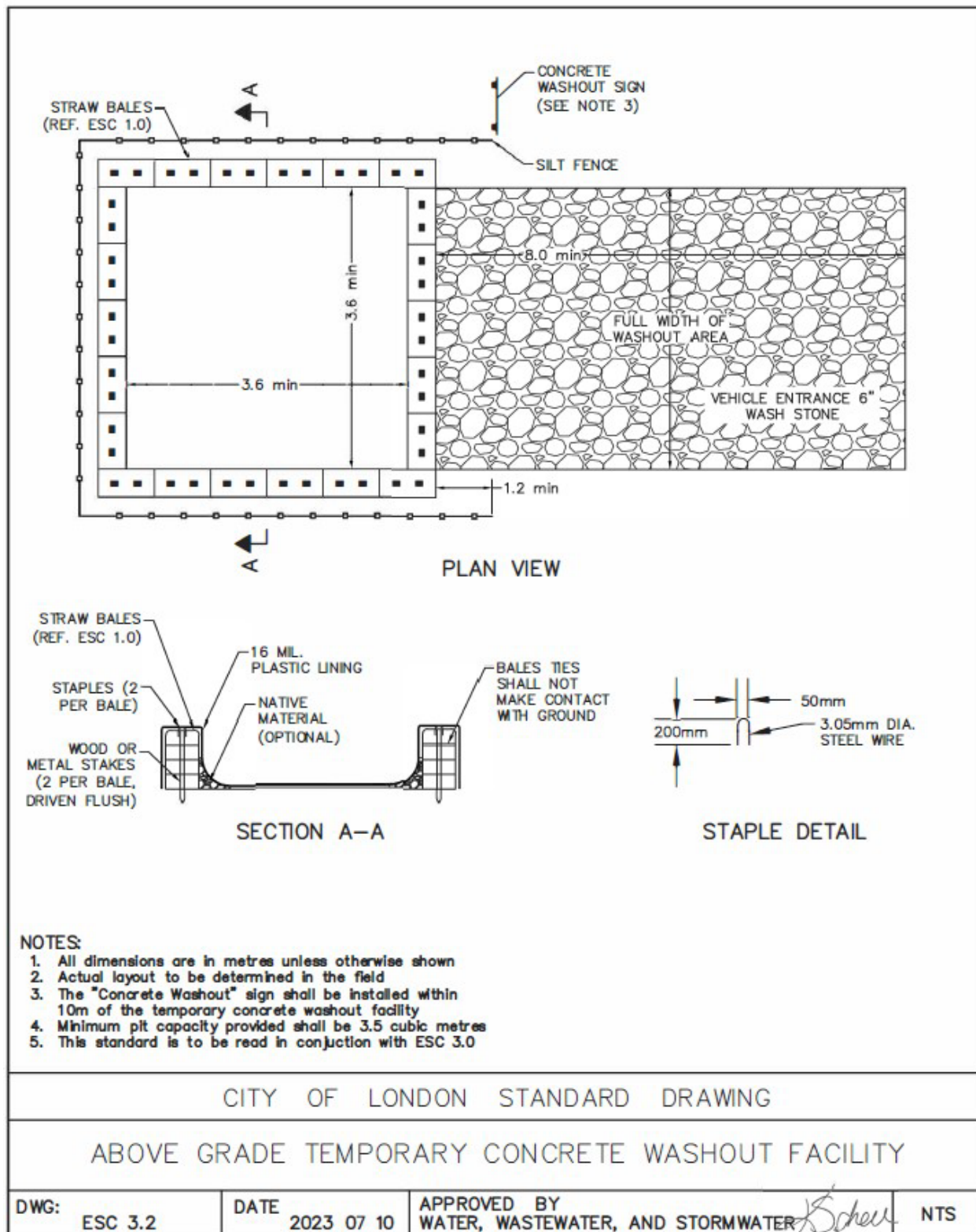
TEMPORARY CONCRETE WASHOUT FACILITY NOTES

DWG:	ESC 3.0	DATE	2023 07 10	APPROVED BY	<i>Scheek</i>	NTS
				WATER, WASTEWATER, AND STORMWATER		

ESC 3.1 Below Grade Temporary Concrete Washout Facility



ESC 3.2 Above Grade Temporary Concrete Washout Facility



Appendix E: Typical E&SC Engineering Drawing Notes

These typical notes shall be included on all engineering E&SC drawings when submitted to the City for acceptance.

Contingency measures in case of failure:

- Any unexpected discharge of sediment or other deleterious substance to the watercourse shall be reported by the contractor to **[CONSULTANT NAME]**, the City of London and the MECP within a 2-3 hour time period during active construction hours or within a reasonable due diligence period during obscure times or situations. Time is of the essence.
- The contractor will cease all construction related work and focus on erosion and sediment control repairs as required to effectively stabilize the site where failure has occurred or is imminent.
- If long term damage to fish habitat, Natural Heritage features, or property has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the proponent, in consultation and with approval from the DFO, UTRCA and the City for implementation by the proponent.
- The work shall be completed to the satisfaction of the contract administrator and those regulatory agencies that have been consulted.

Contingency measures where there is a potential for failure:

Where monitoring has identified a high potential for failure. Steps shall be immediately taken to reduce the risk. These measures may include repair to existing measures, modification of existing measures, and the addition of new measures.

- The contractor shall document the proposed approach and submit it to the contract administrator for immediate review and response. Where no response is forthcoming, the contractor shall immediately proceed with implementation.
- The contract administrator shall immediately provide a copy of the proposed approach to the city of London. As time may be of the essence, it will be the city's responsibility to respond forthwith, otherwise the contractor and contract administrator shall proceed with the proposed measures.
- In cases where the weather forecast indicates that significant rainfall is expected within a 24-hour period, the contractor shall immediately complete the following:
- Verify that erosion and sediment control measures are secure and to reasonably minimize all exposed soil to erosion that could be deposited outside of the work limits; and
- Verify that all other sediment and erosion control measures are in good working order.

- The contract administrator shall document the status of the above-listed steps.

Contingency Plan:

The purpose of the contingency plan is to minimize the risk or consequence of failure of the erosion and sediment control works. The contractor shall be responsible for following the contingency plan, and will prepare the following items:

- An emergency contact list for emergency situations, including [CONSULTANT NAME], City of London, MECP and DFO/UTRCA if required.
- Contractor shall be on call for emergency situations for construction of emergency sediment and erosion control measures. Any associated health and safety issues are the responsibility of the contractor.
- Heavy duty silt fence, straw bales, linear filter socks and stakes, sandbags, appropriately sized riprap, clean gravel fill, filter bags, and catchbasin silt sacks, etc., shall be available onsite or be available in a reasonable time frame to address any E&SC deficiencies that arise onsite. This also includes spill kits and other materials for environmental emergencies.
- Gas powered pumps, appropriately sized hoses, filtration socks, and filter cloth shall be available for emergency dewatering either onsite or be available in a timely manner.
- Heavy equipment shall be on hand or available in a reasonable time for emergency works.
- Fuel spill equipment shall always be available onsite for emergency spills of deleterious substances.
- A contact list for any further required equipment or materials shall be prepared and made available for emergency use.

If unforeseen events cause the strategies set out in the contingency plan to be insufficient or inappropriate to meet the objective, the contractor, either independently or as directed by the contract administrator, will respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish, fish habitat, natural heritage features, and human interest (i.e., safety, property value).

Inspecting and Reporting:

To monitor the effectiveness of the erosion and sediment control measures during construction, frequent inspections will be required. The inspection activities will include the following (minimum) tasks:

- The contractor shall monitor weather reports daily, and the contract administrator shall document any weather that would negatively impact the E&SC measures and capture this in the E&SC logs.

- The contractor shall inspect the E&SC works on all days when construction is active and continue to monitor all E&SC measures on inactive construction days .
- The contract administrator and the contractor shall inspect the erosion control works following periods of significant² precipitation and the contractor will correct any deficiencies within 48 hours.
- The contract administrator will document all inspection activities in a logbook that will be submitted to the city of London at the completion of construction.
- Prior to removal of significant erosion and sediment control measures (large sediment basins, critical treatment trains), the contract administrator and the city of London shall conduct a joint inspection of the construction site to confirm that the measures can be removed and discuss the methods that will be used for removal and decommissioning.
- The contract administrator shall prepare inspection reports for the duration of construction and submit the compiled reports to the city of London all in accordance with Chapter 10, Section 10.3.5 of the Design Specifications and Requirements Manual, until all works and services of the plan are completed and/or end of warranty.
- The inspection report shall document any repairs, rainfall or pumping that has occurred since the last report, and any risks of failure that may be present.
- Additionally, any failure of the proposed temporary erosion & sediment control measures shall be reported as described in the contingency plan.

Erosion and sediment control measures (General Servicing):

1. Minimize all area(s) to be disturbed during construction.
2. Protect all exposed surfaces from erosion.
3. Control runoff during construction.
4. All erosion control measures are to be in place and inspected by a qualified person before starting construction and remain in place until restoration is complete.
5. The contractor shall be responsible for constructing and maintaining all erosion and sediment control measures. Any failures of the implemented E&SC plan will be the responsibility of the contractor and not the contract administrator.
6. The contractor shall be responsible for maintaining all erosion and sediment control measures, including but not limited to, maintaining fencing, diversion

² A rainfall event should be considered **significant** when either of the following criteria are met:

- An event during which ≥ 15 mm have been received within 24 hours; or
- An event with an intensity of ≥ 5 mm/hr. and during which at least 10 mm have been received.

[Section 10.1.2 of the Erosion and Sediment Control Guidelines for Urban Construction \(TRCA, 2019\).](#)

swales, catchbasin silt sacks, temporary sedimentation basins, and removing all accumulated sediment from these controls when warranted.

7. All soil deemed to be excess soils shall be managed in accordance with O. Reg. 406/19 On-site and Excess Soil Management Regulations and the soil rules.
8. All disturbed areas where work will not occur for 30 days or more shall be stabilized in accordance with OPSS MUNI 804. If grading is completed during off-season construction months, the slopes will be stabilized, as per OPSS MUNI 804, when weather permits.
9. Any soil stockpiles (excluding topsoil) shall be surrounded with silt fence and stabilized in accordance with OPSS MUNI 804. Topsoil piles are not required to have silt fencing around them but shall be placed and protected so that there are no negative impacts on surrounding private properties.
10. All erosion and sediment control measures shall be installed prior to the commencement of construction and shall remain in place until site restoration is complete.
11. Unless otherwise specified, all geotextile (Class II per OPSD or approved equivalent) shall be installed in all maintenance holes and pipe ends to protect the storm sewer system from sediment accumulation.
12. All accumulated sediment shall be disposed of at an approved location, in accordance with all applicable laws and regulations.
13. All dewatering must be conducted using an approved outlet control method such as a sedimentation basin or filter bag. Effluent monitoring shall be conducted in accordance with the accepted E&SC monitoring program requirements and to ensure discharge is consistent with the receiver's background water quality requirements.
14. Protect all catchbasins from sediment intrusion using catchbasin filter sacks or equivalent.
15. Protect all curb inlet catchbasins from sediment intrusion using catchbasin filter sacks and protect the curb inlet portion with the use of sections of linear filter socks or equivalent. (City of London Detail ESC 2.3)
16. Keep all sumps clean during construction and identify a regular maintenance program to do so.
17. Have a plan to minimize/prevent wind-blown dust such as spraying calcium chloride, water and applying ground soil tackifiers (PAM) via hydroseed or straw and regular street scraping/sweeping to remove debris.
18. Straw bales and/or wattles to be used in localized overland flow areas as shown and as directed by the engineer during construction for works.

19. Straw bales, wattles and silt fence are to be terminated by rounding the ends (J-Hooking) to contain and filter runoff.
20. All refueling and maintenance of equipment should be at a minimum of 30 meters away from any surface water feature. Where site constraints cannot accommodate this separation, all fuel and equipment shall be placed within an approved spill containment kit.

Erosion and sediment control measures

(These notes shall be included on all Lot Grading Plans/Building Permit Stage) (Home Building Stage – Post General Servicing)

1. Lot sediment and erosion control structures are not to be removed until the lot is covered with vegetation, formal landscaping, structures, and pavement, or as approved by the designer and the City of London.
2. It is the responsibility of the home builder/contractor to ensure that if any required pumping of ponding water to facilitate house construction, it shall be done in accordance with the City of London Waste Discharge By-Law (WM-16) and the Drainage By-Law (WM-4). All end of pipe pumping discharge shall have an appropriately sized sediment filter bag and shall be monitored and maintained for the duration of all pumping activities.
3. All sedimentation basins are to remain functional and maintained along with all outlet structures, while vertical/big box construction activities occur unless deemed not warranted by the Consulting Engineer and the City of London.
4. Lots under construction must have sediment control BMPs installed on downstream property boundaries as determined by the builder.
5. Unless instructed by the Consulting Engineer and the City of London, total blockage of inlet openings by fabric material will not be permitted.
6. The home builder/contractor is responsible to perform good housekeeping activities on their lots to ensure the municipal right of way, and lots are kept relatively clean and free of wind-blown construction debris while construction activities occur.
7. No home builder/contractor shall stockpile any materials on the municipal right of way for any duration greater than one day. Any stockpiling of materials on the municipal right of way shall be in a location that will not cause deleterious effects to the City sewer system (i.e., no stockpiles near or overtop of catchbasins)

8. The home builder/contractor is responsible for E&SC measures inspections on a regular basis especially after significant³ rainfall event.
9. The home builder/contractor is also responsible for maintenance of their project site, inlets, and other sediment containment systems onsite (silt fencing/ wattle placements) and immediately downstream of their property.
10. The home builder/contractor shall ensure that there is no mixing of cement or mortar operations on the municipal right of way and shall have appropriate E&SC measure to protect all City infrastructure during these operations. All residual concrete and mortar shall be disposed of in the subdivision designated concrete washout locations and/or disposed of offsite at an approved disposal site.

³ A rainfall event should be considered **significant** when either of the following criteria are met:

- An event during which ≥ 15 mm have been received within 24 hours; or
- An event with an intensity of ≥ 5 mm/hr. and during which at least 10 mm have been received.

[Section 10.1.2 of the Erosion and Sediment Control Guidelines for Urban Construction \(TRCA, 2019\).](#)

Appendix F: Sediment and Erosion Control Practices

Please refer to Appendix B in the TRCA - Erosion and Sediment Control Guide for Urban Construction (2019) for additional information.

Table 10.5 – Erosion and Sediment Control Practices

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Vegetative Filter Strips	BMP	I D <ul style="list-style-type: none"> • Vegetative buffer strips to be provided down gradient of sediment fencing according to the following criteria: <ul style="list-style-type: none"> ➢ 3 m for perimeter fencing ➢ 15 m for fencing adjacent to a warm water watercourse. ➢ 30 m for fencing adjacent to a cold-water watercourse supplemented with a second row of fencing 2 metres. ➢ beyond the initial row • Space will be required to store equipment, vehicles, material, and soil stockpiles away from areas where soil compaction and/or vehicle tracking may damage vegetation and tree roots. • Vegetative filter trips aren't effective at filtering high velocity flows from paved areas, steep slopes, or hilly areas without additional ESC measures. 	<ul style="list-style-type: none"> • Inspect weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. • Repair any damage to fencing within 48 hours and remove, by hand, and dispose of any mounds of accumulated sediment or debris. 	<ul style="list-style-type: none"> • Filter strips can be left in place to blend into the existing proposed grades or altered when not required to be graded for final lot grading requirements. Ensure that other ESCs are used, if warranted, when altering/removing the filter strips

E&SC Control Practices	Applicable OPSD or City Standard Details	I D BP Installation Timing and Application Initial Construction Setup per Accepted E&SC Engineering Drawing(s) During General Servicing Construction (E&SC Phasing) Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Sediment Control Fences and Strawbale Barriers	OPSD 219.100 OPSD 219.110 OPSD 219.131 OPSD 219.130 SPO-4.5 ESC 1.0	I D BP <ul style="list-style-type: none"> • Installed linearly in areas to protect Natural Heritage Features. • Along the perimeter of a construction site • Along the up-gradient side of sensitive areas, streams, and river corridors • Around stockpiles of excavated material, such as topsoil • Approximately 1.5 metre away from the base of moderate slopes • Any other areas where sediment laden sheet flow requires treatment, provided that the fencing is installed parallel to the site contours. • Sediment control fences should not be used perpendicular to flow in watercourses or other concentrated flow paths. • Sediment control fence is meant to be used as a treatment measure for sheet flows and does not need to be installed as a means of delineating site boundaries if the area does not receive any sheet flow (e.g., high point). In these areas other types of fencing may be used if desired. • For installation of sediment control fence on slopes, the grade and slope length must be considered to ensure that flows will not overwhelm the structural stability of the fence. The following are the maximum lengths of slopes on which sediment control fencing should be installed, according to grade. 	<ul style="list-style-type: none"> • Regular inspections and documentation required. • Sediment removal shall be in accordance with manufacturer's maintenance specifications and schedule. • Inspect the entire length of sediment fence weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. • Inspect the fence to look for any signs of damage to the geotextile or compromising of the structural integrity of the fence. Ensure the fence has been properly installed as defined under Design and Installation" section above. • Remove and properly dispose of sediment before it reaches approximately 30% of the height of the fence, or sooner if not functioning as intended. • A supply of sediment control fence materials should be kept on site to allow for quick repairs, or the installation of additional fencing as needed. • Where fence continues to fail on an ongoing basis, consider reinforcing problem areas or replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to the fence, consider re-designing surface water flow paths to reduce volumes being directed to the problem area. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of sediment fence installed upgradient of natural features. 	<ul style="list-style-type: none"> • All materials associated with the sediment fence must be removed once the site has been restored and disturbed areas have been stabilized with vegetation and/or groundcover. • Controls shall be removed only upon the direction from the city or the contract administrator's approval. • Ensure removal and proper disposal of accumulated sediment. • All sediment fence materials should be removed from the site. Reusable components can be salvaged for future use and others should be disposed of at an appropriate waste facility.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Linear Filter Socks	ESC 2.0 ESC 2.1	I D BP <ul style="list-style-type: none"> • Installed linearly in areas to protect Natural Heritage Features in combination with sediment control fencing. • On slopes that require erosion protection • In swales as part of filter sock check dams 	<ul style="list-style-type: none"> • Inspect all filter socks weekly, and before and after significant rainfall or snowmelt events, and keep a record of the inspection. • Look for any signs of erosion and areas where water is undermining the sock and consider how positioning, ground contact or flow rates can be adjusted to prevent continued undermining. • Inspect positioning and placement of filter socks to ensure they haven't shifted substantially. Reposition and re-stake as needed. • Where flows are exceeding the retention capacity of the sock (e.g., frequent overtopping, water flowing around check dams), re-consider filter sock diameters used, add additional socks (for swale applications) or stack socks to create a higher barrier. • Where socks continue to fail on an ongoing basis, consider replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to socks being applied for sheet flow control, consider re-designing surface water flow paths to reduce volumes being directed to the problem area. • Sediment and/or debris accumulation behind socks should be removed before it reaches approximately 30% of the sock height. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of filter socks installed upgradient of natural features. 	<ul style="list-style-type: none"> • Remove and properly dispose of accumulated sediment. • Where desired, and if fill material is not contaminated, socks may be cut open so that fill can be used onsite as mulch for restoration works. • Remove and dispose of any non-biodegradable material. • Where socks will be seeded and left as a permanent part of the landscape (e.g., in restoration areas) ensure it is seeded with a weed-free, native seed mix. In these instances, only socks with a biodegradable casing should be used.

E&SC Control Practices	Applicable OPSD or City Standard Details	I D BP Installation Timing and Application Initial Construction Setup per Accepted E&SC Engineering Drawing(s) During General Servicing Construction (E&SC Phasing) Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Natural Fibre Logs / Wattles	Used in Various BMP Applications	I D BP <ul style="list-style-type: none"> • As flow interruption on level and sloped areas where they are applied along contours, perpendicular to runoff sheet flows. • At the base of slopes, at a recommended distance of at least 1.5 m from the based in order to provide adequate space for sediment deposition. • Along the site perimeter in areas of sheet flow. • Perpendicular to channelized flow in swales and ditches where they function as check dams. • Around storm drain inlets receiving sheet flows. • At the base of topsoil stockpiles. • Around sediment bags as part of a dewatering treatment train. • During frozen conditions in place of sediment fence that cannot be trenched in. • Any other areas where it is necessary to dissipate flow velocities and pond water to promote sediment settling. 	<ul style="list-style-type: none"> • Inspect all logs weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. • Look for any signs of erosion and areas where water is undermining the log and consider how positioning, ground contact or flow rates can be adjusted to prevent continued undermining. • Inspect positioning and placement of logs to ensure they haven't shifted substantially. Re-position and re-stake as needed. • Where flows are exceeding the retention capacity of the log (e.g., frequent overtopping, water flowing around check dams), re-consider log diameter used, add additional logs (for swale applications) or stack them to create a higher barrier. • Where logs continue to fail on an ongoing basis, consider replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to logs being applied for sheet flow control, consider re-designing surface water flow paths to reduce volumes being directed to the problem area. • Sediment and/or debris accumulation behind logs should be removed before it reaches approximately 30% of the log height. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of logs installed upgradient of natural features. 	<ul style="list-style-type: none"> • Remove and properly dispose of accumulated sediment. • Where desired, and if fill material is not contaminated, some types of logs may be cut open so that fill can be used onsite as mulch for restoration works. • Remove and dispose of any non-biodegradable material at the appropriate disposal sites.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Rock Check Dams	OPSD 219.180 OPSD 219.191 OPSD 219.200 OPSD 219.210 OPSD 219.211	I D BP <ul style="list-style-type: none"> • Perpendicular to flows in low flow conveyance channels on construction sites (e.g., interceptor swales). • Particularly important in long or steeply sloped (3H:1V or steeper) channels. • In any concentrated flow path where flow interruption for erosion prevention or sediment settling is needed. • Never installed in natural watercourses or other natural water features. • Rock check dams should be constructed with the following three layers: Bottom <ul style="list-style-type: none"> ➢ Granular material 50 mm diameter stone stacked 450 mm high. Middle <ul style="list-style-type: none"> ➢ Non-woven geotextile with a trench at the upstream end extended beyond the check dam anchor to form an underling spill apron. Top <ul style="list-style-type: none"> ➢ Granular material, 150 mm diameter angular stone in a layer > 100 mm ➢ Extend from the conveyance channel invert to the top of the bottom layer. ➢ Form a spillway 300 mm below the top of the drainage ditch to prevent bypassing or shortcutting of the flows. • Construct check dam to create upstream gradient of 2H:1V, downstream gradient of \leq 4H:1V and centre of the dam \leq 1.0 m high. • Construct check dam to create upstream gradient of 2H:1V, downstream gradient of \leq 4H:1V and centre of the dam \leq 1.0 m high. • Avoid undermining by making the outer sides approximately 0.5 m higher than the center and notch the center (~ 15 cm deep) to concentrate flow in low area. • Place multiple dams in series along long or steeply sloped (3H:1V or steeper) channels. • Space check dams such that top of the middle (spillway) of each downstream check dam at the same elevation as the base of the previous dam. • Ensure erosion control measures are applied in the area draining to the conveyance channel in order to minimize sediment loads to the channel. Ensure the flows from the channel are conveyed to sediment control measures (e.g., sediment trap) for additional sediment removal as needed. 	<ul style="list-style-type: none"> • Inspect weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. • Look for any signs of erosion and areas where water is undermining the check dam and consider how spillway construction or flow rates can be adjusted to prevent continued undermining. • Ensure check dams remain structurally sound and replace and regrade the stone as required to maintain its shape. • Where erosion is observed and stabilization measures are absent or inadequate, consider adding stabilization measures. • Determine whether high flow rates are causing excessive erosion and if so, consider reducing the size of the area draining to the swale, or re-grading the swale to a flatter slope. • Sediment and/or debris accumulation behind the check dam should be removed before it reaches approximately 30% of the device height. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • When conveyance channel is no longer in use, remove and properly dispose of sediment, granular material, and geotextile.

E&SC Control Practices	Applicable OPSD or City Standard Details	I D BP Installation Timing and Application Initial Construction Setup per Accepted E&SC Engineering Drawing(s) During General Servicing Construction (E&SC Phasing) Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Storm Drain Inlet Protection	ESC 2.3	I D <ul style="list-style-type: none"> Installation shall occur immediately upon the connection of the storm sewer. Existing <ul style="list-style-type: none"> All existing catchbasins peripheral to the development site that would be impacted by sediment from construction activities. (i.e., fronting streets) Proposed <ul style="list-style-type: none"> All proposed catchbasin types. ESC measures shall be installed immediately after the structure is installed. Wattles can be installed along the Curb inlet portion of the CICB to block water from entering and to direct flows to the silt sack. <ul style="list-style-type: none"> Ensure all structures are secure and installed per manufacturers specifications 	<ul style="list-style-type: none"> Inspect weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. Look for any signs that runoff is undermining or otherwise bypassing the sediment control measure and repair as needed. Remove any sediment accumulation that has reached approximately 30% of the height of the sediment retention barrier and ensure proper disposal. For below grade installations, like filter fabric sacks/bags, ensure that it is cleaned out at the frequency specified by the manufacturer/supplier. The sediment accumulation threshold at which clean out is needed may vary from one product to another but is normally 50% accumulation. If there are signs of clogging causing impeded flow through and flooding, clean out immediately. Clean and/or replace the device if there is any evidence of clogging significantly impeding flow through and leading to flooding. Look for any signs of structural damage to the device. If it is being damaged due to vehicle traffic, consider substituting with a below grade device. If using granular material, periodically rake to reshape and remove and replace any granular material overloaded with sediment. Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Ensure the inlet grate is not being unintentionally blocked by the protection device. 	<ul style="list-style-type: none"> Removal shall occur based on the following installation locations. Rear Yard CBs <ul style="list-style-type: none"> Once the final sod has been installed on the lots or the seed has stabilized the ground to ensure no sediment runoff into the catchbasin All other CB type locations <ul style="list-style-type: none"> Existing peripheral streets can be removed when base coat of asphalt is installed in new subdivisions. <ul style="list-style-type: none"> Internal locations shall remain in place until subdivision assumption is complete or may be removed based on consultation with the City. Remove accumulated sediment. Carefully remove inlet inserts by the handles. Remove all components of the inlet protection devices carefully to minimize disturbance of the area and accidental release of sediment into the inlet and storm sewer system.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Temporary By-Pass Channels/Interceptor Swales	OPSD 221.010 OPSD 221.020 OPSD 221.030	I D BP <ul style="list-style-type: none"> • Installed with the initial ESC setup. • Priority areas where interceptor swales should be applied include: <ul style="list-style-type: none"> ➢ Along the top of un-stabilized long or steep slopes (in conjunction with slope drains). ➢ Along the perimeter of the site. ➢ Along the toe of slopes. ➢ Adjacent to valley and stream corridors. ➢ Where flows are being diverted around an area that is being stabilized/restored, to allow vegetation to become established. • Used in situations where external flows are required to be by-passed around the construction site. • Channels can be relocated as construction phasing progresses. • Channel profile must be sized to accommodate the 10-year design flows from the contributing catchment area and convey the flows to the intended outlet. • Channel shall be stabilized prior to use as to not transport and pick up suspended solids. Lining the channel with filter fabric, riprap (bottom and sides) and the use of poly membrane is recommended. • Interceptor/diversion swales and dikes are intended to convey flows along low-gradient channels. They should be directed towards a suitable sediment control measure, like sediment traps or sediment control ponds. • The channel/swale shall be designed to the expected service life of the swale and potential consequences if it is overtopped. • Channel grades should be the minimum possible that will maintain positive drainage. Velocities greater than 1.0 m/s will erode the invert of a grassed swale. • Swales should be shaped like an inverted trapezoid, with side slopes no steeper than 2H:1V (Figure B1-5). Where dikes are used, they should be compacted and also constructed with side slopes no steeper than 2H:1V. • Dikes/berms greater than 1 m in height should be designed by a geotechnical engineer. The consequences of failure must be considered. Use a multi-barrier approach if swale overtopping would result in sediment release to natural features or other private property. 	<ul style="list-style-type: none"> • Inspect weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. • Look for any signs of erosion, in the swale and/or dike, particularly at the inlet and outlet. • Where stabilization measures are already in place, fill and re-stabilize eroded areas. Consider whether stabilization measures should be upgraded to hardier materials. • Where erosion is observed and stabilization measures are absent or inadequate, consider adding additional stabilization measures. • Determine whether high flow rates are causing excessive erosion and if so, consider adding flow interruption devices, reducing the size of the area draining to the swale, or re-grading the swale to a flatter slope. • Inspect all flow interruption devices to ensure they are properly installed and functioning as intended. Sediment and/or debris accumulation behind the device should be removed before it reaches approximately 30% of the device height. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • Ensure flows are re-routed appropriately prior to decommissioning of the swale, to mitigate erosion or flooding issues. • Fill swale, stabilize and restore the disturbed area. • Ensure flow interruption devices are properly disposed of.

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Sediment (dewatering) bags/Silt sacks	Use as Needed	I D BP <ul style="list-style-type: none"> • Suitable anywhere dewatering of sediment laden water is necessary to create a dry work area, and particularly where space is limited. • Can be used for dewatering of an isolated in stream work area, tunneling, excavating for a basement, pumping of water from a basement foundation or drawing down a sediment control pond to allow for maintenance. • Applied where flow dispersion is needed to prevent erosion, as the bag receives concentrated water from the hose and disperses. • Ensure the manufacturer’s specified water flow rate and apparent opening size are appropriate for the planned flow rates and the expected particle size distribution of the water being treated. • Bag should be located at least 30 m from any natural water feature to minimize risk of a sediment spill into the feature if the bag ruptures. Where siting 30 m away is not possible, consult with the local CA for guidance on potential laydown areas and any additional measures (e.g., dewatering treatment train setup) and monitoring efforts that can be applied to mitigate risk. • Bag should be located so that it is easily accessed for maintenance and removal purposes and so that water discharged from the bag doesn’t cause or aggravate erosion. • Place bags on a relatively flat surface to ensure the bag doesn’t shift downslope. • Place on stabilized ground (e.g., grassed surface, rock pad) and underlain with non-woven geotextile fabric to prevent erosion under and around the bag. Installing a rock pad or wood pallet below the bag can be beneficial as it allows for better drainage out of the bottom of the bag. • As part of a treatment train or multi-barrier approach to dewatering through a sediment bag, install a sediment control barrier such as a filter sock around the bag to provide more opportunity for sediment settling. • Ensure the planned flow path from the bag to the ultimate receiver is stable, and where it is not, create a stable flow pathway to ensure the discharge doesn’t cause erosion. • During freezing conditions keep the bag elevated, such as with a rock pad, to prevent it from freezing to the ground and tearing when being lifted away for removal. 	<ul style="list-style-type: none"> • Inspect daily during active pumping into the bag to ensure that there are no tears or leaks in the seals or the bag, and check that the discharge from the bag is not causing erosion underneath it or anywhere along the flow path from the bag to the receiver. Keep a record of the inspection. • Where there is evidence of erosion, re-consider whether stabilization is adequate to protect against erosion based on the flows coming out of the bag. • Confirm that the pumps and bag size are continuing to provide the desired level of water treatment. Where sediment levels in discharged water remain elevated, consider adding or replacing with a different dewatering practice (e.g., weir tanks) to provide additional sediment removal. • Inspect bag to determine whether it is full and requires replacement. • Where the bag is damaged or no longer functioning, cease pumping immediately and replace or repair components. • Replace the bag once it’s not functioning and/or according to the manufacturer’s instructions. If the flow through rate begins to decline significantly that may indicate the bags is full and requires replacement. The amount of sediment contained in the bag can also be confirmed once pumping is ceased and the bag is left to drain. • Keep additional bag(s) on site so that replacement can be handled quickly when needed. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • Allow bag to drain over time until the bulk of the water is gone. • Remove bag with minimal disturbance to stabilized areas or nearly natural features. The full bag should never be lifted over a water feature or a person. • Dispose of or reuse sediment based on its quality and the requirements stated in existing excess soil policy and legislation. • Properly dispose of the sediment bag. • Clean and restore the sediment bag lay down area with seed.

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Sediment Traps	OPSD 219.220 OPSD 219.240	I D BP <ul style="list-style-type: none"> • At or near the end of a treatment train (i.e., end of pipe) for sediment removal from stormwater (via detention) before it is discharged offsite. • Typically installed across drainage/conveyance features. • For drainage areas ≤ 2 ha that do not drain to another detention feature (e.g., sediment control pond). • Design to provide at least 125 m³ of storage for each hectare of contributing drainage area. • Construct with stabilization on the bottom and all side slopes. Suitable stabilizations measures for sediment traps include well-established vegetation with turf reinforcement mats (if needed) or rock underlain with non-woven geotextile fabric. • Trap should be designed to be between 1.0 and 2.0 metres deep. Minimum depth recommended is to avoid re-suspension of previously settled sediment. Maximum depth recommended is for safety reasons. Where a depth > 2 metres is unavoidable additional perimeter safety measures should be implemented. • Sediment trap should be ≤ 20 metres long and the maximum width should be half the length. • Ensure proper grading of 0.5H: 1V side slopes and compaction to prevent slumping and slope failure. • Recommended sediment trap side slope grade is 0.5H:1V • Sediment trap outlet should be a stable open channel spillway located at the downstream end of the trap. Spillway construction is critical to prevent failure of the structure during high flows. All specifications provided by the plan designer should be implemented. • Construct a check dam structure (rock or filter sock) at the outlet to provide additional detention and opportunity for sediment settling. Filter socks should be configured to form a pyramid for added stability and more opportunity for sediment retention. Any check dam structure should be lower in the centre and extend up the channel slopes to ensure that water leaving the trap flows over the centre of the check dam rather than around the sides. • Erosion protection measures should be installed immediately downstream of the spillway outlet. 	<ul style="list-style-type: none"> • Inspect weekly, and before and after significant rainfall or snowmelt events, and keep a record of the inspection. • Look for any signs of erosion at the inlet, outlet, or side slopes. Repair eroded areas by filling in rills, smoothing out the surface and re-installing or augmenting the stabilization that was in place. Consider whether the stabilization measures in place are failing due to poor condition or because flows are higher than anticipated. • Remove sediment that has accumulated to 50% of the height of the sediment trap. • Observe and/or analyze (e.g., handheld turbidity testing) sediment trap effluent to assess whether the trap continues to effectively remove suspended sediment. • Where effluent turbidity is elevated, consider sediment trap storage capacity and stabilization to pinpoint reasons for under-performance. Consider adding additional measures upstream (e.g., ditch/swale stabilization) and/or downstream of the trap to achieve greater sediment removal. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. • Ensure spillway remains structurally sound and repair as needed when damage occurs. Replace and regrade the stone as required to maintain its shape. 	<ul style="list-style-type: none"> • When sediment trap is no longer in use, remove and properly dispose of sediment, granular material and geotextile.

E&SC Control Practices	Applicable OPSD or City Standard Details	I D BP Installation Timing and Application Initial Construction Setup per Accepted E&SC Engineering Drawing(s) During General Servicing Construction (E&SC Phasing) Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Sediment Control Basins	OPSD 219.240	I D <ul style="list-style-type: none"> Treatment of runoff from any construction site drainage areas > 2 ha. Applied as an end-of-pipe ESC control. 	<ul style="list-style-type: none"> Inspect weekly, and before and after significant rainfall (see definition in Section 10.3.6) or snowmelt events and keep a record of the inspection. Ensure pond has been constructed prior to any construction activities except for activities associated with the construction of the pond, such as topsoil stripping and grading. Verify that pond and its specific components (i.e., inlet, forebay, berms, outlet, emergency spillway) appear to be constructed as per detailed drawings in ESC plan. Verify stabilization of pond banks and inlet and look for any evidence of erosion. Repair or augment stabilization measures as needed, i.e., fill rills, re-seed and apply RECP. Inspect inlet for signs of excess sediment accumulation and/or large debris. Remove sediment accumulation in the forebay before it reaches 50% of the forebay storage capacity. Measure sediment accumulation in the pond at least once every six months. Remove sediment accumulation in the pond when it reaches approximately 30% of the permanent pool storage volume. Observe and/or analyze pond effluent suspended sediment and/or turbidity levels to assess performance. This should be done before and after significant rainfall and snowmelt events or more frequently as needed. Where effluent turbidity is elevated, consider potential reasons for under-performance including: <ul style="list-style-type: none"> Water short circuiting flow path due error in design or implementation Erosion from banks or swale inlet High sediment loads entering the pond due to inadequate ESC in the contributing drainage area. Excessive sediment accumulation in the pond Address deficiencies and carry out follow up monitoring to assess whether actions taken have resulting in pond performance improvement. Ensure spillway remains structurally sound and repair as needed when damage occurs. Replace and regrade the stone as required to maintain its shape. Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> In the case where the sediment control pond is in the location of the ultimate (post-construction) pond, and construction is complete, accumulated sediment must be removed (and appropriately disposed of) and the permanent pool storage must be restored to the design level. Water pumped out of ponds that are being decommissioned should be treated with a sediment control measure prior to release to the receiving water system. Appropriate sediment removal BMPs for application during pond dewatering include sediment bags, weir tanks, or treatment trains that may incorporate these measures. Sediment and liner materials should be removed from the bottom of the pond and properly disposed of based on sediment quality. Best practices shall be incorporated relating to pond sediment disposal / reuse.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Weir Tanks	Use and design as needed	I D BP <ul style="list-style-type: none"> • Weir tanks can be used alone or as the settling component of a larger water treatment system. Tanks can be particularly useful when: <ul style="list-style-type: none"> ➢ Sediment removal is required for short-term pumping / dewatering activities, such that taking the time to construct a BMP with similar sediment removal capacity (e.g., sediment control pond) would be impractical. ➢ Site specific requirements dictate more stringent effluent water quality standards than are achievable when applying other sediment control BMPs used during dewatering (e.g., sediment bags); or ➢ Planned pumping rates are high and require a large capacity BMP. 	<ul style="list-style-type: none"> • Inspect daily during active use of the system and keep a record of the inspection. • Carry out routine inspection of sediment accumulation in the tank to determine when clean out is required and ensure previously settled sediment is not becoming re-suspended. • Carry out routine effluent monitoring to verify performance and ensure that effluent quality meets any applicable standards. If performance declines, consider whether pump rates need to be adjusted or accumulated sediment needs to be removed. Consider enhancing removal efficiency using a polymer flocculant-based system. • Ensure system is monitored daily during active pumping and that staff overseeing the use of the system have a thorough knowledge of proper operation. • Where there is evidence of erosion at the discharge point or along the flow path downstream of the discharge locations, re-consider whether stabilization is adequate to protect against erosion based on the flows. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • Tanks can be decommissioned when contract administrator deems the tanks to not be used as part of the ESC plan.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application I Initial Construction Setup per Accepted E&SC Engineering Drawing(s) D During General Servicing Construction (E&SC Phasing) BP Lot or Block Building Permit	Inspection and Maintenance Requirements	Decommissioning
Active Treatment Systems	Use and design as needed	I D <ul style="list-style-type: none"> • Treatment is required for short-term pumping activities, such that taking the time to construct a BMP with similar sediment removal capacity (e.g., sediment control pond) would be impractical. • A high sediment removal rate is required but the area available for treatment is too small to accommodate a sediment control pond. • Water being treated contains certain contaminants of concern that require removal through specific chemical and/or physical processes. • Site specific policy requirements define more stringent effluent water quality standards than are typical and/or achievable when applying other conventional BMPs; or • Other conventional sediment control measures have failed to achieve the necessary removal rates. 	<ul style="list-style-type: none"> • Inspect daily during active use of the system and keep a record of the inspection. Inspection of specific system components may be the responsibility of the supplier, depending on the terms of the contract. As a minimum the onsite inspector should look monitor sediment accumulation in the tank and effluent quality. • Carry out routine effluent monitoring to verify performance and ensure that effluent quality meets any applicable standards. • Ensure system is monitored daily during active pumping and that staff overseeing the use of the system have a thorough knowledge of proper operation. • Where there is evidence of erosion at the discharge point or along the flow path downstream of the discharge locations, re-consider whether stabilization is adequate to protect against erosion based on the flows. • Keep MSDS sheets and toxicity reports related to the flocculant used in an easily accessible location on the site. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • Can be decommissioned when contract administrator deems the tanks to not be used as part of the ESC plan.
Vehicle Tracking Control	Use as needed	I D BP <ul style="list-style-type: none"> • Installed during initial setup of all ESC measures at all construction exits from the construction site. • May need to be removed and reinstated based on construction phasing. 	<ul style="list-style-type: none"> • Inspect vehicle tracking controls weekly, and before and after significant rainfall or snowmelt events, and keep a record of the inspection. • Inspect mud mats for excessive sediment accumulation. For rock pads look for signs that the voids have been filled with sediment and replace granular material as needed. • Clean up any sediment tracked onto public roads at the end of each day. • Ensure the installation of storm drain inlet protection for inlets in roads that will be subject to street sweeping, since this can sometimes cause additional sediment to be swept into storm drain inlets. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. 	<ul style="list-style-type: none"> • Removal can occur when all granular/soil materials are no longer exiting the site and/or the site does not generate onsite materials being transferred off the site. • Ensure all components are removed with minimal disturbance, and that waste materials are properly disposed of. • Grade and restore the area as per the final stabilization plans.

E&SC Control Practices	Applicable OPSD or City Standard Details	Installation Timing and Application		Inspection and Maintenance Requirements	Decommissioning
		I D BP	Initial Construction Setup per Accepted E&SC Engineering Drawing(s) During General Servicing Construction (E&SC Phasing) Lot or Block Building Permit		
Concrete Washout	ESC 3.0 ESC 3.1 ESC 3.2	I D BP	<ul style="list-style-type: none"> Installed during initial setup of all ESC measures for the initial subdivision servicing. Can be maintained during all phases of construction up to building permit stages. 	<ul style="list-style-type: none"> Inspect facility each working day and maintain them in effective operating condition. Maintenance of the facility should be proactive and not reactive. Inspect facility after every significant rainfall or snowmelt events. Where perimeter controls have failed immediate remediations shall take place to repair the identified failures. Facility shall be repaired, cleaned, or enlarged as necessary to maintain capacity for concrete spoils/waste. All concrete spoils/waste shall be removed when the facility reached 75% storage capacity of the facility. All large concrete pieces, washout water and any other debris shall be removed and transported from the facility site in a water-tight container and disposed of at a proper disposal site. 	<ul style="list-style-type: none"> A concrete washout facility shall remain onsite until all concrete work has ceased. Once the facility has been removed then the site shall be restored to proposed grades and/or finished with appropriate seeding.

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Chemical Stabilization (PAM, Tackifiers, Soil Binders, etc.)	Use and design as needed.	I D BP <ul style="list-style-type: none"> • Use in and/or within 30 m of a natural water feature is subject to CA approval. Toxicity data must be available upon request. • Best used in conjunction with seeding, such as within a hydroseeding or hydro-mulching mix in order to establish a more lasting stabilization. • When used with seed, suitable for any areas requiring erosion protection, including slopes, interceptor swales and any other areas not subject to vehicle traffic. • Prior to application of a chemical stabilizer, alone or as part of a hydraulic mix, the soil surface should be prepared by removing large rocks or other deleterious materials and filling in any rills or gullies. • When using a chemical stabilizer in conjunction with seeding, the top few inches of soil should be de-compacted to ensure good germination. • Consider the drying time for the selected chemical stabilizer and ensure that there will be an opportunity for the application to dry before the next rainfall event. • Avoid hydraulic application of chemical stabilizers during windy conditions in order to avoid having the product end up in unintended areas. • Chemical stabilizers should not be applied to frozen soil or during freezing or rainy conditions. 	<ul style="list-style-type: none"> • Inspect chemically stabilized areas weekly, and before and after significant rainfall or snowmelt events, and keep a record of the inspection. Beyond this routine inspection, additional inspections of seeded areas may be needed when the seed is newly planted as well as during periods of drought. • Confirm that the chemical stabilizer has been applied evenly with coverage of at least 80%. • If the stabilizer has failed to adsorb to the soil particles, it can be easily washed away during a rainfall event and migrate downslope from the intended treatment area. If this is observed it may mean the stabilizer is ineffective for the soil type, and that a different formulation should be applied. • Ensure vehicles and equipment are not driving over areas that have been treated. To prevent damage, chemically stabilized areas can be fenced off, particularly if it is a busy and heavily used area. • Look for any evidence of erosion on chemically stabilized areas (rill erosion). Where erosion is occurring, determine whether a second application is needed, if the area should be reinforced with additional erosion control measures (e.g., blankets, mats), or if flows are too concentrated and should be re-routed around the treated area. • Regrade and re-apply stabilizer in areas that have been subject to erosion or where the initial application was deficient. • Re-apply at the frequency recommended by the product supplier/manufacturer to ensure area remains stabilized. If stabilizer was applied with seed, re-application of chemical stabilizer is needed (at the recommended frequency) only until vegetation is well established. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. • Consider planning and budgeting for long-term as re-application may be required over time. 	<ul style="list-style-type: none"> • Ensure flocculant-treated sediment and any leftover flocculant are properly disposed of. • Where polymer flocculants left over are suitable for reuse elsewhere, ensure proper handling and storage in accordance with supplier / manufacturer guidance.

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Slope Drains	OPSD 219.230 OPSD 219.231	I D <ul style="list-style-type: none"> • Exposed slopes where runoff is being conveyed from top to bottom. • Where it is anticipated that concentrated flows will flow over the slope face • Particularly important on long and/or steep slopes • In conjunction with a multi-barrier approach that includes water detention and/or diversion measures. 	<ul style="list-style-type: none"> • Inspect weekly, and before and after significant rainfall or snowmelt events, and keep a record of the inspection. • Inspect all slope drain components (joints, anchors, etc.) • Inspect the length of the top of slope to ensure that runoff is being directed to the slope drain and is not flowing down slope face. • Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. • Inspection tip. Always look out for seepage and scour to ensure your slope drain doesn't fail 	<ul style="list-style-type: none"> • Ensure that areas receiving runoff are well-stabilized. If the final grading will result in runoff that was conveyed through the drain flowing over the slope, ensure that the slope is fully stabilized. If it has been seeded, vegetated, ensure that the seed/vegetation is fully established. • Remove slope drains with as little disturbance of the slope as possible. • Stabilize and restore all disturbed areas.

Appendix G: Roles and Responsibilities

City of London: Roles and Responsibilities of key parties involved in construction site erosion and sediment controls.

Note: ESCGUC – Erosion and Sediment Control Guide for Urban Construction (TRCA 2019), reference Table 5.1

Table 10.6 - Roles and Responsibilities

Party	Defined role	Key responsibilities
Municipality, Landowner / Developer or Builder (once building Construction phase has begun)	<p>City of London, Company, or individual who owns the land being developed or is working to develop the land on behalf of the landowner(s).</p> <p>Work Approval Permit – City Right of Way (aka PAW)</p>	<ul style="list-style-type: none"> • Holds ultimate responsibility for ensuring that E&SC is implemented so that the project does not adversely affect natural features and other adjacent lands. • Delegates responsibility to hired professionals (engineers, contractors, ecologists, inspectors) who design, install, inspect, monitor, maintain and decommission E&SC measures. • Ensures agreement with contractor on protocol for payment/reimbursement related to E&SC maintenance, such that E&SCs can be kept in working order throughout the project. • Holds liability in the event of E&SC failure or regulatory violation. • Remains engaged throughout construction with Contract Administrator, Contractors, and home builders to ensure effectiveness of ESC planning, implementation, operation, and maintenance. • While the division of responsibilities and liabilities may vary from project to project, a builder will typically, upon transfer of ownership, become responsible for activities occurring on their lots. Any impacts to the Municipal Right-of-Way or any natural heritage features from the individual lot development, shall be the Landowner / Developer and/or Builder’s responsibility to address. including any Work Approval Permits (A.K.A. PAW) within the City Right-Of-Way

Party	Defined role	Key responsibilities
Project Manager / Design Manager / Design Engineer (Municipality, Landowner/Developer's Engineering Consultant)	Assists E&SC plan designer in planning E&SCs as it relates to construction phases (if known), schedules, and site conditions and coordinates with CA.	<ul style="list-style-type: none"> • Oversees collection and analysis of pre-construction site data, as detailed in ESCGUC Section 6.1. • Conducts erosion risk assessment (as applicable, Ref. App. C Flowchart) based on site data collected (see ESCGUC Section 6.2). • Provides information to support E&SC plan design, e.g., site details, erosion risk and scheduling considerations if known (subject to the Owner's timing and Contractor's workplan). • Reviews and stamps E&SC drawings and report(s). • Provides recommendations of permits/approvals required and applies for them on behalf of landowner / developer. • Maintains awareness of consequences regarding E&SC failures from a regulatory perspective and remains in regular contact with landowner / developer. • Makes recommendations for the requirement of monitoring/testing specialists (QP) for unique site conditions. • Remains aware of contingency plans and directs use <u>only</u> when necessary. This role is further defined in the terms of the engineering assignment/contract. Note: The Engineer's default role is not to intervene on a regular basis. The Contractor should be responsible to manage the site including non-standard conditions. The Engineer shall provide guidance of ESC design criteria that the contractor must meet.
E&SC Plan Designer (Engineering Consultant)	Develops (or leads the development of) ESC plans for all stages of construction.	<ul style="list-style-type: none"> • Specifies E&SC measures, their sizing, and placement on site based on site conditions and erosion risk. • Designs E&SC plans for each stage of construction (where known) (see ESCGUC Section 7.2), and includes general instructions related to decommissioning of ESC measures. • Confirms E&SC plans are designed in accordance with established policies and best practices guidance. • Develops E&SC plans, that if suitably implemented, should reasonably mitigate exceedances of turbidity-duration and/or TSS targets (see ESCGUC Section 10.2.2) as applicable to the receiver(s). • Conducts site visits before designing the plan and during its implementation. • Designs E&SC plans that are practical and implementable and update/revise based on CA and City review.

Party	Defined role	Key responsibilities
<p>Contract Administrator (Engineering Consultant)</p>	<p>Forms the core of the construction team and reports directly to the landowner/developer and Project Manager.</p>	<ul style="list-style-type: none"> • Provides construction specifics and schedules to the rest of the Consultant’s construction contract administration team and informs the contractor of key performance metrics. • Confirms and requests copies of the necessary obtained permits and approvals and keeps copies of approved E&SC plans, permits and inspection reports in a central location on site. • Serves as the primary liaison between the project manager, plan designer, E&SC inspector, and contractor(s). • Liaises with all parties including landowner, design engineers, contractors, and regulatory agencies. • Coordinates with any recommended monitoring/testing specialists (QPs). • Receives E&SC inspection reports from inspector and communicates necessary actions to construction staff. • Aid in spills response and reporting as defined in ESCGUC Section 7.7. • Requests Contactor workplan for major changes to approved E&SC design plans and/or Contractors staging plans for multi-phase projects. • Reviews Contractor’s contingency plans for certain stages or activities as needed (e.g., dewatering activities) to ensure compliance with overall E&SC objectives and criteria. Subject to contractor’s work plan. • Reviews and approves of on-site E&SC design modifications if proposed by the consultant and communicates changes to appropriate approval agencies where required and coordinates plan updates accordingly. • Revised E&SC Contractor plans will be reviewed for applicable compliance requirements. Revised plan shall be provided to the Owner, CA, and approval agencies as needed. • Reviews and monitors the implementation of the contingency plan if needed to ensure overall E&SC design criteria compliance. Should the Contractor fail to suitably follow requirements of the plan after being notified of imminent risk of failure, subject to general conditions of the contract, the Owner and the City shall be notified, as required. • Reviews and monitors the implementation of all E&SC measures and plans along Natural Heritage Features (e.g. Significant Woodlands, Wetlands, ESAs, Significant Valleylands etc.). Additional consideration is to be given to these areas to quickly identify and rectify any issues to confirm proper and continuous function of all E&SC measures and to proactively assess for any potential E&SC measure failures. Any E&SC measure deficiencies, failures, issues, actions taken to rectify etc. are to be promptly documented (along with a photolog) and reported to the City of London. Additional E&SC measures/ actions may be required to prevent further deficiencies.



Party	Defined role	Key responsibilities
<p>E&SC Inspector (Engineering Consultant)</p>	<p>Carries out E&SC inspections, reporting directly to landowner / developer and/or approval agencies.</p> <p>Note: Inspector qualifications are detailed in ESCGUC Section 10.1.1.</p>	<ul style="list-style-type: none"> • Understands the E&SC plan, spills response and contingency plans, and construction methods. • Familiarizes him or herself with the landscape, drainage patterns and natural features prior to the start of construction, taking notes and pictures to document pre-construction conditions. • Conducts an initial site inspection to evaluate whether E&SC measures are installed as per the approved plan. • Recognizes effective application of E&SCs and communicates recommendations with the contractor. • Inspects all E&SC measures every seven days at a minimum, before and after significant rainfall and snowmelt events, and at other times as detailed in ESCGUC Section 10.1.2 which provides guidance on inspection frequency. • Completes E&SC inspection reports and circulates them to the contract administrator, Owner, contractor and (depending on project requirements) regulatory agencies like municipalities, CAs, and any other permitting agencies. • Establishes a protocol for communication with on- and off-site contacts and inspection report circulation. • Confirms with the contractor that site effluent and/or receiving water system monitoring is performed based on project-specific requirements. Criteria is usually set out in the contract Special Provisions. Records will be obtained from the contractor for record keeping. (see ESCGUC Section 10.2). • Understand the permits and approvals that have been secured for the project and any associated conditions.

Party	Defined role	Key responsibilities
Contractor	Undertakes construction the implementation and maintenance of E&SC measures.	<ul style="list-style-type: none"> • Reviews E&SC plans to ensure it is practical and implementable on the site. • Installs/constructs/maintains ESC measures based on approved E&SC plans and according to plan specifications. • Provides input on construction-related aspects of E&SC plan implementation including labour, equipment and materials requirements, construction procedures and field constraints. • Informs E&SC Inspector, Contract Administrator and in some cases the E&SC Plan Designer about any failures or ongoing issues with the effectiveness of E&SC measures and suggests E&SC design modifications if needed. • Reviews on-site E&SC design modifications, communicates changes to Contract Administrator, E&SC Inspector and appropriate approval agencies where required, and updates plans accordingly. • Is responsible for advising the CA in advance of shutdown periods and confirming that contingency measures are in place if required. Reads all E&SC inspection reports and takes corrective actions recommended within the specified timeframes. • Ensures E&SC measures remain functional and are maintained / repaired as needed. • Typically directs implementation of the contingency plan if needed. Subject to general conditions of the contract. • Provides an E&SC workplan if selected construction methodology and staging differs from the approved work plan in accordance with the general conditions of the contract. (City of London Standard General Conditions , Section 18. • Monitors site effluent and/or receiving water system(s) based on project-specific requirements provided by the Consulting Engineer and /or CA. E&SC Criteria is usually set out in the contract Special Provisions. (see ESCGUC Section 10.2).



Party	Defined role	Key responsibilities
Regulatory Agencies (DFO, MECP, UTRCA, KCCA, City of London)	Protect human and environmental health from water, air and noise pollution related to construction activities through development review, issuance of permits / approvals, and enforcement.	<ul style="list-style-type: none"> • Responsibilities vary according to the agency but involve plan review, permitting and enforcement responsibilities per their regulatory mandate and/or agreements with their partner agencies. • Establish best practices and disseminate through guidelines, training programs and other forms of advocacy. • Communicate instructions on the development review process and submission requirements in a clear manner. • Reviews and accepts E&SC plans to ensure compliance with legislation, policies, and City of London design standards, specifically Chapter 10 of the DSRM. • Receives and reviews E&SC inspection reports submitted by the Developer/Owner's Consulting Engineer in accordance with the submission frequency indicated in Chapter 10. • Issue permits / approvals / authorizations as needed to permit development activities that are otherwise restricted or limited by federal, provincial, or municipal legislation. • Conduct site visits to assess effectiveness of ESCs and ensure compliance with conditions of permits/approvals. • City of London designated E&SC by-law inspectors perform inspections to ensure conformance with the E&SC By-Law.