

SECTION 02370**EROSION AND SEDIMENTATION CONTROL****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes furnishing all labor, materials, equipment, and operations necessary for work related to Erosion and Sediment Control (ESC), including control of storm water, surface water, erosion, and sedimentation. It shall include installation, maintenance, removal and area clean up related to sedimentation and erosion control work as shown on the Contract Documents and as specified herein.
- B. The Work shall include, but not be limited to: protection of exposed excavated areas and stored excavated material during periods of construction; protection of embankment slopes against sediment runoff and erosion; protection of the Charles River against sediment runoff and erosion by use of a silt curtain; installation and maintenance of temporary access ways, staging areas, and sedimentation control measures; mitigation of concentrating runoff into one area; collection of eroded sediments on site through the use of temporary barriers, basins, or other devices; design, implementation, and maintenance of Best Management Practices (BMPs) for control of erosion and sediment discharge; removal and disposal of collected sediment, temporary devices, and final cleanup.
- C. In addition, the Work shall include documenting inspections and repairs of the erosion and sediment control measures during construction and until permanent vegetation has been established or site restoration has been completed.
- D. The erosion and sedimentation control measures shown on the Plans and specified herein represent minimum requirements, and the Contractor shall be fully responsible for preventing sediment discharge from the Work. If, in the opinion of the Authority, the erosion and sedimentation controls provided are not sufficient to protect the Charles River or adjacent wetlands and waterways as a result of the Contractor's sequencing, means, or methods of construction, the Contractor shall promptly implement additional or modified erosion and sedimentation control measures as necessary, at no additional cost to the Authority.
- E. This Work applies to, but is not limited to, any construction work resulting in soil disturbance and work with the potential to result in water pollution or soil erosion.

1.02 RELATED SECTIONS

- A. Section 01060 – Permits and Regulatory Requirements

- B. Section 01070 – Abbreviations
- C. Section 01200 – Coordination and Meetings
- D. Section 01300 – Submittals
- E. Section 01562 – Dust and Air Quality Control
- F. Section 01567 – General Environmental Controls
- G. Section 01600 – Control of Materials
- H. Section 02240 – Construction Dewatering and Groundwater Control
- I. Section 02660 - Geosynthetics
- J. Section 02900 – Restoration and Landscaping

1.03 CODES AND STANDARDS

- A. Massachusetts Department of Environmental Protection (MassDEP).
 - 1. 310 CMR 10.00: Wetlands Protection Act Regulations
 - 2. 314 CMR 9.00: 401 Water Quality Certification
 - 3. Massachusetts Stormwater Handbook and Stormwater Standards
 - 4. Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas
- B. United States Department of Agriculture Soil Conservation Service Publication:
 - 1. Standards and Specifications for Soil Erosion and Sediment Control in Developing Areas
- C. United States Environmental Protection Agency Publication (EPA):
 - 1. 430/9-73-007 Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity
 - 2. National Pollutant Discharge Elimination System (NPDES) Construction General Permit for Discharges from Construction Activities, effective February 16, 2012
 - 3. Stormwater Pollution Prevention Plans for Construction Activities Guidebook
- D. Chapter 21: Section 42 of the Massachusetts Clean Water Act of the Massachusetts

General laws as amended.

E. American Society for Testing and Materials (ASTM)

1. ASTM D-7322 - Standard Test Method for Measurement of Shear Resistance of Turf Reinforcement Mats Using Large-Scale Channel Testing
2. ASTM D-1117 - Standard Guide for Soil Erosion and Sediment Control Planning and Practice

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 – Submittals.

B. Storm Water Pollution Prevention Plans (SWPPP) shall include the following for review:

1. Submit a SWPPP for review and acceptance thirty (30) days prior to the commencement of any soil-disturbing activities.
2. Submit all amendments to the SWPPP.

C. For information:

1. Storm Water Inspection Reports.
2. Submit procedures and schedule for inspection, repair and alteration, including inspection forms and logs.
3. Notice of Intent for coverage under EPA's NPDES Construction General Permit for Discharges from Construction Activities.

D. Product data for all products and materials to be used for sedimentation and erosion control.

1.05 QUALITY ASSURANCE

A. The SWPPP and ESC plans shall be prepared and/or amended in accordance with:

1. 310 CMR 10.00: Wetlands Protection Act Regulations.
2. 314 CMR 9.00: 401 Water Quality Certification.
3. Massachusetts Stormwater Handbook and Stormwater Standards, located at <https://www.mass.gov/guides/massachusetts-stormwater-handbook-and-stormwater-standards>.
4. Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban

Areas, located at <https://www.mass.gov/files/documents/2016/08/qz/esfull.pdf>.

5. EPA's Stormwater Pollution Prevention Plans for Construction Activities Guidebook, located at <https://www.epa.gov/npdes/developing-stormwater-pollution-prevention-plan-swppp>.

B. Pre-Construction Meeting:

1. Arrange an on-site meeting with the Authority in accordance with Section 01200 – Coordination and Meetings a minimum of thirty (30) days prior to implementing erosion and sediment control measures at each construction site. This meeting shall be in addition to any site meetings required by MEPA erosion and sediment control requirements or required by the Order of Conditions. Items to be discussed include, but are not limited to:
 - a. Erosion and sediment control methods to be implemented, and schedule for implementation.
 - b. Quality Control procedures, including inspection and maintenance protocol.
 - c. Inspection and reporting requirements.

C. Quality Control:

1. Quality Control Plans:
 - a. Refer to Erosion and Sediment Control drawings included in Contract Documents.
2. Reporting and Recordkeeping:
 - a. SWPPP inspection reports, compliance certification statements, and correspondence must be maintained. Retain copies of the SWPPP, reports required by the SWPPP, and records of data including all logs and documentation described in this section for a period of at least three (3) years from the date that the permit coverage expires or is terminated, and no less than three (3) years after Substantial Completion.
 - b. Inspection and monitoring requirements are to be consistent with those specified/referenced in the Massachusetts Stormwater Handbook and Standards.
 - c. Document the SWPPP measures inspected and implemented each working day with daily logs, and weekly and bi-weekly inspection records. These records shall be maintained at each construction site in the environmental binder.

- d. Copies of the SWPPP inspection reports shall be submitted monthly with progress payment request.
- e. Submission of the SWPPP inspection reports is a condition of the periodic payment request process. Periodic payment requests may not be processed if the SWPPP inspection reports are not submitted.
- f. The SWPPP, all inspection forms, logs and all amendments to the SWPPP shall be submitted to the Authority and meet the requirements of Section 01700 - Contract Closeout.

1.06 QUALIFICATIONS (NOT USED)

1.07 DELIVERY, STORAGE, AND HANDLING (NOT USED)

1.08 PROJECT/SITE CONDITIONS (NOT USED)

1.09 DEFINITIONS

- A. BMP – Best Management Practices
- B. ESC – Erosion and Sediment Control
- C. NOI – Notice of Intent
- D. SWPPP – Storm Water Pollution Prevention Plan

1.10 TOLERANCE (NOT USED)

1.11 GENERAL REQUIREMENTS

- A. Work under this Section shall consist of any and all temporary and/or permanent measures to control water pollution and soil erosion as required, specified herein, shown on the Contract Drawings.
- B. Provide and maintain temporary measures to control soil erosion, dust migration, and water pollution.
- C. Comply with all applicable legal requirements governing this Work. Refer to Section 01060 – Permits and Regulatory Requirements for additional requirements.
- D. Comply with the SWPPP, soil erosion, and sediment control requirements of this Contract, the Authority, MassDEP and the EPA and for otherwise preventing sediment and silt-laden storm runoff from exiting each construction site or other project soil disturbance area. No action or inaction shall have the potential to result in a non-compliance with the requirements contained in these specifications, authorization

permits, approvals and other permits and approvals required by the project and government agencies. The Contractor shall be solely responsible for all fines, penalties, or damages, which result from its failure to comply.

- E. Develop and implement a SWPPP to reduce pollutants that may result from land disturbance activities in accordance with the Federal Phase II Storm Water regulations (effective March 2003).
- F. Maintain an Authority reviewed and accepted SWPPP and inspection log at each construction site and in the main construction site office, and continually update as regulations require, reflecting current site conditions.
- G. Water Control:
 - 1. Continuous control of surface runoff (and surface and ground water related to erosion and sedimentation control) shall be maintained at all times during the course of the construction, including Saturdays, Sundays, and holidays.
 - 2. No discharges shall be made to sewers without prior written authorization from the Authority.
 - 3. Obtain an MWRA Temporary Discharge Authorization (TDA) Permit 30 days prior to the first anticipated discharge, if this authorization is required to control erosion and sedimentation.
- H. In instances where the Authority has applied for a permit in its name, amend the permit to have permit in Contractor's name at least 60 days prior to the start of any construction or earth disturbing activity (including clearing, grubbing, or installation of erosion control measures).
- I. Any amendments to Authority-obtained ESC Plans shall be signed and sealed by a Contractor's registered Professional Engineer, licensed in the Commonwealth of Massachusetts.
- J. Spill Prevention and Response:
 - 1. Minimize the potential for spills of pollutants stored on any construction site. Leaks and spills shall be minimized and if observed, commence containment and clean-up immediately, and institute preventive measures. Immediately notify the Authority upon the discovery of any leaks and/or spills.
- K. Discharges shall meet the requirements of Section 02240 – Construction Dewatering and Groundwater Control.
- L. All erosion and sediment controls shall be installed as indicated on the Contract Drawings and shall be installed to the satisfaction of the Authority before the

commencement of any construction. Once installed all systems shall be maintained so that they are fully functional until disturbed areas are stabilized. If systems fail throughout the duration of the Contract, additional controls shall be added at no expense to the Authority. Erosion and sediment controls shall be inspected and maintained per Part 3 of this section.

PART 2 PRODUCTS

2.01 SWPPP

- A. Prepare a SWPPP that meets the requirements contained in Section 7 of EPA's NPDES Construction General Permit (CGP) for discharges from construction activities.
- B. The SWPPP shall be signed and certified by Contractor's Project Manager, Site Superintendent and Environmental Manager. The SWPPP shall specifically address each construction site. A separate SWPPP may be developed for each construction site, if the Contract consists of multiple locations, at the discretion of the Contractor.
- C. SWPPP(s) shall be submitted for review and acceptance by the Authority prior to submitting the NPDES Notice of Intent (NOI) for any construction site.
- D. Develop the SWPPP and revise as conditions change to meet the objectives outlined below:
 - 1. Identify all pollutant sources including sources of sediment that may affect the quality of storm water discharges associated with construction activity.
 - 2. Identify non-storm water discharges.
 - 3. Identify, construct, implement in accordance with a time schedule, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from each construction site during construction.
 - 4. Select applicable BMPs from EPA 833-R-060-04.
- E. Develop inspection and maintenance schedules for BMPs installed during construction to reduce or eliminate pollutants after construction is completed (post-construction BMPs).
- F. The person onsite responsible for storm water and ESC permit compliance, and designated alternates shall sign the SWPPP's certifications, amendments, and storm water inspection reports. Any person signing the aforementioned shall make the following certification in the SWPPP:
 - 1. "I certify under penalty of law that I understand and shall comply with the terms and conditions, as detailed in Section 02370 – Erosion and Sedimentation Control

of this Contract.

2. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete.
3. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

G. Provide a construction staging area description that includes:

1. A description of the nature of the construction activity.
2. A description of the intended sequence of major activities, which disturb soils or could cause dust migration.
3. Estimates of the total area of each construction site that is to be disturbed by excavation, grading, or other land disturbing activities.
4. An estimate of the runoff coefficient of each construction site after construction activities are completed and existing data describing the soil or the quality of any discharge from the construction site.
5. A site map showing the outline of each construction site perimeters, staging areas, construction facilities, access roads, major roadways, geographic features and landmarks, existing utilities, bodies of water within and adjacent to the Project vicinity, wetlands, known wells, off-site draining into the site, and general topography.
6. A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, location of stockpiles, locations of structural and non-structural controls identified in the SWPPP, location of areas where stabilization practices are to occur, and anticipated discharge locations.
7. All storm water inlets and catch-basins and location of points of discharge to existing storm runoff conveyance systems.

H. Identify all pollution sources, including:

1. The SWPPP shall identify all potential sources of storm water pollution.
2. List all of the construction activities and materials that have the potential to contribute sediment to storm water discharge. Describe the anticipated soil and

stockpile materials at the construction work area.

3. List all of the construction methods that have the potential to track sediment off-site onto haul routes and access roads. Also, list all potential dust-generating activities.
4. In addition to land disturbing activities, provide information on potential sources of storm water pollution including, but not limited to:
 - a. Temporary fuel storage and handling. Refueling of equipment within the containment areas shall be addressed in the SWPPP.
 - b. Material storage and hazardous material storage – identify locations on a site plan.
 - c. Equipment and maintenance areas.
- I. Controls: The SWPPP shall include a description, timing, and designated area as appropriate of controls and measures that will be implemented for each major activity and for each potential pollution source identified above.
- J. Stabilization Practices: Refer to the Erosion and Sediment Control drawings.
- K. Structural Practices: Refer to the Erosion and Sediment Control drawings.
- L. Operational Practices: Dust control, dust monitoring, housekeeping, non-hazardous regular waste collection and disposal, control of equipment fluids and lubricants, and similar practices to minimize pollutant generation.
 1. Vehicle and Wheel Washing – All vehicle and wheel washing shall occur at a designated equipment wash pad.
 2. Concrete Washout – Concrete washout will only be allowed if a concrete washout operations and maintenance work plan is submitted under the SWPPP containing the following:
 - a. Concrete washout station types and specifications.
 - b. Proposed locations on each construction site.
 - c. Operations and maintenance procedures including daily inspections and clean up schedules.
 - d. Clean up and waste disposal methods.
 - e. Jet grout, compaction grout, ground modification grout, or other grout

operations shall comply with the concrete washout requirements.

- M. BMPs: The SWPPP shall identify BMPs for control of the tracking of sediment, and dust migration, off-site during construction and to prevent polluted runoff from entering surface waters.
- N. Refer to Section 01562 – Dust and Air Quality Control for dust control measures, Section 01567 – General Environmental Controls for air pollution measures, and Section 01600 – Control of Materials for additional soil stockpile requirements.
- O. Maintenance: A description of procedures to maintain protective measures in proper operating condition.
- P. Inspection: A description of inspection procedures, including inspection logs and documentation, and schedules of all structural and non-structural pollution control measures.
- Q. Prior to the Table of Contents, include a separate page identifying the name of the Contractor's preparer, reviewer, revision number and date.
- R. Identify SWPPP Team Members.
- S. The SWPPP may utilize plans, details, notes, and other information provided in the Contract Documents; however, such information shall not, in itself, be construed to meet the requirements of this section.
- T. Detailed methods for monitoring the weather, alerting work crews, and implementing additional BMPs for rainfall and/or high wind, include provisions for weekends and holidays.
- U. Working drawings that show installation details, dimensions, and materials for implementing each BMP identified in the SWPPP. Identify quantities of materials for implementing BMP to be stored on site to ensure adequate supply for the Work. Show storage locations on a site map.

2.02 MATERIALS

- A. Silt fence used for sedimentation barriers and erosion control shall consist of woven geotextile fabric in accordance with Section 02660 – Geosynthetics. Support posts shall be hardwood or steel, nominal 2 inches by 2 inches in cross-section, and a minimum of 4.5 feet in length.
- B. Support netting shall be heavy-duty plastic mesh.
- C. Sediment Control Devices (Silt Sack) shall be used during construction to control sediment discharges into existing drainage systems or other receiving streams. Silt sack

shall be used under catch basins and dewatering bags as a standalone device to catch sediment laden groundwater. Dewatering bags shall be constructed of permeable geotextile material and contain factory installed hose connections.

D. Erosion Control Barrier Composite Filter Tube (Silt Sock)

1. Provide erosion control barrier composite filter tubes, or silt socks, such as SiltSoxx® manufactured by Filtrexx International, Diamond Sock manufactured by Kengro, CORE Filter Sock manufactured by CORE Erosion Control, or approved equal, for use as sediment control devices at locations shown on the Contract Drawings. Silt socks shall be suitable for erosion and sediment control applications and compatible with site conditions and anticipated flows.
2. Filter media shall consist of composted organic material. Media shall be free of trash, debris, and invasive species. Media shall conform to ASTM D-1117.
3. Netting encasing the silt socks shall be tubular, flexible mesh netting. Netting shall be UV-stabilized and resistant to tearing during handling and installation. The netting shall be biodegradable or photodegradable.
4. Provide silt socks in diameters appropriate for the application and site conditions, typically ranging from 8 inches to 12 inches. Provide larger diameters where required to accommodate anticipated flows.

E. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of materials to be 10 inches or longer. Straw shall be air-dry condition and suitable for placement with blower equipment.

F. Floating Silt Curtain

1. The floating silt curtain is to be provided in pre-manufactured segments as shown on the Contract Drawings. Each segment is to have integral flotation, ballast and tension reinforcing. The silt curtain may be manufactured of nylon reinforced vinyl or other fabric having suitable resistance to sunlight and oils and having a minimum tensile strength of 300 pounds per inch of fabric.

G. Stabilized Construction Entrance

1. Construct a minimum of one (1) stabilized construction entrance/egress at the location(s) shown on the Contract Drawings. The entrances shall be stabilized in accordance with the details shown on the Contract Drawings and shall be maintained in an effective condition for the duration of the project.

2. Construct stabilized construction entrances using a woven geotextile separator overlain by a minimum 6-inch thick pad of clean, angular crushed stone, nominal 2-inch diameter, or approved reclaimed/recycled concrete equivalent, free of fines.
3. Stones to maintain stabilized construction entrances shall be as specified in Section 02200 – Earthwork.

PART 3 EXECUTION

3.01 FIELD PROCEDURES

- A. Erosion and sediment control features shall be installed prior to the start of clearing of vegetation or excavation of materials. Features shall be maintained and checked daily, before an anticipated storm greater than 0.25 inches and after each severe rainstorm for damage, until such features are no longer needed.
- B. Silt fence support posts shall be spaced three (3) to four (4) feet on center at low points and in areas where overtopping may occur. In all other areas, post spacing shall not exceed five (5) feet on center. Fabric tails shall be properly trenched and embedded, and the trench shall be backfilled and compacted on both sides of the silt fence using a plate compactor.
- C. All sediment traps and sediment basins shall have the accumulated sediment and/or clean water removed before it significantly reduces their storage volume or function, prior to the next rain storm forecast for the region.
- D. All grounds disturbed by any of the operations necessary to complete the Work for this Project shall be restored. Restoration shall be accomplished in accordance with Section 02900 –Restoration and Landscaping.
- E. Stockpiles within any construction site's perimeter controls are required to be enclosed around the base of the stockpile with silt fence or other erosion and sedimentation controls.
- F. Have on hand, at all times, the necessary materials and equipment to provide for early slope stabilization and corrective measures to damaged slopes.
- G. The floating silt curtain is to be securely fastened to solid ground at any points of contact with the shoreline and is to be anchored or restrained at intermediate locations sufficient to prevent the distortion of the curtained area due to the action of wind, waves, currents, or the effects of the work in progress.
- H. The erosion and sediment control measures shall be inspected regularly and maintained in effective operating condition throughout the duration of construction. Maintenance activities shall include replacement of filter fabric when deteriorated or

ineffective, repair or replacement of damaged control measures, removal of accumulated sediment before deposits reach 50 percent of the height of the control device, and cleaning of catch basins, inlets, and drainage structures to remove sediment and debris and prevent ponding. Erosion and sediment control measures shall remain in place until disturbed areas have been permanently stabilized, after which they shall be removed.

3.02 INSPECTIONS

- A. Perform storm water and erosion and sediment control permit required inspections weekly, before and after each storm event, and as required by the ESC Permits and the Order of Conditions.

**** END OF SECTION ****