

SECTION 310000 - EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

- A. This Section includes the following:
 - 1. Temporary and permanent erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
 - 2. Inspection, repair, and maintenance of erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - 3. Removal of erosion and sedimentation controls and restoration and stabilization of areas disturbed during removal.
- B. Related Sections include the following:
 - 1. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.
 - 2. Section 312000 "Earth Moving" for soil materials, excavating, backfilling, and site grading.
 - 3. Section 329300 "Landscaping" for finish grading, including preparing and placing topsoil and planting soil for lawns and plant materials.

1.3 DEFINITIONS:

- A. MDOT: Maine Department of Transportation.
- B. Maine DEP: Maine Department of Environmental Protection.

1.4 PERFORMANCE REQUIREMENTS:

- A. Environmental Licensing Requirements: All construction is subject to review and/or inspection by local, State, and Federal agencies for adequacy of erosion and sedimentation control measures. Contractor shall conform to conditions of

environmental permits or licenses that are applicable to the project. Take necessary steps to prevent soil erosion. Refer to publications of the Maine DEP and the Maine Soil and Water Conservation Commission for additional prevention measures to stop soil erosion and follow Maine DEP "Best Management Practices." The Contractor shall conduct his operations in conformity with all Federal and State permit requirements concerning water, air, or noise pollution, or the disposal of contaminated or hazardous materials. Erosion control measures shown on the Plans are minimum only and are not intended to be complete. Satisfy the current requirements of the regulatory agencies.

- B. Erosion and Sedimentation Control Guidelines: Cumberland County Soil & Water Conservation District, Maine Department of Environmental Protection publication dated March 2003, "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices."
- C. Basic Performance Standards for State of Maine Department of Environmental Protection General Permit for Construction Activity, Maine Pollutant Discharge Elimination System (MPDES), dated March 2003, or latest revision.

1.5 SUBMITTALS:

- A. Product Data: For each manufactured product indicated. Include manufacturer's instructions for installation.
- B. Provide to the Architect, in writing, a time schedule outlining the sequence of construction for site work.

1.6 SEQUENCING AND SCHEDULING:

- A. Conduct operations in conformity with all Federal and State permit requirements. Plan the sequence of construction so that the smallest practical area of land is exposed at any one time during construction. Schedule the work such that sedimentation barriers are installed early in the construction sequence, to prevent sediments from uphill areas reaching streams, wetlands, or property lines.
- B. Provide to the Architect, in writing, a time schedule outlining the sequence of construction for site work.
- C. See Plans for erosion and sedimentation control requirements.
- D. Stabilize exposed soils throughout the project site.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Seed, Fertilizer and Lime: Shall be as specified under Erosion Control Notes on Drawings.
- B. Mulch: Comply with the requirements of MDOT Standard Specification, Section 619.
- C. Erosion Control Mesh: Jute or excelsior blanket conforming to MDOT Standard Specification, Section 613 or as approved by the Engineer
- D. Siltation Fence:
 - 1. Support Fence: 30 inch high livestock fence, or high strength plastic mesh.
 - 2. Post: Rolled steel manufactured line post or 2 inch diameter hardwood post, 4.5 feet in length.
 - 3. Fabric: Fabric: Pervious sheet of synthetic polymer meeting the following minimum requirements.

Weight	2.5 oz/sy
Width	36 inches
Thickness	12 mils
Equiv. Opening Size	20-50 sieve
Tear Strength	50 lb.
Ultraviolet stability	80%

 - a. Mirafi 100X; Terra Tex-SC, or approved equal.
 - 4. Pre-manufactured Silt Fencing systems: Separate support fence may be eliminated if fabric is manufactured with reinforcement, including top cord,
 - a. ProPex Silt Stop; Amoco Fabrics and Fibers Co.
- E. Crushed Stone: Durable, clean, angular rock fragments obtained by breaking and crushing rock material; 2 to 3-inch stone.
- F. Filter Fabric: Woven fabric composed of high-tenacity polypropylene yarns for sediment riser pipes and block and stone catch basin inlet traps.
 - 1. Product: Mirafi 100X; Mirafi Construction Products or equal
- G. Catch Basin Inlet Filter Bag: A filter fabric bag designed to catch sediments.
 - 1. Products:
 - a. Siltsack; ACF Environmental Services.

b. Streamguard; Foss Environmental Services.

- H. Erosion Control Mix: Mix may be manufactured on or off project site.
1. Mix shall consist primarily of organic material, separated at the point of generation, and may include shredded bark, stump grindings, composted bark, or flume grit and fragmented wood generated from water-flume log handling systems.
 - a. Wood chips, ground construction debris, reprocessed wood products, or bark chips shall not be acceptable as the organic component of the mix.
 2. Mix shall contain well-graded mixture of particle sizes and may contain rocks less than 4 inches in diameter. Mix shall be free of refuse, physical contaminants, and material toxic to plant growth.
 3. Mix composition shall meet the following standards:
 - a. Organic matter content shall be between 20 and 100 percent, dry weight basis.
 - b. Particle size by weight shall be 100 percent passing a 6-inch screen, and a minimum of 70 percent and a maximum of 85 percent passing a 0.75-inch screen.
 - c. Organic portion shall be fibrous and elongated.
 - d. Large portions of silts, clays or fine sands are not acceptable in the mix.
 - e. Soluble salts content shall be less than 4.0 mmhos/cm.
 - f. Mix pH shall fall between 5.0 and 8.0.
 - g. Filter Berm: A windrow of erosion control soil/bark mix 2 ft. high by 3 ft. wide.
- I. Hay Bales: Bales shall be at least 14" x 18" x 30" in size, staked twice per bale. Stakes shall be 1" x 1" x 36" wooden. Place bales with twine on sides of bale, not top and bottom.
- J. Water, calcium chloride, or crushed stone for prevention of airborne dust.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Prior to grubbing, stripping, excavation, placement of fill, temporary or permanent placement of excavated materials, or other earthwork, the Contactor shall implement erosion and sedimentation control measures as specified herein and indicated on the plans.

- B. A silt fence, filter berm, or stone sediment dam shall be installed along the down-slope side of the construction site, as necessary, to prevent soil sediment migration away from the site. Install silt fence or filter berm long the down-slope side of all top-soil and subsoil stockpiles.
- C. Temporary measures for controlling erosion and sedimentation may include, but are not limited to, the following:
 - 1. Siltation fencing around the down-slope periphery of areas to be disturbed by construction.
 - 2. Filter Berm around the down-slope periphery of areas to be disturbed by construction.
 - 3. Temporary seeding and mulching of soil stockpiles or disturbed areas.
 - 4. Temporary sedimentation basins, siltation traps, stone check dams and other temporary practices as approved by the Engineer.
- D. Permanent measures for controlling erosion and sedimentation shall be provided as shown on the drawings or required by these Specifications.
- E. Where disturbed areas cannot be permanently stabilized within 14 days of exposure of the soil, the areas shall be temporarily seeded and mulched, or otherwise stabilized as approved by the Architect.
- F. Permanent soil stabilization measures for any slopes, channels, ditches, or any disturbed land area shall be completed within 7 calendar days after final grading has been completed. Where such permanent erosion control measures are not possible or practical to implement, and upon approval by the Architect, temporary stabilization practices shall be applied as in 3.01.D above.
- G. All temporary and permanent control measures shall be periodically inspected and maintained by the Contractor for the duration of the construction and warranty period of this Contract. Sediment collection devices shall be cleaned periodically as required, and the removed material reused or disposed of at an approved disposal area.

3.2 SURFACE WATER DIVERSION:

- A. Build, maintain, and operate all cofferdams, channels, flumes, sumps, and other temporary diversion and protection works needed to divert surface water through or around the construction site and away from the construction work while construction is in progress.
- B. Outlet diverted stormwater and water from excavations to sedimentation trap or basin or other approved sedimentation control measure.

3.3 SILTATION FENCE:

- A. Construct siltation fences at the locations and to the dimensions indicated, and as required to meet specified criteria.
- B. Set fence post 8 feet O.C. to a depth of 2 feet. Attach support fence to post with fencing staples or appropriate wire ties.
- C. Overlap joints in support fence 12 inches. Apply fabric to full height of support fence and secure to prevent sagging, blow off, and loss. A 12-inch overlap of fabric for vertical piecing shall be maintained, folded to a 3 inch width and securely attached to supports.
- D. No horizontal joints will be allowed.
- E. The bottom of the fabric shall be trenched into the existing ground a minimum of 6 inches. In addition, hay bales or ditch checks shall be installed along the silt fence to create sedimentation pools in low areas where run-off concentrates.
- F. Prior to removal of the silt fence, all retained soil or other material shall be removed and disposed of at an approved disposal area.

3.4 FILTER BERM:

- A. Place un-compacted erosion control mix in a windrow at locations shown on the plan or as directed by the Architect.
 - 1. At a minimum the berm shall be 3 feet wide at the base and 2 feet high at the center of all points along its length.
 - 2. Berm material, where the berm is still required, which has decomposed, clogged with sediment, eroded, or becomes ineffective, shall be replaced.
 - 3. The berm shall be removed from the site when no longer required, as determined by the Architect.

3.5 TEMPORARY SEEDING AND MULCHING:

- A. Topsoil stripped and stockpiled on site shall be immediately seeded with erosion control seed mix and mulched with hay.
- B. Exposed earthwork areas, which will not be worked on for one week, shall be mulched with straw. Unfinished areas which are not to be worked on for one month, or will be wintered, shall be seeded with erosion control mix at a rate of 3 pounds of seed per 1000 sq.ft. and mulched with straw. Apply straw mulch at the rate of 75 pounds per 1000 sq.ft. Anchor mulch to prevent wind blown movement.

- C. No fill shall be placed on hay mulch. Dispose of used hay mulch off site.

3.6 FALL AND WINTER STABILIZATION:

- A. Stabilize exposed soils throughout the project site with permanent seed and mulch by September 15, with the exception of areas undergoing active earthmoving operations. These construction areas are primarily in the immediate vicinity of the building. For proposed grass areas not stabilized by permanent seed and mulch by this date, provide the following stabilization measures at no additional cost to the Owner. Select the appropriate methods from the options listed and obtain approval from the Architect prior to installation.
 1. Stabilize the soil with temporary vegetation, except for ditches, by October 1. Place winter rye seed at the rate of 3 pounds per 1000 sq.ft. and lightly mulch with hay or straw at 75 pounds per 1000 sq.ft. Place erosion control mesh over mulch and anchor.
 2. For slopes flatter than 3H:1V, place sod over the exposed soil by October 1. Roll the sod, anchor it with wire pins, and water it to promote growth.
 3. For grassed areas flatter than 10H:1V, stabilize the disturbed soil by November 1 with temporary winter mulching by applying hay or straw at a rate of at least 150 pounds per 1000 sq.ft., such that no soil is visible through the mulch. Anchor mulch with erosion control mesh.
 4. For slopes steeper than 10H:1V and flatter than 2H:1V, place a 6" layer of erosion control soil/bark mix on the disturbed soil by November 1. Remove snow accumulated on the slope prior to installation. If groundwater seeps are present, place stone rip rap to thickness shown on drawing details over non-woven geotextile.
- B. If the catch of permanent or temporary grass is less than 3" tall or covers less than 75% of the disturbed soil by November 1, apply additional hay mulch at a rate of 150 pounds per 1000 sq.ft. Anchor mulch with erosion control mesh.

3.7 PARKING AND DRIVES:

- A. Place temporary stabilized construction exits where vehicles leave the site and enter existing paved roads; consisting of a 6" layer of 1-1/2" to 3" crushed stone. Tracking and spilling of earth and/or debris on public streets shall be avoided to the maximum extent possible. Clean up and remove such spillage.

- B. As the crushed stone stabilized construction exits continue to scrub the soil from the trucks, the stone layer will tend to fill with sediments. When this occurs remove the stone and sediment and replaced it with a clean layer of stone.
- C. As soon as possible after roads and parking areas are cleared, grubbed and graded to the required subgrade, the gravel base shall be placed.

3.8 INSTALLATION OF STRAW BALES AT CATCH BASINS:

- A. Construct straw or hay bales at catch basins to the dimensions indicated and as required to meet specified criteria.
- B. Place bales (straw or hay) in a row with ends tightly abutting the adjacent bales.
- C. Embed each bale in the soil a minimum of 4 inches.
- D. Anchor bales securely in place with stakes or rebar driven through the bales. Angle first stake in each bale toward the previously laid bale to force bales together.
- E. Remove or replace bales when they have served their usefulness so as not to obstruct storm flow or drainage.

3.9 CATCH BASIN INLET FILTER BAG:

- A. General: Install in catch basin in accordance with manufacturer's written instructions.
- B. Inspect weekly and after all rainfall events. Empty sediment and inspect bag when bag is less than half full of sediment.

3.10 EROSION CONTROL MIX-MULCH:

- A. Apply mix of the following thicknesses based on length and steepness of slope:
 - 1. On Slopes of 3:1 or Less: 2 inches plus an additional 1/2-inch per 20 feet of slope up to 100 feet.
 - 2. On Slopes Between 3:1 and 2:1: 4 inches plus an additional 1/2-inch per 20 feet of slope up to 100 feet.
 - 3. The thickness of the mulch at the bottom of the slope shall be as follows:

	<u>Less Than 3:1 Slope</u>	<u>Slopes Between 3:1 & 2:1</u>
Less than 20 Feet of Slope:	2.0 inches	4.0 inches

Less than 60 Feet of Slope:	2.5 inches	5.0 inches
Less than 100 Feet of Slope:	3.0 inches	6.0 inches

3.11 DUST CONTROL:

- A. Provide dust control measures to prevent off-site damage, health hazard to humans, wildlife and plant life, or become a traffic safety hazard.
- B. To the maximum extent as is practicable:
 - 1. Use traffic control to restrict traffic to predetermined routes.
 - 2. Maintain as much natural vegetation as possible.
 - 3. Use phasing of construction to reduce the area of land disturbed at any one time.
 - 4. Use temporary mulching, permanent mulching, temporary vegetative cover, permanent vegetative cover, or seeding to reduce the need for dust control.
 - 5. Use mechanical sweepers on paved surfaces where necessary to prevent dust buildup.
 - 6. Stationary sources of dust, such as rock crushers, shall utilize fine water sprays to control dust.
- C. Moisten exposed soil surface periodically with adequate water to control dust.
- D. Where other methods are not practical, use of calcium chloride will be permitted. Spreader at a rate that will keep surface moist but not cause pollution or plant damage. To reduce potential for environmental degradation, use only when other methods are not practical. In areas adjacent to waterways and sensitive environmental areas, verify materials and procedures with governing authority.
- E. Cover surface with crushed stone or coarse gravel. In areas adjacent to waterways, use chemically stable aggregate.
- F. When temporary dust control measures are used, repetitive treatment shall be applied as needed to accomplish control.

CONSTRUCTION DEWATERING:

- A. Water from construction dewatering operations shall be cleaned of sediment before site boundaries. Utilize temporary sediment basins, erosion control soil filter berms, silt fencing, block and gravel catch basin inlet protection, or other approved Best Management Practices (BMPs).

3.13 ADDITIONAL MEASURES:

- A. Areas outside the Contract work limits shall be protected from lubricants, fuel, sediment and other pollutants.
- B. Inspect erosion and sedimentation control weekly and after every storm and maintain in good working condition for project duration.

3.14 REMOVAL AND DISPOSAL:

- A. After permanent soil stabilization has been achieved, temporary materials and devices that are not readily degradable shall be removed and disposed of off site. Silt fences, filter berms, and catch basin sediment filters shall be fully removed.
- B. Repair areas disturbed by temporary materials and removal operations to match surrounding finished surfaces. At natural vegetation areas to remain, restore to match existing.

END OF SECTION 310000