SECTION 312500
EROSION AND SEDIMENTATION CONTROLS

PART 1  GENERAL

1.01  GENERAL REQUIREMENTS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.02  DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Prior to the start of construction work, prepare a Stormwater Pollution Prevention Plan (SWPPP) for management of the site construction in compliance with the U.S. Clean Water Act, NPDES Construction General Permit and file a Notice of Intent with the U.S. Environmental Protection Agency for coverage under that permit. The SWPPP shall be consistent with the Plans and the wetlands Order of Conditions and shall be submitted to the Architect and the Conservation Commission for approval.

2. Control measures to prevent all erosion, siltation and sedimentation of drainage ways, construction areas, wetlands resource areas, adjacent on-site areas and off-site areas, and manage the site in compliance with the NPDES Construction General Permit, Approved SWPPP and the Order of Conditions. Note: Erosion controls and siltation measures shall be left in place upon completion of the work.

3. Control measures shall be accomplished adjacent to or in the following work areas:
   a) Soil stockpiles and on-site storage and staging areas.
   b) Cut and fill slopes and other stripped and graded areas.
   c) Constructed and existing swales and ditches.
   d) Sediment ponds.
   e) At edge of wetlands areas, if applicable, as shown on Drawings.

4. Additional means of protection shall be provided by the Contractor as required for continued or unforeseen erosion problems, at no additional cost to the project.

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5. Periodic maintenance of all sediment control structures shall be provided to ensure intended purpose is accomplished. Sediment control measures shall be in working condition at the end of each day.

6. After any significant rainfall, sediment control structures shall be inspected for integrity. Any damaged device shall be corrected immediately.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:

1. Section 311000 – SITE PREPARATION for protection of existing tress and other vegetation to remain.

2. Section 312000 – EARTHWORK for soil materials, excavating, backfilling, and site grading and removal of site utilities.

1.03 QUALITY ASSURANCE

A. Comply with the requirements of Stormwater Pollution Prevention Plan prepared for the NPDES permit, which are incorporated herein by reference, and all other applicable requirements of governing authorities having jurisdiction. The specifications and drawings are not represented as being comprehensive, but rather convey the intent to provide complete slope protection and erosion control for both the Owner’s property, adjacent property and wetland resource areas.

1. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a sediment and erosion control plan specific to the site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.

B. Erosion control measures shall be established at the beginning of construction and maintained during the entire period of construction. On-site areas which are subject to severe erosion, and off-site areas which are especially vulnerable to damage from erosion and/or sedimentation, are to be identified and receive special attention.

C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time, and the length of time of exposure.

D. Surface water runoff originating upgrade of exposed areas should be controlled to reduce erosion and sediment loss during the period of exposure.

E. When the increase in the peak rates and velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream bed, provide measures to control both the velocity and rate of re-

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lease so as to minimize accelerated erosion and increased sedimentation of the stream.

F. All land-disturbing activities are to be planned and conducted so as to minimize off-site sedimentation damage.

G. The Contractor is responsible for cleaning out and disposing of all sediment once the storage capacity of the sediment facility is reduced by one-half.

H. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established or until the end of work under this contract and the site is turned over to the owner.

I. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal unless the erosion controls are to be turned over to the Owner for management.
PART 2          PRODUCTS

2.01      MATERIALS

A.  Straw Bales:  Nylon bound bales of straw, oriented around sides, rather than over and under.

B.  Stakes:  Stakes for bales shall be one of the following materials:  Wood stakes of sound hardwood 2 by 2 inches in size or steel reinforcing bars of at least No. 4 size.  Lengths shall be approximately three feet.

C.  Fiber Logs:  A fabric sock filled with wood cellulose fiber, coir fiber or other material intended to filter stormwater runoff and trap sediment.

D.  Siltation Fence:  Fabricated or prefabricated unit consisting of the following filter fabric properties:

1.  Grab Tensile Strength        90  ASTM D1682
2.  Elongation at Failure (%)    50  ASTM D1682
3.  Mullen Burst Strength (PSI)  190 ASTM D3786
4.  Puncture Strength (lbs)      70  ASTM D751 (modified)
5.  Slurry Flow Rate (gal/min/sf) 0.5 Virginia DOT VTM-51
6.  Equivalent Opening Size      40-80  US Std Sieve CW-02215
7.  Ultraviolet Radiation Stability (%)  90 ASTM G26

E.  Protective Measures:  As temporary coverings on ground areas subject to erosion, provide one of the following protective measures, and as directed by the Architect.

1.  Straw temporary mulch, 100 pounds per 1,000 square feet.
2.  Wood fiber cellulose temporary mulch, 35 pounds per 1,000 square feet.
3.  Tackafier for anchoring mulch or straw shall be a non-petroleum based liquid bonding agent specifically made for anchoring straw.
4.  Provide natural (jute, wood excelsior) or man-made (glass fiber) covering with suitable staples or anchors to secure to ground surface.  Note that wire stapes and non-biodegradable coverings shall not be used for any area that will be mown turf.
5.  Temporary vegetative cover for graded areas shall be undamaged, air dry threshed straw free of undesirable weed seed.
6.  Riprap:  Stone used for drain outfalls and drain channel protection.  See plans for sizes.  Stone shall be hard, durable, angular in shape, resistant to weathering.
7.  Others Protective Measurers as shown on the plans and as contained in the approved SWPPP and as field conditions warrant.
F. Geotextile: Geotextile used under stone rip-rap for drain outfalls and stone channels for slope stabilization shall be a woven geotextile used for filtration, separation, and erosion protection and shall meet the following properties:

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<tr>
<th>Property Description</th>
<th>Value</th>
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<tr>
<td>1. Grab Tensile Strength (MD @ Ultimate, lbs)</td>
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<td>ASTM D4632</td>
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<td>2. Grab Tensile Strength (CD @ Ultimate, lbs)</td>
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<td>3. Elongation at Failure (MD @ Ultimate, %)</td>
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<td>4. Elongation at Failure (CD @ Ultimate, %)</td>
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<td>7. Puncture Strength (lbs)</td>
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<td>8. UV Resistance (% Strength after 500 hrs)</td>
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<td>9. Apparent Opening Size (US Std Sieve)</td>
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<td>10. Flow Rate (gal/min/sf)</td>
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3.01 STRAW BALE BARRIERS

A. Excavation shall be to the width of the bale and the length of the proposed barrier to a minimum depth of 4 inches.

B. Bales shall be placed in a single row, lengthwise on proposed line, with ends of adjacent bales tightly abutting one another. In swales and ditches the barrier shall extend to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale.

C. Staking shall be accomplished to securely anchor bales by driving at least two stakes or rebars through each bale to a minimum depth of 18 inches.

D. The gaps between bales shall be filled by wedging straw in the gaps to prevent water from escaping between the bales.

E. The excavated soil shall be backfilled against the barrier. Backfill shall conform to ground level on the downhill side and shall be built up to 4 inches on the uphill side. Loose straw shall then be scattered over the area immediately uphill from a straw barrier.

F. Inspection shall be frequent and repair or replacement shall be made promptly as needed.

3.02 STABILIZED CONSTRUCTION ENTRANCE AND STONE BERMS

A. Stone size: Use ASTM designation C-33, size No. 2 (1-1/2” to 2-1/2”). Use crushed stone.

B. Length: As effective, but not less than 50 feet.

C. Thickness: Not less than eight inches.

D. Width: Not less than full width of all points on ingress or egress, but not less than 25 feet.

E. Washing: When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through the use of sand bags, gravel boards or other approved methods.
F. Maintenance: The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spoiled, dropped, washed or tracked onto public rights-of-way must be removed immediately.

G. Place crushed stone berms in locations required and as directed. Berms shall have side slopes of 1:3 or less.

H. Inspect stone berms periodically and replace and/or regrade crushed stone as required.

3.03 SILT FENCING

A. Excavate a 6 inch trench along the upstream side of the desired fence location.

B. Drive fence posts a minimum of 1'-6" into the ground. Install fence, well-staked at maximum eight foot intervals in locations as shown on Drawings. Secure fabric to fence and bury fabric end within the six inch deep trench cut.

C. Lay lower 12 inches of silt fence into the trench, 6 inches deep and 6 inches wide. Backfill trench and compact.

D. Overlap joints in fabric at post to prevent leakage of silt at seam.

3.04 EROSION CONTROL GRASSING

A. Grassing shall be applied according to State of Massachusetts Highway Department Standard Specifications.

3.05 SLOPE STABILIZATION

A. Stabilization of the cut slope area along the haul road between the upper and lower field shall be performed using a heavy application of hydro-mulch and tackifier or application of a protective erosion control matting approved by the Engineer.

3.06 INLET PROTECTION

A. Install a silt sack in catch basins that may be affected by runoff from the disturbed portion of the work site.
3.07 DUST CONTROL

A. Throughout the construction period the Contractor shall carry on an active program for the control of fugitive dust within all site construction zones, or areas disturbed as a result of construction. Control methods shall include the following: Apply calcium chloride at a uniform rate of one and one-half (1 ½) pounds per square yard in areas subject to blowing. Application of water to affected areas. Covering of exposed areas with mulch or other effective protection measure. The source of supply and the method of application for water are the responsibility of the contractor.

B. The frequency of application for fugitive dust control shall be as required to control dust.

3.08 TEMPORARY PROTECTIVE COVERINGS (AFTER GROWING SEASON)

A. Place temporary covering for erosion and sedimentation control on all areas that have been graded and left exposed that will not be utilized for a period of longer than 30 days. Contractor shall have the choice to use either or both of the methods described herein.

B. Straw shall be anchored in-place by one of the following methods and as approved by the Architect: mechanical “crimping” with a tractor drawn device specifically devised to cut mulch into top two inches of soil surface or application of non-petroleum based liquid tackifier, applied at a rate and in accordance with manufacturer’s instructions for specific mulch material utilized.

C. Placement of mesh or blanket matting and anchoring in place shall be in accordance with manufacturer’s printed instructions.

D. Inspect protective coverings periodically and reset or replace materials as required.

3.09 ALL EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS)

A. All erosion and sediment controls are to be installed per the latest EPA and USDA Natural Resource Conservation Service guidelines and in accordance with the approved SWPPP.

END OF SECTION