

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

***Table M6.03.0-1: Grass Seed Requirements for Lawn Grass Areas***

<b>Grass Type</b>	<b>Proportion</b>	<b>Germination Minimum</b>	<b>Purity Minimum</b>
Creeping Red and/or Chewings Fescue	59%	85%	95%
Kentucky Blue	30%	85%	90%
Perennial Rye	5%	90%	98%
Redtop	5%	85%	92%
Dutch White Clover	1%	85%	96%

***Table M6.03.0-2: Grass Seed Requirements for Slopes and Shoulders***

<b>Grass Type</b>	<b>Proportion</b>	<b>Germination Minimum</b>	<b>Purity Minimum</b>
Creeping Red, Chewings, and/or Hard Fescue	50%	85%	95%
Tall Fescue	35%	85%	90%
Perennial Rye	5%	90%	98%
Redtop	5%	85%	92%
Dutch White Clover	5%	85%	96%

The seed shall be furnished and delivered premixed in the proportions specified above. All seed shall comply with State and Federal seed laws. Clover shall be pre-inoculated.

Contractor will supply a manufacturer's Certificate of Compliance to the specifications shall be submitted by the manufacturers with each shipment of each type of seed mix. Certificates will be attached to the seed bags for inspection. These certificates shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net mass and date of shipment. No seed may be sown until the Contractor has submitted the certificates.

**M6.03.1: Short Term Erosion Control Seed**

This seed shall consist of a mixture of the previous year's crop and shall contain the following mixture by weight with 98% purity:

## **SECTION M6: ROADSIDE DEVELOPMENT MATERIALS**

### **M6.00.0: General**

This section describes requirements for materials used for soil amendments, seed, plant material, mulches, and other materials required for the care and establishment of plants.

### **M6.01.0: Inorganic Amendments**

Limestone shall consist of pulverized limestone obtained by grinding either calcareous or dolomitic limestone such that 95% of the material will pass a 20 mesh sieve and at least 50% will pass a 100 mesh sieve. The limestone shall meet the applicable provisions of State and Federal laws which relate to commercial fertilizers.

Sulfur for adjustment of loam pH shall be elemental or flours of sulfur, unadulterated, and shall be delivered in containers with the name of the manufacturer, material, and net weight appearing on each container.

Gypsum for soil structure amendment and de-icing salt mitigation shall be agricultural grade, 80 percent calcium sulphate ( $\text{CaSO}_4 \times 2\text{H}_2\text{O}$ ), in granular or slurry form, with 100% passing a 2 mm screen, and 90% passing through 150  $\mu\text{m}$  screen. Gypsum may be derived from natural sources or from recycled wallboard.

Soil wetting agent shall be a synthetic, non-toxic acrylic polyacrylamide or natural soluble plant extract. Application rates shall be per manufacturer's recommendations. Submit supplier specifications and certification.

### **M6.02.0: Fertilizer**

Fertilizer shall meet the applicable provisions of State and Federal laws and be furnished in containers plainly marked with the chemical analysis of the product.

Fertilizer for general planting shall be slow release and shall be commercial grade 10-10-10, or sufficient to meet the recommendations for soil amendment. At least 40% of the nitrogen content shall be slow release, phosphorus shall be available phosphoric acid, and potassium shall be water-soluble potash.

### **M6.03.0: Long Term Seed Mixes for Lawns and Slopes**

The seed mixture specified for slopes and shoulders consists of a tough hardy type for use on slopes graded at the rate of 1 vertical to 4 horizontal, and steeper slopes, and on shoulders adjacent to the roadway pavement or as otherwise directed. The mixture for lawn grass plots is of a finer type that will produce finer turf.

Grass seed shall be of the previous year's crop and in no case shall the weed seed content exceed 1% by mass. All Bluegrass, Fescue, and Ryegrass shall be within top 25% of either of two most recent National Turfgrass Evaluation Program reports. The grass seed shall conform to the requirements of the following tables:

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

***Table M6.03.1-1: Requirements for Short-Term Erosion Control Seed***

<b>Seed Type</b>	<b>% by Weight</b>	<b>Germination Minimum</b>
Winter Rye	80 minimum	85%
Red Fescue (Creeping)	5 minimum	80%
Perennial Rye Grass	5 minimum	90%
Dutch White Clover	3 minimum	90%
Other Crop Grass	0.5 maximum	
Noxious Weed Seed	0.5 maximum	
Inert Matter	1.0 maximum	

A manufacturer's certificate of compliance will be required as specified in M6.03.0: Long Term Seed Mixes for Lawns and Slopes.

**M6.04.0: Mulch**

Materials to be used in mulching shall conform to the following requirements:

**M6.04.1: Hay Mulch**

Hay Mulch shall consist of mowed and properly cured grass, clover or other acceptable plants.

**M6.04.2: Straw Mulch**

Straw Mulch shall be seed free, consisting exclusively of stalks or stems of grain after threshing.

**M6.04.3: Wood Chip Mulch**

Wood chip mulch shall consist of wood chips produced by cutting branches, limbs of trees, brush or shrubs with chippers or from the chipping of stumps, and shall be free of topsoil, stones, and other extraneous material. The chippers shall be approved for use by the Engineer. Wood chip mulch must be free from long stringy material over 4 in. in length and from live, rot-free wood and bark, except that 35% or less by volume of the wood chip mulch may consist of "slab wood," chipped to an acceptable size by chippers equipped with a ¼ in. knife set and thoroughly mixed with the live material. Wood Chip Mulch containing an excess of fine particles, such that mulch will blow or wash away, decay too quickly, or percolate too slowly, will not be acceptable. Wood Chip Mulch may be produced on the project from acceptable cuttings. Wood chip mulch containing remnants of invasive species such as Japanese Knotweed and Bittersweet shall not be used.

**M6.04.4: Wood Fiber Mulch**

Wood Fiber Mulch shall consist of wood fiber produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered on the project. Recycled material may be evaluated for acceptance based on evaluation of submitted sample, specifications and certified test results from an approved laboratory, per the requirements of M1.06.0: Organic Soil Additives.

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

When the edging is used on a curve of 160 ft radius or less the length shall be as directed by the Engineer except that where the edging is to be set on a radius of 10 ft the maximum length shall be 1 ft.

**Finish.**

**Type SA Edging.**

The exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over 1 in. to show between a 2-ft straight-edge and the face when the straightedge is placed as closely as possible on any part of the face.

If projections on the face are more than that specified they shall be dressed off. The top and bottom lines of the face shall be pitched off to a straight line and shall not show over 0.5 in. between stone and straightedge when straight-edge is placed along the entire length of the top and bottom lines and when viewed from a direction at right angles to the plane of the face, and for the top line only not over  $\frac{1}{2}$  in. when viewed from a direction in the plane of the face. The ends shall be square to the length at the face and so cut that when placed end to end as closely as possible no space shall show in the joint at the face of over  $\frac{3}{4}$  in., except that where the edging is to be used on a curve having a radius of 10 ft or less the ends of the stones shall be so cut as to provide a finished joint at the face of not more than  $\frac{1}{2}$  in. The arris formed by the intersection of the plane of the face with the plane of the end joint shall not vary from the plane of the face or the plane of the joint more than  $\frac{1}{4}$  in. Drill holes may show on the exposed face but only along the bottom edge. The sides shall not be broken under the square more than 4 in. and the side adjacent to the grass shall not project over 1 in.

**Type SB Edging.**

The exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over 1 in. to show between a 2 ft straight-edge and the face when the straight-edge is placed as closely as possible on any part of the face.

If projections on the face are more than that specified they shall be dressed off. The top and bottom lines of the face shall be pitched off to a straight line and shall not show over 1 in. between stone and straight-edge when straight-edge is placed along the entire length of the top and bottom lines and when viewed from a direction at right angles to the plane of the face, and for the top line only not over 1 in. when viewed from a direction in the plane of the face. The ends shall be square to the length at the face and so cut that when placed end to end as closely as possible, no space shall show in the joint at the face of over 1.5 in., except that where the edging is to be used on a curve having a radius of 10 ft or less the ends of the stones shall be so cut as to provide a finished joint at the face section of not more than  $\frac{1}{2}$  in. The arris formed by the intersection of the plane of the face with the plane of the end joint shall not vary from the plane of the face more than  $\frac{1}{4}$  in. Drill holes not more than 3.5 in. in length and  $\frac{1}{2}$  in. in depth will be permitted. The sides shall not be broken under the square more than 4 in. and the side adjacent to the grass shall not project over 1 in.

**Type SC Edging.**

The exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over  $\frac{1}{2}$  in. to show between a 2 ft straight-edge and the face when the straightedge is placed as closely as possible on any part of the face. If projections on the face are more than that specified they shall be dressed off. The top and bottom lines of the face shall be

#### **M6.04.5: Aged Pine Bark Mulch**

This mulch shall consist of the outer bark of pine trees and a minimum of hardwood bark. Bark shall be processed by removal from the limbs and trunks of trees.

Bark mulch shall be shredded pine bark aged a minimum of 6 months. The mulch shall be dark brown in color, free of chunks and pieces of wood thicker than ¼ in. and shall not contain, in the judgment of the Engineer, an excess of fine particles. Do not use wood chips, recycled, dyed, wood product, or crumb rubber mulch.

Mulch must be free from long stringy material.

#### **M6.05.0: Sod**

Sod shall be composed of the grass mixture recommended by the New England Sod Producer's Association and shall be specified as:

***Table M6.05.0-1: Sod Type 1 for Full Sun Turf Areas (6 or More Hours Direct Sunlight in Growing Season)***

Species	Percent by Turf Area*
Kentucky Bluegrass	50% to 80%
Fine Fescues	10% to 30%
Perennial Ryegrass	0 to 20%
* All species with >70% of the mix shall have at least 3 varieties; >40% shall have at least 2 varieties.	

***Table M6.05.0-2: Sod Type 2 for Partial Shade Turf Areas (4 to 6 Hours Minimum Direct Sunlight in Growing Season)\*\****

Species	Percent by Turf Area*
Fine Fescues	75% to 90%
Kentucky Bluegrass	10% to 25%
Perennial Ryegrass	0 to 10%
* All species with >70% of the mix shall have at least 3 varieties; >40% shall have at least 2 varieties.	
** Areas receiving less than 4 hours per day of direct sun during growing season should not receive sod.	

***Table M6.05.0-3: Sod Type 3 for Multi-Use Turf Areas (and 4 to 6 Hours Minimum Direct Sunlight in Growing Season)***

Species	Percent by Turf Area*
Tall Fescue	50% to 90%
Fine Fescues	20% to 50%
Kentucky Bluegrass	0 to 20%
Perennial Ryegrass	0 to 20%
* All species with >70% of the mix shall have at least 3 varieties; >40% shall have at least 2 varieties.	
** Areas receiving less than 4 hours per day of direct sun during growing season should not receive sod.	

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

Lawn sods shall have been nursery grown on cultivated agricultural land used specifically for sod purposes. Grasses shall be drought tolerant cultivars.

The sods shall be free of objectionable grassy and broadleaf weeds. Sods shall be considered free of such weeds if less than 5 such plants are found per 10 yd<sup>2</sup> of area.

The sod shall be machine cut at a uniform minimum thickness of  $\frac{3}{4}$  in. at the time of cutting. Measurement for thickness shall exclude top growth and thatch.

Individual pieces of sod shall be cut to the supplier's standard width and length. Maximum allowable deviation from standard widths and lengths shall be 5%. Broken pads and torn or uneven ends will not be acceptable.

Sod that has dried out, or that has been unplanted over 3 days (including weekends) since harvest, will be rejected.

#### **M6.06.0: General Planting**

The Contractor shall furnish all plants as shown on the plans.

#### **M6.06.1: Nursery Stock – General**

All scientific and common plant names of the items specified shall conform to the current edition of Hortus Third, compiled by the staff of the L.H. Bailey Hortorium, Cornell University. These standards shall determine all requirements of acceptable shrub and seedling nursery stock names. All plants will have durable, non-fading labels applied at the nursery that clearly bears the correct botanical name, including cultivar, as well as common name and size. Caliper or spread shall govern over height specifications. The Contractor must obtain written permission from the Engineer for any substitutions of types or sizes specified.

All plants shall be grown in a certified nursery. All plants shall be typical of their species or variety in growth habit. Plant sizes, habit, rootball dimensions, stem and cane count shall conform to the requirements of the American Standards for Nursery Stock (ASNS) standards as a minimum requirement for acceptance. Container sizes shall also be consistent with the guidance per plant size per the ASNS. Each plant shall have plenty of fibrous roots, healthy buds, and shall be free of disease and insect pests. No plant material from cold storage will be accepted. All plant parts shall show active green cambium when cut and shall be densely foliated when in leaf.

Deciduous shrubs shall have 4 to 6 canes coming from the roots and shall have a well-branched root system.

Vines and ground cover shall be minimum 2-year No. 1 stock. Herbaceous plants shall be minimum 1-year No. 1 stock, and clumps shall have not less than 6 buds, eyes, or crowns.

The trunk of each tree shall be free from sunscald, frost cracks, or wounds resulting from abrasions, animal pest, fire or other causes. Pruning wounds shall be no larger than 2 in. and shall show vigorous scar tissue. No trees with double-leaders or twin-heads will be acceptable without the written approval. The plants must be in a vigorous condition and free from dead wood, bruises and other root or branch injuries. Deficient plants may be rejected at any time.

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

Any species (including all cultivars) listed on the Massachusetts Department of Agricultural Resources Prohibited Plant List shall not be used including but not limited to the following:

Norway Maple (*Acer platanoides*)  
Sycamore Maple (*Acer pseudoplatanus*)  
Japanese Barberry (*Berberis thunbergii*)  
Autumn Olive (*Eleagnus umbellata*)  
Burning Bush or Winged Euonymus (*Euonymus alatus*)  
Glossy or European Buckthorn (*Frangula alnus*)  
Dames Rocket (*Hesperis matronalis*)  
Yellow Iris (*Iris pseudoacoris*)  
Border Privet (*Ligustrum obtusifolium*)  
Honeysuckle -- Japanese, Amur, Morrow's, Tatarian, Bell's (*Lonicera japonica*, *L. maackia*, *L. morrowii*, *L. morrowii x tartarica*)  
Plume grass (*Miscanthus sacchariflorus*)  
Forget-me-not (*Myosotis scorpioides*)  
Reed Canarygrass (*Phalaris arundinacea*)  
Amur Cork Tree (*Phellodendron amurense*)  
Common Buckthorn (*Rhamnus cathartica*)  
Black Locust (*Robinia pseudoacacia*)  
Wild Rose (*Rosa multiflora*)

**M6.06.2: Nursery Stock – Balled and Burlapped**

All plants that are to be balled and burlapped previous to shipment are designated “B&B.” B&B plants shall be dug so as to retain as many fibrous roots as possible. All B&B plants shall come from soil that will hold a firm root ball and the solidity of the ball shall be carefully preserved. B&B plants shall be wrapped with untreated 8-oz burlap, firmly held in place by a stout cord or wire. Wire containers shall be of adequate size to allow root development for the plant size as per ASNS requirements. Plants prepared with plastic or other non-biodegradable wrappings will not be accepted. Rootballs shall remain intact during all operations. No plant will be accepted if the rootball has been cracked or broken prior to, or during, the process of planting. All plant materials shall be dug with reasonable care and skill immediately prior to shipment.

**M6.06.3: Nursery Stock – Container Grown**

All container grown plants shall be healthy, vigorous and well rooted in the container in which they are sold. They shall have tops that are of good quality and are in healthy growing condition. No single-stemmed shrubs or sparsely leafed plants will be accepted. The side branches must be generous and well twigged, and the plant as a whole must be well-branched to the ground or typical of the species or cultivar. Container-grown stock shall have been grown in the container long enough for the root system to develop sufficiently to hold the soil together firmly. No plants shall be loose in the container. Container-grown plants shall not be pot bound with spiraling roots or roots growing densely against the sides of the container. The container shall be sufficiently rigid to protect the root mass during shipment and sizes shall be provided in accordance with the ASNS standards. The size of plant, as well as minimum number of stems or canes, will conform to the type of plant per ASNS standards.

Massachusetts Department of Transportation – Highway Division  
Standard Specifications for Highways and Bridges

pitched off to a straight line and shall not show over 1 in. between stone and straight-edge when straight-edge is placed along the entire length of top and bottom lines and when viewed from a direction at right angles to the plane of the face, and for the top line only, not over 1 in. when viewed from a direction in the plane of the face. The ends shall be square to the length at the face and so cut that when placed end to end as closely as possible no space shall show in the joint at the face of over 1.5 in., except that where the edging is to be used on a curve having a radius of 10 ft or less the ends of the stones shall be so cut as to provide a finished joint at the face of not more than ½ in. The arris formed by the intersection of the plane of the face with the plane of the end joint shall not vary from the plane of the face more than ¼ in. Drill holes not more than 3.5 in. in length and ½ in. in depth will be permitted. The sides shall not be broken under the square more than 4 in. and the side adjacent to the grass shall not project over 1 in.

**M9.04.4: Stone for Stone Masonry Walls**

Stone for stone masonry walls shall consist of sound durable blasted or field stone free from seams, cracks and other structural defects and of an approved and satisfactory quality and shape.

The stone shall consist of angular blasted or field stones having straight edges without re-entrant angles. The faces shall be flat but not necessarily rectangular in shape.

Individual stone shall have, when set in the wall, no face dimension less than 8 in. Stretchers shall have a depth in the wall at least 1.5 times the rise, and a length on the face at least twice the rise. Headers shall have a length on the face at least equal to the rise. Headers shall hold in the heart of the wall the same size as shown on the face and shall extend at least 12 in. more than the stretchers into the backing.

**M9.04.5: Granite Curb Inlets**

The granite for curb inlet shall conform to M9.04.0: Curb and Edging. It shall have a horizontal bed and the top shall be free from wind. The stone shall be sawn or peen hammered on top and the front and back edges shall be pitched true to line. The back face for a distance of 3 in. down from the top shall have no projection greater than 1 in. The front face shall be straight split, free from drill holes, and it shall have no projection greater than 1 in or depression greater than 0.5 in. for a distance of 10 in. down from the top, and for the remaining distance there shall be no depression or projection greater than 1 in. The ends shall be squared with the top for the depth of the face finish and so cut that the curb inlet can be set with joints of not more than ½ in.

The granite curb inlet shall be 6 ft in length  $\pm 1\frac{1}{2}$  in., from 17 to 19 in. in depth, 6 in. wide at the top and at least 6 in. wide at the bottom.

Curb inlets to be set on a radius of 160 ft or less shall be cut to the curve required. The joints of all curved curb inlets shall be cut on radial lines.

A gutter mouth at least 3 in. in depth and at least 2 ft in length shall be cut in the front face of the stone as shown on the plans.

Granite curb inlets shall match the adjacent curbing in color.