

Model Landscape Design Zoning Bylaw

The following model Zoning Bylaw was developed for the North and South Rivers Watershed Association (NSRWA) by Horsley Witten Group, Inc. (HW), with legal assistance provided by Rubin and Rudman LLP. The project was funded by the Massachusetts Environmental Trust. The central purpose of this model bylaw is to provide a mechanism whereby developers will create more sustainable landscapes. The focus of the standards and specifications within the model is on the health of soils, the preservation of natural landscapes and the development of aesthetically pleasing landscaped areas that are environmentally sound.

Importantly, the focus of the model bylaw is not to closely examine the role of landscaping in stormwater management or to provide guidance on other stormwater related impacts such as erosion and sediment control. These subjects have been covered extensively in recent work performed by the Massachusetts Executive Office of Environmental Affairs (EOEA), the Metropolitan Area Planning Council (MAPC), and several communities that have adopted so-called “Low Impact Development” ordinances or regulations. References for some of these documents appear at the end of this document.

This model landscape bylaw was developed as a “stand alone” bylaw and uses the Special Permit process as the mechanism for review and approval. This approach was used to demonstrate how these different standards might be implemented in a self-contained permitting process. However, one of the most important issues for practitioners to remember is that several aspects of this model bylaw may overlap with existing requirements in their local codes, particularly the Subdivision Rules and Regulations. Also, communities that have already implemented low-impact stormwater standards, Site Plan Review or Open Space Residential Design (OSRD) will need to be particularly careful regarding how the standards and plan requirements in this model will compare with those already in local codes. Municipalities may wish to take pieces of the bylaw and insert them into existing landscaping bylaws that do not require a Special Permit or they may wish to take some of the language and include it into their rules and regulations, thus avoiding the time consuming bylaw approval process.

A central issue in developing any viable bylaw or ordinance is to ensure that applicants do not unnecessarily duplicate their efforts, and have a clear path through the permitting process. Within the text below, HW has identified areas that may be easily integrated into existing provisions or that may borrow other materials already submitted to agencies such as the Planning Board, Zoning Board of Appeals or the Conservation Commission.

As with any model bylaw or ordinance, it is important that each community looking to implement any of these regulations closely examines its existing regulatory documents and administrative structure before adoption. Any proposed bylaw amendments should be closely examined by a variety of local agents, including Town or City Counsel, to ensure consistency with local needs. Where issues are likely to arise that will require specific local considerations, this model provides “*Commentary*” on the critical questions

that each community will need to answer in order to properly adjust this language to suit its needs.

Although the documents are formatted and referred to as “bylaws” for use by towns, they may also be formatted and promulgated as “ordinances” by a city.

- 1. Purpose:** The purpose of this bylaw is to encourage better design through a proactive approach in creating sustainable landscapes within the development review process. Consistent with the recommendations of the town's comprehensive plan, this bylaw seeks to protect the natural and cultural resources of the Town through preservation and sustainable landscape planning and the following:

Commentary: It is not certain that all municipalities will have an approved Comprehensive Plan. This language can be omitted or other officially adopted plans, such as the Open Space and Recreation Plan may be referenced.

- 1.1 Protect the health, safety and property of the residents of the Town of _____ by regulating clearing and grading activities associated with land development and preserving existing trees and vegetation, preventing erosion and sedimentation of inland and coastal wetlands, vernal pools, ponds and other water bodies, controlling stormwater runoff, minimizing fragmentation of wildlife habitat and loss of vegetation;
- 1.2 Protect Specimen Trees, significant forest areas and other valuable natural assets on a site from damage or removal during site development;
- 1.3 Protect water quality of adjacent wetlands, ground and surface water bodies; and/or
- 1.4 Protect and/or restore the natural hydrologic balance of the [INSERT NAME] aquifer;

Commentary: The thresholds for this Special Permit will most often be triggered by new development. Therefore, this bylaw will more often "protect" rather than "restore" the natural hydrologic balance of an aquifer. However, thresholds that include the word "Grading" could potentially cause redevelopment sites to fall within the Special Permit jurisdiction. These would constitute "restoration" opportunities.

- 1.5 Encourage the use of Best Management Practices for Sustainable Landscape Design;
- 1.6 Promote landscaping and site planning practices that are responsive to the town's scenic character without preventing the reasonable development of land; and,
- 1.7 Minimize grading, cuts and fills, and alterations along steep slopes and protect existing soil and vegetation on the property.

Commentary: These provisions are meant to set the tone for the requirements that follow and are also referenced in the decision making process for the Special Permit Granting Authority.

- 2. Definitions:** In this bylaw, the following words have the meanings indicated:

Applicant - Any person proposing to engage in or engaged in any non-exempt clearing of trees or understory vegetation within the Town.

Berm - A linear earthen mound designed to block views, noise or other potentially objectionable circumstances.

Best Management Practices (BMPs) - A structural, nonstructural, or managerial technique recognized to be the most effective and practical means to prevent and reduce nonpoint source pollutants and encourage sustainable landscape design. BMPs should be compatible with the productive use of the resource to which they are applied, and should be cost-effective.

Caliper - American Association of Nurserymen standard for measurement of trunk size of nursery stock. Caliper of the trunk shall be taken 6 inches above the ground up to and including 4-inch caliper trees, and 12 inches above the ground for larger sizes.

Certified Arborist - A professional who possesses the technical competence through experience and related training to provide for or supervise the maintenance of trees and other woody plants in the residential, commercial, and public landscape.

Clearing or Clear Cutting- Removal or causing to be removed, through either direct or indirect actions, trees, shrubs, understory and/or topsoil from a site, or any material change in the use or appearance of the land. Actions considered to be clearing or clear-cutting include, but are not limited to: causing irreversible damage to roots or trunks; destroying the structural integrity of vegetation; and/or any filling, excavation, grading, or trenching in the root area of a tree, shrub or understory which has the potential to cause short-term irreversible damage.

Deciduous - A plant with foliage that is shed annually.

Dripline - An area encircling the base of a tree which is delineated by a vertical line extending from the outer limit of a tree's branch tips down to the ground.

Diameter/Diameter-Breast-Height (DBH) - The diameter of any tree trunk, measured at 4.5 feet above existing grade.

Essential Root Zone - An area located on the ground between the tree trunk and 10 feet beyond the dripline of a tree which is required for protection of a tree's root system.

Evergreen - A plant with foliage that is retained and remains green throughout the year.

Filling - The act of transporting or placing (by any manner or mechanism) material from, to, or on any soil surface or natural vegetation.

Grading - Any excavating, filling, clearing, or the creation of impervious surface, or any combination thereof (by any manner or mechanism), which alters the existing surface of the land.

Hazardous Tree - A tree with a structural defect or disease, or which impedes safe sight distance or traffic flow, or otherwise currently poses a threat to life or property.

Landscape Architect - A person licensed by the Commonwealth of Massachusetts to engage in the practice of landscape architecture.

Mulch - Nonliving organic or synthetic matter spread over cultivated ground to retain moisture, limit weed growth and control erosion.

Ornamental Tree - A deciduous tree, generally smaller than a shade tree that is planted primarily for its aesthetic value.

Protected Tree/Vegetation - A tree or area of understory vegetation identified on an approved landscape plan to be retained and protected during construction.

Shade Tree - A large deciduous tree with a high crown of foliage or overhead canopy.

Shrub - A self-supporting woody plant, smaller than a tree, which consists of several small stems or branches from a base at or about the ground.

Significant Forest Community - Unfragmented forests including forest types that provide habitat for rare species, unusual ecological processes, highly diverse forest communities, rare forest types, and those forest types which maintain connections between similar or different habitat patches.

Specimen Tree - A native, introduced or naturalized tree which is important because of its impact on community character, its significance in the historic/cultural landscape or its value in enhancing the effects of wildlife habitat. Any tree with a DBH of 6 inches or larger is eligible to be considered a specimen tree. Trees that have a small height at maturity or are slow growing, such as flowering dogwood or American holly with a DBH of 4 inches or larger are eligible to be considered specimen trees.

Sustainable Landscape Design – Design approaches and techniques that can reduce a site’s impact on the vegetation, landscapes and the watershed through the preservation and use of hardy, drought-resistant, low maintenance [native AND/OR non-invasive] plant species, reducing disturbance and impervious cover and the promotion of non-structural low impact development stormwater management practices.

Commentary: Requiring exclusively native species as part of a landscape plan represents a conservative approach to managing plant selection. Depending on the goals of a community, “non-invasive” species could be included in the plant selection.

Understory Vegetation - Small trees, shrubs, and groundcover plants, growing beneath and shaded by the canopy of trees.

3. Applicability: Unless specifically exempted under Section 5.0 of this Bylaw, this Bylaw shall be applicable to:

- 3.1 All land clearing or clear cutting or grading activities of an area greater than [40,000 square feet];
- 3.2 Any development within the [INSERT NAME] Watershed that will result in the clearing and/or grading of more than 20,000 square feet;
- 3.3 Any development activity within a Zone 2 contributing area to the Town's public water supply that will result in the clearing and/or grading of more than 20,000 square feet;
- 3.4 Any development within the jurisdiction of the Conservation Commission that will result in the clearing and/or grading of more than 20,000 square feet.
- 3.5 In applying the applicability standards of this bylaw from the date of adoption, the entire proposed project including future expansions shall be considered and not separate phases or segments thereof. Ownership by different entities does not necessarily indicate that projects are separate.

Commentary: The applicability triggers provided above are meant to represent a wide variety of potential triggers. Communities should consider their specific priorities before selecting from the list of triggers provided above. In general, it is important for local officials to consider the scale of different projects and the location of projects relative to sensitive hydrologic areas. Where numeric triggers are used, such as disturbances in excess of 40,000 square feet, local communities may wish to adjust these values to suit their existing dimensional requirements and development patterns. For example, communities that generally experience smaller scale commercial development or small subdivision proposals, it may be appropriate to decrease these thresholds to ensure oversight over incremental hydrologic impacts.

An application for a Special Permit shall be submitted and reviewed in accordance with the procedures listed in Section 4. The Planning Board ("Board") shall be the special permit granting authority.

4. Review and Decision Procedures: Upon receipt of a completed application and required plans as described in Section 6.0 below, the Board shall transmit one copy each to the [Conservation Commission, Building Inspector, and Department of Public Works]. Within 30 days of receipt of completed application/plans, these agencies shall submit recommendations in writing to the Board. Failure of any of these agencies to reply within 30 days shall be deemed as a lack of opposition to the plans. The Board shall act on applications according to the procedure specified in G.L. c. 40A, §9.

Commentary: The list of agencies that will receive copies of the plan should be clear so that an Applicant understands who will be involved in the review process and how many copies of plans are required. The agencies chosen for this list may change from one community to another.

5. Exemptions: The provisions of this bylaw shall not apply to the following activities:

- 5.1 Removal of hazardous trees, as defined herein;
- 5.2 Routine maintenance of vegetation and removal of dead or diseased limbs and/or trees necessary to maintain the health of cultivated plants, to contain noxious weeds and/or vines in accordance with a Department of Environmental Management (DEM) - approved Forest Management Plan, or to remedy a potential fire or health hazard or threat to public safety;
- 5.3 Construction and maintenance of public and private streets and utilities within town-approved roadway layouts and/or easements;
- 5.4 Work conducted in accordance with a valid earth removal permit issued by the Town;
- 5.5 Agricultural activities in existence at the time the bylaw is adopted, work conducted in accordance with an approved Natural Resource Conservation Service Agricultural Plan or agricultural uses on parcels of land of more than five acres as specified in MGL c. 40A Section 3;
- 5.6 Construction of any state or town agency project approved by the Town Manager, Town Council, Town Meeting or Town Selectmen;
- 5.7 Construction or installation of utilities;
- 5.8 Non-commercial cutting for fuel, provided that clear-cutting does not occur;
- 5.9 Design and development of public or private outdoor turf-dependent recreational uses including, but not limited to, recreation fields and golf courses.
- 5.10 Any proposed development that has entered into the [Open Space Residential Design] process as provided in [INSERT REFERENCE].

Commentary: It is important to consider any other Special Permit processes or development options within the local zoning that provide desirable alternatives to conventional development. The above reference to OSRD removes the potential disincentive for an applicant to enter into the OSRD process because he or she might then require more than one Special Permit. If this language is used, it will be important for a community to have at least some prescriptive language within their OSRD bylaw addressing landscaping. Also, it is important to note that communities may already have similar provisions to OSRD that are named something different.

Another way to address this situation would be to provide language ensuring that the applicant can submit for a Landscape Bylaw Special Permit and an OSRD Special Permit to the same authority as a joint application.

6. Application Requirements

- 6.1 Locus Map: Submission of a locus map at a scale of 1" = 500' showing the proposed site in relation to the surrounding area.

6.2 Existing Conditions Plan: An Existing Conditions Plan shall be submitted to the Board at a scale of 1"=40'. Where the scale of the site may cause the submittal of multiple plans, the Board may approve an Existing Conditions Plan at a larger scale. The plan shall contain a survey of existing conditions conducted by an individual qualified through appropriate academic credentials and field experience. A statement of credentials shall be submitted with the survey. The survey of existing vegetation shall include the following information:

- 6.2.1 Major upland vegetation communities located on the site, including Significant Forest Communities, shrub layer, ground cover and herbaceous vegetation;
- 6.2.2 Size and height of Specimen Trees and/or forest communities;
- 6.2.3 Location of any endangered or threatened species or species of special concern as mapped by the Massachusetts Natural Heritage and Endangered Species Program;
- 6.2.4 Existing contour lines at intervals of not more than 2 feet prepared by a registered civil engineer or professional land surveyor;
- 6.2.5 Soil survey or soil logs indicating predominant soil types on the project site, including information on erosion potential from the Natural Resources Conservation Service;
- 6.2.6 Delineation of all bodies of water, including wetlands, vernal pools, streams, ponds, and coastal waters within 100 feet of the project site/limit of work and delineation of the 100-year floodplain;
- 6.2.7 Areas of protruding or known subsurface ledge;
- 6.2.8 Delineation of any existing water resource protection boundaries.

6.3 Landscape Plan: A Landscape Plan shall be submitted to the Board at a scale of 1"=40' depicting the information specified below. The plan shall be prepared by a Registered Landscape Architect or other Massachusetts certified landscape professional. Where the size of the site may cause the submittal of multiple plans, the Board may approve Landscape Plans at a larger scale.

- 6.3.1 The limit of work for both construction and post-construction phases. This plan shall include all building, parking, stockpiling and vehicular use areas, and any grading associated with the proposed development.
- 6.3.2 The following approximate area calculations:
 - 6.3.2.1 Overall lot size;
 - 6.3.2.2 Area to be developed as impervious surface (including any gravel or non-paved walking or driving surface);
 - 6.3.2.3 Area to be developed as lawn or turf;
 - 6.3.2.4 Area to be developed as new landscape other than lawn; and
 - 6.3.2.5 Area to be maintained in natural state;

- 6.3.3 Location of natural resource areas including areas to be maintained in their existing state.
- 6.3.4 Location of site elements that could potentially create a nuisance for abutting properties including, but not limited to dumpsters, areas for snow stockpiling, detention basins and loading docks.
- 6.3.5 Location of all temporary fencing, hay bales or other protective structures to be used during the construction phase to protect water resources, existing vegetation and the essential root zones of trees that shall be preserved.
- 6.3.6 Landscape rendering of all areas to be newly landscaped with a list of plants to be used in each area.
- 6.3.7 Areas to be irrigated with automated or manual irrigation systems and approximate location of sprinkler heads if applicable.
- 6.3.8 The approximate locations of soil testing areas that shall be required pursuant to [INSERT REFERENCE] below.
- 6.3.9 A summary table providing the following information for each tree, shrub, plant or turf that may be used on the site:
 - 6.3.9.1 Common name and botanical name;
 - 6.3.9.2 The status as a “native” or “introduced” species;
 - 6.3.9.3 Characteristics that contribute to a Sustainable Landscape including but not limited to “drought resistant”, “salt resistant”, “perennial”, etc.;
 - 6.3.9.4 Number of plants to be used on the site.

Commentary: This summary table is intended to provide the Board with a reference sheet that can be compared with the rendering required in Section 6.3.6. Using this summary sheet, the Board should be able to quickly identify the location of each plant on the rendering and whether specific varieties are optimally located for different stressors such as salt application or regular near-by automobile traffic.

- 6.4 Construction Schedule: Construction schedule which describes the timing of vegetation removal, transplanting or replacement in relation to other construction activities. This schedule shall serve as a reference for any monitoring or inspection that may be required by the Board pursuant to Section 11 of this Bylaw.
- 6.5 Erosion and Sedimentation Control Plan: A plan of all appropriate erosion and sedimentation controls as required by the [Subdivision Rules and Regulations, Site Plan Review and/or Local Wetlands Regulations]. Copies of existing plans that may have been submitted as part of other permit applications may be acceptable to the Board.

7. Sustainable Landscape Guidelines

Commentary: The Landscape Guidelines provided below represent those elements in a landscape approach that are more difficult to quantify or enforce. These provisions are

meant to serve as guidance for the applicant and should adequately frame his or her approach to the overall site and to selected areas including buffers and peripheral areas that will be re-grown after construction. Because these guidelines are not as “black and white” as the Standards provided in the following section, the Board does not hold the applicant to a strict compliance standard for issuing the Special Permit. Under the evaluation criteria in Section 9, the applicant is required to pursue these standards to their “best effort” as part of the Board’s evaluation process.

7.1. General Landscape Guidelines

- 7.1.1 Landscaping shall be designed to remain functional and attractive during all seasons through a thoughtful selection of deciduous, evergreen, berrying and flowering plant varieties;
- 7.1.2 Applicants are encouraged to consult the latest version of *The Vascular Plants of Massachusetts: A County Checklist* as published by the Massachusetts Division of Fisheries and Wildlife and Natural Heritage & Endangered Species Program to determine which plants are native to [INSERT COUNTY NAME];
- 7.1.3 Plant varieties should be selected for resistance to drought, moisture, salt, urban conditions, or insects and other pests depending on the location of landscaping and the specific stressors anticipated for different areas of the site. Plants should be selected so that landscaping can be maintained with minimal care and the need for watering, pesticides or fertilizers is minimized or eliminated. Applicant are encouraged to consult The Massachusetts Nursery and Landscape Association’s *Pocket Guide to Native and Low Maintenance Woody Plants*;
- 7.1.4 Prominent natural or man-made features of the landscape such as mature trees, surface waters, natural rock outcrops, old roadways or stonewalls shall be retained and incorporated into the development plan where possible;
- 7.1.5 Land clearing shall be minimal with existing natural vegetation retained where possible;
- 7.1.6 Natural re-growth of disturbed areas, mulched planting beds and alternative groundcover plant varieties are encouraged;
- 7.1.7 A combination of mulched planting beds, decorative pavers and sustainable groundcover plant varieties are preferred over lawn areas.

7.2 Buffers for Non-Residential Uses

- 7.2.1 All non-residential site plans shall have a natural or landscaped buffer between the site and all adjacent parcels with a different use;
- 7.2.2 Common driveways, access ways, drainage ways and structures and utilities may be located within or traverse these buffer areas where necessary;

- 7.2.3 The size, type and composition of buffers should be adequate to substantially screen non-residential uses from residential areas. The use of landscape berms and decorative fences are encouraged where appropriate;
- 7.2.4 Curbing or wheel stops shall be provided in all parking areas abutting landscape strips to avoid accidental damage or soil compaction. Where landscaped areas are designed as part of a stormwater management system, curbing shall be appropriately cut to allow for proper drainage;
- 7.2.5 Sidewalks, benches, trash receptacles, lighting fixtures, permitted signs and other similar improvements may be integrated into landscape strips where appropriate.

7.3 Informal, Re-growth and Peripheral Landscape Areas:

- 7.3.1 Disturbed areas intended for natural re-growth should be, at a minimum, graded, loamed and seeded with wildflowers, perennial rye grass, a meadow or “conservation” native grass mix or similar varieties;
- 7.3.2 The planting of hardy shrubs along the edge of the cleared woodlands is encouraged to provide for an attractive transition between natural woodland and more formally landscaped portions of the site.

8. Sustainable Landscape Design Standards

Commentary: The following standards are designed to provide more concrete and enforceable standards to the landscaping approach. Where numeric standards are provided, these standards represent a reasonable approach but may need to be adjusted to meet a community’s specific needs.

8.1 General

- 8.1.1 Aggregate clearing for an undeveloped site shall not exceed [fifty percent (50%)] of the site area. The Board may adjust or waive this requirement upon petition from an applicant who demonstrates that site conditions necessitate a greater percentage of clearing or that the provision of utilities, parking and or other shared amenities requires increased levels of clearing. The Board may require additional mitigation for clearing beyond 50%. Mitigation strategies proposed by the Applicant may include:
 - 8.1.1.1 Replacement of existing invasive plantings with native or non-invasive species;
 - 8.1.1.2 Additional pre-treatment of stormwater runoff;
 - 8.1.1.3 Enhanced recharge on the site;

- 8.1.1.4 Installation of innovative stormwater practices including but not limited to pervious pavers, green rooftops, and bioretention facilities; and
- 8.1.1.5 The use of drip irrigation to service landscaped areas.

Commentary: The above provision for limiting clearing is based on what is considered a reasonable approach to developing a residential site. The “fifty percent” value is a standard open space set aside within existing Open Space Residential Design bylaws and has demonstrated to be a reasonable figure in many Massachusetts communities.

Providing the Board with the power to adjust this standard is critical, as it is not possible to predict how different lot geometries and environmental factors may influence development. Commercial operations with significant parking needs may require a significant adjustment or simply a full waiver of these provisions. Increasing the threshold for clearing may also provide an applicant the opportunity to provide higher levels of wastewater or stormwater treatment through innovative utility approaches.

- 8.1.2 For previously developed sites where clearing has already exceeded [fifty percent (50%)] the applicant shall demonstrate that up to [fifty percent (50%)] of the site shall be restored with naturally occurring vegetation. The Board may adjust or waive this requirement upon petition from an applicant who demonstrates that site conditions necessitate a greater percentage of clearing or that the provision of utilities, parking and or other shared amenities requires increased levels of clearing. The Board may require additional mitigation for clearing beyond 50%. Mitigation strategies proposed by the Applicant may include:
 - 8.1.2.1 Replacement of existing invasive plantings with native or non-invasive species;
 - 8.1.2.2 Additional pre-treatment of stormwater runoff;
 - 8.1.2.3 Enhanced recharge on the site;
 - 8.1.2.4 Installation of innovative stormwater practices including but not limited to pervious pavers, green rooftops, and bioretention facilities; and/or
 - 8.1.2.5 The use of drip irrigation to service landscaped areas.
- 8.1.3 Clearing for utility trenching shall be limited to the minimum area necessary to maneuver a backhoe or other construction equipment. Roots shall be cut cleanly rather than pulled or ripped out during utility trenching. Tunneling for utilities installation shall be utilized wherever feasible to protect root systems of trees;
- 8.1.4 Understory vegetation within the essential root zone of preserved trees shall also be retained in an undisturbed state;
- 8.1.5 Efforts to minimize the clearing and grading on a site associated with construction activities shall be employed, such as parking of

construction vehicles, offices/trailers, stockpiling of equipment/materials, etc. in areas already planned for permanent structures. Topsoil shall not be stockpiled in areas of protected trees, wetlands, and/or their vegetated buffers;

- 8.1.6 During clearing and/or construction activities, all vegetation to be retained shall be surrounded by temporary protective fencing or other measures before any clearing or grading occurs. Such delineation shall be maintained until all construction work is completed and the site is restored. Barriers shall be large enough to encompass the essential root zone of all vegetation to be protected.

8.2 Soil Testing and Preparation

- 8.2.1 In all areas where topsoil is removed for the purposes of site development and/or grading and landscaping is to be provided, topsoil shall be restored and shall contain a minimum of 5% organic matter for turf areas and 10% for trees and shrubs. The minimum depth of restored topsoil for areas to contain lawn shall be six (6) inches and for shrubs shall be twelve (12) inches;

Commentary: Organic matter is used to ensure that the topsoil will retain water over time. Because it is appropriate for turf areas to drain more readily than other landscaped areas for root zone health, a lower organic matter percentage is suggested.

- 8.2.2 Where pre-existing topsoil will be used for landscaping, soil testing shall be performed in a spatial pattern acceptable to the Board to determine which plant species are best suited to these areas;
- 8.2.3 Where pre-existing topsoil will be used for landscaping, this soil shall be cultivated to a depth of six (6) inches for lawn and twelve (12) inches for shrubs.

8.3 Tree, Shrub and Plant Selection

- 8.3.1 No tree, shrub or plant shall be proposed for use within a restored or cultivated landscape that has been identified as an Invasive Species by the Massachusetts Plant Advisory Group in the latest version of *The Evaluation of Non-Native Plant Species for Invasiveness in Massachusetts (with annotated list)*, has been identified as invasive or banned on the *Massachusetts Prohibited Plant List* as periodically updated by the Massachusetts Department of Agricultural Resources, or in any other reputable scientific publication that may be acceptable to the Board;
- 8.3.2 Shade or canopy trees shall be three (3) inches DBH with a height of not less than twelve (12) feet above grade;
- 8.3.3 Small or minor shade trees shall be two and one-half (2.5) inches DBH with a height of not less than nine (9) feet above grade;

- 8.3.4 Ornamental or flowering fruit trees shall be two (2) inches DBH with a height of not less than seven (7) feet above grade;
- 8.3.5 Evergreen trees used for screening shall be not less than six (6) feet in height above grade;
- 8.3.6 Shrubs shall be not less than one and one-half (1.5) feet in height above grade.

8.4 Planting

- 8.4.1 Pits for trees shall be wide enough to allow for at least eight (8) inches between the ball of the tree and the sides of the pit on all sides;
- 8.4.2 Cultivated areas shall be covered with not less than a two (2) to three (3) inch deep layer of mulch after planting. Mulch should be natural, unpainted and unstained.

8.5 Lawn and Turf Grass

- 8.5.1 Lawn area in residential development shall be limited to the lesser of [twenty percent (20%)] of the overall lot size or 8,000 square feet.
- 8.5.2 Lawn seed mixes shall be drought resistant. To achieve a high level of drought tolerance, mixes may include, but shall not be limited to, a predominance of fine fescues.

Commentary: This numeric standard for maximum lawn development is based upon what is considered a reasonable approach to regulating residential areas and a review of other standards developed elsewhere in the United States. The applicability of this provision may be more powerful in communities that have larger lot zoning (i.e., two and three acre minimum lot size) as these lots are highly prone to vast expanses of highly irrigated lawns.

Enforcing this provision through the Special Permit process will not be particularly difficult based upon the required plans that illustrate and calculate the extent of turf to be planted as well as the monitoring and inspection provisions in Section 11. However, it will be more challenging for communities to enforce these provisions as properties change hands or homeowners make landscaping changes unaware of these requirements. Communities will need to pursue continuous outreach regarding this topic to make residents aware of the restrictions on lawn development. Another potential way to help monitor the situation is through the irrigation system registration requirements developed as part of the Model General Bylaws associated with this project. These provisions require homeowners that intend to install irrigation systems to register them with the local Building Inspector. This process would allow the Building Inspector to assess the extent of irrigated lawn and potentially enforce the lawn area restrictions.

It should be noted that developing enormous tracts of turf is in direct conflict with the Purpose of this bylaw and the Guidelines provided in Section 7. Furthermore, the topsoil requirements in Sections 8.2 will also serve as a disincentive to developing large lawns.

Communities concerned with the political ramifications of explicitly limiting lawn size may wish to rely on these other sections to indirectly regulate this issue.

- 8.5.2 Lawn area for ornamental purposes in commercial, industrial or institutional development shall be limited to yards with frontage. The use of turf in yards without frontage shall be limited to areas reserved for utilities or alternative parking surfaces.
- 8.5.3 Lawn or turf areas shall not be planted in strips that are less than six (6) feet in width.

Commentary: Strips of lawn that are designed at smaller widths are often subject to higher levels of stress and require higher levels of irrigation to compensate.

9. Sustainable Landscape Design Evaluation Criteria: The Board may grant a Special Permit and may impose conditions on said Special Permit if each of the following conditions are met:

- 9.1 The Purpose of this Bylaw as stated in Section 1 is achieved.
- 9.2 The Applicant has provided a complete Application as described in Section 6 of this Bylaw.
- 9.3 The Applicant has used best efforts to follow the applicable Guidelines provided in Section 7 of this Bylaw.
- 9.4 The Applicant has complied with all of the applicable Standards provided in Section 8 of this Bylaw.

10. Required Security: The Board may require a performance guarantee (e.g., a surety bond, irrevocable letter of credit, cash or other acceptable security) in a form acceptable to the Town to cover the costs associated with compliance with this bylaw. The performance guarantee, if required by the Board, shall meet the following requirements:

- 10.1 An amount of 150% of the cost of site restoration shall be posted prior to the issuance of a Special Permit for the proposed project.
- 10.2 The performance guarantee shall be held for the duration of any prescribed maintenance period required by the Board to ensure establishment and rooting of all new plantings, and may be reduced from time to time at the Board's discretion to reflect completed work. Plantings which die within the prescribed maintenance period shall be replaced. Securities shall not be fully released without a final inspection and approval of vegetation replacement by the Board or its agent.

Commentary: The prescribed maintenance period for a particular project will vary depending on the scale of the project and the phasing of construction. As a general rule, the permit granting authority will want to condition the period of maintenance as part to the Special Permit. Allowing for one year of maintenance after the final phase of construction will probably allow for all vegetation to reasonably establish itself.

11. Monitoring and Inspections

- 11.1 Prior to commencement of construction, the Applicant, land owner, contractor and construction crew, Board or its representative, Town Engineer, Town Planner or Building Inspector, and site engineer shall conduct a meeting to review the proposed construction phasing and number and timing of site inspections.
- 11.2 Initial site inspection of erosion and sedimentation controls and placement of tree protection measures shall occur after installation of barriers around preserved areas and construction of all structural erosion and sedimentation controls, but before any clearing or grading has begun.
- 11.3 Routine inspections of preserved areas and erosion and sedimentation controls shall be made at varying intervals of the project depending on the extent of site alteration and the frequency and intensity of rainfall.
- 11.4 Effective stabilization of revegetated areas must be approved by the Board or its appointed agent before erosion and sedimentation controls are removed. The Board shall complete an inspection prior to removal of temporary erosion and sedimentation controls.
- 11.5 The Board may require auger tests of turf areas on the site to ensure that adequate pH levels, soil depths and other specifications of this bylaw have been met;
- 11.5 Prior to issuance of a final occupancy permit for the property, the Applicant shall request a “certificate of compliance” from the Board. The Applicant shall provide a written statement or certificate from a licensed landscaper, landscape architect, or engineer that the project was constructed as designed and approved by the Board.

Commentary: These enforcement measures should be included as formal conditions of the Special Permit to ensure that they are clearly tied to the permitting process.

12. Enforcement: The Town may take any or all of the enforcement actions prescribed in this bylaw to ensure compliance with, and/or remedy a violation of this bylaw; and/or when immediate danger exists to the public or adjacent property, as determined by the Building Inspector. Securities described in Section 10 above may be used by the Town in carrying out any necessary compliance or restoration work or enforcement actions.

- 12.1 The Building Inspector may post the site with a Stop Work order directing that all vegetation clearing not authorized under the Special Permit cease immediately. The issuance of a Stop Work order may include remediation or other requirements which must be met before clearing activities may resume.
- 12.2 The Town may, after written notice is provided to the applicant, or after the site has been posted with a Stop Work order, suspend or revoke the Special Permit issued by the Town.

- 12.3 No person shall continue clearing in an area covered by a Stop Work order, or during the suspension or revocation of a Special Permit except work required to correct an imminent safety hazard as prescribed by the Town.
- 12.4 This bylaw may also be enforced pursuant to Section _____ of the Town's Zoning Bylaw and G.L. c.40A, §7.

13. Severability

- 13.1 If any provision of this bylaw is held invalid by a court of competent jurisdiction, the remainder of the bylaw shall not be affected thereby. The invalidity of any section or sections or parts of any section or sections of this bylaw shall not affect the validity of the remainder of the Town's Zoning Bylaw.