# PART III. DEVELOPMENT STANDARDS

## Article 1. General Standards



### Section 1.1 Overview

1.1.1 The standards contained in these regulations apply to all site plans. These standards shall be construed as minimum standards. The Planning Board, at its discretion, may require higher standards in individual cases or may waive certain requirements for good cause in accordance with the procedures outlined in these regulations.

1.1.2 In addition to these standards, the Planning Board may stipulate any appropriate special measures to eliminate or mitigate potential adverse impacts upon abutters, neighbors, or the general public that might result from a proposed project.

1.1.3 A site plan application may be denied by the Planning Board if the proposal fails to meet one or more of the requirements herein.

1.1.4 Legally established nonconforming site conditions are considered "grandfathered" until such time as site plan review is required due to proposed changes to a property. The Planning Board shall use the nonconforming provisions in the Town of Durham Zoning Ordinance as a guide in reviewing such situations, to the extent appropriate.

As part of any site plan review, the Planning Board may require that:

(a) nonconforming site conditions be brought into compliance; or

(b) the extent of nonconforming site conditions be reduced; or

(c) nonconforming site conditions be mitigated, giving due consideration both to the extent of the nonconformities and their adverse impacts and to the costs for addressing the nonconformities relative to the costs for the overall project.

### Section 1.2 Other Regulations

1.2.1 The site plan shall conform to all applicable ordinances, regulations, standards, and statutes of the Town of Durham, State of New Hampshire, and United States Government, as appropriate, including, but not limited to:

(a) The Town of Durham Zoning Ordinance;

(b) Other ordinances within the Durham Town Code;

(c) The Town of Durham Subdivision Regulations;

(d) Specifications and/or regulations promulgated by the Town of Durham Public Works Department; and

(e) The building and life safety codes, as adopted by the Town of Durham.

1.2.2 The Town of Durham Master Plan and Capital Improvement Program (CIP) are policy rather than regulatory documents, but the Planning Board may consult these documents as guides in reviewing proposed development or redevelopment.

## Article 2. Architectural Design Standards

Due to its size, Article 2, containing the Architectural Design Standards, is placed in an Appendix to these Site Plan Regulations. The Architectural Design Standards are part of the Site Plan Regulations and fully apply in like manner as other standards contained in the main body of these regulations.

## Article 3. Construction Practices



### Section 3.1 Commencement

No site work, grading, nor removal of vegetation (except that necessary to establish the items that follow) shall commence until limits of clearing are established; construction fencing, when appropriate, is installed; and all erosion and sedimentation control devices are installed and stabilized.

### Section 3.2 Construction Equipment

3.2.1 Construction equipment and materials shall be stored at least 25 feet away from drainage channels, unless other suitable measures, acceptable to the Department of Public Works, are implemented. Equipment and storage will be excluded from entering into shoreland and wetland setback areas.

3.2.2 If there will be any refueling or servicing of construction vehicles or equipment on site, provisions shall be made for this activity, including, as appropriate, fuel storage, secondary containment, spill cleanup, and management procedures. If not otherwise addressed as part of the Site Plan Review, when applicable, a plan addressing these procedures shall be provided to the Public Works Department when site work or building construction is commenced.

## Section 3.3 Fire Access

Access into the site for fire apparatus shall be maintained at all times during the construction process.

## Section 3.4 Hours of Activity

3.4.1 For any site where development activity would occur within 300 feet of any residential dwelling unit, outside construction is restricted to the following hours:

- between 7:00 a.m. and 6:00 p.m., Monday through Friday, and
- between 8:00 a.m. to 6:00 p.m., Saturday.

For blasting, chipping of stone, and use of hoe or rock hammers, hours are restricted to 9:00 a.m. to 4:00 p.m. Monday through Friday

3.4.2 The Planning Board may modify these hours, and when they apply, as appropriate.

## Section 3.5 Topsoil

3.5.1 Unless otherwise approved by the Town, all stripped topsoil from the site shall be retained, stabilized in accordance with NHDES standards, and stockpiled on site for later reuse on site, unless otherwise approved by the Planning Board.

## Section 3.6 Protection of Trees and Other Vegetation During Construction

3.6.1 Dead or declining trees that pose a high risk to people or property should be removed prior to the start of construction. Existing desirable trees and vegetated areas to save will be identified for protection. Trees to remove and trees to save will be identified by a certified arborist and approved by the Planning Board prior to the start of construction, and identified on planning documents.

3.6.2 For any sites one (1) acre or larger, during the development and construction process, wooded natural and non-wooded natural areas shall be managed to maintain a healthy vegetative cover to maintain the soil structure, minimize soil erosion and enhance the quality of the proposed community. In wooded natural areas, the healthy forest cover shall be retained to reduce the amount of stormwater running across the ground surface.

3.6.3 Limits of clearing shall be established in the field with construction fencing, wherever natural limits are not otherwise clearly identified. Trees to be protected during clearing operations and construction shall be protected with fencing at a distance from the tree of 1 foot per 1 inch of tree DBH. Example: a 10” tree has a circle with a 10’ radius to protect the critical root zone. The Planning Board may reduce the size of this protection zone. The developer shall notify the Tree Warden in advance to ensure this occurs. Impacts outside of clearing limits shall be reestablished with native species at applicant’s expense.

3.6.4 No construction activity shall occur within the critical root zone to avoid soil compaction and damage to the tree. This includes: Vehicles and equipment traffic and parking, stock piling of any supplies, soil, stone or any building materials, changing the grade, changing

the drainage. If the full CRZ area cannot be fenced the Planning Board may reduce the size of the area; however other measures (see appendix) should be required for protection of the tree and root system.

3.6.5 Additional detailed recommended measures for protecting trees during construction are in Appendix A. When appropriate the Planning Board may require additional protection measures.

3.6.6 Trees on public property (or on a municipal right of way) must be protected, if they will be impacted by construction. If these trees are damaged or cannot be protected they will be replaced with an appropriate number of trees as determined by the Planning Board. Depending on circumstances, as one option, the Planning Board could require that the total combined caliper of the replacement trees equal the DBH of the tree removed. Example: ten - 2" caliper trees could be required to replace one 20" DBH tree.

## Section 3.7 Waste Materials

3.7.1 Construction site operators shall control and properly dispose of all on-site waste, including but not limited to cut trees, stumps, debris, junk, rubbish, discarded building materials, concrete truck washout, chemicals, litter, sanitary waste and other materials. These materials shall not be buried or left on the site unless specifically approved by the Durham Department of Public Works, and where appropriate, by NHDES.

3.7.2 If the development site is in close proximity to a waterbody, all stockpiles, concrete washout areas, chemicals, fertilizers, hazardous materials, etc., shall be located as far from the waterbody as possible and at a minimum of 50 feet away (75 feet in the case of a wetland setback area).

3.7.3 Applicants are encouraged to recycle materials generated during construction either for reuse by the applicant or for collection for recycling by third parties. Applicants are encouraged to coordinate with the Durham Department of Public Works for advice on what materials can be recycled in the local area, and for a list of firms accepting recyclables.

## Section 3.8 Blasting

A Town of Durham Blasting Permit shall be obtained from the Durham Fire Department prior to conducting any blasting. A Blasting Permit shall be issued only after a Pre-Blast Structural Condition Survey and Blasting Plan has been performed. All blasting activities shall be conducted following the General Procedures and Best Management Practices, below.

3.8.1 Pre-Blast Structural Condition Survey and Blasting Plan. A minimum of 30 days prior to conducting any blasting, the applicant shall prepare a Pre-Blast Structural Condition Survey ("Survey") and Blasting Plan and submit them to the Durham Fire Department for review and approval. The approved Blasting Plan shall be implemented accordingly. The Survey shall include pre-blast structural condition inspections of all existing structures and conditions on the site, adjacent to the site or in the vicinity of the site. The Survey shall extend to such structures or conditions as may be affected by the applicant's

construction operations and the inspections shall be performed on all structures (including homes, foundations, driveways, roadbeds, swimming pools, wells and mobile homes) within a radius of 250 feet (or as otherwise specified by the Planning Board) of the anticipated blasting areas. The blasting contractor and the owner of the property being inspected shall sign all such inspections once completed. If an owner refuses to allow for the conducting of a pre-blast conditions inspection or sign a pre-blast conditions inspection form for whatever reasons the applicant shall note this on the form. The blasting contractor shall make at least three attempts to notify the owner of the need for such inspections; the last such attempt shall include a written notification by certified mail and appropriate contact information.

3.8.2 The applicant shall conduct a Survey for any property located within 1,000 feet of the anticipated blasting areas, if so requested in writing by the property owner at least 7 days prior to the planned start of blasting. The property owner shall pay all expenses for preparing the survey.

3.8.3 The pre-blast structural condition inspection shall be performed in the presence of the property owner or an owner's representative and shall consist of photographs and a written description of the interior and exterior condition of each of the structures examined. Descriptions shall locate any existing cracks, damage, or other defects and shall include such information in order to make it possible to determine the effect, if any, of the construction operations on the defect. A good-quality videotape survey with appropriate audio description of locations, conditions, and defects may be used in lieu of a written form. Copies of all inspection forms and photographs shall be submitted to the Durham Fire Department and kept for a minimum of seven (7) years on file with the Durham Fire Department (unless the documentation cannot be provided to the Fire Department for some reason).

3.8.4 The individual conducting the inspections shall give written notice, not less than 10 days in advance, to the owner of the property concerned and tenants of the property. The notice shall state the dates on which inspections are to be made. Copies of all notices shall be provided to the Durham Fire Chief.

3.8.5 General Procedure. Blasting and on-site chipping or hammering (of stone) is restricted to the hours of 9:00 a.m. to 4:00 p.m. Monday through Friday. There shall be no processing of stone on site. A notice of intent to blast shall be provided at least 24 hours in advance via signage placed in places easily accessible to the public and via other media provided by the Town (such as the Town's website and Friday Updates). The applicant is encouraged (but not required) to do all blasting during the summer when the University of New Hampshire is out of session.

3.8.6 The applicant shall hold a meeting with members of the neighborhood prior to starting any blasting, at an appropriate time and place determined by the applicant. The applicant shall give a minimum of three days' advance notice of said meeting. The applicant shall notify:

(a) all abutting property owners who were notified of the development at the outset;

(b) all parties whose property is located within 250 feet of any area where blasting will occur; and

(c) the Planning Department.

3.8.7 Best Management Practices for Blasting. All activities related to blasting shall be performed in accordance with the following New Hampshire Department of Environmental Services (NHDES) Blasting Best Management Practices (BMPs) to prevent contamination of groundwater. These include preparing, reviewing and following an approved blasting plan; proper drilling, explosive handing and loading procedures; observing the entire blasting procedures; evaluating blasting performance; and handling and storage of blasted rock.

If the NHDES BMPs are updated subsequent to the adoption of these Site Plan Regulations, those subsequent BMPs shall become the standards.

(a) Loading practices. The following blast hole loading practices to minimize environmental effects shall be followed:

(1) Drilling logs shall be maintained by the driller and communicated directly to the blaster. The logs shall indicate depths and lengths of voids, cavities, and fault zones or other weak zones encountered as well as groundwater conditions.

(2) Explosive products shall be managed on site so that they are used in the borehole, returned to the delivery vehicle or placed in secure containers for off-site disposal.

(3) Spillage around the borehole shall either be placed in the borehole or cleaned up and returned to an appropriate vehicle for handling or placement in secured containers for offsite disposal.

(4) Loaded explosives shall be detonated as soon as possible and shall not be left in the blast holes overnight, unless weather or other safety concerns reasonably dictate that detonation should be postponed. In the event that detonation must be delayed, reasonable security measures shall be maintained.

(5) Loading equipment shall be cleaned in an area where wastewater can be properly contained and handled in a manner that prevents release of contaminants to the environment.

(6) Explosives shall be loaded to maintain good continuity in the column load to promote complete detonation. Industry accepted loading practices for priming, stemming, decking and column rise must be attended to.

(b) Explosive Selection. The following BMPs shall be followed to reduce the potential for groundwater contamination when explosives are used:

(1) Explosive products shall be selected that are appropriate for site conditions and safe blast execution.

(2) Explosive products shall be selected that have the appropriate water resistance for the site conditions present to minimize the potential for hazardous effect of the product upon groundwater.

(c) Prevention of Misfires. Appropriate practices shall be developed and implemented to prevent misfires.

(d) Muck Pile Management. Muck piles (the blasted pieces of rock) and rock piles shall be managed in a manner to reduce the potential for contamination by implementing the following measures:

(1) Remove the muck pile from the blast area as soon as reasonably possible.

(2) Manage the interaction of blasted rock piles and stormwater to prevent contamination of water supply wells or surface water.

(e) Spill Prevention Measures and Spill Mitigation. Spill prevention and spill mitigation measures shall be implemented to prevent the release of fuel and other related regulated substances to the environment. The measures shall include at a minimum:

(1) Storage of fuel and other regulated substances requirements shall include at a minimum:

(i) Storage on an impervious surface;
(ii) Secure storage areas against unauthorized entry;
(iii) Label regulated containers clearly and visibly;
(iv) Inspect storage areas weekly;
(v) Cover regulated containers in outside storage areas;
(vi) Wherever possible, keep regulated containers that are stored outside more than 50 feet from surface water and storm drains, 75 feet from private wells, and 400 feet from public wells; and
(vii) Secondary containment is required for containers containing regulated substances stored outside, except for on premise use heating fuel tanks, or aboveground or underground storage tanks otherwise regulated.

(2) The handling of fuel and other regulated substances requirements shall include at a minimum:

(i) Except when in use, keep containers containing regulated substances closed and sealed;
(ii) Place drip pans under spigots, valves, and pumps;
(iii) Have spill control and containment equipment readily available in all work areas;
(iv) Use funnels and drip pans when transferring regulated substances; and
(v) Perform transfers of regulated substances over an impervious surface.

(3) Training of on-site employees and the on-site posting of release response information describing what to do in the event of a spill of regulated substances.

(4) Fueling and maintenance of excavation, earthmoving and other construction-related equipment will comply with the regulations of NHDES. [Note that these requirements are summarized in NHDES's publication WD-DWGB-22-6 "Best Management Practices for Fueling and Maintenance of Excavation and Earthmoving Equipment" or its successor document. ]

3.8.8 Upon completion of all earth/rock excavation and blasting work, the applicant shall conduct a post-blast condition inspection of any properties, structures, and conditions for which complaints of damage have been received or damage claims have been filed. Notice shall be given to all interested parties so they may be present during the final inspection. Records of the final inspection shall be distributed in the same manner as the original pre-blast structural condition inspection.

## Article 4. Cultural Resources



### Section 4.1 General Guidelines

4.1.1 The applicant is encouraged to retain architecturally or historically significant buildings, structures, and resources. This includes the following resources:

(a) Those that are listed or determined eligible to be on the National or State Registers of Historic Places;

(b) Those that were constructed prior to 1930 and that in the reasonable opinion of the Planning Board possess significant architectural value due to quality and integrity of condition, overall design, detailing, materials, craftsmanship, style, or form; and

(c) Those that were constructed prior to 1930 and that in the reasonable opinion of the Planning Board are closely associated with the lives of persons or events important in the history of the Town of Durham.

4.1.2 The Planning Board may refer items to the Historic District/Heritage Commission for its recommendation at the next regularly scheduled meeting, but final approval of applications shall not be unduly delayed when such a recommendation is sought.

## Section 4.2 Archaeological Resources

Where significant archaeological resources exist or are believed to exist on a site, the applicant shall mitigate the impact upon those resources~~,~~ by renovating, excavating, or providing a buffer around the resource, or by other appropriate means.

## Section 4.3 Cemeteries

4.3.1 Applicants shall comply with RSA 289:3 III, as amended. As of the date of the adoption of these Regulations, the RSA reads as follows:

"…[N]o new construction, excavation, or building shall be conducted within 25 feet of a known burial site or within 25 feet of the boundaries of an established burial ground or cemetery, whether or not such burial site or burial ground was properly recorded in the deed to the property, except when such construction, excavation, or building is necessary for the construction of an essential service, as approved by the governing body of a municipality in concurrence with the cemetery trustees, or in the case of a state highway, by the commissioner of the department of transportation in concurrence with the cemetery trustees."

4.3.2 The applicant shall restore or renovate existing cemeteries on the subject site situated in proximity to the proposed site work, if reasonably deemed appropriate by the Planning Board. At its reasonable discretion, the Planning Board may require buffering between the development and an existing cemetery, beyond that stipulated in the RSA, above, in order to mitigate the visual impact of the development on visitors to the cemetery.

## Section 4.4 Stone Walls

4.4.1 RSA 472:6 Removing or Altering Boundary Markers shall apply to stone walls situated along property boundaries.

4.4.2 In addition, when it is necessary to remove portions of a stone wall that is not situated along property boundaries to accommodate development, the applicant shall preserve remaining portions to the extent feasible. Applicants are encouraged to:

(a) rebuild stone walls in an appropriate new location on site when they must be removed from the existing location;

(b) restore and rebuild older stone walls; and

(c) build new stone walls as and where appropriate. Appropriate locations for relocated or rebuilt stone walls may include the front property line, the edge of travel ways (provided they would not interfere with sight distance or maintenance requirements), side lot lines, the edge of the development, and open space areas.

# Article 5. Landscaping and Screening Standards



## Section 5.1 Purpose

The purpose of landscaping and screening standards is to:

1) Help integrate the built environment with the natural environment;

2) Enhance the quality and appearance of development;

3) Preserve open space and natural habitats;

4) Control excessive stormwater runoff;

5) Prevent soil erosion and pollution of water bodies;

6) Reduce noise, wind, glare and dust;

7) Provide shade and windbreaks to increase energy conservation in buildings;

8) Establish an attractive streetscape adjacent to roadways;

9) Screen vehicular headlights in parking areas;

10) Promote public safety by guiding vehicles and pedestrians within a site;

11) Provide areas for snow storage;

12) Enhance privacy;

13) Enhance the health and survivability of selected landscaping materials

14) Protect the value of surrounding property; and

15) Protect and enhance the natural beauty, environment, and green space within the Town of Durham.

16) Increase property values

## Section 5.2 General Objectives

Landscaping shall be provided that:

1) Defines areas for pedestrian and vehicular circulation;

2) Breaks up the mass of buildings and impervious areas;

3) Incorporates existing native vegetation and other natural features into the site design;

4) Manages and controls stormwater at its source to minimize off-site impacts;

5) Conserves water and reduces outside water use on the site;

6) Provides buffers between incompatible land uses or sites;

7) Softens the visual impact of architectural and structural materials;

8) Minimizes the introduction of pollutants to the environment.

9) Protects gateways by requiring substantial vegetative screening where appropriate.

## Section 5.3 General Requirements

5.3.1 Areas not occupied by buildings or other structures, parking, loading, access ways, landscaping materials, natural vegetation or other natural features shall be left in their natural vegetated state where desirable. Areas disturbed during construction that otherwise will not be occupied by one of the above structures or elements shall be replaced with a minimum of 6 inches of suitable topsoil and replanted as appropriate.

5.3.2 At a minimum, all yards, setbacks, and areas of open space as required by the Zoning Ordinance shall retain existing natural features or be landscaped as required herein.

5.3.3 Landscaped areas shall consist of a combination of grass, flowers, vines, groundcovers, shrubs, and/or trees, as appropriate. All planting areas shall be landscaped with a combination of climate tolerant plant material and protective groundcover and bark mulch, as appropriate. No area shall be left to remain as bare soil.

5.3.4 Sites shall be designed to retain and enhance the existing natural features as reasonably determined by the Planning Board.

5.3.5 Existing invasive plant species on the subject property shall be removed and destroyed. The Planning Board may reduce or disregard this requirement, where appropriate, based upon the location and area of invasive species relative to the area to be developed. Applicants shall refer to the current *Prohibited Invasive Plant Species List* maintained by the NH Department of Agriculture.

5.3.6 Existing topography shall be maintained unless otherwise approved by the Planning Board.

5.3.7 Plant material and landscape maintenance procedures shall incorporate water conservation techniques (i.e., xeriscaping)

5.3.8 All local and state requirements for yards and sight distance shall take precedence for selection and placement of landscaping features, as appropriate.

5.3.9 No plantings shall be placed where they may interfere with existing or proposed sewer, water, natural gas lines, or power/utility lines, or where they will inappropriately block signs or lighting.

5.3.10 The front yard landscaping area may contain any of the following:

(a) Public utility easements and open surface drainage easements that do not occupy more than thirty (30) percent of the required landscaped area. Such areas shall be planted with perennials or groundcover in order to not interfere with utility connections;

(b) Transformers and underground utility connections, provided that they do not encroach more than five (5) feet into the required landscaped area. Such equipment shall be landscaped to soften the visual impact.

5.3.11 Applicants shall incorporate Low Impact Development (LID) design practices and technologies in all aspects of the site's landscaping.

5.3.12 Zoning Ordinance. Until such time that Article XXII – Landscaping, in the Durham Zoning Ordinance, is removed from the Zoning Ordinance, wherever any provision in these regulations is inconsistent with a provision in the Zoning Ordinance, the stricter provision shall apply.

5.3.13 The landscaping plan shall be developed by a landscape architect or other qualified professional, unless waived by the Planning Board.

## Section 5.4 Plant Selection

The following standards shall apply.

5.4.1 Trees shall be selected for growing habits that are appropriate for the location, and for the intended function (privacy buffer, shade, etc.). Consideration shall be given to rooting space, crown height and canopy spread at maturity in order not to interfere with structures, sidewalks, utility lines (above- and below-ground), signs, lights, and other elements.

5.4.2 When appropriate, soil tests shall be performed and serve as reference for plant species selection.

5.4.3 Deciduous trees, at the time of planting, shall be fully branched and have a minimum caliper of 2 inches. When trees will be used for screening, buffering, or other purposes where a larger tree is desirable, the Planning Board may stipulate a larger caliper, such as 2-1/2 to 3-1/2 inches.

5.4.4 Evergreen trees, at the time of planting, shall be fully branched and have a minimum height of 5 feet. When trees will be used for screening, buffering, or other purposes where a larger tree is desirable, the Planning Board may stipulate a taller tree, such as one 7 to 9 feet tall.

5.4.5 Shrubs, at the time of planting, shall be fully branched and have a minimum height of 2½ feet, except for shrubs intended to be shorter or those used for ground cover.

5.4.6 All proposed plantings shall be appropriate for the soils, drainage, hardiness zone, climate and other conditions of the site. Particular attention shall be paid to tolerance to potential road salt and other deicing treatments.

5.4.7 Plant materials shall be of specimen quality conforming to the most recent version of the American Standards for Nursery Stock (ANSI) and be pest free. Plant materials shall be guaranteed for at least two growing seasons or two years, whichever is greater. Plant materials that die or are in poor condition during the 2-year warranty period shall be replaced.

5.4.8 Unless otherwise approved, trees shall be selected from the approved list of tree species, included in Appendix B – Approved Tree Species.

5.4.9 Species on the current Prohibited or Restricted Invasive Plant Species Lists maintained by the NH Department of Agriculture shall not be planted.

5.4.10 Species shall not be planted that are a known host for an insect or disease pest of concern for the region.

## Section 5.5 Planting Requirements

The following standards shall apply:

5.5.1 Planting holes for trees shall be at least two times the width of the root ball and shall be no deeper than the root ball.

5.5.2 Shrubs shall have a planting hole at least three times the width of the root ball and shall not be deeper than the root ball itself. Plant material shall be watered and mulched with 2" – 4" of bark mulch at time of planting.

5.5.3 Plant material shall be installed during appropriate planting seasons unless otherwise approved (March – Mid June or Mid September – December).

5.5.4 Trees planted in dense urban development within sidewalks, parking lots, pavement or other hardscape require special design techniques to ensure they will be healthy. Adequate drainage, irrigation, rooting space, soil volume and protection from human activity must all be considered.

5.5.5 For trees placed within sidewalks, porous pavers, tree box filters, or other appropriate devices shall be used to prevent excessive soil compaction, enhance stormwater management, and add interest. If tree grates are used they shall be fabricated of a strong, durable material, installed flush with grade, and provide an expandable center opening to allow for continued tree growth.

5.5.6 Where appropriate, tree guards shall be installed to protect the base of the tree from street activity.

5.5.7 Tree wells over 6 inches deep or other landscape features that have the potential to present a tripping/falling hazard to the public shall have grates, fences or other protective measures installed.

## Section 5.6 Landscaped Areas, in General

5.6.1 Side slopes for all landscaped areas shall not exceed thirty-three and one third (33-1/3) percent (3:1 slope) and shall be appropriately stabilized with vegetation.

5.6.2 Landscaped areas shall be a minimum of 6 feet wide (unless otherwise specified in these regulations) or as determined appropriate by the Planning Board in order to provide adequate room for vegetative root growth and to not interfere with access to vehicles, lines of sight, and pedestrian travel. For trees with a mature height of under 30 feet, a minimum width of 4 feet is adequate.

5.6.3 Landscaped areas shall consist of a combination of large and small trees, shrubs, perennial and/or annual flowers, and/or groundcover, as appropriate.

5.6.4 Landscaped areas shall be designed with a variety of plant species that provide seasonal variety and biodiversity.

5.6.5 Landscaping around building entrances, near parking spaces, and along pedestrian and bicycle ways shall not interfere or block lines of sight, restrict travel, or present a hazard to personal property.

5.6.6 Any landscaping located within the safe site distance of a driveway entryway, as defined by AASHTO standards, shall be no more than 3 feet at mature height.

5.6.7 Low Impact Development (LID) techniques such as raingardens, bioretention systems, tree box filters, and similar stormwater management landscaping techniques shall be incorporated into landscaped areas, as appropriate, and may replace required landscaping components as approved by the Planning Board with the goal of conserving water and achieving at minimum the following:

(a) Avoidance of extensive grading
(b) Retention of as much of the original vegetation as possible and incorporation into site design
(c) Control of airborne particulates such as soot and dirt
(d) Enhancement of the public and private streetscape
(e) Screening of service structures
(f) Relief from broad expanses of pavement and definition of pedestrian and vehicular circulation areas
(g) A pedestrian-friendly environment

## Section 5.7 Landscaping Along Public Rights of Way

5.7.1 Where feasible and when required at the discretion of the Planning Board, street trees shall be planted along public rights-of-way with the goal of providing a tree-lined street.

5.7.2 Trees shall be spaced at a minimum of 1 tree per 30 lineal feet (50 feet for trees with a large mature height) or as specified by the Planning Board to accommodate the mature crown spread of the tree. In most cases, deciduous trees – larger shade trees where space permits or smaller ornamental/fruit trees where space does not permit – should be used. Trees shall not interfere with buildings, overhead utilities, pedestrian travel, or access to on-street parking spaces.

5.7.3 Landscaping strip. Along Route 4, Route 108, Route 155/Lee Road, Route 155A/Mast Road, and the Old Concord Turnpike, but not including any property located in the five core commercial zoning districts (C, CB, CC, CH, and PO), there shall be established a front landscaping strip 50 feet wide, extending onto the property from the front right of way/property line. The landscaping strip shall be laid out with an appropriate combination of trees, shrubs, hedges, planted berms, fences, brick or stone walls, and other landscaping elements, as determined by the Planning Board. Where the landscaping area will be wider than 50 feet the appropriate landscaping may be spaced across the wider area.

## Section 5.8 Parking Lots Landscaping and Screening

5.8.1 The requirements of this subsection, do not apply to parking areas situated to the rear of the main building, if it is not visible from a public way, or beyond the line running even with the rear wall of the building. For smaller parking lots/areas, such as those with fewer than 6 vehicle spaces, the Planning Board may adjust these requirements as appropriate.

5.8.2 All off-street parking areas shall be screened from the public right-of-way to provide substantial visual screening up to a height of 3-1/2 feet above grade, excluding sight triangles at vehicular entrances and exits. A moderately dense hedge composed predominantly of evergreen small trees or shrubs shall be planted that is reasonably expected to provide this screening within one year. Alternatively, a combination of plantings, mounds, berms, walls, and fences may be used to provide this screening. This screening will often occur in conjunction with the front landscaping strip.

5.8.3 Landscaping shall be used to delineate vehicular and pedestrian circulation patterns within parking lots and throughout the site and to provide visual interest.

5.8.4 Trees shall be distributed throughout the parking lot as evenly as practical, in order to provide optimal canopy coverage and shading.

5.8.5 Where practical as determined by the Planning Board, a landscaping peninsula (known as an "end cap") shall be placed at the end of each parking row in line with the adjoining parking spaces, wherever the row of parking spaces is adjacent to a perpendicular travel way. Each peninsula shall be planted with one shade tree, or one ornamental tree if use of a shade tree is not practical, for lack of space for roots.

5.8.6 There shall be no more than four continuous parallel parking rows on the interior of the parking lot (i.e. parking rows along the perimeter of the parking lot are not situated on the interior) without installation of a landscaped median separating those parking rows from any additional parking rows. The landscaped median shall be at least 9 feet wide, where practical, as determined by the Planning Board, and shall be parallel to and run the same length as the adjacent parking rows.

5.8.7 Trees and shrubs used in parking lots shall be selected to avoid species that may drop significant fruit, flowers, sap, and other materials onto vehicles.

5.8.8 Selected species shall be salt tolerant and able to tolerate hotter and drier conditions in expansive pavement areas.

5.8.9 Foundation Planting Strip. There shall be a minimum 4 foot wide foundation planting strip between the building and any parking lot or driveway situated on the front or side of the building. The foundation bed shall be planted with appropriate landscaping materials, including grass, shrubbery, flowers, and mulch, as determined by the applicant. Use of ornamental trees is encouraged where practical. Where there is a sidewalk alongside the building, the foundation planting strip may be situated on either side of the sidewalk. A

continuous foundation planting strip is preferred but it need not be continuous where there are projecting building elements, such as entrances, bays, and utilities.

5.8.10 A minimum of five percent (5%) of the total parking and driveway area, in addition to a buffer strip of at least ten-feet in width abutting a public right-of-way, shall be landscaped.

5.8.11 Parking lots shall be broken up into smaller parking areas with landscaping features and bioretention systems. The total parking area required shall be broken into sections not to exceed forty (40) spaces unless otherwise approved by the Planning Board.

5.8.12 All islands, peninsulas, and medians required in the parking areas shall be more or less evenly distributed throughout such parking areas. The distribution and location of landscaped areas may be adjusted to accommodate existing trees or other natural features so long as the total area requirement for landscaped islands, peninsulas, and medians for the respective parking area is satisfied. All landscaped islands, peninsulas, and medians shall be a minimum of nine feet in width or as necessary to provide adequate room for vegetative root growth and in order to not to interfere with access to vehicles, lines of sight, pedestrian travel, or the long-term health of the vegetation. Some islands may be used to provide pedestrian walkways. Areas designated as water-quality swales or rain garden beds (if sheet flow is allowed) shall be designed to promote detention time and infiltration. Soils must be designed for infiltration and evaluated for need of amendments. Overflow contingencies shall be provided and plumbed to adjacent drainage network if necessary.

5.8.13 Corner clearance, as defined in Section 175-7 of the Durham zoning ordinance, shall be observed regarding all landscaping or screens.

## Section 5.9 Screening

5.9.1 Where nonresidential uses and/or off-street parking facilities abut a vacant lot in a residential zone or an existing residential use, the perimeter shall be screened to provide physical and visual separation from the residential zone or use.

5.9.2 Screening measures composed of trees, shrubs, berms, walls, and/or fences shall be installed to a height of 6 feet, or higher, when appropriate, as specified by the Planning Board. A wall or fence shall be placed on the exterior side of any landscaping unless otherwise approved by the Planning Board. The more attractive finished side of the fence shall face abutters, unless otherwise approved by the Planning Board.

5.9.3 When natural vegetation is used, it shall consist of evergreen shrubs and/or trees planted in a line to form a continuous screen that will grow to a minimum height of 6 feet within 3 years. Additional evergreen shrubs/trees may be planted in a second, staggered line to form a screen together with the first line.

5.9.4 All sites shall incorporate screening measures to prevent the headlights of vehicles from shining on adjoining residential areas.

5.9.5 All mechanical installations and equipment, solid waste collection equipment, pump stations, outdoor storage, and similar items shall be screened or softened with landscaping that is appropriate for the location.

5.9.6 The Planning Board may stipulate additional buffers due to unusual impacts generated, including odor, noise, glare, dirt, dust, vibration, etc.

## Section 5.10 Maintenance and Replacement of Landscaping and Screening

5.10.1 The developer or property owner shall be responsible for the maintenance and repair of all required landscaping and screening materials for three years from the date of planting. A written, 3-year tree maintenance plan shall be submitted that includes specifications for watering, mulching, removal of guy wires/stakes (if used), pruning, and tree protection.

5.10.2 All required plant materials (including mulched beds) shall be tended and maintained in a healthy growing condition reasonably free of weeds, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair.

5.10.3 The property owner shall remove plant materials that are dead or in poor condition immediately once their condition is recognized and replace them with the same type, size, and quantity of plant materials as originally installed, unless alternative plantings are approved by the Durham Tree Warden or Planning Board.

5.10.4 A performance bond or letter of credit is required to ensure compliance with this section and to cover maintenance for a period of three (3) years after the time of planting.

## Section 5.11 Irrigation

5.11.1 The need for irrigation shall be minimized to the extent practicable through use of native drought-tolerant species and the use of landscaping that does not require permanent irrigation systems, such as xeriscaping.

5.11.2 When irrigation is necessary to support the establishment and/or maintenance of landscaped areas, smart controllers shall be used to limit irrigation during the day and during rain events.

5.11.3 Where appropriate, additional water conservation features including trickle and drip lines, rain barrels, cisterns, or other water harvesting elements shall be used.

5.11.4 Irrigation systems shall be installed and operated in accordance with any applicable Town standards.

## Section 5.12 Innovative Landscaping Practices

5.12.1 Green Roofs. Applicants are encouraged to use roofing materials that have a Solar Reflective Index (SRI) of at least 29 (greater for roofs with a slope of 2:12 or more) or to install vegetated roofs.

5.12.2 Passive heating and cooling. Applicants are encouraged to incorporate landscaping techniques that help reduce energy consumption for heating and cooling of buildings on the site. Trees should be planted to provide shade on buildings and parking lots in the warm seasons and to allow solar heat during the cool seasons.

5.12.3 Stormwater Management. When planting in urban street or sidewalk areas, incorporate techniques to use landscaping to reduce stormwater, such as stormwater tree boxes, and rain gardens.

## Section 5.13 Definitions

Note that there are special definitions sections in several sections in the Site Plan Regulations, specifically: Part I, Article 10 - Definitions and Part III, Article 2 – Architectural Design Standards, Article 5 – Landscaping and Screening Standards, Article 6 – Lighting Standards, and Article 16 – Stormwater Management Standards.

The following words and terms are oriented specifically toward landscaping. However, these words and terms may be found elsewhere in the Site Plan Regulations, and may appear in more than one place (in which case, the same definition is given in both places). Wherever these words and terms are found, they shall have the meanings given below.

**Biodiversity**. Contraction of the term "biological diversity," as defined by the Convention on Biological Diversity, which includes diversity within species, between species, and of ecosystems. With respect to these Regulations, see General Landscaping Subsection 5.6.5 for requirements to increase plant materials' resilience to pests and diseases and, thus, their longevity.

**Caliper**. A measurement of the tree stem diameter used for nursery stock, measured at a point 6 inches above the ground, if the resulting measurement is no more than 4 inches. If that measurement is larger than 4 inches, the desired measurement is made 12 inches above the ground.

**Critical root zone** (or root save area). The area surrounding a tree that is essential to that tree's health and survival. For a free-standing tree with no apparent root restriction, the root save area consists of a circle having a radius of one foot for each one inch DBH of the tree.

**Diameter at Breast Height** (DBH). The diameter of the main stem of a tree, or the combined diameters of a multi-stemmed tree, as measured 4.5 feet above the natural grade at the base.

**Growing season**. The period of time from the last frost date in spring to the first frost date in the fall.

**Tree, ornamental**. Broadleaved deciduous tree, often bearing recognizable fruit, which generally reaches a height of 15 to 30 feet at maturity.

**Tree, shade**. Broad-leaved deciduous tree that generally reaches a height of at least 30 feet at maturity.

**Tree Size**. Small tree: mature height under 30 feet; Medium-sized tree: mature height 31 – 45 feet; Large tree: mature height over 45 feet.

**Xeriscaping**. The practice of designing landscapes to reduce or eliminate the need for irrigation. Xeriscaped landscapes need little or no water beyond what the natural climate provides.

# Appendix A - Recommended Landscaping Measures

The following measures are recommended, but not required.

Placement of underground utilities in the same trench is encouraged in order to reduce disturbance to the site.

In order to provide variety and biodiversity the following mix of species is recommended:

a) no more than 10% of any species shall be planted;
b) no more than 20 % of any genus shall be planted; and
c) no more than 30 % of any family shall be planted.

Within parking lots, when appropriate, it is recommended that all islands, peninsulas, and medians be depressed and incorporate curb cuts to allow for sheet flow to pond to a maximum depth of 8" in the median. Water quality swales or rain garden beds (if sheet flow is allowed) should be designed to promote detention time and infiltration. Soils should be designed for infiltration and evaluated for need of amendments. Overflow contingencies should be provided and plumbed to adjacent drainage network if necessary.

Where appropriate, it is recommended that natural wooded or vegetated areas existing on property boundaries be preserved as a visual buffer to adjacent areas. To be an adequate buffer and maintain the area as a viable natural ecosystem, the buffer should be at least 50 feet wide, preferably wider. Larger trees on the edge of this buffer, should have root systems protected from damage

**Protection of Trees During Construction**

The following measures are recommended.

1. Assess and Map Existing Forested Areas
   Identify general areas on the ground where proposed construction will occur. Make sure that the developer also identifies areas where disturbance will occur, such as travel lanes, storage areas, etc. In those proposed construction and disturbance areas, do a general assessment to identify tree and vegetation types, size, age, and general condition. Note sensitive areas, scenic vistas, wildlife habitat, natural or cultural features, topography, water features, etc. This information should be used in developing a conceptual plan for development, so that important features can be avoided and innovative techniques can be incorporated to avoid damage.

2. Tree Inventory
   Inventory and assess significant trees or stands of trees, such as trees with larger diameter (over 16 " DBH), desirable species, good aesthetics, good condition, wildlife value, etc. Saving trees in groups is more effective than saving individual trees scattered over a construction site.

   a. Flag trees or groups of trees which will be kept and need protection during construction. Identify those trees, and the critical rooting area needed on construction documents.

b. Alternatively, undesirable trees should also be identified, such as declining high risk trees (as identified by a certified arborist) , poor species, species intolerant of disturbance, invasives, etc. With PB approval these could be removed prior to construction to avoid conflicts.

c. Make adjustment in the site plan to leave adequate room around the desirable trees. Plan construction of footings, pavement, underground utilities, etc. to avoid critical root areas.

3. Protection Techniques for Trees

Most of the tree root system is in the top 20 inches of the soil, and can extend out well past the branches of the tree. Construction can damage the root system by severing roots. If too much of the tree root system is removed or damaged by construction, the tree may decline or die, resulting in the loss of benefits, and possibly creating a public hazard with larger trees that could later fail.

Soil compaction caused by equipment can also be a serious problem. This is especially true on wet soils. Compacted soils have less open pore space, and hence less space for moisture and oxygen needed to sustain tree health. Even one pass with heavy equipment can cause soil compaction.

A general rule of thumb in the protection of open grown trees is to protect a circle called the critical root zone (CRZ) around the tree. The circle radius is equal to 1 foot per 1 inch of trunk diameter for tree species that are tolerant of construction impacts and 1.5 feet per 1 inch of trunk diameter for tree species that are in-tolerant. This is more critical with older trees, than young trees that recover more easily.

Create a tree protection plan to specify how trees will be protected during construction. Techniques should include commonly accepted professional practices, such as those described in “Best Management Practices for Protecting Trees During Construction – International Society of Arboriculture. Some techniques to consider include:

a. Install highly visible and sturdy fencing to keep equipment off of the critical rooting zone of trees identified to protect. Fencing should be installed around all wooded areas and individual trees where equipment may be present.

b. Where construction must come close to large trees, use other techniques to protect the roots, trunk and branches such as;

   i. Wrap the trunk in wooden snow fencing or other similar material to protect it from wounding from equipment.

   ii. Place a heavy layer of wood chips (6”) over the root zone where equipment will pass.

iii Use heavy timbers, vehicle mats, or steel plates over the root zone where equipment will pass.

c. Establish and identify travel lanes, parking areas, unloading, washout and storage areas to keep vehicles, equipment and chemicals away from tree root zones.

d. Where grading or excavation will damage roots, severing roots cleanly by hand or with power equipment (concrete saw) causes less tree damage then tearing through the root system with heavy equipment.

e. Filling and grading should be planned so as not to change the drainage or soil moisture level in the root zone area. In changing grade, do not add more than 4 – 6 inches of fill soil over the critical root zone. This fill will affect the amount of moisture and oxygen reaching the root system.

f. Prune any low hanging branches that are likely to be broken off by equipment.

g. Conduct construction during the winter or dormant season, when stress to trees will be less, and there is less soil compaction and disturbance on frozen ground.

h. Mulch and irrigate impacted trees as needed if construction occurs during the growing season.

4. Transplanting and Reforestation
Where appropriate, the developer should provide an appropriate level of reforestation to replace desirable trees that are damaged or removed. Consider transplanting smaller desirable trees on the site that may be severely damaged by construction - it may be reasonable to move trees up to 8 inches in diameter with the right methods.

5. Communication
Communicate with all staff, sub-contractors and Town staff about the details of the tree protection plan. Erect signage at key sites and trees protection areas to raise awareness of sub-contractors.

6. Mitigation and Maintenance after Construction
Where damage has occurred, a qualified professional (Certified Arborist) should be brought in to assess and mitigate the damage. This may include, pruning, watering, mulching, aerating or amending the soil, wound repair, etc.

7. Monitor and Evaluate
Town staff should monitor tree protection during construction and evaluate tree health after construction. Mitigation, tree care and replacement should be required as needed.

# APPENDIX B

## RECOMMENDED LANDSCAPING SPECIES AND PROHIBITED INVASIVE SPECIES

Consult the Missouri Botanical Garden website for information about individual landscaping species at: http://www.missouribotanicalgarden.org/plantfinder/plantfindersearch.aspx

1) Recommended Shade Trees
2) Recommended Small/Ornamental Trees
3) Recommended Shrubs
4) Recommended Shrubs and Trees for Screening/Buffering
5) Prohibited Invasive Plants

### Recommended Shade Trees

| COMMON NAME | LATIN NAME | MATURE HEIGHT (feet) | CROWN SPREAD (feet) | INTEREST | CULTURAL NOTES |
|---|---|---|---|---|---|
| **Beech, American** | *Fagus grandifolia* | 50 - 80 | 40 - 80 | magnificent specimen tree | intolerant to salt, drought, compaction |
| **Birch, Paper** | *Betula papyrifera* | 50 - 70 | 25 - 50 | NH state tree, fall color, bark | intolerant to drought, soil compaction, pollution; selection of insect and disease tolerant species is important |
| **Black Gum** | *Nyssa sylvatica* | 30 - 50 | 20 - 30 | beautiful in fall, fine architecture | requires moisture; intolerant to pollution, soil compaction; requires careful consideration for special use |
| **Elm** | *U/mus* | 50 - 70 | 30 - 50 | elegant upright form | select disease resistant cultivar, e.g. Princeton Valley Forge |
| **Ginkgo** | *Ginkgo biloba (male)* | 40 - 50 | 25 - 30 | yellow fall color | very hardy, difficult sites |
| **Gum, Sweet** | *Liquidambar styracifula* | 60 - 80 | 40 - 60 | five-lobed leaves; hard, spiked fruit | tolerates pool drainage |
| **Hackberry, Common** | *Ce/tis occidentalis* | 40 - 60 | 40 - 60 | light brown, distinctive bark | Intolerant to salt and shade, edible berries |
| **Hawthorne, Fleshy** | *Crataegus succulenta* | 20 - 25 | 20 - 25 | fruits/fall color | withstands drought |
| **Hopthornbeam, American** | *Ostrya virginiana* | 25 -40 | 25 - 30 | handsome tree | winter tolerant; salt intolerant |
| **Hornbeam, American** | *Carpinus caroliniana* | 20 - 35 | 20 - 35 | orange-red in fall | wet areas |
| **Larch, American** | *Larix laricina* | 60 - 100 | 20 - 30 | fine in masses | intolerant to drought and pollution |

| | | | | | |
|---|---|---|---|---|---|
| **Locust, Honey** | *G/editsia triacanthos* | 60 - 80 | 60 - 80 | tolerant of urban conditions | scented cream-color flowers |
| **Linden** | *Tilia* | 50 - 80 | 30 - 50 | broad conical tree | well drained soil; multiple cultivars - select varieties with care |
| **Maple, Red** | *Acerrubrum* | 40 - 70 | 30 - 50 | fall color | intolerant to drought and pollution |
| **Maple, Sugar** | *Acer saccarum* | 40 - 80 | 30 - 60 | beautiful fall color | Intolerant to pollution |
| **Maple, Three Flower** | *Acer triflorum* | 25 - 30 | 25 - 30 | fine small specimen | requires well drained soil |
| **Maple, Trident** | *Acer buergeranum* | 20 - 30 | 20 - 30 | fall color | hardy, withstands drought |
| **Oak, Pin** | *Quercus palustris* | 50 - 70 | 40 - 60 | distinctive canopy | tolerates poorly drained soil |
| **Oak, Scarlet** | *Quercus coccinea* | 50 - 70 | 40 - 50 | fall color | requires well drained soil |
| **Oak, Red** | *Quercus rubra* | 50 - 75 | 50 - 75 | tall tree | high maintenance |
| **Oak, Swamp White** | *Quercus bicolor* | 50 - 60 | 50 - 60 | large, broad leaves | wet areas, intolerant of salt and pollution |
| **London Plane Tree** | *Platanus acerifolia* | 75 - 100 | 60 - 75 | exfoliating bark | tolerant of pollution and compaction; leaf - slow breakdown |
| **Zelkova, Japanese** | *Ze/kova serrata* | 50 - 80 | 50 - 80 | handsome bark, architecture | hardy, well-drained soil; requires regular pruning |

## Recommended Small/Ornamental Trees

| COMMON NAME | LATIN NAME | INTEREST | CULTURAL NOTES |
|---|---|---|---|
| **Apple Serviceberry/Shadbush** | *Amelanchier* | white flowers, fall color | wet areas |
| **Cherry** | *Prunus* | flowers | can be difficult to grow and maintain |
| **Crabapple, Donald Wyman** | *Matus spp. 'Donald Wyman'* | white flowers, red fruit | well drained soil |
| **Crabapple, Japanese Flowering** | *Ma/us floribunda* | pink-white flowers, yellow-red fruit | well drained soil |
| **Crabapple, Professor Sprenger** | *Matus spp. 'Professor Sprenger'* | beautiful tree, flowers, fruit | hardy |
| **Dogwood, various** | *Cornus various* | flowers, shape, fruit | withstands drought |
| **Lilac, Japanese Tree** | *Syringa reticu/ata* | beautiful flowers | most trouble free lilac |
| **Pagoda Tree, Japanese** | *Sophora japonica* | foliage and fragrant flowers | rich, well drained soils |
| **Pear** | *Pyrus* | beautiful white canopy in bloom | Well-drained soil in full sun to partial shade |
| **Plum, Canadian** | *Prunus nigra* | white flowers, red fruit | works in small spaces |

## Recommended Shrubs

All are deciduous except where otherwise noted

| COMMON NAME | LATIN NAME | INTEREST | CULTURAL NOTES |
|---|---|---|---|
| **Arrowwood** | *Viburnum Dentatum* | flowers/fruit/fall color | withstands adverse city conditions |
| **Azalea** | *Azalea* | beautiful flowers | tends to be overused |
| **Bayberry, Northern** | *Myrica pensy!vanica* | semi-evergreen | no serious insect or disease problems |
| **Blueberry, Highbush** | *Vaccinium corymbosum* | flowers/fruit/fall color, winter twigs | withstands adverse city conditions/ attractive to birds |
| **Cotoneaster** | *Cotoneaster* | flowers and fruit | moist, loamy, well-drained soils |
| **Cranberry, Highbush or Cranberrybush** | *Viburnum Trilobum* | showy white flowers, glossy red berries | generally free of insect and disease problems; attractive to birds |
| **Dogwood, Panicled** | *Camus Racemosa* | flowers/fruit/colored stalks/fall color | will tolerate adverse city conditions |
| **Dogwood, Red Osier** | *Camus Sericea* | red stems, white berries | tolerant of most adverse city conditions |
| **Elderberry** | *Sambucus Canadensis* | white flowers, purple berries | tolerates adverse city conditions; attractive to birds. |
| **Forsythia** | *Forsythia* | yellow flowers in early spring; wild form | medium, well-drained soils |
| **Holly** | */lex* | Leaves, flowers, and berries | *evergreen,* useful to plant male and female near each other |
| **Juniper** | *Juniperus* | depends on variety | *evergreen,* many varieties and forms |
| **Lilac** | *Syringa* | beautiful fragrant flowers | well-drained soil in full sun |
| **Mountain Laurel** | *Kalmia Latifolia* | evergreen/flowers | *evergreen* |
| **Rhododendron, Rosebay** | *Rhododendron Maximum* | flowers/evergreen | *evergreen.* some pollution tolerance |
| **Spicebush** | *Lindera Benzoin* | yellow flowers/red fruits | no serious insect or disease problems |
| **Viburnum, Sweet** | *Viburnum Lentago* | flowers/fruit/fall color | tolerates adverse city conditions; select carefully due to pests |
| **Viburnum, Mapleleaf** | *Viburnum Acerifotium* | fall color | withstands adverse city conditions; select carefully due to pests |
| **Winterberry, Black Alder** | */lex Verticillata* | beautiful red berries in fall | cool, moist, acid soils; shade ok; relatively free of insect and disease; need male and female plants |
| **Witch Hazel** | *Hamametis virginiana* | lacy colorful blossoms | many varieties |
| **Yew** | *Taxus* | colorful fruit | *evergreen* |

## Recommended Shrubs and Trees For Screening/Buffering

*All are evergreen except where noted otherwise*

| COMMON NAME | LATIN NAME | HEIGHT (in feet) | GROWTH RATE | CULTURAL AND USE NOTES |
|---|---|---|---|---|
| **Arborvitae, Eastern** | *Thuja occidentalis* | 30 - 50 | Moderate | Tolerates wide range of conditions; can also function as low hedoe; prunes and tops well |
| **Boxwood** | *Buxus* | 3-5 | Slow | *Shrub*. |
| **Cedar, Red** | *Juniperis virginiana* | 50 - 75 | Slow | High wildlife value. |
| **Cedar, Western Red** | *Thuja plicata* | Up to 65 | Moderate | Moist, fertile, well-drained soil |
| **Euonymus** | *Euonymus* | 3-6 | Moderate/ Rapid | *Shrub*. Deciduous but dense |
| **Fir, Douglas** | *Pseudotsuga menziesii* | 75 - 100 | Moderate | High wildlife value. Don't mix with Colorado Spruce |
| **Forsythia** | *Forsythia* | 5-8 | Rapid | *Shrub*. Deciduous, wild form |
| **Hemlock, Canadian** | *Tsuga, canadensis* | 75 - 100 | Slow/ Moderate | Needs high moisture; low salt tolerance |
| **Juniper** | *Juniperus* | 3 - 10 | Rapid | *Shrub*. Many varieties. |
| **Lilac** | *Syringa* | 3 - 10 | Moderate | *Shrub*. Deciduous. |
| **Pine, Austrian** (Black Pine) | *Pinus nigra* | 20 - 40 | Moderate | Tolerates salt & city conditions; susceptible to disease |
| **Pine, Eastern White** | *Pinus strobus* | 75 - 100 | Moderate | Prefers acid soil. Hiqh wildlife value. |
| **Pine, Japanese Black** | *Pinus thundergiana* | 60 - 80 | Moderate | Tolerates salt |
| **Pine, Red** | *Pinus resinosa* | 50 - 100 | Moderate | Tolerates droughty conditions. |
| **Pine, Scotch** | *Pinus sy/vestris* | 30 - 60 | Rapid/ Moderate | Prefers acid soils; tolerates droughty conditions. |
| **Privet** | *Ligustrum* | 6 - 12 | Rapid | *Shrub*. select evergreen, noninvasive variety |
| **Spirea** | *Spiraea* | 2-6 | Moderate/ Rapid | *Shrub*. Deciduous but the brush is dense |
| **Spruce, Colorado** | *Picea pungens* | 75 - 100 | Slow | Prefers acid soil. Don't mix with Douolas Fir |
| **Spruce, Norway** | *Picea abies* | 50 - 75 | Moderate | Many cultivars available; attractive form |
| **Spruce, White** | *Plcea glauca* | 50 - 75 | Slow | Prefers acid soil. |
| **Viburnum** | *Viburnum* | 5-8 | Moderate/ Rapid | *Shrub*. Deciduous |
| **Yew** | *Taxus* | 3-8 | Slow | *Shrub*. |

## Prohibited Invasive Plants

| COMMON NAME | LATIN NAME | REASON |
|---|---|---|
| **Autumn Olive** | *Eleagnus umbel/ala* | Crowds out native vegetation |
| **Barberry, European** | *Berberis vulgaris* | Forms thorny thickets preventing native herbaceous and shrub growth |
| **Barberry, Japanese** | *Berberis thunbergii* | Forms thorny thickets preventing native herbaceous and shrub growth |
| **Bittersweet, Oriental** | *Celastrus orbicu/atus* | Vines grow up to 66 feet long. |
| **Buckthorn, Common** | *Rhamnus cathartica* | Buckthorn invading drier areas |
| **Buckthorn, Glossy** | *Rhamnus frangula* | Tolerant of dense shade and invades wet areas |
| **Euonymus, Winged** | *Euonymous alatus* | Dense shade and dense root system crowd out everything but own seedlings |
| **Honeysuckle** | *Lonicera morrowii and tatarica* | Form impenetrable thickets and displace vegetation in young forests and floodplains |
| **Honeysuckle, Japanese** | *Lonicera japonica* | Vine that chokes supporting trees and shrubs |
| **Japanese Knotweed** | *Fallopia japonica* | Very aggressive shrub along edge of roadsides and open lots |
| **Locust, Black** | *Robinia pseudoacacia* | Crowds out native vegetation |
| **Loosestrife, Purple** | *Lythrum salicaria* | Grows aggressively in wetlands |
| **Maple, Norway** | *Acer platanoides* | Crowds out native vegetation |
| **Rose, Multiflora** | *Rosa multiflora* | Crowds out native vegetation |

# Article 6. Lighting Standards



## Section 6.1 Purpose

The purpose of this article is to:

1) Permit the use of outdoor lighting that does not exceed the minimum levels specified in IES recommended practices for night-time safety, utility, security, productivity, enjoyment, and commerce;

2) Minimize adverse offsite impacts of lighting such as light trespass and obtrusive light;

3) Curtail light pollution, reduce skyglow and improve the nighttime environment for astronomy;

4) Promote use of high-efficiency lighting sources; and

5) Conserve energy and resources to the greatest extent possible.

## Section 6.2 Definitions

The following words and terms are oriented specifically toward lighting. However, these words and terms may be found elsewhere in the Site Plan Regulations, and may appear in more than one place (in which case, the same definition is given in both places). Wherever these words and terms are found, they shall have the meanings given below.

**Cone of illumination**. A regular conical shaped volume situated directly below, and centered upon, a light fixture. The sides of the cone radiate out from the fixture at an angle of 80 degrees from the vertical. For wall-mounted fixtures, the cone of illumination is a half cone.

**Floodlight**. A light fixture that is positioned or designed to concentrate substantial light, often in a single beam, in a direction other than directly downward.

**Footcandle**. The measure of light falling on a surface, usually the ground. One footcandle equals the amount of light generated by one candle shining on a one square foot surface one foot away.

**Full cut-off fixture**. A type of fixture as defined by the Illuminating Engineering Society of North America (IESNA). The standards are incorporated under Shielding, below.

**Glare**. Light emitted from a fixture, where the light source is not shielded, with sufficient intensity and in a direction such that it impairs a viewer's ability to see. In extreme cases it causes momentary blindness.

**Light trespass**. The shining of light beyond the subject property boundary.

## Section 6.3 Standards

6.3.1 Design. Lighting plans shall be designed to enhance the attractiveness, usability, comfort, and security of a site. Plans, including the design of mounting structures and fixtures, shall be designed with due consideration of setting, use, architecture, landscaping, existing trees, neighboring properties, and the character of the adjacent roadway.

6.3.2 Glare. All exterior lights shall be designed, located, installed, and directed in such a manner as to not cause glare and objectionable light trespass onto neighboring roads and properties.

6.3.3 Shielding. All lights, including those placed on building walls (e.g., wall-packs), shall be fully shielded such that the light source cannot be seen directly from any point on the same horizontal plane as the light source (i.e., a "full cut-off" fixtures). No more than 10% of the total light output (as measured in lumens) from any fixture may be directed above the cone of illumination and none of the total output may be directed above the horizontal plane that is at the same height as the fixture. At its reasonable discretion, the Planning Board may require additional shielding for lights, beyond what is described herein, to protect neighboring residential properties.

6.3.4 Maximum illuminance. Horizontal illuminance on the ground shall not exceed the following: 4 footcandles in the Residential zoning districts (RA, RB, RC and Rural), 8 footcandles in the Core Commercial Districts, (C, CB, CH, CC, and PO) and 12 footcandles in the Office Districts (DBP, OR, ORLI, and MUDOR), (except for gasoline station canopies, below).

6.3.5 Property line. Horizontal illuminance at the property line may not exceed one half (½) footcandle adjacent to a residential property nor 1 footcandle adjacent to a nonresidential property. This limitation does not apply in the vicinity of driveway entrances and exits.

6.3.6 Mounting heights. Light fixtures mounted on buildings shall not be placed higher than 20 feet above the ground. Light poles shall not exceed the following heights, measured from the ground to the bottom of the light fixture:

(a) 15 feet in the Residential Zoning districts;
(b) 20 feet in the Retail/Commercial Zoning Districts;
(c) 25 feet in the Research/Industry Zoning Districts

6.3.7 Gas station canopies. Light levels directly under a gas station canopy shall not exceed 20 footcandles. Light fixtures mounted under canopies shall be recessed so that the lens cover is recessed or flush with the bottom surface (ceiling) of the canopy. There shall be no lighting attached to the sides or top of the canopy, nor may the sides or top of the canopy be illuminated.

6.3.8 Vertical lighting. Exterior lighting of buildings is allowed only with express approval of the Planning Board, with the exception of low-level, fully shielded, downcast wall pack lights. Illumination of any vertical surface, including building walls, shall not exceed 3 footcandles.

6.3.9 Floodlighting. Floodlighting is prohibited, unless a): lights are directed toward the rear of a lot and away from the road and neighboring properties, and b) the Planning Board determines that there will be no negative impact upon motorists and neighboring properties.

6.3.10 Flashing lights. Flashing, blinking, and moving lights are prohibited.

6.3.11 Timing of lights. The Planning Board may stipulate that all unnecessary lighting (i.e., lighting not used for security) be turned off outside of business hours. Use of timers, sensors, and other energy saving devices is strongly encouraged.

6.3.12 Wiring. Wiring for all lighting fixtures must be placed underground.

6.3.13 Visibility for pedestrians. Appropriate lighting shall be provided to ensure visibility and safety for people walking to or within the site in the evening.

6.3.14 Natural areas. Lighting shall be directed away from stands of trees and habitat areas in order to not to disrupt animal behavior.

6.3.15 Abutting residential districts. Lighting on nonresidential properties that abut residential properties or residential zoning districts shall be turned off when the business is not open except for minimal necessary security lighting. As part of site plan review, the Planning Board may impose stricter standards than those included in this article for such nonresidential properties, as appropriate.

6.3.16 Lamp specifications

(a) Lamp types shall be selected for optimum color rendering as measured by their color rendering index (CRI), as listed by the lamp manufacturer.

(b) Lamps with a color-rendering index lower than 50 are not permitted. This requirement shall not apply to decorative lighting, which may include colored lamps, such as holiday lighting.

(c) Commercial lighting shall meet minimum IESNA illumination levels while not exceeding IESNA uniformity ratios and average illuminance recommendations.

(d) Should any outdoor light fixture, or the type of light source therein, be changed significantly or the intensity of light be increased significantly after the building permit has been issued, a modification to the site plan approval shall be required.

# Article 7. Miscellaneous Design Standards

Section 7.1 Building Configuration and Siting

## Section 7.1 Building Configuration and Siting

7.1.1 Configuration. Buildings shall be configured on the site in a manner to promote walkability, create a connection with each other and with the road/street providing access to the building(s), and foster a sense of harmonious open space. In many cases, but not always, this involves buildings being placed parallel or perpendicular to the road/street (except where other site constraints and objectives direct otherwise) and multiple buildings being placed parallel or perpendicular to one another.

7.1.2 Streetscapes. Buildings shall be configured and sited to enhance access to the structures and amenities on the site and views along the fronting streets.

7.1.3 Solar access. Siting and structure designs shall provide protection of a reasonable amount of sunlight from shade from structures and vegetation whenever feasible both to buildings within the site and to adjacent sites in order to preserve the economic value of solar radiation falling on structures, investments in solar energy systems, and the options for future uses of solar energy. Any obstructions of solar access to a registered solar energy system shall be mitigated to the maximum extent feasible during the review of any permit to construct a building, wall, fence or other structure, or part of a structure on a solar-impacting property.

## Section 7.2 Erosion and Sedimentation Control

An erosion and sedimentation control plan shall be submitted for any project: a) where there will be at least 10,000 square feet of ground disturbance; or b) where any area(s) of bare ground will be exposed during the construction process such that there would be a reasonable likelihood of adverse impacts on downgradient water or land from erosion or sedimentation without specific controls.

7.2.1 Stormwater manuals. The design and implementation of erosion and sedimentation control shall be guided by the practices laid out in the following manuals, as appropriate:

(a) New Hampshire Department of Environmental Services, Alteration of Terrain Program, New Hampshire Stormwater Manual, Volume 2 Post Construction Best Management Practices Selection and Design, latest version.

(b) New Hampshire Department of Environmental Services, Alteration of Terrain Program, New Hampshire Stormwater Manual, Volume 3 Construction Phase Erosion and Sediment Controls, latest version.

7.2.2 Standards. In addition, the following standards shall apply.

(a) Whenever practicable, native site vegetation shall be retained, protected, or supplemented. Any stripping of vegetation shall be done in a manner that minimizes soil erosion.

(b) Appropriate erosion and sediment control measures shall be installed and reviewed and approved by the Department of Public Works prior to any soil disturbance, unless other approaches are approved by the Department of Public Works.

(c) Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area using approved measures. Wetland areas and surface waters shall be protected from sediment. Soil disturbance shall be avoided within established buffers.

(d) All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of these temporary measures shall be permanently stabilized, including seeding of disturbed soil areas, when appropriate, within 30 days unless conditions dictate otherwise.

(e) The area of disturbance shall be kept to a minimum and be limited to an area only large enough to accommodate construction activities for a particular construction phase.

(f) Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas where feasible or measures to convey stormwater through the project area without causing erosion of sediment shall be included. Integrity of downstream drainage systems shall be maintained.

(g) Perimeter site controls shall not be placed within wetland areas, stream channels or wetland buffers.

(h) Disturbed soil areas shall be either temporarily or permanently stabilized consistent with the NHDES Stormwater Manual Volume 3 guidelines. In areas where final grading has not occurred, temporary stabilization measures shall be in place within seven (7) calendar days for exposed soil areas that are within 100 feet of a surface water body or a wetland and no more than fourteen (14) calendar days for all other areas. Permanent stabilization shall be in place within three (3) calendar days following completion of final grading of exposed soil areas.

(i) All temporary erosion and sediment control measures shall be maintained in functioning condition until final site stabilization is accomplished. A proposed inspection schedule shall be included in the approved plans.

(j) For construction during the winter season an erosion and sedimentation control plan and timeline shall be submitted by September 1 to the Department of Public Works.

(k) Additional temporary stabilization for the winter season consistent with NHDES guidelines shall be in place for disturbed areas that are not permanently stabilized

by October 1, or at the discretion of DPW.

(l) Special stabilization details shall be provided with the submission for any disturbance on slopes equal to or steeper than 3:1.

(m) Sediment Basins. For projects that will disturb and expose soils in areas of at least 1 acre in size, or less if stipulated by the Planning Board, a temporary sediment basin shall be provided with a minimum of 3,600 cubic feet of storage per acre of drainage area, until final stabilization of the site. In determining appropriate locations and number of sediment basin(s) needed, the operators may consider such factors as erodibility of site soils, slope lengths, available area on-site, construction period and other unique site considerations.

(n) Use of temporary sediment basins shall avoid any additional vegetation clearing or site disturbance not otherwise needed for post-construction. Sediment basin locations must be reviewed by the Department of Public Works prior to construction and must consider the potential for offsite impacts including public safety, especially as it relates to sediment movement and/or sediment basin failure and alternative sediment controls must be used where site limitations preclude a safe design.

## Section 7.3 Fences and Walls

7.3.1 The finished or "good" side of fences shall face outward, away from the subject property.

7.3.2 Chain link fences shall not be used: a) between the primary building and any street; b) within 20 feet of any street; or c) in any location that would be prominently visible from any street. Where chain link fences are used, they shall be covered in a dark green or black vinyl or planted with vines that will grow into the fences.

7.3.3 The height of fences and walls shall not exceed six (6) feet from grade unless the Planning Board agrees that a greater height is appropriate for additional screening purposes.

## Section 7.4 Special Flood Hazard Areas:

All site plan proposals governed by these regulations having lands identified as Special Flood Hazard Areas in the "Flood Insurance Study for the County of Strafford, N.H.", together with the associated Flood Insurance Rate Maps shall meet the following requirements:

7.4.1 Site Plan proposals, including their utilities and drainage, shall be located and designed to be consistent with the need to minimize flood damage.

7.4.2 All public utilities and facilities, such as sewer, electrical and water systems shall be located and constructed to minimize or eliminate flood damage.

7.4.3 Adequate drainage shall be provided to reduce exposure to flood hazards.

7.4.4 All site plan proposals shall include base flood elevation data.

7.4.5 All necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

## Section 7.5 Recreation and Open Space

7.5.1 Recreation facilities and preservation of open space may be required as part of multi-unit residential site plans, depending on the location of the development, the scale of the development, the type of residents expected to occupy the development, and the availability of nearby public facilities.

7.5.2 The Planning Board may stipulate construction of passive recreational structures such as benches, picnic tables, and gazebos, and/or active recreational facilities such as tot lots, playground equipment, ball fields, basketball courts, or tennis courts. Such recreational facilities and open space shall be available for use by the residents of the subject development. The Planning Board may not require public access to these facilities unless acceptable to the developer.

7.5.3 The Planning Board may determine the suitability of particular open space areas based upon size, shape, topography, geology, access, location, proximity to neighboring open space areas, and other pertinent factors.

## Section 7.6 Signage

7.6.1 Standards for signage regarding the number, location, dimensions, and other parameters are contained in the Town of Durham Zoning Ordinance. Proposed signs (except where exempt from review) are reviewed by the Zoning Administrator to ensure compliance with the ordinance.

7.6.2 As part of site plan review, when new signage will be installed, the applicant shall submit proposed sign designs to the Planning Board for the opportunity to make recommendations to the applicant regarding the design, in accordance with the suggested guidelines below. When the design meets the requirements of the Zoning Ordinance, the applicant need follow any such recommendations of the Planning Board, only at his or her option. No such review of signage is required for changes to existing signage or new signage when site plan review is not involved.

7.6.3 Suggested Sign Guidelines. In order to enhance the aesthetic appeal of the community, the following approaches and types of signs are encouraged:

(a) Signage that is low in height and small in area;

(b) Signage which is non-illuminated

(c) Use of a dark background with light letters;

(d) Use of wood, metal, urethane, or other solid materials, rather than plastic;

(e) Use of a matte or non-reflective surface;

(f) Use of building-mounted signs rather than freestanding signs;

(g) For freestanding signs, use of two posts rather than one center pole; and

(h) Monument style signs (signage rising from a base connected to the ground) rather than pole signs

# Article 8. Natural Resources Standards



## Section 8.1 Purpose

The purpose of this section is to protect, preserve, and enhance Durham's rich and varied natural resources while accommodating appropriate growth and development by encouraging the applicant and the Planning Board to consider natural resources in the planning process.

## Section 8.2 General Provisions

8.2.1 Buildings, parking areas, travel ways, and other site elements shall be located and designed in such a manner as to preserve natural resources and maintain natural topography to the extent practicable. Extensive grading and filling shall be avoided.

8.2.2 Development shall be directed away from valuable and fragile resources to the extent practicable.

8.2.3 Development shall follow the natural contours of the landscape to the extent practicable to minimize grading.

8.2.4 The applicant is encouraged to make special efforts to protect elements considered to have significant value, which in many cases involves creating a buffer around them.

8.2.5 The Planning Board may request guidance from the Conservation Commission or other knowledgeable parties in its consideration of natural resources.

8.2.6 The Board may require the designation of buffer strips of at least 50-feet width around surface water, wetlands, or other natural features that may be adversely affected by erosion or stormwater runoff. The Board may require a vegetative buffer to provide screening, where appropriate.

8.2.7 Natural features and systems shall be preserved in their natural condition, wherever practicable. Such areas include watercourses, waterbodies, floodplains, wetland areas,

steep slopes, aquifer recharge areas, wildlife habitats, large or unique trees, and scenic views.

8.2.8 All regulated substances shall be stored, transported, disposed, or transferred in accordance with the rules for Best Management Practices for Groundwater Protection of the New Hampshire Department of Environmental Services (NHDES).

8.2.9 The development shall meet all applicable federal, state, and Town regulations, statutes, ordinances, and standards.

## Section 8.3 Water Quality Protection

8.3.1 The proposed development shall not adversely impact either the quality or quantity of groundwater available to surrounding properties or to public water supply systems.

8.3.2 For any on-site water system supplying 20,000 gallons per day (gpd) or more, evidence presented by a qualified hydrologist shall be sufficient to reasonably conclude that there will be no adverse effect on other public or private groundwater sources.

## Section 8.4 Specific Features

The elements listed below are considered to be: a) resources worthy of protection or special care; or b) features which, if disturbed, could cause hazards to the environment, health, safety, or property. These elements shall be preserved, if practicable, and enhanced, where appropriate, or special design solutions shall be incorporated to avoid, minimize, or mitigate impacts or protect against hazard.

1) Wetlands

2) Rivers, streams, lakes, and ponds

3) Aquifers, aquifer recharge areas, and groundwater

4) High groundwater, perched groundwater, shallow depth to ledge, poorly drained soils, and excessively well drained soils (generally considered a sensitive feature rather than one worthy of protection)

5) Flood plains

6) Steep slopes (i.e., those greater than 15% where there is a change in elevation of at least 4 feet)

7) Exposed ledge or areas with frequent or large rock outcrops (generally considered a sensitive feature rather than one worthy of protection)

8) Large boulders

9) Individual specimen trees (unusually large, old, rare, or attractive trees)

10) Unusual, rare, threatened, or valuable tree and plant communities. Mast stands shall be preserved to the extent practicable.

11) Special habitats crucial to maintaining wildlife populations, e.g., deer yards and vernal pools. The current New Hampshire Wildlife Action Plan should be used as a reference in determining these possible locations. Development shall be directed away from habitat types that are rare statewide. Deer yards shall be preserved to the extent practicable.

### Section 8.5 Energy Conservation

8.5.1 The Applicant shall submit a completed Energy Considerations Checklist. Except for those items on the checklist with which compliance is required by specific regulation, such as the standards under Chapter 38 of the Town of Durham Code of Ordinances, the applicant is encouraged (but not required) to satisfy the objectives contained in the checklist. Prior to Planning Board site plan approval, the checklist must be submitted and the applicant must meet with a representative of the Durham Energy Committee and the Building Inspector. Thus, the checklist is required prior to approval, not acceptance of the application.

8.5.2 Buildings should be sited and developed to benefit from solar heating and passive cooling to the extent practicable. It is recognized that this goal may conflict with the provision in the Architectural Standards, where applicable, for buildings to be oriented toward the street, so balance should be sought.

8.5.3 Solar panels. Where the applicant will be including solar panels, the Planning Board may request, in coordination with the applicant, architectural drawings to identify solar-ready zones on southern-exposure portions of the roofs of each building (See definition in Part I). These solar-ready zones are spaces that are unshaded, un-penetrated, and free of obstructions and may thus serve as a suitable place where solar panels can be installed as part of the project or at a future date.

## Article 9. Operational Issues Standards



### Section 9.1 Hours of Operation

The Planning Board may restrict hours of operation for businesses and other organizations as appropriate, such as for businesses that are located in close proximity to residences and that generate significant activity.

## Section 9.2 Management and Maintenance of the Site

The property shall be maintained in a sanitary condition, with a neat and orderly appearance, free from refuse and debris.

When the Planning Board deems appropriate, the applicant shall provide a property management plan. The plan shall include the following elements, as appropriate:

a) rules and regulations of the development;

b) night-time security for the site from Thursday night through Saturday night, from 9:00 p.m. to 2:00 a.m. (the following morning);

c) acknowledgement that if problems persist on the property, as reasonably determined by the Police Chief, with timely notification to the property owner, then: i) the property owner shall provide full time security 7 days a week from 8:00 p.m. to 6:00 a.m. until the problems are rectified, as reasonably determined by the Police Chief; or ii) an alternative corrective measure, as approved by the Police Chief, may be implemented until the problems are rectified, as reasonably determined by the Police Chief;

d) contact information for a primary agent with authority to resolve security and other issues and who can be reached 24 hours a day/7 days a week;

e) contact information for a secondary agent, who can address the concerns, above, if the primary agent is not available;

f) assurance that all information will be updated with the Police, Fire, and Building Departments, as needed;

g) permission for the Building Official to have access to the development to enforce the Durham Town Code Section 118:11 for Offensive Material (Waste Material), as needed; and

h) when deemed appropriate by the Planning Board, a provision that at least one full-time staff member and at least one courtesy officer shall reside on-site, or that there be somebody on site, or immediately available to the site, overseeing the operation, 24 hours a day, 7 days a week.

i) the following statement: "It is understood that professional management of the site is critical and the Town of Durham expects that the ownership/management will be highly diligent in overseeing and suppressing any activity on the part of residential tenants or their visitors or any other parties on site which would be unreasonably disturbing to any of the residents or neighbors of the project, including loud parties, especially late at night, and other unruly and disturbing behavior. Owner/Manager agrees to cooperate with the Town of Durham to ensure all appropriate measures are being followed to suppress unruly or noisy behavior."

## Section 9.3 Snow Storage and Removal

9.3.1 Snow shall be removed from driveways, parking areas, sidewalks, and other areas where its accumulation in the winter would impair safe and efficient use of the site. Snow shall not be pushed against trees or other vegetation. Provisions shall be made for storage of snow on site and/or removal of snow from the site when there is not sufficient space on site or when there will not be sufficient space in the event of excessive snowfall.

9.3.2 Snow storage areas shall be located such that no direct discharges to receiving waters are possible from the storage site. Runoff from snow storage areas shall enter treatment areas to remove suspended solids and other contaminants before being discharged to receiving waters or preferably be allowed to infiltrate into the groundwater.

9.3.3 Snow storage areas shall be selected to avoid:

(a) landscaped areas and natural vegetation, especially vegetation that is less hardy and more likely to be harmed by snow storage;
(b) drainage ways whose function would be impaired if blocked by snow;
(c) areas where spring flooding could result;
(d) wetlands, ponds, and streams;
(e) locations where vehicular or pedestrian visibility would be impaired;
(f) vehicular and pedestrian travel ways;
(g) areas where it might present a visual nuisance; and
(h) other sensitive locations on the site.

9.3.4 Snow shall not be stored where it might accumulate on, slump onto, or result in spring flooding of, adjacent properties or public ways.

9.3.5 Snow shall not be stored where melting could create a hazard when refreezing occurs.

9.3.6 Snow shall be stored in a location to provide maximum protection to downstream sites from the accumulated ice control materials and chemicals that often end up in snow storage areas.

9.3.7 In some cases, it may be effective to direct snow toward stormwater basins in order to avoid rapid spring runoff from snow melt, prevent sediment loading of downstream waters, and allow for the settling out of salts and other contaminants prior to leaving the site.

9.3.8 When appropriate, the snow storage plan shall include a calculation to show there will be sufficient space for storage of snow on site. Generally, there shall be 1 square foot of storage area for every 5 to 10 square feet of area to be cleared. (See *New Hampshire Department of Environmental Services Best Management Practices* for snow storage.)

## Section 9.4 Solid Waste

The applicant shall include adequate provisions for solid waste disposal and shall comply with Chapter 118. Solid Waste of the Town of Durham Code.

9.4.1 General Requirements

(a) All waste materials shall be contained in dumpsters or other acceptable receptacles. Disposal areas shall be fully enclosed and screened from the street and from abutting properties by a fence, a wall, vegetation, or another method to a height of at least 6 feet. For dumpsters over 6 feet in height, the height of the screening device shall be at least 1 foot above the height of the dumpster.

(b) All dumpsters shall be placed on a suitable surface. When there will be intensive usage, the dumpster shall be located on a minimum 6 inch thick concrete pad.

(c) Special safeguards may be stipulated to minimize odors, flyaway trash, and impacts upon environmental resources.

(d) The Planning Board may stipulate the following (or comparable) as part of a site plan approval, as appropriate: The property owner's waste management hauler's name, account number, and phone number shall be provided to the Durham Building Official/Health Officer (DHO) in order that the DHO can call and order an emergency pick up if necessary. The DHO is authorized to request this service at the applicant's expense should it be deemed necessary. The DHO is authorized to contact the waste management hauler only after first contacting the property owner and allowing the property owner to order a pick up.

(e) The owner of a property shall insure that the contents of all waste containers are to be emptied or removed for disposal as necessary to prevent nuisance odors and public safety hazards.

9.4.2 Location of Facilities

(a) Solid waste facilities shall be strategically located in order to minimize visibility from the street; minimize visibility and the impact of odors, noise, and flyaway trash upon abutters; minimize interference with the daily operations on the site; and allow for safe and convenient access and removal without damage to sidewalks or other Town property.

(b) Dumpster or other waste container pads shall be a minimum of 20 feet from any property line or yard.

(c) Dumpster or other waste container pads shall be a minimum of 20 feet from any inlet for stormwater collection.

(d) When a dumpster or other waste storage container pad is adjacent to a watercourse, a minimum landscaped area of 50 feet shall be maintained between the pad and the bank of the watercourse.

9.4.3 Storage Containers

(a) Every property shall be supplied with adequate solid, semi-liquid, and liquid waste storage containers, as appropriate. These containers shall be provided by the owner

of the property, by the construction company, or by contract with a commercial hauler.

(b) All solid waste storage containers shall be resistant to insect or animal entry. Liquid waste may only be stored in tanks designed for the particular waste type.

(c) Containers shall be constructed with rust- and impact-resistant materials and shall be equipped with tight-fitting covers. Containers shall have an appropriate child-safe design and be securely locked to prevent unauthorized access after business hours. The property owner is responsible for maintaining containers in a neat, clean, sanitary, and leak-free condition.

(d) All containers for regulated substances shall meet all applicable federal, state, and local standards.

9.4.4 Recycling and Reuse

(a) Recycling shall comply with Chapter 118. Solid Waste of the Town of Durham Code.

(b) Site plans shall include provisions for collection of recyclable materials. These provisions shall include an appropriate, dedicated physical space for recycling receptacles sized to support the planned occupant load. The site waste management plan shall require the applicant to provide supervision to ensure that occupants know and comply with Town recycling standards.

(c) The waste management plan shall provide for single-stream recycling.

### Section 9.5 Flammable and Combustible Liquids

9.5.1 All flammable and combustible liquids shall be contained and stored in accordance with the National Fire Protection Association's standards and the International Fire Code.

9.5.2 The location of all flammable, combustible and hazardous material storage shall be provided to the Fire Department along with a copy of all required Material Safety Data Sheets (MSDS) prior to Fire Department approval.

### Section 9.6 Street Addressing

9.6.1 New street addresses will be issued by the Durham Fire Department for new developments and for additions to, changes to, and redevelopment of, existing sites, when appropriate.

9.6.2 The Town may stipulate that a private driveway or travel way serving a new development be given a separate street name, where appropriate. In such cases, the applicant shall apply for a new street name and install a street sign in accordance with Town standards.

## Article 10. Parking and Circulation Standards

### Section 10.1 Required Number of Parking Spaces

## Section 10.1 Required Number of Parking Spaces

Purpose. The purpose for setting a minimum required number of on-site parking spaces is to eliminate or minimize inefficient and unsafe parking outside of designated areas, unauthorized parking on neighboring private parking lots, and disproportionate use of on-street parking spaces.

Parking shall be required as follows and shall be rounded up to the nearest whole number:

| Type of use | Number of required parking spaces |
|---|---|
| *Residential* | |
| Single-family duplex or multi-unit dwellings | 2 per dwelling unit |
| OR | |
| Dwelling units permitted to be occupied by 3 or more unrelated individuals | 1 per resident |
| Dwelling units in multi-unit dwellings that include 10 or more units | 1 per dwelling unit |
| Studio units and one-bedroom units that are under 1,000 square feet | 0.75 per dwelling unit |
| Rooming or boarding houses, fraternities, sororities, or congregate housing | 1 per resident |
| Elderly housing | 1 per dwelling unit plus 1 per employee |
| Homes for aged, disabled, or handicapped | 1 per 5 beds, plus 1 per employee of the maximum shift |
| Educational facilities | 1 per staff member, plus 1 for 4 seats in the largest public assembly room |
| | |
| *Commercial* | |
| Bed and breakfasts or hotels and motels | 2 for the resident family or |

| | |
|---|---|
| | manager, plus 1 per rental room, plus 1 for each 2 outside employee on the maximum shift, plus 1 per 400 square feet of meeting place |
| Veterinary clinics or commercial kennels | 1 per 400 square feet of gross floor space; minimum of 4 |
| Auditoriums, theaters, churches, or other places of assembly with fixed seating | 1 per 4 seats or 40 square feet of gross floor area used for assembly purposes; whichever is greater |
| Libraries, museums, and art galleries | 1 for every 500 square feet of gross floor area. |
| Day care | 1 per 6 supervised children or adults, plus 1 per employee |
| Restaurant Carry-out | 1 space per every two (2) seats, plus (1) space per each employee in the maximum shift, or one (1) space per fifty square feet of gross floor area, plus one (1) space per each employee in the maximum floor shift. |
| Restaurants less than 4,000 square feet | 1 per 100 square feet of seating area, plus 1 per employee on the maximum shift |
| Restaurants over 4,000 square feet | 40, and 1 per 200 square feet of gross floor area in excess of 4,000 square feet |
| Banks and financial institutions | 1 per 250 square feet of gross floor area |
| Professional offices | 1 per 350 square feet of gross floor area |
| Medical and dental offices | 1 per 250 square feet of gross floor area, plus 1 per employee |
| Offices not providing customer service | 1 per employee, but not fewer than 1 per 400 feet of gross floor area |
| Retail or personal service stores | 1 per 250 square feet of gross floor area |

| | |
|---|---|
| Retail II (furniture, hardware or carpets) | 1 space per 600 hundred square feet of gross floor area. |
| Service stations | 3 per service bay, plus 1 per employee |
| Manufacturing uses, research testing and processing, assembling, all industries | 1 per 1.5 employees on a maximum shift, but not less than 1 space for every 400 square feet of gross floor area |
| Other Uses | Closest similar use as shall be determined by the Director of Planning and Zoning Administrator. |

## Section 10.2 General Parking Requirements

10.2.1 When a proposed use on an established site would require more parking spaces than the existing use, additional parking spaces shall be provided to accommodate the proposed use. If it is not practical to create additional parking spaces for the new use, the Planning Board may reduce or eliminate this requirement at its reasonable discretion.

10.2.2 Parking spaces, excluding employee parking, shall be on the same lot with the principal building unless arrangements have been made for shared parking on another property and approved by the Planning Board

10.2.3 Where there are multiple uses within one site or building, parking requirements shall be determined by adding the requirements for each individual use. This also applies where there is one principal use that contains secondary use areas, such as a retail shop which contains separate office and storage areas.

10.2.4 Required parking spaces shall not be used for any purposes other than vehicle parking unless specifically approved by the Planning Board.

10.2.5 All off-street parking shall be provided on-site unless other arrangements are approved by the Planning Board.

10.2.6 While the parking table above provides the minimum number of on-site parking spaces, there shall not be created an excessive amount of parking either, in order to avoid unnecessary development and unsightly expanses of pavement. The Planning Board may limit the total amount of on-site parking spaces where it determines that an excessive amount is proposed, including, in unusual cases, stipulating a total amount less than what is specified in the parking table above.

10.2.7 Maximum Number Allowed. Parking lots may contain up to ten percent (10%) more spaces than the required minimum. Any additional spaces above ten percent (10%) shall be allowed only as a conditional use upon the finding that such additional spaces are needed.

10.2.8 Off-street loading spaces shall not be counted to satisfy the off-street parking requirements.

10.2.9 Central Business District exemption. All permitted uses shall be exempt from the parking requirements of this chapter within the Central Business District, provided that:

(a) A one-time parking impact fee (as set by the Town Council) is paid by the owner and/or developer for the number of spaces required less the number of on-site spaces provided. The parking impact fee shall be reviewed by the Durham Town Council on an annual basis.

(b) The existing number of required parking spaces shall not be reduced by any proposed development unless approved as part of a property redevelopment plan by the Planning Board.

## Section 10.2a Alternative Parking Solutions

At their option, an applicant may propose an alternative parking solution to meet the parking demand for a proposed use in place of the number of spaces specified in Table 10.1 Required Number of Parking Spaces, above. (This section is adopted in accordance with RSA 674:16-a.)

10.2a.1 An alternative parking solution may include, but is not limited to, the following.

(a) an agreement for the provision of off-site parking spaces with another property owner during hours which the off-site parking spaces are not in use (with consideration of intermittent, seasonal, and compatible uses) located within a quarter of a mile of the proposed residential use. A shared parking agreement shall be filed with the Town.

(b) an agreement with a rideshare company to provide transportation to the occupants of the proposed residential use.

(c) availability of public transportation including fixed-route bus service within a quarter of a mile of the proposed residential use. Or

(d) location in one of the five Core Commercial districts where there is adequate walkability infrastructure. The Planning Board may consider an alternative parking solution in determining the number of spaces required under the Central Business District exemption, above.

10.2a.2 "Adequate walkability infrastructure" means sidewalks, density of development, bus stops, bike lanes, mixed use neighborhoods, and other infrastructure that supports walkability.

10.2a.3 If there is a proposal for a residential use to meet the on-site parking requirements with an alternative parking solution due to economic considerations, the Planning Board shall consider such alternative parking solution.

10.2a.4 The Planning Board may approve an alternative parking solution herein even if it is inconsistent with a requirement under the zoning ordinance.

10.2a.5 If the applicant can demonstrate that the alternative parking solution will meet the parking demand created by the proposed residential use, the Planning board shall approve the alternative parking solution.

10.2a.6 The Planning Board shall not be required to approve the alternative parking solution if the results of a third-party review under RSA 676:4-b, I, conclude that the proposed alternative parking solution will not meet the parking demand created by the proposed residential use. The Planning Board can request a third-party review at its option under RSA 676:4-b, I.

## Section 10.3 ADA-Accessibility Requirements

10.3.1 All sites and parking lots shall be in compliance with the Americans With Disabilities Act of 1990, as amended (ADA). The number and design of ADA-accessible parking spaces shall conform to the N.H. Architectural Barrier Free Design Code, as prepared by the Governor's Commission for the Handicapped and/or Title III of the deferral Americans with Disabilities Act.

10.3.2 Number of spaces.

(a) Wheelchair accessible parking spaces must be provided on sites that provide on-site parking, as follows:

| Minimum number of accessible spaces | Total number of Parking spaces |
|---|---|
| 1 | 1 to 25 |
| 2 | 26 to 50 |
| 3 | 51 to 75 |
| 4 | 76 to 100 |
| 5 | 101 to 150 |
| 6 | 151 to 200 |
| 7 | 201 to 300 |
| 8 | 301 to 400 |
| 9 | 401 to 500 |
| 2% of total | 501 to 1,000 |

(b) At least 1 in every 8 wheelchair accessible spaces shall be designated as van accessible, or otherwise as provided for in ADA.

10.3.3 Design of spaces.

(a) ADA-accessible parking stalls shall be at least 8 feet in width. All ADA-accessible parking spaces shall be served by an adjacent access aisle that is at least 5 feet wide for standard spaces and at least 8 feet wide for van accessible spaces. The access aisle may be shared by two adjacent spaces.

(b) Every wheelchair-accessible space shall be identified with appropriate pavement marking and a clearly visible vertical sign, between 5 and 8 feet in height. Signage

for every van-accessible space shall indicate that the space is van accessible. Vertical "No Parking" signs shall be installed in front of each ADA-accessible parking space access aisle.

10.3.4 Other Requirements

(a) ADA-accessible parking spaces shall be located in close proximity to wheelchair accessible entrances to the building. Wherever practicable, the main entrance to the building shall be wheelchair accessible.

(b) The route from the access aisle to the nearest wheelchair accessible entrance must be paved.

(c) The slope of wheelchair accessible parking spaces and adjoining access aisles shall not exceed 1 foot of rise per 48 feet of run.

(d) Wheelchair ramps shall be provided, where appropriate, with a slope not exceeding 1 foot of rise per 12 feet of run.

(e) ADA-accessible curb ramps shall be provided as necessary.

(f) Truncated domes (textured plates) to alert visually-impaired persons shall be installed at tip downs where sidewalks meet streets, driveways, and parking lots. Truncated domes shall be constructed of cast iron or other materials acceptable under ADA.

(g) All tip-downs on sidewalks located within any Town right-of-way shall be made of concrete.

## Section 10.4 Parking Lot Design

10.4.1 General Requirements

(a) Applicants shall situate parking lots to the side and/or rear of buildings to preserve streetscapes, unless the Planning Board determines that placement at the rear or side is not practicable.

(a) Within the five Commercial Core Zoning Districts (C, CB, CC, CH, and PO) parking lots shall be located at the rear of principal buildings unless the Planning Board determines that placement at the rear is not practicable, in which case parking lots may be located at the side of principal buildings set back at least as far as the front of the building or 15 feet, whichever is greater.

(b) All parking spaces shall be designed such that they can be accessed safely from the aisles and that there is sufficient room for backing and turning for spaces situated at the end of an aisle.

(c) Parking areas shall be designed such that it is not necessary for vehicles to back into a public road.

(d) All parking spaces shall be demarcated with white or yellow traffic paint/marking of two-inch minimum line width.

(e) Parking areas shall have a minimum grade of 0.5% and a maximum grade of 5%.

10.4.2 Stall size

(a) The standard parking stall, located perpendicular to the traffic aisle, shall be at least 9 feet wide and 18 feet long.

(b) Parking stalls set at an angle to the traffic aisle shall be large enough to fully contain a rectangle measuring at least 9 feet in width and 18 feet in length.

(c) Parking stalls oriented parallel to the traffic aisle (i.e., parallel parking spaces) shall be at least 8 feet wide and 22 feet long.

(d) A compact parking space shall be no smaller than eight by sixteen (8 x 16) feet. No more than thirty percent (30%) of the off-street parking requirement shall be met by the use of compact spaces, and all such spaces shall be suitably marked on the site as compact spaces.

10.4.3 Design Requirements.

(a) All parking areas and access driveways shall have bumper guards, curbs, or other measures, as appropriate, to define parking spaces or limits of paved areas, and to prevent vehicles from projecting into any setback, landscaping area, or other portion of a lot where parking is prohibited.

(b) Parking lots for ten (10) or more vehicles shall be clearly marked with properly painted lines or other method approved by the Code Enforcement Officer.

(a) Width of Drive Aisle. The width for traffic aisles shall be as follows:

| **Angle of parking stall to drive aisle** | **Two-way circulation: Minimum aisle width** | **One-way circulation: Minimum aisle width** |
|---|---|---|
| 90 degrees | 24 feet | 20 feet |
| 60 degrees | Not Permitted | 18 feet |
| 45 degrees | Not Permitted | 16 feet |

(d) One-way vs. two-way circulation. In most cases, the conventional parking layout with spaces situated perpendicular to the traffic aisle is preferred (middle column, above). However, there may be situations when a one way circulation pattern with angled parking spaces works better (right-hand column, above).

## Section 10.5 General Requirements for Parking Lots and Circulation

10.5.1 Sites and parking lots shall be designed so that there is safe and efficient traffic circulation.

10.5.2 All travel ways shall be of sufficient width and configuration to accommodate the prospective traffic and to afford satisfactory access into, through, and out of the site for police, fire, and other emergency service vehicles.

10.5.3 Channelizing/stacking space shall be provided at entrances into sites, exits out of sites, and other appropriate areas.

10.5.4 The Planning Board may stipulate driveway and parking lot interconnection of adjoining parcels where it determines that such interconnection is practicable, will enhance traffic movement and on-site circulation, will reduce the number of vehicles entering and exiting the street, and will not lead to undue traffic cutting through lots or create backups of vehicles. Where an adjacent lot is vacant a stub out to the property line may be required to accommodate future connection. For shared driveways and parking lot/driveway connections cross easements shall be recorded at the Registry of Deeds.

10.5.5 Each site shall have full internal vehicular circulation, with access from any location on the site to any other without need to use the adjacent street system.

10.5.6 All driveways shall be at least 20 feet in width, except for parking aisles, as specified in the table, above, and one-way driveways, where the Planning Board determines that a narrower width is workable.

10.5.7 Any driveway width greater than 24 feet shall be justified based upon large traffic volumes, the need to accommodate oversized vehicles, or other considerations as determined by the Planning Board.

10.5.8 Curbing, striping, islands, landscaping, or other appropriate means shall be provided as needed to control and direct traffic.

10.5.9 Appropriate directional signage shall be provided in accordance with the current USDOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices for Streets and Highways" ("MUTCD"). Parking spaces, stacking lanes, entry and exit drives, and direction of traffic flow shall be appropriately demarcated.

10.5.10 Fire lanes and emergency vehicle access into and through the site shall be provided as necessary.

10.5.11 The maximum slope for any driveway for any project subject to these regulations is 8 percent.

10.5.12 Traffic Calming. Where the Planning Board determines appropriate, special techniques shall be employed to slow traffic on a site, in order to enhance safety for drivers, pedestrians, and bicyclists.

10.5.13 Zoning Ordinance. Until such time that Article XXI – Off-Street Parking and Loading, in the Durham Zoning Ordinance, is removed from the Zoning Ordinance, wherever any provision in these regulations is inconsistent with a provision in the Zoning Ordinance, the stricter provision shall apply.

## Section 10.6 Pavement Structure

10.6.1 All parking areas and travel ways shall be surfaced with a hard, finished surface - asphalt, concrete, porous asphalt or concrete, interlocking pavers, paving stones, or comparable material - that will provide good protection against potholes, erosion, and dust, and will not be subject to damage from snow plowing. However, developments that generate little parking and traffic, developments in rural or outlying areas, and low usage overflow parking areas may be finished with gravel, crushed stone and comparable materials. This exception does not apply to nonresidential uses which will generate significant traffic, multi-unit dwellings, fraternities, sororities, and rooming and boarding houses, for which a hard, finished surface shall be used.

10.6.2 All parking areas and travel ways that are paved with asphalt shall have a structural section with these minimum specifications, except where otherwise approved by the Planning Board with a recommendation from the Department of Public Works.

- 1 inch top "wearing" course,
- 2 inch base "binder" course,
- 6 inch bank run gravel, and
- 6 inch crushed gravel.

10.6.3 Loam or yielding material shall be removed to a depth of at least 21 inches below final grade and replaced with gravel. Muck shall be removed to a depth of at least 36 inches below finish grade and replaced with gravel. Given that these are privately maintained areas, the Planning Board may adjust these standards appropriately on an individual basis.

## Section 10.7 Curbing

10.7.1 Curbing or other means of articulation may be required within the site to facilitate traffic circulation, direct drainage, and protect landscaping.

10.7.2 Curbing, including sloped curbing, shall have a 6-inch vertical reveal. Sloped curbing shall be set at a 45 degree angle unless otherwise approved by the Planning Board.

10.7.3 Where concrete curbing is used, it may be either cast in place or precast. It shall:

- have a minimum strength of 2,500 psi;
- be at least 18 inches in depth; and
- be at least 5 inches in width.

10.7.4 Where asphalt (bituminous) curbing is used, a tack coat of bituminous material shall be placed on the pavement for the width of the curb before placing the curb.

10.7.5 Where curbing forms the edge of a sidewalk, the curb shall be vertical.

10.7.6 Any curbing placed within or along the street right of way shall be vertical or sloped granite curbing, as specified by the Planning Board. Placement of curbing within the street right of way may be appropriate in order to articulate turning radii at the entrance, direct stormwater, protect sidewalks, reinforce road structure, continue existing curbing, or perform other functions.

## Section 10.8 Surface materials

10.8.1 Use of permeable (or "pervious" or "porous") paved surfaces is encouraged for parking areas and travel ways.

10.8.2 Whenever possible the applicant is encouraged to utilize alternate paving methods for parking lots, such as, but not limited to, permeable pavement, permeable concrete or grass pavers to reduce the environmental impact and drainage impacts.

10.8.3 When permeable pavement is used, the applicant shall: a) submit a maintenance plan; and b) erect a prominent sign in the parking lot/travel way pointing out that the pavement is permeable, salt, sand, and seal coating must not be applied, and the parking lot must be vacuumed at appropriate intervals. (For placement and design criteria, see the New Hampshire Stormwater Manual Volume 2 - http://des.nh.gov/organization/divisions/water/stormwater/manual.htm and the UNH Stormwater Center - http://www.unh.edu/unhsc/.)

## Section 10.9 Loading

10.9.1 All nonresidential and large residential multi-unit sites shall be provided with off-street loading facilities sufficient to meet the needs of the proposed use.

10.9.2 Loading areas shall be located and designed to allow shipping and delivery vehicles to maneuver safely and efficiently to and from a public street, without unduly interfering with vehicular movement either on-site or on a public street.

10.9.3 Loading areas shall be located on the side or rear of the building and shall be screened from abutting residences. No loading space shall be located within 50 feet of a residential district boundary nor the lot line of an abutting residential use within a residential district.

10.9.4 A typical loading bay contains a rectangular area of at least 50 feet in length and 12 feet in width with a minimum height clearance of 14 feet above grade. Loading bays may be larger or smaller depending upon the needs of the proposed use.

10.9.5 All loading spaces shall be appropriately graded and surfaced. Use of a concrete pad for heavy-duty vehicles is encouraged.

10.9.6 While it is not preferred, designated parking spaces may also serve as loading spaces, when deemed workable by the Planning Board.

# Article 11. Pedestrian, Bicycle, and Transit Facility Standards



## Section 11.1 General Provisions

11.1.1 The site plan shall provide for a system of pedestrian or bicycle paths, or a combination of both, as appropriate to the type and scale of development. This system shall connect the major building entrances and exits, parking areas and any existing or proposed sidewalks within or adjacent to the project.

11.1.2 Any paths shall be located within the lot lines of the site, unless it is determined by the Planning Board that it would be more appropriate to locate these in the public right of way.

11.1.3 The system shall be designed to link the project with residential, recreational, commercial facilities, schools, bus stops and existing bicycle or pedestrian facilities in the area. The Planning Board may stipulate off-site improvements to accomplish this objective, as appropriate, with the design of such improvements to be approved by the Planning board.

11.1.4 The system shall be designed to minimize conflicts among pedestrians, cyclists and drivers.

11.1.5 Use of permeable materials for sidewalks/pedestrian paths is encouraged, and may be required by the Planning Board, where conditions are conducive to use of permeable materials. Use of permeable pavement requires deeper excavation and thus can impact nearby tree roots. The Tree Warden or a professional arborist shall be consulted.

## Section 11.2 Sidewalks/Pedestrian Paths

11.2.1 Sidewalks/pedestrian paths longer than 500 feet, or shorter if determined appropriate by the Planning Board, shall provide areas for standing and sitting and may include amenities such as benches, tables, shade trees or grassy areas.

11.2.2 Sidewalk/pedestrian paths shall connect destinations efficiently and shall not require pedestrians to travel out of their way unnecessarily.

11.2.3 Sidewalks shall be ADA compliant. See ADA-accessibility requirements under Article 1- Parking and Circulation Standards.

11.2.4 Sidewalks/pedestrian paths shall be clearly distinguished from vehicular and bicycle traffic areas through the use of paving materials, landscaping buffers, or other means.

11.2.5 Sites, particularly through parking lots, shall be designed to provide safe and convenient pedestrian access, including, as appropriate, sidewalks and footpaths, crosswalks, and pedestrian-oriented lighting.

11.2.6 Pedestrian circulation shall be separated from vehicle circulation to the extent practicable or accommodated with appropriate shared use facilities that safely accommodate the most vulnerable user.

11.2.7 A protective railing shall be installed alongside any sidewalk/pedestrian path that is adjacent to and above a slope steeper than 1:3.

11.2.8 Where there is a public sidewalk within the road right of way, a sidewalk shall be built on site to connect the entrance to the building to the public sidewalk.

11.2.9 In large parking lots with multiple aisles driving aisles shall be oriented perpendicular to the building in order to reduce the number of traffic aisles that a pedestrian must cross to reach the building.

11.2.10 All sidewalks/pedestrian paths shall be a minimum of 5 feet in width.

11.2.11 Where it is expected that there will be high vehicular and high pedestrian traffic, such as in large parking lots serving shopping centers, the Planning Board may stipulate the use of pedestrian refuge areas and traffic calming techniques - such as speed tables – when appropriate.

11.2.12 Stop signs shall be provided where vehicular travel ways intersect with sidewalks/pedestrian paths.

11.2.13 Sidewalks/pedestrian paths may be required to link multiple buildings on the same site and separate, adjoining sites if there is a reasonable expectation that pedestrians would travel between those sites.

11.2.14 Sidewalks/pedestrian paths shall be protected from parking and driving areas by curbing or other suitable methods.

11.2.15 The Planning Board may stipulate that a public sidewalk be constructed within the public right of way in front of the subject property, and it may stipulate that the sidewalk link with an existing or planned neighboring sidewalk.

11.2.16 Pedestrian crosswalks shall be distinguished by the use of durable, low maintenance surface materials such as pavers, bricks, stamped asphalt, or scored concrete to enhance pedestrian safety.

11.2.17 Landscaping and other elements designed to enhance the safety and comfort of pedestrian travel ways shall be incorporated as appropriate.

11.2.18 Except where deemed not practicable, a planting strip, measuring at least five feet in width, shall be installed between the sidewalk/pedestrian path and any paved area.

11.2.19 When there is an existing or proposed sidewalk located in the public right of way, applicants are encouraged to widen the sidewalk onto the adjacent private lot when the public right of way may not be wide enough to accommodate the expect volume of pedestrians passing through. When a significant amount of pedestrian traffic is generated by the subject property, the Planning Board may require that the sidewalk be expanded onto the subject property.

11.2.20 Construction Standards for sidewalks.

(a) Sidewalks shall be constructed of either concrete or asphalt and have the following cross sections. These standards are established for public sidewalks and thus the Planning Board may adjust these specifications, as appropriate, for sidewalks situated in private developments, including those for which permeable pavement is proposed. These standards do not apply to pedestrian paths, such as those made of stone dust, gravel, or compacted dirt, that might be constructed outside of the primary development area. (See Parking and On-Site Circulation Section about standards for curbing.)

(b) Concrete Sidewalks
- 4 inches of concrete
- #8 x #8, 6 inch x 6 inch mesh
- 2 inches of crushed gravel
- 4 inches of bank run gravel

(c) Concrete Sidewalks crossing travel ways
- 6 inches of concrete
- #8 x #8, 6 inch x 6 inch mesh
- 4 inches of crushed gravel
- 8 inches of bank run gravel

(d) Asphalt Sidewalks
- 1 inch finish
- 1.5 inch binder
- 3 inches of crushed gravel
- 6 inches of bank run gravel

(e) Asphalt Sidewalks crossing travel ways
- 1 inch finish
- 2 inch binder
- 4 inches of crushed gravel
- 12 inches of bank run gravel

## Section 11.3 Bicycles

11.3.1 General

(a) If determined appropriate by the Planning Board, bicycle facilities (including routes and racks) may be combined with pedestrian facilities when designed according to shared path standards of AASHTO.

(b) Bicycle facilities shall be designed in accordance with AASHTO, "Guide for the Development of Bicycle Facilities," as amended.

11.3.2 Bicycle Routes

Bicycle routes may be required by the Planning Board in the form of separate off-street paths or on-street marked bicycle lanes, particularly where an existing network or paths or lanes will be extended.

11.3.3 Bicycle Storage. Bicycle storage shall be provided as follows:

(a) Bicycle racks shall be provided for all development that provides 5 or more parking spaces or where 5 or more parking spaces would be required (and is otherwise exempted or waived).

(b) All bicycle racks shall be located in a convenient and secure location.

(c) If bicycle racks are placed near trees, trees shall be protected with tree guards to prevent the securing of bicycles to trees.

(d) All bicycle racks shall be designed to allow the bicycle frame and at least one wheel to be locked to the rack with a high-security, U-shaped shackle lock if both wheels are left on the bicycle. "Wave" style racks shall not be used.

(e) All bicycle racks shall be securely anchored to a durable, hard-paved (preferably concrete) permanent surface.

(f) For residential multi-unit developments which will accommodate more than 20 residents, a covered area shall be provided to protect bicycles stored overnight from the weather.

(g) For projects located in the Central Business, Church Hill, Courthouse, and Professional Office zoning districts, the applicant shall provide a total number of bicycle storage spaces equal to or exceeding 1/3 the number of parking spaces that would be required for the project or 1/3 the number of residents who will occupy the project, whichever is greater. For projects not located in one of these zoning districts, the applicant shall provide a total number of bicycle storage spaces equal to or exceeding 1/5 the number of parking spaces that would be required for the project or 1/5 the number of residents who will occupy the project, whichever is greater.

When covered bicycle storage is required per Subsection f), above, at least 1/3 the total number of required bicycle storage spaces shall be outdoor covered spaces and/or indoor spaces.

The Planning Board may adjust any of the amounts in this section upward or downward, as appropriate, based upon such factors as the site location, site characteristics and layout, the type of users and residents, the amount of vehicle parking provided, and other pertinent factors.

### Section 11.4 Transit

11.4.1 The applicant may be required to provide bus shelters, including pedestrian access to the shelters, bus turnouts, and other transit-related facilities for developments where transit services are expected to be provided.

11.4.2 Where appropriate for large scale developments, especially those located outside of the downtown area, the Planning Board may require applicants to arrange for adequate transit service for the development, including providing service at adequate times. In such cases, the applicant may need to coordinate/contract with the University of New Hampshire to provide the service.

## Article 12. Personal Wireless Service Facilities Standards

### Section 12.1 Submittal Requirements Related to Design

12.1.1 Brochures. Equipment brochures for the proposed personal wireless service facility such as manufacturer's specifications or trade journal reprints shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.

12.1.2 Materials. Materials of the proposed personal wireless service facility specified by generic type and specific treatment (e.g., anodized aluminum, stained wood, painted fiberglass, etc.). These shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.

12.1.3 Colors. Colors of the proposed personal wireless service facility represented by a color board showing actual colors proposed. Colors shall be provided for the antennas, mounts, equipment shelters, cables as well as cable runs, and security barrier, if any.

12.1.4 Dimensions. Dimensions of the personal wireless service facility specified for all three directions: height, width and breadth. These shall be provided for the antennas, mounts, equipment shelters and security barrier, if any.

12.1.5 Photographs. Appearance shown by at least two (2) photographic superimpositions of the personal wireless service facility within the subject property. The photographic superimpositions shall be provided for the antennas, mounts, equipment shelters, cables

as well as cable runs, and security barrier, if any, and for the total height, width and breadth.

12.1.6 Lighting. If lighting of the site is proposed, the applicant shall submit a manufacturer's computer-generated point-to-point printout, indicating the horizontal footcandle levels at grade, within the property to be developed and twenty-five (25) feet beyond the property lines. The printout shall indicate the locations and types of luminaires proposed.

12.1.7 Co-location. Carriers shall share personal wireless service facilities and sites where feasible and appropriate, thereby reducing the number of personal wireless service facilities that are stand-alone facilities.

(a) All applicants for site plan review for a personal wireless service facility shall demonstrate a good faith effort to co-locate with other carriers. Such good faith effort includes contact with all the other carriers for personal wireless services operating in the Town of Durham or in adjoining or nearby jurisdictions.

(b) If the applicant intends to co-locate or to permit co-location, drawings and studies that show the appearance and operation of the personal wireless service facility with maximum co-location shall be provided.

(c) If the Planning Board approves co-location for a personal wireless service facility site, the site plan shall indicate how many facilities and of what type shall be permitted on that site. Facilities specified in the site plan approval shall require no further zoning approval, but shall require a Building Permit. However, the addition of any facilities not specified in the approved site plan shall require a new site plan.

## Section 12.2 Noise Standards

The applicant shall provide a statement listing the existing and maximum future projected measurements of noise from the proposed personal wireless service facilities, measured in decibels Ldn (logarithmic scale, accounting for greater sensitivity at night). Such statement shall be certified and signed by an acoustical engineer, stating that noise measurements are accurate and meet the Noise Ordinance of the Town of Durham and such statements shall include the following:

1) Existing, or ambient: the measurements of existing noise.

2) Existing plus the proposed personal wireless service facilities: maximum estimate of noise from the proposed personal wireless service facility plus the existing noise environment.

3) Existing plus the proposed personal wireless service facilities plus cumulative: maximum estimate of noise from the proposed personal wireless service facility plus

the maximum estimate of noise from the total addition of co-located personal wireless service facilities plus the existing noise environment.

## Section 12.3 Radio Frequency Radiation (RFR)

The applicant shall provide a signed and stamped certificate by an RF Engineer stating that the maximum radio frequency radiation of the personal wireless service facility and the cumulative RFR of any existing personal wireless service facilities at the site will not exceed the FCC Guidelines. The FCC Guidelines shall be incorporated as part of this certification.

## Section 12.4 Environmental Filing Requirements

12.4.1 The National Environmental Policy Act (NEPA) applies to all applications for personal wireless service facilities. NEPA is administered by the FCC via procedures adopted as Subpart 1, Section 1.1301 et seq. (47 CFR Ch. I). The FCC requires that an environmental assessment (EA) be filed with the FCC prior to beginning operations for any personal wireless service facility proposed in or involving any of the following:

(a) Wilderness area
(b) Wildlife preserve
(c) Threatened or endangered species
(d) Historical site
(e) Native American religious site
(f) Floodplain
(g) Wetland
(h) High-intensity white lights in residential neighborhoods
(i) Excessive radio frequency radiation exposure

12.4.2 At the time of application filing, an EA that meets FCC requirements shall be submitted to the Town for each personal wireless service facility site that requires such an EA to be submitted to the FCC. In addition, a letter of concurrence substantiating the finding of the applicant for each of the NEPA checklist items shall be provided with the site plan application.

12.4.3 The applicant shall list the location, type, and amount (including trace elements) of any materials proposed for use within the personal wireless service facility that are considered hazardous by the federal, state, or county government, or by the Town of Durham.

## Section 12.5 Structural Report for All Ground-Mounted Personal Wireless Service Facilities

The applicant shall provide a report prepared by a licensed professional civil engineer describing the facility and specifying the maximum number and types of antennas the facility is designed to accommodate. The report shall bear the seal of the engineer that prepared the report.

## Section 12.6 Visibility Standards for Ground-Mounted Personal Wireless Service Facilities, Excluding Reconstruction of Existing Facilities

12.6.1 Sight Lines. Lines representing the sight line showing the viewpoint (point from which view is taken) and visible point (point being viewed) as described below:

(a) Sight line representation. A sight line representation shall be drawn from any public road within three hundred (300) feet and the closest facade of each residential building (viewpoint) within three hundred (300) feet to the highest point (visible point) of the personal wireless service facility. The three hundred (300) foot measure shall be measured from the subject property boundary. Each sight line shall be depicted in profile, drawn at one inch equals forty (40) feet. The profiles shall show all intervening trees and buildings. In the event there is only one (or more) residential building within three hundred (300) feet, there shall be at least two sight lines from the closest habitable structures or public roads, if any.

(b) Existing (before condition) photographs. Each sight line shall be illustrated by one (1) four-inch by six-inch or larger color photograph of what can currently be seen from any public road or residential building identified above.

(c) Proposed (after condition). Each of the existing condition photographs shall have the proposed personal wireless service facility superimposed on it to show what will be seen from public roads and residences if the proposed personal wireless service facility is built.

12.6.2 Elevations. Siting elevations, or views at-grade from the north, south, east and west for a fifty (50) foot radius around the proposed personal wireless service facility plus from all existing public and private roads that serve the subject property. Elevations shall be at either one-quarter inch equals one foot or one-eighth inch equals one foot scale and show the following:

(a) Antennas, mounts and equipment shelter(s), with total elevation dimensions and AGL of the highest point.

(b) Security barrier. If the security barrier will block views of the personal wireless service facility, the barrier drawing shall be cut away to show the view behind the barrier.

(c) Any and all structures on the subject property.

(d) Existing trees and shrubs at current height and proposed trees and shrubs at proposed height at time of installation, with approximate elevations dimensioned.

(e) Grade changes, or cuts and fills, to be shown as original grade and new grade line, with two-foot contours above mean sea level.

12.6.3 Balloon Test. Within fourteen (14) days of the acceptance of the site plan application by the Planning Board, the applicant shall arrange for a balloon or crane test at the proposed site to illustrate the height of the proposed facility. The date, time and location of such test shall be advertised in a newspaper of general circulation in the Town at least ten (10) days prior to the test.

### Section 12.7 Site Plan Review

In accordance with RSA 674:43 V., site plan review shall not be required for a collocation or a modification of a personal wireless service facility, as defined in RSA 12-K:2.

## Article 13. Public Health and Safety Standards

### Section 13.1 Fire Protection

13.1.1 Access for the Fire Department.

(a) Appropriate access for the Fire Department shall be provided to any parts of the building or site for the Fire Department to fight fires or address other emergency situations.

(b) Driveways. All driveways that the Fire Department determines might be used for access into and through the site shall be at least 20 feet wide, provide at least 13-1/2 feet of vertical clearance, and be capable of supporting fire apparatus in all weather conditions. Appropriate provisions for through movement, turning, or backing of vehicles shall be made as reasonably requested by the Fire Department. The Fire Department may adjust these requirements, as appropriate, for sites where the buildings are sprinkled, Town water is available, and/or the level of development or risk is considered especially low.

(c) Fire Lanes. Fire lanes, i.e., corridors that must remain free of parked vehicles, shall be established as requested by the Fire Department.

13.1.2 Fire Hydrants. (See additional specifications under Utilities.)

(a) Where Town water is available, fire hydrants shall be provided on and/or off site as requested by the Fire Department. Each proposed hydrant shall be capable of delivering adequate flow as determined by the Fire or Public Works Department.

(b) Fire hydrants shall be served by a minimum 8-inch diameter main. Branch lines leading from a hydrant shall have a minimum 6-inch diameter.

(c) In cases where buildings are to be sprinkled, a fire hydrant shall be placed within 100 feet of the fire department connection (pipe situated on the outside of the building that connects to the interior sprinkler system). The hydrant may be placed either on the subject lot (a private hydrant) or within the street right of way (a municipal hydrant). If Town water is not available to the site, and will not be

extended as part of the site plan, then other arrangements may be made if approved by the Fire Department.

(d) All fire hydrants, water lines, and other related structures shall be designed and installed in accordance with the requirements of the Fire and Public Works Departments.

(e) A red winter flag shall be attached to each new hydrant in order that the hydrant can be readily located when snow is on the ground.

13.1.3 Other fire prevention measures, such as fire alarm systems and Knox Boxes® (or equivalent), shall be incorporated as reasonably requested by the Fire Department.

13.1.4 For large-scale projects or projects with high hazard potential located in areas not served by public water, the developer may be required to take special measures such as constructing fire ponds or fire cisterns with dry hydrants if those approaches are specifically authorized by the Fire Chief.

13.1.5 Radio Communications Standards

(a) When necessary to provide emergency response communication to the site and at the request of the police or fire department, the applicant shall have a site survey conducted by a radio communications carrier approved by the Town of Durham's Police and Fire Departments. The radio communications carrier must be familiar and conversant with the police and fire radio configuration.

(b) If the site survey indicates that it is necessary to install a signal repeater either on or near the proposed project, those costs shall be the responsibility of the property owner.

(c) The property owner shall be responsible to pay for the site survey whether or not the survey indicates a repeater is necessary.

(d) The owner shall coordinate with the supervisor of radio communications for the Town.

(e) The requirements of the Durham Public Safety Amplification ordinance, Chapter 68 of the Durham Town Code, shall be satisfied.

## Section 13.2 Hazardous Materials

13.2.1 The applicant shall identify any hazardous materials that will be used, stored, or created on site and shall include a plan for their storage, handling, and disposal, consistent with best management practices and all applicable state and federal regulations.

13.2.2 Explosives, flammable liquids, propane gas, liquefied petroleum gas, and similar materials shall be stored and protected in accordance with specifications from the Fire Department.

13.2.3 Material Safety Data Sheets (MSDS) shall be provided to the Fire Department, as appropriate.

## Section 13.3 Salt Storage

13.3.1 Salt, or any material containing salt, that is stored in bulk shall be stored and handled in accordance with the following best management practices. The purpose of this regulation is to protect surface and ground waters from salt intrusion, which can contaminate drinking water supplies and kill aquatic life.

13.3.2 These materials shall be stored inside a fully enclosed roofed structure, impenetrable to rain and snow. Ideally the structure will be large enough to allow for vehicles to pick up and drop off the materials inside the structure with any spills occurring during pick up or drop off being contained within the structure. Structure hardware shall be galvanized and concrete block buildings should be waterproofed inside.

13.3.3 A cover shall be supplied at the open end so that salt inside is not exposed to the elements

13.3.4 The storage structure shall be located on a flat site situated away from surface water, wetlands, wells, aquifers, and other environmentally sensitive areas, so that any drainage flowing from the storage area will not affect those resources.

13.3.5 Storage areas shall have an impermeable floor constructed of asphalt, concrete or other suitable material that extends around the building's exterior and is sloped away from the structure to prevent storm water from entering the structure. Concrete pads and walls shall be treated to prevent spalling.

13.3.6 Floors and walls shall be sealed as appropriate to prevent penetration by rain and snow.

13.3.7 A plan to prevent spillage of material from trucks shall be submitted.

13.3.8 A contingency plan shall be submitted to address any contamination to soils or groundwater.

13.3.9 If there are any drinking water sources located close by and downgradient from the storage area on an abutter's property, the Planning Board may stipulate that one or more monitoring wells be situated on the subject property or the abutter's property to determine if groundwater is being adversely impacted.

## Section 13.4 Site Security

13.4.1 Sites shall be designed with attention to ensuring safety and security for customers, employees, and suppliers and to minimizing opportunities for trespassing, theft, and vandalism when the facility is closed. Appropriate attention shall be given to site lighting, vehicular access into the site and circulation within the site, pedestrian access into the site and circulation within the site, visibility and access into the site for the Police Department, and communication with the Police Department.

13.4.2 Appropriate methods developed under Crime Prevention Through Environmental Design (CPTED) should be employed. CPTED is based on the principle that proper design and effective use of buildings and sites brings a reduction in both the fear of and incidence of crime and an improvement in quality of life. See this website for recommended design principles: http://www.designcentreforcpted.org/Pages/Principles.html.

# Article 14. Standards for Particular Uses/Activities

## Section 14.1 Contractor's Storage Yards

The following requirements apply to all contractor's storage yards.

14.1.1 Screening. Contractor storage yard activity shall be screened from abutting properties and public roads.

14.1.2 Security. To ensure public safety the applicant shall present a plan for securing any dangerous vehicles, equipment, or materials from unauthorized access, to be approved by the Planning Board. A simple plan specifying such items as lighting, fencing, and locking of equipment may be sufficient.

14.1.3 Maintenance and Repair Work. On-site maintenance and repair of heavy vehicles is restricted to those owned by the contractor storage yard owner and operator. Commercial maintenance and repair of heavy equipment and vehicles owned by others is permitted only if such work is permitted within the applicable zoning district and such work is approved as part of the contractor storage yard site plan review.

14.1.4 Salt Storage. Salts, and any bulk materials containing salts, commonly used in snow and ice removal or de-icing, shall be stored as specified in the Salt Storage subsection, herein.

## Section 14.2 Recreational Playing Fields, Outdoor

The following requirements apply to all outdoor recreational playing fields.

14.2.1 Policy. It is the policy of the Durham Planning Board to support and encourage outdoor recreation, and to facilitate the safe and reasonable use of private lands for non-commercial outdoor playing fields. It is recognized that this use may raise issues including but not limited to noise, traffic and traffic safety, parking, fertilizer, pesticide and herbicide use. It is also recognized that, unlike many other uses, this use is primarily intended to create a public benefit, and; this use does not require a long-term or irreversible commitment of land or capital.

14.2.2 Waiver. The Planning Board may, in order to implement the policy expressed in Policy, above, at its reasonable discretion, waive or modify any of the submission requirements, herein.

14.2.3 Unique Requirements. Given the intermittent and seasonal nature of this use, and the variability that may characterize impacts on abutters and the community at large, the Planning Board may impose conditions controlling timing (hours of use, frequency of use, start, end and duration of season), intensity (number of participants, noise restrictions, whether practice sessions, organized games, tryouts, tournaments are allowed), in addition to any design standards and required improvements that may be authorized under Section 9 and deemed necessary by the Planning Board.

# Article 15. Stormwater Management Standards



## Section 15.1 Purpose

The purpose of this set of regulations is to establish standards to manage the discharge of stormwater runoff to Durham waterbodies, all of which are on the Federal and State lists of impaired waterbodies as of the date of adoption of these Regulations and to comply with Town's Water Ordinance, Chapter 158 of the Town Code. These impairments are directly linked to stormwater runoff. These standards encourage the use of Low Impact Development (LID) strategies, build upon innovative stormwater standards recently adopted by several coastal watershed communities, and are consistent with EPA Region 1 and NHDES guidelines.

## Section 15.2 General Requirements

All developments shall provide adequate management of stormwater runoff and prevent the discharge of stormwater runoff from creating or contributing to water quality impairment.

15.2.1 All applications shall be accompanied by a completed Stormwater Management Checklist to be provided to the Planning Board for consideration.

15.2.2 Applicants for developments and redevelopments that disturb 5,000 or more square feet must submit to the Planning Board for review and approval a Stormwater Management Plan ("the Plan") describing all proposed stormwater management system elements, practices, and associated designs, including all calculations and analyses of the designs.

15.2.3 The Planning Board reserves the right to require any development that disturbs less than 5,000 square feet to submit, and then implement, an approved Stormwater Management Plan (complete, as described below, or abbreviated) to prevent

degradation of local water resources. The Planning Board may solicit input from the Conservation Commission in making this determination, at its discretion.

15.2.4 All elements of the Plan must be designed/prepared by a New Hampshire Registered Professional Engineer in accordance with the Design Standards below. The Plan must contain Parts I and II, below, and be presented in that order.

## Section 15.3 Stormwater Management Plan—Part I

15.3.1 Existing Conditions Site Plan

1. This plan shall show all pre-development:
   (a) surface waterbodies and wetlands
   (b) drainage patterns
   (c) watershed boundaries
   (d) buffer zones
   (e) topographic contours with minimum 2-foot intervals
   (f) scale bar
   (g) north arrow
   (h) title block with project name, applicant's name, and map and parcel number
   (i) designer's stamp and wetland scientist's stamp (if applicable)
   (j) legend
   (k) locus plan
   (l) benchmarks, and appropriate notes with datum and other plan references, instructions, and detail descriptions

2. The Existing Conditions Site Plan shall be provided in hard copy (minimum 22-inch by 34-inch) at an appropriate scale in tens of feet per inch (maximum of 100 feet per inch) such that all important site and hydrologic features are easily recognized.

3. Existing buildings, structures, pavement, utilities, and soils information with coding as HSG-A, B, C, or D shall be included on the Existing Conditions Site Plan.

4. High Intensity Soil Survey (HISS) mapping may be required per request of the Planning Board.

15.3.2 Proposed Conditions Site Plan

1. The Plan shall show all proposed post-development temporary and permanent stormwater management system elements and erosion and sediment control BMPs and all important hydrologic features.

2. The Proposed Conditions Site Plan must be at the same scale as the Existing Conditions Site Plan with consistent title block, plan features, and descriptors including but not limited to the following:
   (a) Existing and proposed topographic contours (2-foot minimum contour interval; 1-foot contour intervals may be required for sites with limited relief and/or where proposed stormwater outfalls are located adjacent to buffer zones)

(b) Proposed areas of disturbance with total area of disturbance clearly labeled in square feet
(c) Existing and proposed buildings and structures
(d) Stormwater discharge locations keyed to drainage analyses
(e) Wells and sanitary protective radii
(f) Septic systems
(g) Plan references and notes (including sequence of soil disturbance)
(h) Proposed and existing public and private utilities
(i) Proposed project components to become property of or the responsibility of the Town shall be labeled as such
(j) Existing and proposed impervious surfaces and pavements with areas used to calculate EIA clearly identified and the square footage of each type identified and labeled
(k) Details of individual design elements shown on separate plan sheets following the Proposed Conditions Site Plan

## Section 15.4 Stormwater Management Plan—Part II

15.4.1 Drainage Analysis that includes calculations comparing Pre- and Post-Development stormwater runoff rates (cubic feet per second) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 10-year, and 17-year 24-hour frequency storms. The rainfall amount shall be obtained from the Northeast Regional Climate Center – http://precip.eas.cornell.edu. The analysis shall include extreme precipitation table as obtained from the above referenced website.

1. Calculations shall include, but not be limited to, the sizing of all structures and BMPs including of sizing of emergency overflow structures based on assessment of the 100-year 24-hour frequency storm discharge rate.

2. Phased applications for the original parcel apply as though the development of the entire parcel were proposed in one application at one time.

15.4.2 Drainage Analysis Results Summary tabulated for each proposed outfall or catchment outlet point including runoff rates and volumes for each storm event analyzed above.

15.4.3 An Erosion and Sediment Control Plan for all proposed construction activities in accordance with the most current New Hampshire Stormwater Manual (New Hampshire Department of Environmental Services; downloadable from the website).

15.4.4 Copies of any additional permits or plans required for compliance with Environmental Protection Agency (EPA) and/or New Hampshire Department of Environmental Services (NHDES).

15.4.5 A comprehensive Operation and Maintenance Plan for long-term maintenance of all proposed stormwater management elements and BMPs including the proposed schedule of inspections and anticipated maintenance.

## Section 15.5 Design Standards

15.5.1 Minimum requirements:
The Stormwater Management Plans shall meet the following minimum requirements:

1. Where applicable, the Plan must comply with the EPA Phase II Stormwater Rules and the Town's MS4 Stormwater Discharge (NPDES) Permit, as amended.

2. All proposed measures shall be in accordance with the most current New Hampshire Stormwater Management Manual (New Hampshire Department of Environmental Services; downloadable from the website).

3. Water Quality Protection. All aspects of the application shall be designed to protect the water quality of the Town of Durham's waterbodies as follows:

   (a) No person shall locate, store, discharge, or permit the discharge of any treated, untreated, or inadequately treated liquid, gaseous, or solid materials of such nature, quantity, noxiousness, toxicity, or temperature that may run off, seep, percolate, or wash into surface or groundwaters, and thus contaminate, pollute, harm, impair or contribute to an impairment of such waters nor to any impaired waters as listed with the New Hampshire Department of Environmental Services.

   (b) All storage facilities for fuel, chemicals, chemical or industrial wastes, and biodegradable raw materials shall meet the standards of the New Hampshire Department of Environmental Services (NHDES).

   (c) All projects under review by the Planning Board of such magnitude as to require a stormwater permit from EPA or NHDES shall comply with the standards of EPA and/or NHDES AOT program, with respect to the export of Total Suspended Solids and other pollutants.

15.5.2 Stormwater Management for New Development. All proposed stormwater management and treatment systems shall meet the following performance standards:

(a) Existing surface waters, including lakes, ponds, rivers, perennial and intermittent streams (natural or channelized), and wetlands (including vernal pools) shall be protected by the minimum buffer setback distances specified in the Zoning Ordinance. Stormwater and erosion and sediment control BMPs shall be located outside the specified buffer zone unless otherwise approved by the Planning Board. Alternatives to stream and wetland crossings that eliminate or minimize environmental impacts shall be considered whenever possible. When necessary, as determined by the Planning Board or their representative, stream and wetland crossings shall comply with state recommended design standards to minimize impacts to flow and enhance animal passage (see "University of New Hampshire Stream Crossing Guidelines" May 2009, as amended, downloadable from the "Streams and Stream Crossing" page of the NHDES website:

http://des.nh.gov/organization/divisions/water/wetlands/documents/nh-stream-crossings.pdf

(b) LID (Low Impact Development) site planning and design strategies shall be used to the maximum extent practicable in order to reduce the generation of the stormwater runoff volume for both new and redevelopment projects. An applicant must document why LID strategies are not appropriate if not used to manage stormwater.

(c) All stormwater treatment areas shall be planted with native plantings appropriate for the site conditions: grasses, shrubs and/or other native plants in sufficient numbers and density to prevent soil erosion and to promote proper treatment of the proposed runoff.

(d) All areas that receive rainfall runoff must be designed to drain within a maximum of 72 hours for vector control.

(e) Salt and other de-icing material storage areas shall be covered or located such that no direct untreated discharges to receiving waters are possible from the storage site. Snow storage areas shall be located such that no direct untreated discharges to receiving waters are possible from the storage site. Runoff from snow and salt storage areas shall enter treatment areas as specified above before being discharged to receiving waters or allowed to infiltrate into the groundwater.

(f) The use of sodium chloride-based materials for winter road maintenance shall be the minimum necessary for roadway safety. If the development calls for the use of porous asphalt, sand shall not be used in those areas. However, sand may be used in other areas not using porous asphalt to cut down on the amount of sodium chloride based materials used.

(g) Runoff shall be directed into recessed vegetated and landscaped areas designed for treatment and/or filtration to the maximum extent practicable to minimize Effective Impervious Cover (EIC) and reduce the need for irrigation systems.

(h) The Plan shall make provisions to retain stormwater on the site by using the natural flow patterns of the site. Effort shall be made to utilize natural filtration and/or infiltration BMPs (i.e., bioretention areas, subsurface filtration/infiltration systems, ponds, swales, etc.). Proof of such effort shall be provided to the Planning Board.

(i) Measures shall be taken to control the post-development peak rate runoff so that it does not exceed pre-development runoff for the 2-year, 10-year and 17-year, 24-hour storm events. Similar measure shall be taken to control the post-development runoff volume to filtrate the WQv according to the following minimum ratios of Hydrologic Soil Group (HSG) type versus infiltration rate multiplier:

- HSG-A: 1.0
- HSG-B: 0.75
- HSG-C: 0.4
- HSG-D: 0.16

For sites where infiltration is limited or not practicable, the applicant must demonstrate that the project will not create or contribute to water quality impairment. Infiltration structures shall be in locations with the highest permeability on the site. Measures shall be taken to protect against on and off site peak flow to prevent overloading of existing downstream facilities.

(j) The biological and chemical properties of the receiving waters shall not be degraded by the stormwater runoff from the development site.

(k) The design of the stormwater drainage system shall provide for the disposal of stormwater without flooding or functional impairment to streets, adjacent properties, downstream properties, soils, or vegetation.

(l) The design of the stormwater management systems shall take into account upstream and upgradient runoff that flows onto, over, or through the site to be developed or re-developed and provide for this contribution of runoff.

(m) Appropriate erosion and sediment control measures shall be installed prior to any soil disturbance such that the area of disturbance shall be kept to a minimum. See Section 7.1.

(n) Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area using approved measures. Wetland areas and surface waters shall be protected from sediment.

(o) All temporary control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized prior to removal of temporary control measures.

(p) Every effort shall be made to use pervious parking surfaces as an alternative to impervious asphalt or concrete for general and overflow parking areas. Pervious pavement shall be appropriately sited and designed for traffic and vehicle loading conditions.

(q) Whenever practicable, native site vegetation shall be retained, protected, or supplemented. Any stripping of vegetation shall be done in a manner that minimizes soil erosion.

(r) Whenever practicable, all subsurface filtration BMPs shall include perforated underdrains positioned a minimum of 8-inches above the bottom of the filter bed to prevent extended periods of saturated conditions.

15.5.3 Redevelopment Criteria:

(a) In order to determine the stormwater requirements for redevelopment projects, the percentage of the site covered by existing impervious areas must be calculated. Stormwater requirements for redevelopment will vary based upon the amount of site surface area that is covered by existing impervious surfaces.

(b) For sites meeting the definition of a redevelopment project and having less than 40% existing impervious surface coverage, the stormwater management requirements will be the same as other new development projects with the important distinction that the applicant can meet those requirements either on-site or at an approved off-site location. The applicant must satisfactorily demonstrate that impervious area reduction, LID (Low impact development) strategies and BMPs have been implemented on-site to the maximum extent practicable.

(c) For sites meeting the definition of a redevelopment project and having more than 40% existing impervious surface coverage, stormwater shall be managed for water quality in accordance with the following technique:

Implement other LID (Low impact development) techniques onsite to the maximum extent practicable to provide treatment for at least 50% of the entire site area

15.5.4 Off-Site Mitigation:

(a) In cases where the applicant demonstrates, to the satisfaction of the Planning Board, that on-site treatment has been implemented to the maximum extent possible or is not feasible, off-site mitigation will be an acceptable alternative if implemented within the same subwatershed, within the project's drainage area or within the drainage area of the receiving water body. To comply with local watershed objectives the mitigation site would be preferably situated in the same subwatershed as the development and impact/benefit the same receiving water.

(b) Off-site mitigation shall be equivalent to no less than the total area of impervious cover NOT treated on-site.

(c) An approved off-site location must be identified, the specific management measures identified, and an implementation schedule developed in accordance with Planning Board review. The applicant must also demonstrate that there is no downstream drainage or flooding impacts as a result of not providing on-site management for large storm events.

## Section 15.6 Responsibility for Installation and Construction

The applicant shall be responsible for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of these regulations.

15.6.1 Site development shall not begin before the Stormwater Management Plan receives written approval by the Planning Board.

15.6.2 Structures that meet Best Management Practices (BMP's) shall be installed as designed and scheduled as a condition of final approval of the plan.

15.6.3 Phasing of the installation shall be coordinated with and approved by the Town Engineer. Post-construction BMP's are not intended to be used as a temporary sediment control basin during construction unless approved by the Planning Board.

15.6.4 The Planning Board may require an independent third-party inspection and oversight of the construction of stormwater management facilities and erosion and sediment control and of annual maintenance operations, at its discretion. Such independent oversight may be especially important for implementing innovative techniques such as those involving pervious pavement and gravel wetlands. The expense of this oversight shall be the full responsibility of the applicant.

## Section 15.7 Plan Approval and Review

The Planning Board shall approve the Stormwater Management Plan if it complies with the requirements of these regulations and other requirements as provided by law. At the discretion of the Planning Board, a technical review by an independent third party may be required of any stormwater management and erosion control plan prepared under these regulations. Such independent review may be especially important for projects that incorporate innovative techniques such as pervious pavement and gravel wetlands. The technical review shall be performed by a qualified professional consultant, as determined by the Planning Board, and the expense of which shall be the full responsibility of the applicant.

## Section 15.8 Maintenance and Inspection

15.8.1 After final Planning Board approval and as a condition of that approval, the owner of record of the property shall record a notice of the requirements for maintenance pursuant to the stormwater management and erosion and sediment control plans, as approved by the Planning Board, at the Registry of Deeds sufficient to provide notice to all persons that may acquire any property subject to the stormwater management and sediment control plans. (See RSA 477:3-a.) The notice shall comply with the applicable requirements for recording contained in RSA 477 and 478. The notice need not set forth the requirements at length, so long as it is sufficient to provide notice to prospective purchasers of the requirements for maintenance pursuant to the stormwater management and erosion and sediment control plans as approved by the Planning Board. The Planning Board may require routine inspections to insure compliance with the Stormwater Management, Groundwater Protection, Impervious Surfaces, and Erosion and Sedimentation Control sections of these regulations. Such inspections shall be performed

by a designated agent with appropriate certifications at reasonable times to the landowner.

15.8.2 If permission to inspect is denied by the landowner, the designated agent shall secure an administrative inspection warrant from the district or superior court under RSA 595-B.

## Section 15.9 Reimbursement

The applicant shall reimburse the Town for the Planning Board's administrative expenses and costs of special investigation and the review of documents and other matters that may be required by particular applications. This includes, but is not limited to, review by consulting engineers or other consultants to assess the environmental impact, hydrological impact, ground water quality impact, traffic impact, or any other study deemed necessary by the Planning Board in order to make an informed decision."

## Section 15.10 Waivers & Exceptions

For reasons well demonstrated, the Planning Board may waive one or more of these regulations. In order for the Planning Board to issue a waiver, the applicant must demonstrate and board must find the application meets the minimum criteria listed below and, if granted, will be considered conditions of approval.

15.10.1 Runoff from new impervious surfaces shall be directed to a filtration and/or infiltration device or properly discharged to a naturally occurring or fully replanted and vegetated area with slopes of 15 percent or less and with adequate controls to prevent soil erosion and concentrated flow.

15.10.2 Impervious surfaces for parking areas and roads shall be minimized to the extent possible (including minimum parking requirements for proposed uses and minimum road widths).

15.10.3 Runoff generated from new impervious surfaces shall be retained on the development site and property and mimic natural hydrologic processes to the maximum extent possible, or it is determined that the biological and chemical properties of the receiving waters will not be degraded by or its hydrology will benefit from discharge of stormwater runoff from the development site.

15.10.4 Compliance with standards 15.9.1 - 15.9.3, above, will be determined by the Planning Board on a case by case basis as site conditions and constraints will differ greatly between various redevelopment proposals.

In addition, the following activities are considered exempt from preparing and submitting stormwater management plans:

1. Agricultural practices located outside the wetland and surface water buffers

2. Road and parking lot resurfacing provided removal of road or parking surface materials does not occur down to the erodible subsurface.

## Section 15.11 Definitions

Note that there are special definitions sections in several sections in the Site Plan Regulations, specifically: Part I, Article 10 - Definitions and Part III, Article 2 – Architectural Design Standards, Article 5 – Landscaping and Screening Standards, Article 6 – Lighting Standards, and Article 15 – Stormwater Management Standards.

The following words and terms are oriented specifically toward stormwater management. However, these words and terms may be found elsewhere in the Site Plan Regulations. Wherever these words and terms are found, they shall have the meanings given below.

**Best Management Practices (BMP)** *[also Part I].* Methods and means that have been determined to be the most effective, practical, commonly accepted approaches to meting a specific objective. Regarding stormwater management, BMPs control, treat, or prevent pollution and detrimental impacts from stormwater runoff. BMPs for stormwater management may be structural (engineered) or nonstructural (strategies implemented to control stormwater runoff that focus on pollution prevention such as alternative site design, zoning and ordinances, education, and good housekeeping measures).

**Bioretention**. A water quality practice that utilizes vegetation and soils to treat urban stormwater runoff by collecting it in shallow depressions, before filtering through an engineered bioretention planting soil media.

**Buffers along water resources, Riparian Buffers**. A special type of preserved area along a watercourse or wetland where development is restricted or prohibited. Buffers protect and physically separate a resource from development. Buffers also provide stormwater control flood storage and habitat values. Wherever possible, riparian buffers should be sized to include the 100- year floodplain as well as steep banks and freshwater wetlands.

**Disconnected Impervious Cover**. The sum of the proposed areas of impervious cover and pavement that receive runoff and, by means of implementing BMPs and LID (low impact development) strategies, is designed to capture and filtrate the precipitation from a 1-inch 24-hour rain event.

**Disturbance** *[also Part I].* Any activity that significantly alters the characteristics of the terrain in such a manner as to impede or alter the hydrology or natural runoff pattern, or creates an unnatural runoff.

**Disturbed area** *[also Part I].* An area in which the natural vegetative soil cover has been removed or altered and, therefore, is susceptible to erosion.

**Effective impervious cover (EIC).** The total impervious surface areas less the area of disconnected impervious cover (areas where runoff is captured and infiltrated or otherwise treated).

**Filtration**. The process of physically or chemically removing pollutants from runoff. Practices that capture and store stormwater runoff and pass it through a filtering media such as sand, organic material, or the native soil for pollutant removal. Stormwater filters are primarily water quality control devices designed to remove particulate pollutants and, to a lesser degree, bacteria and nutrients.

**Gravel wetlands, subsurface**. A recent innovation in Low Impact Development (LID) stormwater design. It approximates the look and function of a natural wetland, effectively removing sediments and other pollutants commonly found in runoff, while enhancing the visual appeal of the landscape and adding buffers or greenscape to urban areas

**Groundwater recharge**. The process by which water that seeps into the ground, eventually replenishing groundwater aquifers and surface waters such as lakes, streams, and the oceans. This process helps maintain water flow in streams and wetlands and preserves water table levels that support drinking water supplies.

**Groundwater recharge volume**. The post-development design recharge volume (i.e., on a storm event basis) required to minimize the loss of annual pre-development groundwater recharge. The GRV is determined as a function of annual pre-development recharge for site-specific soils or surficial materials, average annual rainfall volume, and amount of impervious cover on a site.

**Hydrologic Soil Group (HSG)**. A Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from "A" soils, with high permeability and little runoff production, to "D" soils, which have low permeability rates and produce much more runoff.

**Impaired waters**. Those waterbodies not meeting water quality standards. Pursuant to Section 303(d) of the federal Clean Water Act, each state prepares a list of impaired waters (known as the 303(d) list) which is presented in the state's Integrated Water Report as Category 5 waters. Those impaired waters for which a TMDL has been approved by US EPA and is not otherwise impaired, are listed in Category 4A.

**Impervious Cover or Surface** *[also Part I].*A material with low permeability that impedes the natural infiltration of moisture into the ground so that the majority of the precipitation that falls on the surface runs off or is not absorbed into the ground. Common impervious surfaces include, but are not limited to, roofs, concrete or bituminous paving such as sidewalks, patios, driveways, roads, parking spaces or lots, and storage areas, compacted gravel including drives and parking areas, oiled or compacted earthen materials, stone, concrete or composite pavers, wood, and swimming pools.

**Infiltration**. The process of runoff percolating into the ground (subsurface materials). Stormwater treatment practices designed to capture stormwater runoff and infiltrate it into the ground over a period of days.

**Low impact development (LID)**. Low impact development is a site planning and design strategy intended to maintain or replicate predevelopment hydrology through the use of site

planning, source control, and small-scale practices integrated throughout the site to prevent, infiltrate and manage runoff as close to its source as possible. Examples of LID strategies are pervious pavement, rain gardens, green roofs, bioretention basins and swales, filtration trenches, and other functionally similar BMPs located near the runoff source.

**Maximum Extent Practicable** *[also Part I].* To show that a proposed development has met a standard to the maximum extent practicable, the applicant must demonstrate the following: (1) all reasonable efforts have been made to meet the standard, (2) a complete evaluation of all possible management measures has been performed, and (3) if full compliance cannot be achieved, the highest practicable level of management is being implemented.

**Mitigation** *[also Part I].*Activities, strategies, policies, programs, and actions that, over time, will serve to avoid, minimize, or compensate for (by treating or removing pollution sources) the deleterious impacts of a particular development or activity., such as the measures to treat or remove pollution from downgradient water resources.

**MS4**. Shorthand reference to the small Municipal Separate Storm Sewer System General Permit, the MS4 General Permit, issued by the EPA under the Clean Water Act. MS4 applies to municipalities that contain any portion of an urbanized area as defined by the Census. It applies to stormwater conveyances owned by a state, city, town, or other public entity that discharge to "Waters of the United States." The MS4 Permit requires that operators of small MS4s develop a Stormwater Management Program that uses appropriate Best Management Practices (BMPs) for each of the six minimum control measures required in the MS4 permit.

**Native plants or vegetation** *[also Part I and Landscaping].* Plants that are indigenous to the region, adapted to the local soil and rainfall conditions, and require minimal supplemental watering, fertilizer, and pesticide application.

**NHDES** *[also Part I].* New Hampshire Department of Environmental Services

**Pavement** *[also Part I].* Areas of a site that are covered with pervious and/or impervious asphalt and/or concrete. [See "porous pavement and pavers."]

**Pollutant load**. The amount of pollutants introduced into a receiving waterbody measured in units of concentration or mass per time (i.e. concentration (mg/l) or mass (lbs/day)).

**Porous Media.** Material with open connected pore spaces that allows water to percolate through it such as granular soils, gravel, crushed stone, pervious pavements, and woven and non-woven geosynthetics.

**Porous pavement and pavers**. Alternatives to conventional pavement that utilize a variety of porous media, often supported by a structural matrix, concrete grid, or modular pavement, which allow water to percolate though to a sub-base for gradual infiltration.

**Redevelopment** (in terms of stormwater). Any construction, alteration, or improvement that disturbs a total of 10,000 square feet or more of existing impervious area where the existing land

use is commercial, industrial, institutional, governmental, recreational, or multifamily residential. Building demolition is included as an activity defined as "redevelopment", but building renovation is not. Similarly, removing of roadway materials down to the erodible soil surface is an activity defined as "redevelopment," but simply resurfacing of a roadway surface is not. Pavement excavation and patching that is incidental to the primary project purpose, such as replacement of a collapsed storm drain, is not classified as redevelopment. In general, the requirements in this manual do not apply to projects or portions of projects when the total existing impervious area disturbed is less than 10,000 square feet. However, specific regulatory programs may impose additional requirements. Any redevelopment activity that results in improvements with no increase in impervious area shall be considered redevelopment activity under this regulation if capital cost of improvements is greater than 30% of the appraised property value.

**Retention**. The amount of precipitation on a drainage area that does not escape as runoff. It can be expressed as the difference between total precipitation and total runoff from an area.

**Riparian**. Referring to anything connected or immediately adjacent to the shoreline or bank of a stream, river, pond, lake, bay, estuary or other similar body of water. The naturally vegetated shoreline, floodplain or upland forest adjacent to a surface waterbody. Riparian buffers provide stormwater control flood storage and habitat values.

**Runoff**. Stormwater that does not infiltrate into the ground and flows toward a below-ground or surface discharge location.

**Stormwater** *[also Part I]*. Water that originates from precipitation events and accumulates on land.

**Stormwater Management Plan.** A written plan describing the proposed methods and measures to be implemented to prevent or minimize water quality and quantity impacts from stormwater associated with a development or redevelopment project both during and after construction. It identifies selected BMPs, LID (low impact development) source controls, and treatment practices to address those potential impacts, and contains the engineering design plans, specifications, and calculations of the management and treatment practices, and maintenance requirements for proper performance of the proposed practices.

**Total Suspended Solids (TSS).** The total amount of soils particulate matter which is suspended in the water column.

**Tree box filters.** Miniature bioretention areas installed beneath trees that can be effective at controlling runoff, especially when distributed throughout a site. Runoff is directed to the tree box, where it is cleaned by vegetation and soil before entering a catch basin. The runoff collected in the tree boxes also helps irrigate the trees. These systems combine the versatility of manufactured devices with the water quality treatment of vegetated systems. They serve as attractive landscaping and drainage catch basins. They receive runoff through breaks in the curbing.

**Water Quality Treatment.** The capture of sediment, nutrients, metals and hydrocarbons suspended in stormwater runoff from impervious surfaces before being conveyed to a storm sewer network or to another water quality treatment system. In most cases where no other local waterbody impairments exist, adequate treatment refers to documenting the treatment systems ability to remove 80% of the total suspended solids (TSS) on an annual basis. Where water quality impairments do exist adequate treatment refers to a system's ability to meet maximum load allocations or not further impair the receiving water.

**Water Quality Volume (WQv).** The storage volume needed to capture and treat the runoff from the 1-inch 24-hour rainstorm for a specific contributing area. WQv shall be calculated using the following equation:

*WQv = (P)(Rv)(A),* where P = 0.083 ft, Rv = the unitless runoff coefficient, Rv = 0.05 + 0.9(I), where I = the percent impervious surface draining to the discharge point, in decimal form, and A = total site area in square feet draining to the discharge point

**Watershed.** The land area, or catchment, that contributes water to a specific waterbody. All the rain or snow that falls within this area flows to the waterbodies as surface runoff, in tributary streams, or as groundwater.

# Article 16. Traffic and Access Management Standards



## Section 16.1 General Provisions

16.1.1 When the Planning Board deems appropriate, the applicant shall address the impact of the project upon traffic conditions—including pedestrian and bicycle conditions—on neighboring streets and intersections.

16.1.2 A proposed project shall not be approved if the neighboring streets and intersections cannot safely and reasonably accommodate anticipated traffic volumes generated by the proposed development.

16.1.3 The access management standards herein apply to automobile-oriented thoroughfares. Within the downtown or other pedestrian-oriented areas, the standards should be appropriately adapted foremost to foster a pedestrian-friendly environment. For example, much smaller turning radii are appropriate in pedestrian-oriented areas.

16.1.4 If a new town street is to be built as part of a site plan, then the design for the street shall conform to the Town of Durham Road Construction Regulations and Subdivision Regulations.

16.1.5 The site shall have safe and suitable access onto an appropriate Town or State road, i.e., a Class V or better road. In its determination of the appropriate type and location of the access, the Planning Board shall consider such factors as safety, operations, and overall street system circulation.

16.1.6 All driveways and encroachments into any state highway must be approved by the New Hampshire Department of Transportation (NHDOT).

16.1.7 For driveways accessed off a state highway the Town of Durham may nonetheless impose stricter standards for access than those stipulated by NHDOT, where appropriate (unless superseded by NHDOT).

16.1.8 The following should be used as general guides for the design of driveways:

(a) "The Transportation and Traffic Engineering Handbook" (Institute of Transportation Engineers, Prentice Hall, Englewood Cliffs, NJ);

(b) "The Manual on Uniform Traffic Control Devices" (MUTCD; see above);

(c) "A Policy on Geometric Design of Highways and Streets" (American Association of State Highway and Transportation Officials);

(d) New Hampshire Department of Transportation rules and procedures; and

(e) standard access management techniques.

16.1.9 Placement of new driveways and widening of existing driveways in the Commercial Core area (C, CB, CC, CH, and PO districts) is often inappropriate and may be denied at the reasonable discretion of the Planning Board.

16.1.10 When an existing development or redevelopment does not conform with the standards herein, as part of a new site plan application, the Planning Board may stipulate improvement of existing access points, consolidation of existing access points, closing off of wide open access areas onto a street, increasing or decreasing driveway width, addition of acceleration or deceleration lanes, installation of traffic control devices, installation of curbing, or other measures, as appropriate.

16.1.11 The Planning Board may require a secondary access into sites, where appropriate.

16.1.12 Driveways, shared driveways, travel ways, and roads, approved as private roads or private thoroughfares shall remain in private ownership. In cases, where it is plausible that future property owners would seek to convert the roads to Town roads, the Planning Board may require the developer to provide legal instruments to ensure the continuation of private ownership and maintenance.

## Section 16.2 Driveways and Access Management

16.2.1 Purpose

(a) The purpose of this section is to provide for reasonable access to private development while preserving the capacity of the neighboring network of public roads. This is to be accomplished by minimizing the number of driveways, consolidating existing driveways, encouraging placement of driveways on lower order roads, controlling the geometric design of driveways, encouraging narrower driveways, and locating driveways as far away from other driveways and road intersections as practicable.

(b) The higher the classification of the road, the more the road is intended for through travel instead of access to individual sites. Local roads are the lowest order roads, collector roads are mid-level roads, and arterial roads are the highest order roads.

16.2.2 Spacing of Driveways

(a) On higher order roads, driveways shall be located in such a way as to achieve significant spacing from other driveways and intersecting roads. The Planning Board may adjust these spacing standards on a case by case basis, where appropriate.

(b) Any new driveway shall be spaced a minimum distance from any existing driveway on another site, based upon the classification of the road from which the driveway take access. The following distances are measured from centerline to centerline.

| Spacing from other driveway | |
|---|---|
| *Spacing:* | Driveways taking *access from:* |
| 75 feet | local road |
| 125 feet | collector road |
| 175 feet | arterial road |

(c) Any new driveway shall be spaced a minimum distance from any existing road, based upon the classification of the road that it takes access from. The following distances are measured from centerline to centerline.

| Spacing from other road | |
|---|---|
| *Spacing:* | Driveway taking *access from:* |
| 100 feet | local road |
| 150 feet | collector road |
| 200 feet | arterial road |

(d) There shall be a minimum separation of 75 feet between two driveways serving the same lot. If one driveway is one way, then the minimum separation shall be 50 feet.

16.2.3 Number of Driveways

(a) Two is the maximum number of driveways permitted for a lot on a Town road or within the Urban Compact.

(b) An applicant must provide evidence of the need for or value of a second access point, satisfactory to the Planning Board, based upon the following:

- high trip generation from the site
- high traffic volumes on the road
- constraints of the site
- constraints of the road
- use of one way or right turn only driveways
- extensive frontage
- double frontage
- other considerations

16.2.4 Location of Driveways

(a) Driveways shall be located in the most appropriate locations, considering land use, topography, visibility, and locations of nearby access points.

(b) To the extent practicable, new driveways shall be located directly opposite existing ones.

(c) Where there is frontage on more than one road, access shall be taken from the lower order (or "secondary") road where practicable. In cases where the lower order road serves a residential development, it may be preferable for the new access to be taken from the higher order road.

(d) Driveways shall not be located where they will intersect the acceleration/deceleration or right/left turn lanes.

(e) Driveways shall be located as far from abutting properties as practicable, in order to minimize the impact upon those abutting properties.

(f) Driveways shall be located and designed in order to discourage the routing of vehicles through residential streets.

16.2.5 Driveway Design

(a) All driveways shall be of sufficient width and configuration to accommodate the prospective traffic and to afford satisfactory access into the site for police, fire, and other emergency services.

(b) The entrance driveway shall have:
(1) a maximum slope of 12 percent; and

(2) a suitable stopping platform at the intersection with a maximum slope of 3 percent.

(c) The minimum width of a driveway at an access to the road is 20 feet, not including turning radii.

(d) The maximum permitted width, number of lanes, and sizes of turning radii of a driveway shall be determined by sound engineering principles, based upon the special circumstances of the site and the adjoining highway.

(e) Driveways (except for right turn only driveways) shall intersect with streets at an angle as near to 90 degrees as site conditions will permit.

(f) A full service driveway includes four turning movements: right turn in, right turn out, left turn in, and left turn out. When called for by traffic volumes and other constraints, the Planning Board may prohibit turning movements - especially left turn movements - that would be expected to impair safety or efficiency on the road.

(g) Sharing of access driveways by adjoining properties is encouraged. The Planning Board may require shared driveways, when appropriate, based upon traffic considerations, sight distance, and other factors. In such situations, cross easements shall be established as needed.

(h) Driveways shall be combined wherever practicable to minimize the number of access points onto public roads, especially on higher order roads with a high traffic volume.

(i) All driveways shall be constructed with the same cross sections specified for parking lots and travel ways in the Parking and Circulation section.

16.2.6 Traffic Control Devices. The applicant shall provide appropriate traffic control devices in accordance with the latest edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* ("MUTCD") by the USDOT Federal Highway Administration.

16.2.7 Other Provisions. The Planning Board may require construction of frontage or service roads, parallel to collector or arterial roads, when appropriate. In such cases, joint access easements among the property owners may be needed.

16.2.8 Driveway Throat Length. There shall be a minimum driveway throat length based upon expected traffic at the site for the purpose of allowing vehicles to enter the site without

a queue extending near to the road. As a general guide, the throat length should be a minimum of 25 feet for collector roads and 40 feet for arterials.

## Section 16.3 Sight Distance

16.3.1 All driveways shall be designed and located in order to provide an all season safe sight distance as specified in the table below. The sight distance represents the critical line of sight between the operator of a vehicle exiting the driveway and the operator of a vehicle approaching from either direction. Consideration shall also be given to visibility with and between drivers, bicyclists, and pedestrians.

16.3.2 This distance is measured from the driveway location at a point set back 10 feet from the edge of road pavement at 3 feet 6 inches above the driveway surface (the height of a typical driver's eyes) to points 3 feet 6 inches above the road surface in both directions. The posted speed limit on the road is a reasonable approximation of the design speed.

16.3.3 This table follows the recommendations of the American Association of State Highway and Transportation Officials (AASHTO) as set forth in the 2001 version of A Policy on Geometric Design of Highways and Streets

| *Design Speed* | *Minimum Distance* |
|---|---|
| 15 mph | 80 feet |
| 20 mph | 115 feet |
| 25 mph | 155 feet |
| 30 mph | 200 feet |
| 35 mph | 250 feet |
| 40 mph | 305 feet |
| 45 mph | 360 feet |
| 50 mph | 425 feet |
| 55 mph | 495 feet |
| 60 mph | 570 feet |

## Section 16.4 Traffic Impacts

16.4.1 Traffic impact assessments may be required to quantify the impacts of the proposal on all roads and intersections that would likely be affected in any meaningful way.

16.4.2 The anticipated impacts should be evaluated using standard performance indicators including, but not limited to, level-of-service (LOS), a measure of congestion, or flow of traffic at intersections, denoted by a lettered ranking from A to F, with F being the lowest), traffic delays, and volume to capacity ratio. Factors other than smooth flow of vehicles shall also be evaluated, when appropriate, including calming traffic and facilitating access, safety, and ease of use for pedestrians and bicyclists.

16.4.3 The latest edition of the Institute of Transportation Engineers (ITE) Highway Capacity Manual and Trip Generation Manual shall be the primary source for calculating LOS.

16.4.4 Appropriate mitigation to offset any significant impacts created by the proposal, shall be stipulated by the Planning Board.

16.4.5 Extra measures shall be taken to minimize or eliminate impacts upon residential neighborhoods.

16.4.6 On large projects, the Planning Board may require the applicant to determine impact upon congestion levels and air emission levels using either the Strafford Regional Planning Commission traffic models or other appropriate traffic and air quality tools.

16.4.7 Durham Traffic Model. On larger projects where significant impacts are likely, the Planning Board may require the applicant to pay for a Durham Traffic Model simulation to determine likely impacts.

16.4.8 The Planning Board, at its reasonable discretion, may deny any project:

(a) that would reduce the level of service (LOS) at any neighboring road or intersection by one level or more;

(b) that would likely result in a service level of E or F during any peak hour or where service level E or F conditions presently exist during any peak hour, if the proposed project is expected to aggravate those existing conditions in any meaningful way;

(c) that would otherwise have a significantly negative impact or cause unsafe conditions on any neighboring road or intersection;

(d) for which there is not sufficient capacity at any neighboring road or intersection to support the project; or

(e) where the adjoining street from which access will be taken is considered substandard for the purposes and scale of the proposed project.

## Section 16.5 Off-Site Improvements

The Planning Board, at its reasonable option, may require the applicant to:

1) construct necessary infrastructure improvements to facilitate or mitigate the impacts of the project;

2) pay for such improvements that will be constructed by another party; or

3) contribute his/her proportional share toward such improvements if they are being undertaken as part of a larger plan.

# Article 17. Utilities Standards



## Section 17.1 General Provisions

17.1.1 The development shall be provided with all utilities to adequately meet the anticipated use of the project both current and anticipated.

17.1.2 All new and relocated wires, conduits, and cables shall be located underground.

17.1.3 Temporary overhead power and telephone lines are permitted during construction only.

17.1.4 Utility equipment for private development shall not be built in public rights of way.

17.1.5 At its reasonable, discretion, the Planning Board may require that utilities for the proposed site plan be designed oversized, and/or with additional conduits, stubs, or extensions provided within the public right-of-way, to serve nearby land that is an integral part of the neighborhood service area.

17.1.6 Utilities shall be located in order to not conflict with roadside drainage systems, trees that are to be preserved, lighting systems, other utilities, and other such elements located on or off site.

17.1.7 It is the responsibility of the applicant to coordinate with all utility companies to ensure that non-municipal utilities are installed in accordance with approved plans and company specifications.

17.1.8 Easements

(a) Easements located on private property for use by the Town of Durham shall be at least 30 feet wide. It is preferable that such easements run alongside and rear lot lines, if practicable.

(b) No buildings, structures, or septic leaching areas may be situated within Durham utility easements.

(c) Reference pins made of ferrous metal shall be installed in the ground to indicate the location of all such easements. The pins shall be ½ inch in diameter and a total of 24 inches in length. They shall project 1.5 inches above the ground.

17.1.9 Solar systems. Should the property owner seek to add any building-mounted solar photovoltaic or solar thermal system at any time, then such installation shall be exempt from Planning Board site plan review.

## Section 17.2 Water Service and Wells

17.2.1 An adequate supply of potable water for domestic consumption, using municipal water or private wells, as appropriate, shall be provided for all developments.

17.2.2 Municipal Water Service

(a) The municipal water system shall be designed and constructed in accordance with the provisions of Chapter 158, the Water Ordinance of the Town of Durham, other standards of the Town of Durham, and the New Hampshire Department of Environmental Services.

(b) Where municipal water supply is situated in proximity to the project, the applicant shall extend the lines to serve the project. The Planning Board shall use its reasonable discretion to determine when lines must be extended based upon the distance of existing lines from the project, the difficulty in extending those lines, the scale of the project, and the likely positive and negative aspects of extending versus not extending the lines.

(c) In order to prevent damage from freezing, there shall be a minimum soil cover of 5 feet over water mains.

(d) The final design and construction of municipal water facilities serving the project - including size, flow rate, and pressure - is subject to review and approval by the Public Works Department.

(e) Extensions of water lines shall be designed to avoid dead end lines, where practicable.

(f) The following items must be specified:
- Rated normal capacity and gallons per minute at prime use
- Rated maximum capacity and gallons per minute at prime use
- Residual pressure of proposed tap line

17.2.3 Private Wells. Private on-lot and community-type water systems shall be designed in accordance with the standards of the New Hampshire Department of Environmental Services.

17.2.4 Adequacy of public water supply will be determined using existing DPW hydraulic models and studies.

17.2.5 Fire hydrants shall be located within five hundred (500) feet of a building (distance measured as usable, not as straight line).

17.2.6 Fire hydrants shall be served by a minimum 8-inch main.

17.2.7 Fire hydrant flow tests shall yield flow determined adequate for the project by the Fire Department.

17.2.8 The size, flow rate, and pressure of water mains serving the project shall comply with the provisions of Chapter 158, the Durham Water Ordinance.

## Section 17.3 Sewerage and Septic Systems

17.3.1 Adequate provision for sanitary waste shall be provided for all developments, through the municipal sewer system, individual septic waste disposal systems, or a private central sewerage system.

17.3.2 Municipal sewer supply. Where municipal sewer supply is reasonably available, the project shall be connected to that system. The following standards shall apply.

(a) The final design and construction of municipal sewer facilities serving the project - including size, flow rate, and pressure - is subject to review and approval by the Public Works Department.

(b) Where non-domestic sanitary discharge is anticipated, the type of effluent shall be identified and be in compliance with all federal, state, and local laws, rules, and regulations.

(c) Projected peak hour sewer load volume shall be provided.

(d) There must be capacity in the existing sewer line into which the project will connect to handle the estimated maximum sewage generated without adverse impact effect upon the system. If any existing lines or systems are inadequate, the applicant may be required to upgrade those lines or systems at his/her own expense.

(e) The project may not connect to the municipal system unless the Durham Wastewater Treatment Plant is capable of providing adequate treatment for the volume and type of sewage generated by the project.

(f) The following design requirements for sewer systems shall apply:

(1) projected flow velocity shall not exceed ten feet per second and nor be less than two feet per second.

(2) The minimum slope for a gravity sewer line with a diameter of 8 inches or more is 0.005 foot per foot.

(3) The minimum slope for a gravity sewer line with a diameter of 6 inches or more is 0.01 foot per foot.

(4) Manholes shall be spaced no more than 300 feet apart.

17.3.3 Septic systems. All sewage disposal systems shall be designed, constructed and operated in conformance with the NHDES requirements in a manner that will prevent the spread of disease and illness; prevent the pollution of the town's brooks, streams, ponds, lakes, and groundwater table; and assure an adequate supply of potable and palatable water for human consumption.

(a) New Hampshire Department of Environmental Services approval is required for all lots less than 5 acres in size that will not be served by the municipal sewer system.

(b) Private septic systems shall be constructed in accordance with the most recent edition of the New Hampshire Department of Environmental Services Subsurface Disposal Regulations.

## Section 17.4 Electrical Utilities

17.4.1 All electric, telephone, television and other communication lines and structures shall be placed underground throughout the site, including utilities extended onto the site from existing poles near the site.

17.4.2 For sites located on collector and arterial roads where the only pole nearby is across the street, the Planning Board may authorize that one additional pole be placed on or near the property to allow for overhead extension of wires across the street, without having to excavate across the street. Utilities extending from any such new pole must be underground.

17.4.3 When an existing site is redeveloped, and there are existing above ground utilities serving that site, those utilities shall be removed and relocated underground, unless the Planning Board determines such relocation to be impracticable or cost prohibitive given the scale of the proposed redevelopment.

17.4.4 All electrical and mechanical devices (including but not limited to transformers, telecommunications devices, equipment switching boxes, generators, and other utility cabinets) shall be located within buildings when possible or, when located outside, be hidden from street and pedestrian areas by landscaping or architectural screens, according to the requirements of Article 5 – Landscaping and Screening.

# AMENDMENTS TO SITE PLAN REGULATIONS SINCE 2015

*September 12, 2018.* Amendment to Part II. Article 3. Section 3.3 regarding fees.

*April 24, 2019.* Amendment to Part II. adding Article 7 creating Minor Site Committee.

*September 13, 2023.* Amendment to Part II. Article 1. Subsection 1.6.1 changing certified mail to verified mail and Subsection 1.6.2 changing posting of public notice from a newspaper to the Town website.

*November 8, 2023.* Amendment to Part II. Article 1. Subsection 1.5 providing that the deadline is extended when a site plan is appealed to court.

*July 24, 2024.* Amendment to Part II. Article 7. Section 7.8 adding 10) Installation of accessory freestanding solar energy systems.

*November 20, 2024*. Amendment to Part III. Development Standards, Article 10. Parking