

# TOWN OF DURHAM, NEW HAMPSHIRE



***\*DRAFT\****

## **SITE PLAN REGULATIONS**

September 17, 2014

Articles 13-17 presented to the Planning Board on July 8, 2015

Adopted by the Durham Planning Board: \*DATE  
Most Recently Amended:

*Proposed additions are shown like this*

*Proposed deletions are shown like this*

*[Comments are shown like this]*

**COMMENTS FROM APRIL TALON, TOWN ENGINEER, ARE SHOWN IN  
THE RIGHT MARGIN**

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## **PART III. DEVELOPMENT STANDARDS**

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- Article 1 General Standards
- Article 2 Architectural Design Standards (The standards are contained in the Appendix)
- Article 3 Construction Practices Standards
- Article 4 Cultural Resources Standards
- Article 5 Landscaping and Screening Standards
- Article 6 Lighting Standards
- Article 7 Miscellaneous Design Standards
  - Building Configuration
  - Erosion and Sedimentation Control
  - Fences and Walls
  - Flood Zones
  - Recreation and Open Space
  - Signage
- Article 8 Natural Resources Standards
- Article 9 Operational Issues Standards
  - Hours of Operation
  - Maintenance of the Site
  - Snow Storage and Removal
  - Solid Waste
  - Flammable and Combustible Liquids
  - Street Addressing
- Article 10 Parking and Circulation Standards
- Article 11 Pedestrian, Bicycle, and Transit Facility Standards
- Article 12 Personal Wireless Service Facilities
- Article 13 Public Health and Safety Standards
- Article 14 Standards for Particular Uses/Activities
  - Contractor's Storage Yards
  - Recreational Playing Fields, Outdoor
- Article 15 Stormwater Management Standards
- Article 16 Traffic and Access Management Standards
- Article 17 Utilities Standards

## Article 13 Public Health and Safety Standards

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### 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.

*[Mower/Bubar – language simplified]*

- 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 *reasonably* requested by the Fire Department.

*[Bubar/Mower]*

#### 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 Know 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,

Comment [AT1]: Knox-Box?

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 should be galvanized and concrete block buildings should be waterproofed inside.
- 13.3.3 A cover should be supplied at the open end so that salt inside is not exposed to the elements
- 13.3.4 The storage structure should 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 should 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.

**Article 14 Standards for Particular Uses/Activities**

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**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.

*[Bubar/Mower]*

**Section 14.2 Recreational Playing Fields, Outdoor**

- 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 General Requirements  
Section 15.2 Stormwater Management Plan—Part I  
Section 15.3 Stormwater Management Plan—Part II  
Section 15.4 Design Standards  
Section 15.5 Responsibility for Installation and Construction  
Section 15.6 Plan Approval and Review  
Section 15.7 Maintenance and Inspection  
Section 15.8 Reimbursement  
Section 15.9 Waivers & Exceptions

**Comment [AT2]** : I prefer Times New Roman throughout rather than a mix of different fonts, matter of preference.

*[Email from Jamie Houle*

*Michael and Peter*

*Thank you for the opportunity to make comments on the updated site plan regulations. I have conducted a thorough review of the updated site plan regulations that are currently under review by the planning board and have attached them to this e-mail for your reference and consideration.*

*I also wanted to provide some context. Many of my edits better align Durham's site plan regulations with the updated Southeast Watershed Alliance's standards published in December of 2012. Having participated in both the writing of SWA standards as well as other regulations in towns throughout the seacoast region I have also made a few comments that have been potential sticking points for other communities. A few of the recommendations also benefit from a recently completed modeling effort that EPA region 1 funded the UNH Stormwater Center and VHB to perform. I would be happy to provide a presentation of these results to the town, planning board or any other applicable venue. These results demonstrate that with the reduction of the trigger threshold from 10,000 sf to 5,000 sf the regulations themselves will result in an overall reduction of 1.8% TSS, 1.1% TP, and 1.3% TN per permit term (5 yrs) from the existing baseline pollutant loads allocated to the town through previous modeling efforts (GBNPSS and VHB). This an important finding as the regulations are the only way the town currently has in managing existing sources of pollutants generated from developed areas like nitrogen. In essence it responsibly shifts some of the burden of complying with potential future permit responsibilities, albeit small, from local tax payers to commercial redevelopers.*

*Please don't hesitate to contact me should you require any additional information.*

*Jamie*

*James Houle, M.A., CPSWQ, CPESC  
PhD Candidate  
Program Manager  
The UNH Stormwater Center  
Environmental Research Group  
Dept of Civil Engineering]*

*[Mower - ...During his review of the proposed draft, focusing on stormwater management, Jamie Houle pointed out that portions of the Landscaping Article and the Stormwater Management Article may conflict. Apologies if I have missed any acknowledgement of this point by the Board, but I thought it important to mention.*

*If I remember correctly, the conflict may be found primarily, if not entirely, between a focus on aesthetics versus a focus on function, in the parking lot landscaping section (if not in others).*



*In addition, some proposed regulations may be overly prescriptive. It may be better left to the professional engineers designing stormwater management for a parking lot, for example, to determine specific measurements. This is a broad statement, but the advice of Richard Kelley and the Town Engineer, as well as of Jamie, might well provide good guidance to the Board on this matter.*

*So I would simply suggest that the Board might wish to consider these two Articles in coordination (rather than in different groups) and attempt to resolve the conflicts.]*

#### 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.

*[Suggested by Dave Cedarholm, former Durham Town Engineer]*

#### Section 15.1. 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.

- 15.1.1 All applications shall be accompanied by a completed Stormwater Management Checklist to be provided to the Planning Board for consideration.
- 15.1.2 Applicants for developments and redevelopments that disturb **10,000** 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.

**Comment [AT3]** : Change to 5,000 – especially important here to change considering the amount of existing commercial developments in downtown with relatively small footprints.

*[Houle. Consider lowering this to 5,000 sf, which will result in approximately 80% regulation of properties in Durham. This is most important for redevelopment projects which will likely constitute the majority of projects that do not have to follow this regulation. This is the only way to address existing commercial landuses that have no current stormwater management and are non-conforming. Note: of the existing commercial developments in Durham the following chart represents the probability of coverage under this regulation for various percentages of impervious cover: (table provided)]*

- ~~15.1.3. —If the applicant submits an approved NHDES Alteration of Terrain (AOT) permit, the Town does not then require a Stormwater Management Plan. The~~

~~applicant must still provide an Operation and Maintenance Plan. (See Stormwater Management Plan—Part II, below.)~~

*[Houle. I highly recommend this being deleted. The result of this stipulation in Newington has led to a circumventing of the Planning Board for at least 3 large developments over the past 5 years. It should be noted that NHDES AOT is currently staffed by 1 person and should not cede local jurisdiction]*

Comment [AT4] : I agree with Jamie here that 15.1.3 should be deleted.

- 15.1.4 The Planning Board reserves the right to require any development that disturbs less than ~~10,000~~ 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.

*[Houle]*

- 15.1.5 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 15.2. Stormwater Management Plan—Part I

### 15.2.1 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. All site features such as eExisting 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.

*[Bubar and Mower: Requires definition or reference.]*

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

#### 15.2.2 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 Effective Impervious Cover (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

**Comment [AT5]:** This would be more helpful if it was included within the Drainage Analysis – and could be covered as a requirement within the Stormwater Management Checklist. Suggest this be deleted here. The Existing Conditions plan is already very busy and including this information on the plan here is unnecessary.

Section 15.3 Stormwater Management Plan—Part II

15.3.1 ~~*Drainage Analysis that includes calculations comparing Pre- and Post-Development stormwater runoff rates (cubic feet per minute) and volumes (cubic feet) based on a 1-inch rainstorm, and the 2-year, 10-year, and 17-year 24-hour frequency storms.*~~

Comment [AT6]: Agree that this is an important change. Also reflects what most consultants are already using for precip data.

*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.*

Field Code Changed

[Houle]

*[Comments from Bubar and Mower: This should be updated. The Board should consult April Talon (the Town Engineer), Richard Kelley, and Jamie Houle (former members of the Water Resources Protection Subcommittee) relative to the following email from Rockingham Planning Commission Planner Julie LaBranche to Robin Mower, August 2014 reads:*

*One change to the model we recommend is requiring use of the Northeast Region Climate Data Center extreme precipitation data (which is now used by NHDES for Alteration of Terrain permits). See reference here <http://precip.eas.cornell.edu>. The NRCDC site allows entry of an address which will bring up the geographically closest data set available. To see a comparison of old/new precipitation values refer to Appendix A NH Rainfall Tables in the NHDES NH Stormwater Manual volume 2: Post-construction Best Management Practices Selection & Design at <http://des.nh.gov/organization/divisions/water/stormwater/manual.htm>. In many cases the difference in 24-hour rainfall events is significant from area to area because the old data set applies a uniform value for each town.]*

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.

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

- 15.3.3 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).
- 15.3.4 Copies of any additional permits or plans required for compliance with Environmental Protection Agency (EPA) and/or New Hampshire Department of Environmental Services (NHDES).
- 15.3.5 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 15.4 Design Standards**

15.4.1 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.

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

1. 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://www.unh.edu/erg/stream\\_restoration/nh\\_stream\\_crossing\\_guidelines\\_u\\_nh\\_web\\_rev\\_2.pdf](http://www.unh.edu/erg/stream_restoration/nh_stream_crossing_guidelines_u_nh_web_rev_2.pdf);  
<http://des.nh.gov/organization/divisions/water/wetlands/documents/nh-stream-crossings.pdf>
2. LID 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.
3. 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 should 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:

[Houle]

- 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. ~~Disturbed areas shall be stabilized within thirty (30) days.~~ See Section 7.1.

*[Houle]*

- 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.

15.4.3 ~~Redevelopment Project Requirements. Because redevelopment may present a wide range of constraints and limitations, an evaluation of options may be proposed to work in conjunction with broader state watershed goals and local initiatives. Stormwater requirements for redevelopment vary based upon the~~



~~surface area of the site that is covered by existing impervious surfaces. In order to determine the stormwater requirements for redevelopment projects, the percentage of the site covered by existing impervious areas must be calculated.~~

- ~~1. —Less than 40%— 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, within the same watershed within the Town of Durham, provided the applicant satisfactorily demonstrates that impervious area reduction and LID strategies and BMPs have been implemented on-site to the MEP.~~
- ~~2. —More than 40%— For redevelopment sites with more than 40% existing impervious surface coverage, stormwater shall be managed for water quality in accordance with one or more of the following techniques, listed in order of preference:~~
  - ~~a) —Implement measures onsite that result in an EIA of at least 30% of the existing impervious surfaces and pavement areas, and 50% of the additional proposed impervious surfaces and pavement areas through the application of porous media; or~~
  - ~~b) —Implement other LID techniques onsite to the maximum extent practicable to provide treatment for at least 50% of the redevelopment area; or~~
  - ~~e) —Implement off-site BMPs to provide adequate water quality treatment for an area equal to or greater than 50% of redevelopment areas may be used to meet these requirements provided that the applicant satisfactorily demonstrates that impervious area reduction, LID strategies, and/or onsite BMPs have been implemented to the MEP. An approved off-site location must be identified, the specific management measures identified, and an implementation schedule developed in accordance with local 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. To comply with local watershed objectives the mitigation site should be situated in the same subwatershed as the development and impact the same receiving water.~~

1. 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 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 one or more of the following techniques, listed in order of preference:

~~a. Implement measures onsite that result in disconnection or treatment of at least 30% of the existing impervious cover as well as 50% of the additional proposed impervious surfaces and pavement areas through the application of filtration media; or~~

b. Implement other LID techniques onsite to the maximum extent practicable to provide treatment for at least 50% of the entire site area

Comment [AT7]: After discussing with Jamie Houle, we feel deleting this section would be appropriate to simplify the application process and the remaining requirement would capture redevelopment effectively.

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 watershed, 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 watershed 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.

[Houle - These changes reflect an improvement and increased clarity and flexibility on the older standards.]

Section 15.5 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.

- 15.5.1 Site development shall not begin before the Stormwater Management Plan receives written approval by the Planning Board.
- 15.5.2 Structures that meet Best Management Practices (BMP's) shall be installed as designed and scheduled as a condition of final approval of the plan.
- 15.5.3 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.

*[Comments from Bubar and Mower : Timing / phasing is critical. For example, it is important not to completely install gravel wetland before construction, or it may become nonfunctional due to siltation and need to be reinstalled. It is my understanding that this is what happened at Peak.]*

- 15.5.4 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.

Comment [AT8] : I agree that third party oversight is critical.

*[Comments from Bubar and Mower: Regarding review of the design or plan: In 2012 Jamie Houle, UNH Stormwater Center and a subject matter expert about installation of pervious pavement, expressed concern about the design of the paved areas of the Peak project, having witnessed issues with a similar design for parking and dense drive lanes at the Capstone Cottages.*

*In addition, On October 8, 2012, Conservation Commission member Derek Sowers, at the time employed by the Piscataqua Region Estuaries Partnership (PREP), wrote the following on behalf of the Commission to Michael Behrendt regarding conditions of approval for the Peak project:*

*As discussed at the October 3, 2012 meeting of the Durham Conservation Commission (DCC), the Commission agreed that there was an item that should be added to Michael Behrendt's list of suggestions to the Planning Board pertaining to conditions of approval for the Peak Development project.*

*The following item should be added to the list: Independent, third-party review of designs for the stormwater management facilities and inspection and oversight of the*

*construction of stormwater management facilities and erosion and sediment control plan an annual maintenance operations.*

*Third-party review and oversight is especially key to designing and implementing innovative stormwater management techniques such as pervious asphalt and gravel wetlands. While the town is fortunate to have the services of a well-qualified engineer in addition to the drainage analysis and review that will be conducted by NHDES, these are no substitute for independent review of the entire plan and the system designs. Third-party reviews can often benefit both the town and the applicant by locating critical errors or identifying opportunities for design improvements. Third-party services should be paid for by the developer.]*

#### Section 15.6 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 15.7 Maintenance and Inspection

15.7.1 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.

- 15.7.2 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 15.8 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 15.9 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.*

*a. 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.*

*b. 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).*

*c. 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.*

*d. Compliance with standards 16.9.a-16.9.d 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.*

*[Houle]*

*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.*

*[Houle]*

## Section 15.10 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.

*[Comments from Bubar and Mower: Capitalization of multi-part terms is inconsistent. Make a decision and stick to it.]*

Best Management Practices (BMP): *[also Part I]* Methods and means that have been determined to be the most effective, practical, commonly accepted approaches to meeting 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).

*[Comments from Bubar and Mower: What are examples of these “housekeeping measures?” Is this a term of art, i.e., do engineers reading these Standards understand what is meant?]*

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.

*[Bubar/Mower]*

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 strategies, is designed to capture and filtrate the precipitation from a 1-inch 24-hour rain event.
Disturbance <i>[also Part I]</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 <i>[also Part I]</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, GRV

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 REV-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.

[Comments from Bubar and Mower: “REV” is not defined. AWAITING RESPONSE FROM HOULE 10/28/14]

Comment [AT9] : This should be GRV

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 <i>[also Part I]</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 <i>[also Part I]</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 ~~asphalt 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.

*[Bubar/Mower]*

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.

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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 creation of new impervious area over portions of the site that are currently pervious is required to comply fully with the requirements of this manual, with the exception of infill projects.~~ Any redevelopment activity that results in improvements with no increase in impervious area shall be considered redevelopment activities under this regulation if capital cost of improvements in greater than 30% of the appraised property value.

**Comment [AT10]:** This would require redevelopment projects with significant improvements be required to make some contribution to improving stormwater management.

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.
Riparian buffer	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 <i>[also Part I]</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 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 catchbasins. 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

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- Section 16.1 General Provisions
- Section 16.2 Driveways and Access Management
- Section 16.3 Sight Distance
- Section 16.4 Traffic Impacts
- Section 17.5 Off-Site Improvements

*[Mower - The City of Dover has posted online a document titled "Traffic Impact Assessment and Analysis Standards." It would perhaps have been useful to have had a similar document on our books prior to the application for the large student housing developments. See URL below to download the PDF.*

*I see no date on it, so don't know whether it is current, but it might be worth following up with the City Planner.*

*Would something like this be an appropriate companion to the site plan regs?]*

*[Here is the link to Dover's form: <http://www.dover.nh.gov/Assets/government/city-operations/1form/planning/TRAFFIC%20IMPACT%20ANALYSIS%20Standards.pdf>]*

- Section 16.1 General Provisions
  - 16.1.1 Plans for all significant development or redevelopment shall ~~should~~ address the impact of the project upon traffic conditions—including pedestrian and bicycle conditions—on neighboring streets and intersections.

*[Bubar/Mower]*

- 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.

*[Bubar/Mower]*

- 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	
<i>Spacing:</i>	<i>Driveways taking access from:</i>
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	
<i>Spacing:</i>	<i>Driveway taking access from:</i>
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.

*[Query from Bubar and Mower: Should “within the Urban Compact” be retained?]*

- 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 ~~should~~ shall be located as far from abutting properties as practicable, in order to minimize the impact upon those abutting properties.

*[Comments from Bubar and Mower: Why use the term SHOULD instead of SHALL?]*

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

*[Comments from Bubar and Mower: Why use the term SHOULD instead of SHALL?]*

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:
  - i. a maximum slope of 12 percent; and
  - ii. 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 current (2009) *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

<i>Design Speed</i>	<i>Minimum Distance</i>
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**

*[Comments from Bubar and Mower: We urge the Board to consider borrowing from the City of Dover's "Traffic Impact Assessment and Analysis Standards," posted at*

<http://www.ci.dover.nh.us/Assets/government/city-operations/2document/planning/Traffic%20Impact%20Assessment%20and%20Analysis%20Standards.pdf>> In addition, we note that Level of Service (LOS) may not be an appropriate benchmark in every situation. As some in the field of urban planning note, the way LOS is measured and applied has had unanticipated results—“perverse outcomes, in planner speak—that run contrary to other state goals such as emissions reductions and safer streets.”]

- 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.
- [Bubar/Mower]*
- 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 should 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**

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- Section 17.1 General Provisions
- Section 17.2 Water Service and Wells
- Section 17.3 Sewerage and Septic Systems
- Section 17.4 Electrical Utilities

#### 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 along side 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.

**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 TRG.

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.

*[Comments from Bubar and Mower: Why use the term REASONABLY?]*

- 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 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:
  - i. projected flow velocity shall not exceed ten feet per second and nor be less than two feet per second.
  - ii. The minimum slope for a gravity sewer line with a diameter of 8 inches or more is 0.005 foot per foot;
  - iii. The minimum slope for a gravity sewer line with a diameter of 6 inches or more is 0.01 foot per foot;
  - iv. 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.

*[Comments from Bubar and Mower: We believe this section was inadvertently omitted in the draft. The reintroduced section below is identical to that in the current Regulations.]*

*[MB - They are referring to Special Flood Hazard Areas. Note this is included under Article 7 – Miscellaneous Design Standards]*