

Residential Land-Use Regulation in Eastern Massachusetts

A Study of 187 Communities

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Housing Regulation Database: A Joint Project of Pioneer Institute and Rappaport Institute

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Executive Summary

Local housing regulations concerning zoning, road design and installation, and the environment play a fundamental role in housing development in Massachusetts. National studies have indicated that in some regions of the country, including Massachusetts, municipalities have used regulations to restrict the supply of housing, thus driving up prices. Since as far back as 1969, when Massachusetts policymakers passed Chapter 40B, the “Anti-Snob Zoning Act,” policymakers have been concerned that municipal zoning does not allow the market to meet the range of housing needs, particularly for low-income households. More recently, “smart growth” advocates have argued that local regulations favoring low-density residential development are causing the loss of forest and agricultural land in ecologically sensitive areas in Massachusetts. Yet, despite the persistence of debates about land-use regulation, analysts have lacked systematic data on the issue: each of Massachusetts’ 351 municipalities writes its own land-use regulations, and it is no easy task to compare them across localities. The Pioneer/Rappaport study provides a first-of-its-kind research tool for analysts to take a systematic and comparative look at local regulations.

The Pioneer/Rappaport Housing Regulation Database catalogues zoning, subdivision, wetlands, and septic regulations in every municipality within 50 miles of Boston, not including Boston. These municipalities comprise more than half of the state’s municipalities. The database is intended as a research tool to inform the following questions:

1. Do local housing regulations allow the market to meet the range of housing needs in the state?
2. Are municipalities acting to restrict housing supply in general, and thus driving up prices?
3. Are current local land-use regulations effective at accomplishing their intended goals, such as promoting appealing places to live, good design, and environmental protection?

This document explains the research methodology, covers the specific questions included in the surveys of local regulations, and summarizes the answers to those questions. It is meant as a reference document with basic aggregations of how many localities have what kinds of regulations, explanations of the regulations, and examples. It does not assess the regulations’ effectiveness or necessity.

Information was collected from municipal regulations, obtained either directly from the municipalities or from Ordinance.com, a commercial firm that publishes local zoning and subdivision regulations. The regulations are up to date through December 2004. Researchers supplemented information obtained from the regulations with interviews and emails with municipal staff. For verification, short answers to the questions were mailed in survey form to the municipal planning, health, and conservation departments, and responses were received from at least one department in 110 of the 187 localities.

The following is a sampling of findings (or aggregations):

Zoning: All 187 municipalities have zoning

- **Lot size:** 14 municipalities zone for a minimum of two-acre lot sizes in more than 90% of the municipality's land area. (MassGIS data)
- **Buildable area requirements:** 117 municipalities (more than 60% of the sample) restrict use of wetlands, steeply sloped lands, and/or easements in calculations of minimum lot area for subdivisions with single-family homes.
- **Multi-family:** Ten municipalities do not allow any multi-family housing, including townhouses. Another nine municipalities only allow multi-family housing if it is age restricted.
- **Flexible/cluster zoning:** 150 municipalities (80% of the sample) allow some kind of flexible/cluster zoning. The majority have used the flexible provisions for only a few developments.
- **Inclusionary/incentive zoning:** 99 zoning bylaws/ordinances (53% of the sample) contain some kind of provision for inclusionary or incentive zoning.
- **Accessory apartments:** 107 municipalities (57% of the sample) explicitly allow some form of accessory apartment. Only 50 of the provisions (27% of the sample) do not place any restrictions on who can live in the unit.
- **Permit caps:** 29 municipalities regulate the rate of development of residential units by enacting town-wide caps limiting the number of units that can be built annually or biannually.

Subdivision regulations: 181 of 187 municipalities have subdivision regulations

- **Width of pavement:** The most common requirement for "typical subdivision roads" is 28 feet.
- **Right of way:** 119 municipalities require 50 feet for subdivision rights of way.
- **Curbs:** Where curbs are required, more than half of the municipalities require granite curbing in typical subdivisions, slightly fewer either require bituminous or give an option between bituminous or granite (often at the discretion of the planning board).
- **Sidewalks:** More than half of the municipalities require sidewalks on both sides of typical subdivision roads.
- **Grade:** 66 municipalities limit the grade of subdivision roads to 8%.
- **Dead-ends:** 112 (62% of the sample) do not allow dead ends to be longer than 600 feet.

Wetlands: 131 of 187 municipalities have wetlands bylaws/ordinances

- **Wetlands bylaws/ordinances:** 131 municipalities (70% of the sample) have adopted local wetlands laws that give local conservation commissions authority to regulate activities/areas that are not covered under the state's Wetlands Protection Act.
- **Regulations:** 109 conservation commissions have promulgated regulations.
- **Land subject to flooding:** 100 expand the conservation commission's jurisdiction over land subject to flooding.
- **Isolated wetlands:** 114 extend protection to isolated or non-bordering vegetated wetlands.
- **Vernal pools:** 77 municipalities regulate vernal pools that are not state-certified.
- **Setbacks:** 99 municipalities create limited-use zones within the buffer adjacent to wetlands.

Septics: 109 of 187 municipalities have local septic regulations

- **Septic regulations:** 109 (58% of the sample) have adopted local septic regulations that go beyond the state's Title 5.
- **Depth to groundwater:** 27 municipalities amend Title 5's depth to groundwater requirement in some way.
- **Design flow:** 36 municipalities change Title 5's requirements for design flow in some way.
- **Percolation rate:** 27 municipalities (25% of those with regulations) set the maximum percolation rate at 20, 25, or 30 minutes per inch.
- **Setbacks:** 22 municipalities increase the minimum setback requirements from soil absorption systems to property lines from 10 feet (Title 5) to 15, 20, 25, or 30 feet.
- **Leaching fields:** 33 municipalities require a minimum size in square feet for leaching fields.
- **Installation:** 16 municipalities prohibit installation during the winter months.
- **Perc tests:** 21 municipalities restrict the time of year that percolation tests can be observed.

Contents

Executive Summary	3
Introduction	9
Research Methodology	11
<i>Development Of Survey Questions</i>	12
<i>Data Collection</i>	13
<i>Data Coding, Cleaning, And Verification</i>	13
<i>Additional Notes And Comments</i>	14
<i>Questions Not Posed In This Study</i>	16
Zoning Regulations	18
Single-Family Zoning	19
<i>Minimum Lot Sizes</i>	19
What Counts Towards Minimum Lot Size: Wetlands, Slopes, And Easements	19
<i>Lot And Structure Dimensions</i>	24
Height Measurement	24
Frontage	25
Shape	26
Lot Shape Factors	27
Width Requirements	27
Circles, Squares, Rectangles, And Ellipses	29
Angles Of Lot Corners	30
Exclusions Of Odd-Shaped Portions From Lot Area Calculation	30
Waivers	31
Multi-Family Housing	31
<i>By Right Or Special Permit</i>	33
<i>Freestanding New Construction</i>	35
<i>Conversions</i>	35
<i>Mixed-Use Developments</i>	36
<i>Townhouses</i>	37
<i>Age-Restricted Housing</i>	38

<i>Regulatory Barriers To Multi-Family Development</i>	39
Re-Zoning Required	40
Parcel-Size Requirements	41
Zoned Land Is Built Out	41
Restrictions On Dimensions And Density	41
Cluster/Flexible Zoning	42
<i>By-Right Permits Versus Special Permits, And Re-Zoning</i>	44
<i>Minimum Parcel Size</i>	45
<i>Number Of Units, Density Bonuses</i>	46
<i>Lot Area And Other Dimensional Requirements</i>	49
<i>Open Space</i>	50
<i>Design Process</i>	51
<i>Outcomes</i>	52
Inclusionary Zoning	54
<i>Developments That Trigger Inclusionary Provisions</i>	56
Mandatory	56
Incentives	58
<i>Quantity Of Affordable Units</i>	60
<i>Who Qualifies For Units</i>	60
<i>Duration Of Affordability Restrictions</i>	60
<i>On-Site Versus Off-Site, Or Cash Payment</i>	61
<i>Re-Sale Conditions</i>	62
<i>Results</i>	62
Accessory Apartments	65
<i>Owner Occupancy</i>	65
<i>Qualifications For Residents Of Accessory Apartments</i>	66
<i>By-Right Versus Special Permits</i>	68
<i>Physical Requirements</i>	68
<i>Expiration, Renewal, And Termination Of Permits</i>	71
Building Caps And Phasing	74
<i>Building Caps</i>	75
<i>Phasing</i>	75
<i>Exemptions</i>	77
<i>Expiration And Renewal</i>	79
Subdivision Rules And Regulations	80
Road Classifications	80
Width Of Pavement	81
Rights Of Way	83
Curbing	83
Sidewalks	84
Maximum Grades	84
Dead Ends	86

Local Wetlands Regulation	88
Land Subject To Flooding	89
Isolated Vegetated Wetlands	91
Vernal Pools	92
<i>Buffer Zones</i>	93
Delay Of Wetlands Delineation	94
No-Disturbance And No-Build Zones	96
Local Regulation Of Septic Systems	99
Depth To Groundwater	100
Design Flow	101
<i>Gallons Per Bedroom Per Day</i>	101
<i>Bedroom Count</i>	102
<i>Design Flow For Single-Family Homes</i>	104
Percolation Rates	104
Setbacks Of Soil Absorption Systems	105
<i>From The Property Line</i>	105
<i>From Wetlands</i>	105
<i>From Private Wells</i>	106
Leaching Field Size	108
Shared Systems	109
Seasonal Prohibitions	111
<i>System Installation</i>	111
<i>Percolation Tests</i>	111

Introduction

Local housing regulations concerning zoning, subdivision, and the environment play a fundamental role in housing development in Massachusetts. National studies have indicated that in some regions of the country, including Massachusetts, municipalities have restricted supply through housing regulations, thus driving up prices. Since as far back as 1969, when Massachusetts policymakers passed Chapter 40B, the “Anti-Snob Zoning Act,” policymakers have been concerned that municipal zoning does not allow the market to meet the range of housing needs, particularly for low-income households. More recently, “smart growth” advocates have argued that local regulations favoring low-density residential development are causing the loss of forest and agricultural land in ecologically sensitive areas in Massachusetts. Yet, despite the persistence of debates about land-use regulation, analysts have lacked systematic data on the issue: each of Massachusetts’ 351 municipalities writes its own land-use regulations, and it is no easy task to compare them across localities. The Pioneer/Rappaport study provides a first-of-its-kind research tool for analysts to take a systematic and comparative look at local regulations.

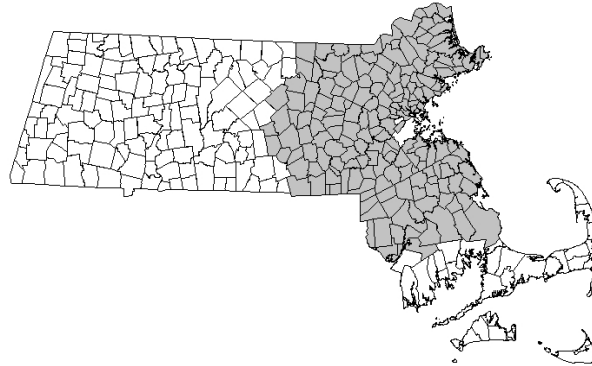
The Pioneer/Rappaport Housing Regulation Database catalogues zoning, subdivision, wetlands, and septic regulations in 187 municipalities in eastern and central Massachusetts. In 2003, Pioneer Institute partnered with the Rappaport Institute to produce a policy study “Getting Home: Overcoming Barriers to Housing in Greater Boston” to explore the role of regulation in the Massachusetts housing market. This study grew out of that undertaking.

The database is intended as a research tool to inform the following broad questions:

1. Do local housing regulations allow the market to meet the range of housing needs in the state?
2. Are municipalities acting to restrict housing supply in general, and thus driving up prices?
3. Are current local land-use regulations effective at accomplishing their intended goals, such as promoting appealing places to live, good design, and environmental protection?

While many studies approach these issues through case studies, the Pioneer/Rappaport initiative’s approach is more systematic—creating a database of local regulations for all municipalities within 50 miles of Boston that enables comparison of the regulations across localities. The 187 municipalities covered reach from the coast to beyond

Worcester, north to the New Hampshire border, and south to Plymouth (the shaded municipalities on the map). Boston and Cape Cod are not included in the study. Massachusetts has 351 cities and towns; this sample represents more than half of them.



This document is intended as a reference guide. It explains the study's methodology, reviews the technical questions included in the database, and summarizes the answers to those questions. It includes basic aggregations of how many localities have what kinds of regulations, explanations of the regulations, and examples. These summaries do not include an evaluation of the regulations' effectiveness or necessity.

Regulations addressed by the study include zoning, subdivision, wetlands, and septic. Each municipality has its own local zoning bylaw or ordinance. (Note: towns have bylaws, cities ordinances.) All but six municipalities have subdivision regulations that govern the design and construction of roads and other infrastructure (because new roads are not often built in Cambridge or Brookline, for example, they do not need subdivision regulations). Seven out of ten of the municipalities studied have local wetlands regulations that go beyond the standards set by the state Wetlands Protection Act. Almost six out of ten have local septic regulations that go beyond the state's Title 5.

Data were coded from municipal bylaws and ordinances, obtained either directly from the municipalities or from Ordinance.com, a commercial firm that publishes local zoning and subdivision regulations. Researchers supplemented information obtained from the regulations with interviews and emails with municipal staff. The database provides a time-slice of regulations in 2004. For verification, short answers to the questions were mailed in survey form to the municipal planning, health and conservation departments, and responses were received from at least one department in 110 of the 187 municipalities.

The land-use regulation database is a research tool for policymakers and analysts, developers, planners, members of conservation commissions and health boards, homeowners, academics, housing advocates, municipal officials, and others interested in land use and housing. This study includes a few "products" or "tools" that would be useful to different parties. All of the tools are located on the Pioneer Institute website, and include (1) Access database with questions, short answers and regulatory text/commentary; (2) PDF documents with answers to questions for each municipality (e.g., in one document analysts could find all of the accessory apartment bylaws/ordinances for each municipality in the survey); (3) Excel and stata spreadsheets with short answers to be used for statistical analysis; (4) analyses based on the data; and (5) a technical summary of the data (this document).

Research Methodology¹

The data obtained through the study is intended to be useful to two different types of audiences, and thus two different versions of the database were created. Academics and other researchers who perform quantitative analysis require data to be in the form of concise numeric or categorical variables that can be used with statistical software. The senior researcher, Jenny Schuetz, developed the data table version intended for quantitative analysis. It was also anticipated that qualitative researchers, advocacy groups, or private citizens might wish to have access to the text of the regulations that were relevant to particular questions. The project manager, Amy Dain, developed the full text version of the database, which contains short answers to a smaller number of questions and sections of text from the regulations.

The following table shows an overview of project phases, described in greater detail below.

Research Timeline

Project phase	Dates	Staff responsible
Survey development	January–May 2004	Project manager, advisors
Data collection	June 2004–January 2005	Project manager, researchers
Data coding and cleaning	October 2004–June 2005	Project manager, senior researcher
Verification and final revisions	March–June 2005	Project manager, senior researcher

The database covers a total of 187 cities and towns, every municipality in Massachusetts within 50 miles of Boston. They reach from the coast to beyond Worcester, north to the New Hampshire border, and south to Plymouth. The coverage does not correspond to U.S. Office of Management and Budget definitions of the metropolitan statistical area [MSA], or other regional definitions; rather, it extends beyond the Boston MSA into communities that only recently have begun facing development pressures. Massachusetts has 351 cities and towns; this sample represents more than half of them. The City of Boston was not included in the study because it does not operate under the state zoning enabling legislation.

¹ This section, “Methodology,” was co-authored by Jenny Schuetz, PhD candidate at the Kennedy School of Government and the Senior Researcher on this study.

Development of Survey Questions

Two broad criteria were established to select regulations to track: (1) Is the regulation perceived to have an impact on housing development? and (2) Could the regulation be tracked across municipalities and measured objectively? The study looked at a range of residential land-use regulations including zoning, subdivision, wetlands, and on-site sewage disposal (septic) regulations. The study did not examine regulations related to commercial, industrial, or recreational land uses.

The project manager developed the research questions iteratively, soliciting suggestions and reviewing the questions with experts in issues of residential permitting and development. The project manager conducted a literature review to establish the preliminary list of questions. The list was then refined through a series of four meetings with an advisory committee, which included several residential developers and builders, civil engineers, and a wetlands scientist. The research questions were sent to real estate experts, housing advocacy groups, environmental groups, state government officials, and developers for review and comment. The project manager spoke with representatives from a range of organizations about the questions, including the Massachusetts Association of Homebuilders, Massachusetts Association of Conservation Commissions, and Citizens Housing and Planning Association.

The four types of regulations captured in the database are zoning, subdivision, wetlands, and septic. Each municipality has its own local zoning bylaw or ordinance, which must be approved by the town meeting or city council. Nearly all municipalities have subdivision regulations adopted by planning boards that govern the design and construction of roads and other infrastructure. The few communities that do not have subdivision regulations are inner-ring suburbs that are not adding any new roads, such as Cambridge and Brookline. Seventy percent of the municipalities studied have local wetlands regulations adopted by conservation commissions that go beyond the standards set by the state Wetlands Protection Act. Nearly 60% have local septic regulations adopted by the boards of health that go beyond the state's regulations. The table below shows the number of municipalities with each type of regulation and the number of variables coded for each section in the data table version.

Coded variables by topic

Regulation type	Variables	Municipalities
Zoning	64	187
Subdivision	14	181
Wetlands	21	131
Septics/Sewer	20	109

The questions fall into three general categories—technical requirements, actual permitting numbers, and the planning/regulatory capacity of the municipality. Most of the questions are about technical requirements. While data on permitting levels for each municipality is available from a few sources such as the U.S. Census, the data is limited and does not answer certain questions about what has been permitted, such as what was done as a cluster development or how many affordable units have been developed through inclusionary zoning. The survey therefore included a couple of questions about

what has been built under the cluster and inclusionary provisions. The planning capacity of municipalities is another area of inquiry, although this study only asked a couple of questions about municipal master plans.

Data on minimum lot sizes and other standard dimensional requirements were not collected as part of the study. MassGIS, the Office of Geographic and Environmental Information within the state Executive Office of Environmental Affairs, conducted a survey of dimensional requirements in zoning codes for all 351 cities and towns in 1999–2000 and assembled a database of these regulations that is publicly available at <http://www.mass.gov/mgis/>. Therefore, the Pioneer-Rappaport study did not duplicate these efforts.

Data Collection

The project manager and twelve research assistants conducted primary data collection. Prior to data collection, the project manager provided an extensive training for the research assistants on the regulatory issues and research methodology. Researchers obtained the regulations from a variety of sources. When possible, researchers downloaded regulations from the municipalities' websites. Zoning and subdivision regulations that were not available on websites were downloaded from a commercial firm, Ordinance.com, that provides local regulations for several states on a subscription basis. In cases where wetlands and septic regulations were not available on the municipal websites, researchers called the conservation commission, board of health, or municipal clerk to determine whether the municipality has such regulations and, if so, to obtain a copy.

Once regulations had been obtained, researchers reviewed the documents and recorded answers to the survey questions in a Microsoft Access database. If answers could not be determined from the regulations, researchers called or emailed the relevant municipal officials. For each question, researchers recorded a short answer (generally either "Yes" or "No" or a single number, but occasionally longer text answers). The database also includes a "Notes" field for each question, into which the researchers entered lengthy sections of the regulations, emails from staff, or summaries of phone conversations. The "Notes" sections were often several pages per question per locality. The manager reviewed all data entries on a daily basis to ensure completeness of information and consistency across the research team.

Data Coding, Cleaning, and Verification

Several types of changes were made to the database during the coding and cleaning phase. The senior researcher recoded some of the short answers, coded additional variables for the data table version, and developed a codebook to accompany the dataset. Both the project manager and senior researcher identified variables with incomplete or ambiguous data; gaps and questions were double-checked by reviewing bylaws and/or communicating with municipal staff. Answers in the data table version of the database are consistent with the short answers in the full text version, unless specifically noted.

For a number of variables, the senior researcher recoded the short answers to ensure that variables used consistent definitions and assumptions across all municipalities. For example, one survey question asked, "What is the width of pavement on a 'typical'

subdivision road?” Most municipalities define different road widths for different categories of roads, intended to serve different numbers of houses and automobile trips. Thus, the initial widths recorded in the short answer to this question did not reflect widths of comparable streets; some were coded for “Lanes” with 4–6 houses, others for “Minor Roads” intended to serve up to 30 houses. The senior researcher created a new variable that identified the name of the road category intended to serve 10–30 houses, or the nearest equivalent, and recoded the short answer to correspond to that road type.

The senior researcher also coded additional variables from the text of the regulations to capture descriptive details. Many of the original survey questions were quite broad, while the text of the regulations included in the “Notes” field contained significant qualitative and quantitative differences in regulations across municipalities. For example, one survey question asked, “Is cluster/flexible development allowed by special permit anywhere in the municipality?” and researchers recorded “Yes” or “No.” However, specific details of the cluster provisions are likely to affect the feasibility or attractiveness to developers of using the provisions, such as the minimum parcel size required and whether more housing units can be developed under cluster than under conventional subdivision standards. The senior researcher coded new variables from the “Notes” field for several of the original survey questions, notably on multi-family zoning, cluster development, inclusionary zoning, and growth management, as well as the dates various provisions were adopted or most recently amended. All variable definitions and clarifying assumptions used to create consistency were documented by the senior researcher in the codebook that accompanies the dataset. The codebook also lists the survey question on which the variable is based, the type of variable (numeric or text), and information on interpreting the coded values (e.g., category names and units of measurement). Definitions and clarifying assumptions are also documented in the full text version of the database.

Eva Claire Synkowski, one of the project researchers, also expanded the list of coded variable on wetlands regulation to capture the sometimes subtle differences in the ways municipalities define various types of wetlands, in particular vernal pools and land subject to flooding.

Following data coding and cleaning, the project manager sent the short answers for 70% of the variables to planning departments, conservation commissions and health departments for verification. At least one department from 110 of the 187 municipalities returned the verification survey. Some of the questions and answers were excluded from the verification surveys to make review easier for municipal staff and to avoid confusion. For example, many municipalities have several types of cluster development with varying dimensional requirements. To avoid confusion, municipal staff were not asked to verify data coded from multiple cluster provisions, but were asked to verify that cluster provisions existed. Enough questions/answers were included for each issue tracked to catch any red flags in the researchers’ coding and interpretation. The project manager and senior researcher revised the data to incorporate municipal comments and corrections, where appropriate.

Additional Notes and Comments

The database presents a time-slice of regulations that were on the books at the time of data collection (summer and fall of 2004). Regulations are cumulative documents—

provisions are added, deleted or revised frequently. Particularly because of the durable nature of buildings, the most basic elements of zoning bylaws—the districts established on the zoning map—may remain generally the same for long periods. However, in several cases, municipalities amended their regulations during the period of data collection, so researchers had to revise earlier data entries to reflect changes, so that all entries would be current through the end of December 2004.

The regulations were in some places vague, and even contradictory. For example, one zoning bylaw listed in one section that multi-family development is a “by-right” use, and in another section the same multi-family was listed as requiring a special permit. The researcher emailed the town planner for clarification; he responded by email: “you have identified one of several contradictions in our by-laws regarding the level of review necessary to undertake certain uses. We hope to clean up such discrepancies soon, when we revise and update our by-laws.”

What is actually built may vary from what appears to be allowed on the books for several reasons. First, municipalities often grant variances that waive certain regulations for specific projects. Second, what is listed as allowed may be made infeasible by the details of the regulations, as appeared to be the case for some types of multi-family housing and cluster development. Third, some municipalities enforce policies that have not been formally promulgated, and thus are hard to track by researchers. For example, several conservation commissions enforce building setbacks from wetlands that are not codified in the local wetlands bylaw/ordinance or regulations. Fourth, outdated regulations that are still on the books may not be enforced. Staff at a few health departments said that they do not enforce outdated regulations of septic systems. Finally, regulations are often vague or ambiguous, so interpretation of the same written language can vary across municipalities. For instance, conservation commissions varied in their interpretation of the width of jurisdiction from the mean annual water line of vernal pools; based on virtually identical language, some municipalities claimed 200 feet of jurisdiction, while others enforced only 100 feet. The database is coded according to the official regulations. Researchers sought clarification from municipal officials where the language was ambiguous.

The greatest challenge in developing the database was to create standardized variables that can be compared across municipalities from distinctly non-standardized regulations. The terms used for the same concept, and the definitions of the same terms, may vary considerably across municipalities, so researchers carefully reviewed the text of the regulations. For instance, the provisions for flexible residential development may be called “Cluster Development,” “Conservation Subdivision,” “Planned Development,” or “Open Space Residential Development,” to give just a few names. Some provisions for planned development allow reductions in minimum lot sizes in exchange for permanent open space, others allow a mix of residential and commercial uses with no open space provisions (the former were coded as “cluster” while the latter were not). Other municipalities may have provisions for age-restricted homes with open space requirements that meet the definition of cluster, but are located in a separate section of the bylaw. As another example, while some towns define multi-family housing to include townhouses, others categorize townhouses under a separate heading—“single-family attached” or just “townhouses.” Thus, the study tracks townhouse requirements in a separate category from multi-family housing. Careful and meticulous review was essential to ensure that the variables truly compare similar items from locality to locality.

Questions Not Posed in This Study

The questions in this study cover a broad range of issues, but do not address every regulatory issue that is important in residential development. Some issues were never raised during the process of developing questions; some issues did not lend themselves to being framed as questions with short, straightforward, comparable answers that could be obtained at a reasonable cost and coded in a database; and some questions were dropped for various reasons after the research was launched.

An example of a question that the study discontinued after its launch was whether districts zoned for by-right multi-family development were “built out.” The question should have been framed: “Are by-right multi-family districts built out to the full capacity allowed by zoning?” Some multi-family zones could be built out with single-family homes that could be re-developed to include many new units or be built out with parking lots that could be re-developed, while other multi-family zones are built out with as many units of multi-family housing as the zoning would allow, so no new units could be added to the district. For this question, however, even a better frame would not have made the answers sufficiently consistent for coding. While some planners could provide answers, others said they would have to study the question—there is not always a straightforward answer. Another question removed from the study was whether municipalities prohibit “mounded systems”—the study should have asked if municipalities have restrictions on mounded systems that go beyond Title 5—since many municipalities have lengthy regulations in this area, but few actually prohibit mounded systems.

Future efforts at such data collection may consider inclusion of additional questions, for example:

ZONING

- Does the municipality allow shared driveways?
- Does zoning include provisions for “transfer of development rights”?
- Are two-family houses allowed?
- Is conversion to two-family houses allowed?
- Does zoning include provisions for design review of residential development?
- Does zoning include provisions for “major residential development”?
- Does zoning include provisions for “Traditional Neighborhood Development” or TND?
- What are the greatest setback requirements in any residential zone from the front and side property lines?

SUBDIVISION

- What kind of mechanisms are allowed for surety of subdivisions?
- What is the diameter of the turnaround required for cul-de-sacs?
- What is the required width of sidewalks in residential subdivisions?
- How far must sidewalks be placed from the curb face?
- What is the required corner radius?

WETLANDS

- What are the wetlands fee schedules?

SEPTIC

- What time of year is groundwater testing allowed for septic systems?

Other questions on technical requirements could be developed relating to parking requirements, bedroom requirements for multi-family housing, site plan review, floor-area ratio (FAR) requirements, and road design standards regarding sight distance, vertical alignment, and horizontal curves.

Additional questions regarding what has been permitted or built could include:

- How many dwelling units have been permitted through “adaptive re-use” or building conversion (since the U.S. Census does not collect permitting data on conversions)?
- How many units of age-restricted housing have been permitted in the last five or ten years?
- Have any mixed-use developments been permitted since 2000?
- Have any accessory or in-law apartments been permitted in the last five years?

Questions could also be developed about by-right permits versus special permits, developments that are appealed, etc.

Finally, more questions could be included about the planning and regulatory capacity of municipalities, such as whether there is a planner on staff, what is the budget of the planning department or planning board, and how is the conservation commission organized.

Zoning Regulations

The Massachusetts Zoning Act, Chapter 40A, delegates to municipalities the power to zone land uses. Zoning is a regulatory system that permits and prohibits various land uses in mapped districts that cover all of the land of a municipality. Zoning bylaws and ordinances (bylaws for towns, ordinances for cities) commonly include lists of activities that can be permitted in each zoning district, the densities at which structures can be built, height of structures, dimensional requirements for lots such as setbacks from property lines and percentages of landscaped or paved land, parking requirements, and procedures for approving permits. According to Chapter 40A, city councils and town meetings can adopt or amend zoning laws only by a supermajority, i.e., a two-thirds vote.

The first Massachusetts municipalities to adopt zoning in the 1920s include Cambridge, Arlington, Dedham, Medfield, Needham, Wakefield, Woburn, Everett, Lynn, Norwood, Concord, Marblehead, Weston, Lincoln, and Saugus. Researchers for this study did not obtain the date of adoption for all zoning bylaws and ordinances, so this may not be a complete list. Municipalities continued to adopt zoning in each decade during the next fifty years. More municipalities in the sample of 187 adopted zoning in the 1950s than in any other decade.

The length and complexity of zoning bylaws and ordinances varies widely. The longest documents are more than 200 pages—in Cambridge, Worcester, Millbury, Plymouth, Woburn, and Natick. The shortest documents are 20 and fewer pages, in such municipalities as Berkley, Millville, and Princeton.

Most zoning bylaws and ordinances divide the municipalities into zoning districts—geographic areas delineated on the zoning map—and most permitted uses and dimensional requirements are assigned by district. In the sample of 187 municipalities, only Essex and Berkley have a single town-wide district. Municipalities with the most districts include Acton, Brookline, Cambridge, Peabody, and Worcester—each with 20 or more zoning districts on the map.

Overlay districts can be used to allow different land uses and dimensional requirements than are permitted in regular zoning districts, without redefining the underlying districts. They can also be used to increase the level of restriction within certain areas. The boundaries of an overlay district may or may not coincide with the boundaries of regular zoning districts. Some of the most common overlay districts do not directly impact residential development (for instance, overlays for wireless communication services), while others affect development indirectly (floodplain or aquifer protection overlays designate certain areas for heightened environmental protection, which may

impose additional restrictions on development, as do historic district overlays). There are also some that explicitly enable development, such as senior residential overlays that permit age-restricted housing in residential and/or non-residential zones.) Berkley, Millville, and Winthrop have no overlay zones. Amesbury, Billerica, Cambridge, Hopkinton, and Wayland have the most overlay zones—from 9 to 11 (Cambridge).

Note that it was sometimes a challenge for the researcher to determine whether something is an overlay or just a separate use allowed in some but not all districts. One bylaw will refer to a cluster overlay or active adult overlay while another bylaw with similar regulations will list the uses under the headings of existing districts. Overlays are not always clearly indicated in the official documents.

Single-Family Zoning

Minimum Lot Sizes

Lot size requirements are a universal part of zoning. They provide a “first cut” at determining the density of development, while other regulations either further restrict or relax the density (often in exchange for provision of public goods such as open space or affordable dwelling units.)

In 1999 and 2000, the Office of Geographic and Environmental Information (MassGIS) within the Massachusetts Executive Office of Environmental Affairs collected information on lot size requirements for the 351 cities and towns in the state. The project aggregated land areas in each zoning district using geographic information systems (GIS) and tracked lot size requirements per district. All regulations tracked were “as-of-right” and did not include requirements listed in overlay districts or through provisions such as cluster developments that require special permits. The Pioneer/Rappaport study did not track lot size requirements beyond obtaining what is available through the MassGIS database.

Lot size requirements for single-family houses vary widely, from under 5,000 square feet per lot to more than 80,000 square feet. According to the MassGIS data, fourteen municipalities (in the sample of 187) zone for a minimum of two-acre lot sizes in more than 90% of the municipality’s land area: Paxton, Princeton, Rehoboth, Sutton, Boxford, Plympton, Carlisle, Lincoln, Medway, Berlin, Bolton, Groton, Dunstable, and Townsend. Thirty-eight municipalities (20% of the sample) zone two-acre lot sizes in more than 50% of the lot area. Seventy-three municipalities (40% of the sample) have two-acre lot size requirements in some part of the municipality. Twenty-seven municipalities zone more than 90% of the land area for one-acre lot size requirements. In addition to the fourteen listed above (for two-acre lot sizes), the following are included on that list: Pepperell, Harvard, Mendon, Sudbury, Sherborn, Berkley, Carver, Norwell, Newbury, Ipswich, Wenham, Topsfield, and Lunenburg. Ninety-five municipalities (50% of the sample) zone more than 50% of land area for one-acre lot sizes or larger.

WHAT COUNTS TOWARDS MINIMUM LOT SIZE: WETLANDS, SLOPES, AND EASEMENTS

More than 60 percent of the sample, 117 municipalities, restrict use of wetlands, steeply sloped lands, and/or easements in calculations of minimum lot area for subdivisions with single-family homes. Fifty-six of those municipalities require that the minimum

buildable or upland area be contiguous or continuous. The term uplands refers specifically to non-wetlands areas, while buildable may be synonymous with upland or additionally refer to lands without easements and steep slopes. Many more bylaws and ordinances restrict use of wetlands in lot calculations than easements or sloped land. Restrictions on counting non-buildable land to meet area requirements are generally located in one or more of three sections of the zoning bylaw or ordinance: (1) definitions (usually of “lot area”), (2) dimensional regulations, or (3) special regulations for flood plain or wetlands districts. Note that it is common for municipalities to limit use of wetlands in calculating allowable density for cluster, multi-family housing, townhouses, etc., but this study only looked at the restrictions as they apply to single-family subdivisions.

As of 2004, Ipswich did not have a minimum upland requirement for single-family lots, but the Ipswich Community Development Plan recommends adopting such a policy to decrease housing density in environmentally sensitive parts of town. The plan states (Section H3-3): “Minimum Upland Requirement: Require every buildable lot to contain some minimum amount of contiguous upland area. The required minimum should be defined to be some percentage (e.g., 50%) of the minimum lot size for the district where the lot is located. This change will decrease the amount of wetlands that can count toward lot area calculations and therefore decrease the overall number of dwelling units that can be constructed in environmentally sensitive sections of the Town.” Similarly, the Town of Rehoboth Master Plan, November 2000 recommends adopting this type of requirement (Section 10.1.1): “In addition to establishing a local wetlands by-law, the Town should require that each buildable lot contain a minimum amount of contiguous uplands. This requirement helps to increase buffering around wetlands and avoid situations where homeowners would likely encroach onto adjacent wetlands. A reasonable requirement for contiguous uplands might be 40,000 square feet or 75% of the lot area, whichever is smaller.”

One planning director from a community south of Boston commented when asked if the town has a minimum upland requirement: “We purposely don’t do that. It is a ‘taking’ issue for me. If we have wetlands on site and it is restricted as open space by law, and we then say you can’t credit it for open space on the site, then we have denied all use. I’ve always been paranoid that somebody would call that a taking.” [“Taking” refers to a public “taking” of property without the due compensation required by the U.S. Constitution.] Another town planner who confirmed her town does not have an upland requirement commented: “if the Planning Board knew about CBA [contiguous buildable area], I’m sure that they’d want it. Personally, I think that it’s a way for towns to make lots even bigger.”

Most of the restrictions come in the form of a “minimum upland requirement” that a certain percent or square footage of the minimum lot area requirement be met by upland or buildable area. Haverhill’s ordinance provides an example: Haverhill requires half of the minimum land area requirements to be met by contiguous buildable area (CBA), excluding wetlands under state and local definitions, land sloped more than 15%, and easements (Definitions, “Building Lot”): “A buildable lot shall have a contiguous buildable upland area which is at least 50 per cent of the required lot size for the zone in which the lot is located. This buildable upland area shall not exceed slopes of 15% on average. The term ‘buildable upland’ shall mean any land

area which is not part of a street, right of way or easement, and not part of a pond, river, stream or wetland (as defined further by MGL Ch. 131 Sec. 40 and City of Haverhill Code section 253).”

Instead of stating the minimum required upland percent, some bylaws/ordinances list the maximum amount of the lot area requirement that can be met by wetlands, which is the same thing, in inverse. For example, Lunenburg’s bylaw states (Section 5.1.1.1): “In all districts, no more than ten (10) percent of the required lot area, as defined in this Section 5.0., shall consist of wetlands or land under water.” This is the same as requiring that 90% of the lot area requirement be met by uplands.

A few of the bylaws/ordinances state that no more than a certain percent of wetlands on a lot can be used to meet minimum lot area requirements. This is different from the two variations cited above; it does not say what percent of lot area requirements can be met by wetlands, but instead it says what percent of existing wetlands on a lot can count. Needham is an example—no more than 30% of land located in a Flood Plain District, subject to protection under the state Wetlands Protection Act, and certain land subject to federal flood storage restrictions can be counted towards minimum lot area requirements in some districts (Section 4.2.1.a): “Not more than a combined total of thirty (30) percent of: (a) land located in a Flood Plain District; (b) land area subject to the Wetlands Protection Act and the Inlands Wetlands Act, M.G.L., Ch. 131, S. 40 and 40A (but not including any area defined as a buffer area under said statutes); and (c) land subject to federal flood storage restrictions included within the Charles River Valley Storage Project shall be counted in calculating the area of a lot for purposes of determining the respective minimum lot areas in Single Residence A, Single Residence B, General Residence and Institutional Districts.” Other municipalities with this approach include Beverly and Dracut.

The contiguous and non-contiguous requirements generally look the same; the former only state that the buildable area must be contiguous. For example, Norton requires 100% of the lot area requirement to be met by CBA (Section 6.4): “The lot must contain the minimum lot area for the district in which the land is located in a single contiguous site, not separated by any portion of a way, waterbody or wetland.” Dedham has a contiguous requirement (under definition of “lot area”): “The horizontal area of a lot exclusive of any area in a street or recorded way open to public use. At least eighty (80) percent of the lot area required for zoning compliance shall be contiguous land other than that under any water body, or wetland as defined in G.L. c. 131, s. 40.” Bellingham does not require contiguity (definitions, “lot area”): “At least 90% of the lot area necessary for compliance with minimum lot area requirements shall also be exclusive of areas subject to protection under the Wetlands Protection Act, Section 40, Chapter 131, G.L. for reasons other than being subject to flooding.” Freetown has both a contiguous and a non-contiguous requirement (Section 3.A): “Land laid out into lots for any purpose after the adoption of this By-Law shall have a minimum frontage on a street or way of 175 feet and a minimum area of 70,000 square feet, a minimum of 52,000 square feet of which must be of non-wetland area (as defined by M.G.L. Chapter 131, Section 40); 30,000 square feet of this non-wetland area must be contiguous.”

The portion of the lot that must be upland/buildable is specified usually either as a percent or in square feet. The percent that must be upland varies widely. The most

common requirements are 50% and 90%. Fourteen municipalities require 100%, with just over half of those requiring that the upland area be contiguous. Halifax provides an example of the 100% contiguous buildable requirement (Article IV, Section 167-10.M): “Minimum lot area must be met by contiguous land which is not: (1) Wetlands as defined in MGL c. 131, Section 40, the Wetlands Protection Act; (2) Wetlands as defined by the Town of Halifax’s Wetlands Protection Bylaw. (3) Land subject to flooding as defined by MGL c. 131, Section 40, the Wetlands Protection Act; (4) Land within the Floodplain District as defined by Section 167-4 of this chapter of the Code of the Town of Halifax.”

Municipalities that exclude all wetlands from minimum lot area calculations

100% contiguous upland	100% upland
Andover	Burlington
Duxbury	Essex
Halifax	Lynnfield
Hingham	Mendon
Medfield	Norwell
Norton	Scituate
Wenham	Tyngsborough
Andover	

In some municipalities, the percentage of upland area required varies by district. For example, in Reading (Section 5.2.9), 12,000 square feet of upland area are required in Single Family 15; 12,000 square feet in Single Family 20; and 20,000 square feet in Single Family 40. In Georgetown (Intensity of Use Schedule, Note 12), the CBA requirement is 15,000 square feet for districts RA, RB, and RC. Therefore, the percent required varies by district, as the lot area requirements for these districts vary: RA (15,000 square foot lots—100% CBA), RB (40,000 square foot lots—37.5% CBA) and RC (80,000 square foot lots—18.75% CBA). Bridgewater lists the requirement in both square feet and as a percentage—whichever requires more upland land (Section 8.50): “Any land used to satisfy the minimum area requirements for a buildable lot must consist of either fifty percent non-wetlands (upland) as defined by the Wetlands Protection Act, Section 40 of Chapter 131, M. G. L. or ten thousand square feet of upland, whichever is greater.” In Berkley, 30,000 square feet of lots that are 65,340 square feet must be uplands, but the upland requirement does not apply to lots that are 87,120 square feet or larger.

In Groveland the requirement varies depending on whether the lot is serviced by town water or not (Section 303.6). In R-A and R-B, 60% contiguous upland area if not service by town water, 50% if served by town water. In Mansfield, the requirement varies for lots serviced by sewer or septic system (in some districts the lot size requirement varies too): more CBA is required for lots without sewer connections.

What counts as wetlands for calculations of buildable area varies by municipality. Some, such as Carver, refer generally to wetlands (Section 2320, footnote 4): “At least 70% of the minimum lot size shall be dry land; i.e., not taken up in streams,

bogs, wetland and/or flood plain.” Many specify that the wetlands are defined by the state Wetlands Protection Act, and several also use the definitions in their local wetlands bylaws/ordinances. Canton’s bylaw, for example, refers to state wetlands standards (Section 4.21): “In computing the ‘Non-Wetland Area’ required for a Residential Lot, no portion of any brook, creek, stream, river, pond, lake or reservoir or portion thereof, nor any freshwater wetland as defined by the Massachusetts Wetlands Protection Act, MGL Chapter 131, Section 40, nor any portion of a way or street, as defined by the By-law may be included in the minimum required Non-Wetland Area.” Walpole’s regulation on “Contiguous Buildable Area” (Section 4C.b) defines “Resource Area” by “Massachusetts General Law, Chapter 131, Section 40, and/or the Town of Walpole Wetlands By-Law.”

The regulations vary not only by whether they use state or local definitions, they also vary on what items fall under the wetlands heading in general for upland calculations. For example, in Gloucester, 75% of lot area requirements must be met by upland area that does not include “land subject to tidal action, coastal storm flowage, flooding or inundation, as defined by Section 12-11 of the City of Gloucester Code of Ordinances,” among other things (Section 6, definition of “lot area”). In contrast, Bellingham notes that land subject to flooding can count as upland area (Section V, definition of “lot area”): “At least 90% of the lot area necessary for compliance with minimum lot area requirements shall also be exclusive of areas subject to protection under the Wetlands Protection Act, Section 40, Chapter 131, G.L. for reasons other than being subject to flooding.”

Boxford has its own variation of what does not count as uplands. Boxford has a two-acre lot area requirement and one-acre CBA requirement. Among other things, Boxford does not count 75 feet of land adjacent to wetlands resource areas as upland (Section 196-24.B.3.c): “In any lot created after the adoption of this amendment, no land which is part of a Wetland Resource Area as specified . . . [in the Wetlands Protection Act] nor any land within 75 feet of such Wetland Resource Area may be counted towards the contiguous buildable area.”

Some buildable area requirements refer to land that is marked as wetlands on a municipal map of wetlands or land that is within floodplain and wetlands districts that are zoning overlays. For example, Andover’s bylaw states (Part II, Article VIII, Section 10): “One hundred percent (100%) of the lot area required for zoning compliance shall be contiguous land other than land located within a line identified as the wetland margin as shown on maps entitled ‘Wetland Areas of Andover, MA.’” Concord’s bylaw (Section 6.2.2.1) states that not more than 50 percent of lot area requirements can be provided “by land located within the Flood Plain Conservancy District and Wetlands Conservancy District.” East Bridgewater has a similar requirement (Section 5.M.3).

Less common than minimum upland requirements are restrictions on the use of sloped land to meet minimum area requirements. North Andover provides an example of separate regulations for restricting wetlands and excluding sloped land from lot area calculations. North Andover requires that 75% of minimum lot area requirements be land that does not have wetlands. At the same time, North Andover does not allow slopes exceeding 33% to count at all towards lot size minimums. North Andover’s bylaw states (Section 8.10.e): “All areas with natural slopes exceeding 33% (3:1) over a horizontal distance of 30 feet as measured perpendicular to the contour on a tract or parcel

of land intended or proposed for subdivision or development, or on a lot intended for building purposes, shall be excluded from the calculation of the minimum lot area required for the applicable zoning district.” Andover has a similar regulation (Article VIII, Section 4.1.4.f): “All areas with natural slopes exceeding twenty-five percent (25%) over a horizontal distance of thirty feet as measured perpendicular to the contour on a tract or parcel of land intended or proposed for subdivision or development, or on a lot intended for building purposes, shall be excluded from the calculation of the minimum lot area required for the applicable zoning district.”

A few municipalities have different types of regulations that relate to sloped land and lot area. In Burlington, where the ground slope is 10% or less, minimum lot area in One Family Dwelling Districts is 20,000 square feet, and where the average ground slope is more than 10 percent, the minimum lot size is increased by 1,000 square feet for each additional percentage of slope, to a maximum of 40,000 square feet. The Burlington bylaw states (Section 6.6.5.b): “Minimum lot size = 20,000 sq. ft. + 1,000 sq. ft. × (n–10.0), where n is the percentage of slope for the lot, rounded to the nearest one tenth of a percent.”

Several municipalities also restrict use of easements in minimum lot area requirements. Some restrict use of easements in general, while others refer to types of easements such as utility transmission easements and surface drainage easements. For example, Sutton’s zoning bylaw states: “For the purposes of calculating required lot area, land area subject to easements and the area contained in detention basins, retention basins and infiltration basins may not be utilized.” Ashland’s bylaw states (Section 282-99): “At least ninety percent (90%) of the lot area required for zoning compliance shall be land . . . other than land within utility transmission easements.” Boxborough’s zoning bylaw states (Definitions, Lot Area): “Lot Area shall mean the horizontal area of the lot exclusive of any area in a street, way, road, or in a surface drainage easement.”

Many municipalities, such as Framingham, explicitly allow for easements to be counted towards lot area requirements. Framingham’s bylaw states (Definitions, Lot Area): “LOT AREA: The horizontal area of the lot including land over which easements have been granted, but exclusive of any area within the limits of a street or recorded public or private way, even if fee to such street is in the owner of the lot.”

Lot and Structure Dimensions

HEIGHT MEASUREMENT

Zoning bylaws and ordinances specify maximum height requirements for residential and other buildings. Many municipalities also specify the maximum number of stories, and a few specify stories but not height. Within a municipality, height requirements usually vary by zoning district. Across municipalities, there is some variation in the way municipalities prescribe that height be measured. Almost 60% of the municipalities (111 of 187) mandate that height be measured starting from the finished (post-construction) grade, averaged across all sides of the building. Twenty-nine list that height be measured from finished grade on the front side or street side of the building. Eight measure from the finished grade at street level or the curb. Thirteen make some reference to using the natural, or pre-construction, grade in the definition of height. There are also a number

of definitions that do not fall into these categories, and a few municipalities do not specify in the bylaw/ordinance how height will be measured.

Marblehead's bylaw includes an example of a height definition that refers to the "original grade" (Article I, Section 200-7): "HEIGHT OF BUILDING—Building height shall be measured from the highest point of any roof or parapet to the lowest point of the original grade or the lowest point of the finished grade of the ground adjoining the building, whichever makes the building height greater." Swampscott uses the finished grade, except where grades are raised three or more feet, in which case the original grade is used for measurement (Article VI): "If the existing grades on the site prior to construction are raised three (3) feet or more (on average) for the new construction, then the height of the building shall be calculated from the grades that existed prior to new construction." Milton varies by district the way height is measured. In Milton's Residence AA, A, B, and C Districts, the height is measured from the mean grade of the "natural ground" contiguous to the building, as the ground existed prior to construction. In the residence D districts, height is measured from the "finished grade of the ground contiguous to the building, as such ground will exist subsequent to construction."

Other variations of the starting point from which height is measured include:

- Belmont: "average finished grade within 20 feet of structure on the street side" (Section 1.4);
- Cohasset: "mean level of the ground within ten (10) feet of the outside walls of the structure" (Section 2.1);
- Dedham: "average finished grade of the lot between the frontage street and the rear building line" (V-1);
- Leicester: "established lowest point of elevation of the finished surface of the ground, paving, or sidewalk within the area between the building and the property line adjoining the building" (Section 1.3);
- Mendon: "from the sill plate of the foundation to the mid-point of the attic" (Section V).

FRONTAGE

Like the maximum height and minimum lot requirements, frontage requirements are also listed per district. "Frontage" is the lot line that abuts the street in front of the house. The minimum frontage requirements for single-family houses vary from well under 50 feet to well over 250 feet. In 80% of the municipalities (151 of 187), the minimum frontage requirement for single-family house lots is listed in at least one district as 150 feet or longer. Nine list frontage requirements of 250 feet or over in at least one district: Acton, Blackstone, Boxford, Carlisle, Marlborough, Newburyport, Sherborn, Sutton, and Weston. A number of municipalities list exceptions to standard frontage requirements for large lots, often called hammerhead, flagpole, or backland lots.

Seventeen municipalities define frontage in a way that portions of the front lot line may not count in meeting the frontage requirement. There are three common ways municipalities exclude some portion of the lot line from frontage calculations. First, some municipalities require that land along the lot frontage must meet the minimum depth/setback requirement in order for that portion of the frontage to be included. These municipalities include Hopkinton, Wrentham, Walpole, Saugus, Reading, and

Halifax. Second, several municipalities do not count as frontage portions of the front line that are crossed by easements and/or wetlands. These municipalities include Chelmsford, Lowell, Tewksbury, Cohasset, Nahant, Essex, Plainville, Lakeville, Marshfield, Rowley, Millbury, and Somerset. Third, some bylaws and ordinances state that frontage calculations “shall not include jogs in street width, back-up strips and other irregularities in street line.” These include Sudbury, Maynard, Lexington, Billerica, Peabody, Groveland, and Leominster. Several bylaws/ordinances specify that “actual access to potential building site shall be required.” A few bylaws, such as those in West Boylston, Hudson, Tyngsborough, and West Newbury, do not allow shared driveways to count towards frontage.

SHAPE

There are a number of ways that municipalities regulate the shape of lots. Lot size, frontage, lot width and setback requirements, all fairly standard zoning tools, influence the shape of lots created when land is subdivided. Many municipalities enact additional shape regulations that often appear under the heading “dimensional regulation” and are titled “lot shape,” “lot shape factor,” “lot regularity,” “lot perimeter,” or “irregularly shaped lots.” Regulations adopted to ensure regularity of lot shape include (1) perimeter-area ratios, sometimes called “shape factors”—equations that limit the length of the perimeter in relationship to the area of the lot, (2) variations on width requirements—that a certain lot width be maintained for a portion of the lot, (3) requirements that a circle, square, rectangle, or ellipsis of specified dimensions fit within the lot, and (4) exclusion of oddly shaped parts of the lot from minimum area requirements. Some municipalities allow the rules to apply only to the portion of a lot that meets minimum lot area requirements, such that the rules will not discourage large lot formation. In addition, several of the regulations include provisions for waivers or special permits for irregularly shaped lots. (Note that in at least one municipality—Bridgewater—the shape requirement appeared in the subdivision regulations, not zoning.)

A couple of bylaws do not include specific shape rules, but generally prohibit oddly shaped lots. Millbury’s bylaw, for example, generally states (Section 32.12): “Odd-Shaped Lots Prohibited. No pork chop, rattail, or excessively funnel-shape or otherwise unusually gerrymandered lots shall be allowed.” Plympton’s bylaw states (Section 5): “Lots, which are so distorted in configuration as to be detrimental to public health, safety, welfare or convenience, even though complying with dimensional requirements established herein, shall not be allowed.” Other bylaws and ordinances that contain specific dimensional requirements for lot shape regularity also preface the shape regulation with general statements prohibiting irregular lots. For example, Rehoboth’s bylaw reads: “Gerrymandered Lots—No pork chop, rat tail, or excessively funnel-shaped or otherwise unusually gerrymandered lots shall be allowed if their shape is caused solely by the attempt to meet the lot size or frontage requirements of these by-laws while evading the by-laws’ intent to regulate building density; such a lot being, for example, a pork chop or rat tail lot which does not contain a rectangular building area which is at least 100’ by 150’ and in which the principal structure is to be located.” Billerica’s bylaw requires that buildable lots encompass a circle with a diameter of 80% of the district’s frontage requirement; Billerica’s bylaw states (Section 7.B.7): “All lots shall be so far as possible regular and symmetrical.”

LOT SHAPE FACTORS

It is common for municipalities to regulate shape through “shape factor equations.” There are three versions of such equations, all based on length of perimeter and lot area:

- $((p^2)/a)/(a/r) \leq X$
- $(p^2)/a \leq X$
- $p/a \leq X$

In these perimeter-area ratios, “a” is actual lot area (square feet), “p” is perimeter (feet), and “r” is required lot area (square feet). Some of the equations listed in the bylaws and ordinances are algebraically re-arranged versions of these three equations. For example, Stow, Littleton, Westford and Carlisle list the requirement $16a/(p^2) \geq .4$, which can be re-arranged to the form $(p^2)/a \leq X$. Boxford and Topsfield use another variation of the same equation: $a \geq X * ((p/4)^2)$.

Instead of listing equations, some bylaws/ordinances write out the requirement in words. For example, Boxford’s bylaw reads (Article VI, Section 196-24.K): “A lot with at least 250 feet of street frontage is substantially irregular in shape if the area of the lot is less than 50% of the area of a square lot of the same perimeter.” This is the same as: $a \geq 0.5 * ((p/4)^2)$. Lancaster also writes its requirement out in words (Section 4.50): “Lot Shape. No lot shall be created which is so irregularly shaped or extended that the square of the lot perimeter exceeds 30 times the gross lot area for any lot in excess of 80,000 square feet, or 25 times the gross lot area for any other lot, unless authorized on special permit by the Planning Board, upon the Board’s determination that development can be better fitted to the characteristics of the land and to the purposes of the Bylaw if such configuration is allowed.”

Some municipalities allow the formula to be applied only to the portion of the lot that meets lot area and frontage requirements, so larger lots are allowed to be more irregular. For example, Carlisle’s bylaw reads (Section 4.1.3.4.1): “The formula may be applied only to that portion of the lot that conforms to the minimum dimensional requirements of the bylaw (frontage and area), thus allowing greater irregularity on large parcels where that irregularity is not used to meet minimum requirements.”

The table on the following page lists all of the municipalities with lot-shape factor requirements. The lower the maximum number (“X”) permitted, the more restrictive the requirement.

WIDTH REQUIREMENTS

The majority of municipalities have some kind of width requirement, although the specifics of the requirements vary. Sometimes the minimum width must be met only at one point in the lot, usually at the front yard setback line or at the front of the dwelling structure. In some municipalities, the width requirement should be met for the whole front setback area or from the frontage to the front of the dwelling—which would regulate the shape of the front yard. Similarly, a number of municipalities require that width be met from the front lot line to the rear of the building. Others require the width to be met throughout the lot or for a large portion. Often, the width requirement is a function of the frontage requirement; the width must be a certain percent (75%, 80%, or 100%) of the frontage requirement for a district.

Shape factor equations

Perimeter-Area Equation	Municipality	X=
$((p^2)/a)/(a/r) \leq X$	NORFOLK	20
	WELLESLEY	20
	WINCHESTER	20 in RDB-10 and RDC-15; 25 in RDA-20
	WRENTHAM	25
	NEEDHAM	30 in Res A and Industrial; 20 in Res B
	NEWTON	30 in single res 1; 20 in single res 3; 25 in single res 2
$(p^2)/a \leq X$	ASHLAND	22 (only for lots under 2 acres)
	BELLINGHAM	22
	BELMONT	22
	DANVERS	22
	HINGHAM	22
	MEDWAY	22
	NORTON	22
	CANTON	23
	WAKEFIELD	24.6
	BLACKSTONE	25; but if lot area >2 acres then 30
	LANCASTER	30 for lots >80,000 sf; 25 for lots <80,000 sf
	MIDDLEBOROUGH	30
	MILFORD	30 in RD; 22 in RA, RB, RC
	STOUGHTON	30
	BOLTON	32 (does not apply to lots over 4.5 acres)
	BOXFORD	32 if frontage over 250 ft; 80 if under 250 ft
	AUBURN	40
	CARLISLE	40
	GROTON	40
	LITTLETON	40
	PAXTON	40
	PEPPERELL	40
	STOW	40
	SUTTON	40
	WESTFORD	40
TOPSFIELD	45.7	
$p/a \leq X$	PEMBROKE	0.02
	DRACUT	0.025
	ROWLEY	0.025
	SUDBURY	0.025
	TEWKSBURY	0.025
	TYNGSBOROUGH	0.025
	MILLIS	0.08

Examples include:

- Lynnfield (Section 10.4): “No dwelling shall be constructed on a lot having a width at any point between the frontage way and that part of the dwelling nearest thereto of less than eighty (80) percent of the frontage distance required for the district in which said lot is located.”
- Holliston (Section IV-A.6): “Lot width at the required front yard setback shall be measured as a straight line distance between the side lot lines and shall be no less than eighty percent (80%) of the required Lot Frontage.”
- Milton (Section 1.A): “At least 80% of the required frontage measured parallel to the aforementioned straight line must be maintained without interruption for a distance of at least 75% of the required frontage.”

CIRCLES, SQUARES, RECTANGLES, AND ELLIPSES

Twenty-six municipalities have a requirement that the lot be configured such that circle of given diameter (generally 75–80% of minimum required frontage) can be a) placed tangent to the frontage without crossing any side lot lines or b) “passed along a continuous line from the lot frontage to the rear yard setback without the circumference intersecting any lot lines” (Southborough). The first version is more common. An example is Billerica (Section 7.B.8): “All buildable lots shall be able to encompass a circle that touches the frontage and has a diameter equal to 80% of the lot’s frontage requirement within the interior of the lot.” The second version of the circle requirement applies to Berlin, Southborough, Franklin, and Hamilton.

Several municipalities require that the inscribed circle not include any wetlands. Lakeville has such a requirement (Section 5.1.2): “No dwelling . . . shall be erected on a lot unless the lot has an area within its bounds which encompasses an upland circle with a minimum diameter of 160 feet and within which the frontage, or frontage at the required set back, must pass.” Similarly, Dunstable’s bylaw states (Section 11.3.1): “Each lot shall be capable of containing a 150-foot diameter circle within which there is not wetland subject to protection under the Dunstable General Wetlands By-Law or Massachusetts General Law, Chapter 131, Section 40, (the ‘Wetlands Protection Act’), and within which any principal building shall be located.” Groton does not allow wetlands or easements within the circle (Section 218.22.G): “Each lot shall be capable of containing a one-hundred-fifty-foot-diameter circle within which there is no area subject to protection under the Wetlands Protection Act, MGL C. 131, ~ 40, and within which any principal building shall be located. All easements, except easements specifically serving the individual dwelling, shall not intersect with the one-hundred-fifty-foot-diameter circle.”

Dighton, Dover, and Medfield require that squares of a certain size fit inside their lots. In Dighton, the square must be 100 feet by 100 feet (Section VI). In Dover’s R district (half-acre lot size), the square must be 100 feet by 100 feet; in the R-1 District (one-acre lot sizes), the square must be 150 feet by 150 feet; in the R-2 District (two-acre lot sizes) the square must be 200 feet by 200 feet. The size of Medfield’s squares also vary by district.

Marlborough and Rehoboth require that rectangles fit within new lots. Marlborough’s ordinance reads (Section 200-42.B): “Lot Shape. The lot shall be large enough to contain a rectangle having one side equal in length to the required frontage and situated parallel

to the mean direction of the front lot line and the other side equal to 3/4th of the required frontage. Where the front lot line is curved, the mean direction of the front lot line shall be the line established by connecting the intersection points of the side property lines with the street line. Said rectangle shall touch the front lot line, but no part of said rectangle shall intersect any lot line.” In Rehoboth, the rectangle must be 100 by 150 feet.

Middleborough requires that lots have 12,000 square feet of contiguous upland area in the shape of a square, circle, or rectangle, in Residence Districts A, B, and R: “No dwelling . . . shall be erected . . . on any lot, unless the lot has an upland building area within it which encompasses a minimum 12,000 square feet of contiguous land in the shape of a circle, square or rectangle and in the use of a rectangle no side may measure less than 100 feet, within which no land is subject to protection under the Wetlands Protection Act, General Laws Chapter 131, Section 40 and within which at least 75% of the foot print of any dwelling, building or structure, not including accessory structures, shall be located.” Stow requires an upland circle or rectangle (Section 4.3.2.3): “The area suitable for buildings shall be considered sufficient if: (a) a circle of 150 feet in diameter, or, (b) a rectangle with an area of 20,000 square feet and a minimum side of 80 feet can be drawn on the LOT plan without overlapping any LOT line or any wetlands or Flood Plain/Wetlands District.”

Carlisle has an ellipse requirement (Section 4.1.3.3): “The site of the dwelling shall be completely within an ellipse, which ellipse shall 1) be completely within the lot; 2) have an area of at least 1.12 acres; 3) have a minor diameter of at least one-hundred-fifty feet (150’).”

ANGLES OF LOT CORNERS

Some municipalities regulate lot shape through the angles at which lot lines meet. For example, Lynnfield (Section 10.5): “Lot Shape. Lot side lines shall not vary more than 20 degrees from being perpendicular to the street boundary, or a tangent thereto, for a distance of at least 30% of the District frontage requirement. The same shall apply to the intersection of side lot lines with the rear boundary.” Similarly, Holbrook’s bylaw reads (Section 9.5.b): “In no case shall a side lot line be such that the direction of the side lot line shall form an angle of less than seventy-five (75) degrees with the street line (or in the case where the side line of the street is a curving line, less than seventy-five (75) degrees with the arc tangent to the curve at the point of intersection with the curving side line of the street).”

EXCLUSIONS OF ODD-SHAPED PORTIONS FROM LOT AREA CALCULATION

Instead of (or in addition to) requiring that the lot shape conform to certain rules, some municipalities use a disincentive against creation of irregular lots—by not allowing odd-shaped parts of lots to count towards minimum lot area requirements. For example, Dunstable (Section 11.3.2): “It is the intent of this bylaw to prohibit the use of long, narrow strands of land not part of the substantial body of a lot as a means for satisfying minimum area requirements. Therefore, when any portion of a lot is defined by parallel lines, or irregular lines that generally oppose one another, such that the mean distance between points on the lines is less than fifty (50’) feet, the land lying within such lines shall be excluded in the computation of minimum lot area; furthermore, in the event that such sections of lot lines connect separate portions of a lot in a dumbbell configuration, the smaller of the connected sections shall also be excluded; provided that

these exclusions shall not be applicable to lots on which the aggregate linear distance along such sections of width less than fifty (50') is less than one hundred fifty (150') feet." Holbrook's bylaw states (Section 9.5.a): "Any portion of a lot which is less in width or depth the eighty (80%) percent of the minimal lot frontage for that zoning district when measured perpendicular to any property line shall not be included in the determination of the required minimum lot size area." Lakeville's bylaw states (Section 5.2.2): "Any portion of a lot which is less than fifty (50) feet in width or depth when measured perpendicular to any property line shall not be included in the determination of the required minimum area and/or frontage." Carver's bylaw states (Section 2320.5): "Portions of the lot less than 40 feet in width shall not be counted as any part of the minimum lot size." Hamilton (Section VI.B) does not count portions of the lot that are less than 75 feet in width towards minimum lot size requirements.

At least ten municipalities use the same language (with slight variations in wording): "When the distance between any two points on lot lines is less than 50 feet, measured in a straight line, the smaller portion of the lot which is bounded by such straight line and such lot lines shall not be considered in computing the minimum lot area unless the distance along such lot lines between such two points is less than 150 feet." (Bedford, Section 6.2.2) The municipalities include Bedford (6.2.2), Bellingham (V, Lot Area), Belmont (1.4), Blackstone (123-24), Chelmsford (195-108), Concord (6.2.2.2), Duxbury (Definitions), Newburyport (II.22), Tyngsborough (2.12.40), and Wilmington (5.2.1).

North Andover's zoning bylaw includes another variation for excluding oddly shaped parts of a lot from area calculations (Section 7.1.3.1): "When a fifty (50) foot straight line is drawn to divide a lot in two, and the perimeter of the smaller piece is greater than two hundred (200) feet, then such smaller piece shall not be included in the calculations when determining: lot area contiguous buildable area (CBA), or street frontage as required by the Summary of Dimensional Requirements (Table 2) of this bylaw."

WAIVERS

Several zoning bylaws/ordinances with lot-shape requirements include provisions for waiving the requirement or granting a special permit for irregular lots. For example, Holbrook's bylaw reads (Section 9.5.c): "the Planning Board may waive any of the requirements in (a) or (b), above, by a Special Permit granted pursuant to Section 10.6, Site Plan Review, herein, when, in the opinion of the Planning Board, such waiver is consistent with the intent of the Subdivision Control Law and will permit an overall well-designed subdivision and where the overall shape of the parcel of land to be subdivided makes such a waiver appropriate." Lancaster's lots must meet a perimeter-area ratio requirement "unless authorized on special permit by the Planning Board, upon the Board's determination that development can be better fitted to the characteristics of the land and to the purposes of the Bylaw if such configuration is allowed." (Lancaster, Section 4.50)

Multi-Family Housing

Multi-family housing comes in a wide variety of forms and sizes. The ways municipalities define and categorize multi-family housing also varies widely, as do the use regulations that govern multi-family housing development. This study includes as

multi-family any building with three or more dwelling units. Some municipalities include townhouses in the definition of multi-family housing, while others list them as single-family attached. This study separated townhouses into its own category. Multi-family dwelling units can be rental or condominium. They can be in a free-standing residential building or part of a mixed-use building, new construction or conversion of a preexisting building. Municipalities can allow multi-family housing as a matter of right or require a special permit for its development. They can allow its development in traditional zoning districts or permit it in overlay districts or as part of a special use category such as cluster development. Many municipalities include provisions for restricting multi-family housing to residents more than a certain age such as 55, and several towns only allow multi-family housing if it is age restricted. (Assisted living facilities, congregate care homes, dormitories, and lodging houses are not counted in this study as multi-family housing.)

Of the 187 municipalities in the sample, 177 (95%) allow multi-family housing in some form, including townhouses. Ten municipalities do not allow any multi-family housing, including townhouses. Another three municipalities only allow townhouses, but no other form of multi-family (and two of those three towns only allow townhouses as part of age-restricted developments). Another seven municipalities only allow multi-family housing if it is age restricted, and another two allow townhouses (no other multi-family) only if age restricted. Another five municipalities do not allow new construction of free-standing multi-family housing, but allow mixed use (dwelling units combined with offices or retail) or conversions (and townhouses too). See table below.

An example of a town that does not allow multi-family housing or townhouses is Littleton. According to Littleton's table of uses, the only residential use in addition to single-family homes, is the "two-family dwelling (conversion)," which is allowed by special permit in houses that existed prior to March 5, 1951 (Article XV, Section 173-68, Conversion of Dwellings). Similarly, Carlisle (which does allow age-restricted multi-family) marked on the survey (April 2005) in response to the question of whether the municipality allows multi-family by right: "Conversion from single to two-family allowed by right in pre-1962 structures."

Municipalities with the most restrictions on multi-family development

	No MF, No TH	Only townhouses	Only age restricted	No freestanding new construction
1	Bolton	Carver	Boxford	Hopedale (conversion, townhouse)
2	Boylston	Hanover (55+)	Carlisle	Norfolk (mix use, townhouse)
3	Bridgewater	Medway (55+)	Lynnfield	Norwell (conversion, townhouse 55+)
4	Dighton		Marshfield	Princeton (conversion)
5	Lakeville		Paxton	Sudbury (mix use, townhouse 55+)
6	Littleton		Plympton	Swansea (conversion)
7	Mendon		Wenham	
8	Nahant		Hanover (townhouse)	
9	Seekonk		Medway (townhouse)	
10	West Bridgewater			

Each municipality that allows multi-family or townhouses classifies and defines those uses in its own way. Lowell, for example, lists the following uses: three-family attached or semi-detached; multi-family dwelling (4 to 6 units); multi-family dwelling (7 or more units); townhouse development (3 to 6 units), townhouse development (7 or more units); “other dwellings converted for more than two families”; and “buildings located in historic mill complexes or religious or educational buildings converted for more than two families.” In the Table of Principal Uses, Concord lists combined business/residence, combined industrial/business/residence and planned residential development. Concord permits multi-family as a part of planned residential development (PRD): “There shall be permitted in any PRD: 10.2.4.1 Single-family detached and semidetached dwellings, two-family dwellings; and multi-unit dwellings of all types without regard to dwelling unit configuration or form of ownership; however, no multi-unit dwelling shall contain more than eight (8) dwelling units.” Holden lists the following multi-family and townhouse uses: “two, three and four family dwelling and duplex not in cluster,” “townhouse,” “multi-family dwelling,” “conversion of existing dwelling to 2, 3 and 4 family dwelling,” “retirement community,” “cluster residential development,” “conversion of existing dwelling to publicly sponsored multi-family dwelling for elderly,” “mixed use development,” “affordable housing development,” “publicly sponsored multi-family dwelling for elderly,” and “housing sponsored by non-profit organization and designed specifically for elderly persons under recognized government assisted programs.”

By Right or Special Permit

Zoning bylaws/ordinances list multi-family housing either as an “as-of-right” use or as requiring a special permit. Often, a municipality will allow some multi-family by right and some by special permit, based on the zoning district, intensity of use, and development types. For example, a municipality could allow multi-family by right in the multi-family district and by special permit in the business district; three units by right and four to eight units by special permit; or conversion of a single-family dwelling to a three-family by right and garden apartments by special permit. Eighty-one municipalities allow some form of multi-family housing (new, conversion, free-standing, mixed-use, townhouses) by right in some area of the municipality (43% of sample). The other ninety-six municipalities that allow some form of multi-family development require special permits in all cases.

Unlike a variance that enables a property to be used in a way that is otherwise not allowed, special permits are used in a manner expressly authorized by the bylaw/ordinance. While as-of-right uses are allowed uniformly throughout a district, special permits are designed for uses that are generally compatible with a particular zone, but that the municipality would not want to allow as a matter of right in any location in the zone. The special permit mechanism gives municipalities leverage to negotiate with an applicant—approval can be made contingent on an applicant meeting certain conditions.

Massachusetts General Law Chapter 40A, Section 9 “Special Permits” authorizes municipal authorities to provide special permits: “Zoning ordinances or by-laws shall provide for specific types of uses which shall only be permitted in specified districts upon the issuance of a special permit. Special permits may be issued only for uses which are in harmony with the general purpose and intent of the ordinance or by-law, and shall be subject to general or specific provisions set forth therein; and such permits may

also impose conditions, safeguards and limitations on time or use. Zoning ordinances or by-laws may also provide for special permits authorizing increases in the permissible density of population or intensity of a particular use in a proposed development; provided that the petitioner or applicant shall, as a condition for the grant of said permit, provide certain open space, housing for persons of low or moderate income, traffic or pedestrian improvements, installation of solar energy systems, protection for solar access, or other amenities. Such zoning ordinances or by-laws shall state the specific improvements or amenities or locations of proposed uses for which the special permits shall be granted, and the maximum increases in density of population or intensity of use which may be authorized by such special permits.”

Municipalities can designate the planning board, board of appeals, or city council/board of selectmen as the special permit granting authority (SPGA) for multi-family housing. Some municipalities divide responsibility between entities based on age-restricted versus non-restricted, by size of development or zoning districts, or for new construction versus conversion. Massachusetts General Law Chapter 40A, Section 9 states: “Zoning ordinances or by-laws may provide that certain classes of special permits shall be issued by one special permit granting authority and others by another special permit granting authority as provided in the ordinance or by-law.” It continues: “A special permit issued by a special permit granting authority shall require a two-thirds vote of boards with more than five members, a vote of at least four members of a five-member board, and a unanimous vote of a three-member board.” Seventeen of the municipalities designate the city council or board of selectman as the SPGA for at least one type of multi-family housing. Sometimes land must first be re-zoned with approval from town meeting before the SPGA can grant a special permit. Some municipalities also require site plan review by an additional entity.

Seventy-one of the 167 municipalities that allow new construction of free-standing multi-family housing (not including townhouses) list it as part of the provisions for cluster, planned unit development or another type of flexible zoning. For example, Cohasset defines cluster development (Section 10.1): “An option which permits an applicant to build single-family (and multi-family) dwellings with reduced lot area and frontage requirements so as to create a development in which the buildings and accessory uses are clustered together into one or more groups with adjacent common open land.” Eight municipalities allow free-standing new construction of multi-family units only through provisions for cluster or planned unit development (PUD):

- Concord (Planned Residential Development)
- Douglas (Flexible Development)
- Duxbury (Planned Development)
- Groveland (Conservation Subdivision Design)
- Hamilton (Flexible Plan Subdivision)
- Lunenburg (Lake Whalom Overlay District)
- Newbury (Open Space Residential Design)
- Paxton (Senior Residential Development)

Milford is not on this list because its bylaw allows housing for the elderly that is operated by the Milford Housing Authority, but the 2003 Milford Comprehensive Plan

does place it in this general category: “Since 1972, Milford has prohibited the construction of residential buildings with more than two units, except in PRDs [Planned Residential Development] since 1985. Historically, Milford provided nearly all the multi-family housing among surrounding communities. Concerned about this unbalanced distribution of apartments, Milford amended the zoning bylaw to no longer allow for multi-unit buildings.”

Freestanding New Construction

Freestanding new development is also listed in a range of categories: high-rise apartments, garden apartments, or just “multi-family.” Twenty municipalities (11% of the sample) do not allow new construction of freestanding multi-family dwellings; 167 do allow it. Sixty-five allow such new construction by right, at least under certain circumstances.

Conversions

Eighty-four municipalities explicitly allow and regulate conversion of dwellings or non-residential buildings into multi-family housing. Other municipalities, without explicitly addressing conversion in the regulations, may permit conversion to uses and intensities allowed in the given district. For example, Ipswich has a municipal building reuse committee and has recently completed conversion of a building to dwelling units, although its bylaw contains no reference to conversion or reuse.

Municipalities more often list conversion of existing dwellings into multi-family than they list conversion of non-residential buildings. Most often, these regulations limit reconfiguration of a dwelling to contain no more than three units, although some allow more units. Many of the regulations specify that to be permitted for conversion, the dwelling must have existed for a period of time or by a certain date. The dwelling conversions are generally allowed in residential and business districts.

For conversion of non-residential buildings, the regulations usually either generically allow “conversion of non-residential structures” or specify that conversion is allowed for specific structure-types such as mills or municipal buildings. Examples of the more generic requirements include Waltham (“rehabilitation of existing structures”), Stoughton (“conversion of nonresidential structures to residential,”) and Lowell (“conversion of larger buildings”). The following municipalities allow reuse of municipal or public buildings:

- Attleboro (Reuse of Public Buildings)
- Beverly (Residential Reuse of Existing Public Buildings)
- Blackstone (Conversion of a Municipal Building)
- Foxborough (Chestnut-Payson Overlay District includes reuse of Foxborough State Hospital property)
- Lexington (Conversion of a municipal building to residential use)
- Mansfield (Older Building Reuse—includes public school building or other municipal building)
- Peabody (Municipal Properties Reuse Development District)

- Reading (Municipal Building Reuse District)
- Sharon (Municipal Building Conversion)
- Wilmington (Municipal Building Reuse)

The following specifically allow mill conversion:

- Clinton (Mill Conversion/Planned Development)
- Dracut (Mill Conversion Overlay District)
- Millbury (Adaptive Reuse Overlay District—“adaptive reuse of abandoned . . . mill buildings.”)
- Northbridge (Historic Mill Adaptive Reuse Overlay District)
- Westford (Mill Conversion Overlay District)

Hopedale, Norwell, Princeton and Swansea only allow multi-family housing (not including townhouses) by means of conversion. Norwell allows conversion to two- or three-family housing by right in the residential districts, business A, and business B. Princeton allows conversion to two- or three-family housing by special permit in the residential-agricultural, business and business-industrial zones. Swansea allows conversion by special permit to houses for two or more families in any district. Hopedale allows conversion of structures built 40 or more years ago.

Mixed-Use Developments

Traditionally, zoning has served as a tool for segregating uses—isolating noxious industrial uses from other uses, for example, or business uses from residential. Increasingly, municipalities are zoning for mixed uses with dwelling units and businesses in the same buildings—through either conventional use regulations, special regulations such as planned unit developments, or mixed-use overlays.

Eighty-four zoning bylaws/ordinances (45% of sample) include explicit provisions for combining dwellings with other uses, usually retail or office (34 by right in at least some cases and 50 by special permit in all cases). In a few cases, zoning allows multi-family housing and retail in the same district, but does not specify whether the uses are allowed in the same building, although the municipality may in practice allow mixed use.

The provisions for mixed use can be found in a range of sections in zoning bylaws/ordinances. Some municipalities list “combined dwelling/retail” as an allowed use in their table of use regulations. Some specify in a footnote to the table of uses that any individual uses allowed in the same district can be permitted in the same building. Some municipalities have detailed provisions for mixed use through overlay districts or special regulations (mixed-use district, downtown overlay, planned unit development, or cluster zoning). Canton, for example, has a mixed-use overlay; Dunstable allows “Planned Unit Development for Mixed Uses” in the Mixed Use District; Hanson lists mixed use in the “Flexible Zoning Bylaw/Special District”; Millis allows mixed use development in the Millis Center Economic Opportunity District; Shirley has a Mixed Use Zoning Overlay District that pertains to the C-1 Commercial Village district; and mixed use is allowed in Townsend’s Downtown Commercial District. Some mixed use is allowed as a part of conversion—for example allowing retail and housing in a former mill.

Several of the municipal master plans or community development plans recommend the municipality adopt mixed-use zoning. For example, Sharon's Community Development Plan Draft (May 2004) reads: "Create a mixed-use overlay district to encourage multi-family housing in conjunction with retail areas by special permit of the Planning Board. Mixed-use developments that combine multi-family housing with retail are beginning to replace old-fashioned malls and strip shopping centers. A mixed use district applied over Shaw's Plaza, the Heights, and the Post Office Square area can promote redevelopment of these areas into more village-like environments." The 2004 Wrentham Master Plan recommends (p. 141): "Allow upper-story apartments above ground floor retail in Town Center. Permitting apartments above shops is an easy way to add housing alternatives and more activity to the town center. . . . Consider permitting mixed-use redevelopment in the mall area. . . . This is a new model of mixed-use development that has proved successful in other parts of the country and is beginning to appear in Massachusetts."

As described in the Norfolk 2004 Community Development Plan, zoning for mixed use does not automatically translate into its development: "In an attempt to provide housing for young people, the town amended its Zoning Bylaw to allow one-bedroom apartments within its Town Center on the upper floors of commercial buildings. A conceptual plan for such apartments was approved by the Planning Board. However, the developer who presented the conceptual plan later proposed a stand-alone condominium project of 36 units. Working with the Town, this became 44 units that are better integrated into the commercial aspects of the Town Center to more closely achieve the Town's goal of mixed-use development."

Townhouses

Many municipalities include townhouses in the definition of multi-family housing and would permit them where multi-family housing is allowed generally. A number of municipalities treat townhouses as a distinct use category and list "townhouse" in the table of uses, often separate from other multi-family uses listed such as garden apartments and high-rise apartments. A number of municipalities label townhouses as "single-family attached units" or "zero lot line dwelling units." Often, municipalities allow townhouses through overlay or special use provisions for cluster, PUD, or active adults (55+). Since the U.S. Census counts townhouses in the same category as single-family detached housing, while many municipalities treat townhouses as multi-family housing, this study addressed townhouses in a separate question.

The U.S. Census website (<http://www.census.gov/const/www/newresconstdoc.html>) includes the following description of attached units, or townhouses: "The one-unit structure category includes fully detached, semidetached (semiattached, side-by-side), rowhouses, and townhouses. In the case of attached units, each must be separated from the adjacent unit by a ground-to-roof wall in order to be classified as a one-unit structure. Also, these units must not share heating/air-conditioning systems or interstructural public utilities, such as water supply, power supply, or sewage disposal lines."

Some municipalities define a multi-family as a "building or series of buildings, for 3 or more families, including apartment house . . . townhouse or rowhouse". Concord's bylaw, for example, includes the following definition (Section 1.3.14): "MULTI-UNIT DWELLING A structure containing more than two (2) dwelling units. This term shall

include, but is not limited to, triplex, quadraplex, and townhouse structures containing three (3) or more dwelling units.” Quite a few towns that do not explicitly include townhouses in the definition of multi-family housing reported in surveys that they consider townhouses to be a form of multi-family, and would allow townhouses in districts zoned for multi-families. Forty-two municipalities either include townhouse in the definition of multi-family dwelling or reported on surveys that they would permit townhouses as “multi-family” housing. For example, Acton’s definition of multi-family does not include any reference to attached units or townhouses, but the survey received from Acton was marked: “treated the same as multi-family.”

Age-Restricted Housing

Sixty-four municipalities have provisions for age-restricted multi-family housing², and nine municipalities only allow multi-family housing if it is age restricted. The provisions specify that the housing be deed restricted to occupants 55 (or another age) and older. Some of the provisions are for developments that are entirely age-restricted, while other provisions are incentives, often density bonuses, to include age-restricted units within an unrestricted development, such as cluster or multi-family. The restricted developments are often called active adult housing, adult retirement villages, senior villages, or planned retirement communities.

Several zoning bylaws/ordinances contain provisions from the 1970s or 80s for public housing for the elderly. These provisions are for the development of multi-families that are restricted by both age and income and must be owned or managed by a public or non-profit agency. This essentially permits development of senior housing under federal or state subsidy programs, such as HUD’s Section 202 (more commonly used in the 1970s and 1980s). More recently, many towns have adopted provisions for age-restricted market-rate developments (units usually offered for sale and less frequently for rent) to financially secure, healthy adults aged 55 or older. Sometimes age-restricted housing is allowed in conjunction with assisted living facilities or nursing homes (i.e., continuum of care housing).

Many master plans and community development plans suggest that the municipality promote age restricted multi-family housing. For example, Chelmsford’s Master Plan reads: “Senior housing is usually more readily accepted by existing residents than regular multi-family housing because of the reduced levels of automobile traffic, the maturity of the residents, and the realization that such housing is needed to accommodate the increasing number of seniors.” Lynnfield’s Master Plan notes in the section on “Economic Development”: “Another means of increasing the tax base in Lynnfield is development of age-restricted housing. These developments have a positive fiscal impact because they do not produce any schoolage children.” Ipswich’s community development plan includes the following discussion: “H2-1. Senior Housing Use Category: Housing for senior citizens is an important need in Ipswich, and will become even more critical in the future, as the elder population continues to grow. In addition, housing for seniors generally has much lower impacts (e.g., traffic and schoolchildren) than other single-family or multi-family housing, and therefore can be part of a comprehensive growth management strategy.”

² Ninety-six municipalities include provisions for any kind of age-restricted housing, including for single-family subdivisions.

One suburban director of community development offered an explanation for restricting housing by age: “Cost of schools and infrastructure. . . . We don’t have money to build schools. We feel zoning for 55 and older will not impact the schools as much as something with younger people in it. We have high taxes here. Especially with 93% of the town as residential, you don’t have the business help that you have in other towns.”

Regulatory Barriers to Multi-Family Development

There are a number of municipalities that technically allow multi-family housing by listing it as a permitted use in the zoning regulations, but where development of multi-family housing in practice is not feasible, for a range of reasons. First, some zoning bylaws/ordinances list a “multi-family” district, but do not zone it on the map; a town meeting or city council would first need to re-zone the land before multi-family housing could be developed. Second, some regulations require a parcel size (up to 50 acres) that cannot be assembled in the municipality. Third, the land zoned for multi-family housing is often already built out with multi-family housing to the full capacity that is allowed (so re-development could yield no additional units.) Finally, dimensional restrictions on height, lot area per dwelling unit, etc. could make its development unfeasible. Milton’s Director of Planning Aaron Henry said (9/2/04): “It may technically say that you can build multi-family, but the bar is so high that you can’t build under it.” He commented that no multi-family housing has been built in Milton for a while.

Rowley’s Master Plan, under the heading “Multi-family Housing Provisions,” describes these issues: “While the Town has recognized the need to offer a wider variety of housing opportunities to meet the needs of its residents, the Town’s zoning bylaw offers few viable options for building such housing. Multi-family housing is only allowed in the three small Residential districts on Haverhill Street and in the Central District, and much of this land is already developed. In the Residential district, a minimum parcel size of 20 acres is required to build multi-family housing. In addition, the multi-family housing special permit process requires four out of the five Planning Board members to vote in favor of the proposal.”

Westborough’s Master Plan provides a similar summary (Section 3.2.1): “Both the Garden Apartment and the High Rise Apartment districts allow single-family, two-family, and multi-family housing by right. . . . Although these districts appear to provide ample alternatives to single-family housing in the Town, in reality they do not since virtually no land is zoned for multi-family housing. The Garden Apartment district includes only the 14 acres already developed as Mayberry Court, off of Water Street. No land in the Town is zoned for High Rise Apartment. A final option for housing developers in Westborough is the Planned Parcel Development (PPD) bylaw. This bylaw allows greater development flexibility on sites of at least 20 acres that Town Meeting votes to establish as PPDs. . . . However, dimensional requirements in PPDs are rather stringent. . . . Given the Town’s current zoning regulations, it is unsurprising that most of the new housing developed in Westborough has consisted of large single-family detached homes on large lots. Although the Town nominally has several provisions on the books to allow multi-family housing, in reality these are very difficult for developers to use because they all require Town Meeting approval (either to establish a PPD or to re-zone land to Garden Apartment or High Rise Apartment). Therefore, it is not surprising that most developers seeking to build multi-family housing have sought Comprehensive Permits under Chapter 40B.”

Hamilton's 2002 Master Plan also describe similar challenges (p. 43): "The Elder Housing District in Hamilton's bylaw has noble intentions but is unlikely to produce what the town hoped to achieve. Non-traditional zoning approaches such as the 'floating zone,' while attractive to local officials, are difficult to implement. . . . The Elder Housing District's weaknesses are not in the construction of the bylaw. Rather, they stem from an approval that is very high-risk from a developer's point of view, contains too many restrictions as to form of ownership, and imposes density and design requirements that may be unrealistic for the type of housing involved."

RE-ZONING REQUIRED

Like Westborough and Hamilton, a number of municipalities that list multi-family housing as a use in the zoning bylaw/ordinance do not actually put it on the zoning map. Chelmsford, for example, requires re-zoning; multi-family dwellings are allowed by special permit in RM districts in Chelmsford, but the RM district must first be created by a town meeting vote (Section XII, 195-59,60). The district must have at least five acres. In Lynnfield, re-zoning by town meeting is necessary to designate an area as an Elderly Housing District.

Maynard lists in the table of uses: "Multi-family dwelling" by special permit in GR and B, "Garden apartments" by right in GA and "High-rise apartments" by right in HRA. According to Carolyn Britt from the Maynard Community Development Office (7/29/04), the High Rise Apartment District is on the books but not on the zoning map. She said that technically the only multi-family zoning by right is in the Garden Apartment District.

Randolph's Building Commissioner Mary McNeil (11/23/04) said that multi-family is a use listed in the bylaw, but the town must re-zone for multi-family to be built. Scituate's town planner, Laura Harbottle, (7/15/04) explained that the Multifamily District is in the zoning bylaw, but it does not exist on any land and it is not used at all. The only multi-family housing allowed in Wenham is elderly housing, and according to the permitting coordinator, a developer would have to get town meeting approval before a permit could be issued. Burlington's Garden Apartments zone is mostly built-out, and planned unit development requires re-zoning by town meeting. Dover's bylaw (Section 185-42) includes "Multifamily Residence Districts". The survey received from Dover on 5/4/05 was marked in response to the question of whether multi-family development is allowed in the town: "Yes, only if a multi-family district is created." Bellingham's bylaw states (Section 4441): "New Multi-family Districts (M) shall each be created only by vote of the Town Meeting amending the Zoning Map. Each such district shall not be less than 20 acres in extent, shall front for at least 500 feet on an arterial street, and shall contain not less than 70% vacant or agricultural land."

Weston's planner (6/21/04) explained that 98% of the town is single-family. Since the multi-family zones are so small, she described them as "floating zones." If a developer has enough land to meet the minimum land requirements for multi-family housing, the developer can ask for the land to be re-zoned.

Auburn's mixed-use development overlay district is not drawn on the zoning map. The Auburn planner (1/3/05) said there have been no requests to use the provisions for mixed-use development.

Braintree requires re-zoning for Planned Unit Development. Town Planner Peter Loppola (7/6/04) said that the PUD overlay was created in 1991, but so far there has been

no PUD development. He said: “We created the use regulations but we did not feel it appropriate to designate certain zones. We figured we could go back to town meeting on a case-by-case basis, but so far nobody has wanted to do it. I assume someday we will do it.”

The Shrewsbury Master Plan, April 2001, lists as a recommendation: “Rather than select specific sites for additional multi-family housing districts, the Town should continue to allow multi-family housing by re-zoning application, as is currently done. This policy will allow developers to select the most appropriate sites for multi-family development while giving the Town significant control over the approval and design of this development. Specific criteria for the approval of multi-family housing special permits should be established so that the process is fair and results in development that is acceptable to the community.”

PARCEL-SIZE REQUIREMENTS

As noted above in the Rowley and Westborough master plans, parcel size requirements of 20 acres for multi-family development can be a barrier to multi-family development. Parcel size requirements are often 5, 10 or 20 acres, but they can be even larger—25 or 50 acres.

ZONED LAND IS BUILT OUT

While municipalities tend to allow special permit uses in a large portion of the town, “by right” multi-family uses tend to be zoned in small districts. In a number of municipalities, these by right multi-family districts are already developed to capacity with multi-family buildings. Planners in Needham and Melrose, for example, said that land zoned for multi-family is built out.

Natick is a town that has long allowed multi-family development by right, but Natick’s planner Sarkis Sarkisian (9/10/04) commented: “If you look at zoning, we don’t really have it by right. The town is already built up. When you get into redevelopment, it is very difficult to do it by right. You almost can’t do that in our town. There are historic buildings, neighbors.” Note that Natick is encouraging dense development (up to 30 units per acre) in the downtown by special permit through newly established overlays. The planner explained: “We want developers to use the bylaw. We have a design review board. If you are coming into that district, then you need to come by the design review board. You can have density, but it is all about the design.”

Steve Antinelli, Auburn Town Planner, wrote in an email (12/17/04): “Only one small section of Auburn is designated RO, that portion of Auburn Street from Oxford Street North to Southbridge Street, 200 feet on either side of the street. It is almost entirely developed, and most of it has been developed commercially or institutionally (Auburn High School.)” RO is the district where multi-family housing is allowed by right (with site plan review). Multi-family housing is allowed in other districts in Auburn by special permit.

RESTRICTIONS ON DIMENSIONS AND DENSITY

Dimensional regulations such as height, lot area per unit, units per building, parking and bedroom restrictions can also limit multi-family development. Tyngsborough’s 2004 master plan notes that the density allowed for multi-family housing is the same as single-family: “The objectives of increasing densities and creating more affordable

housing could be met by reducing the equivalent minimum lot size requirements for multi-family unit construction in the R-3 Districts. Currently this figure is 20,000 sq. ft. which makes it equivalent to the minimum amount of land required for single-family homes in the R-2 and R-3 Districts. If 15,000 sq. ft. per dwelling unit were used, a density of about 3 dwelling units per acre could be achieved, rather than the current density of about 2 dwelling units per acre.” In Townsend, multi-family housing, which can include up to six units per building, is allowed by special permit at a density of one unit per two acres in RB districts and one unit per three acres in RA districts (which typically are single-family densities): “G. Density: not to exceed one apartment unit per three acres in RA Districts; two acres in RB Districts.”

Similarly, in Princeton, the only multi-family allowed is by means of conversion of existing dwellings into units for two or three families, but the lot for a two-family house must be three acres, and for a three-family it must be five acres (Section III.1.B.I.a). Berkley also only permits low-density multi-family development (Section 3.c.2): “multi-family dwellings, not to exceed four dwelling units per building and provided that the area shall comprise at least one and one-half acres (65,340 square feet) per dwelling unit.” Planning Board member Steve Leary (11/18/04) confirmed that multi-family is allowed in Berkley by special permit, but he noted that the town does not have much of it (mostly duplexes, if anything).

In Dover’s multi-family residence districts (Section 185-42): “The total number of dwelling units in a multi-family development shall be limited to the lesser of 4 times the difference between the total number of acres in the tract less the number of acres of wetlands and 40.” This means on a parcel with no wetlands the maximum density is four units per acre, one unit per 10,000 square feet. In some municipalities, single-family homes are zoned on lots of that size.

Steve Antinelli, Auburn Town Planner, wrote in an email: “We do have a 25-foot height limitation, which can be raised to 35 feet by Special Permit of the ZBA, but when combined with setback requirements and stringent parking requirements, for commercial developments in particular, high-density uses face serious constraints.”

Sharon’s 2004 community development plan recommends: “I. Review the limitation on number of bedrooms in multi-family developments. Sharon’s current limits on the number of bedrooms in multi-family developments should be evaluated because it has the effect of constraining a full range of housing choice in the Town.” Wrentham’s Master Plan recommends changes to parking restrictions: “The current 3-space on-site parking requirement for multi-unit housing is excessive and acts as a disincentive. Parking requirements should be tied to the number of bedrooms in the units. Provisions should be made for the possibility of nearby but off-site shared or leased parking.”

Cluster/Flexible Zoning

Under traditional as-of-right zoning, the municipality must grant permits for all proposed units that meet the lot area, frontage, setback, and height requirements, are sited on enough dry land (away from wetlands), with soil appropriate for a septic system (if no sewer option), and have adequate frontage on an access road that also meets municipal requirements. In addition to the traditional as-of-right option, municipalities can

create more flexible zoning either as-of-right or requiring a special permit. The flexible zoning comes by many names, including open space residential design, cluster, planned unit development, or conservation subdivision. Under such a plan, the developer is excused from the rigid lot size, setback, and other requirements of the standard zoning plan. Flexible zoning may also allow types of units (townhouse, duplex, multi-family) not permitted through the municipality's conventional zoning (although some flexible provisions are strictly for single-family development). Construction is usually concentrated or "clustered" on part of the land and the remainder is designated as permanent open space and/or for recreational use.

Flexible zoning can allow the overall density of a project to remain the same (the same number of units permitted as through conventional zoning) or can allow an increase in the number of units. Many of the flexible provisions allow the municipality to grant the developer additional units (above the number allowed in conventional zoning) in exchange for the inclusion of affordable units, designation of more open space, or fulfillment of other community goals.

Where flexible provisions exist, the applicant can usually choose to apply for a conventional subdivision or the alternative flexible subdivision. Some flexible zoning provisions are intended to be used for large numbers of units and new subdivisions, while others can accommodate as few as three or four units.

Flexible provisions come in many forms. Some are less than a page in length, while others are more than thirty pages long. The researcher's main criterion for including provisions under this heading was whether the provision allowed for flexibility in the placement and number of units. Researchers only included provisions that are primarily for residential uses—mixed-use provisions and planned commercial development are not included here. Many of the age-restricted provisions qualify as flexible, as well as some provisions titled multi-family housing or townhouse development.

Eighty percent of the municipalities (157 of 187 in the sample) allow some kind of flexible/cluster zoning. Belmont, Gloucester, Raynham, Sutton, and Upton allow flexible/cluster development by right, at least in some circumstances, while the other 145 municipalities require special permits for flexible/cluster development under all circumstances. Thirty municipalities (20% of 150) only allow single-family houses developed in cluster, while the others also allow two-family, multi-family and/or townhouse development. Four municipalities only allow flexible development if it is age-restricted:

- Berlin—Senior Residential Development Overlay District
- Hanover—Planned Residential Development for Seniors
- Norwell—Village Overlay District (55+)
- Paxton—Senior Residential Development

Researchers obtained the date of adoption for 92 of the 150 flexible/cluster bylaws/ordinances. The following municipalities first adopted flexible zoning in the 1970s: Ashland, Georgetown, Haverhill, Holliston, Lynnfield, Melrose, Milton, Pepperell, Salem, Stoughton, Stow, Wayland, and Weymouth. Municipalities continued to adopt the provisions in each decade since then.

Some municipalities such as Natick have multiple types of cluster. Sharon has both Conservation Subdivision Development (CSD) and Flexible Development. The Town of

Sharon Community Development Plan (Draft) May 2004 states (p. 36): “Flexible Development appears to have been superceded by CSD, but both by-laws persist side by side.” Sudbury has Cluster Development, Flexible Development, and Senior Residential Community. Wilmington has Planned Residential Development and Conservation Subdivision Design. Taunton lists in the table of uses: “Cluster, single-family,” “Cluster, multi-family/garden” and “Cluster, multi-family/rowhouse.”

By-Right Permits Versus Special Permits, and Re-Zoning

The vast majority of flexible provisions require the developer to apply for a special permit, but a few municipalities allow a flexible option as-of-right—Belmont, Gloucester, Raynham, Sutton, and Upton.

One hundred twenty-one municipalities list the planning board as the special permit granting authority (SPGA) for all types of flexible zoning in the municipality. Eight municipalities list the zoning board of appeals as the SPGA for cluster. In six municipalities the selectmen/council grant special permits for cluster development—Haverhill, Lynn, Newton, Quincy, Waltham, Woburn. Fourteen list a combination of entities. For example, in Easton both the planning board and the zoning board are the SPGA for open space residential development (OSRD). In Westwood, the board of appeals is the SPGA for Flexible Development while the planning board grants special permits for Senior Residential Development.

Many of the regulations list specific criteria for the SPGA to use in granting approval for cluster development. For example, Andover’s section on special permits for Cluster Development reads (Section 7.1.5): “Special Permit. The Planning Board shall approve a special permit for a cluster development only if it finds that the proposed disposition of lots and buildings under the particular circumstances involved will make more efficient the provision by the town of health, safety, protective and other services without causing substantial detriment to the character of the neighborhood.” The Andover regulations list additional criteria related to the quality of cluster layout and open space. Plainville’s Residential Cluster Development bylaw lists the following criteria for the SPGA to consider:

1. Compatibility with existing developments;
2. Acceptance design and layout of ways, streets, and paving;
3. That the projected traffic increase to the local road(s) is within the capacity of the existing network;
4. Compliance with environmental standards; and
5. Appropriateness of building and site design.

Several of the municipal master plans and community development plans recommend allowing cluster development by right. For example, the Town of Sharon Community Development Plan 2004 recommends: “A. Make Conservation Subdivision Development the mandatory, by-right zoning for parcels of 5 acres or more. The Town recently reduced the CSD threshold to 5 acres. However, CSD is still a special permit process and most developers prefer the path of least resistance and good profits, which is conventional subdivision development. Since the state legislature recently allowed cluster subdivisions to be a by-right use, Sharon can now make CSD the only by-right use for

remaining parcels more than 5 acres. . . . Because site plan review still applies, the Planning Board can still require the CSD Design Process, Concept Plan, and other aspects of the current by-law to make sure that the subdivision design meets the standards for a conservation subdivision.” The Brookline proposed comprehensive plan suggests: “Establish greenway/open-space cluster zoning as of right in large-lot residential zones.”

Some provisions for flexible development first require re-zoning by town meeting, board of selectmen or city council before the developer can apply for a permit (usually “special permit”). Burlington’s Assistant Planner, Kristin Hoffman, said (7/21/04) that Planned Development requires re-zoning by town meeting. Burlington recently re-zoned for 425 units of Planned Development housing. She explained that if a developer wants to make any changes to dimensions after town meeting approval, the developer must go back to the town meeting. She said: “This makes town meeting members more comfortable with the flexibility because they have control. Only the tough [developers] survive, is what it seems like. We try not to make it difficult. It is hard to imagine the small timers could go through it because the time to go through the process costs money.” Section 12.1.3 of the Burlington Zoning Bylaw explains the procedure for re-zoning to Planned Development district. The developer submits a concept plan to the board of selectmen. The board of selectmen refers it to the planning board. The planning board holds a public hearing and prepares a detailed report making a recommendation to town meeting. Town meeting must then approve the re-zoning with a two-thirds vote.

Tyngsborough’s zoning bylaw states (Section 4.14.00): “Special Permit—Open Space Residential Development. The Planning Board may grant a special permit for Open Space Residential Development. . . .Town Meeting approval of an Open Space Residential Plan is required prior to the granting of a Special Permit.” Tyngsborough’s Master Plan 2004 recommends: “Eliminate requirement that Town Meeting approve each Open Space Residential Development.”

Arthur Noonan of Dedham Planning (3/21/05) said that no Planned Residential Development has been built in Dedham. He suggested that the process is quite burdensome, requiring approval of the planning board, selectmen, and town meeting.

Minimum Parcel Size

Minimum parcel size requirements for flexible zoning can limit the provision’s applicability to development. For example, it can be a challenge for a developer to assemble a 10- or 20-acre parcel in some municipalities. The most common requirement for parcel size in cluster development is ten acres; five acres is the second most common requirement. Some municipalities vary the parcel size requirement by type of cluster development or according to the underlying district where it is located. Middleton requires a 20-acre parcel for Cluster development; Manchester-by-the-Sea requires ten acres for Open Space Planning in Single Residence District A and 20 acres in Single Residence District C and E; Dracut requires five acres for Open Space Residential Development in R1 and ten acres in R2; and Dunstable requires fourteen acres for a tract to qualify for Open Space Development. Clinton does not require a minimum tract size for Flexible Development (Section 7120): “Applicability. In accordance with the following provisions, a Flexible Development project may be created, whether a subdivision or not, from any parcel or set of contiguous parcels held in common ownership and located entirely within the

Town.” Some municipalities, such as Concord, require that the parcel size be five times the minimum lot area in the zoning district where the parcel is located. Dighton’s provisions apply to “Any creation of five (5) or more lots, whether a subdivision or not, from a parcel or set of contiguous parcels held in common ownership and located entirely within the Residence District.”

Some municipal master plans and community development plans recommend reducing the required parcel size for cluster development. Westborough’s Open Space Communities Bylaw was widely used with a 10-acre requirement, but available parcels of that size are running out. The Westborough 2003 Master Plan reads (Section 10.6.1): “Westborough’s Open Space Communities Bylaw has been an effective tool for preserving open space and creating more environmentally sensitive development in Westborough. However, the current minimum tract size of ten acres prevents the development of open space communities on smaller parcels. As Westborough nears buildout and there are fewer large parcels to develop, new subdivisions may increasingly be proposed on smaller ‘infill’ tracts. Recommended Action: The Town should reduce the minimum tract size for open space communities (specified in Section 4330.1 of the zoning bylaw) from 10 acres to 5 acres and allow adjacent land in common ownership to count toward the 5-acre required tract size. This change will allow, at the Planning Board’s option, the development of open space communities on smaller parcels.”

The Town of Cohasset Master Plan and EO 418 Community Development Plan, Draft November 2003, reads: “Although Cohasset does not have many large parcels of vacant developable land, it is worth considering the benefits of refining the Town’s cluster development model for remaining parcels of five acres or more.” Cohasset currently requires ten acres.

Lynnfield’s Greenbelt Zoning requires 25 acres (Section 8.4.2.2): “The area of the tract of land to be subdivided is not less than 25 acres.” Kathy Randele, Secretary, Lynnfield Planning Board, (6/2/05) said that approximately seven “Greenbelt” developments have been built since its adoption in 1972. Recently a group wanted to use it, but had only 23 acres and developed the land through conventional zoning.

In Leicester, the minimum area of tract eligible for Recreational Development is two hundred acres. Town Planner Michelle Buck (11/2004) said that Recreational Development was created as an overlay for a particular 300-acre golf course. She said that the overlay was created to protect the land, while developing 300 single-family homes. She said that in the end, the town bought the land to protect it and no housing was built.

Kristin Hoffman, Burlington Assistant Planner, said (7/21/04), in reference to Open Space Residential Development: “We require ten acres right now, which is silly for any town within 128. We are trying to bring it to 3 acres.” She said that there was one development that triggered the cluster provisions: Cranberry Estates.

Number of Units, Density Bonuses

At least fifty-seven of the municipalities that allow some form of cluster (38% of 150) do not allow any more units to be built under any of the cluster provisions than could be built using conventional zoning plan. Several additional municipalities grant an increase in the number of units only for the senior cluster provisions, but not for the unrestricted cluster.

Carver, Attleboro, and Bolton are examples of municipalities that do not allow any additional units to be built under cluster. Carver's Flexible Development Bylaw reads (Section 5850): "Number of Dwelling Units. The maximum number of dwelling units allowed shall be equal to the number of lots which could reasonably be expected to be developed upon that parcel under a conventional plan in full conformance with all zoning, subdivision regulations, health regulations, wetlands regulations, and other applicable requirements." Attleboro's Open Space Residential Development Bylaw states (Section 17-10.05): "The number of building lots that could be accommodated within the tract shall not exceed the maximum number of lots permitted by the minimum areas in the applicable Districts after deduction of fifteen (15%) percent of its area for streets." Bolton's Farmland and Open Space Planned Residential Development Bylaw states (Section 2.3.6.4): "The maximum number of dwellings which can be built in a FOSPRD is equal to the number of dwellings which . . . could be built on the land in a traditional subdivision." Note that some bylaws/ordinances require submission of an alternative conventional plan to establish a baseline number of units, while others, like Attleboro's, offer a formula to establish the number of units.

Some municipalities offer "bonus units" automatically for cluster developments. Norfolk, for example, grants an automatic increase of 10% (Section H.2.c.3): "The maximum number of building lots permitted in an Open Space Preservation development shall be equal to the number of building lots which could be developed through a conventional subdivision of the tract, plus ten percent (10%)." Easton also allows up to 10% more units: "In order to grant a special permit for OSRD, the Planning and Zoning Board must find that the number of housing units to be developed in the OSRD will not exceed by more than ten percent (10%) the number of house lots that could be developed under standard lot area frontage requirements." Carlisle grants one additional unit for conservation clusters.

It is more common for the zoning bylaws/ordinances to specify that the density bonus will be granted in exchange for fulfillment of certain community goals such as designation of affordable units, age-restrictions on units or set-asides of additional open space. Some municipalities establish complicated formulas while others have more general requirements.

Brookline will grant up to 25% more units in a cluster development beyond what is allowed in a conventional plan. Brookline gives a 1% bonus for every 20% increase in landscaped open space above the required minimum; a 1% bonus for every 20% increase in usable open space over the required minimum; a 1% bonus per 5% of parking concealed below grade or within a residential structure; and up to 10% bonus for superior site design—preservation of architecturally significant structures, preservation of significant trees, underground wiring, etc.

Clinton grants density bonuses in Flexible Developments for open space, units restricted to occupants 55 years of age and older, affordable units, and apartments developed with limited bedrooms ("for every dwelling unit restricted to two (2) bedrooms, an additional two (2) bedroom unit may be added as a density bonus.")

Douglas allows up to 50% more units in a Flexible Development than in a conventional development. A 5% bonus is awarded for each additional 10% of the site, beyond the required 40%, set aside as open space; one additional dwelling unit can be added for every two restricted to occupants over the age of 55; additional bonuses are granted for

recreational facilities available to the public, as well as the development of affordable units on- or off-site. Douglas also grants up to four additional units per Flexible Development project for cash contributions: “6. A density bonus unit shall be allowed for each contribution made of cash or cash equivalent for public purposes to the Town of Douglas by any developer, such as but not limited to:

- Contribution to Douglas Public Library for purchase of books.
- Purchase of Douglas Police or Douglas Fire equipment.
- Contribution to a Douglas town property to update or renovate public facilities, such as the Highway Garage, Skate Park, Sports Field, etc.
- For scholarships to Douglas High School Graduates.
- To repave existing Douglas town roads, correcting drainage problem or other public preservation, purchase of open space or any other public purpose approved by the Planning Board.”

Millbury’s zoning includes a point system for calculating density bonuses granted as part of Open Space Community. The percentage increase is a function of the number of bonus points, up to a 50% increase in the number of units permitted, and based on the following:

- A. *Encourage residential choice and mix*: 0.25 × percentage of all dwelling units legally reserved for the elderly or handicapped. (Maximum ten points)
- B. *Avoid excessive school impact*: 0.05 × percentage of multi-family dwelling units with only one bedroom. (Maximum five points)
- C. *Protect existing natural areas*: 0.15 × percentage of trees of eight inches plus caliper to be retained. (Maximum ten points)
- D. *Protect existing natural areas*: 1.0 × acres of wetland to be retained in its natural state, minus 1.5 × acres of wetlands to be altered. (Maximum ten points)
- E. *Protect existing natural areas*: 0.4 × acres of land with a slope of fifteen percent or greater to be retained in its natural state. (Maximum ten points)
- F. *Protect existing natural areas*: 1.0 × acres of land within two hundred horizontal feet of a river, pond, lake, or stream to be retained in its natural state. (Maximum ten points)
- G. *Minimize incongruity with surrounding area*: 0.1 × percentage of plan boundary abutted by a two hundred foot or more buffer strip to be retained in a natural state or planted with indigenous trees. (Maximum ten points)
- H. *Minimize visual impact*: 0.1 × percentage of dwelling units with the highest habitable floor at a level below the highest ground elevation within five hundred feet. (Maximum ten points)
- I. *Encourage active or passive recreation*: 0.5 × acres of common open space which is developed for active or passive recreational activities and is open to the general public. (Maximum fifteen points)
- J. *Preserve agricultural lands*: 0.5 × acres of agricultural land in which the development rights are transferred to the Town of Millbury or the Commonwealth of Massachusetts. (Maximum thirty points)
- K. *Encourage the use of solar energy*: 0.25 × percentage of dwelling units in which solar energy supplies at least fifty percent of the total annual energy requirements for heating and hot water. (Maximum twenty-five points)

Hamilton's Flexible Plan Subdivision Bylaw gives the SPGA more discretion in determining the number of bonus units: "c. Number of Dwelling Units. The maximum number of dwelling units in a Flexible Plan Subdivision shall be from 1 to 1.5 times the number of units achievable in a conventional single-family-lot plan of the same parcel as set forth below. The Planning Board shall determine the allowable density within that range based on the quality of the Flexible Plan, considering whether the plan accomplishes significant preservation of open space, vistas and Historic District, and whether the design and siting of buildings contribute to this effect. . . . Flexible Plan Subdivision is not intended to render developable any parcels that would not otherwise be developable."

Upton's 2004 Community Development Plan notes that its bylaw is vague about density bonuses (p. 42): "3-A Cluster Housing and Open Space Subdivisions. . . . Upton's open space preservation subdivision provision is unique in that it does not specify a density bonus or even the total amount of new lots that can be created under this option. Rather, it is left to the Planning Board to determine the maximum number of lots that can be created under the open space preservation subdivision option on a case-by-case basis. In practice, the Planning Board has not allowed open space subdivisions to create more lots than could be created through a traditional subdivision plan. Although the current situation may provide the Planning Board with flexibility regarding the number of lots that can be created as part of an open space preservation subdivision, the provision as written is somewhat ambiguous for developers. Without a clearly defined density bonus, developers may choose to forgo the option of an open space preservation subdivision and opt for the more straightforward traditional subdivision plan."

Planners in Milton and Canton noted that the lack of a density bonus in the cluster provisions may be a reason that no cluster developments have been built in their towns. Milton's bylaw reads: "In a Cluster Development, the number of lots on which dwellings may be erected or maintained shall not exceed the number of buildable lots which would be available in a subdivision." According to Aaron Henry, Milton Director of Planning (9/2/04), cluster zoning has been on the books in Milton for 30 years and has not been used. He suggested that there must be something wrong with the bylaw, such as that there is no density bonus offered. Canton's Flexible Residential Development Bylaw reads (Section 5.45.3): "The basic density of a Flexible Residential Development shall be the number of lots upon which a single-family dwelling could be constructed in the residential district in which the Flexible Residential Development is located without regard to the Flexible Residential Development, and without waivers of the design standards set forth in the Subdivision Rules and Regulations of the Planning Board." Roger Nicholas, Canton Town Planner, commented (8/18/04): "If you have a cluster division on 10,000 square foot lots or subdivision on 20,000 square foot lots, then they would rather do the 20,000 square foot lots. You can't mandate them to do cluster."

In other municipalities, such as Bolton and Walpole, many cluster developments have been built under cluster provisions that allow no additional units.

Lot Area and Other Dimensional Requirements

While thirty municipalities only permit single-family homes in cluster development, the majority of cluster provisions allow for development of other types of housing such as

two-families, townhouses, and multi-families. The density—or lot area per dwelling unit—allowed in the provisions varies widely, even in provisions that only allow single-family houses. The provisions usually either specify that the lot area required for each unit is a percentage of the lot area required in the underlying district or they list the new minimum lot area requirements for the cluster development.

Some places, such as Bedford and Milford, explicitly do not include minimum lot area requirements in the provisions for Planned Residential Development (PRD). Bedford's bylaw reads (Section 9.2.5): "There shall be no minimum lot area, frontage or yard requirements within a PRD." Milford's bylaw similarly reads (Section 6.4.4): "There shall be no minimum lot area, frontage, lot shape factor, or yard requirements within a PRD."

Norton's Residential Cluster Development policy allows lot sizes to be reduced up to 50% from the minimum size required in the zoning district where the site is located. Where on-site sewage disposal is required, Norton mandates that the minimum lot area be 40,000 square feet. Carver's Flexible Development allows lot area to be reduced to one acre, provided that the average area of all the lots is 50,000 square feet, and the frontage can be reduced to 100 feet, as long as the average frontage is 125 feet. Sutton allows the minimum lot size in Open Space Residential Developments to be "not less than one-third (1/3) the square footage otherwise required by the Zoning District in which the subdivision is located or fifteen thousand (15,000) square feet, whichever is less." Holliston lists different lot sizes for cluster development by district: in Agricultural-Residential District A, 40,000 square feet, in Agricultural-Residential District B, 25,000 square feet and, in the Residential District, 20,000 square feet. Bolton allows the minimum lot area to be reduced to one acre in the Farmland and Open Space Planned Residential Development. Dighton's minimum lot size requirement in Conservation Subdivisions is 7,500 square feet per lot, and minimum frontage is 50 feet.

Some municipalities, such as Easton in its Open Space Residential Development (OSRD), also ease the subdivision regulations for cluster development. In a conventional subdivision, Easton requires that the road's right-of-way be 50 feet, while the width of pavement for minor roads is 24 feet and for major roads 28 feet. In OSRD subdivisions in Easton, the right of way must be 40 feet, and the paved travel area of roads is 22 feet for streets providing access to 40 or fewer dwellings and 24 feet for streets serving more than 40 dwellings.

Open Space

Most of the provisions specify a percentage of a parcel to be set aside as open space within a cluster development. The percentage mandated varies widely, from 10% (Westford's Open Space Residential Development, Avon's Cluster Residential Development) to 70% (Lincoln's Planned Community Development District). Most municipalities fall within the range of 20–50%. Nineteen municipalities require 50% or more.

Examples include Easton: "In an OSRD, at least sixty percent (60%) of the total tract area shall be set aside as Common Land for the use of the OSRD residents or the general public." Medway and Foxborough both have Open Space Residential Development that requires 45% of the parcel to be dedicated open space, although they will waive the figure to 35% if there are unique circumstances (shape of parcel, wetlands, etc.) that would otherwise prevent the development.

Design Process

A number of municipalities specify in the cluster provisions a four-step design process that developers should undertake for designating open space, locating house sites, laying out streets, and drawing lot lines. These municipalities include Dighton (Conservation Subdivision), Douglas (Flexible Development), Easton (Open Space Residential Development), Norfolk (Open Space Preservation), Sharon (Conservation Subdivision Design), Swansea (Open Space Residential Design) and West Newbury (Open Space Preservation Development). The Metropolitan Area Planning Council has promoted the design process through its model bylaw.

An example of the provisions for design process is Dighton's Conservation Subdivision (Section 4332): "Four-Step Design Process. Each Development Plan shall follow a four-step design process, as described below. When the Development Plan is submitted, applicants shall be prepared to demonstrate to the Planning Board that these four design steps were followed by their site designers in determining the layout of their proposed streets, houselots, and open space.

a. Designating the Open Space. First, the open space is identified. The open space shall include, to the extent feasible, the most sensitive and noteworthy natural, scenic, and cultural resources on the property.

b. Location of House Sites. Second, potential house sites are tentatively located. House sites should be located not closer than 100 feet to wetlands areas, but may be situated within 50 feet of open space areas, in order to enjoy views of the latter without negatively impacting the former.

c. Street and Lot Layout. Third, align the proposed streets to provide vehicular access to each house in the most reasonable and economical way. When lots and access streets are laid out, they shall be located in a way that avoids or at least minimizes adverse impacts on open space. To the greatest extent practicable, wetland crossings and streets traversing existing slopes over 15% shall be strongly discouraged.

d. Lot Lines. Fourth, draw in the lot lines. These are generally drawn midway between house locations."

Wrentham's Master Plan suggests adopting this design approach (p. 144): "Wrentham's OSPD [Open Space Preservation Development] bylaw needs to include a more sophisticated approach to site analysis and subdivision design. A simple methodology for planning these subdivisions has been developed and publicized by landscape architect Randall Arendt, who uses the name 'conservation subdivision design' to emphasize its value as a conservation tool.¹ Conservation subdivision design has four steps and reverses the process generally used in conventional subdivision design. . . . The advantage of this method is that it first identifies for preservation the most environmentally sensitive and scenic lands for preservation, rather than locating houses and roads first. The Metropolitan Area Planning Council has prepared a model bylaw under the name Open Space Residential Design that includes the four-step design process described above."

Outcomes

Researchers for this study obtained answers for 112 municipalities (three-quarters of the 150 with cluster provisions) to the question of whether or not they have actually permitted any cluster developments. The results varied widely.

Of the 112, sixteen (or 11%) have no cluster developments on the ground. The sixteen include: Canton, Carver, Dedham, Douglas, Duxbury, Framingham, Lynn, Manchester-by-the-Sea, Medway, Merrimac, Millis, Milton, Sherborn, Sutton, Townsend, and Wellesley. Merrimac and Douglas only adopted their flexible provisions in 2004. Milton adopted its provisions in the 1970s. The others were adopted in the years in between.

Surveys sent to the municipalities asked whether one to eight cluster developments or more than eight have been built. The following eighteen municipalities either indicated on the survey that there have been more than eight or municipal officials indicated in interviews that a large number of clusters have been built: Acton, Bolton, Braintree, Carlisle, Concord, Groton, Holliston, Hopkinton, Ipswich, Lexington, Lincoln, North Andover, Southborough, Taunton, Tewksbury, Walpole, Westborough, and Weston.

Municipal planners, as well as master plans and community development plans, tell a range of stories about cluster developments in Massachusetts communities. Some describe highly positive and successful experiences with cluster zoning, some express frustration that cluster zoning has been triggered so infrequently, and a few register disappointment over what has been developed.

Groton's Planning Administrator Michelle Collette (10/2004) said that the flexible provisions have been in the bylaw for a couple of decades and the majority of development in Groton has been done through the flexible mechanism. Lincoln's Town Planner Mark Whitehead (6/3/05) wrote in an email in response to the question of how many cluster developments have been built in Lincoln: "This is a tough question to get numbers on because we actually do more cluster subdivisions than we do conventional subdivisions. . . . This is because our cluster provisions are very flexible and we have a very active non-profit group that acts as the developer on behalf of our Land Trust. When properties come up for sale, the Rural Land Foundation will often purchase the land, do a cluster to sell some lots to pay for the purchase and give the rest to the land trust."

Hopkinton's master plan notes its success with cluster development (p. 26): "Hopkinton has been unusually successful at encouraging open space-cluster developments over conventional subdivisions. During the 1990s, 70% of all subdivisions approved by the Planning Board were permitted under the Open Space and Landscape Preservation Development (OSLPD) bylaw, resulting in 840 acres of protected open space." Westborough's 2003 Master Plan (p. 18) states that its Open Space Communities Bylaw is "widely regarded as one of the most successful in Massachusetts." The Westborough plan explains: "Westborough's Open Space Communities Bylaw . . . allows open space communities to be developed on lots of at least ten acres. Dimensional requirements include a minimum lot size of 8,000 square feet, maximum lot size of 15,000 square feet, and minimum frontage of 50 feet. There is no density bonus for open space communities. However, the Town has encouraged developers to use this development method by requiring the submittal of an Open Space Community concept plan for any tract that exceeds 10 acres in size. After review of the concept plan, the Planning Board can recommend either the conventional or the open space subdivision. As a result

of the Open Space Communities Bylaw, the Town has protected about 250 acres of open space as part of new residential development projects.”

Other municipalities have met less success with their cluster provisions. Cohasset’s draft master plan explains: “Since 1981 Cohasset has provided a cluster development special permit option for subdivisions on sites of 10 acres or more (Section 10 of the Zoning Bylaw—Residential Cluster Development District). Three developers have taken advantage of this option. Disincentives to developers include the need for a special permit, which can increase development costs, the need for a development site of at least 10 acres, and the excellent market for conventional subdivisions.”

Hamilton’s 2002 Master Plan Phase 1 Report “Growth and Change: Hamilton, Massachusetts” explains that the flexible plan subdivision bylaw has not been as effective as the town thought it would be (p. 41–42): “Zoning regulations can be an effective vehicle for preserving open space and scenic views, but Hamilton has not had the success that many other communities have had with ‘cluster’ planned development and other techniques. Hamilton’s bylaw provides for a ‘flexible plan subdivision,’ which is similar to cluster development bylaw, yet only one project in Hamilton has resulted from the flexible-plan approval process. A flexible-plan subdivision requires a special permit from the Planning Board, which means the permit is discretionary. The lack of interest from developers in using the flexible-plan subdivision process may be attributable to several factors. One possibility is that the flexible-plan regulations were unsuitable for sites that developed since the bylaw was adopted in 1985. Second, applicants may have believed the Planning Board would impose unreasonable demands on a special permit, so they relied on the conventional subdivision or approval-not-required (ANR) process instead. Third, the bylaw may contain features which unwittingly discourage developers from using it, making conventional development more palatable even for a site that could meet flexible-plan requirements. . . . Assuming the accuracy of data used to develop Hamilton’s recent build-out study (EOEA, 2000), 10 out of 18 tracts that were subdivided between 1986–1998 met the 10-acre minimum for a flexible plan subdivision. One of these parcels resulted in Taft Woods Row, Hamilton’s only flexible plan development. Though a few more developers considered cluster projects in Hamilton, they opted for the simpler—and guaranteed—procedure of ANR.”

The survey received from Melrose on 4/22/05 notes that “Very few parcels [are] available that meet the requirements of these types of development.” According to Framingham’s building commissioner Joseph Mikielian (7/23/04), there has only been one flexible development attempted, and it is still being held up in court. Wayland’s 2005 Comprehensive Housing Plan notes (p. 25): “Until recently Wayland’s Conservation Cluster Development Bylaw has been little used with the only completed development being the six-lot Lincoln View Estates located on Concord Road. . . . The Planned Residential Development District is located on both sides of Rice Road in the southeastern section of Wayland. The Town has issued permits for planned developments for all the land in this district, and most of it has been built and is currently occupied.”

Aaron Henry, Milton’s Director of Planning, said that the cluster provisions have not been used in the 30 years they have been on the books. He said he aims to re-write them so that they will be more flexible. The person interviewed in Medway’s planning office (4/15/05) said that although one OSRD was approved in the last year, there is “clearly something wrong with the bylaw” since it has not been used more. She said they

are hoping to model a new bylaw on Metropolitan Area Planning Council's—to have more flexibility and creative options. Methuen's Director of Planning and Community Development Curt Bellavance (10/26/04) said the PUD has not been used regularly (perhaps there were one or two developments, but none in the last five years). He mentioned that the town is currently working to create a separate PUD ordinance that would make the option more flexible and attractive to developers.

Groveland's Chairman of the Zoning Board of Appeals, James Doyle, (11/2/04) said that after the last cluster development, some people in town have been discussing removing cluster from the books because they did not like the development. According to Dave Roche, Franklin's Building Commissioner, Franklin is currently looking at changing the flexible development, even for seniors, because “the density is exceeding what we thought.” In contrast, Natick's planner Sarkis Sarkisian referred to the “beautiful” cluster developments in his town. Andy Sheehan, Chelmsford's Community Development Coordinator, wrote in an email on 7/22/04: “Chelmsford adopted open space residential subdivision provision in 1987. It has been used about eight times, but has only resulted in one project that provided beneficial open space.”

Inclusionary Zoning

Inclusionary zoning requires or encourages developers to include affordable dwelling units within new developments of market rate homes. Some municipalities call it “incentive zoning”—when provision of affordable units is voluntary. The affordable units are typically located on site, but some municipalities also allow off-site development under certain circumstances. Often, payments may be made to a trust fund in lieu of building housing. Housing designated as affordable must be restricted by deed or covenant, usually for a period of 30 or more years, to residents with low or moderate incomes. The deed restrictions also limit sales prices and rents as the units are vacated, sold, or leased to new tenants. Municipalities adopt inclusionary zoning as a mechanism to increase affordable housing, scattered across sites, in proportion to new market-rate housing. Inclusionary programs are based on an internal subsidy: the proceeds from the market-rate units support the affordable units.

Ninety-nine zoning bylaws/ordinances contain some kind of provision for inclusionary or incentive zoning (53% of the sample). Eighty-eight municipalities do not have provisions for inclusionary zoning. Provisions in thirty-nine bylaws/ordinances are optional; thirty-six are mandatory; and twenty-four have both mandatory and optional provisions (Bedford, for example, has mandatory inclusionary zoning for mixed-use development and voluntary for planned residential development; Franklin requires some units in its Senior Village Overlay to be affordable and grants density bonuses for additional affordable units.) The mandatory provisions for including affordable housing, in some municipalities, apply to all development (by right and special permit, as well as “Approval Not Required” under the Subdivision Control Act) and, in other municipalities, inclusion of affordable housing is a condition for obtaining a special permit for cluster, multi-family development, etc. Optional provisions give the developers choice of whether to designate affordable units, usually in exchange for density bonuses. The option can apply broadly as a density bonus granted for any residential

development or as an incentive included in special regulations such as cluster or active adult village zoning.

The Commonwealth of Massachusetts mandates through Chapter 40B (established 1969) that each municipality reach the goal that 10% of the housing stock be designated as affordable to low- and moderate-income households. Many municipalities see inclusionary zoning as a mechanism to meet or maintain the 40B goal of 10% affordability. According to the website for the Citizens Housing and Planning Association, 33 of the 351 communities in the state have achieved the 10% goal. In communities that do not meet the 10% threshold, developers can seek “Comprehensive Permits” from the local zoning board of appeals for developments with at least 20–25% of the units under long-term affordability restrictions. At least 25% of the units must be affordable to lower income households who earn no more than 80% of the area median income or 20% of the units to households below 50% of median income. In reviewing applications for comprehensive permits, the zoning board of appeals does not enforce local zoning, wetlands, septic or other requirements (although all state regulations remain in force) and must have a compelling basis to reject the application. In most 40B developments, the production of the market rate units subsidizes the reduced prices of the affordable units.

Several of the community development plans, master plans, and planners discussed inclusionary zoning in the context of 40B. Braintree does not currently have inclusionary zoning, but is considering its adoption. Peter Loppola, Braintree’s Director of Planning and Conservation, (7/6/04) said that “We have reached our 10% under 40B, assuming everything gets built. We want to maintain or enhance that. The best way may be through inclusionary zoning.” Hamilton’s 2004 Master Plan notes: “Hamilton has no regulations to combat its most significant threat of large-scale housing development: the comprehensive permit.” Boxborough’s 2002 Master Plan states: “An inclusionary housing bylaw would essentially require every developer who proposes a subdivision (over some threshold number of units) to include a set-aside for affordable housing. This form of exaction is defensible. Since the Commonwealth requires that each community provide a minimum of 10% of its housing stock as affordable housing, as defined by statute, each market rate development that does not provide such housing essentially waters down the affordable housing stock. Therefore, the requirement simply helps to maintain the status quo.”

Researchers obtained the date of adoption of three-quarters of the provisions—forty-six of them were adopted since January 1, 2000, and eleven of those were adopted in 2004, the year the data was collected. Only fourteen of the provisions (of the 75 with dates documented) were first adopted before 1990. Several planners interviewed commented that they are currently considering adoption of inclusionary zoning or they are in the process of amending existing provisions. Peabody’s Senior Planner Joe Viola (8/17/04) said that they adopted inclusionary zoning “probably within the last year and a half” and that it is being “updated as we speak.” Several of the master plans and community development plans recommended adoption of inclusionary zoning. Sudbury’s 2001 Master Plan, for example, states (p. 80): “2 Allow incentives for inclusion of affordable housing units in single-family subdivisions (Inclusionary Zoning). In 1994, the Inclusionary Zoning Study Committee proposed a zoning amendment to Annual Town Meeting that would have required the construction of affordable units in all new subdivisions with more than six lots (or payment in lieu of construction to an affordable

housing fund) in exchange for a density bonus to develop extra market-rate lots. The article was defeated by the Town Meeting, due to lack of public support and acceptance of the idea. Such development would have increased Sudbury's affordable housing stock at no cost to the town, on scattered sites, thus preventing concentration of units in one area. The Planning Board and other town officials should continue to study and promote this idea."

In addition to the municipalities that explicitly include affordability mandates or incentives in the zoning bylaw/ordinance, some municipalities in practice negotiate (informally) inclusion of affordable units. For example, Lauren DiLorenzo, Director of the Medford Office of Community Development, said (12/3/04) that Medford has been negotiating affordable units when granting variances, but does not formally have inclusionary zoning. She said they are considering adoption of an inclusionary ordinance.

Massachusetts General Law Chapter 40A, Section 9, "Special Permits," authorizes the use of special permits to grant incentives for development of low- and moderate-income housing: "Zoning ordinances or by-laws may also provide for special permits authorizing increases in the permissible density of population or intensity of a particular use in a proposed development; provided that the petitioner or applicant shall, as a condition for the grant of said permit, provide . . . housing for persons of low or moderate income."

Developments that Trigger Inclusionary Provisions

There is a wide variation across municipalities as to which developments trigger the inclusionary provisions. On the one end, Ipswich applies the inclusionary bylaw to any development with two or more units. Several bylaws/ordinances apply to any development with more than four, six, eight, or ten units—regardless of whether the development is single-family or multi-family, or whether it requires a special permit or not. Other inclusionary bylaws/ordinances are triggered by any special permit or variance application (but not by conventional by-right permit applications), or apply only to one or more of the following: multi-families, townhouses, duplexes, single-families, clusters, senior housing, mixed use, individual non-conforming lots, or accessory apartments.

MANDATORY

Examples of the bylaws/ordinances that apply most broadly, and are mandatory, are Berlin's, Bolton's and Framingham's inclusionary zoning. Berlin's provisions state (Section 730): "Applicability. In all zoning districts, the provisions of this bylaw shall apply to the following uses: a. any project that results in a net increase of six or more dwelling units, whether by new construction or by the alteration, expansion, reconstruction or change of existing residential or non-residential space; and b. any subdivision of land for development of six or more dwelling units; and c. any senior residential development that includes six or more senior residential units and accompanying services." Bolton's inclusionary housing section reads (Section 2.5.9.3): "Applicability 1. Division of Land. This Bylaw shall apply to the division of contiguous land held in single or common ownership into eight (8) or more lots. The conditions of this Bylaw will apply to the

special permit required and issued for land divisions under MGL c. 40A sec. 9 as well as for ‘conventional’ or ‘grid’ divisions allowed by MGL c. 41 sec. 81-L and sec. 81-U, including those divisions of land that do not require subdivision approval. This bylaw therefore applies to Section 2.3.6 (Farmland and Open Space Planned Residential Development) and Section 2.3.7 (Major Residential Development) of the Zoning Bylaws.” Framingham’s affordable housing provisions read (Section O): “3. Applicability An Affordable Housing Special Permit under this section shall be required from the Planning Board for all development or re-development of ten (10) or more dwelling units on one or more contiguous parcels, whether such units are proposed under a special permit process pursuant to G.L. c. 40A sec. 9, or proposed pursuant to ‘the Subdivision Control Law’ G.L. c. 41 sec. 81K to 81 GG inclusive, including divisions of land that do not require subdivision approval.”

The following is a chart of the inclusionary provisions that apply most broadly, such as Berlin’s, Bolton’s and Framingham’s, as cited above:

Mandatory inclusionary zoning for all residential development

Municipality	Section and title	No. units as trigger	Quantity of affordable units	Year established	Results?
Berlin	730 Inclusion of Affordable Housing	6+ units	15% affordable	2003	New, no results
Bolton	2.5.9 Inclusionary Housing	8+ units	12.5% affordable	2004	New, no results
Duxbury	560 Inclusionary Housing	6+ units	10% affordable	2003	New, no results
Framingham	O. Affordable Housing	10+ units	10% affordable	2004	New, no results
Groveland	950 Affordable Housing Requirements	4+ units		2003	New, no results
Ipswich	I. Inclusionary Housing Requirements	2+ units	10% affordable	1997	Units built, money contributed
Kingston	6.12 Inclusionary Housing	6+ units	10% affordable	2003	New, no results
Mansfield	6.0 Inclusionary Housing Requirement	6+ units	6th unit, and then every 7th (approx. 15%)	2004	New, no results
Norton	XIX Affordable Housing	6+ units	10% affordable	2003	New, no results
Peabody	4.11 Inclusionary Zoning Requirements	8+ units	15% affordable	2003	7 units built, at least one contribution to fund
Southborough	174-13.2 (E) Affordable Housing	8+ units	10% affordable	1990s	Invoked 4 times; 3 cash contributions; 4 units in 1 development
Stow	8.9 Inclusion of Affordable Housing	6+ units	10% affordable	2003	New, no results

The following are other variations of mandatory inclusionary zoning:

- *All housing authorized by special permit or variance:* Georgetown (Section 165-71) and Quincy (Section 17.04.235) require that 10% of the units in any housing authorized by special permit or variance be affordable.
- *Developments with 5+ units that require special permit:* Watertown's "Affordable Housing Requirements" (Section 5.07) apply in certain districts to residential developments with five or more units that require a special permit. At least 10% of the units must be affordable.
- *All multi-family development:* Haverhill's affordable housing requirements (Section 255-89.1) apply to all multi-family housing. Ten percent of the units must be affordable, with density bonuses offered for more units. Holbrook's section on "Apartments, Multiple or Attached Dwellings" (Section 10.2) mandates that 15% of the units developed must be affordable.
- *Multi-family with 11+ units:* Gloucester mandates that 10% of the units in a multi-family development with 11 or more units be affordable.
- *Townhouse development:* Carver's Townhouse Development (Section 3900) mandates that 10% of the townhouses developed be affordable. Townhouse Development requires a special permit.
- *Senior village overlay:* Franklin mandates that 5% of the units in a Senior Village Overlay District development be affordable, and grants density bonuses for more affordable units.
- *Planned developments:* Andover has mandatory inclusionary zoning in its Planned Developments (Section 7.2.4. Affordability): "No application for a PD-MD or PD-MU which contains residential use shall be approved unless at least fifteen percent (15%) of the total dwelling units proposed are devoted to affordable housing . . . provided, however, that such applications requesting three or fewer dwelling units are exempt from this requirement."

INCENTIVES

Incentive zoning for affordable housing comes in a range of forms. Some municipalities offer density bonuses for inclusion of affordable housing in any type of residential development. Most of the incentive provisions are part of special regulations for cluster, planned unit development, mixed use, multi-family development, or senior village overlay.

While most of the bonus incentives are structured, some are in the form of general encouragement. Clinton's Flexible Development provides an example of a structured bonus for affordable units (Section 7173): "For every dwelling unit restricted as affordable to persons or families qualifying as low income, four (4) dwelling unit may be added as a density bonus. For every dwelling unit restricted as affordable to persons or families qualifying as moderate income, three (3) dwelling unit may be added as a density bonus. For every dwelling unit restricted as affordable to persons or families qualifying as median income, two (2) dwelling unit may be added as a density bonus. Thus density bonus shall not exceed 15% of the Basic Maximum Number." In contrast, Ayer's Cluster Development (Section 6.135.a) encourages inclusion of affordable units: "Applicants are encouraged to provide dwelling units that are deemed to be affordable

or below market sales price or rental levels for the region.” (Out of two clusters built in Ayer, one included two affordable units.) Similarly, Leominster’s provisions for Planned Unit Development (Section 22-66) note that the planning board will give “special consideration” to proposals that include affordable units.

Other examples of incentive zoning include:

- *Any type of development:* Northborough, Natick, and Taunton have provisions that apply widely to any type of residential development. Taunton’s Inclusionary Housing (Section 14.2) provides as an incentive up to 2.75 times the base density for inclusionary projects. Natick’s Inclusionary Housing Option Program (Section III-A.6) grants additional units and relaxed frontage for projects that include 10% of the units as affordable. Northborough’s incentive provisions apply to tracts of 10 or more acres in RA, RB, RC zones, but not within the Groundwater Protection Overlay District, and subdivisions must be cluster-style to receive the bonus.
- *Multi-family:* Waltham’s Affordable Housing Provisions (Section 9.1) apply to multi-family development with eight or more units.
- *Single-family:* Norfolk’s Affordable Housing Development (Section H.3) is an “elective inclusionary overlay” that applies only to single-family homes on tracts of 10 or more acres. Norfolk will grant up to 20 additional units and relax dimensional requirements in exchange for designating 10% of all units as affordable.
- *Planned residential development:* Milford grants density bonuses for Planned Residential Developments when 25% of units are deed restricted for sale to persons who qualify as low- or moderate-income.
- *Various special regulations:* Billerica includes density incentives in the Garden Style Apartment District, Townhouse Overlay District, and Elderly Housing. Billerica also allows affordable units to be built on non-conforming lots that meet at least 50% of the district’s lot area requirement. Sutton offers incentives for inclusion of affordable units in Limited Density Residential Development, Open Space Residential Development and Traditional Neighborhood Development. In addition, Sutton requires inclusion of affordable units in Continued Care Retirement Community.

Dracut, Holliston, Billerica, and Andover allow development of affordable units on non-conforming lots. Billerica’s “Affordable Housing Lot Reduction” (Section 7) reads: “The purpose of this by law is to allow the construction of single-family dwelling units by special permit from the SPGA Board of Appeals on lots that do not meet the current lot dimensional requirements of this bylaw.” Lot area must be 50% of district requirement and frontage 75 feet. Andover’s section on non-conforming lots reads (Section 7.8.1): “The by-law gives the Board of Appeals authority to issue a special permit modifying dimensional standards for the use of existing non-conforming lots for purposes of affordable housing as defined herein.” Holliston grants special permits for low- or moderate-income housing on individual lots in existence as of 2001 (adoption of bylaw) that do not meet lot area and frontage requirements. Depending on the district, the lot area requirement can be reduced to 20,000 or 40,000 square feet.

Arlington’s incentive for including affordable units is a reduction in required parking spaces.

Quantity of Affordable Units

Most inclusionary provisions are based on a 10% set-aside of affordable units. Some list other percentages—5%, 12.5%, 15% or more.

Examples of higher percentages include:

- Beverly includes the following requirement for reuse of existing public buildings: “the Board of Aldermen may permit by Special Permit the reuse of an existing public building, as hereinafter defined, for residential purposes, provided that twenty-five percent (25%) of such allowed units are set aside for low or moderate income tenants or owners as hereinafter defined.”
- Dover requires that 25% of the units in its Multifamily Residence District developments be affordable.
- Lincoln’s Planned Community Development District mandates that not less than 60% of dwelling units be subsidized. (This provision has never been used.)

Who Qualifies for Units

To be counted as an affordable unit, a unit must be restricted to residence by households earning below a certain income threshold, usually 80% of the area median income, as determined by the U.S. Department of Housing and Urban Development. Affordability is typically considered to be a price (rental or mortgage) that a low- or moderate-income household could cover using 30% of its gross income.

Some inclusionary provisions specify percentages of the total number of “affordable units” that should be affordable to different income groups. For example, Berlin requires that 25% of the “affordable units” be affordable to low income households at 50% of the area median income and 75% of the units be affordable to moderate-income households at 80% of the median income. Brookline requires that 25% of the affordable units be for low-income households, 50% for moderate income, and 25% for upper-moderate income (81-100% of median).

Several of the inclusionary bylaws/ordinances mandate that a portion of affordable units be set aside for “local preference.” For example, Groveland’s bylaw states that 50% of the sales units shall be for residents of Groveland. Peabody’s ordinance states that 70% of the affordable units shall be initially offered to current residents of Peabody who have resided there for at least five years, people employed within the City of Peabody for at least five years, or people who previously resided in Peabody for at least five years. Southborough lists several groups that get preference for the units: “(4) Local preference. Local preference shall be assured for the maximum number of affordable units allowable by law, consisting in order of priority: (a) Full or part-time employees working for the Town of Southborough. (b) Full or part-time employees working within the town for other employers or self-employed. (c) Current and previous residents of the town. (d) Persons with close family (parents, grandparents, children or siblings) presently living in town.”

Duration of Affordability Restrictions

Most of the inclusionary provisions (such as in Dracut, Dunstable, Groton, Holbrook, and Ipswich) require that the deed restrictions for affordability be in force for a duration of 30

years. Other municipalities list that the restrictions be in force for as long a period as is lawful. For example, Kingston's bylaw (Section 6.12.10, Preservation of Affordability) states: "The resale controls . . . shall be in force for as long a period as is lawful." Norton's restrictions should be in place for "ninety-nine (99) years or as long a period as is lawful." A number of municipalities list other periods: in Shrewsbury and Northborough, 40 years, and in Lunenburg's Mixed Residential Development, affordable units shall remain affordable for a period of not less than 20 years from first occupancy.

On-site versus Off-site, or Cash Payment

While some municipalities require that all affordable units be built on site with the market rate units, many municipalities will also allow placement of affordable units off-site, or payment of a fee in lieu of construction to a housing trust fund (or contribution of land instead of cash).

Most of the provisions state a preference for on-site development, and note that the units should be interspersed with the market-rate units. For example, Berlin's bylaw states: "Affordable units shall be dispersed throughout the project so as to ensure a true mix of market-rate and affordable housing." Berlin's bylaw notes that affordable units must conform to the general appearance of residences in the project. Similarly, Bolton's bylaw reads (Section 2.5.9.6): "All affordable units created under this Bylaw shall be situated within the development so as not to be in less desirable locations than market rate units in the development and shall, on average, be no less accessible to public amenities." Framingham's inclusionary provisions note that the affordable units can be built off-site only if they would otherwise make the development uneconomic: "If the applicant can demonstrate that building AHUs [affordable housing units] on the locus will make the development 'uneconomic,' they may purchase and rehabilitate or build the AHUs off-site but within a residential zoning district which is the same as that of the proposed project." Likewise, Arlington's provisions mandate that affordable units shall be located on the project site, but that the Arlington Redevelopment Board may, in exceptional cases such as when the provision of units would render a project economically infeasible, allow the developer to make a financial contribution to the Affordable Housing Trust Fund in lieu of providing the units. Quincy's inclusionary zoning requires that 10% of all units approved by special permit be affordable, but if the affordable units will be built off-site, then they must constitute 15% of the project. Brookline's Affordable Housing Requirements (Section 4.08) allow alternatives to on-site development of affordable units: off-site location (can be in existing structures), cash payment, conveyance of land, or buildings or cash contributions to the town for the purpose of providing affordable housing.

When cash payments are allowed in lieu of units, the level of the contribution can be determined in a few ways. Arlington, for example, requires that the financial contribution be equal to the difference between the fair market value of a unit and the price of an affordable unit. Belmont uses a similar formula: "The cash payment, or equivalent value in land or buildings, shall be equal to the difference between the fair market value for a typical market-rate housing unit in the development subject to this By-Law as determined by the Board and the price of an affordable housing unit for a household at 80% of median income . . . for a household size of 1.49 persons per bedroom rounded to the nearest

whole person.” In contrast, Norton uses a fixed fee (Section 19.10.1): “Calculations of fees-in-lieu of units. . . . For the purpose of this by-law, the fee in lieu of the construction or provision of affordable units is determined to be \$200,000 per unit.”

If a municipality requires that 10% of the units be affordable, for example, and a development includes a total number of units that is not a multiple of ten, which would mean the developer owes a fraction of an affordable unit, the municipality will often give the developer the option of constructing a unit or contributing a fee. In Ipswich, if a development has fewer than 10 units, then the developer can provide one unit or pay a fee of \$10,000 per market-rate unit, up to nine units. In Framingham, for each market-rate unit that is not a multiple of ten, the developer must contribute 3% of the closing price.

Re-sale Conditions

Most of the inclusionary provisions include requirements for setting the re-sale prices of affordable ownership units. Kingston includes the following formula (Section 6.12.10.1): “Resale price. Sales beyond the initial sale to a qualified affordable income purchaser shall include the initial discount rate between the sale price and the unit’s appraised value at the time of resale. This percentage shall be recorded as part of the restriction on the property noted in Section 6.12.10. For example, if a unit appraised at \$300,000 is sold for \$225,000, as a result of this Bylaw, it has sold for 75% of its appraised value. If, several years later, the appraised value of the unit at the time of proposed resale is \$325,000, the unit may be sold for no more than \$243,750, or 75% of the appraised value of \$325,000.”

Another example is Peabody: “(4) Resale prices. Subsequent resale prices shall be determined based on a percentage of the median income at the time of resale as determined by the federal Department of Housing and Urban Development and adopted by the Commonwealth of Massachusetts Department of Housing and Community Development. The resale price will be established based on a discount rate, which is the percentage of the median income for which the unit was originally sold. The method of resale price calculation shall be included as part of the deed restriction. Through agreement between the Department of Community Development and the developer or owner, this percentage may be increased or decreased by up to five per cent (5%) at the time of resale, in order to assure that the target income groups’ ability to purchase will be kept in line with the unit’s market appreciation and to provide a proper return on equity to the seller.”

Results

More than 40% of the municipalities with inclusionary provisions on the books have developed no affordable units through the mechanism. (Researchers did not find out the answer for all municipalities, so there are likely more in this category.) Many of the bylaws and ordinances were adopted recently and have not had the chance to yield units. Even some of the provisions adopted in the 1980s and 90s have not yielded units. For example, Northborough’s inclusionary provisions have been on the books since 1988, but have not been used. Several municipalities did report either that more than ten units were developed through the inclusionary mechanism or that, in general, the municipality has been suc-

successful at increasing the affordable inventory using this mechanism: Andover, Arlington, Cambridge, Concord, Ipswich, Newton, Peabody, Quincy, Sherborn, Somerville, Wakefield, Watertown, and Wenham. Most of these developed under 25 units; Cambridge, Quincy, Newton, Somerville, and Westwood have developed more than 50 units through the inclusionary provisions. Many more municipalities increased their affordable housing inventory by only a few units through the inclusionary mechanism.

Acton is an example of a municipality that has developed fewer units than it expected through inclusionary zoning. Kristin Alexander, Assistant Town Planner in Acton, wrote in an email dated 7/29/04: “out of the 22 projects developed in the affordable housing overlay zones since 1990, only 3 of them chose to develop under the affordable housing option.” Those three developments yielded six units. She wrote in another email dated 7/27/04: “I can tell you that the affordable housing overlays, in Planning staffs’ opinion, have not been very successful because very few developers have chosen the option.” Acton’s June 2004 Comprehensive Development Plan also expressed this sentiment (p. 14): “Acton’s success at producing any affordable housing under its Affordable Housing Incentives and Overlay District bylaw is remarkable, yet the bylaw has not accomplished what local officials hoped when it was adopted in the early 1990s.” Acton’s 1988 Master Plan Update explains: “The Town’s Affordable Housing Overlay District is intended to provide a density bonus to induce developers to construct affordable units in new subdivisions. However, the formula for determining allowable density is complex, even to Town staff. In combination with the strong market for upscale housing, the complexities of the formula and the special permit process have prevented this approach from becoming an effective tool for producing affordable housing.” The Master Plan Update also notes that Acton has negotiated with developers that they contribute to an affordable housing fund, but that the cost of buying homes in Acton limits the number of homes that could be purchased with that fund.

A number of planners, master plans, and community development plans discuss the need to get the incentives right for developers to build affordable units. If inclusion is mandatory and the financial numbers do not work, the provisions can undermine a development or cause the developer to build something that will not trigger the provision. If inclusionary development is voluntary and the incentives to use it are not enough to cover the cost of developing the affordable units, then a developer will not use the inclusionary option.

Chelmsford’s bylaw, for example, includes incentives to build affordable units through its multi-family development (since 1987) and facilitated and independent living development (since 1999). Andy Sheehan, Chelmsford Director of Community Development, wrote in an email (7/22/05): “they have never been utilized by a developer. Developers tell us there is insufficient incentive for them to take advantage.”

Bedford offers a doubling of the density of a Planned Residential Development in exchange for inclusion of affordable units. Richard Joly, Bedford’s Director of the Planning Department, said (9/2/04): “We thought from talking to the developers that that would generate interest, but it hasn’t in actuality.” Bedford more recently passed a mixed-use bylaw that requires inclusion of affordable units. Richard Joly said: “The new one that we have had for only two years now is generating a lot of interest. We have two developers interested. If it doesn’t work, we will write another one or amend what we have. We will keep trying.”

According to Gino Carlucci, Norfolk Planner, (7/9/04) no units have been built under Norfolk's inclusionary provisions that offer a 10% density bonus for including affordable units in single-family developments. The Norfolk 2004 Community Development Plan makes the following recommendations: "Review/Revise Affordable Housing Development Provision of Zoning Bylaw. The current provision of the Zoning Bylaw (Section H.3) that provides density bonuses for affordable housing has never been used by a developer. This provision needs to be reviewed and possibly revised in order to make it more attractive to developers. Currently, the provision only provides a density bonus for the affordable housing units themselves. In addition, it requires affordable units to be single-family dwellings. It may be more attractive if it allowed multi-unit buildings designed to look like comparable single-family homes in the neighborhood. Also, consideration should be given to applying the bonus provision to multi-family dwellings (age restricted) as well as single-family homes."

Kingston's supplement to its master plan, adopted 2003 by the Board of Selectmen, notes that the planning office has at every opportunity discussed the density bonus for affordable housing with developers. The supplement notes: "In spite of this attempt at inclusionary zoning, developers have expressed the concern that affordable units are a wash financially and hurt the absorption rate of their development."

A couple of planners noted that it is more practical for a developer to apply for a permit through the Comprehensive Permit process (Chapter 40B) than through the local inclusionary provisions. Berlin's Planning Board Chairman Timothy Wheeler (1/4/05) said that the Inclusionary Housing Bylaw was adopted in October 2003 and has not been used yet. He commented that since under Berlin's Zoning multiple dwellings as of right are restricted to 12 units, developers will likely use the State's 40B process to gain more units. Similarly, Cindy Amara, Dover Town Planner, (7/6/04) commented that builders may find it more practical to develop affordable units under 40B than through Dover's inclusionary provisions in its Multifamily Residence District.

Duxbury Planning Director Christine Stickney (10/27/04) said that inclusionary housing gets triggered in Duxbury at six dwellings (and certain acreage) and that developers can get around this by building fewer than six dwellings and making some of the lots/houses very large. Sharon's Draft Community Development Plan 2004 also comments on this issue within the recommendation that Sharon adopt inclusionary zoning for subdivisions (p. 51-52): "The correct threshold number of units must also be considered. For example, if inclusionary zoning applies to all developments of ten or more units but the incentives are insufficient, developers may prefer to build nine bigger and more expensive houses—and recent experience indicates that they will have little trouble finding buyers."

Raynham's town planner explained that Raynham is considering removing the affordable housing provision because it has created a disincentive to do cluster development. Raynham's Open Space Preservation bylaw (Section 14.5) mandates that for every 10 units developed one unit must be designated as affordable.

Marshfield Town Planner Angus Jennings (10/27/04) said that three projects have been permitted so far under inclusionary zoning, all age-restricted. He noted that the inclusionary process has been a "tremendous strain on staff," but he is hoping that the addition of a housing coordinator will speed up and improve the process.

Accessory Apartments

Accessory apartments are secondary dwelling units located within, attached to, or on the same lot as an owner-occupied single-family house. The accessory dwelling typically has its own kitchen, bathroom and bedroom facilities. Zoning regulations that allow accessory apartments may include: (1) specifications about owner occupancy, (2) restrictions on who can live in the apartment (such as relatives of the owner, elderly, people with low incomes, or anybody), (3) physical characteristics of the primary dwelling, accessory dwelling, and lot, (4) permitting procedures (special permit versus as-of-right), and (5) procedures for certification, termination, renewal of permits and enforcement.

Zoning bylaws/ordinances in 107 municipalities (57% of the sample) explicitly allow some form of accessory apartment. Some of the 80 municipalities that do not explicitly allow accessory apartments will permit them in zones where two-family houses or conversion to two-family are allowed.

The regulations addressing accessory apartments can be quite short (a sentence or two) or extensive (several pages). Andover and Grafton, for example, have short regulations. Andover lists “family dwelling unit” in the table of use regulations (requires special permit from the board of appeals), and defines it as the “use of a room or rooms in a detached one-family dwelling or accessory building as a dwelling by relatives (by reason of birth or marriage) where there is a need by reason of illness, disability or age requiring extended care or supervision of the relative. This use shall be subject to reasonable conditions and the requirement for renewable time periods not exceeding five years.” Grafton lists accessory apartments as a special-permit use in its table of use regulations, and provides the following definition: “An accessory apartment is a separate housekeeping unit, complete with its own sleeping, cooking, and sanitary facilities, that is substantially contained within the structure of a single-family dwelling, but functions as a separate unit.”

The most extensive regulations (multiple pages) can be found in Bedford, Berlin, Canton, Carlisle, Cohasset, Hamilton, Lexington, Lincoln, Milton, Norfolk, Peabody, Reading, Scituate, Shirley, Sudbury, Topsfield, Tyngsborough, West Boylston, and Westwood.

Owner Occupancy

Most of the regulations explicitly state that the owner of the structure must reside in either the primary or accessory dwelling. For example, Acton’s zoning bylaw reads (Section 3.3.2.7): “The owner of the property shall occupy either the principal dwelling unit or the Apartment. For the purposes of this section, the ‘owner’ shall be one or more individuals residing in a dwelling who hold legal or beneficial title and for whom the dwelling is the primary residence for voting and tax purposes.” A few municipalities, such as Norfolk, specify that the owner must reside in the principal unit (Section E.2.g.1.b): “The principal dwelling unit shall be occupied by the owner of the property, for at least nine months each year.” Boxborough’s 2002 Master Plan explains: “The key to accessory apartments is that they should be in structures that are owner occupied so that they do not then become apartment buildings.”

Like Norfolk, many municipalities allow for temporary absences of the owner. Manchester-by-the-Sea’s zoning bylaw reads: “(d) Either the accessory dwelling unit or

the main dwelling shall be occupied by the owner of the property except for temporary absences of up to one year.” Bedford and Burlington allow absences of up to six months. In a section titled “Temporary Absence of Owner,” Lexington’s bylaw states that an owner who is “absent for a period of less than two years may rent the owner’s unit as well as the second unit during the temporary absence” provided that written notice is given to the building commissioner, the owner resided in the house for at least two years prior to and between such absences, and the house remain the owner’s primary legal residence for voting and tax purposes.”

A few of the provisions state that the owner must reside at the property for a certain period of time before applying for a permit for an accessory apartment. Kingston, for example: “1. No permit for an accessory housing unit granted hereunder shall take effect sooner than three (3) years after occupancy by the applicants of the principal residential structure.” Rockland requires that the owner/applicant live in the house for 24 months continuously before filing an application for a special permit for the apartment, and “shall continue to reside in the main dwelling throughout the duration of the Special Permit.” Waltham requires that the “owner shall have owned the lot for not less than five years” before adding an accessory dwelling unit.

Some municipalities, such as Pepperell, require that the applicant submit an affidavit that the owner will occupy one of the two dwellings.

Many of the bylaws/ordinances state that permits for accessory apartments are granted to the applicant and are not transferable. Halifax’s bylaw, for example, states: “Special Permits for In-Law Apartments are granted to the applicant and are not transferable with the land.” Groveland’s bylaw (Section 301.8.2) states: “Should there be a change in ownership or change in residence of the owner, the Special Permit and the Certificate of Occupancy for the accessory apartment shall become null and void.” Hopkinton’s bylaw adds (Section 210-126.K): “Occupancy permits shall not be transferable upon change in ownership or change in occupancy.”

Qualifications for Residents of Accessory Apartments

Forty-six of the municipalities only allow accessory apartments if relatives of the owner reside in the apartment (or in the primary dwelling if the owner is in the accessory dwelling). Eleven more municipalities restrict residence to certain categories of people (usually in addition to relatives): (1) elderly, (2) caretakers, and (3) low-income residents. Only fifty of the provisions (27% of the sample) allow any person to rent/reside in the unit.

Some of the provisions broadly restrict the unit to “members of the family.” Many of the provisions are more specific about who qualifies as family. Amesbury’s bylaw states: “The in-law apartment may only be occupied by brothers, sisters, parents and grandparents, in-laws and/or children of the residing owners of the principal dwelling unit.” Beverly and Ipswich allow occupancy by people related “within the third degree of consanguinity to the record owner.” Holliston’s accessory units are limited to people related by first degree of kinship, marriage, or adoption to the owner of the premises. Chelmsford only allows parents or handicapped relatives of the owner to reside in the “limited accessory apartment.” Medway’s bylaw provides a longer list of qualifying occupants: “The accessory family dwelling unit only may be occupied by the following

family members: mother/father, mother-in-law/father-in-law, son/daughter, son-in-law/daughter-in-law, sister/brother, sister-in-law/brother-in-law, grandmother/grandfather, step-mother/step-father, step-son/step-daughter, step-sister/step-brother, step-grandmother/step-grandfather. A notarized statement of the relevant relationship shall be provided to the Inspector of Buildings prior to the issue of a certificate of occupancy for the accessory family dwelling unit.”

A number of municipalities allow domestic employees, in addition to family members, to reside in the accessory units. For example, Sherborn’s bylaw states: “1(a) Such unit shall be occupied by not more than three persons related by blood, adoption or marriage to the family owning and residing in the dwelling; or 1(b) Such unit shall be occupied by not more than two domestic employees of the family owning and residing in the dwelling.”

Some municipalities, such as Ashland, allow people older than a certain age to live in accessory apartments: “Accessory Family Dwelling Unit . . . to accommodate an additional family related by blood, marriage or adoption or sixty (60) years of age or older.” Hamilton, Norwell, and Hopkinton also allow use of accessory dwellings by people who are related to the owner or are 60 years of age or older. (Hamilton also allows “a caretaker or a health care provider to the occupant of one of the units” to live there.) Mansfield’s regulation states: “at least one of the two units shall be occupied by a person(s) at least fifty-five (55) years of age or older.”

A number of zoning bylaws include provisions for accessory units deed restricted to low- or moderate-income households. With a deed restriction, an accessory unit can count towards the state’s requirement that 10% of each municipality’s housing stock be affordable. Towns with these provisions include Douglas, Merrimac, Sudbury, Townsend, Wayland, and Wenham. Merrimac’s bylaw reads (Section 17.3.3): “Use limitations. Such accessory dwelling unit shall at the discretion of the Zoning Board of Appeals accommodate up to a maximum of three persons, provided that the owner of record of the structure is a resident of the structure which includes the accessory dwelling unit and occupancy of the dwelling unit is limited to:

- 17.3.3.1. A family related by blood, marriage or adoption to the owner of the premises, or
- 17.3.3.2. A household with an individual who is 65 years of age or older, or
- 17.3.3.3. A household with an individual with disabilities.
- 17.3.3.4. A low- or moderate-income household, provided the unit meets the requirements of the Local Initiative Program, 760 CMR 45-00, for listing on the Chapter 40B Subsidized Housing Inventory as provided for by G.L. c.40B, Sections 20-23.”

The community development plans, housing plans, and master plans in a number of communities recommend that the municipality allow affordable accessory apartments. For example, Ipswich’s 2003 Community Development Plan recommends: “Any accessory dwelling unit created in Ipswich—whether an attached apartment or a small unit in a secondary building—should be required to have a deed restriction that ensures that it will be rented at an affordable rate in perpetuity (or until the use is discontinued). Without an acceptable deed restriction to ensure long-term affordability, accessory units

will not count toward the Town's state-mandated 10% affordable housing goal." Similar recommendations (for towns that do and do not already allow accessory apartments) are listed in plans for Danvers, Middleton, Northborough, Sharon, and Wrentham, among other communities.

Sharon's 2004 Community Development Plan includes this recommendation: "D. Amend zoning to promote affordable accessory units. All accessory units currently require a special permit and are restricted to relatives. Affordable accessory units can be an excellent way to create affordable housing without significant change to neighborhood or community character. Although the Town is unlikely to gain large numbers of affordable units through accessory units, these units can be valuable on the margin. Sharon should allow permanently affordable accessory units to be created by right and allow all accessory units to be open to non-relatives. Templates for affordability agreements and simple monitoring protocols have already been established in several Massachusetts communities. The Sharon Housing Authority can assist with these issues."

Many of the regulations state that there shall be no boarders or lodgers staying in either the principal or accessory dwelling.

Some regulations (for apartments restricted to family members) specify that the apartment can not be rented. For example, Sherborn: "No rent shall be paid for such unit." Several of the bylaws/ordinances note that the permit will be terminated if the apartment is advertised for rent.

By-Right versus Special Permits

Ninety of the municipalities that allow accessory apartments (84% of 107) require special permits. Seventeen allow at least some accessory apartments by right (many of these require special permits in some districts or under certain circumstances). For example, Berlin allows in-law apartments restricted to relatives of the homeowner by right, and accessory apartments for any resident (not necessarily related to the owner) by special permit. Some allow accessory apartments by right in residential districts and by special permit in the commercial district.

In 81 of the communities, the Special Permit Granting Authority (SPGA) for accessory apartments is the zoning board of appeals. In 14 it is the planning board. In Newton, the Board of Aldermen is the SPGA, and in Peabody it is the City Council.

A few of the regulations require consultation with the planning board in addition to the SPGA. For example, Dover's bylaw includes the following: "D. Consultation with Planning Board; report. (1) In connection with an application for a Special Permit under this section, the applicant shall consult with the Planning Board at least 30 days prior to the hearing, and the Planning Board shall submit, in writing, prior to the hearing, its recommendation and report to the Board of Appeals. The Planning Board may supplement its report within 14 days after the hearing."

Physical Requirements

Most of the bylaws/ordinances that address accessory dwelling units include requirements for the physical characteristics of the house, the accessory unit, and the lot. The requirements can describe the minimum floor area of the house and the accessory unit,

the percent of the house's floor area that is in the secondary unit, the number of bedrooms in the unit, the screening of new entrances and stairways, lot size, etc. Many of these regulations are aimed at maintaining the single-family character of the house. The Ashland zoning bylaw (Section 248-44) states that the intent of the regulations are to "assure that the single-family character of the neighborhood will be maintained and that the accessory unit remains subordinate to the principal living quarters."

Most include language that the exterior of the house shall continue to look like a single-family house or shall remain mostly unchanged. Dighton's bylaw, for example, states: "The external appearance of the structure in which the accessory apartment is to be located shall not be significantly altered from the appearance of a single-family structure." Duxbury requires that the apartment be wholly located within the building footprint in existence at the time of special permit application—it shall require no exterior change, except for the installation of a doorway to conform with the Massachusetts Building Code. Dighton (Section 2524.b) requires that "Any stairways or access and egress alterations serving the accessory apartment shall be enclosed, screened, or located so that visibility from the public ways is minimized." Holliston requires that "All stairways to additional floors shall be enclosed within the exterior walls of the structure." Waltham's requirements include: "(e) No alteration to the exterior of the dwelling shall be made. (f) No increase in the floor area of the dwelling shall be made." Many of the regulations state that any new entrances must be on the side or the rear of the house.

While communities like Duxbury and Waltham require that the unit fit within the original footprint of the single-family house, many communities allow for the house to be expanded to accommodate a unit, and a few allow for the unit to be attached to or detached from the house. Topsfield allows the family accessory apartment to be located within or attached to the main dwelling. Ashland allows conversion "by attachment via common wall or containment within" the existing single-family dwelling. Many municipalities will only allow an expansion of a certain percentage of the floor area of the main dwelling in constructing an accessory apartment. For example, Carver (Section 2263.e.1): "Any accessory apartment construction shall not create more than a 15% increase in the gross floor space of the original structure."

Several municipalities allow the apartments in detached structures. Acton allows accessory apartments in detached structures that have been in existence since 1950 and that have not been expanded since 1991. Hopedale allows for the apartments to "be created in an attached or detached garage existing on the date of adoption of this By-Law." Lexington has special regulations that allow accessory dwellings in certain districts in structures that existed before 1983. Wenham allows accessory apartments in accessory buildings when the lot contains at least 40,000 square feet exclusive of wetlands and floodplains. Westford and Weston allow them in detached structures that have existed for at least ten years.

Many of the municipalities limit the floor area of the accessory unit both in terms of square feet and also as a percent of the floor area of the principal unit. The most common maximum floor area is 800 square feet, but municipalities also cap the floor area at as little as 600 feet or as much as 1,200 feet (Lincoln, North Andover, and Sudbury). When a percentage is listed, it is usually between 25 and 50% of the principal unit. Several also list a minimum floor area for the new unit (some may be reiterating the state building code).

Some municipalities require that the primary dwelling must meet a certain threshold size requirement to have an apartment added. For example, Burlington requires that the house have at least 1,800 square feet of floor area as of 1989 to add an accessory unit. Bedford also requires 1,800 square feet. Canton requires 2,000 square feet as of 1989. Cohasset and Lunenburg require that the house have at least 1,200 square feet of net floor area.

Most of the bylaws/ordinances limit the accessory apartment to one or two bedrooms, although some also allow three bedrooms. The list of towns that limit units to one bedroom includes: Dracut, Hamilton, Hopedale, Ipswich, Mansfield, Medway, Natick, Stoughton, and Tewksbury.

The regulations vary about the extent of separation there should be between the accessory apartment and the primary dwelling. Several municipalities require that there be an interior door that connects the two units. Bylaws in Holliston, Hopkinton, and Ashland state: "An interior doorway shall be provided between each living unit as a means of access for purposes of supervision and emergency response." Topsfield's bylaw notes that the required interior door "may be locked from either side." In contrast, Amesbury defines an in-law apartment to be a separate dwelling unit "connected by an unlocked common door" to the single-family dwelling. Bolton requires that the accessory apartment have its own separate entrances from the outside, while Dracut requires that the unit "must be entered through main dwelling unit and may not have an exit directly to the outside, unless otherwise permitted by the Special Permit Granting Authority." Tyngsborough has a similar requirement: "9. That the proposed temporary independent living quarters must be entered through the main dwelling unit and may not have an independent exit directly to the outside, unless waived by the Special Permit Granting Authority for reasons of handicap accessibility." Halifax and Sharon require that the accessory unit share a common entrance with the primary dwelling.

In addition to requiring a common entrance, Halifax also requires that in-law apartments share major utilities and some living space with the principal dwelling. A number of municipalities, such as Topsfield and Dracut, also require shared utilities. Topsfield's bylaw reads: "Electricity, water and gas shall be provided by a single service to both the family accessory apartment and the main dwelling." Dracut's states: "9. Separate metered utilities are prohibited."

Many municipalities require one or two additional off-street parking spaces to serve the accessory unit.

While some municipalities, such as Middleborough, allow for accessory apartments to be included in new construction of single-family homes, many of the regulations require that the home be built before a certain year or period of years before an accessory apartment can be installed. Shirley, for example, requires that the single-family home be constructed at least ten years before an application be approved for an accessory apartment. The Shirley bylaw states: "It is not the intent of this Bylaw to permit or encourage the building of new dwellings which are large enough to contain apartments." Cohasset also states that a special permit for an accessory apartment cannot take effect sooner than ten years after the occupancy permit was issued. Weston requires that any addition or enlargement of the house be completed ten years before an application is submitted for an accessory apartment.

Sudbury, Wenham, and Wilmington will authorize accessory apartments five years after the date of initial occupancy. Bellingham and Rockland will permit the apartments two years after occupancy of the house. Other municipalities require that the single-family dwelling has existed since a certain date: Medfield (1938), Manchester-by-the-Sea (1984), Newton (1989), Scituate (1989), Rowley (1990), and Stow (1991).

Several bylaws/ordinances mandate that the accessory unit be designed for easy re-incorporation with the single-family house. For example, Hamilton's bylaw states: "The kitchen facilities shall be of a type readily removable." Milton's bylaw states: "The designs shall also show that the temporary apartment can be readily and inexpensively incorporated into the principal dwelling quarters upon expiration of the special permit."

Municipalities designate districts where accessory apartments are allowed. Some allow them in all districts, in all residential districts, or only in a subset of residential districts. Newton, for example, created overlay districts where accessory apartments are allowed.

A handful of municipalities limit the number of permits town-wide the municipality can grant for accessory apartments. Carlisle caps the total number of accessory apartments allowed at 75 for the town. Cohasset lists an annual cap of 10 permits; Scituate's annual permit cap for accessory apartments is 25. Dover and Reading cap the total number of accessory units in the town at 10% of the number of single-family dwellings. Sudbury and Southborough limit the permits to 5% of the single-family dwellings.

Expiration, Renewal, and Termination of Permits

Many of the bylaws/ordinances that allow accessory apartments also elaborate on procedures for permitting, enforcement, verification, and termination of the permits.

Several of the regulations specify that the special permits expire in one, two, three, four, or five years. Depending on the municipality, the procedures for renewal vary. Several municipalities require that the applicant certify compliance by submitting an affidavit to the special permit granting authority (and renewal is somewhat automatic). Some municipalities require a new application to go before a public hearing. Some bylaws give the building inspector authority to issue renewed permits.

Permits in Bellingham and Freetown expire after five years; in Canton, Carver, and Douglas after three years; and in Dighton, Hopkinton, Maynard, Kingston, and Paxton after two years. Sherborn's special permits for family members expire every four years; for domestic employees, every two years. In Sudbury, the special permit for accessory apartments for persons related to the owner expire after four years; special permits for apartments for domestic help and for low- and moderate-income families are issued for two years.

Under the heading "Procedures," Canton's bylaw reads: "Upon application by the owner such special permit shall be renewed by the Board of Appeals for an additional three-year term or terms." In Carver, the board of appeals can issue subsequent special permits after the applicant certifies by affidavit that the house is still owner occupied and that the unit has not been enlarged. Bellingham's bylaw allows extensions with the following procedure: "A Special Permit for a Family Apartment may be extended for additional five year periods upon application to the Zoning Board of Appeals at least sixty (60) days prior to the expiration of the Special Permit. An extension shall be given only after inspection and a written report by the Town Inspector that the conditions of

the renewal have not changed since the initial application and the Zoning Board's determination that the applicant is in full compliance with Section 4130. Any extension given must be filed at the Norfolk Registry of Deeds within 30 days of issuance. Failure to file within the time period given shall nullify the permit given."

Douglas' bylaw notes that the permit can be renewed without a public hearing for another three year period upon submittal of an affidavit by the owner that it is in compliance. Freetown's special permit is valid for five years, and Freetown's bylaw states: "Five years from date of issue a public hearing will be held to ensure use is the same." Dighton's special permit for accessory apartments expires after two years. Subsequent special permits are granted after the applicant certifies by affidavit that the unit is still in compliance. Hopkinton's occupancy permits for accessory apartments remain in force for two years from the date of issue. The bylaw states: "Thereafter, permits may be issued by the Director of Municipal Inspections for succeeding two-year periods, provided that the structure and use continue to comply with the relevant provisions of the State Building Code, this Chapter and the special permit." In Hopkinton, the owner is responsible for initiating each application for renewal. The bylaw states that the town may assess fees for renewal reviews, investigation, and processing.

Kingston's special permits expire after two years. The bylaw states that "renewal shall be automatically granted upon receipt of certification by the Planning Board that the property remains the principal residence of the owner and that all conditions met at the time of the original application remain unchanged." Paxton's also expires after two years (Section 5.9.4): "Required Renewal: The effective period of the Special Permit for an accessory apartment shall be two (2) years. At the end of every two (2) years, renewal shall be granted upon receipt of a new application, accompanied by a ten dollar (\$10) application fee, and certification by the owner to the Planning Board that the property remains the principal residence of the owner, and that all other conditions met at the time of the original application remain unchanged. The Planning Board in its discretion may require a new Special Permit and demonstration of compliance with all the conditions necessary for a Special Permit for an accessory apartment, pursuant to the Special Permit procedures of this Bylaw."

A number of municipalities require annual certification of compliance. For example, Lynnfield's bylaw states (Section 5.1.2.4): "Yearly Renewal. The special permit shall be issued on a year-to-year basis and the Board of Appeals shall not renew any such permit where the need for such accessory use no longer exists." Marshfield, Norfolk, and Rockland also requires annual recertification. Marshfield: "6. Recertification of Owner Occupancy—Not later than January 31 of each year following issuance of a Special Permit for an accessory apartment, the owner of the premises must certify under the pains and penalties of perjury on forms to be available at the office of the Building Inspector that the premises continue to be occupied by the owner as his or her principal residence. Failure to recertify in a timely manner shall result in the automatic termination of the Special Permit." Norfolk: "The initial Permit for temporary family apartment shall remain in force for a period of one (1) year from date of issue, provided no terminating event has occurred. Thereafter, the Special Permit may be renewed by the Building Commissioner for each such succeeding one (1) year period provided that the structure and use continues to comply with the relevant provisions of the State Building Code, this Bylaw, and the Special Permit. If the Special Permit lapses, the

Owner(s) must apply for a new Special Permit from the Zoning Board of Appeals. . . . The Owner(s) of record are responsible for initiating each such renewal application to the Building Commissioner which shall include an affidavit of residency per the Special Permit. A reasonable fee for this annual renewal may be assessed.” Rockland: “1. No later than January 31st of each year following the issuance of the Special Permit, the owner/applicant shall provide to the Building Inspector the names of the tenants of the accessory apartment and shall certify that the main dwelling is occupied by the owner/applicant. A form for this certification shall be obtained at the offices of the Building Inspector. Failure to file the annual certification shall constitute grounds for immediate revocation of the Special Permit.”

Newburyport’s special permit expires after three years (unless renewed by the board of appeals), but recertification is still required at the end of the first and second years: “(g) In the eleventh and twenty-third months following the grant or renewal of a special permit hereunder, the homeowner shall certify, under the pains and penalties of perjury, that paragraph (a) herein is still being complied with; and shall file this certification with the building inspector and the zoning board of appeals.”

In general, the permits can be terminated before expiration for non-compliance. In Milton, if the building commissioner has cause to believe that a unit is not complying, s/he can schedule a hearing by the Board of Appeals for a determination. Milton’s bylaw states: “At the hearing, the Building Commissioner or a designee shall specify the basis of his belief that one of the events has occurred, including information provided by third persons, who also may speak at the hearing. The holder of the special permit shall then have the burden of convincing the Board of Appeals that no event terminating the special permit has occurred. Unless the Board of Appeals is convinced that no such event has occurred, it shall formally revoke the special permit which shall thereupon terminate.” Taunton has similar language in its bylaw.

Wenham’s bylaw states that special permits will be renewed on an annual basis unless written objection is filed with the Town Clerk prior to the anniversary date. If an objection is filed, there will be a public hearing.

Lynnfield and Wakefield both require a surety bond from applicants to insure that improvements made for accessory dwelling will be removed after the permit expires. Lynnfield’s bylaw states (Section 5.1.2.4) “The Board shall require bond or surety to insure that any improvements made shall be removed at the expiration of such special permit, or the sale of premise whichever occurs first. All yearly renewals of a special permit granted under this subsection may, but need not, be granted as an administrative matter by the Board of Appeals without the necessity of public notices or hearings upon receipt by the Board of Appeals of 1. a report from the Director of the Zoning Enforcement and Inspection that the owner and occupant of the premises are in compliance with all provisions of this subsection and that the need for such accessory use still exists and 2. a renewal of the surety bond referred to in the preceding sentence for the term of the renewed permit.” Wakefield’s states: “(4) The special permit shall be issued on a year-to-year basis, and the Board of Appeals shall not renew any such permit where the need for such accessory use no longer exists. The Board shall require a bond or surety to insure that any improvements made shall be removed at the expiration of such special permit or the sale of the premises, whichever occurs first.”

Many of the bylaws have provisions explaining procedures for removing the accessory apartment after the permit has expired or been terminated. Dover's bylaw states: "Within 6 months of the lapse of a Special Permit hereunder, the owner or owners of the building containing an apartment shall dismantle the cooking facilities of the apartment and restore the building to a single-family dwelling." Hamilton's states: "10. The kitchen facilities shall be removed when there is no longer a valid special permit for the unit." Sherborn's bylaw explains: "8. The Inspector of Buildings may, in addition to other remedies, order removal of the separate kitchen facilities, equipment, fixtures, interior alterations, any separate metering of utilities, and any structural changes, that were installed to create such unit if the lawful use of such unit has expired or been terminated."

Topsfield's regulations also note that the owner shall permit an inspection by the building inspector without a warrant after an accessory apartment is discontinued. Milton's bylaw also states that the building inspector will inspect the premises after giving reasonable notice to determine whether the apartment was incorporated into the house. Milton's bylaw has one of the longest sections addressing termination of permits: "h. Following sale of the premises, expiration of the term of the special permit, or revocation of the special permit by the Board of Appeals, there shall be no further use or occupancy of the temporary apartment separately from the principal dwelling quarters. The temporary apartment shall be incorporated with the principal dwelling quarters within sixty (60) days from the date of sale, from the date of revocation of the special permit, or from the date of expiration of the special permit, whichever occurs first. . . . Following termination of the special permit, after giving reasonable notice, the Building Commissioner shall inspect the premises to determine whether the temporary apartment has been incorporated into the principal dwelling quarters. Failure to so incorporate the temporary apartment into the principal dwelling quarters or to give the Building Inspector access to inspect such incorporation shall be cause for the Building Commissioner to terminate the certificate of occupancy for the dwelling."

Building Caps and Phasing

Many municipalities regulate the rate of development of residential units by enacting town-wide caps limiting the number of units that can be built annually or biannually or requiring phased growth for individual developments. Project phasing (also known as development scheduling or buildout scheduling) allows for the gradual buildout of approved subdivisions over a number of years. Often the municipality exempts from growth management requirements certain types of housing such as age-restricted and affordable units or developments with protected open space. Most of the "rate of development" provisions include an expiration or "sunset" date (some that have expired have been updated and re-adopted).

Municipalities explain that caps and phasing are used to avoid unexpected growth spikes that might hinder the town from keeping pace with new demand for services. Amesbury's Master Plan explains: "One of the key elements of the bylaw is to provide the Town with reasonable time and opportunity to study the effect of housing growth and to guard against short term patterns that may be inconsistent or impede effective

implementation of this Master Plan.” Stow’s bylaw on the “Phasing of Growth” states (Section 8.6): “The citizens of Stow insist on, take pride in, and enjoy a reputation for such high quality and reliable municipal services. Several key municipal services, including human services and schools, are currently or may soon be under considerable strain. This Section will relate the timing of residential development to the Town’s ability to provide services.”

Building Caps

Town-wide annual permit caps range from 20 to 155 permits. The number of permits is often set at the average in the previous years. The chart on the following page lists the municipalities with permit limits that were still in effect in 2004 (others had caps that expired). The chart includes the name of the relevant provisions, the annual permit limits (listed as half the number of units allowed in two years for some municipalities), the number of permits allowed per applicant per year, and the dates of adoption and expiration of the provisions. Note that most of the municipalities list some exemptions to the permit limit; exemptions are described below.

Several of the growth management or rate of development provisions listed above also include additional requirements such as project phasing or further delineation of what is allowed under the cap. For example, in Lunenburg no more than half of the units allowed annually can be within subdivisions. In Carver, while the annual cap is 30 units, there are monthly caps of two or three units. In Amesbury, the annual town-wide cap is 48 units; no more than 12 can come from single-unit-per-lot housing and no more than 36 from multi-unit-per-lot housing (including “Definitive Subdivisions,” cluster, multi-family dwellings, etc.)

Some provisions include a point system where points are awarded for provision of community goods such as open space or affordable units, and projects with more points are given priority for permits. For example, in Amesbury, the “Smart Growth Housing Points Table” specifies that projects receive negative points for location within a Water Resources Protection District, altering wetlands or floodplains, the demolition of historic structures and inclusion of a dead-end street more than 750 feet in length. Projects receive positive points for off-site improvements to roads, sidewalks, and public sewer, inclusion of affordable housing, restoration of historic structures, and permanent restrictions on conservation land, among other things.

Phasing

Fifty municipalities require project phasing for subdivisions of a certain size. In municipalities with no explicit provisions for phasing, special permit granting authorities may negotiate a “buildout schedule” as a condition of granting the special permit. The phasing provisions apply broadly to any development of a certain size.

Some phasing provisions are only triggered once a threshold number of units have been permitted town-wide. Berlin’s phasing, for example, is only triggered when 15 building permits have been issued in the 11 months previous to the application (Section 1530.a). In Stow, phasing is triggered once 35 units have been permitted over a two-year period (Section 8.6.2.1): “the applicable permit granting authority (Planning Board,

Limits set on rate of residential development

	Municipality	Bylaw/Ordinance Name	Permit Limit, 12 Months*	12 Mo. Permit Limit/Applicant	Year Adopted	Expiration Year
1	AMESBURY	V.E. Building Permit Allocation System	48	12	2003	2005
2	AYER	IX. Rate of Development By-Law	32	6	1999	2005
3	BOLTON	2.5.8 Rate of Development	37	6	2000	2008
4	BOYLSTON	12. Growth Management	20	No limit	2000	2005
5	CARVER	2400. Rate of Development	30	No limit	1998	2006
6	DUNSTABLE	11.8 Growth Rate Limitation	24*	7	2001	2006
7	FRANKLIN	185-46. Growth Management	100	10	1997	2009
8	GEORGETOWN	III. Rate of Development	20	5	1995	2005
9	GROTON	218-28. Development Rate Limitation	60*	No limit	1980	2005
10	HALIFAX	167-19. Building or use permit.	40	6	1998	2008
11	HOLDEN	XV.3 Planned Growth Rate	100*	No limit	1991	No expiration
12	KINGSTON	6.10.4.1 Rate of Residential Development	70	No limit	1996	No expiration
13	LANCASTER	14.10 Development Rate Limitation	30*	No limit	1986	No expiration
14	LEICESTER	6.1.3 Planned Growth Rate	50*	No limit	1980s	No expiration
15	LEOMINSTER	VII. Scheduled Development	100	No limit	2001	No expiration
16	LUNENBURG	4.11. Phased Growth	45	6	1997	2004
17	MANSFIELD	4.2.3.3 Building Permit Limitations	115	No limit	1997	2007
18	MENDON	XIII. Rate of Development	39	7	2001	2006
19	PEPPERELL	3600. Rate of Development	40	5	1998	2006
20	PLYMOUTH	205-11. Building permit limitations	155	30	1999	2005
21	ROWLEY	8.5 New Single-family Dwelling Limitation	24	No limit	1996	No expiration
22	SHARON	3420. Permit Issuance	50*	No limit	1990s	No expiration
23	SHIRLEY	2.9 Rate of Development	30	5	2000	2005
24	STERLING	4.3 Rate of Development	30	No limit	1998	2008
25	TOWNSEND	15. Rate of Development and Subdivision Phasing	28	3	2004	2008
26	TYNGSBOROUGH	1.19.00 Growth Management	65*	No limit	1988	2008
27	UXBRIDGE	Growth Management	60	5	2004	2009
28	WALPOLE	9-J Growth Management By-Law	85	No limit	1990s	2006
29	WESTFORD	6.3 Growth Management	30	6	1996	2007

*These municipalities list the permit limit per two-year period (not annually), and thus the number listed in the chart is half of the two-year limit. Also note that some of the annual limits are based on calendar years while others refer to a rolling 12-month period.

Zoning Board of Appeals or Building Inspector) shall not approve any residential development which would result in authorizations for more than 35 dwelling units over a 730 consecutive day (two-year) period unless (a) specifically exempted (the project has less than four residential units); or (b) it is duly authorized in a development schedule.”

Some phasing requirements specify a single quantity of units that can be built per year in developments of any size while other phasing programs base the rate of development on the size of the project. For example, Mendon allows development per project of up to seven units per year (Section XIII.D.6): “Building permits for each development shall not exceed 7 in one year.” Pepperell allows five units per year (Section 3640): “There shall be no more than a total of five (5) building permits issued in any one subdivision for new dwellings units regardless of the applicant(s).” Dighton allows the greater of eight units per year or 10% of the total units (Section 2820): “Subdivisions containing eight (8) or more building lots shall not be developed by the construction of dwelling units at a rate greater than eight lots or ten percent of the total number of lots shown on the approved definitive subdivision plan per year, whichever is greater.”

Boxford (Article VI, Section 196-32) and Boylston are examples of municipalities that base the phasing rate on the size of the development.

Examples of buildout schedules

Boxford		Boylston	
Number of units	Units permitted per year	Number of units	Units permitted per year
1-10	5	1-3	100%
11-20	6	4-10	Up to 50%
21-30	7	11-20	Up to 33%
31-40	8	21-40	Up to 24%
41-50	9	41+	Up to 20%, not to exceed 10 units per year
51+	10 plus 5% of number over 50		

Of all of the municipalities that require project phasing, 80% allow only 10 or fewer units to be permitted per year for a subdivision of 30 lots.

Exemptions

Municipalities with targeted growth rate limits or phased development often exempt from the cap or give preference to certain types of residential permits, or do not require them to be phased. Some grounds for exemption are almost universal including: (1) developments that received approval prior to the adoption of the cap/phasing, (2) units developed under Comprehensive Permits (40B), (3) “enlargement, reconstruction or restoration” of a dwelling unit currently in existence, and (4) construction of a single-family unit on a lot, intended for residence by the lot’s owner (not as part of a larger development). Beyond those basic exemptions, the most common exemptions are for affordable and age restricted units (23 municipalities exempt age-restricted units and 27 exempt low-income units). Many municipalities also provide exemptions for subdivisions that preserve open space, reduce the number of lots developed beyond the

basic number allowed by zoning requirements, or provide infrastructure or contribute to public services for the municipality. Several municipalities give the planning board discretion to grant special permits that will exempt projects from the permit cap or phasing that provide significant public benefit, in the planning board's judgment.

Berlin (Section 1516) exempts dwellings built with special permits for senior residential development or built under any program that categorizes the units as low or moderate income housing (with deed restrictions). Dunstable (Section 11.8.3) exempts lots which have 100% more than the required minimum lot area excluding "land unsuitable for development" and lots created in an Open Space Development where the open space is at least 100% more than the required minimum also excluding land unsuitable for development. Shirley (Section 2.9.4) exempts dwelling units for low- and moderate-income families, dwelling units deed restricted to senior residents (55+), and development projects that have a 25% reduction in the buildable lots permitted under an approved definitive subdivision plan. East Bridgewater exempts from the phasing provisions projects approved under Planned Open Space Residential Development, Adult Retirement Planned Unit Development and Historic Residential Overlay District, as well as residential developments with average lot areas of two acres or more (and each lot having 35,000 square feet of upland area). Holden counts every three dwelling units in a Retirement Community as a single dwelling unit for calculations of the growth rate (Section 3.3). Carver, Dighton, Douglas, Dunstable, East Bridgewater, Hopkinton, Pepperell, Plymouth, Raynham, Shirley, Walpole, and Westford all give preference or exemption to developments that have fewer units or larger lot sizes (less density) than zoning requires.

Several municipalities (Bolton, Groton, Lancaster, Uxbridge, and Walpole) with growth caps allow for special permits to be granted for rapid development under certain conditions. Bolton's bylaw explains under the heading "Special Permit for More Rapid Development" (Section 2.5.8.6): "The Planning Board may issue a special permit authorizing the immediate issuance of a building permit for up to ten (10) single-family dwelling units upon making all of the following determinations and findings: a. A salient and unmet housing need would be addressed by the granting of such permit; and b. Adequate infrastructure and other mitigating measures are being provided to ensure that municipal services will not be overburdened; and c. Expected benefits to the community outweigh anticipated adverse impacts upon municipal service or public facilities associated with the issuance of a Special Permit." Uxbridge's conditions are more broad: "d. Special permits for rapid development shall be granted only upon a determination by the Planning Board that such development also would serve a significant housing need, would be unfeasible if limited to five (5) residential dwelling units over twelve months, and would not overburden public services."

Sterling gives the planning board discretion to grant special permits that exempt projects from the permit cap (Section 4.3.4): "Upon a determination by the Planning Board under a special permit application that the building permits will be issued for dwelling units within a development that will provide special benefits to the community, said permits shall be exempt from this section in its entirety, and shall not count toward the thirty (30) permits to be issued annually. The Planning Board may grant a special permit under this section only if the Board determines that the probable benefits to the community outweigh the probable adverse effects resulting from granting

such permit, considering the impact of schools, other public facilities, traffic and pedestrian travel, recreational facilities, open spaces and agricultural resources, traffic hazards, preservation of unique natural features, planned rate of development, and housing for senior citizens and people of low or moderate income, as well conformance with Master Plan or Growth Management Plans, if any, prepared by the Planning Board pursuant to G.L. c.41, s81D. The Planning Board shall give particular consideration to proposals that demonstrate a reduction in allowable density of fifty percent (50%) or more.” Douglas has similar provisions for special permits that exempt developments from phasing (Section 4.2.4): “In making such determination, the Board shall consider whether the applicant has offered one or more of the following improvements or amenities which have a positive impact upon: a. schools and other public facilities; b. traffic and pedestrian safety; c. recreational facilities, open spaces, agricultural resources, and unique natural features; d. housing for senior citizens and people of low or moderate income; e. conformance with Master Plan or Growth Management Plans prepared by the Planning Board pursuant to G.L. c. 41, s. 81D. f. reduction in otherwise allowable residential density. Particular consideration shall be given to special permit applications that demonstrate a reduction in allowable density of twenty-five percent (25%) or more.”

Expiration and Renewal

Many of the growth management, rate of development, and project phasing provisions come with sunset dates, often two, four, five, or ten years from the date of adoption. Many have already expired (without renewal), for example, in Abington, Blackstone, Haverhill, Raynham, and Topsfield, among others. In other municipalities, the provisions have expired and been renewed (in some cases perhaps more than once): Ayer, Franklin, Georgetown, Halifax, Holden, Pepperell, Plymouth, and Rowley.

Subdivision Rules and Regulations

Local subdivision regulations regulate division of land into smaller parcels. They specify standards for roadways and other improvements in new rights of way, such as sidewalks, paths, street trees, utilities, walls, etc. The regulations list the types of information that should be on submitted plans. They also include provisions for ensuring road improvements. The Planning Board adopts subdivision regulations by majority vote after a duly posted public hearing.

While most municipalities have subdivision regulations, five cities and towns that are largely built out do not have them—Arlington, Belmont, Brookline, Cambridge, and Watertown. Somerville has subdivision regulations, but since they do not address the variables tracked in this study and do not resemble the other local regulations, they are not included in the study.

Road Classification

There is no standardized classification for types of roads. Each municipality labels and defines its road types in its own way. Typical names for residential subdivision roads include: minor, local, lane, residential, secondary, sub-collector, subsidiary, dead-end, cul-de-sac, court, feeder, intermediate, and subdivision. The regulations sometimes define the type of road according to the number of houses on it, the number of expected vehicle trips per day, or both. Some municipalities define subdivision roads as “providing access to abutting lots” or serving as a connection between such roads and collector roads. Some regulations do not include definitions for the road types.

Since regulations for minimum width of pavement on roadways, maximum grade for roads, sidewalk and curbing installation, etc. usually vary by road classification (minor, collector, arterial, etc.), the study created its own standardization to facilitate comparison across municipalities. Researchers tracked requirements for “typical subdivision road” and in a couple of cases the “shortest” of subdivision roads. For consistency, researchers coded “typical subdivision” as the street intended to serve 10–30 houses or 100–300 vehicle trips per day or closest equivalent category. If no house or traffic counts were listed, researchers chose the type “used primarily to provide access to abutting lots,” generally not intended to carry through traffic. These definitions may not always be consistent, as the streets “used primarily to provide access to abutting lots” may often be the ones that serve fewer than 10 residential lots. Therefore, the researchers

also tracked a couple of the requirements (grade and pavement width) for the shortest of roads listed, which were often the same as the typical subdivision road, but sometimes not. Some of the “shortest” road classifications were for private roads or courts that serve fewer than four houses.

Municipalities that use the same terms to classify roads do not necessarily use the same criteria to classify the roads. For example, many municipalities use the term “minor” to define a subset of residential roads, but the definitions vary widely. In Amesbury, “minor roads” receive traffic from less than 100 dwelling units. In Andover, “minor roads” serve no more than 20 lots or dwellings. In Auburn, a “minor road” is “a street which is likely to be used only by vehicles traveling to or from lots on that street.” In Boxford, “minor roads” have 400 or fewer vehicle trips on an average week-day. Several regulations state that “minor roads” are streets that do not qualify as lanes (that typically serve approximately eight or fewer lots) but handle less traffic than collector roads.

Width of Pavement

Most subdivision regulations list the minimum required width of pavement for all of the types of roads allowed in the municipality. In general, a “travel lane” is 9–10 feet, so the most narrow pavement requirements are 18–20 feet of pavement. The average car or pickup is 5.5–6.5 feet wide, and dump trucks and school buses are 7 feet. The rationale for roads wider than 20 feet is the need to accommodate parked cars and two-way traffic, as well as emergency vehicles.

Wakefield’s 2003 Housing Master Plan’s Design Guidelines cite safety as a rationale for requiring narrow roads (Section 6.0): “In general, residential streets should be as narrow as possible while still accommodating traffic and emergency vehicles. Narrow driving lanes and onstreet parking slow traffic and improve safety. On-street parking can be provided in widened areas off the street while maintaining narrower, pedestrian-oriented dimensions elsewhere.” Aaron Henry, Milton Director of Planning, commented on Milton’s requirement of 32 feet of pavement for subdivisions (9/2/04): “It is probably too wide. . . . We usually waive down to something smaller. . . . Most of our subdivisions are with four or five lots, cul-de-sacs. You don’t want to end up with a sea of pavement.”

Most of the regulations list requirements of 24–28 feet of pavement. For either the typical subdivision road or the shortest subdivision road, more than half of the municipalities list requirements from 24 to 28 feet.

Twenty-six municipalities require at least 30 feet of pavement for all types of subdivision roads (coded for both the shortest of roads and typical). More municipalities, in addition to the 26 listed below, require 30-foot widths for some subdivision roads (perhaps “minor” but not “lane,” for example).

1. Avon (30 for Residential)
2. Ayer (36 for Minor)
3. Brockton (34 for Residential)
4. Chelsea (32 for Minor)

5. Hamilton (32 for Minor)
6. Hopedale (30 for Minor)
7. Leominster (34 for Minor)
8. Lynn (34 for "All roadways")
9. Medford (30 for Class B&C)
10. Melrose (32 for "Roadways")
11. Mendon (30 for Secondary)
12. Merrimac (35 for Secondary)
13. Milford (30 for Minor)
14. Milton (32 for Subdivision)
15. Peabody (32 for Secondary)
16. Reading (30 for Local)
17. Rockland (30 for Local Residential)
18. Salisbury (30 for Subdivision Type I)
19. Seekonk (30 for Local or Minor)
20. Shrewsbury (30 for Minor)
21. Stoneham (32 for Roadways)
22. Stoughton (30 for Minor)
23. Taunton (30 for Minor)
24. Waltham (30 for Residential)
25. Wilmington (32 for Minor)
26. Worcester (30 for Residential)

Twenty municipalities have requirements of 22 feet of pavement or less for subdivision roads (not including collector and arterial roads). Additional municipalities, not included below, allow narrow roads (22 feet and narrower) for some categories of subdivision road but not others (for example, 24 feet for minor but 22 for lanes serving eight or fewer lots).

1. Boxborough (20 for Private Lane; 22 for Local Access; 22 for Subcollector)
2. Boxford (20 for Minor)
3. Canton (22 for Residential Streets; 18 for Residential Lane)
4. Carlisle (20 for Local Roads serving 15+ lots; 18 for Local serving under 15 lots)
5. Dover (22 for Minor)
6. Duxbury (22 for roads with 11+ lots; 18 for 4–10 lots; 14 for 1–3 lots)
7. East Bridgewater (20 for Local and Minor)
8. Groton (22 for Minor; 20 for Lane)
9. Hingham (22 for Minor; 18 for Limited Residential)
10. Hopkinton (22 for Minor; 20 for Rural)
11. Kingston (22 for Local)
12. Lincoln (20 for Secondary; 16 for Minor)
13. Manchester-by-the-Sea (22 for Minor; 15 for Lane)
14. Marshfield (20 for residential streets under 25 lots; 18 for residential streets for 8 or fewer lots)
15. Nahant (22 for Minor)
16. Newbury (22 for Minor; 20 for Minor cul-de-sac)

17. Stow (22 for Access; 22 for Marginal Access; 22 for Cul-de-sac; 18 for Rural Lane)
18. Upton (20 for Minor)
19. West Newbury (20 for Minor)
20. Westford (22 for Minor; 18 for Private)

Rights of Way

Subdivision regulations list the standard right of way boundaries for each type of road. The right of way refers to areas dedicated to use by the public for pedestrian and vehicular travel, and can include the paved street, sidewalk, curb, gutter, median, grassy shoulder, etc. The requirement for typical subdivision rights of way is usually 40–50 feet. The most common requirement for typical subdivision roads is 50 feet—listed in 119 municipalities. Only one-quarter of the municipalities list rights of way less than 50 feet for typical subdivisions (although more allow a 40-foot right of way for the shortest of road types such as lanes, courts, and private roads). Six municipalities require a 60-foot right of way for subdivision roads—Berlin, Framingham, Norfolk, Paxton, Reading, and Sherborn.

Curbing

Curbs come in a range of materials (bituminous concrete, granite, or pre-cast concrete) and shapes (vertical, sloped, or rolled). Municipalities often vary the curbing requirements along roads based on the density of settlement and the types of uses along the roads. Where curbs are required, more than half of the municipalities require granite curbing in typical subdivisions, slightly fewer require either bituminous or give an option between bituminous or granite (often at the discretion of the planning board). It is standard practice across most municipalities to require granite curbing at intersections and catch basins, so this was not tracked by the study. Requirements for “cape cod berms”—rolled curbs—are counted as bituminous. Most of the regulations specified a curb type to be selected when curbing is installed, but this requirement does not by itself indicate whether curbing is usually required on subdivision roads. A few municipalities list that pre-cast concrete curbing is required—these were counted as requiring granite, since pre-cast concrete is more expensive than bituminous concrete.

Some of the regulations list clear mandates for a given type of curbing, while others leave more discretion to the planning board. For example, Abington has a clear requirement for granite curbing (Section IV.B.8): “Each and every street proposed to be built shall be required to have straight-faced granite curbing, (See Exhibit D), on both sides of the street for its entire length including all radii regardless of grades.” Acton has a requirement for bituminous curbing, although it gives the Board discretion to require alternate materials under some circumstances (Section 9.5.1): “A continuous, low-profile, modified Cape Cod berm shall be provided as an integral part of all new streets. The Board may require alternate curb materials depending on local conditions and the location and purpose of the curb.” Marblehead lists either bituminous or granite (Section 258-20.F.7.a): “Bituminous concrete curb (Type 2) or sloped granite edge per MDPW standards.”

According to Rebecca Curran, Marblehead Planner, (6/28/04) granite recently has been the most commonly used curbing material. Burlington's regulations (Section 10.5) state that the planning board prefers granite curbing throughout subdivisions; the second alternative is pre-cast concrete; the third preference is bituminous concrete.

Sidewalks

More than half of the municipalities require sidewalks on both sides of typical subdivision roads. Most of the rest require sidewalks on one side, and only thirteen require no sidewalks. Where sidewalks were listed as at the discretion of the planning board, the regulation was counted as not requiring sidewalks. If the regulations present the option of one side or both, the regulation was counted as "one side."

Many of the regulations vary the sidewalk requirements by the type of road. For example, in Bolton (Section 6268), sidewalks must be installed on both sides of major and secondary streets and on one side of minor streets; lanes do not require sidewalks. Leicester requires sidewalks on both sides of all subdivision roads (Section V.G.1): "Sidewalks shall be installed on both sides of all streets within a subdivision."

Many regulations note that the planning board can waive the requirement for sidewalks. Hanover's regulations, for example, state (Section V.C.1): "Paved sidewalks shall be constructed along the full length of both sides of every subdivision way, except that the Planning Board, at its own volition when deemed necessary for public safety or convenience, may waive construction along one side of the way and may require the developer to install a sidewalk of similar length, at a maximum, along a neighboring public way." Some of the requirements are somewhat vague and thus leave some discretion to the planning board, such as Berlin's requirement (Section V.E): "Where possible and practical and especially along collector and residential streets in a subdivision, sidewalks shall be provided outside of the street right-of-way within an easement conveyed to the Town of Berlin." Winchester's regulations explicitly grant the planning board discretion to require sidewalks on minor roads (Section V.B.5): "Sidewalks, having a width of not less than five (5) feet, shall be constructed within the subdivision on both sides of all major and collector streets, and on minor streets at the discretion of the Board." Lancaster's regulations also give the planning board discretion (Section 451.a): "The Planning Board may require sidewalks on one or both sides of the street if it is felt that the public safety will be served by their installation. Normally, no sidewalk will be required on lanes." Several of the regulations state that the planning board should take into consideration whether neighboring roads have sidewalks.

Typically, sidewalks must be four to five feet wide. Some municipalities require wider sidewalks, such as Lynn (Section VI.B.1), which requires eight feet of width.

Maximum Grades

While some municipalities list a single maximum grade for all roads, others vary the maximum grade requirement by road type, district, density of settlement along the road, the distance of the slope, or the curvature of the road. The maximum grade requirements

for residential subdivision roads vary from 4% to 12%. For typical subdivision roads, 20% of the municipalities list a maximum grade of 7% or less. For the shortest roads (including courts, lanes, and private roads), 15% list a maximum grade of 7% or less. For typical roads, 30% list maximum slopes of 10% or more, while for the shortest roads, 40% list maximum slopes of 10% or more. For typical roads, 8% is by far the most common requirement for maximum grade (in 66 municipalities). For the shortest roads, 8% (52 municipalities) and 10% (50 municipalities) were the most common requirements.

The following municipalities do not allow slopes steeper than 6% on residential subdivision roads (although some may grant waivers or variances):

1. Beverly (6% for secondary streets; 3% for principal streets)
2. Bridgewater (5% for residential subcollector, collector, arterial)
3. Carver (6% for local, 3% for collector)
4. Cohasset (6% for streets, with waivers)
5. Easton (6% for residential streets)
6. Foxborough (6% for residential streets)
7. Georgetown (6% for streets)
8. Halifax (6% for minor residential, 5% for collector, 3% for major)
9. Lakeville (6% for minor, 6% for secondary, 4% for primary and major)
10. Medfield (6% for streets)
11. Mendon (6% for secondary, 4% for principal)
12. Sudbury (6% for all streets, with waivers)
13. Taunton (6% for minor residential, 5% for collector, 3% for major)
14. Westborough (6% for streets)
15. Weston (6% for streets)
16. Wilmington (6% for minor streets in low density areas, 5% for minor in high density areas)

Municipalities generally allow steeper grades for minor roads than collector and arterials roads. Bellingham is an example of municipality that varied requirements by road type. In Bellingham, minor roads can have grades up to 10% and lanes up to 12%. Concord varies the grade requirement by road type and district. For local roads, the maximum is 8% in Residential AA, A, and B and 7% in Residential C. Mansfield, Princeton, and Rowley allow steeper grades for lower-density neighborhoods, defined at the discretion of the planning board. Grafton allows steeper grades on streets with single-family houses than on streets with multi-family housing. Milford (Section V.A.3) caps the grade at 8% where frontages are less than 120 feet, and allows up to 12% where frontages are greater than 120 feet. A few municipalities will also allow one grade for a short distance, and a grade that is less steep for a longer distance. Middleborough (Section IV.B.5.b), for example, allows a maximum grade of 6% (preferably not more than 4%) but allows an increase of 1% for a distance of 200 feet or less. A few municipalities limit the grade on curves. For example, Wenham allows in low-density areas a 10% grade on collector straight-aways and 8% on curved parts of collector streets.

A few municipalities note grade requirements may vary to meet unusual conditions. For example, Dunstable (Section IV.A.4.a): “Grades shall not be more than 6%, except

where in the opinion of the Board a greater grade is required due to unusual topographic conditions in which case grades up to 12% may be permitted.” Duxbury’s subdivision regulations state (Section 7.6.3.a): “Grades of all streets shall not be less than one percent (1%), nor more than six percent (6%). Where the six percent (6%) requirement would result in adverse impacts to the aesthetic value of the site due to extensive cut and/or fill or tree removal, the Board may waive the six percent (6%) requirement provided such waiver is consistent with safety determinants, including the distance from an intersection, the number of dwellings served, the type of street, the length of the steeper graded portion of the street, the horizontal alignment and street curvature.”

Marblehead’s subdivision regulations (Section 258-17.B.4.a) note that lanes can have slopes up to 10%, but on north facing lanes only up to 8%.

Dead Ends

Most municipalities list a maximum length for dead-end streets in feet, but some municipalities also list it in terms of the number of lots the street can serve. Within municipalities, planning boards often allow different maximum lengths across districts, by type of road installed or for other reasons such as topographical necessity. Some municipalities will allow longer dead ends if certain conditions are met such as sprinkler installation in houses, looped water, or designation of the road as private. A maximum of 500–600 feet for dead-end roads is standard in many municipalities because fire hydrants historically were placed at the entrance to the road and fire trucks carried 600-foot hose line. Sixty-two percent (112 of 181) of municipalities with subdivision regulation do not allow dead ends to be longer than 600 feet. The longest dead-end maximum is in Pembroke—2,000 feet. Seven municipalities allow 1,500 feet–2,000 feet.³

A couple of municipalities (Acton and Dover) prohibit dead-end roads, in general. Several more municipalities state in the regulations that dead-end roads are discouraged or will only be allowed if topography allows no alternatives. Several municipal master plans recommend that the local planning board discourage dead ends. Franklin’s 1997 Master Plan states (Goal 2, Objective 3): “In order to minimize travel distances to and from main roads and improve access for public safety vehicles to residential areas with only one entrance, local roads should be connected wherever possible. In some cases, this will result in an increase of traffic in neighborhoods that previously had limited access, but there will be corresponding decreases in other neighborhoods as leveling occurs after additional routes are created.” Sudbury has a similar recommendation in its 2001 Master Plan “Sustainable Sudbury”: “Require through streets in all new developments where feasible. The popularity of dead-end streets poses a dilemma for older towns like Sudbury. While offering a safe neighborhood setting for the new homes,

³ Note that when municipalities list the maximum length in terms of lots located on the road, researchers estimated the maximum length by using the longest frontage requirement allowed in any district. Also note that there may also be slight inconsistencies in the lengths tracked by researchers as some municipalities list the maximum length from the intersection to the start of the turnaround while others list the length to the midpoint of the turnaround or the end of it (in some regulations it is not clear what is intended). In general, the researchers coded the answers for the length to the end of the turnaround, but some small inconsistencies may remain in the numbers.

dead-end streets burden the existing travel routes by eliminating the possibility of bypasses and alternative means of getting from one place to another. Dead end streets also make public services, such as mail delivery, school bus service and emergency vehicle circulation more difficult. Since most of the highly traveled roads in Sudbury are the historic ways, they tend to be narrower and more winding than new subdivision streets. Routing all new traffic onto the existing roads causes them to become overburdened with a corresponding decrease in the level of service (or capacity) of the roadway.”

Wakefield’s 2003 Housing Master Plan (Design Guidelines) also states that grid streets in most locations in Wakefield are more appropriate than cul-de-sacs: “For most locations in Wakefield, a grid of streets is likely to be more appropriate for new development than the arbitrary winding of a cul-de-sac. A grid allows multiple entry and exit points connecting a new development to the surrounding community. Streets can be narrower and shorter, avoiding rush hour choke points and encouraging pedestrian traffic. Curves can be located where they make sense in relation to the natural landscape, avoiding a contrived or arbitrary quality.”

While many municipalities list a single maximum length for dead-end roads and cul-de-sacs (for example, Ashland, Section 344.12.G.2: “Dead-end streets and their extensions shall not be longer than five hundred (500) feet”), others offer several maximum lengths, for different circumstances. Milton’s maximum lengths vary by district (500 feet in Res A, B, C and 650 feet in Res AA). Some municipalities allow longer streets depending on the road design standards used. For example, Newburyport allows cul-de-sacs designed as courts to be 300 feet, as lanes to be 450 feet and as local streets to be 600 feet. Freetown (Section IV, Table 1 and footnotes) generally limits dead ends to 750 feet, but will allow them to be up to 1,500 feet if constructed to the standard of a secondary street. Several regulations list a maximum length but note that longer will be permitted if required by topography. For example, Attleboro’s regulation (Section VI.6.1.j): “No more than twelve (12) lots shall be permitted along a dead-end street unless necessitated by topography, or necessitated by other unique situations, and with the approval of the Board.”

Stow allows for dead-end streets to extend 500 feet and serve no more than eight dwelling units, but Stow’s Planning Board may allow up to 1,500 feet if several conditions are met, such as installation of a turnaround part way down the road, covenants running with the land that lots be provided with residential sprinkler systems and dedication of 10% of the land as open space. North Reading limits dead ends to 500 feet, but will allow up to 1,000 feet if the water line is looped. Norton only allows dead-end roads if they are permanently private.

Local Wetlands Regulation

State wetlands protection programs regulate work (vegetation removal, re-grading, construction, etc.) in and abutting coastal and inland wetlands that border surface waters, as well as in other resource areas such as land subject to flooding, riverfront areas, and land under water bodies. The regulations are intended to promote flood control, prevention of pollution and storm damage, and protection of public and private water supplies, groundwater supply, fisheries, land containing shellfish, and wildlife habitat.

The Massachusetts Department of Environmental Protection (DEP) oversees administration of the law (develops regulations, provides training, and hears appeals), while local conservation commissions actually administer it by reviewing proposed work that may impact wetlands. Conservation commissions are volunteer boards of three to seven members appointed by the selectmen or city council. The commissions receive Requests for Determination of Applicability and applications called "Notices of Intent," visit properties, hold hearings, on a case-by-case basis issue permits called "Determinations of Applicability" and "Orders of Conditions," and issue "Enforcement Orders" for violations of the regulations.

Section 404 of the U.S. Clean Water Act requires that parties seeking to deposit dredged or fill material into "waters of the United States, including wetlands" receive authorization. The Army Corps of Engineers (ACOE) has responsibility for administering the Section 404 permitting process. "Orders of Conditions" granted by local conservation commissions for under 5,000 square feet of wetlands fill serve as ACOE Water Quality Certification permits.

Seventy percent of the municipalities (131 of 187) have passed wetlands bylaws or ordinances that give local conservation commissions authority to regulate activities/areas that are not covered under the state's Wetlands Protection Act. For example, while the state grants conservation commissions jurisdiction over 100-foot buffer zones around vegetated wetlands that border bodies of water, many municipalities also regulate buffer zones around isolated vegetated wetlands (not bordering surface water).

Most of the local bylaws and ordinances give the conservation commission authority to promulgate additional regulations. Conservation commissions in 94 communities have promulgated regulations.

Researchers obtained the date of adoption of the bylaw/ordinance for 118 of the 131 relevant municipalities. Sixty were first adopted before 1990. Twenty-six were adopted from 2000 to 2004. Eight were adopted in 2004. Researchers obtained the last date of amendment for 67 municipalities. Forty-seven bylaws/ordinances were last amended since 2000.

The research only includes bylaws/ordinances/regulations passed or amended by December 31, 2004, although municipalities continued to adopt and amend them in 2005. The survey received from Plainville in June 2005 marked that the wetlands bylaw had been amended in 2005. Grafton's website notes: "Following a Public Hearing held on January 4, 2005, the Grafton Conservation Commission voted unanimously to amend the '1988 Rules and Regulations for the Administration of the Town of Grafton Local Wetlands By-Law of 1987.'" The survey received from Wakefield in March 2005 reads: "Going to Town Meeting April 4-8 to propose wetland protection bylaw." If passed, the bylaw would cover non-certified vernal pools, grant a 100-foot buffer around vernal pools, extend its jurisdiction around isolated vegetated wetlands and areas subject to flooding, and establish "no build zones" of 20 feet. Groton approved regulations in January 2005. Newbury and Shirley both amended their wetlands bylaws in 2005. (This is not an exhaustive list of recent amendments.)

A few conservation agents described challenges they face in amending/passing wetlands bylaws/ordinances. Carlisle's conservation agent said that the town "came up a few votes short" of passing a new vernal pool bylaw. One conservation chair from another town wrote in an email in June 2004: "Given how long they take to draft and accept, I can safely say we will not have one completed by the year's end (hopefully by the end of next year, though)." Another conservation agent wrote in an email in November 2004: "We're just launching our efforts to revise the bylaw and the regs. We aren't known for moving too swiftly, so don't hold your breath."

Sixty-three percent of the municipalities (82 of 131) post the bylaw/ordinance and/or regulations on the municipal website. The bylaws/ordinances are more frequently posted than the regulations.

Land Subject to Flooding

The state Wetlands Protection Act Regulations (310 CMR 10.00) include "land subject to flooding" in the list of protected resources under the "Statement of Jurisdiction." The regulations group land subject to flooding into two categories: isolated and bordering. The state defines "isolated land subject to flooding" as "an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water to a volume of at least $\frac{1}{4}$ acre-foot and to an average depth of at least six inches." The boundary of "bordering land subject to flooding" is the estimated extent of floodwater which would result from the statistical 100-year frequency storm, according to data provided by the Federal Emergency Management Agency [FEMA]. While the state regulations give conservation commissions authority to regulate activities in buffer zones (100 feet of adjacent land) around vegetated wetlands (swamps, bogs, marshes) that border bodies of water, they do not extend the buffer zone around land subject to flooding.

One hundred of the 131 municipalities with local wetlands bylaws/ordinances expand the conservation commission's jurisdiction over land subject to flooding. (That is 76% of the municipalities with bylaws/ordinances; 53% of all municipalities in sample.) Eighty-two give the conservation commission authority to regulate activities in buffer zones around land subject to flooding (63% of 131). Fifty-nine expand the definition of "land subject to flooding," usually by including isolated flood volumes less than $\frac{1}{4}$ acre-foot, and occasionally by supplementing FEMA flood data with local data.

Ninety-three municipalities expand the state's phrase "land subject to flooding" to read "land subject to flooding and inundation" or "land subject to flooding and inundation by groundwater or surface water," although the additional words often do not indicate any change in performance standards for "land subject to flooding." Only 19 of these 93 municipalities define the phrase "land subject to flooding and inundation by groundwater or surface water." Many more of the 93 that use this phrase in the statement of jurisdiction do list definitions for "isolated land subject to flooding" or "land subject to flooding."

Of the municipalities that grant a buffer zone around land subject to flooding or add the terms "land subject to flooding and inundation by groundwater or surface water," 40 do not provide any explicit definitions for the resource area. The presumption is that they follow the state's performance standards. Many of the conservation agents in these 40 municipalities confirmed that they adhere to the state standards.

Eleven more of these municipalities (those granting buffer zones or adding terms) explicitly state that the state definitions apply. In this category are Acton, Andover, Beverly, Billerica, Boxford, Framingham, Ipswich, Manchester-by-the-Sea, Mansfield, Marblehead, and Southborough. Andover's wetlands regulations, for example, include the following definitions (Section 5): "Land subject to inundation means the same as land subject to flooding or isolated land subject to flooding," "Land subject to flooding is defined in 310 CMR 10.57, as may be amended," and "Isolated land subject to flooding is defined in 310 CMR 10.57 (2) as may be amended."

Of the 59 municipalities that expand the state's definition of land subject to flooding, the most common standard (in 11 municipalities) given for isolated land subject to flooding is a flooded volume of $\frac{1}{8}$ th of an acre-foot with an average (and sometimes minimum) depth of 6 inches. The next most common standard (in five municipalities) is that the flooded depression must cover a surface area of 2,000 square feet ($\frac{1}{20}$ th of an acre) and be 6 inches deep. The five municipalities are Attleboro, Lynn, Natick, Needham, and North Reading.

Beyond these two most common performance definitions for land subject to flooding, there is a wide range of definitions. Sherborn lists a volume of $\frac{1}{4}$ th of an acre-foot (same as the state) to a depth of 4 inches. Dover lists a volume of $\frac{1}{6}$ th of an acre-foot to six inches depth. Hingham lists $\frac{1}{16}$ th of an acre-foot and 6 inches. Gloucester lists 1,000 cubic feet (approximately $\frac{1}{43}$ rd of an acre-foot) and 6 inches. Wrentham lists 3,000 cubic feet. Taunton lists 1,000 square feet of surface area and 100 cubic feet of volume. Burlington and Wayland list 500 square feet or greater surface area. Swansea counts at least 1,000 square feet of surface area that floods at least once every five years. (This is not an exhaustive list of the variations.)

Another 24 municipalities that expand on the state's performance standard for isolated land subject to flooding do not include any numerical standard for the size of the flooded depression. Eleven bylaws/ordinances/regulations use the following language:

“an isolated depression or closed basin without an inlet or outlet. It is an area which at least once per year confines standing water.” Included in this category are Arlington, Canton, Easton, Halifax, Hanson, Salisbury, Sharon, Watertown, Wenham, West Bridgewater, and Weymouth.

Thirteen municipalities use language that is even broader (dropping the requirement of “at least once per year”). The exact language varies, but the most common is “A temporary inundation or a rise in the surface of a body of water such that it covers land not usually under water.” Included in this category: Danvers, Cohasset, Dedham, Haverhill, Kingston, Marshfield, Methuen, Peabody, Reading, Stow, Townsend, Westford, and Winchester.

A few of the definitions of land subject to flooding specify whether or not wetlands vegetation should be present. For example, the Boxborough Regulations for the Wetlands Bylaw, Section 1.5.9 (adopted 2001) reads: “Isolated Lands Subject to Flooding: Any isolated depression without an inlet or outlet where surface or groundwater is at or near the surface of the ground for at least 8 weeks during the year to support wetland vegetations.” Kingston’s Wetland Protection Regulations, Section 3.00 (Definitions) states: “Isolated Land Subject to Flooding is any area subject to flooding or inundation which, in the Commission’s judgment, does not support wetland vegetation and does not serve as Vernal Pool habitat.” Other municipalities, such as Arlington, state that “such areas may or may not be characterized by wetlands vegetation or soil characteristics.” (Arlington Wetlands Protection Regulations, amended 2001)

Isolated Vegetated Wetlands

Massachusetts Wetlands Regulations (310 CMR 10.00) list in the “Statement of Jurisdiction” that “any bank, any freshwater wetland, any coastal wetland, any beach, any dune, any flat, any marsh, or any swamp bordering on the ocean, any estuary, any creek, any river, any stream, any pond, or any lake” are subject to protection. Thus, the state’s protection extends to “bordering vegetated wetlands,” not “isolated vegetated wetlands.”

The state’s jurisdiction extends 100 feet to the “upland” land adjacent to the bordering vegetated wetlands. Activities within the buffer zone are reviewed under jurisdiction by the state because activities in the adjacent land such as clearing and paving may cause soil erosion, loss of shading, reduction in nutrient inputs, and change in soil composition (reduced ability to filter)—which may alter the resource area itself.

One hundred fourteen of the 131 municipalities with local wetlands bylaws/ordinances extend protection to “isolated” or “non-bordering” vegetated wetlands. These bylaws and ordinances list in the statement of jurisdiction that the municipality protects “any vegetated wetland” or include the phrase (at the end of the statement of jurisdiction) “said resource areas shall be protected whether or not they border surface waters.” Some specify in the definitions that freshwater wetlands, for example, “shall include all wetlands whether or not they border on a body of water.” (Groton)

When a municipality protects isolated vegetated wetlands, it is standard for it also to extend a buffer zone of protection around the isolated wetlands. The vast majority

(110) of the 114 municipalities that protect isolated vegetated wetlands extend a 100-foot buffer zone around the isolated wetlands. Two extend buffer zones greater than 100 feet (Framingham, Watertown), and two regulate activities only within 25 feet of the resource (Cohasset, Attleboro).

In many cases, isolated wetlands were described in terms of hydrology and vegetation (if isolated wetlands are defined at all), but some municipalities also place a size requirement on the isolated resource area. A minimum area of 5,000 square feet is the standard listed for eight municipalities: Andover, Boxford, Groveland, Haverhill, Manchester-by-the-Sea, Mansfield, Medway, and Topsfield. Groveland's Wetlands Protection Regulations (X.2) state "Only Isolated Wetlands greater than 5,000 square feet in area are subject to protection under these regulations." One thousand square feet in surface area is the minimum for Hamilton, Marblehead, and North Andover; 2,500 square feet for Wellesley; 2,000 square feet for Merrimac; 500 square feet for Harvard, Kingston, and Norwell; 400 square feet for Marshfield. Saugus counts isolated vegetated wetlands with a minimum of 5,000 cubic feet of water.

Vernal Pools

Vernal pools are confined basin depressions that are covered by shallow water usually for at least two months in the late winter, spring, and summer, but may be dry during much of the year. They are unsuitable for fish, but may provide habitat for species such as frogs and salamanders. The absence of fish, which prey on amphibian eggs, makes vernal pools suitable breeding habitat for many amphibians. The state regulations define vernal pool habitats as "confined basin depressions which, at least in most years, hold water for a minimum of two continuous months during spring and/or summer, and which are free of adult fish populations, as well as the area within 100 feet of the mean annual boundaries of such depressions, to the extent that such habitat is within an Area Subject to Protection under M.G.L. c. 131, 40 as specified in 310 CMR 10.02(1)."

The state regulates activities within and around vernal pools that are officially certified by the Massachusetts Division of Fisheries and Wildlife—which is a small subset of the total number of vernal pools in the state. Since the state wetlands regulations 310 CMR 10.00 do not include vernal pools in the statement of jurisdiction, the certified vernal pool and its adjacent habitat must fall within a protected resource area (as listed in the statement of jurisdiction) to receive protection under the authority of the state Wetland Protection Regulations.

Seventy-seven municipalities regulate vernal pools that are not state-certified. (That is 59% of the 131 municipalities with bylaws/ordinances and 41% of the whole sample.) Many bylaws/ordinances explicitly state that vernal pools do not need to be certified to receive protection, often by including in the definition of vernal pool the phrase "regardless of whether the site has been certified by the Massachusetts Division of Wildlife and Fisheries." Others implicitly protect non-certified vernal pools by referring generally to "any vernal pool" or "vernal pools." If vernal pools are included in the statement of jurisdiction and certification is not specified, then usually (but not always) the conservation commission will extend protection to non-certified vernal pools.

Some conservation agents in municipalities with regulations that in-writing only protect certified vernal pools have said that they will protect non-certified vernal pools as “isolated land subject to flooding” or “isolated vegetative wetlands.” These municipalities were not counted among the 77 that protect non-certified vernal pools.

Some bylaws/ordinances state that the pools must be certifiable, but need not be certified, while others include a broader definition of what qualifies as a vernal pool than the certification criteria establish. Some bylaws/ordinances include vernal pools in the statement of jurisdiction, while others include the pools in the definitions of other areas listed in the jurisdiction such as land subject to flooding or vegetated wetlands. Needham’s wetlands regulations, for example, do not list vernal pools in the statement of jurisdiction, but defines them (Section 1.04) as “any vegetated wetland or isolated area subject to flooding which provides a breeding habitat for obligate vernal pool species such as wood frogs (*Rana Sylvatica*), spotted salamanders (*Ambystoma macalatum*), or fairy shrimp, and which may be without standing water during late summer.”

Kingston recently amended its definition of vernal pools, but an older version of Kingston’s Wetland Protection Regulations (Section 3.00) included the language: “Vernal pools may be certified by the Commission and protected wherever they occur. The Commission will follow procedures and standards as described in the handbook ‘Certified’ and Reading High School Vernal Pool Association’s ‘Wicked Big Puddles.’”

Buffer Zones

Eighty-two municipalities extend the conservation commission’s jurisdiction to regulate more potential area as buffer zones around vernal pools than the state’s jurisdiction would cover (63% of the 131 municipalities with bylaws/ordinances.) Under state regulations, conservation commissions can regulate certified vernal pools and the 100-foot habitat extending from the pool’s waterline only to the extent that the vernal pool and habitat fall within state defined wetland resources areas (for example, within the 100-foot buffer zone around a swamp). The 82 municipalities regulate buffer zones (1) around any vernal pool, whether or not the pool is state-certified and/or (2) regardless of the pool’s location (even outside of a wetland resource area). Seventy-four municipalities list vernal pools (some specifying certified only) in the statement of jurisdiction, which means that the pools and their buffer zones do not need to be located within another protected resource area to receive protection.

Several of the regulations are explicit about the commission’s increased jurisdiction to regulate vernal pools. For example, Section 3.1 of Merrimac’s Wetlands Protection Regulations (adopted 2004) states: “It is not necessary for a Vernal Pool to be located within another type of resource area, or certified as a vernal pool by the MA Division of Fisheries and Wildlife, to be eligible for protection under this Bylaw.”

While most of these 82 municipalities extend jurisdiction to 100 feet of land adjacent to the vernal pools, at least 16 extend jurisdiction to greater than 100 feet from the vernal pool’s waterline. Two municipalities extend the jurisdiction from the boundary of the pool 125 feet; 13 extend it 200 feet; one extends it 250 feet.

Some municipalities define vernal pool to include the 100-foot habitat (around the waterline), and then grant a 100 foot buffer around the vernal pool, giving the conservation

commission 200 feet of jurisdiction from the pool's waterline. For example, Sharon's Wetlands Protection Bylaw (Section 2) defines vernal pool: "2.7 The term 'vernal pool' shall mean a naturally occurring, confined basin depression . . . as well as the area within one hundred (100) feet of the mean annual boundary of such depression." The Sharon bylaw defines buffer zone: "2.3 The term 'buffer zone' shall be the land within one hundred (100) feet horizontally landward from the perimeter of outer border of any wetland, floodplain, vernal pool or body of water." The Sharon conservation agent confirmed that the commission's jurisdiction stretches 200 feet from the waterline.

In practice, some conservation commissions enforcing bylaws that contain this language extend the buffer zone only 100 feet from the waterline of a vernal pool. Twenty-nine municipalities fall into the category that their jurisdiction could be interpreted to extend more than 100 feet from the waterline of the vernal pool. Only about half of those actually enforce more than 100 feet. For example, Stoneham's bylaw (adopted 2004) includes in the definition of vernal pool: "The boundary of the resource area for vernal pools shall be 100 feet outward from the mean annual high water line defining the depression, but shall not include existing lawns, gardens, landscaped or developed areas." The bylaw grants a buffer of 100 feet around the resource areas. Blake Allison, Stoneham Conservation Chair, wrote in an email (11/19/04): "Our bylaw states that 'the boundary of the resource area for vernal pools shall be 100 feet outward from the mean annual high water line defining the depression.' I take that to mean we do not claim an additional 100 feet of buffer zone beyond the original 100 feet."

While some of the bylaws/ordinances/regulations are vague about the width of buffer zone jurisdiction, a few of them are explicit about the width from the waterline. For example, Manchester-by-the-Sea's Wetlands Bylaw Regulations (amended 2002) state in Section 2.15: "The buffer zone to a vernal pool resource area shall mean that area extending outward 100 feet horizontally from the mean annual boundary of the resource area (200 feet from the mean annual boundary of the pool)." Marblehead has the same language.

Others make no distinction between the habitat and buffer zone. For example, Scituate's Wetlands Protection Rules and Regulations, Section 10.04, read: "Buffer Zone: Area of land within 100 feet of a resource area, except in the case of vernal pools, where the buffer zone shall be 250 feet."

Delay of Wetlands Delineation

The state wetlands regulations state in Section 10.05 (Procedures): "Within 21 days after the date of receipt of the Request for a Determination of Applicability, the conservation commission shall issue a Determination of Applicability, Form 2." If the conservation commission fails to make the determination in 21 days, the applicant may, within ten days, request determination by the state, which shall issue determination within 35 days. The state regulations state that "upon a negative Determination of Applicability by a conservation commission or upon failure of a conservation commission to act within the 21 day time period, and where the Department has been requested to issue a Superseding Determination of Applicability but has failed to do so within 35 days, work may proceed at the owner's risk upon notice to the Department and to the conservation commission."

Of the 131 wetlands bylaws/ordinances or regulations, 105 include language that gives the conservation commission the right to delay delineation of resource area or postpone hearings.

A few local bylaws/ordinances (Boxford, Groveland, Topsfield, and Wayland) explicitly state that wetland boundary delineations can be reviewed only during non-winter months. Groveland's, for example, states (Regulations, X.3): "Wetland boundary delineations shall be reviewed only between April 1 and December 1 of each year, unless the Commission grants a waiver on a particular site due to the low probability of error." Boxford allows delineations on the same calendar. Topsfield allows them between April 15 and October 1 of each year. Wayland's Wetlands Rules and Regulations (adopted 2004) state: "Resource Area Delineations: Applications for Notice of Resource Area Delineation (ANRAD) are encouraged to be submitted between the months of May and October and shall not be finalized between the months of November through April of any given year."

A few more municipalities (Dedham, Harvard, Holbrook and Peabody, and Douglas by policy) explicitly allow delays of delineations and hearings due to snow, frozen ground or other seasonal issues. Peabody Wetlands and Rivers Protection Regulations, Section 32-18, Continuation of Public Hearing, states: "when there is snow on the ground and/or the ground is frozen the Commission may continue a hearing until the snow melts and/or the ground thaws if it determines that accurate wetland delineation is not possible otherwise." The Rules and Regulations for the Administration of Harvard's Wetlands Bylaw, Section III (B), state: "In the event that the Commission determines that snow cover, ice or other weather conditions prevent the verification of the wetland line, the Commission shall continue the hearing to a date certain when the Determination can be made. In the case that the Applicant object[s] to a continuance or delay the hearing shall be closed and the Commission shall take action on the information available."

Town of Holbrook Wetlands Protection By-Laws, Section 6, state: "The Commission shall have the authority to continue the hearing to a date certain announced at the hearing, for reasons stated at the hearings, which may include receipt of additional information offered by the applicant and others deemed necessary by the Commission in its discretion, or comments and recommendations of the boards and officials listed in Section 9: If the land is snow covered or frozen on the date of a scheduled inspection to an extent which, in the judgment of the Commission prevents adequate inspection, the action required by the Commission may be postponed until such time as the ground is free of snow and thawed and new inspection(s) can be scheduled and completed. In the event the applicant objects to a continuance or postponement, the hearing shall be closed and the Commission shall take action on such information as is available."

The Holbrook conservation agent (8/25/04) explained why the language was added to the bylaw: "We were out there in the snow up to the hips, and we would go out to try to delineate wetlands. When you hear ice cracking under your feet you know you have to come back in the spring. Is it a puddle or is it a stream?"

In addition to the regulations that specifically allow seasonal delays, most bylaws/ordinances/regulations include a clause that gives the commission the right to continue a hearing to another date if additional information, in general, is required. Most specify that if an applicant objects to the postponement, the hearing shall be closed and the commission will act on information available.

Kristan Tarricone, Danvers Planner, wrote in an e-mail on 6/10/04 in response to the question “Does the wetlands bylaw/ordinance give the conservation commission the right to delay certification of wetlands during dry seasons, droughts or winter months?”: “Section 1.05 (4) (b) give the Commission the right to continue a public hearing for the purposes of acquiring new or additional information. It does not specifically state that they may continue in a drought or during winter months. My experience here has shown that an applicant would rather wait out the winter to verify a VP [vernal pool] than push the Commission to make a decision without adequate information because the applicant may end up with a denial of the Order of Conditions on the basis that the Commission did not have enough information to make an informed decision about the project.”

At least seven conservation commissions (Attleboro, Beverly, Boxborough, Holliston, Hopkinton, Sudbury, and Sutton) use the same language (with only minor changes across towns) in their regulations to state that challenges to the presumption of vernal pool habitat may require postponement of determination until the springtime. (This language is also in the model bylaw on the MACC website.) The City of Attleboro Wetlands Rules and Regulations state: “4.7.4 Timing of Evidence Collection. Many of the indicators of vernal pool habitat are seasonal. For example, certain salamander egg clusters are only found between late March and late May. Wood frog chorusing only occurs between late March and May, and then only at night. Consequently, failure to find evidence of breeding must be tied explicitly to those periods during which the evidence is most likely to be available. Accordingly, in the case of challenges to the presumption of vernal pool habitat the Conservation Commission may require that the determination be postponed until the appropriate time period consistent with the evidence being presented. The Commission may also require its own site visits as necessary to confirm the evidence. It is the Commission’s intent that no applicant will be required to wait longer than 12 months for a vernal pool determination except in periods of Drought, in which case the Commission will make its determination as soon as it is practical or possible.” Other municipalities (Reading, Dover, and Kingston), using different language, also refer to delays for verifying vernal pool habitat (in cases where the presumption of vernal pools is challenged).

A number of conservation agents in communities with regulations that allow the commission to delay commented that (1) they do not have the right to delay, (2) there is no need to delay, or (3) they have never delayed. A couple of municipalities with regulations that include the language for delay (Blackstone and Hanson) marked on surveys that the bylaws do not give the conservation commission the right to delay.

Pepperell’s bylaw makes no reference to delay. The survey received from Pepperell in May 2005 marked: “As a general practice, we delay reviews of delineations when snow cover would make such reviews difficult/impossible. So far, our applicants have not objected.”

No-Disturbance and No-Build Zones

Ninety-nine municipalities create limited-use zones within the buffer zone adjacent to the wetlands. The state regulations do not establish limited use zones. Most municipalities

require a setback from the wetland of undisturbed natural vegetation, often called a zone of “no disturbance,” “no alteration,” “no cut” or “no work.” Beyond the zone of no disturbance (or instead of it), there is often a “no build” zone where construction of structures is prohibited, but other activities are allowed, including clearing and paving. Several municipalities create concentric zones or several setbacks that vary according to (1) proposed activity (alteration of vegetation, pavement, porches, and dwellings), (2) use types (single-family, multi-family, and commercial), (3) type of wetland (vegetated wetlands, isolated land subject to flooding, vernal pools), (4) site characteristics (groundwater protection overlay, steep land, ground cover, or mapped habitat for endangered species), or (5) existing versus new lots.

The length of the setbacks varies. Acton has a 50-foot no-disturbance zone, a 75-foot no-build zone, a 50-foot chemical-free area and a 100-foot zone of no disturbance for vernal pools. Seekonk has a 25-foot no-disturbance zone and a 50-foot no build zone. Hingham does not allow living quarters within 50 feet, accessory structures with 35 feet, driveways within 25 feet, clear-cutting within 20 feet. Plymouth has a 50-foot no-disturb zone where areas are mapped with endangered species, and 25-foot no-disturb zone elsewhere. In Sharon, the no-build zone is 100 feet for all resource areas; the no-disturb zone is 25–50 feet wide in previously developed areas, 50 feet for previously undisturbed land, and 75 feet for areas with critical wildlife, fish or plant habitat, resources located within a Water Resource Protection Overlay Zone, Zone II, or an Area of Critical Environmental Concern, and land with slope greater than 15%.

Many municipalities enforce limited use zones as a matter of policy, and do not establish the requirements in the bylaw/ordinance or regulations. Conservation representatives at Bridgewater (a policy of 25-foot no disturbance), Burlington (a policy of 20-foot no disturbance), and Framingham (a policy of 30-foot no disturbance) said that they aim to make the setbacks official by adding them to the bylaws or regulations. Carlisle’s conservation agent described an informal policy of negotiation with the aim of keeping foundations 25 feet from the wetland. Douglas has a written policy of 50-foot no disturbance. Freetown has a policy of 20-foot no disturbance.

Several municipalities that have no wetlands bylaw or ordinance also enforce policies of limited use zones. Weston’s website states: “The Town of Weston does not have a Town Bylaw, but the Weston Conservation Commission does have a policy stating that no work may be performed within 25 feet of the edge of a resource subject to protection under the Massachusetts Wetlands Protection Act.” Norton has a written policy posted with the Town Clerk: “1. At least a 25-foot ‘No Disturbance Zone’ will be required for all projects. The 25-foot area shall not be cleared, grubbed, or made into lawn; it shall be left in its natural state. The 25-foot no-disturbance zone requirements shall be met for the entire length of the approved wetland boundary. The Commission may grant relief from portions of the 25-foot No Disturbance Zone requirement if there are significant attempts made to meet the requirement and a clear showing that the requirement cannot be met. Posted with the Town Clerk May 30, 2001.” Hopedale and Northbridge have 25-foot setbacks. Raynham’s written policy is 25 feet. Uxbridge’s written policy is a 25-foot setback. Wakefield has an informal policy of 25 feet. Wilmington noted on the survey: “Town policy is a 15’ natural vegetated buffer strip and a 25’ strip with no structures. DEP generally overrules the Town’s decision in an appeal process.” (This list is not exhaustive.)

Of the 88 municipalities in the sample that either (1) do not explicitly list the limited use requirement in the bylaw/ordinance/regulations or (2) have no wetlands bylaw or ordinance, at least seventeen municipalities (or 19%) have limited use policies. Researchers noted these policies when found, but did not seek them systematically. Many more municipalities are likely to have such policies.

Some municipalities describe the limited-use requirements in the zoning bylaw/ordinance.

At least sixteen municipalities restrict development over a longer distance from vernal pools than from other wetlands. At least twelve prohibit alteration in zones of at least 100 feet from vernal pools. Acton, Beverly, Boxborough, Boxford, Kingston, Marblehead, Marshfield, Maynard, Natick, and Needham all enforce no-disturb zones of 100 feet from vernal pools. Hopkinton and Scituate enforce 125 feet.

The regulations usually include language about variances, exceptions, or waivers to the setback requirements. Waivers are usually granted where there are no feasible alternatives, mitigation will be undertaken, and the work will involve the least amount of impact possible. Some also note that waivers will be granted if the project is necessary for an overriding public interest, and some make exceptions for access paths.

Local Regulation of Septic Systems

The Commonwealth regulates the siting, construction, inspection, upgrade, and maintenance of on-site subsurface sewage disposal systems (septic systems) through “Title 5”, or 310 CMR 15.000 of The State Environmental Code. The law was adopted in 1978, and underwent extensive revisions in 1995.

Septic systems, which typically consist of an underground septic tank, distribution box, and soil absorption system, treat wastewater flows under 10,000 gallons per day from homes that are not connected to a public sewer. When septic systems are not properly sited or maintained, they can be major contributors to pollution in rivers, coastal waters, groundwater, and surface water.

Title 5 grants local boards of health the authority to enact more stringent regulations (Title 5, Section 15.003 (3)). Fifty-eight percent of the cities and towns (109 of 187) have adopted local septic regulations that may include requirements concerning setbacks from property lines and wetlands, prohibition of shared systems, limits on allowable percolation rates, and specifications about system size. Titles of the local regulations include the following: Subsurface Disposal of Sewage; Subsurface Sanitary Systems; On Site Wastewater Disposal Systems; Supplemental Regulations to Title 5; Supplementary Rules and Regulations to the State Environmental Code Title 5, 310 CMR 15.000; and Standard Requirements for the Siting, Construction, Inspection, Upgrade and Expansion of On Site Sewage Treatment and Disposal Systems.

Thirty-eight municipalities (35% of the 109 with regulations) post the regulations on the municipal website, usually as a link on the page for the board of health.

This study tracked requirements only for new construction, not replacement or upgrading of existing systems.

Thirteen of the 109 municipalities with local septic regulations reported that at least 75% of the existing homes in the municipality are serviced by public sewer: Amesbury, Auburn, Ayer, Beverly, Haverhill, Hopedale, Leominster, Lexington, Natick, Raynham, Rockport, Shrewsbury, and Wellesley (97% on sewer). This study does not have data on the percent of the new homes in these cities/towns that require on-site subsurface sewage disposal.

Of the sampled municipalities, 53 of the 187 have no homes on sewer. Twenty-six are entirely on sewer. Sixty-eight percent of municipalities that have some homes with septic systems (not entirely sewer) have passed local septic regulations (109 out of 161).

Depth to Groundwater

Title 5 requires four feet depth to groundwater if the percolation rate is more than two minutes per inch and five feet if the percolation rate is less than two minutes per inch. Depth to groundwater refers to the minimum vertical separation distance between the stone underlying the soil absorption system and the high groundwater elevation. The purpose of the requirement is to ensure that the effluent percolates through enough soil to be cleansed prior to entering groundwater.

Twenty-seven of the 109 municipalities (25%) amend Title 5's depth to groundwater requirement in some way.

Fifteen require that there be at least five feet for any system, in any location (with some, but not all, requiring six feet under certain circumstances). For example, Berkley: "A five (5) foot separation is required between the bottom of the leaching area and the water table for all systems." (Town of Berkley "Subsurface Disposal," adopted 2003) Or Berlin: "No leaching facility (pit, chamber, trench, galley, or field) shall be constructed in areas where the maximum groundwater elevation is less than 5 feet below the bottom of the facility." (Town of Berlin Board of Health Regulations, Sub-Surface Disposal Regulations, adopted 1996) Or Duxbury: "(1) The minimum vertical distance from the bottom of the stone underlying the soil absorption system to the maximum high groundwater elevation shall be: (a) five (5) feet in soils with a recorded percolation rate of more than two (2) minutes per inch; (b) six (6) feet in soils with a recorded percolation rate of two (2) minutes or less per inch." (Town of Duxbury, Supplementary Rules and Regulations to the State Environmental Code, Section 1.11, effective 2000.)

While Title 5 requires only four or five feet of separation, fourteen municipalities require that there be six feet depth to groundwater in some circumstances, often where percolation rates are faster than two minutes per inch or in groundwater/aquifer/watershed overlay protection districts (Duxbury, as mentioned above). Those municipalities requiring six feet in some circumstances require either four or five feet as the standard in other circumstances. Sudbury: "Section VIII. Installation in Aquifer Protection Areas. If a subsurface disposal system is to be installed in a Zone II aquifer protection area, the distance from the bottom of the leaching facility to the high groundwater must be six (6) feet." (Sudbury Rules & Regulations Governing the Subsurface Disposal of Sewage, adopted 1984, amended 1998.)

Seven municipalities require at least five or six feet in groundwater protection districts. For example, Townsend in its Amendment 11.4 Maximum Groundwater Elevation states that "the minimum vertical separation distance of the bottom of the stone underlying the soil absorption system above the high ground-water elevation shall be: a) four feet outside the aquifer overlay district b) five feet inside the aquifer overlay district." (Townsend Board of Health Sub Surface Sewage Disposal Regulations, adopted 2004)

Other variations from Title 5 include Halifax and Lunenburg. Halifax requires five feet of separation in soils with percolation rates between 31 and 60 minutes per inch. Lunenburg's minimum separation depends on when the soil evaluation was completed: five feet when the test is taken from March 1–April 30 and six feet during May and February.

Design Flow

Title 5 requires that septic systems for single-family houses be designed to accommodate a minimum flow of 330 gallons per day—or 110 gallons per bedroom per day for a three-bedroom house. Title 5 requires that unless a house is deed restricted to two bedrooms, the system must be designed to serve at least three bedrooms.

There are a few mechanisms that municipalities can use to require a greater minimum design flow than the state does: (1) changing bedroom definitions, (2) increasing design flow per bedroom per day, (3) listing an increased minimum design flow for single-family houses. Thirty-six municipalities (33% of municipalities with septic regulations) make at least one of these changes.

Gallons per Bedroom per Day

Twenty-one municipalities require systems to be designed for flows greater than 110 gallons per bedroom per day. Eleven require 150 gallons per bedroom per day. Eight require 165 gallons per bedroom per day. One requires 200 gallons per bedroom per day, and another 137.5 gallons per bedroom per day (or a 25% increase over Title 5).

Title 5 requires that septic systems serving houses with garbage disposals be designed for a flow of 165 gallons per bedroom per day (110 without garbage disposal). Many of the local regulations state that systems should be designed for the increased flow (165 gallons per bedroom per day) whether or not garbage disposals are installed. For example, the Georgetown regulations state: “All new septic systems shall be designed to include garbage disposal systems. Therefore, the sewage (flow design rate) for residential dwellings shall be at least one hundred sixty-five (165) gallons per bedroom per day. This supersedes 310 CMR 15.02 (13) (Title V).” (Georgetown Bylaws Chapter 462, Sewage Disposal, Section 8 B, adopted 1974, amended 1999) The Weston regulations state: “Garbage grinders are inherently destructive to soil absorption systems. Consequently, the use of garbage grinders is discouraged. However, all residential sewage disposal systems shall be designed for an increase of 150% more than that required by Title V. This increase is to prolong the life of a septic system in the event that a garbage grinder is used or installed in the future.” (CHAPTER VI of the Weston Board of Health Regulations—SEWAGE DISPOSAL SYSTEMS, Section 2.4, adopted 2001, amended 2002)

Eleven regulations mandate that systems be designed for 150 gallons per bedroom per day. For example, Ipswich: “Septic system design flows for dwellings shall be based on a flow rate of 150 gallons per day per bedroom for a design of three bedrooms or more. . . . Variances will not be granted for new construction.” (Ipswich Supplements to Title 5, Section 2.2, adopted 2002) Also Rowley: “Designs for a sanitary sewerage disposal area based on a minimum flow of 150 gallons per day per bedroom for single and multiple residences.” (Town of Rowley Regulations in Addition to Title 5 and Relating to Private Water Supplies and Wastewater, Section 3.1.s, adopted 2002)

Topsfield requires that designs be based on 200 gallons per bedroom: “The determination of a minimum daily sewage flow to be used for design of systems for residential or boarding and lodging house use shall be calculated at the rate of one-hundred

(100) gallons per person, with a minimum calculation of two (2) persons for each bedroom. Rooms, other than living room, dining room, bathroom and kitchen may be considered as bedrooms for computing septic system size.” (Topsfield Board of Health, Supplemental Regulations to 310 CMR, 15.00 Title 5 of the State Environmental Code, Section 8a, effective 1987) Rehoboth requires a 25% increase in design flow, unless the housing is deed- restricted to residents who are 55 years or older.

Some municipalities vary the flow requirement depending on certain factors. For example, Carlisle requires a design flow of 165 gallons per bedroom per day, but in lots that are less than one acre, 110 is allowed with a deed restriction that garbage disposals cannot be installed. Ipswich requires 150 gallons per bedroom per day for three or more bedrooms, but only 110 for houses with only one or two bedrooms.

Hingham follows Title 5 by requiring 110 gallons per bedroom per day, but it also caps its design flow level based on lot area: “8. No Sewage Disposal System (SDS) serving new construction or Expansion of Use shall be designed to discharge more than 110 gallons of design flow per day per 12,500 sq. ft. in Lot area.” (Section VI. Board of Health Supplementary Rules and Regulations for the Disposal of Sanitary Sewage) The Hingham Executive Health Officer (6/22/04) explained that “dilution is the solution to pollution.”

Bedroom Count

Title 5 requires that septic systems serving single-family homes be designed for at least 2 bedrooms if the house is deed restricted and 3 bedrooms otherwise. Title 5 definition of bedroom: “A room providing privacy, intended primarily for sleeping and consisting of the following: floor space of no less than 70 square feet; for new construction, a ceiling height of no less than 7’3”; for existing houses and for mobile homes, a ceiling height of no less than 7’0”; an electrical service and ventilation; and at least one window. Living rooms, dining rooms, kitchens, halls, bathrooms, unfinished cellars and unheated storage areas over garages are not considered bedrooms. Single-family dwellings shall be presumed to have at least three bedrooms. Where the total number of rooms for single-family dwellings exceeds eight, not including bathrooms, hallways, unfinished cellars and unheated storage areas, the number of bedrooms presumed shall be calculated by dividing the total number of rooms by two then rounding down to the next lowest whole number.”

Fourteen municipalities count bedrooms in a way that differs from Title 5. Since design flow is calculated according to the number of bedrooms, these municipalities require greater design flows than Title 5 in some cases.

While Title 5 requires that design be based on a minimum of three bedrooms, four municipalities (Middleton, North Andover, Plympton, and Wilmington) base design flow on a minimum of four bedrooms. Health agents in Middleton and Wilmington marked on surveys that they count bedrooms in the same way as Title 5 prescribes; since they use a four-bedroom minimum for design flow, this study counted them as different from Title 5. Middleton’s regulations state: “Wastewater Disposal Systems for new construction shall be designed to accommodate a minimum of four bedrooms.” They also state: “The number of bedrooms shall be calculated in accordance with the State

Sanitary Code 310 CMR 15.00.” (Town of Middleton Rules and Regulations for On-Site Wastewater Disposal Systems, Section 3.01 b and c, revised 2000)

Examples of changes in the definition of bedrooms include:

1. All rooms except for living rooms, kitchens and bathrooms count as bedrooms (Auburn, Duxbury, Sharon, Sterling, Topsfield and Tyngsboro);
2. Rooms in excess of a certain square footage count as two rooms (for Littleton 300 square feet, for Medfield 460 square feet, and for Sherborn 450 square feet);
3. Calculation of bedrooms is based on division of the number of rooms by two and rounding up, instead of down (Littleton);
4. Calculation of bedrooms is based also on total contiguous buildable area on the lot (Manchester-by-the-Sea); and
5. All rooms above the first floor are counted as bedrooms in houses with fewer than eight rooms (Medfield).

Tyngsboro’s regulations read: “All living space is to be considered bedrooms with the exception of one living room, one kitchen, one attached (Addition) family or great room, and all bathrooms. All other rooms shall be considered as bedrooms for design purposes.” (Town of Tyngsborough’s Supplemental Regulations to Title 5, 3.2 L, adopted 1998) Sterling’s regulations read: “A bedroom means any portion of a dwelling which is so designed as to furnish the minimum isolation necessary for use as a sleeping area. Such area shall not include kitchen, bathrooms, living room, dining area, halls or unfinished cellar; but may include bedroom, den, study, studios or sleeping loft. A deed restriction may not be used to reduce the number of bedrooms.” (Sterling Board of Health, Section 3, adopted 1995)

Manchester-by-the-Sea includes the following for counting bedrooms: “Where the: [a] total number of rooms for a single-family dwelling and its appurtenant habitable structure(s), excluding bathrooms(s), hallways(s), unfurnished cellar and unheated storage area, exceeds eight [8]; or [b] total square footage for a single-family dwelling and its appurtenant habitable structure(s), excluding bathroom(s), hallway(s), unfinished cellar and unheated storage area, exceeds 4,500 square feet, then the total number of bedrooms allowable shall be calculated by taking the lesser of the: [c] total number of rooms divided by two, and rounding down to the next whole number; or [d] total contiguous buildable upland land area divided by 10,000 square feet and rounding down to the next whole number.” (Manchester-By-The-Sea Board of Health, Policies, Procedures and Local Addendum to Title V, Section 3.2)

Deed restrictions to reduce the count of bedrooms are not allowed in Sterling, Grafton, Millis, Lunenburg, and Ipswich. Billerica will not allow deed restrictions to count fewer than three bedrooms. Grafton’s regulations read: “For lots created after November 1, 2004, soil absorption systems must be designed to accommodate the number of bedrooms in the final house design using Title 5 definition of ‘bedroom’; deed restrictions will not be granted.” (Town of Grafton’s Supplement to Title 5, no. 18, revised 2004) Note that Grafton, Millis, Lunenburg, and Ipswich otherwise did not change the way of counting bedrooms, and therefore are not counted among the 14 municipalities that count bedrooms in a different way from Title 5.

Design Flow for Single-Family Homes

Twenty-eight municipalities require minimum flow for a single-family house to be greater than 330 gallons per day (Title 5's requirement). Six require 440 gallons per day. Eleven require 450 gallons per day. Eight require 495 gallons per day.

A few of the regulations specify the minimum flow for a single-family dwelling. For example, Billerica: "All subsurface sewage disposal systems for new construction of single-family dwellings shall be designed to accept a minimum flow of four hundred forty (440) gallons of effluent per day." (Billerica Board of Health Rules & Regulations, Section 5.3.007, adopted 2000) Also Marshfield: "All sewage flows shall be determined by SEC Title 5 except that the estimated total flow for any residence, apartment, cottage, rooming house, motel, or boarding house will be a minimum of 400 gallons per day." (Marshfield Rules and Regulations for the Disposal of Sanitary Sewage, Section 2.13, adopted 1978, amended 2000). Since the Marshfield regulations make no change to design flow in gallons per bedroom per day, a four-bedroom house, for example, would require a system that can handle 440 gallons per day.

If the regulations do not state a minimum flow for the house, then the flow is determined by multiplying the minimum number of bedrooms that the regulations specify (three or four) by the design flow requirement in gallons per bedroom per day. For example, if the regulation states that systems serving single-family dwellings shall be designed for a minimum of four bedrooms, and there is no change in the design flow, then the design flow is 440 gallons per day. If the regulations require a design flow of 150 gallons/bedroom/day and the regulations make no change in the minimum count of bedrooms, then the minimum flow is 450 gallons per day.

Percolation Rates

Title 5 requires a maximum percolation rate of 60 minutes per inch for septic system installation. Percolation rate is the time it takes one inch of water to drain from a hole dug at the site of a proposed septic system. If the soil in the disposal area is impermeable, the effluent will not percolate effectively through the soil, and a pond of inadequately filtered effluent will remain in the yard.

Twenty-seven municipalities (25% of those with regulations) set the maximum percolation rate at 20, 25, or 30 minutes per inch. Thirteen require 30 minutes per inch. Twelve require twenty minutes per inch. Two require 25 minutes per inch.

Berlin's regulations state: "Maximum percolation rate shall be 30 minutes per inch." (Berlin Board of Health Regulations, Sub-surface Disposal Regulations, Section IV, D, adopted 1996) Chelmsford's regulations state: "Cutoff rate on percolation tests is 25 minutes per inch (all uses)." (Town of Chelmsford General Provisions, Chapter 200, Article VI, Board of Health, Subsurface Sewage and Wastewater Disposal, Groundwater Protection, Section 201-24E, amended 1995) Harvard's state: "Percolation tests: twenty-minute limit per inch, allowing a variance up to 30 minutes per inch." (Harvard Board of Health Regulations, Article 1, 145-1 D, adopted 1974, amended 1987) Mansfield's state: "Soil with a percolation rate greater than 20 minutes per inch shall be considered

unsuitable for the construction and use of a subsurface disposal system.” (Mansfield Board of Health Requirements for the Subsurface Disposal of Sanitary Sewage, Section 8, adopted 2002)

Setbacks of Soil Absorption Systems

■ Title 5 establishes minimum setbacks between soil absorption systems and a range of items including the property line, slab foundation, surface waters, and downhill slopes.

From the Property Line

Title 5’s setback between the soil absorption system and the property line is 10 feet. Twenty-two municipalities increase the minimum setback requirements—to 15, 20, 25, or 30 feet. Two require 15 feet; 14 require 20 feet; four require 25 feet; and two require 30 feet (Plympton and Rowley).

Boxborough’s regulations state: “No part of a septic system shall be constructed within 20 ft. of any property line.” (Town of Boxborough Subsurface Disposal of Sewage Regulations, Section 6.5, adopted 2000) Boylston’s regulations state: “Offsets to property lot lines for the soil absorption system (SAS) for new construction shall be a minimum of 25 feet from the front property line and 20 feet from all other property lines.” (Town of Boylston Massachusetts Board of Health Rules and Regulations, Section II, 10, amended 2003) Groton’s regulations state: “7.A minimum of twenty (20) feet must be available between any property line and the entire exterior perimeter of any proposed leach areas. 8.The distances required by Title 5 and the Groton Board of Health are minimum distances and may be increased if, in the opinion of the Board or its agent, such an increase is required to protect the environment or the public health.” (Town of Groton Sewage Disposal Requirements, Section 1E, adopted 2001, amended 2003)

From Wetlands

Title 5 requires a 50-foot setback between soil absorption systems and wetlands. At least 61 municipalities require a longer setback for single-family homes. Eleven municipalities require 75 feet; 43 require 100 feet; two require 125 feet; and three require 150 feet. Gloucester requires a 400-foot setback (from wetlands bordering on water supplies and tributaries to water supplies; 100 feet to non-bordering wetlands). These numbers refer to setbacks listed in septic regulations; other municipalities may list setbacks in the wetlands or zoning bylaw/ordinance.

Municipal regulations often increase the setback from wetlands for systems that serve planned unit developments, multi-family housing, or commercial uses; are located in soils with percolation rates faster than 2 or 5 minutes per inch or slower than 30 minutes per inch; or are located in a groundwater protection zone. The 61 municipalities mentioned above do not include these per se; they do include setbacks that are greater than Title 5 for single-family systems from bordering vegetated wetlands, in soil with a percolation rate between 5–30 minutes per inch, not necessarily in an overlay district. Therefore, more

than 61 municipalities make some kind of change to Title 5's mandated setback between soil absorption systems and wetlands.

The Ashland regulations state: "The term 'Wetlands and Waterbodies' shall be the same as that in Title 5. The minimum distance between wetlands and waterbodies and all components of the subsurface disposal system shall be seventy-five (75) feet." (Town of Ashland Board of Health, Rules and Regulations Governing the Subsurface Disposal of Sewage, Section 4.10, adopted 1997) Berlin lists in a table that the setback is 100 feet from water courses, streams, ponds, swamps, and other wetlands, and 150 feet where the percolation rate is 2 min/inch or less. (Berlin Board of Health Regulations, Sub-surface Disposal Regulations, Section IV, F, adopted 1996) Boxford states: "B. The leaching facility or soil absorption system of a subsurface sanitary sewage disposal system shall be set back 100 feet from any wetland resource area. . . . E. No leaching facility in those cases where the percolation rate is less than five minutes per inch shall be installed within 150 feet of a wetland resource area [Amendment effective 3-1-1995]." (Boxford Code, Chapter 201, Subsurface Sanitary Systems, Article V, Section 201-9B,E, effective 1995) Bridgewater states: "No subsurface disposal system for single or two-family dwellings shall be constructed within 75 ft of any wetlands or previously filled wetlands or vegetative wetland area. No subsurface disposal system for commercial, industrial or multiple dwellings containing more than two units shall be constructed within 100 foot of any wetland or previously filled wetlands or vegetative wetland area." (Town of Bridgewater's Wastewater Rules and Regulations, Design Requirements, no.6, adopted 1989) Groveland's regulations state: "All on site surface disposal systems shall be. . . . b) A minimum of 100 feet from a wetland, stream, pond, or lake. c) A minimum of 200 feet from a wetland, stream, pond or lake, when a planned unit development is to be constructed." (Groveland's Rules and Regulations for Sewage Disposal, Section III,10, b-c, adopted 1997)

The Foxborough regulations increase the minimum setback requirement of the leaching area from watercourses, etc. to 150 feet. (Town of Foxborough Board of Health, Septic System Regulations, Section 13.03:(7), undated) On 10/27/04 the Board of Health confirmed that "watercourses, etc." includes any wetlands.

From Private Wells

Title 5 requires a 100-foot setback between soil absorption systems and private wells.

Nineteen municipalities extend this setback for single-family systems to more than 100 feet. Five require 125 feet; nine require 150 feet; two require 200 feet; and one requires 250 feet. Municipalities often base the setback distance on the percolation rate, with longer distances required for percolation rates faster than two or five minutes per inch. They sometimes also reduce setbacks in areas where high groundwater would be five, six or more feet below the leaching facility (or increase setbacks where the depth is only four feet). For the 19 municipalities, the setback is always greater than Title 5's 100 feet, regardless of percolation rate and depth to groundwater. Far more than 19 municipalities amend Title 5's setback from wells in some way.

The local setback requirement is often recorded in the septic regulations, but it can also be mandated through local well regulations (which researchers did not systematically obtain).

Berlin requires a setback of 100 feet between leaching facilities and a "well or suction line." If the percolation rate is faster than two minutes per inch, the setback is 150

feet. Hingham’s regulations state: “6. No Sewage Disposal System or Plant shall be constructed within four hundred (400) feet of a public water supply well or wellfield, as defined in the Massachusetts drinking water regulations, 310 CMR 22.02 or surface water supply as defined herein or within two-hundred and fifty (250) feet of any private potable well or one hundred (100) feet of any private non-potable well or tributary to a Surface Water Supply including surface and subsurface Drain or within one hundred and seventy-five (175) feet of any Protected Water body.” (Town of Hingham Board of Health Supplementary Rules and Regulations for the Disposal of Sanitary Sewage, Section VI)

Norfolk bases the setback distance from private water supply wells on both the percolation rate of the soil as well as the depth to groundwater:

Norfolk's setback requirements from private wells

Percolation Rate	above high groundwater (feet)	Setback from well (feet)
<=5 min/in	4	150
	5	125
	6	100
5-10 min/in	4	125
	5	100
>10 min/in	4	100

(Norfolk Board of Health Regulations for the Siting, Construction, Inspection, Upgrade, Repair, and Expansion of On-Site Wastewater Disposal Systems, Section VII, Part 7, adopted 1997)

Plainville’s regulations have a similar chart:

Plainville's setback requirements from private wells

Percolation Rate	Distance above high groundwater (feet)	Setback from well (feet)
<=2 min/in	5	175+
	6	151-174
	7	126-150
	8	100-125
2-8 min/in	4	75+
	5	151-174
	6	126-150
	7	100-125
8-15 min/in	4	150+
	5	126-149
	6	100-125
>15 min/in	4	125+
	5	100-124

(Plainville Board of Health Regulations for the Siting, Construction, Inspection, Upgrade, Repair, and Expansion of On-Site Wastewater Disposal Systems, Adopted 1996)

Note that Norfolk and Plainville are counted in this study as only requiring a 100-foot setback from private wells.

Leaching Field Size

Soil absorption systems come in various forms, such as leaching trenches and fields. Title 5 has no minimum size requirement for leaching fields. Title 5 states in Section 15.240: “Absorption trenches shall be used whenever possible. When trenches cannot be used because of area limitations, other soil absorption system configurations may be proposed for substitution.” Title 5 establishes requirements for trenches, beds, fields, pits, galleries, and chambers. Trenches have more surface area than beds/fields.

Thirty-three municipalities require a minimum size in square feet for leaching fields. For a three-bedroom house, eight require a field of 600 square feet; two require 750 square feet; ten require 800 square feet; three require 900 square feet; and six require 1,000 square feet.

Some municipalities have a single minimum size requirement—for example, 800 square feet minimum for any leaching field (Amesbury). Some vary the size requirements according to number of bedrooms (Carver), and some according to both number of bedrooms (or design flow) and percolation rate (Shirley). Four municipalities prohibit leaching fields (Lincoln, Medfield, Norfolk, and Wrentham).

Amesbury’s regulations state: “The leaching area must be a minimum of 800 square feet, with a reserve area of equal size for new construction.” (Amesbury Title V Septic Regulations Amendments, Amendment 5, amended 2003) Carver’s regulations state: “The minimum leaching area for all leaching trenches, infiltrators, galleys, fields and chambers shall be 750 sq. ft. for up to and including a four (4) bedroom home. Then consequently 1,000 sq. ft. for a five (5) bedroom home, 1,250 sq. ft. for a six (6) bedroom home, 1,500 sq. ft. for a seven (7) bedroom home, and so on, adding 250 square feet for each bedroom.” (Carver Board of Health Title 5 Supplemental Regulations)

Shirley bases the minimum size of the leaching field on the number of bedrooms and the results of percolation tests.

From a table titled “Required Square Footage of Effective Leaching Area”:

Shirley's requirements for the size of leaching fields

Bedrooms	Minimum perc rate (min./in.)	Bed (sq. ft.)
2–4	0–5	600
	6–13	1000
	14–20	1500
5–6	0–5	1200
	6–13	1440
	14–20	1700
6+	20	400 per bedroom

(Shirley Board of Health Regulations for Sewage Disposal, 10.1, adopted 1984, amended 1995)

Shared Systems

According to Title 5, a shared system serves more than one facility or more than one dwelling on a single facility. Title 5 does not define a system serving condominium units on the same facility as a shared system. Condominium owners with a “common system” may share a leaching facility, and will either jointly or individually own and maintain the septic tanks. Title 5 allows shared and condominium/common systems, although it places on these systems more restrictions than on conventional systems.

Twenty-one municipalities (19% of those with regulations) prohibit shared systems. Many of those municipalities require that systems be located on the same lot as the dwelling it serves, which would prohibit shared but not condominium systems. At least five regulations state explicitly that shared systems are prohibited—which might implicitly mean that the municipality in practice also prohibits condominium/common systems, if the municipality, as a policy, uses a broader definition of shared systems than Title 5 grants. Two municipalities (Haverhill and Medfield) prohibit “systems that serve multiple units” (which would include condominium systems).

Holliston, Medfield, Norfolk, Plainville, and Wrentham all include the following language in their health regulations: “Except for upgrades for ‘failed’ systems, construction or use of shared systems are prohibited until, in the opinion of the Board of Health, sufficient financial and management safeguards are available to assure the protection of the public health, safety, and environment of the Town.”

Haverhill’s regulations state: “All condo/duplex housing which is built within the city of Haverhill, and is to be served by a private sewage disposal system, must provide separate septic for each dwelling unit. Each system must meet all of the requirements of Title V of the Massachusetts State Environmental Code.” (Regulation passed 1990) Medfield’s regulations state: “6. On-Site Wastewater System Limitations: The use of an on-site sewage disposal system by more than one property or more than one single dwelling is prohibited, except for upgrades of failed systems in situations where it is deemed the preferable solution by the Board of Health.” (Medfield BOH OSDS Regulations, Section IV. General Regulations, adopted 1995)

Many municipalities allow shared systems but place added restrictions on them. Berlin, Bolton, Lancaster, and Littleton all use the same language to allow shared systems: “Shared systems will only be approved if each individual lot proposed to use such systems can support a subsurface sewage disposal system which can meet the requirements of Title 5 and local regulations without variance. The area proposed which could support a subsurface sewage disposal system on each lot shall not be used for any other purpose. The Board may require financial and legal guarantees to insure system inspection, maintenance, repair, and replacement will occur without delay or expense to the Town.”

Carlisle has one of the most detailed regulations on shared and condominium systems. Applicants must provide an insurance policy, bond, or financial instrument to guarantee long term operation and maintenance of the system—with a value no less than the current replacement cost of the system. The land in which the system is located must be permanently set aside by deed as commonly owned land. Maximum flow is limited to 5,000 gallons per day. Design flow is based on 165 gallons per bedroom per

day. Garbage grinders are prohibited in all units. The septic system must be pumped annually. Water meters must be installed in each unit and a report must be filed with the board of health each year on the water meter readings. The homeowners association must appoint a liaison to the board of health. The liaison must submit an annual report on the sewage disposal system, including information on pumping, inspection, updated replacement costs, copy of the insurance policy/bond/financial instrument and annual water usage per dwelling unit. (Town of Carlisle Supplementary Regulations for Sewage Disposal Systems, Section 15.290-15.293, adopted 1983, amended 1998)

Norton and Plympton also require the establishment of a fund available for repairs or system replacement. Norton's regulations read: "The applicant shall establish a fund to be reserved specifically for repairs to and/or replacement of the communal sewerage system and the subsurface disposal system. . . . The sum of the initial payments shall total one hundred fifty percent of the certified constructions cost of the communal system." (Norton Rules and Regulations of the Board of Health, Section 3.16 L, revised 2002) Plympton has similar requirements: "Shared Systems(6) The Town of Plympton shall hold a sum of money equivalent to the total of all planning and construction costs of the proposed shared system, but in no case less than \$30,000, in escrow for a minimum of 20 years. This money will be used to resolve any problems as deemed by the Board of Health. Any owner or owners who use the shared system may request after the 20-year period that any funds in this account be dispersed equally among the owners of record that use the shared system." (Plympton Board of Health Title 5 Amendments, Section 15.290)

Pembroke allows shared leaching facilities, but requires that each dwelling unit have its own septic tank: "Each individual unit must have their own 1500 gallon septic tank with Zebel Filter or equal, and distribution box, although they may share a common leaching area." (Pembroke Subsurface Sanitary Sewage Disposal Supplementary Rules and Regulations to State Environmental Code Title 5, Section 15.290.2g, adopted 1995)

For a few municipalities, the information shared by health agents on the surveys or through phone interviews differed from the language of the regulations. For example, the survey received from Dover (May 2005) read that shared systems are prohibited, but the regulations appear to allow them with limitations: "The Board of Health may establish any special conditions necessary to ensure adequate protection of public health and safety and the environment and to ensure appropriate evaluation and testing. Such conditions may include, without limitation: specification of site of effluent characteristics; flow limitations; monitoring; testing; and reporting requirements; a requirement that a certified operator operate the system; or financial assurance mechanisms. The Board of Health may also specify changes or modifications of requirements otherwise applicable to conventional systems that are appropriate for use of the shared systems." (Code of the Town of Dover, Part II, Chapter 217, Section 217-3.19, updated 2004)

The survey received from Marshfield (May 2005) completed by Peter Falabella, Director of Public Health, read that shared systems are not prohibited. However, the regulations state: "All sewage disposal systems must be located in their entirety on one lot or parcel of land, it being the same lot or parcel on which the facility producing the sewage is located." (Marshfield Rules and Regulations for the Disposal of Sanitary Sewage, Section 2.3, adopted 1978, amended 2000). In response to a follow-up inquiry about this language, the Director of Public Health confirmed in an email (5/25/05): "We do not prohibit shared systems."

Tewksbury’s regulations make no reference to shared systems. The survey received from Tewksbury (March 2005) states that shared systems are prohibited. Barbara Westaway, Operations Assistant to the Tewksbury Board of Health, (5/13/05) confirmed that, as a matter of policy, Tewksbury does not allow shared systems.

Seasonal Prohibitions

System Installation

- Title 5 does not limit the months when a septic system can be installed.

Sixteen municipalities prohibit installation during the winter months. In general, these municipalities allow replacement of failed systems at any time.

Examples include Amesbury and Dover. Amesbury’s regulations state: “Construction of new septic systems or repairs of septic systems will not occur from December 1st to March 1st, unless an existing septic system is in failure and it is a danger to public health and safety.” (Amesbury Title 5 Septic Regulations Amendments, amendment 1, amended 2003) Dover also restricts installation: “Installation of septic systems is prohibited during the months of December, January and February.” (Code of the Town of Dover, Massachusetts, Part II, Chapter 217, Section 217-3.10, updated through 2004)

Percolation Tests

The state does not set restrictions on the times of the year that percolation tests can be conducted. Title 5 states (Section 15.104(6)): “Percolation tests may be performed at any time of the year provided the soil to be tested is below the frozen soil layer.”

A perc-test is conducted by digging a small hole in the area of the proposed septic field, filling it with water for a period of time, and measuring the rate (minutes per inch) at which the water drains from the soaked hole. According to Title 5, soil with a rate slower than 60 minutes per inch is not acceptable for septic system installation. Percolation rates generally have seasonal variation.

Twenty-one municipalities restrict the time of year that percolation tests can be observed. The dates that the tests are allowed vary widely across towns—for example: from December through April; from June through February; from March through May and September through November; or from March through June.

Berkley’s regulations state: “4. The perc season is December 1–April 30. 5. Testing is done Monday through Friday (weather permitting) from 8:00 am–12:00 Noon and 1:00 p.m.–4:00 p.m. if agents are available.” (Subsurface Disposal, Well and Development Regulations, “Procedure to Obtain a Perc Test”, adopted 2003) Canton’s regulations state: “Section 1: Unless otherwise authorized by the Board of Health, percolation tests shall be performed between March 1st and May 30th, and between September 1st and November 30th of each year.” (Canton Board of Health Regulations, Section 2.4 On-site Sewage Disposal Systems, received by fax August 2004) The Grafton regulations state: “Perc testing between December 15th and March 31st will be at the Agent’s discretion based upon weather conditions.” (Town of Grafton’s Supplement to Title 5, “Lot Testing” n. 8, revised 2004)