



Innovative Land Use Planning Techniques

A HANDBOOK FOR SUSTAINABLE DEVELOPMENT

OCTOBER 2008

COMPILED BY

New Hampshire Department of Environmental Services

New Hampshire Association of Regional Planning Commissions

New Hampshire Office of Energy and Planning

New Hampshire Local Government Center

Innovative Land Use Planning Techniques

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October 2008

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INTRODUCTION

With growth comes change. Many New Hampshire communities express in their master plans the desire to grow or to reduce the tax rate while maintaining the community characteristics that distinguish one town from another and that identify with the regional characteristics of New England. Master plans typically call for preservation of rural character, thriving downtowns, and a sustainable working landscape. These quality of life issues depend on a healthy environment and a thriving economy.

Often, land use regulations fail to implement these goals.

The Department of Environmental Services (DES) established the Regional Environmental Planning Program in 1998 to work with the nine regional planning agencies on environmental planning projects. Recognizing the need for more comprehensive guidance on land use planning techniques, DES and the regional planning agencies decided to develop a handbook with model ordinances and guidance on innovative land use regulations authorized in state law. For legal and planning expertise, the New Hampshire Local Government Center and the New Hampshire Office of Energy and Planning were invited to participate on the editorial board.

The authors have written the guide with the New Hampshire Association of Regional Planning Commission's principles for good planning in mind. The planning principles are organized into four general categories:

1. **Prosperity** – that planning for economic development should be fully integrated into the planning process.
2. **Sustainability** – that a central role of planning is to ensure the long term value and sustainability of the environment that maintains choices for future generations.
3. **Livability** – that good planning principles should be applied to local decisions to direct development in ways that maximize public benefit and contribute to the quality of life.
4. **Mobility** – that to have prosperous and livable communities, we must have a transportation system that provides for the safe and efficient movement of people and goods, and livability.

LEGAL AUTHORITY

In 1983, New Hampshire law authorized towns and cities to use innovative land use controls to deal with complex planning issues. While RSA 674:21 listed a number of techniques, little guidance has been available to help planning boards, citizens, and developers figure out how to use them. The law gives municipalities a great deal of power to adopt and administer – and even require – innovative land use controls; we selected the most relevant techniques for this handbook.

Municipal planning boards and staff should be mindful of the legal requirement to have a basis for zoning ordinances in the master plan, as required by RSA 674:18. Some of the techniques recommended in the handbook are best implemented through subdivision and site plan review regulations. State law grants planning boards authority to enact subdivision and site plan review regulations that require innovative land use controls *when supported by the master plan* (RSA 674:36 and 674:44).

When crafting innovative land use controls, municipalities should consider the different ramifications of adopting zoning ordinances versus subdivision and site plan review regulations. Zoning ordinances are adopted by the local legislative body – town meeting in most towns and town council in some towns, and city council, or board of mayor and aldermen in cities – while subdivision and site plan review regulations are adopted by the planning board.

Granting relief from specific requirements also differs substantially between zoning ordinances and subdivision and site plan review regulations.

State law empowers the zoning board of adjustment to grant variances where literal interpretation of the ordinance will result in unnecessary hardship and where certain other criteria are satisfied. For subdivision and site plan review, power to grant waivers is vested in the planning board where strict conformity would pose unnecessary hardship, provided such waiver provisions are included in the planning board's regulations.

An important legal provision applicable to innovative land use controls is that administration of the ordinance, including the granting of conditional or special use permits, can be granted to the planning board, board of selectmen, zoning board of adjustment, or such other person or board as the ordinance may designate. If administration is not vested in the planning board, any proposal submitted under the ordinance or regulation shall be reviewed by the planning board prior to final consideration by the administrator. In such a case, the planning board provides its comments on the proposal in writing and the administrator shall, to the extent that the planning board's comments are not directly incorporated into its decision, set forth its findings and decisions on the planning board's comments.

Another important legal distinction regarding innovative land use controls is that where administration of the ordinance is delegated to the planning board, as is typical, decisions of the planning board cannot be appealed to the zoning board of adjustment, but may be appealed to the superior court (RSA 676:5, III).

PURPOSE AND USE OF THE HANDBOOK

The purpose of the handbook is to offer sound technical advice about innovative land use techniques, including model ordinances and regulations. Municipalities are

encouraged to seek the advice of legal council prior to adopting land use regulations and to contact their regional planning agency for technical assistance.

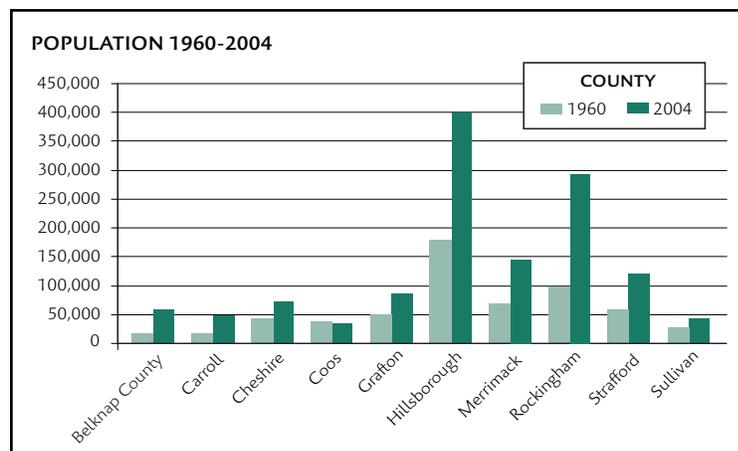
The handbook is intended as a reference manual to which users can turn for information on any topic without having to read through the entire manual. Each chapter is written with the same outline to facilitate ease of use.

The model ordinances and regulations include explanatory notes and provide guidance where planning boards may wish to consider alternatives for regulatory language.

Since planning models are dynamic, it is expected that the model ordinances in this guide will be updated continuously. While the printed version of the guide will not be updated frequently, the most current versions of the models will be available on the DES web site. Please refer to www.des.nh.gov/repp for the most current version of the models.

GROWTH IN NEW HAMPSHIRE

From 1960 to 2004, New Hampshire’s population more than doubled from about 600,000 to over 1.3 million people. Today, New Hampshire grows by about 17,500 new residents and adds about 9,900 new jobs each year. (U.S. Census, OEP, Bartlett)^{1,2} This translates to about 7,100 new households per year, about 14,000 additional vehicles on our roadways, and many new and expanded commercial, industrial, and retail businesses to serve our growing population.^{3,4} New Hampshire’s population is expected to top 1.6 million residents by 2025.



New Hampshire’s population is not only growing – it is spreading out. We are losing our traditional pattern of development of densely developed city and town centers separated by wide, open, undeveloped spaces. In 1960, half of our population was concentrated in our 12 largest cities. In 2003, half of the state’s population was spread between 23 of the largest cities and towns.⁵ From 1990 to 2004, New Hampshire’s smaller communities grew more than twice as fast as the largest cities and towns.⁶ In addition, more development is occurring in the rural areas between the city and town centers. Every year, many more large parcels of land are sub-divided into two and three acre lots for new homes

¹ Annual population growth estimated based on population change from 2000 to 2004. 2000 population data from US Census. 2004 population estimate from 2004 Population Estimates of New Hampshire Cities and Towns, New Hampshire Office of Energy and Planning, July 2005.

² New Hampshire Employment Security, Economic and Labor Market Information Bureau, email from Peter Bartlett, Economist, January 10, 2006.

³ Annual growth in number of households estimated based on change in number of households from 2000 to 2004 from 2004 Household Estimates for New Hampshire Cities and Towns, New Hampshire Office of Energy and Planning, March 2005.

⁴ Number of additional vehicles estimated based on US Census statistic for average number of vehicles per household for New Hampshire.

⁵ Achieving Smart Growth in New Hampshire, New Hampshire Office of State Planning, April 2003.

⁶ From 1990 to 2004, communities that had populations of less than 10,000 in 1990 grew by 23.3%, while the 10 largest cities and towns (with population of greater than 20,000 in 1990) grew by 10.3%, based on population data from US Census for 1990 and 2000 and population estimates from New Hampshire’s Office of Energy and Planning for 2004.

⁷ Community Rules: A New England Guide to Smart Growth Strategies. Conservation Law Foundation and Vermont Forum on Sprawl.

⁸ A Handbook on Sprawl and Smart Growth Choices for Southern New Hampshire Communities, Southern New Hampshire Planning Commission, August 2002.

and more commercial and retail development appears along the major roadways connecting communities.

As a result of the sprawling nature of the new growth and development, New Hampshire is consuming increasing amounts of land for development. In ten case study towns examined in “Managing Growth in New Hampshire: Changes and Challenges” (*Managing Growth*), a report prepared by the then Office of State Planning (OSP) and the Growth Management Advisory Committee in 2000, population grew by 71 percent from 1974 to 1992, while the amount of developed land

increased 137 percent. The results of the *Managing Growth* analysis are confirmed by more recent data from the Natural Resource Conservation Service (NRCS) and Southern New Hampshire Planning Commission. Based on land cover data produced by the NRCS from satellite imagery and data from the U.S. Census, New Hampshire’s population increased by 35 percent from 1980 to 2000, while the amount of developed land statewide increased by about 56 percent.⁷ The Southern New Hampshire Planning Commission found that, in their region, population increased by 25.6 percent from 1986 to 2000, while residential land use increased by 58 percent and commercial land use increased by 76.8 percent.⁸

WHY IS GROWTH AND THE PATTERN OF GROWTH IMPORTANT FOR NEW HAMPSHIRE?

While economic growth and development present opportunities for our state, they also place additional burdens on our communities and our natural resources. Specifically, poorly managed growth leads to the following types of consequences:

- **Economic:** increased costs for road maintenance, infrastructure expansion, public services (such as plowing), and schools, higher public and private automobile maintenance and fuel costs, higher housing costs, and reduced ability to attract new businesses.
- **Environment:** degradation of air and water quality, deforestation and forest fragmentation, increased impervious cover and greater polluted runoff, loss of wildlife habitat, loss of agricultural land, loss of open space, and loss of scenic vistas.
- **Social:** loss of sense of community, increased traffic congestion, disrupted social networks with fewer opportunities to connect with neighbors, loss of intergenerational contact, lack of housing options, lack of transportation options, reduced walkability, lower levels of exercise, loss of time spent on community activities and with families, lower levels of participation in civic life, loss of rural character, and loss of rural culture.

In producing their report on *Managing Growth*, the Office of State Planning compared recent growth trends and land development patterns against the master plans of several towns and concluded that current planning and zoning approaches do not provide the type and pattern of growth and development desired by communities. Techniques to improve the design of new development and curtail the sprawling pattern of recent growth are needed to reduce the potential negative impacts of growth and produce development that is consistent with a community’s vision.

Recent public meetings and surveys have confirmed that many communities want to grow compactly in areas of traditional development that have nearby access to undeveloped lands. The public also wants new approaches to managing growth to reduce the potential negative effects of growth discussed above. The techniques discussed here can help to meet these needs.

This guidance seeks to provide information on several techniques available to communities that wish to redirect future growth in their communities to enhance existing developed areas, create new areas of focused development in appropriate locations, and reduce development pressures on important natural systems and undeveloped lands. There are broader approaches that can be used to redirect development at the community or regional level, such as village development, transit-oriented development, growth boundaries, infill development, transfer of development, and conservation or open space zoning, as well as site-specific approaches that can minimize the impact of developing an individual parcel, such as conservation subdivision design, minimum impact development standards, access management, and comprehensive water resource protection requirements.

These techniques, used as a whole or individually, can help communities grow in a way that is more consistent with their stated vision and more protective of the resources and community character that are so important to every New Hampshire community.

Suggestions for Where to Apply Different Zoning and Regulatory Techniques							
							
	TRANSIT-ORIENTED DEVELOPMENT	URBAN/TOWN DEVELOPMENT	HIGHER DENSITY RESIDENTIAL AREAS	LOWER DENSITY RESIDENTIAL AREAS	RURAL TO WILD AREAS	WILDERNESS AREA	STATEWIDE
Liveable, Walkable Community	✓	✓	✓				Dark Skies Lighting Stormwater Management Energy Efficient Development Erosion and Sediment Control Wetlands Protection Drinking Water Protection Floodplain Zoning
Transfer of Development Rights (receive)		✓	✓				
Growth Boundary			✓				
Landscaping Standards		✓	✓				
Infill Development	✓	✓	✓				
Inclusionary Housing		✓	✓				
Access Management			✓	✓			
Village Plan Alternative				✓	✓		
Conservation Design Subdivision				✓	✓		
Wildlife Habitat Management				✓	✓	✓	
Feature-Based Density				✓	✓	✓	
Steep Slopes and Ridgelines				✓	✓	✓	
Agricultural Incentives					✓		
Lot Size Averaging				✓	✓	✓	
Transfer of Development Rights (send)					✓	✓	

MULTI-DENSITY ZONING



1.1

Density Transfer Credit

BACKGROUND AND PURPOSE

INTRODUCTION

Many, perhaps most, communities in New Hampshire have master plans that advocate protecting natural resources and important conservation lands, preserving open space, saving what is left of their rural character and working landscapes and preventing sprawl. These are core values for most communities. Yet despite the best of intentions, most existing zoning ordinances, no matter how well crafted, will not achieve these goals. On the contrary, communities, especially in southern New Hampshire, who 30 years ago thought they had protected themselves from excessive development by adopting low density development requirements, have found instead that these policies have resulted in a kind of hypersprawl. Density is relatively low (e.g., 1 to 3 acres per unit) but development, especially residential development, is occurring everywhere that land is available and buildable. Such policies, where applied town-wide, have unwittingly encouraged sprawl by spreading development across the landscape and increasing the amount of land “consumed” for each unit of development. Conventional zoning tools as applied in most New Hampshire communities are not designed to prevent development from occurring on land that is physically suitable to support it, even though that may be the community’s objective.

At its essence, zoning is the legal framework used to direct the type, density, and location of land use in a community, but it is limited in its ability to prevent all development from a site. In rapidly growing areas like southern New Hampshire, virtually all buildable land has inherent development value. Since zoning ordinances must permit at least some reasonable economic use of land, which today usually means development of some kind, it is reasonable to expect that so long as our regional economy continues to grow, all developable land that is not protected by easement or purchase will *eventually* be developed.

Under conventional zoning, the only sure way to permanently protect land from development is to acquire it—and increasingly that means **buying** it. Yet it is unrealistic to expect that sufficient public funds will ever be available to acquire all the land in any community that should remain undeveloped.¹ Even if the

RELATED TOOLS

- Conservation Subdivision
- Village Plan Alternative
- Lot Size Averaging
- Steep Slope and Ridgeline Protection

¹ For example, The Land Conservation Plan for Coastal Watersheds (NHEP/NHCP, 2006) identified 190,400 acres (34%) of land in the coastal watersheds that provide essential habitat and/or ecological services and that should not be developed. Less than a quarter of that area is protected today. It is unlikely that much of the balance, some 150,000 acres, will be protected through conventional public or private conservation efforts alone.

funding were available, acquiring large fractions of the remaining developable land would dramatically bid up land prices and cause other harmful consequences. High land prices would worsen housing affordability problems and increase the cost of conservation acquisitions to unsupportable levels.

The concept of **transferring development rights** and the density transfer credit was devised several decades ago as a potential solution to the problem of preventing or discouraging development in places where it is physically feasible, but undesirable for one or more reasons. While it has met with only partial success as a zoning technique, recent variations show promise in overcoming the common barriers that have prevented more widespread use. The model presented here is based on one of those variations.

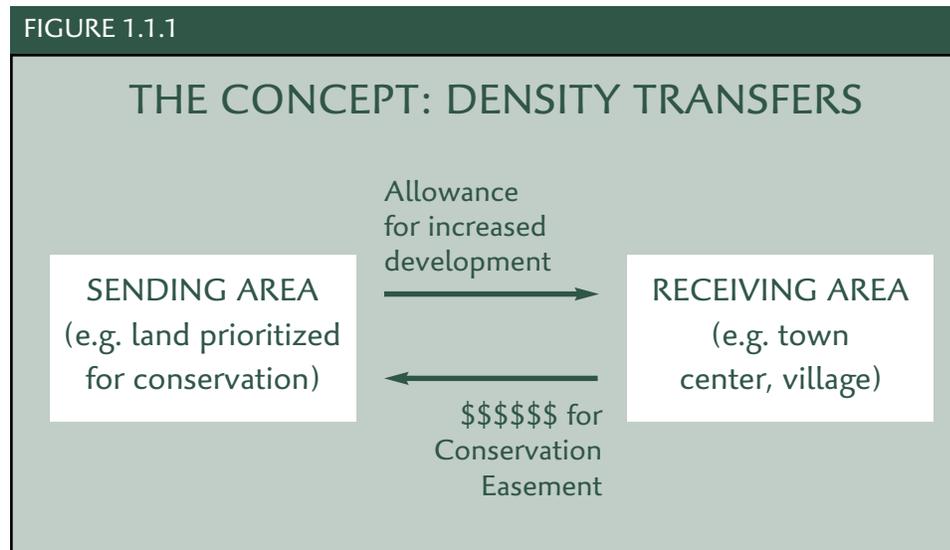
TRANSFER OF DEVELOPMENT RIGHTS EXPLAINED

Simply stated, transfer of development rights (TDR) is a zoning technique used to redirect future development potential from one location to another in a way that is fair and equitable to the landowners involved, and one that supports community development, planning and conservation goals. TDR programs allow for the development value associated with one property to be sold and removed from that property and bought and added to another. In so doing, TDR creates and uses market incentives to stimulate the voluntary redirection of development away from the places a community wants to save and to the places where it wants to grow (Pruetz 2003). It does so without necessitating expenditure of public funds in the acquisition.

TDR programs are not intended to control the *amount* of growth in a community, but rather to direct **where** and at what **density** that growth occurs. In addition, TDR avoids the consequences (and criticism) of bidding up land and housing prices due to scarcity caused by a “conservation only” strategy, because additional development opportunities are created to offset the development rights removed from the areas to be conserved. As more fully explained below, the term **density transfer credits** (DTC) is a specialized and greatly simplified variation of the conventional transfer of development rights concept.

Conventional TDR requires the establishment of **sending** zones or areas and **receiving** zones or areas, and relies on an active real estate market with sufficient growth to stimulate the sale and transfer of development credits. Sending zones are the land areas the community seeks to protect from development, e.g., conservation lands, agricultural lands, water supply protection lands, critical habitat, etc. Receiving zones are the areas where the community wants to grow—such as village or town centers (new or old), special development districts, established residential areas capable of accepting “in-fill” development, etc. Ideally, receiving areas are places with supportive infrastructure already in place (roads, public water and/or sewer), and perhaps close to employment centers and municipal services such as schools, community services and public transportation.

Zoning in the receiving areas is modified with the establishment of a TDR program to allow for an additional development increment or bonus *that can only be accessed by purchasing a development credit from land, or intermediary “bank,” located in the sending*



area. Proceeds from the sale of development credits is used to purchase permanent deed restrictions or conservation easements in the sending area.

While simple enough in concept, conventional TDR programs have proven to be too logistically complex to achieve widespread adoption, especially in smaller communities where arguably they can do the most good. There are at least five important barriers:

1. The pre-designation of sending and receiving zones requires considerable upfront planning and may engender opposition on both ends—by residents in receiving areas who want no additional development in their neighborhoods, and by sending area landowners who perceive that their right to develop will be diminished or hampered.
2. They require the development of a real estate “market” and related mechanisms for the buying and selling of transfer credits.
3. They are considered new and unproven in most areas, and few applicable models and examples exist.
4. They are perceived as viable only in communities that have areas serviced by public sewer and/or water systems.
5. They add complexity to the administration of the subdivision and site plan review process.

In addition to these, a more general challenge is developing sufficient understanding of the local real estate market to “price” development credits correctly so that they are both attractive to developers to buy, i.e., they will be profitable to use, and yet generate sufficient benefits to the community, i.e., funds to buy the offsetting conservation easements. Achieving the right balance will likely require both expert advice and some trial and error. What’s more, the “right” price for density credits will differ from one area of the state to another and by type of development, e.g., multi-family vs. single family.

These challenges are real, but not insurmountable. With close to 50 years of sprawl to draw upon in our collective experience, it can be reasonably asserted that some form of successful development rights transfer will be a necessary component of zoning in any growing community that is serious about protecting a significant portion of its remaining undeveloped land for open space and conservation purposes, while creating a more compact development pattern elsewhere.

HISTORY

The concept of TDR evolved in the mid-1960s and the first transfer of development rights mechanism appeared in the New York City Landmark Preservation Law in 1968. There it was used not as a mechanism to protect open space, but to protect historic landmarks from demolition and redevelopment by allowing their owners the option of transferring unused development density rights to adjacent properties, usually in the form of “air” rights or the ability to build higher, as illustrated in Figure 1.1.2. Since then, nearly 200 TDR programs and variants have been adopted across the country. The most well known and successful TDR programs focused on the preservation of unique or highly valued resources such as in Calvert and Montgomery counties, Md., through which over 50,000 acres of farmland has been preserved to date; the California Coastal Commission TDR program, which focuses on reducing the number of substandard lots in the coastal zone; the New Jersey Pinelands TDR, which has protected over 30,000 acres of pine barrens; and the Tahoe Regional Planning Commission TDR, program which transfers development away from sensitive shoreland (Pruetz, 2003). The most successful and well known TDRs have been regional in scale; however, a number of successful local municipal TDR programs exist as well.

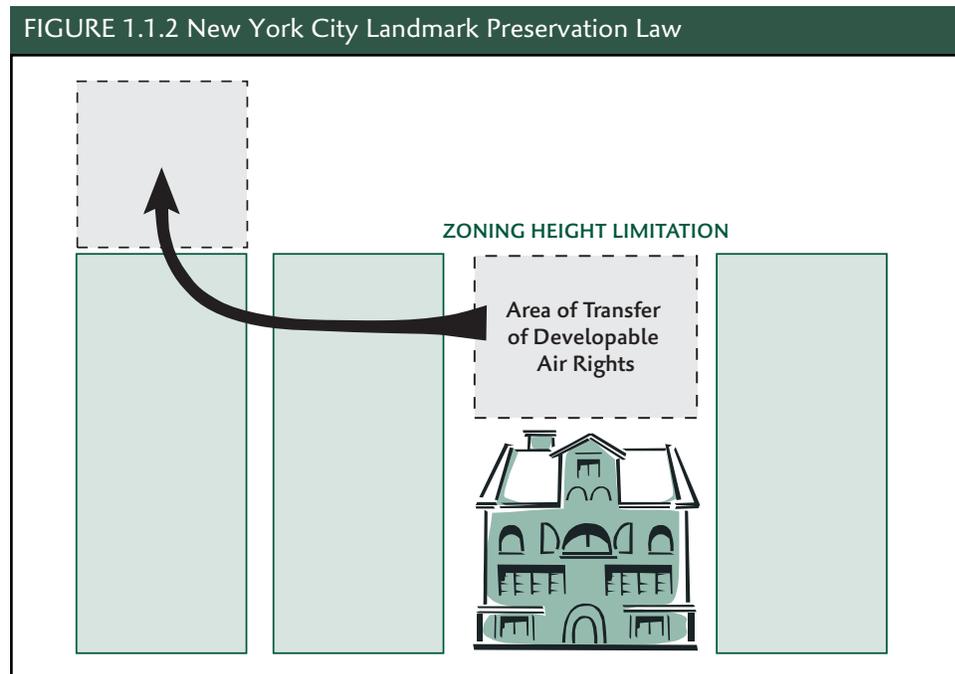
Little Used in New England

Adoption of TDR has been a slow process in New England. This is likely attributed to the barriers listed above, as well as the fact that land use control is retained at the town level, rather than county or regional level, where market and administrative barriers to TDR are harder to overcome. Nationwide, the most successful uses of conventional TDR have been limited to communities, counties, or regions of sufficient size and real estate market activity to allow the relatively free trading of development rights. In smaller markets, such as at a town level, the probability that a developer will find available sending property with which to trade or transfer development rights is low and so the market demand is harder to establish.

Renewed Interest and New Models

Despite the inherent challenges, there has been a renewed interest in density transfer zoning provisions in New England. As of 2002, at least 17 are in place, including five in Massachusetts, three in Vermont, two in Maine, and one in Connecticut, (Pruetz, 2003). At least two communities in New Hampshire (Lee and Dover) have density transfer provisions in their zoning ordinances. Several others are known to be actively working on implementing some form of TDR.

Equally important to this renewed interest is the development of *new simplified approaches* to TDR which overcome or lessen the barriers that have prevented its



widespread adoption in the past. Most notable was the creation in 2000 of a first-of-its-kind TDR program in the town of Berthoud, Colo. (population 4,800) that does not involve identifying fixed “receiving” zones and allows the use of a fee as the density transfer mechanism. This important innovation has lowered the barrier for enacting TDR in smaller communities and is the basis of the model ordinance contained in this guidebook.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

GENERAL APPLICABILITY

Density transfer ordinances are potentially useful in any New Hampshire community that seeks to preserve important natural or cultural resources and has done the necessary planning to support its use. In concept, transfer of development right ordinances or as the newer approaches are more commonly called, “density transfer credit” ordinances, are adaptable to a wide variety of circumstances and objectives. Appropriate circumstances can range from an urban community wishing to preserve historic sites under pressure for redevelopment, to a growing suburban community wishing to displace future highway commercial “strip” development to a more centralized node or downtown area, to a small town seeking to preserve open space while promoting the creation or expansion of a village or town center.

For the purposes of this guidebook, the use of the model density transfer ordinance will consider residential development only and focus on circumstances where land conservation and the creation of higher density neighborhood or village development are the principle objectives. This is the type of application where density transfers have been most commonly and successfully used in the past and where the greatest interest in them in New Hampshire appears to exist. It should be

noted however, that density transfer can also work with commercial and industrial development as well, as have been successfully done in Dover.

ELEMENTS FOR SUCCESS

In the book *Beyond Takings and Givings* the author surveys 142 existing TDR programs and ordinances in use across the country. Of these, only 20 are considered by the author to be highly successful in terms of density transfers achieved; nearly 50 more were moderately successful and the remainder—about half of those surveyed—have not been used successfully at all, even though many have been in place for a decade or more. Given this poor track record it is especially important to focus some attention on the conditions and prerequisites that can yield success (Pruetz, 2003).

Fortunately, the prerequisites for implementing a density transfer credit style ordinance are significantly less than for a conventional TDR program, and more appropriate and workable for smaller New Hampshire communities. Nevertheless, a number of prerequisites do exist. Specifically, a town will need to update its master plan to support the density transfer concept, identify areas appropriate for increased and decreased densities, establish an appropriate value for density credits, setup a non-lapsing local account for the density credit fees, and ensure the administrative capacity and knowledge to properly administer the ordinance. *None of these requirements place the use of density transfers out of reach of the typical New Hampshire community.* Technical assistance may be required to update the master plan and prepare an ordinance, but the administration of the ordinance is no more complex, and probably less so, than most growth management and impact fee ordinances. The remainder of this section explains the prerequisites identified, and how they may be addressed.

1. Master Plan

To successfully use and support a density transfer credit (DTC) program, a community must have (or update accordingly) a master plan that articulates and supports the objective of transferring future development density from areas containing natural resources that should be conserved to areas where additional development can be accommodated. Ideally, the master plan would identify specific sending and receiving zones, but at a minimum, would specify the conditions and criteria that qualify specific types of land suitable for increased or decreased density and identify generally the areas that meet these criteria. To support the DTC form of TDR it is only necessary to generally identify the areas in the community where increased and decreased development density would be appropriate and desirable. It is also important that the master plan articulate the public purposes that will be served by offering the transfer of future development.

2. Identification of Conservation Areas (Sending Areas)

Many communities in New Hampshire that have developed natural resources inventories (NRIs) have already taken the first steps in identifying appropriate areas for reduced development density. NRIs identify areas of the community as having important resource values for purposes such as water supply protection, flood storage, habitat protection and even carbon sequestration. They can serve as a solid foundation for identifying the sending areas of the DTC ordinance. Often these areas will be

synonymous with conservation or resource protection areas identified in conservation and open space plans. A local open space or conservation plan, which may be adopted as part of the master plan, typically identifies parcels or groups of parcels that the community has declared are in its long term interest to conserve. If the town has such a plan, that will be a good starting point for identifying the areas where future development should be avoided, and thus for defining its sending area(s).

In addition to local conservation plans, many towns in New Hampshire have access to larger scale resource inventories and analysis that can be used to identify sending area conservation lands. For example, the state Wildlife Action Plan (WAP) has provided resource co-occurrence mapping for all areas of the state showing the area with high value wildlife habitat (NH Fish and Game 2005). Such areas correlate well with other local resource protection values, such as open space, shoreland, wetland, watershed, floodplain and aquifer protection.

A more detailed regional conservation plan has been developed covering the 42 communities within the coastal watersheds (eastern Rockingham and Strafford counties), which includes extensive resource co-occurrence mapping and identification of 75 “core” and “supporting” conservation areas representing the most important lands and ecological systems to retain for conserving living resources and water quality (The Nature Conservancy 2006). A similar plan exists in the southwest region covering the 27 communities in the Asheulot River Watershed (The Nature Conservancy 2004). In addition, the 26 communities in the NHDOT’s I-93 Community Technical Administrative Program (CTAP), have access to regional scale “natural service network” (NSN) maps prepared by the Jordan Institute and the UNH Center for Complex Systems Research, which show individual and co-occurrences of water supply, flood protection, and agricultural resources.

Any of these resources together with existing local conservation plans and resource analyses can form a good basis for identifying DTC sending areas—where density transfer fees would be used to acquire conservation easements.

3. Identification of Areas Appropriate for Increased Density

Finding locations in a community where increased density is to be permitted may be the most challenging part of implementing a TDR or DTC ordinance. Depending on how much additional development is allowed and what exists to start with, residents in these areas may resist the change, especially if it appears that other parts of the community are benefiting at their expense. Several strategies may be considered; they are not mutually exclusive.

- a. **Density Increase by “Petition” or Permit:** One approach, and the one adopted in the model ordinance included in this chapter, is to allow for an incremental density increase in all residential development zones (except for those identified as sending areas). The increased density would be initiated by a request or petition from a developer during the plan review process and subject to conditional review and approval. With this approach, the additional density is not given by right, but by condition based on circumstances and an established set of criteria and is evaluated on a case by case basis. Thus, the decision about additional density in each zone is not provided “by right” or decided ahead of

time in the zoning ordinance, but deferred to the planning board to be decided in each case. The form of density increase could vary as well. For example, in a downtown or town center district, it may be most appropriate to allow both increased building height and lot coverage as the format for gaining density. In a moderate density residential zone with sewer and water, allowing medium scale multi-family development where none is permitted may be appropriate. In a low density residential area where houses rely on on-site septic systems, a modest density increase—perhaps 30 percent or 50 percent—depending on the starting minimum lot size site conditions, might be appropriate. The “by petition” approach avoids the need to rezone areas as receiving or “upzoned” areas and allows the planning board to control the outcome. It has the disadvantage of placing the burden for these decisions solely on the planning board, and makes for an uncertain outcome for the developer.

- b. **New Town Center or Village Zone:** Another, very different, approach is to create an entirely new district where significantly increased zoning densities are permitted. A clear example of this is establishing a new or expanded town center or village district. This approach has the advantage of tracking the “upzoned” area to one where increased density is essential to the objective of establishing the zone. Disadvantages are that more upfront planning work is required to identify locations for a new zone and to achieve consensus in the community about its designation, especially from existing residents in the proposed district.
- c. **Brownfields Redevelopment:** Brownfields, previously contaminated sites that have potential for remediation and redevelopment, present a natural opportunity for increased density and can further the “win-win” that characterizes brownfields development in general. Even if the new development is non-residential, the added value to the developer from increased density can be captured as a density credit and used in the conservation areas.
- d. **Sewer and Water Districts:** A straight forward approach is to establish increases in existing development density within existing (or planned) sewer and water districts, where higher densities are most easily supported. Such districts may already be developed as much as is desired by the community, while others may be developed only in limited sections and have opportunities for greater density. Strategic extensions of sewer and water lines into areas where increased density is desired can work well with this approach.

The decision of where to “up zone” needs to be approached in the context of a successful and open planning process. The rationale and the approach should be documented in the future land use section of the master plan.

As indicated, the strategy in the model provided here is most similar to that described above—by petition or permit—and was chosen for two reasons: it is easier to establish and allows for small increments of increased density to be captured in most, if not all residential zones. Any community that is contemplating the adoption of a density transfer ordinance should be mindful of zoning amendment proposals not connected to a DTC that would have the effect of increased development density from existing standards. They present an opportunity to generate density transfer credits that will be lost if put in place before a DTC ordinance exists.

4. Defining the Transfer Mechanism

Density transfer ordinances must specify how the density credit is moved from sending to receiving areas. In many versions of TDR, developers must obtain certificates of density credits in order to build at higher densities in the receiving area. The credits are issued by the community in exchange for conservation easements on land in the sending area obtained by the developer. The developer is responsible for obtaining the easements on which the credits are issued. Since this exchange has to be accomplished upfront, this often discourages the use of TDR. It takes time, and furthermore assumes that conservation easements are readily obtainable. This is often viewed as the key barrier to the more widespread use of TDR provisions that are in place.

The approach used for the model in this guidebook uses a novel approach pioneered by the town of Berthoud, Colo., to address the problem by which the community accepts a *density transfer fee* in place of the actual conservation easements. The fee is used to purchase the easements, either at that point or at a later time. By “monetizing” the transfer mechanism, ease and speed in the transaction is provided to the developer and flexibility is provided to the community. For the developer, the fee approach removes the uncertainty and delay involved with finding willing landowners in the sending area with whom to negotiate conservation easements. For the community, it provides more opportunity for choice in selecting which conservation lands to acquire, and when. The community could also pool multiple transfer fees over time and make larger, more strategic acquisitions when conditions are right. It could also allow them to leverage density fees with other acquisition grant sources such as state or federal land protection programs, or partner with regional land trusts.

The clear benefits from this approach do come with a down side: the community is not actually receiving a known amount of conservation land for the density credit given. Rather it is receiving the money to buy it. There is a risk that the amount of land that can ultimately be negotiated for the fee in hand will be less than what is expected for the density credits given. This risk can be controlled by setting the cost of density credits appropriately, and by understanding what conservation easements on the lands being sought will, on average, cost to acquire.

5. Market Analysis: Establishing the Value of Density Credits

Properly setting the value of density credits is critical to a well functioning density transfer ordinance. It is not necessarily easy to do, and may require outside expertise. As previously explained, the value of credits must be low enough to generate interest from developers, but high enough to result in the protection of appropriate and proportionate amounts of land in the conservation or sending areas.

A fair transfer fee will vary according to several factors:

Strength of the local real estate market: The more robust the market, the more “in demand” the credits will be and the higher their value.

Type of development: The value of the credit will need to vary with the value of the development on which they are used. Considering that the fees will be used to buy the right to develop additional units, the fees must be proportionate to the expected market value of those units. For example, the fee per additional unit for a

multifamily condominium development will ordinarily be lower than for an additional detached single family house.

Change over time: The density fee will need to be adjusted over time to account for changes in prices of land and house.

Degree of incentive: As a matter of local policy, the value or cost of a density credit can also vary by the degree of incentive the community wants to place on their use. If priced so high as to capture all of the value of the increased density (i.e., the full value of an additional building “right”) there may be no financial advantage to the developer and no use of the TDR. A community that wants to see active use of density transfers will price them to ensure they are profitable. Some trial and error is likely needed to find the right balance.

Because of these variables, it is highly recommended that a community planning to implement a density transfer ordinance undertake a real estate market analysis (REMA). A REMA will help calibrate the proper prices for density credits, gauge the market strength in the community and estimate the average amount of conserved land that would be achievable per credit sold. This appraisal should be undertaken prior to the enactment of the ordinance and setting of the fees. In addition, communities are advised to include a provision in the ordinance or administrative regulations allowing the planning board to obtain an opinion of value appraisal as needed in the review of a density transfer proposal.

6. Density Transfer Fund

In order to hold and accumulate density transfer fees, communities must have in place a non-lapsing municipal fund established (or useable) for this purpose. The Conservation Fund, as enabled by RSA 36-A:5, is already established in many New Hampshire communities and can be used for this purpose to the extent that the density transfer fees are for the acquisition of conservation lands.

The conservation fund, by statute, is placed under the control of the conservation commission and may legally be used to carry out other obligations of the commission in addition to land acquisition. In some towns this may create a concern that the transfer fees might not always be used as intended by the ordinance. To address this, it may be advisable to include language in the ordinance to require the town treasurer, who administers the account, to account for density transfer fees separately, essentially creating a Density Transfer Account within the Conservation Fund, and to stipulate that the fund be used only for land acquisition in the “sending” conservation areas. Alternatively, the community could seek to establish a wholly separate density transfer fund once authorized. Legal opinions differ as to whether towns are allowed to do this under existing statutes, or whether specific enabling law is needed. With either approach communities are strongly advised to seek the advice of their legal counsel and consent from the NH Department of Revenue Administration.

7. Administrative Capacity

The use of the density fee approach simplifies the administrative requirement of a density transfer ordinance in comparison to the conventional forms but it still carries some administrative burden. At a minimum, additional development

checklist items are needed to determine eligibility; accounting procedures will need to be established to ensure that correct density credits are applied and fees are paid; the added density right will need to be recorded on the subdivision plan or site plan; and that the process exists to periodically review and adjust the density transfer fee structure. Once established, however, these are little more burdensome than many common ordinances in wide use in New Hampshire.

The model ordinance assesses the density transfer fee at the time of the issuance of the building permit. The fee is averaged across all lots in the approved development, rather than being applied to only the lots or units added from the density credit. This has the advantage of reducing up-front costs for using density transfers to the developer (again, the purpose being to encourage their use), but this approach does place the responsibility on the municipality to ensure that the fees are collected when the building permit is issued—even if the lots change ownership prior to construction. Thus it would be important to include appropriate notations on the subdivision plans that include density transfers.

The model ordinance also requires the planning board to periodically review and update the density transfer fee schedule. Further, it would be advisable for planning boards to track the amount of land conserved using the density transfer fee to determine to what extent the amount of land conserved is balancing the additional housing units permitted by the density transfer.

8. Market Conditions

The prerequisites and conditions discussed in this section to this point involve preparations that a community at its discretion can undertake and control. Market conditions are a different matter, yet equally important for successful implementation. Specifically, there must be sufficient demand for new housing development overall and adequate opportunity and demand for development of the type and in the areas where density credits can be used. For most New Hampshire communities, and especially in the southern tier of the state, the demand for new housing development is generally met. In recent decades New Hampshire has experienced greater growth pressures than other New England states and is likely to continue, especially if a greater choice in housing types and prices are offered. In addition, it appears that the trend in community development here and elsewhere is toward traditional neighborhoods and village development, as well as other forms of higher density development. This trend will create real opportunities for using density transfers.

To the extent that market conditions limit density transfer ordinances from taking hold here, it will be because they are shunned by developers as offering insufficient advantage to offset added time and complexity. Yet as the most easily developable land is depleted in New Hampshire, there will be more opportunity for infill and higher density development than of the conventional form.

STEPS FOR ENACTING A DENSITY TRANSFER ORDINANCE

1. Update the master plan to incorporate information and outreach supportive of the concept and public purpose for affecting density transfers; and broadly identifying the area where densities should be lowered and raised.
2. Identify sending areas (conservation areas) where density transfer fees will be used to acquire conservation easements.
3. Identify receiving zones where density increases of varying degrees are feasible and appropriate, and establish conditions under which higher densities will be allowed.
4. Conduct real estate market analysis to establish the value(s) of density credits.
5. Prepare a density transfer ordinance and educate the public.
6. Establish a density transfer fund or town conservation fund to hold density transfer fees until used to buy development rights and related accounting procedures for tracking the use of the fees.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

LEGAL FRAMEWORK

The legal framework for density transfer ordinances is based on the convergence of three legal concepts: 1) the ability of government to regulate and limit the extent (including density) of development on a property for a valid public purpose, like protecting public water supply lands; 2) the common legal convention that property rights are made up of a bundle of different rights, which are severable from one another, e.g., air rights, mineral rights, rights-of-way, water rights, and use rights; and 3) the ability to establish an exchange of such rights through a contractual arrangement, i.e., established in the zoning ordinance. The three come together in a TDR ordinance in that the government (town or city) varies allowable development density in different areas of the community; allows a density right to be severed from sending property and added to receiving property; and finally, regulates the transfer through a form of zoning contract established in its ordinance.

As a zoning ordinance, the authority to adopt a TDR system is derived from statute to regulate land use to protect public health, safety and welfare. Approximately 50 percent of the states in the nation, including New Hampshire, have specific statutes that enable density transfer ordinances in their planning enabling statutes, while in others the statutory basis falls back on general zoning.

STATUTORY AUTHORITY IN NEW HAMPSHIRE

New Hampshire's innovative zoning statute, RSA 674:21(d), Innovative Land Use Controls, includes the "transfer of density and development rights" as one of the controls that is specifically enabled in state law. As with most of the listed techniques in the innovative land use statute, no specific definition, description or limitations are provided to define how the technique should be used. Standard requirements applicable to all of the innovative land use controls may be established however, they must be supported by the master plan and must contain standards for their administration. The statute also specifically authorizes the granting of conditional or special use permits in approving proposals submitted under the statute.

Two important changes were made to the Innovative Zoning Statute in 2004, which may strengthen the implementation of density transfer ordinances. First, the word "density" was added to transfer of development rights, and second, the law was changed to stipulate that innovative land use controls, including density transfer ordinances, can be made mandatory.

The model ordinance presented in Section V is designed to use the conditional use process as specified in 674:21, II. It makes specific references to the community's master plan and assumes in particular that the plan has identified the concept and rationale for transferring density between zones as well as the locations, either generally or by specific location, of the areas where density is to be added or reduced.

Finally, the Innovative Land Use Control Statutes (RSA 674:21-a) contain specific provisions to ensure that development restrictions agreed to as a condition of

approval, including conservation easements, partial development restrictions or other limitations, are legally enforceable by municipalities and affected property owners.

DENSITY TRANSFERS AND THE TAKINGS ISSUE

A recurring legal issue with TDR and DTC ordinances (as with many other planning regulations which impose limitation on the use of property) is the claim that they constitute a taking without just compensation. TDRs may be more vulnerable to this claim than other land use regulations in that they specifically involve the “taking” of development rights from one location even if the value is preserved for the owner. For the most part, where TDRs have been challenged, they have been upheld.

The model contained here is not likely to be vulnerable to any takings claim in that it is voluntary. Land identified as conservation area is not restricted from development unless and until conservation easements on that land have been acquired through voluntary sale or other agreement. The property owner will enter into conservation restrictions by choice. However, in the case where a town makes density transfers mandatory, which is permitted in 674:21, if supported in the master plan, an understanding of the applicable case law is advisable.

For further reference, *Takings and Givings* (Pruetz 2003) contains a comprehensive review of federal and state court cases pertaining to TDRs. While density transfer ordinances have been upheld repeatedly in the courts, they have also been denied in a few instances, so care must be taken in how mandatory density transfer ordinances are enacted.²

There have been no density transfer cases in New Hampshire courts. There are however a number of takings cases, which are reviewed in Loughlin (2006).

EXAMPLES AND OUTCOMES

Pruetz (2003) presents case studies of over 130 TDR and other density transfer programs that are in use around the country. They cover a wide range of program scopes, techniques, and approaches. As was pointed out earlier, there are many more examples of TDR than there are *successful* examples. Many operate at a scale that has limited applicability in New Hampshire. The most applicable and useful examples for this guidebook are municipal TDRs, and with some exceptions, programs from other New England states. Examples presented below, all municipal in scale, include two conventional TDR programs, two density transfer fee programs and two existing examples from New Hampshire.

CONVENTIONAL TDR PROGRAMS

Falmouth, Massachusetts

The Falmouth TDR ordinance was first enacted in 1985 and has been revised over time. Its purpose is to protect surface waters and groundwater recharge areas in an effort to protect the

² Two major cases involving density transfer have been heard before the U.S. Supreme Court: *Penn Central v. City of New York* (1978) and *Suitum v. Tahoe Regional Planning Agency* (1997). In the former, New York City denied Penn Central the right to build a 50-story building on top of grand Central Terminal, but allows in its “Landmarks” legislation the transfer of their vertical development rights to other lots in the surrounding area. The Court denied Penn Central’s takings claim because: 1) the city’s objective in preserving the historic character of the building was a permissible governmental goal, and 2) no taking had occurred. This was supported by the ability to transfer and use the development rights elsewhere.

In the Tahoe case, the landowner was denied the use of land for building in an environmentally sensitive area (a sending area in their TDR program), but was granted the right to build elsewhere. The owner did not wish to build elsewhere and sued the agency. The court remanded the case and it is not fully litigated; however, the court found that the value of a TDR does not determine whether a taking has occurred, rather it only addresses whether adequate compensation has occurred. This decision suggested that TDRs do not necessarily eliminate a takings claim but do provide a “built in” means to compensate for them.

town's public water supplies. It establishes donor (sending) areas defined primarily as areas important to surface and groundwater supplies and receiving districts are comprised of most residentially zoned districts not located in the sending area. TDRs are granted through the subdivision process and include a "special permit" requirement somewhat analogous to the model's conditional use permit. The ordinance establishes a minimum parcel size of 5 acres for the area to be developed. The ratio for density transfers ranges from 1.2 to 1.4 (meaning for every acre conserved, credits for 1.2 to 1.4 lots are transferred) depending on the receiving zone. Acceptance of the program has been slow and has only been used three to four times.

Jericho, Vermont

The town of Jericho adopted a TDR program in 1992. As required by Vermont TDR enabling law, the town identified sending and receiving areas and established a "by right" fixed density increase of 100 percent in the receiving areas. It stipulates that the sending sites must be protected by conservation easement. The ordinance establishes a "transferable development unit" as equal to one residential unit or 1,000 square feet of commercial office space. Applicants must submit a surveyed plan for the sending area showing the number of lots that could be derived, a step which may discourage its use. Receiving site proposals are reviewed under a conditional use permit process. Particular attention is paid to the documentation and filing of the TDR, which permanently attaches the transferred rights to the receiving site. As of 2001, Jericho's TDR program had not yet been used (Pruetz 2003).

DENSITY TRANSFER FEE PROGRAMS

Berthoud, Colorado

The town of Berthoud has been the pioneer in "reinventing" TDR into a more flexible, adaptable and less complex zoning tool. The concept Berthoud developed serves as the starting point for the model in this chapter. The approach came about through an unsuccessful attempt to adopt a conventional TDR in 1999. Unable to achieve consensus in the community in identifying the boundaries of sending and receiving areas, the town adopted a density transfer fee in lieu of a traditional TDR. The fee applies to any residential development where additional density has been petitioned. The proceeds of the transfer fee are restricted to the preservation of agricultural land, open space, and environmentally sensitive areas. Like the model presented here, the fees are assessed at the building permit stage. Also similar is the option for the developer to provide the conservation easement directly instead of paying the transfer fee.

An aspect that gives one pause in the Berthoud example is the low values of the fees assessed per unit of added density. The town charges \$3,000 per single-family house and \$1,500 for multi-family homes. However, these levels are based on the town's estimate of what it will cost to protect an acre of land in the unincorporated lands that make up the sending areas. The estimated cost is \$3,700 per acre, yielding a transfer bonus of about 1.25—well within the range of other TDR programs (Pruetz 2003).

Gorham, Maine

The town of Gorham may be the first community in New England to adopt Berthoud's approach of a fee-based density transfer ordinance. Gorham's ordinance

was the starting point for the model developed for this guidebook. The town adopted its ordinance in 2004 largely in support of its comprehensive (master) plan, which calls for the concentration of development around two historical village centers in the town.

The ordinance establishes a “development transfer overlay district,” which serves as the receiving area of the density transfer ordinance. Use of the ordinance is *optional*. Developers are granted the right to develop at higher densities within the overlay (“well planned higher density residential development in the designated areas”). Proposals submitted under the overlay district must be served by the public sewer system and are subject to special review under performance standards contained in the ordinance—analogue to the conditional use permit process in the model. The calculation of the fee is somewhat complicated and derives a number of “bonus units” defined as the number of units in excess of what is approvable under the town’s conventional zoning provisions. The fee per bonus unit is \$15,000. The proceeds of this fee are used to buy land or development rights from rural land. Preservation priority is given to parcels adjacent to land already under town ownership.

NEW HAMPSHIRE TRANSFER FEE PROGRAMS

Lee, New Hampshire

Lee was the first New Hampshire community to adopt a TDR ordinance. It is designed to preserve farmland, open space, forests, watersheds and other significant natural resources, as well as the town’s rural character. The ordinance is simple and short, but is also limited in scope in that sending sites and receiving sites must be contiguous. No sending or receiving zones are defined per se; any two contiguous sites in the town could potentially utilize the TDR provisions. The amount of density that can be transferred from a sending site is equal to the development units approvable under the town’s conventional zoning. The amount of development allowed on the receiving site through TDR is equal to the total development permitted on both sites combined. The planning board has the right to decide TDR applications on a case-by-case basis taking into consideration the specific natural characteristics and resource values of the two sites.

Dover, New Hampshire

The city of Dover has had its TDR ordinance in place since 1990, however, until 2004 it was limited to non-residential development in the city’s industrial and business development districts. The TDR functions primarily within the confines of two large industrial and business parks (I-4 and B-4), but has been used numerous times and is considered to be successful by the planning staff. Approximately 35 acres of conservation land has been preserved in these two parks since the inception of the program. The TDR district is treated as an overlay zone; projects submitted are reviewed under special performance standards.

The TDR provisions were expanded in 2004 to include residential subdivisions, but to date, have not been successfully used. The planning staff is considering amendments to the TDR ordinance to make its use more attractive.

Model Language and Guidance for Implementation

As implied in both the Preamble and Authority and Purpose, it is important that the municipal master plan include policies supportive of density transfers. The master plan should clearly support the goal to have the areas of town that are recognized as most important for resource protection and open space preservation remain largely undeveloped, and identification of areas where higher development densities are appropriate and desired. Up to a point, the more specific the future land use section of the master plan is in identifying the location of this area, the more supportive it will be of a density transfer regulation.

DENSITY TRANSFER ORDINANCE

PREAMBLE

The Density Transfer Ordinance is enacted to facilitate the implementation of multiple goals of the Town of [_____] master plan [date], including [as appropriate: *the protection of natural resources, preservation of open space, promoting compact and village forms of development, and encouraging development in locations well served by municipal infrastructure*]. These goals are accomplished by allowing, under certain conditions, an increased increment of residential development density in designated residential zones in exchange for the permanent protection of land in designated conservation and resource protection areas, either through direct acquisition or through the payment of density transfer fees used for this purpose.

The zones in which increased densities are permitted are intended to be those where higher development densities are desired and consistent with future land use recommendations of the master plan. The areas where offsetting conservation land is to be acquired are intended to be those with high conservation and resource protection value as identified in local, regional and state conservation plans, and consistent with the future land use recommendations of the master plan.

I. AUTHORITY AND PURPOSE

- A. The Density Transfer Ordinance is enacted in accordance with RSA 674:2-5 and under the authority granted by RSA 674:16 (Grant of Power) with specific authority provided 674:21(I) (Innovative Zoning Land Use Controls) and 674:21(II) relative to conditional use permits. Density transfer, as established in this ordinance is a specific application of 674:21(I)(d), “Transfer of density and development rights.” Further, this ordinance is enacted to implement future land use recommendations of the master plan pertaining to the protection of important natural resources, the preservation of open space and the establishment of efficient and orderly and more compact development patterns in the community.
- B. The purpose and intent of the ordinance is further specified as follows:
 1. To protect important natural resources including agricultural lands, large forest blocks, water supply lands, and other undeveloped lands contributing to general ecological function.
 2. To foster a more sustainable pattern of growth by encouraging development within or near existing areas of development and infrastructure.
 3. To promote the implementation of the [As appropriate: *Town of _____ Open Space and Conservation Plan—or other similar reference*].
 4. To reduce sprawl and the rate of consumption of undeveloped land.
 5. To establish a workable, equitable mechanism to shift development density from areas in the town where future development is undesirable to areas where it is desirable.

II. DEFINITIONS

Conservation Area: The area or areas defined in Section IV.B within which conservation land acquisitions will be made using density transfer fees.

Density Transfer Credit: The increase in density allowance afforded to a development, expressed in dwelling units or reduction in lot area, which is acquired through the payment of a density transfer fee or the donation of developable land in the Conservation Area.

Density Transfer Fee: The fee paid to the town in exchange for an increase in permitted development density when developing within one of the defined Development Areas.

Density Transfer Increment: The differential between the maximum development density permitted under the standard provisions of the zoning ordinance and that permitted under the Density Transfer Ordinance.

Development Districts: The residential and mixed use districts within which density transfer credits can be used, as specified in Section IV.A.

Definitions specific to the density transfer ordinance are included here as a separate section but are best incorporated into the general definitions section of the zoning ordinance. Other terms may need to be defined.

III. APPLICABILITY

- A. The use of the density transfer ordinance by landowners is optional. Approval of a specific application is at the discretion of the planning board, granted through a conditional use permit. If the density transfer option is not requested or not approved, the provisions of the underlying ordinance remain in effect.
- B. The provisions of the density transfer ordinance may be utilized for new residential subdivisions, in-fill development, [*including mixed use development if applicable under existing zoning*] and residential development projects subject to site plan review, provided that:
 1. The development is to be located within an eligible residential [*or mixed use*] development district as defined in Section IV.
 2. The landowner or developer will pay a density transfer fee to the town to be used to acquire conservation land or conservation deed restrictions or easements in areas designated for conservation in Section IV, or, at their discretion, the landowner or developer acquires such land or easements directly on behalf of and in the name of the town. The amount of the transfer fee or acreage conserved shall be determined through the process described in Section V.
 3. A conditional use permit is approved.

IV. DESIGNATION OF DISTRICTS FOR DENSITY TRANSFERS

- A. **Development Districts.** Density transfer credits may be applied in the residential [add where applicable: mixed use district and village or town center districts] development districts specified below. Density transfer credits may not be applied in portions of these districts that are within a defined resource protection district or overlay zone including:

[Identify as applicable: conservation overly district or wetland, shoreland, aquifer, floodplain overlay districts.]

[Include here a list of the residential, mixed use, town center and others where density transfer credits are to be applicable: e.g.,

1. *Town Center District*
2. *Multi-Family Residential District*
3. *Residential District A*
4. *Residential District B]*

B. Conservation Areas. The utilization of density transfer credits in eligible development districts shall be off-set by the permanent protection of conservation land *[or permanent deed restriction to reduce development density]*. The land areas designated for conservation acquisition through density transfers shall be limited to those defined by the town through the master plan and the following supporting sources:

[Include here a map(s) or other references to applicable plans or studies indicating areas of high natural resources and conservation value. Sources might include resource co-occurrence mapping, the town’s open space/conservation plan, if one exists, or other objective sources such as The Land Conservation Plan for Coastal Watershed, State Wildlife State Plan, I-93 Natural Services Network study, Regional Open Space/Conservation Plan, etc. Multiple sources can be used, but the net results should be a readily definable conservation area where the town will use density transfers fees and other sources to limit future development through acquisitions].

V. DENSITY TRANSFER DETERMINATION

A. Procedure

1. **Notification:** A landowner or developer intending to utilize the density transfer option shall notify the planning board of this intent upon application for development review. The planning board shall determine eligibility of the proposed development to use density transfer in accordance with Section IV and review with the applicant the criteria for conditional use approval.
2. **Conflicting Provisions:** Where provisions of the density transfer ordinance conflict with those of the underlying district, the provisions of this ordinance shall apply, provided that the application is in compliance with the ordinance and any conditions required as part of the conditional use permit.
3. **Plan Notation:** Any subdivision or site plan submitted for approval under the density transfer ordinance must include a plan notation to be filed with the plan at the Registry of Deeds stating that a density transfer fee will be required prior to the issuance of the building permit for each dwelling unit. The density fee shall be determined at the time of building permit issuance based upon the fee schedule referenced in Section V.C.2.

B. Density Transfer Standards

1. Increases in development density permitted under this ordinance shall only apply to development proposed in zoning districts identified in Section IV.A.
2. The allowable density increase that may be transferred to a residential development [*or to the residential portion of a mixed use development*] within an eligible district is determined by the planning board as part of the Subdivision or site plan approval process.
3. No density increase shall be permitted above that which would cause lot size or configuration to fall below the minimum required to meet on site septic disposal, well radius, wetland or shoreline setbacks, or other applicable environmental standards.
4. The maximum density increase allowable under the density transfer ordinance shall be as specified in Schedule 1. The landowner may request a smaller density increase than allowed based on development design objectives; the planning board may approve a smaller density increase than requested, based on site characteristics, neighborhood context, or other considerations as outlined in Section VI.

SCHEDULE I: Maximum Density Transfer

Lot size reduction ranges are shown for illustration purposes; in an actual ordinance a single maximum value should be used in each zone. The maximum transfer rate(s) may be reduced as a condition of the conditional use permit based on the evaluation of the specific proposal (see Section VI A and B).

Example Development Districts	Existing Minimum Lot Size	Maximum Density Transfer (Lot Size Reduction)	Minimum Lot Size after Density Transfer	Density Transfer Credit (= additional lots)
Town Center (with municipal water and sewer)	10,000 s.f.	at 25%... at 50%...	7,500 s.f. 5,000 s.f.	0.33 1.0
Rural Village (with community water and sewer)	20,000 s.f.	at 25%... at 50%...	15,000 s.f. 10,000 s.f.	0.33 1.0
"Suburban" Residential (with shared septic and/or community well)	43,560 s.f.	at 35%... at 75%...	28,300 s.f. 10,890 s.f.	0.54 3.0
"Suburban" Residential (without community water and sewer)	43,560 s.f.	NONE	NA	NA
Rural Residential	87,120 s.f.	at 35%... at 60%...	56,628 s.f. 34,848 s.f.	0.54 1.5

Setting density transfer rates, i.e., the level of 'up-zoning' allowed, in the development districts is a key component in successfully implementing a density transfer ordinance. If set too high, existing residents in these districts are likely to object. If set too low, the usefulness in generating density transfer fees or acreage, and thus in protecting conservation lands, will be too limited to be perceived as worthwhile. This model takes the approach of establishing a maximum transfer for each zone where they are allowed, but allowing for a case by case evaluation through the conditional use permit. This puts some burden on the planning board to make this judgment in each application but allows for flexibility. In areas without municipal sewer and water, onsite requirements for septic, well radius and other setbacks will become the limiting factor for density transfers rather than the limits established here. Note that the ranges provided in the Sample Schedule 1 are included to illustrate the range of impacts, both to the change in lot size and the potential to generate transfer fees. When implementing the ordinance these ranges should be replaced with set maximums.

C. Density Transfer Credits

The mechanism for implementing density transfers established under this ordinance is a density transfer credit. In order to utilize the higher development densities allowed in Schedule 1, the appropriate number of density transfer credits must be acquired by the payment of a density transfer fee or by the acquisition and protection of developable land.

1. **Calculation:** Density transfer credits shall be calculated based on the number of additional dwelling units in the subdivision or site plan that are in excess of the number that could be approved on the site without the use of the density transfer option. The number of units approvable without any density transfers shall be determined from a satisfactory yield plan supplied by the applicant.
2. **Yield Plan:** Dwelling unit density for the proposal based on underlying zoning requirements shall be determined using a yield plan provided by the applicant and reviewed and approved by the planning board. The yield plan, while not required to be a fully engineered plan, must contain sufficient detail of site conditions for the board to accurately determine the number of dwelling units that are reasonably approvable on the site based on conventional density, dimensional standards and environmental standards. The planning board may adopt regulations to specify the content and methods to be used in preparing the yield plan.

If the town already has an open space or cluster development ordinance it likely already has a requirement for a yield plan or similar method for determining the site's base development density. If so, that method may be referenced here. Note that non-engineered yield plans have not always proven to be satisfactory, however, requiring a fully engineered plan will deter the use of the density transfer option. Other methods exist, that use site level averaging of soil, slope and wetlands conditions together with standard deductions for roads, drainage facilities and setbacks. The town may wish to investigate these as alternatives to the yield plan.

3. **Density Transfer Fee:** The density transfer fee required to purchase density transfer credits shall be established on a per dwelling unit basis for the development project and assessed at the time of the issuance of the building permit for each dwelling unit. The fee schedule shall be established by the planning board, published in the town subdivision and site regulations and updated periodically to reflect changing market conditions. The objective of the fee structure shall be to generate sufficient funds to offset the additional dwelling units with the permanent protection of developable land within the designated conservation areas at the rate of [*not less than 1 acre per single family dwelling and 0.5 acre per multifamily dwelling*].

Much like the density transfer rate itself, establishing the "right" density transfer fees is critical to the success of the ordinance. The objective is to find the right balance between a fee low enough to create adequate incentive for developers to use density transfers, and high enough to generate enough revenues to purchase the offsetting conservation land.

The model places the fee schedule in the planning board's regulations so that it can be more easily modified to adjust to find the right balance and to account for changing market conditions. A sample fee schedule is provided at the end of this model, however municipalities are strongly advised to engage in a market study using real estate appraisers or others familiar with land valuations in the community who have no financial interest in the outcome, and development project pro-formas before establishing a schedule.

4. **Direct Land Conservation Option:** As an alternative to the payment of the density transfer fee, the density transfer credits may be acquired through direct acquisition or permanent protection of conservation land within the conservation area defined in Section IV. B. Applicants using this option shall submit plans for the proposed acquisitions at the time of the application. The acquisitions shall be sufficient to offset the additional dwelling units with the permanent protection of developable land at the rate of not less than [*1 acre per single family dwelling and 0.5 acre per multi-family dwelling*]. The transfer and recording of fee simple deeds or conservation easements at the Registry of Deeds shall be a condition for the issuance of building permits for dwelling units for the development.

VI. CONDITIONAL USE PERMIT

Approval of a development proposal utilizing the density transfer option is subject to a conditional use permit approved by the planning board (RSA 674:21(II)). This approval shall be based on compliance with the standards of approval set forth below. The board shall issue a written report of finding and conditions which shall be filed with the plan if approved.

- A. **Standards for Approval.** The following standard must be met or mitigated to the satisfaction of the planning board prior to granting the conditional use permit. These standards should be reviewed within the scope of impacts caused specifically by the increase in density sought under the provisions of this ordinance.
1. **Compatibility with Existing Residential Use:** The proposed development is compatible with existing residential character and setting. This standard shall consider neighborhood design and function; architectural compatibility, including roof type and pitch, style of units, and building materials; screening and privacy; and other factors as appropriate.
 2. **Neighborhood Design:** Where appropriate to the density and style of development, the proposed development should include features to enhance walkability and features of good neighborhood design, such as sidewalks and curbing, pedestrian paths, bike paths, street lighting and public spaces.
 3. **Environmental Compliance:** Increased density and smaller lot sizes of the proposed development will not result in non-compliance with any applicable state or town environmental ordinances and regulation, including, but not limited to septic system siting, well radius, wetland or shoreline setbacks.
 4. **Traffic Impact:** The higher density of the proposed development will not unreasonably impact nearby intersections and corridors, nor result in added future costs for the town beyond that for a development of standard density.
 5. **Historic and Cultural Resources:** Increased density will not result in the loss or impairment of historic buildings, settings or landscapes beyond that for a development of standard density.
 6. **Municipal Facilities and Services:** Increased density of the proposed

development will not exceed the capacity of required municipal services beyond that which will be mitigated as a normal condition of approval.

7. **Conservation Land Acquisition:** If the proposed development is to donate developable conservation land or easements to the town in place of the payment of a density transfer fee (as provided for in Section V.C.4), the planning board shall request an evaluation from the conservation commission as to the appropriateness of the donation with regards to its location, conservation value and development potential, an independent appraisal of the property value, and identification of the parties with primary and executory interest in the easement, if applicable.

8. **General Considerations:** The proposed development is consistent with the town master plan and the purpose and intent of the Density Transfer Ordinance.

The increased density of development, when also considering the offsetting conservation of developable land, will not result in undue future expenses to the town.

The proposed development will not create a hazard to the general public health safety and welfare of the community.

B. **Conditions.** The planning board may impose additional conditions in its approval of the conditional use permit as deemed necessary to accomplish the goals of the density transfer ordinance, including, but not limited to, the reduction in the maximum density transfer set forth in Section V.B, and in Schedule 1.

VII. USE AND DISPOSITION OF DENSITY TRANSFER FEE

A. **Establishment and Use of Density Transfer Fund.** Density transfer fees collected pursuant to this ordinance shall be deposited into a separate non-lapsing density transfer fund account administered by the town treasurer (RSA 41:29). The account is established for the purpose of collecting, holding and disbursing funds for the acquisition of fee interest in, or conservations easements on, potentially developable land. Such acquisitions shall be made within the conservation areas designated in Section IV.B above and for the purposed set forth in this ordinance. The fund may also be used to offset costs for property appraisals and the preparation of deed restriction and easements documents or other such costs directly related to the acquisition of such lands.

The density transfer fund may be used in conjunction with other town, state, federal or private funds to acquire such land provided that the land will remain permanently undeveloped and is located within the conservation area.

An alternative to establishing a new fund specifically for the density transfer fee is to use the conservation commission's conservation fund enabled under RSA 36-A:5 and established in many communities. Be aware, however, that under that enabling law, the conservation fund may be used for other duties of the conservation commission in addition to land acquisition. If the Conservation Fund is used, the density transfer fees placed in it should be accounted for separately to ensure that the purposes of the ordinance are met.

B. Disposition of Protected Land. Any land acquired using density transfer fees shall be permanently restricted from development by conservation easement, which shall run with the land. Such land shall be used only for conservation, agriculture, forest management, watershed management, wildlife management, open space, passive recreation and accessory uses necessary to support the principle uses. Acquisitions held by the town may be used for additional recreational purposes as determined by the town not involving the erection of permanent enclosed buildings.

Ownership of the land may be held by the town under management of the conservation commission, or may be transferred, upon the approval of town meeting, to a recognized conservation organization or land trust provided that the land will remain permanently undeveloped and subject to the use restrictions as defined above, and that ownership will be returned to the town upon dissolution of the organization.

Sample Density Transfer Fee Schedule for inclusion in Subdivision and Site Plan Regulations			
Fee per Additional Dwelling Unit (See V. C. 1. – Density Transfer Credit Calculation)			
Example Development Districts	Existing Minimum Lot Size	Single Family	Multi-Family
Town Center (with municipal water and sewer)	10,000 s.f.	\$15,000	\$7,500
Rural Village (with community water and sewer)	20,000 s.f.	\$15,000	\$7,500
“Suburban” Residential (with shared septic and/or community well)	43,560 s.f.	\$25,000	\$15,000
“Suburban” Residential (without community water and sewer)	43,560 s.f.	NA	NA
Rural Residential	87,120 s.f.	\$20,000	\$12,500
(For illustration only—do not use)			

REFERENCES

- Louglin, Peter. *New Hampshire Practice, Land Use Planning and Zoning*. 2006. 3rd Edition.
- The Nature Conservancy, Monadnock Conservancy, Society for the Protection of New Hampshire Forests, Southwest Region Planning Commission. July 2004. *Land Conservation Plan for the Ashuelot River Watershed*.
- The Nature Conservancy, Society for the Protection of New Hampshire Forests, Rockingham Planning Commission, Strafford Regional Planning Commission. December 2006. *Land Conservation Plan for the New Hampshire Coastal Watersheds*.
- NH Fish and Game Department. October 2005. *New Hampshire Wildlife Action Plan*.
- Pruetz, R., AICP. 2003. *Beyond Takings and Givings*. Arje Press.

1.2 Lot Size Averaging: One Size Does Not Fit All

RELATED TOOLS:

- Feature-Based Density

BACKGROUND AND PURPOSE

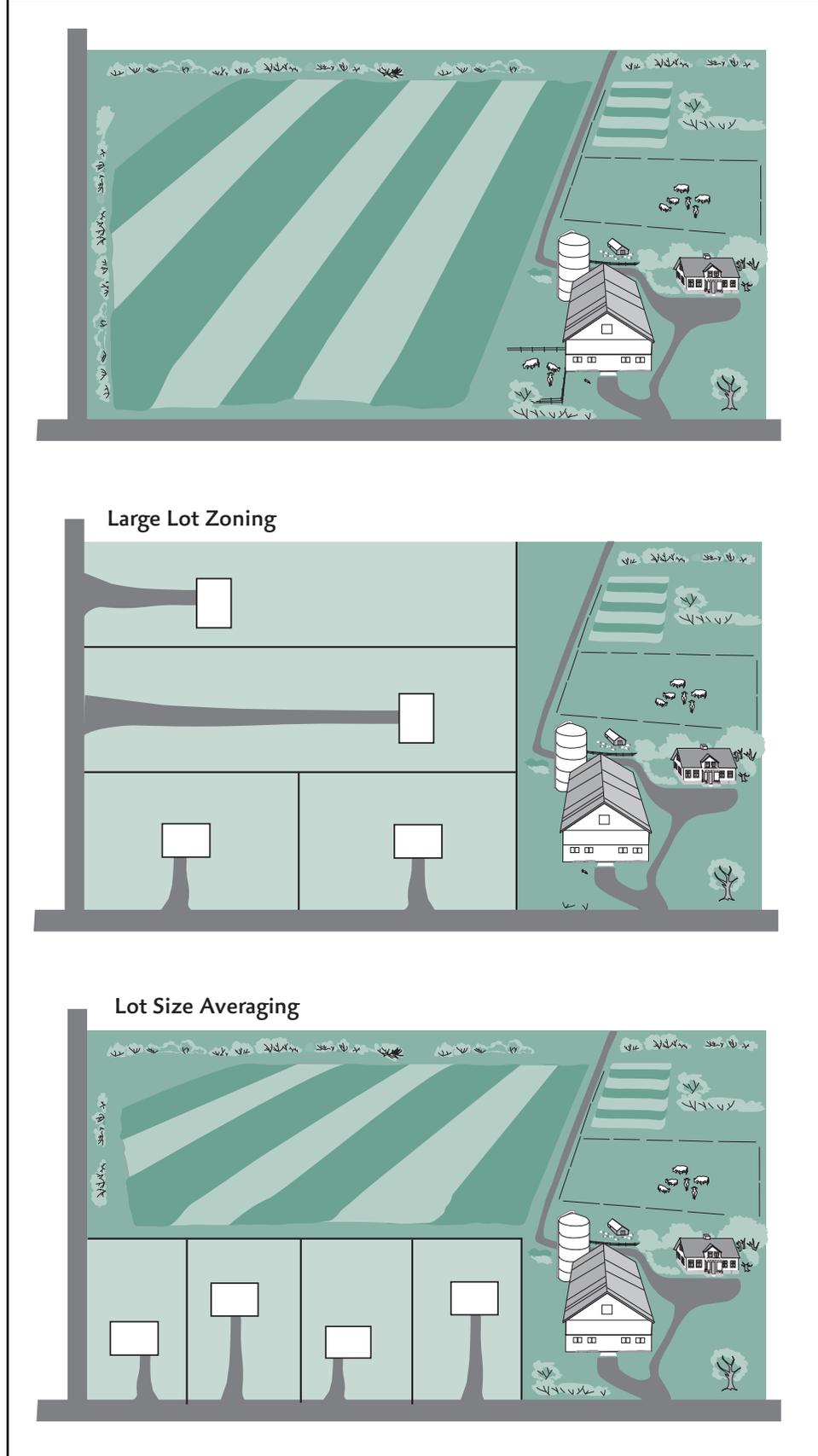
This chapter provides planning boards with a simple approach for achieving certain local master plan objectives while providing landowners with the flexibility needed to shape development to the landscape. The technique discussed here is lot size averaging, the basic concept that provided the foundation for the cluster or conservation subdivision.

Lot size averaging refers to the approach of requiring the average size of all of the lots in a subdivision to be equal to or greater than a specified minimum rather than requiring that each individual lot meet the minimum size threshold. The terms “density zoning” and “area-based allocation” of dwelling units are sometimes used as well. The conventional approach is to require each lot to be equal to or greater than a prescribed minimum lot size. Zoning has evolved to make adjustments to the underlying assumption that all lots in a subdivision should be of the same size. Conservation subdivisions are the most well known approach for enabling flexibility. In this form of lot size averaging, developed lots are typically smaller than the usual minimum lot size and grouped together in one portion of the lot while the cumulative reductions are compiled in one large lot reserved for open space uses. Some communities have required conservation subdivisions in certain situations such as to conserve important farmlands.

Conservation subdivision is often reserved for larger subdivisions. Lot size averaging can be used for minor subdivisions as well. This makes it especially helpful for a forest or farm owner who wants to create just one additional building lot but leave as much productive acreage as possible.

One job of the local zoning board of adjustment is to make case by case exceptions to requirements of the zoning ordinance when the underlying assumption that one size fits all proves unworkable. Often the layout of lots on the landscape results in challenging lot topographies making it difficult to meet all of the dimensional requirements of the zoning ordinance. More often than not, requests for variances from the ordinance based on the difficult features of the landscape are granted. Similarly, planning boards often grant waivers from certain requirements of the subdivision regulations when needed to accommodate difficult terrain. Flexibility within the ordinance reduces the temptation for local land use boards to grant inappropriate variances or waivers.

FIGURE 1.2.1 Zoning with No Flexibility vs. Lot Size Averaging



When zoning ordinances begin with uniform requirements and evolve toward additional considerations and/or flexibility, e.g. with multiple overlays and cluster provisions, they become more and more complex. A lot size averaging approach can greatly simplify the ordinance and result in more successful implementation of the master plan. Consider, for example, the goal of many small New Hampshire towns to retain rural character. This concept is typically heavily tied to the aesthetics associated with a landscape dominated by agriculture and forest without due regard for the needs of owners of either to maintain economic viability. One of the greatest failures of typical zoning ordinances is that by prescribing large minimum lot sizes in rural areas of the community they are denying landowners the opportunity to subdivide in a manner that will best promote continued forest management and retention of a critical mass of agricultural land. The owner of the farm or forest tract is often required to carve out five or 10 acres of productive land to meet minimum lot size requirements. Often the resulting landscape dotted with homes is neither productive nor scenic. Flexible techniques enable residential development to continue in rural areas in a manner compatible with goals of the community to protect open space, agriculture, forest, important habitats and scenic resources. Lot size averaging can make the job of the planning board volunteer much more rewarding as applicants will no longer need to be forced to develop lot configurations that meet the zoning requirements but make little sense on the ground.

The flexibility granted to the landowner through lot size averaging can strengthen the ability of the planning board to ensure that individual subdivision layouts achieve many goals of the local community. These include:

- Conservation of forest, agricultural land, scenic resources, wildlife habitat.
- Provision of a range of building lot prices.
- Layout of subdivisions in a manner that is conducive to neighborhood dynamics.
- Walkability, linkage between areas.
- Reducing the cost of roads and utilities to the developer and to the community.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Lot size averaging is authorized by the zoning ordinance and implemented by the planning board through the subdivision regulations. Whether it is permitted as matter of course or only under certain conditions depends on whether the individual community feels it will typically result in better development, or should only be allowed as an exception when it can be proven to result in a more appropriate layout or have other conservation benefits for the public.

Lot size averaging is appropriate in any size community and in any zoning district where the current minimum lot size is based more on the overall resulting density desired in the area than on requirements relating to the size of individual lots such as the minimum needed for the provision of on-site water supply and wastewater disposal.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

ENABLING STATUTES

RSA 674:16, Grant of Power, provides the foundation of a municipality's right to zone. Lot sizes and the density of the population are among the aspects of land use a zoning ordinance "shall be" designed to regulate. The lot size averaging approach complies with RSA 674:20, Districts, requiring that "regulations shall be uniform for each class or kind of buildings throughout each district." Although it has become commonplace, nowhere in the enabling statutes is it stated or implied that lot size and density need to be synonymous.

For the planning board member looking for further reassurance, RSA 674:16 clarifies that the power to adopt a zoning ordinance "... expressly includes the power to adopt innovative land use controls which may include, but which **are not limited to**, the methods contained in RSA 674:21." Among the techniques listed in 674:21 are "flexible and discretionary zoning" and "environmental characteristics zoning," both of which enable a lot size averaging approach.

LOCAL CONSIDERATIONS

It is important for planning boards to carefully consider the municipality's ability to implement and enforce an ordinance prior to proposing a particular approach. A simple lot size averaging subdivision plan does not require any more expertise or follow-up than a subdivision plan where all lots are the same size. However, to ensure that municipal records are clear regarding lots restricted from further development, the planning board's filing system must be carefully organized by parcel number and cross-referenced with other municipal records. If the ordinance is going to allow development rights to be held in reserve for future use, some additional careful record keeping is required.

Subdivision application fees should be reviewed to ensure that they cover the costs of administering the ordinance, including any special studies or outside assistance routinely utilized such as a regional planning commission circuit rider planner.

EXAMPLES AND OUTCOMES

Several communities in New Hampshire allow lot size averaging. Lyme, in the Upper Valley Lake Sunapee Region, has had a lot size averaging provision in the zoning ordinance for many years. Lot size averaging is permitted for residential subdivisions in any district where residential uses are permitted. The ordinance grants the planning board the authority to approve reduced lot sizes, frontage and setbacks. The minimum dimensions are to be determined by the board based on the character of the land, soils, traffic safety, and other issues. The ordinance also authorizes the planning board to approve a density bonus of up to 25 percent for subdivisions of 20 acres or more where open space permanently protected by a conservation easement to the town or a conservation organization comprises at least 75 percent of the lot. Lyme's lot size averaging approach is used by many applicants and the board has found it quite simple to administer.

In the late 1990s, the Acworth planning board sought a mechanism for providing for more protection of the town's working landscape while also allowing landowners more flexibility. There was interest in the benefits of the conservation subdivision approach and in applying them to the smaller subdivisions typical in town. The planning board also felt that the typical Acworth home buyer was interested in the privacy associated with a small rural town more than the social opportunities and amenities of a typical conservation subdivision. The Upper Valley Lake Sunapee Regional Planning Commission staff worked with the planning board to develop and achieve adoption of a simple lot size averaging approach. Acworth's ordinance enables the planning board to approve reduced lot sizes, frontage requirements, and setbacks for subdivisions involving 10 acres or more in the town's rural district. The rural district encompasses most of the land in town and provides for a three-acre minimum lot size in conventional subdivisions and a one-acre minimum when lot size averaging is used. A 10 percent density bonus is permitted for subdivisions that result in the permanent protection of 20 acres or more.

Some towns and cities from other states that have applied lot size averaging include:

- Franklin, Michigan
- Prince George County, Maryland
- Bedminster Township, New Jersey
- Colts Neck, New Jersey
- Far Hills Boro, New Jersey
- Holmdel, New Jersey
- Mendham Township, New Jersey
- Pleasant Grove, Utah
- Hartland, Vermont
- Bothell, Washington
- Snohomish County, Washington

Some are simple lot size averaging approaches. Others place restrictions on the percentage of lots that may be reduced in size. The approach used must be tailored to meet a community's objectives.

Model Language and Guidance for Implementation

In *[name the zoning districts where lot size averaging will be allowed]*, the planning board may approve reduced *[list requirements which the community feels are appropriate to reduce in the district such as lot sizes, frontage requirements, and/or setbacks]* in accordance with the following provisions:

I. PURPOSE

[State the community’s objectives to be achieved through lot size averaging, for example:]
 Lot size averaging permits flexibility in subdivision design to promote the most appropriate use of land and the protection of productive agricultural or forest land, scenic views, historic sites, shorelines, wetlands, important habitat areas, and other resources of importance to the community, while minimizing the alteration of the natural topography of the land, in accordance with the goals and objectives of the master plan.

II. APPLICABILITY

The minimum acreage for a lot size averaging subdivision plan shall be *[insert the minimum size parcel your planning board feels is appropriate for application of lot size averaging. This will depend partly on the minimum lot size in the district, and whether the lots are served by public water supply and/or wastewater disposal.]*

III. DENSITY

The total number of lots approved will be determined based on the number that would be otherwise approved under a conventional subdivision plan. The applicant may choose to either:

1. Submit a concept plan showing lots, road rights-of-way, and stormwater management areas, and any other areas which would not be incorporated in individual lots as necessary to meet the usual minimum standards for the district without the need for any lot area or lot dimension variances, and accounting for development limitations such as steep slopes, wetlands, septic suitability, available water supply, adequate driveway access to each lot, and compliance with the *[Town/City]* subdivision regulations, or
2. After accounting for areas that must be subtracted from the acreage figure utilized to calculate the developable area pursuant to other sections of this ordinance if any, subtract a percentage of the property in accord with the table below to account for roads, drainage and other utilities prior to dividing by the minimum acreage required per unit for the district.

Zoning District Lot Size	Percent Deduction for Roads and Utilities
5-10 Acres	5%
1.5 – 4.5 Acres	10%
1 Acre or less	15%

Percentages for each zoning district in your community should be developed based on a review of the average number of lots approved in previous subdivisions of various sizes. These can come from both your own community and other communities with similar topography and zoning requirements.

With lot size averaging, a landowner not wishing to create the maximum number of permitted lots today can either set aside the area to be conserved all at once and reserve the right to create additional lots in the future, or restrict from development only the area needed to balance the reduced size of each lot being created at the time. From both an administrative point of view and relative to conservation values, there is an advantage to setting aside all of the land to be conserved at one time and in larger pieces with an easement to a conservation organization to provide stewardship in the future. To provide an incentive to the landowner to choose this option, a community may want to consider granting a density bonus, e.g., one additional residential unit for each x acres conserved with a conservation easement.

Optional: A density bonus of up to [percentage] will be permitted for subdivisions that result in the permanent protection of [number or percentage] acres or more for the protection of resources identified in the master plan as important to the community. The protected land must be appropriately sized, configured and located to achieve the resource protection goals. The planning board's determination of appropriateness may include consideration of features of adjacent properties.

Examples of adjacent open space the planning board might consider are a stream corridor, trail, water supply protection area, or conserved farm or forest land.

The planning board needs to have a mechanism for keeping track of the development and conservation of a parcel over time when the maximum permissible number of lots is not created with the first subdivision.

For example, Landowner A has a 20-acre parcel in a 5-acre district. In the community's zoning ordinance, lot size averaging enables lot size to be reduced to 1 acre. Because Landowner A wishes to provide a building lot for their child but keep as much of the land as possible in the existing hayfield, they want to create a 1-acre lot and permanently protect 4 acres of the remaining 19 in exchange for the reduced lot size. Over time, two more lots of between 1 and 5 acres can be subdivided from the original parcel. Clear records of decisions in the planning board files and notations on plans and in the deeds resided at the Registrar are essential.

IV. DIMENSIONS AND ARRANGEMENT OF LOTS

The [factors which the provision allows to be reduced, such as minimum lot size, frontage and setbacks] shall be determined by the planning board based on the character of the land and neighborhood, the adequacy of the soils to support on-site wastewater disposal and wells [unless on public water supply and/or wastewater disposal], safety of access, traffic and pedestrian circulation, impervious surface, and other issues relating to the future use and enjoyment of the property.

The factors considered by the planning board when evaluating the proposed arrangement of lots shall include, but not be limited to, the following:

- Arrangement of roads, stormwater facilities, wastewater and other utilities in conformance with the natural features of the parcel, minimizing changes to the topography.
- Minimization of impervious cover.
- Protection of stream corridors and other important habitat areas.
- Protection of wetlands.
- Feasibility of continued or future agricultural use.
- Feasibility of continued or future forest management.
- Relationship to neighboring property, including conservation easements, or natural, cultural, recreational or scenic features.

In no case will lots smaller than [state smallest acceptable lot size] be permitted. The setbacks from abutting properties not part of the application shall not be reduced.

The planning board should review the subdivision regulations and amend as needed to ensure that the information required to determine appropriate lot dimensions and layouts is provided early on in the review process.

The planning board should take care to review the definitions section whenever amending the zoning ordinance to ensure that terms are appropriately and consistently defined.

Front setbacks may be reduced only when on an internal subdivision road approved by the planning board as part of the subdivision application. When frontage requirements are reduced, the planning board may require shared driveways.

V. PERMANENTLY PROTECTED AREA

The lot size averaging plan will concentrate development away from the most important resource areas and from those areas of the property that are most environmentally sensitive as described in Section I.

For each lot less than the minimum size normally required for the district, one or more lots larger than the minimum shall be provided in order to maintain an average lot size no smaller than the minimum lot size normally required for the district. Permanent protection from further development shall be provided for an area equal to or exceeding the sum of the areas by which individual lots are reduced below the minimum normally required for the district. Further subdivision, or use for other than one dwelling unit, noncommercial outdoor recreation, conservation, agriculture, forestry or other principle use or building as otherwise permitted by the zoning ordinance, shall be prohibited. The protected land shall be shown on the final plat and the conservation restriction recorded with the Register of Deeds.

VI. MANAGEMENT OF PERMANENTLY PROTECTED AREA

Pursuant to RSA 674:21-a, planning board approval of a final lot size averaging subdivision plan shall result in the creation of a conservation restriction incorporating the conditions of approval, including the maximum number of lots and the location, size and permissible uses of the land area that is to remain undeveloped. If the undeveloped area is to be held in common, all covenants, deed restrictions, organizational provisions for a homeowner's association or equivalent, and any other agreements regarding the method of ownership, management or maintenance of the protected area shall be established prior to planning board approval of the subdivision plan. By mutual agreement of the planning board and subdivider, the conservation restriction may take the form of a conservation easement to the town/city or private conservation group, or other instrument approved by the planning board.

REFERENCES

- Arendt, Randall. 1998. "Connecting the Dots," *Planning*, August.
- Meshenberg, Michael J. 1976. *The Administration of Flexible Zoning Techniques, Planners Advisory Service Report 318*.
- Nellis, Lee, and Karen Van Gilder. 2003. *The Planning for Results Guidebook*. National Association of Counties.
- New Hampshire Association of Regional Planning Commissions. 2004. *Planning Principles for New Hampshire*. October.
- Nicholson, Dave, and Jim Breuckman. 2004. *Smart Growth Tactics*. Michigan Society of Planning May.
- Pivo, Gary, Robert Small, and Charles R. Wolfe. 1990. "Rural Cluster Zoning: Survey and Guidelines," *Land Use Law*, September.

Examples of lot size averaging and other related ordinances:

www.smartgrowthgateway.org

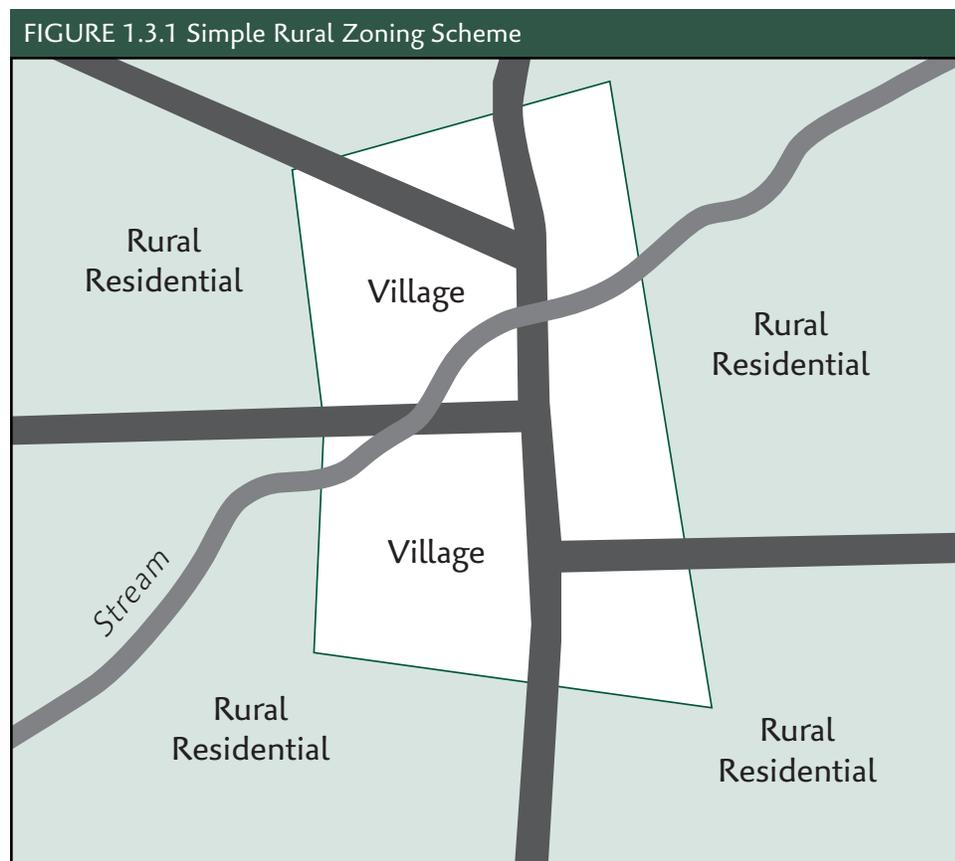
1.3 Feature-Based Density

RELATED TOOLS:

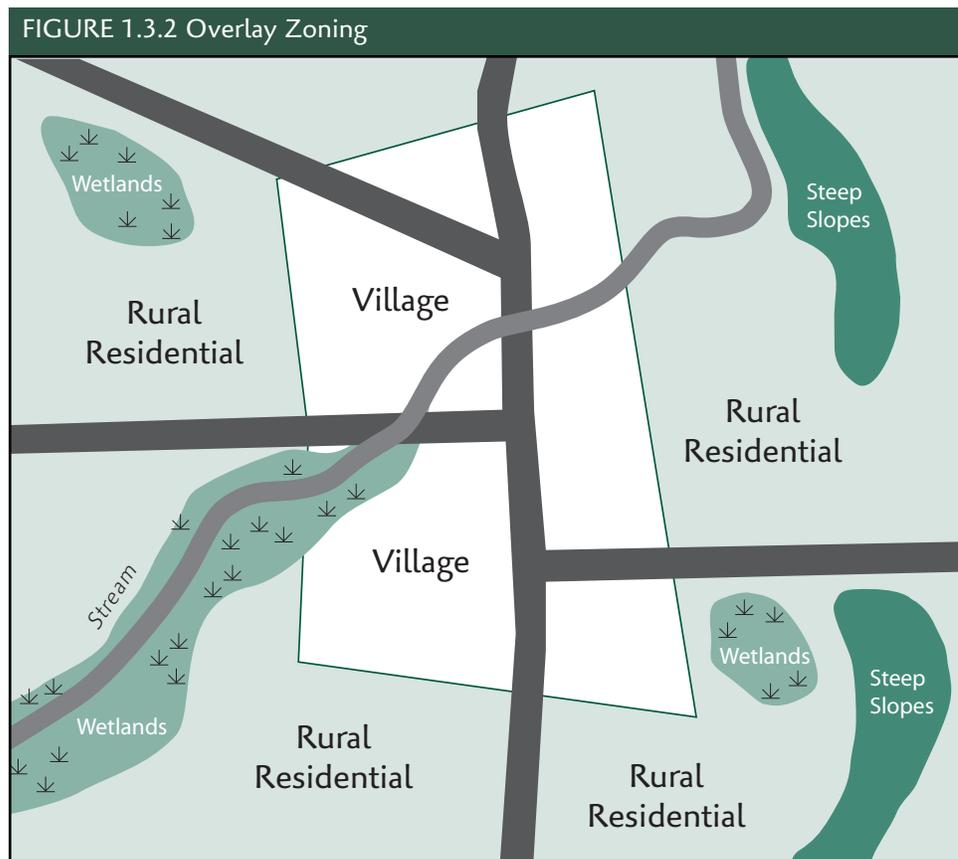
- Lot Size Averaging

BACKGROUND AND PURPOSE

This chapter provides planning boards with a new approach for achieving certain local master plan objectives through the zoning ordinance. Feature-based density is a zoning technique where the permissible density is calculated based on a set of factors contained in the ordinance, as opposed to a uniform standard being applied to all of the land in the zoning district. Conventional zoning prescribes one minimum lot size for a particular use throughout each zoning district, along with a residential density uniformly applied to each parcel of land in the district. In communities with the most basic zoning ordinances, one size is applied throughout town. Many small New Hampshire towns have a simple tiered system with small lot sizes/higher density in areas designated as village, and larger minimum lot sizes/lower density in the rest of town.



If all land parcels were the same, this approach would not trouble planners. However, since the landscape in many areas such as northern New England is hilly and challenging to develop, zoning has evolved to incorporate mechanisms for adjusting the rules. For example, overlay zoning for features such as steep slopes and wetlands is sometimes used as a way of making exceptions to the minimum lot size/maximum density provisions of the underlying district. This is the case in communities where, in addition to the requirement that development be kept away from wetlands and steep slopes for example, the area unsuitable for development is excluded from the area used for calculating the maximum number of lots. Zoning ordinances sometimes enable adjustments in the other direction, i.e. smaller lot sizes/increased density, to factor in the benefits of a particular land use to the community. Density bonuses for affordable housing are the most well known example.



Basing the permitted density on a feature of the parcel is not a new concept. Soil-based lot sizing is an approach used by some communities based on a single factor—suitability of the soils for treatment and dilution of septic system effluent. Similarly, subdivisions proposed in outlying areas on inadequate roads are often reduced in size by the applicant after a planning board raises concerns that a large subdivision might be scattered and premature (as provided by RSA 674:36II(a)) without a substantial upgrade of the road at the applicant's expense (pursuant to RSA 674:21V(j)).

When zoning ordinances begin with uniform requirements and evolve toward additional considerations and/or flexibility, e.g. with multiple density districts, multiple overlays, cluster provisions, etc., they become more and more complex. A feature-based density approach can actually simplify the ordinance by replacing district-

specific density regulations, overlays and certain other provisions, and result in more successful implementation of the master plan. Feature-based density can strengthen the ability of the planning board to ensure that the zoning ordinance and individual subdivision layouts achieve many goals of the local community. These include:

- Conservation of forest, agricultural land, scenic resources, wildlife habitat.
- Concentration of development activity close to services.
- Provision of a range of building lot sizes and prices throughout the community.
- Layout of subdivisions in a manner that is conducive to neighborhood dynamics.
- Walkability, linkage between areas.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Feature-based density is appropriate for any size community. It may be applied town-wide or in specified districts. It can be an effective tool when the planning board's goals for development density are related to such things as the geography of the community, e.g. dense development is desired close to a village area, features of the landscape, or road attributes.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

ENABLING STATUTES

RSA 674:16, Grant of Power, provides the foundation of a municipality's right to zone. Lot sizes and the density of the population are among the aspects of land use a zoning ordinance "shall be" designed to regulate. Feature-based density complies with RSA 674:20, Districts, requiring that "regulations shall be uniform for each class or kind of buildings throughout each district." Although it has become commonplace, nowhere in the enabling statutes is it stated or implied that the maximum density must be uniform for each piece of land in a district as opposed to being derived from features of the land itself.

For the planning board member looking for further reassurance, RSA 674:16 clarifies that the power to adopt a zoning ordinance "... expressly includes the power to adopt innovative land use controls which may include, but which **are not limited to**, the methods contained in RSA 674:21." Among the techniques listed in 674:21 are "flexible and discretionary zoning" and "environmental characteristics zoning," both of which enable a feature-based density approach.

LOCAL CONSIDERATIONS

It is important for planning boards to carefully consider the municipality's ability to implement and enforce an ordinance prior to proposing a particular approach.

For feature-based density the factors chosen need to be rationally related to density and to the purposes listed in the enabling statute (RSA 674:17). Data on the features

chosen needs to be available in a suitable form and level of detail to provide the planning board and landowner a reasonably accurate determination of developable area. For a reasonable cost relative to the overall cost of development, more detailed information should be able to be obtained by the applicant if desired. Consider steep slopes for example. A relatively inexpensive town-wide soil-based map or map based on digital topographic data can be obtained from your regional planning commission showing, for example, slopes over 25 percent, slopes 15-25 percent, and slopes less than 15 percent. For large land areas, these may provide an adequate basis for determining whether or not steep slopes are likely to be an issue on the property. However, the scale of the source data makes it impossible to determine the proportion of the property in each slope category. On-site surveying is required in that case.

Subdivision application fees should be reviewed to ensure that they cover the costs of administering the ordinance, including any special studies or outside assistance routinely utilized, such as a regional planning commission circuit rider planner.

EXAMPLES AND OUTCOMES

Following completion of a town plan update, the Norwich, Vermont, planning commission reviewed the community's zoning ordinance with an eye toward influencing development patterns in a manner more closely tied to the town's land use goals. These included encouraging denser development near the village where facilities and services are available, on better roads, and away from the town's rural natural resource areas. With the assistance of Burnt Rock Inc. of Waitsfield, Vermont, the commission incorporated feature-based density into the town's subdivision regulations in 2002. A cross-referencing statement was incorporated in the zoning ordinance as well.

Following a presentation on Norwich's innovative approach organized by the Upper Valley Lake Sunapee Regional Planning Commission, the Newbury N.H. planning board developed a similar approach incorporating feature-based density into that town's zoning ordinance. Newbury had previously adopted overlay districts for shorelands, wetlands and steep slopes. The planning board had been discussing and evaluating the relationship between natural features such as these and permitted development density. The community supported excluding these areas from the portion of a lot used for calculating the permitted number of lots. As with any substantial zoning amendment such as this, public input and acceptance strongly influenced the factors ultimately incorporated by Newbury. As a result of this input and of the physical layout of the community, Newbury did not include an "anti-sprawl" factor such as distance to the town center in the calculations. Several important conservation and recreation areas were identified as ones where a lower density in adjacent properties is desired.

Model Language and Guidance for Implementation

The purpose statement for the ordinance should be reviewed to ensure it encompasses the valid zoning purposes to be achieved through the community's feature-based density approach. If this approach is only applied to a portion of the community, a purpose statement should be developed specifically for the feature-based density provision to relate the community's specific goals to be achieved through this tool to the valid zoning purposes.

The maximum number of lots created within the [District] after the effective date of these regulations shall be determined as set forth below.

I. MINIMUM LOT SIZE

The minimum lot size within the [District] shall be not less than [*smallest permissible lot size in square feet or acres*].

This may or may not be the same as the maximum density depending on whether lot size averaging is allowed or multiple buildings are permitted on a lot.

If the community allows smaller lot sizes as part of a specific named clustering scheme such as a PUD, PRD or Village Plan, additional language will be needed here to make that exception to the usual minimum lot size.

Communities with public water and/or wastewater will probably want to consider different minimum lot sizes for lots on and off these services.

II. MAXIMUM AND MINIMUM DENSITY

In general the density (total number of units allowed on any pre-existing parcel) shall be as determined by the planning board in accordance with this section of the Ordinance, based upon the formulas set forth in Tables 1 and 2. However, the maximum density permitted will be [*insert maximum permissible density, e.g. one unit per developable acre*]. In no case will a density less than [*insert minimum density, e.g. one unit per every 50 acres of developable area*] be required.

The treatment of lot size and density varies from community to community. Every zoning ordinance needs a statement establishing whether or not each lot is limited to one dwelling unit or other principal use or building. Care should be taken to word this section in a manner which is consistent with the rest of your ordinance.

III. DETERMINATION OF DEVELOPABLE AREA

It is the intent of these regulations to limit development density on parcels on which fragile features and critical natural resources are located. To achieve this intent, development density shall be calculated based upon the total amount of developable area found on the pre-subdivision parcel. The developable area shall be determined by subtracting the area of these fragile features and critical natural resources, in

Feature-based density applies to new subdivisions. It can not replace environmental overlays, such as steep slopes and wetlands districts, as they would still be needed to ensure development on existing lots is located in the safest, most suitable location. While feature-based density accounts for unbuildable land in determining density, it does not prevent building on sensitive lands; environmental overlays are an effective tool to keep building sites away from sensitive resources.

The figures provided in the table are for example only. The planning board should revise it to fit the objectives of the local master plan and other zoning ordinance provisions such as floodplain, shoreline and wetlands overlays.

whole or in part, from the area that can be counted toward the density calculations. The total developable area shall be based upon the formula described in Table 1.3.1.

Determination of developable area only applies to the proposed creation of new lots or to the determination of density if more than one dwelling unit, other than an accessory unit, is desired on the lot. It does not apply to the use of pre-existing parcels for single or two family dwellings or other nonresidential uses that otherwise meet the minimum requirements of the zoning ordinance.

In determining the amount of developable area located on a parcel, the applicant may in some cases utilize the GIS mapset entitled [*map titles and dates*] prepared by [*e.g. regional planning commission*] available at the municipal office. In the event the planning board, as a result of site investigation, determines that the town/city's GIS data may not accurately identify features found on a site, the board may require the applicant to provide more detailed site-scale information prepared by a licensed engineer or surveyor regarding one or more of the features included in the table below. The applicant may also choose to provide site-scale data indicating the features listed in the table and use such data as the basis of the determination of developable area.

TABLE 1.3.1 Determination of Developable Area

Physical Features on the Parcel	Developable Area Adjustment*
Slopes in excess of 25%	deduct 100%
Slopes 15% - 24%	deduct 50%
100 Year Floodplain	deduct 100%
Wetlands and Surface Waters	deduct 100%
Wetland Buffers	no deduction
Shoreline Buffers	no deduction
Deer Wintering Areas	50% deduction
<i>Insert your community's other priorities here.</i>	
All Other Land	no deduction

* *In instances where two or more features overlap, the deduction is only made once for a given portion of the lot. The highest applicable deduction is made.*

In situations involving the subdivision of land for non-development purposes, the planning board may waive the requirements of this section.

IV. DETERMINATION OF DEVELOPMENT DENSITY

In accordance with the town/city of [*name*] master plan, it is the intent of this Ordinance to maintain low development densities in areas of the community with limited and/or poor access to municipal facilities and services, [*optional: insert other*

objectives to be achieved through density calculations, e.g. maintain low development densities contiguous to significant public lands and open spaces], and to encourage moderate to high densities in areas of the community with good access to municipal facilities and services and close proximity to the town/city center. Rather than designating multiple zoning districts within the [District], maximum density shall be based upon the unique characteristics of the parcel relative to highway access, distance to the town/city center, and [optional: e.g. proximity to protected open space].

The total development density of a site shall be presumed to be one unit per every [e.g. 1 acre] of developable area, although the density shall be adjusted in accordance with the formulas set forth in Table 1.3.2. In no instance shall the total allowable density be less than one unit per every [e.g. 50 acres] of developable area.

The area to be used for road right-of-way or other utility rights-of-way or other areas not incorporated in individual lots shall be excluded from the acreage figure used in the density calculation.

TABLE 1.3.2 Determination of Development Density	
Parcel Location	Adjustment to Area Required for Each Unit*
A. Proposed driveway or development road will access:	
Paved State or Class V Highway or Private Road built to standards approved by the Planning Board as part of an approved subdivision	x 1
Gravel Class V Highway or Private Road built to standards approved by the Planning Board as part of an approved subdivision	x 2
Substandard** Class V Highway (as identified by the Town/City) or other private road that does not meet municipal standards	x 4
B. After adjusting for access, adjustments shall be made for travel distance from the municipal building to the parcel (measured to the nearest part having 50 feet of frontage) by the most direct route using maintained state or town highways.	
Less than 1.5 miles	x 1
1.5 to 3 miles	x 3
3 to 5 miles	x 5
More than 5 miles	x 10
C. Optional: Consider adding additional objectives, for example: After adjusting for access and travel distance, the density shall be adjusted for proximity to the significant public lands listed below:	
[e.g. state park land, Appalachian Trail corridor]	[e.g. x 2]

Each community needs to make its own determination of an acceptable minimum and maximum density. The figures contained here are for example only.

* Density adjustments are cumulative.

** If using the term “substandard,” the community needs to carefully define what this means. In Newbury, for example, the town’s consulting engineer and road agent worked with the planning board to create a list of criteria based on grade, alignment, sight distances, surface condition and width, and shoulders. All of the roads in town were then evaluated and a list was developed.

Where the sample language makes reference to the “municipal building,” this should be a location representative of your own town/city center. For example, this may be a school or fire station. The size, character and geographic arrangement of your community will determine the appropriate distance categories and factors.

Each community should identify the factors appropriate to density determination, as well as the weight of each factor. The numbers here are shown for example only. However, all factors must have a clear rational linkage to density. For example, factors that might provide a basis for increased density include public water and/or wastewater treatment, or the provision of open space for recreational use by residents, or other site design features which reduce the negative impacts, or even enhance the benefits, of living in close proximity. Another example is stormwater management, where certain techniques can reduce the negative water resource impacts of concentrated impermeable surfaces. Similarly, location over zones of contribution to public drinking water supplies makes density an important water quality consideration. Any factors included should also be clearly and readily identifiable on a map or on the ground.

The planning board should take care to review the definitions section whenever amending the zoning ordinance to ensure that terms are appropriately and consistently defined.

V. BUILDING ENVELOPE

A minimum of one building envelope for each proposed new lot shall be delineated on the plans for subdivisions submitted for review and approval by the planning board indicating a minimum of [x] square feet for the location of all structures, site work other than access, and septic systems outside of setbacks, floodplains, slopes over [x] percent, wetlands and shoreland and wetlands buffers.

REFERENCES

Readings on related topics:

Arendt, Randall. 1998. “Connecting the Dots,” *Planning*, August.

Meshenberg, Michael J. 1976. *The Administration of Flexible Zoning Techniques. Planners Advisory Service Report 318.*

Nellis, Lee, and Karen Van Gilder. 2003. *The Planning for Results Guidebook.* National Association of Counties.

New Hampshire Association of Regional Planning Commissions. 2004. *Planning Principles for New Hampshire.*

Nicholson, Dave, and Jim Breuckman. 2004. *Smart Growth Tactics.* Michigan Society of Planning. May.

Example of regulations:

Norwich, Vermont’s regulations can be found on the town’s website at www.norwich.vt.us.

Newbury, New Hampshire’s regulations can be found on the town’s website at www.newburynh.org/Public_Documents/NewburyNH_Ordinances/toc

1.4 Conservation Subdivision

BACKGROUND AND PURPOSE

A conservation subdivision is a residential subdivision in which a substantial amount of the site remains as permanently protected open space while the homes are located on the remaining portion of the site. Under this approach, the community works with the applicant to fit the development into the landscape in a way that maximizes the protection of important natural and cultural amenities on the site and maintains the character of the community.

Conservation subdivisions can provide economic, environmental and social benefits to a community in the following ways.

- The cost of developing the lots can be reduced, which can support the inclusion of some affordable housing units as part of the development project.
- Future service costs for public infrastructure, such as roads, sewers and water lines, are lower because roads and water/sewer lines can be shorter.
- School buses, refuse trucks, snow plow and other service vehicles will have shorter service routes.
- Property values within conservation subdivisions can appreciate faster than properties in conventional subdivisions due to the added amenities provided by the adjacent open space.
- Residents enjoy the recreational opportunities and views provided by the preserved open space.
- Important and unique natural and cultural features, such as archeological or historical sites, can be protected.
- Can reduce the amount of impervious surface created, thus reducing runoff to local water bodies, such as rivers and streams.
- The open space can provide a buffer to protect water bodies and other natural areas, lowering the impact that development has on fragile natural features.
- A larger network of protected areas and open space can be created if open space is connected across several developments and potentially support trail networks for walking, biking, and hiking.
- The clustering of houses can encourage more walking and more frequent interaction with ones' neighbors, fostering a stronger sense of community.

RELATED TOOLS:

- Pedestrian-Oriented Development
- Density Transfer Credit
- Feature-Based Density
- Lot Size Averaging
- Permanent (Post-Construction) Stormwater Management
- Habitat Protection

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Conservation subdivision requirements will be most effective when used with a larger plan for resource conservation and community development. New developments using the conservation subdivision design approach can match their development layout to a local or regional open space protection plan to ensure that important natural resource areas, such as a river corridor, are protected as one large, contiguous block even though several individual parcels are developed at different points in time.

Prior to working with the model zoning ordinance and subdivision regulations, a community should consider the following questions and their community's goals.

HOW MUCH LAND AREA SHOULD BE CONSERVED?

Given that conservation of open space is typically a primary objective of pursuing this approach, communities are encouraged to require that a minimum of 50 percent of "buildable" area of the parcel and 80 percent of the "non-buildable" area be conserved as part of a conservation subdivision. "Non-buildable" area is defined based on a community's existing development restrictions (i.e., what areas cannot be counted toward minimum lot size or are restricted from development), but may include wetlands, hydric soils, open water, slopes greater than 25 percent, or any area otherwise restricted from development. By requiring a minimum of 50 percent of the "buildable" land to be conserved helps ensure that uplands, agricultural land, and forested areas are preserved as well as wetlands.

Although it is up to the community to decide what amount of land must be conserved, lesser requirements may not provide sufficient open space to meet the objectives of the community. A community might decide to vary the required amount of open space that must be conserved for different areas or zones within their community. For example, the amount of required open space might increase to 80 percent of the total area of the parcel in areas zoned as rural or agricultural/forestry, but might decrease to 20 percent in higher-density areas.

Communities should also be explicit about what types of land can be counted as part of the open space. For example, land that is part of an individual house lot or right-of-way should not be counted as part of the conserved open space.

WHAT USES SHOULD BE ALLOWED IN THE CONSERVED OPEN SPACE?

A community should identify what activities or uses are allowed within the conserved open space. The types of uses allowed and the amount of the conserved land that can be dedicated to those uses will depend on the community's goals and the nature of the resources being protected. For example, more intensive uses, such as a playground or ball field, might be allowed in a higher-density zone, but most uses could be restricted in areas conserved as wildlife habitat preservation or working farmland.

WHAT RESOURCES SHOULD BE PROTECTED?

Upfront consideration of a community's priorities for protection will help guide the implementation of this approach. Some resources that a community might give priority to include in the open space include:

- Floodplains
- Wetlands, including vernal pools
- Riparian areas (land areas adjacent to water bodies) and surrounding uplands
- Habitat for threatened or endangered species
- Highest condition habitat areas defined by NH Wildlife Action Plan
- Wildlife corridors
- Drinking water supply areas, e.g., wellhead protection areas
- Cemeteries
- Historic sites
- Scenic viewsheds
- Contiguous, high-productivity woodlands
- Productive agricultural or forest soils
- Existing or planned hiking, biking, walking, skiing or snowmobile trails through the site

SHOULD INCENTIVES BE OFFERED FOR CERTAIN DESIGN CHARACTERISTICS?

Incentives may be used to encourage the use of this approach, to motivate better design, or to promote the use of a conservation easement held by a third party to protect the open space. Incentives, which typically take the form of additional dwelling units, should be used sparingly.

Incentives can be used to encourage applicants to provide certain amenities within the development, such as full public access to the open space or a percentage of affordable units, or to encourage designs that provide for greater protection of certain types of natural or cultural features of particular importance to the community.

HOW SHOULD THE NUMBER OF UNITS ALLOWED BE DETERMINED?

Communities are encouraged to use a formula-based approach as the primary method for determining the number of units that can be built within a conservation subdivision. Under a formula-based approach, the number of units is determined based on the natural resource and spatial characteristics of the site and the underlying zoning or density requirements. Several communities in New Hampshire have used formula-based approaches, including Hopkinton, New Durham, and Chichester.

The intent of a conservation subdivision approach is to allow at least as many units as could be built under a conventional approach. To avoid conflict on whether

a formula-based approach unfairly reduces the number of units, communities can allow the use of the yield plan approach as a secondary option. Under the yield plan approach, an applicant creates a conventional subdivision plan to determine the number of allowable units. Although many communities currently use a yield plan approach, this approach can be expensive and time-consuming, and thus, serve as a deterrent to the use of the conservation subdivision approach. Often the effort invested by both the applicant and the planning board in developing and evaluating the conventional subdivision design during the yield plan process is better spent in developing a better conservation subdivision design.

WHAT COMMUNITY CONCERNS ABOUT DESIGN AND LAYOUT SHOULD BE ADDRESSED?

Under a conservation subdivision approach, most, if not all, dimensional requirements for individual lots are eliminated or substantially reduced to provide more flexibility to fit the development to the landscape. However, communities might wish to adopt design standards or guidelines to address community concerns regarding the visual impact of a new development or the quality of the open space conserved. Some of the design standards will be appropriate to apply to all types of subdivisions, not just those using a conservation design approach.

Layout and Location of Protected Open Space

The protected open space within a conservation subdivision should, whenever possible, be connected to undeveloped land on adjacent parcels. Communities may also include additional design parameters as well as a requirement that the subdivision proposal demonstrate consistency with local and regional long-term open space or land protection plans, where applicable.

Rural Character within Built Area

A community may have concerns with allowing a large number of homes to be tightly clustered together, particularly in rural or agricultural areas. In such situations, design standards can be included in the subdivision regulations to maintain the open, undeveloped character of the community and provide a sense of privacy and openness for individual houses.

Neighborhood or Village Character within Built Area

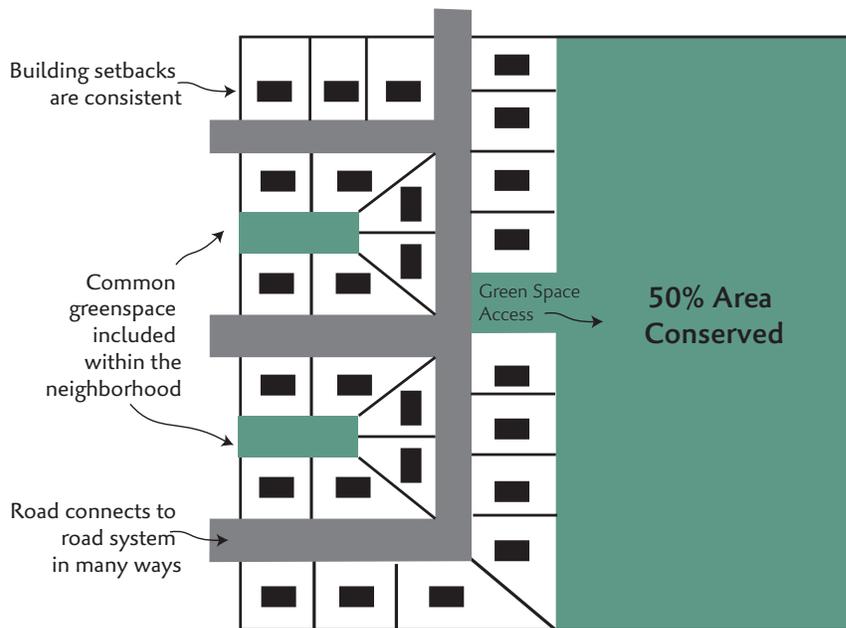
Development within higher-density areas, such as those adjacent to an existing village or town center, or larger developments with a significant clustering of homes, might benefit from using village-type design parameters to structure the built area. A village-type layout of homes, consistent with the traditional New England style of development, will allow homes to be located closer together in much less space, while still creating a comfortable environment for residents and pedestrians. In addition to the model regulations in this chapter, see Chapter 1.5: Village Plan Development.

Minimize the Impact on the Environment

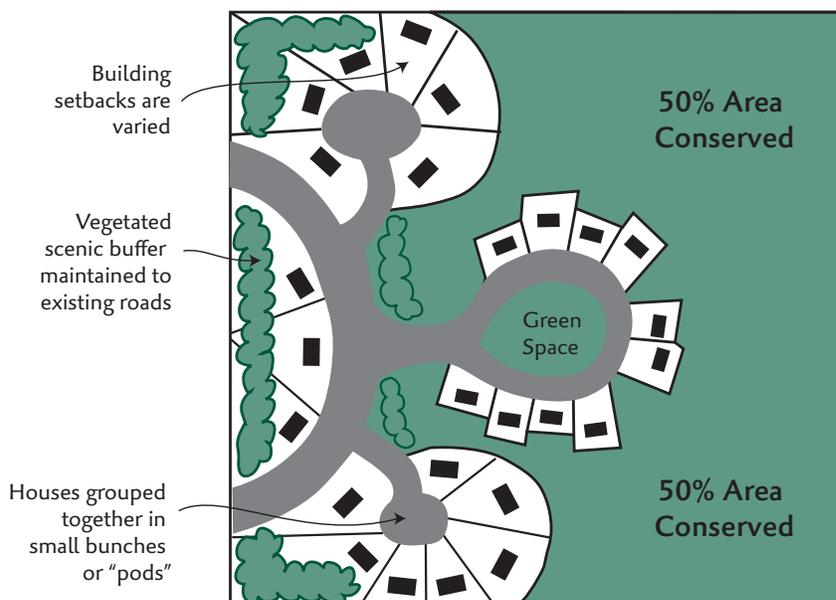
Zoning/subdivision requirements designed to protect natural resources (e.g., wetland buffers, stormwater, landscaping) should continue to apply to all subdivisions, including conservation subdivisions. In many cases, using a conservation subdivision design approach makes it easier for a development to comply with existing and recommended

FIGURE 1.4.1 Conservation Design Works in Village and Rural Settings

**Village Style Layout
(26 Houses)**



**"Rural Pod" Layout
(26 Houses)**



practices for minimizing impacts. For more information on this topic, please refer to the standards presented in the chapters on *Water Resource Protection*, *Permanent (Post-Construction) Stormwater Management*, *Landscaping*, and *Habitat Protection*.

OTHER COMMUNITY CONCERNS:

How will Long-term Protection of the Conserved Open Space be Ensured? What Role is the Municipality Willing to Assume?

The open space land may remain in private ownership by one or more landowners, be owned in common, or be conveyed to the municipality or to a third-party organization. Regardless of who owns the conserved open space, a community needs to ensure that there is an acceptable legal restriction and stewardship plan in place to ensure the long-term protection of the open space conserved as part of the conservation subdivision.

Conservation easements are legally binding agreements held by a third-party (either a municipality or a qualified organization in the area), that govern the future use and management of the parcel of land on which the conservation easement is placed. The easement provides the legal basis for the organization that holds the easement to ensure the long-term protection of the open space. Conservation easements are the preferred approach for larger areas of protected open space, especially for parcels containing high-valued natural resource or cultural features. Local and state-wide land trusts and conservation groups are more likely to accept an easement for larger parcels protecting resources and/or areas they have identified as important (either as a participant in the site design process or in a previous conservation planning effort). The municipality (often the local conservation commission) must be prepared to perform all the necessary actions if they hold a conservation easement on a property.

Deed restrictions (also called restrictive covenants) can also be used to protect open space. A deed restriction is a restriction on the use of land usually set forth in the deed of a property. The restrictions would limit how the open space is used, the structures that would be allowed on it and how the land should be maintained in perpetuity. A homeowners' association is almost always required, especially when there is joint open land and/or open space protected through deed restrictions alone. If deed restrictions are implemented, municipalities should provide sample language to the applicant to ensure effectiveness and should require that the municipality and any resident of the development or abutting properties have the authority to enforce the deed restriction. Although deed restrictions are considered a less secure alternative, they can be an appropriate protection method for smaller parcels of land or for open spaces that are subject to more intensive uses.

To facilitate oversight of the conserved land, protected areas must be clearly identified on a final plat of the subdivision and on-the-ground markers should be placed on site to identify the boundaries of conservation land.

The logistics of implementing a **long-term monitoring and stewardship plan** also must be addressed. The monitoring and stewardship plan ensures that the conditions of the open space protection agreement (whether it is an easement or deed restriction) are honored. One approach to provide for long-term stewardship is to assess a fee at the time of subdivision approval to fund long-term monitoring. Most

local and state organizations require a fee to cover their stewardship responsibilities when accepting an easement.

Municipalities might also require that homeowner education materials be developed to teach new homeowners about the appropriate uses and prohibited activities in the protected open space. The planning board should discuss with the applicant and the conservation commission how these materials will be developed, maintained and distributed to future homeowners.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

ENABLING STATUTES

RSA 674:21 authorizes a community to enact a conservation subdivision ordinance. A community follows the same procedures to enact a conservation subdivision ordinance as other ordinances, as outlined in RSA 675:2-5. Although some communities require a special exception for a conservation subdivision, this is not recommended. To encourage the use of this approach, a conservation subdivision application should be treated in the same manner as a conventional subdivision application.

Under RSA 674:21, municipalities have the option of granting the planning board the authority to issue a special permit (also known as a conditional use permit) as a means of giving the planning board and applicants greater flexibility to waive or modify some or all of the requirements specified in the conservation subdivision ordinance or to allow certain additional uses in the designated open space when deemed appropriate. The advantage of allowing special permits is that the planning board can work with an applicant to modify a plan when it is in the best interest of the community and the applicant to do so without requiring a zoning variance.

When authorized by local zoning, the conservation subdivision approach can be the required format for new subdivisions. A community might elect to require this approach for all subdivisions or only for subdivisions of a certain size, e.g., greater than 10 acres, or in certain areas of their community, such as those areas targeted for conservation or for parcels containing certain types of important natural or cultural features.

To make the best use of the conservation subdivision approach, communities should revise the application requirements and review process for all subdivisions to require more detailed information on the site to be developed earlier in the review process and to require applicants to participate in a preliminary review prior to submitting a formal application (under RSA 676:4, II). Pursuant to RSA 674:35, I, a municipality's governing body must authorize the planning board to require preliminary review of applications for the subdivision or land (and for site plans, under RSA 674:43, I). The process for subdivision application and review and the submission requirements for each step are addressed in a municipality's subdivision regulations.

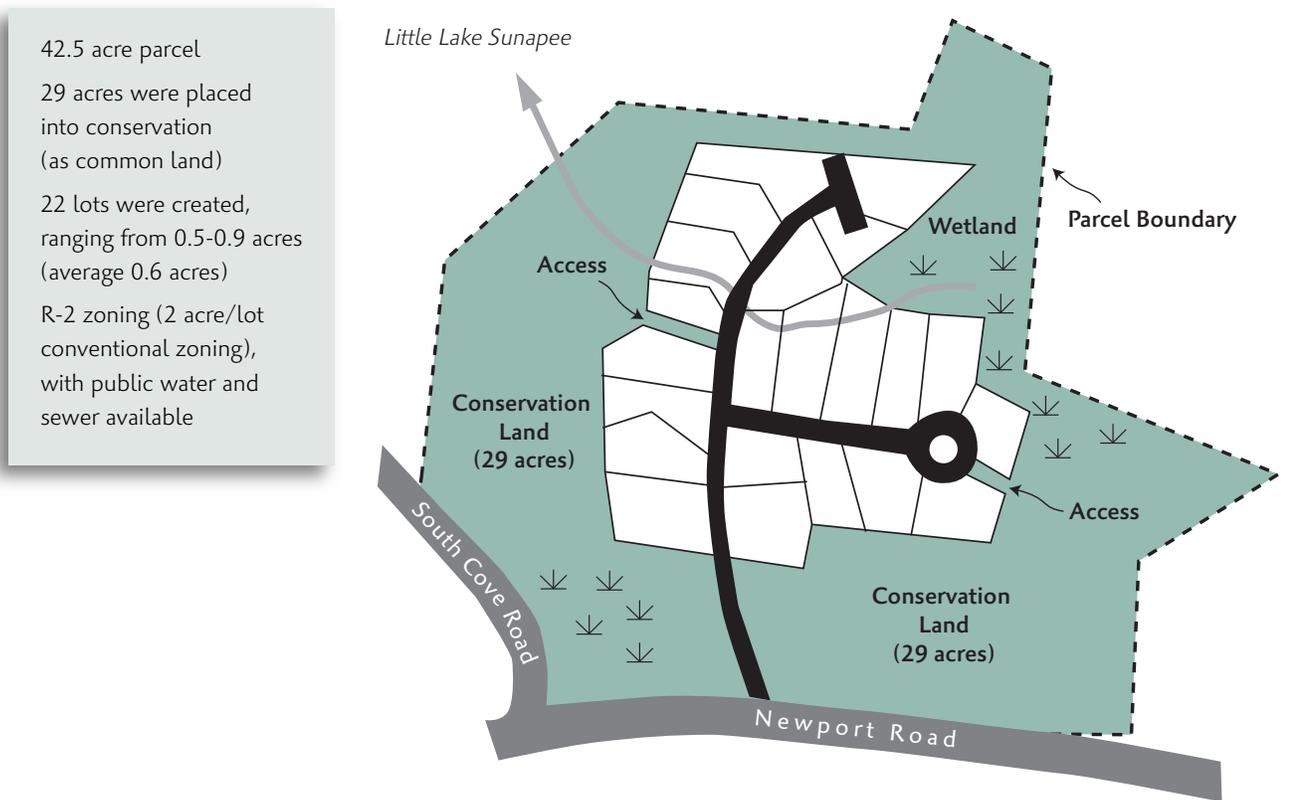
New Hampshire statute identifies three stages of plan review: preliminary review, design review, and formal application (RSA 676:4, II). Preliminary review is non-binding and is limited to discussion of "proposals in conceptual form only and in general terms such as desirability of types of development and proposals under the master plan (RSA 676:4, IIa)."

EXAMPLES AND OUTCOMES

Many New Hampshire communities have adopted some type of open space or conservation subdivision design approach. Communities vary substantially, however, in how these concepts are applied, including the amount of open space that must be conserved and whether the use of conservation design is required (or optional).

The communities of Hanover, Hopkinton, and Durham have adopted the approach described in this chapter. Exeter, Stratham, Dublin, New Durham, and Dover, among others, have similar open space subdivision requirements.

FIGURE 1.4.2 Conservation Subdivision Example: Great Pines, New London, New Hampshire



42.5 acre parcel
 29 acres were placed into conservation (as common land)
 22 lots were created, ranging from 0.5-0.9 acres (average 0.6 acres)
 R-2 zoning (2 acre/lot conventional zoning), with public water and sewer available

Property is located uphill, approximately 1,000 feet from Little Lake Sunapee, which provided the impetus for developing this property as an open space/conservation/ cluster subdivision (under New London's cluster development ordinance in place at that time). To further reduce the potential impact, this project used a narrow pavement width (18 feet of pavement with gravel shoulders within 50 foot right-of-way), minimized clearing and land disturbance, and included additional measures to control stormwater runoff (e.g., infiltrating open swales rather than a closed drainage system).

Required setbacks include: 20 feet from edge of pavement, 100 feet from the exterior parcel boundary, and 25 feet separation between structures on adjacent lots.

Model Language and Guidance for Implementation

This section provides a model conservation subdivision zoning ordinance and additional model subdivision regulation language. Also included are model resolutions authorizing the planning board to require applicants to participate in site inventory review and conceptual plan review meetings with the planning board prior to submitting a formal subdivision application. The model subdivision regulation language revises the application requirements and review process for all subdivisions. A conservation subdivision ordinance will be more effective if a community also revises the general requirements and application process for all subdivisions.

CONSERVATION SUBDIVISION ORDINANCE

I. PURPOSE

This Conservation Subdivision ordinance is intended to encourage environmentally sound planning to conserve open space, retain and protect important natural and cultural features, and provide for efficient use of land and community services to advance the goals stated in the master plan.

II. OBJECTIVES

- To maintain rural character, preserving farmland, forests and maintaining rural views.
- To preserve those areas of the site that have the highest ecological value, including, for example, wildlife habitat, e.g., large unfragmented blocks of undeveloped land, areas of highest condition identified based on NH Fish and Game's Wildlife Action Plan, and water resources, e.g., drinking water supply areas and watersheds, wetlands, streams and rivers.
- To locate buildings and structures on those portions of the site that are the most appropriate for development and avoiding developing in areas ill-suited for development, including, for example, areas with poor soil conditions, a high water table, that are subject to frequent flooding or that have excessively steep slopes.
- To preserve historic, archeological, and cultural features located on the site.
- To create a contiguous network of open spaces or "greenways" by linking the common open spaces within the subdivision and to open space on adjoining lands wherever possible.
- To reduce the impacts on water resources by minimizing land disturbance and the creation of impervious surfaces and stormwater runoff.
- To reduce the amount of roads, sidewalks, and stormwater management structures that must be built and maintained.
- To minimize the impact of residential development on the municipality, neighboring properties, and the natural environment.

Each community should examine its own purpose and objectives, as expressed by the public and articulated in the Master Plan, in implementing this approach.

Municipalities should review the list below and include only those terms not already defined within their zoning ordinance, or revise terms included within their ordinance as needed. Terms that are expected to already be defined in a town's existing zoning ordinance are not included here.

III. DEFINITIONS

For the purpose of this chapter, the terms used herein are defined as follows:

Applicant: The owner of land proposed to be subdivided or his representative.

Buffer: Land area within which adequate vegetation is maintained or provided to visibly separate or screen one use from another and/or to minimize potentially negative impacts on surrounding areas, e.g., shield or block noise, light or other nuisances, reduce water pollution. Also known as a “vegetated buffer.”

Buildable Area: Land area of a parcel excluding non-buildable area.

Buildable Lot: The smallest lot area established by the zoning ordinance on which a use or structure may be located in a particular district.

Building Envelope: Area of a building lot identified on a subdivision plan indicating the allowed limits of clearing and grading, and within which all structures, and, when applicable, the well and septic systems, including the tank and leach field, shall be located.

Conservation Easement: A permanent legal restriction against future development and other activities as specified in the conservation easement deed. An easement may be worded to permit or restrict public access, allow or disallow recreational uses, allow or disallow other uses, such as limited development, agriculture, or forestry. Easements are tied to the title of the land, regardless of subsequent ownership.

Conservation Subdivision: An alternative form of residential development where, instead of subdividing an entire tract into lots of conventional size, a similar number of housing units are arranged on lots of reduced dimensions, with the remaining area of the parcel permanently protected as designated open space. Also referred to as “open space subdivision.”

Deed Restriction: A restriction on the use of land usually set forth in the deed for the property. Also known as a “restrictive covenant.”

Designated Open Space: Reserved land that is permanently protected from further development and remains in a natural condition or is managed according to an approved management plan for natural resource functions, e.g., forestry, agriculture, habitat protection, passive recreation, or limited uses as approved by the planning board under this ordinance as part of a conservation subdivision.

Easement: The right or privilege that a person may have in another person's property, often for the purposes of installing and maintaining utilities and drainage ways or allowing a right of passage.

Homeowners Association: A private corporation, association, or other legal entity organized in accordance with state law and established by the applicant or the member individuals for the benefit and enjoyment of its members, including oversight and management of common open space, designated open space, and/or shared facilities.

Non-buildable Area: Land area that cannot be counted toward the minimum lot size under a conventional subdivision, including areas with the following characteristics:

wetlands or wetland soils as defined by RSA 482-A: 2, X; slopes greater than 25 percent; submerged areas; utility rights-of way; land area within the 100-year floodplain; or land that is restricted from development by covenant, easement or other restriction.

Open Space Common: Land within or related to a development, exclusive of land dedicated as designated open space, not individually owned, which is designed and intended for the common use or enjoyment of the residents of the development and/or the town and may include such complementary structures and improvements as are necessary, appropriate and approved by the planning board.

Restrictive Covenant: A restriction on the use of land usually set forth in the deed for the property.

Sketch Plan: A preparatory sketch of the preliminary subdivision layout that does not include engineering details, which is used to support a general discussion with the planning board as to the form of the plat and the objectives of the zoning ordinance and applicable subdivision or site plan regulations.

The definition of **non-buildable area** should be customized for each community based on its restrictions regarding what land area can be counted toward the minimum lot size under the conventional subdivision requirements.

IV. AUTHORITY AND APPLICABILITY

- A. To facilitate the implementation of the goals of the master plan, all subdivisions for residential use shall use a conservation subdivision design approach, unless exempted under Section IV.B or granted a special use permit under Section IV.C.

The model ordinance is written to encourage the use of conservation design subdivisions, but to allow the planning board to entertain a conventional development plan under a special permit or conditional use process (rather than seeking a variance from the Zoning Board of Adjustment). Under this approach, the use of the conventional subdivision design is subject to an additional review and approval step by the planning board, making it somewhat more difficult for the applicant to pursue conventional subdivision design.

Each community must decide whether it wishes to require the use of conservation subdivision design for residential subdivision development or leave the choice up to the applicant. A community can also require the use of conservation subdivision design for specific areas or situations, such as specific zoning districts or on any parcel with high natural resource value (e.g., on parcels containing rare or outstanding habitat features, buffer areas to wetlands, streams, rivers, ponds, and lakes, etc.), or when certain cultural features are present such as historic structures or existing trail networks.

This model ordinance does not restrict the use of the conservation subdivision approach to larger parcels of land. Instead, the level of protection afforded to the open space is expected to vary. Although smaller parcels of conserved land are generally not viable candidates for a conservation easement held and enforced by a third party, such areas can be protected through deed restrictions. The open space is protected over time by ensuring that neighboring land owners in the subdivision and abutters, a community association, and the town all have the legal authority to enforce the deed restrictions.

- B. **Exemptions:** Subdivisions meeting any one of the following criteria shall be exempt from the requirements of this section, unless a landowner elects to follow the standards of this section.

If conservation subdivision is required as the primary form of residential subdivision, the community might wish to identify specific conditions under which conservation subdivision is not required, such as when a small number of lots or dwelling units are created with no future opportunity for further subdivision or when very large lots are created, e.g., 11-25 acres or greater per lot. A lot that is at least 11 acres in size is eligible for the current use tax assessment for 10 acres.

1. The subdivision creates lots that are, on average, equal to or greater than 479,160 square feet (11 acres) in size and provided the deed for each lot created contains a restriction prohibiting the further subdivision of the lot;
2. The parent parcel is nine acres or less in total size and the subdivision does not require a new road; or
3. The subdivision creates five or fewer dwelling units and does not require a new road.

C. Authorization to Issue a Special Use Permit: Notwithstanding other provisions of (municipality)'s zoning ordinance, authority is hereby granted to the planning board, as allowed under RSA 674:21, II, to issue a special use permit to modify the requirements of this section as follows:

1. The planning board may issue a special use permit for the parcel to be developed as a conventional subdivision when it finds that:
 - a. The parcel is ill-suited for development using conservation subdivision design, or a conventional design provides greater or equal benefits to the community; and
 - b. The conventional subdivision design retains and protects important natural and/or cultural features identified by the planning board and/or the site inventory.
2. The planning board may issue a special use permit for a modified conservation subdivision design to allow for variations from certain requirements of this section as specified herein. Such modifications shall be consistent with the purposes and standards of this section, fall within the guidelines contained herein, and shall not be detrimental to public health, safety or welfare.

Municipalities have the option of granting the planning board the authority to issue a special permit (also known as a conditional use permit) as a means of giving the planning board and applicants greater flexibility to "fit" the development into the landscape by being able to waive or modify some or all of the requirements specified in the conservation subdivision ordinance or to allow certain additional uses in the designated open space when deemed appropriate. The advantage of allowing special permits is that the planning board can work with an applicant to modify a plan when it is in the best interest of the community without forcing the applicant to pursue a zoning variance. The risk, however, is that the applicant and/or planning board may also go too far in relaxing the standards. For this reason, this model ordinance specifies the degree to which the specific standards can be varied under a conditional use or special permit.

D. Sequential Subdivisions: The provisions of this ordinance shall apply to the sequenced development of a parent parcel over time through separate successive applications. When a subdivision is proposed that involves part of a larger

parcel or includes lots that are capable of further subdivision, the planning board may require that a site inventory and a conceptual (non-binding) long-range plan be submitted for the entire parcel and used to evaluate the proposed subdivision.

- E. **Review Process:** A subdivision application under this section shall comply with the application and review process specified in the subdivision regulations, except that sections of the subdivision regulations that are clearly not applicable to a conservation subdivision design shall not be imposed on the applicant by the planning board.
- F. **Legal Review:** Prior to final approval by the planning board, the applicant shall submit for review by the town counsel any restrictive covenants, condominium or cooperative agreements, conservation easement, deed restrictions, or other legal agreements proposed for use in the conservation subdivision. The town counsel shall advise the planning board of the adequacy of such legal provisions. The applicant shall pay all associated costs of the legal review.

The details for the **review process** are provided in the model language for revising a community’s subdivision review regulations, which follow the model zoning ordinance.

V. MAXIMUM DEVELOPMENT DENSITY

- A. **Base Number of Development Units:** The applicant shall choose one of the following methods for calculating the base number of dwelling units that may be constructed on the property:
 1. **Formula Approach:** Under the formula approach, the base number of dwelling units is determined by the following formula:

Example Formula

$$\text{Base Number Dwelling Units} = \frac{[(\text{Net Area}) \times (\text{Factor}) \div \text{Conventional Minimum Lot Size} (\# \text{ Dwelling Units/Lot})]$$

Where Net Area =

Total Area of Parcel (sq. ft.) – “Non-Buildable Area” on the Parcel (sq. ft.)

Conventional Minimum Lot Size = lot size determined for a single-family building, two-family building, or multi-family building (or combination of the above as permitted) based on the conventional zoning requirements.

Non-Buildable Area = any area that cannot be counted toward the minimum lot size under a conventional subdivision or is restricted from development by covenant, easement or other restriction (see definition).

Factor = number determined by the following:

Percentage of Parcel that is Wetlands and/or Steep Slopes*	Factor
0-<10%	0.75
10-<20%	0.70
20-<30%	0.65
30% or more	Use Yield Plan Approach

* Steep slopes are those greater than 25%

The “**factor**” accounts for area required for a new roadway, right-of-way, and utilities, and reflects the difficulty of developing a site by varying density based on the amount of wetlands and steep slopes.

The number of allowable dwelling units is determined based on the allowable number of units per building under the conventional zoning, where the result is rounded up for single family homes and down to the next whole number for buildings containing more than one dwelling unit.

If the subdivision involves only part of a parcel, the buildable area shall be calculated for that portion of the parcel proposed to be included in the subdivision. If a parcel is located in more than one district, the base number of allowable dwelling units will be determined for each portion of the parcel separately and added together and then rounded to the next whole number.

For example, for a 120 acre parcel in a 3 acre zone (i.e., 3 acre minimum lot size per single family home (1 dwelling unit per building)) with 30 acres of wetlands, the example formula approach above permits 20 dwelling units, as single family homes

$$[(120-30)*0.65] \div 3 = 19.5 \text{ or } 20 \text{ single family homes.}$$

With a 4 acre minimum lot size per two-family building (each building containing two dwelling units), 14 two-family buildings are permitted

$$[(120-30)*0.65] \div 4 = 14.6 \text{ or } 14 \text{ buildings,}$$

$$*2 \text{ dwelling units per building} = 28 \text{ dwelling units.}$$

Communities should evaluate any proposed formula against several recent subdivisions and consider the nature of remaining land in their community. The objective is to define a formula that provides a number of units that is the same or very close to the number that would be allowed under a conventional subdivision approach.

2. **Yield Plan Approach:** Under this approach, the applicant presents a yield plan to the planning board to determine the number of allowable buildings and dwelling units permitted within the conservation subdivision. The yield plan is a sketch plan for a conventional subdivision development that fully complies with the requirements for a conventional subdivision.

Applicants and planning boards must follow all standard procedures for approving variances or waivers in approving a Yield Plan (see Auger v. Town of Strafford, No. 2006-646).

3. Exceptions

- a. If more than 30 percent of the area of the parcel consists of wetlands or steep slopes, then the applicant shall use the yield plan approach to determine the allowable number of buildings and dwelling units.
- b. The planning board may require the preparation of a yield plan if the subdivision creates 20 or more dwelling units as determined by the Formula Approach. The planning board may require the use of the yield plan for determining the permitted number of dwelling units if it finds, upon review of the yield plan, that the characteristics of the site, e.g., soil types, arrangement of wetlands and steep slopes, support fewer than 90 percent of the number of dwelling units permitted by using the formula approach.

- B. Incentives:** Additional dwelling units and/or lots, not to exceed 20 percent over and above the base number of dwelling units permitted, may be awarded at the discretion of the planning board for any of the following:

Incentives generally are not needed to encourage the use of the conservation subdivision approach, provided the review/approval process is the same as for a conventional subdivision. Incentives are best used sparingly to encourage actions that cannot be required – such as providing full public access, more permanently protected open space, or establishing a permanent conservation easement held by a third-party conservation organization. Too many opportunities for applicants to increase the number of dwelling units allowed can reduce community support for using the conservation subdivision approach.

1. Conservation of greater than 50 percent of the buildable area of the parcel within the designated open space shall receive a 5 percent increase in the number of dwelling units allowed for every additional 10 percent of open space protected, up to a maximum increase of 15 percent over the base number of dwelling units allowed.
2. Developments that grant public access, i.e., not limited to residents of the subdivision, to the designated open space shall be eligible for up to a 10 percent increase in the number of dwelling units allowed.
3. Developments that provide for a permanent conservation easement and that include a stewardship fund payment, acceptable to the planning board and held by the town, a recognized conservation organization, or land trust, shall be eligible for a 10 percent increase in the number of dwelling units allowed.

For example, a 20-unit development with 72 percent of the buildable area of the parcel retained as designated open space would receive two additional bonus units, for a total of 22 units.

In this case, the additional dwelling units are provided to encourage the establishment of conservation easements in recognition of the additional work and expense involved in putting the easement in place.

VI. DIMENSIONAL REQUIREMENTS

A. Lot Size Requirements

1. Buildings in a conservation subdivision may be located on individual residential lots, on common lots, or a combination thereof. If more than one dwelling unit will be located on a lot, the ownership and management arrangements for that lot, and the units thereon, shall be included in the subdivision application. The arrangements shall be subject to approval by the planning board in accordance with the subdivision regulations.
2. **Minimum Lot Size** [First Option for a Municipality]
 - a. If public wastewater treatment is not available, the minimum lot size permitted shall be based on soil-based lot sizing requirements for wastewater management as specified by the New Hampshire Department of Environmental Services. Developments may utilize individual or community wells and/or septic systems.
 - b. The planning board may require lot sizes to be larger than the minimum required under soil-based lot sizing to comply with other requirements of this section, particularly the dimensional and

The model provides two options for establishing a minimum lot size within a conservation design subdivision. Under the first approach, the minimum lot size is determined by soil-based lot sizing requirements for wastewater management. Under the second approach, the community specifies a minimum lot size, e.g., 50 percent of the minimum lot size under conventional subdivision, but allows for variation from that minimum by special permit.

design standards of this section, or to protect human health, welfare and public safety.

- c. If public or community wastewater treatment is provided, lot size shall be the minimum size necessary to comply with the dimensional and design requirements of this section. In no case, shall a lot be less than 5,000 square feet.
- d) The size of the individual lots shall be shown on the subdivision plan and shall be subject to planning board approval based upon its finding that the lot sizes will allow for the creation of a high-quality living environment for the residents of the subdivision and the abutting property owners.

3. Minimum Lot Size [Second Option for a Municipality]

[Insert a minimum lot size table for your community]

The municipality determines standard minimum lot size(s) within a conservation design subdivision for each zoning district, but allows for flexibility by including the section below on alternative lot sizing.

4. Alternative Lot Sizing: The planning board may authorize variations from the minimum lot sizes specified above by special use permit, provided the planning board determines that the following conditions are met:

- a. All lots comply with the New Hampshire Department of Environmental Services requirements for subsurface wastewater management (developments may utilize individual or community wells and/or septic systems); and
- b. The goals and design specifications of this section are otherwise achieved.

B. Specifications for Individual Lots

- 1. A building envelope shall be identified for each new lot in compliance with the standards in Table 1 to ensure an adequate separation between new primary structures on the subdivided parcel and between new primary structures and existing structures on adjacent lots. For new lots, the standard is applied to the *average* distance between building envelopes on adjacent new lots, i.e., the actual distance of separation may vary and be less than the minimum specified for some lots, provided that, on average, the minimum distance of separation is achieved across all new lots created. Variations from this standard may be granted by the planning board under special permit provided that the intent of this section is met and an adequate vegetated buffer is maintained or provided between new structures.

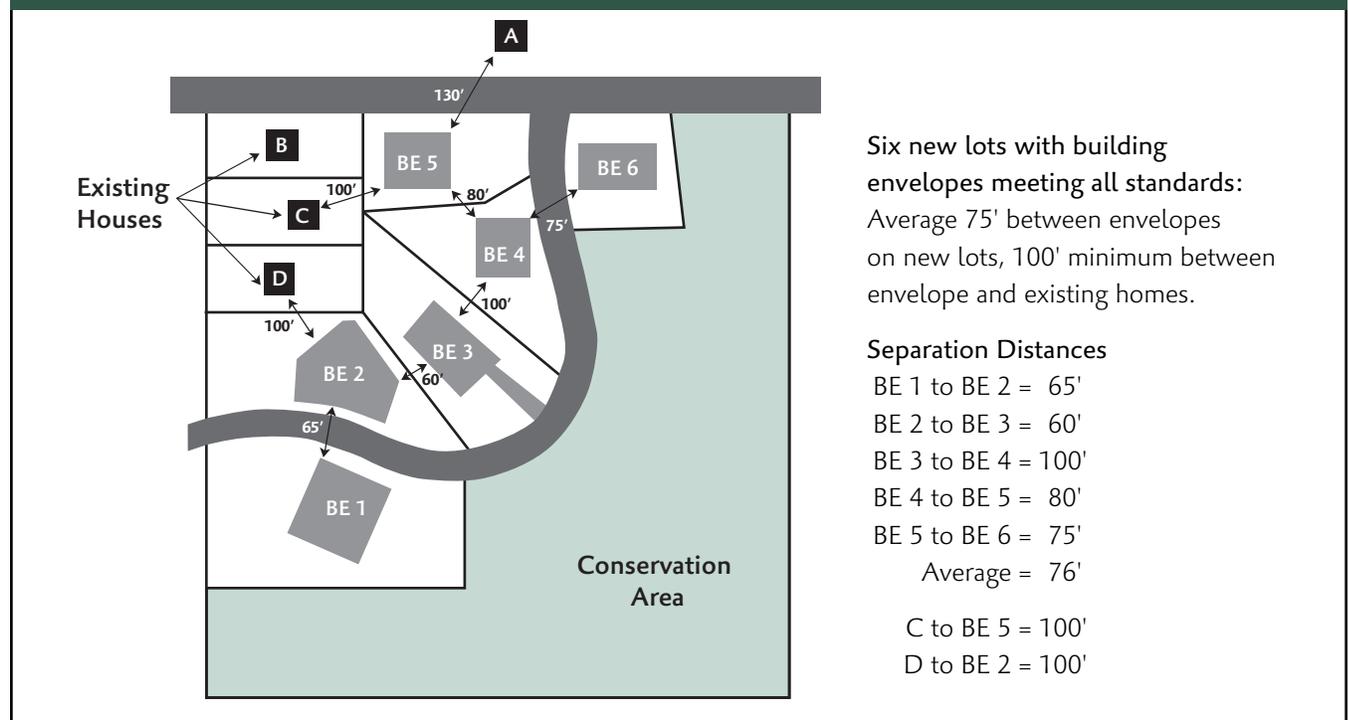
Minimal dimensional standards are set under this approach to allow flexibility in the design and layout of the subdivision and maximize the open space conserved. For this reason, frontage requirements are eliminated and set back requirements are minimized. The layout of structures is managed by the required separation between building envelopes. A community should review these specifications for consistency with their objectives for the design of subdivisions within their different zoning districts.

Table 1.4.1: Specifications of Minimum Separation Distances Between Building Envelopes
 [EXAMPLE: Specify Requirements for Your Community!]

District	Minimum Separation Distance of Building Envelopes for New Lots From Existing Structures on Adjacent Parcels	Minimum Average Separation Distance Between Building Envelopes for New Lots
Rural – large lots (4+ acres)	100 feet	75 feet
Rural Residential (2-3 acre lots)	75 feet	50 feet
Residential(1 acre lots)	40 feet*	30 feet*
Village Development (< 1 acre lots)	30 feet*	20 feet*

* The minimum separation distance may be reduced to the average separation between structures on neighboring properties.

FIGURE 1.4.3 Building Separation in a Conservation Subdivision



- Principal structures located on a common lot (and within a common building envelope) shall be no less than 15 feet apart and shall conform to the requirements of the town's building code and the NFPA fire protection codes based upon the type of construction and proposed use.
- Height limits for structures shall be determined by the underlying zoning for the parcel, unless variations are granted by special permit.
- Building envelopes shall provide for a minimum setback of at least 10 feet from the lot boundaries.
- Building envelopes shall be delineated to ensure that no structures shall be less than 15 feet from the edge of pavement of the roadway.

6. Building envelopes shall be setback a minimum of 50 feet from wetlands and shorelines (unless subject to a greater setback requirement under local zoning or state law). No structures or supporting utilities may be constructed on wetland.
 7. Lots may be irregular in size and shape provided they conform to the natural topography and features of the parcel (e.g., the lot lines follow an existing stone wall, stream, or other natural dividing feature).
 8. The planning board may authorize variations from the above standards, except for provision (6) pertaining to the setback from a wetland/shoreline or any requirement covered by state regulation or addressed elsewhere in this ordinance, by up to 50 percent by special use permit issued pursuant to Section IV.C.2, for the purpose of providing flexibility in the design of the subdivision to meet the objectives of this section or to support the creation or continuation of a traditional village-style development pattern.
- C. **Design Standards for Developed Areas:** Subdivision plans shall comply with any additional applicable standards governing the location and layout of lots and structures found elsewhere in this ordinance and as set forth in the Subdivision Regulations.

VII. OPEN SPACE REQUIREMENTS

- A. At least 50 percent of the buildable area and 80 percent of the non-buildable area of the parcel shall be permanently protected as designated open space subject to the additional conditions below. The planning board may authorize a slight reduction in the area of designated open space by special use permit, when it finds that (1) the reduction is necessary to enable the use of the conservation subdivision approach based on the characteristics of the parcel, and (2) the proposed subdivision adequately meets all other requirements of this ordinance. In no case, shall the designated open space represent less than 50 percent of the total area of the parcel.

A community might decide to require a greater or lesser percentage of the parcel to be conserved or vary the percentage for different areas of town or dependent on the specific characteristics of the parcel. For example, a community might require 80 percent of the total area of a parcel to be conserved in areas with high-value natural resources.

- B. Portions of the parcel that comprise part of an individual house lot, roadway, driveway, access road, roadway right-of-way, other new or existing right-of-way, utility easement, private or community leachfields or other components of a wastewater management system, stormwater management structures, or are part of a required buffer between any new structure and an existing right-of-way, or any area that is less than 100 feet wide shall not count toward the calculation of the designated open space.
- C. The location, layout, and management of the designated open space shall conform to the standards and process set forth in the Subdivision Regulations.

The model envisions that the predominant purpose of the designated open space is preservation of natural resource functions, and thus, allows only limited uses of the open space. A community should decide what uses are appropriate in the designated open space based on your community's goals and objectives in utilizing this technique. A community might decide to vary the uses allowed depending on the location of the development or the types of natural and/or cultural resources present. For example, all uses of the open space might be prohibited if an area to be conserved contains critical wildlife habitat; passive recreation, agriculture and forestry might be permitted in a development in a rural zone; while more intensive recreation, such as ball fields or tennis courts, might be permitted in an area targeted for higher density growth. Alternatively, a community could establish a process to determine the allowable uses based on the characteristics of the site and the recommendations of a natural resource specialist.

- D. Any use of the designated open space is subject to approval of the planning board and conservation commission and shall demonstrate that such uses shall not negatively impact the natural and/or cultural amenities preserved through the conservation subdivision design.
- E. The following uses generally are permitted in the designated open space, unless specifically prohibited or restricted as a condition of subdivision approval for the purposes of protecting important natural features or characteristics of the parcel:
 - 1. Forest management.
 - 2. Agricultural cultivation and pastures.
 - 3. Passive (non-motorized) trails and recreational uses.
 - 4. Snowmobile trails.
- F. Up to 50 percent of the designated open space may be permitted by special permit to be used for the following. The planning board may impose specific criteria or restrictions on such uses as deemed necessary to support the goals of this section:
 - 1. Agriculture involving animal husbandry and/or boarding.
 - 2. Active outdoor recreation uses, including formal playgrounds and fields.
 - 3. Parking areas for access to the designated open space.
 - 4. Individual or community wells provided that this use was approved as part of the subdivision plan and that appropriate legal arrangements are established and approved by the planning board for the maintenance and operation of these facilities.
- G. The removal of soil, trees and other natural features from the designated open space is prohibited, except as consistent with conservation objectives or permitted uses as provided above.
- H. The designated open space shall be retained in a natural, undisturbed state, except for those activities permitted and approved as provided above, or as required for active management according to a conservation agreement and management plan written by a qualified natural resource professional.

FIGURE 1.4.4 Rural Conservation Subdivision Example

16.5 acre parcel (1 acre wetlands and 1.5 acres steep slopes)
 Conventional Zoning: 2 acres per dwelling, 3 acres for 2-family

CALCULATE NUMBER OF ALLOWED UNITS

Number of single family homes =

$$\frac{[(718,740 \text{ sq ft} - 43,560 - 65,340) \times (\text{factor} = 0.70)]}{2 \text{ acres}} = 4.9$$

wetlands steep slopes

= 5 homes
= 6 homes (with 20% bonus)

20% bonus = 1 additional single family home

Number of 2-family structures =

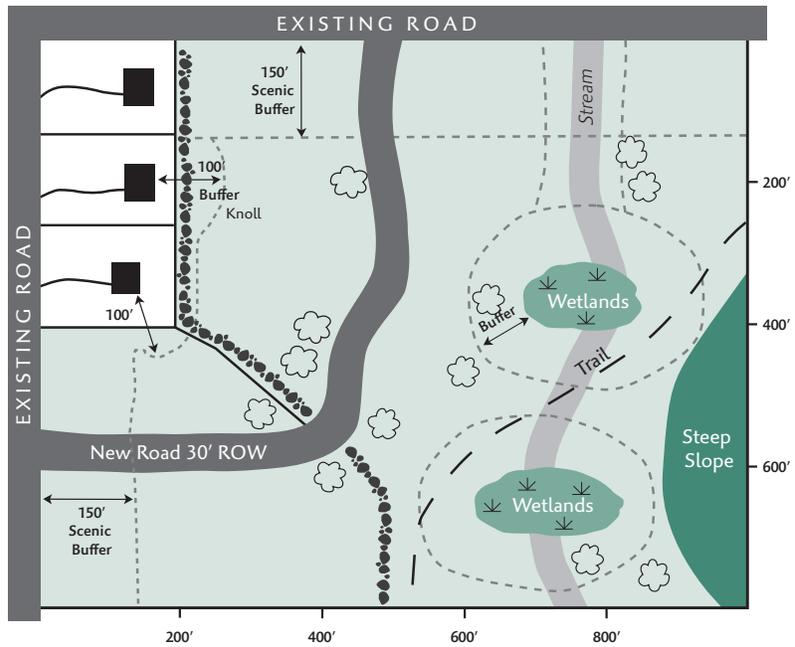
$$\frac{426,888}{3 \text{ acres}} = 3.3$$

= 3 structures
x 2 units per building = 6 units

STEP 1: Identify natural and cultural features and required setbacks

- minimum 100' setback from existing homes
- minimum 50' setback from wetlands
- minimum 150' setback along existing roads

- Significant trees (stand of trees)
- Stone wall



STEP 2: Delineate conservation areas and potential area for building (possible building envelope)

- 9 acres conserved = 54% of buildable area)

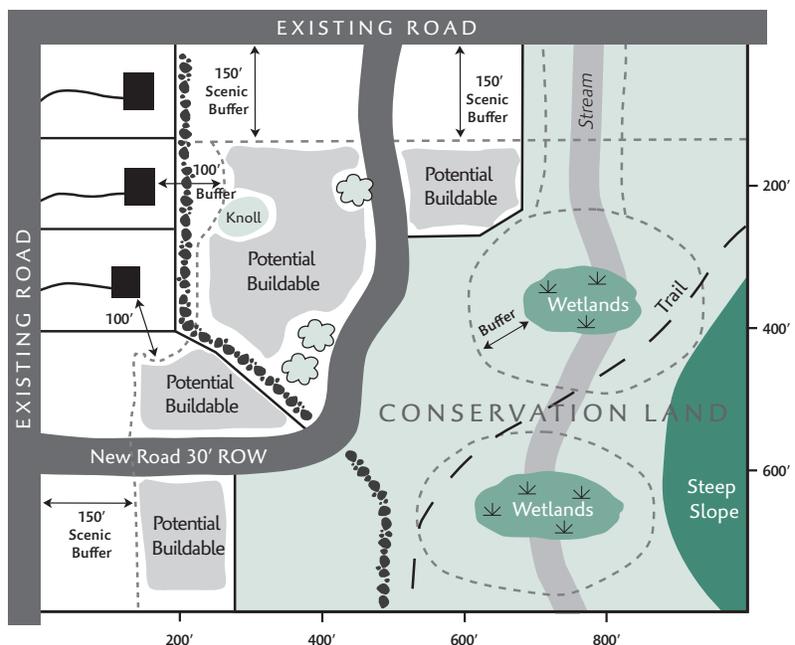
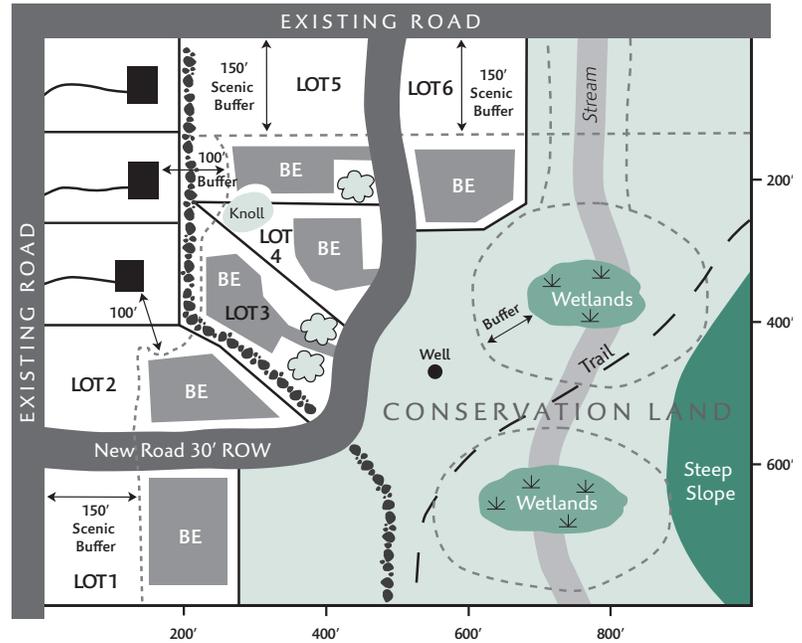


FIGURE 1.4.4 Rural Conservation Subdivision Example (continued)

STEP 3: Delineate building envelope and lot lines (for single family homes)

- minimum 75' average separation between new building envelopes (BE)
- minimum 15' from edge of pavement
- minimum 10' from parcel boundary (unless another setback is in effect)
- minimum lot size = 21,780 sq ft
 - Community well, individual septic
 - Type 3 soils, open space development



AMENDED PROCESS AND REQUIREMENTS FOR SUBDIVISION APPLICATION AND APPROVAL

AUTHORIZATION OF PRE-APPLICATION REQUIREMENTS

Model Resolution Language

Pursuant to RSA 674:35, I, the planning board is hereby authorized to require preliminary review of applications for the subdivision of land.

Pursuant to RSA 674:43, I, the planning board is hereby authorized to require preliminary review of site plans for nonresidential uses or for multi-family dwelling units.

Pursuant to RSA 674:35, I, a municipality's governing body must authorize the planning board to require preliminary review of applications for the subdivision of land (and for site plans, under RSA 674:43, I). The ability of the planning board to require applicants to participate in preliminary or pre-application meetings is critical to providing planning boards early involvement in the subdivision design process and will greatly increase their ability to influence the ultimate design and layout based on the broader municipal goals and the characteristics of the site. The pre-application meeting can also foster a collaborative relationship between the board, the abutters, and the applicant.

REVISIONS TO SUBDIVISION REGULATIONS AND APPLICATION PROCEDURES

(once authorized by resolution at town meeting or by city/town council)

The following text is intended to be added to a community's existing subdivision review regulations and to apply to all subdivision applications, both conventional and conservation design.

I. PRELIMINARY REVIEW

A community will need to determine if all subdivisions are required to participate in a preliminary review prior to submitting a formal application and if not, what types of projects are exempt, e.g., minor subdivisions.

All applicants for subdivision review are required to participate in a preliminary review process with the planning board. The purpose of this process is to discuss the characteristics of the site and proposed plan for development in conceptual terms. The preliminary review process is further designed to acquaint the potential applicants with the formal application process and particular information that the planning board may request, to suggest methods for resolving possible problems in the development design and layout, and to make the potential applicant aware of any pertinent recommendations in the master plan, zoning, or regulations to the property in question.

A. Limits of the Review

1. The preliminary review shall be conducted at a posted meeting of the planning board after identification of and notice to the abutters, holders of conservation, preservation or other restrictions on the site or abutting parcels, and the general public under RSA 676:4 I(d).
2. The preliminary review shall not cause the proposed plan to be a pending application or proceeding, and as such, no processing time limits, as defined in RSA 676:4 shall apply.
3. The preliminary review shall be informational and shall not bind the applicant or the planning board. However, the planning board shall be entitled to make recommendations with respect to the material presented during the preliminary review to assist the potential applicant in preparing a formal application. No decisions relative to the plan shall be made at the preliminary review.
4. Public input will be accepted.
5. Any documents provided to the planning board will be made part of the record for future reference purposes.
6. The planning board shall enter into the minutes any suggestions, recommendations, or other factors discussed.

B. Preliminary Review Documents

Applicants shall submit the following materials at least 30 days in advance of the preliminary review meeting with the planning board. Materials shall be

submitted to the town office, c/o chairperson of the planning board, according to the filing schedule established by the planning administrator. All materials must be submitted before a preliminary review can be scheduled.

1. **Request for Preliminary Review.** Applicants shall submit the appropriate form, available from the town office, a list of the names and addresses of abutters obtained from town records not more than five days before the date of filing of the application, and application fee.
2. **Site Context Map.** The site context map shall be drawn at a size adequate to show the relationship of the proposed subdivision to the adjacent properties and to locate the subdivision within the municipality, e.g., 1 inch = 400 feet. The site context map shall include the following:
 - a. Existing subdivisions in the proximity of the proposed subdivision, including building locations.
 - b. Locations and names of existing streets.
 - c. Boundaries and designations of zoning districts.
 - d. Watershed and subwatershed boundaries.
 - e. An outline of the subject parcel and the proposed subdivision.
3. **Site Inventory and Map(s).** The site inventory map(s) shall be at a scale of one inch equals 100 feet (unless another scale is mutually agreed upon for larger projects) and shall involve an individual or team with the necessary training in natural resources and who shall certify the information submitted. The inventory and map(s) shall include, at a minimum, the following:
 - a. The proposed name of the subdivision, north arrow (true meridian), date, and scale.
 - b. The boundaries of the parcel based upon a standard boundary survey prepared by a registered land surveyor and giving the bearings and distances of all property lines.
 - c. Existing structures or easements on the site; if none, so state.
 - d. The topography of the site at an appropriate contour interval depending on the nature of the use and the character of the site.
 - e. The major natural features of the site and within 500 feet of the site, including wetlands, vernal pools, streams, ponds, rivers, riparian areas, floodplains, stratified drift aquifers, areas of significant wildlife habitat (i.e., areas identified by the NH Wildlife Action Plan as the highest condition habitat in the state or region; habitats of endangered or threatened wildlife, other habitats of local significance as identified by the conservation commission or other conservation organization), mast stands, boundary trees, noteworthy tree specimens, scenic views or areas, significant geologic features,

Municipalities should review their current standards and requirements for site maps and site information and provide consistency between the preliminary review and formal application materials.

ridgelines, slopes in excess of 25 percent, agricultural soils of local and statewide significance, high quality forest soils, meadows, and any other important natural features. Wetlands on the site shall be identified and delineated by a New Hampshire Certified Wetlands Scientist and certified by the person performing the delineation. Information on adjacent properties may be from published sources and available state, regional, and local data.

- f. Visible or known human-made features of the site and within 500 feet of the site, including historic or cultural features, stone walls, roads, driveways, fences, trails, historic structures or remnants, archeological resources, graveyards, cemeteries, historic or current waste disposal sites, and any other important features; if none, so state.
 - g. Soils on the site based on a soil survey. The planning board may require the submission of a high intensity soil survey if it determines that a HISS is necessary to determine if the proposed density of development conforms to the zoning requirements or to evaluate the appropriate use of the property.
 - h. Vegetative cover conditions on the property.
 - i. Views onto and off of the property, with accompanying photographs.
 - j. Watershed and subwatershed boundaries.
 - k. Location of drinking water supplies (public and private) and protective radii.
 - l. All areas subject to covenant, easement or other restriction limiting the potential development and/or use of such areas, including resource boundaries and buffer areas subject to local, state, and/or Federal regulation. The nature of the restriction shall also be noted.
 - m. Location and size of existing utilities or improvements to the site; if none, so state.
 - n. If not served by public water, any potential sources of fire protection water supply within one half mile of the site, including public water mains, existing fire ponds, or other possible sources.
 - o. Preliminary identification of those areas of the site with the most significant conservation value based on the assessment of the site.
4. **Conceptual Plan of Proposed Development.** Applicants shall submit a conceptual plan for the development of the subject parcel that reflects the characteristics of the site as detailed in the site inventory and map(s) and its location within the community as indicated in the site context map. The conceptual plan shall be prepared at the same scale as the site inventory map and be provided as both a translucent sheet, which can be overlaid onto the site inventory map(s), and solid plan.

A conceptual plan shall be a draft plan, which does not include engineering details, but is drawn to scale and indicates the following:

- a. Proposed location of any new roadway.
- b. Proposed residential lots, building envelopes, including the possible location of a well and septic system, when applicable, and potential house sites for each lot.
- c. Existing and proposed features and amenities, including common areas, trails, or community buildings, etc.
- d. Proposed boundaries of the designated open space.
- e. A narrative description of the proposed approach for providing for drinking water supply, waste water treatment, stormwater management, and landscaping.

Applicants shall demonstrate that their conceptual plan is consistent with the following approach for designing a subdivision:

- a. **Step One: Identify Conservation Areas.** Identify those areas of the parcel containing or supporting important natural resource features and functions, as listed in the subdivision regulations or otherwise identified by the planning board for priority consideration for inclusion within the designated open space. If not included in the designated open space, other protective mechanisms, such as a substantial setback of development or maintenance of an undisturbed buffer around the feature, shall be identified.
- b. **Step Two: Locate House Sites and Building Envelopes.** To the maximum extent feasible, house sites and building envelopes shall be located outside of those areas delineated in Step One. The location of the house sites and building envelopes shall also reflect the design objectives identified elsewhere.
- c. **Step Three: Align Streets and Trails.** The minimum length and network of streets necessary to access each house lot shall be identified, subject to the road standards of the Town and with consideration given to conforming the street to the natural landscape. Proposed trails shall be identified where access to the designated open space is appropriate and/or to provide for pedestrian circulation within the development as well as pedestrian access to areas outside the development.
- d. **Step Four: Identify Lot Lines.** Lot lines for each house site, or group of homes on a common lot, shall be identified. The placement of the lot lines shall give consideration to those areas identified in Step One as well as conform to the natural features of the landscape to the greatest extent possible, e.g., follow stone walls, lines of boundary trees, streams. The delineation of lots shall also consider the privacy provided for individual homeowners and opportunity for future owners to reasonably expand the structures on the lot.

- e. **Conceptual Long Range Development Plan.** When a subdivision will not utilize the entire parcel and there is potential for future subdivision or development of the parcel or any of the lots being created, the application for preliminary review shall include a conceptual long range development plan showing the potential utilization of the lots and the balance of the parcel not being subdivided. The conceptual long range development plan is a sketch plan with no engineering details, intended to be conceptual in nature, to rely on published data about natural resources relevant to the parcel, and to demonstrate that the current subdivision proposal will not compromise important conservation values or the long term development of the parcel as a conservation design subdivision. This plan shall show the relationship of the proposed subdivision area to the balance of the parcel and to adjacent land. This plan shall analyze the conservation and development potential of the remaining area of the parcel and shall show, in general terms, the potential street network, open space areas, and development areas in a manner that demonstrates that both the proposed development and the future development can occur so that it conforms to the requirements for conservation design subdivisions and preserves the significant natural resource and conservation values of the entire parcel.

C. Technical Review

At the discretion of the planning board, the board may request that the applicant pay a reasonable fee to provide for a third-party technical review of the information provided on the site or the conceptual plan of the proposed development submitted for the preliminary review. The fee shall be due at the time of submission of a formal application. A formal application for subdivision review shall not be deemed complete until the technical review of the preliminary review materials is conducted, or 30 days after the preliminary review materials and the fee for the technical review are received (provided all other requirements for a formal application are met), whichever is earlier. The applicant may elect to submit the fee for this technical review in advance of the formal application to expedite the review process.

D. Site Inspection

The planning board may conduct a site inspection of the subject property to review existing conditions, field verify the information submitted, and investigate the preliminary development proposal. The board may schedule this inspection before or after the preliminary review meeting or decide not to hold a site inspection at this time.

II. FORMAL APPLICATION REVIEW PROCESS

[A community should evaluate its existing formal application procedure for consistency with the pre-application procedures in this chapter.]

III. DESIGN STANDARDS: SUBDIVISIONS

The following design standards are intended to improve the character and aesthetic qualities of the development and to minimize its impact on the natural and cultural features on the site. Variations from these standards may be granted by the planning board provided that the overall intent of this section is achieved by the alternative design.

A. Lot Configuration and Design

The following design standards are intended to improve the character and aesthetic qualities of development and to minimize impacts on natural and cultural features on the site. The planning board may require development plans to be certified by an individual with professional training in neighborhood design.

1. Minimum Impact to Natural and Cultural Features.

Individual lot lines and building envelopes shall, to the extent possible, conform to the natural contours of the site and be delineated to minimize negative impacts on the natural and cultural resources of the site as identified by the planning board and/or site inventory.

- a. The location and orientation of individual building envelopes and building sites shall be designed to maintain the natural topography and drainage patterns, to preserve important natural features in their natural condition, to maximize the potential for use of passive solar energy for light and heat, to minimize disturbance of natural vegetated cover, and to minimize grading, cut-and-fill, and soil removal.
- b. Topography and natural drainage ways shall be treated as fixed determinants of road and lot configuration rather than malleable elements that can be changed to allow for a preferred development scheme. Land disturbance and cut-and-fill shall be minimized.
- c. The removal or disruption of historic, traditional, or significant uses, structures, or architectural elements shall be minimized.
- d. Significant trees, boundary trees, stone walls, wetlands and streams and other important natural features not included within the designated open space should be incorporated along the edges of individual lots or along a path or roadway, rather than transected by lot lines or a roadway.
- e. The planning board may require the designation of protected, naturally-vegetated buffer strip of 50 feet or more around water resource features, e.g., lakes, ponds, streams, wetlands, or other natural features that may be adversely affected by erosion or stormwater runoff. Such areas may be required to be revegetated if they were recently cleared prior to subdivision approval or cleared during construction.
- f. Stream and wetland crossings shall be eliminated whenever possible. When necessary, stream and wetland

These standards will augment any existing design standards guiding subdivision layout. Most of these standards are appropriate to apply to all types of subdivision development, not just to conservation subdivisions. Those design criteria intended to apply solely to conservation subdivisions are listed separately.

Readers should also review the design standards specified in several other chapters, including Stormwater Management, Wildlife Habitat Protection, and the Water Resource Protection chapters for additional provisions they might wish to apply.

See chapter on Wildlife Habitat Protection for a more extensive set of criteria to minimize impacts on wildlife through site design.

See chapter on post-construction stormwater management for more information on recommended stormwater management practices, including additional discussion on restricting land disturbance (clearing, grading, cut and fill), impervious cover and off-site drainage.

crossings shall comply with state recommended design standards to minimize impacts to flow and animal passage (see NH Fish and Game Department, 2008).

- g. A building envelope shall be identified for each lot. Future construction on the lot is encouraged, but not required to be located within the identified building envelope for each lot; however, construction outside of the designated building envelope shall comply with the setback requirements for a conventional development.
- h. Building envelopes, and/or areas of contiguous clearing, shall generally be limited to a maximum area of 21,780 square feet (1/2 acre) for an individual building or up to 87,120 square feet (2 acres) when multiple buildings are located on a common lot.

2. **Minimum Visual Impact.** Individual lots and building envelopes shall be delineated so as to mitigate the visual impact of new development on views from existing roadways, adjacent properties, and offsite vantage points.

- a. At its discretion, the planning board may prohibit the placement of building envelopes in visually prominent areas that cannot be adequately screened.
- b. Development within open fields shall be discouraged. If development must be located within open fields due to constraints elsewhere on the site, building envelopes should not be located on prime agricultural soils and/or should be located at the edges of the field to the maximum extent possible. Additional landscaping may be required to provide a sufficient visual buffer for new development.
- c. To the extent practical, building envelopes shall be delineated to maximize the privacy afforded to each dwelling unit, by, for example, positioning homes to eliminate direct sight lines to neighboring homes and to prevent a building from being positioned directly above (or “perched” above) another building on a vertical slope, unless an adequate separation distance and vegetated buffer exists or is provided.
- d. The planning board may require a vegetated buffer to provide screening between developments and/or between development and public roadways.
- e. Lots that have frontage on an existing public road shall be laid out to minimize the number of curb cuts onto the existing road through the use of shared or common driveways or other methods. The number of curb cuts and distance between them shall be subject to planning board approval.
- f. Lots in the rural, agricultural or low-density residential zones having frontage on an existing public road may be required to maintain a 150 foot vegetated, screening buffer from the existing public road to minimize the effect of the development on the streetscape. The buffer area shall remain free of buildings, parking, or other

structures. This buffer area shall be protected by a deed restriction on the subject properties.

- g. The setback of building envelopes and structures from the roadway in rural areas are encouraged to vary from lot to lot within the subdivision. Applicants are further encouraged to vary lot sizes, lot dimensions, and the location of building envelopes and structures within the subdivision to retain significant, natural vegetation along the road; provide increased privacy for residents on adjacent lots; and increase the visual variety provided by the arrangement of homes within the subdivision.

Each community should evaluate if and where they want to require a vegetated setback and/or variation in lot layout and building envelope setback. These standards are intended to help maintain the "rural character" within the subdivision and along existing roads. In village situations, new development should be visible from public ways and contiguous with existing development.

3. Landscaping and Tree Preservation. At the request of the planning board, an applicant shall prepare a detailed landscaping plan and/or tree preservation plan.

- a. The landscaping plan shall identify the areas of existing natural cover to be retained as well as new landscaping to be provided on the site, including specific types and sizing of plantings with a preference for native species. The landscaping plan should provide reasonable privacy for individual homes, provide a visual buffer of the development, and improve the overall aesthetics of the development.
 - i. The planning board may require revegetation of any setback or buffer area that was substantially cleared prior to or during the subdivision development to ensure adequate visual screening of the new development, particularly for setbacks to existing roadways and neighboring structures, or within the development itself.
 - ii. The planning board may require the planting of shade trees within all subdivision layouts where residential, commercial or industrial development is to take place.
- b. When requested by the planning board, the landscaping plan shall include a tree preservation plan, which shall identify all trees greater than 15 inches in diameter at 4 feet above the ground, indicate which trees will be retained, and detail a plan to protect those trees, including the root zone, during construction.
- c. Landscaping plans may be submitted to the conservation commission for its review.

4. Additional Design Guidelines for Conservation Subdivisions

- a. Building envelopes on individual or common lots should be set back as far as possible from the boundary of the adjoining designated open space, consistent with other design parameters of this section, to augment and protect the integrity of the open space area.
- b. Consideration should be given in the layout of the subdivision to provide each dwelling unit with access and/or views onto the designated open space.

The restriction on the number of buildings that may be clustered together in a contiguous grouping or “pod” is intended to provide for natural visual breaks in the developed area of the parcel to address concerns about the potential negative visual impact of tightly clustering a large number of homes in a rural area characterized by low-density and dispersed development. This standard may not be appropriate or necessary in all areas of a community; thus the model allows for this to be applied at the discretion of the planning board. Alternatively, a community might apply this requirement only in certain zoning districts.

- c. At the discretion of the planning board, groupings of buildings in the rural zone(s) may be limited to six buildings (containing single or multiple dwelling units) together in a “pod” formation (on individual lots or on a common lot) with a vegetated buffer of 100-300 feet separating the groupings. Larger buffers (200-300 feet) may be required depending on the size of the proposed structures, the nature of the existing vegetation, and the elevation change in the area of concern.
- d. A septic leach field may be located outside of the lot line boundaries provided the requirements of the New Hampshire Department of Environmental Services are met, including appropriate legal provisions to allow for maintenance and replacement.
- e. Shared driveways are permitted and encouraged where appropriate to access individual lots.
- f. Other design requirements that apply to all residential subdivisions shall continue to apply, when appropriate. These may include, but are not limited to, landscaping standards, street and neighborhood lighting provisions, utility placement, erosion and sediment control, and post-construction stormwater management.

B. Village Design Standards

The following standards provide guidelines for the layout of a new residential and/or mixed use development in a traditional village format when such an option is feasible under the applicable zoning, i.e., frontage and set back requirements, allowable uses, etc.

1. Lots within a village-style layout should have a maximum frontage of 70 feet.
2. Lots within a village-style layout should have a maximum front setback of 20 feet.
3. Garages and Secondary Structures.
 - a. Attached garages must be flush or (preferably) set back from the front wall or façade of the principle building and must be architecturally integrated with the principle building.
 - b. Detached garages or other secondary structures must be flush with or set back from the front wall or façade of the principle building. Detached garages and other secondary structures are encouraged to be located behind principle structures.
 - c. No more than two garage doors facing a street may be located in a row, and such rows of garage doors must be separated from any other garage door facing a street by at least ten feet.
4. Houses on opposite sides of the street should be located between 70 feet and 100 feet across from each other, except along a boulevard, which is defined as a divided street with a center landscaped strip at least ten feet

wide, and except when buildings face onto greens, commons, or other open space.

5. Buildings should be of at least one-and-one-half story construction, but no more than three stories. Public or commercial buildings containing significant architectural features, such as a steeple or clock tower, may be higher than three stories if the height of the building is consistent with the overall village design of the development.
6. Villages shall be designed in a pattern of interconnecting streets and alleys, defined by buildings, street furniture, landscaping, pedestrian ways, and sidewalks. The layout should be suited to the existing topography and other natural features of the area to minimize cut-and-fill and grading throughout the site.
7. Sidewalks or pathways, no less than four feet wide, shall be provided along all road frontages of new village-style development.
8. Cul-de-sacs are prohibited.
9. To calm traffic speeds and to provide for pedestrian safety, the use of “T” intersections, small roundabouts, and four-way stops are encouraged.
10. Street trees shall be planted every 35 linear feet within the street right of way.

See chapter on Village Plan Alternative for additional design standards to apply to a new village-style development that incorporates small scale retail and commercial in addition to residential uses.

C. Designated Open Space: Design Criteria

1. The subdivision and development shall, whenever possible, preserve important natural features in their natural condition. The planning board may request an advisory opinion from the conservation commission in determination of the value of the natural features on a site, the boundaries of those natural systems, and the appropriateness of the proposed designated open space to preserve the integrity and function of important natural features.
2. Areas containing the following shall be considered high priority for inclusion in the designated open space:
 - a. Riparian areas, wetlands, streams, and other water resources and buffers for those resources.
 - b. Critical or high-quality habitat areas, including areas identified as the highest statewide or eco-region importance by the NH Fish and Game’s Wildlife Action Plan, and buffers or supporting landscapes to these areas.
 - c. Significant stands of trees or significant individual trees.
 - d. High-quality soil resources (forest or agricultural soils).
 - e. Cultural and historic resources, e.g., stone walls, historic structures.
 - f. Existing trails.

A community should review and revise this list of high priority resources based on the resources present in their community and the preservation goals of the community.

- g. Areas that connect to undeveloped open space on adjacent properties
 - h. Ridgelines, particularly those that continue through the parcel
 - i. Viewshed areas
 - j. Water supply protection areas
3. To the maximum extent possible, the area of designated open space shall include any area identified as a priority for conservation in a local, town, regional or state conservation plan, e.g., areas identified in the Natural Resource Inventory, highest ranked habitat areas identified within New Hampshire's Fish and Game's Wildlife Action Plan. These areas shall be adequately buffered from development by including an additional (minimum) 300 foot distance within the designated open space to the maximum extent feasible. A larger setback from the edge of the designated open space to specific areas may be required depending on the type of habitat and/or sensitivity of a species of concern to human influence.
 4. To the extent practical, the designated open space shall be contiguous within the parcel and adjacent to existing undeveloped land on adjoining parcels to form a continuous, integrated open space system. Particular attention shall be paid to maintaining and expanding existing trail networks.
 5. The design of the designated open space and any permitted uses, such as trails, shall be sensitive to minimizing potential impacts to high-quality and/or rare plant communities and habitat areas, particularly those areas potentially supporting rare or endangered species.
 6. To the maximum extent practical, a minimum of a 50 foot undisturbed, vegetated buffer around water resource features, e.g., lakes, ponds, streams, wetlands, shall be included within the designated open space. Such areas may be required to be revegetated if they were recently cleared prior to subdivision approval or impacted during construction.
 7. No topsoil or vegetation shall be removed from the designated open space, except in conformance with an approved management plan for the area.
 8. Access points to the designated open space shall be clearly identified on plans and posted with permanent signage approved by the planning board indicated allowed uses.
 9. No more than 5 percent of the designated open space shall be covered by surfaces that impede the infiltration of rainwater into the soil, except as approved by special permit by the planning board.
 10. The designated open space shall not be used as the location for dwelling units, roadways, other access, private recreation structures or play equipment, private accessory structures, or other nonresidential buildings or parking except as approved by the planning board.

D. Designated Open Space: Protection and Management

1. Area Boundaries of the designated open space shall be clearly identified:

- a. Boundaries shall be clearly delineated on plans including plats.
 - b. Boundaries shall be clearly marked and identified as “No Disturbance” areas, except in areas identified for permitted uses, prior to commencing construction activities, including tree cutting, site clearing and grading; temporary markings are acceptable.
 - c. Boundaries shall be clearly and permanently marked in the field with signage approved by the planning board to identify the area as protected open space.
2. Future development in and/or subdivision of designated open space areas shall be prohibited and shall be so noted on the approved subdivision plan/plat.
 3. Prior to the approval of the final plat, the designated open space shall be protected and controlled by one or more of the following methods subject to planning board approval:
 - a. Transfer to the municipality as open space, with public access and permanent deed restriction or conservation easement in place (subject to acceptance by the municipality).
 - b. Transfer, with permanent deed restrictions or conservation easement, to a land trust or other recognized conservation organization (subject to acceptance by the organization).
 - c. Ownership by one or more private individuals (separately or in common) or a cooperative legal entity, e.g., a homeowner’s association, with a conservation easement granted to the municipality and/or recognized conservation or land trust organization.
 - d. For designated open space areas of less than 50 acres, ownership by one or more private individuals (separately or in common) or a cooperative legal entity, e.g., homeowner’s association, with open space protection deed restrictions enforceable by any land owner within the subdivision, any owner of separate land parcels abutting the open space, or the municipality.
 4. In the event that the designated open space is owned by a cooperative legal entity for the benefit of the residents of the subdivision, all common open space shall be governed in accordance with the requirements of New Hampshire RSA 479-A:1-23 inclusive as amended.
 5. Deed restrictions and/or conservation easement documents shall be placed on file with the town clerk upon receipt of planning board subdivision approval and duly recorded at the County Registry of Deeds, where appropriate. Such documents shall clearly indicate whether the property is open to the general public, open only to residents of the municipality, or open only to residents of the subdivision.

Because **deed restrictions** are considered a somewhat weaker form of long-term protection against future development, this approach is not recommended to protect large and/or significant parcels of open space. In these cases, every effort should be made to secure a conservation easement for the property to be held by the municipality and/or a recognized conservation organization. However, if the municipality is not willing or able to accept the conservation easement and fulfill the stewardship responsibilities, it may be necessary to accept deed restrictions for larger parcels.

6. A management plan for the designated open space and facilities shall be prepared and approved by the planning board, which includes the following:
 - a. Identifies the entity assuming responsibility for stewardship and management of the designated open space, including regular inspections to confirm continued compliance with the terms of the subdivision approval and conservation easement or deed restrictions.
 - b. Includes detailed standards and schedules for maintenance of the designated open space, including maintenance of vegetation.
 - c. Allows for municipal maintenance in the event that the maintenance specified under the agreement is not completed and recovery of costs incurred from the designated management entity or the owners of the designated open space within the subdivision.
 - d. Provides that any amendments to the plan shall be reviewed and approved by the planning board.
7. For properties containing open space protected under a conservation easement to be held and enforced by the town or a third-party, a one-time stewardship fee shall be collected and provided to that entity to be held in a separate trust account and used to support the monitoring and enforcement of the conservation restrictions. The amount of the stewardship fee shall be determined by the town or third-party easement holder based on the size and restrictions in place on the open space and the requirements of the easement holder.
8. At the discretion of the planning board, an applicant may be required to prepare a brochure identifying the development as a conservation subdivision and detailing the location and use restrictions of the designated open space, and provided to all purchasers of property within the subdivision. Additional copies (hard copies and an electronic format) of the brochure shall be provided to the municipality to be distributed to future property owners.
9. All documents, including deed restriction language, conservation easements, and the management plan shall be reviewed and approved by town counsel prior to receiving subdivision approval from the planning board.

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1.5 Village Plan Alternative

BACKGROUND AND PURPOSE

The Village Plan Alternative (VPA) is a planning tool that promotes compact development with a mix of land uses, including residential, small-scale commercial, recreation and conservation in close proximity to one another within a neighborhood. It is designed to implement the specific provisions of RSA 674:21.VI(a) to allow for the creation of new villages with mixed-use development that is scaled to the smaller populations and lower density of New Hampshire towns.

The ordinance was designed to respond to the economic, environmental and social consequences of conventional two-acre lot zoning that segregates the locations of work, home, and recreation and produces a sprawling development pattern. The VPA addresses these economic, environmental and social consequences by promoting the smart growth principles of compact, mixed-use development, preserving the working landscape, and protecting environmental resources.

The VPA is based on the best examples of village design and Traditional Neighborhood Design (TND), scaled to a rural setting. The ordinance includes provisions to require design at the human scale by providing for pedestrian access, clear delineations of public and private spaces, and connections between residential and small-scale retail areas. Provisions are included in the VPA to protect open space, provide access to parks and recreation, and preserve and enhance the rural, small town character of many New Hampshire towns.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

The VPA is most appropriate as an alternative to cluster or open space development occurring in undeveloped areas. It may be useful to think of this option where the development is of a size and location where a new village, or an extension of an existing village, would be an appropriate outcome. Towns should consider the use of the VPA as a tool to support larger-scale goals from the master plan and/or regional planning process to conserve a network of contiguous, open-space lands, such as unfragmented forest blocks or wildlife corridors, as well as to protect specific sensitive environmental resources.

RELATED TOOLS:

- Density Transfer Credits
- Conservation Subdivision
- Infill Development
- Inclusionary Housing
- Pedestrian-oriented Development

The VPA differs from cluster zoning in two ways: First, a mixed-use village component is included in the VPA, and second, the VPA requires a 20/80 split in the amount of developed land versus the amount set aside for conservation. The VPA differs from a Planned Unit Development, which is also listed as an innovative land use control, because the VPA requires the 20/80 split, and because the VPA was designed to create a smaller, village-like development compared to the larger new town development that the PUD was originally modeled on.

The model ordinance applies to towns lacking public water and sewer infrastructure, and allows septic systems and wells to be located in adjacent open space areas. DES-approved innovative septic systems, which may use smaller areas of land and can be sited within small lots, are encouraged, as are community wells and community septic systems, with appropriate safeguards and legal review of maintenance and ownership documents by town counsel.

A town with an area zoned for higher density and/or mixed use development or an existing historic downtown area may wish to adopt portions of this ordinance, such as the dimensional requirements or design standards.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

There are two key requirements of the VPA per RSA 674:21. First, the entire density permitted by existing land use regulations must be located within 20 percent or less of the entire parcel available for development. Second, the VPA must comply with existing subdivision regulations relating to emergency access, fire prevention, and public health and safety, however, lot size setbacks, density regulations, and lot size regulations, shall not apply. Although dimensional regulations do not apply, the model includes minimum and maximum design standards because the village concept relies on spatial dimensions and relationships between elements such as buildings, streets, and open areas in order to achieve the goal of a compact, mixed-use village.

The model ordinance is set up as a conditional use ordinance, under the jurisdiction of the planning board. Procedures for waiver and for review of decisions made by the planning board under this ordinance are included in the model language.

Expedited review was required under the original VPA legislation but was removed in a subsequent amendment. Expedited review is not precluded, however and is used in this model ordinance as an incentive to encourage developers to design their projects utilizing village design principles. The locations and extent of areas in a town zoned for the VPA should be set forth in the master plan, based on the considerations given in the above sections.

EXAMPLES AND OUTCOMES

The VPA was passed by the New Hampshire Legislature in 2002. A model ordinance was developed in 2003 by the Rockingham Planning Commission to assist towns in utilizing this new section of RSA 674:21. Due to its recent development, the VPA has not yet been widely adopted. Several towns in New Hampshire either

currently allow mixed-use development, Planned Unit Development, or are currently considering the Village Plan Alternative ordinance as they update their master plans.

The Town of Fremont recently approved two developments that represent the village plan concept, even though the town has not formerly zoned an area for the VPA. The first development, Coopers Corners, contains a mixed-use residential, retail and light industrial component connected with an area of single-family homes. This development also represents a re-use of an existing industrial site that was formerly a barrel factory. The second development is an area of multi-family elderly housing units connected with a retail development that is a reuse of an existing historical barn complex.

The Rockingham Planning Commission has also developed model plans for village development based on the site-level physical and environmental limitations of two parcels in Rockingham County. Towns may also wish to consider examples discussed in *Achieving Smart Growth in New Hampshire*, available at www.nh.gov/oep/programs/SmartGrowth/index.htm.

Other examples of development utilizing the principles found in this ordinance may be found in other states. These developments are often called Traditional Neighborhood Design developments or “New Urbanism” developments. Although some of these developments have been built at a scale that is much larger than many New Hampshire towns, they share many common design principles. Readers seeking specific examples may wish to study one of the following developments: Kentlands, Seaside, I’ona, and Coffee Creek Center. The Congress for the New Urbanism website (www.cnu.org) lists several other developments as well.

Model Language and Guidance for Implementation

MODEL ORDINANCE FOR A VILLAGE PLAN ALTERNATIVE SUBDIVISION

I. PURPOSES

- A. To encourage the preservation of open space and environmental resources wherever possible.
- B. To permit the efficient layout and lower maintenance costs of roads, utilities, and other public and private infrastructures, and the reduction of traffic congestion and air pollution.
- C. To create a neighborhood that provides a mix of uses, including residential, commercial, civic, and recreational uses in close proximity to one another.
- D. To provide a mix of housing styles, types and sizes, to accommodate households of all ages, sizes, and incomes.

II. APPLICABILITY

- A. **Applicability.** The standards in this section are applicable within the areas zoned for the Village Plan Alternative Subdivision and are defined as those areas whose location and boundaries have been selected to be consistent with policies in the master plan, encouraging compact mixed-use development in areas where village development would be appropriate for the reasons detailed in that plan.

1. **Size and Location.** The Village Plan Alternative subdivision ordinance (VPA) is designed to apply to new development of ten acres or more including:

- a. Areas contiguous to existing subdivision development.
- b. Areas contiguous to existing cluster subdivisions with the intent of connecting contiguous conservation lands, greenways, or unfragmented forest areas.
- c. Other appropriate locations for development consistent with the town's master plan for future land use.

2. **Redevelopment and Infill.** The VPA is generally NOT designed to apply to redevelopment or infill development. Other innovative land use tools are generally more appropriate for redevelopment or infill development, such as redevelopment of abandoned mills, factories, or other vacant industrial/commercial or brownfield areas or structures is encouraged. An exception to this general rule is a situation where an existing commercial area is contiguous to an area or parcel in town where conservation to protect natural resources would be appropriate.

Although the law does not specify a minimum acreage necessary for the VPA, sufficient acreage may be necessary to ensure that mixed-use retail or commercial uses will be viable.

3. Health, safety and welfare factors and consistency with the master plan.

The planning board shall determine whether the development is appropriate for the area by considering the following additional factors:

- a. Pre-existing development near the proposed site.
- b. Environmental resources that may be detrimentally impacted by the development.
- c. Consistency of the development with the master plan.
- d. Any other relevant factors to protect the health, safety, and welfare of town residents.

Emergency access, fire prevention, and setbacks for wells, septic, or wetlands requirements imposed by DES shall apply, as shall local health and safety restrictions.

- B. **Conditional Use Permit.** This ordinance is adopted pursuant to 674:21, allowing the administration of the ordinance by Conditional Use Permit. Compliance with the individual provisions of this ordinance shall constitute the conditions required for the issuance of a Conditional Use Permit. Any provision of this ordinance may be waived, when, upon application by the applicant to the planning board, the board shall determine in its sole discretion 1) that requiring compliance with the particular provision for the granting of a Conditional Use Permit would create an unreasonable hardship and 2) that the application would be consistent with the spirit and intent of this ordinance. Provisions included as mandatory for a Village Plan Alternative Subdivision by RSA 674:21 shall not be waivable as such would be contrary to state law. Requests for waivers must be written and the planning board must vote on each waiver request at a properly noticed public hearing.
- C. **Appeals.** Any person aggrieved by a planning board decision that constitutes a denial of a Conditional Use Permit due to noncompliance with one or more of the waivable provisions of this ordinance may appeal that decision to the Superior Court, as provided for in RSA 677:15. A planning board decision on the issuance of a Conditional Use Permit cannot be appealed to the zoning board of adjustment (RSA 676:5, III).

III. USES AND USE AREAS

- A. **General Use Areas.** VPAs may consist of up to three areas: Village Residential Areas, Small-scale Retail Areas, and Village Conservancy Areas. At a minimum, they must contain both a Village Residential Area and a Village Conservancy Area. Village Zones may consist of the Village Residential Area and the Small-Scale Retail Area.
 - 1. **Village Residential Areas** provide locations for a broad range of housing types, including single-family detached, semi-detached, and attached, and may also include accessory dwelling units.

The scale of retail uses intended for these areas is small, and would include small stores and businesses, libraries, galleries, and other small commercial, institutional and retail uses typically found in small New England towns. Consideration should also be given to the compatibility of the retail and commercial areas to the residential areas within the development. Banks, daycare facilities, doctor's offices, or small groceries are some of the retail uses that may be compatible with a small village.

2. **Village Conservancy Areas** are permanently protected open spaces, including greens, commons, and private non-common acreage within larger estates, country properties, or other parcels used for agriculture, wholesale nurseries, tree farms, equestrian facilities, etc.
3. **Small-Scale Retail Areas** are intended primarily to provide uses that meet the retail and service needs of a traditional community center and its vicinity, and may contain other compatible uses, such as civic and institutional uses of community importance, including second-story residential uses.

The small-scale retail area is not intended to be used for industrial uses, large-scale retail or commercial buildings, or storage, unless such use is completely architecturally integrated into the overall development, and in no case shall any industrial uses other than light industrial uses be permitted.

4. **Residential/nonresidential phasing.** In approving a conditional use application for a new village with or without mixed uses according to the standards for conditional uses listed in the zoning ordinance, the planning board shall ensure by approval of a condition, phasing schedule, or other measure, that the nonresidential portions of the development are occupied only in accordance with a schedule that relates occupancy of such nonresidential portions of the village to the completion of a specified percentage or specified number of phases or sections of the residential portions.

The purpose of this phasing section is to provide a mechanism to ensure appropriate residential to nonresidential density proportions.

B. Uses Permitted in All Areas

1. Single family detached dwellings.
2. Open space land permanently protected through conservation easements.
3. Municipal or public uses, such as public parks and recreation areas, or government or public utility buildings, except for storage or materials, trucking or repair facilities, or private or municipal sanitary landfills.
4. The planning board reserves the right to determine the allowability of any use not expressly allowed or prohibited in this ordinance. All uses shall be governed by any applicable standards in any other applicable state or local law or regulation that would restrict uses based on environmental concerns.
5. Where two provisions conflict, the stricter provision shall apply.

- C. **Conditional Uses.** The following uses are classified as conditional uses and shall adhere to the dimensional standards and design standards in the following sections of this ordinance. The purpose of this section is to enable the planning board to ensure that the overall design of the development is compatible with the town's existing land use, future plans for land use, and the needs of the community.

1. Village Residential Area Conditional Uses

- a. Two-family and multi-family dwellings designed according to the standards in this ordinance.

- b. Architecturally integrated accessory dwellings, home occupations and other uses related to residential uses.

2. Small-Scale Retail Area Conditional Uses

- a. Retail uses, professional offices, and personal or professional services in one-and-one half story buildings of 1,500 square feet or less, and up to 5,000 square feet when in buildings of two or more stories. Buildings in this type of area may contain other compatible uses, such as civic and institutional uses of community importance, specifically including second-floor residential uses. The maximum building footprint for any single building or group of buildings owned or operated by the same entity shall be 10,000 feet.
- b. Bed and breakfast establishments or inns.
- c. Schools, day care centers, libraries, churches, and other houses of worship.
- d. Two or three family dwellings designed in accordance with the provisions of this ordinance.
- e. Second-story residential units are encouraged to be located above shops and or offices, to the extent that on-site parking, or off-site parking shared with other users, can be provided.
- f. Live/work uses for artisans, professionals, and service providers such as studios or small shops.

Towns may wish to consider the typical building size of uses they would like to encourage or discourage. For example, if a town wishes to allow a mid-sized grocery store, the 5,000 square feet limit would be too small.

IV. DIMENSIONAL STANDARDS AND DENSITY DETERMINATIONS

A. Overall Village Size. Village Plan Alternative subdivisions shall range in size from 25 dwellings to 100 dwellings. The purpose of this restriction is to provide enough dwellings in a development to support the accompanying small-scale retail and to allow the town to better plan for and provide the increase in local services that accompanies population growth within a town.

The intent of the dwelling limitation is to reflect typical New Hampshire village scale. Communities may choose larger limits as appropriate.

B. Density Determination. The entire density permitted by existing land use regulations must be located in 20 percent or less of the entire parcel available for development. Village Plan average density shall vary depending on soil conditions, suitability of on and off-site locations for septic systems and community water systems, wetlands, topography, and other features of the land. In no case shall the average density be lower than that of a conventional subdivision.

C. Density Bonuses

- 1. A density bonus of one unit for five acres shall be granted where applicants use a community well or community septic system or a DES-approved

Optional: It is up to a community to determine whether it wants to award **density bonuses** for certain design attributes, such as providing for affordable housing, protection of significant resources, or public access to community amenities. Density bonuses for providing affordable housing should be used only if the community has established standards to define “affordable” and ensure such conditions are maintained over time.

A density bonus for using innovative or community septic systems is suggested because a developer might view using such an approach as more difficult or time-consuming to permit, yet a traditional village-type development likely cannot be done with conventional septic systems.

Lot size and shape are important in creating the spatial relationships of a village. Long, narrow lots work well to allow home owners the privacy of backyards, while maintaining the walkability and scale of a village. Form-based codes typically contain minimum as well as maximum standards.

innovative septic design utilizing a smaller land area to provide for VPA development.

2. A density bonus of one unit for five acres shall be granted where applicants provide for full public access to community amenities, such as trails, ball fields, or playgrounds.
3. The board may develop other density bonuses based on provision of affordable housing, protection of sensitive environmental resources, or provision of other amenities.

D. Dimensional Standards for Village Residential Area

1. **Dimensional Requirements.** Conventional lot size regulations, dimensional requirements for frontage and setbacks from all property lines, and lot size regulations, as well as density regulations, shall NOT apply. This ordinance establishes its own minimum and maximum dimensional requirements. In no case can lesser density requirements be imposed for a Village Plan Alternative Subdivision.
2. **Minimum lot area.** Where septic systems and water supply are located off-site, the minimum lot size shall be 10,000 square feet. Where both septic and water are located on-site, or where septic is located on site, and water is located off site, the minimum lot size will depend on compliance with the provisions found in the DES publication “Subdivision and Individual Sewage Disposal System Design Rules, Chapter Env-Ws 1000, August 1999,” and subsequent amendments or updates.
 - a. For the Village Residential Areas, applicants should refer to Table 1005-2 Minimum Lot Sizes – Cluster Subdivisions.
 - b. Applicants should consult with the Department of Environmental Services during the design phase of the development to determine appropriate lot sizes and septic/water system design.
3. **Minimum street frontage.**
 - a. Lots must have a minimum of 40 feet of frontage either on a street or back lane or shared driveway. Lots should have a maximum frontage of 70 feet.
 - b. Houses served by rear lanes may front directly onto parks or greens, which shall have perimeter sidewalks.
4. **Flag lots.**
 - a. Flag lots must possess at least 30 feet of frontage on a street.
 - b. No more than two contiguous flag lots shall be created.
 - c. Flag lots shall not comprise more than five percent of all lots within a village.
 - d. The “pole” end of such lots shall not be longer than 200 feet.

5. **Minimum and Maximum Standards.** Variations in the principal building position and orientation are allowed, but the following minimum and maximum standards shall be observed:

- a. **Front yard.** Principle buildings: 12 feet minimum depth, 6 feet to front porches or steps, and 20 feet maximum.
 - i. Attached garages (front loaded) must be flush with or set back from the front wall or façade of the principle building. Attached garages (side loaded) must be flush with or set back from the front wall or façade of the building and must be architecturally integrated with the principle building.
 - ii. Detached garages must be flush with or set back from the front wall or façade of the principle building. Detached garages located behind principle structures are encouraged. No more than two garage doors facing a street may be located in a row, and such rows of garage doors must be separated from any other garage door facing a street by at least ten feet.
- b. **Rear yard.** Principal buildings: 30 feet minimum depth. Rear-loaded garages: minimum 20 feet from paved edge of alley or lane, and 9 feet to the alley right-of-way.
- c. **Side yard.** Principal buildings: 20-foot separation between principal buildings on adjacent lots.

6. **Building-to-Building minimum and maximum distance.** Houses on opposite sides of the street shall be located between 70 and 100 feet across from each other, except along a boulevard, which is defined as a divided street with a center landscaped strip at least ten feet wide, and except when buildings face onto greens, commons, or other open space.

- a. **Maximum and minimum height.** Buildings shall be of at least one-and-one-half story construction, but no more than three stories. Church steeples or buildings containing historic architectural features may be higher than three stories if the height of the building is consistent with the overall design of the development. Buildings on corner lots may be as high as three-and-a-half stories.

E. Dimensional Standards for Small-Scale Retail Area

- 1. **General.** Small-scale retail areas may take a variety of forms that include rehabilitation of existing buildings, new town centers, or mixed-use developments that combine residences and businesses.
- 2. **Minimum Frontage.** Lots shall have a minimum of 20 feet of frontage on a street to provide access. The minimum lot width at the building line shall be 40 feet.
- 3. **Setbacks, minimum and maximum.** There is no required minimum front setback. The maximum front setback shall be 10 feet.

Setting standards for buildings results in a neighborhood that avoids the monotonous wall of garages so prevalent in conventional subdivisions, and encourages attention to the design and orientation of buildings.

These standards encourage the spatial relationships found in traditional villages, which promote alternative means of transport, such as walking and bicycling.

4. **Building-to-Building Distance.** Commercial buildings on opposite sides of new streets shall be located between 50 and 75 feet across from each other, except where buildings face onto public greens.
5. **Building Height.** Buildings shall be between one-and-a-half and three stories above grade, except for architectural embellishments such as church steeples or clock towers, and buildings on corner lots, which may be three and a half stories high.

V. OPEN SPACE REQUIREMENTS

The first provision listed here is required by statute. Subsequent provisions are suggestions for types and uses of required open space.

- A. For open space and recreational requirements, the entire density permitted by existing land use regulations must be located in 20 percent or less of the entire parcel available for development. Remaining land shall be reserved through a recorded easement solely for one or more of the following: conservation, agriculture, forestry, or public recreation.
- B. Land area reserved as protected open space should represent the area of the site that is most valuable in terms of open space features, such as (but not limited to) providing scenic views or having other aesthetic qualities, containing significant wildlife habitat or rare or outstanding landscape features, containing high-productivity agricultural soils or forest soils, or providing high-quality community recreation opportunities (e.g., includes a portion of an existing trail network).
- C. All developments shall install at least one outdoor playground or other youth recreation facility, such as a baseball diamond or playing field, in an area that is designed to be pedestrian accessible as well as buffered from vehicular traffic by fencing and suitably landscaped. Such facilities must be shown in the plan set and include plans for grading, drainage, and maintenance.
- D. Snowmobiling or ATV use is generally discouraged but if allowed will be permitted only on designated separate trails with appropriate signage, mitigation efforts to control erosion, designated hours of use, noise control measures, and measures to ensure safety of pedestrians.
- E. The deed and related documents for the property must clearly state the conveyance of a conservation easement for the open space land to the town, land trust, or other appropriate entity reserving the conserved open space land area solely for agriculture, forestry, and conservation, or for public recreation. Covenants that run with the land as well as appropriate documents and bylaws that explain the maintenance and use of the open space shall be established if the open space lands are to be retained in ownership by a homeowner's association or private individual.
- F. The open space must be accessible by walking trails. If public access is provided to these trails, a dedicated parking area shall be provided near an access point.
- G. Each development must contain a community building that can reasonably accommodate at least 20 people at any one time.

VI. SEPTIC SYSTEMS

- A. Where public sewer is unavailable, applicants may choose to use conventional, individual septic systems, a community septic system, a community leach field, an innovative septic system or any combination thereof, subject to DES approval.
- B. Applicants will consult with the town’s engineer in proposing the plan for the septic system of the development. Where developments are adjacent to town centers or other areas in which eventual sewer construction is foreseen, applicants must install capped sewer connections and related infrastructure so that the development can be connected to the town’s system in future years.
- C. Applicants must specify measures for the management of community systems as well as the schedule and methods for regular maintenance of such systems. Applicants must provide appropriate deed language for access easements for maintenance of these systems. Town counsel will review all submitted documents for management, ownership and access.

VII. DESIGN STANDARDS FOR ALL AREAS

A. Overall Form and Spatial Relationships

1. **Overall Form.** Areas of new construction shall be sited so as to best preserve natural vistas and existing topography.

- a. In all areas, peripheral greenbelt open space shall be designed to follow the natural features whenever possible and to maintain an agricultural, woodland, or countryside character.
- b. The village shall be distinguished from the peripheral, greenbelt open space by a well-defined line or edge so that developed areas will transition very quickly to rural, undeveloped lands.

2. Village Layout

- a. **Overall Layout.** Villages shall be designed in a pattern of inter-connecting streets and alleys, defined by buildings, street furniture, landscaping, pedestrian ways, and sidewalks. The layout should be suited to the existing topography and other natural features of the area to minimize cut-and-fill and grading throughout the site.
- b. **Pedestrian Connections.** No less than one eight-foot pedestrian alley or way must be provided for every 250 feet of street frontage in the Small Scale Retail Area, connecting with rear parking lots.
- c. **Building Orientation.** Houses shall be oriented to maximize passive solar energy, natural shade and windbreaks, and to orient rooms such as kitchens and bedrooms based on light and heat requirements at different times of the day. The use of energy-efficient appliances and materials is encouraged.

The **Design Standards** section can be used as a stand-alone section by towns that do not adopt the VPA, to improve the overall appearance of town center and main street areas. These standards are typical of village design for small towns.

B. Street and Sidewalk Network

1. **Sidewalks.** Sidewalks are required along all road frontages of new development. The width of the sidewalk shall be consistent with the prevailing pattern in the immediate neighborhood, provided that no new sidewalk shall be less than four feet wide.
2. **Curbs.** Where curbing is used, it shall be granite curbing for durability.
3. **Overall Street Layout.** Each development shall have at least two points of entry and egress, and shall be connected to other existing streets to provide for the future extension of the community's street network. Main roads should not cut through the center of the development, but instead should provide access to secondary roads that begin at the periphery of the street layout.
4. **Cul-de-sacs.** Cul-de-sacs are prohibited, unless conducive to a harmonious village pattern due to topographic constraints.
5. **Traffic calming.** In order to calm traffic speeds and to provide for pedestrian safety, the use of "T" intersections, small roundabouts, and four-ways stops shall be used.

C. Pedestrian and Bicycle Access

1. **Connections between uses.** Pedestrian and bicycle connections between mixed-use development and residential areas are required.
2. **Bicycle parking.** Small-scale retail areas shall provide areas for parking and locking of bicycles.

D. Streetscape

1. **Trees.** Any new development must be accompanied by a landscape plan that will address the location, suitability, and species of trees, shrubs, or other plantings within the development. In new developments, street trees shall be planted every 35 linear feet of street right of way.
2. **Benches and other street furniture.** New developments shall provide benches with seats and backs every 500 feet of street right-of-way in the Small-Scale Retail Area.
3. **Buffer zones.** A vegetated buffer of at least 100 feet shall be provided between Residential Areas and adjacent industrial zones.
4. **Public Space.** Each Small-Scale Retail Area shall contain one or more public spaces such as a green, pocket park, gazebo, or picnic area. These spaces should be designed to encourage community interaction.
5. **Lighting.** Lighting shall be provided in all public spaces within the Small-Scale Retail Area, and at appropriate intervals along the street. Where appropriate, lighting shall be provided in Village Residential Areas as well. All light fixtures shall meet the specifications for full cut-off or cut-off fixtures as defined by the Illumination Engineering Society of North America.

E. Architectural Design Standards

1. **General.** The following architectural design standards shall apply to all structures.
2. **Buildings: Scale and Style.** Buildings shall generally relate in scale and design features to the surrounding buildings, showing respect for the local context. Buildings shall reflect a continuity of treatment obtained by maintaining the building scale or by subtle graduation changes, by maintaining small front setbacks, by continuous use of front porches on residential buildings, by maintaining cornice lines in buildings of the same height, and by extending horizontal lines of fenestration.
3. **Corner Lots.** Buildings on corner lots shall be considered significant structures, given that they have at least two front facades visibly exposed to the street. Buildings on corner lots may be three-and-a-half stories high.
4. **Walls and Planes.** Retail and commercial buildings shall avoid long, monotonous uninterrupted walls or roof planes. Offsets including projections, recesses, and changes in floor level shall be used in order to add architectural interest and variety, and to relieve the visual effect of a simple, long wall. Similarly, roof-line offsets shall be provided, in order to provide architectural interest and variety to the massing of a building and to relieve the effect of a single, long roof. Flat roofs should be avoided in favor of pitched roofs.
5. **Facades Facing Public Streets.** Buildings with more than one façade facing a public street or internal open space shall be required to provide multiple front façade treatments. The architectural treatment of the front façade shall be continued, in its major features, around all visibly exposed sides of a building. All sides of a building shall be architecturally designed to be consistent with regard to style, materials, colors, and details. Bland wall or service area treatment of side and or rear elevations visible from the public viewshed is discouraged.
6. **Roofs.** Gable roofs with a minimum pitch of $\frac{9}{12}$ should be used to the greatest extent possible. Where hipped roofs are used, it is recommended that the minimum pitch be $\frac{6}{12}$. Both gable and hipped roofs should provide overhanging eaves on all sides that extend a minimum of one foot beyond the building wall. Flat roofs should be avoided on one-story buildings, but may be used on buildings with a minimum of two stories, provided that all visibly exposed walls shall have an articulated cornice that projects horizontally from the vertical building wall plane.
7. **Windows/Fenestration.** Fenestration shall be architecturally compatible with the style, materials, colors, and details of the building, and appropriate to a rural New England setting. Windows shall be vertically proportioned wherever possible. To the extent possible, upper story windows shall be vertically aligned with the location of windows and doors on the ground level, including storefront or display windows. Blank, windowless walls are not permitted in either the Small-Scale Retail area or the Residential area.

Requiring good design helps to ensure that when businesses come and go, subsequent owners and tenants of the buildings will be able to quickly occupy and convert the building to use by a new business, thus protecting the vitality and continuity of a town's local business districts.

Storefronts are an integral part of the building and shall be integrally designed with the upper floors to be compatible with the overall façade character. Ground floor retail, service, and restaurant uses should have large pane display windows, framed by the surrounding wall, and shall not exceed 75 percent of the total ground level façade area.

8. **Entrances.** Main entrances to a building shall be defined and articulated by architectural elements such as lintels, pediments, pilasters, columns, porticoes, porches, overhangs, railings, balustrades, and others, where appropriate. Any such element utilized shall be consistent with the style, materials, colors, and details of the building as a whole, as shall the doors. Awnings are permitted where they compliment the building's architectural style.
 9. **Light fixtures.** Light fixtures attached to the exterior of a building shall be architecturally compatible with the style, materials, colors, and details of the building and shall comply with local building codes. The use of low-pressure sodium, tube-fluorescent, or mercury vapor lighting either attached to buildings or to light the exterior of buildings shall be prohibited.
 10. **Lighting.** Streetlights shall be decorative and shall blend with the architectural style of the community. Along all commercial or mixed-use streets, parking areas, sidewalks, walkways, courtyards, community greens, and interior open spaces, decorative light posts shall be provided at regular intervals. Lighting on residential streets should be confined to intersections, pocket parks, and corners. Small-scale retail areas shall utilize reduced lighting after business hours to conserve energy and to encourage dark, starry skies characteristic of rural areas. Lighting shall be properly shielded to reduce glare for the safety of motorists.
 11. **Air conditioners and other fixtures.** All air conditioning units, HVAC systems, exhaust pipes or stacks, elevator housing, and satellite dishes and other telecommunications receiving devices shall be thoroughly screened from view from the public right-of-way and from adjacent properties by using walls, fencing, roof elements, or landscaping.
 12. **Fencing.** In no case will chain-link fencing be permitted. Fencing must be iron rod or wood, and no higher than three feet unless used as screening for trash collection areas.
 13. **Fire escapes.** Fire escapes shall not be permitted on a building's front façade.
 14. **Security.** Solid metal security gates or solid roll-down metal windows shall not be permitted. Link or grill type security devices shall be permitted only if installed from the inside, within the window or door frames. Security grilles shall be recessed and concealed during normal business hours.
- F. **Signs in Small-Scale Retail Areas**
1. **General.** All signs must be consistent with the overall design of the development, and should be constructed of wood, granite, painted cast metal, bronze, brass, or other material consistent with the materials used in the

building's façade or fixtures. Plastic panel rear-lighted signs are not permitted. Billboards are not permitted. Signs employing mercury vapor, low pressure and high-pressure sodium, neon, and metal halide lighting are not permitted.

2. **Design.** Unique and interesting designs are encouraged in the lettering and graphics of each sign. Signs may be attached to the building and project outward from the wall so long as the sign does not project outward from the wall to which it is attached more than 18 inches. Projecting signs must be no larger than four square feet. Projecting signs must be at least ten feet above the ground. Signs attached to the front façade shall not exceed the dimensions of the façade.
3. **Height.** The maximum permitted height of signs is 15 feet above the front sidewalk elevation, and shall not extend above the base of the second floor windowsill, parapet, eave, or building façade.
4. **Freestanding signs** shall only be permitted where the business is not attached to any other buildings. All freestanding signs must be no higher than four feet and no wider than six feet.
5. **Street address numbers** shall be clearly marked in any new development and included in the design of the front façade or signage of individual buildings.
6. **Signs in residential areas.** No signs shall be permitted in the residential area, except one sign no larger than two square feet related to a home occupation.

G. Landscaping

1. All developments must contain a landscaping plan that lists the location, species, and suitability of plant species to the site.
2. Trees shall be planted at regular intervals no greater than 35 feet to enhance public spaces, open spaces, and streetscapes. A variety of native and non-invasive species shall be used.
3. Low-impact stormwater management designs that treat and recharge runoff on-site are encouraged.

H. Parking

1. Parking for small-scale retail areas must be on-street or in the rear of buildings. No more than five spaces may be located in front of the building.
2. Rear parking areas shall be landscaped with an area of low shrubs or suitable foliage at least ten feet wide between every two rows of spaces. This area shall include a pedestrian walkway at least four feet wide for pedestrian safety. Crosswalks and walkways at regular intervals shall connect this strip to building entrances. Applicants are encouraged to utilize permeable pavement and other low-impact techniques suitable for cold climates for on-site water recharge in parking lot design.

See the chapters on **Landscaping and Permanent (Post-Construction) Stormwater Management** in this handbook for a more comprehensive set of requirements.

The location and layout of **parking areas** is a key spatial aspect in the creation of a village. Pedestrian safety, stormwater management, access management, and aesthetics are primary elements.

3. Landscaped islands must contain curb breaks and utilize ecological engineering methods to allow maximum on-site water recharge and to minimize sheet flow.

VIII. REVIEW PROCESS

Worksheet. The Planning Board shall establish a worksheet, outline, or checklist of the pre-application and application procedure to assist applicants with the relevant town ordinances and regulations in the review process and to discuss potential issues concerning the design or feasibility of the site plan, based on town ordinances and regulations.

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1.6 Infill Development

BACKGROUND AND PURPOSE

Infill development in its simplest form is the development or redevelopment of land that has been bypassed, remained vacant, and or is underutilized as a result of the continuing development process. Infill development can occur anywhere that a parcel of land is underutilized or misused compared to the surrounding land use activities, such as large urban areas, village settings, town centers, or areas with large lot development that the master plan designates for higher densities. It is often a component of mixed-use development and is a technique that is frequently used in housing strategies to provide affordable housing or to fulfill the need for various types of housing. In addition to its role in housing strategies, infill development plays a critical role in the conservation of land, the creation of community centers, and provides an alternative to sprawl.

The purpose of this chapter is to explore the issues associated with the promotion and implementation of infill development and to highlight its relationship to other planning tools.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

There is no single technique to implement infill development. There are however, two common approaches that are often used to promote infill development. The first involves the development of a special district within a particular zone. This approach identifies the specific areas within a municipality that are subject to the infill development ordinance. The second method involves identifying areas of infill development by definition. In this instance, the zoning ordinance applies to those areas of a community that meet a set of defined criteria for an infill development project. This type of ordinance may be assigned to a specific zone or may be applied community-wide. Often this type of ordinance is tied to “adaptive reuse” or “redevelopment” of a community. In both instances, a community may also choose to further enhance a zoning ordinance by identifying design guidelines within the Site Plan Review Regulations.

The key to the successful implementation of infill development is flexibility, both in zoning and in the design standards for existing and proposed infrastructure, such as buildings, roadways and parking.

RELATED TOOLS:

- Density Transfer Credit
- Conservation Subdivision
- Inclusionary Housing
- Pedestrian-oriented Development

Closely related to infill development is the concept of adaptive reuse or revitalization. While infill development focuses on the development of underutilized land or parcels, revitalization more often addresses the issues of building design and building use. Implementation of both infill development and revitalization can strengthen community function through the efficient use of existing infrastructure and buildings.

While not an exhaustive list, the questions below can help determine if infill development is appropriate for an identified parcel or area of a community.

1. Will the project improve the appearance of the immediate area and contribute to the economic vitality and/or redevelopment of the area and local economy?
2. Will the project make use of underutilized infrastructure or make better use of existing infrastructure, including, but not limited to: the transportation system (public transportation, sidewalks, and roads); sewer, water, and other utilities; and proximity to other buildings and uses that can increase visitation or usage (library, museums, cultural centers and etc)?
3. Will the project make the area more pedestrian friendly and a more livable community?
4. Will the project create jobs, improve the housing supply, provide open space and/or contribute to the improvement of the area in any other way?
5. Will the project provide tax revenue directly or indirectly as a result of new investment in this area?
6. Will the project provide or encourage better utilization of other land in the community such as reducing sprawl and preserving land for farms and other open spaces?
7. Will the project fill an apparent visual void that currently exists within the existing infrastructure?
8. Will redevelopment of the land assist in cleanup of the site?

Understanding the benefits and potential barriers to implementing infill development can help a municipality develop an ordinance and/or design standards that meet the needs of the community while allowing for successful infill development to occur.

The following is a list of some of the benefits of infill development.

1. Benefits for Housing:
 - Expands the range of housing choices to meet the needs of the state's changing demographic trends, i.e., smaller household, elderly, 55+ housing options, single, and empty nesters.
 - May result in lower initial costs as project sites may be in areas already served by infrastructure as opposed to housing developed on raw land outside of the municipal service area.
 - May result in lower housing costs as smaller units require less maintenance.
 - Strengthens existing neighborhoods.
2. Benefits for Transportation:
 - Increased density results in less auto-dependency and create more walkable communities.
 - Uses existing infrastructure capacity rather than necessitating new public investment costs to develop in the suburbs and rural areas.

3. Benefits for Growth Management:

- Reduces demand to develop farmland and open space by providing a constructive and positive alternative to scattered or strip development.
- Improves tax base of older areas of a municipality.
- Encourages community revitalization.

The challenge to implementing infill development is overcoming the initial barriers. Overcoming the community's existing regulatory structure will likely prove the most difficult. Setbacks, minimum lot size, minimum frontage, maximum lot coverage, parking ratios, and other zoning requirements impact the ability to implement an infill development project. Crafting an ordinance that is sufficiently flexible to make the project fit into the surrounding neighborhood and that also provides adequate economic incentives is necessary for successful implementation.

Factors to consider when developing infill development standards include:

- Establish a minimum lot size, such as 8-10 permitted units per acre or lots 2,000-4,000 square feet in size. Consider also establishing a maximum lot size for areas serviced by municipal water and or sewer.
- Require minimum density requirements as opposed to maximum density requirements.
- Increase height limitations of buildings to increase density.
- Encourage use of rooftops for open space (gardens), particularly roofs of accessory buildings, such as garages.
- Permit an increase in lot coverage, especially if common public areas are in close proximity.
- Reduce front setbacks to conform to existing building lines or add a maximum requirement to prevent new construction from being set back "too far" from the street.
- Reduce side setbacks, including the use of zero lot line development.
- Reduce lot width requirements.
- Encourage mixed use buildings, combining housing and commercial, particularly in village and downtown areas.
- Develop mixed land use zoning districts.
- Reduce parking requirements and allow shared parking, consider maximum rather than minimum parking standards to prevent too much land being used for parking.
- Require parking in the rear of buildings.
- Require sidewalks that connect to established pedestrian systems, street trees, benches, mini-parks to create attractive livable walkable communities.
- Develop architectural design guidelines for streetscapes and building facades.
- Amend sign regulations to encourage creative and appropriately sized signage.

LEGAL BASIS AND CONSIDERATION FOR NEW HAMPSHIRE

Infill development incorporates a variety of planning techniques including but not limited to: increased density, density bonuses, zero lot line developments, transfer of development rights, mixed use zoning, flag lots, development on non-conforming lots, use of accessory dwellings for in-law apartments or elderly housing, cluster developments, reducing setbacks, and village alternative development. Several of the innovative land use controls allowed per RSA 674:21 are often techniques used in infill development proposals, such as transfer of density and development rights, performance standards, flexible zoning, accessory dwelling unit standards, and village plan alternative concepts. Furthermore, RSA 674:17 states that the overall intent of a zoning ordinance serves to promote many of the practices utilized to implement infill development projects.

EXAMPLES AND OUTCOMES

Infill development affords a community an opportunity to use an array of techniques to redevelop a parcel or building. There are many success stories in New Hampshire including but not limited to, the following.

Portsmouth

Portsmouth's Downtown Overlay District promotes the economic vitality of the downtown business district by ensuring continuity of pedestrian-oriented business uses along streets. The ordinance prohibits large surface parking lots and restricts accessory parking to the rear of buildings.

Concord

Concord established an Opportunity Corridor Performance District for the economic redevelopment of under utilized urban properties located between the downtown business district and Interstate 93, as well as in other former brownfield locations in the City. A hotel and conference center, as well as several office buildings, have been built since the creation of the district.

Model Language and Guidance for Implementation

MODEL INFILL DEVELOPMENT ORDINANCE

I. PURPOSE AND INTENT

The purpose of this district is to provide for [*neighborhoods/town centers/main streets/employment centers/mixed use districts, etc.*] with efficient land use and cost-effective delivery of urban services. The provisions of this district recognize the design challenges inherent to developing infill properties, and ensure that new development is consistent in character and scale with existing development. The intent of this district is to:

- A. Accommodate growth in _____ [*name of local jurisdiction*] by encouraging and facilitating new development on vacant, bypassed and underutilized land within areas that already have infrastructure, utilities, and public facilities, while addressing the needs of _____ [*name of local jurisdiction*] residents.
- B. Encourage efficient use of land and public services in the context of existing communities.
- C. Stimulate economic investment and development in established neighborhoods.
- D. Provide developers and property owners flexibility so that they can achieve high quality design and develop infill projects that strengthen existing communities.
- E. Create a high quality community environment that is enhanced by a balanced compact mix of residential, commercial, recreational, open space, employment and institutional uses and building types.
- F. Implement the goals, objectives, and policies of the comprehensive plan, or the small area plan.
- G. Provide clear standards for infill development.
- H. Encourage compact development that is pedestrian-scaled and, if applicable, transit-oriented.

II. APPLICABILITY

The Infill Development Overlay applies to the areas shown on the zoning map. The requirements of the overlay zone are in addition to the requirements of the underlying zone. Where the requirements of the Infill Development Overlay conflict with the underlying zone, the requirements of the Infill Development Overlay shall apply.

The intent of the district will vary by municipality, so it is important to clearly identify the intent in this section and develop an ordinance specific to those needs.

Alternatively, the Infill Development Ordinance can be adopted as a flexible zone, allowing developers to use the ordinance provision when certain conditions are met, such as development of vacant lots in developed areas, redevelopment of sub-standard buildings, or to take advantage of the opportunity for increased density offered by water and sewer extensions.

III. GENERAL REQUIREMENTS

The site plan shall incorporate the following elements to enhance compatibility with the surrounding community:

- A. Sidewalks that connect to the adjacent sidewalk system.
- B. Public streets that connect to the adjacent street pattern and that are designed to discourage speeds and volumes that impede pedestrian activity and safety.
- C. Preservation of architecturally significant structures whenever feasible.
- D. Street furniture, lighting and landscaping that is primarily oriented to pedestrian use.
- E. Setbacks, building envelopes, use and parking compatible with surrounding community.
- F. All new buildings (except accessory structures) shall have the primary entrance oriented to the street or public walkway, with direct, barrier-free and convenient pedestrian connections.

IV. PERMITTED USES

In addition to uses permitted in the underlying zone, the following uses are permitted in the Infill Overlay District:

- A. Home occupations.
- B. Accessory dwelling units.
- C. Residential units on the upper floors of commercial buildings.

This list is intended as an example. This section should be adapted to a community's needs.

This section should be specific to a community's needs and will need to be adapted as such. Development standards will vary significantly for infill development in urban and village settings compared to suburban settings.

V. DEVELOPMENT STANDARDS

- A. **Lot size:** Lots shall be no greater than 5,000 square feet in village or urban zones, unless required to accommodate mixed use development. In rural zones, lot size may be reduced to the smallest size needed to accommodate on-site water supply and wastewater disposal.
- B. **Setbacks:** Setbacks shall conform to the surrounding properties, and may be reduced to zero where appropriate and with adequate fireproofing. In no case shall the setbacks be substantially greater than surrounding properties.
- C. **Density:** Density shall be controlled by the allowable building height, required setbacks, building code requirements, and the availability of water and sewer service.
- D. **Bulk and Scale:** Building size, scale, and architecture shall be consistent with neighboring buildings, unless the planning board determines that significant differences from neighboring buildings are in the best interests of the town.

The intent of the **Lot Size** requirement is to avoid low density site development in urban and village areas that can accommodate greater density. The 5,000 square foot maximum lot size is intended to encourage high density. Mixed use development, such as first floor retail space with residential or office units in upper floors may require larger lots.

- E. **Building Orientation:** Primary facades and entries shall face the adjacent street with a connecting walkway that does not require pedestrians to walk through parking lots or across driveways.
- F. **Accessory Dwellings:** In single-family residential areas, one accessory dwelling unit per lot shall be allowed in addition to the principal dwelling unit.
- G. **Privacy:** Optimize privacy of residents and minimize infringement on the privacy of adjoining land uses through the placement of windows and door entrances. Create opportunities for interactions among neighbors in common pedestrian circulation areas of the project.
- H. **Parking:** Parking requirements may be waived if there is suitable and available public parking in close proximity. Parking shall be provided in the rear of buildings.
- I. **Pedestrian Access and Circulation:** Continuous sidewalks shall be provided between primary entrances to buildings, parking areas, pedestrian facilities on adjacent properties, and existing public sidewalks along perimeter streets.

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1.7 Agricultural Incentive Zoning

BACKGROUND AND PURPOSE

Agriculture has long been an important part of the economic, social, and cultural fabric of New Hampshire. Farmers have been producing crops from New Hampshire soil for 375 years. Today, although agriculture is important to communities, it is facing significant challenges, not only from the increasing pressures of growth and development, but also from municipal regulations that may be inhospitable to many agricultural practices.

The definition of agriculture under New Hampshire state law is very broad (RSA 21:34-a). According to the RSA, agriculture includes all aspects of breeding, raising, and selling livestock, silviculture (timber and logging), honey and maple syrup production, and crops ranging from vegetables and fruit to hay and seeds along with the processing, storage, and transportation of the agricultural products. The purpose of this chapter is to provide tools to planning boards aiming to preserve the diverse agricultural lands and uses in New Hampshire.

According to the American Farmland Trust (AFT), Rockingham, Hillsborough, and Merrimack counties are part of the southern New England region that is ranked tenth on the list *Top 20 Most Threatened High-Value Farmland Regions*. Sections of Cheshire, Sullivan, and Grafton counties are included in the number 19-ranked Connecticut River Valley. Studies by the AFT also show that the highest-value and more perishable foods are produced closest to population centers. Across the United States, this means that 87 percent of fruits, 86 percent of vegetables, and 79 percent of milk and dairy products are produced in urban-influenced counties (NH OEP). Rockingham and Hillsborough Counties are among the top 20 counties in the US in direct-to-consumer farm sales. With almost 96 percent of New Hampshire farms classified as “small farms” by the US Department of Agriculture’s definition of sales below \$250,000, farmers find that their greatest asset is their land. When farms are profitable, farmers are able to keep their farms and woodlands undeveloped. If a farmer goes out of business or sells their land to move to an area with less development pressure, the community is affected by the potential conversion of the land.

Many community master plans cite “preserving rural character” as one of the main goals. There are many aspects to rural character in New England. The character of the landscape is epitomized by the traditional village center surrounded by a landscape of working farms and open space. The character of the community is likewise

RELATED TOOLS:

- Density Transfer Credit
- Habitat Protection
- Village Plan Alternative
- Urban Growth Boundary
- Conservation Subdivision

Agriculture makes vital and significant contributions to the food supply, the economy, the environment and the aesthetic features of the state of New Hampshire.

—NH Right to Farm Law

exemplified by people seeking to hold onto and promote the traditional rural or small-town values of family, community, independence, responsibility, self-government, conservation, entrepreneurship, and strong work ethic (NH OEP). Given agriculture's traditional appeal as a core community value, many planning boards desire zoning, subdivision, and site plan regulations that aid with retention or encouragement of agricultural activities and open space. These measures are especially important when economic competition from development threatens conversion of prime agricultural land to non-agricultural land uses. The zoning ordinance, along with the subdivision and site plan regulations, may create a flexible regulatory environment that encourages and promotes agriculture and open space.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Although many people enjoy farmland for its open spaces or the fresh vegetables available at the farm stand, farming is fundamentally a business and land use. One

... leading farmland preservation counties employ at least six techniques: a comprehensive plan, transfer or purchase of development rights, differential assessment, right-to-farm laws, agricultural zoning, and urban growth boundaries.

—APA

unique aspect of agriculture is that it does not fall neatly into a prescribed area of a community like a traditional commercial or industrial zone. Instead, productive farms are located where the physical characteristics of the land, such as prime soils and adequate water supply, occur regardless of the zone. Wherever farms are located, communities need to carefully consider both the benefits of and challenges to sustaining agriculture.

Moreover, one farmland preservation technique cannot succeed alone; a coordinated package of financial incentives and land use regulations are preferred. According to the American Planning Association (APA), in the United States, leading farmland preservation counties employ at least six techniques: a comprehensive plan, transfer or purchase of development rights, differential assessment, right-to-farm laws, agricultural zoning, and urban growth boundaries.

Benefits of Agriculture

Farms are sources of fresh produce and other products that connect people to their food supply in ways not possible when produce travels thousands of miles from the field to a local supermarket (NH OEP). As a land use, agriculture broadly promotes environmental quality, scenic vistas, and cultural activities. Farm and forestlands help to protect water quality by absorbing and filtering water. They also provide habitat and travel corridors for wildlife, and often provide recreational and educational opportunities for the community. Agricultural businesses in New Hampshire are typically small and family-owned, and reflect local market conditions.

There are economic benefits associated with agriculture above and beyond its direct tax contributions. According to the report, *The Impact of Agriculture on NH's Economy in FY02*, agriculture's overall total economic impact from direct, indirect, and induced spending was over \$2.3 billion; of this amount \$930 million was in direct spending. The report notes that approximately 18,000 jobs are related in some way to agriculture. Working farms also help to attract tourists and retain businesses that have nothing in common with agriculture, such as software and high-tech firms that locate in New Hampshire for the quality of life and the rural character. Cost of community service studies show that land held as open space, whether it is farmed

or not, requires fewer community resources than what it contributes in property and other taxes. On the other hand, land used for residential purposes is often known to demand more resources than it contributes in taxes.

CHALLENGES TO SUSTAINING AGRICULTURE

Although there are many benefits to agriculture, there are some significant challenges that need to be addressed by the community. The primary challenge is that a farm is a working business. Depending on the type of farm there is the possibility of truck traffic, signage, increased traffic from customers, noise, and in some cases smell from livestock. Another challenge is that farms frequently require accessory dwellings and other structures that are usually not permitted under standard zoning ordinances and subdivision and site plan regulations. Finally, the engineering and site design requirements in municipal regulations can be expensive, making it difficult to expand the farm. Farms implementing best management practices (BMPs) can reduce their impact on the environment from fertilizer application and pesticide use.

BUILDING THE CASE FOR AGRICULTURE IN YOUR COMMUNITY

Agricultural incentive zoning, like all other zoning, requires a solid foundation in the community's master plan and a clear understanding of the role agriculture plays in the community. In order to gain that understanding, the following steps should be carried out during the master planning process to ensure success with local land use regulations.

1. **Participation by the local agricultural community.** The local agricultural community should include, but is not limited to: local farmers, the New Hampshire Department of Agriculture, UNH Cooperative Extension Service, the New Hampshire Farm Bureau, the New Hampshire Farmers Market Association, and others. These stakeholders know how existing ordinances and regulations affect farming and are local experts on the needs and concerns that are unique to farming, which should be considered when developing a zoning ordinance.

The New Hampshire Farm Viability Task Force recommends creation of agricultural commissions, which promote farms and offer advice to other municipal boards on how to encourage communities to be farm-friendly.

2. **Identification of significant farmland soils within the community.** Undeveloped prime agricultural lands are an important natural resource that should be protected for future agricultural activities. The GRANIT system at the University of New Hampshire stores digital soils maps prepared by the Natural Resources Conservation Service (NRCS); both organizations, as well as the regional planning commissions and county conservation districts, can provide data or expertise with soils mapping.
3. **A comprehensive agricultural profile of the town.** A community agricultural profile can identify historic, existing, and potential agricultural activities. The profile helps to establish a basic understanding of agriculture, and serve as a base for the zoning regulations. For example, the profile could include a map highlighting the agricultural lands and their correlation to the 100-year floodplain elevations.
4. **A concerted public outreach program.** Educating the public about how agriculture works in their community is essential to a successful relationship between

the farmers and community members. For example, mailers included with the water bills could highlight the benefits of zoning the 100-year floodplain as “agricultural use” to decrease development and possible flooding within these areas. The better the public understands agriculture, the more likely they are to support ordinances that benefit agricultural activities in their community.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

There are several New Hampshire statutes that address agriculture. The definition of agriculture is found in NH RSA 21:34-a, as follows:

21:34-a Farm, Agriculture, Farming.

- I. The word “farm” means any land, buildings, or structures on or in which agriculture and farming activities are carried out or conducted and shall include the residence or residences of owners, occupants, or employees located on such land. Structures shall include all farm outbuildings used in the care of livestock, and in the production and storage of fruit, vegetables, or nursery stock; in the production of maple syrup; greenhouses for the production of annual or perennial plants; and any other structures used in operations named in paragraph II of this section.
- II. The words “agriculture” and “farming” mean all operations of a farm, including:
 - (a) (1) The cultivation, conservation, and tillage of the soil.
 - (2) The storage, use of, and spreading of commercial fertilizer, lime, wood ash, sawdust, compost, animal manure, septage, and, where permitted by municipal and state rules and regulations, other lawful soil amendments.
 - (3) The use of and application of agricultural chemicals.
 - (4) The raising and sale of livestock, which shall include, but not be limited to, dairy cows and the production of milk, beef animals, swine, sheep, goats, as well as domesticated strains of buffalo or bison, llamas, alpacas, emus, ostriches, yaks, elk (*Cervus elephus canadensis*), fallow deer (*Dama dama*), red deer (*Cervus elephus*), and reindeer (*Rangifer tarandus*).
 - (5) The breeding, boarding, raising, training, riding instruction, and selling of equines.
 - (6) The commercial raising, harvesting, and sale of fresh water fish or other aquaculture products.
 - (7) The raising, breeding, or sale of poultry or game birds.
 - (8) The raising of bees.
 - (9) The raising, breeding, or sale of domesticated strains of fur-bearing animals.
 - (10) The production of greenhouse crops.
 - (11) The production, cultivation, growing, harvesting, and sale of any agricultural, floricultural, viticultural, forestry, or horticultural crops including, but not limited to, berries, herbs, honey, maple syrup, fruit, vegetables, tree fruit, grapes, flowers, seeds, grasses, nursery stock, sod, trees and tree products, Christmas trees grown as part of a commercial Christmas tree opera-

- tion, trees grown for short rotation tree fiber, compost, or any other plant that can be legally grown and harvested extensively for profit or subsistence.
- (b) Any practice on the farm incident to, or in conjunction with such farming operations, including, but not necessarily restricted to:
- (1) Preparation for market, delivery to storage or to market, or to carriers for transportation to market of any products or materials from the farm.
 - (2) The transportation to the farm of supplies and materials.
 - (3) The transportation of farm workers.
 - (4) Forestry or lumbering operations.
 - (5) The marketing or selling at wholesale or retail, on-site and off-site, where permitted by local regulations, any products from the farm.
 - (6) Irrigation of growing crops from private water supplies or public water supplies where not prohibited by state or local rule or regulation.
 - (7) The use of dogs for herding, working, or guarding livestock, as defined in RSA 21:34-a, II (a)(4).
 - (8) The production and storage of compost and the materials necessary to produce compost, whether such materials originate, in whole or in part, from operations of the farm.
- III. A farm roadside stand shall remain an agricultural operation and not be considered commercial, provided that at least 35 percent of the product sales in dollar volume is attributable to products produced on the farm or farms of the stand owner.
- IV. Practices on the farm shall include technologies recommended from time to time by the university of New Hampshire cooperative extension, the New Hampshire department of agriculture, markets, and food, and appropriate agencies of the United States Department of Agriculture.
- V. The term “farmers’ market” means an event or series of events at which 2 or more vendors of agricultural commodities gather for purposes of offering for sale such commodities to the public. Commodities offered for sale must include, but are not limited to, products of agriculture, as defined in paragraphs I-IV. “Farmers’ market” shall not include any event held upon any premises owned, leased, or otherwise controlled by any individual vendor selling therein.
- VI. The term “agritourism” means attracting visitors to a working farm for the purpose of eating a meal, making overnight stays, enjoyment of the farm environment, education on farm operations, or active involvement in the activity of the farm which is ancillary to the farm operation.

NH RSA 432:33 (the Right to Farm Law) is intended to protect agriculture from nuisance lawsuits. NH RSA 672, the general planning and zoning authorization, states that: “Agriculture makes vital and significant contributions to the food supply, the economy, the environment and the aesthetic features of the state of New Hampshire, and the tradition of using the land resource for agricultural production is an essential factor in providing for the favorable quality of life in the state. Natural features, terrain and the pattern of geography of the state frequently place agricultural land in close proximity to other forms of development and commonly in small

parcels. Agricultural activities are a beneficial and worthwhile feature of the New Hampshire landscape and shall not be unreasonably limited by use of municipal planning and zoning powers or by the unreasonable interpretation of such powers.”

NH RSA 674:21 authorizes innovative land use controls, and mentions agriculture specifically in the village plan alternative where only 20 percent of a parcel may be developed and the other 80 percent must be set aside by easement for agriculture, forestry, conservation, or public recreation.

MASTER PLAN

Because the master plan provides the basis for a community’s zoning ordinance, it is very important that the steps outlined in Section II of this chapter are followed. There are many opportunities to discuss agriculture in the master plan, such as the economic development chapter, the land use chapter, or the natural resources chapter. Existing conditions and the vision of the community should be reflected in the plan.

CURRENT USE

According to the New Hampshire Farm Viability Task Force, “current use taxation greatly reduces the property taxes on farmland and is the single most important public policy benefit for farm owners.” Still, if the value of a farmer’s land rises to the point where it eclipses his income potential, then there is increased pressure to sell the land, with or without the current use law. Transferable development/density rights or the purchase of development/density rights are other important tools for the community and the farmer to consider. Both provide options for a farmer to receive capital for the increased value of his real estate and encouragement to maintain the farm.

Current use taxation... is the single most important public policy benefit for farm owners.

—NH Farm Viability Task Force

EXAMPLES AND OUTCOMES

CONCORD, NEW HAMPSHIRE

In its master plan, the city of Concord determined that most agricultural uses were located either on the rural outskirts of the city or along the flood plains of the Merrimack and Contoocook Rivers. In 2001, the city adopted agricultural zoning based on the master plan. The 2001 zoning ordinance allows for agricultural uses in the Open Space Zone (RO) and the Medium Density Zone (RM). Agricultural, horticultural, and silviculture operations are permitted uses in both districts. Raising poultry and keeping stables and nurseries are permitted uses only in the RO zoning district. All other agricultural uses are allowed only by special exception of the zoning board of adjustment.

Seasonal Help

Concord’s zoning ordinance allows for housing seasonal workers on farms, as needed in the RO and RM districts. These uses must also be reviewed under the provisions of the city’s site plan review regulations, however, the applicants are provided a more expedited review process than in normal site plan review applications. The provisions for seasonal help only allow for a maximum of ten employees, and require at least 150 square feet of housing per person or meet OSHA standards, whichever is greater.

Site Plan Review Regulations

Since the new regulations were adopted, only two applicants, Apple Hill Farm and Carter Hill Orchards, have come before the planning board. In both cases, the applicants wanted to expand housing for their seasonal help. The planning board determined that both applications fell under the provisions of a minor site plan review. Therefore, both applicants were allowed to prepare their own plans using available information, and to submit the plans to the planning board and the architectural design committee without architectural or engineering stamps on the plans.

Preserving Agricultural Land

In recent years, the city of Concord has recognized that its agricultural resources are a significant asset to the community. In 2001 the city, along with land trusts and private individuals, purchased development rights and agricultural easements on Carter Hill Orchards. This saved a very popular orchard, and added recreational opportunities for multiple uses such as hiking and cross-country skiing. In addition, the city of Concord and various land trusts are about to close on another property that abuts the Carter Hill Orchards. The property produces strawberries, pumpkins, and Christmas trees. The plan is to expand the hiking and cross-country skiing opportunities across the two properties.

Another significant cooperative venture was the purchase of a major portion of the agricultural land in the flood plain of the Merrimack River. Not only were public private partnerships instrumental to the sale, but also the landowner agreed to a bargain price for the property, which led to a reduction in their tax burden. This property is intended to continue to be used for raising of feed corn and sod. The property is leased to the people who were farming the property under the previous owners, and the lease funds are being used to help pay down the bond used to purchase the land and the agricultural rights to the property.

The city, along with land trusts, also purchased Diamond Hill Farm, a property with farm buildings and a variety of agricultural uses. The purpose is to lease the farm and the property at an affordable rate to maintain its agricultural use. Like the other properties, the lease would be used to pay down the bonds used to finance the purchase.

Farm Stands

Since the ordinance was established in 2001, no farm stands have been built or proposed in Concord. Farm stands are only allowed as an accessory use to the principle agricultural use on the same parcel of land. The ordinance does not allow for construction of off-site farm stands or for the sale of agricultural products, unless part of a larger retail market or at an organized farmers market.

WAKEFIELD, NEW HAMPSHIRE

The town provides for agricultural use of open space that could be used for agricultural purposes in open space and cluster developments, which are permitted in several districts (Zoning Ordinance Article 12). This helps to satisfy one of the master plan goals to preserve agricultural lands. The open space/cluster development section of the zoning ordinance requires that 50 percent of the open space be buildable land and that it be designated as permanent open space. The planning board is required to look at open space and consider land areas designated as prime agricultural soils as part of its review of open space.

Model Language and Guidance for Implementation

A successful agricultural incentive zoning ordinance will grant the maximum possible flexibility to agricultural practices. The following four items outline key issues that communities should consider when developing ordinances and regulations regarding agricultural activities.

1. **Establish a clear definition of agricultural activities and what constitutes an agricultural use.** The state's definition is RSA 21:34-a. The definition is broad enough to reflect the diversity of agriculture in New Hampshire and allow for continuing change that will respond to the changing agricultural market. Make sure that the community master plan has a detailed section on agriculture. This section should express the value agriculture contributes to your town's quality of life through open space, wildlife habitation, watershed purification and natural resource preservation.
2. **Allow agricultural activities throughout the community.** Farms and other agricultural uses as defined under RSA 21:34a can operate near residential or commercial uses. They can provide rural relief and soften the impacts of development. When a community limits farming and agricultural activity to business and residential agricultural zoning districts it ends up counterproductive to the intent of the agricultural zoning ordinance.
3. **Be sensitive to the needs of farms.** Recognize that farming enterprises are dynamic and include agricultural accessory uses, from machinery sheds to housing, and onsite farm related business, such as farm stands or processing facilities. Farming activities that add value to the commodity being produced or that support the management of the farm are often necessary to farming operations. For instance, some farming operations require either fulltime housing or seasonal housing to assist in the operation of the farming activity, such as planting, harvesting, and tending to livestock.
4. **Adhere to the right to farm principle that is already established under state law.** Right to farm laws began to be developed in the 1970s as state lawmakers became more aware of and concerned about the loss of agricultural land. These laws are generally enacted at either the state or local level, and tend to share similar traits: they define to some degree the purpose of the law; mention the need to conserve and protect agricultural land; and protect the farm against nuisance lawsuits that result from changing land uses around a farm.

Enacting a right to farm law or ordinance protects farms from nuisance lawsuits over the grittier aspects of agriculture such as noise and smell. In New Hampshire, RSA 432:33 protects farms that have been in operation for more than a year from nuisance lawsuits, but it does not address new farms or buffers.

There are two main ways to address potential conflicts between agricultural and non-agricultural uses. One is to require that developers who wish to develop properties adjacent to farms create enough buffer so that the noise, odor, dust, and other

necessary by-products of farming operations will not affect residents of the new development. The other is to educate people who are thinking about purchasing property near an active farm about what living next door to a farm really means, and how farming practices can vary from season to season.

Agriculture may be permitted in any zone the municipality deems appropriate. This could include residential, rural residential, industrial, or commercial, depending on the community. Consideration should be given to existing and potential uses in the zone, to ensure that agricultural activities will be compatible and potential negative impacts minimized. For the purposes of this chapter, model zoning provisions are presented by topic area. Communities wishing to encourage agricultural uses in existing zones should audit existing zoning provisions, review the model language, and adopt the desired elements, as appropriate.

ORDINANCE AND REGULATION PROVISIONS TO SUSTAIN AGRICULTURE

Statutory Authorization

RSA 21:34-a Farm, Agriculture, Farming

RSA 432:33 Immunity from Suit

RSA 672:1(III-b) Declaration and Purpose

RSA 672:1(III-d) Declaration and Purpose

RSA 674:21 Innovative Land use Controls

RSA 674:26 Districting Under Interim Zoning Ordinance

RSA 674-32-a through c Agricultural Uses of Land

Principles: Community planners should consider the following principles in reviewing and amending their local land use regulations to foster continued agricultural activities.

- In order to foster agricultural enterprises, minimize review costs for commercial activities associated with farm activity. Flexibility in site plan review regulations can be used to exempt farm stands from inappropriate commercial regulation, or can allow a tiered approach to the regulating of farm stands.
- Signage is an important aspect of a viable agricultural enterprise and differs greatly from commercial uses. Consider exempting agricultural signage from regulation. Temporary signs that change with the season and crop availability and off-site signage may be critical to farm success.
- Agricultural structures, other than year-round retail operations, are different from commercial buildings and should be treated differently, and possibly exempted from review, in site plan review regulations. Defined by the Internal Revenue Service as “single purpose agricultural structure,” these include (but aren’t limited to): barns, silos, farm stands, greenhouses, stables, coolers, etc. The design criteria for these structures relate to the purpose served in the farm operation, which can frequently be in conflict with site review regulations for commercial or industrial buildings that are open to the general public.

- Animal density is an important consideration for community planners because it goes directly to the issues of farming and potential conflicts with dissimilar land uses. Animal density issues are addressed in best management practices for manure handling, as specified by the NH Department of Agriculture, Markets, and Food.
- Housing is an integral component of an agricultural enterprise. Agricultural housing takes several different forms and raises several different issues from the perspective of municipal government. Farms have historically been and are typically operated by the members of a single extended family. In addition to family members there is a need for agricultural related housing for non-family employees.

Zoning Provisions: Communities wishing to promote agricultural use should audit their existing land use regulations to see if they present barriers to agriculture. Listed by topic below are sample zoning provisions addressing various agricultural issues.

INTENT AND PURPOSE

- A. **Intent:** The Agriculture Conservation District is intended to protect areas of the community that are well suited for agriculture. It is also the intention of this ordinance to minimize conflicts between incompatible uses by directing non-farm residential uses to other districts within the community.
- B. **Purpose:** The purposes of the Agriculture Conservation District are:
1. To protect and promote the continuation of farming in areas with the most suitable soils.
 2. To protect and promote the continuation of farming in areas of the community that have historically contained these areas and therefore have developed compatible residential patterns and transportation infrastructure.
 3. To permit primarily agricultural land uses and activities.
 4. To separate agricultural land uses from potentially incompatible residential, commercial, and industrial development, and public facilities that may interfere with normal agricultural operations.
 5. To achieve the goals stated in the master plan, including preservation of rural character, continuation of agriculture, economic development, and natural resource protection.
 6. To preserve wetlands and natural areas associated with farms, that because of their natural physical features, are useful, as water retention and ground-water recharge areas, and as wildlife habitat; and that have an important aesthetic and scenic value, which contributes to the unique character of the community.
 7. To encourage the viability of agricultural soils for agricultural use.
 8. To maintain and enhance food self-sufficiency, including: local food for local people; reduced energy consumption; and employment opportunities in the community.

DEFINITIONS

Accessory Structure: Any structure including but not limited to seasonal housing for seasonal farm employees, barns, equipment storage, feed storage, farm stand, greenhouses, lath houses, energy producing devices that provide energy primarily for farm use, cold storages, manure and compost storage, and product processing centers.

Agriculture and Farming: agriculture and farming as defined in RSA 21:34-a.

Agritourism: attracting visitors to a working farm for the purpose of eating a meal, making overnight stays, enjoyment of the farm environment, education on farm operations, or active involvement in the activity of the farm which is ancillary to the farm operation.

Farm: any land, buildings, or structures on or in which agriculture and farming activities are carried out or conducted and shall include the residence or residences of owners, occupants, or employees located on such land. Structures shall include all farm outbuildings used in the care of livestock, and in the production and storage of fruit, vegetables, or nursery stock; in the production of maple syrup; greenhouses for the production of annual or perennial plants; and as defined in RSA 21:34-a. as amended.

Farmers' Market: means farmers' market as defined in RSA 21:34-a.

Farm Parcel: A tract or parcel of land devoted primarily to agricultural uses may contain a dwelling or other accessory uses.

Farm Roadside Stand: Means an on-farm, agricultural retail operation provided that: (A) at least 35 percent of the product sales in dollar volume is attributable to products from the farm or farms of the farm stand owner or farm stand operator; and (B) product sales not attributable to the farm or farms of the farm stand owner or farm stand operator shall be agriculturally related and may include, but not necessarily limited to, the sale of garden accessories, cheese, home crafts, cut flowers, dried flowers, value added products such as jams, jellies and baked goods from a farm stand kitchen. Proof of farm income may be required to determine conformity with these provisions.

Farm Worker Dwelling: A dwelling located on a farm for the purpose of housing an employee of that farm operation and his/her family. Also included in this use type would be multi-family dwelling(s) for seasonal employees in connection with an orchard or other agricultural use, which relies on seasonal employees who must be housed.

PERMITTED USES

- A. Agriculture.
- B. Farm worker dwellings.
- C. Farm roadside stand.
- D. Accessory structures for agricultural use.
- E. Agritourism.

These definitions should be incorporated into the definition section of the ordinance, especially if the municipality decides to allow agriculture in multiple zones. See Section III for complete legal definition in New Hampshire.

A farm roadside stand shall remain an agricultural operation and not be considered commercial, provided that at least 35 percent of the product sales in dollar volume is attributable to products produced on the farm or farms of the stand owner.
NH RSA 21:34-a III

PERFORMANCE STANDARDS FOR NON-AGRICULTURAL USES

In general, the use of land and structures within the Agriculture Conservation District shall seek to maximize agricultural productivity. The non-agricultural use of land and structures must also conform to the following design standards that create a minimum level of consistency in lot and parcel configuration:

A. Design Standards

All residences developed either on frontage lots or within a conservation/open space subdivision shall comply with the following standards:

1. All buildings, homes and structures shall be located a minimum of 100 feet from agricultural land and shall be separated by a 50-foot wide buffer strip sufficient to minimize conflicts between farming operations and residences. This buffer shall be on the land developed for the non-farming use and may consist of trees and or fencing.
2. Each structure shall be integrated into the existing landscape on the property so as to minimize its visual impact and maintain visibility of adjacent agricultural lands from public ways through use of vegetative and structural screening, landscaping, grading and placement on or into the surface of the lot.

B. Additional Requirements for Subdivision/Site Plan Approval

The applicant shall comply with the minimum requirements for subdivision/site plans, and shall also submit to the planning board the following information:

1. Description or illustration of the physical characteristics within and adjacent to this site, including: prime agricultural soils, soils of state and local importance, other soils and soil characteristics, areas used for crop or other agricultural production.
2. Description of compliance with Agricultural Land and Development Standards in Section 5C-E and Site Design Standards in Section 5A.

C. Criteria for Review: The planning board shall also consider whether:

1. The development is in compliance with Agricultural Land and Development Standards (Section 5D, below).
2. The development will not interfere with farming operations on adjacent lands.
3. The development is situated on the portion of the site with soils least suitable for the production of crops or livestock.
4. The development is integrated into the existing landscape through features such as vegetative buffers, and through retention of open agricultural land.

D. Agricultural Land and Development Standards

1. Residential subdivision developments in the Agriculture Conservation District shall be laid out according to the Conservation Subdivision standards set forth in Section [] of this ordinance. All buildings and roads shall be located away from soils that are most suitable for agriculture (based

Conservation subdivision requirements can either be laid out in a separate section of a community's ordinances, or the community can adopt the simpler standards set forth in the following sections.

on Natural Resource Conservation Service classifications for prime farmland soils and soils of state and local importance) to the maximum practical extent. This provision does not apply to the location of on-site septic disposal facilities that must be placed in soils meeting N.H. Department of Environmental Services rules.

2. All roads, drainage systems and utilities shall be laid out in a manner so as to have the least possible impact on agricultural lands and uses.

E. Maximum Number of Dwelling Units

1. The maximum number of dwelling units permitted in an open space community in the agricultural conservation district shall be calculated based upon one unit per acre for the net developable acreage remaining once the area of all wetlands and steep slopes (in excess of 15%) have been subtracted from the total acreage of the property.
2. Under the supervision of the conservation commission, all wetlands shall be identified, and their area subtracted from the net developable acreage of the total parcel.

F. Required Open Land

At least 50 percent of the net acreage remaining after the area of all wetlands have been subtracted shall be retained as open agricultural land. Remaining open agricultural land shall have appropriate acreage, configuration, and access to enable continued farming operations.

G. Protection of Open Agricultural Land

The following standards shall apply to open agricultural land to be protected as part of the development of an open space community:

1. Farmland owners are not required to sell the part of their property that is to become permanent agricultural open space, provided that they convey the development rights of that open space in a conservation easement prohibiting future development of this property to any of the official bodies named in Section G.2 below.
2. All remaining open agricultural land shall be permanently protected by either:
 - a. A permanent conservation easement or deed restriction conveyed to the municipality with municipal approval or to a non-profit farmland trust or conservation organization whose principal purpose is to conserve farmland and open space, or other suitable entity.
 - b. Ownership in fee simple conveyed to the municipality with municipal approval or to a non-profit farm trust, open space or conservation organization as a gift or for a consideration.
3. At a minimum, such an easement, fee simple ownership, or restriction shall entail the use of management practices that ensure existing fields or pastures will be plowed or mowed at least once every year.

AGRICULTURAL MANAGEMENT STANDARDS

All farms are recommended to develop and keep current soil conservation and nutrient management plans in compliance with Natural Resource Conservation Service standards, where appropriate.

REFERENCES

Cultivating Success on New Hampshire Farms. Fall 2006. NH Farm Viability Task Force Report.

Preserving Rural Character: The Agricultural Connection. Winter 2000. NH Office of Energy and Planning Technical Bulletin 6, www.nh.gov/oepr/resourcelibrary/TechnicalBulletins.

Preserving Rural Character Through Agriculture – a Resource Kit for Planners. 2002. University of New Hampshire, Cooperative Extension.

Who's Who in New Hampshire Agriculture, www.agriculture.nh.gov/publications.

1.8 Urban Growth Boundary and Urban Service District

BACKGROUND AND PURPOSE

Urban growth boundaries and urban service districts are planning tools that promote more efficient, orderly, and compact development. For communities adopting them, they are two components of a municipal growth management program designed to uphold community character, protect water and other natural resources, promote efficient development and use of public infrastructure, stimulate community and economic development, and impart long term, comprehensive thinking about the community's future.

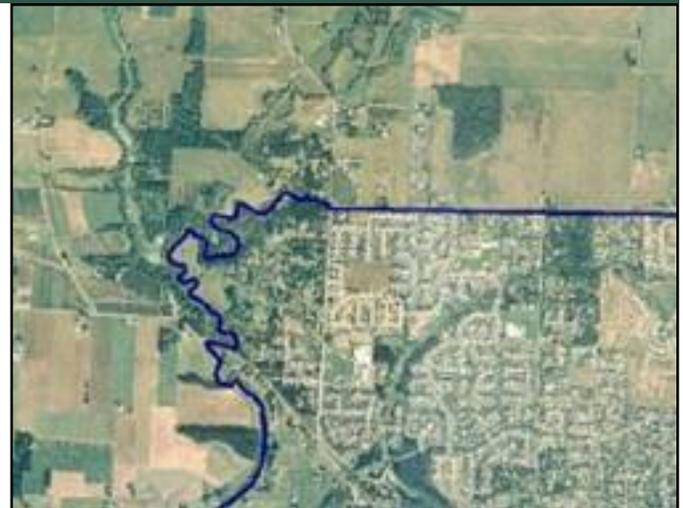
RELATED TOOLS:

- Infill Development
- Density Transfer Credit
- Village Plan Alternative

FIGURE 1.8.1 Urban Growth Boundaries



Urban Growth Boundary for Portland, Oregon (on-line resources at www.portlandonline.com/planning).



Urban Growth Boundary in Washington State illustrates land uses and densities (from University of Washington's Evans School of Public Affairs at <http://depts.washington.edu/visions>).

An urban growth boundary is the line on a map showing the demarcation between land that has or may receive concentrated development (urban, suburban) and land that has or may receive less development (rural, scattered). On one side of the boundary line are predominantly low-density land uses, such as farms, timberland, large residential lots, and natural or protected lands. On the other side are more intensive land uses and densely developed lands, such as commercial and industrial uses, multi family and small lot residential, schools, government facilities, and transit services. An urban growth boundary provides a clear picture of what lands will be

developed for a given period of time as specified by a growth management plan. It could be used with a transfer of density program to ensure that property owners receive fair compensation for their land.

An urban service district is an area in which urban services will be provided and outside of which such services will not be extended thus discouraging development sprawl. In this section it is organized as a zoning district within which the municipality would plan for, coordinate and provide and maintain municipal services and facilities, such as sewer, water and wastewater treatment, and transit. This zoning district allows the municipality to develop and manage public facilities and services, such as fire police and school, more efficiently and cost effectively. A district of this type could stimulate infill development within its boundaries and provide a more efficient use of land in harmony with its natural characteristics; preserve more usable open space, agricultural land, tree cover, recreation areas or scenic vistas and expand the opportunity for the development of affordable housing.

URBAN GROWTH BOUNDARY

An urban growth boundary is a product of the master plan process directed and approved by the planning board. During their analysis the planning board would need to ensure that there are adequate public facilities and services, a sufficient amount of land to meet projected growth, a mix of land uses, an analysis of impacts on water and natural resources from growth, and a fair and equitable process and criteria for establishing the growth boundary. Once adopted by the planning board, it could be incorporated into the zoning ordinance and other land use regulations per municipal legislative processes.

Normally before defining the growth boundary, the municipality would make three planning studies addressing:

1. Population growth projection, housing needs and land needs for residential, commercial, industrial and public spaces and buildings.
2. Inventory of public facilities, their capacity and projected needs.
3. Estimate of a 20-year supply of buildable land, taking into consideration topography and other factors.

Based on the planning studies, the municipality and the regional planning agency, would amend their master plans to delineate the growth boundary and describe policy goals, standards, and implementation strategies. The policies and implementation strategies would most likely address land use, transportation, housing, development design and appearance, and facilities and services issues.

Supplementing this master plan action, the municipality could amend its zoning ordinance and map to establish an urban growth overlay district. Within this overlay district, permitted land uses and intensities would be defined as well as development standards. Economic incentives for development may be provided. All or some development could be subject to planning board approval via a Conditional Use Permit. All development would be subject to normal or special subdivision and site plan review and development regulations appropriate to implement master plan growth area policy goals.

To protect conservation areas outside the growth boundary, the municipality could amend its zoning ordinance to establish adequate provisions for agriculture, forestry, variable lot or large lot residential, or other natural resource based zoning land use and intensity provisions. This would function to limit leapfrog development or scattered or premature subdivision of land as provided in RSA 764:36 II (a), or as may be regulated by a municipality via site plan review regulations per RSA 764:44 II.

Once established, the zoning ordinance also should provide that the scope and extent of the growth boundary be reviewed every five years by the planning board and adjusted accordingly.

URBAN SERVICE DISTRICT

To promote development within the urban growth boundary, an urban service district may be created. The purpose of this district is to contain development within the growth boundary where services such as water and sewer are in place or are planned.

The boundary of the urban service district may be the same as the growth boundary, or somewhere within, but in no case shall it extend outside or beyond the growth boundary.

Again, uses and intensities of use would be defined. Most importantly, there would be a provision that municipal services, such as sewer and water lines, would not be extended beyond the district, unless supported by additional development conditions and a concomitant change in the urban growth boundary within the master plan.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

A planning board may wish to use an urban growth boundary and urban service district in two differing scenarios. The first scenario would be for a municipality that has existing development patterns with urban densities and intensities of use. There would most likely be sewer, water, transit, etc. provided by the municipality in this area. Examples include New Hampshire cities and some of our smaller towns with historic mill districts. The second scenario would be for a municipality that is establishing an urban or village center, within which they are encouraging growth. Either way, the municipality would be monitoring development activity through its growth management program and providing tools and incentives through zoning and land use regulations to control the locations and intensity of future development.

CONNECTION TO DENSITY TRANSFER CREDIT PROGRAM

A Density Transfer Credit program allows landowners to transfer density rights from conservation zones to development zones. These programs establish two zones:

1. **Sending Area:** a defined area outside the growth boundary from which development rights are transferred from, resulting in the permanent preservation of lands possessing significant conservation features, farms or forests.

2. **Receiving Area:** a defined area within the growth boundary to which development rights are transferred to, resulting in more efficient and intense use of suitable development sites, where land may be developed at a higher density than would otherwise be allowed by local zoning.

A municipality could use an urban growth boundary as the demarcation for sending and receiving areas for a density transfer credit program. Property within the urban growth boundary would be classified as a receiving zone, and property outside the boundary would be classified as a sending zone. Based on the research done by the Maine State Planning Office, there needs to be an economic incentive for these programs to be used by municipalities and property owners.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

RSA 674:16 states that the power to adopt a zoning ordinance

“... expressly includes the power to adopt innovative land use controls which may include, but what are not limited to, the methods contained in RSA 674:21.”

Among the techniques listed in 674:21 are

“... (a) timing incentives, (b) phased development, and (i) flexible and discretionary zoning.”

RSA 674:36 states that ...

“the subdivision regulations which the planning board adopts may: (a) provide against such scattered or premature subdivision of lands as would involve danger or injury to health, safety, or prosperity by reason of the lack of water supply, drainage, transportation, schools, fire protections, or other public services, or necessitate the excessive expenditure of public funds for the supply of such services.”

Additionally, RSA 674:39 states that existing site approvals

“... shall be exempt from all subsequent changes in subdivision regulations, site plan review regulations, impact fee ordinances, and zoning ordinances adopted by any city, town, ... except those regulations and ordinances which expressly protect public health standards, such as water quality and sewage treatment requirements.”

EXAMPLES AND OUTCOMES

Concord, New Hampshire

The City of Concord, New Hampshire adopted Urban Growth Management Boundaries as part of its master plan for the Year 2010 on December 15, 1993 incorporating it within the Future Land Use Plan, Transportation Improvement Plan, and Open Space Plan. In 2001, Concord completed a comprehensive revision to the zoning ordinance premised on the master plan and zoning ordinance closely following the urban growth boundary. For instance, the residential open space district is outside the urban growth boundary, and all other districts are within the boundary. Concord’s infrastructure planning is based on the divide between rural and urban for water and sewer systems. Currently the master plan is being amended,

FIGURE 1.8.2 Concord Village/Master Plan Districts



and the urban growth boundary may be further refined. (See Figure 1.8.2 for City of Concord Master Plan Map).

Derry, New Hampshire

During Derry's rapid growth in the 1970s and 1980s, predominantly residential growth created a substantial imbalance amongst development, services, and the environment. The strain on municipal services and revenues, and citizen concerns about the environment led to the December 1994 adoption of a one-year moratorium on growth while the town developed a growth plan and regulations. A growth management plan and program was developed in 1996 and adopted. In 1998 the town adopted a growth management ordinance based on the Ramapo, N.J. growth management ordinance, which used a future buildout analysis. The ordinance regulates the timing and phasing of major new development proposals and established a building permit limit of fifty residential units per year. The ordinance links development rights to the availability of town services, facilities, and schools. Since it was adopted, it has helped to keep Derry's growth rate lower than some of the neighboring towns.

Derry does not have an urban growth boundary per se. However, as part of growth management planning, in 1997 the town developed and adopted a revised zoning map that more closely guides development to desired and appropriate areas in Derry. The town also uses a thirty year capital improvement program upon which the growth controls of the ordinance are based. This is an instance where careful construction of the zoning map and zoning districts functions like an urban growth boundary.

Oregon

In 1966 communities in Oregon joined together to consider future urban growth options. They realized that the only way forward was through regional planning. Statewide planning goals were adopted to express the state's policies on land use and related topics, such as citizen involvement, housing, and natural resources. These state goals include implementation guidelines but are not mandatory. Goal 14, adopted in 1974, mandated the creation of urban growth boundaries in each city in Oregon. The goal's intention was to provide for an orderly and efficient transition from rural to urban land use, to accommodate urban populations and urban employment inside urban growth boundaries, to ensure efficient use of land and to provide for livable communities.

Oregon's 241 cities all have an urban growth boundary, a line drawn on planning and zoning maps to show where the city expects to grow. Land inside the urban growth boundary would be developed to accommodate the municipality's future growth. Every city was to adopt an urban growth boundary in a cooperative process between the city and county or counties surrounding it. When determining the location of the growth boundary there were two key factors: need – how much land needs to be included inside the boundary; and location – what is the efficient use of land, protection of agricultural land, and the cost effect on public services. By 1997 almost 2 million acres of Oregon's 28 million acres of privately owned land had been included inside urban growth boundaries. Inside the urban growth boundaries, development occurs at a very high rate as developers recognize that they can meet market demand. (More information at: www.oregon.gov/LCD/docs/goals/goal.14.pdf).

Maine

In 1998 the Maine State Planning Office studied development patterns in the state and documented that Maine's population was spreading out. This sprawling development pattern created increased local and state taxes for new or redundant infrastructure in remote areas; lengthened service routes for police, fire, and road maintenance; increased air and water pollution; fragmented wildlife habitats; isolated the poor and elderly in cities; disrupted farming and forestry activities; and left declining populations and underused infrastructure in older city and town centers.

Understanding that sprawl was happening in Maine, the state adopted the Comprehensive Planning and Land Use Regulation Act in 1999. This act mandated that all communities prepare and adopt comprehensive plans and land use ordinances consistent with state goals. Goal 1 was to encourage orderly growth and

development in appropriate areas of each community while protecting the state's rural character, making efficient use of public services and preventing development sprawl. The state recognized that developers didn't cause sprawl, they simply sought the path of least resistance in building and selling.

A 2005 Maine State Planning Office report on the Growth Management Act stated that comprehensive planning has had little effect on growth patterns. Most of the evidence shows that growth is not being directed to the designated growth areas as specified in local plans. State planners say that on average, about 70 percent of the growth in the last 15 years has occurred in rural areas, and that the vast majority of recent growth has been single homes, not subdivisions.

The town of Kennebunk's comprehensive plan includes: limiting sewer and water utility service area boundaries to growth areas; endorsing formal mutual aid agreements for police and fire protection; increasing capital planning for sidewalks and bikeways; retaining elements of the town's cultural landscape and developing design standards to enhance neighborhood character; and developing an open space, trail, and corridor plan based on criteria.

Kennebunk's plan proposed implementation strategies limiting the annual number of permits allowed in non-growth areas to no more than 25 percent of the total permits issued town-wide the preceding calendar year, allocated among three non-growth areas. The proposed cap would allocate 5 percent to the critical rural area; 5 percent to the proposed rural area, and 15 percent to the proposed transitional growth area.

The town of Acton's comprehensive plan protects its water resources, reflecting the dedication of its active lake associations. Among the plan's land use strategies is to create a small village zone, which spans the border, Salmon Falls River, with New Hampshire at Milton Mills, N.H. While residents are not in favor of large-scale commercial development, the concept of an essential services category is proposed for uses such as hardware, convenience, and professional services for this small traditional village.

The town of Union's comprehensive plan strives to maintain a thriving village area while protecting the town's working and scenic rural landscape. It includes a 50 percent open space provision in the agricultural overlay zone to help conserve Union's important agricultural lands. The plan also recognizes of the importance of working with neighboring communities to address shared resources and issues.

Model Language and Guidance for Implementation

URBAN GROWTH OVERLAY DISTRICT

I. PURPOSE

The purpose of the Urban Growth Overlay District is to guide future planned growth and development, and enable the municipality to meet the service needs most effectively and at the lowest reasonable cost consistent with policies of the master plan and the capital improvement program.

II. AUTHORITY

This provision is adopted in accordance with RSA 674:16 and RSA 674:21.

III. ESTABLISHMENT

The municipality hereby establishes, under the guidance of the planning board in cooperation with the municipality's elected legislative representatives, e.g. council, board of selectmen and Urban Growth Overlay District. The Overlay District's boundary shall be as shown on the adopted Zoning Map, consistent with the adopted master plan map, as may be amended by the planning board.

IV. ADOPTION

This ordinance supersedes and replaces any ordinance, resolution, regulation, rule, or other provision that purports to regulate or administer the issuance of permits or otherwise authorize or require tie-ins or increase utilization of municipal facilities.

V. APPLICATION

This ordinance shall apply to all applicants who seek a new subdivision or site plan approval, building, or any other permit, expansion of existing permit and use, and renewals for permit to tie into, utilize or expand utilization of municipal facilities or services.

VI. CONDITIONAL USE PERMIT

Land Uses permitted shall be consistent with the provisions of the underlying land use zoning district [*or as may be otherwise specified*] and subject to approval of a Conditional Use Permit by the planning board.

VII. DEVELOPMENT STANDARDS

[*State development standards if other than the provisions of the underlying land use zoning district. See note on following page.*]

A coordinated set of regulatory and non-regulatory standards can be selected to ensure development that complements community character and to guide the development process while meeting the goals and needs of the community.

Regulatory Requirements may include:

- Permitted and conditional uses, density, density bonuses (see incentives below).
- Lot area and dimensions, building height, building setbacks, lot coverage, open space coverage, parking, driveways, access, connectivity.
- Design guidelines and standards for overall form and spatial relationships.
- Performance standards for landscaping and water quality.
- Review and approval process, conditional use or special use permits.

Incentive-Based Improvements and Public Benefits may include:

- Traffic and safety, sidewalks, roads, lighting, water and sewer infrastructure, storm water management, water quality.
- Historic preservation, Brownfields redevelopment.
- Public access and walkways, multi-use corridors, parks, gardens, street trees and landscaping.
- Natural resource protection and restoration.
- Affordable and workforce housing, and economic investments.

Phased Development

Municipalities may consider adopting a phased development plan to sustain growth rates and protect the growth area's potential for urban development over the projected growth period. A phased development plan could be based on designation of concentric growth around an existing urban core, new mixed use or village hubs, and neighborhood revitalization and expansion. Any plans associated with designation of a UGB should incorporate several overarching goals:

- Prioritize and integrate residential development districts, commercial uses, mixed uses, and public areas.
- Develop a growth time table to accommodate expansion of infrastructure, utilities and services.
- Define an urban core with designated growth areas or districts in priority order as defined in a phased development plan.

VIII. ADMINISTRATION

The planning board shall review the provisions of this article every five years to ensure consistency with the adopted master plan and make findings and recommendations to the municipality's legislative body.

URBAN SERVICE DISTRICT AND SERVICE EXPANSION AREA

I. AUTHORITY

This ordinance is adopted in accordance with RSA 674:16 and RSA 674:21.

II. ESTABLISHMENT

The municipality hereby establishes, under the guidance of the planning board in cooperation with the municipality's elected legislative representatives and the [*applicable municipal service provider having jurisdiction over the service or operating department,*] an Urban Service District and Service Expansion Area for the municipality that defines a service area within which the municipality can meet the service needs most effectively and at the lowest reasonable cost for the provision of municipal facilities consistent with policies of the master plan and the capital improvement program.

III. ADOPTION

This ordinance supersedes and replaces any ordinance, resolution, regulation, rule, or other provision that purports to regulate or administer the issuance of permits or otherwise authorize or require tie-ins or increase utilization of municipal facilities.

IV. APPLICABILITY

This ordinance shall apply to all applicants who are seeking new permits, expansion of existing permits and uses, and renewals for permits to tie in to, utilize or expand utilization of municipal facilities.

V. EXISTING PERMITS

All permits that have been legally issued and/or properly renewed on an annual basis in accordance with the municipality's regulations shall be required to submit for a conditional use permit under this ordinance at the expiration of the previously issued permit. Permits that have expired or that have been transferred in violation of any provision of or have not been renewed in accordance with the applicable rules shall require a newly issued conditional use permit. Conditional Use Permits must be renewed on an annual basis.

VI. SERVICE CONNECTIONS

The area where future connections can be allowed shall only occur within the area delineated by the municipality as the established district as shown on the zoning map entitled "Urban Service District" as approved and available from the municipality's office (e.g. town hall). Service to areas outside the district, in "Expansion Districts" can only be provided as permitted herein according to, and consistent with, a phased program of improvements meeting the service needs of the new service area in conjunction with available capacity and projected service and rate-payer base.

VII. CONDITIONAL USE PERMITS

Conditional Use Permits shall be issued by the planning board in accordance with RSA 674:21 and RSA 676:4, including notice provisions and appeals. No user shall be permitted to tie in to or expand their use of municipal services without first securing a conditional use permit.

A. **Definitions and Findings.** The following definitions and findings are made in accordance with the reported data from the municipality on the status of applicable service facilities, including, demand, service capacity, reserved capacity, and outstanding approvals in process.

1. **Acceptable Service Level (Sustainable Yield).** The Acceptable Service Level (Sustainable Yield) is that amount of service that can be reasonably relied upon at acceptable levels to the citizens and users of municipal facilities under normal operating conditions. This is also considered the capacity of the municipal system.

a. *[Define the measuring criteria for each service: (Note: Include one or several as appropriate and include the measuring criteria.)*

- *Public Transportation: Ridership.*
- *Roads: Miles maintained or plowed.*
- *Fire and/or Police: Response time within ___ minutes.*
- *Water: Gallons per day.*
- *Wastewater: Gallons per day.*
- *Schools: Capacity by square feet.]*

b. *[Set the Acceptable Service Level/Sustainable Yield.]*

2. **Demand.** The demand is the reasonable estimate of the use of any facility listed in “1. Acceptable Service Level” above. The demand reflects the impact of all users on the system and the projected demand of those sites that claim vested and approved status, taking into account, the time of the year, the specific and general circumstances affecting demand, and utilization management programs that are in place.

a. *[This amount is determined through a review of current and historical data provided by the relevant administrative department and the capital improvement program.]*

b. *[Set the demand.]*

3. **Reserve Capacity.** The reserve capacity of the service facility or system is that amount of service that can be considered available for new and expanded use by users without considering expanded facilities or undue municipal expense.

a. *[This amount is determined by review of the relevant municipal department data on current and past usage amounts, utilization management programs in place at the time and recent impacts to the system. The reserve capacity is the difference between the acceptable service level/sustainable yield and the demand.]*

b. *[Complete the calculation and quantify.]*

4. The relevant municipal department shall prepare, on a semi-annual basis (on or about the target dates of June 1 and January 1), a report to the municipality's elected legislative body and the planning board on the status of the municipal facilities and services covered by this ordinance and the ability to provide reserve capacity for services within the municipal service district.

- a. Contents of the report. The report shall include the following information:
 - The usage data for the municipal system on a monthly (or other reasonable accounting period) accounting basis.
 - The facilities that provide the service, such as buildings, infrastructure, etc.
 - Estimate of the number and capacity needed for potential users with unexpired permits that have remained in compliance with Section V of this ordinance.
 - Estimate of the number and capacity needed for potential users with unexpired, expired, or newly issued permits that have been issued a conditional use permit in accordance with Section VII.
 - Such other information as may be required by the elected legislative representatives or planning board.

B. Permit Conditions. The planning board may issue a conditional use permit for the delivery of services to facilities located on parcels of land located within the urban service district and not contained within the areas delineated in accordance with Section VII.C if the following conditions exist.

1. Sufficient capacity is provided to meet the projected demand for the application of the requested services.
 - a. Existing capacity is present in the system as determined by the board under the reporting requirements of Section VII.A.4.
 - b. A new supply source is identified by the elected legislative representatives in sufficient quality and quantity to assure the planning board that the approval process, and deployment for the supply can be reasonably determined and the quantity of services to be provided is sufficient to allow the municipality to operate the system at the acceptable service level and provide sufficient supply for the proposed use.

Where a new supply is proposed, the planning board may condition its approval on the deployment of new supplies or any other reasonable condition necessary to insure the appropriate timing for the demand and the source availability.

2. The owner of the property to be served desires delivery of services by the municipality as evidenced by a written acknowledgement which shall include the estimate of projected demand for the new or expanded service

in a manner acceptable to the planning board using best available data from the relevant department of the municipality or other generally acceptable and scientifically based estimates.

3. The municipality can meet the demand of the proposed use without violating the standards of acceptable service level/sustainable yield of the system.
4. The municipality can supply the needed services without reducing the ability to meet the needs of those properties and their respective capacity reservations as listed in Section VII.C. capacity reservation.
5. An application for approval, as required, must be submitted and accepted for approval from the planning board within three months of the issuance of the conditional use permit. If no application is filed, the conditional use permit shall expire unless renewed.
6. All impact fees and off site exactions required under RSA 674:21, and municipal tie-ins are paid, or waived as provided for in the respective authorizing legislation thereof, prior to connection.
7. Renewals for conditional use permits issued under this section must show continual and adequate progress toward completion given the scale, scope, and complexity of the project.

C. Capacity Reservation. The planning board may issue a conditional use permit for the delivery of services to facilities located on parcels of land located within the capacity reservation areas in the urban service district if the following conditions exist.

1. The total amount of services to be provided to new and or expanded services under this provision shall not exceed [_____].
2. The capacity reservation area is located in the urban service district and is for a use of land that is located within the area so designated.
3. The owner of the property to be served desires delivery of services by the municipality as evidenced by a written acknowledgement which shall include the estimate of projected demand for the new or expanded service in a manner acceptable to the planning board using best available data from the relevant department or other generally acceptable and scientifically based estimates.
4. The municipality can meet the demand of the proposed use without exceeding the acceptable service level/sustainable yield of the system.
5. An application for approval, as required, must be submitted and accepted for approval from the planning board within three months of the issuance of the conditional use permit. If no application is filed, the conditional use permit shall expire unless renewed.
6. All impact fees and off-site exactions as required by RSA 674:21 and municipal tie-ins are paid, or waived as provided for in the respective authorizing legislation thereof, prior to connection.

7. Renewals for conditional use permits issued under this section must show continual and adequate progress toward completion given the scale, scope, and complexity of the project.

D. Service Expansion Area. The planning board shall consider delivery of services to areas outside the established urban services district in the service expansion area only where the planning board determines that there is a clearly defined need for service, that the provision of service by the municipality is appropriate and consistent with the municipal master plan, and that the service district under Section VII.B. and capacity reservations required in Section VII.C. are maintained and that improved services may be expected to enhance the municipality's ability to meet the service needs of existing municipal residents and businesses in the existing service district.

1. The planning board shall only grant such a permit provided the capacity reservations required in Section VII.B. and C. are met by the current capacity of the facilities in place in the municipality or through the provision of new supplies by the applicant to provide additional supply beyond the requirements of the proposed facility and that the provision of such facilities does not result in undue municipal expense.
2. The applicant shall provide a report to the planning board showing that the expansion is fiscally responsible through evidence that the cost to construct new facilities, the new service base to be provided, and the long-term maintenance costs are balanced and will not result in an increased expenditure for the municipality.
3. An applicant for permit shall provide existing data showing the capacity of the existing facilities to provide service, quantification of proposed capacity needs for the entire expansion area, and all other amounts found in the annual report required under Section VII.A.1.
4. The applicant may meet these requirements by providing new supplies or funding the acquisition of additional supplies by the municipality that exceed the projected demand of the proposed facility.

VIII. SEPARABILITY

If any portion of this ordinance is found to be invalid or illegal by a court of competent jurisdiction, the remainder of the ordinance shall not be affected thereby.

REFERENCES

The following publications provide an overview of urban growth boundaries and urban service areas and implementation issues.

1000 Friends of Oregon. November 1999. "Myths and Facts about Oregon's Urban Growth Boundaries." www.friends.org/resources/myths.html.

Avin, Uri, FAICP and Bayer, Michael, AICP. February 2003. "Right-sizing Urban Growth Boundaries." American Planning Association.

Daniels T. and Bowers D. 1997. *Holding Our Land: Protecting Americas Farms and Farmlands*. Island Press, Washington D.C.

Department of Land Conservation & Development. January 1992, revised May 1995. "What is an Urban Growth Boundary?" www.uoregon.edu/~pppm/landuse/UGB.html, Salem, Oregon.

Kolakowski, Kelly; Machemer, Patricia; Thomas, June; and Hamlin, Roger. December 2000. *Urban Growth Boundaries: A Policy Brief for the Michigan Legislature*. Urban and Regional Planning Program, Dept. of Geography, Michigan State University.

Land Use Department. 2006. "Boulder Valley Comprehensive Plan: Community Service Areas." www.co.boulder.co.us/lu/bccp/index.htm, Boulder, Colorado.

Maine State Planning Office. "2005 Evaluation of Comprehensive Planning & Growth Management in Maine." www.state.me.us/spo/landuse/whatsnew/review.php.

Manning, Rob. February 2003. "Portland's Expansion is the Biggest Yet." American Planning Association.

Planners Web. 2001. "Sprawl Guide: Urban Growth Boundaries." Planning Commissioners Journal. Burlington, Vermont. www.plannersweb.com/sprawl/solutions_sub_urban.html

1.9 Inclusionary Housing

BACKGROUND AND PURPOSE

Inclusionary housing ordinances are one mechanism, among many, intended to spur affordable housing development within the private market. The typical argument justifying why the private market does not create affordable units is that it is not economically viable given the economics of housing production. Inclusionary housing ordinances work to overcome that economic barrier and establish incentives that may make affordable housing development feasible. These incentives may be in the form of zoning exemptions and density bonuses in return for units reserved for low and moderate income households and may assist communities to meet their fair share of regional affordable housing needs.

The ordinances facilitate mixed-income development, where a portion of the new units created are reserved for qualified low to moderate income households, while the remaining units are sold or rented at or above market value. Developments should be designed with a common aesthetic, making the affordable units blend in and be visually unidentifiable from the rest. Thus, inclusionary zoning helps avoid the segregation of affordable or low-income housing, allowing a more diverse and appealing housing stock to be created.

Inclusionary housing ideally generates housing for low to moderate income households, elderly households, and disabled persons. It may be difficult or impossible for inclusionary zoning to serve the lowest or very-low income households since the level of cross-subsidization from the market rate units to make a unit affordable to a very-low income household may be too great (APA 2004). It does however, help establish the workforce housing needed to keep community employees, such as firefighters, nurses, teachers, recent graduates and young professionals in the community where they work. The current deficit of workforce housing in New Hampshire has a negative impact on business growth and expansion and economic development throughout the state and within local communities.

According to Paul Fisher and Jo Patton in “Expanding Housing Options through Inclusionary Zoning,” the benefits derived from inclusionary housing ordinances include:

- New incentives for developers,
- Greater housing options for all municipal residents,

RELATED TOOLS:

- Village Plan Alternative
- Conservation Subdivision
- Infill Development
- Feature-Based Density and Lot Size Averaging
- Density Transfer Credit

- Increased supply of workforce housing, and
- Increased supply of employees to bolster the local employment and economy.

The greatest key to the success of inclusionary housing ordinances are the incentives provided. The incentives must compensate the developer for the foregone profits that market rate development would have brought in the affordable units. Incentives to developers can include density bonuses, expedited permitting, zoning exemptions, waived or reduced application or impact fees, reduced parking provisions, or other financial benefits. Additionally, regulations must permit forms of construction or development, such as higher densities, smaller lots or units, multi-family development, or the ability to have multiple structure types in a single project proposal, which cost less than conventional single-family development for inclusionary housing to work. (Ray 2001)

Inclusionary housing developments typically are allowed through either conditional use permit from the planning board or special exception by the zoning board of adjustment. Although inclusionary development could be permitted by right, establishing the inclusionary housing provision as a conditional use or special exception, the municipality is afforded a greater level of project review. Vesting this review in the planning board as a conditional use permit consolidates the permitting process and control over the terms of the project (as opposed to having the zoning board of adjustment grant a special exception in addition to planning board review of subdivision or site plan requirements). This may also reduce the required permitting time, which in turn lowers development costs, helping to keep the price paid by future residents down.

Communities must also decide where to permit inclusionary housing development or whether to permit it in all zones where residential uses are permitted. If specific areas are to be designated for inclusionary zoning the community must consider the most appropriate locations. Marginal lands should not be selected as the primary permitted location. While land may be less expensive in remote areas communities must also consider access to services of interest to developers and future residents. These services may include water and sewer systems, availability of undeveloped land, retail services, and possible employment.

Inclusionary ordinances should include a clause that ensures compatible architectural style and integration of units. Subdivisions or developments created under an inclusionary housing ordinance ought to be designed in a harmonious and equitable manner that will not segregate households based on income. The low-income units should not be singled out in a manner that identifies them as being less desirable than the market rate units. Ideally, the affordable units should be dispersed throughout the proposed development.

In order for the local planning board to ensure they have sufficient information on any given inclusionary housing proposal, they may add related application data requirements to the subdivision and site plan review regulations. These additional provisions may require:

- Calculation of the number of permitted units under the inclusionary ordinance instead of conventional development of the property.

- Provision of data demonstrating affordability requirement compliance – complete cost estimation.
- Descriptions of the affordable units including size, type and cost.
- Identification of any variances or special exceptions required to make the units affordable.
- Provision of any agreements with outside agencies.

Other than issues directly related to the affordability of units, the planning board should not impose data or procedural requirements that exceed those of other developments.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Communities must recognize a specific need for affordable or workforce housing, in the municipality or region, within their master plan before they can implement an inclusionary housing ordinance. To assist with this requirement, the Regional Planning Commissions each prepare a housing needs assessment for their regions that analyzes the housing supply, demand and affordability. These documents can provide the foundation or justification for affordable or workforce housing ordinances.

Affordable housing is defined as housing opportunities for all income levels, where the annual gross housing costs do not exceed 30 percent of the household's annual income. Most often, when addressing affordable housing needs in a state, region, or individual community, analysts and policy makers focus on establishing affordable housing opportunities for households earning at or below 80 percent of the area median income, since market based opportunities are most limited for these households. The area median income is adjusted for household size and typically based on the United States Department of Housing and Urban Development (HUD) Metropolitan or Non-Metropolitan Fair Market Rent Area (HMRA or county RMRA) in which the housing is located. Median area income figures are established and published annually by HUD.

Since ownership units require additional up front capital for purchase, they may have higher income limits than rental units and can include households earning up to 80 or 100 percent of the median income. For rental housing, which typically is more affordable than ownership properties, affordable workforce housing is typically limited to households earning up to 60 or 80 percent of the median income.

Inclusionary zoning is most effective within communities with a growing housing stock since it relies on new housing construction or adaptive reuse of existing structures to generate affordable units. Communities with existing growth control ordinances in effect can exempt inclusionary housing development from the annual development cap or maximum as an implementation incentive. Additionally, the community should work with local trusted developers to ensure their incentives will truly induce the creation of affordable units. Alternately, if multiple communities have similar provisions it will eliminate the chances of builders electing to forego development in one community in preference for another's more profitable

ordinances. If inclusionary housing ordinances are similar across a regional market it increases the probability of utilization. (Ray 2001)

Additionally, inclusionary ordinances can be supplemented by the incorporation of other initiatives that encourage affordability and a variety of housing types. These may include:

- Smaller permitted lot sizes
- Increased density
- Open space or cluster development
- Mixed use development
- Village plan alternative development
- Tax increment financing
- Public/private partnerships
- Manufactured housing
- Smaller dwelling units
- Housing for the elderly and disabled
- Accessory dwelling units

The combination of many affordability mechanisms can produce greater benefits than any of the programs used in isolation. Additionally, there are many agencies and private developers across the state willing to partner with municipalities interested in developing affordable housing. (Frost 2001)

Although it is not necessary for a municipality to partner with a local, regional, or state housing authority or a community housing trust, these partnerships often help facilitate the ordinance's implementation and make associated monitoring easier. The partner agency can help to remove the burden of continued affordability from the municipality, which may not have the administrative means to take on this responsibility. Additionally, the agency can retain a "first right of refusal" through deed restrictions that will allow them the right to purchase the property and guarantee its affordability.

Communities without direct access to a monitoring agency may choose to forgo this partnership, so long as a municipal employee, such as a planning coordinator or building inspector, is available and able to monitor the future sale or transfer of affordable properties. Otherwise, it is advised that these communities look outside their borders for an agency committed to regional participation for assistance. Additionally, the simpler the ordinance, the less administrative time required to maintain it.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

The power to establish inclusionary housing or zoning ordinances is granted to New Hampshire communities under the statutes providing for Innovative Land Use Controls, RSA 674:21, I (k). The statute defines inclusionary zoning in RSA 647:21, IV(a) as "...land use control regulations which provide a **voluntary** incentive or

benefit to a property owner in order to induce the property owner to produce housing units which are affordable to persons or families of low and moderate income. Inclusionary zoning includes, but is not limited to, density bonuses, growth control exemptions, and a streamlined application process.” This means that, under New Hampshire law, inclusionary zoning may not be made mandatory. Municipalities wishing to implement inclusionary zoning must find ways to induce developers to voluntarily engage in such an effort.

Inclusionary housing ordinances are one tool, among others, that can help communities ensure that their land use regulations would not be considered exclusionary by a court. This concern is generally addressed by RSA 672:1, III-e, which states:

All citizens of the state benefit from a balanced supply of housing which is affordable to persons and families of low and moderate income. Establishment of housing which is decent, safe, sanitary and affordable to low and moderate income persons and families is in the best interests of each community and the state of New Hampshire, and serves a vital public need. Opportunity for development of such housing, including so-called cluster development and the development of multi-family structures, should not be prohibited or discouraged by use of municipal planning and zoning powers or by unreasonable interpretation of such powers...

The *Britton v. Town of Chester* case (1991) was the second case in the State of New Hampshire to rule against exclusionary zoning, the first being *Soares v. Atkinson* (1986 and 1987). In the *Britton* case the court stated that the Town of Chester’s exclusionary zoning was in violation of RSA 674:16, the zoning enabling act, and that the provision of housing for all income levels was a fundamental part of “promoting the health, safety, or the general welfare of the community.”

As with the development of affordable housing through any mechanism, maintaining affordability becomes one of the greatest complications. Many ordinances require a deed restriction to be set in place and recorded when the unit is constructed. These restrictions set resale price limits, allowing the seller to benefit from some of the appreciated value, yet limiting the resale price.

The Strafford Regional Planning Commission and the Workforce Housing Coalition of the Greater Seacoast recently prepared a model “Affordable Housing Restrictive Covenant and Agreement.” It is intended for use by municipal officials, long-term affordability monitoring agencies, developers, and homebuyers to establish terms of resale. The agreement is made between the property owner and The Housing Partnership, a non-profit community-based organization in Portsmouth. The covenant provides essential definitions, maintains rights of first refusal for The Housing Partnership, sets resale and transfer restrictions, as well as restrictions on use, rental and junior encumbrances, establishes mortgage protections, and sets the term, in years, the covenant will run with the home.

The New Hampshire Housing Finance Authority has prepared a “Long Term Value Retention Model,” through which municipalities may ensure affordability of housing units over time. The New Hampshire Housing model includes an ordinance that is intended to work together with an inclusionary zoning ordinance. The model establishes an easily administered mechanism through which municipalities acquire a

lien on properties that are built as affordable housing units under an inclusionary zoning ordinance. The value of the lien is based on the difference between the fair market value of the unit and its reduced “affordable” sale price, which is indexed according to qualifying income standards that are previously established. The municipality’s lien is inflation indexed, so its value does not degrade over time, but the owner is able to reap the benefits of an expanding real estate market. Subsequent sales are not limited based on income targets, but the maintenance of the municipality’s lien will tend to keep units affordable for a relatively long period.

EXAMPLES AND OUTCOMES

Amherst, New Hampshire

Amherst has established an “Affordable Housing” provision in its Zoning Ordinance as a conditional use. The ordinance first establishes suitability criteria for proposed projects including style, affordability standards, environmental concerns, and required tract areas. Amherst’s ordinance defines affordability as dwelling units available for sale or rent to households earning at or below 100 percent of the median area income. In exchange, the town provides flexible lot size, setback, and density standards which are reduced from those for traditional subdivisions. This allows otherwise non-conforming lots to be developed for affordable units. Additionally, a maximum dwelling unit size of 1,300 square feet is set, which cannot be expanded or increased for ten years.

Using the ordinance, developers have created a variety of affordable housing types in Amherst including duplexes, multi-family, and single family homes. By requiring smaller units and allowing smaller lots, prices have been reduced from \$350,000 or higher for market rate townhouses down to \$170,000 for affordable ones.

Chester, New Hampshire

Chester has established an “Incentive System for Low-Moderate Income Cluster Housing” within Article 7 of its Zoning Ordinance. This ordinance established definitions for four different income levels, which are each permitted different density bonuses dependent on whether the proposed units will be owner or renter occupied. The density bonus is calculated using a multiplier, so that the percent of units in the development dedicated to a specific income group is multiplied by a factor ranging from 1.25 to 5.00 (dependent of the type) to determine the increase in density. Applicants can combine types of housing for a mix of income groups and add up density bonuses until they have achieved a the maximum permissible density for that site based on on-site well and septic standards of the New Hampshire Department of Environmental Services.

Projects developed under this ordinance are required to set purchase price and resale restrictions to maintain affordability. Additionally, occupancy restrictions are set to ensure that the target income group identified during permitting becomes the unit inhabitants. The town’s building inspector is charged with administration and monitoring of housing developments created under this cluster housing ordinance. Since the ordinance was enacted, there have been three developments built in

Chester that have utilized this option. A total of 72 units were created within these subdivisions with 13 units (18 percent of units) affordable to moderate income households.

Exeter, New Hampshire

Exeter's inclusionary housing ordinance is incorporated into the zoning provisions for elderly congregate health care facilities and open space development. Within both sections, the zoning ordinance simply grants a 15 percent density bonus in exchange for 20 percent of the total number of proposed units provided as affordable (15 percent for households with incomes between 80 and 120 percent of the area median income and 5 percent for households with incomes below 80 percent of the area median income). The area median income is defined as the New Hampshire portion of the Portsmouth HUD Metropolitan Fair Market Rent Area. All units are to be sold with deed restrictions and a recorded housing agreement that limit the resale value to no more than the purchase price plus two times the accumulated consumer price index for a period of 30 years. The Exeter inclusionary housing ordinance is one of the most straightforward.

The ordinance was implemented in the Watson Road mixed income subdivision. The development has 86 single family homes, 20 of which are two-bedroom condominiums priced at \$180,000 and up. Another eight units are priced starting at \$300,000. The remaining homes begin at \$400,000. Income limits have been set for prospective buyers. While the affordable units were priced about \$60,000 below their market value, the combined benefits of the density bonus and higher cost unit revenues will offset the price reduction.

Nashua, New Hampshire

Nashua's Inclusionary Zoning, Section 16-93 of the city's Land Use Code, begins with a clear set of definitions particular to this section, and potentially helpful to others looking to establish an inclusionary housing ordinance. To allow for greater flexibility in affordable housing, Nashua has created a series of 12 different potential exchange rates—affordable units for density—based on the type of housing offered. Alternately, the ordinance allows developers to pay a fee, equal to the dwelling unit construction cost, into a housing trust fund as means of compliance.

All types of affordable housing created under the ordinance must be designed to be “compatible in architectural style and appearance” to all other units in the development. Additionally, an affordability “control period” is specified for each affordable housing type, which must be enforced through deed restrictions, restrictive covenants or contractual agreements with a housing authority or trust. The ordinance provides project phasing requirements that ensure all affordable units have been constructed and completed before the final ten percent of the market rate units are completed and marketed. The city's Community Development Department is charged with administering the ordinances and monitoring of completed developments.

More information on financial assistance programs for affordable housing development through statewide agencies can be found at the following websites:

- New Hampshire Housing Finance Authority: www.nhhfa.org
- New Hampshire Community Development Finance Authority: www.nhcdfa.org
- New Hampshire Community Loan Fund: www.nhclf.org

Additional resources may be available from local and regional non-profit housing organizations.

Model Language and Guidance for Implementation

MODEL ORDINANCE FOR INCLUSIONARY HOUSING

I. PURPOSE

The purpose of this *Article* is to encourage and provide for the development of affordable housing within [*Community Name*]. It is intended to ensure the continued availability of a diverse supply of home ownership and rental opportunities for low to moderate income households. This *Article* was established in order to meet the goals related to affordable housing provision set forth in the [*Community Name*] Master Plan. Additionally, in implementing this Article [*Community Name*] has considered the region’s affordable housing need as defined in the [*Regional Planning Commission*] Housing Needs Assessment.

II. AUTHORITY

This innovative land use control *Article* is adopted under the authority of RSA 674:21, and is intended as an “Inclusionary Zoning” provision, as defined in RSA 674:21(I)(k) and 674:21(IV)(a).

III. APPLICABILITY

Communities must decide where to permit inclusionary housing development. Options include either in all residentially zoned areas or selected locations. Decisions should be weighed carefully to determine where the greatest incentive for inclusionary housing development would be. Inclusionary housing could be extended as a permitted use into compatible mixed use or commercial zones. Industrial and other incompatible lands should retain their strict prohibition of residential development.

Applications under this ordinance should allow greater flexibility in the permitted housing types as an added incentive to developers. This is especially true in areas where only single family residential is permitted. Alternate, more affordable housing construction types need to be encouraged as a way of ensuring lower development costs and subsequently lower sale or rental prices.

A. Development in accordance with the provisions of this Article is permitted as a conditional use within the following zoning districts as defined in this Zoning Ordinance:

1. [*List Zoning Districts*]

B. Permitted Uses: In the interest of encouraging affordability, single-family, duplex, multi-family, and manufactured housing is permitted within an application under this Article irrespective of the permitted uses of the underlying zoning requirements in the areas identified in section III-A above.

C. Any person aggrieved by a Planning Board decision that constitutes a denial of a Conditional Use Permit due to noncompliance with one or more of the provisions of this ordinance may appeal that decision to the Superior Court, as provided for in RSA 677:15. A Planning Board decision on the issuance of a Conditional Use Permit cannot be appealed to the Zoning Board of Adjustment (RSA 676:5 III).

IV. DEFINITIONS

Affordable Rental Housing: where the rent plus utilities for the dwelling unit does not exceed 30 percent of the allowed individual household income.

Affordable Owner-Occupied Housing: where the total cost of mortgage principal and interest, mortgage insurance premiums, property taxes, association fees, and homeowner’s insurance does not exceed 30 percent of the maximum allowed income of the purchaser. The calculation of housing costs shall be based on current taxes, a 30-year fixed rate mortgage, a 5 percent down payment, and prevailing mortgage rates within the region.

Area Median Income (AMI): the median income of the greater region, either the HUD Metropolitan or Non-Metropolitan Fair Market Rent Area to which [Community Name] belongs, as is established and updated annually by the United States Department of Housing and Urban Development.

Assets: As defined as “Net Family Assets” by 24 CFR Part 5, Subpart F, and as amended from time to time.

Income: As defined as “Annual Income” by 24 CFR Part 5, Subpart F, and as amended from time to time.

Low Income: A household income (as defined herein) that does not exceed 50 percent of the area median income.

Low to Moderate Income: A household income (as defined herein) that is more than 50 percent and does not exceed 80 percent of the area median income.

Market Rate Housing: Any unit within a development, whether the unit is to be owner or renter occupied, that is intended to be available for sale or occupancy at the prevailing market value for the area similar to comparable real estate transactions.

Moderate Income: A household income (as defined herein) that is more than 80 percent and does not exceed 100 percent of the area median income.

Owner-occupied Housing: Any dwelling unit intended to be conveyed in fee simple, condominium or equity-sharing arrangement such as a community housing land trust and limited equity cooperatives.

Rental Housing: Any dwelling unit intended to be leased.

The definition of **Annual Income** considers both wage income and assets when determining a family’s income level eligibility—the full definitions are provided in the reference section at the end of this chapter. This definition **MUST** be considered in conjunction with the definitions of Low, Low to Moderate, and Moderate Income herein.

The **Area Median Income (AMI)** is determined and published annually by the United States Department of Housing and Urban Development. The AMI varies by location and by household size. Each community’s AMI, or HUD Income Limit, is that of the Metropolitan Fair Market Rent Area (HMRA) or County based Non-Metropolitan Fair Market Rent Area (RMRA) if the community is not part of a HMRA. The NH Housing Finance Authority also publishes these limits on their website on the “HUD Limits and Allowances” page.

V. AFFORDABLE HOUSING CATEGORIES AND INCENTIVES

- A. A site plan or subdivision plan that will guarantee a designated percentage of units, reserved as affordable housing, may be approved with an increase in the density of the site and a reduction of the minimum site frontage as is set forth in Table 9.1.1. The planning board may allow a reduction of the minimum lot size to accommodate the increased site density.

The incentives section could be expanded to allow others including parking reductions, setback reductions, exemption from impact fees, exemption from application fees, or exemption from growth control ordinances.

Table 9.1.1 Affordable Housing Incentives

	Set Aside	Density Bonus/ Frontage Reduction
Low Income Rental Housing	15 - 25%	15 - 25%
Moderate to Low Income Rental Housing	20 - 30%	15 - 25%
Low Income Owner-occupied Housing	5 - 10%	15 - 25%
Moderate to Low Income Owner-occupied Housing	10 - 20%	15 - 25%
Moderate Income Owner-occupied Housing	15 - 25%	15 - 25%

The designated affordable percentage, density bonus, and minimum site frontage reductions presented in Table 9.1.1 are recommended ranges. A fixed percent should be established for both the designated affordable percentage and bonus in consultation with local developers or housing professionals actively engaged in the local housing market. The fixed percentage is not recommended to be less than the bottom limit of the range but could be in excess of the upper limit if market conditions will support such development. The bonus **MUST** compensate the developer for the designated affordable percentage. Too low a bonus will cause the ordinance to fail or not be implemented.

Inclusion of “Low Income Owner-occupied Housing” incentives is optional. Very few households in this income bracket are able to support the costs of home ownership. To provide ownership opportunities for these households will require deeper subsidies given the higher risk of loan default.

Allowing developers to combine bonuses and increase the number of designated affordable units they provide is mutually beneficial to the municipality and the developer. The incentives need to maintain some flexibility to respond to the market conditions developers are working within. Aggregated bonuses will allow this flexibility. Communities may leave the aggregated density bonus uncapped or set a cap of 20 percent or greater.

- B. A site plan or subdivision plan can mix affordable housing types and accumulate density bonuses to a maximum bonus equal to 30 percent where municipal sewer and water are available or in areas without water and sewer service to the maximum density permitted by on-site well and septic standards of the New Hampshire Department of Environmental Services as applied to the site.

When mixing affordable unit types the designated affordable percentage for each individual affordable housing type may be less than that required in Table 9.1.1. The density bonus is then proportioned to the actual percentage of designated affordable units provided, so that if the applicant provides only one-half of the required designation of one type of affordable housing they will receive one-half of the density bonus. The combined total of all affordable housing types must equal a 15 percent designation of affordable units, at a minimum.

- C. Individual lots within an application under this Article are also granted a frontage reduction equal to the density bonus established in section V-A or V-B of this Article.

VI. GENERAL REQUIREMENTS OF AFFORDABLE UNITS

- A. The dwellings qualifying as affordable housing shall be compatible in architectural style and appearance with the market rate dwellings in the proposed development. The affordable units should be interspersed throughout the overall development.
- B. To ensure that the application is completed as permitted, the dwellings qualifying as affordable housing shall be made available for occupancy on approximately

the same schedule as a project's market units, except that the certificates of occupancy for the last 10 percent of the market rate units shall be withheld until certificates of occupancy have been issued for all the affordable housing units. A schedule setting forth the phasing of the total number of units in a project under this Article, along with a schedule setting forth the phasing of the required affordable housing units shall be established prior to the issuance of a building permit for any development subject to the provisions of this Article.

- C. To ensure that only eligible households purchase/rent the designated affordable housing units, the purchaser/renter of an affordable unit must submit copies of their last three years' federal income tax returns and written certification verifying their annual income level, combined with household assets, does not exceed the maximum level as established by this ordinance in sections IV and V-A of this Article. The tax returns and written certification of income and assets must be submitted to the developer of the housing units, or the developer's agent, prior to the transfer of title. A copy of the tax return and written certification of income and assets must be submitted to all parties charged with administering and monitoring this ordinance, as set forth in sections VIII through VIII-D of this article, within 30 days following the transfer of title.
- D. All applicants under this article must submit the following data to ensure project affordability:
1. Calculation of the number of units provided under this Article and how it relates to its provisions.
 2. Project Cost Estimate including land, development and construction costs; financing, profit, and sales costs; and other cost factors.
 3. Description of each unit's size, type, estimated cost and other relevant data.
 4. Documentation of household eligibility as required in section VI-C of this Article.
 5. All agreements established as part of sections VII through VII-2 of this Article.
 6. List of required variances, conditional use permits, and special exceptions including justification of their necessity and effectiveness in contributing to affordability.

Requiring compatible architectural styles does not indicate that all units must be identical. The affordable units may be smaller or scaled down versions of the higher cost units, using different interior finishes, fixtures, or amenities. The overall subdivision or development should be designed in a harmonious and equitable manner that will not promote segregation based on income. Ideally, the affordable units should be dispersed throughout the proposed development and not clustered together independent from market rate units.

By requiring that the affordable units are completed before the market rate units gives a certain level of protection to the municipality that the proposed affordable units will be completed as permitted. This percentage may be adjusted and a more regimented schedule could be utilized. To ensure that sufficient project capital is generated for the project to be successful, municipalities should not mandate affordable unit provision prior to completion of the first third of the market rate units.

It is essential that prospective affordable unit occupants document both their actual income and assets to prevent misuse of the units by those households that may be on a fixed income but have significant assets. For example, many recent retirees may be on a fixed income from a retirement or pension plan that meets the income requirements, but also own outright a large single family or vacation home or have other large assets, rendering the household more than capable of affording market rate housing. Additionally, community members should review income related documents with the utmost confidentiality as permitted under state statutes.

The provisions of section VII-A are established to be consistent with NHHFA's Value Retention Model, which is required if the community wishes to have NHHFA administer their inclusionary housing ordinance. Alternate mechanisms of continued affordability could be utilized, such as alternate indexed, itemized, or appraisal-based formulas. The Workforce Housing Coalition of the Greater Seacoast's "Affordable Housing Restrictive Covenant and Agreement" requires limiting equity appreciation to an amount not to exceed 25 percent of the increase of the affordable housing unit's value, as determined by the difference between fair market appraisal at the time of purchase of the property and a fair market appraisal at the time of resale, with such adjustments for improvements made by the seller and necessary costs of sale.

Inclusionary Ordinances must include assurances for continued affordability. Municipalities should review any possible continued affordability or value retention programs they find locally suitable and review them with their attorney to establish the most appropriate and enforceable ordinance language. The process adopted by the community should be referenced here and appropriate revisions made to Section VII to VII-B of this model.

VII. ASSURANCE OF CONTINUED AFFORDABILITY

In order to qualify as affordable housing under this Article, the developer must make a binding commitment that the affordable housing units will remain affordable for a period of 30 years. This shall be enforced through a deed restriction; restrictive covenant; or a contractual arrangement through a local, state or federal housing authority or other non-profit housing trust or agency. For the 30-year term, the deed restriction, restrictive covenant, or contractual arrangement established to meet this criterion must make the following continued affordability commitments:

- A. Affordable housing units offered for sale shall require a lien, granted to [*Community Name*], be placed on each affordable unit. The value of the lien shall be equal to the difference between the fair market value of the unit and its reduced "affordable" sale price, which is indexed according to the qualifying income standards. The municipality's lien is inflated over time at a rate equal to the Consumer Price Index (CPI). Future maximum resale values shall be calculated as the fair market value minus the CPI adjusted lien value. Subsequent sales are not limited based on income targets, but the combination of maintenance of the municipality's lien and adherence to this Article's Definition of Affordable Owner-Occupied Housing for a period of 30 years.
- B. Affordable housing rental units shall limit annual rent increases to the percentage increase in the area median income, except to the extent that further increases are made necessary by hardship or other unusual conditions.
- C. Deed restrictions, restrictive covenants, or contractual arrangements related to dwelling units established under this Article must be documented on all plans filed with the [*Community Name*] planning board and the Registry of Deeds.

VIII. ADMINISTRATION, COMPLIANCE AND MONITORING

- A. This article shall be administered by the planning board or local planning department. Applications for the provisions provided under this Article shall be made to the planning board and shall be part of the submission of an application for site plan or subdivision plan approval.
- B. No certificate of occupancy shall be issued for an affordable housing unit without written confirmation of the income eligibility of the tenant or buyer of the affordable housing unit and confirmation of the rent or price of the affordable housing unit as documented by an executed lease or purchase and sale agreement.

- C. On-going responsibility for monitoring the compliance with resale and rental restrictions on affordable units shall be the responsibility of [insert designated entity, i.e. board of selectmen, building inspector, planning department, other coordinating housing authority or trust] or their designee.
- D. The owner of a project containing affordable units for rent shall prepare an annual report, due on [Insert Date], certifying that the gross rents of affordable units and the household income of tenants of affordable units have been maintained in accordance this Article. Such reports shall be submitted to [insert designated entity set in section VIII-C above] or their designee and shall list the contract rent and occupant household incomes of all affordable housing units for the calendar year.

It is critical there be a municipal staff person or designated agent, rather than a volunteer, with the capacity to take on the required monitoring in conjunction with the Planning Board and Planning Department. This could be a town administrator, building inspector, planning department staff, or other coordinating housing authority or trust. This person/agency must be specified in sections VIII-C and VIII-D of this model. Additionally, all documents produced should be reviewed by legal counsel.

REFERENCES

The following publications provide an overview of inclusionary housing, how the ordinances work, and present many ideas to consider when planning an inclusionary ordinance for a community.

- American Planning Association (APA). 2004. "Housing Choice in Southern New England Scoping Session Summary." www.planning.org/housingchoice/pdf/newenglandsummary.pdf October 19, 2005.
- Fischer, Paul and Jo Patton. 2001. "Expanding Housing Options through Inclusionary Zoning," *ideas@work*, Volume No. 3, June 2001. www.growingsensibly.org/cmapdfs/ideasv3.pdf October 19, 2005.
- Mallach, Alan. 1984. *Inclusionary Housing Programs: Policies and Practices*. New Jersey: Center for Urban Policy Research.
- Ray, Anne, MUPP. 2001. *Inclusionary Housing: A Discussion of Policy Issues*. Florida: Alachua County Department of Planning and Development. www.shimberg.ufl.edu/pdfs/IncluHousingPolicy.pdf October 19, 2005.
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- Werwath, Peter. 1994. *Inclusionary Zoning: Program Design Considerations with a Program Design Checklist*. New Mexico: The Enterprise Foundation, Inc. www.enterprisefoundation.org/model%20documents/e512.htm October 19, 2005.

The following ordinances were used herein either as examples or as guidance when formulating the model.

- Cape Cod Commission. 2002. *Inclusionary Housing Bylaw/Ordinance for Towns in Barnstable County, Massachusetts*. www.capecodcommission.org/bylaws/affordhous.html October 19, 2005.

- City of Burlington, Vermont. 2002. "Article 14: Inclusionary Zoning/Density Bonus," *Burlington Zoning Ordinance*. www.ci.burlington.vt.us/planning/zoning/z ordinance/article14.html October 19, 2005.
- City of Nashua, New Hampshire. 2006. "16-93 Inclusionary Zoning," *Land Use Code*. www.gonashua.com/planning/planningboard/finalluc.pdf January 27, 2006.
- Code of Federal Regulations. 2006. *24 CFR, Part 5, Subpart F*. ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title24/24cfr5_main_02.tpl October 19, 2006.
- Town of Amherst, New Hampshire. 2006. "Section 8-5 Affordable Housing," *Zoning Ordinance*. www.amherstnh.gov/Regulations/zoning2005-II.pdf January 31, 2006.
- Town of Chester, New Hampshire. 2005. *Zoning Ordinance*.
- Town of Exeter, New Hampshire. 2004. *Zoning Ordinance*. www.exeternh.org/zoneord.pdf October 19, 2005.
- Town of Lexington, Massachusetts. 1998. *Inclusionary Housing Policy*. ci.lexington.ma.us/Planning/Documents/Inclus.pol.html September 10, 2004.
- Town of Salem, New Hampshire. 1992. *Article XVI Affordable Housing Ordinance*.

REFERENCED CODE OF FEDERAL REGULATIONS LANGUAGE

For the purpose of general reference, the definitions of Net Family Assets and Annual Income provided by 24 CFR Part 5, Subpart F, as of October 2006, are included below. The actual language must be verified as it changes periodically.

NET FAMILY ASSETS

§ 5.603 Definitions

- (1) Net cash value after deducting reasonable costs that would be incurred in disposing of real property, savings, stocks, bonds, and other forms of capital investment, excluding interests in Indian trust land and excluding equity accounts in HUD homeownership programs. The value of necessary items of personal property such as furniture and automobiles shall be excluded.
- (2) In cases where a trust fund has been established and the trust is not revocable by, or under the control of, any member of the family or household, the value of the trust fund will not be considered an asset so long as the fund continues to be held in trust. Any income distributed from the trust fund shall be counted when determining annual income under §5.609.
- (3) In determining net family assets, PHAs or owners, as applicable, shall include the value of any business or family assets disposed of by an applicant or tenant for less than fair market value (including a disposition in trust, but not in a foreclosure or bankruptcy sale) during the two years preceding the date of application for the program or reexamination, as applicable, in excess of the consideration received therefor. In the case of a disposition as part of a separation or divorce settlement, the disposition will not be

considered to be for less than fair market value if the applicant or tenant receives important consideration not measurable in dollar terms.

- (4) For purposes of determining annual income under §5.609, the term “net family assets” does not include the value of a home currently being purchased with assistance under part 982, subpart M of this title. This exclusion is limited to the first 10 years after the purchase date of the home.

§ 5.609 Annual Income

(a) **Annual income means all amounts, monetary or not, which:**

- (1) Go to, or on behalf of, the family head or spouse (even if temporarily absent) or to any other family member; or
- (2) Are anticipated to be received from a source outside the family during the 12-month period following admission or annual reexamination effective date; and
- (3) Which are not specifically excluded in paragraph (c) of this section.
- (4) Annual income also means amounts derived (during the 12-month period) from assets to which any member of the family has access.

(b) **Annual income includes, but is not limited to:**

- (1) The full amount, before any payroll deductions, of wages and salaries, overtime pay, commissions, fees, tips and bonuses, and other compensation for personal services;
- (2) The net income from the operation of a business or profession. Expenditures for business expansion or amortization of capital indebtedness shall not be used as deductions in determining net income. An allowance for depreciation of assets used in a business or profession may be deducted, based on straight line depreciation, as provided in Internal Revenue Service regulations. Any withdrawal of cash or assets from the operation of a business or profession will be included in income, except to the extent the withdrawal is reimbursement of cash or assets invested in the operation by the family;
- (3) Interest, dividends, and other net income of any kind from real or personal property. Expenditures for amortization of capital indebtedness shall not be used as deductions in determining net income. An allowance for depreciation is permitted only as authorized in paragraph (b)(2) of this section. Any withdrawal of cash or assets from an investment will be included in income, except to the extent the withdrawal is reimbursement of cash or assets invested by the family. Where the family has net family assets in excess of \$5,000, annual income shall include the greater of the actual income derived from all net family assets or a percentage of the value of such assets based on the current passbook savings rate, as determined by HUD;
- (4) The full amount of periodic amounts received from Social Security, annuities, insurance policies, retirement funds, pensions, disability or death

benefits, and other similar types of periodic receipts, including a lump-sum amount or prospective monthly amounts for the delayed start of a periodic amount (except as provided in paragraph (c)(14) of this section);

- (5) Payments in lieu of earnings, such as unemployment and disability compensation, worker's compensation and severance pay (except as provided in paragraph (c)(3) of this section);
- (6) Welfare assistance payments. (i) Welfare assistance payments made under the Temporary Assistance for Needy Families (TANF) program are included in annual income only to the extent such payments:
 - (A) Qualify as assistance under the TANF program definition at 45 CFR 260.31; and
 - (B) Are not otherwise excluded under paragraph (c) of this section.
 - (ii) If the welfare assistance payment includes an amount specifically designated for shelter and utilities that is subject to adjustment by the welfare assistance agency in accordance with the actual cost of shelter and utilities, the amount of welfare assistance income to be included as income shall consist of:
 - (a) The amount of the allowance or grant exclusive of the amount specifically designated for shelter or utilities; plus
 - (b) The maximum amount that the welfare assistance agency could in fact allow the family for shelter and utilities. If the family's welfare assistance is ratably reduced from the standard of need by applying a percentage, the amount calculated under this paragraph shall be the amount resulting from one application of the percentage.
- (7) Periodic and determinable allowances, such as alimony and child support payments, and regular contributions or gifts received from organizations or from persons not residing in the dwelling;
- (8) All regular pay, special pay and allowances of a member of the Armed Forces (except as provided in paragraph (c)(7) of this section).
- (9) For section 8 programs only and as provided in 24 CFR 5.612, any financial assistance, in excess of amounts received for tuition, that an individual receives under the Higher Education Act of 1965 (20 U.S.C. 1001 et seq.), from private sources, or from an institution of higher education (as defined under the Higher Education Act of 1965 (20 U.S.C. 1002)), shall be considered income to that individual, except that financial assistance described in this paragraph is not considered annual income for persons over the age of 23 with dependent children. For purposes of this paragraph, "financial assistance" does not include loan proceeds for the purpose of determining income.

(c) Annual income does not include the following:

- (1) Income from employment of children (including foster children) under the age of 18 years;

- (2) Payments received for the care of foster children or foster adults (usually persons with disabilities, unrelated to the tenant family, who are unable to live alone);
- (3) Lump-sum additions to family assets, such as inheritances, insurance payments (including payments under health and accident insurance and worker's compensation), capital gains and settlement for personal or property losses (except as provided in paragraph (b)(5) of this section);
- (4) Amounts received by the family that are specifically for, or in reimbursement of, the cost of medical expenses for any family member;
- (5) Income of a live-in aide, as defined in §5.403;
- (6) Subject to paragraph (b)(9) of this section, the full amount of student financial assistance paid directly to the student or to the educational institution;
- (7) The special pay to a family member serving in the Armed Forces who is exposed to hostile fire;
- (8)(i) Amounts received under training programs funded by HUD;
 - (ii) Amounts received by a person with a disability that are disregarded for a limited time for purposes of Supplemental Security Income eligibility and benefits because they are set aside for use under a Plan to Attain Self-Sufficiency (PASS);
 - (iii) Amounts received by a participant in other publicly assisted programs which are specifically for or in reimbursement of out-of-pocket expenses incurred (special equipment, clothing, transportation, child care, etc.) and which are made solely to allow participation in a specific program;
 - (iv) Amounts received under a resident service stipend. A resident service stipend is a modest amount (not to exceed \$200 per month) received by a resident for performing a service for the PHA or owner, on a part-time basis, that enhances the quality of life in the development. Such services may include, but are not limited to, fire patrol, hall monitoring, lawn maintenance, resident initiatives coordination, and serving as a member of the PHA's governing board. No resident may receive more than one such stipend during the same period of time;
 - (v) Incremental earnings and benefits resulting to any family member from participation in qualifying State or local employment training programs (including training programs not affiliated with a local government) and training of a family member as resident management staff. Amounts excluded by this provision must be received under employment training programs with clearly defined goals and objectives, and are excluded only for the period during which the family member participates in the employment training program;
- (9) Temporary, nonrecurring or sporadic income (including gifts);

- (10) Reparation payments paid by a foreign government pursuant to claims filed under the laws of that government by persons who were persecuted during the Nazi era;
 - (11) Earnings in excess of \$480 for each full-time student 18 years old or older (excluding the head of household and spouse);
 - (12) Adoption assistance payments in excess of \$480 per adopted child;
 - (13) [Reserved]
 - (14) Deferred periodic amounts from supplemental security income and social security benefits that are received in a lump sum amount or in prospective monthly amounts.
 - (15) Amounts received by the family in the form of refunds or rebates under State or local law for property taxes paid on the dwelling unit;
 - (16) Amounts paid by a State agency to a family with a member who has a developmental disability and is living at home to offset the cost of services and equipment needed to keep the developmentally disabled family member at home; or
 - (17) Amounts specifically excluded by any other Federal statute from consideration as income for purposes of determining eligibility or benefits under a category of assistance programs that includes assistance under any program to which the exclusions set forth in 24 CFR 5.609(c) apply. A notice will be published in the Federal Register and distributed to PHAs and housing owners identifying the benefits that qualify for this exclusion. Updates will be published and distributed when necessary.
- (d) **Annualization of income.** If it is not feasible to anticipate a level of income over a 12-month period (e.g., seasonal or cyclic income), or the PHA believes that past income is the best available indicator of expected future income, the PHA may annualize the income anticipated for a shorter period, subject to a redetermination at the end of the shorter period.

ENVIRONMENTAL CHARACTERISTICS ZONING

2

2.1 Permanent (Post-Construction) Stormwater Management

BACKGROUND AND PURPOSE

Stormwater runoff is water from rain or melting snow that does not soak into the ground. It flows over land from rooftops, paved areas and bare soil, and steep slopes and saturated vegetated areas. As it flows, stormwater runoff collects and transports pollutants including sediment and organic matter; pet waste; automobile fluids (oil, grease, gasoline, antifreeze); deicing products (road salt); pesticides and fertilizers; grass clippings, leaves and other yard waste; and cigarette butts and other litter.

While traditional stormwater management practices are designed to collect, detain, and divert water to the nearest surface water body or watercourse, time and experience have shown that this approach does not adequately address the cumulative hydrologic or water quality impacts of stormwater. Development creates impervious surfaces that prevent water from infiltrating through the underlying soil. Impervious and disturbed surfaces from development can cause changes to both water quality and hydrology, or the movement of water through the landscape.

Changes to water quality from increased impervious surface cover include increased pollutant loads, higher bacterial contamination, and higher temperatures. These changes can degrade fisheries, inhibit certain uses, such as swimming, and increase treatment costs for public water supplies. Hydrologic changes resulting from increased impervious area include increased volume and velocity of stormwater runoff entering receiving waters, reduced groundwater levels, more frequent high flows in streams during wet weather (i.e. “flashy” streams), reduced stream flows during dry weather, unnatural changes in stream channels and banks that reduce habitat quality, and more frequent and severe flooding.

Thus, an essential part of stormwater management is maintaining the natural hydrology of a site to the maximum extent possible. This is accomplished by limiting land disturbance as much as possible, slowing down the flow of stormwater to

RELATED TOOLS:

- Erosion and Sediment Control During Construction
- Landscaping
- Steep Slopes and Ridgeline Development

Infiltration is the movement of water from the land surface into the soil. Infiltration occurs naturally in the undeveloped landscape as water, from rain or snowmelt, soaks into the ground, often using the roots of trees and other vegetation to travel through soil layers. Infiltration is important to replenish groundwater supplies, often used for drinking water, and for maintaining the volume of water flowing in streams and wetlands during dry weather. It is also important in treating stormwater to remove pollutants.

On an undeveloped site, the land has a natural rate of infiltration, also referred to as groundwater recharge, which is the volume of water that soaks into the ground and replenishes groundwater aquifers over a set period of time. This rate is dependent on a number of factors including type of soil, slope of the land, type of vegetation cover and depth to a confining layer, such as bedrock or the water table.

When that same site is developed, impervious surfaces, such as rooftops, roads, and driveways, block water on the land surface from soaking into the soil. This reduces the volume of water that infiltrates to recharge groundwater supplies and increases the amount of runoff from a site.

maintain peak flows and increase infiltration, and treating stormwater on-site to maintain and protect the quality of receiving waters. Non-traditional and non-structural methods, such as minimizing clearing and grading, maintaining natural flow paths, and disconnecting impervious surfaces, focus on prevention and reduction of stormwater volumes and pollutants at their source and help to maintain the natural hydrology of a site. These approaches are typically preferred where possible and may reduce the need for structural best management practices. For example, runoff can be diverted along existing land contours to localized low spots on a site where it will be retained, infiltrated or taken up by vegetation. Where natural vegetation is limited, areas can be constructed and planted with water tolerant vegetation, such as the creation of a bioretention area or rain garden, to provide similar treatment. If a lot is hilly, terraced slopes can slow the flow of runoff, while preservation or creation of wooded areas can effectively retain water on larger lots. Buffers of thick vegetation around surface water resources such as wetlands, lakes, ponds, or streams are considered among the most effective stormwater management practices. Since site disturbance has great influence over the hydrology of a site, the model stormwater ordinance presented here includes specific requirements and limits for site disturbance.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Stormwater controls are recommended for all development sites. While state and federal permit requirements address the impacts of development on large sites, considerable development occurs on smaller sites that do not require permits from the U.S. Environmental Protection Agency (EPA) or New Hampshire Department of Environmental Services (DES). Yet these small-scale developments can have serious, cumulative impacts on water quality. To mitigate these effects, communities are encouraged to adopt a local stormwater management ordinance instituting stormwater controls for projects of all sizes and during all phases of development. This combination of local, state, and federal requirements will help to promote the long-term protection of water resources.

NPDES Stormwater Phase II requirements apply to municipalities located in or near an urbanized area as defined by U.S. Census (i.e., a central place (or places) adjacent to a densely settled surrounding territory that together have a residential population of at least 50,000 and an average density of at least 1,000 people per square mile). In New Hampshire, 45 communities must comply with Phase II requirements. However, the NPDES Construction General Permit, which applies to any construction activity disturbing more than 1 acre, applies statewide. See <http://des.nh.gov/Stormwater> for more information.

The model ordinance should satisfy EPA's requirements under Phase II of the National Pollutant Discharge and Elimination System (NPDES) for small municipal separate storm sewer systems (MS4, see margin note) to regulate land disturbances greater than one acre.

DES also regulates alteration of terrain activity disturbing greater than 100,000 square feet, or 50,000 square feet within the protected shoreland zone. The model presented here is intended to be at least as stringent as the DES requirements and does take into account the proposed changes to the DES requirements. However, because the model is a performance standard approach, it does not include all the technical specifications for specific types of best management practices that are contained within the DES rules. Every effort has been made to ensure that any technical specifications that are included in the

model are consistent with the DES requirements. In addition, in some areas, the model includes more stringent requirements and/or additional provisions not addressed by the DES program.

Stormwater management is necessary during all stages of site development including site planning and design, design review, construction, and post-construction permanent controls. The model language below is focused on post-construction stormwater management and assumes communities have adopted and will institute construction-phase stormwater management and sedimentation and erosion control requirements. Permanent stormwater management systems cannot be expected to function properly if adequate controls are not implemented during construction.

Construction-phase mitigation is not addressed in the model ordinance included in this chapter. Stormwater management controls instituted during construction are typically designed to be temporary, using methods such as silt fences, sediment basins, mulch, erosion control mats, berms, and check dams. Construction-phase requirements (also called sedimentation and erosion controls) deal primarily with preventing a build-up of sediments in on- and off-site surface waters, by controlling unstable soils. Alternatively, post-construction stormwater management measures are designed as permanent solutions to keep and treat water on-site.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

Stormwater management requirements are best addressed through a performance-based zoning ordinance. Zoning is the appropriate means for addressing stormwater for the purpose of “promoting the health, safety, or the general welfare of the community” (RSA 674:16) and “to assure proper use of natural resources” (RSA 674:17). A performance-based approach (authorized under RSA 674:21) allows the community to specify the desired outcome or performance required by any development activity without being overly prescriptive regarding the specific techniques or approaches used. A zoning ordinance is also the appropriate means for addressing several issues affecting stormwater management, such as lot usage, density, location of buildings, and vegetative cover.

Although many larger sites are subject to state and federal stormwater management requirements, a local zoning ordinance provides the municipality the authority to act independently from state and federal officials to address any problems on the site or local water quality impacts. In addition, many building lots are too small to be subject to federal or state stormwater regulations. A local zoning ordinance ensures that all development activity must comply with the stormwater management requirements, including projects not subject to state or federal regulations and individual building lots that are not subject to subdivision or site plan review. Stormwater management requirements that apply to an individual building site that does not go through subdivision or site plan review are enforceable at the building permit stage and by a code enforcement officer.

A zoning ordinance can also authorize the planning board to require a more detailed stormwater management plan for certain types of development, such as for larger developments, developments subject to subdivision and/or site plan review, or for

developments near sensitive resources. Under this situation, the planning board will develop site plan and subdivision regulations specifying what information is required in a plan and establishing any additional requirements for such sites.

EXAMPLES AND OUTCOMES

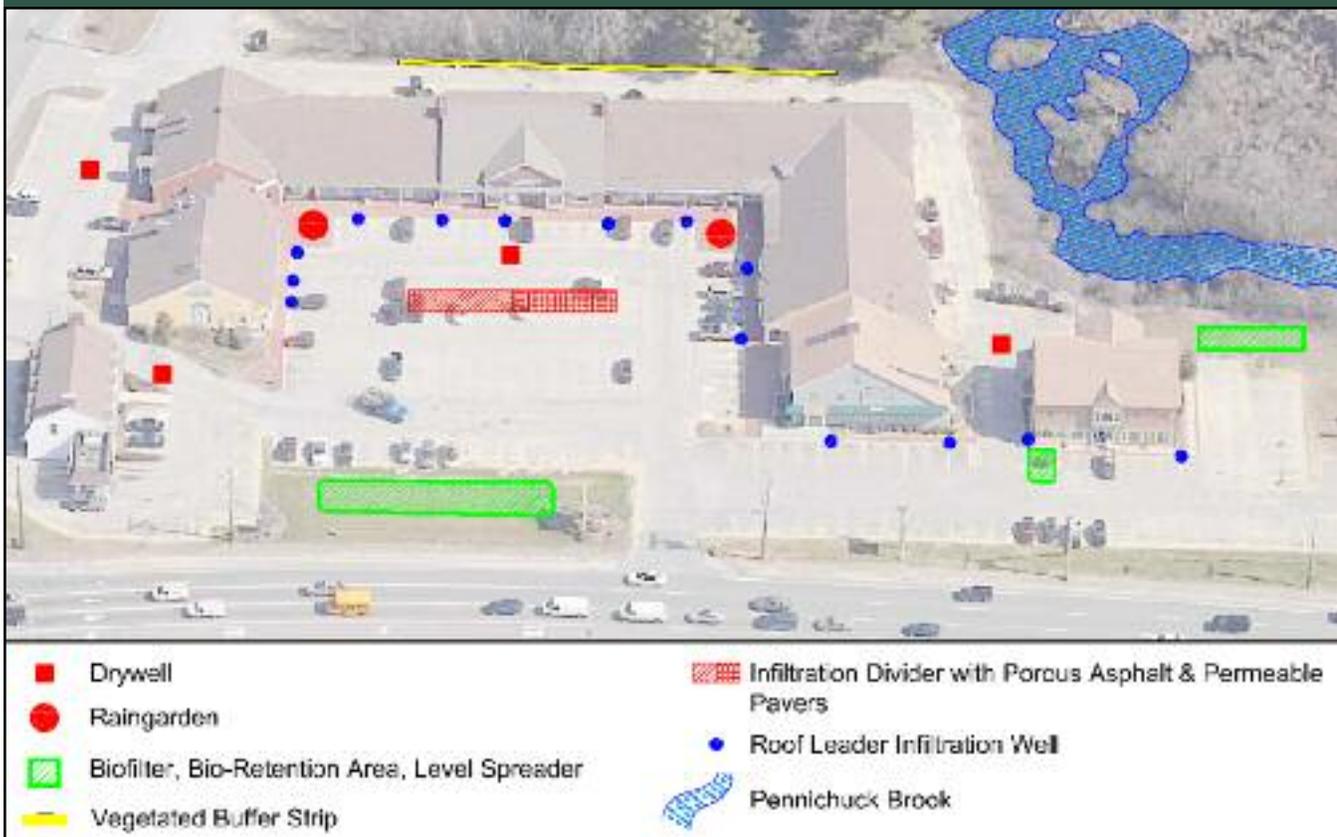
Nashua

The city of Nashua has a stormwater management ordinance that prefers runoff prevention measures and on-site stormwater treatment.

Merrimack

The Pennichuck Square redevelopment project used innovative stormwater practices to infiltrate runoff on a densely developed retail site. The project resulted in over 88 percent of the site's runoff being infiltrated and treated on-site where it had previously been piped untreated into Pennichuck Brook, Nashua's water supply. See Figure 2.1.1 for illustration.

FIGURE 2.1.1 Low Impact Development Redevelopment Plan: Pennichuck Square, Merrimack, NH



Comprehensive Environmental, Incorporated (www.pennichuck.com/raingardens/raingardens.htm)

Model Language and Guidance for Implementation

PERMANENT (POST-CONSTRUCTION) STORMWATER MANAGEMENT MODEL ORDINANCE

I. PURPOSE

To protect, maintain and enhance the public health, safety, environment, and general welfare by establishing minimum requirements and procedures to control the adverse affects of increased post-development stormwater runoff, decreased groundwater recharge, and non-point source pollution associated with new development and redevelopment.

II. AUTHORITY

The provisions of this Article are adopted pursuant to RSA 674:16, Grant of Power, RSA 674:17, Purposes of Zoning Ordinance, and RSA 674:21, Innovative Land Use Controls.

III. APPLICABILITY

The requirements of this Article shall apply to land disturbance, development, and/or construction activities in all zoning district(s).

IV. DEFINITIONS

Best Management Practice (BMP): Structural, non-structural and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and non-point source pollution, and promote stormwater quality and protection of the environment.

Curve Number (CN): A numerical representation used to describe the stormwater runoff potential for a given drainage area based on land use, soil group, and soil moisture, derived as specified by the U.S. Department of Agriculture, Natural Resources Conservation Service (USDA/NRCS).

Developer: A person who undertakes or proposes to undertake land disturbance activities.

Development: For the purposes of this article, development refers to alterations to the landscape that create, expand or change the location of impervious surfaces or alters the natural drainage of a site.

Disconnected Impervious Cover: Impervious cover that does not contribute directly to stormwater runoff from a site, but directs stormwater runoff to on-site pervious cover to infiltrate into the soil or be filtered by overland flow so that the net rate and volume of stormwater runoff from the disconnected impervious cover is not greater than the rate and volume from undisturbed cover of equal area.

Communities should review existing definitions sections prior to the adoption of any of the following definitions to avoid duplication or conflicting definitions.

Drainage Area: Means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

Effective Impervious Cover: Impervious cover that is not disconnected impervious cover.

Erosion: The detachment and movement of soil, rock, or rock fragments by water, wind, ice or gravity.

Impervious Cover: A structure or land surface with a low capacity for infiltration, including but not limited to pavement, roofs, roadways, and compacted soils, that has a Curve Number of 98 or greater.

Infiltration: The process by which water enters the soil profile (seeps into the soil).

Land Disturbance or Land Disturbing Activity: For the purposes of this Article, refers to any exposed soil resulting from activities such as clearing of trees or vegetation, grading, blasting, and excavation.

Owner: A person with a legal or equitable interest in a property.

Pervious Cover: A land surface with a high capacity for infiltration.

Recharge: The amount of water from precipitation that infiltrates into the ground and is not evaporated or transpired.

Redevelopment: The reuse of a site or structure with existing man-made land alterations. A site is considered a redevelopment if it has 35 percent or more of existing impervious surface, calculated by dividing the total existing impervious surface by the size of the parcel and convert to a percentage.

Regulated Substance: A “regulated substance” as defined in Env-Ws 421.03(f) or successor rule, Env-Wq 401.03(h).

Sediment: Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Sensitive Area: For the purpose this Article include lakes, ponds, perennial and intermittent streams, vernal pools, wetlands, and highly erodable soils.

Sheet flow: Runoff that flows or is directed to flow across a relatively broad area at a depth of less than 0.1 feet for a maximum distance of 100 feet in such a way that velocity is minimized.

Site: The lot or lots on upon which development is to occur or has occurred.

Stormwater: Water resulting from precipitation (including rain and snow) that runs off the land’s surface, is transmitted to the subsurface, or is captured by separate storm sewers or other drainage facility.

Stormwater Runoff: Water flow on the surface of the ground or in storm sewers, resulting from precipitation.

Total Impervious Cover: The sum of Disconnected Impervious Cover plus Effective Impervious Cover.

Undisturbed Cover: A natural land surface whose permeability has not been altered by human activity.

Vegetation: Is defined to include a tree, plant, shrub, vine or other form of plant growth.

Wellhead Protection Area: As defined in RSA 485-C:2, XVIII, the surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field.

V. STORMWATER MANAGEMENT PLAN

All developments disturbing greater than 20,000 square feet of area shall submit a permanent (post-construction) Stormwater Management Plan (SMP) with an application for subdivision or site plan review. The permanent SMP, which shall be prepared by a licensed New Hampshire, professional engineer, shall address and comply with the requirements set forth herein and as specified by the planning board.

VI. PERMANENT STORMWATER MANAGEMENT REQUIREMENTS

All development activity must comply with the following provisions to reduce and properly manage stormwater post-construction:

- A. Maximum effective impervious cover shall not exceed 10 percent of a site. Impervious cover may be disconnected from the stormwater drainage network, to reduce total effective impervious cover, through such techniques as infiltration or sheet flow over a pervious area.
- B. BMP techniques shall be used to meet the conditions below for control of peak flow and total volume of runoff, water quality protection, and maintenance of on-site groundwater recharge.
 - 1. Stormwater management practices shall be selected to accommodate the unique hydrologic and geologic conditions of the site.
 - 2. The use of nontraditional and/or nonstructural stormwater management measures, including site design approaches to reduce runoff rates, volumes, and pollutant loads, are preferred and shall be implemented to the maximum extent practical. Such techniques include, but are not limited to, minimization and/or disconnection of impervious surfaces; development design that reduces the rate and volume of runoff; restoration or enhancement of natural areas such as riparian areas, wetlands, and forests; and use of practices that intercept, treat, and infiltrate runoff from developed areas distributed throughout the site (e.g. bioretention, infiltration dividers or islands, or planters and rain-gardens). Applicants shall demonstrate why the use of nontraditional

Each community should decide whether it wants to require a separate management plan and, if so, what size development or disturbed area is subject to this requirement. A community might also decide to restrict the applicability of additional provisions from this model ordinance to larger developments or developments in more sensitive areas.

As noted in the definitions, Effective Impervious Cover is different from Impervious Cover. For example, to comply with this section, a site that creates 50 percent impervious cover must provide ample opportunities to capture and infiltrate stormwater to reduce the amount of stormwater leaving the site to be equivalent to having just 10 percent impervious cover (i.e., the site has 10 percent effective impervious cover).

An example of a site condition that should be factored into the stormwater management approach is soil type. The areas of a site with the best soils for infiltration should be preserved to maintain natural infiltration or set aside to be used for infiltrating stormwater generated elsewhere on the site.

and/or nonstructural approaches are not possible before proposing to use traditional, structural stormwater management measures (e.g., stormwater ponds, vegetated swales).

3. The applicant shall demonstrate how the proposed control(s) will comply with the requirements of this ordinance, including the control of peak flow and total volume of runoff, protection of water quality, and recharge of stormwater to groundwater. The applicant must provide design calculations and other back-up materials necessary.
4. At the discretion of the planning board, stormwater management systems shall incorporate designs that allow for shutdown and containment in the event of an emergency spill or other unexpected contamination event.
5. Stormwater management systems shall not discharge to surface waters, ground surface, subsurface, or groundwater within 100 feet of a surface water within a water supply intake protection area.
6. Stormwater management systems shall not discharge within the setback area for a water supply well as specified in the following table:

Well Type	Well Production Volume (gallons per day)	Setback from Well (feet)
Private Water Supply Well	Any Volume	75
Non-Community Public Water Supply Well	0 to 750	75
	751 to 1,440	100
	1,441 to 4,320	125
	4,321 to 14,400	150
Community Public Water Supply Well	0 to 14,400	150
Non-Community and Community Public Water Supply Well	14,401 to 28,800	175
	28,801 to 57,600	200
	57,601 to 86,400	250
	86,401 to 115,200	300
	115,201 to 144,000	350
	Greater than 144,000	400

7. BMPs shall be designed to convey a minimum design storm event, as described in the table below, without overtopping or causing damage to the stormwater management facility.

Treatment Practice	Design Storm Event
Stormwater Pond	50-year, 24-hour storm
Stormwater Wetland	50-year, 24-hour storm
Infiltration Practices	10-year, 24-hour storm
Filtering Practices	10-year, 24-hour storm
Flow through Treatment Swales	10-year, 24-hour storm

Communities may wish to include a provision to require emergency shutdown and containment, particularly in commercial and industrial areas or in drinking water supply areas, as an added protection against contamination of surface waters or groundwaters.

The NHDES Alteration of Terrain program provides for exemptions to the above standards (5) and (6) for stormwater management systems that discharge stormwater from areas less than 0.5 acres and that do not and will not receive stormwater from a high-load area. The exemption is designed to encourage low impact development.

C. Protection of natural hydrologic features and functions.

1. Site disturbance shall be minimized. Vegetation outside the project disturbance area shall be maintained. The project disturbance area shall be depicted on site plans submitted as part of the site plan review process. The project disturbance area shall include only the area necessary to reasonably accommodate construction activities. The applicant may be required to install construction fencing around the perimeter of the proposed project disturbance area prior to commencing land disturbance activities.
2. Soil compaction on site shall be minimized by using the smallest (lightest) equipment possible and minimizing travel over areas that will be revegetated (e.g., lawn areas) or used to infiltrate stormwater (e.g., bioretention areas). In no case shall excavation equipment be placed in the base of an infiltration area during construction.
3. Development shall follow the natural contours of the landscape to the maximum extent possible. A grading plan shall be submitted as part of the site plan review process showing both existing and finished grade for the proposed development.
4. Cut and fill shall be minimized. The maximum height of any fill or depth of any cut area, as measured from the natural grade, shall not be greater than 10 feet.
5. Any contiguous area of disturbance, not associated with the installation of a roadway, shall be limited to 20,000 square feet for residential development and to 100,000 square feet for other types of development. Contiguous areas of disturbance shall be separated by an area maintained at natural grade and retaining existing, mature vegetated cover that is at least 20 feet wide at its narrowest point.
6. No ground disturbed as a result of site construction and development shall be left as exposed bare soil at project completion. All areas exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of six inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials (mulch, loose rock, gravel, stone).
7. Priority shall be given to maintaining existing surface waters and systems, including, but not limited to, perennial and intermittent streams, wetlands, vernal pools, and natural swales.
 - a. Existing site hydrology shall not be modified so as to disrupt on-site and adjacent surface waters. The applicant must provide evidence that this standard can be achieved and maintained over time.
 - b. Existing surface waters, including lakes, ponds, rivers, perennial and intermittent streams, wetlands, vernal pools, and natural swales, shall be protected by a 50 foot no disturbance, vegetated buffer.

Communities may decide to allow a larger contiguous area of disturbance overall or in certain areas where appropriate, such as in areas zoned for larger-scale commercial or industrial use.

The 50 foot buffer requirement under 7.b. is meant as a bare-minimum standard for communities that do not have more specific buffer requirements. While a 50 foot buffer will provide some water quality benefits, it will not be adequate in all situations (e.g., particularly steep slopes) or sufficient to meet all the natural resource protection goals of a community. Communities should determine whether a broader buffer requirement is appropriate for their community to provide additional water quality and other benefits, such as wildlife habitat and corridor protection and human recreation opportunities. Other chapters in this series, particularly those pertaining specifically to the protection of surface water resources and habitat, provide additional information on appropriate buffer widths and protections to achieve various natural resource protection goals.

- c. BMPs shall not be located within the 50 foot no disturbance, vegetated buffer or within 50 feet of steep banks (greater than 15 percent slope).
- d. Where roadway or driveway crossings of surface waters cannot be eliminated, disturbance to the surface water shall be minimized, hydrologic flows shall be maintained, there shall be no direct discharge of runoff from the roadway to the surface water, and the area shall be revegetated post-construction.
- e. Stream and wetland crossings shall be eliminated whenever possible. When necessary, stream and wetland crossings shall comply with state recommended design standards to minimize impacts to flow and animal passage. (See NH Fish and Game Department, 2008.)

D. Post-development peak flow rates and total runoff volumes.

1. The applicant shall provide pre- and post-development peak flow rates. Any site that was wooded in the last five years must be considered undisturbed woods for the purposes of calculating pre-development peak flow rates.
2. The two-year, 24-hour post-development peak flow rate shall be (a) less than or equal to 50 percent of two-year, 24-hour storm pre-development peak flow rate or (b) less than or equal to the one-year, 24-hour storm pre-development peak flow rate.
3. The 10-year, 24-hour post-development peak flow rate shall not exceed the 10-year, 24-hour pre-development peak flow rate for all flows off-site.
4. The 50-year, 24-hour post-development peak flow rate shall not exceed the 50-year, 24-hour pre-development peak flow rate for all flows off-site.
5. Measurement of peak discharge rates shall be calculated using point of discharge or the down-gradient property boundary. The topography of the site may require evaluation at more than one location if flow leaves the property in more than one direction. Calculations shall include runoff from adjacent up-gradient properties.
6. An applicant may demonstrate that a feature beyond the property boundary is more appropriate as a design point.
7. The applicant shall provide pre- and post-development total runoff volumes. Any site that was wooded in the last five years shall be considered

The NHDES Alteration of Terrain program provides for exemptions to the standards D.2, D.3, and D.4 for projects that directly discharge to a stream, waterbody, estuary, or tidal water and where the applicant has provided supporting off-site drainage calculations for the 10-year and 50-year, 24-hour storm showing that at a point immediately downstream from the project site the post-development peak flow rate from the site and the off-site contributing area does not exceed the pre-development peak flow rate at that point.

undisturbed woods for the purposes of calculating pre-development total runoff volumes.

8. The post-development total runoff volume shall be equal to 90 to 110 percent of the pre-development total runoff volume (based on a two-year, 10-year, 25-year, and 50-year, 24-hour storms). Calculations shall include runoff from adjacent up-gradient properties.

E. Water Quality

1. If more than 35 percent of the total area of the site will be disturbed or the site will have greater than 10 percent effective impervious cover, the applicant shall demonstrate that their stormwater management system will:
 - a. Remove 80 percent of the average annual load of total suspended solids (TSS), floatables, greases, and oils after the site is developed.
 - b. Remove 40 percent of phosphorus.
2. Compliance with the recharge requirements under Section F, consistent with the pre-treatment and design requirements in Sections F.2 and F.3, shall be considered adequate to meet the treatment standards specified in VI.E.1.
3. Applicants not able to employ Section F must provide suitable documentation, including a pollutant loading analysis from an approved model, that the treatment standards specified in VI.E.1 will be met.

Depending on the existing water quality of downstream receiving waters, in particular if a waterbody is impaired or designated as an “outstanding resource water,” development projects requiring an Alteration of Terrain Permit or a 401 Water Quality Certification from the state may be subject to more stringent pollutant removal requirements than specified in Sections E. 1. a. and b.

F. Recharge to Groundwater

Except where prohibited, stormwater management designs shall demonstrate that the annual average pre-development groundwater recharge volume (GRV) for the major hydrologic soil groups found on-site are maintained.

1. For all areas covered by impervious cover, the total volume of recharge that must be maintained shall be calculated as follows:

a) **REQUIRED GRV =**
 (Total Impervious Cover) x (Groundwater Recharge Depth)

Where Total Impervious Cover is the area of proposed impervious cover that will exist on the site after development.

And where Groundwater Recharge Depth is expressed as follows:

USDA/NRCS Hydrologic Soil Group (HSG)	Groundwater Recharge Depth (inches)
A	0.40
B	0.25
C	0.10
D	not required

Example: Applicant proposes 30,000 square foot parking lot over C soils.

$$\text{REQUIRED GRV} = 30,000 \times 0.10$$

$$\text{REQUIRED GRV} = 250 \text{ ft}^3$$

- b. Where more than one hydrologic soil group is present, a weighted soil recharge factor shall be computed.

2. Pre-Treatment Requirements

- a. All runoff must be pretreated prior to its entrance into the ground-water recharge device to remove materials that would clog the soils receiving the recharge water.
- b. Pretreatment devices shall be provided for each BMP, shall be designed to accommodate a minimum of one-year's worth of sediment, shall be designed to capture anticipated pollutants, and be designed and located to be easily accessible to facilitate inspection and maintenance.

3. Sizing and design of infiltration (recharge) BMPs

- a. All units shall be designed to drain within 72 hours from the end of the storm.
- b. The floor of the recharge device shall be at least three feet above the seasonal high water table and bedrock.
- c. Soils under BMPs shall be scarified or tilled to improve infiltration.
- d. Infiltration BMPs shall not be located in areas with materials or soils containing regulated or hazardous substances or in areas known to DES to have contaminants in groundwater above ambient groundwater quality standards or in soil above site-specific soil standards.

4. Infiltration may be prohibited or subject to additional pre-treatment requirements under the following circumstances:

- a. The facility is located in a well-head protection area or water supply intake protection area; or
- b. The facility is located in an area where groundwater has been reclassified to GAA, GA1 or GA2 pursuant to RSA 485-C and Env-Dw 901; or
- c. Stormwater is generated from a "high-load area," as described under Section G.

G. Land Uses with Higher Potential Pollutant Loads

1. The following uses or activities are considered "high-load areas," with the potential to contribute higher pollutant loads to stormwater, and must comply with the requirements set forth in subsections 2, 3, and 4 below:

- a. Areas where regulated substances are exposed to rainfall or runoff; or
- b. Areas that typically generate higher concentrations of hydrocarbons, metals, or suspended solids than are found in typical stormwater runoff, including but not limited to the following:
 - i. Industrial facilities subject to the NPDES Multi-Sector General Permit (MSGP); not including areas where industrial

The use of below-ground pre-treatment devices should be discouraged because of the added difficulty in assessing their function and performing regular inspections and maintenance.

This design requirement addresses concerns about infiltration BMPs contributing to mosquito problems. Requiring such facilities to drain within 72 hours will prevent mosquitoes from successfully breeding.

activities do not occur, such as at office buildings and their associated parking facilities or in drainage areas at the facility where a certification of no exposure will always be possible [see 40CFR122.26(g)].

- ii. Petroleum storage facilities.
- iii. Petroleum dispensing facilities.
- iv. Vehicle fueling facilities.
- v. Vehicle service, maintenance and equipment cleaning facilities.
- vi. Fleet storage areas.
- vii. Public works storage areas.
- viii. Road salt storage and loading facilities.
- ix. Commercial nurseries.
- x. Non-residential facilities having uncoated metal roofs with a slope flatter than 20 percent.
- xi. Facilities with outdoor storage, loading, or unloading of hazardous substances, regardless of the primary use of the facility.
- xii. Facilities subject to chemical inventory under Section 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA).
- xiii. Commercial parking areas with over 1,000 trips per day.

- c. If a high-load area demonstrates, through its source control plan, the use of best management practices that result in no exposure of regulated substances to precipitation or runoff or release of regulated substances, it shall no longer be considered a high-load area.

2. In addition to implementation of BMPs for designing site-specific stormwater management controls, uses included under subsection G.1 shall provide a stormwater pollution prevention plan (SWPPP, see margin note below), describing methods for source reduction and methods for pretreatment.

3. Infiltration of stormwater from high-load areas, except commercial parking areas, is prohibited. Infiltration, with appropriate pre-treatment (e.g., oil/water separation) and subject to the conditions of the SWPPP, is allowed in commercial parking areas and others areas of a site that do not involve potential “high-load” uses or activities (e.g., where a certification of “no exposure” under the MSGP will always be possible).

4. For high-load areas, except commercial parking areas, filtering and infiltration practices, including but not limited to, sand filters, detention basins,

Information on the Multi-Sector General Permit for commercial and industrial sites is available at <http://cfpub.epa.gov/npdes/stormwater/swppp-msgp.cfm>.

The uses listed under 1.b.ii – 1.b.xiii are generally not subject to the MSGP, unless associated with another use or specific activity that is covered under the MSGP. A municipality may decide not to regulate one or more of these types of uses, or to cover additional types of uses that may represent a threat to water quality in their community (e.g., auto recyclers/salvage yards; marina service areas).

Example Stormwater Pollution Prevention Plans (SWPPP) are available at <http://cfpub.epa.gov/npdes/stormwater/swppp-msgp.cfm>.

wet ponds, gravel wetlands, constructed wetlands, swales or ditches, may be used only if sealed or lined.

H. Parking

1. Snow may not be plowed to, dumped in, or otherwise stored within 15 feet of a wetland or waterbody, except for snow that naturally falls into this area. Snow storage areas shall be shown on the site plan to comply with these requirements.
2. At the discretion of the planning board, parking spaces may be allowed, or required, to be constructed of a pervious surface (i.e. grass, pervious asphalt, pervious pavers).
3. Infrequently used emergency access points or routes shall be constructed with pervious surfaces (i.e. grass, pervious asphalt, pervious pavers).

I. Redevelopment or Reuse

1. Redevelopment or reuse of previously developed sites must meet the stormwater management standards set forth herein to the maximum extent possible as determined by the planning board. To make this determination the planning board shall consider the benefits of redevelopment as compared to development of raw land with respect to stormwater.
2. Redevelopment or reuse activities shall not infiltrate stormwater through materials or soils containing regulated or hazardous substances.
3. Redevelopment or reuse of a site shall not involve uses or activities considered “high-load areas” unless the requirements under Section G. are met.

J. Easements

1. Where a site is traversed by or requires construction of a watercourse or drainageway, an easement of adequate width may be required for such purpose.
2. There shall be at least a ten foot wide maintenance easement path on each side of any stormwater management system element. For systems using underground pipes, the maintenance easement may need to be wider, depending on the depth of the pipe.

K. Performance Bond

1. To ensure that proposed stormwater management controls are installed as approved, a performance bond shall be provided as a condition of approval in an amount determined by the planning board.
2. To ensure that stormwater management controls function properly, a performance bond shall be required, as a condition of approval, which may be held after final certificate of occupancy is issued.

L. Operation and Maintenance Plan

1. All stormwater management systems shall have an operations and maintenance (O&M) plan to ensure that systems function as designed. This plan shall be reviewed and approved as part of the review of the proposed per-

manent (post-construction) stormwater management system and incorporated in the Permanent Stormwater Management Plan, if applicable. Execution of the O&M plan shall be considered a condition of approval of a subdivision or site plan. If the stormwater management system is not dedicated to the city/town pursuant to a perpetual offer of dedication, the planning board may require an applicant to establish a homeowners association or similar entity to maintain the stormwater management system. For uses and activities under Section G, the O&M plan shall include implementation of the Stormwater Pollution Prevention Plan (SWPPP).

2. The stormwater management system owner is generally considered to be the landowner of the property, unless other legally binding agreements are established.
3. The O&M plan shall, at a minimum, identify the following:
 - a. Stormwater management system owner(s), (For subdivisions, the owner listed on the O&M plan shall be the owner of record, and responsibilities of the O&M plan shall be conveyed to the party ultimately responsible for the road maintenance, i.e. the Town should the road be accepted by the Town, or a homeowners association or other entity as determined/required under Section VI.L.1 above.)
 - b. The party or parties responsible for operation and maintenance and, if applicable, implementation of the Stormwater Pollution Prevention Plan (SWPPP).
 - c. A schedule for inspection and maintenance.
 - d. A checklist to be used during each inspection.
 - e. The description of routine and non-routine maintenance tasks to be undertaken.
 - f. A plan showing the location of all stormwater management facilities covered by the O&M plan.
 - g. A certification signed by the owner(s) attesting to their commitment to comply with the O&M plan.
4. Recording:
 - a. The owner shall provide covenants for filing with the registry of deeds in a form satisfactory to the planning board, which provide that the obligations of the maintenance plan run with the land.
 - b. The owner shall file with the registry of deeds such legal instruments as are necessary to allow the city/town or its designee to inspect or maintain the stormwater management systems for compliance with the O&M plan.
5. Modifications:
 - a. The owner shall keep the O&M plan current, including making modifications to the O&M plan as necessary to ensure that BMPs continue to operate as designed and approved.

- b. Proposed modifications of O&M plans including, but not limited to, changes in inspection frequency, maintenance schedule, or maintenance activity along with appropriate documentation, shall be submitted to the planning board for review and approval within thirty days of change.
- c. The owner must notify the planning board within 30 days of a change in owner or party responsible for implementing the plan.
- d. The planning board may, in its discretion, require increased or approve decreased frequency of inspection or maintenance or a change in maintenance activity. For a reduced frequency of inspection or maintenance, the owner shall demonstrate that such changes will not compromise the long-term function of the stormwater management system.
- e. The planning board shall notify the owner of acceptance of the modified plan or request additional information within 60 days of receipt of proposed modifications. No notification from the planning board at the end of 60 days shall constitute acceptance of the plan modification. The currently approved plan shall remain in effect until notification of approval has been issued, or the 60 day period has lapsed.

M. Record Keeping

1. Parties responsible for the operation and maintenance of a stormwater management system shall keep records of the installation, maintenance and repairs to the system, and shall retain records for at least five years.
2. Parties responsible for the operation and maintenance of a stormwater management system shall provide records of all maintenance and repairs to the [_____] *i.e. Code Enforcement Officer; Board of Selectmen*, during inspections and/or upon request.

N. Enforcement

When the responsible party fails to implement the O&M plan, including, where applicable, the SWPPP, as determined by the Code Enforcement Officer or Board of Selectmen, the municipality is authorized to assume responsibility for their implementation and to secure reimbursement for associated expenses from the responsible party, including, if necessary, placing a lien on the subject property.

VII. AUTHORIZATION TO ISSUE A SPECIAL USE PERMIT

- A. Authority is hereby granted to the planning board, as allowed under RSA 674:21 II, to issue a special use permit to allow variations from the requirements and restrictions set forth in this section upon the request of the applicant provided the development design and proposed stormwater management approach satisfy the following conditions:
 1. Such modifications are consistent with the general purpose and standards of this section and shall not be detrimental to public health, safety or welfare;

2. The modified design plan and stormwater management approach shall meet the performance standards under sections VI.D-VI.F of this ordinance; and
3. The modified design plan and stormwater management approach shall satisfy all state and/or federal permit requirements, as applicable.

VIII. ENGINEERING REVIEW

- A. The applicant shall submit a fee, as determined by the planning board, with their application for subdivision or site plan review to cover the cost of outside engineering review of their proposed permanent post-construction stormwater management system(s), and the separate Permanent Post-Construction Stormwater Management Plan (SMP) and Stormwater Pollution Prevention Plan (SWPPP), if applicable.
- B. Additional copies of all plans, engineering studies, and additional information as requested by the planning board describing the proposed permanent post-construction stormwater management system shall be provided as necessary to allow for a thorough outside engineering review.

Municipalities have the option of granting the planning board the authority to issue a special use permit (also known as a conditional use permit) as a means of giving the planning board and applicants greater flexibility to meet the requirements of this section. The advantage of allowing a special use permit option is that the planning board can work with an applicant to modify a plan when it is in the best interest of the community, while still ensuring compliance with the intent of the ordinance, without forcing the applicant to pursue a zoning variance.

REFERENCES

GENERAL STORMWATER AND ORDINANCE INFORMATION

City of Nashua, NH

The city of Nashua Land Use Code stormwater management and landscaping requirements were referenced in the development of this chapter. The code also contains language for recordkeeping requirements for O&M plans approved as part of a subdivision or site plan. In addition, the city's "Alternative Stormwater Management Methods Part 1 – Planning and Guidance" (March 2003) and "Alternative Stormwater Management Methods Part 2 – Designs and Specifications" (March 2003), prepared by Comprehensive Environmental Inc., are model resources for communities when reviewing proposed alternative stormwater management techniques. The city's Land Use Code is available on the city's website, www.ci.nashua.nh.us. The "Alternative Stormwater Management" resources are available on OEP's Resource Library under Low Impact Development, at <http://nh.gov/oep/resourcelibrary/referencelibrary/l/lowimpactdevelopment/index.htm>.

Comprehensive Environmental Inc. (CEI)

CEI has prepared numerous publications designed to assist communities with developing stormwater management regulations. "Design Guidelines and Criteria for Stormwater Management" (November 2003) and "Appendix A: Stormwater Technical Design Criteria: To Achieve Phase II Stormwater Compliance and Promote Low Impact Development" both referenced in the development of this chapter. For more information refer to the CEI website at <http://ceiengineers.com>.

Jefferson County, Washington

Jefferson County stormwater management requirements for all types (scale) and phases of development provide a step-by-step process to help owners/developers understand the requirements. Several checklists and flowcharts could be adapted for use by New Hampshire municipalities. For more information, refer to the Jefferson County Department of Community Development website at www.co.jefferson.wa.us/commdevelopment.

Low Impact Development Center Inc.

The Low Impact Development Center Inc. develops and provides information to individuals and organizations dedicated to protecting the environment and water resources through proper site design techniques that replicate pre-existing hydrologic site conditions. For more information refer to the Low Impact Development Center Inc. website at www.lowimpactdevelopment.org.

National Low Impact Development Clearinghouse

The Clearinghouse is a website developed through a Cooperative Assistance Agreement under the US EPA Office of Water 104b(3) Program in order to provide a web-based clearinghouse that allows researchers, practitioners, and program managers to collaborate and efficiently disseminate and share information with local governments, states, builders, developers, stakeholders, and environmental groups. The administrative and technical information available through this clearinghouse will be useful to permit writers, local government officials, watershed managers, and stakeholders. Refer to the Clearinghouse website at www.lid-stormwater.net/clearinghouse/home.htm.

The Practice of Low Impact Development (LID)

“The Practice of Low Impact Development,” (July 2003) prepared by NAHB Research Center Inc. for the U.S. Dept. of Housing and Urban Development, Office of Policy Development and Research, provides an overview of LID including a discussion and examples of LID. For a copy of this publication, refer to the publications page of the Housing and Urban Development website at <http://www.huduser.org/publications/destech/lowImpactDev1.html>.

Town of Thornton, New Hampshire

The town of Thornton’s Subdivision and Site Plan Regulations include stormwater management provisions referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

Towns of Duxbury, Marshfield, and Plymouth, Massachusetts

The “Model Stormwater Management Bylaw” (December 31, 2004) prepared by Horsely Witten Group for the towns of Duxbury, Marshfield, and Plymouth, includes model bylaws, regulations, pollutant load calculations, and credits and incentives to support the implementation of municipal stormwater management

controls. For more information, refer to the Horsely & Witten website at www.horsleywitten.com.

U.S. EPA Stormwater Management

U.S. EPA provides extensive information and resources for protecting water resources, including best management practices fact sheets for construction and post-construction stormwater management. For more information on techniques for the protection water and other resources refer to the US EPA website at www.epa.gov.

New Hampshire Stormwater Manuals

New Hampshire Department of Environmental Services. May 2002. *Innovative Stormwater Treatment Technologies Best Management Practices Manual*. www.des.nh.gov.

New Hampshire Department of Environmental Services. 2008. *New Hampshire Stormwater Management Manual: Volume 1 Antidegradation and Stormwater*.

New Hampshire Department of Environmental Services. 2008. *New Hampshire Stormwater Management Manual: Volume 2 Post Construction Best Management Practices: Selection and Design*.

New Hampshire Department of Environmental Services. 2008. *New Hampshire Stormwater Management Manual: Volume 3 Construction Phase Erosion and Sediment Controls*.

New Hampshire Fish and Game Department. September 2008. *New Hampshire Stream Crossing Guidelines*.

2.2 Steep Slope and Ridgeline Protection

BACKGROUND AND PURPOSE

There are a number of issues associated with development on steep slopes, hillsides, and ridgelines. Foremost among them are health, safety, and environmental considerations that arise when planning development in steep areas. Another factor is the aesthetic quality of hillsides and ridgelines that can be lost when they are developed. New Hampshire residents and visitors place great value on the state's natural resources. Protecting hillsides and steep slopes from development helps to preserve those unique environmental qualities that people value. Furthermore, development on steep slopes can have an adverse effect on water quality as a result of increased erosion and sedimentation.

This chapter provides information on regulating both steep slopes and ridgelines. While the two subjects are closely related, the regulations for each usually have different emphasis. Steep slope regulations are frequently based on environmental considerations such as erosion and sedimentation controls, while ridgeline regulations have more emphasis on view protection. The model ordinance in this chapter contains a section that deals with steep slopes and one that deals with ridgelines.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Since the beginning of steep slope regulation in the 1950s, there have been a variety of ways to approach the subject. In 1975, the authors of a report called *Performance Standards for Sensitive Lands* reviewed a total of 35 hillside and grading regulations, and found that the regulations could be classified in the following three categories (Thurow 1975):

1. **Slope/Density Provisions.** These reduce allowable densities on hillsides: the steeper the slope, the less the allowed density.
2. **Soil Overlays.** These provisions key development regulations to soil type, based on maps by the Natural Resource Conservation Service.
3. **The Guiding Principles Approach.** This approach creates hillside overlay districts to cover all hillside lands in a jurisdiction. A set of guiding principles is applied to all proposed development in these areas. These regulations are usually

RELATED TOOLS:

- Habitat Protection
- Erosion and Sedimentation Control During Construction

flexible, allowing for tailoring of development to the characteristics of each site and encouraging innovative approaches to attain the desired end.

These approaches have all become popular because they reduce the negative impacts of hillside development. These impacts include excessive cuts and fills, unattractive slope scars, and erosion and drainage problems. A logical method for addressing these problems is to reduce the intensity of development as the grade of the slope increases. The implication of linking density limitations with steep slopes is that steeply sloped hillsides are inherently unsuited for development for reasons of public safety, erosion, aesthetics, or general environmental protection. Because this type of regulation does allow for some hillside development, property owners can retain some use of their land. Pairing slope/density regulations with grading regulations helps to ensure that those sites are developed as safely as possible.

In most cases, large-scale commercial development is discouraged in areas with steep slopes because of the difficulties associated with trying to provide level building and parking areas as well as safe access to the site. Drainage and stormwater runoff can also cause problems.

When developing regulations to govern development on steep slopes, hillsides, and ridgelines, it is important to collect as much data as possible to form the basis of the ordinance. In a 1996 publication, Robert Olshansky, an expert on hillside development outlined ten topics that should be considered prior to implementing a regulation. These ten topics, which are outlined below, can be used as a framework to build a solid justification for regulating steep slopes, hillsides, and ridgelines.

TOPOGRAPHY

Before the location and extent of steep slopes in a community can be determined, it is essential that the definition of a steep slope be determined. Many communities define steep slopes as having a grade of 15 percent or greater, meaning that the elevation increases by 15 feet over a horizontal distance of 100 feet.

SLOPE STABILITY

When considering slope stability, it is important to consider not only how stable the slope is prior to development, but also what effect the grading necessary for development would have on slope stability. On steep slopes, any change in the equilibrium, whether it is caused by natural phenomena such as heavy rains or earthquakes or human activities, can cause erosion or landslides. Development on very steep slopes disturbs far more than the building footprint: on a 30 percent slope, 250 feet would have to be graded in order to create a 100-foot wide pad for construction, assuming a maximum 2:1 (50 percent) steepness of cut and fill as specified in the Uniform Building Code.

DRAINAGE AND EROSION

Collecting data on drainage and erosion entails identifying major watersheds and drainage courses as well as areas that are prone to flooding. In addition, key facilities and structures downstream of hillside drainageways should be identified. Knowing

where the water is likely to drain and what impacts changing existing patterns will have on the entire drainage system can help to prevent damage to buildings and loss of life in the event of a landslide. In addition, changing drainage patterns and increased sedimentation due to erosion can compromise water quality. All highly erodible soils should be identified.

INFRASTRUCTURE

Extending infrastructure to hilltop communities can be very difficult to engineer and construct, especially for water and sewer systems. Individual septic systems are especially difficult to construct and maintain on steep slopes, both because of the slopes and because the soils tend to be shallow and poorly drained. This makes septic systems on steep slopes prone to higher failure rates, which puts ground and surface water supplies at risk. In New Hampshire, no septic system may be placed on a slope greater than 33 percent; however, individual municipalities may implement stricter regulations, or develop inspection/maintenance programs. Roads, power lines, and telephone wires are also difficult and expensive to extend up steep slopes, and to maintain after construction.

ACCESS

Providing access roads and driveways to development on steep slopes can be especially challenging. The New Hampshire Department of Transportation recommends that driveways for commercial activities not exceed an 8 percent grade, and that driveways to residences not exceed 15 percent. Towns may set a lower threshold if they choose. In order to be safe, roads and driveways on steep areas tend to be longer and have more curves and switchbacks than roads and driveways on flatter terrain. This means that there are more impacts on the hillside, such as increased erosion and runoff, a higher potential for accidents, and difficulty for emergency vehicles to access the development.

AESTHETICS

In many of the steep slope ordinances reviewed during the preparation of this chapter, preserving a view was cited as one of the purposes for enacting the ordinance. Although this chapter treats steep slope and ridgeline/viewshed regulation separately, there is a good deal of overlap. When citing aesthetic reasons for implementing an ordinance, it is important to carefully document the rationale. This includes evaluating the extent and quality of views to the hills. In addition, it is important to identify any peaks or hillsides of special symbolic value to the community, to survey community values regarding appearance of hillsides and ridgelines, and to prepare maps of significant aesthetic resources. Taking photographs of the most important resources is another valuable tool that can be used, especially to convince the community that the ordinance is needed.

One method for cataloging visual resources is to use the Visual Resource Management strategy developed by the United States Bureau of Land Management (BLM) for use on public lands (BLM Manual H-8410-1). This system analyzes the quality of the view, the sensitivity of the resource, and the impacts that development

would have at different distances. This comprehensive approach allows resources to be ranked in the context of their surroundings. Individual communities may not want or need to go into the amount of detail described in the BLM manual. However, the process outlined in the manual does provide a good framework that communities can use to build their own natural resource inventories.

NATURAL QUALITIES

Documenting natural qualities or resources includes identifying and mapping vegetation communities and wildlife habitats, and identifying threats to these resources. Special attention should be paid to rare and endangered plant and animal species. Because of the difficulties associated with steep slope development, hillsides tend to be developed after development has occurred on flatter areas. Wildlife species often take refuge on undeveloped hillsides, even if it is not their native habitat, because their preferred habitats have been developed.

FIRE HAZARD

Fire can break out in many parts of New Hampshire, especially in the White Mountain National Forest. Since it is more difficult to control fires on hillsides than on flat areas, it is important to evaluate the frequency and causes of hillside wildfires, identify fuel reduction methods, and identify architectural and landscaping factors in fire safety. Attention must be paid to response times and access requirements for fire departments, as well as the evaluation of the tradeoffs between natural habitat preservation and fire hazards.

RECREATIONAL VALUES

Hills and mountains provide many popular and important recreational opportunities, including hiking, hunting, climbing, wildlife observation, and skiing. When developing ordinances, consideration of areawide needs and opportunities for wildland recreation as well as identification of possible trail and viewpoint locations are important factors. Locating possible access points to existing and potential recreational opportunities is also important.

OPEN SPACE

Providing open spaces can be a key component of hillside/steep slope regulations. Possible mechanisms for open space management include creating greenways, wildlife habitat preservation areas, and conservation areas.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

In New Hampshire, regulating development on steep slopes is authorized under RSA 674:16, the zoning Grant of Power, RSA 674:21, Innovative Land Use Controls, and 674:21, I (j), Environmental Characteristics Zoning. Although steep slopes and ridgelines are not specifically named in the RSA, they are generally considered to be environmental characteristics and are frequently found as overlay districts similar to wetland protection. According to the New Hampshire Office of Energy and Planning,

there were 27 municipalities in the state that had steep slopes regulations as of January 2007. In addition to regulating steep slopes and ridgelines through zoning, some communities include site-specific standards in their subdivision and site plan regulations.

Master Plan

Communities interested in regulating development on steep slopes, hillsides, and ridgelines should address the subject in the natural resource or land use chapters of their master plans. In developing the plan, it will be helpful to study maps of various slope categories. Using the ten-point framework outlined in Section II, a strong case can be built for protecting steep slopes. If viewshed protection is a high priority, then communities should survey their resources using either the Visual Resource Management strategy developed by the United States Bureau of Land Management, or a similar tool.

EXAMPLES AND OUTCOMES

In the United States, the earliest known example of steep slope regulations was in Los Angeles, California in the early 1950s, when grading regulations were first implemented. These regulations were designed to protect lives and property from unengineered development of hillsides (Olshansky 1995). This type of ordinance has been very successful at addressing engineering problems on hillside developments.

In December 2005, the Lakes Region Planning Commission published *Regulating Development on Steep Slopes, Hillsides, and Ridgelines*, a comprehensive look at the history and rationale behind steep slope regulation, along with several case studies from the state of New Hampshire as well as a few examples from other states. Excerpts from some of the case studies are included below.

LYME, NEW HAMPSHIRE

The Lyme zoning ordinance has both a Steep Slopes Conservation District and a Ridgeline and Hillside Conservation District. The Steep Slopes Conservation District is defined as all areas where there is an elevation change of 20 feet or greater and the average slope is 20 percent or greater. The Ridgeline and Hillside Conservation is defined as those ridgeline and hillside areas which are visible from public waters or public roads located within the town at a distance on the USGS topographic map of a half-mile or more (measured in a straight line distance from the proposed area of development).

According to the town planner, the Steep Slopes Conservation District works smoothly for the most part. There are occasional difficulties associated with determining where the district should be applied, which are solved with a site visit. The town has faced some challenges in defining exactly what land falls in the Ridgeline and Hillside Conservation District. The town is working on a map that will show where the district falls.

SANBORNTON, NEW HAMPSHIRE

The minimum lot size in the steep slopes conservation district is six acres. However, the planning board can waive that requirement if at least 50 percent of the lot has a

slope of less than 15 percent and there is at least one contiguous area of 40,000 square feet that has a slope of 15 percent or less. According to the town planner, this regulation has been in place for several years, and people who plan to subdivide land in the steep slope conservation district are accustomed to the regulations and therefore bring the proposed subdivision plans with lots drawn in accordance with the ordinance.

NORTH CAROLINA MOUNTAIN RIDGE PROTECTION ACT

Steep slope and hillside regulations are mostly found at the local level as part of either the zoning ordinance or subdivision regulations. One exception to this trend is the North Carolina Mountain Ridge Protection Act of 1983 (NC G.S. 113A-205-214). This state law restricts development on mountain ridges that have elevations of 3,000 feet and higher. As the basis for enacting the law, the North Carolina State Legislature found that:

The construction of tall or major buildings and structures on the ridges and higher elevations of North Carolina's mountains in an inappropriate or badly designed manner can cause unusual problems and hazards to the residents of and to visitors to the mountains. Supplying water to, and disposing of the sewage from, buildings at high elevations with significant numbers of residents may infringe on the ground water rights and endanger the health of those persons living at lower elevations. Providing fire protection may be difficult given the lack of water supply and pressure and the possibility that fire will be fanned by high winds. Extremes of weather can endanger buildings, structures, vehicles, and persons. Tall or major buildings and structures located on ridges are a hazard to air navigation and persons on the ground and detract from the natural beauty of the mountains.

According to a report from the Land-of-Sky Regional Council in North Carolina, this law has been mostly effective in controlling development on mountain ridges. However, many mountain communities in the state are currently searching for ways to protect land at lower elevations from development as well (Houck 2005).

Model Language and Guidance for Implementation

This model ordinance contains two sections: Steep Slopes Protection and a Visual Resource Protection District. Steep Slopes Conservation should be adopted as a component of the zoning ordinance that applies in all districts. The Visual Resource Protection District is an overlay district where the boundaries are determined through a visual resource inventory process.

STATUTORY AUTHORIZATION

- A. RSA Title LXIV, Chapters 674:16, Grant of Power
- B. 674:21, Innovative Land Use Controls
- C. 674:21(j), Environmental Characteristics Zoning
- D. 673:16, II; 676:4, I(g); and 674:44,V collectively authorize planning boards to collect fees from applicants to cover the costs of hiring outside experts to review subdivision applications and site plans.

MODEL ORDINANCE FOR STEEP SLOPE PROTECTION

TITLE: STEEP SLOPE PROTECTION

I. PURPOSE

The purpose of this ordinance is to reduce damage to streams and lakes from the consequences of excessive and improper construction, erosion, stormwater runoff, or effluent from improperly sited sewage disposal systems, and to preserve the natural topography, drainage patterns, vegetative cover, scenic views, wildlife habitats, and to protect unique natural areas.

II. DELINEATION

This ordinance shall apply to all areas with a slope greater than 15 percent, as shown on the town's steep slopes map, and where the proposed site disturbance is greater than 20,000 square feet.

III. DEFINITIONS

Erosion: The wearing away of the ground surface as a result of the movement of wind, water, ice, and/or land disturbance activities.

Sedimentation: The process by which sediment resulting from accelerated erosion has been or is being transported off the site of the land-disturbing activity or into a lake or natural watercourse or wetland.

Site Disturbance: Any activity that removes the vegetative cover from the land surface.

Municipalities should consider the local political climate, the terrain, and the nature of typical development in determining the minimum area of disturbance that triggers the steep slopes ordinance. The 20,000 square feet minimum recommended here will trigger the ordinance for most single-family home construction on steep slopes.

Slope: The degree of deviation of a surface from the horizontal, usually expressed in percent or degrees; rise over run.

Vegetative Cover: Grasses, shrubs, trees, and other vegetation which hold and stabilize soils.

IV. APPLICATION REQUIREMENTS

- A. Uses that will cause more than one acre of site disturbance must show the area subject to site disturbance in two-foot contours.
- B. An engineering plan will be prepared by a professional engineer that shows specific methods that will be used to control soil erosion and sedimentation, soil loss, and excessive stormwater runoff, both during and after construction.
- C. A hydrology, drainage, and flooding analysis will be included that shows the effect of the proposed development on water bodies and/or wetlands in the vicinity of the project.
- D. A grading plan for the construction site and all access routes will be prepared.

V. PERFORMANCE STANDARDS

All uses permitted in the underlying district will be a conditional use in the Steep Slope Conservation District and must meet the following conditions for approval:

- A. The grading cut and fill should not exceed a 2:1 ratio.
- B. Existing natural and topographic features, including the vegetative cover, will be preserved to the greatest extent possible. In the event that extensive amounts of vegetation are removed, the site shall be replanted with indigenous vegetation and shall replicate the original vegetation as much as possible.
- C. No section of any driveway may exceed a 10 percent slope for residential subdivisions or 8 percent slope for nonresidential site plans.
- D. No structure shall be built on an extremely steep slope (greater than 25 percent prior to site disturbance).

VI. ADMINISTRATION OF CONDITIONAL USE PERMITS

In addition to meeting the conditions set forth in this section, Conditional Use Permits shall be granted in accordance with the following pertinent procedures:

- A. A Conditional Use Permit shall be granted by the planning board upon a finding that the proposed use is consistent with the intent of the ordinance and following receipt of a review and recommendation of the conservation commission and any other professional expertise deemed necessary by the board.
- B. The applicant must demonstrate that no practicable alternatives exist to the proposal under consideration, and that all measures have been taken to minimize the impact that construction activities will have upon the district.

VII. COSTS

All costs pertaining to the consideration of an application, including consultants fees, on-site inspections, environmental impact studies, notification of interested persons, and other costs shall be borne by the applicant and paid prior to the planning board's final action.

MODEL ORDINANCE FOR RIDGELINES/HILLSIDES/VIEWSHED PROTECTION

TITLE: VISUAL RESOURCE PROTECTION DISTRICT

I. PURPOSE

The purpose of the Visual Resource Protection district is to protect the scenic and ecological resources associated with lands characterized by high elevations, steep slopes, and visual sensitivity in a manner that allows for carefully designed, low-impact development.

II. DELINEATION

The Visual Resource Protection District is an overlay district that will be defined by a visual resource inventory dated _____. The results of the visual resource strategy will be shown on the Visual Resource Map, which is hereby incorporated into this ordinance.

III. DEFINITIONS

Design Guidelines: A set of guidelines defining parameters to be followed in a site or building design or development.

Site Disturbance: Any activity that removes the vegetative cover from the land surface.

Visual Impact: A modification or change that could be incompatible with the scale, form, texture or color of the existing natural or man-made landscapes.

Visual Resource Map: The map depicting the visually sensitive areas, as determined by the visual resource inventory.

Visual Resource Inventory: A system for minimizing the visual impacts of surface-disturbing activities and maintaining scenic values. The inventory consists of a scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones.

IV. APPLICATION REQUIREMENTS

- A. Uses that will cause more than 20,000 square feet of site disturbance must show the buildable area in two-foot contours.
- B. An engineering plan will be prepared by a professional engineer that shows specific methods that will be used to control soil erosion and sedimentation, soil loss, and excessive stormwater runoff, both during and after construction.

Each community will have unique visual resources. It is the responsibility of the community implementing this ordinance to complete and document a comprehensive visual resource inventory. A manual detailing the Bureau of Land Management's Visual Resource Management Strategy is available online: www.blm.gov/nstc/VRM_8410.html#Anchor-49575

- C. A hydrology, drainage, and flooding analysis will be included that shows the effect of the proposed development on water bodies and/or wetlands in the vicinity of the project.
- D. A grading plan for the construction site and all access routes will be prepared.
- E. Architectural plans and renderings clearly depicting all proposed structures to scale and their location on the site in relation to the physical and natural features of the parcel, including the proposed grade of the building area and finished floor elevations. Drawings should clearly display building elevation and architectural design, including building materials, exterior colors and window fenestration. All structures proposed, including outbuildings and garages are to be shown.
- F. A landscaping plan showing existing vegetation and proposed landscaping and clearing plans showing proposed type, size, and location of all vegetation to be preserved and/or installed, along with other landscaping elements such as gazebos, berms, fences, walls, etc. Special attention should be given to existing/proposed vegetation adjacent to buildings for visibility and screening purposes. A species list of existing vegetation and a plan for maintenance of the existing and proposed landscape should be included. Such a plan shall address specific measures to be taken to ensure the protection and survival, and if necessary, replacement of designated trees during and after the construction and/or installation of site improvements.

V. ADMINISTRATION OF CONDITIONAL USE PERMITS

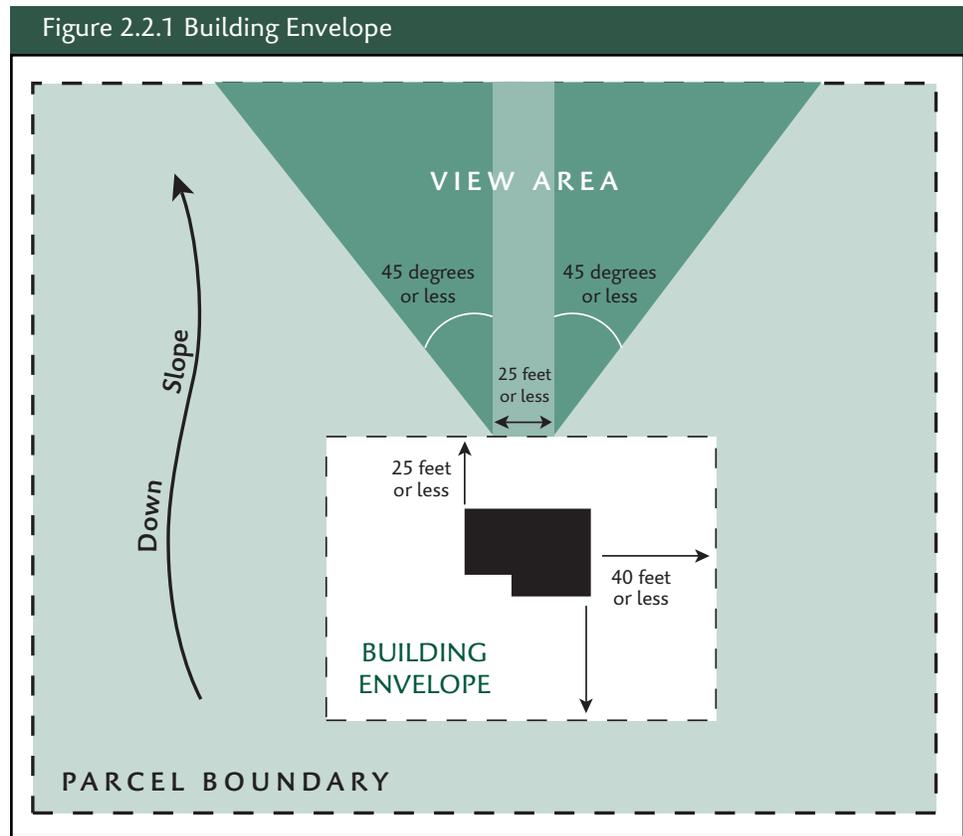
Conditional Use Permits shall include the findings of an architectural review in accordance with the following pertinent procedures:

- A. A Conditional Use Permit shall be granted by the planning board upon a finding that the proposed use is consistent with the intent of the ordinance and following receipt of a review and recommendation of the conservation commission and any other professional expertise deemed necessary by the board, such as a licensed architect.
- B. The applicant must demonstrate that no practicable alternatives exist to the proposal under consideration, and that all measures have been taken to minimize the impact that construction activities will have upon the district.

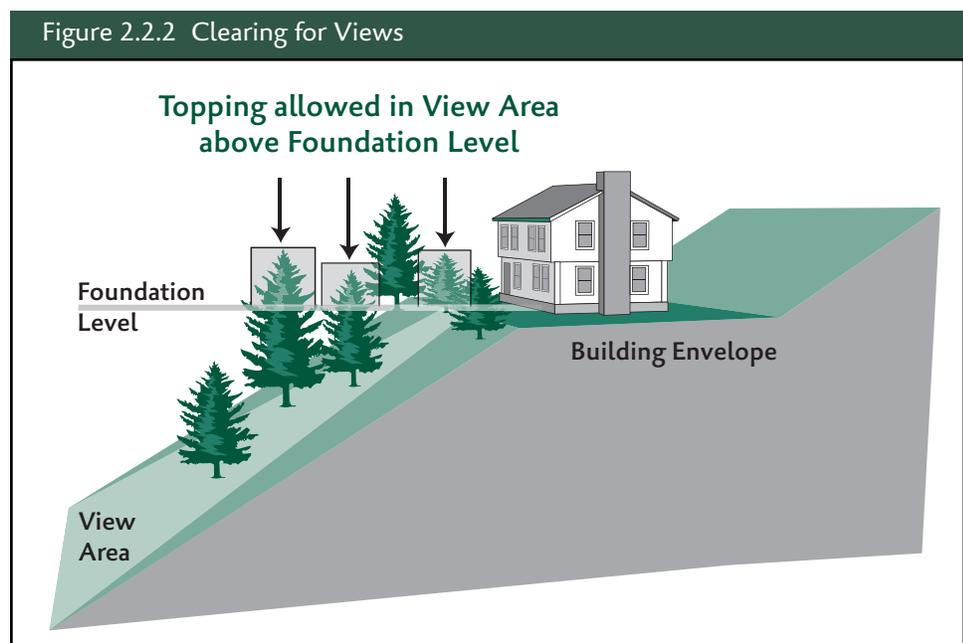
VI. DESIGN GUIDELINES

In order to reduce the visual impact of development in the Visual Resource Protection District, all proposed structures shall meet the following design guidelines:

- A. **Building Envelope:** The building envelope permitted in this district is a rectangle with an up-slope boundary 40 feet or less from the building, side boundaries 40 feet or less from each side of the building, and a down-slope boundary 25 feet or less from the building. Accessory structures shall be built within the building envelope. Building envelopes shall be at least 30 feet from property lines.



B. **Clearing for views:** In order to develop a view, trees may be removed beyond the building envelope for a width of clear cutting not to exceed 25 feet and extending outward therefrom at an angle of 45 degrees or less on both sides, to a point down-slope where the tops of the trees are at the same elevation as the ground floor of the building.. The 25-foot opening may be at any point along the down-slope boundary.



- C. Natural/neutral colors will be used.
- D. Reflective glass will be minimized.
- E. Only low level, indirect lighting shall be used. Spot lights and floodlights are prohibited.
- F. No portion of any structure shall extend above the elevation of the ridgeline.
- G. Structures shall use natural landforms and existing vegetation to screen them from view from public roads and waterways to the extent practicable.
- H. Cuts and fills are minimized, and where practical, driveways are screened from public view.
- I. Building sites and roadways shall be located to preserve trees and tree stands.

VII. COSTS

All costs pertaining to the consideration of an application, including consultants fees, on-site inspections, environmental impact studies, notification of interested persons, and other costs shall be borne by the applicant and paid prior to the planning board's final action.

REFERENCES

Bureau of Land Management. Manual H-8410-1 – Visual Resource Inventory. Washington, DC: U.S. Department of the Interior, Bureau of Land Management www.blm.gov/nstc/VRM/8410.html#Anchor-49575.

This manual provides a process for inventorying and prioritizing important visual resources. This, or another methodology, should always be employed when a community is contemplating a visual resource protection district.

Lakes Region Planning Commission. December 2005. *Regulating Development on Steep Slopes, Hillsides, and Ridgelines*. www.lakesrpc.org/steep%20slopes%20final.pdf.

The report explores the historical importance of steep slope regulation, outlines key development issues, and provides a variety of case studies designed to address safety, aesthetics, preservation of wildlife habitat, water quality protection and more.

Olshansky, Robert. September/October 1995. "Planning for Hillside Development" in *Environment & Development*, American Planning Association,

A short article that introduces the themes found in the 1996 PAS report of the same name.

Olshansky, Robert. 1996. *Planning for Hillside Development*: Planning Advisory Service Report No. 466, American Planning Association, Chicago.

A comprehensive study, building on the themes published in the 1995 article that discusses in depth the history and challenges of regulating hillside and steep slope development. The PAS report also provides excerpts from several of the ordinances and regulations reviewed for the study.

Thurow et al. 1975. *Performance Standards for Sensitive Lands*, Planning Advisory Service Nos. 307/308, American Planning Association.

This report was one of the first comprehensive looks at steep slope regulations.

Zoning Ordinances Reviewed:

Links to all of the New Hampshire ordinances listed here are available online from the Steep Slope Protection section of the New Hampshire Office of Energy and Planning Reference Library, nh.gov/oep/resourcelibrary/referencelibrary/s/steepslopeprotection/index.htm

Town of Antrim, NH

Town of Bath, NH

Town of Dublin, NH

Town of Enfield, NH

Town of Frankestown, NH

Town of Hancock, NH

Town of Harrisville, NH

Town of Loudon, NH

Town of Lyme, NH

Town of New Ipswich, NH

Town of New London, NH

Town of Newbury, NH

Town of Northwood, NH

Town of Roxbury, NH

Town of Sanbornton, NH

Town of Sandwich, NH

Town of South Hampton, NH

Town of Stowe, Vermont

www.townofstowevt.org/images/photos/stowe_regs_8-29-05.pdf

City of Park City, Utah

www.parkcity.org/government/codesandpolicies/title_15_c_2_21.html

City of San Rafael, California

ordlink.com/codes/sanraf/_DATA/TITLE14/Chapter_14_12_HillsideDevelop.html

Town of Cortland, N.Y.

law.wustl.edu/landuselaw/ssprotection.htm

Sonoma County, California

municipalcodes.lexisnexis.com/codes/sonomaco (Article 26, Section 64)

Model Steep Slope Ordinance, Ten Towns Committee, N.J.

www.tentowns.org/10t/ordsteep.htm

North Carolina Mountain Ridge Protection Act of July 1983

www.cals.ncsu.edu/wq/lpn/statutes/nc/mountainridgeprotection.htm

2.3 Habitat Protection

BACKGROUND AND PURPOSE

Wildlife and wildlife habitat provide many public benefits and serve important ecological functions. Important ecological services are often provided by particular wildlife habitats, which may serve as buffers to streams, flood retention areas, areas of carbon sequestration, and filters of environmental contaminants. Diversity of plant and animal life contributes to the versatility and long-term health of the food supply and the ecosystem as a whole.

Protecting wildlife and their habitat also contributes to the rural character of New Hampshire, as hunting, fishing, and wildlife watching are long-standing features of the culture and attract tourism to a rural area.

Habitat protection can occur at three levels: regional, town master planning, and site planning. Habitat protection can be accomplished with regulatory, market-based or voluntary measures. This chapter deals with regulatory measures.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Ideally, protection of wildlife habitat begins at the largest scale appropriate. This scale is determined through study of the range of the particular animal and the extent of its habitat across a multi-state and multi-regional area. Due to difficulties in coordinating across political boundaries and biological boundaries, most government entities must settle for either a coordinated approach with neighboring regions, or a regional-level approach that acknowledges that the range may extend beyond political boundaries.

The New Hampshire Wildlife Action Plan, which was mandated and funded by the federal government, identifies statewide strategies for identifying, restoring and maintaining critical habitats and populations of nongame species of conservation and management concern. It is a pro-active effort to define and implement a strategy that will help keep species off rare species lists.

At the town level, protection occurs in reference to larger plans, but is refined by local wildlife habitat mapping and inventories. Town protection starts in the master planning process when areas are identified for protection through the use of natural

RELATED TOOLS:

- Conservation Subdivision
- Density Transfer Credit
- Village Plan Alternative

resource inventories and maps. These areas can then be protected through zoning ordinances and regulatory measures.

The tool presented here can be used in three ways: as voluntary guidelines for developers, as a set of design principles adopted by a town or board, and finally, as a set of standards that could be incorporated into site plan and subdivision ordinances as performance standards.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

Protection of wildlife is referenced and or supported in the following state laws:

- **Environmental Characteristics Zoning. RSA 674:21:** Although not specifically defined, this provision gives planning boards the authority to adopt an innovative land use control based upon the environmental characteristics as shown in a local or regional natural resources mapping and inventory project. Examples of environmental characteristics could include aquifers, wetlands, unfragmented forest blocks, or specific habitat types such as grasslands or forest types.
- **Village Plan Alternative Subdivision. RSA 674:21:** This section defines village plan alternative as “an optional land use control and subdivision regulation to provide a means of promoting a more efficient and cost effective method of land development. The village plan alternative’s purpose is to encourage the preservation of open space and more efficient use of land.”
- **Master Plan; Purpose and Description RSA 674:2:** This section states that a master plan may include the following section: (subpart (d)) “a natural resources section which identifies and inventories any critical or sensitive areas or resources, not only those in the local community, but also those shared with abutting communities. This section provides a factual basis for any land development regulations that may be enacted to protect natural areas.”
- **Subdivision Regulations. RSA 674:36II(l) and (m):** This section gives the planning board the authority to adopt a subdivision regulation which “provide for efficient and compact subdivision development that promotes retention and public usage of open space and wildlife habitat, by allowing for village plan alternative subdivision” and “require innovative land use controls on lands when supported by the master plan.”
- **Comprehensive Shoreland Protection Act. RSA 483-B:2:** This section states that the standards set forth in the chapter shall serve to “protect fish spawning grounds, aquatic life, and bird and other wildlife habitats” and “promote wildlife habitat, scenic beauty, and scientific study.”
- **Rivers Management and Protection Program. RSA 483:6:** This section provides a process for any New Hampshire organization or resident to nominate a river or segment of a river for protection by submitting a description of the river and its values and characteristics, including “an assessment of fisheries ... vegetation, and ... wildlife. And provides standards for classification and management of rivers.”

EXAMPLES AND OUTCOMES

Many New Hampshire towns have completed wildlife habitat inventories to guide the work of town boards. Belmont has adopted statements of purpose in its master plan language to guide the creation of ordinances and regulations to carry out the purpose of protection of wildlife. Rye includes discussions of wildlife and habitat and the need to protect such resources in its natural resources chapter of the master plan.

In addition to comprehensive regulations, as presented here, a town may wish to focus on a particular wildlife species and habitat that may be found locally or may be identified in New Hampshire's Wildlife Action Plan. A town may also wish to deal with particular impacts of development and put in place strategies to address those impacts, such as regulations to limit allowable tree clearing for new development or require vegetated buffers of streams to protect riparian area habitat.

Model Language and Guidance for Implementation

HABITAT SENSITIVE SITE DESIGN AND DEVELOPMENT PRACTICES

These practices may be used in three ways:

1. As an educational tool for citizens and developers to encourage voluntary practices for habitat sensitive site design.
2. As a checklist for conservation commissions and planning boards in reviewing applications and suggesting voluntary alternative site designs and development practices at the planning stage.
3. As elements of a performance zoning ordinance that awards density bonuses or requires compliance with the checklist items as a condition of subdivision approval.

A pre-application review meeting between the developer and planning staff to discuss the checklist elements is strongly encouraged.

MODEL LANGUAGE FOR SUBDIVISION AND SITE PLAN REVIEW REGULATION AND CHECKLIST

I. PURPOSE

The purposes of this section are:

- A. To protect and maintain the natural environment.
- B. To provide for green spaces of adequate proportions.
- C. To provide a habitat for wildlife.
- D. To minimize soil erosion, lessen air pollution, conserve energy, and protect the quality of groundwater.
- E. To provide for the harmonious and aesthetically pleasing development of the municipality and its environs.
- F. To protect the public benefits of habitat protection, including flood control, water recharge, carbon sequestration, food web integrity, and nutrient cycling.

II. APPLICABILITY

This regulation applies to all applications for new development requiring site plan review and applications for the subdivision of land.

Option: A municipality might choose to limit the applicability of these requirements to certain areas of the community (e.g., an overlay zone consisting of those areas identified as important habitat within a natural resource inventory or open space plan) or to parcels of a certain size (e.g., any parcel greater than 10 acres). An overlay zone would be established through a separate zoning action.

III. AUTHORITY

- A. **RSA 674:16 II. Subdivision Regulations.** The power to adopt a zoning ordinance under this subdivision expressly includes the power to adopt innovative land use controls which may include, but which are not limited to, the methods contained in RSA 674:21.
- B. **RSA 674: 21 (j). Innovative Land Use Controls/ Environmental Characteristics.** An innovative land use control to protect specific natural resources or features based on scientific evidence and community input may be adopted under RSA 674:21 when supported by the master plan and contains within it the standards that shall guide the person or board which administers the ordinance.
- C. **RSA 674: 21(h) Innovative Land Use Controls/ Performance Standards.** An innovative land use control to control the physical characteristics and operations of a proposed use may be adopted under RSA 674:21 when supported by the master plan and contains within it the standards and criteria against which the development will be evaluated.
- D. **RSA 674: 17 (h) and (i) Purposes of Zoning Ordinances.** To assure proper use of natural resources and other public requirements and to encourage the preservation of agricultural lands and buildings.

IV. FINDINGS AND PRINCIPLES

It is the finding of this board that, in order to achieve the purposes above, the following principles will significantly enhance the protection of wildlife habitat at the site level and contribute to the protection of habitat at the watershed and regional level by:

- Maintaining the ability of ecological systems to provide ecosystem functions necessary to maintain wildlife habitat and the multiple benefits to wildlife and humans provided by such habitat.
- Maintaining unfragmented habitat blocks.
- Connecting habitat patches, facilitating wildlife movement through the area.
- Protecting wildlife from the negative impacts of development, including not only negative impacts to the habitat itself, but also to animal behavior and life cycle activities.
- Requiring site-specific habitat assessment and other practices described more fully below to protect wildlife from the negative impacts of development.

V. DEFINITIONS

Deer Wintering Area: An area used by deer during winter for shelter. Also called a deer yard. Deer wintering areas are typically comprised of dense softwood cover with a crown closure greater than 60 percent.

Habitat: An organism's home, including the area used in all parts of its life cycle, such as feeding, breeding, egg laying, or bearing young.

Mast Stand: An area of woody plants, such as oak, hickory, beech, maple, and various pines, that produce dry fruit (mast), which is a food source for a variety of mast-dependent wildlife such as deer, turkey, and squirrels.

Riparian: Related to or adjacent to a stream or watercourse, or having a high water table because of proximity to an aquatic ecosystem or subsurface water. Although originally associated with rivers and streams, this term is now also sometimes used to describe wetland areas not necessarily associated with rivers or streams.

Vernal Pool: A confined basin depression that is 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.

Wetland: An area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to, swamps, marshes, bogs and similar areas.

VI. HABITAT-PROTECTION SITE PLAN AND SUBDIVISION REVIEW CHECKLIST

The following checklist shall be utilized in the review of all site plan and subdivision applications. The board shall determine, on a case-by-case basis, and as applicable, whether the applicant's proposed development is consistent with these principles:

- A. Does the applicant conserve rare and outstanding landscape features, including unique or critical habitats, by directing development to other areas?

Yes _____ No _____

Required action:

- Conduct a site assessment of existing resources, identify areas for protection and associated buffers, and demonstrate methods that will be utilized for protection in the construction sequence section of the plan set.
- Development is directed away from habitat types that are rare statewide or to a particular geographic region.
- Development should be directed away from salt marshes, riparian areas, vernal pools, emergent wetlands, large wetland complexes (i.e., wetlands greater than five acres or clusters of wetlands), south-facing slopes, open fields, agricultural lands, and mast stands.
- Building envelopes are specified to control the location of future development.
- Avoid locating roads within or near important habitat or forage areas such as mast stands, deer wintering areas, or vernal pools.

- B. Does the applicant maintain significant buffers of undeveloped land between important habitat areas and developed area?

Yes _____ No _____

Required actions: Applicant must maintain appropriate buffers for the protection of habitat areas on the parcel as follows:

- Maintain vegetated buffers for wetlands and surface waters including riparian buffer areas. The most effective buffer strips will consist of a series of vegetation of different heights beginning with a grassy strip graduating to a strip of shrubs, and ending with a forested strip along the stream bank. The multiple series approach provides multiple benefits including stream bank stabilization. A generally accepted width for a buffer for wildlife habitat is 300 feet; for water quality, a buffer of 50 to 100 feet is recommended for most situations. Where high sediment loads or steep slopes exist, the water quality buffer should be expanded about five feet for every 1 percent increase in slope. (Connecticut River Joint Commission 2000; J.C. Klapproth 2000; Wenger 1999; Hodgman 2006).
- Maintain at least 200 feet of buffer from the perimeter of core areas of identified deer wintering areas.
- Maintain a minimum 300 feet of buffer from other significant habitat areas identified by the municipality, local or regional open space or habitat protection plan, or during site plan or subdivision plan review.
- Maintain a buffer of 400 feet around existing vernal pools and maintain a mostly closed canopy of trees within 100 feet of any vernal pool.
- Avoid construction of houses within 300 feet of important mast stands and avoid construction of paved roads within 200 feet of important mast stands.
- Avoid fragmentation of connecting areas between habitat areas and buffer areas.
- Mark areas of vegetated buffers and soft (graduated) edges of conservation areas with permanent monuments or signage indicating that the area is A NO CUT/ NO DISTURB VEGETATED BUFFER.

C. Does the applicant identify and conserve wildlife corridors of a minimum width of 300 feet through the property to facilitate wildlife movement within and across developed areas?

Yes _____ No _____

Required action:

- Conduct a site-specific wildlife assessment to identify appropriate corridors through a property or reference the town's Natural Resource Inventory or other local or regional assessment identifying appropriate corridors.
- Construct adequately sized underpasses or tunnels across roadways at known reptile and amphibian crossing sites and overpasses or underpasses across roadways along wildlife corridors.

D. Does the applicant maintain the structure and function of aquatic systems?

Yes _____ No _____

Required actions:

- Layout of development eliminates or minimizes stream and wetland crossings by roadways and driveways.
- Use a bridge span to cross river, streams or wetlands whenever possible.
- Stream and wetland crossings are eliminated whenever possible. When necessary, stream and wetland crossings shall comply with state recommended design standards to minimize impacts to flow and animal passage. (See NH Fish and Game Department, 2008.
- Maintain a 300-foot vegetated buffer on either side of a stream crossing.
- Stormwater management practices are used to prevent the direct discharge of stormwater to aquatic systems, including wetlands and small streams.

E. Does the applicant minimize the clearing, grading, and compaction of soil during construction activities?

Yes _____ No _____

Required actions:

- Cut and fill is minimized, with the maximum height of any fill or depth of any cut area, as measured from the natural grade, not greater than 10 feet, and is preferably limited to four to six feet.
- Development follows the natural contours of the landscape to the maximum extent possible to minimize grading.
- The smallest feasible equipment is used during construction and every effort is made to minimize travel over the area.
- Soils are re-aerated after construction is complete and prior to seeding and landscaping.
- Provide for six to 10 inches of top soil post-construction to any areas previously disturbed prior to seeding and landscaping these areas.

F. Does the applicant provide for the protection of vegetated buffers, stands of mature trees, and other vegetation to be preserved during and after construction?

Yes _____ No _____

Required actions:

- Important mast stands and other vegetation to be protected during construction are clearly marked, including area out to the drip line of the tree.
- Not allow construction materials to be stored over the root zone of trees.
- Mark areas of vegetated buffers and soft edges of conservation areas with permanent monuments or signage indicating that the area is a no cut/ no disturb vegetated buffer.

- Submit a tree clearing plan, indicating areas of trees to be cleared, and areas to be protected, and retain, at the applicant's expense, a qualified natural resources professional to review the applicant's plan.

G. Does the applicant attempt to mimic features of the local natural landscape in developed areas?

Yes _____ No _____

Required actions:

- Maintain existing foliage height diversity, to provide a range of habitat through layers of vegetation, such as ground covers, shrubs, and trees.
- Minimize edge effects by creating soft edges between developed areas and conservation areas using a graduation of smaller shrubs to larger shrubs to small trees to larger trees.
- Utilize native, non-invasive species in landscaping.
- Minimize the amount of area per lot converted from existing vegetation to lawn.
- Provide a stormwater management approach that maintains the natural peak flow and total volume of flow off-site pre- and post-development by providing for best management practices that capture, treat, and infiltrate stormwater in smaller-scale management areas throughout the development.

H. Does the applicant minimize the negative effects of development on wildlife and discourage human-wildlife conflicts by using such methods including but not limited to: directing light away from stands of trees, fencing gardens, pet food areas, and covering and fencing trash disposal areas?

Yes _____ No _____

Required actions:

- The homeowners association's documents should include the specific measures that will be used to ensure that the development will minimize potential negative effects on wildlife and habitat, and that human-wildlife conflicts such as predation or nuisance animal incidents will be discouraged by ensuring that garbage, pet food areas, and small pets do not serve as a food source to area wildlife. The documents should also address landscaping and discourage the introduction of invasive species and excessive use of nitrates and phosphates.
- Some areas of the development near homes may require fencing or other measures to deter wildlife from gardens and yards.
- Lighting must be fully shielded and directed away from stands of trees or other habitat areas so as not to disrupt animal behavior.

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2.4 Wetlands Protection

BACKGROUND AND PURPOSE

This chapter provides municipalities with a model ordinance designed to protect wetlands and adjacent upland habitat and the functions and values they provide.

Historically, wetlands were viewed as wastelands, too wet to plant or build on. Many wetlands were either drained or used as dumping grounds. Now it is understood that wetlands provide important environmental benefits.

Wetlands and adjacent uplands provide essential habitat for wildlife, including food, cover, and travel if connected to other habitat. Protection of small wetlands and adjacent uplands is often important for achieving this connectivity. Wetlands support almost two-thirds of New Hampshire's wildlife in greatest need of conservation (N.H. Fish and Game Department, 2005). Some small seasonal surface waters known as vernal pools – temporarily flooded depressions that lack breeding fish populations – are the breeding habitat for amphibian species that live in upland areas most of the year. Larger wildlife, such as moose, depend on wetlands for their food source as well. In New Hampshire, hunting generates \$71 million in revenue and provides more than 1,400 jobs (N.H. Fish and Game, 2005).

Wetlands protect water quality in our lakes and streams. They remove excess nitrogen and trap sediment and associated contaminants, such as metals and phosphorus. Wetlands located along waterways and shorelines buffer the natural wind and waves.

Wetlands help to reduce floods by acting like a sponge, slowing runoff from upland areas and releasing water slowly, reducing peak flood flows downstream. Conversely, wetlands help keep streams flowing in dry periods, because groundwater is often discharged into wetlands, and they continue to release the water even without additional rain. This is important for adequate water supply and wildlife habitat.

Estuarine areas and coastal marshes, where salt water and fresh water mix, are among the most ecologically-productive areas in the world. Tidal wetlands are nurseries for finfish and shellfish. In tidal areas, retention of sediment is especially important to minimize the deposition of fine sand or silt in shellfish beds. Tidal wetlands serve as spawning and nursery areas for fish, including those that are commercially harvested.

RELATED TOOLS:

- Stormwater Management
- Habitat Protection
- Erosion and Sediment Control During Construction
- Shoreland Protection: The Importance of Riparian Buffers
- Flood Hazard Area Zoning

Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society. Values are benefits that derive from either one or more functions and the physical characteristics associated with a wetland.

Buffer areas, the upland areas adjacent to wetlands, are essential to maintenance and protection of wetland functions and values. These buffer areas protect wetlands from degradation by:

1. Stabilizing soil and preventing erosion.
2. Filtering suspended solids, nutrients, and harmful or toxic substances.
3. Moderating impacts of stormwater runoff.
4. Moderating system microclimate.
5. Providing habitat and protecting wetland wildlife habitat from adverse impacts.
6. Maintaining and enhancing habitat diversity and/or integrity.
7. Supporting and protecting wetland plant and animal species and biotic communities.
8. Reducing disturbances to wetland resources caused by intrusion of humans and domestic animals.

The size of buffers needed varies by the function and the site-specific conditions.

The ability of vegetated wetland buffers to provide water quality protection increases with the size of the buffer. At 100 feet, most of the contaminants and nutrients have been removed (Chase *et al*, 1997). Protection of buffers will reduce wetland impacts by moderating the effects of stormwater runoff, including stabilizing soil to prevent erosion; filtering suspended solids, nutrients, and harmful or toxic substances; and moderating water level fluctuations.

However, wetland buffers to support wildlife may need to be much larger. Buffers also provide essential habitat for wetland-associated species for use in feeding, roosting, breeding and rearing of young, and cover for safety, mobility, and thermal protection.

Finally, buffers reduce the adverse impacts of human disturbance on wetland habitats by blocking noise and glare; reducing sedimentation and nutrient input; reducing direct human disturbance from dumped debris, cut vegetation, and trampling; and providing visual separation.

State jurisdiction of wetlands is found in RSA 482-A and NH Department of Environmental Services administrative rules Env-Wt 100-800. Almost all activities that disturb the soils in a jurisdictional area, regardless of size or scale, in or on the banks of a surface water body or in a wetland require a permit from the state. Projects are classified according to their potential environmental impact – as minimum impact, minor impact, and major impact. There are a variety of ways by which projects are classified, including area of impact. Wetlands impacts less than 3,000 square feet may be minimum impact, from 3,000 to 20,000 square feet may be minor impact; and impacts greater than 20,000 square feet, any activity in or within 100 feet of prime wetlands, tidal wetlands, sand dunes, bogs, or natural exemplary communities, or disturbance of more than 200 feet of shoreline, are classified as major impacts. The classification of impact determines the amount of information and environmental analysis required and the commensurate review of an application.

The federal government also has jurisdiction over wetlands under Section 404 of the Clean Water Act. Section 404 review is administered by the Army Corps of Engineers, which coordinates review with the federal resource agencies – National Oceanic and Atmospheric Administration - National Marine Fisheries, and the US Fish and Wildlife Service. The Army Corps of Engineers has issued a Programmatic General Permit in New Hampshire, which means that most state wetlands permits are concurrently approved by the Army Corps of Engineers. This provides for a more streamlined process and less duplication of effort. The new New Hampshire Programmatic General Permit was reissued on June 28, 2007. A copy may be downloaded from the Army Corps of Engineers' website.

Protection of wetlands and adjacent uplands on a local level can provide additional oversight for proposed activities in wetlands and establish buffers that maintain the functions and values of wetlands. Local regulation of wetlands can:

- Review potential impacts to smaller wetlands more thoroughly.
- Prevent the cumulative impacts associated with a collection of small projects.
- Reflect the interests of the community, e.g. to prevent costly water supply impacts or increased flooding.
- Protect the functions and values of the wetland ecosystem by protecting buffers around the wetlands.
- Provide local inspection and enforcement.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Wetlands occur in every community in New Hampshire. Communities that want more protection for wetlands than is provided through state and federal regulations, including protection of wetland buffers, need to incorporate local wetland protection requirements into the zoning ordinance. Protection of wetlands and adjacent uplands is best achieved with an overlay district so that the underlying zoning is still in effect and these resources have an additional layer of protection.

Zoning ordinance provisions are just one piece of what is necessary to protect the functions and values associated with wetland ecosystems. Vegetated buffers may not remove all pollutants and can not address large volumes of stormwater runoff. In fact, large peak flows may result in sediments and other pollutants that were previously trapped in the vegetated buffer to be carried into the wetland. For the wetland ecosystem to truly be protected from pollutants and extreme fluctuations in water levels, communities also need to address the issue of stormwater management.

Communities wishing to protect the functions and values of their wetlands may want to consider conducting an inventory of important local natural resources and habitats. A natural resources inventory may identify some wetland areas that are particularly valuable for ecosystem services, protection of water supplies, or recreational opportunities. RSA 482-A:15 provides an option for municipalities to protect their high value, or prime, wetlands. By conducting an assessment of the functions and values of their wetlands, municipalities can designate prime wetlands for a higher level of protection, increasing the likelihood that there will be no significant net loss of wetlands values.

Communities may designate prime wetlands based on their importance for 10 of the following 14 functions and values:

- Ecological integrity
- Wildlife habitat
- Finfish habitat
- Educational potential
- Visual/aesthetic quality
- Water-based recreation
- Flood control potential
- Groundwater use potential
- Sediment trapping
- Nutrient attenuation
- Shoreline anchoring and dissipation of erosive forces
- Urban quality of life potential
- Historical site potential
- Noteworthiness

Stormwater management and erosion and sedimentation control regulations ensure that stormwater runoff from roads and other developed areas is minimized and also receives some treatment before reaching areas such as wetlands.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

RSA 674:21 II, Innovative Land Use, grants administrative authority to a “person or board as the ordinance may designate” to review proposals and issue the conditional use permit. The model ordinance in this chapter has designated the conservation commission as the responsible administrative entity. Each municipality should designate the entity best suited to review projects seeking wetlands conditional use permits. There may be instances involving site plan or subdivision review where the process will benefit from concurrent review with the planning board. However, in most cases requiring site plan or subdivision review, the conditional use permit should be required prior to submission of the site plan or subdivision application.

ENABLING STATUTES

NH RSA 674:16, Grant of Power, provides the foundation of a municipality’s right to zone. RSA 674:16 clarifies that the power to adopt a zoning ordinance “...expressly includes the power to adopt innovative land use controls which may include, but which are not limited to, the methods contained in RSA 674:21.” Among the techniques listed in 674:21 is “environmental characteristics zoning.”

LOCAL JURISDICTION

Municipal boards occasionally hear arguments that state regulation of an activity precludes additional local review. This argument is false. Local regulations are preempted by state law only if they expressly contradict a state law, or run contrary to the legislative intent (Beliveau, 2006). Beliveau cites support for local wetland regulations from several recent New Hampshire cases: “[absent a clear manifestation of legislative intent to preempt a field, a municipality may enact an ordinance that neither conflicts with state legislation nor is itself unreasonable,” *Town of Hooksett v. Baines*, 148 N.H. 625, 627 (2002); and, “[A] municipality is not estopped from creating more restrictive rules for wetlands issues than those required by the [wetlands] board,” *Cherry v. Town of Hampton Falls*, 150 N.H. 720 (2004).

clear manifestation of legislative intent to preempt a field, a municipality may enact an ordinance that neither conflicts with state legislation nor is itself unreasonable,” *Town of Hooksett v. Baines*, 148 N.H. 625, 627 (2002); and, “[A] municipality is not estopped from creating more restrictive rules for wetlands issues than those required by the [wetlands] board,” *Cherry v. Town of Hampton Falls*, 150 N.H. 720 (2004).

LOCAL CONSIDERATIONS

It is important for planning boards and conservation commissions to carefully consider the municipality’s ability to implement and enforce an ordinance prior to proposing a particular approach.

A good wetlands map is important for local wetland regulations even when using a wetlands definition as the basis of the actual wetlands zoning district. National Wetlands Inventory maps and soils maps are useful indicators of the locations of larger wetlands in the community. These will help voters get a feel for how much of the community will be affected by the proposed ordinance at town meeting time, and will help the community implement the regulations later. Ideally a community with local wetland regulations should aim to conduct a local wetlands inventory. A digitized local inventory could be overlain with digital parcel boundaries and provide the basis for a wetlands overlay district map, reducing the need for mapping at the time of each permit application and so making it easier for both the landowner and regulator.

National Wetland Inventory maps do not show all wetlands. Short of field delineation, a combination of NWI maps and soils maps will best represent wetlands. For further information about wetlands inventories, see www.des.nh.gov.

EXAMPLES AND OUTCOMES

According to the 2007 survey by the NH Office of Energy and Planning (OEP), 111 New Hampshire communities currently regulate development in wetlands. The survey information posted on the OEP website showed that at least 62 of these communities also regulate development adjacent to the wetlands. The approach to the buffer area varies a great deal among communities. Some communities have incorporated the 100-foot buffer recommended in *Buffers for Wetlands and Surface Waters* (Chase *et al.*, 1997) as the effective distance for most water quality issues. Other communities regulate the activities in a buffer zone ranging from 25 feet to 125 feet to ensure that the functions and values of the wetland are protected. However, many communities, while requiring that buildings be set back 50 to 100 feet from the wetland, allow unregulated removal of vegetation and other potentially harmful activities in the buffer zone.

Lyme is an example of a community that has regulated activities adjacent to the wetland for many years. In a 100-foot buffer, only activities not involving structures or alteration of the land surface, such as forestry, agriculture, conservation and passive recreation, are permitted uses.

In Milford, while a buffer only 25 feet wide is protected around most wetlands, “peatlands” or bogs are protected with a buffer 100 feet wide.

Several communities, including Auburn, Bow, Rochester, Loudon and Windham, specifically address vernal pools in their zoning ordinances as well.

Model Language and Guidance for Implementation

WETLANDS CONSERVATION OVERLAY DISTRICT

I. TITLE AND AUTHORITY

- A. Title: The title of this district shall be the Wetlands Conservation Overlay District.
- B. Authority: This ordinance is adopted under the authority granted pursuant to RSA 674:16, Grant of Power, and RSA 674:21, Innovative Land Use Controls.

II. FINDINGS

The wetlands and buffers in the municipality of [_____] are a valuable natural resource requiring careful management to maintain their usefulness to public health, safety and welfare. The municipality of [_____] finds that wetlands and buffers:

- A. Prevent the destruction of, or significant changes to, those wetland areas, related water bodies and adjoining land which provide flood protection.
- B. Protect persons and property against the hazards of flood inundation by ensuring the continuation of the natural flow patterns of streams and other watercourses.
- C. Provide for nutrient attenuation and augmentation of stream flow during dry periods.
- D. Preserve and protect important wildlife habitat and maintain ecological balance.
- E. Prevent the expenditure of municipal funds for the purposes of providing and/or maintaining essential services and utilities which might be required as a result of abuse or inharmonious use of wetlands.
- F. Protect the wetlands, watercourses, surface and groundwater supplies and waterbodies of the town/city from degradation.
- G. Preserve and enhance those aesthetic values associated with the Wetlands Conservation Overlay District.

III. PURPOSE

The purpose of the Wetlands Conservation Overlay District is to protect the public health, safety and general welfare by promoting the most appropriate use of land and the protection of wetland ecosystems and water quality in accordance with the goals and objectives of the master plan.

IV. APPLICABILITY

All proposed development, removal of vegetation, and alteration of the land surface within the Wetlands Conservation Overlay District is subject to this ordinance.

Each community will need to review the definition of "development" contained in their zoning ordinance to ensure that the term, along with the removal of vegetation and alteration of the land surface, covers all activities that should be reviewed in the Wetlands Conservation Overlay District.

V. BOUNDARIES

A. The Wetlands Conservation Overlay District includes:

- Surface waters of the state.
- Wetlands of any size.
- Buffers 100 feet wide around bogs over 1,000 square feet, vernal pools over 500 square feet, wetlands of any size adjacent to open water, and all other wetlands over 40,000 square feet.

Some communities may want to limit the applicability of the ordinance to larger wetlands for administrative efficiency. Suggested thresholds are as follows:

- Wetlands of any size adjacent to surface water.
- Vernal pools over 500 square feet.
- Other wetlands over 1,000 square feet.

Be sure to review the DES Wetlands rules before proceeding with the ordinance. Wetland delineation (identification of wetland boundaries) requires a field-conducted evaluation of soils, hydrology and plants by a certified wetland scientist, unless exempted under New Hampshire law (RSA 310-A or RSA 482-A or administrative rules Env-Wt 100-800). Three indicators are used to identify wetlands:

1. The presence of water at or near the ground surface for part of the growing season.
2. The presence of hydric soils.
3. The predominance of plants that are adapted to living in saturated soils.

Current methodology required by DES Wetlands Bureau Rules, as of 2007, is the Wetlands Delineation Manual, (U.S. Army Corps of Engineers, January 1987).

B. Wetlands constructed for stormwater treatment, agricultural use, waste treatment or other such purpose are exempt from the provisions of the Wetlands Conservation Overlay District.

C. The Wetlands Conservation Overlay District Map, dated [_____], available at the (town/city office), is based on (reference National Wetlands Inventory map, hydric soils, or other source map) and provides a general indication of the location of the larger wetlands in the community.

Use the best available map as an indicator of wetlands. For some communities this will be the National Wetlands Inventory and soils maps together. The map should include a caveat that not all wetlands are shown.

D. Boundary Disputes. When a boundary of the Wetlands Conservation Overlay District is disputed by either the conservation commission or an applicant, the conservation commission, at the applicant's expense, may engage an independent certified wetlands scientist to determine the location of the Wetland Conservation Overlay District limit on the properties affected. The delineation shall be consistent with DES Wetlands Bureau Rules, as amended. The completion of a New England District Wetland Delineation Datasheet (US Army Corps of Engineers, 2000) by the certified wetland scientist can provide the appropriate level of documentation to address questions about the delineation. The conservation commission shall make the final determination of the wetlands limit based on its consultant's report. The Wetlands Conservation Overlay District Map shall be amended to incorporate the results of any such studies.

VI. DEFINITIONS

Adjacent: Bordering, contiguous, or neighboring. The term includes wetlands that directly connect to other waters of the United States, or that are in reasonable

proximity to these waters, but physically separated from them by man-made dikes or barriers, natural river berms, beach dunes, and similar obstructions.

Bog: A wetland distinguished by stunted evergreen trees and shrubs, peat deposits, poor drainage, and/or highly acidic soil or water conditions.

Buffer: The protected upland areas adjacent to wetlands and surface waters in the Wetlands Conservation Overlay District.

Certified Wetland Scientist: A person qualified to delineate wetland boundaries and prepare wetland maps who is certified by the State of New Hampshire Board of Natural Scientists, as defined by RSA 310-A:76, II-a.

Development: Any human-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, excavation or drilling activities.

Hydric Soils: Soils that are saturated or flooded during a sufficient portion of the growing season to develop anaerobic conditions in the upper soil layers.

Prime Wetlands: Those areas designated Prime Wetlands in accordance with RSA 482-A:15, and the N.H. Code of Administrative Rules Env-Wt 700.

Vernal Pool: A body of water, typically seasonal, that provides essential breeding habitat for certain amphibians and invertebrates, does not support viable fish population, and meets the criteria established by the New Hampshire Fish and Game Department, Nongame and Endangered Wildlife Program, *Identification and Documentation of Vernal Pools in New Hampshire*, rev 2004.

Surface Waters of the State: Pursuant to RSA 485-A:2.XIV, perennial and seasonal streams, lakes, ponds, and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses, and other bodies of water, natural or artificial.

Wetland: Pursuant to RSA 482-A:2.X, an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

VII. PERMITTED USES

The uses listed below are presumed to be consistent with the protection of wetland functions and values when in accord with the following and so are allowed in the Wetlands Conservation Overlay District without a Conditional Use Permit. These uses will not:

- Require the erection or construction of any structure.
- Alter the natural surface configuration by re-contouring or grading of the land.
- Involve filling, dredging, or draining of the wetland.
- Change the flow of water.
- Result in the pollution of the wetlands, surface water, or groundwater.
- Involve substantial clearing of vegetation, except for the purposes of agriculture or forest management in accord with current best management practices.

Permitted uses include:

- A. Passive recreation such as hiking, fishing, hunting on foot, non-motorized boating.
- B. Wildlife or fisheries management.
- C. Scientific research and educational activities.
- D. Agriculture in the wetland buffer, consistent with best management practices published by the NH Department of Agriculture, Markets and Food.
- E. Forest management in the wetland buffer, consistent with best management practices published by the NH Department of Resources and Economic Development and UNH Cooperative Extension.

The building/zoning permit application form should be revised to ask the applicant if the proposed activity or structure is located in a wetland or buffer.

VIII. PROHIBITED USES

The following uses may not be established or expanded within the Wetlands Conservation Overlay District:

- A. Structures, except as provided in section IX: Conditional Uses.
- B. Salt storage.
- C. Automobile junkyards.
- D. Solid or hazardous waste facilities.
- E. Use of fertilizer on lawns, except lime or wood ash.
- F. Bulk storage or handling of chemicals, petroleum products or hazardous materials.
- G. Sand and gravel excavations.
- H. Processing of excavated materials.
- I. Impervious surfaces, unless associated with a use approved as a Conditional Use.
- J. Activities which result in soil compaction such as parking vehicles or heavy equipment, unless associated with a use approved as a Conditional Use.
- K. Underground tanks.

IX. CONDITIONAL USES

All activities in the Wetland Conservation Overlay District not listed in Section VII, Permitted Uses, above are presumed to impair the wetland functions and values unless proven otherwise by the applicant as provided below. The following uses may be granted a Conditional Use Permit by the conservation commission:

- A. Accessory structures in the wetland buffer associated with legally preexisting primary structures if it is demonstrated that no practicable alternative exists elsewhere on the lot.

- B. The construction, repair, or maintenance of streets, roads, and other access ways, including driveways, footpaths, bridges, and utility right of way easements including power lines and pipe lines, if essential to the productive use of land adjacent to the Wetlands Conservation Overlay District. These uses shall be located and constructed in such a way as to minimize any detrimental impact upon the wetlands and consistent with state recommended design standards (see Fish and Game Department 2008), and only if no viable alternative is available.
- C. Agricultural activities consistent with best management practices as published by the NH Department of Agriculture Markets and Food.
- D. Forestry activities consistent with best management practices as published by the NH Department of Resources and Economic Development and NH Cooperative Extension. As specified in Logging Operations (Env-Wt 304.05), all skid trails, truck roads and log landings shall be located 50 feet from streams or ponds and designed using appropriate erosion control devices. Stream and wetlands crossings shall be kept to a minimum in size and number.
- E. Water impoundments for the purpose of creating a waterbody for wildlife, fire safety, or recreational uses. Conditional Use Permits may be granted for impoundments for on-site detention of stormwater runoff in buffers only.
- F. Disposal of snow and ice collected from roadways and parking areas.
- G. Other uses that the applicant proves will not interfere with the wetlands functions and values, water quality or value as wildlife habitat, pursuant to Section II.

According to DES, snow dumps should be located in flat areas adjacent to flowing surface water, such as streams and rivers, in order for salt to be diluted while allowing for collection and proper disposal of solids. See the fact sheet at www.des.nh.gov.

X. NONCONFORMING USES

Expansion of a nonconforming use or structure may be allowed by the zoning board of adjustment in the wetland buffer provided that the encroachment upon the wetland is not increased and review by the conservation commission finds that any potential increased impact upon the wetland functions will be mitigated.

XI. CONDITIONAL USE PERMIT

- A. Application for a Conditional Use Permit shall be made on forms supplied by the conservation commission and shall include a site plan containing the following information on one or more sheets at a scale of 1 inch = 100 feet or larger, and a report demonstrating compliance with the requirements listed below in Section XI.B:
 1. North arrow and date.
 2. Property lines.
 3. Locus map showing adjacent wetlands and other significant hydrological features.
 4. Names and addresses of abutting property owners and holders of conservation restrictions and easements.
 5. Wetland limit and wetland buffer.

6. Soil types.
 7. Vegetation types.
 8. Topographic contours at no greater than 5 foot intervals.
 9. Surface drainage patterns, intermittent and year-round.
 10. Existing and proposed development, removal of vegetation, and alteration of the land surface.
 11. Computation of the area to be impacted, in square feet of surface area and cubic yards of cut and fill.
 12. Stormwater management proposed during and after construction.
- B. The conservation commission shall consider all relevant facts and circumstances in making its decision on any application for a permit and shall make findings that the project is both consistent with the purposes of this ordinance and minimizes impacts to the wetland and buffers, including but not limited to the following:
1. The proposed activity minimizes the degradation to, or loss of, wetlands and wetland buffers, and compensates for any adverse impact to the functions and values of wetlands and wetland buffers, including but not limited to the capacity of the wetland to:
 - a. Support fish and wildlife
 - b. Prevent flooding
 - c. Supply and protect surface and ground waters
 - d. Control sediment
 - e. Control pollution
 - f. Support wetland vegetation
 - g. Promote public health and safety
 - h. Moderate fluctuations in surface water levels.
 2. The proposed activity will have no negative environmental impact to abutting or downstream property and/or hydrologically connected water and/or wetland resources, including:
 - a. Erosion
 - b. Siltation
 - c. Turbidity
 - d. Loss of fish and wildlife
 - e. Loss of unique habitat having demonstrable natural, scientific, or educational value
 - f. Loss or decrease of beneficial aquatic organisms and wetland plants.
 - g. Dangers of flooding and pollution.
 - h. Destruction of the economic, aesthetic, recreational and other public and private uses and values of the wetlands to the community.

3. The proposed activity or use cannot practicably be located otherwise on the site to eliminate or reduce the impact to the wetland or its buffer.
 4. The proposed activity utilizes applicable best management practices.
 5. Federal and/or state permit(s) have been received for the proposed activity in accordance with N.H. Administrative Rules Env-Wt 100-800 and the Federal Clean Water Act Section 404 Permit.
 6. Where applicable, proof of compliance with all other state and/or federal regulations has been received.
- C. The conservation commission, in acting on an application for a conditional use permit in the Wetlands Conservation Overlay District, may attach conditions to its approval including but not limited to requirements for more extensive buffers, additional plantings in areas to be revegetated, performance guarantees, and a reduction in proposed impervious surfaces.
- D. Prior to making a decision, the conservation commission shall afford the planning board an opportunity to provide comment, and shall consider any such comments provided.

XII. IDENTIFICATION OF BUFFER

The entire length of the upland limit of the wetland buffer shall be marked with highly visible construction tape prior to, and maintained for the full duration of, any construction-related activities. The applicant may also be required to place a permanent monument (e.g., iron pin, granite bound) at all points of the lot lines which intersect with the upland limit of the Wetlands Conservation Overlay District prior to such activities. These monuments shall be shown on the site plan submitted with the application. The applicant may also be required to affix tags to trees or other durable objects (e.g., 4" x 4" wood posts) at 50 foot intervals along the upland boundary of the Wetlands Conservation Overlay District, and maintain said tags as needed to provide evidence of the upland side buffer boundary. Tags shall be obtained from the municipality.

Figure 2.4.1 Examples of Buffer Identification Tags



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2.5 Protection of Groundwater and Surface Water Resources

BACKGROUND AND PURPOSE

Drinking water for public and private wells and municipal drinking water systems is derived from both groundwater and surface water. This chapter addresses groundwater and surface water separately by providing model ordinances for each. Both ordinances focus on the regulation of land use and the implementation of performance standards as the primary mechanisms to protect the quality of these resources. These model ordinances apply to designated geographic areas that comprise overlay districts superimposed over existing zoning districts. The purpose of these model ordinances is to preserve, maintain, and protect from contamination existing and potential groundwater and surface water drinking water supplies used by public water suppliers.

The *Model Drinking Water Ordinance for Protection of Surface Water Supply Areas and Sources* and its appendices follow the background section of this chapter.

The *Model Groundwater Protection Ordinance* can be downloaded from the N.H. Department of Environmental Services Drinking Water and Groundwater Bureau website at www.des.nh.gov.

TYPES OF WATER RESOURCES

In New Hampshire, public drinking water is supplied by both groundwater and surface water sources. These sources include bedrock aquifers (commonly known as deep or artesian aquifers), stratified drift aquifers (commonly known as sand and gravel aquifers), rivers, lakes and reservoirs. Groundwater is a critical natural and economic resource for communities, and it is the most frequently used source of drinking water in the State. Approximately 62 percent of New Hampshire residents rely on groundwater for their drinking water.

Bedrock Aquifers

Many communities utilize bedrock aquifers as a water supply source. These wells serve both public water suppliers and domestic or private users. In fact, most of the wells drilled in the state since the 1970s have been bedrock wells. In comparison to stratified-drift wells, bedrock wells are typically deeper, tend to have lower yield, and can have a variety of water quality concerns such as iron, manganese and arsenic.

RELATED TOOLS:

- Stormwater Management
- Erosion and Sediment Control During Construction

Stratified Drift Aquifers

Stratified drift aquifers are composed of coarse to fine unconsolidated sediment deposited by glacial meltwater and are found across the state. These aquifers have historically been and are in some communities, the principal high-yielding aquifers for community wells. Stratified drift deposits also are a valuable commodity, providing coarse aggregate material used for construction. Many communities have limited distribution of stratified drift aquifers with varying yields. For many areas, a large percentage of lands overlying these aquifers have already been developed, making these aquifers of limited use to accommodate future water needs.

Surface Water Sources

New Hampshire has approximately 60 surface waters (rivers, lakes, ponds, reservoirs) currently used as a public water supply source. These surface water sources – or water supply watersheds – serve approximately 38 percent of the state’s population or 494,000 people, and the watersheds that provide these sources comprise 80 percent of the state. As a result, nearly all water supply watersheds extend beyond the communities that they serve.

ENSURING THE QUALITY OF PUBLIC AND PRIVATE DRINKING WATER SUPPLIES

Public water systems, whether they derive their water from groundwater or surface water sources, have specific federal and state regulatory monitoring, treatment, and operating requirements to ensure the quality of drinking water. In contrast, private wells that serve homes (or those wells not considered a public water supply source) typically have no monitoring requirements except when first drilled and put into use.

Public Water Systems

The N.H. Department of the Environmental Services Drinking Water and Groundwater Bureau (DWGB) administers New Hampshire’s Drinking Water Source Protection Program, which provides regulatory oversight and non-regulatory assistance to protect groundwater and sources of public and private drinking water. The DWGB also works to ensure the protection, responsible development and use of the ground water and surface waters of the state. The program is responsible for permitting new sources of drinking water, improving protection of existing sources, and ensuring adequate quantity and quality of drinking water. In New Hampshire, “very small” water systems (serving fewer than 500 persons) comprise 95 percent of the public water systems. A public water system is defined by DES as “a piped water system having its own source of supply, serving 15 or more service connections or designed to serve an average of at least 25 or more people for 60 or more days each year.” Public water systems are divided into three categories:

- **Community Systems** include municipal, apartment/condominium complexes, and mobile home parks (resident population).
- **Non-Community/Non-Transient Systems** includes schools, daycare facilities, year-round office buildings, commercial and industrial, and businesses with permanent employees (serving the same non-resident population each day).

- **Non-Community Transient Systems** include restaurants, motels, hotels, ski areas, beaches, and campgrounds (serving different people each day).

The state has approximately 2,416 public water systems that serve about 65 percent of the total state population, or approximately 850,000 people. Of these public water systems, 30 percent are community systems, 19 percent are non-transient, non-community water systems, and 51 percent are transient systems. (NH DES 2008)

Private Drinking Water Wells

Private wells supply drinking water to about 35 percent of the population of New Hampshire, but are not regulated or monitored for water quality by state and federal agencies. Although both public water systems and private drinking water wells derive water from groundwater sources (bedrock, stratified drift, and shallow surface aquifers), routine monitoring of water quality is not regulated by DES for private drinking water wells. New private drinking water wells must be registered with DES and a few communities require water quality and quantity testing as a condition of a local well permit or building/occupancy permit. However, in most instances, if not all, there are no local requirements for subsequent monitoring of water quality or water quantity of private drinking water wells. For all private wells, DES recommends regular water testing of certain contaminants. Visit DES's website www.des.nh.gov for more details.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Sustainability of existing development and accommodation of future growth will largely depend upon development of water resource protection plans at the local level, using the best available technical data and analytical tools to support these plans.

WATER RESOURCES TECHNICAL DATA AND TOOLS

Information valuable for comprehensive water resource protection includes: inventory and map of existing groundwater (bedrock aquifers and stratified drift aquifers) and surface water resources; capacity analysis of existing water supply use and future water demands; and water quality data for existing public and private drinking water wells. The following data sources serve as a fundamental and objective scientific foundation on which land-use, water-use, and resource-use decisions and planning can be based.

USGS Stratified Drift Aquifer (SDA) Maps

The UNH GRANIT GIS system has statewide coverage of stratified drift aquifer deposits, including technical and spatial information about where these aquifers are, how much capacity they have, and the general water quality conditions in a given area. The GRANIT SDA maps are based on a statewide study conducted by the USGS in cooperation with the state in the late 1980-1990s. The detailed reports and maps produced are available from the USGS website http://nh.water.usgs.gov/Publications/biblio_subj.htm.

Surficial Geologic Maps (U.S. Geological Survey and N.H. Geological Survey)

New Hampshire's surficial geologic maps depict the surface distribution, orientation, and structural features of earth materials. The information in these maps can be used to refine the SDA map information. Maps can be viewed and ordered from www.des.nh.gov.

Bedrock Well-Yield Probability Assessment (U.S. Geological Survey)

The U.S. Geological Survey assessed the bedrock aquifer throughout the state in the mid-late 1990s. The purpose of the study was to identify potential high-yielding areas of ground water and determine the quality of water from this source. Products from the study include a statewide bedrock yield model for high yielding wells, lineament and fracture trace maps for all areas of the state, and a summary of bedrock water quality by major groupings of bedrock geologic units. The probability model is designed to show yield areas based on a random placement of wells. High yield wells can be found in every rock type in New Hampshire if specialized exploration methods are employed. Additionally, one of the data sets used to derive the model is the published bedrock geologic map of New Hampshire, which represents the geology at the 1:250,000 scale. Thus, the probability map is limited in its use by this generalized representation of the state's geology. However, the results of the study can provide information useful to communities, as well as to regional and state planners, as a planning tool suitable for community level analysis or resource inventory. The bedrock aquifer yield potential mapping tool and more information are available at <http://nh.water.usgs.gov/projects/nhwellyieldprob>.

One Stop Data Retrieval

The DES maintains an inventory and database of all public (permitted through DES) and private drinking water wells in each New Hampshire community. DES maintains several databases, one of which includes the following information about public water supplies: well type, category, status, population served, service connections, laboratory sample analysis results and reports, licenses and applications, operator contact information, and sampling schedule with results. The database is located at www2.des.nh.gov/OneStop/Public_Water_Systems_Query.aspx.

Web-based Geographic Information System

This GIS database includes various regulated uses and potential point source contamination sites, conservation lands, hazardous waste generators, local resource protection priorities, non-point sources, National Pollutant Discharge Elimination System (NPDES) outfalls, remediation sites, and watershed information. The database is located at www2.des.nh.gov/gis/onestop/.

LOCAL PLANNING INITIATIVES RELATED TO WATER SUPPLY

The following steps are recommended to accomplish comprehensive protection of public drinking water supplies on the local level. Technical and financial assistance is available from DES's Drinking Water Source Protection Program to accomplish these steps.

Step 1. Collect and evaluate information related to existing sources of drinking water supplies (private and/or public) in your community or region; identify issues related to the total quantity and quality of existing water supplies (e.g. growing water consumption); locate local studies concerning future water supplies; evaluate gaps in protections (e.g. existing ordinances, regulations, and plans); identify potential natural and manmade contaminants in local surface and ground waters; evaluate whether they influence the viability of a particular source, and identify long-term public health risks.

Source Water Assessments have been completed by DES to evaluate the existing threats to public water systems in New Hampshire. Visit www.des.nh.gov or a list of water systems and assessment in your community.

Step 2. Develop a Water Resources Chapter in the local master plan that addresses the topic in a comprehensive manner, including an inventory of groundwater and surface water resources, with emphasis on the connection between drinking water supply, and wetlands, lakes, ponds and streams.

Step 3. Develop a Drinking Water Source Protection Plan that identifies long-term water supply protection and management issues and options. A source protection plan consists of the following basic elements: 1) an inventory of potential contamination sources (PCSs); 2) an assessment of risks posed by these PCSs; 3) a management plan to minimize risks to the water source(s); and 4) a contingency plan for responding to emergency loss of the water supply. A source protection plan is an important tool in source water protection because it sets priorities for actions to take in protecting a water source. Actions taken by water system management, surrounding landowners, and the larger community are key to achieving comprehensive protection.

Step 4. Adopt a Groundwater and/or Surface Water Protection Ordinance that balances land development with water supply protection needs; limits high-risk uses; establishes a district boundary based upon technical studies delineating watersheds, stratified drift aquifers, or wellhead protection areas; and requires buffers and setbacks, measurable performance standards related to stormwater management and control of regulated substances.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

FEDERAL SAFE DRINKING WATER ACT

DES has primacy authority to regulate public drinking water systems in the state under both the federal and state Safe Drinking Water Acts. The federal Safe Drinking Water Act applies to every public water system in the United States but does not regulate private wells. The 1996 amendments to the Act greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water protection.

A “primacy state” refers to a state that has the responsibility and authority to administer federal drinking water regulations within its borders, and must have rules for drinking water protection at least as stringent as EPA’s.

NEW HAMPSHIRE SAFE DRINKING WATER ACT

The New Hampshire Safe Drinking Water Act (RSA 485:3) establishes authority for DES to adopt drinking water rules and primary drinking water standards, which

apply to all public drinking water systems for the protection of public health. Through its Drinking Water Source Protection Program, DES provides guidance and assistance to water suppliers and municipalities to protect groundwater and surface water sources for public water systems. The program emphasizes prevention of contamination of drinking water through better management of potential contamination sources, land conservation, local land use controls, and public education.

Under RSA 485:23, water suppliers, local boards of health, local health officers, and citizens may petition DES to adopt rules to protect a particular water supply source. Under this section of the Act, DES has adopted rules to protect half of the state's 60 surface water supply sources. As noted above, the watersheds of most surface water sources extend beyond the municipalities they supply; hence, protecting the watersheds through state rules is sometimes more appropriate and effective than relying on local ordinances. DES's goal for these rules is to balance the desire to protect water supplies with the desire to accommodate other existing uses and address threats specific to the water supply source. To that end, DES published *Model Rule for the Protection of Water Supply Watersheds* in 2000 to help water suppliers and local officials craft proposed rules for DES's consideration. Once the rules are adopted by DES, local officials have a role in their enforcement. (NH DES 2006a).

NEW HAMPSHIRE GROUNDWATER PROTECTION ACT

The New Hampshire Groundwater Protection Act (RSA 485-C) was adopted to protect the natural quality of the groundwater resource of the state for drinking water supply. This is accomplished by assisting local groundwater protection efforts and by establishing procedures and standards for the classification and remediation of groundwater, and provides for consistent, protective management and remediation of groundwater affected by regulated contaminants. DES developed and adopted N.H. Code of Administrative Rules Part Env-Wq 401 Best Management Practices for Groundwater Protection, which apply to all potential contamination sources in the state. The BMPs in the rules are essentially common-sense structural and operating practices that should be adopted by all entities that use regulated substances (e.g. oil, regulated contaminants) as defined in Env-Wq 401. The purpose of the BMPs is to help prevent a release of regulated substances, particularly into a high value water resource.

New Hampshire's Groundwater Protection Act, passed by the state legislature in 1991, is enabling legislation for local entities (e.g., water suppliers, town boards) that choose to play a role in actively managing threats (potential contamination sources) in order to protect valuable groundwater. Under the Act, all groundwater may be classified into one of four classes: GAA classification, the most protected class, includes groundwater contributing to public water supply wells (wellhead protection areas). Within GAA areas, six high risk land uses are prohibited and local entities must develop a management program that includes regular on-site inspections and distribution of educational materials to potential contamination sources (PCSs); GA1 classification allows local entities to identify valuable groundwater resources they want to protect via management of potential contamination sources; GA2 classification includes high-yield stratified drift aquifers mapped by the USGS that are potentially valuable sources of drinking water; and GB classification includes all groundwater not in a higher classification. Within areas reclassified to GAA or GA1, local health officers may enforce best management practices within state administrative rule Env-Wq 401 that apply to regulated substances (e.g. oil, regulated contaminants). Reclassification allows protection to be applied across multiple communities according to the resource's boundaries. (Refer to www.des.nh.gov/reclass.htm.)

MODEL DRINKING WATER ORDINANCE FOR PROTECTION OF SURFACE WATER SUPPLY AREAS AND SOURCES

The purpose and the approach of the model ordinance presented in this section are similar to those of DES's *Model Rule* described above under New Hampshire Safe Drinking Water Act. Both DES's model rule and the model ordinance focus on prohibiting certain activities on the water supply source and on restricting land uses within buffer zones around the source and its tributaries. The model ordinance would be useful in situations where the ordinance, in combination with other local controls and protections, would provide adequate protection. In situations where local controls and other existing protections would not be sufficient to adequately protect the source, the model rule should be considered.

Model Groundwater Protection Ordinance

DES and the OEP published in 1998 (and revised in 2006) a *Model Groundwater Protection Ordinance* as a tool for communities to protect groundwater resources. The model ordinance was designed for the protection of aquifers as well as other locally important groundwater, such as wellhead protection areas. The model recommends that before adopting a groundwater protection ordinance, communities should address water resources (groundwater and surface water) in their master plan and where applicable in their community facilities/capital improvements program. The model provides an alternative to a strictly regulatory approach based solely on local use restrictions by including provisions for inspections, measurable performance standards for best management practices and stormwater treatment, and protection of selected groundwater resources that serve as drinking water supplies to ensure the necessary resources can be focused in these areas.

EXAMPLES AND OUTCOMES

CASE STUDY: HOLLIS, NEW HAMPSHIRE

In 2006, the town of Hollis received the DES Source Water Protection Award for its exemplary zoning ordinance overlay districts that protect local groundwater and surface water, as well as protection of conservation lands, a private water well testing program, and protection of the regional drinking water supply. Hollis's Aquifer Protection Overlay Zone provides protection for all of the town's mapped stratified drift aquifer areas. The overlay identifies 13 high-risk land uses that are prohibited, and all permitted uses must implement best management practices and meet specific performance standards for groundwater protection. The Hollis Water Supply Protection Zone further limits land use over the aquifer serving both public and private drinking water wells. The Wetland Conservation Zone protects a 100-foot buffer around wetlands and surface waters, and includes a significant portion of the streams and wetlands in the watershed for Pennichuck Brook, the main water source for Nashua and portions of the surrounding towns. The town also conducted a ground water study (with the N.H. Geological Survey) to locate well records and collect samples, which were compiled to create a comprehensive groundwater water quality database to provide information about arsenic, road salt and the geology of the local aquifers. (NH DES 2006)

Communities should modify DES or other "model" guidance and apply needed protections to both public and/or private water supplies based upon existing or future threats. Information concerning natural (arsenic, radon) or anthropogenic threats (source threat assessments for public water supplies) is available from DES at www.des.nh.gov/dwspp/

CASE STUDY: NEWMARKET, NEW HAMPSHIRE

Newmarket adopted an Aquifer Protection District and Wellhead Protection District ordinance to protect groundwater resources. The Aquifer Protection District for Groundwater Protection includes all stratified-drift aquifer areas and contains the following innovative groundwater zoning protections: compliance with Env-Wq 401 Best Management Practices rules for preventing groundwater pollution; incentives for open space and low-impact development; prohibiting high-risk land uses; requiring environmental performance standards; increased minimum lot size and reduced density where septic systems are used; limits on impervious surface coverage; and limiting on-site hazardous materials. The ordinance includes: a ban on new commercial excavation and underground storage tanks containing petroleum products within the wellhead protection area; and requirement for a build-out analysis and a hydrogeologic study for large developments. (NH DES 2007)

CASE STUDY: PEMBROKE, NEW HAMPSHIRE

Pembroke established an Aquifer Conservation District (ACD) and associated zoning by-laws to “protect, preserve, and maintain existing and potential groundwater supply and ground water recharge areas within known aquifers from adverse development, land use practices, or depletion.” Pembroke Water Works utilizes high capacity gravel packed wells located in shallow aquifers along the Suncook and Soucook Rivers. Among other requirements, the by-laws expressly prohibit subsurface storage of petroleum and refined petroleum products as well as limiting the area of impervious surfaces within the ACD. The ACD boundaries are coincident with the aquifer mapping completed by USGS in cooperation with the DES. As mapping quality improves, the town of Pembroke adjusts its ACD to accurately delineate aquifer boundaries. The entire aquifer is covered by the ordinance so that future supplies as well as current water supplies are protected. In addition, Pembroke applied to the DES to reclassify its wellhead protection areas as GAA, the highest level of protection afforded under state groundwater reclassification. The DES approved the reclassification in January of 1997. GAA classification requires an active inventory, inspection, and management of potential contamination sources (PCSs are defined in RSA 485), limits six high-risk land uses within areas contributing water to the town’s wells and provides Pembroke with local authority to enforce Env-Wq 401 rules at PCSs.

Refer to the margin note under “New Hampshire Groundwater Protection Act” for an explanation of groundwater classification.

Model Language and Guidance for Implementation

MODEL DRINKING WATER ORDINANCE FOR PROTECTION OF SURFACE WATER SUPPLY AREAS AND SOURCES

I. AUTHORITY

The Town or City of Name hereby adopts this Ordinance pursuant to the authority granted under RSA 674:16, II and RSA 674:21, relative to innovative land use controls and RSA 147:1, relative to local health regulation.

II. PURPOSE

The purpose of this ordinance is, in the interest of public health, safety, and general welfare, to preserve, maintain, and protect from contamination existing and potential drinking water supply areas and sources, and surface water bodies that are hydrologically connected to them. The purpose is to be accomplished by regulating land uses, which have potential to contribute pollutants to designated surface water supply areas and sources identified as being needed for present and/or future public water supply, and to maintain the Water Quality Goals as identified in Env-Ws 310.

III. APPLICABILITY

This Ordinance applies to all uses in the Drinking Water Protection District, except for those uses exempt under Article XI Exemptions of this Ordinance.

IV. DEFINITIONS

Best Management Practices (BMPs): A practice or combination of practices determined to be the most practicable means of preventing or reducing, to a level compatible with water quality goals, the amount of pollution generated by nonpoint sources. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.

Disturbance: Any alteration to or reconfiguration of the land surface such as, but not limited to, excavating, clearing, grading, cut and fill.

Drinking Water Supply: Water extracted from a stream, river, lake, pond, or reservoir used as a public drinking water supply, as defined under RSA 485:1-a.

Grandfathered Parcel or Lot: A parcel or lot of record shown on a plan recorded at the ___ Register of Deeds at the time of adoption of this Ordinance.

Hazardous Waste: (As defined under RSA 147-A) A solid, semi-solid, liquid or contained gaseous waste, or any combination of these wastes:

1. Which, because of either quantity, concentration, or physical, chemical, or infectious characteristics may:

The Model Groundwater Protection Ordinance is available online at www.des.nh.gov/dwspp.

The ordinance's restrictions on activities on surface waters are adopted pursuant to the local authority to adopt health regulations. In order for these restrictions to take effect, the ordinance must be approved by the selectmen, etc. as prescribed in RSA 147:1, I., in addition to being adopted by the local legislative body as with other land use ordinances.

- a. Cause or contribute to an increase in mortality or an increase in irreversible or incapacitating reversible illness; or
 - b. Pose a present or potential threat to human health or the environment when improperly treated, stored, transported, disposed of or otherwise mismanaged.
2. Or which has been identified as a hazardous waste by the department using the criteria established under RSA 147-A:3, I or as listed under RSA 147-A:3, II. Such wastes include, but are not limited to, those which are reactive, toxic, corrosive, ignitable, irritants, strong sensitizers or which generate pressure through decomposition, heat or other means. Such wastes do not include radioactive substances that are regulated by the Atomic Energy Act of 1954, as amended.

Impervious Surface: A hard surface area that either prevents or retards the entry of water into the soil profile as under natural conditions prior to development and/or a hard surface area that causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development.

Personal Watercraft: A gasoline powered sailboat, powerboat, jet-ski, barge, raft, inflatable craft, or other floatable device.

Primary Buffer Protection Zone: The area within 300 feet of the seasonal high water mark of a waterbody actively used as a surface water supply and the area within 100 feet of the reference line of all contributing perennial surface waterbodies (see Figure 2.5.1).

Qualified Professional: A person knowledgeable in the principles and practices of erosion and sediment control, and stormwater management, such as but not limited to a licensed professional engineer, soil scientist, Certified Professional in Erosion and Sediment Control (CPESC), Certified Professional in Storm Water Quality (CPSWQ), or another professional with experience in the principles and practices of erosion and sedimentation control and stormwater management working under the direction and supervision of a qualified professional.

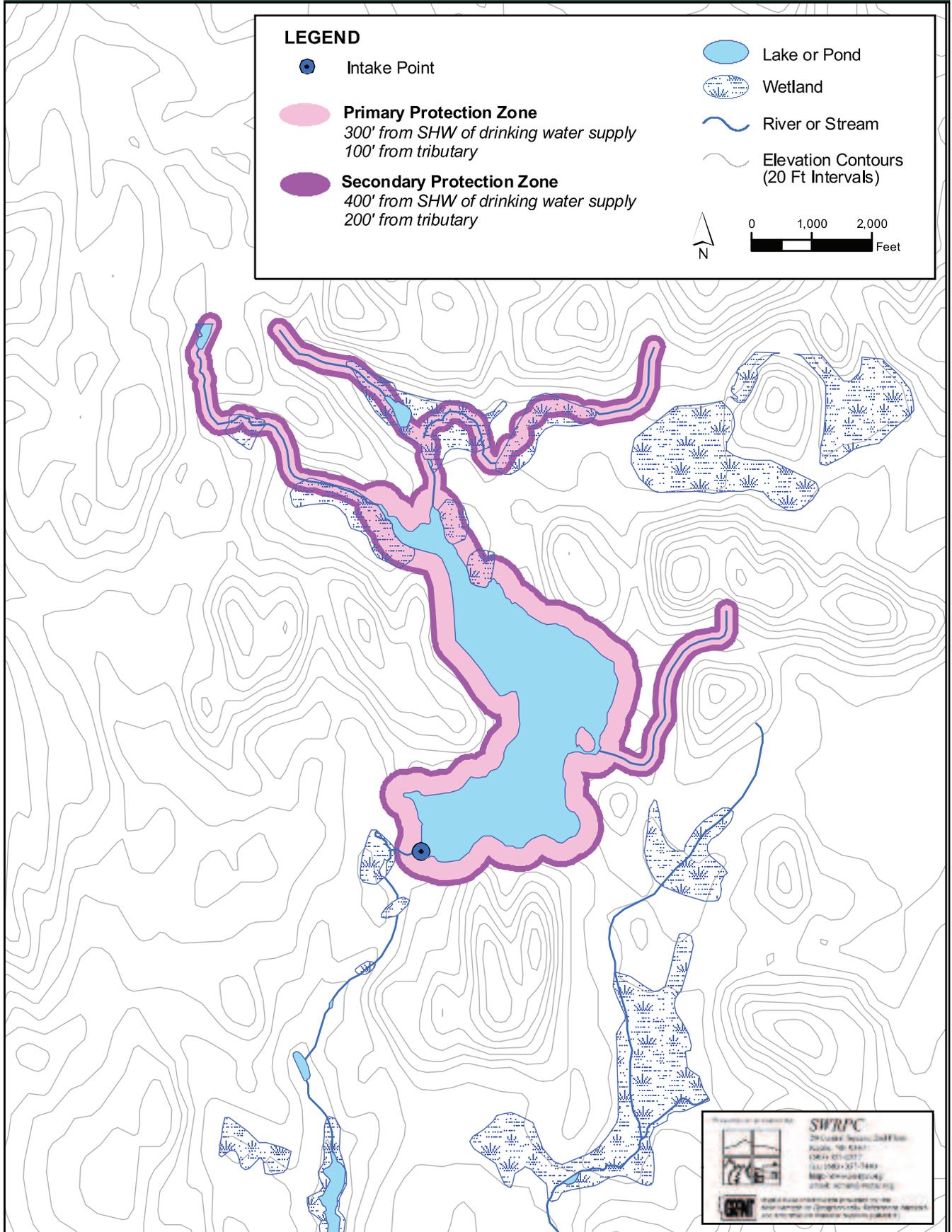
Regulated Substance: (defined in New Hampshire Administrative Rule Env-Wq 401) Any of the following, with the exclusion of ammonia, sodium hypochlorite, sodium hydroxide, acetic acid, sulfuric acid, potassium hydroxide, and potassium permanganate:

1. Oil as defined in RSA 146-A:2, III.
2. Any substance that contains a regulated contaminant for which an ambient groundwater quality standard has been established pursuant to RSA 485-C:6.
3. Any substance listed in 40 CFR 302, 7-1-05 edition.

Reference Line: (defined in RSA 483-B:4, XVII):

1. For natural fresh water bodies without artificial impoundments, the natural mean high water level as determined by the Department of Environmental Services.

FIGURE 2.5.1 Drinking Water Supply Primary and Secondary Protection Zones



2. For artificially impounded fresh water bodies with established flowage rights, the limit of the flowage rights, and for water bodies without established flowage rights, the waterline at full pond as determined by the elevation of the spillway crest.
3. For coastal waters, the highest observable tide line, which means a line defining the furthest landward limit of tidal flow, not including storm events, which can be recognized by indicators such as the presence of a strand line of flotsam and debris, the landward margin of salt tolerant vegetation, or a physical barrier that blocks further flow of the tide.
4. For rivers, the ordinary high water mark.

Secondary Buffer Protection Zone: The area between 300-400 feet of the seasonal high water mark of a water body actively used as a surface water supply, and the area within 100-200 feet of the reference line of all contributing perennial surface waterbodies.

Surface Water Supply: Water that is extracted and treated from sources open to the atmosphere, such as rivers, lakes, and reservoirs.

Water Body: Any flowing water confined in a channel or concentrated overland flow and any standing body of water in a topographic depression that persists annually and for at least several months during the year.

Wetland: An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions (RSA 482-A:2).

V. DRINKING WATER PROTECTION DISTRICT

- A. The provisions of this Ordinance shall apply to land uses and activities and expansion or alteration of existing nonconforming uses and activities identified as possible sources of contamination within areas designated as the Drinking Water Protection District (District). The regulation of land use and activities within the District is essential to protect existing or potential surface water supply areas and sources from the effects of point source and non-point source pollution and sedimentation.
- B. **Drinking Water Protection District Boundary.** Within Town/City [Name], the Drinking Water Protection District is an overlay district, which is superimposed over the underlying zoning district and includes within its boundaries. The District is shown on the map entitled, Town/City of [Name] Drinking Water Protection District, dated [date adopted] and includes the following:
 1. The contributing perennial surface waters to the drinking water supply source.
 2. The Primary and Secondary Buffer Protection Zones as defined under Article IV Definitions of this Ordinance.
 3. The surface water body [insert name of stream, river, lake, pond, or

reservoir] used as a public drinking water supply source, as defined under RSA 485:1-a.

- C. All surface water bodies within the District shall be accurately delineated on each parcel or lot using the best available data or site evaluation methods for all activities regulated under this Ordinance.

The scientific literature suggests that common non-point source pollutants (i.e. nutrients, metals, pathogens) require a natural vegetated buffer of between 100-300 ft to attenuate those pollutants associated with land use development. Application of buffers to first and second order streams, as well as larger tributaries, has been shown to be essential to overall watershed water quality; thus buffer protection is extended to all perennial tributaries. Given varying natural buffer conditions, such as slope, soil type or land cover as well as the nature of the proposed land use, the buffer distances necessary to protect drinking water supplies may vary. Three hundred feet is suggested as a buffer distance along the shoreline of a surface water drinking water supply as that distance would attenuate most common non-point source pollutants. A secondary buffer extending from 300 to 400 from the water supply's shoreline limits certain higher risk land uses.

VI. PRIMARY AND SECONDARY BUFFER PROTECTION ZONE REQUIREMENTS

The Primary and Secondary Buffer Protection Zones are established to protect the water quality of the drinking water supply source and all of its perennial tributaries, while permitting limited uses within the designated Primary and Secondary Buffer Protection Zones. The Primary and Secondary Buffer Protection Zones are intended to protect water quality by maintaining an undisturbed vegetated area and otherwise limiting land use in the area surrounding surface waters used for drinking water supply and perennial surface waters that contribute to the drinking water supply. All permitted uses and activities within the Primary and Secondary Buffer Protection Zones must comply with Article VIII Performance Standards unless specifically exempt under Article XI.

- A. The following uses and activities are prohibited on surface waters or on the ice of water used for drinking water supply that are protected under this Ordinance:
1. Gasoline powered boats, snowmobiles, ATVs or any other gasoline powered personal watercraft.
 2. Fishing, ice fishing, wading, swimming, bathing, water skiing or any similar water contact activity.
 3. Placement of any hazardous waste or regulated substances of any sort left in water or otherwise able to enter the water supply.
 4. Placement of waste, trash or refuse of any sort left in water or otherwise able to enter the water supply.
- B. The following uses and activities are permitted within the Primary Buffer Protection Zone of the Drinking Water Protection District. All Permitted Uses and Activities must comply with Article VIII Performance Standards unless specifically exempt under Article XI. All other uses and activities are prohibited in the Primary Buffer Protection Zone.

1. Uses and activities that provide for conservation of soil, water, plants, and wildlife.
 2. Outdoor recreation, nature study, non-motorized boating, shoreline fishing, and hunting where otherwise legally permitted.
 3. Foot and/or bicycle paths, and bridges designed for such uses; horse paths providing these are no closer than 50 feet to surface waters.
 4. Normal operation and maintenance of existing water bodies and dams, and other water control, supply and conservation devices.
 5. Maintenance and repair of any existing structures.
 6. Agriculture, forestry, and grazing, provided that a 50-foot non-disturbance zone is maintained along all waterbodies, and is conducted in compliance with best management practices in Manual for Best Management Practices (BMPs) for Agriculture in New Hampshire (reprinted April 2002).
 7. Construction, maintenance, repair and enlargement of drinking water supply related facilities such as, but not limited to, wells, pipelines, aqueducts and tunnels.
- C. The following uses and activities are prohibited within the Secondary Buffer Protection Zone of the Drinking Water Protection District:
1. Activities or uses that cannot prevent, through the design or use of best management practices, the untreated release of any regulated substance.
 2. Storage, use, treatment or disposal of hazardous waste as defined under RSA 147-A.
 3. Storage, use, treatment or disposal of a solid waste or sludge facility.
 4. Outdoor storage of road salt or other deicing chemicals in bulk.
 5. Salvage or reclamation yards, including but not limited to automobiles, appliances, home electronics and construction waste.
 6. Snow dumps or long-term storage or stockpiling of snow.
 7. Wastewater or septage lagoons.
 8. Animal feedlots and manure storage, unless in compliance with Agricultural Best Management Practices Manual as referenced above in B.6.
 9. Petroleum, fuel oil and heating oil bulk plant, stations or terminals.
 10. Gasoline stations.
 11. Sewage disposal systems and treatment systems.
 12. Housing, grazing, or other maintenance of livestock.
 13. Commercial (non-agricultural) application of pesticides, herbicides, and fertilizers.

- D. Enlargement or intensification of an existing non-conforming use shall not be permitted in the Primary Buffer Protection Zone. Existing uses, which are nonconforming under this ordinance, may continue until the use ceases to exist or the use is discontinued for a period of two years. Existing nonconforming uses shall operate in conformance with Article VIII Performance Standards. Within the Drinking Water Protection District, an existing nonconforming use shall not be changed to another nonconforming use.
- E. All lands within the Primary Buffer Protection Zone that are part of a subdivision or development project or activity requiring approval under this ordinance shall be identified on an approved subdivision plat or site plan and shall be preserved in a natural state (undisturbed and undeveloped) through a declaration of protective covenant as a “Water Supply Protection Zone.” Such covenant shall be submitted to the Planning Board for review and approval, shall be recorded with the approved subdivision plat or site plan at the Country Registry of Deeds, and shall run with the land and continue in perpetuity.

VII. CONDITIONAL USE PERMIT

A. Grant of a Conditional Use Permit

A Conditional Use Permit from the planning board shall be required for certain permitted uses and activities within the Primary and Secondary Buffer Protection Zones.

1. The following uses occurring wholly or partially within the Drinking Water Protection District shall, where permitted under Section VI, require the grant of a Conditional Use Permit by the planning board:
 - a. Land disturbances greater than 10,000 square feet of land.
 - b. Enlargement, alteration or intensification of an existing non-conforming use or structure.
 - c. Storage, handling, and use of regulated substances in quantities greater than household quantities (greater than five gallons).
2. In granting a Conditional Use Permit, the planning board must determine that the applicant has met all requirements of Article VIII Performance Standards, as well as all applicable local, state and federal permitting requirements.
3. In granting a Conditional Use Permit, the planning board may impose conditions to the extent the Board concludes such conditions are necessary to minimize any adverse effect of the proposed use or activity upon surface waters, consistent with the intent of this ordinance, and to ensure compliance with state and federal drinking water quality standards.
4. In granting a Conditional Use Permit, the planning board may reduce the required buffer zone to reflect site-specific features such as topography, highly permeable soils or areas that provide significant water quality protection for the drinking water supply source and its tributaries.

5. **Primary Buffer Protection Zone Reduction:** A reduction in the required Primary Buffer Protection Zone width down to an absolute minimum of 75 feet may be granted by the planning board upon presentation of technical and water quality information that provides sufficient justification that even with the reduction, the protection afforded would be the same as that provided by the full-width buffer.
6. **Performance Guarantee:** The planning board may, at its discretion, require a performance guarantee or bond, in an amount and with surety conditions satisfactory to the board, to be posted to ensure completion of construction of any facilities required for compliance with the Performance Standards.
7. **Conditional Use Standards.** A Conditional Use Permit application shall be evaluated by the planning board and/or their consultant, in terms of meeting the following standards to ensure that:
 - a. The use or activity, at any point in the development process, shall not result in degradation of the drinking water supply.
 - b. The use or activity will not result in a violation of state drinking water quality standards as defined under Env-Ws 310.
 - c. Non-point source pollution is minimized through implementation of Low Impact Development (LID) techniques.
 - d. Best available technology and stormwater treatment systems address expected non-point source pollutants.
 - e. Structural or operational best management practices are designed to remove or neutralize pollutants that present a potential impact to surface waters within the Drinking Water Protection District.
 - f. Grading and removal of vegetation is minimized, and erosion and sediment control measures (temporary during development and permanent post-development) are properly designed and appropriately placed to minimize erosion and maximize sediment control.
 - g. Subsurface disposal systems (tanks, leachfields) are in compliance with state rules and will only receive residential domestic wastewater. (Note: The planning board may require inspection of existing subsurface disposal systems to ensure proper function in compliance with state rules.
 - h. All businesses using regulated substances are in compliance with Env-Wq 401 and will not expose regulated substances to precipitation.

B. Application and Review Requirements for Issuance of a Conditional Use Permit

1. **Applicability.** A Conditional Use Permit application shall be submitted to the planning board for review for uses and activities described in Article VI.

Such application shall include a copy of any application for a building permit, a site plan review, or a subdivision of land, occurring wholly or partially in the Drinking Water Protection District.

2. **Application Requirements.** A Conditional Use Permit application shall be accompanied by the following information.
 - a. A site plan and description of the size and density of the proposed project, use or activity including the location and extent of impervious surfaces and all land disturbance; existing site conditions including topographic, hydrologic, historic, and vegetative features; and all plans shall identify and label the Primary and Secondary Buffer Protection Zones.
3. **Additional Information.** For uses or activities that disturb greater than 20,000 square feet or pose a high risk to water quality within the district, the planning board may request the following additional information:
 - a. Characteristics of natural and/or man-made drainage on the site and projected runoff from the proposed project area or activity, including rate and chemical characteristics of runoff deemed necessary to make an adequate assessment of both pre-development and post-development water quality.
 - b. Measures proposed to be employed to reduce the rate of runoff and pollutant loading of runoff from the project area, both during and after construction.
 - c. Proposed runoff control and surface water protection measures for the project area or activity. These measures shall be designed with the goal of ensuring the rate and volume of surface water runoff from the site does not exceed pre-development conditions.
 - d. Where existing or planned off-site stormwater quality management facilities are proposed to be utilized, the applicant shall provide a written certification that the owner of the off-site facilities will accept runoff and be responsible for its adequate treatment to a level acceptable to the planning board and/or their consultant.
4. **Bonds.** For projects requiring a Stormwater Management Plan and Erosion and Sedimentation Control Plan, the planning board may request a bond as a condition of approval in an amount determined by the Planning Board, which may be held for up to 12 months after final certificate of occupancy is issued. Such bond will ensure:
 - a. Proposed stormwater management controls are installed as approved.
 - b. Stormwater management controls function properly.
 - c. Performance of routine inspections during and after construction and any necessary maintenance of structures and facilities included in the approved site plans or subdivision plans.

Expansions or redevelopment of areas with preexisting soil contamination problems (referred to as “brownfields”) should be evaluated to determine whether changes to the surface or underlying soils will release existing contamination to groundwater or surface water. Environmental assessment standards and guidance for evaluating brownfield conditions can be obtained from the American Society of Testing and Materials (ASTM) or the US EPA. See EPA’s Brownfields website at www.epa.gov/swerosps/bf/regneg.htm.

VIII. PERFORMANCE STANDARDS

The following performance standards apply to all uses and activities permitted or allowed through a Conditional Use Permit in the Drinking Water Protection District unless exempt under Article XI.

1. **Stormwater Management.** For all activities and uses regulated under this Ordinance, a stormwater management plan shall be submitted to the planning board and/or their consultant for determination of consistency with the intent and purpose of this Ordinance and with Best Management Practices for Urban Stormwater Runoff, NH Department of Environmental Services (January 1996 as updated and amended).

Communities may consider adopting a Stormwater Management Ordinance requiring treatment and management of stormwater for development throughout the community. Alternatively, as a condition of approval for development projects in the Drinking Water Protection District requiring a Conditional Use permit, these projects may be required to meet specific performance criteria for protection of surface waters.

2. **Stormwater Discharge.** Stormwater generated within the Drinking Water Protection District or entering the district shall be treated based upon expected non-point source pollutants prior to discharge, and shall be infiltrated to the maximum extent possible.

Refer to the Stormwater Management chapter for a model ordinance with performance standards and criteria for: impervious surfaces, best management practices, implementation of low impact development techniques, preserving natural hydrologic functions and drainage patterns, and post-development peak flow rates and total runoff volumes, water quality treatment criteria and measurement, groundwater recharge. These performance standards and criteria can also be adopted as part of the subdivision and site plan regulations.

3. **Erosion and Sedimentation Control.** For all activities and uses regulated under this ordinance, an Erosion and Sedimentation Control Plan shall be submitted to the planning board and/or their consultant for determination of consistency with the intent and purpose of this Ordinance.

Communities may consider adopting an Erosion and Sedimentation Control Ordinance requiring implementation of best management practices during construction and for a period following construction for all development projects in the community. Alternatively, as a condition of approval for development projects in the Drinking Water Protection District requiring a Conditional Use permit, these projects may be required to meet specific performance criteria for protection of surface waters.

Refer to the chapter in this volume, Erosion and Sedimentation Control During Construction, which includes a model ordinance with performance standards and criteria for the protection of water quality. These performance standards and criteria can also be adopted as part of the subdivision and site plan regulations.

4. Regulated Substances. For all uses or activities involving the storage, handling, and use of regulated substances the property owner shall develop a stormwater management and pollution control plan. Such plan shall include information consistent with “Stormwater Management For Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices” (US EPA, 1992). The plan shall demonstrate that:

- a. The use or activity will minimize, through source controls and other pollution prevention measures, the release of regulated substances into stormwater.
- b. Recharge to groundwater will not result in violation of Ambient Groundwater Quality Standards (Env-Ws 410.05) on the property.
- c. The use or activity will not infiltrate stormwater passing through areas containing contaminated soils without completing a Phase I Assessment in conformance with ASTM E 527-05 (All Appropriate Inquiry or AAI).
- d. The use or activity will comply with Env-Wq 401.

Source control BMPs are structures or operations that are intended to prevent pollutants from coming into contact with stormwater through physical separation of areas or careful management of activities that are sources of pollutants. See www.ecy.wa.gov/pubs/0510032.pdf.

5. Roads, Bridges, Driveways, Paths and Utilities. Documentation that the following standards are met shall be provided for review for all projects including roads, bridges, driveways, paths and utilities within the Secondary Buffer Protection Zone.

- a. A feasibility analysis shall be conducted to ensure no alternatives are practicable to locate roads, bridges, driveways, paths and utilities outside the Drinking Water Protection District.
- b. All utility rights-of-way shall be the minimum width necessary to allow for maintenance access and installation.
- c. The angle of a road crossing shall be perpendicular to the tributary, wetland or other surface waters, or otherwise configured to minimize disturbance to the land surface and steep slopes, and to reduce clearing.
- d. The minimum number of crossings shall be used within each project and will result in the least overall impact to water quality (i.e. shared driveways).
- e. All roads, bridges, driveways and paths shall be configured and composed of materials to minimize impervious surface coverage to the maximum extent possible.

6. Structures, Buildings, and Residential Dwellings and Accessory

Structures. Documentation that the following standards are met shall be provided for review for all projects including structures, buildings, and residential dwellings and accessory structures within the Secondary Buffer Protection Zone.

- a. An evaluation to demonstrate that no feasible alternatives are practicable to locate structures, buildings and dwellings outside the Secondary Buffer Protection Zone.
- b. All structures, buildings and dwellings shall be located and otherwise configured to minimize disturbance to the land surface and steep slopes, to reduce clearing, and to minimize impervious surfaces.

7. Impervious Surface. Impervious surface coverage shall not exceed 10 percent of the total land area of a parcel or lot wholly within or partially within the Drinking Water Protection District. For developed parcels and lots within the Drinking Water Protection District, existing impervious surface coverage in excess of 10 percent shall not be increased.

Communities may consider restricting impervious surface limits to less than 10 percent to achieve the higher standards for water quality required for drinking water supplies as compared with other uses such as the standards for “fishable and swimmable waters.” It is simply cost effective to maintain the highest water quality standards by limiting land use than paying for additional costly treatment of the drinking water supply.

Watershed research has established that water quality and habitat degradation accelerate rapidly in watersheds when impervious surface areas are greater than 10 percent of the total area, and that stream degradation increases proportionately with increases in imperviousness (see Schueler 1994 and Deacon 2005).

IX. SPILL PREVENTION, CONTROL AND COUNTERMEASURE (SPCC) PLAN

- A. Any use or activity having regulated substances in amounts greater than five gallons, shall submit to the local official such as Fire Chief, Emergency Response Official a SPCC plan for review and approval. It will include the following elements:
 1. Disclosure statements describing the types, quantities, and storage locations of all regulated substances that will be part of the proposed use or activity.
 2. Owner and spill response manager’s contact information.
 3. Location of all surface waters and drainage patterns.
 4. A narrative describing the spill prevention practices to be employed when normally using regulated substances.
 5. Containment controls, both structural and non-structural.
 6. Spill reporting procedures, including a list of municipal personnel or agencies that will be contacted to assist in containing the spill, and the amount of a spill requiring outside assistance and response.

7. Name of a contractor available to assist in spill response, contaminant, and cleanup.
8. The list of available clean-up equipment with instructions available for use on-site and the names of employees with adequate training to implement containment and clean up response.

X. EXISTING NON-CONFORMING USES

Existing nonconforming uses may continue without expanding or changing to another nonconforming use, but must be in compliance with all applicable state and federal requirements, including Env-Wq 401, Best Management Practices for Groundwater Protection Rules.

XI. EXEMPTIONS

The following uses are exempt from this ordinance as long as they are in compliance with all applicable local, state and federal requirements:

1. Storage of heating fuels for on-site use or fuels for emergency electric generation, provided that storage tanks are indoors on a concrete floor or have corrosion control, leak detection, and secondary containment in place.
2. Storage of motor fuel in tanks attached to vehicles and fitted with permanent fuel lines to enable the fuel to be used by that vehicle.
3. Storage and use of office supplies.

XII. RELATIONSHIP BETWEEN STATE AND LOCAL REGULATIONS

Where both the state and the municipality have existing requirements the more stringent shall apply.

XIII. MAINTENANCE AND INSPECTION

Pursuant to the requirements of Article VIII Performance Standards, Inspections shall be performed by the planning board's designee, to ensure compliance with the requirements of this ordinance and any conditions of a Conditional Use Permit. Any necessary maintenance of structures or facilities in the approved Plans shall be paid for with the performance bond.

XIV. ENFORCEMENT PROCEDURES AND PENALTIES

Any violation of the requirements of this ordinance shall be subject to the enforcement procedures and penalties detailed in RSA 676. When the responsible party fails to implement the requirements of this ordinance or any conditions of a Conditional Use Permit, as determined by the Code Enforcement Officer or Board of Selectmen, the [name of the municipality] is authorized to assume responsibility for their implementation and to secure reimbursement for associated expenses from the responsible party, including, if necessary, placing a lien on the subject property.

XV. SAVING CLAUSE

If any provision of this ordinance is found to be unenforceable, such provision shall be considered separable and shall not be construed to invalidate the remainder of the ordinance.

XVI. EFFECTIVE DATE

This ordinance shall be effective upon adoption by the municipal governing body.
[Insert statement of date of adoption and by whom.]

REFERENCES

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- Wenger, Seth. 1999. *A Review of the Scientific Literature on Riparian Buffer Width, Extent, and Vegetation*. Office of Public Service & Outreach, Institute of Ecology, University of Georgia, Athens, Georgia, www.outreach.ecology.uga.edu/tools/buffers/lit_review.pdf.

2.6 Shoreland Protection: The Importance of Riparian Buffers

BACKGROUND AND PURPOSE

The purpose of this chapter is to provide municipalities with a model ordinance designed to promote shoreland and riparian protection.

The simplest and most effective way to protect streams, rivers, lakes and estuaries is to leave an area of undisturbed native vegetation adjacent to the water body. These undisturbed areas act as buffers by performing functions that protect water quality and enhance wildlife habitat. Preserving and restoring riparian buffers is essential to surface water quality protection.

There are a number of important guides, technical reports and scientific bulletins available to help New Hampshire municipalities better understand the importance of shoreland protection and the value of riparian buffers (see References).

Two of the key resources for municipal planners are *Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities* and *Riparian Conservation: A Professional's Practical Guide to Financial Assistance and Program Support*.

Surface waters can be broadly classified as either lakes and ponds or rivers and streams. Streams are typically classified according to their *order* (see the definition of *Stream Order* in *Glossary*). In general, streams of higher order are larger than those of lower order. Rivers are examples of higher order streams. The size of a stream is one parameter that can be used to determine the amount of protection or buffer size that is desired for the water body.

In New Hampshire, municipalities currently have four options to regulate development for shoreland and riparian purposes:

- Option 1:** They may rely solely on the state's Comprehensive Shoreland Protection Act (CSPA) to protect the specific types of surface water bodies that fall under the jurisdiction of the CSPA¹; or
- Option 2:** They may elect to adopt regulations that extend protection to the streams and surface water bodies that are not covered by the CSPA; or
- Option 3:** The municipality may adopt more stringent regulations than the minimum standards of the CSPA as provided for under RSA 483-B:8; or

RELATED TOOLS:

- Habitat Protection
- Permanent (Post-Construction) Stormwater Management
- Environmental Characteristics Zoning
- Density Transfer Credit

¹ RSA 483-B, Comprehensive Shoreland Protection Act (CSPA); Effective Date of Enactment: 1991. Revised: 2008.

² If a municipality desires to pursue this option, the following applicable provisions from this Model Ordinance should be considered: I, II, III, IV, V, VI, VII a, b, d, 3, e, g, VIII, XI, and X.

Option 4: The municipality may elect to develop separate stream corridor (watershed) regulations to protect the riparian buffers along first, second and third order streams and rivers within the community leaving the CSPA or a more stringent local shoreland ordinance to regulate the lakes, ponds, and higher order streams and rivers within the community.²

Four primary resources were used to develop the ordinance of this chapter; the three-zone riparian buffer system developed by the Center for Watershed Protection; the Standards of the CSPA where those standards are most effective in protecting shorelands; the recommendations recently proposed by the Senate Commission to Review the Effectiveness of the CSPA as they relate to this ordinance; and the DES Model Rule for the Protection of Water Supply Watersheds.

The model ordinance is designed to implement Option 3 above. It includes a provision to protect lower order streams and expands upon the buffers established by the CSPA.

The ordinance contains three basic components: (1) a shoreland protection overlay district and zoning map; (2) shoreland protection district standards; and (3) riparian buffer standards. It is drafted as a complete zoning ordinance amendment.

Buffers for wetlands, fire and farm ponds, beaver impoundments, and coastal shorelands are excluded from the model ordinance.

For the purposes of this chapter, the terms “shoreland” and “riparian” shall be used interchangeably to refer to anything connected or immediately adjacent to the shoreline or bank of a stream, river, pond, lake, bay, estuary or other similar body of water. The term “riparian buffer” shall refer to the naturally vegetated shoreline, floodplain or upland forest adjacent to a surface water body.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

THE FUNCTION AND CONFIGURATION OF BUFFERS

There are many types and sizes of riparian buffers. Within any given watershed, riparian buffers can be strips of grassy land leading to the water’s edge, thickly forested upland areas or floodplain areas that provide a transition zone between development areas and adjacent surface waters. Typically, these areas are managed to reduce the impacts of adjacent land use and to protect water quality by providing a buffer between upland development and the adjoining surface waters.

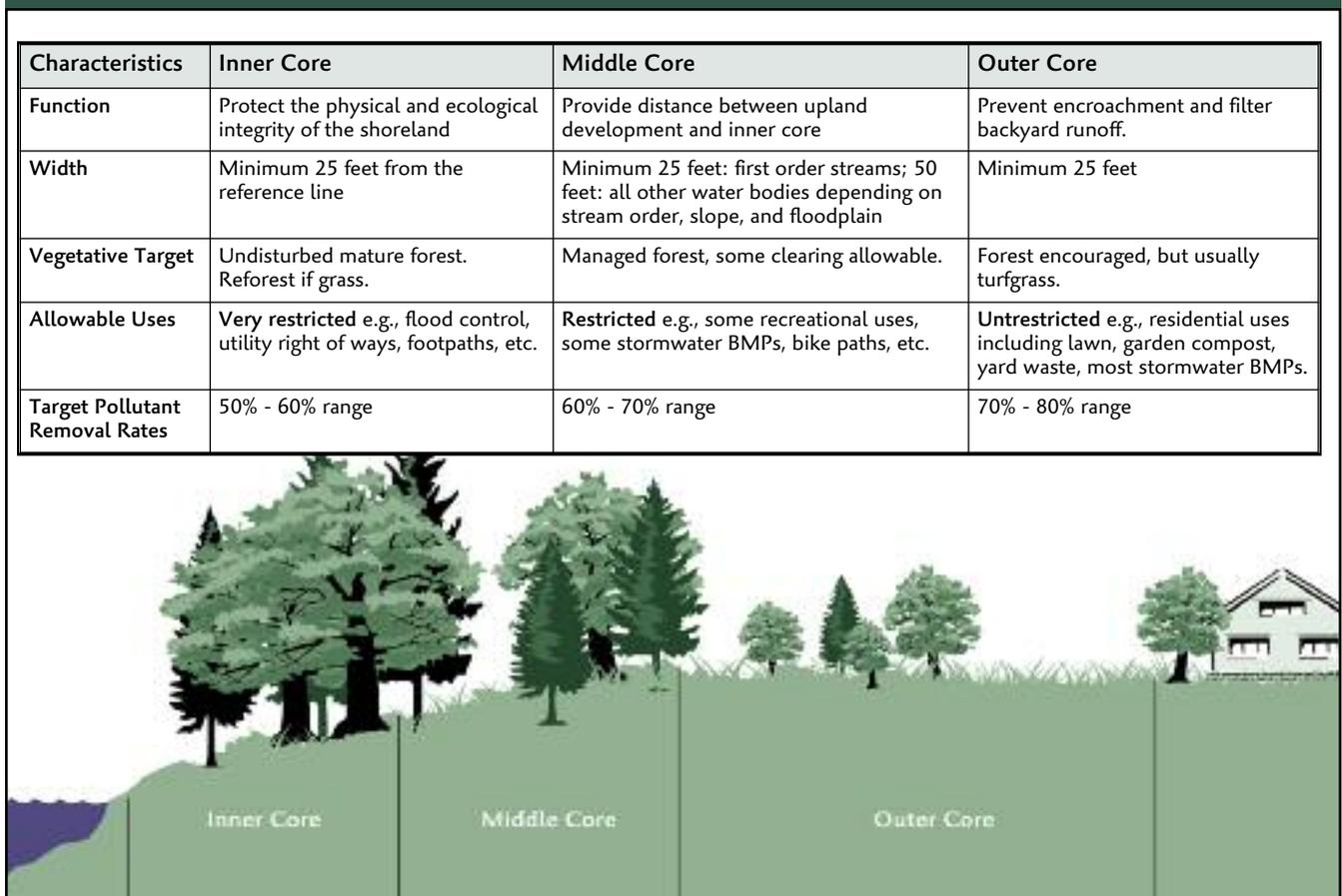
Most riparian buffers in New Hampshire consist predominately of forest vegetation. When left undisturbed and intact, these natural forest systems help to maintain clean water and healthy aquatic wildlife. Specifically, they serve to:

- Stabilize stream banks and shorelands with healthy root systems.
- Moderate the impact of heavy rains.
- Act as a natural filter, capturing sediment and pollutants from runoff.

- Protect people and property from flood damage by slowing and storing flood waters.
- Shade the shoreline and help to lower water temperatures. Cooler water holds more oxygen which is essential to aquatic animal species.
- Provide the organic matter that helps give soil the structural ability to hold oxygen and moisture. The duff layer (downed leaves, small twigs, and dead herbaceous vegetation) also moderates the impact of heavy rain, holds moisture, and can act as a natural mulch to prevent weed species.
- Increase property values by improving the appearance, beauty and aesthetics of the shoreland.
- Provide wildlife habitat on the shore with tree canopy, snags, and downed woody debris.
- Provide organic matter and woody material that falls into the water. The biomass that falls naturally into the water serves as food and habitat for the aquatic life in the water body.

The Center for Watershed Protection (CWP) has developed an effective three zone vegetated buffer model. The principles from that model have been adopted for the buffer strategy reflected in this model ordinance (see Figure 2.6.1). The CWP model consists of an inner core (closest to the water's edge), a middle core, and outer core.

Figure 2.6.1 The Three Cores of the Natural Riparian Buffer



The inner core most closely matches the waterfront buffer in the CSPA. The middle and outer cores closely match the woodland buffer standards of the CSPA.

Inner Core: extends a minimum of 25 feet from the water's edge for 1st and 2nd order streams (about the distance of one to two mature trees) and 50 feet for lakes, ponds and 3rd and 4th order streams. The Inner Core serves to protect the physical and ecological integrity of the adjacent water ecosystem. A mature riparian forest is the desired vegetation because it provides multiple canopy layers, interwoven root systems, shade, leaf litter, woody debris, and erosion protection. Only limited tree cutting and very restricted uses such as access paths and utility rights of way should be allowed. No land clearing or impervious surfaces (except an access path) should be considered within this zone.

Middle Core: extends beyond the inner core to the beginning of the outer core, a minimum of 25 feet for 1st and 2nd order streams and a minimum of 50 feet for all other water bodies. The exact size of this zone will depend on stream order and slope. This zone is mainly composed of managed forest with some clearing allowed. This zone protects adjacent water quality and offers wildlife habitat. Fifty percent of this area can be allowed for structures, recreational use, stormwater best management practices (BMPs), and tree removal. The other fifty percent of this zone should remain in an undisturbed state.

Outer Core: extends a minimum 25 feet out from the middle core for 1st and 2nd order streams and 50 feet for lakes, ponds and all 3rd and 4th order streams. This zone is mainly composed of forest or turf and typically contains the yard, garden, or woods between a residential dwelling and the rest of the buffer. This zone traps sediment and consists of play areas, gardens, compost piles, and other common residential activities.

While many factors including slope, soil type, adjacent land use (including amount of impervious cover), floodplain, vegetation type, and watershed condition all influence buffer width, in most cases, the most commonly prescribed minimum buffer widths for use in water quality and habitat protection are 35 to 250 feet (Tjaden and Weber). Buffers of less than 35 feet have not been found to sustain long-term protection of aquatic communities.

A minimum 100-foot buffer width is recommended in *Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Communities*, as a standard width for all surface waters and wetlands in New Hampshire (Chase, et al. 1997)

Even for narrow creeks or intermittent streams that run through residential neighborhoods or commercial developments, riparian buffers are important for sediment control and aquatic integrity. Protection of these smaller creeks and streams is particularly important because:

- they are numerous across the landscape;
- they feed larger streams and rivers – one of the best ways to protect larger rivers is to protect the small streams that flow into them; and
- they can be readily impacted by sedimentation, erosion and non-point source pollution.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

This chapter is being prepared at a time when sweeping changes have been recommended to the State of New Hampshire's Comprehensive Shoreland Protection Act (CSPA). These changes, adopted by the legislature during 2007, will help to improve the implementation of the CSPA at both the state and local level.

Under the current CSPA, municipalities may adopt land use ordinances (zoning, subdivision, site plan, etc.) to regulate protected shorelands within their boundaries. These ordinances can be more stringent than the minimum standards of the CSPA (see RSA 483-B:8, Municipal Authority). In fact, the CSPA encourages municipalities to adopt land use control ordinances designed to protect the shorelands of water bodies and water courses not subject to the CSPA. These other water bodies can include first and second order (headwater streams and tributaries), third order streams and rivers, lakes, and ponds, and other impoundments. In addition, municipalities may elect to enforce the provisions of the CSPA by issuing cease and desist orders, and by seeking injunctive relief or civil penalties as provided in RSA 483-B:18, III(a) and (b). One of the advantages of local enforcement is that any civil penalties and fines collected by the court, can be remitted to the treasurer of the municipality prosecuting violations, for use of the municipality. In order to enforce the provisions of the CSPA, however, municipalities must have a knowledgeable code enforcement officer on hand who understands and can apply the provisions of the act on a case by case basis.

The CSPA minimum standards are designed to overlay other state and municipal permitting programs. This means that state permitting programs such as Subsurface, Wetlands, and Alteration of Terrain as well as local building permits must ensure that any permits issued are in compliance with the CSPA.

Currently, the protected shoreland under the CSPA includes all land located within 250 feet of the reference line (see glossary for definition of reference line) of public waters and fourth order and higher streams.

Exemptions for forestry and agricultural activities are built into the CSPA and can be considered when establishing a local ordinance. The CSPA also provides an urban exemption for situations in which specialized urban conditions exist. This exemption requires the governing body to make a formal request to the Commissioner of DES to grant an exemption from the CSPA.

On July 1, 2005, the New Hampshire legislature established a "Commission to study the effectiveness of the CSPA." On November 30, 2006, the Commission's final report was released and in the spring of 2007, most of the Commission's recommendations were incorporated into house bills. The following summarizes the major proposed legislative changes that are important considerations in developing a local shoreland protection ordinance:

- The setback for primary structures to protected shoreland shall be at least 50 feet in all towns whether or not the municipality has an established lesser setback.

- The current methodology for measuring and maintaining the Natural Woodland Buffer (50 percent basal area removal/well distributed stand) would be replaced by establishing a waterfront buffer that extends 50 feet back from the reference line. Within the waterfront buffer there would be no root, rock, duff, or understory removals and no fertilizer or pesticide use. Tree cutting would be limited and would be managed in accordance with a grid and points system. Fifty percent of the area outside of permitted impervious surfaces would be left undisturbed.
- Impervious surfaces would be limited to 20 percent of the area within the protected shoreland. With mitigation, the impervious surface allowance could be up to 30 percent.
- The full protection of the CSPA would be extended to all third order and higher streams (including the Saco and Pemigewasset Rivers) as identified by the N.H. Hydrologic Database.

EXAMPLES AND OUTCOMES

There are many municipalities in New Hampshire that have developed regulations to protect shorelands and riparian buffers. The Office of Energy and Planning currently maintains a list of 48 communities within New Hampshire that have adopted local regulations for shoreland and riparian protection.

The model ordinance contained in this chapter provides municipalities with a new and effective tool for shoreland and riparian protection. Key provisions within the ordinance include:

- a 25 foot setback for primary structures from the reference line for first and second order streams;
- a 50 foot setback for primary structures from all third, fourth and higher order streams, lakes, ponds, and coastal estuaries;
- a 20 percent impervious surface limitation requirement for any portion of any lot located within the Shoreland Protection District. (see sidebar)
- The inclusion of Conditional Use Permit requirements for water-dependent structures, including but not limited to docks, piers, breakwaters, boathouses and marinas, etc. Many of these uses currently require planning board approval subject to both local site plan review and DES permits as applicable.
- Requirements for the submittal of a stormwater management plan for all earth moving or excavation activities on lots greater than one acre in size.
- Requirement for planning board approval of a selected clearing and landscape plan

Municipalities may wish to consider a 10 percent impervious surface limitation as studies show that there is a level (between 7 and 14 percent impervious surface) at which water quality and wildlife habitat become affected by urban characteristics, such as impervious surface. These results are similar to other studies, where measures of impervious surface of about 10 percent have been identified as the level at which stream quality decreases (Klein, 1979; Schueler, 1994; Booth and Reinelt, 1993).

Model Language and Guidance for Implementation

MODEL ORDINANCE FOR SHORELAND AND RIPARIAN PROTECTION

Shoreland Zoning Ordinance for the Municipality of _____

I. TITLE AND AUTHORITY

- A. **Title:** This Ordinance shall be known as the “Shoreland Protection District of the City/Town of _____, New Hampshire.”
- B. **Authority:** Pursuant to the authority granted by RSA 483-B:8, Municipal Authority; RSA 674:17 I., Purposes of Zoning Ordinances; and RSA 674:21 I., Innovative Land Use Controls this ordinance is hereby adopted by the Town/City of _____, New Hampshire to protect the public health, safety, and general welfare.

II. PURPOSE

The purpose of this Ordinance is to establish regulations for the design of riparian buffers to protect the flowing streams and surface water bodies of the Town/City of _____ to protect the water quality of these resources; to protect the Town/City of _____’s riparian and aquatic ecosystems; and to provide for the environmentally sound use of the Town/City of _____’s land resources.

III. FINDINGS

The City/Town of _____, New Hampshire finds that shoreland protection and riparian buffers adjacent to flowing waters and surface water bodies provide numerous environmental benefits. Shoreland forested buffers serve to:

- A. Restore and maintain the chemical, physical and biological integrity of the water resources;
- B. Provide infiltration of stormwater runoff;
- C. Remove pollutants delivered in stormwater runoff;
- D. Reduce erosion and control sedimentation;
- E. Stabilize lake and stream banks;
- F. Maintain base flow of streams;
- G. Contribute food and habitat for the aquatic ecosystem;
- H. Moderate the temperature of near shore waters
- I. Provide and enhance terrestrial wildlife habitat; and,
- J. Enhance scenic value and recreational opportunities

Therefore, the City/Town of _____, New Hampshire adopts this ordinance to protect and maintain the native vegetation along the shorelands of the community's water courses and surface waters by implementing standards for protection, use and development of these areas within the jurisdiction of the municipality.

IV. APPLICABILITY

A. Shoreland Protection District. The Shoreland Protection District of the City/Town of _____, New Hampshire is an overlay district superimposed over the existing conventional zoning districts of the municipality. It includes within its boundary a protected shoreland on either side of all 1st, 2nd, 3rd and 4th order and higher rivers and streams, and a protected shoreland adjacent to all natural and impounded lakes and ponds and coastal estuaries (if applicable) located within the municipality. The Shoreland Protection District does not apply to wetlands, ephemeral streams, beaver impoundments, fire ponds, and farm ponds as defined in this ordinance. The Shoreland Protection District subject to this Ordinance shall be shown on the municipality's Official Shoreland Zoning Map, which is incorporated as part of this Ordinance.

B. Official Shoreland Zoning Map.

1. Scale of Map. The Official Shoreland Zoning Map shall be drawn at a scale of not less than 1 inch = 2,000 feet. District boundaries shall be clearly delineated and a legend indicating the symbols for each district shall be placed on the map.

A municipality may have a series of maps instead of one map depicting its shoreland protection district. The state's regional planning commissions are available to assist your municipality in preparing this map. A reliable source of stream location and stream order classification i.e. the identification of first, second, third and fourth and higher streams within your municipality is available from the New Hampshire Hydrography Dataset (NHHD) developed by Complex Systems Research Center, University of New Hampshire. The Final Report of the Commission reviewing the effectiveness of the CSPA recommends that the state adopt the NHHD for the purpose of identifying stream order.

Planning boards are encouraged to include in their site plan and subdivision regulations, requirements for the submittal of surveyed plans depicting the true location of the streams, rivers and other water bodies subject to this ordinance within the subject property. This plan information can then be used to supplement the NHHD data.

Other reliable mapping resources:

Stream Buffer Characterization Data and Maps; town specific maps that assess 150 and 300 buffer areas.

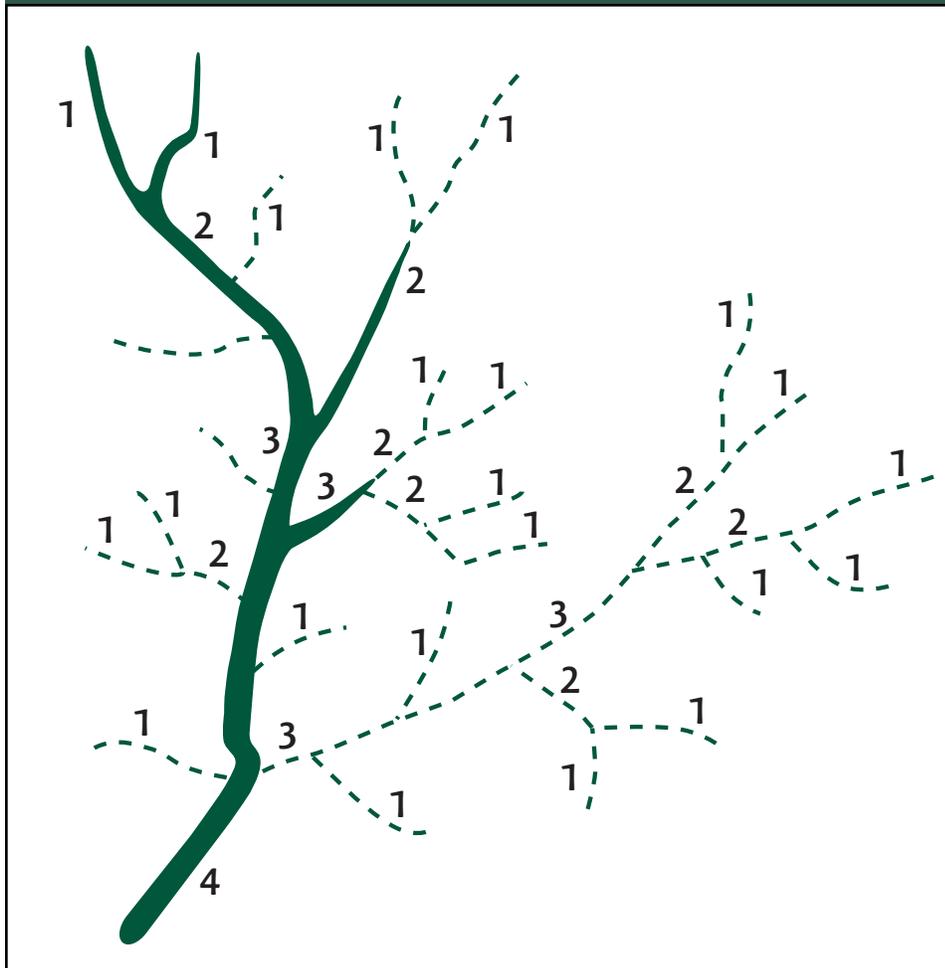
Online: www.nhep.unh.edu/resources/actions.htm

Buffer Data Mapper; demonstrates the land area impact of various buffer widths.

Online: <http://mapper.granit.unh.edu/viewer.htm>

2. Certification of Official Shoreland Zoning Map. The Official Shoreland Zoning Map shall be certified by signature of the municipal clerk and shall be located in the municipal planning office. In the event the municipality does not have a planning office, the municipal clerk shall be the custodian of the map.

Figure 2.6.2 Fourth Order Rivers: The Strahler Method



3. **Changes to the Official Shoreland Zoning Map.** If amendments are made to the Shoreland Protection District or other matters portrayed on the Official Shoreland Zoning Map, such changes shall be made on the map within 30 days after the amendment has been adopted by the municipality.

V. DISTRICT BOUNDARIES

- A. **Definition of District Boundaries.** The district boundaries of the Shoreland Protection District shall encompass all land within a horizontal distance of 150 feet of the reference line of any 1st and 2nd order stream, and 250 feet of the reference line of any 3rd and 4th order stream and higher, lake, pond or coastal estuary as defined by this Ordinance.
- B. **Interpretation of District Boundaries.** Where uncertainty exists as to the exact location of district boundary lines, the city/town code enforcement officer with the assistance of the N.H. Department of Environmental Services (DES) shall be the final authority as to boundary locations.

Municipalities are encouraged to incorporate specific written descriptions of district boundaries into this Ordinance so that disputes over boundaries are minimized. The Official Shoreland Zoning Map is only one of the primary tools in determining district boundaries. Other tools include actual field verification of the reference line. This is where the assistance of DES will be the most useful.

VI. DEFINITIONS

Accessory Structure or Use: A use or structure located on the same lot and customarily incidental and subordinate to the primary structure, including but not limited to paths, driveways, patios, any other improved surface, pump houses, gazebos, woodsheds, garages, or other outbuildings. A deck or similar extension of the primary structure or a garage attached to the primary structure by a roof or a common wall is considered part of the primary structure.

Base flow: The groundwater contribution to stream flow arising from submerged springs and seeps.

Beaver Impoundment: An area this is generally inundated most of the year as a result of flowing water impounded by a beaver dam. Beaver impoundments and the meadows that develop when the dams are not kept up and deteriorate are generally considered wetlands.

Best Management Practices (BMPs): A proven or accepted structural, non-structural, or vegetative measure the application of which reduces erosion or sedimentation, stabilizes stream channels, or reduces peak storm discharge, or improves the quality of stormwater runoff, or diminishes the quantity of stormwater runoff flowing to a single location by using multiple BMPs at separate and dispersed locations. BMPs also include construction site maintenance measures such as removing construction debris and construction waste from construction sites and disposing of debris and waste appropriately in order to reduce contamination of stormwater runoff.

Boat Slip: On water bodies over 10,000 acres, means a volume of water 25 feet long, 8 feet wide, and 3 feet deep as measured at normal high water and located adjacent to a structure to which a watercraft may be secured. On water bodies of 10,000 acres or less, a volume of water 20 feet long, 6 feet wide, and 3 feet deep as measured at normal high water mark and located adjacent to a structure to which a watercraft may be secured (RSA 482-A:2 VIII.).

Buffer: A vegetated area, including trees, shrubs and herbaceous vegetation, which exists or is established to protect a stream, river, lake, pond, reservoir, or coastal estuarine area.

Canopy: The more or less continuous vegetative cover formed by tree crowns in a wooded area.

Disturbed Area: An area in which natural vegetation is removed, exposing the underlying soil.

Ephemeral Stream: A drainage feature that carries only stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events. An ephemeral stream may or may not have a well defined channel, the aquatic bed is always above the water table, and stormwater runoff is the primary source of water. An ephemeral stream typically lacks the biological, hydrological, and physical characteristics commonly associated with the continuous or intermittent conveyance of water.

Estuaries: A tidal wetland whose vegetation, hydrology or soils are influenced by periodic inundation of tidal waters.

Farm Pond: A small, shallow (3-14 foot) artificial impoundment maintained for private recreational use, such as fishing or swimming, or to provide water for livestock, irrigation, or other agricultural uses. Such ponds may be addressed as part of an approved USDA Natural Resources Conservation Service conservation plan and as such do not need to be protected by this Ordinance.

Fire Pond: A small, naturally-occurring or artificially constructed water body designated and maintained for the purpose of providing water for fire suppression, characterized by large-vehicle access to the water's edge throughout the year and/or the presence of a dry hydrant. Typically such ponds have been identified or designated by the municipality's fire department as a fire pond.

First Order Streams: Are intermittent and perennial streams identified as either dashed lines or solid lines on the New Hampshire Hydrography Dataset (NHHD) or the most recent edition of USGS topographic maps, where mapped.

Forest Management: The application of scientific and economic principles to conserve forest resources and obtain forest benefits.

Great Pond: All natural bodies of fresh water situated entirely in the state having an area of 10 acres or more are state-owned public waters, and are held in trust by the state for public use; and no corporation or individual shall have or exercise in any such body of water any rights or privileges not common to all citizens of this state; provided, however, the state retains its existing jurisdiction over those bodies of water located on the borders of the state over which it has exercised such jurisdiction (RSA 271:20).

Ground Cover: Any herbaceous or woody plant which normally grows to a mature height of two feet or less, especially mat forming vegetation which stabilizes the soil.

Headwater Streams: Intermittent streams and perennial streams of first and second order.

Impervious Surface: Any areas covered by material that impedes the infiltration of water into the soil. Examples of impervious surfaces include buildings, roofs, decks, patios, and paved, gravel, or crushed stone driveways, parking areas, and walkways.

Intermittent Streams: A well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by stormwater runoff. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the conveyance of water. Intermittent streams (or portions thereof) are portrayed as dashed blue lines on a USGS topographic map, where mapped).

Lake: A natural or impounded inland body of fresh water. May also be called a pond or great pond. The terms lakes and ponds are commonly used interchangeably,

Defining "First Order Streams" is perhaps the most difficult issue in developing this ordinance. This model ordinance defines first order streams as both intermittent and perennial streams because these streams are the most important headwater streams within a watershed. However, municipalities may elect to limit the application of this ordinance to "perennial" streams only. To accomplish this, intermittent streams would need to be excluded from the definition of first order streams. This would require revisions to the NHHD database, because intermittent streams are currently identified as first order streams in this database.

however, a lake can be distinguished from a pond because a lake contains a thermo-cline layer while a pond does not.

Lot of Record: A legally created parcel, the plat (keep “or” here in case there is only a recorded metes and bounds description) description of which has been recorded at the registry of deeds for the county in which it is located.

Marina: A commercial waterfront facility whose principal use is the provision of public services such as the securing, launching, storing, fueling, servicing, repairing and sales of watercraft equipment and accessories.

Natural Vegetation: All existing live woody and herbaceous trees, shrubs, and other plants.

Natural Woodland Buffer: Is defined in the CSPA, RSA 483-B as a forested area consisting of various species of trees, saplings, shrubs, and ground covers in any combination and at any stage of growth.

Non-Conforming Lot: A single lot of record which, at the effective date of adoption or amendment of this Ordinance, does not meet the dimensional requirements of the district in which it is located.

Non-Conforming Structure: A structure which does not meet any one or more of the following dimensional requirements; setback, height, or lot coverage, but which is allowed solely because it was in lawful existence at the time this Ordinance or subsequent amendments take effect.

Non-Conforming Use: Use of buildings, structures, premises, land or parts thereof which is not permitted in the district in which it is situated, but which is allowed to remain solely because it was in lawful existence at the time this Ordinance or subsequent amendments take effect.

Mean High Water Level: See Reference Line definition.

Ordinary High Water Mark: Means the line on the shore, running parallel to the main stem of the river or stream, established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the immediate bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Perennial Streams: A stream that normally flows year round because it is sustained by groundwater discharge as well as by surface water. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water. Perennial streams (or portions thereof) are portrayed as solid blue lines on a USGS topographic map, where mapped.

Pond: Means a natural or impounded still body of water. The term is often used conterminously with “lake.”

Primary Structure: A structure built for the support, shelter or enclosure of persons, animals, goods, or property of any kind, as well, as anything constructed or erected with a fixed location on or in the ground, exclusive of fences. The primary

structure is central to the fundamental use of the property and is not accessory to the use of another structure on the same premises.

Protected Shorelands: The area subject to this Ordinance.

Public Waters: See CSPA, RSA 483-B:4, Definitions.

Reference Line: Defined in the CSPA, RSA 483-B and under this Ordinance as follows:

- a. for natural fresh water bodies without artificial impoundments, the natural mean high water level as determined by the NH Department of Environmental Services;
- b. for artificially impounded fresh water bodies with established flowage rights, the limit of the flowage rights, and for water bodies without established flowage rights, the waterline at full pond as determined by the elevation of the spillway crest;
- c. for coastal waters, the highest observable tide line, which means a line defining the furthest landward limit of tidal flow, not including storm events, recognized by indicators such as the presence of a strand line of flotsam and debris, the landward margin of salt tolerant vegetation, or a physical barrier that blocks further flow of the tide;
- d. for third and fourth order and higher rivers and streams, the ordinary high water mark; and
- e. for first and second order streams, the extent of the defined channel.

Removal or Removed: Cut, sawed, pruned, girdled, felled, pushed over, buried, burned or otherwise destructively altered.

Riparian Area: The area of land adjacent to the shoreline or bank of a stream, river, pond, lake, bay, estuary, or other similar body of water.

Riparian Buffer: See Buffer definition.

Sapling: A young tree less than four inches (9.75 cm) in diameter (dbh) and less than 20 feet in height

Selected Clearing and Landscape Plan: A site plan drawn to scale depicting the lot boundaries, shoreland protection district boundaries, shoreline, reference line, all impervious surfaces, structures, septic and well systems, setback requirements, proposed view corridor, and existing and proposed trees and vegetation.

Setback: Horizontal distance from the reference line of a water body to the nearest part of a structure, road, parking space or other regulated object or area.

Shoreland: The area of land adjacent to the reference line of a stream, river, pond, lake, bay, estuary, or other similar body of water.

Shoreland Frontage: The average of the distances of the actual natural shoreline frontage and a straight line drawn between the property lines (RSA 483-B:4, Definitions).

Shoreline: The intersection of a specified plane of water with the beach or bank. It migrates with changes of the water level.

Shrub: A woody perennial, smaller than a tree, usually branching from the base with several main stems.

Stream ordering is a widely applied method for classifying streams. Its use in classification is based on the premise that the order number has some relationship to the size of the contributing area, to channel dimensions and to stream discharge (Strahler 1964). The most common method used in stream ordering is based on the Strahler Method. This method is applied by DES and GRANIT in classifying streams within the New Hampshire Hydrologic dataset. For more information about the Strahler Method, refer to Strahler, A.N., 1964. Part II. Quantitative geomorphology of drainage basins and channel networks, pp. 4-39 to 4-76. Chow, ed. Handbook of Applied Hydrology, McGraw-Hill, New York.

Stream Order: A classification system for streams based on stream hierarchy. The smaller the stream, the lower its numerical classification. For example, a first order stream does not have tributaries and normally originates from springs or seeps. At the confluence of two first order streams, a second order stream begins and at the confluence of two second order streams, a third order stream begins, et.seq.

Stream or River: A free-flowing body of water or segment or tributary of such water body (RSA 483:4, XVII.).

Structure: Anything built for the support, shelter or enclosure of persons, animals, goods or property of any kind, together with anything constructed or erected with a fixed location on or in the ground, exclusive of fences, and poles, wiring and other aerial equipment normally associated with service drops as well as guying and guy anchors. The term includes structures temporarily or permanently located, such as decks, patios, and satellite dishes.

Stormwater or Surface Water Runoff: Water that flows over the surface of the land as a result of rainfall or snow-melt. Surface water enters streams and rivers to become channelized stream flow.

Stormwater Management Plan: An analysis and plan designed in accordance with rules adopted by the DES under RSA 541-A for terrain alteration under RSA 485-A:17, to manage stormwater and control erosion and sediment, during and after construction.

Surface Waters: Those portions of waters of the state as defined by RSA 482-A:4, which have standing water or flowing water at or on the surface of the ground. This includes but is not limited to rivers, streams, lakes, ponds and tidal waters (Env-Wt 101.88).

Timber Harvesting: The cutting and removal of timber for the primary purpose of selling or processing forest products.

Tree: A woody perennial having a main stem.

USGS (United States Geological Survey) topographic map: A map that uses contour lines to represent the three-dimensional features of a landscape on a two-dimensional surface. Map scale: 1:24,000.

Water Body: Any pond, lake, river or stream.

Water Dependent Use or Structure: A use or structure that services and supports activities that require direct access to, or contact with the water, or both, as an operational necessity and that requires a permit under RSA 482-A, including but not limited to a dock, pier, breakwater, beach, boathouse, retaining wall, or launching

ramp. Hydroelectric facilities, including, but not limited to, dams, dikes, penstocks, and powerhouses, shall be recognized as water dependent structures, however, these uses are exempt from the requirements of this Ordinance.

Wetlands: areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (RSA 482-A:2).

VII. SHORELAND PROTECTION DISTRICT REGULATIONS

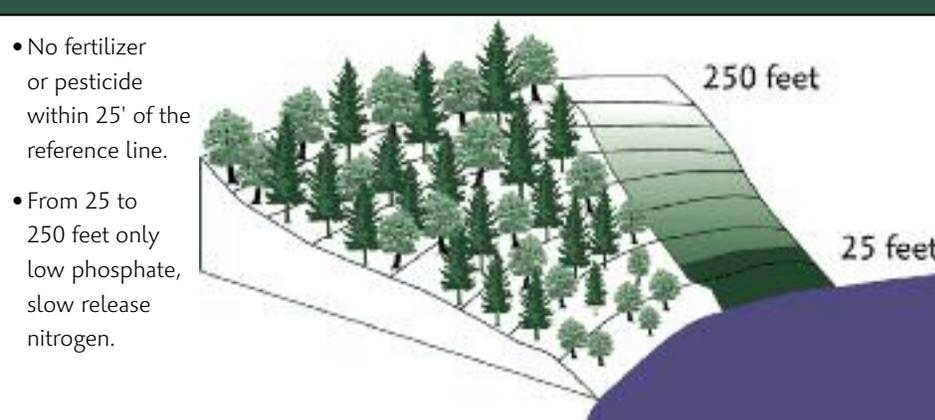
A. Prohibited Water Pollution Hazards, Uses, Structures and Activities

The following uses, structures and activities are prohibited within the Shoreland Protection District:

1. Establishment or expansion of salt storage yards, automobile junk yards and solid or hazardous waste facilities.
2. Establishment or expansion, dry cleaning establishments and automobile service/repair shops.
3. Laundry/car wash establishments not on municipal or public sewer.
4. Subsurface disposal of pollutants from sewage treatment facilities, other than on-site septic systems.
5. Storage of hazardous substances, including the use of road salt, de-icing chemicals, herbicides, pesticides, or fertilizer, (except limestone) within 50 feet of the reference line of any property. Fifty feet beyond the reference line, low phosphate, slow release nitrogen fertilizer or limestone may be used on areas that are already vegetated.
6. Bulk or temporary storage of chemicals above or below ground.

The following shoreland protection regulations are modeled after specific provisions of the CSPA (RSA 483-B) as applicable, the recommendations contained within the Final Report of the Commission to Review the Effectiveness of the CSPA, as well as the NH DES Model Rule for the Protection of Water Supply Watersheds. Some noted key provisions include a 25 foot setback for primary structures from the reference line of first and second order streams, a 50 foot setback for all other water bodies, a maximum impervious surface requirement of 20% of the lot area located within the shoreland protection district, and Conditional Use Permit requirements for water-dependent uses and structures. The riparian buffer requirements included within this ordinance are modeled after the three-stage riparian buffer design and buffer model ordinance favored by the journal Watershed Protection Techniques and developed by the Center for Watershed Protection, Elliot City, Maryland.

FIGURE 2.6.3 Fertilizer and Pesticide Restrictions



Source: N.H. Department of Environmental Services

7. Bulk or temporary storage of petroleum products or hazardous materials above or below ground, excluding normal residential or business use of liquid petroleum products and heating fuels for on-premise use.
8. Sand and gravel excavations as defined in RSA 155-E.
9. Mining or the processing of excavated materials.
10. Any use or activity not expressly permitted.

B. Permitted Uses, Structures and Activities

All necessary state and local approvals and permits shall be obtained prior to the commencement of any activity within the Shoreland Protection District. The following uses, structures and activities are permitted within the Shoreland Protection District, subject to state and local approval:

1. All permitted uses allowed within the municipality’s underlying zoning district(s), except those uses expressly prohibited as listed above.
2. All primary structures shall be setback a minimum distance of 25 feet from the reference line of all first and second order streams , 50 feet of all third order and higher streams, lakes, ponds, and coastal estuaries as required by the CSPA.
3. All accessory structures shall be setback a minimum distance of 25 feet from the reference line of all streams, lakes, ponds and coastal estuaries.
4. Water-dependent structures, or any part thereof, built over, on or within adjacent public waters subject to the jurisdiction of RSA 483-B 9.2 c.shall be constructed only as approved by the DES, pursuant to RSA 482-A. All water-dependent uses or structures or parts thereof, built over, on or within the adjacent waters subject to this Ordinance shall be required to obtain a Conditional Use Permit from the planning board of the municipality in accordance with the requirements of subsection c) Conditional Uses below.
5. Other permitted uses within the Shoreland Protection District, subject to necessary local and state approval, include the following:
 - a. Public water supply facilities, including water supply intakes, pipes, water treatment facilities, pump stations and disinfectant stations;
 - b. Public water and sewage treatment facilities;
 - c. Hydroelectric facilities, including, but not limited to dams, dikes, penstocks and powerhouses;
 - d. Public utility lines and associated structures and facilities;
 - e. Existing solid waste facilities, including the construction of accessory structures and other activities consistent with the operation of the facility and its solid waste permit, including filling, grading and installing monitoring wells and other drainage structures;
 - f. Flood control structures; and,
 - g. Public roads and public access facilities, including boat ramps.

Under the CSPA, development within the protected shoreland requires a permit from the Department of Environmental Services.

C. Conditional Uses

The following Conditional Uses are permitted within the Shoreland Protection District, subject to all applicable local, state and federal regulations:

1. Marinas developed in accordance with the following requirements:
 - a. Minimum shoreland frontage shall be 300 feet with an additional 25 feet of shoreland frontage per boat slip.
 - b. Off street parking shall be provided at a rate of 500 square feet per boat slip.
 - c. Submission of an environmental impact study including measures to mitigate potential negative impact on the adjacent waters, including but not limited to:
 - i. Measures to prevent leakage or spills of fuels, lubricants, wastewater and other potential pollutants into the public waters;
 - ii. Assurances that impact on wetlands and other related sensitive areas have been avoided.
 - d. Submission of a site plan, that is consistent with local regulations, for review by the planning board which includes locations of rest rooms, buildings, parking areas and all related support facilities with assurances that these facilities shall be permanently available to the project.
 - e. Receipt of a wetland permit from DES.
2. Water dependent uses and structures including, but not limited to, docks, wharves, boat ramps, etc. All water dependent uses and structures shall be approved as a Conditional Use Permit in accordance with the following requirements:
 - a. The use is in keeping with the purpose and intent of this Ordinance.
 - b. The least impacting route and methodology for the use have been selected as the best practicable alternative.
 - c. Canopies and seasonal covers extend only over the boat slips and shall be removed during the non boating season.

D. Minimum Lot Requirements

1. The minimum size for new lots in areas dependent upon on-site subsurface wastewater systems shall be determined by either the municipality's underlying zoning district requirements or the soil type lot size determinations, as established by the DES under RSA 485-A and rules adopted to implement it.
2. The total number of residential units in the protected shoreland district, whether built on individual lots or grouped as cluster or condominium development, shall not exceed:

- a. one unit per 150 feet of shoreland frontage; or
 - b. for any lot that does not have direct frontage, one unit per 150 feet of lot width as measured parallel to the shoreland frontage that lies between the lot and the reference line.
3. The total constructed, impervious surface area within any lot shall not exceed 20 percent of the area of the lot located within the shoreland protection district. In instances when the existing tree cover has been depleted, 25 percent impervious coverage may be granted in exchange for additional native tree and shrub planting within 50 feet of the reference line. This should be enforced through a deed restriction whereby the property owner agrees not to cut after the trees are planted.

E. Subsurface Wastewater Disposal Facilities

All new lots, including those in excess of five acres, any portion of which is located within the Shoreland Protection District, shall require subdivision approval by the DES Water Division, Subsurface Systems Bureau pursuant to RSA 485-A:29. All subsurface wastewater disposal facilities shall be in compliance with RSA 485-A:29 and 483-B.

F. Erosion and Siltation

1. New structures and all modifications to existing structures within the Shoreland Protection District shall be designed, constructed and maintained to prevent the release of surface runoff across exposed mineral soils.
2. All earth moving or excavation activities on lots greater than 1 acre in size either partially or wholly within the Shoreland Protection District, including the construction of new structures and modifications to existing structures shall be conducted in accordance with a stormwater management plan approved by the municipality's planning board. Such plan shall be designed in accordance with rules adopted by the DES under RSA 541-A for terrain alteration under RSA 485-A:17, to manage stormwater and control erosion and sediment, during and after construction. All erosion control measures shall be implemented before any earth disturbance occurs.
3. In new developments, on-site and non-structural stormwater management alternatives shall be preferred over larger facilities within the riparian buffer.
4. When constructing stormwater management facilities (i.e. BMPs), the area cleared shall be limited to the area required for construction, and adequate maintenance access only.
5. A permit under RSA 485-A:17, I. shall be required for developed, or subdivided land whenever there is a contiguous disturbed area exceeding 50,000 square feet that is either partially or wholly within the Shoreland Protection District.

G. Riparian Buffer Requirements

Riparian Buffer: Within the Shoreland Protection District, a riparian buffer of natural vegetation and trees shall be maintained or established within 75 feet of the reference line of all first and second order streams, and 150 feet of

The riparian buffer standards included in this ordinance are based upon the Center for Watershed Protection’s Buffer Model Ordinance and as such these standards present the best technical guidance available to create and protect the most effective riparian buffers possible.

Also included are appropriate buffer standards from New Hampshire’s CSPA and the Commission’s recommendations where applicable. Municipalities should use these standards as a guide to adopt the most appropriate buffer requirements for their community considering such factors as existing site conditions, ease of enforcement, public acceptance, and the sensitivity and vulnerability of the water body to be regulated.

Municipalities are also encouraged to include a reference to these standards in their site plan and subdivision regulations and to add a checklist item or requirement that the location of all streams and water bodies be surveyed and accurately shown on site plans and subdivisions.

the reference line of all third and fourth and higher order streams, lakes, ponds and coastal estuaries. This riparian buffer is similar in terminology to the Natural Woodland Buffer under the CSPA.

To address areas containing steep slopes, the following formula recommended by the Center for Watershed Protection should be used to expand the riparian buffer widths as noted:

Percent Slope*	Width of Buffer
15%-17%	add 10 feet
18%-20%	add 30 feet
21%-23%	add 50 feet
> 24%	add 60 feet

*Percent slope shall be based on an average of the overall slope dividing the average vertical distance of the slope into the overall horizontal distance of the slope.

Source: Southern New Hampshire Planning Commission. Adapted from Center for Watershed Protection

Within the riparian buffer, the following management zones shall be maintained.

- 1. Waterfront Zone:** The waterfront zone is located closest to the water’s edge and serves to protect the physical and ecological integrity of the shoreland. This zone must be maintained in a natural state although a view corridor and a maximum 6 ft wide path to the water’s edge may be established in accordance with an approved Selected Clearing and Landscape Plan. This zone extends a minimum distance of 25 feet from the reference line for 1st and 2nd order streams and a minimum distance of 50 feet from the reference line for all other water bodies. Allowable uses within the waterfront zone are restricted to flood control structures, utility rights of way, footpaths, road crossings such as bridges and culverts as required and water-dependent structures and uses where permitted under Section VII. b. and c. of this ordinance. Target sediment and pollutant removal rates are to be within 50 percent and 60 percent.

A minimum fixed buffer width of 10 meters or 33 feet is documented in the scientific literature as providing approximately 60 percent or greater sediment and pollutant removal while minimally protecting the adjacent water body (Source: Center for Watershed Protection).

Examples of Selective Clearing and Landscape Plans can be found in the following resources: *Vegetated Riparian Buffers and Buffer Ordinances*, Figure 2, pg. 12 and *Environmental Land Use Planning and Management*, John Randolph, Island Press, Figure 14.3, pg. 446, 2004.

Within the Waterfront Zone, the following additional prohibitions and limitations apply:

- a. No mechanized logging, no clear cutting of trees, and no cutting or removal of vegetation and natural ground cover (including the duff layer) below 3 feet in height shall be permitted, except as provided by an approved Selected Clearing and Landscape Plan.
- b. Restricted tree care involving the removal of dead, diseased, unsafe, or fallen trees, saplings, shrubs is permitted. All stumps and their root systems, stones, and duff shall be left intact in or on the ground.
- c. A view corridor and path to the water's edge may be established in accordance with a Selected Clearing and Landscape Plan submitted to and approved by the planning board of the municipality. This plan shall include photographic documentation of the pre-existing riparian buffer. The view corridor shall not exceed 75 feet in width or one-third the width of the shoreline frontage, whichever is less. View corridors must also be in compliance with the CSPA, Natural Woodland Buffer requirements, RSA 483-B.
- d. Preservation of dead and living trees that provide dens and nesting places for wildlife is encouraged.
- e. Planting and reforestation efforts to restore native vegetation within this zone is encouraged.

2. **Middle Zone:** The middle zone begins at the outer edge of the waterfront zone extending out a minimum fixed distance of 25 feet for 1st and 2nd order streams and a minimum distance of 50 feet for all other water bodies. The overall width of the middle zone can vary depending upon stream order and slope. Target sediment and pollutant removal rates are to be within 60 to 70 percent. Forest management and limited tree clearing and removal are allowed within the middle zone as well as limited recreational uses, stormwater BMPs, paths, and other similar uses as permitted under Section VII. b. and c. of this ordinance. However, a minimum of 50 percent of the tree canopy within this zone shall remain in an undisturbed state. Overall tree canopy shall be managed through a Selective Clearing and Landscape Plan.

Within the middle zone, the following additional prohibitions and limitations apply:

- a. Impervious surfaces on the portion of the lot within the shoreland protection district shall be limited to 20 percent subject to Section D. 3. of this ordinance.
- b. No mechanized logging or clear cutting of trees and vegetation shall be permitted.
- c. Limited tree removal and clearing, tree pruning, including the removal of dead, diseased, unsafe, or fallen trees, saplings, shrubs is permitted. All stumps and their root systems shall be left intact in the ground.
- d. Fifty percent of this zone should remain in an undisturbed state.

A minimum fixed buffer width of 15 meters or 50 feet is documented in the scientific literature as providing greater than 60 percent sediment and pollutant removal while providing minimal general wildlife and avian habitat value. (Source: Center for Watershed Protection).

- e. A view corridor and path to the water's edge may be established in accordance with a **Selected Clearing and Landscape Plan** approved by the planning board of the municipality. No more than 50 percent of the tree canopy within this zone may be removed as shown on the **Selected Clearing and Landscape Plan**.
 - f. Preservation of dead and living trees that provide dens and nesting places for wildlife is encouraged.
 - g. Planting and reforestation efforts to restore the native vegetation within this zone is encouraged.
3. **Outer Zone:** The function of the outer zone is to prevent encroachment into the inner and middle zones of the riparian buffer and to filter runoff from adjacent residential and commercial development. The outer zone begins at the outer edge of the middle zone extending out a minimum distance of **25 feet** for 1st and 2nd order streams and a minimum distance of **50 feet** for all other water bodies. Target sediment and pollutant removal rates are to be within 70 to 90 percent.

Within the outer zone, the following additional prohibitions and limitations apply:

- a. Tree removal and clearing, tree pruning, including the removal of dead, diseased, unsafe, or fallen trees, saplings, shrubs is permitted in accordance with a Selected Clearing and Landscape Plan approved by the planning board of the municipality.
- b. No more than 50 percent of the tree canopy within this zone may be removed as shown on the Selected Clearing and Landscape Plan.
- c. Preservation of dead and living trees that provide dens and nesting places for wildlife is encouraged.
- d. Planting and reforestation efforts to restore the natural vegetation within this zone is encouraged.
- e. Impervious surfaces on the portion of the lot within the shoreland protection district shall be limited to 20 percent subject to Section D. 3. of this ordinance.

A minimum fixed buffer width of 20 meters or 66 feet is documented in the scientific literature as providing 70% or greater sediment and pollutant removal while providing minimal general wildlife and avian habitat value. (Source: Center for Watershed Protection).

VIII. NON-CONFORMING LOTS, USES AND STRUCTURES

- A. **General Purpose:** It is the intent of this Ordinance to promote the conforming use of land located within the Shoreland Protection District, except that non-conforming lots, structures and uses that existed before the effective date of this Ordinance or amendments thereto shall be allowed to continue, subject to the requirements as set forth in this section. Except as otherwise provided in this Ordinance, a non-conforming lot, use or structure shall not be permitted to become more non-conforming.
- B. **Non-conforming Lots:** Non-conforming, undeveloped lots of record that are located within the Shoreland Protection District shall comply with the following restrictions, in addition to any other requirements of the municipality's zoning ordinance:

1. Except when otherwise prohibited by law, present and successive owners of an individual undeveloped lot may construct building or structure on it, notwithstanding the provisions of this Ordinance.
2. Conditions may be imposed which, in the opinion of the municipality's zoning board of adjustment as appropriate, more nearly meet the intent of this Ordinance, while still accommodating the applicant's rights.
3. Building on non-conforming lots of record also include but not limited to docks, piers, boathouses, boat loading ramps, walkways, and other water dependent structures, consistent with this Ordinance.

C. **Non-conforming Uses:** Existing uses which are non-conforming under this ordinance may continue until the use ceases to exist or the use is discontinued for a period of one year. An existing non-conforming use may not be changed to another non-conforming use; existing non-conforming uses shall be required to meet the requirements of this ordinance to the maximum extent possible.

D. **Non-conforming Structures:** Except as otherwise prohibited, non-conforming structures, erected prior to the effective date of this Ordinance or amendments thereto, located within the Shoreland Protection District may be repaired, renovated, or replaced in kind using modern technologies, provided the result is a functionally equivalent use. Such repair or replacement may alter the interior design or existing foundation, but no expansion of the existing footprint or outside dimensions shall be permitted. An expansion that increases the sewage load to an on-site septic system, or changes or expands the use of a septic system or converts a structure to condominiums or any other project identified under RSA 485-A:29-44 and rules adopted to implement it shall require DES approval. Between the primary building line and the reference line as shown on the following figure, no alteration shall extend the structure closer to the adjacent water body, except that the addition of a deck is permitted up to a maximum of 12 feet towards the reference line.

IX. RIPARIAN BUFFER MANAGEMENT, MAINTENANCE AND INSPECTION

- A. It shall be the responsibility of every property owner within the Shoreland Protection District to manage and maintain the vegetation and natural conditions existing within the riparian buffer located on their property. Management includes specific limitations on the alteration of the natural conditions of these resources as specified by this Ordinance. To help property owners assume this responsibility, it shall be the duty of every property owner to secure and install markers every 50 feet on trees depicting the location of the riparian buffer on their property.
- B. It shall be the responsibility of the planning board of the municipality to ensure that all plats and rights of way, prepared for recording, and site plans adopted by the planning board clearly:
 1. show the extent of the riparian buffer on the subject property by metes and bounds;

These buffer markers should be designed and sold by the conservation commission of the municipality to property owners. Examples of tree markers can be obtained from the Town of Bow, N.H. and are shown in the Wetlands Protection chapter. Installation and cost of the markers should be the responsibility of the property owner.

2. label the riparian buffer, building setbacks as well as the inner core, middle core and outer core zones of the riparian buffer;
 3. provide a note to reference the riparian buffer stating: “There shall be no clearing, grading, construction or disturbance of vegetation except as permitted by the planning board of the municipality”; and
 4. provide a note to reference any protective covenants governing the riparian buffer area stating: “Any riparian buffer shown hereon is subject to protective covenants which may be found in the land records and which restrict disturbance and use of these areas.
- C. It shall be the responsibility of the planning board of the municipality through aerial photography to inspect the integrity of the riparian buffer both annually and immediately following severe storms for evidence of sediment deposition, erosion, or concentrated flow channels and corrective actions taken to ensure the integrity and functions of the riparian buffer.

Procedures for conducting these inspections should be developed by the planning board and the municipality. This should also include obtaining photographic documentation of the integrity of the riparian buffer as part of the review and approval of stormwater management or selective clearing and landscape plans.

X. EXCEPTIONS

The following land uses are exempt from the provisions of this Ordinance:

- A. Forest management not associated with shoreland development or land conversion, and conducted in compliance with RSA 227-J:9.
- B. Forestry involving water supply reservoir watershed management.
- C. Agriculture activities and operations as defined in RSA 21:34-a. (except animal feedlots) provided such activities and operations are conducted in accordance with best management practices (BMPs).
- D. Temporary stream, stream bank, and other vegetation restoration projects, the goal of which is to restore the shoreline and riparian buffer to an ecologically healthy state.
- E. Wildlife and fisheries management activities consistent with the State Wildlife Action Plan and applicable state laws.
- F. The creation of foot path(s) to the water in accordance with an approved selective clearing and landscape plan and the construction of perched sandy beaches in accordance with a wetland permit issued by DES.
- G. Other uses permitted by the DES or under Section 404 of the Clean Water Act. Notwithstanding the above, all except uses, structures or activities shall comply with all applicable best management practices and shall not diminish water quality as defined by the Clean Water Act. All excepted uses shall be located as far from the reference line as reasonably possible.

SUMMARY OF MODEL ORDINANCE

SHORELAND PROTECTION DISTRICT AND RIPARIAN BUFFER STANDARDS

SHORELAND PROTECTION DISTRICT

- **150 ft.** for 1st and 2nd order streams and **250 ft.** for all other water bodies.
- Establishment/expansion of salt storage yards, auto junk yards, solid waste and hazardous waste facilities, animal feedlot operations, dry cleaning establishments, automobile service/repair shops, laundry/car wash establishments not on municipal water or sewer, disposal or land application of biosolids, including septage, sewage sludge and animal manure are prohibited.
- Subsurface disposal of pollutants from sewage treatment facilities, other than on-site septic systems, storage or hazardous substances, including the use of road salt and de-icing chemicals are prohibited.
- Bulk or temporary storage of chemicals above or below ground, bulk or temporary storage of petroleum products or hazardous materials above or below ground, excluding normal residential or business use of liquid petroleum products and heating fuels for on-premise use are prohibited.
- Sand and gravel excavations as defined in RSA 155-E, mining or the processing of excavated materials, and any other use or activity not expressly permitted.
- No fertilizer, except limestone between the reference line and 50 feet. From 50 ft. landward of the reference line to 250 ft. only low phosphate, slow release nitrogen fertilizer may be used.

Impervious Surface Area Limitations:

- Total constructed, impervious surface area is limited to 20% of a lot either partially or wholly located within the shoreland protection district. This may be increased to 25% in exchange for additional native tree and shrub planting within 50 ft. of the reference line through a deed restriction.

Stormwater Management:

- All earth moving or excavation activities on lots greater than 1 acre in size either partially or wholly within the shoreland protection district, including the construction of new structures and modifications to existing structures must be conducted in accordance with an approved stormwater management plan per NH DES specifications under RSA 541-A for terrain alteration and RSA 485-A:17 to manage stormwater and control erosion and sediment, during and after construction.
- A permit is also required under RSA 485-A:17, I. for developed, or subdivided land whenever there is a contiguous disturbed area exceeding 50,000 square feet that is partially or wholly within the shoreland protection district.

RIPARIAN BUFFER STANDARDS

- **Waterfront Zone:** 25 ft. from reference line for 1st and 2nd order streams and 50 ft. for all other water bodies. The Waterfront Buffer must be maintained in a natural state, although a view corridor and path to the water's edge may be established in accord with an approved Selected.
- **Clearing and Landscape Plan.** No mechanized logging, no clear cutting of trees, and no cutting or removal of vegetation and natural ground cover (including the duff layer) below 3 feet in height is allowed, except as provided by this plan. Restricted tree care involving the removal of dead, diseased, unsafe, or fallen trees, saplings, shrubs is permitted. All stumps and their root systems, stones and duff shall be left intact in or on the ground.
- **Middle Core:** 25 ft. from reference line for 1st and 2nd order streams and 50 ft. for all other water bodies. Forest management and limited tree clearing and removal are allowed. No more than 50% of the tree canopy within this zone can be removed. Overall tree coverage is managed through a Selected Clearing and Landscape Plan.
- **Outer Core:** 25 ft. from the reference line for 1st and 2nd order streams and 50 ft. for all other water bodies. No more than 50% of the tree canopy within this zone may be removed. Tree removal and clearing, tree pruning, including the removal of dead, diseased, unsafe, or fallen trees, saplings, shrubs is permitted.
- **Selected Clearing and Landscape Plan:** This plan is required in order to establish a view corridor and path to the water's edge as well as document the pre-existing riparian buffer conditions on the lot. The view corridor shall not exceed 75 feet in width or one-third the width of the shoreline frontage, whichever is less. View corridors must also be in compliance with the CSPA, Natural Woodland Buffer requirements per RSA 483-B.

PRIMARY BUILDING LINE

- Primary structures must be set back at least **25 ft.** from the reference line for 1st and 2nd order streams and **50 ft.** for all other water bodies.

ACCESSORY STRUCTURES

- Accessory structures must be setback at least **25 feet** from the reference line.

REFERENCE LINE

- For coastal waters = highest observable tide line
- For rivers = ordinary high water mark
- For natural fresh water bodies = natural mean high water level
- For artificially impounded fresh water bodies – water line at full pond

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2.7 Flood Hazard Area Zoning

BACKGROUND AND PURPOSE

This chapter provides planning boards with some basic background information on protecting residents and their property from floods through the prevention of adverse impacts caused by development in the floodplain, and a model ordinance that can be adopted by communities or used to amend existing floodplain ordinances.

Flooding is a routine natural process that occurs when flows exceed the capacity of stream channels to carry them. The adjacent lands, called floodplains, serve an important function. As the water spreads out over the floodplain it slows down, and as a result, both downward erosion in the riverbed and lateral erosion of the riverbanks are reduced. Vegetation on the banks and in the floodplain slows the floodwaters further.

RELATED TOOLS:

- Stormwater Management
- Erosion and Sediment Control During Construction
- Shoreland Protection
- Wetlands Protection

FIGURE 2.7.1 Floodplain Diagram

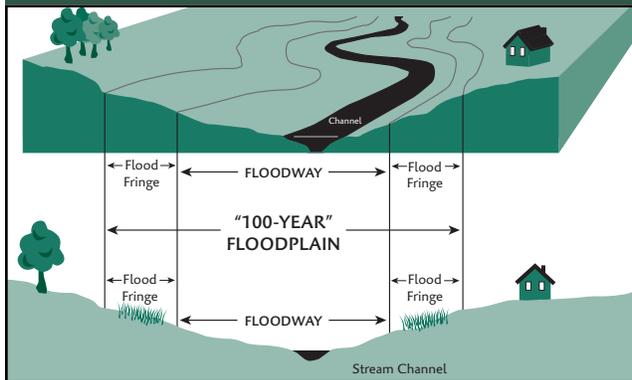


FIGURE 2.7.2 Church Street Flooding in Keene, 1936



The most disastrous flooding in New Hampshire during recent decades resulted from prolonged heavy rains or repetitive rain events. In the 1990s, hurricanes and other heavy rains in summer and fall caused flooding on a magnitude to warrant six disaster declarations. More recently, in October 2005, the remnants of a tropical storm and subtropical depression merged with cold fronts to produce 9 to 11 inches of rainfall in Cheshire County over just a couple of days (NOAA National Climatic Data Center). Severe flooding occurred in the watersheds of the Cold River, Ashuelot River and Otter Brook as well as along the Connecticut River. News accounts reported more than 1,000 people evacuated, numerous houses washed off their foundations, seven deaths, and five bridges destroyed. Soon after, in mid-May

FIGURE 2.7.3 Alstead Flooding, 2005



2006, 8 to 12 inches of continuous heavy rain over a three-day period caused the worst flooding in New Hampshire since the hurricane of 1938 (NOAA National Climatic Data Center). USGS reported the highest ever flows recorded on 12 rivers in central and southern New Hampshire; six were higher than the predicted 100-year flood. A reported 600 roads were closed, hundreds of families had to evacuate, and dozens of homes were lost.

Floodwaters themselves are dangerous. Just a few inches of swiftly moving water can knock people off their feet, and it only takes a couple feet of water to carry an automobile away. Often the greatest damage from flooding is caused by the debris carried by the floodwaters, or by debris obstructing stormwater flow. Damage to or obstruction of flows through bridges, dams and culverts can have devastating effects.

Flooding is costly both to the victims and the public. In the short term, there is the cost of the emergency response, temporary housing, conducting damage assessments, and the administrative cost of organizing assistance. The long term costs associated with property damage, such as loss of business and personal income, reduction in property values, loss of tax revenues, and infrastructure repair, can be devastating to residents, businesses and the local government. The October 2005 flood described above resulted in \$15.9 million in reported damage, and the May 2006 floods caused tens of millions of dollars in damage (NOAA National Climatic Data Center).

Northern New England's development history brought us to a point where much development is already in the path of floodwaters. In early years, rivers provided both transportation routes and the source of power for mills. As roads developed, these too tended to follow the paths of river courses. The places where rivers and roads came together often became the focal points for development that formed today's cities and villages. In recent decades, the flat, well drained soils of floodplains, often already cleared for agricultural purposes, have attracted residential, commercial and industrial development.

Just as much of the nation's population is concentrated along its east and west coasts, nearly one-third of New Hampshire's population resides in its two coastal counties. As noted geographer Rutherford Platt wrote of the threats of hurricanes,

FIGURE 2.7.4 Coastal Storm



flooding and erosion faced by coastal inhabitants, “Often the very physical characteristics which attract human occupancy are responsible as well for the disaster potential. They [the nation’s perimeters] are the scene of intense competition between public and private interests, between economic and environmental values, and between diverse land and water uses: residence, business, industry, transportation, recreation, and conservation.” (Platt, 1978)

Local flood hazard planning must address these existing activity centers and respect the historical investments that have been made in them, as well as prevent impacts associated with development. Reduction of flood hazards requires a comprehensive approach to both hazard mitigation and watershed management.

Many New Hampshire cities and towns have floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements. The National Flood Insurance Act of 1968 created the NFIP in response to the lack of private market flood insurance and the rising costs of disaster relief to the taxpayer. Property owners are not eligible for the insurance program until their community adopts regulations requiring residential structures to be elevated to or above the 100 year flood elevation. Regulations must also require nonresidential structures (including public facilities) to be flood-proofed, and restrict encroachment on the floodway. The Government Accounting Office estimates that the standards for new construction required by participating communities save about \$1 billion annually in flood damage nationwide (United States General Accounting Office, National Flood Insurance Program – 2004). Most New Hampshire communities participate in the NFIP. At the state level, the NFIP is coordinated through the Office of Energy and Planning (OEP) which provides model ordinances meeting the minimum requirements for NFIP eligibility.

It is important for local officials, residents and business owners to realize that the model ordinances provided by OEP are *only* intended to meet the minimum requirements of the National Flood Insurance Program. They meet the minimum standards for regulation of floodplain development. The NFIP was not intended to

keep the public safe from floods, but to reduce flood damage by putting some parameters on floodplain development in exchange for affordable insurance. In fact, the Federal Emergency Management Agency minimum requirements allow encroachment of the floodplain until the base flood elevation of the floodway has been increased by one foot.

This increased flood elevation has the potential to increase the damage to neighboring properties, as well as to downstream communities receiving the floodwaters with increased velocity and increased erosion and sedimentation. In addition, the minimum standards allow development in the floodplain that will cause the floodplain itself to expand over time. Application of only the minimum NFIP requirements provides a false sense of security for residents in light of these cumulative impacts of development.

Floodplain maps have been developed by the Federal Emergency Management Agency but are only approximations of the flood plain location for insurance purposes. It is important for communities to understand the meaning of the terms used on the floodplain maps developed for their city or town, and what is and is not included on the maps. Table 1 displays the terms used in floodplain maps. In general, “A” or “A” followed by a letter or number represents the 100-year floodplains, which are areas with a 1 percent chance of a flood occurring, or being exceeded, in a given year. In unnumbered “A” zones, no engineering study has been done. The maps in these areas are based on existing data only, such as records or evidence of past floods. “V” designates the areas expected to be affected by the storm surges and a three-foot breaking wave associated with the 100-year coastal storm.

Development in areas labeled with “B”, “C” or “X” are not necessarily safe from flooding. These may be areas between the 100-year and 500-year floodplains, 500-year floodplain, areas where the 100-year base flood is expected to be less than one foot, or other areas with minimal hazard. Flood hazards are not mapped by FEMA for watersheds smaller than one square mile.

FEMA mapping is based on existing watershed conditions, with the exception of the floodway. In general terms, the regulatory floodway is the main channel of the water course. It is demarcated by determining how much area would need to remain unobstructed for the 100-year flood elevation to only increase the water surface elevation by a designated height. In New Hampshire, this elevation is one foot. (*In coastal areas, the floodway is determined based on riverine flooding only, and the wording for the ordinance should be adapted accordingly.*)

FEMA has several programs to provide financial assistance to communities for projects aimed at reducing the potential damage from flooding, including the Flood Mitigation Assistance Program, Pre-Disaster Mitigation Program, and Hazard Mitigation Grant Program. Such projects include removing or raising existing buildings to prevent repeat claims. The Government Accounting Office reported that in New Hampshire flood insurance claims paid to the same property more than once in 10 years between 1978 and 2003 totaled \$2,489,816 (United States General Accounting Office, 2004). In addition, FEMA’s Community Rating System (CRS) program provides an incentive to communities that go beyond the minimum NFIP requirements. Through the Community Rating System program materials, FEMA provides information on a number of approaches communities can take to further reduce damage from flooding and protect the functions of the floodplain. The CRS program encourages conservation of floodplain areas as open space, higher regulatory standards for construction, public education, development of better flood data, and flood preparedness. As an incentive for incorporating some of these approaches into the community’s floodplain management, FEMA reduces flood insurance rates for policyholders in participating communities.

Designation	Definition
Zone A	The 1 percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.
Zone AE and A1-A30	The 1 percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AH	The areas of 1 percent annual chance shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AO	The areas of 1 percent shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the Flood Insurance Rate Map. Mandatory flood insurance purchase requirements apply.
Zone AR	<p>The zone used to depict areas protected from flood hazards by flood control structures, such as a levee, that are being restored. FEMA will consider using the Zone AR designation for a community if the flood protection system has been deemed restorable by a federal agency in consultation with a local project sponsor; a minimum level of flood protection is still provided to the community by the system; and restoration of the flood protection system is scheduled to begin within a designated time period and in accordance with a progress plan negotiated between the community and FEMA. Mandatory purchase requirements for flood insurance will apply in Zone AR, but the rate will not exceed the rate for an unnumbered Zone A if the structure is built in compliance with Zone AR floodplain management regulations.</p> <p>The property owner is not required to elevate an existing structure when making improvements to the structure. However, for new construction, the structure must be elevated (or floodproofed for non-residential structures) so that the lowest floor, including basement, is a minimum of three feet above the highest adjacent existing grade, if the depth of the Base Flood Elevation (BFE) does not exceed five feet at the proposed development site. For infill sites, rehabilitation of existing structures, or redevelopment of previously developed areas, there is a three-foot elevation requirement regardless of the depth of the BFE at the project site.</p>
Zone A99	The 1 percent annual chance floodplain that will be protected by a federal flood protection system where construction has reached specified statutory milestones. No Base Flood Elevations or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.
Zone D	The areas where there are possible but undetermined flood hazards. In areas designated as Zone D, no analysis of flood hazards has been conducted. Mandatory flood insurance purchase requirements do not apply, but coverage is available. The flood insurance rates for properties in Zone D are commensurate with the uncertainty of the flood risk.
Zone V	The areas within the 1 percent annual chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no Base Flood Elevations are shown within this zone. Mandatory flood insurance purchase requirements apply.
Zone VE	The areas within the 1 percent annual chance coastal floodplain that have additional hazards associated with storm waves. Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zones B, C, and X	The zones that correspond to areas outside the 1 percent annual chance floodplain, areas of 1 percent annual chance sheet flow flooding where average depths are less than one foot, areas of 1 percent annual chance stream flooding where the contributing drainage area is less than one square mile, or areas protected from the 1-percent annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

Source: FEMA website www.fema.gov/plan/prevent/fhm/fq_gen13.shtm

The principle of “no adverse impact” floodplain management, long advocated by many in the planning community, has been endorsed since 2000 by the Association of State Floodplain Managers as a goal for local, state and federal floodplain management. No Adverse Impact floodplain management is where the action of one property owner does not adversely impact the rights of other property owners, as measured by increased flood flows; peaks and velocity; erosion and sedimentation; degradation of water quality; or increased cost of public services. (Association of State Floodplain Managers, 2003).

The Association of State Floodplain Managers No Adverse Impact educational campaign has included publication of a “toolkit,” which provides communities with information on hazard identification and floodplain mapping, education and outreach, planning, regulations and development standards, mitigation, infrastructure, and emergency services. For each of these steps in a comprehensive floodplain management program, a range of approaches is presented, from those necessary to meet the bare minimum FEMA requirements for participation in the flood insurance program, to those which would achieve no adverse impact. In addition, several fact sheets for communities concerned about legal aspects of stricter floodplain regulation, such as takings claims, have been developed for the Association by Jon A. Kusler, Esq., Associate Director of the Association of State Wetland Managers.

Planning for the future is becoming more and more important as global warming makes future weather patterns uncertain. The US Environmental Protection Agency warns that as a result of global warming “more precipitation may come in short intense bursts (e.g., more than two inches of rain in a day), which could lead to more flooding” (USEPA, 1997). Rising sea levels associated with global warming exacerbate the increased risks of flooding in coastal communities. The EPA reports that over the last century the average temperature in Hanover, N.H., has increased two degrees F and is likely to increase several more degrees in this century. Sea level at Portsmouth is rising at a rate of seven inches per century and is likely to rise another 18 inches by 2100. Consistent with the global warming models, the frequency of extreme rainfall events is increasing.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

The Flood Hazard Overlay District provided here is appropriate for any community in New Hampshire with NFIP mapped flood hazard areas. The model ordinance is set up as an overlay district, but can be modified for communities that are interested in creating a flood hazard zone.

To maximize the effectiveness of a floodplain management program, it must be part of a regional watershed approach to managing water resources and development. There are many other issues to consider in addition to what happens in the mapped floodplain itself. For example, all too often communities adopt minimum floodplain regulations for the mapped floodplain, and then allow development in the rest of the community that could increase stormwater runoff, thereby increasing the extent of the floodplain and height of floodwaters. Components of a comprehensive approach to planning for flood hazard prevention include:

- Integration with multi-hazard mitigation planning and emergency operations planning, and coordination of these at the local, regional and state level.

- Inclusion of mitigation as part of the community's floodplain management strategy. Mitigation might include acquisition of certain properties with high value to the community for open space uses such as recreation or prime agricultural land; assistance to landowners desiring to relocate buildings onto higher ground; or moving, elevating or floodproofing important public, cultural and historic buildings.
- Dam safety inspection and maintenance.
- Review of subdivision regulations to ensure they complement the zoning ordinance requirements and do not create lots without access and building sites several feet above the base flood elevation. Plans for subdivisions in 500-year floodplains should show adequate building envelopes outside the floodplain.
- Amendment of zoning and subdivision regulations to incorporate strong stormwater management provisions to ensure that peak flows leaving development sites are not higher than prior to construction; the volume of stormwater runoff is minimized; and retention/detention facilities are appropriately sized, designed, and maintained long term (see the Stormwater Management chapter of the guidebook). Stormwater runoff from the buildings, roads, parking lots and other developed areas where soils have been compacted by human activity has typically been anywhere from 10 percent to over 100 percent higher than from undeveloped areas. The focus of typical subdivision and site plan review has traditionally been on ensuring that the proposed drainage system is adequately sized to move stormwater off of the site. The result of designing stormwater channels more efficient than nature's uneven irregular paths is not only an increase in the amount of stormwater runoff but also an increase in peak flows downstream.
- Prevention of erosion and sedimentation during and after construction. Just as floodwaters can cause erosion and sedimentation, erosion and sedimentation can increase flooding. As sedimentation fills channels, retention basins and surface waters, floodwater storage capacity is lost. (see the Sediment and Erosion Control chapter of the guidebook.)
- Building codes and associated inspections and enforcement. The state building code in New Hampshire is the International Building Code, which incorporates NFIP building standards. However, most enforcement is the responsibility of the municipality.
- Maintenance of the integrity of the hydrological cycle through protection of wetlands and vegetated buffers to ameliorate stormwater flows.
- Maintenance of vegetated shoreline buffers along rivers and streams to slow floodwaters and reduce erosion and sedimentation.
- Shoreline setbacks from all rivers and streams to protect banks and keep human activity away from the danger of flash flooding.
- Appropriate planning and design of roads and culverts. Much more has been learned about the relationship between culvert size and shape since most of our roads were built. Upgrades need to be incorporated into improvement projects.

- Continued efforts to improve mapping of flood hazard areas. Sedimentation and erosion, channel meander, and future development in upstream areas are not accounted for in traditional floodplain modeling and mapping. However, our understanding of fluvial geomorphology – how streams respond to changes in the landscape – is increasing, allowing for more accurate mapping of some flood-prone areas, including smaller headwater streams not shown on FEMA maps.
- Property tax assessments based on what development would be allowed.
- Public education on the availability of flood insurance in most New Hampshire communities and its affordability.

All of these activities together with restrictions on new development in identified floodplain areas can work to keep residents safe and costs down.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

ENABLING STATUTES

Among the techniques authorized by 674:21, innovative land use controls, are environmental characteristics zoning and performance standards. In addition, RSA 674:56 was enacted in 2006 to clarify the authority of municipalities to adopt floodplain ordinances either as part of the community's general zoning ordinance or as a stand-alone ordinance.

THE COURTS

The Association of State Wetland Managers in conjunction with Edward A. Thomas, Esq., reviewed federal and state case law together with the Association of State Floodplain Managers' No Adverse Impact policy, and reports that, "Courts are likely to provide strong support for a no adverse impact regulatory performance standard approach" (Kusler, 2003). Some of the points Kusler makes include:

- Courts have "broadly and universally" supported floodplain regulations against takings challenges, and held that regulations may substantially reduce property values.
- Takings cases that have made headlines, such as *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992), *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987), and *Dolan v. City of Tigard*, 512 U.S. 374 (1994), were "not clearly based on principles of hazard prevention" and either denied all economic use of lands (*Lucas*) or permitted the public to enter private property (*Nollan* and *Dolan*).
- The most common challenges to regulations in the last 15 years have been claims that regulators allowed development that later caused harm such as flooding or erosion. "[A] municipality is vastly more likely to be sued for issuing a permit for development that causes harm than for denying a permit based on hazard prevention or 'no adverse impact' regulations."

- Courts have held that regulatory agencies do not need to eliminate all uncertainty, including maps with some inaccuracies, if a process exists for refining the data on a case by case basis.

LOCAL CONSIDERATIONS

This model incorporates language from model ordinances developed by NH Office of Energy and Planning (OEP) for communities in the NFIP. Communities that are not in the program and will not be considering it in the next several years may be able to remove some of the language provided. The community's regional planning commission staff can help with this. In addition, communities in the NFIP should always contact the NFIP state coordinator at the OEP to have any flood management ordinance reviewed for compliance prior to adoption. Finally, all ordinances and amendments in any community should always be reviewed with an eye toward the next step of implementation and enforcement.

EXAMPLES AND OUTCOMES

New Hampshire communities are fortunate to have access to information on floodplain management through the OEP website at www.nh.gov/oep. OEP reports that quite a few communities in the state have adopted floodplain management regulations stricter than required for participation in the NFIP. Those with “no build” ordinances include: Bath, Cornish, Easton, Frankestown, Franconia, Hancock, Hanover, Litchfield, and Piermont.

Keene, Marlborough, Peterborough, Rye, and Winchester participate in FEMA's Community Rating System program. This means that residents benefit from their community's enhanced floodplain management through reduced rates on flood insurance policies. Other New Hampshire communities have gone beyond FEMA's minimum NFIP requirements as well by incorporating restrictions appropriate to their community. For example, densely developed Salem and Keene have both required compensatory storage to ensure development in the floodplains does not lead to a net loss of flood storage capacity.

The Internet makes it easy for planning board members and others to learn about approaches other communities around the country are using. Lincoln, Nebraska, for example, recently updated its floodplain management strategy to take a comprehensive watershed approach. This has included mapping smaller streams not shown on the community's FEMA maps, requirements for compensatory storage, “no net rise” in flood levels, and a vegetative buffer to help preserve the natural functions of the floodplain (Samuels, 2007).

The Association of State Floodplain Managers has compiled 11 case studies from communities around the country using No Adverse Impact approaches to reduce flood losses and reduce community liability (Association of State Floodplain Managers, 2004). The compilation includes information on tools and activities used by the communities to help other cities and towns develop approaches that best fit their needs and goals. Information on how the communities generated support for the program is also included.

Model Language and Guidance for Implementation

The following model ordinance is based on the No Adverse Impact goal. Primary differences between this model and the minimum National Flood Insurance Program requirements include:

A base flood elevation (BFE) of one foot is the current requirement. Municipalities can require a BFE as high as three feet; however, it is a substantial change. The municipality should evaluate which option is most suitable for the community based on historical flood data and document the reasons this option was chosen.

- New principal buildings are not allowed in flood hazard areas unless there is no other site available on a lot of record at the time of adoption.
- Uses with an especially high potential for causing hazardous conditions during a flood event are prohibited.
- New structures and additions must be 1 to 3 feet above the base flood elevation.
- Fill or other encroachments must be mitigated by compensatory storage.

Many of the elements of this model ordinance are FEMA Community Rating System (CRS) activities, which means the community would get points toward a reduction in flood insurance rates for residents.

MODEL ORDINANCE FOR FLOOD HAZARD AREA OVERLAY DISTRICT

I. TITLE AND AUTHORITY

A. Title

The title of this District shall be the [Town/City] of _____ Flood Hazard Area Overlay District.

B. Authority

This ordinance is adopted under the authority granted pursuant to RSA 674:16, Grant of Power, RSA 674:21, Innovative Land Use Controls, and 674:56, Floodplain Ordinances.

II. PURPOSE

The purpose of the Flood Hazard Area Overlay District is to protect the health and safety of residents by promoting the most appropriate use of land in Flood Hazard Areas, as follows:

- Uses which will result in no increase in base flood levels, flows, peaks or velocity.
- Uses which will not increase the potential for flood damage to the owner's property or that of others.
- Uses which will protect the benefits provided to the community by the floodplain.
- Uses which will result in no increase in erosion and/or sedimentation or other degradation of water quality.

This ordinance can be adopted either as an overlay district in which the underlying district determines lot sizes, density, frontage requirement, setbacks, and uses allowed by special exception, or as a separate zoning district. In the case of a separate zoning district, additional information would be needed specifying those requirements and delineating the area.

- E. Uses which will not increase the risk to public safety, or to emergency personnel during flood events, or result in an increase in the cost of public services above costs incurred when not in a floodplain.

III. FINDINGS

Certain areas of the [Town/City] of _____ are subject to periodic flooding, causing a serious threat to the health, safety and welfare of residents. These areas are shown on the Flood Insurance Rate Maps for _____ dated _____ and described in the Flood Insurance Study for _____ dated _____.

IV. APPLICABILITY

All proposed development in the Flood Hazard Area Overlay District shall require a permit.

The building inspector shall review all building permit applications for new construction, additions to existing structures, and substantial improvement to determine whether the proposed site is within the Flood Hazard Area Overlay District. If the site is determined to be within the Flood Hazard Area Overlay District, the building inspector shall review the application to ensure that the proposal is in compliance with all provisions of the District including all applicable standards contained in section XI Development Standards.

This ordinance should be administered by whatever official in the community administers the local permit requirements and has the function of initially reviewing proposed development, whether that is a building inspector, code enforcement officer, zoning administrator, town planner, board of selectmen, or other official. The title of that administrative official or body should be substituted wherever the words "building inspector" appear in this model ordinance.

- A. For all new, expanded or substantially improved structures located in Zone(s) A, A1-30, AE, A0 or AH the applicant shall furnish the following information to the building inspector:
 1. The as-built elevation (in relation to National Geodetic Vertical Datum/North American Vertical Datum (NGVD/NAVD)) of the lowest floor (including basement) and include whether or not such structures contain a basement.
 2. If the structure has been floodproofed, the as-built elevation (in relation to NGVD/NAVD) to which the structure was floodproofed.
 3. Any certification of floodproofing.
- B. For all new construction or substantially improved buildings located in Zones V, VE or V1-30 the applicant shall furnish the building inspector records indicating the as-built elevation of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) in relation to NGVD/NAVD and whether or not the structure contains a basement.
- C. The building inspector shall maintain the aforementioned information for public inspection, and shall furnish such information upon request.

Encroachment or filling anywhere in the floodplain results in a loss of storage. A number of small structures or minor areas of fill over time can cumulatively increase flood levels and damage significantly.

FEMA is converting the vertical datum on the new county maps from NGVD to NAVD, except in Rockingham and Stafford counties. The municipality should list the vertical datum that is applicable to their community's floodplain maps.

- D. The building inspector shall not grant a building permit until the applicant certifies that all necessary permits have been received from those governmental agencies from which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U. S. C. 1334.
- E. The building inspector shall determine the 100-year flood elevation in the following order of precedence according to the data available:
 1. In Zone(s) AI-30, AH, AE, VI-30, and VE refer to the elevation data provided in the community's Flood Insurance Study and accompanying FIRM or FHBM.
 2. In unnumbered A zones or Zone A the building inspector shall obtain, review, and reasonably utilize any 100-year flood elevation data available from any federal, state or other source including data submitted for development proposals submitted to the community (i.e. subdivisions, site approvals).
 3. In zone A0 the flood elevation is determined by adding the elevation of the highest adjacent grade to the depth number specified on the FIRM or if no depth number is specified on the FIRM at least two feet. (Item (c.) can be deleted if there are no AO zones on the maps.)

Some communities require that developers provide detailed flood data in A zones, or in X zones, to map floodplains for all drainage areas over a certain size, e.g. 40 acres.

The onus of proving a proposed project area is not within the floodplain is on the landowner for all parcels in the overlay district.

Add or replace language as appropriate based on the most accurate and comprehensive maps of the community's flood hazard areas, and revise definitions section accordingly. As more information becomes available, other flood hazard areas not shown on the community's FIRMs can be added to the Flood Hazard Area Overlay District map.

V. BOUNDARIES

The provisions of this district shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency in its "Flood Insurance Study for the [Town/City/County] of _____, N.H." dated _____ or as amended, together with the associated Flood Insurance Rate Maps [*add or revise title for community's maps, e.g., "Flood Boundary and Floodway Maps"*] dated _____ or as amended, which are declared to be a part of this ordinance and are hereby incorporated by reference.

The provisions of the Flood Hazard Area Overlay District shall overlay and supplement the provisions of the underlying zoning district.

VI. DEFINITIONS

The following definitions shall apply only to this Flood Hazard Area Management Ordinance, and shall not be affected by the provisions of any other ordinance of the (Town/City) of _____.

Addition: An expansion of a structure outside of the footprint of the original building.

Area of Shallow Flooding: A designated A0, AH, or V0 zone on the Flood Insurance Rate Map (FIRM) with a 1 percent or greater annual possibility of flood-

ing to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet-flow.

Area of Special Flood Hazard: The land in the floodplain within the [Town/City] of [Name] subject to a one percent or greater possibility of flooding in any given year. The area is designated as Zone A on the FHBM and is designated on the FIRM as Zones A, A0, AH, AI-30, AE, A99, VI-30, VE, or V.

Base Flood: The flood having a 1 percent possibility of being equaled or exceeded in any given year.

Basement: Any area of a building having its floor subgrade on all sides.

Building: “Structure.”

Breakaway Wall: A wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or supporting foundation.

Compensatory Flood Storage: The replacement for any loss of existing flood storage caused by development within the floodplain.

Development: Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavating or drilling operation or storage of equipment or materials.

FEMA: The Federal Emergency Management Agency.

Flood or Flooding: A general and temporary condition of partial or complete inundation of normally dry land areas from either the overflow of inland or tidal waters, or the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Boundary and Floodway Map (Floodway Map): The official map of the [Town/City] of [Name] on which FEMA has delineated the “Regulatory Floodway.” This map should not be used to determine the correct flood hazard zone or base flood elevation, the Flood Insurance Rate Map (FIRM) will be used to make determinations of flood hazard zones and base flood elevations. *[Include this definition only if applicable to the community.]*

Flood Insurance Rate Map (FIRM): The official map incorporated with this ordinance, on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to the (Town/City) of [Name].

Flood Insurance Study: An examination, evaluation, and determination of flood hazards and if appropriate, corresponding water surface elevations, or an examination and determination of mudslide or flood-related erosion hazards.

Floodplain or Flood-prone Area : Any land area susceptible to being inundated by water from any source (see definition of “Flooding”).

Flood proofing: Any combination of structural and non-structural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real

To ensure compliance with NFIP requirements, all definitions contained in OEP’s New Hampshire Model Floodplain Management Ordinance Model E, January 2006, are contained herein, as well as others specific to this model.

estate or improved real property, water and sanitation facilities, structures and their contents.

Floodway: see “Regulatory Floodway.”

Freeboard: A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.

Functionally Dependent Use: A use that cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking and port facilities that are necessary for the loading/unloading of cargo or passengers, and ship building/repair facilities but does not include long-term storage or related manufacturing facilities.

Highest Adjacent Grade: The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic Structure: means any structure that is:

- a. Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- b. Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- c. Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- d. Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
 - i. By an approved state program as determined by the Secretary of the Interior, or
 - ii. Directly by the Secretary of the Interior in states without approved programs.

Lowest Floor: The lowest floor of the lowest enclosed area including basement. An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building’s lowest floor; provided, that such an enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of this ordinance.

Manufactured Home: A structure, transportable in one or more sections that is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes the term “manufactured home” includes park trailers, travel trailers, and other similar vehicles placed on site for greater than 180 consecutive days. This includes manufactured homes located in a manufactured home park or subdivision.

Manufactured Home Park or Subdivision: A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Mean Sea Level: The National Geodetic Vertical Datum (NGVD) of 1929, North American Vertical Datum (NAVD) of 1988, or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

New Construction: For the purposes of determining insurance rates, structures for which the "start of construction" commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, *new construction* means structures for which the *start of construction* commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

One Hundred-Year Flood: "Base flood"

Recreational Vehicle: Defined as:

- a. Built on a single chassis.
- b. 400 square feet or less when measured at the largest horizontal projection.
- c. Designed to be self-propelled or permanently towable by a light duty truck.
- d. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use.

Regulatory Floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Special Flood Hazard Area: See "Area of Special Flood Hazard."

Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

Start of Construction: Substantial improvements, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or part of the main structure.

Substantial Damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Substantial Improvement: Any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds 50 percent of the market value of the structure. The market value of the structure should equal:

- a. The appraised value prior to the start of the initial repair or improvement, or
- b. In the case of damage, the value of the structure prior to the damage occurring.

For the purposes of this definition, “substantial improvement” is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. This term includes structures that have incurred substantial damage, regardless of actual repair work performed. The term does not, however, include any project for improvement of a structure required to comply with existing health, sanitary, or safety code specifications that are solely necessary to assure safe living conditions or any alteration of a “historic structure,” provided that the alteration will not preclude the structure’s continued designation as a “historic structure.” This term does not apply to an “addition.”

Violation: The failure of a structure or other development to be fully compliant with the community’s flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44CFR § 60.3(b) (5), (c) (4), (c) (10), (d) (3), (e) (2), (e) (4), or (e) (5) is presumed to be in violation until such time as that documentation is provided.

Water Surface Elevation: The height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, North American Vertical Datum (NAVD) of 1988, (or other datum, where specified) of floods of various magnitudes and frequencies in the floodplains.

VII. PERMITTED USES

The following uses are permitted provided they are consistent with the purposes of this ordinance and do not involve the placement, expansion or construction of permanent structures or other materials that could impede floodwaters or become flood-carried debris:

- A. Agricultural activities consistent with current best management practices as published by the New Hampshire Department of Agriculture, Markets, and Food, including maintenance or improvement of existing crop or pasture land for continued agricultural use, as defined in Env-Wt 101.20 and described in Env-Wt 303.04(u).
- B. Forest Management consistent with current accepted best management practices. As specified in Logging Operations (Env-Wt 304.05):
 1. All skid trails, truck roads and log landings shall be located far enough from streams or ponds so that waterborne soil particles will settle out before reaching the streams or ponds.

- 2. Skid trails and truck roads shall be laid out using appropriate erosion control devices, as outlined in the *Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire*, Department of Resources and Economic Development, April 1996, updated February 2000, so that the grade approaching a stream or pond is broken, and surface water is dispersed. Crossings of streams and wetlands shall be kept to a minimum and shall be located to minimize impact in accordance with Env-Wt 302.04(b) and (c).
- C. Outdoor recreation, such as play areas, boating, hunting, fishing, trails for motorized or non-motorized use.
- D. Wildlife or fisheries management.
- E. Scientific research and educational activities.
- F. Home occupations and home businesses in existing residences consistent with _____ [community will need to identify other section(s) of zoning ordinance covering these if any].
- G. Replacement water and sewer systems, including on-site systems, provided that the applicant shall provide the building inspector with assurance that these systems will be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and on-site waste disposal systems will be located to avoid impairment to them or contamination from them during periods of flooding.
- H. Substantial improvement not involving an addition.

Floodplain vegetation plays an important role in managing floodwaters and preventing erosion and sedimentation. While most communities will want to allow agriculture and forest management without a Special Exception, inspection and enforcement of vegetated buffer requirements are essential to the maintenance of a well functioning floodplain.

One of the differences between this model and those that are designed to meet minimum NFIP requirements only is the distinction between additions and other substantial improvements. From an actuarial standpoint, the monetary value of the improvement is important. From a floodplain management standpoint, the physical size of the encroachment is the relevant factor. This model therefore allows substantial improvements not involving additions as permitted uses, but requires a Special Exception for additions to ensure that there is no increased encroachment in the floodplain, or that if there is, compensatory storage is created.

VIII. PROHIBITED USES

- A. New buildings or other structures except as allowed below by Special Exception.
- B. Processing or storage of excavation materials.
- C. Storage of construction or other materials which would impede flow of floodwaters.
- D. Filling.
- E. Grading that results in obstruction of flood flows or reduces flood storage capacity.
- F. Dumping.

- G. Wastewater or septage treatment facilities.
- H. Storage of floatable, or toxic, hazardous, or regulated substances. (Quantities typical for household use are permissible if stored [1 to 3] feet or more above base flood elevation.)
- I. Unsecured tanks.
- J. Junkyards.
- K. Landfills.
- L. Subdivision of land that would create a parcel that had no developable land outside the Flood Hazard Area.

IX. USES BY SPECIAL EXCEPTION

The zoning board of adjustment may grant a Special Exception for the following uses if determined, based on evidence provided by the applicant, to be in conformance with the standards provided in Section XI below and the purposes of the Flood Hazard Area Overlay District listed in Section II above:

- A. Water impoundments for the purpose of creating a waterbody for wildlife, fire safety, on-site detention of stormwater run off and/or recreational uses.
- B. Water-dependent uses, such as docks, boathouses, and water powered projects.

If not in floodway:

- C. Additions to or replacements of existing structures, including manufactured homes.
- D. Accessory structures to existing primary uses when it is not practicable to construct the accessory structure on a portion of the lot outside of the Flood Hazard Area Overlay District.
- E. One principal building on a preexisting lot of record with no developable land outside Flood Hazard Area Overlay District.
- F. New or expanded septic systems if no suitable location exists for the system on a portion of the lot outside of the Flood Hazard Area Overlay District.
- G. Construction, repair or maintenance of streets, roads, and other access ways, including driveways, footpaths and bridges, and utility right-of-way easements, including power lines and pipe lines, wastewater collection facilities and pump stations, if essential to the productive use of land adjacent to the Flood Hazard Area Overlay District.
- H. Undertaking of a use not otherwise permitted in the Flood Hazard Area Overlay District, if it can be shown that such proposed use does not involve the erection of structures or filling and is in accordance with all of the purposes of the District as listed in Section II, and those of the underlying zoning district.

A primary goal of this model ordinance is to balance public safety with landowner needs. Only development necessary to enjoy the investment already made in floodprone property is allowed. The alternative allowed under the minimum NFIP requirements, elevating and flood-proofing, does not take other public costs and risks into account. These include the safety of emergency personnel forced to traverse flood waters to rescue people stranded in elevated buildings, or the damage to streets, utilities and other infrastructure serving development in the floodplain.

X. NONCONFORMING USES

An existing use or structure as of the effective date of this ordinance may continue, even though it does not conform to requirements of these regulations. Such non-conforming uses and structures may not be extended, enlarged, or re-established after being discontinued for more than one year.

Nor may a non-conforming use and/or structure be modified to create another non-conforming use and/or structure unless it is determined by the board of adjustment that the proposed use will not increase the degree of non-conformance with the standards contained in these Regulations.

Reconstruction of an existing structure will be allowed if for the same use, within the same building footprint, and of the same or smaller dimensions as existed within 12 months prior to reconstruction, provided the construction meets all applicable development standards of this ordinance.

XI. DEVELOPMENT STANDARDS

A. General Standards within the Flood Hazard Overlay District

1. All development, including new construction, additions, substantial improvements and fill shall be:
 - a. Designed (or modified) and adequately anchored to prevent floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
 - b. Constructed with materials resistant to flood damage.
 - c. Constructed by methods and practices that minimize flood damages.
 - d. Designed to result in no increase in flood levels during the flood event.
2. No encroachments may be located in the floodway unless a registered professional engineer certifies that the proposed development will not result in any increase in base flood levels.
3. All new construction and additions to any residential or nonresidential structure shall have the lowest floor, including basement, together with attendant utility and sanitary facilities, elevated to no lower than [*one to three*] feet above the base flood elevation.

To ensure the effectiveness of many of these provisions, an active program of inspection and enforcement must follow adoption.

The **base flood elevation** is that which models predict has a 1 percent chance of occurring each year. It is recommended that communities allow for some room for error above this figure, at least one foot, preferably three feet. The flood elevation models do not account for debris, downstream obstructions, or future development occurring in upstream communities without adequate stormwater regulations, or who allow development in the floodplain to increase flood levels. In addition, in any given year a larger storm than the 1 percent chance storm might occur. This margin of safety against known and unknown risks, and modeling and mapping limitations is called "Freeboard."

Requirements that buildings be elevated are not enough by themselves. Flood waters can cause damage to elevated buildings through erosion, scouring and settling. Offering the alternative that buildings be elevated with fill instead of columns provides safety for the occupants of the property when outside of the building.

A requirement for **compensatory storage** is an essential component of a floodplain management ordinance if fill is allowed as a means of elevating structures or utilities. Otherwise the ability of the floodplain to store floodwaters is decreased over time, and flood levels and damage will increase.

4. All utilities, including electrical, heating, ventilation, plumbing, air conditioning, and other service facilities, including ductwork, shall be elevated or made of flood resistant materials up to *[one to three]* feet above base flood elevation, and designed and located to prevent water from entering or accumulating within the components during conditions of flooding.
5. All new buildings and additions to existing buildings must be constructed on foundations that are approved by a licensed professional engineer, or constructed on properly designed and compacted fill (ASTM D-698 or equivalent) that extends beyond the building walls before dropping below the level which is *[one to three]* feet above the base flood elevation and has appropriate protection from erosion and scour. The fill design must be approved by a licensed professional engineer.
6. All recreational vehicles shall either: be on the site for fewer than 180 consecutive days; be fully licensed and ready for highway use; or meet all standards of Section 60.3 (b) (1) of the National Flood Insurance Program Regulations and the elevation and anchoring requirements for “manufactured homes” in Paragraph (c) (6) of Section 60.3. These regulations specify that recreation vehicles need to be built on enclosed areas to lift the lowest floor to the required freeboard height and that the enclosed areas must have openings to allow the floodwaters to enter and exit. The design of the openings must meet or exceed the minimum criteria listed in the model ordinance. If the minimum criteria are not feasible, then the openings have to be designed by a registered professional engineer or architect, who must certify the openings.
7. Where new or replacement water and sewer systems, including on-site systems, are proposed in a special flood hazard area the applicant shall provide the building inspector with assurance that these systems will be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and on-site waste disposal systems will be located to avoid impairment to them or contamination from them during periods of flooding.
8. The space occupied by fill, including mounded septic systems, or structure below the level which is *[one to three]* feet above the base flood elevation shall be compensated for and balanced by a hydraulically equivalent volume of excavation taken from below the base flood elevation. All such excavations shall be constructed to drain freely to the watercourse.
9. Nonresidential development, including buildings and fill, shall be limited to 10 percent of the lot.

This is an optional requirement designed to enable some development in areas the community has designated for nonresidential while recognizing that some floodplain values are lost even with compensatory storage.

10. Proposed structures to be located on slopes in special flood hazard areas shall include adequate drainage paths to guide floodwaters around and away from the proposed structures.

11. The activity must be sited and designed to minimize disruption to shorelines and their banks.

B. Additional Requirement for Coastal High Hazard Areas

The following regulations shall apply to coastal high hazard areas, designated as Zone(s) V, V1-30 and VE:

1. All new construction or substantial improvements are to be elevated on pilings and columns so that:
 - a. The bottom of the lowest horizontal structural member of the lowest floor (excluding the pilings or columns) is elevated to *[one to three]* feet above the base flood level; and
 - b. The pile or column foundation and structure attached thereto is anchored to resist floatation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values used shall be those associated with the base flood. Wind loading values used shall be those required by applicable state and local building standards.
2. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for construction, and shall certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this section.
3. The space below the lowest floor must either be free of obstructions or constructed with non-supporting breakaway walls, open lattice-work, or insect screening intended to collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the building or supporting foundation system. For the purposes of this section, a breakaway wall shall have a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Such enclosed space shall be usable solely for the parking of vehicles, building access, or storage.
4. The use of fill for the structural support of buildings is prohibited.
5. Man-made alterations of sand dunes that would increase potential flood damage are prohibited.
6. All new construction or substantial improvements within Zone(s) V1-30, VE, and V on the FIRM shall be located landward of the reach of mean high tide.

C. Additional Standards for Watercourses

[Note: If the community has a local wetlands ordinance, this section should be integrated with it, and the name of the board or title of the official who makes decisions on local wetlands permits should be inserted for "building inspector."]

1. In riverine situations, prior to the alteration or relocation of a watercourse the applicant for such authorization shall notify the Wetlands Bureau of the New Hampshire Department of Environmental Services and submit copies

of such notification to the building inspector, in addition to the copies required by the RSA 482-A: 3. Further, the applicant shall be required to submit copies of said notification to those adjacent communities as determined by the building inspector, including notice of all scheduled hearings before the Wetlands Bureau (add here notice of local wetlands hearings if the community has a local wetlands ordinance).

2. The applicant shall submit to the building inspector certification provided by a registered professional engineer assuring that the flood carrying capacity of an altered or relocated watercourse can and will be maintained.

D. Standards for Substantial Improvements Not Involving Additions and Not in Coastal High Hazard Area

1. Residential structures to be substantially improved shall have the lowest floor (including basement) elevated to or above the 100-year flood elevation.
2. Nonresidential structures to be substantially improved shall have the lowest floor, including basement, elevated to or above the 100-year flood level; or together with attendant utility and sanitary facilities, shall:
 - a. Be floodproofed so that below the 100-year flood elevation the structure is watertight with walls substantially impermeable to the passage of water;
 - b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy; and
 - c. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting the provisions of this section.

E. Additional Standards for Manufactured Homes

All manufactured homes to be placed or substantially improved within special flood hazard areas shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at least [*one to three*] feet above the base flood level; and be securely anchored to resist floatation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors.

F. Additional Standards for Recreation Vehicles

All recreational vehicles placed on sites within special flood hazard areas shall be either:

1. On the site for fewer than 180 consecutive days;
2. Fully licensed and ready for highway use; or
3. Meet all standards of Section 60.3 (b) (1) of the National Flood Insurance Program Regulations and the elevation and anchoring requirements for “manufactured homes” in Paragraph (c) (6) of Section 60.3, in addition to e. above.

XII. VARIANCES AND APPEALS

- A. Any order, requirement, decision or determination of the building inspector made under this ordinance may be appealed to the zoning board of adjustment as set forth in RSA 676:5. [*Note: In communities with no comprehensive zoning, a special board of adjustment appointed by the board of selectmen.*]
- B. If the applicant, upon appeal, requests a variance as authorized by RSA 674:33, I (b), the applicant shall have the burden of showing, in addition to the usual variance standards under state law, that the use, along with any mitigating measures proposed, will not:
1. Result in any increase in base flood levels, flows, peaks or velocity.
 2. Increase the potential for flood damage to the owner's property or that of others.
 3. Result in increased erosion and/or sedimentation or other degradation of water quality.
 4. Increase the risk to public safety or emergency personnel during flood events, or increase the cost to the public by virtue of its location in a flood hazard area.

The variance must additionally be the minimum necessary, considering the flood hazard, to afford relief.

- C. The zoning board of adjustment shall notify the applicant in writing that:
1. The issuance of a variance to construct below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage; and,
 2. Such construction below the base flood level increases risks to life and property.

Such notification shall be maintained with a record of all variance actions.

- D. The community shall:
1. Maintain a record of all variance actions, including their justification for their issuance, and
 2. Report such variances issued in its annual or biennial report submitted to FEMA's Federal Insurance Administrator.

REFERENCES

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2.8 Erosion and Sediment Control During Construction

BACKGROUND AND PURPOSE

The development process typically involves the removal of vegetation, the alteration of topography, and the covering of previously vegetated surfaces with impervious cover such as roads, driveways, and buildings. These changes to the landscape may result in the erosion of soil and the sedimentation of water bodies as soil travels to streams, rivers, and lakes in water runoff during storms at an increased velocity due to the lack of vegetative cover. The removal of vegetative cover and its roots system compromise the ability of vegetation to stabilize soil, reduce the velocity of runoff, shield the soil surface from rain, and maintain the soil's ability to absorb water.

Specific erosion and sedimentation impacts related to the loss of vegetation, pollution of the water supply, and alteration of topography are:

1. **Streambank erosion caused by an increase in stormwater runoff.** Eroded material may affect aquatic habitats and alter aquatic species' life cycle events by increasing turbidity, changing the water temperature, and changing the depth of water bodies.
2. **Alteration of existing drainage patterns.** This may affect abutting properties and roads, as well as water bodies.
3. **Destabilization of steep slopes.** Removal of trees and other vegetation may lead to erosion of soil on steep slopes.
4. **Reduced potential for groundwater recharge** due to coverage by impervious surfaces or drainage control methods that take stormwater off-site.
5. **Runoff of chemicals into water supplies.** Petroleum and other chemicals on construction sites may be included in non-point pollution that drains to water supplies during storm events.
6. **Runoff of nutrients into water supplies.** Nitrogen and phosphorus concentrations in surface water bodies can be dramatically increased by increased stormwater runoff resulting in accelerated eutrophication and the proliferation of non-native aquatic plant species.

There are several structural and non-structural methods and management and planning techniques that may be used to control erosion and sedimentation during the

RELATED TOOLS:

- Shoreland Protection
- Permanent (Post Construction) Stormwater Management
- Steep Slope and Ridgeline Protection

site development process. These methods differ from permanent, or post construction techniques. Methods used during construction are meant to deal with the increased amount of erosion and sedimentation that occurs as a result of grading and other land disturbance short-term activities during construction, and are not designed to be permanently in place. These methods, despite their temporary nature, when properly installed can be effective in preventing the erosion and sedimentation that may occur during construction, including during storm events.

These methods include:

- Developing work zones by consulting with a building contractor during design.
- Within the work zones, establishing the phases of construction.
- Within the phases, developing the sequence of construction and methods to be used.
- Preparing a schedule for earth moving and building construction activities.
- Requiring a narrative of daily activities.
- When all of the above has been completed, creating an erosion and sediment control plan utilizing practices that will support the daily schedule of construction activities while preventing erosion and controlling sediment movement to water bodies.

These methods utilize one or more of the following techniques:

- Compost filter sock and mulching
- Vegetated buffer strips
- Grassed swales
- Detention ponds
- Constructed wetlands
- Stabilization of steep slopes
- Infiltration practices
- Phasing of the removal of vegetation
- Silt fence and haybale barriers
- Stone check dams
- Tree clearing plans during development
- Vegetated buffer requirements

A thorough discussion of the environmental, public health, and welfare justifications for regulating stormwater management is given in the “findings” section of model regulations.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

The following regulations are appropriate for use during the pre-construction, construction, and short-term post construction phases of a development project.

Although permanent post-construction techniques for erosion and sediment control are addressed in the Permanent (Post-Construction) Stormwater Management chapter, the two topics must be considered hand-in-hand in the sense that the imple-

mentation of low impact development techniques for permanent or post-construction stormwater management will also aid in the effectiveness of techniques used during construction. For example, by designing the site with a smaller area of impervious surface, and incorporating a number of smaller permanent stormwater management techniques, the effects of erosion and sedimentation during construction may be lessened through thoughtful design. Also, methods for erosion and sediment control during construction can sometimes be integrated into more permanent measures. For example, a mulch barrier may become integrated into a more permanent erosion and sedimentation control structure. Riparian buffers maintained during construction will remain after construction has been completed.

Land disturbance is also regulated at the federal and state levels (see below, Legal Basis and Considerations for New Hampshire), but the threshold level of disturbance at the state and federal levels may be higher than that of many projects a municipality may wish to regulate, because significant environmental damage can occur at levels of disturbance below the acreage thresholds regulated at the state level.

The model regulations included here propose that the regulations apply where a cumulative disturbed area exceeds 20,000 square feet, or in disturbed critical areas.

Materials provided by the EPA describing the Municipal Separate Storm Sewer System (MS4) program state that municipalities can regulate areas as small as 2,000 square feet. One of the requirements of the MS4 program is that municipalities develop regulations to control erosion and sedimentation of water bodies during construction.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

ENABLING STATUTES

RSA 674:44, Site Plan Review Regulations, subpart II, states: “The site plan review regulations which the planning board adopts may: a) Provide for the safe and attractive development or change or expansion of use of the site and guard against such conditions as would involve danger or injury to health, safety, or prosperity by reason of: (1) Inadequate drainage or conditions conducive to flooding of the property of another; (2) Inadequate protection for the quality of the groundwater; (3) Undesirable and preventable elements of pollution such as noise, smoke, soot, particulates, or any other discharge into the environment which might prove harmful to persons, structures, or adjacent properties;

RSA 674:36, Subdivision Regulations, part II, states: “The subdivision regulations which the planning board adopts may: (a) provide against such scattered or premature subdivision of land as would involve danger or injury to health, safety, or prosperity by reason of the lack of water supply, drainage ... or necessitate the excessive expenditure of public funds for the supply of such services.”

STATE AND FEDERAL REQUIREMENTS

Federal law regulates small municipal separate storm systems, or MS4s, under Phase II of the National Pollutant Discharge and Elimination System (NPDES) for land disturbances greater than one acre. NPDES Stormwater Phase II applies to municipali-

ties, or MS4s, that are located in or near an urbanized area as defined by U.S. Census adjacent to a densely settled surrounding territory that together have a residential population of at least 50,000 and an average density of at least 1,000 square people per square mile. Forty-five New Hampshire communities must comply with Phase II requirements, which include a requirement to adopt a local level erosion and sediment control regulation. The NPDES Construction General Permit, applies to any construction activity disturbing more than one acre. This requirement applies statewide. More information on the DES permit process can be found at www.des.nh.gov.

New Hampshire law protects surface and groundwater quality from degradation as a result of significant alteration of terrain and activities in or on the border of surface waters of the state. RSA 485-A:17, RSA 485-A:17 Water Pollution and Waste Disposal/Terrain Alteration requires a permit from DES when more than 100,000 square feet of contiguous land area is to be disturbed (or 50,000 square feet if within the protected shoreland as defined by the Comprehensive Shoreland Land Protection Act). Other relevant state level controls include timber harvesting and excavation permits. Although these state level permits will be referenced herein, this chapter deals primarily with regulation at the local level.

Despite these protections at the federal and state level, many construction projects disturb a smaller area than 50,000 square feet, and thus local protection is necessary.

EXAMPLES AND OUTCOMES

Many New Hampshire towns, including Exeter, Portsmouth, and East Kingston have developed erosion and control regulations that typically deal with requirements for erosion and sediment control during and after construction. Numerous examples can be found in the subdivision and site plan regulations of most towns. These regulations are not fully effective however, if the pre-application clearing of land is not addressed, and if inspection prior to, during, and after construction is not addressed, as well as issues of maintenance during construction and after storm events.

Some towns, such as Exeter, have developed regulations addressing pre-application land clearing or grading by requiring the pre-cleared condition to be the basis of the stormwater calculation for pre-development conditions. Some towns, such as Newton, have begun to require construction sequencing plans and/or development agreements that consist of a written agreement between the board and developer that covers pre-construction meetings and inspection, during construction meetings, post storm and post construction inspections, maintenance schedules, and bonding of erosion and sediment control measures.

Land excavations are addressed at the state level by RSA 155-A but may also be addressed by municipalities, which may develop local level regulations under the authority granted to them by the state.

The best regulations will be ineffective without accompanying methods referenced for enforcement. The reader is encouraged to consult RSA 676:15, 17, and the publication “Guide to District Court Enforcement of Local Ordinances and Codes, available from the NH Bar Association at www.nhbar.org/legal-links/Local-ordinances-and-codes-guides.asp.

Model Language and Guidance for Implementation

The following regulation is based on several existing models and handbooks, including those prepared by DES and the N.H. Association of Conservation Districts. Model language for pre-application land disturbance was derived from a presentation entitled “Storm Water Phase II-Developing Construction & Post Construction Programs Fees and Funding” given by attorney Stephen C. Buckley, Hodes, Buckley, McGrath & LeFevre, PA, in the spring of 2005 at a workshop hosted by the US EPA, Region 1.

MODEL SUBDIVISION AND SITE PLAN REGULATION

EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

I. TITLE AND AUTHORITY

A. Title

The title of this Site Plan and Subdivision Regulation for the Town/City of [NAME], shall be known as the “Erosion and Sediment Control During Construction.”

B. Authority

This regulation is adopted pursuant to RSA 674:16, Grant of Power, RSA 674:17, Purposes of Zoning Ordinance, and RSA 674:21, Innovative Land Use Controls, Environmental Characteristics. The corresponding section of the Zoning Ordinance is found at section [_____].

II. PURPOSE

Based on the findings above, the purpose of this regulation is to develop standards for design, installation, and maintenance of stormwater management measures during construction for the following reasons:

- To control the quantity and quality of runoff.
- To prevent soil erosion and sedimentation resulting from site construction and development.
- To prevent the pollution of runoff from construction sites.
- To protect natural resources including wildlife habitat.
- To protect other properties from damage that could be caused by erosion and sedimentation or the quantity or quality of runoff.
- To reduce public expenditures in maintenance of stormwater drainage systems such as removing sediment from systems, repairing or replacing failed systems, restoring degraded natural resources, and to prevent damage to town infrastructure caused by inadequate controls.

Towns adopting these regulations should add a section to the zoning ordinance authorizing the adoption of stormwater regulations during construction based on the RSA sections listed above. The findings listed in this regulation should be considered for addition to the master plan natural resources chapter.

III. FINDINGS

The planning board has made the following findings concerning the need to address sediment and erosion control during construction.

A. Land development alters hydrologic response.

Land development projects and other land use conversions and their associated changes to land cover can alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, which in turn increase flooding, stream channel erosion, and sediment transport and deposition, and decrease groundwater recharge by creating impervious surface such as pavement and buildings, and compacting pervious surfaces.

B. Small storms account for 90 percent of runoff.

Over 90 percent of runoff and associated pollutants loads result from very small storms, thus traditional methods of preparing stormwater control plans must be revisited take into consideration not only larger, less frequent storms, but also small storms to ensure that water supplies do not become polluted by these small storms and that designs for larger, less frequent storms resulting in large downstream flows can be reduced so as not to cause significant stream channel erosion and other environmental damage.

C. Cumulative effects.

The cumulative effects of several storms on a particular project, and the erosion and sediment contributions from several projects create a significant cumulative effect on water quality, hydrologic response of local watersheds, and alter or destroy wildlife habitat.

D. Land development contributes to increased nonpoint source pollution.

Land development projects and other land use conversions contribute to increased nonpoint source pollution and degradation of receiving waters due to the addition of petroleum products, fertilizers and pesticides, construction waste, and other substances to runoff from construction sites.

E. Land development causes significant environmental damage to wildlife and wildlife habitat.

Land development projects cause significant damage to trees and other wildlife habitat through compaction of soils due to construction vehicle traffic, stripping of vegetation during grading and other site preparation activities, and increased turbidity in water supplies that may damage the habitat of aquatic species.

F. Stormwater runoff related to development adversely affects health, safety, welfare, and the environment.

The impacts of stormwater runoff related to development can adversely affect public safety, public and private property, surface water supplies, groundwater resources, drinking water, aquatic and non-aquatic wildlife habitats, fish and other aquatic life, property values, and the potential for other uses of land and water.

G. Best management practices can minimize adverse impacts.

These adverse impacts can be controlled and minimized through the application of best management practices during construction activities, low impact

development practices post construction, and periodic inspections before, during and after construction to ensure that erosion and sediment control practices are functioning effectively.

H. Federal law requires regulations to manage stormwater runoff from construction sites.

Federal law requires small MS4 operators to develop, implement, and enforce a program to reduce pollutants in any storm water runoff from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in the program if that construction is part of a large common plan or development or sale that would disturb one acre or more.

It is therefore in the public interest of health, safety, welfare, and environmental protection to minimize the impacts associated with land development and to regulate stormwater runoff during construction in order to address the adverse impacts to public health, safety, welfare, and the environment detailed in the above section.

IV. APPLICABILITY

The requirements of this regulation shall apply to land disturbance, development, and or any construction activities in all zoning districts where the disturbance, development, or construction activity will disturb greater than 20,000 square feet or that is within a critical area as defined below.

V. DEFINITIONS

Best Management Practice (BMP): A proven or accepted managerial, structural, non-structural, or vegetative measure to prevent or reduce increases in stormwater volumes or flow; to reduce erosion, sediment, peak storm discharge, and point-source and non-point-source pollution; and to improve stormwater quality and protection of the environment.

Critical Areas: Disturbed areas of any size within 75 feet of stream, intermittent stream, bog, water body, or poorly or very poorly drained soils; disturbed areas of any size within 50 feet of a property line; disturbed areas exceeding 2,000 square feet in highly erodible soils; or disturbed areas containing slope lengths exceeding 25 feet on slopes greater than 15 percent.

Developer: Any person or legal entity that undertakes or proposes to undertake activities that cause land disturbance.

Development: Any activity involving land grading, or alteration of terrain or landscape, other than for agricultural purposes or silvicultural purposes where best management practices for agriculture or timber harvesting as defined by New Hampshire law are utilized.

Disturbed area: An area where the natural vegetation has been removed exposing the underlying soil or where vegetation has been covered by soil.

Drainage Area: A geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

Effective Impervious Cover: Impervious surfaces that contribute to stormwater runoff leaving a site. Effective impervious cover can be reduced by capturing and directing stormwater runoff generated by the impervious surface to an on-site retention, treatment and infiltration management device or practice.

Erosion: The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

Highly Erodible Soils: Any soil with an erodibility class (K factor) greater than or equal to 0.43 in any layer or listed below or as found in Table 3-1 of the “Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire” Rockingham County Conservation District, 1992.

Impervious Surface: Land surface with a low capacity for soil infiltration, including but not limited to pavement, roofs, roadways, or other structures, paved parking lots, sidewalks, driveways (compacted gravel or paved) and patios. Total impervious surface cover shall be calculated by determining the total area of all impervious surfaces on a site as described above, regardless of whether the impervious surfaces are contiguous or non-contiguous.

Land Disturbance or Land Disturbing Activity: For the purposes of this regulation, refers to any exposed soil resulting from activities such as clearing of trees or vegetation, grading, blasting, and excavation.

Low Impact Development Techniques: Alternative designs for the treatment and management of stormwater that minimize disturbance to the natural drainage patterns on the landscape and require high standards for water quality discharge and recharge. These techniques include treatment of stormwater runoff on residential lots using low-maintenance methods such as vegetated swales, rain gardens and sub-surface infiltration devices.

Openness Ratio: A ratio calculated by dividing a culvert’s cross-sectional area by its length (OR = cross sectional area / length).

Owner: A person with a legal or equitable interest in a property.

Pervious Surface: Any material of structure on or above the ground that permits water to infiltrate into the underlying soil. Naturally pervious surfaces may become less pervious through the process of compaction.

Qualified Professional: A person knowledgeable in the principles and practice of stormwater management and erosion and sedimentation control, including Certified Professional in Erosion and Sediment Control (CPESC), Certified Professional in Storm Water Quality (CPSWQ), licensed soil scientist, licensed engineer, or someone with experience in the principles and practices of stormwater management and erosion and sedimentation control working under the direction and supervision of a licensed engineer and in consultation with a person qualified to construct a project as per design and in compliance with regulatory requirements.

Recharge: The amount of water from precipitation that infiltrates into the ground and is not evaporated or transpired.

Redevelopment: The reuse of a site or structure with existing man-made land alterations. A site which currently has 35 percent or more of existing impervious surface, calculated by dividing the total existing impervious surface by the size of the parcel and converted to a percentage before the project begins would be considered a redevelopment. *[Note: This definition is distinct from other requirements a town may have as to maximum impervious surface allowed in the completed project.]*

Regulated Substance: Oil, as defined pursuant to RSA 146-A or a substance listed in 40 CFR 302, with the following exclusions: ammonia, sodium hypochlorite, sodium hydroxide, acetic acid, sulfuric acid, potassium hydroxide, and potassium permanganate.

Sediment: Solid material, either mineral or organic, that is in suspension, is transported, or has been moved from its site of origin.

Sensitive Area: For the purposes of this regulation, lakes, ponds, perennial and intermittent streams, vernal pools, wetlands, floodplains, floodways and areas with highly erodible soils.

Sheet flow: Runoff that flows or is directed to flow across a relatively broad area at a depth of less than 0.1 feet for a maximum distance of 100 feet.

Site: The lot or lots upon which development is to occur or had occurred.

Stabilization: The condition in which all soil-disturbing activities at a site have been completed and a uniform, perennial vegetative cover with a density of 85 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

Stormwater: Water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other man-made or natural drainage facilities.

Stormwater runoff: The water from precipitation that is not absorbed, evaporated, or otherwise stored within the contributing drainage area.

Stream: Areas of flowing water that occur for sufficient time to develop and maintain defined channels but which may not flow during dry portions of the year. Includes but is not limited to all perennial and intermittent streams located on U.S. Geological Survey Maps.

Turbidity: A condition of water quality characterized by the presence of suspended solids and/or organic material.

Undisturbed Cover: A land surface that has not been significantly altered by human activity.

Vegetation: Is defined to include a tree, plant, shrub, vine, or other form of plant or fungal growth.

Water Supply Intake Protection Area: Designated protection area for a surface water intake used a source by a public water system.

Well Head Protection Area: As defined in RSA 485-C:2, the surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such well or well field.

VI. CONSTRUCTION INSPECTIONS, PHASING, AND THE PLANNING PROCESS

A. **Inspections/Frequency.** Periodic inspections of stormwater management structures or techniques shall be conducted periodically by the town's engineering consultant or a qualified professional; the cost of such inspections shall be included in the escrowed funds paid by the developer for the purpose of reimbursement to the town for the payment of fees to town engineering and planning consultants reviews and inspections. At a minimum, inspections shall be conducted at the site prior to commencement of land clearing activities, after every storm event during construction, periodically during construction, at the completion of construction activities and removal of any temporary BMPs, and as specified thereafter in an agreed-upon inspection schedule proposed by the developer in consultation with either the contractor who will build the project or a consulting contractor and approved by the planning board and the planning board's consulting engineer, to insure that stormwater management structures or techniques are performing effectively.

B. **Inspections/documentation.** All inspections shall be documented and written reports prepared by the town's compliance officer or compliance consultant that contain the following information:

1. Date and location of the inspection.
2. Date of last storm event.
3. Whether construction is in compliance with the approved stormwater management plan.
4. Variations from approved construction specifications.
5. Photographic documentation of each erosion and sediment control BMP and any other site level techniques employed pursuant to this regulation, such as but not limited to seeding of fill piles, marking of root zone areas of trees, disposal of construction debris, and implementation of any state or federal level record-keeping or reporting procedures related to erosion and sediment control.
6. Recommended actions for replacement, repair, or substitution of BMPs, that are not functioning properly.

Copies of reports and labeled photographs shall be provided to the planning board.

C. **Phases of Inspection.** The schedule for inspections should include the following phases:

1. **Initial site inspection** prior to plan approval, which shall include a site walk by the developer or developer's engineer and contractor, the town's

- consulting engineer and/or compliance officer, and a member of the planning board.
2. **Erosion control inspection** to ensure erosion control techniques or structures have been properly installed, and are in accord with the developer's submitted plan.
 3. **During and post-storm event inspection.** The town's consultant shall inspect the site during and within 48 hours after the first storm event and subsequent storm events to ensure that erosion and sediment control techniques and drainage structures are functioning properly.
 4. **Stormwater management system inspection.** This inspection will include inspection of temporary measures to be employed only during construction, as well as semi-permanent and permanent measures designed to remain for some time period after construction is completed but which may be completed before all construction of the site is completed. The inspector will also note whether construction debris is being disposed of properly and whether other erosion and sediment control measures in addition to those in the approved plan must be instituted by the developer to protect water resources.
 4. **Final inspection and storm performance inspection.** The town's consultant shall inspect the system after the system has been constructed and before the surety has been released. This inspection shall also evaluate the effectiveness of the system during and after the first actual storm. No surety will be released until the inspector certifies both the final inspection and the storm performance inspection.
- D. **Phasing.** The developer shall submit a phasing plan to the planning board to be reviewed by the town's engineering consultant to ensure compliance with all applicable federal and state level laws and regulations pertaining to stormwater management. The phasing plan shall specify areas of the development to be completed in sequence and shall specify that all necessary infrastructure to support each phase shall be in place prior to the issuance of permits for certificates of occupancy for that phase.
- E. **The Planning Process.** All developers must adhere to the four-step process as set forth below and demonstrate this in writing in developing their stormwater management plan during construction and thereafter.
- Step 1: Planning.** Plan the development to fit the existing site features, including topography, soils, drainage ways, and natural vegetation.
 - Step 2: Scheduling of Operations.** Schedule grading and earthmoving operations to expose the smallest practical area of land for the shortest possible time.
 - Step 3: Soil Erosion Control.** Apply soil erosion control practice and any other techniques as specified in the stormwater management plan to achieve the purposes set forth in this regulation.
 - Step 4: Inspections and Maintenance.** Implement a thorough maintenance program and schedule inspections in conjunction with the town's consultant, to be reviewed by the planning board.

This section relates to federal law requirements for small MS4 operators to develop procedures to receive public input. Municipalities may wish to develop a standard form for such information.

VII. PROCEDURES FOR CONSIDERATION OF INFORMATION SUBMITTED BY THE PUBLIC

- A. The planning board shall consider any information submitted by the public concerning the stormwater management plan or site conditions or erosion and sediment control measures before and during construction. The board shall develop a short form to allow citizens to submit information concerning these measures. The board shall consider such information at a properly noticed public hearing even if the application to which the information relates has already been closed. All such information shall be either submitted in writing or as testimony in a properly noticed public hearing.

VIII. DESIGN STANDARDS

A. Strategies to Be Employed

To ensure that all sources of soil erosion and sediment on the construction site are adequately controlled, the following strategies shall be employed:

1. **Minimize the areas of disturbed soil.** Limit site preparation activities such as grading and clearing to where they are absolutely necessary and consistent with the phasing plan and the daily schedule of construction activities.
2. **Maximize the protection and on-site use of native vegetation.** Protect all vegetation not intended for removal by adequately marking, fencing around the drip line of trees, protectively wrapping and temporarily transplanting as necessary.
3. **Reduce the time that soil is left disturbed.** Utilize construction management and by phasing; soil disturbed by construction activities shall be stabilized within 14 days of ceasing disturbance.
4. **Stabilize soil** with seeding and mulch as soon as possible after disturbance. Minimize soil disturbance between October 15 and May 1.
5. **Control water at upslope site perimeters.** Prevent stormwater from entering areas of disturbed soil from outside the site and from other parts of the site. Utilize diversion swales and vegetated strips to reduce the amount of water entering a construction site.
6. **Control water on-site.** On the site water must be controlled and kept to low velocities so that erosion is minimal. This can be achieved through immediate seeding and mulching or the application of sod, as well as the use of structural measures including silt fences, check dams, mulch filter socks, and mechanical tracking of hillsides.
7. **Control sediment on site.** Reduce the amount of sediment produced from areas of disturbed soils, and control the sediment produced on site through seeding and mulching and structural measures.
8. **Control sediment at the down slope site perimeters.** Prevent the off-site transport of all sediment produced on the construction site using vege-

tated strips, diversion dikes, and swales, sediment traps and basins, stabilized construction entrances, and silt fences or mulch filter socks.

9. **Utilize biological or recyclable materials.** To the extent possible, developers should utilize natural biological materials or recyclable materials as temporary measures that can remain on-site after the completion of construction such as mulch berms or other methods as opposed to silt fences, which must be removed and disposed after the completion of construction activities in order to reduce waste and reduce costs of removal.

B. Design Standards

The following standards shall be applied in planning for stormwater management and erosion control:

1. Stormwater management and erosion control designs shall not conflict with minimum N.H. Department of Environmental Services requirements for Alteration of Terrain or other environmental permits required.
2. Measures shall be designed and installed to control the post-development peak rate of runoff so that it does not exceed pre-development runoff for the two-year, 10-year, and 25-year/24-hour storm event and for additional storm event frequencies as specified in the design criteria of the N.H. Stormwater Management Manual.
3. Emergency spillways and down slope drainage facilities shall have capacity to accommodate a 100-year/24-hour storm.
4. All measures in the plan shall meet as a minimum the best management practices set forth in the N.H. Stormwater Management Manual.
5. Stormwater management practices shall be selected to accommodate the unique hydrologic and geologic conditions of the site.
6. The use of low impact development techniques are preferred to intercept, treat, and infiltrate runoff from developed areas distributed throughout the site, as are techniques that restore, enhance, or protect natural areas such as riparian areas, stream channels, wetlands, and forests.
7. Stormwater management systems shall not discharge to surface waters, ground surface, subsurface, or groundwater within 100 feet of surface water within a water supply intake protection area.
8. Any contiguous area of disturbance, not associated with the installation of a roadway, shall be limited to 20,000 square feet.
9. Contiguous areas of disturbance shall be separated by at least 20 feet of area maintained at natural grade and retaining existing, mature vegetated cover that is at least 20 feet wide at its narrowest point.
10. Roadway and driveway crossings over streams shall meet the following design criteria to accommodate high flows, minimize erosion, and support aquatic habitat and wildlife passage:
 - a. Natural stream bottoms.

- b. Sized for 1.2 times bank-full stream width, i.e. the width of the stream during the 1.5-year flow event.
- c. Bridges and culverts shall have an openness ration of greater than or equal to 0.25 (calculated in meters) for perennial streams.
- d. Passageways under roads shall be designed to maintain water velocity at a variety of flows that is comparable to flows in upstream and downstream segments of the natural stream.
- e. Culverts shall have a trough or narrow channel in the bottom running the full length of the culvert to maintain sufficient water depth during low-flow periods to support fish passage.
- f. Round culverts must be imbedded at least 25 percent.

The above section is intended to provide some overlap with the chapter on Permanent (Post-Construction) Stormwater Management given that the use of techniques designed for the construction phase may overlap with other techniques that remain after construction activities are completed.

In some cases, design of culverts or other wildlife crossings that may be impacted by temporary or permanent stormwater control methods will require the review of such practices by a wildlife biologist who can assess the site's wildlife habitat and recommend practices that will minimize the adverse impact of stormwater control methods on existing wildlife crossing areas. The town may wish to add a provision allowing this limited review and providing for reimbursement of this expense by the developer. Alternatively, the Conservation Commission may appropriately provide information on the natural resources inventory of a town as well as site-level characteristics.

IX. CONSTRUCTION SITE METHODS

- A. **Responsibility of the applicant.** The applicant shall bear final responsibility for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of this regulation.
- B. **Daily log of installations, inspections, modifications, rainfall, and repairs or reinstallations.** Construction site operators shall be responsible to ensure erosion and sedimentation control measures approved for the site are installed as designed. A daily log of erosion control measures, inspections, modifications required, rainfall events and erosion observed shall be submitted weekly to the town's engineering consultant, or public works department, or the planning board, at the discretion of the planning board.
- C. **Estimate required.** A detailed estimate including unit pricing of temporary and permanent erosion control methods in a form acceptable to the planning board shall be submitted for review by the town's engineering consultant prior to any construction work.
- D. **Construction site inspections.** In addition to the general inspections outlined above, the qualified professional serving as the town's consultant shall verify proposed limits of site disturbance and limits of tree removal, including the marking of root zones of trees to be retained, the location of temporary parking of construction vehicles, the location of stockpiles of construction

materials, the location of earth stockpiles, and the proposed methods for daily removal of construction waste and debris from the site.

- E. **Test upgradient and downgradient waters for turbidity levels.** Both to ensure they meet allowable state and federal standards and to compare these levels in order to evaluate sediment capture through the site.
- F. **Pre-construction meeting.** A pre-construction meeting shall take place in which the applicant, town's consultant, site engineer, site contractor, road agent, and any other key town personnel as necessary attend to discuss the site, the development plans, and all aspects of site construction.
- G. **Pre-winter meeting.** A pre-winter meeting shall be held not later than September 15 of each year prior to the acceptable completion of site work, in order that town staff, the applicant, the contractor, the site engineer, the town's consultant, and other involved parties specify measures to secure the site for the winter season.
- H. **Documentation.** Copies of all required permits and permit applications relative to the site, such as Site Specific Permit, and the Stormwater Pollution Prevention Plan shall be provided to the planning board and shall be considered as necessary for any conditional approval.
- I. **Installation of erosion and sediment control devices.** Erosion and sedimentation control devices shall be installed prior to site disturbance or tree removal that would create erosion and sediment control issues.
- J. **Certification.** No building permit shall be issued by the town until the town's consultant has certified that the site construction has proceeded in accordance with stormwater management and erosion and sedimentation control standards, plans, and specifications, and that the relevant portion of the site has been reasonably stabilized, and until the town's consultant has certified that all utilities, drainage and stormwater management measures and roadway base course of paving have been satisfactorily installed on the site.
- K. **Surety.** An estimate shall be developed for the construction period, which shall include all erosion control costs. The applicant may request periodic release of such surety for work completed and verified by the town's consultant. At the completion of the construction and final acceptance by the town, the applicant may request up to 85 percent of escrow funds. The remaining escrow shall be held for two years after the completion of construction and acceptance by the town at which time the town's consultant will certify all temporary erosion controls that should be removed have been removed and all permanent measures have been installed and are functioning and have been maintained as intended. The site engineer shall develop and submit a maintenance plan for permanent erosion control and sedimentation and an estimate of annual maintenance costs. The plan shall include any necessary easements or other legal documents necessary to allow periodic inspection for a period of two years after completion of the project. Upon receipt of the certification and maintenance plan and legal review of easements or other legal documents as described herein, the town shall release the remaining funds.

X. CONSTRUCTION PRACTICES

- A. Natural vegetation shall be retained, protected or supplemented to the extent practical. The stripping of vegetation shall be done in a manner that minimizes soil erosion.
- B. Excavation equipment shall not be placed in the base of an infiltration area during construction. Excavation or other construction vehicles shall not be placed in the root zone areas of trees to be retained during construction.
- C. Construction equipment and materials shall be stored at a distance greater than 25 feet from drainage channels, streams, lakes or wetlands.
- D. Onsite wastes generated during the course of construction, including, but not limited to discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste shall be removed from the site daily to the extent feasible or at a regular interval as specified in the construction sequence and schedule of daily activities for the project and disposed of properly.
- E. No ground disturbed as a result of site construction and development shall be left as exposed bare soil. All areas exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of six inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials such as mulch, loose rock, gravel or stone. Native, non-invasive species as defined or listed on the New Hampshire DES Shoreland Protection List of Native Shoreland and Riparian Buffers Plantings in New Hampshire.

XI. REQUIRED SUBMISSIONS IN STORMWATER MANAGEMENT PLANS FOR APPLICATION REVIEW

- A. In addition to any information generally required by the town for subdivision or site plan application, the applicant must submit the following items to the planning board for review:
 - 1. Existing and proposed conditions including the following elements
 - a. Local map showing property boundaries.
 - b. North arrow, scale, and date of plan and plan amendments.
 - c. Surveyed property lines.
 - d. Structures, roads, utilities, earth stockpiles, equipment storage, and stump disposal.
 - e. Records of any timbering activities within the past five years.
 - f. Topographic contours at two-foot intervals.
 - g. Critical areas relating to natural resources as defined at a regional level, state level, or local level by a regional, state, or local level natural resource inventory.
 - h. Stockpile areas, and staging areas.

- i. Within the project area, within 400 feet of project boundary, and upgradient within the watershed or appropriate portions thereof, all surface waters, waterbodies, streams, intermittent streams, ephemeral streams, wetlands, vernal pools, and drainage patterns and watershed boundaries.
- j. Identified wildlife corridors if referenced in a local, regional, or state level natural resources plan
- k. Vegetation, including description of species.
- l. Extent of the 100-year flood plain when applicable.
- m. Soil information from a National Cooperative Soils Survey soil series map or a High Intensity Soil Map.
- n. Easements or covenants.
- o. Areas of soil disturbance or remediation areas.
- p. Areas of cut and fill.
- q. Areas of poorly or very poorly drained soils, including any portion to be disturbed or filled.
- r. Location of all structural, non-structural, and vegetative stormwater management and erosion control BMPs.
- s. Detail sheet showing each BMP.
- t. Phasing plan.
- u. Inspection schedule.
- v. Construction schedule.
- w. Earth movement and grading schedule.
- x. Construction Erosion and Sediment Control Plan that complies with the provisions of this regulation.
- y. An operations and maintenance plan.
- z. Spill prevention plan and emergency management plan for spills of potentially hazardous materials.
- aa. Surety.
- bb. Identification of alternatives in the drainage system design that provide for contingencies during storm events, for instance, and alternative for water flow in case a critical culvert becomes blocked by debris.
- cc. Design calculations for all temporary and permanent BMPs and a narrative description of each measure, its purpose, construction sequence, and installation timing.
- dd. Drainage report with inclusion of more frequent small storms as well as traditional calculations.
- ee. Landscaping Plan (unless required by other sections of the regulations).
- ff. Notation of soil types (unless required by other sections of the regulations).

XII. PRE-CLEARING

The applicant shall provide pre and post development peak flow rates in stormwater calculations. Any site that was wooded in the last five years must be considered undisturbed woods for the purposes of calculating pre-development peak flow rates.

XIII. ENFORCEMENT

The planning board may pursue any remedies authorized in the New Hampshire Revised Statutes Annotated for non-compliance with the specifications of an approved plan including revocation of the recorded plan.

REFERENCES

- EPA New England's NPDES Storm Water Permit Program Web Site. www.epa.gov/ne/npdes/stormwater/index.html.
- EPA's Storm Water Phase II Menu of Best Management Practices. www.epa.gov/npdes/menuofbmps/menu.htm.
- EPA Storm Water Phase II Compliance Assistance Guide. www.epa.gov/npdes/pubs/comguide.pdf.
- Maryland Cooperative Extension. Understanding the Science Behind Riparian Forest Buffers: Effects on Water Quality: Effects of Riparian Buffers on Sediment, Nutrients, and other Pollutants. www.ext.vt.edu/pubs/forestry/420-151/420-151.html.
- National Pollutant Discharge Elimination System (NPDES) Phase II: How to Select, Install, and Inspect Construction Site Erosion and Sediment control BMPs for NPDES Storm Water Permit Compliance" International Erosion Control Association. www.ieca.org and www.ieca.org/Chapter/northeast/northeasthome.asp
- New Hampshire Association of Conservation Districts. 1997. Model Stormwater Management and Erosion Control Regulation.
- N.H. Department of Environmental Services. 2008. *Stormwater Management Manual: Volume 1 Antidegradation and Stormwater; Volume 2 Post Construction Best Management Practices: Selection and Design; Volume 3 Construction Phase Erosion and Sediment Controls*.
- N.H. Department of Resources and Economic Development. *BMPs for Erosion Control on Timber Harvesting Operations in New Hampshire*. www.nhdf.org/info-plan-bureau/fi&p-waterqualitybmps.htm.

SITE LEVEL DESIGN

3

3.1 Transit Oriented Development

BACKGROUND AND PURPOSE

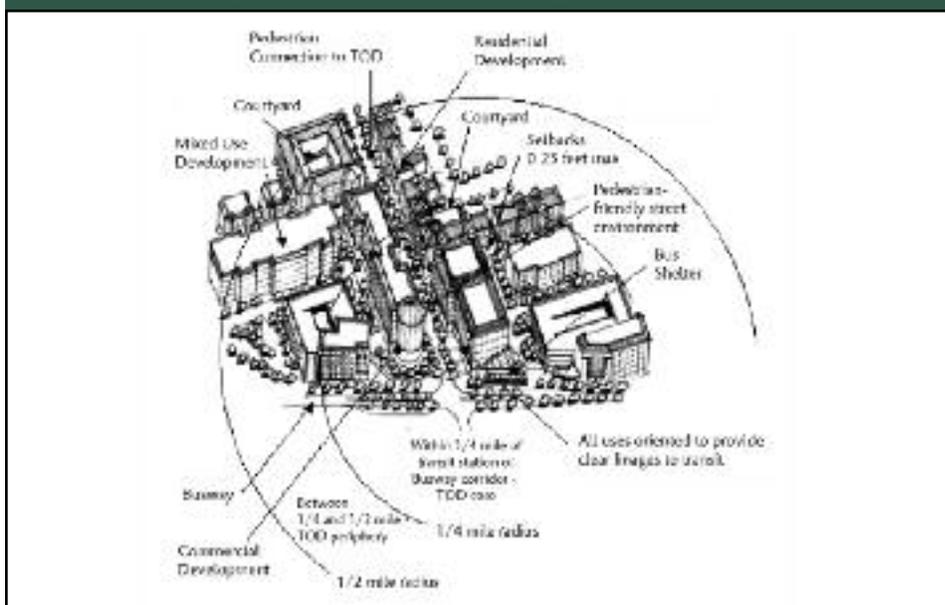
Transit oriented development (TOD) refers to a method of regulating land use that concentrates commercial and residential growth around transit centers in order to maximize access to transit and encourage the use of non-motorized transportation. TOD is a strategy that has broad potential in both large urban and small communities using bus or rail transit systems. It focuses compact growth around transit stops, increasing population density around transit centers thereby capitalizing on transit investments by bringing potential riders closer to transit facilities and increasing ridership.

TOD can be described as development, generally within half a mile of a transit station that provides sufficient densities, mixes of activities and convenient pedestrian linkages to support significant transit ridership. Focusing development in proximity to transit stations can create interesting and functional urban centers, diminish environmentally damaging urban sprawl, and play a major role in realizing regional development strategies. In New Hampshire, TOD principles may be applicable to Park and Ride facilities, which could be considered nodes around which higher density development is concentrated.

RELATED TOOLS:

- Village Plan Alternative
- Pedestrian Oriented Development
- Infill Development

FIGURE 3.1.1 Sample Transit Oriented Development District



Source: Nashua Land Use Code, January, 2006

TOD has a short, but substantial history. Many of the new towns created after World War II in England, Japan, Sweden, and France have many of the characteristics of TOD communities. These characteristics include a mix of residential, commercial, and office uses within walking distance to a transit stop or center. The land uses and transportation choices blend together to make an economically viable, but more importantly, livable area. In a sense, nearly all communities built on reclaimed land in the Netherlands or as exurban developments in Denmark have had the local equivalent of TOD principles integrated in their planning.

Many older United States' cities that sustained rapid growth from the mid 19th century onward developed in conjunction with the invention of and spread of rail transit. Development patterns of the older parts of cities like Boston, New York, Philadelphia, and Cleveland are closely integrated with transit service. The first transit-oriented development projects in the United States were the railroad and streetcar suburbs of the late 19th and early 20th centuries.

For example, Boston in 1850 had an area of dense settlement within a two-mile radius from city hall. Before the invention of the telephone and the introduction of street railways in the 1850s most routine activities were limited to what could be accomplished within walking distance. Without streetcars, as the city grew and expanded, the resulting development would have cut off daily communication between shops and offices and necessitated the development of autonomous subcities and the inefficient duplication of services and facilities. Streetcars preserved the centralized communication of a walking city on an enlarged scale. Residential development followed the main transportation lines and clustered around the streetcar stations, which was soon followed by stores, churches, and schools to serve the residents of the area.

The success of the early streetcar suburbs was dependant on pedestrian access to transit for connection to downtown jobs and neighborhood services. Typical features of these early transit neighborhoods included a transit depot and public space in the center of the neighborhood.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

There are many advantages of a TOD. A TOD reduces the use of single-occupant vehicles by increasing the frequency in which people walk, bicycle, carpool, vanpool, or take a bus, streetcar, or rail. It does this by increasing population densities closer to transit facilities, creating a potential ridership pool, rather than building homes away from population centers, which makes people more dependent on roads and automobiles.

The following list demonstrates some of the advantages of implementing a TOD ordinance:

1. Choice in mobility

- By creating “activity nodes” linked by transit, TOD provides important mobility options, very much needed in the state’s most congested metropolitan areas.

- Allows young people, the elderly, people who prefer not to drive, and those who do not own cars the ability to be mobile.
2. **Increasing public safety**
 - By creating active places that are busy through the day and evening and providing “eyes on the street,” TOD helps increase safety for pedestrians, transit-users, and many others.
 3. **Increase in transit ridership**
 - TOD improves the efficiency and effectiveness of our transit service investments by increasing the use of transit near stations by 20 to 40 percent.
 4. **Reduces rates of vehicle miles traveled (VMT)**
 - TOD can lower annual household rates of driving by 20 to 40 percent for those living, working, and/or shopping near transit stations.
 5. **Increase in household disposable income**
 - Housing and transportation are the first and second largest household expenses, respectively.
 - TOD increases disposable income by reducing driving costs; saving \$3,000-4,000 per year for each household.
 6. **Reduction in air pollution and energy consumption rates**
 - By providing safe and easy pedestrian access to transit, TOD can lower rates of air pollution and energy consumption.
 - TODs can reduce rates of greenhouse gas emissions by 2.5 to 3.7 tons per year for each household.
 7. **Helps to conserve resource lands and open space**
 - Because TOD consumes less land than low-density, auto-oriented growth, it reduces the need to convert farmland and open spaces to development.
 8. **Plays a role in economic development**
 - TOD is increasingly used as a tool to help revitalize aging downtowns and declining urban neighborhoods, and to enhance tax revenues for local jurisdictions.
 9. **Reduces infrastructure costs**
 - Depending on local circumstances, TOD can help reduce overall infrastructure costs for expanding water, sewage and roads to local governments by up to 25 percent through more compact and infill development.
 10. **Contributes to the creation of more affordable housing**
 - TOD can add to the supply of affordable housing by providing lower-cost and accessible housing, and by reducing household transportation expenditures.
 - Housing costs for land and structures can be significantly reduced through more compact growth patterns.

A TOD project is often an opportunity to bring together a diverse group of stakeholders to work together toward achieving a number of goals. Stakeholders who might be involved in a TOD project include municipalities and developers, neighbors, riders, bicycle organizations, community health agencies, banks and businesses. Table 1 below lists the typical stakeholders in a TOD planning process.

Transit oriented development generally occurs under three conditions:

1. When stations are located in prime regional and community nodes of activity attractive to typical market forces.
2. When the regional and local real estate market is active.
3. When local public policies and regulations permit or encourage intensive development in station areas.

Stakeholder	Possible Goals
Transit Agency	<ul style="list-style-type: none"> • Maximize monetary return on land • Maximize ridership • Capture value in the long term
Riders	<ul style="list-style-type: none"> • Create/maintain high level of parking • Improve transit service and station access • Increase mobility choices • Develop convenient mix of uses near station
Neighbors	<ul style="list-style-type: none"> • Maintain/increase property values • Minimize traffic impact • Increase mobility choices • Improve access to transit, services, jobs • Enhance neighborhood livability • Foster redevelopment
Local Government	<ul style="list-style-type: none"> • Maximize tax revenues • Foster economic vitality • Improve quality of life • Encourage healthy choices • Redevelop underutilized land
Federal Government	<ul style="list-style-type: none"> • Protect “public interest” and set limits on how federally-funded investments can be used
Developer/Lender	<ul style="list-style-type: none"> • Maximize return on investment • Minimize risk • Ensure value in long term

Source: “Transit Oriented Development; Moving From Rhetoric to Reality Dena Belzer and Gerald Autler Strategic Economics,” a discussion paper prepared for The Brookings Institution Center on Urban and Metropolitan Policy and The Great American Station Foundation June 2002.

To be most effective, TOD should be “urban” even in a suburban setting. Pedestrian-scale design draws people to return repeatedly. Urban development with sufficient population density supports transit, while low-density suburban development does not. TOD can be implemented in urban and suburban areas where there is adequate compact development combined with adequate public transit service, and is most successfully implemented by regional and local governments in conjunction with private developers and businesses. TOD can consist of new urban or village-scale neighborhoods designed around public transit stations, or incremental changes to existing urban neighborhoods that have or will eventually have public transit.

To reduce external trips, TOD projects should be located in higher-density, mixed-use, pedestrian districts with high-quality transit service. External single-occupancy vehicle (SOV) trips can be reduced as much or more by people walking within a mixed-use urban district as they can by using transit within and between urban centers.

TOD generally requires at a minimum six residential units per acre in residential areas and 25 employees per acre in commercial centers, and about twice that for fixed rail or other transit alternatives with high start-up and operating costs. These densities create adequate transit ridership to justify frequent service, and help create active street life and commercial activities, such as grocery stores and coffee shops, within convenient walking distance of homes and worksites.

Other factors are also important beside simple density. Transit ridership is also affected by factors such as employment density and clustering, demographic mix (students, seniors, and lower-income people tend to be heavy transit users), transit pricing and rider subsidies, parking pricing and road tolls, the quality of transit service, the effectiveness of transit marketing, walkability, and street design. A particular density may be inadequate to support transit service by itself, but becomes adequate if implemented with a variety of transit encouragement and smart growth strategies.

The ideal conditions for implementing TOD may not currently exist in many rural communities in New Hampshire, however, communities can begin planning for the eventuality by identifying possible nodes that have the beginning characteristics of successful TOD. Areas in town that are more concentrated and accessible to highways for bus transit may warrant some long range planning to allow for future TOD development.

Areas near Park and Ride lots may be looked at as potential overlay districts, although these areas are not ideal candidates for TOD because they are automobile oriented and tend not to be pedestrian or bicycle friendly. In addition, a connection to a transit center must be present for the successful implementation of TOD.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

RSA 672:21 provides legal basis for implementing a TOD zoning ordinance in New Hampshire. In addition, RSA 674:2 and 674:3, which regulate the creation of municipal master plans, should be reviewed and used to create the underlying policies that support TOD.

Governmental policies and actions supporting TOD can be expressed by several governmental entities and through a variety of instruments – the N.H. Department of Transportation, regional planning commissions and metropolitan planning organizations, local governments and transit agencies. As with any innovative zoning ordinance, the local policies that support TOD should figure prominently in the municipal master plan.

The municipal master plan should identify areas within a municipality where TOD would be most appropriate, establish base criteria for creating such a district and identify the necessary regulatory changes that would be required for a successful

TOD. Approving the underlying public policies is the first step toward implementing TOD. Allowing mixed uses, increased densities, and creating choice in transportation modes should have a strong foundation set forth in the master plan.

Public planning efforts to support development around transit stations sometimes goes awry by establishing unreasonable or inflexible standards that discourage developers. The resultant delay in market response raises the risk of losing development opportunities altogether. Supportive policies need to be in place prior to initiation of TOD. Developers can more easily accept plan amendments and negotiations for zoning revisions if a policy direction for TOD is already established.

Once TOD is identified as a desired public policy, the municipality should closely examine its zoning regulations. Most existing zoning ordinances prohibit the proper mix of uses, building designs, and densities most suitable for generating transit ridership and for attracting developers' interest to station locations. In addition, public zoning and building provisions may impede design of convenient connections between development projects and station access points. Standards for setbacks and buffering, restrictions on building heights, and density limits all may work against transit-friendly design.

In addition to municipal policies, regional transit provider networks are necessary to implement successful local TODs in more rural settings. Coordination and commitment to act cooperatively by the many agencies and jurisdictions involved in transit is key to establishing this as a sustainable type of development in New Hampshire.

EXAMPLES AND OUTCOMES

NASHUA, NEW HAMPSHIRE

The city of Nashua, N.H. incorporated a transit oriented development district as a development option in its *Land Use Code* adopted January 2006. The transit oriented development district (TOD) is a "special district," which comes into effect only upon an application for rezoning in an area of the city that meets certain criteria. The city chose this option in order to have zoning regulations ready to be implemented by willing land owners and developers in partnership with the city Community Development Office.

The Nashua TOD encourages a mixture of residential, commercial, and employment opportunities within identified commuter rail station areas or other high capacity transit areas. The ordinance promotes transit supportive development, ensures access to transit, and limits conflicts between vehicles, pedestrians, and transit operations. It also allows for a more intense and efficient use of land at increased densities for the mutual re-enforcement of public investments and private development. Uses and development are regulated to create a built-up environment oriented to pedestrians and to provide a density and intensity that is transit supportive. The development standards encourage a safe and pleasant pedestrian environment near transit stations by encouraging an intensive area of shops and activities, by encouraging amenities such as benches, kiosks, and outdoor cafes, and by limiting conflicts between vehicles and pedestrians. A TOD is restricted to areas within one-half mile of an existing or planned transit station, which area is equivalent to a 10-minute walking distance.

The ordinance was designed to implement the recommendations set forth in Nashua's Master Plan:

- Enhance existing commercial areas with improved landscaping, aesthetics, signage, nighttime light pollution, architectural design, traffic flow, and coordination with abutting land uses whenever possible.
- Encourage increasing residential and employment densities as in-fill in established neighborhoods to increase transit ridership, particularly in downtown areas with access to the forthcoming Broad Street Parkway.
- A “planned” transit station is a station proposed for development that meets the following criteria:
 - a. A site plan/design of sufficient detail to accurately describe the location, size, and type of the facility and any support facilities that have been prepared and is on file in the appropriate city or state department, agency or office.
 - b. Not less than 50 percent of the estimated funding necessary to develop the transit station has been appropriated, earmarked or otherwise secured for the project, and
 - c. The transit station is included in the state's 10-year Transportation Improvement Plan, the city's Capital Improvements Program, or other similar state or city funding plan or program. The TOD is designed to be used in conjunction with a tax increment financing district to support the extension of commuter rail to the city of Nashua.

CONCORD, MASSACHUSETTS

In 1987, the town of Concord, Mass., integrated a transit development goal as part of the town's long-term comprehensive plan. The long-range plan identified the Concord Center Station as an important node for future higher density commercial and residential development. The resulting Concord Common development comprises three mixed-use buildings with retail space, office space, a restaurant and rental apartments.

CANTON, MASSACHUSETTS

Canton, Mass., has also implemented design and zoning techniques to encourage TOD. The new zoning proved to be the catalyst for a constant stream of new housing development in the downtown concentrated around the transit station. In an effort to enhance connections between downtown and the train station, the town recently issued a request for proposals for a streetscape improvement project in the TOD overlay district. It will include brick sidewalks, new signage, historic traffic lights, enhanced pedestrian crossings, new landscaping, recessed curbing and enhanced gathering points.

PORTLAND, MAINE

As part of its “Vision for Bayside” the city of Portland, Maine, is implementing a variety of techniques to enhance the downtown area and development of transit

oriented development. The following are sections from the plan entitled “A New Vision for Bayside.”

- Bayside will be an attractive urban gateway and extension of the downtown business district for the city of Portland. A fully functioning urban district and neighborhood will reconnect with and add to the fabric of the peninsula from downtown to the adjacent neighborhoods.
- Bayside will contain housing, workplaces, services, transportation, recreation, dining and shopping, all within comfortable walking distance of each other and downtown. Attractive lighted sidewalks, bicycle and pedestrian trail linkages will connect these uses, designed for full and maximum accessibility.
- Mixed use, compact and intensive land development, and quick and convenient transit service combine to make Bayside a neighborhood that has genuine mobility choice. This model for the peninsula and beyond will be designed from the ground up, free from dependence upon the automobile. Features including the trail connectors and frequent shuttle service throughout the peninsula area and to all major transportation centers will signify progress and commitment by the city to implement the 1993 Portland Transportation Plan.
- Strategically located parking structures will serve multiple functions, connect with transit services, facilitate the flow of traffic with minimal impact on neighborhood residents, and avoid extensive land consumption by surface parking lots.

Portland began to implement this vision by enacting a “Mixed Development District Zone” in 2006. This zone limits automobile oriented development by prohibiting auto-dependent businesses such as gas stations, auto repair and drive-through facilities (except for banking) and limits the development of surface parking. Parking structures are required to have pedestrian friendly design and must have one or more permitted uses located along all primary street frontages.

The district prohibits single family detached housing in favor of attached multi-family housing, live/work units and a full complement of commercial development opportunities. The district has no minimum lot size or frontage requirements, and has a maximum street frontage setback of 10 feet. There is no maximum residential density, and full building coverage of a lot is allowed. Pedestrian and multi-use trails, as well as intermodal transportation facilities, are permitted uses within the district.

Model Language and Guidance for Implementation

MODEL ORDINANCE FOR TRANSIT ORIENTED DEVELOPMENT

TITLE: TRANSIT ORIENTED DEVELOPMENT

I. PURPOSE

The purpose of the transit oriented development (TOD) is to implement the following recommendations set forth in Chapter [X] of the Master Plan [*list recommendations where applicable*]: encourage an appropriate mixture and density of activity around transit centers to increase ridership and promote alternative modes of transportation to the automobile and decrease auto-dependency and mitigate the effects of congestion and pollution.

The intent of this ordinance is to provide a pedestrian, bicycle, and transit supportive development that integrates auto uses with a complementary mix of land uses, where streets have a high level of connectivity and the blocks are small, all within a comfortable walking and bicycling distance from light rail stations.

The specific objectives of this district are to encourage people to walk, ride a bicycle or use transit; allow for a mix of uses designed to attract pedestrians; achieve a compact pattern of development more conducive to walking and bicycling; provide a high level of amenities that create a comfortable environment for pedestrians, bicyclists, and other users; maintain an adequate level of parking and access for automobiles and integrate this use safely with pedestrians, bicyclists, and other users; encourage uses that allow round-the-clock activity around transit stations; provide sufficient density of employees, residents and recreational users to support transit; provide a high quality of life while reducing energy use; and generate a relatively high percentage of trips serviceable by transit.

II. BOUNDARIES

Example of district boundaries: The zoning provisions shall extend for a radius of up to one-half mile from the Central Transit Station and shall apply for a depth of 200 feet extending from the Central Avenue property line. Central Avenue lot widths shall match the lot widths of properties across the street with a minimum width of 100 feet, but are not required to provide matching lot widths greater than 150 feet.

III. USES

A. Permitted Uses

Because most transit users will walk only one-quarter to one-half of a mile to a transit facility, transit influence areas require high densities on small areas of land. Uses inconsistent with transit will undermine the most efficient use of

This section explains what a transit oriented district is and describes the purpose of implementing such a district. References to the master plan to clarify the intent of this section are important to demonstrate consistency with municipal vision and policies.

This section describes the location of the TOD. The TOD should be located where the land area will support transit usage because of the nature of existing or proposed development, street system, access to public transportation and alternative modes of transportation, mix of business and residential development and other relevant factors.

This section lists the uses that are prohibited within the zone. The examples below show uses that would discourage a pedestrian friendly atmosphere and promote a more automobile-oriented area.

limited land areas within a TOD, and may render the transit system unworkable. Accordingly, the uses permitted within the TOD district are those which are dependent upon, or which may generate, a relatively high level of transit usage.

B. Prohibited Uses

Uses that would interfere with transit usage and which generate few transit trips are not permitted. Such uses include, but are not limited to:

1. Drive-in businesses
2. Dry storage of boats
3. General manufacturing
4. Heavy commercial services, except laundry facilities
5. Sales and rental of large boats
6. Vessel repair (major or minor)
7. Principal use, non-residential long-term surface parking
8. Outdoor storage
9. Car wash
10. Sales and rental of motorized vehicles
11. Sales, service and rental of commercial equipment and construction materials
12. Salvage and recycling
13. Towing services
14. Principal use vehicle repair (major or minor)
15. Wholesale showroom
16. Warehouse

C. Conditional Uses

1. Large scale retail facilities when incorporated into the neighborhood setting, designed with architectural treatments that are in line with pedestrian scale development.
2. Parking Garages may only be permitted when incorporated into the design of a building, and designed with architectural treatments deemphasizing the primary auto use.

D. Site Plan Review

Within the TOD, all site plans submitted to the planning board for approval in accordance with this section shall be accompanied by a report, including appropriate studies, drawings, plans and illustrations, which shall address the following relevant factors:

1. Analysis of the ability of the proposed use and existing uses to coexist and the potential impacts that proposed and existing adjoining and surrounding uses and buildings may have upon one another.
2. Analysis of any impacts on significant natural, architectural, visual or aesthetic qualities of the surrounding environment.

3. Analysis of the health and safety impacts on customers, residents, employees and the general population.
4. Analysis of economic or property value impacts.
5. Analysis of traffic and parking impacts.
6. Analysis of the adequacy of existing municipal facilities and services.
7. The consistency of the site plan with the TOD objectives and guidelines established by this section, the master plan and sound planning and development principles.
8. Prior to the preparation and submission of a site plan, the applicant shall hold preliminary review sessions with the planning department and/or planning board to solicit their comments and recommendations.

IV. DENSITY

- A. Minimum levels of six residential units per acre or 25 employees per acre are required to support transit ridership. Developments with lower levels of density will not support transit ridership and will create unacceptable levels of vehicular congestion.
- B. The development shall not exceed a maximum level of 40 residential units per acre.

Density levels should be determined based upon existing or anticipated modes of transit. Minimum and maximum density levels should be determined for the district.

V. SETBACKS

The front setback shall be established as follows:

1. Minimum front setback: 0 feet from the edge of the sidewalk. A minimum setback of 5 feet from the property line shall be required where street tree planting is required.
2. Maximum front setback: 15 feet.

Refer to the Village Plan Alternative to coordinate appropriate setback distances.

VI. MODIFICATION OF DIMENSIONAL, DENSITY AND OTHER REGULATIONS

- A. The planning board, in determining the acceptability of proposed site plans within the TOD, shall have the authority to approve proposed dimensions, density and uses proposed in a development in accordance with section B below.
- B. In considering an application, the planning board must determine that:
 1. The proposed use and existing uses coexist and the proposed uses do not negatively impact existing adjoining and surrounding uses and buildings.
 2. There are no significant adverse impacts to natural, architectural, visual or aesthetic qualities of the surrounding environment that cannot be mitigated.

3. There are no significant adverse health and safety impacts on customers, residents, employees and the general population.
4. There are no significant adverse impacts to economic or property values.
5. There are no significant adverse impacts to existing traffic patterns and parking circulation.
6. There is adequate existing or proposed municipal facilities and services.
7. The site plan is consistent with the TOD objectives and guidelines established by this section, the master plan and sound planning and development principles.

This section is critical to any TOD ordinance because limits on parking are a vital element to establishing and maintaining a successful TOD zone where driving is discouraged. Bicycle parking can also be addressed in this section.

VII. LOCATION AND ACCESS TO PARKING

- A. Within 500 feet of a commuter rail stop, no minimum parking is required.
- B. Within a quarter mile of a transit station, the minimum parking standard is 50 percent of the parking spaces required by this ordinance.
- C. Within the balance of the TOD, the minimum parking standard is 75 percent of the parking spaces required by this ordinance.
- D. Parking must be located to the rear of a structure or built into or under a structure; or parking may be located between a rear or side lot line and a structure.
- E. If parking garages are permitted, the ground floor should be devoted to mixed use and pedestrian scale architectural treatments.

VIII. BUILDING AND LANDSCAPE STANDARDS

- A. Proposed building massing, proportions, spacing, scale, setbacks, orientation, facade treatment, height and roof lines should be integrated and compatible with the surrounding area.
- B. Exterior building and paving materials and details shall be of a composition, scale and form compatible with the site and building environment.
- C. Buildings should be designed in context with clusters of buildings that present a distinct or unified architectural pattern and scale.
- D. Buildings shall be oriented to enhance, maintain and protect unique or significant internal and external view corridors and vistas.
- E. Open space and landscaping shall be incorporated and, where practical, provide visual and physical links to parks, plazas, squares and Main Street.
- F. Open space and landscaping shall be provided to accentuate points of access and pedestrian activity.
- g. Street trees are part of an overall streetscape plan designed to give special character to each street and coherence to each area. The desired aesthetic shall be achieved through the use of native/proven, hardy, adapted species where reasonable.

- H. Lighting sources shall be of an appropriate design and located at strategic locations to provide a safe environment and to accentuate important points of activity, access and building features of landmark proportions and details. Lighting sources shall be adequately shielded to avoid glare.

REFERENCES

- Bayside Tax Force, City of Portland, Maine. December 20, 1999. *A New Vision for Bayside* as part of the City of Portland Comprehensive Plan. Adopted by the City Council of Portland, Maine. www.portlandmaine.gov/planning/bayside.asp
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Web Sites

- Austin City Connections TOD Comparisons. www.ci.austin.tx.us/development/comparison.htm.
- History of Transit Oriented Development. www.transweb.sjsu.edu.
- King County Transportation: Transit Oriented Development. www.metrokc.gov/kcdot/transit.
- Statewide Transit-Oriented Development Study: Factors for Success in California Executive Summary. www.dot.ca.gov/hq/MassTrans.
- Transit-Oriented Development and Joint Development in the United States: A Literature Review. gulliver.trb.org/publications/tcrp/tcrp_rrd_52.pdf
- Transit Oriented Development: Using Public Transit to Create More Accessible and Livable Neighborhoods. www.vtppi.org.
- Zoning for Transit Oriented Development. www.growingsensibly.org/cmapdfs/i@wv2n4.pdf.

Encouraging pedestrian use is a top priority in TOD. Landscaping and streetscaping areas so that the pedestrian can enjoy a safe and attractive environment enables TOD to be more successful. Minimum standards addressing streetscapes, sidewalks, turf and groundcover and materials can be described in this section. Refer to the Village Plan Alternative Design Guidelines for more specific details.

3.2 Pedestrian Oriented Development

BACKGROUND AND PURPOSE

Pedestrian oriented development (POD) is a pedestrian friendly policy providing clear, comfortable pedestrian access to commercial and residential areas and transit stops. POD is employed through a combination of land design practices including compact development, mixed-use, traffic calming, pedestrian – and public transit-orientation, and a mix of housing types. While POD works well in community centers and downtowns, it also can be applied successfully in rural and suburban areas.

Successful implementation requires a shift from modern, automobile-dependent development toward more traditional design practices that provide safe, convenient opportunities for walking, biking and otherwise accessing key destinations such as school or work. This transition to pedestrian- and public transit-oriented development will help to eliminate quality of life impairments, such as congestion and air pollution, loss of open space, costly road maintenance and public health services, inequitable distribution of economic resources, and loss of a sense of community.

New residential and commercial developments can and should incorporate pedestrian circulation into site layouts by providing not only sidewalks and walkways, but also human-scale landscaping, lighting and other features that promote a sense of safety and encourage people to make use of pedestrian amenities.

BENEFITS OF PEDESTRIAN ORIENTED DEVELOPMENT

Potential benefits of POD design at the community-scale include the following.

Environmental Health

In the last 30 years, vehicle miles traveled across the U.S. have increased three times as fast as the population (FHWA, 1997). This increase in auto-dependency has created adverse environmental impacts such as air and water pollution, which in turn affect environmental and human health. Land use practices that increase opportunities for pedestrian- and transit-oriented transportation will help to reduce these adverse effects.

Economic Health

Social interaction created in town mixed use areas promotes a healthy economy by combining accessibility, networking, convenience, and creativity for people's daily rou-

RELATED TOOLS:

- Village Plan Alternative
- Access Management
- Infill Development
- Transit Oriented Development
- Inclusionary Housing
- Energy Efficient Development

According to the Vermont Agency of Transportation, “Walkability is a tourist magnet. Tourists coming to Vermont to walk and bicycle in the scenic, human-scale towns and compact, pedestrian-friendly town centers have proved to be an economic boon. In 1992, an estimated 32,500 visiting cyclists spent \$13.1 million in Vermont – about twice the amount of money generated by Vermont’s maple syrup producers in a good year.” (Bicycle Touring in Vermont and Vermont’s Scenic Byways Program, Bruce Burgess for the Vermont Agency of Transportation, 1995.)

tines. Further, communities that implement POD practices that result in less traffic noise, traffic speeds and vehicle-generated air pollution than other modern communities, are likely to generate higher property values. Studies show a distinct trend in the increasing rate of homeowners and businesses choosing to locate in areas with high livability and walkability (Eppli, et al., 1999; National Association of Local Government Environmental Professionals, 1999). Tourism, which supports local and state economies, is enhanced by walkable community centers.

Human Health

Our community environments play a critical role in our ability and willingness to engage in regular physical activity required

for a healthy lifestyle. According to the U.S. Center for Disease Control and Prevention, “moderate physical activity performed on most days of the week can substantially reduce the risk of dying from heart disease, the leading cause of death in the United States, and can reduce the risk of developing colon cancer, diabetes, and high blood pressure. Currently, more than 60 percent of American adults are not regularly active, and 25 percent of the adult population is not active at all” (CDC National Physical Activity Factsheet, www.CDC.gov, 1/31/06). Human-scale, pedestrian-oriented development provides safe, accessible opportunities for integrating physical activity into our daily routines. For example, sidewalks can create safe environments for children to walk to school while bike lanes may encourage more people to bike to work.

Social Health

Alternative modes of transportation such as walking, biking, and public transit provide opportunities for social interaction that are less prevalent when traveling in a personal automobile. Additionally, these alternative transportation modes allow us to be more acutely aware of the environment around us, thereby creating an appreciation for our community’s natural areas and resources. This combination of increased social opportunities and appreciation for our surroundings contributes to our sense of community and may result in an increased willingness to participate in local government, volunteer for emergency services, or assist with organizing events such as Old Home Days.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Pedestrian Oriented Development design comprises the following components:

Mixed-Use Development

Mixed-use development combines housing, commercial, retail, civic and office uses, placing these key community elements and destinations within close proximity to one another, e.g., a short walk, bike ride or transit stop. Benefits of mixed-use development include increased pedestrian activity and social interaction by bringing key destinations closer together.

Compact Development

Compact development supports efficient use of land and reduces loss of open space by allowing for increased density in areas of existing development such as town centers and downtowns.

Compact development regulations might include requiring:

1. large, true neighborhoods located adjacent to the town center/downtown to ensure reasonable access to destinations;
2. redevelopment of underused and vacant spaces into new uses, including parks or green spaces designed at a human-scale;
3. maximum standards, rather than minimum standards, for the number of parking spaces where on-street parking is available; and
4. appropriate square footage standards for commercial development in the town center/downtown.

Benefits of compact development include reduced infrastructure costs, increased support for neighborhood retail and transit services, and reduced auto-dependence by locating destinations in closer proximity to one another.

Interconnected, Traffic-Calmed Streets

Safe, efficient pedestrian, bicycle and vehicle circulation is provided through block form or pattern streets that have frequent linkages to destinations and neighborhoods. Roads are designed to move traffic at safe, slow speeds by requiring narrow, tree-lined streets and employing affordable methods to manage speed and access, e.g., one-way streets, access management plans, and/or appropriate corner radii to limit turning speed. Designs should ensure opportunities for accessing destinations are provided for people of all ages and abilities.

Public Spaces Pedestrian-Scale Design

Pedestrian-scale design is development that balances pedestrian – and auto-transit needs while providing comfortable environments and places for people to assemble, plan and associate with others. Community design should be human-scale with services in reasonable distance from one another, to the best extent possible. For example, Dan Burden of Walkable Communities Inc. suggests the following standards: homes within ¼ mile of most services; neighborhood elementary schools within ¼ mile of homes; high schools accessible to most children within 1 mile of most homes; parks within 1/8 mile of homes; public transit access within ¼ to ½ mile of most homes; town center/downtown should provide a balance of retail and commercial stores and services, e.g., hair salon, hardware store, pharmacy, grocery/deli, restaurants, clothing, specialty, post office, library, town/city hall, within ¼ mile walk of the absolute center. Areas not being used by pedestrians should be assessed to determine possible reasons for lack of use, e.g., not handicapped accessible, limited store hours, no place to walk or places to walk feel unsafe.

Pedestrian Orientation

Encouraging people to walk, rather than drive, to local destinations requires the integration of safe, human-scale pedestrian access throughout sites. In subdivisions, pedestrian opportunities may be provided in the form of sidewalks throughout a development or walkways linking new development with existing destinations. Within commercial developments, pedestrians should be separated from vehicular traffic through the use of walkways and landscaped buffers that promote a sense of safety and visual appeal that encourage people to walk. Pedestrian circulation should consider not only movement within a site or development, but also access to adjoining development. Increased use of pedestrian walkways between adjoining developments improves traffic safety by reducing the number of vehicles turning into and out of streets and commercial driveways along public highways.

Mix of Housing Types

Allowing for a mix of housing types throughout the community, particularly within areas of greater density, ensures equitable access to services for people of all ages and income levels.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

The following discussion presents the legal basis for and an overview of how POD can be integrated into local land use planning through master plans, zoning ordinances and subdivision and site plan regulations:

MASTER PLAN

As provided in RSA 674:2.I, municipal master plans should guide local planning boards toward achieving "...the principles of smart growth, sound planning, and wise resource protection." POD design can help support a community's economic, environmental, human, and social health goals, by promoting human-scale development consistent with the community's vision.

ZONING ORDINANCE

When identified as a goal in a municipal master plan, POD design can assist municipalities with accomplishing some of the basic purposes of zoning as provided in RSA 674:17, including reducing traffic congestion, promoting general health and welfare, and preventing overcrowding of the land.

RSA 674:16 authorizes the adoption of innovative land use controls consistent with the methods contained in RSA 674:21. Though POD design is not explicitly included among the list of innovative land use controls provided within the statute, it is consistent with the innovative methods described therein, and is therefore permitted under this statute. POD is innovative because it encompasses a variety of planning techniques that in practice, either individually or in combination with one another, promote appropriate uses of land for the purpose of creating healthy, balanced communities.

SUBDIVISION AND SITE PLAN REGULATIONS

Addressing certain components of POD may be most effective when the requirements are determined on a site- or project-specific basis. For example, pedestrian circulation requirements within parking lots may vary greatly depending on the size of the lot, type of development, and zoning district or location of the site. Adopting POD requirements as part of a community's subdivision and site plan review regulations, rather than exclusively within a local zoning ordinance, will provide greater flexibility for applying such requirements.

RSA 674:36 authorizes planning boards to adopt subdivision regulations that may “require innovative land use controls on lands when supported by the master plan.” In addition, the statute permits subdivision regulations to provide for open spaces of adequate proportions; require the proper arrangement and coordination of streets within subdivisions in relation to other existing or planned streets or with features of the official map of the municipality; provide for harmonious development of the municipality and its environs; provide for efficient and compact development that promotes retention and public use of open space and wildlife habitat; require, in proper cases, that plats showing new streets or narrowing or widening of such streets be submitted to the planning board for approval and shall show a park or parks suitably located for playground or other recreational purposes; and, include provisions that will tend to create conditions favorable to health, safety, convenience, or prosperity.

Similarly, RSA 674:44 grants planning boards the power to adopt site plan review regulations that may “require innovative land use controls on lands when supported by the master plan.” More specifically, the statute permits site plan regulations to guard against undesirable and preventable pollution; provide for open and green spaces of adequate proportions; provide for development harmonious with the municipality and its environs; and, require proper arrangement and coordination of streets within the site in relation to other existing or planned streets; and, include provisions that will tend to create conditions favorable for health, safety, convenience, and prosperity.

EXAMPLES AND OUTCOMES

Pedestrian oriented communities come in all sizes, though the opportunities provided in smaller and larger communities may vary. The following examples highlight successful local and national applications of various POD practices. While each of these communities has successfully implemented one or more of the POD components, it is important to understand that these techniques can be difficult, and may take time to implement.

LITTLETON, NEW HAMPSHIRE:

Livable, Walkable Community

Dan Burden, a leading expert on designing walkable communities, praises Littleton's “nearly 98 percent walkable scale and features” (www.walkable.org, January 11, 2006). Yet such praise did not come easily for the town of Littleton. For the last ten

years, Littleton has had communication, cooperation, and economic and infrastructure investment from local businesspersons, professionals, civic leaders, town officials and community members in an effort to establish a powerful sense of community. Such efforts have included the following:

- **Infill Development.** The community recognized that existing schools were badly in need of upgrades and repairs, without which the town would have had a difficult time attracting new businesses. Following a lengthy strategic planning effort, a citizen's committee, *Envisioning Littleton's Future*, recommended a plan to the school board that called for renovating the existing high school and elementary school located in the downtown and constructing a new middle school nearby, rather than constructing new schools away from the community's center. This plan would help to maintain a strong sense of community and promote vitality for the community's downtown businesses.
- **Adaptive Re-Use.** The community encourages reuse of existing structures rather than construction of new buildings, focusing recruitment of new Main Street businesses on those providing goods and services not offered by big-box retailers, and offering programs to help businesses such as an initiative for painting historic building facades.
- **Pedestrian Orientation.** The community strove to promote a pedestrian-friendly, walkable environment, inviting Dan Burden of Walkable Communities Inc. to help the community understand how to design streets and neighborhoods that will entice people to walk. Riverfront improvements, including a new covered walking bridge, were recently completed to provide a recreational opportunity and scenic walk for residents and visitors.
- **Mix of Uses.** The downtown and areas just beyond the community's center are largely residential, dotted with retail shops, services, schools and traditional neighborhood markets for residents, commuters and travelers.

NEWMARKET, NEW HAMPSHIRE

Redevelopment of Vacant or Underused Parcels:

Brownfields Revitalization

Land that is vacant or underused due to the presence or suspected presence of contamination (brownfields) may provide development opportunities that reduce the need to develop greenfields, or undeveloped land. The U.S. EPA Brownfields Program provides grant funding to states, regional planning commissions, and municipalities for the assessment and clean-up of vacant and underused sites suspected or known to be contaminated. Many communities in New Hampshire have made productive use of this funding opportunity to create usable, livable places within their communities.

In 1997, the town of Newmarket, working with funding from the NH Brownfields Program, undertook an initiative to convert one of the historic, multi-use Essex Mills, located in the community's town center, into residential housing. Following several years of planning and environmental site assessment, approximately 1,200

tons of soils impacted with petroleum and other contaminants were removed from the site in 2001. By 2004, a development milestone was marked with the completion of 36 condominium units in the revitalized, cut granite building. Future phases of development on the remaining two-thirds of the mill site may bring office space or other mixed-use occupants.

In addition to the significant tax revenue increases (from \$6,100 annually prior to redevelopment to a whopping \$300,000 + annually), the mill restoration project seriously enhanced the community's livability and walkability. For example, the developer provided an iron pedestrian bridge next to the Lamprey Falls connecting the two mill facilities as it was in the past. Additionally, the developer provided deeded right-of-way through the property for pedestrians, and deeded canoe and kayak access to the Lamprey River at the development's dock. The sidewalks will eventually be part of Newmarket's River Walk.

SHORELINE, WASHINGTON

Mix of Housing Opportunities: Cottage Housing

The community of Shoreline, Wash. a coastal city north of Seattle with a population of approximately 52,000, has taken a unique approach in addressing the need for a "mix of housing opportunities." To increase housing opportunities for singles and single-parent households, Shoreline recently amended its zoning ordinance to include provisions for "cottage housing." The following excerpt describes "cottage housing" and Shoreline's efforts to integrate this innovative housing concept into the community.

At a time when a median new single-family home is 2,114 square feet, according to the National Association of Home Builders, a development concept that puts eight 1,000-square-foot units on three-quarters of an acre may seem like madness. But the Greenwood Avenue Cottages in Shoreline, Wash., combine a true sense of community with a size that fits singles and single-parent households. "In 1953, the average home was only 1,000 square feet," says Jim Soules, president of the Cottage Co., which developed the community and suggested the idea of a cottage housing code. The basic code is a supplement to residential zoning and incorporates such features as a common open area, square-footage limits, 25-foot height limitations, and parking for each unit away from entrances. "The code not only increased density but also reflects the values of the residents," says Shoreline's Assistant Planning Director Anna Kolousek. "The cottages provide a new benchmark for what is reasonable density in the community and open the way to increase Shoreline's housing options." For more information, refer to www.cottagecompany.com. (Evans, 6/1/04)

While provisions for cottage housing would need to be considered on a New Hampshire-scale and community-specific basis, the efforts of Shoreline, Wash., clearly highlight an innovative approach to providing a range of housing types.

Model Language and Guidance for Implementation

To assist communities with promoting safe, convenient pedestrian access that encourages people to walk, rather than drive to destinations, sample language for incorporating pedestrian oriented design requirements into local regulations is provided below. The language addresses pedestrian circulation in conjunction with new development, by providing pedestrian orientation requirements for both subdivision and site plan review regulations.

While opportunities for pedestrian access are crucial for community health and safety, poorly planned pedestrian access can have negative impacts on a community's character. Thus, pedestrian orientation should be designed on a site-specific basis with consideration given to a site's unique features. For example, requiring sidewalks in front of a new development that fronts on a state highway may be appropriate for a site located in a community center, and may be equally inappropriate for a site far from the community center or other destinations. Similarly, requiring new development to provide sidewalks or walkways between new and existing development should be required where new development adjoins community destinations such as schools or playgrounds, but may present an unfair burden on an applicant if the linkage does not provide reasonable public benefits.

The model language below was developed to provide the greatest amount of flexibility for applying pedestrian orientation requirements on a site-specific basis. Authority to require pedestrian access in conjunction with new development is granted in the zoning ordinance, while specific pedestrian orientation requirements are included in the subdivision and site plan review regulations.

While these regulations will help promote livability and walkability in conjunction with new development, it is important to note that they do not address design considerations for improving pedestrian orientation within existing town centers or downtowns. Rather, communities desiring pedestrian improvements in existing centers should develop a community-specific comprehensive pedestrian circulation improvement plan that considers existing conditions, recommends community facility improvements, and establishes requirements for existing sites when uses are expanded or changed.

Prior to the adoption of these regulations, the Access Management and Landscaping chapters of the guidebook should be reviewed carefully to ensure pedestrian design requirements are balanced with innovative auto-orientation and landscaping practices.

MODEL ZONING ORDINANCE

A community's zoning ordinance should contain language, similar to that below, which establishes the authority of the planning board to adopt pedestrian orientation requirements as part of the subdivision or site plan regulations. Prior to the adoption of such language, communities will need to determine whether pedestrian orientation requirements provided in subdivision and site plan review regulations will apply to development in all zoning districts, or only specific zoning districts such as a village, town center or downtown. If pedestrian requirements will apply to all districts, the following language may be included in the General provisions. If such requirements will apply to specific district(s), then the following language should be included within the provisions for those district(s).

General Provisions or _____ Zoning District

To provide safe and efficient opportunities for people of all ages and abilities to access destinations, to encourage people to walk rather than drive to destinations so as to reduce traffic congestion and environmental impacts from automobiles, and to promote economic, environmental and personal health and well-being, sidewalks, pedestrian access routes and walkways shall be provided in new development in accordance with the requirements of the Town of _____ Subdivision and Site Plan Review Regulations.

Communities should consider adopting local landscaping requirements to enhance the landscaping minimum requirements included in the model subdivision and site plan regulations.

MODEL SUBDIVISION REGULATIONS

SECTION ___: PEDESTRIAN ORIENTATION

Applications for subdivision in the Town of _____ must comply with the following pedestrian orientation requirements.

I. SIDEWALKS AND WALKWAYS

- A. When subdivisions are proposed along existing street frontage and when sidewalks exist parallel to said street and the sidewalk ends at, along, or just before the property frontage, the owner and/or developer shall extend existing sidewalks along the existing frontage of the parent lot(s). New sidewalks shall conform to the design and construction requirements provided in this section. Alternative sidewalk design(s) that promote visual continuity between new and existing sidewalks and comply with Americans with Disabilities Act requirements will be considered by the planning board.
- B. When an application for subdivision proposes the creation of new street(s) to provide access to proposed new lots, sidewalks shall be located on at least one side of the street. Sidewalks shall be placed parallel to the street, with exceptions permitted to preserve natural features or to provide visual interest. The planning board may require sidewalks on both sides of the street in high volume areas. Alternative routes that propose locating sidewalks or walkways within and throughout a development away from street systems will be considered by the planning board.

Communities should review local regulations to ensure **vegetative buffer** planting requirements in this section are consistent with local stormwater management and landscaping requirements.

For more information on the **Americans with Disabilities Act**, contact the Accessibility Specialist at the Governor's Commission on Disability at (603) 271-4177 and refer to www.usdoj.gov/crt/ada/adahom1.htm. For the ADA Standards for Accessible www.ada.gov/stdspdf.htm. For the ADA Standards for Accessible Design for accessible route, refer to www.usdoj.gov/crt/ada/reg3a.html#Anchor-17516.

In addition to the requirements of this section, communities that do not already have sidewalk design, grading and construction standards will need to adopt specific construction specifications to address requirements for: earthwork (i.e. grading, clearing), subgrade, materials (e.g. concrete, bituminous pavement), curbing, and loaming and seeding application and installation procedures. Communities that already have sidewalk construction specifications should review existing regulations to ensure they do not conflict with suggested requirements in this section. The New Hampshire State Building Code, RSA 155-A, also applies to the construction and renovation of sidewalks; see www.gencourt.state.nh.us/rsa/html/indexes/155-A.html.

- C. Wherever sidewalks already exist along a traveled way providing access to a new street, sidewalks shall be extended along the new street such that they connect with existing sidewalks.
- D. A minimum 5-foot buffer shall be provided between the street edge and a paved sidewalk or walkway area. The buffer area shall be vegetated with native grass seed, ground cover or low height shrubs.
- E. Sidewalks or walkways may be placed behind designated transit stop locations, when applicable.
- F. Winter snow storage areas shall be located so as to not block sidewalks or walkways.
- G. Where sidewalks or walkways cross high volume streets, crosswalks may be required.
- H. The paved portion of sidewalks or walkways shall be designed, graded and paved in accordance with the following specifications.
 - 1. The paved area shall be a minimum width of 5 feet in rural areas, and a minimum of 8 feet and maximum of 12 feet in width in commercial areas.
 - 2. Maximum side slopes of 1:3. When the vertical drop is more than 30 inches, exceeds a down slope grade of 1:2, and is located less than 4 feet from the edge of the sidewalk or walkway, a guard rail shall be provided.
 - a. When required, railings shall be a minimum of 3.5 feet in height.
 - b. Uphill slopes shall not exceed 1:3, and retaining walls immediately adjacent to trails shall be avoided wherever possible. When retaining walls are necessary, retaining walls shall be screened with landscaping or be designed with an attractive face.
 - c. Grades in excess of 5 percent are not permitted.
 - d. All pedestrian amenities shall meet ADA Standards for Accessible Design and the applicable requirements of the New Hampshire State Building Code.
- I. Curb ramps (or curb cuts) with detectable warnings shall be provided wherever a curb is part of a path of travel and shall be incorporated into the path of travel to/from crosswalks, when provided.

II. NON-MOTORIZED (PEDESTRIAN AND BICYCLE) ACCESS ROUTES

- A. Pedestrian and bicycle access rights-of-way of not less than 14 feet in width may be required to provide linkages to existing development and/or access to essential services including but not limited to schools, parks/playgrounds, shopping centers, transportation access, or other community facilities. Where such pedestrian and bicycle access routes are required, the developer and/or owner shall
 1. Clear the right-of-way area of obstructing rocks, trees, branches and undergrowth;
 2. Bring the right-of-way to a suitable grade of less than 5 percent; and
 3. Construct a sidewalk for pedestrians and bicycles of at least 5 feet in width within the right-of-way, in accordance with the sidewalk design specifications in this section.
- B. Bollards shall be located at both ends of pedestrian and bicycle access routes to prevent motorized vehicle travel through the right-of-way. Bollards shall be a minimum of 30 inches in height, and shall be spaced a minimum of 5 feet apart. Wherever non-motorized access routes serve as an emergency access, bollards shall be designed so as to be removable in the event of an emergency.
- C. Winter snow storage areas shall be located so as to not block pedestrian and bicycle access routes.

Communities may want to consider allowing street furniture, planter boxes, light fixtures or other amenities to be used in place of **bollards**. The need and ability to remove such amenities in the event of an emergency should be considered.

III. LANDSCAPING

New streets shall be bordered by trees on both sides. Street trees shall conform to the following standards.

- A. Trees shall be drought-tolerant, native or non-invasive species, upward branching so as to limit the need for irrigation and obstruction of sidewalks.
- B. Trees shall have a caliper of no less than three inches when planted.
- C. Trees located under utility wires should be low-growing varieties.
- D. Trees planted along a given street shall include a minimum of three species in equal quantities.
- E. Planting of trees susceptible to insect damage should be avoided.
- F. Trees shall be located no more than thirty-five (35) feet apart. Trees should be located so as to avoid obvious obstruction of visibility and so that branches do not protrude into the pedestrian path of travel, and to avoid interference between root systems and utilities. Trees may be planted individually or clustered.
- G. Incentive Bonuses
 1. Each existing healthy and native or non-invasive tree, with a caliper of three inches or greater, preserved within the required planting area may be substituted for one required street tree.
 2. Where an applicant proposes leaving a significant portion of healthy trees within the construction area, the planning board will consider alternative landscaping designs.

Refer to the landscaping chapter of the guidebook for more information on landscaping standards.

MODEL SITE PLAN REGULATIONS

The planning board shall ensure that the applicant has properly designed and coordinated pedestrian access and circulation within the proposed development and in relation to adjoining development. Site designs shall provide for pedestrian orientation with due consideration of unique circumstances of the site and adjoining properties, in accordance with the following requirements.

SECTION ____: PEDESTRIAN ORIENTATION

For the purposes of this section, parking lot size is defined as follows.

Small Parking Lots: Up to 10 parking spaces, including one van-accessible parking space (an 8-foot wide space with an adjacent access aisle (a No-Parking Zone) that is also 8 feet wide).

Medium Parking Lots: More than 10 and less than 50 parking spaces, including one van-accessible parking space (an 8-foot wide space with an adjacent access aisle (a No-Parking Zone) that is also 8 feet wide) and at least one accessible parking space for every 25 parking spaces provided (an 8-foot wide space with an adjacent access aisle (a No-Parking Zone) that is 5 feet wide).

Large Parking Lots: 50 or more parking spaces, including one van-accessible parking space (an 8-foot wide space with an adjacent access aisle (a No-Parking Zone) that is also 8 feet wide) and at least one accessible parking space for every 25 parking spaces provided (an 8-foot wide space with an adjacent access aisle (a No-Parking Zone) that is 5 feet wide).

I. PARKING LOT DESIGN

Parking lot design must include detailed information on pedestrian access to and through the development, including access to adjoining sites. Demarcation shall be required by using a combination of 1) change in paving surface materials, 2) landscaping, or 3) safety and directional lighting.

- A. Parking areas should be designed to minimize breaks in the pedestrian environment along the public street and create safe and comfortable passage for pedestrians.
- B. Parking lots shall be located behind buildings whenever possible. If circumstances somehow prohibit rear of building parking, front or side of building parking will be permitted as determined necessary by the planning board. Expansion of parking for existing uses or structures may be located in front of the primary building facade only when deemed necessary by the planning board.
- C. Where rear of building parking is provided, an entrance shall be provided in the rear of the building that is accessible from the parking lot, in addition to an entrance provided at the front or side of the building.
- D. Medium and large parking lots shall be visually and functionally segmented into several smaller lots. Parking lots shall occupy no more than one-third of the frontage along public streets, with no more than 75 feet per section of parking area.

Communities should review local regulations to ensure requirements in this section do not conflict with local access management standards or requirements.

- E. To maintain pedestrian comfort and calm the speed of entering traffic, drive-ways to parking areas with high traffic volume may be required to provide pedestrian islands to create a break between entrance and exit travel ways. The requirements for an accessible route apply to these areas. Curb ramps (or curb cuts) with detectable warnings must be provided wherever a curb is part of a path of travel.
- F. To maintain pedestrian comfort and calm the speed of entering traffic, turning radii shall be no less than 10 feet and no greater than 15 feet.
- G. Parking lots shall be designed with a perimeter buffer from any public right-of-way. The buffer shall be a minimum of 5 feet for smaller lots, and a minimum of 10 feet for large parking lots. The buffer area shall be covered with vegetation including native or non-invasive trees, shrubs, or ground covers and up to 30 percent non-living landscape material including crushed stone, mulch, or gravel.
- H. Rows in medium and large lots shall not contain more than 28 contiguous parking spaces. Landscaped islands shall be provided between every 14 contiguous parking spaces.
- I. Large parking lots shall have vegetated areas at the end of each row, the width of which shall be a minimum of 10 feet. To promote on-site water retention and filtration, vegetated areas shall be depressed in a manner that guides stormwater from impervious parking areas, sidewalks and walkways to the vegetated areas.
- J. Trees planted in buffers or other required planting areas shall have a caliper of no less than 1½ inches when planted. Ground covers shall be planted in such a manner so as to present an attractive appearance and reasonably complete coverage within one year of planting.
- K. In sites with high traffic volume where pedestrian traffic will also be high, (e.g. shopping centers) traffic calming techniques shall be provided throughout the parking lot area for pedestrian safety. Speed tables or bumps are required at the edges of pick-up/drop-off zones in front of building entrances.
- L. When adjoining parking areas are interconnected for vehicular access, pedestrian access shall be provided along the front of buildings and between buildings.
- M. One-way traffic flow may be required for high volume parking lots.
 1. When one-way traffic flow is required or provided, van-accessible parking spaces shall be located such that the access aisle is located on the passenger side of the parking space.
 2. When one-way traffic flow is required and when more than one van-accessible parking space is required based on the size of the lot, two accessible parking spaces may share an 8-foot wide access aisle, located between the two parking spaces.
- N. Stop signs shall be provided where vehicular travel ways intersect with pedestrian travel ways.

Communities should review local regulations to ensure **vegetative buffer** planting requirements in this section do not conflict with local stormwater management and landscaping requirements.

Refer to the landscaping chapter of the guidebook for more information on **landscaping standards for parking lots**.

Communities should establish maximum number of parking space requirements for new development based on the type and scale of development. Requiring a maximum rather than minimum number of spaces will encourage the use of on-street parking where available and reduce impervious surfaces created by excess parking spaces. These standards should be established with flexibility for consideration of context-specific parking needs based on development location, type and size/density, and availability of nearby parking and alternative transportation choices such as public transit or a local/regional transportation management program. It should be noted that on-street parking spaces cannot provide accessible parking unless there is no curbing and an adjacent and parallel access aisle is provided. Thus, where on-street parking is encouraged, new parking lots may need to provide accessible parking spaces in addition to the minimum required number of accessible spaces.

II. PEDESTRIAN FLOW

- A. Parking lots shall be designed to allow pedestrians to safely move from their vehicles to the building. In small lots, this may be achieved by providing a sidewalk at the perimeter of the lot. In medium and large lots, pedestrian walkways or corridors within the parking area should channel pedestrians from the car to the perimeter of the lot or to the building. These corridors may be delineated by a paving material that differs from that of vehicular areas.
 1. An accessible path of travel must be provided directly from van-accessible parking space(s) to a sidewalk.
 2. Curb ramps (or curb cuts) with detectable warnings must be provided wherever a curb is part of a path of travel and must be incorporated into the path of travel to/from crosswalks, when provided.
- B. When a sidewalk exists along a portion of a public street abutting the lot, the sidewalk shall be extended along the portion of the lot abutting said street. Sidewalks shall be placed parallel to the street or access road, with exceptions permitted to preserve natural features or to provide visual interest.
- C. Continuous internal pedestrian walkways shall be provided from existing or proposed public sidewalks to the customer entrance of all buildings on the site. Walkways shall connect pedestrians to transit stops, street crossings, buildings and store entry points, and central features and community spaces on or adjoining the site. Landscaped areas shall be provided along the length of the sidewalk or walkway that include trees, shrubs, benches, flower beds, ground covers, or other such materials without obstructing the path of travel or creating protruding objects. The landscaped area may be contiguous or segmented, but shall be provided along no less than 50 percent of the length of the sidewalk or walkway.
- D. In medium and larger parking lots, walkways shall be provided the full length of the building featuring a customer entrance, and along any facade abutting public parking areas. A minimum 6-foot wide planting area shall be located between the walkway and the parking lot area along the length of the walkway, to separate vehicles and pedestrians. The planting area may be contiguous or segmented, but shall be provided along no less than 50 percent of the length of the walkway.
- E. Sidewalks and walkways required in this section shall comply with the following requirements.

1. The paved area shall be a minimum of 5 feet in width for small parking lots, 6 feet in width for medium parking lots, and 8 feet in width for large parking lots.
2. Maximum side slopes of 1:3. When the vertical drop is more than 30 inches, exceeds a down slope grade of 1:2, and is located less than 4 feet from the edge of the sidewalk or walkway, a guard rail shall be provided.
3. When required, railings shall be a minimum of 3.5 feet in height.
4. Uphill slopes shall not exceed 1:3, and retaining walls immediately adjacent to trails shall be avoided wherever possible. When necessary, retaining walls shall be screened with landscaping or be designed with an attractive face.
5. Grades in excess of 5 percent shall be avoided.
6. Sidewalks or walkways may be placed within a utility easement so long as the sidewalk or walkway is not located above utilities in a manner that would require removal of some portion of the sidewalk or walkway for maintenance or other access of said utilities.
7. Sidewalks and walkways may be placed behind designated transit stop locations, when applicable.

In addition to the requirements of this section, communities that do not already have sidewalk design, grading and construction standards will need to adopt specific construction specifications to address requirements for earthwork (i.e., grading, clearing), materials (e.g., concrete, bituminous pavement), curbing, and loaming and seeding application and installation procedures. Communities that already have sidewalk construction specifications should review existing regulations to ensure they do not conflict with suggested requirements in this section. The NH State Building Code, RSA 155-A, also applies to the construction and renovation of sidewalks www.gencourt.state.nh.us/rsa/html/indexes/155-A.html.

Provisions for sidewalk maintenance should also be included in approved plans.

- F. To encourage pedestrian circulation, amenities such as seating and planters shall be provided near public service entrances. Benches or other seating shall be provided throughout parking lots as follows: one bench or other seating in small parking lots; a minimum of one bench or other seating located every 40 feet along walkways or sidewalks in medium parking lots; and a minimum of one bench or other seating located every 60 feet along walkways or sidewalks in large parking lots. When required or provided, such amenities shall be located so as to avoid obstructing the path of travel or creating protruding objects.
- G. As an alternative for large parking lots, pedestrian amenities may be clustered in a defined area in a manner that provides or creates a neighborhood-type space or area for socializing and gathering.
- H. Bicycle parking racks shall be provided near public and service entrances.
- I. All internal pedestrian crosswalks shall be distinguished by the use of durable, low maintenance surface materials such as pavers, bricks, stamped asphalt, or scored concrete to enhance pedestrian safety and comfort, as well as the attractiveness of the walkways.

Communities with high **bicycle usage** rates may want to consider establishing volume standards that link the number of required bicycle parking racks to the type and scale of the proposed use.

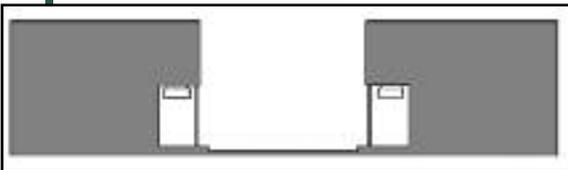
- J. Landscaping shall be used to delineate vehicular and pedestrian circulation patterns.
- K. Winter snow storage areas shall be located so as to not block sidewalks or walkways or otherwise prevent safe pedestrian circulation.
- L. All pedestrian amenities shall meet ADA Standards for Accessible Design and the applicable requirements of the NH State Building Code.

III. BUILDING LOCATION, SCALE AND FAÇADE

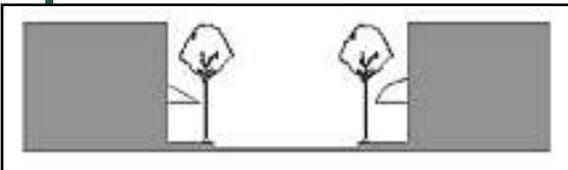
New buildings that exceed the scale and volume of existing buildings may demonstrate compatibility by varying the massing of buildings to reduce perceived scale and volume and integrate larger buildings with pre-existing smaller buildings. Appendages appropriate to the type of use such as porches, patios, and columns are encouraged to promote the transition between a public street or parking area and the building(s).

Buildings shall address the street or parking area in one of the following seven ways.

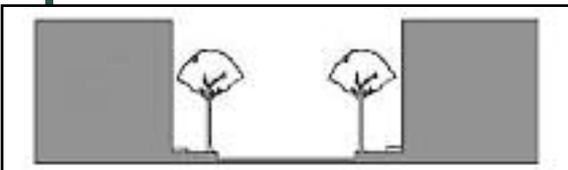
Streetscape examples and drawings from Huntersville, North Carolina Zoning Ordinance, Article 12.2.1 General Definitions.



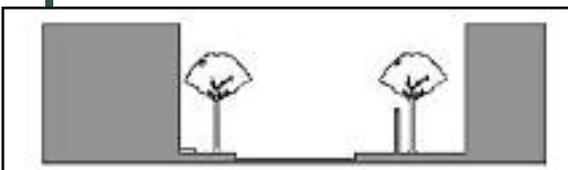
1. **Arcade:** A covered passage with shops on one or both sides that may have a series of arches with columns or piers. Generally, the façade overlaps the sidewalk while the storefront remains setback. Sidewalk is fully covered with overhang.



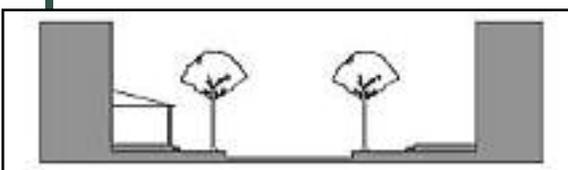
2. **Storefront:** A business or retail use where the façade is aligned directly on the frontage line with the entrance at grade; typical of sidewalk retail. Storefronts often have awnings or a colonnade (series of columns). A transition line should separate the signage from the façade below.



3. **Stoop:** The façade is aligned directly on the frontage line with the first floor elevated to secure privacy at window height. This type is suitable for residential uses such as row houses and apartment buildings. An easement may be necessary to accommodate an encroaching stoop.

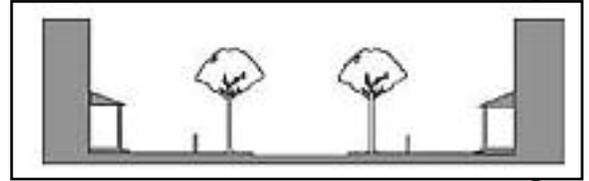


4. **Forecourt:** The façade sets back and is replaced by a low wall at the frontage line. The forecourt is suitable for gardens and car drop offs. It should be used sparingly and in conjunction with a storefront or stoop. Trees within the forecourt should be placed to have their canopies overhanging the sidewalks.

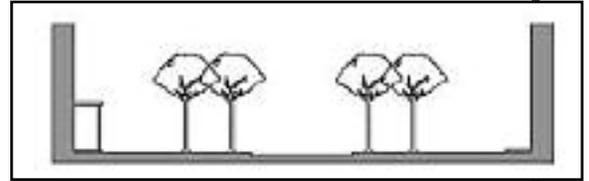


5. **Dooryard:** The façade is set back from the frontage line with an elevated garden or terrace between. This type effectively removes the front yard from the sidewalk and reinforces privacy. A roofed and elevated terrace is especially suitable for restaurants and cafes.

6. **Porch and Fence:** The façade is set back substantially from the frontage line with an encroaching porch. The porch should be within conversational distance of the sidewalk. The fence at the frontage line establishes the demarcation of private from public use. The fence row may be designated by a vegetative hedge or structural material, but should not be less than ____ feet nor more than ____ feet in height.



7. **Front Lawn:** The façade is set back substantially from the frontage line. The front lawn should be visually continuous with adjacent yards and should be unfenced. The large setback provides a good buffer from heavy traffic volumes and is an appropriate design in areas where large lot single family homes are placed along a boulevard.



Communities that adopt pedestrian orientation regulations may also be interested learning about traffic calming. Traffic calming is an approach to designing streets and managing traffic in order to reduce vehicle speeds, improve safety and enhance quality of life. For more information on traffic calming refer to the following resources.

TrafficCalming.org (www.trafficcalming.org) that has traffic calming history, definitions, examples and resources.

The Institute of Transportation Engineers (ITE) Traffic Calming Library, www.ite.org/traffic, that includes databases, articles and reports on traffic calming.

NH DOT Bicycle/Pedestrian Information Center, www.state.nh.us/dot/nhbikeped/links.htm.

RESOURCES

Centers for Disease Control and Prevention

The Centers for Disease Control and Prevention CDC promotes physical activity as a mechanism for disease control and prevention based on research revealing the correlation between obesity and the built environment. For more information on the CDC's "Designing & Building Healthy Places" initiative, see www.cdc.gov/healthyplaces.

City of Pasadena, California

The city of Pasadena's Arroyo/Seco Master Plans Design Guidelines, Chapter 9: Parking, Traffic Control and Paving; www.ci.pasadena.ca.us/publicworks/PNR/ArroyoSeco/pdfFiles/Design%20Guidelines%20Final/chp9rfinal_2-5-05.pdf.

City of Nashua, N.H.

The city of Nashua Land Use Code (adopted November 6, 2005, effective January 2, 2006) has helpful examples of parking and landscaping requirements. The city's "Standard Specifications for Sidewalk Construction" (approved and adopted August 28, 1995) may be a helpful example for communities that want to develop sidewalk construction specifications. Both of these documents are available on the city's website www.gonashua.com.

City of Sequim, Washington

The city of Sequim's "Design Standards & Guidelines for Large Retail Establishments," adopted October 2003, provide general design specifications pedestrian circulation. The Guidelines can be found at <http://www.ci.sequim.wa.us/planning/designguidelines/storageandtrash.cfm>.

Local Government Commission, Center for Livable Communities

The Center for Livable Communities is an initiative of the Local Government Commission (LGC) that helps local governments and community leaders in California be proactive in their land use and transportation planning, and adopt programs and policies that lead to more livable and resource-efficient land use patterns. For more information, refer to the LGC website at www.lgc.org.

Livable Walkable Communities Program

Livable, Walkable Communities (LWC), a program of New Hampshire Celebrates Wellness (NHCW), is designed to increase awareness of the importance of physical activity among all ages through helping New Hampshire communities evaluate and explore ways neighborhoods can improve the quality of life for residents. The Livable Walkable Communities Program has a toolkit designed to assist communities with achieving livable/walkable goals. For more on LWC or other NHCW programs, refer to the NHCW website at www.nhcw.org.

Model Development Code and User's Guide for Small Cities

Prepared by Otak Inc. (September 1999) for the Transportation and Growth Management Program of the Oregon Department of Transportation and Oregon Department of Land Conservation and Development, the model code and guide provides simple to understand language to assist communities with the development of local land use codes. In particular, the information on pedestrian access and circulation and landscaping with street trees were useful in the preparation of the model pedestrian orientation regulations. The code and user's guide can be found on the Oregon DOT website at <http://egov.oregon.gov/LCD/TGM/modelCode05.shtml>.

National Associate of Local Government Environmental Professionals (NALGEP)

NALGEP is a not-for-profit organization that represents local government personnel responsible for ensuring environmental compliance and developing and implementing environmental policies and programs. *Profiles of Business Leadership on Smart Growth: New Partnerships Demonstrate the Economic Benefits of Reducing Sprawl* (1999) is a NALGEP publication referenced in the development of this chapter. For additional information, refer to the NALGEP website, www.nalgep.org.

Pedestrian & Streetscape Guide

The "Pedestrian & Streetscape Guide" (September 2003) prepared by Otak Inc. with sponsorship from the Georgia Department of Transportation is a comprehensive design toolkit that addresses a wide variety of pedestrian and streetscape design considerations. The toolkit includes a discussion of ADA accessibility requirements and as well as helpful diagrams for visualizing how certain design features will look on the ground. The toolkit also includes information on traffic calming, site design

and pedestrian access to transit as well as pedestrian and street design issues related to school zones and recreational trails and pathways.

Pedestrian- and Transit-Friendly Design: A Primer for Smart Growth

Written by Reid Ewing for the Smart Growth Network, this document identifies the essential features of pedestrian- and transit-oriented design. General guidelines for developing local requirements as well as numerous diagrams help the reader understand the interaction of various design features. The Smart Growth Network website can be found at www.smartgrowth.org.

Project for Public Spaces (PPS)

PPS is a non-profit organization dedicated to creating and sustaining public spaces that build communities. PPS provides technical assistance, training, research and other services to communities around the world. For more information, refer to the PPS website at www.pps.org.

Realtor Magazine Online

Forging Livable Communities by Mariwyn Evans, featured on Realtor Magazine Online, June 1, 2004; retrieved from www.realtor.org, January 17, 2006, was referenced in the development of this chapter.

State of New Hampshire's Governor's Commission on Disability

The Governor's Commission on Disability's goal is to remove the barriers, architectural or attitudinal, which bar persons with disabilities from participating in mainstream society. For more information, refer to the commission's webpage, www.nh.gov/disability.

Urban Land Institute

The Urban Land Institute (ULI) is a membership-based nonprofit research and education organization representing a broad spectrum of land use and real estate development disciplines, working in private enterprise and public service, to facilitate the open exchange of ideas, information and experience among local, national and international industry leaders and policy makers dedicated to creating better places. *Valuing the New Urbanism: The Impact of the New Urbanism on Prices of Single-Family Homes*, Mark J. Eppli and Charles C. Tu, 1999, was a ULI publication referenced in the development of this chapter. For more information, refer to the ULI website at www.uli.org.

U.S. DOT Federal Highway Administration

The Federal Highway Administration has numerous publications available to support the design of good transportation systems. For example, FHWA addresses ADA considerations for sidewalk and crosswalk design and construction in "Accessible Sidewalks and Street Crossings – An Informational Guide" (document number FHWA-SA-03-01). The FHWA's publication "Highway Statistics" (Summary to 1995, and annual editions, 1996 and 1997), Washington, DC, was also referenced in the development of this chapter. "How to Develop a Pedestrian Safety Action Plan" (February 2006, FHWA-SA-05-12) was developed as a resource to assist communities with improving pedestrian safety. These and other FHWA publications can be found at www.fhwa.dot.gov.

EPA

A recent EPA publication titled “Parking Spaces/Community Places: Finding the Balance Through Smart Growth Solution” may assist communities seeking to balance parking needs with livable/walkable goals. The publication includes a discussion of the traditional needs and requirements for parking, environmental and economic impacts of parking, and a variety of innovative parking strategies communities have implemented to create a balanced parking supply. For more information or to access this and other EPA Smart Growth publications, refer to the EPA webpage at www.epa.gov/smartgrowth.

3.3 Access Management

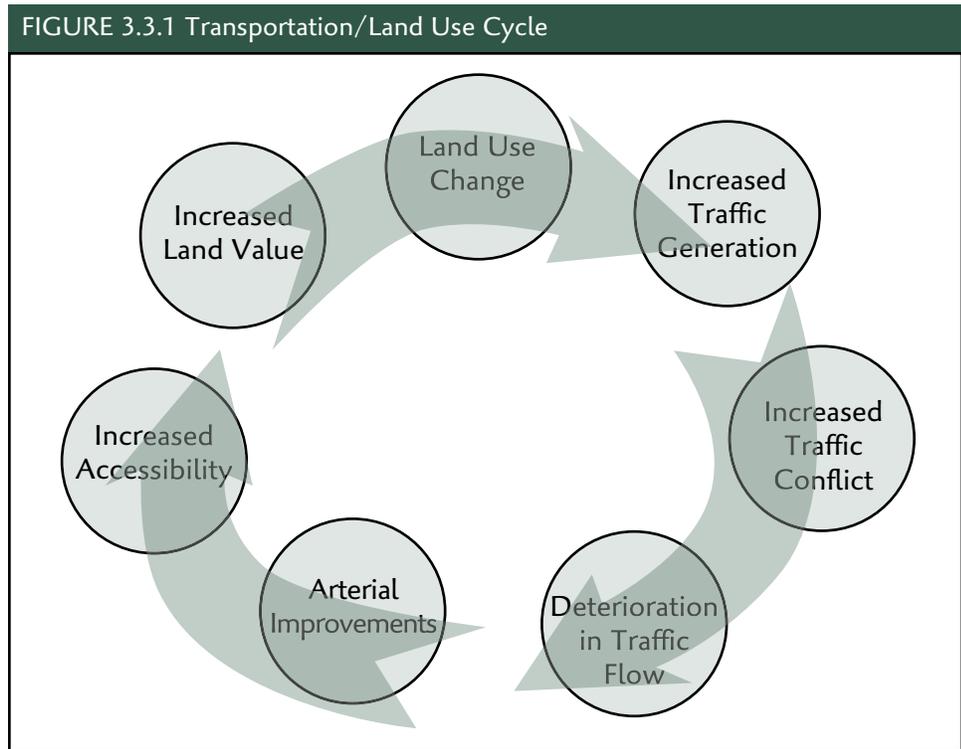
BACKGROUND AND PURPOSE

Access management involves the planning and coordination of the location, number, spacing and design of access points from a roadway to adjacent land. Historically, transportation and access management plans have concentrated primarily on efficiently controlling the movement of vehicles by seeking to reduce conflicts and maximizing the traffic capacity of a roadway. However, recent planning efforts recognize that transportation is inextricably linked to land use decisions and that sprawl and inefficient land use policies go hand in hand with congestion, reliance on automobiles, and increased pollution.

The “Transportation/Land Use Cycle” (Figure 3.3.1) involves a sequence of events in which improvements are made to the transportation network that lead to new land use development, which generates additional traffic and the need for further roadway improvements.

RELATED TOOLS:

- Pedestrian Oriented Development
- Infill Development
- Village Plan Alternative



The recommendations contained in the chapter on Pedestrian Oriented Development should be considered and incorporated into the development of access management plans.

In order to change this cycle, access management must incorporate all modes of transportation including public transit, bicycles and pedestrians, as well as encouraging land use techniques such as nodal development, mixed-use development, and other techniques that reduces the need to travel by automobile and brings the cycle more into balance. Planners now focus access management plans not only on vehicle efficiency, but also on promoting

good land use planning techniques and smart growth as effective ways to extend the life and capacity of roadways.

Good access management can enhance good land use planning. In its simplest concept, access management is quite simply a good balance between the needs of an efficient transportation system and the need to access adjacent land uses. When access to property along roadways is uncoordinated, growth along major travel corridors can result in strip development and sprawl, a proliferation of access points causing unsafe conditions for drivers, pedestrians and other highway users. With uncoordinated development, each individual land use along the corridor has its own access driveway. Numerous access points along the corridor create conflicts between turning and through traffic, which causes delays and accidents.

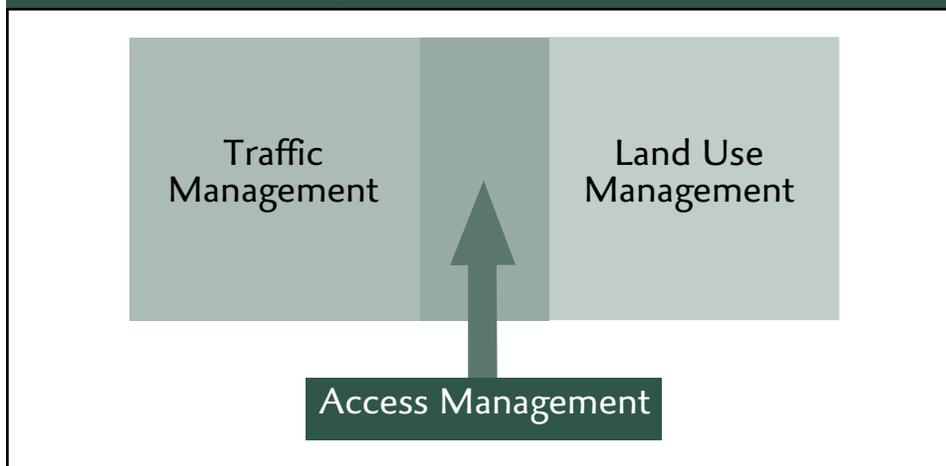
Access management programs facilitate safe access to land uses along major roadways, while promoting and supporting an efficient street system, as well as unified access and internal circulation systems for development. The most effective access management plans are combined with a comprehensive menu of land use planning and zoning techniques that limit strip development and inappropriate growth that often create access and traffic flow problems. They feature concentrated nodes of development along corridors that preserve open space between nodes and integrate pedestrian walkways and bicycle path ways that provide true alternative means for reaching key work, shopping and leisure destinations within the nodes.

The result is a roadway corridor that functions safely and efficiently for its useful life, provides healthier, more walkable communities and a more attractive corridor. Additional benefits that access management plans can facilitate are reduced overall vehicle trips, fewer traffic delays and congestion, maintenance of roadway capacity, improved air quality, compact development patterns, improved access to adjacent land uses and enhanced pedestrian and bicycle networks.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Because of the increase in recent growth rates, many segments of New Hampshire's arterial and collector roadway system are becoming increasingly congested. Most of these congested segments are located on established roadways that provide through routes for commuters as well as local access to employment centers or commercial strips. The key to good access management is to ensure that land uses and development regulations along major corridors and the adjoining local road networks complement and implement the recommendations of a well thought out corridor plan. Coordinated access management (Figure 3.3.2) is the juncture between land use planning policies and traffic management.

FIGURE 3.3.2 Access Management



The actions of local planning boards in planning, reviewing, and approving land development can significantly impact transportation plans. Planning boards play a key role in implementing transportation plans by making sure that the land use decisions they make are coordinated with an overall access management strategy. They have the opportunity to work with developers to implement good land use policies as well as good access management policies.

There are a number of access management strategies that can be used to coordinate transportation and land use. Not all will apply to every community. Some of them are more appropriate to less developed rural areas, others are more appropriate to existing urban areas. In the urban areas, various methods can be applied when existing sites are redeveloped or when negotiations with landowners are successful. Therefore, it is up to each planning board to determine what will work best based on local conditions.

Corridor management plans (discussed below) can assist communities in identifying appropriate land use policies as well as techniques specific to the needs of the corridor. The following are common access management techniques and corresponding land use policies.

- **Limit the number of access points.** Roadways that serve higher volumes of regional through traffic need more access control to preserve their traffic function. Zoning for nodal development which limits development to mixed-use areas such as village areas and restricts development along the corridors in between the nodes strengthens this access management technique.
- **Street and driveway design.** Elements such as medians, median openings, auxiliary lanes, driveway design, intersection channelization, frontage roads, and grade separations are also used to help manage access. Design standards for these elements are usually set forth in local subdivision and site plan regulations or refer to state standards. Design standards are especially important for situations in which there is no comprehensive access management plan.

The requirement of shared driveways is becoming more common and is an effective technique in limiting the number of access points onto major roadways.

For more explanation of these techniques, refer to “Summary of Access Management Methods” (NHCRP Report 548, 2005).

Shared driveways have a tendency to reduce accidents associated with turning traffic and have a tendency of improving the efficiency of the main road.

- **Acquisition of access rights.** State and local agencies have the authority to acquire access rights, which is typically the method used for controlling the access along freeways, expressways, parkways, and other types of major roadways. The acquisition of access rights is an effective and long-term solution to the problem of providing adequate and safe access, particularly at selected locations such as interchanges or close to planned interchanges.
- **Access management ordinances.** Ordinances may be used to address various aspects of access management, such as permitting or prohibiting access; location, spacing, and design of access connections; spacing of median openings, signalized intersections, and interchanges; and the access permitting process. Zoning ordinances can address lot dimensions and coverage, landscaping, parking, site circulation, sidewalks and bicycle facilities, development density, and the allowable use of the land. “Corridor overlay districts” are sometimes used to establish access requirements for a specific roadway corridor. Village Plan Alternatives, higher density development, can be combined with access management ordinances to create a safe, livable and walkable community.
- **Policies, directives, and guidelines.** Communities may adopt specific policies, directives, or guidelines that are directly or indirectly related to access management. Every local government has statutory authority to control highway design and operations to protect public safety, health, and welfare (see RSA 674:17, D). A local community may establish policies by resolution or in its master plan. Access management issues are also sometimes addressed through guidelines without specific legislative authority and without the mandatory status and enforceability of regulations.
- **Land development regulations.** Many communities address highway access management under their subdivision and site plan review process. This can include specific access management and driveway design requirements, as well as regulations that govern the division of land into lots, blocks, and public ways to help ensure proper street layout for existing or planned roadways. Traffic impact studies are usually required for larger developments and can show if, where and how site access may be most effective.
- **Zoning Ordinances.** Encouraging nodal development through zoning and other regulations helps to concentrate development into areas where access can be designed and coordinated while allowing uninterrupted travel between nodes.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

The legal basis for access management comes primarily from three sources: the zoning ordinance, site plan review and subdivision regulations. In New Hampshire, municipalities are expressly given the mandate to develop zoning ordinances that are designed to lessen congestion in the streets, secure safety from fires, panic and other dangers, and facilitate the adequate provision of transportation (RSA 674:17, I a-j).

Under RSA 674:36 (Subdivision Regulations), planning boards are authorized to develop regulations that allow it to design and control the transportation system within the community. Planning boards may regulate the proper arrangement and coordination of streets within subdivisions in relation to other existing or planned streets, require suitably located streets of sufficient width, and be coordinated so as to compose a convenient system.

Under RSA 674:43 (Power to Review Site Plans), municipalities that have adopted a zoning ordinance (RSA 674: 16) and subdivision regulations (RSA 674:36) may permit planning boards to review site plans for non-residential development and multi-family dwelling units. The language that authorizes site plan review mirrors the language in RSA 674:44, subsections (d), (e) and (f) which authorize planning boards to adopt regulations that address the “proper arrangement and coordination of streets within the site in relation to other existing or planned streets or with features of the official map of the municipality” as well as other features such as width, and “be coordinated so as to compose a convenient system.”

ACCESS AND COORDINATION ON STATE ROADWAYS

The New Hampshire Department of Transportation (DOT) issues driveway permits for all proposals for access the state road system (see RSA 236:13). Until recently, the DOT issued permits with limited input from the local decision makers. To improve the coordination of local and state planning objectives along the state’s road system, the DOT is instituting a process to allow communities that have conducted a corridor planning process be more involved in the state permitting process. The DOT has developed a memorandum of understanding (MOU), which is an agreement between the DOT and the community, to coordinate the review and issuance of driveway permits to access state roads.

The MOU contains a number of requirements for the community and the DOT:

1. The community must develop, adopt and enforce access management standards for state highways that comply with best management practices for access management.
2. The community can develop site or parcel specific access management plans for highway corridors or segments.
3. The community must notify the DOT district engineer when it receives a development proposal that would require a state driveway permit and solicit input on the design.
4. The community shall require that all access points comply with its adopted access management standards and any applicable site specific access plans.
5. The community must inform the DOT of any waivers or variances from the access management standards or plans prior to local approval and provide appropriate notice for comments.
6. The DOT will provide information and technical assistance to the community in developing access management standards and site/parcel specific plans.
7. The DOT will not approve driveway permits that do not conform to the local access management standards or plans except with the consent of the community.
8. The DOT district engineer shall notify the community and transmit copies of all

driveway access permit applications to the planning board.

9. The DOT will withhold final action on any driveway access permit until the planning board has formally approved the access plan for the development.
10. The DOT must notify the community if it intends to issue a driveway access permit that is not in conformance with the adopted access management standards or parcel specific plan.
11. All corridor or site specific access management regulations or plans must be filed with the DOT.

Communities interested in coordinating more closely with the Department of Transportation should contact their Regional Planning Commission to explore the MOU option. In addition, communities should develop a permitting process for driveways accessing local roads. Such permits can assist with the implementation of access management techniques.

EXAMPLES AND OUTCOMES

CORRIDOR STUDIES

Corridor studies are studies of specific highway corridors that evaluate the current conditions and address potential problems. These studies identify ways that communities can improve the highway corridor by managing access and makes land use policy recommendations to guide future development in a manner that maximizes the roadway capacity and the efficient development of adjacent land. Transportation corridors are the areas along a roadway and the adjacent land uses.

The *New Hampshire Route 101 Corridor Plan* (2002) completed for the towns of Amherst, Milford, and Wilton is an example of a typical corridor study. The analysis covers traffic volumes, bicycle and pedestrian opportunities, land use patterns and regulation, the natural environment, historic and cultural resources, visual analysis and sets forth a vision for the future. The plan proposes strategies for improving the efficiency of the corridor through a combination of roadway improvements and changes to land use regulations.

An example of a corridor study that spans a large segment of the state is the *Route 16 Corridor Protection Study* developed by DOT and published in 1999. The goal of the study was to “demonstrate an innovative approach to developing a long-range solution to the problem of providing an efficient transportation system which promotes economic vitality and a high quality of life for the residents of communities and visitors to the regions served by the Route 16 Corridor.”

The project phases included initial data collection, additional data collection and public input, analysis, and recommendations. The purpose of this study was to develop principles and techniques to implement the corridor vision. The three main recommendations in the plan for future land use planning were:

1. Encourage development in nodes.
2. Discourage major new development between nodes.
3. Manage access to land uses.

The plan sets forth a program to integrate good transportation and land use principles to guide growth and prevent the sprawl of development. In combination with a planned and dynamic transportation improvement program, conflicts along the roadways can be reduced. Finally, the implementation of the corridor management plan will enhance the travel experience by offering safe passage through a major traffic corridor linking the seacoast with the mountains.

ACCESS MANAGEMENT PLANS

An access management plan should be incorporated into a corridor study along the length of a highway, but it can also serve a more defined area, such as a shopping center or central village area. An example of a recent access management plan that served a targeted area rather than an entire corridor is *The Town of Warner, NH 103 Access Management Study* (2005), which covers the area around Exit 9 on I-89 in the town of Warner. This area is home to recent development that centers around the I-89 Exit 9 interchange, and includes a grocery store, assorted gas stations, a NH Park & Ride facility, fast food restaurants. The town recently located its new police station nearby and was concerned that without a plan, this area could become quickly congested and unsafe, as well as a detriment to the nearby historic village center. As the subject of a Plan NH charrette, the town developed a vision for a gateway and coordinated access to the major businesses. The access management plan analyzed the feasibility of the vision, and proposed a framework for future development around Exit 9. This will serve as a blueprint for the planning board and zoning board of adjustment as they evaluate applications for development in the area.

Subdivision and Site Plan Regulations Addressing Access Management

Many New Hampshire communities have not completed access management plans for all roadways within their communities. However, access management plans are not a prerequisite for incorporating access management into existing regulations. While some communities have regulations that help to specifically control access to important arterial or collector corridors, many more have adopted general regulations that apply to all developments that assist in controlling and managing access to the transportation network.

Control of Access Points

Town of Litchfield: The northern commercial zone requires 500 feet of frontage on Route 3A and limits the number of access points in the district to one per 500 feet. If an access is constructed to town standards or access is taken from an existing town road, then the frontage requirement is reduced to 150 feet.

Town of Hudson: The driveway regulations permit only one driveway per parcel.

Town of Amherst: The commercial zones allow no more than one access to any lot wherever desirable for traffic safety and they allow for combining access points where two or more lots are being developed.

Spacing of Access Points

Town of Brookline: The driveway regulations require that any driveway be separated a minimum of 50 feet from another driveway.

Town of Bedford: The zoning ordinances require a minimum separation of 120 feet between curb cuts.

Town of Mont Vernon: The zoning ordinance requires 500 feet of frontage on Route 13 and permits one access road per 1,000 feet.

Width of Access Points

Town of Amherst: The subdivision regulations limit the maximum width of any driveway to 20 feet for each lane, or 40 feet for a two way driveway.

Town of Hudson: The driveway regulations limit the maximum driveway width to 50 feet with provisions for flaring the entrance to accommodate the turning radius of vehicles expected to use the site.

Shared Access Points

Town of Brookline: The zoning ordinance permits common driveways service a maximum of four lots.

Town of Hollis: The zoning ordinances permit common driveways serving no more than two adjacent lots.

Town of Wilton: The commercial and industrial zoning districts along Route 101 require the design and construction of streets or side roads to permit travel between adjacent lots without accessing Route 101.

Town of Amherst: The zoning ordinance has explicit provisions to limit points of access to commercial and office zones and encourages combining access points where two or more lots are being developed. In addition, direct access to 101A in the industrial zone is not allowed unless other access is unavailable.

Town of Brookline: The site plan regulations provide for shared parking and for minimum and *maximum* parking provision requirements.

Pedestrian and Bicycle Access

Town of Litchfield: The road design standards require developments along Albuquerque Avenue to construct an eight-foot pedestrian/ bicycle path.

City of Nashua: The subdivision regulations require the construction of five-foot wide sidewalks in residential, commercial and industrial developments.

Town of Merrimack: The subdivision regulations require sidewalks be constructed along all existing or proposed collector or arterial streets or streets constructed as part of a subdivision.

Frontage and Backage Roads

City of Nashua: The subdivision regulations require the construction of a “parallel” road to provide access to land adjacent to a limited-access highway, railroad right-of-way or an open watercourse. The parallel road must be at a sufficient distance that the land between the two roads can be used for another use in conformance with the zoning ordinance.

Town of Litchfield: The zoning ordinance encourages the use of an “internal” road to provide access to land along Route 3A by reducing the frontage requirement from 500 feet along 3A to 150 feet along an internal road.

Model Language and Guidance for Implementation

I. ACCESS MANAGEMENT AUDIT (see audit form at the end of chapter)

Planning boards can evaluate their current ordinances to determine if they adequately address access management strategies. By comparing current ordinances and regulations to these guidelines, communities can identify areas in the ordinances or regulations where access management strategies can be incorporated. These measures are based on the access management guidelines that were developed by the Nashua Regional Planning Commission in 2002.

II. MODEL REGULATION LANGUAGE (Subdivision and Site Plan)

Unless access management regulations are incorporated into a specific zoning or overlay district, most of the techniques are a collection of regulations that work together in a comprehensive scheme to control access to a transportation network. Below is some suggested language that can be incorporated into existing subdivision or site plan review regulations.

III. LANGUAGE TO INCORPORATE INTO DEFINITIONS

Access Management: Providing or managing access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity and speed.

Arterial Road: A road whose primary function is mobility, moving people and goods over long distances quickly and efficiently.

Collector Road: A road connecting arterial roads to local roads, whose function is divided between providing mobility and access.

Curb: A stone, concrete or other improved boundary usually marking the edge of the roadway or paved area.

Curb Cut: The opening along the curb line at which point vehicles may enter or leave the roadway.

Driveway: A private roadway providing access to a street or highway.

Easement: A grant of one or more of the property rights by the owner to, or for the use by, the public, a corporation or another person or entity.

Frontage: The length of any one property line of a premises that abuts a legally accessible street right-of-way.

Local Road: A road whose primary function is to provide access to adjacent development.

Median: A barrier placed between lanes of traffic flowing in opposite directions or between parking spaces.

Parking Aisle: The area of a parking lot that allows motor vehicles ingress and egress from the driveways or streets.

Parking Lot: An outdoor area where motor vehicles may be stored for the purposes of temporary, daily or overnight off-street parking.

Parking Space: A temporary storage area for a motor vehicle.

Pedestrian: A person traveling on foot; a walker. A person operating a pushcart; a person riding on, or pulling a coaster wagon, sled, scooter, tricycle, bicycle with wheels less than 14 inches in diameter, or a similar conveyance, or on roller skates, skateboard, wheelchair or a baby in a carriage.

Right-of-way: An easement held by the municipality or the state over land owned by the adjacent property owners that allows the holder to exercise control over the surface and above and below the ground of the right-of-way. Property owners are typically responsible for the construction of transportation improvements adjacent to their property. The municipality or the state maintains the street, while the property owner is responsible for maintaining the sidewalk.

Street: Any vehicular way that is: 1) an existing state or municipal roadway; 2) shown upon a plat approved pursuant to law; or 3) approved by other official action; including rights-of-way, whether improved or unimproved.

Traffic Study: A traffic impact study to determine the effect of a proposed development, both on and off site, and propose appropriate mitigation measures.

IV. LANGUAGE TO INCORPORATE INTO PLAN REVIEW STANDARDS

Traffic: The planning board shall determine that the proposed development will not cause unreasonable highway or public road congestion or unsafe conditions with respect to the use of the highways or public roads existing or proposed, and the traffic associated with the development shall maintain the existing level of service within 200 feet of any existing or proposed curb-cut. In making its determination, the planning board shall consider factors such as vehicular circulation, parking, pedestrian circulation, and landscaping. The board shall also consider a statement or report from a traffic engineer indicating that the proposed development will not create or further contribute to unsafe traffic conditions, and consider statements from the fire department, police department and public works department in evaluating the project for highway or public road congestion or safety.

Pedestrian and Bicycle Access and Safety: The planning board shall determine that the proposal is designed to accommodate bicyclists and pedestrians, and addresses issues of bicycle and pedestrian access, safety and circulation both within the site and to points outside of the site. In making its determination, the planning board shall consider factors such as vehicular circulation, parking, pedestrian circulation, and landscaping.

V. VEHICULAR CIRCULATION STANDARDS

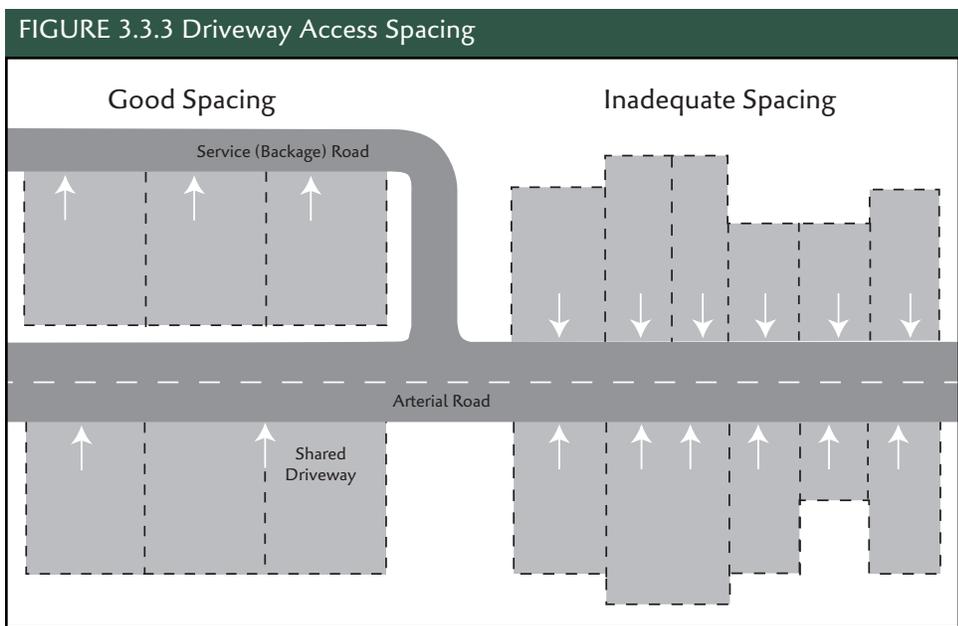
A. Number, Spacing and Width of Access Points

1. **General Provisions:** No person shall cut, break or remove any curb along a street except as herein authorized. No person shall construct, alter or extend any driveway approach that can be used as a parking space or area between the curb and private property. The provisions in this section are based on principals of access management.
2. **Driveway Approach Width (commercial and industrial):** The maximum width of a driveway approach for a two-way driveway shall not exceed 36 feet including two-foot shoulders. The minimum width of a driveway approach for two-way driveway shall not be less than 24 feet including two-foot shoulders.
3. **Driveway Approach Width (multifamily residential):** The maximum width of a driveway approach shall not exceed 15 feet. The minimum width of a driveway approach shall not be less than 10 feet.
4. **Driveway Access Spacing:** Driveway access spacing shall be measured from the edge of the proposed driveway pavement to the nearest edge of the roadway of the adjacent or opposite driveway or street. Driveway access spacing shall meet the requirements of Table 3.3.1.

This section should be integrated with the pedestrian circulation section of the Pedestrian Oriented Development chapter.

TABLE 3.3.1 Driveway Spacing		
Roadway Classification	Minimum Spacing (feet)	Desirable Spacing (feet)
Major Arterial	300	500
Minor Arterial	100	300
Collector	100	200

Source: Access Management Guidelines, Nashua Regional Planning Commission, April 2002



Source: Access Management Guidelines, Nashua Regional Planning Commission, April 2002

5. **Intersection Alignment:** If a proposed driveway cannot meet the requirements of the sections above, then the proposed driveway shall be aligned directly opposite an existing or proposed opposite driveway and the configuration shall be treated as a four-way intersection.
6. **Angle of Driveway Approach:** The angle of driveway approach shall be approximately 90 degrees for two-way driveways and between 60 degrees and 90 degrees for one-way driveways.
7. **Turning Radii:** The principal users of the roadway shall be considered when determining the inside turning radii. The inside turning radii shall vary between a minimum of 15 feet and a maximum of 30 feet and meet the minimum and maximum requirements of Table 3.3.2.

Land Use	Minimum Inside Turning Radii (feet)	Maximum Inside Turning Radii (feet)
Multifamily/Residential	15	20
Commercial/Industrial	20	30
Mixed Uses	15	30

Source: *Access Management Guidelines, Nashua Regional Planning Commission, April 2002*

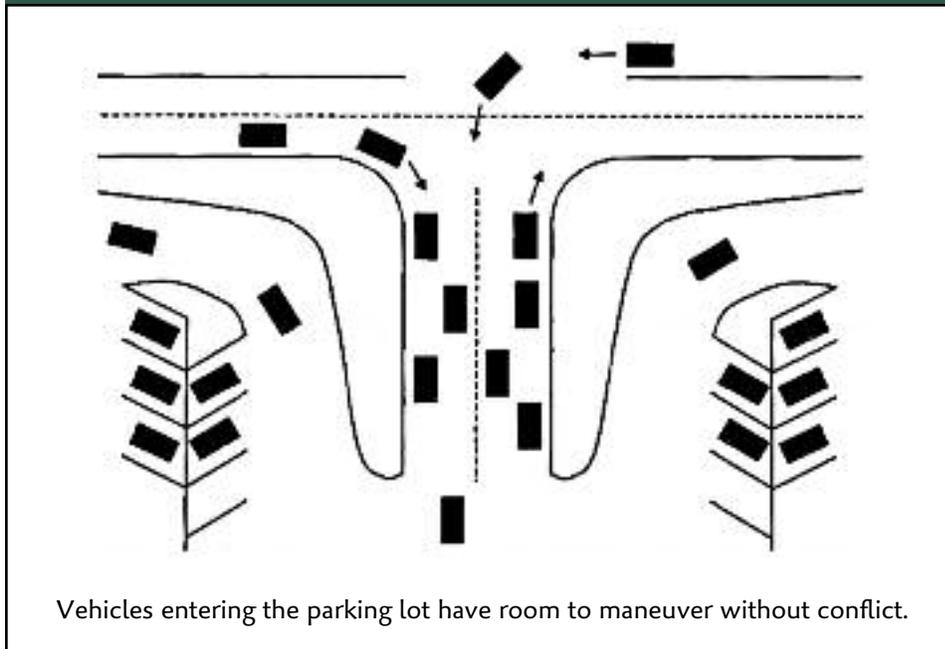
8. **Corner Clearance:** No driveway approach may be located closer to the corner than indicated in Table 3.3.3. The measurement shall be taken from the intersection of property lines at the corner to the nearest edge of the proposed driveway pavement. When these requirements cannot be met due to lack of frontage, the nearest edge of the proposed driveway pavement shall be located as far as possible from the intersection of property lines at the corner.

Speed (mph)	Distance to Corner (ft)
30	325
35	425
40	525
45	630
50	750

Source: *Access Management Guidelines, Nashua Regional Planning Commission, April 2002*

9. **Driveway Throat Length:** Driveway throat length shall be measured from the edge of the property line to the furthest end of the driveway. A minimum driveway throat length of 25 feet for collector streets, 40 feet for minor arterials, and 55 feet for major arterials shall be required. The purpose of the driveway throat length is to allow for traffic entering the site to

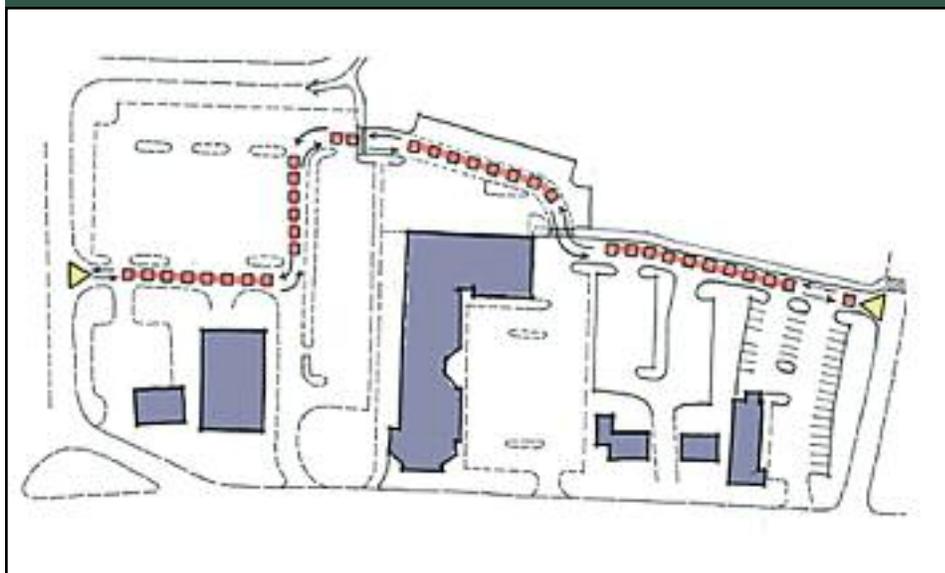
FIGURE 3.3.4 Adequate Throat Length



be stored on site in order to avoid a queue of traffic on the roadway causing delays and a potentially hazardous situation. (See Figure 3.3.4.)

10. **Shared Access:** Shared driveways are encouraged and may be required between adjacent lots that front on arterial and collector streets. In such cases, a joint access easement between the property owners may be required. The location and dimensions of said easement shall be determined by the planning board (See Figure 3.3.5).

FIGURE 3.3.5 Shared Access



Source: *Access Management Guidelines*, Nashua Regional Planning Commission, April 2002

11. All-Season Safe-Sight Distance: All-season safe-sight distance is defined as a line that encounters no visual obstruction between two points, each at a height of three feet nine inches above the pavement, and 10 feet back from the road pavement as to represent the critical line of sight between the operator of a vehicle using the access and the operator of a vehicle approaching from either direction. Safe sight distance shall be compatible with the maximum speed limit posted on the roadway as indicated in Table 3.3.4.

TABLE 3.3.4 All-Season Safe-Sight Distance

SPEED LIMIT (MPH)	ALL SEASON SAFE SIGHT DISTANCE (FEET)					
	Downgrades			Upgrades		
	3%	6%	9%+	3%	6%	9%+
25	158	165	173	147	143	140
30	205	215	227	200	184	179
35	257	271	287	237	229	222
40	315	333	354	289	278	269
45	378	400	427	344	331	320
50	446	474	507	405	388	375
55	520	553	593	469	450	433

Source: *Access Management Guidelines, Nashua Regional Planning Commission, April 2002*

To prevent hardship to owners of small parcels of land or special land uses, exceptions to the all season safe sight distance requirements should be allowed for individual homes, agricultural land, public works land, highway department land and temporary accesses for vehicles such as construction vehicles, gravel trucks and log trucks. The road shall then be properly signed for “Blind Drive” or “Trucks Entering.”

VI. PARKING REQUIREMENTS

Shared Parking Provision: Parking provisions for any combination of uses on the same site shall consider the opportunity for combined visits (i.e. one parking space in front of a gas station pump may count as one parking space for both the convenience store and the gas station in a combined gas station/convenience store development). Shared parking arrangements with adjoining nonresidential developments or other uses on site are encouraged. Off-site shared parking shall be protected with a shared parking easement agreement which shall be reviewed and approved by the planning board and recorded with the approved site plan.

ACCESS MANAGEMENT STRATEGIES AUDIT

Planning boards can evaluate their current ordinances to determine if they adequately address access management strategies. By comparing current ordinances and regulations to these guidelines, communities can identify areas in the ordinances or regulations where access management strategies can be incorporated. These measures are based on the Access Management Guidelines that were developed by the Nashua Regional Planning Commission in 2002; see table at end of chapter.

REFERENCES

- American Association of State and Highway Transportation Officials. 2001. *AASHTO Green Book: A Policy on Geometric Design of Highways and Streets*.
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- Urbitran Associates. 2002. *CRP-CD-24: Impact Calculator: Impacts of Access Management Techniques*, Transportation Research Board of the National Academies.

ACCESS MANAGEMENT STRATEGIES: COMMUNITY AUDIT

DOCUMENT	FEATURE	Y	N	Comments/Notes
ZONING ORDINANCE				
	Limit number of access points per parcel or frontage			
	Require use of side roads or shared driveways			
	Allow reduced frontage requirements along arterials and collectors when a frontage/backage road is used instead of a driveway			
	Other alternative zoning requirements			
	Required Shared parking for commercial establishments			
SUBDIVISION AND SITE PLAN REVIEW REGULATIONS				
	Minimum driveway spacing standards to control space between curb cuts			
	Minimum and maximum driveway width standards			
	Minimum and maximum turning radius standards for access points based on land use			
	Minimum distance between driveways and intersections.			
	Require consolidation of driveways or corner clearance during redevelopment of sites.			
	Adopt minimum throat length standards for new or redeveloped sites			
	Require interconnections between existing and future subdivisions			
	Require rights of way be provided to adjacent undeveloped land			
	Establish standards for shared driveways			
	Require commercial developments to establish cross easements and interconnections between developments			
	Define standards for intersections, street and driveway alignments			
	Establish safe sight distance requirements based on the design speed of the road.			
	Require traffic impact studies to identify needed roadway improvements resulting from proposed development.			
	Provide safe pedestrian and bicycle access within and between developments			
	Require parking areas to address pedestrian access and circulation within the site			

ACCESS MANAGEMENT STRATEGIES: COMMUNITY AUDIT				
DOCUMENT	FEATURE	Y	N	Comments/Notes
SUBDIVISION AND SITE PLAN REVIEW REGULATIONS (CONTINUED)				
	Require bus turnouts and shelters for large retail or employment centers where existing or proposed transit services are provided			
	Require construction of frontage/backage roads to service parcels adjacent to arterials or collectors			
	Provide for the use of roundabouts in the community, referencing FHWA design criteria			
	Develop preliminary review process for applications to receive input into the design of new developments at the outset of a project			
	Require overall access and development plans for large sites			
COMMUNITY POLICIES				
	Promote an interconnected road network for municipal and private roadways			

3.4 Preserving Dark Skies

BACKGROUND AND PURPOSE

The dark, star-filled night skies that still prevail in New Hampshire’s extensive rural areas are an important but diminishing natural resource. The pale arc of the Milky Way, the constellations, bright planets and an occasional passing comet that are easily seen on moonless nights form an essential component of the state’s rural character – and a part of nature now lost to most Americans who live in densely lighted urban areas where “light pollution” washes out the stars.

New Hampshire’s dark skies have more than esthetic value. They are part of the rural experience that attracts tourism, which in turn contributes significantly to local economies. By taking relatively simple steps to regulate outdoor lighting, communities may also save energy and minimize the impact of artificial light on wildlife habitat, where darkness is essential to predation, migration and reproduction of many nocturnal species.

When properly designed, outdoor lighting can meet a community’s needs for safety and security while helping to preserve or enhance its rural character. Well-designed lighting also prevents potentially dangerous roadway glare and “light trespass,” the unwanted intrusion of a neighbor’s lighting across property lines. In addition, by requiring that newly installed outdoor lights emit the minimum amount of illumination recommended by industry standards for a given purpose – whether parking lots, streetlighting or building security – communities can encourage energy conservation.

Lighting regulations, which may take the form of a local ordinance or provisions in a planning board’s site plan review and subdivision rules, can mitigate the impact of light pollution and encourage energy savings with little or no burden of public cost or inconvenience.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

Dark sky regulations are appropriate for any area where preserving, enhancing or restoring rural character is desired, or where excessive artificial lighting may impact wildlife.

According to studies cited by the 2006 Wildlife Action Plan prepared by the New Hampshire Fish and Game Department, biologists have found that bright artificial

RELATED TOOLS:

- Habitat Protection
- Energy Efficient Development
- Pedestrian Oriented Development

lights can be harmful to a wide spectrum of wildlife, including migratory birds, nocturnal amphibians such as frogs and salamanders and valued insects.

The Wildlife Action Plan notes that New Hampshire's fragile pine barrens or pitch-pine habitat, where a number of rare and endangered moth and butterfly species are found, including the Karner Blue butterfly, is particularly vulnerable to bright artificial lighting that may disturb the reproductive cycles of these insects and increase their predation by birds and bats.

On the esthetic side, the visibility of stars is impaired by "light pollution." It is caused primarily by stray upward illumination from poorly designed outdoor lighting. Upward-beamed light reflects off dust particles and fine water droplets in the atmosphere to cause "sky glow" that can be brighter than the stars. Sky glow can be seen when driving in the dark countryside toward a brightly-lit urban area, where a bowl of light appears to hover over the distant city.

In most smaller New Hampshire communities, light pollution comes mainly from the illumination of commercial and public buildings – parking lot and security flood lights, store signs and the illumination of building exteriors – and from streetlighting. Privately installed area or yard lights at individual homes may also contribute to light pollution, but the small size and often dispersed nature of rural populations tends to diminish the harmful collective effects of residential lighting. "Light trespass," or nuisance lighting, such as a yard light shining into a neighbor's windows, is a more common problem.

Local lighting regulations commonly address the type and design of commercial, public and, in some cases, private residential lighting. In recent years, both the types and fixture design of outdoor lighting have evolved rapidly. Whereas once the domi-

FIGURE 3.4.1 Well-Shielded Lighting Illuminates the Ossipee Public Library



Photo: R Gillette

Shielding Lights: Terminology

Lighting designers generally identify four degrees of shielding in outdoor lighting fixtures or “luminaires” (a fixture and its bulb), depending on the amount of light they emit upward and at a high angle.

- **Full Cutoff:** Zero light emitted above a horizontal plane drawn through the lowest part of the luminaire; no more than 10 percent of light emitted at the 80 degree angle. Also known as “fully shielded.”
- **Cutoff:** 2.5 percent of light or less emitted upward; 10 percent or less emitted at the 80 degree angle.
- **Semi-Cutoff:** 5 percent of light or less emitted upward; 20 percent or less emitted at the 80 degree angle.
- **Non-Cutoff:** No limits.

nant type of outdoor lighting was a 175 to 250 watt mercury vapor bulb that cast a white glow tinted blue-green, area lighting and streetlighting now comes predominantly from high-pressure sodium fixtures (producing an orange-pink light) and metal-halide (producing white light).

These designs are far more energy-efficient than mercury vapor or traditional incandescent lights, producing a given amount of illumination using 50 to 80 percent less electricity. Moreover, spent mercury vapor bulbs must be treated as toxic waste, and are now banned by some states and local communities. On the near-horizon, still being tested in commercial and roadway projects, are LED (light-emitting diode) fixtures for commercial and street lighting, which promise still greater energy efficiency.

In addition to bulb type, outdoor lighting is also defined by the extent to which the fixture shields the bulb in order to direct light downward to the ground, where it is needed (See terminology above).

For example, the most common type of streetlight, and the New Hampshire Department of Transportation’s standard installation along state highways, is a 175-watt high-pressure sodium semi-cutoff “cobra-head” fixture, so named for its resemblance to the snake. “Semi-cutoff” means that 5 percent of the light is allowed to radiate upward, and 20 percent is cast at a high angle – 80 degrees, or nearly horizontally – so as to maximize the fixture’s illumination footprint.

Increasingly, local communities in New Hampshire and elsewhere are requiring the use of *full-cutoff* lighting for commercial and roadway lighting, and in some cases for outdoor residential lighting. A full-cutoff fixture has a slightly narrower footprint of illumination than the semi-cutoff at a given height above ground, but allows no upward light emission, and casts no more than 10 percent of its light at a high (80 degree) angle, thereby reducing lateral glare, energy loss and sky-glow.

Many fixture designs that meet full-cutoff (sometimes called “dark sky friendly”) standards are now on the market, in both modern and traditional or historic styles. As there is essentially no cost difference between full-cutoff and less well-shielded designs, regulations requiring full-cutoff lighting impose no additional cost for compliance, while promoting more efficient use of energy.

FIGURE 3.4.2 Full-Cutoff “Dark Sky Friendly” Yard Light



Since the early 1900s, the Illuminating Engineering Society of North America (IESNA) has developed lighting standards in step with evolving technologies. Its standards are universally accepted by architects, engineers, safety designers and most advocates of preserving dark skies. The society produces guidelines for good, efficient lighting that are easily understood by laymen.

The New Hampshire Office of Energy and Planning (OEP) published an informative guide to efficient outdoor lighting in its Technical Bulletin 16 in 2001, re-issued in 2007. Information about lighting ordinances around the country and specifically in New England can be obtained from the International Dark Sky

Association, an organization of amateur astronomers and educators, and the New England Light Pollution Advisory Group.

To visualize a community’s level of light pollution, the free internet service GoogleEarth provides a “night-sky view” of any location, with an overlay of local sky glow derived from NASA satellite images.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

At the state level, only RSA 236:55 addresses the impact of outdoor lighting. This statute relates only road safety, rather than preservation of dark skies. It requires the Commissioner of Transportation and municipal board of selectmen to prohibit the placing of “any light along a highway so positioned as to blind or dazzle the vision of travelers on the adjacent highway.”

Many local zoning ordinances incorporate this prohibition on roadway glare, and also regulate light-trespass or nuisance light across property lines. According to the OEP, as of 2007 at least 30 New Hampshire municipalities have incorporated broader outdoor lighting regulations, either in the form of zoning or other ordinances or in planning board regulations. Most of these regulations specifically address preservation of dark skies.

Outdoor lighting regulations may be included in site plan review or subdivision regulations adopted by local planning boards. However, planning board regulations pertain only to site-specific designs of new development projects, not to new lighting that may be installed at existing businesses or residences, and so may not address the cumulative effects of light pollution as effectively as a town ordinance.

In larger towns and urban areas, lighting regulations may need to be more detailed and varied according to the needs and character of specific areas, such as industrial or heavily trafficked commercial zones in contrast with residential areas where less illumination is needed. In such cases, a municipality should consider adapting regulations from a comparably-sized location in consultation with a lighting engineer.

For most New Hampshire towns, however, effective outdoor lighting regulations may be comparatively brief, simple and uniformly applicable throughout the town.

Although municipal and state highway lighting fall outside the authority of such regulations, there are important opportunities for communities to install more energy efficient, fully shielded streetlighting to reduce costs and help preserve dark skies.

Public Service of New Hampshire, serving 70 percent of New Hampshire, offers municipalities a “SmartStart” program to replace older town streetlighting with more energy efficient high-pressure sodium or metal halide lights at no up-front cost. The cost of the new lighting is paid through resulting energy savings, and is the same for both full-cutoff and semi-cutoff fixtures. Thus dark sky friendly streetlights cost no more than those emitting stray upward light.

In early 2008, for example, PSNH replaced the town of Ossipee’s 108 streetlights – a mix of old-fashioned incandescent lights, older sodium-vapor and mercury vapor lights – with an equal number of 70-watt metal-halide (white light), dark sky compliant fixtures. The \$51,000 cost of the replacement project will be paid over seven years by a 39 percent annual energy saving.

The New Hampshire Electric Cooperative (NHEC), the second largest utility serving 11 percent of the state, has gone a step further by adopting a policy of providing only dark sky compliant, full-cutoff streetlights and private floodlights. NHEC is currently engaged in a long-term replacement program for existing lights at no additional cost to municipalities.

In addition, NHDOT customarily consults with local town administrations before installing new streetlights at state highway intersections, and has expressed willingness to install full-cutoff fixtures if requested.

EXAMPLES AND OUTCOMES

Outdoor lighting regulations currently in effect in New Hampshire tend to share several features in common.

- **Statement of Purpose**, outlining the public good the regulations is meant to serve. Chichester’s zoning ordinance, for instance, states that, “The intent of this ordinance is to improve visibility of the nighttime sky without impacting safety, by reducing lighting conditions including but not limited to glare, light trespass and sky glow.”

Wilton’s zoning ordinance states in part that its lighting ordinance is intended to “preserve the rural atmosphere and dark skies of Wilton” and notes that, “Natural dark skies are the nighttime aspect of rural character. Increasing light pollution and glare from inappropriate lighting degrades such rural character.”

- **Prohibition of Upward Illumination:** The most recent local ordinances require that all new lighting fixtures (luminaires) be fully shielded so as to emit zero light above a horizontal plane drawn through the lowest light-emitting part of a luminaire. Others require that all new outdoor lighting (some specify only commercial or institutional lighting) comply with IESNA standards for full-cutoff lighting.

- **Exceptions:** Local lighting regulations exempt emergency or temporary construction lighting; lighting required by state or federal regulations (as on transmission towers); and seasonal decorative and flag illumination. Towns that include residential lighting in such regulations usually exempt lights emitting less than 1,800 lumens, the light output equivalent of a 100-watt incandescent bulb.
- **Minimum Illumination:** By requiring that outdoor lighting use the minimum level of illumination recommended by the IESNA for a given purpose, regulations encourage energy conservation and prevent competitive “light escalation” among businesses that seek to illuminate signs and store fronts no less robustly than a neighboring business.
- **Grandfathering Existing Installations:** Regulations apply to new and (in the case of local ordinances) replacement lighting, but not to existing lighting. However, some local ordinances do require commercial signage to be brought into compliance within a specific period, such as three years.
- **Lighting Plan Required:** When lighting requirements are part of site plan or subdivision regulations, it is common to require an applicant to submit a lighting plan showing compliance with the regulations.
- **Other Features:** Some local regulations prohibit internally lit signs and allow only downward-pointing external sign lighting. Some specifically require gas station lighting to be located entirely under the pump canopy and recessed into the ceiling. Others require parking lot illumination to be dimmed or turned off after business hours, usually by 11 p.m. or midnight. Some regulations also specify maximum pole height for outdoor lights, with a formula for reducing pole height as property lines are approached.

The following examples of outdoor light regulations illustrate the range of detail and scope currently found among New Hampshire communities.

- **Peterborough:** Detailed and comparatively complex standards prohibit all upward lighting and set differing maximum levels of outdoor illumination in commercial and village areas as opposed to residential and rural areas. Outdoor lighting provisions in Peterborough’s zoning ordinance provide a model for larger towns and urban areas.
- **Raymond:** Site plan review design standards for lighting apply to all commercial and multi-family developments, but not single-family residences. The standards require the use of full-cutoff light fixtures, with no upward lighting allowed.
- **Shelburne:** Shelburne provides an example of how a simple lighting ordinance might be implemented in a small town. Requirements for outdoor lighting are as follows: “All outdoor lighting shall be controlled to minimize the spillover of light onto adjacent properties. All outdoor area (non-decorative) lighting shall be aimed below the horizontal plane except for non-directional residential lighting such as porch, driveway and walkway lights.” Although brief, this regulation addresses problems of light trespass, glare and preservation of dark skies.

Model Language and Guidance for Implementation

This model outdoor lighting ordinance is intended to be included in the municipal zoning regulations of small or medium-sized town. A municipality may decide to adapt this zoning ordinance as written, or it may chose to supplement this document with additional design standards placed in site plan review regulations.

Larger municipalities may wish to consult the more detailed example of outdoor lighting provisions in the zoning ordinances of Peterborough or Nashua, with the provision that full-cutoff fixtures be required. (Nashua allows upward light of up to 3 percent, thus allowing semi-cutoff fixtures.)

MODEL ORDINANCE FOR OUTDOOR LIGHTING

LIGHTING REQUIREMENTS

All public and private outdoor lighting installed in the Town of _____ shall comply with the requirements specified below.

I. PURPOSE

The intent of this ordinance is to maintain the rural character of *[town]*, in part by preserving the visibility of night-time skies, and to minimize the impact of artificial lighting on nocturnal wildlife. This ordinance recognizes the importance of lighting for safety and security while encouraging energy efficiency, and promotes good neighborly relations by preventing glare from outdoor lights from intruding on nearby properties or posing a hazard to pedestrians or drivers.

II. DEFINITIONS

Direct Light: Light emitted directly from the lamp, off of the reflector or reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

Fixture: The assembly that houses the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.

Lamp: The component of a luminaire that produces the actual light.

Luminaire: A complete lighting assembly that includes the fixture and its lamp or lamps.

Flood or Spotlight: Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

Glare: Light emitting from a luminaire with intensity great enough to reduce a viewer's ability to see and, in extreme cases, causing momentary blindness.

Height of Luminaire: The height of a luminaire shall be the vertical distance from the ground directly below the centerline of the luminaire to the lowest direct-light-emitting part of the luminaire.

IESNA: Illuminating Engineering Society of North America.

Indirect Light: Direct light that has been reflected or has scattered off of other surfaces.

Light Trespass: The shining of light produced by a luminaire beyond the boundaries of the property on which it is located.

Lumen: A unit of luminous flux. One foot candle is one lumen per square foot. For the purposes of this ordinance, the lumen-output values shall be the initial lumen output rating of a lamp.

Outdoor Lighting: The night-time illumination of an outside area or object by any manmade device located outdoors that produces light by any means.

Temporary Outdoor Lighting: The specific illumination of an outside area or object by any manmade device located outdoors that produces light by any means for a period of less than seven days with at least 180 days passing before being used again.

III. OUTDOOR LIGHTING DESIGN

- A. Any luminaire emitting *more than* 1800 lumens (with 1,700 lumens being the typical output of a 100-watt incandescent bulb) shall be fully shielded so as to produce no light above a horizontal plane through the lowest direct light-emitting part of the luminaire. (Such fixtures usually are labeled Dark Sky Certified or Compliant.)
- B. Any luminaire with a lamp or lamps rated at a total of *more than* 1800 lumens, and all flood or spot lights with a lamp or lamps rated at a total of *more than* 900 lumens, shall be mounted at a height equal to or less than the value $3 + (D/3)$ where D is the distance in feet to the nearest property boundary. The maximum height of the luminaire shall not exceed 20 feet.
- C. Any luminaire with a lamp or lamps rated at 1800 lumens *or less*, and all flood or spot lights with a lamp or lamps rated at 900 lumens *or less*, may be used without restriction to light distribution or mounting height, except that, to prevent light trespass, if any flood or spot light is aimed, directed or focused so as to cause direct light from the luminaire to be directed toward residential buildings on adjacent or nearby land, or to create glare perceptible to pedestrians or persons operating motor vehicles on public ways, the luminaire shall be redirected, or its light output reduced or shielded, as necessary to eliminate such conditions. [*Note: This exempts most residential front-door lights, but not so-called yard-blaster wide-area flood lighting.*]
- D. Any luminaire used to illuminate a public area such as a street or walkway shall utilize an energy efficient lamp such as a low pressure sodium lamp, high pressure sodium lamp or metal halide lamp. Mercury vapor lamps shall not be used due to their inefficiency and high operating costs and toxic mercury content.

[Optional: New or replacement installation of mercury vapor lighting shall not be permitted after the effective date of this ordinance, and the public shall be encouraged to remove and safely dispose of existing mercury vapor bulbs as soon as practicable.]

[Note: Compact fluorescent lamps are not yet commercially available for roadway or wide-area lighting.]

- E. Luminaires used in public areas such as roadway lighting, parking lots and for exterior building illumination shall be designed to provide the minimum illumination recommended by the IESNA in the most current edition of the IESNA Lighting Handbook.
- F. To protect light-sensitive wildlife habitats such as Pine Barrens, artificial lighting in or on the periphery of areas identified as such by the NH Fish and Game Department shall be minimized and fully shielded to prevent any emission above a horizontal plane through the lowest light-emitting part of a luminaire.
- G. Whenever practicable, outdoor lighting installations shall include timers, dimmers, and/or motion-sensors to reduce overall energy consumption and eliminate unneeded lighting, particularly after 11 p.m.
- H. Moving, fluttering, blinking, or flashing, neon or tubular lights or signs shall not be permitted, except as temporary seasonal holiday decorations. Signs may be illuminated only by continuous direct white light with illumination confined to the area of the sign and directed downward. *[Note: A requirement for direct white light would prohibit internally-lit signs, which are inherently impossible to shield.]*
- I. Luminaires mounted on a gas station canopy shall be recessed in the ceiling of the canopy so that the lens cover is recessed or mounted flush with the ceiling of the canopy and fully shielded. Luminaires shall not be mounted on the sides or top of the canopy, and the sides or fascia of the canopy shall not be illuminated.

IV. EXEMPTIONS

- A. Luminaires used for public-roadway illumination may be installed at a maximum height of 25 feet and may be positioned at that height up to the edge of any bordering property.
- B. All temporary emergency lighting needed by the police, fire or other emergency services, as well as all vehicular luminaires, shall be exempt from the requirements of this ordinance.
- C. All hazard warning luminaires required by federal regulatory agencies are exempt from the requirements of this article, except that all such luminaires used must be red and must be shown to be as close as possible to the federally required minimum lumen output requirement for the specific task.
- D. Luminaires used primarily for signal illumination may be mounted at any height required to ensure roadway safety, regardless of lumen rating.
- E. Seasonal holiday lighting and illumination of the American and state flags shall be exempt from the requirements of this ordinance, providing that such lighting does not produce glare on roadways and neighboring residential properties.

- F. Installations existing prior to the enactment of this ordinance are exempt from its requirements. However, any changes to an existing lighting system, fixture replacements, or any grandfathered lighting system that is moved, must meet these standards.

V. TEMPORARY LIGHTING

- A. Any temporary outdoor lighting for construction or other purposes that conforms to the requirements of this article shall be allowed. Non-conforming temporary outdoor lighting may be permitted by the planning board after considering:
1. The public and/or private benefits that will result from the temporary lighting.
 2. Any annoyance or safety problems that may result from the use of the temporary lighting.
 3. The duration of the temporary non-conforming lighting.

VI. PUBLIC AREA AND ROADWAY LIGHTING

Installation of any new public area or roadway lighting fixtures other than for traffic control shall be permitted only by decision of the planning board, following a duly noticed public hearing.

REFERENCES

GoogleEarth “Earth City Lights” images. www.earth.google.com To view any location at night, go to GoogleEarth menu and click on Gallery/NASA/Earth City Lights.

Illuminating Engineering Society of North America (IESNA) www.iesna.org
The IESNA’s documents RP-33-99, “Lighting for Exterior Environments” and G-1-03, “Guideline for Security Lighting for People, Property and Public Spaces” may be particularly useful for local communities.

International Dark Sky Association (IDA), an organization centered in Tucson, Ariz., dedicated to preserving visibility of the night sky. <http://www.darksky.org/>

New England Light Pollution Advisory Committee (NELPAG) <http://nelpag.harvee.org/references>

N.H. Office of Energy and Planning, Technical Bulletin 16, Outdoor Lighting, Summer 2001; re-issued 2007. www.nh.gov/oep/resourcelibrary/TechnicalBulletins.htm

New Hampshire Municipal Regulations

Town of Ossipee Site Plan Review Regulations
www.ossipee.org/boards/planningboard/index.html

Town of Raymond Site Plan Review Regulations
www.raymond-nh.com/html/planning_community_developme.html

City of Rochester Zoning Ordinance [www.rochesternh.net/
Public_Documents/RochesterNH_ZoningOrds/ZoningOrdinance/](http://www.rochesternh.net/Public_Documents/RochesterNH_ZoningOrds/ZoningOrdinance/)

City of Rochester Site Plan Review Regulations
www.rochesternh.net/Public_Documents/RochesterNH_BComm/planning

Town of Peterborough Zoning Ordinance

www.townofpeterborough.com

Town of Chichester Zoning Ordinance

www.chichesternh.org/Public_Documents/ChichesterNH_WebDocs/forms

Town of Wilton Zoning Ordinance

www.ci.wilton.nh.us/

Town of Shelburne Zoning Ordinance

www.shelburnenh.com/Zoning.html

Municipality	County	RPC	Outdoor Lighting
Bedford	Hillsborough	SHNPC	Yes
Bethlehem	Grafton	NCC	Yes
Brookline	Hillsborough	NRPC	Yes
Chester	Rockingham	SNHPC	Yes
Chichester	Merrimack	CNHRPC	Yes
Conway	Carroll	NCC	Yes
Dover	Strafford	SRPC	Yes
Easton	Grafton	NCC	Yes
Goffstown	Hillsborough	SNHPC	Yes
Gorham	Coos	NCC	Yes
Goshen	Sullivan	UVLSRPC	Yes
Greenland	Rockingham	RPC	Yes
Hanover	Grafton	UVLSRPC	Yes
Hopkinton	Merrimack	CNHRPC	Yes
Jackson	Carroll	NCC	Yes
Lincoln	Grafton	NCC	Yes
Londonderry	Rockingham	SNHPC	Yes
Nashua	Hillsborough	NRPC	Yes
New Boston	Hillsborough	SNHPC	Yes
New Hampton	Belknap	LRPC	Yes
Newbury	Merrimack	UVLSRPC	Yes
Newmarket	Rockingham	SRPC	Yes
Newport	Sullivan	UVLSRPC	Yes
Nottingham	Rockingham	SRPC	Yes
Peterborough	Hillsborough	SwRPC	Yes
Raymond	Rockingham	SNHPC	Yes
Rochester	Strafford	SRPC	Yes
Shelburne	Coos	NCC	Yes
Waterville	Grafton	NCC	Yes
Wilton	Hillsborough	NRPC	Yes

NH Office of Energy and Planning January 25, 2007. List not necessarily pertaining to dark skies.

3.5 Energy Efficient Development

BACKGROUND AND PURPOSE

Familiarity with energy efficient design and project planning has been steadily increasing in recent years. Site design techniques that take advantage of sun exposure, differences in microclimate, and landscaping reduce a development's demand for fossil fuel derived energy sources and overall reduce energy consumption. These planning techniques can be used in designing housing and non-residential developments, deciding on density levels, integrating different land uses, and designing transportation and circulation systems. Energy efficient planning principles can be implemented and upheld through subdivision and site plan review regulations, zoning ordinance, and building codes.

Current building codes represent the minimum legal energy efficiency for structures. These standards are not uniformly enforced, and baseline studies in Massachusetts and other states with similar codes indicate many structures are not built to code. Furthermore, these standards focus on the building envelope and mechanical systems and disregard natural and renewable means of reducing a building's environmental impacts. By applying passive solar design in conjunction with building codes, energy utility bills can be decreased by 30 percent. Add to that "well insulated and tightly constructed building shells" and the savings can reach 75 percent. (Urban Land Institute, 2000)

As with most provisions that may be initially opposed by developers or builders, providing a set of incentives may draw interest that would not otherwise exist. While the return on the initial, more costly investment of energy efficient systems is usually seen in less than ten years, and as fast as only a few years, incentives can help lessen the initial cost burden. Incentives may essentially offer a subsidy to the development through possible tax deferments, deductions, credits, or abatements. Other incentives may include awarding developments a special certification status or the provision of technical and design assistance from the town. Traditional incentives such as density bonuses or reduced standards found in other ordinances may also be used. Additionally, there is the prospect of net metering or receiving a refund for excess power generated on site and pumped back into "the grid."

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

For energy efficient development to be realized, it needs to first be outlined as a critical element in a community's master plan, similar to all other innovative land

RELATED TOOLS:

- Landscaping
- Dark Skies
- Conservation Subdivision

use controls adopted into local ordinances. The master plan should identify energy efficient development as a need and a priority in the community.

Voluntary energy efficient development regulations will be most effectively implemented in communities, regions or states that have a system of incentives in place encouraging the private sector to move from traditional development systems to high performance models. This could include property tax credits or density bonuses.

LEGAL BASIS AND CONSIDERATIONS FOR NEW HAMPSHIRE

There are several ways communities can incorporate energy efficiency into their municipal ordinances. If a community has adopted zoning and declared energy efficiency a priority in its master plan, then simple provisions related to the construction orientation and building siting can be incorporated into site plan and subdivision regulations as part of the design standards. If the municipality has a building inspector, additional building codes may be adopted that are more stringent than state codes and will produce greater energy savings. Lastly, if the community has a building inspector and feels confident they have ample code enforcement support staff, a comprehensive zoning ordinance may be adopted.

Energy efficient development ordinances are permitted in New Hampshire as a means of carrying forth the purposes of zoning ordinances established in RSA 674:17. Section I (j) of that statute encourages the uses of solar, wind, or other renewable energy systems. The law also gives zoning ordinances the power to establish buffer zones or other zoning districts that overlap any existing districts. When these zoning provisions, promoting renewable energy and efficiency, are combined with enabling legislation for performance standards under RSA 674:21 I (h), communities can develop a comprehensive zoning article that provides incentives to developers in exchange for meeting a number of energy efficiency performance standards.

Communities can implement energy efficiency standards into their subdivision regulations through power granted in RSA 674:36 II (k), which establishes the groundwork for the protection of energy sources through the establishment of lot standards, street orientation, and other requirements. These provisions are similar in their intent as is provided for zoning ordinances, under RSA 674:17 I (j), as described above. When supported by the master plan communities may also include energy efficiency language in their site plan review regulations as allowed as an innovative land use control per RSA 674:44 II (i).

RSA155-D requires that all new construction comply with State energy efficiency codes and receive a permit certifying compliance. While the Public Utilities Commission (PUC) is charged with administering the code, it is the responsibility of the local building code official to “review plans and specifications to determine if all pertinent data and features of the structure and the equipment systems conform with the provisions of the code.” In communities with a part-time building official, the PUC may provide support through application review and compliance certification. Additionally, if there is no local building code, the contractor or owner-builder is responsible for submitting plans and specifications to the PUC for review.

RSA 155-A:2 VI allows municipalities to adopt more stringent building codes than the state codes. This chapter presents some examples of more stringent standards a

community may adopt to achieve desired energy savings.

RSA 72:61-72 allows municipalities to adopt property tax exemptions for property owners that have installed solar, wind-powered, or central wood heating energy systems on their property. Only 56 New Hampshire communities offered exemptions as of 2003. The southernmost three counties in the state contained the most communities offering tax exemptions. Hillsborough County had the most communities with 10, while Cheshire and Rockingham Counties each had eight.

Another incentive offered by the state is backward or net metering allowed through PUC Rule 900. Net metering focuses on how much energy a household produces and consumes through the use of a solar, wind, or water-powered generators. Whenever the household is generating more electricity than it is consuming, the meter runs backward, and the homeowner is billed only for the net meter reading. Additionally, under RSA 477:49-51 a landowner can guarantee solar access for an abutter's solar installation through a solar skyspace easement.

Amendments to RSA 198:15-b, effective July 22, 2005, increase support to school districts building high performance schools. Additional state financial support is available to districts building high performance schools. The School Building Aid formula can be augmented by up to 3 percent, or \$100,000 per year, for districts that design and construct a facility consistent with the high performance school standards published by the State Department of Education. The revised statute also requires districts building to these standards to apply to their utility companies (electric and gas, when available) for the appropriate rebate payments offered on high performance energy equipment.

EXAMPLES AND OUTCOMES

There are currently no energy efficient development ordinances in New Hampshire. To date, the only efforts regarding energy efficient development are a result of the Cities for Climate Protection programs in Keene and Nashua. Many communities have examples of developers voluntarily undertaking energy efficient measures in their individual endeavors.

Peterborough's, Union Mill project is a prime example of voluntary energy efficient development. The project uses a combination of geoexchange heat pumps and solar thermal panels for heating and cooling; and a wood-pellet backup furnace will assist in heating when necessary. The building will use Energy Star windows and R-49 insulation. In addition, natural building materials will be used in place of more conventional ones. Cotton insulation, soy based urethane foam insulation, formaldehyde free plywood, and natural paints and recycled materials are a few examples of the materials specified for the building.

Elsewhere in New England, Burlington, Vermont's "Guidelines for Energy Efficient Construction" is a series of amendments to the International Energy Conservation Code 2000, which is the same code utilized by the State of New Hampshire. The amendments customize the code to Burlington's climatic conditions and other local needs. These requirements are more oriented toward building codes than zoning ordinance provisions. The ordinance covers administration and enforcement, as well as defining terminology. It goes into depth on design conditions, including details on residential building design. The ordinance also touches upon lot standards.

Model Language and Guidance for Implementation

To successfully implement regulations to promote energy efficiency there are three ordinance components a community may adopt, dependent on the availability of building inspection and code enforcement personnel and support staff. The more comprehensive the regulatory approach, the greater the level of staff capability is required. The most effective way for a community to generate change and see positive results from their energy efficiency regulations is to adopt a combination of all three regulatory approaches.

For communities just beginning, the easiest and least burdensome on municipal staff is to simply adopt language into development regulations such as **subdivision or site plan review regulations** that requires site development to occur in a fashion that optimizes the passive solar heating and cooling opportunities. A second level is to adopt additional **building codes** that exceed the state energy codes for residential and non-residential construction. This however requires an established building inspector and code enforcement system. The third and most comprehensive method is to adopt a performance **zoning ordinance** encouraging the voluntary implementation of energy efficient practices for new construction in exchange for a set of incentives or bonuses. This however, requires the most staff time of any of the three options. When all three alternatives are used in combination the greatest energy savings results will be achieved.

Alternatively, rather than implementing a set of energy efficient development regulations as are proposed here, communities may choose to require all new development and renovations meet the requirements of the various US Green Building Council Leadership in Energy and Environmental Design (LEED) programs including:

- LEED-NC: New commercial construction and major renovation projects
- LEED-EB: Existing building operations
- LEED-CI: Commercial interiors projects
- LEED-CS: Core and shell projects
- LEED-H: Homes
- LEED-ND: Neighborhood development

Another alternative is for communities to adopt the Energy Star standards for all new construction and renovations.

SUBDIVISION AND SITE PLAN REVIEW REGULATIONS (DEVELOPMENT REGULATIONS)

The following should be incorporated as a new subsection within the local development regulations' design standards section.

I. ENERGY EFFICIENCY

All buildings are to be sited and developed in such a way as to maximize the benefits of the site for solar heating and passive cooling through the following:

- A. Buildings are to be oriented on the site to optimize passive solar heating and cooling opportunities.
- B. Buildings are to be oriented so as to minimize wind loads on the structure.
- C. Windows are to be placed, and appropriately shaded, to maximize solar penetration during the winter months and minimize solar penetration during the summer months.
- D. Landscaping is to be designed to provide shading and cooling during the summer months while minimizing reduction of solar heat penetration during the winter months.
- E. Landscaping is to be environmentally sensitive and should include native drought resistant plants and designs, and a reduced need for chemical fertilizers and pest control.
- F. Building design features are to discourage pest infestation, such as sloped roofs to minimize pigeons roosting.

BUILDING CODES

The following provisions may be adopted in addition to, or used to revise, the Statewide Energy Codes including the International Energy Conservation Code 2000 for residential construction and ASHRAE 99 for commercial and industrial development. They may be utilized in their entirety, or in part, as desired. The provisions should be reviewed by the community's building inspector, code enforcement officer, planning board and/or staff, and municipal legal counsel prior to adoption.

Alternatively, communities may directly reference and require that construction meet the standards of Energy Star for Homes or the U.S. Green Building Council's LEED program. Additionally, communities may wish to review the ASHRAE Advanced Energy Design Guide for Small Office Buildings (2004) to guide the establishment of energy efficient building codes for non-residential construction.

While it may not be practical or feasible to require that permit applicants provide an on-site renewable energy source, it is something that can be recommended or encouraged during the review process.

The building codes presented here have predominantly relied on research derived from the New Hampshire Public Utilities Commission, the Environmental Protection Agency's Energy Star fact sheets, LEED-NC and LEED-H standards, and Guidelines for Energy Efficient Construction for the City of Burlington, Vt.

This is not a fixed list of requirements, but instead a list of the fundamentals. Planning boards can and should review this list prior to implementation. This list can be expanded upon, but should not be reduced.

Before putting energy efficiency provisions into development regulations, Planning boards should review some of the references identified at the end of this chapter to better understand how an applicant can meet these standards.

I. ENERGY EFFICIENCY

A. Applicability

Wherever the following standards conflict with other building code requirements, those that are more restrictive, and with the greater energy efficiency savings, shall prevail.

II. GENERAL CONSTRUCTION STANDARDS

For all new construction and substantial improvements, buildings must comply with the following:

- A. A minimum of 50 percent of all non-hazardous construction or demolition debris materials must be either recycled or salvaged. Calculation of the percent recycled or salvaged can be based on either weight or volume, but the measure used must be consistent for all calculations under this provision.
- B. Seventy-five percent of the existing building structure and envelope, based on surface area and including the structural components of the building's walls, floors, and roof, and the building's exterior skin, shall be maintained in the case of substantial improvements to existing buildings. The following building components are exempted from the calculation of maintained materials: hazardous materials remedied or removed, window assemblies, and non-structural roofing materials.
- C. Re-use existing interior non-structural components or other recycled building materials such as the interior walls, doors, floor coverings, and ceilings in at least 50 percent of the completed building, as calculated by area, in substantial improvements to existing buildings.
- D. A minimum of 5 percent of the total project material costs must be for salvaged, refurbished, or reused materials. Additionally, another 5 percent of the total material costs must be for products with post-consumer recycled content.
- E. The project must use building materials that provide long-term durability and decreased maintenance costs; are extracted, processed and manufactured within 500 miles of the project site; and are made from renewable resources or materials wherever possible.
- F. The project must provide adequate storage and collection of recyclables both during and post construction. Post construction recyclable areas must be easily accessible to all building occupants/users and be sufficiently sized for storage and collection of non-hazardous materials including at a minimum paper, corrugated cardboard, glass, plastics, and metals.
- G. The project must reduce the building's heat load by either using roofing materials with a minimum Solar Reflectance Index (SRI) of 78 for roof slopes less than or equal to 2:12 or a minimum SRI of 29 for slopes greater than 2:12; or install a vegetated roof for at least 50 percent of the roof area.
- H. Air ventilation rates, calculated by the Breathing Zone Outdoor Airflow Ventilation Rate Procedure, must be exceed the State/Local Building Codes' minimum standards for all mechanically ventilated spaces by at least 30 percent.

Each community will need to define **substantial improvement** in their regulations. A standard definition: "Substantial Improvement" means any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds 50 percent of the market value of the structure. The market value of the structure should equal either the appraised value prior to the start of the initial repair or improvement, or in the case of damage, the appraised value of the structure prior to the damage occurring.

- I. Within all naturally ventilated spaces the permit applicant must demonstrate that the room-by-room air flows will effectively ventilate at least 90 percent of the occupied area based on the minimum ventilation rates established in the State/Local building codes.

III. RESIDENTIAL CONSTRUCTION STANDARDS

For all residential new construction and substantial improvements, buildings must comply with the following:

- A. Covered and secure bicycle storage facilities must be provided on site allowing sufficient capacity for a minimum of one bicycle per dwelling unit. This may be provided as a separate storage facility or as individual carports or garages if part of the proposed design.
- B. Wood framed construction must use “Value-Engineered Framing” to improve the building envelope’s energy efficiency (see Figure 3.5.1).
 1. All exterior wall framing to be 2x6 stud framing, 24 inches on center.
 2. Align window openings with stud spacing to minimize narrow openings between studs that are difficult to insulate.
 3. Utilize plywood box beam or insulated headers with a minimum R-10 value.
 4. Arrange wall studs in corners to minimize uninsulated or difficult to insulate small pockets.
- C. Either provide insulation for flat ceilings at an R-Value of 49 for standard truss construction or an R-Value of 38 with a minimum six inch raised heel or energy truss (see Figure 3.5.2).

Since energy efficiency is highly dependent on restricting air leakage from conditioned to unconditioned spaces, careful attention needs to be given to the supply of fresh air and to monitoring the indoor air quality.

Figure 3.5.1 Ideal Corner Stud Configurations

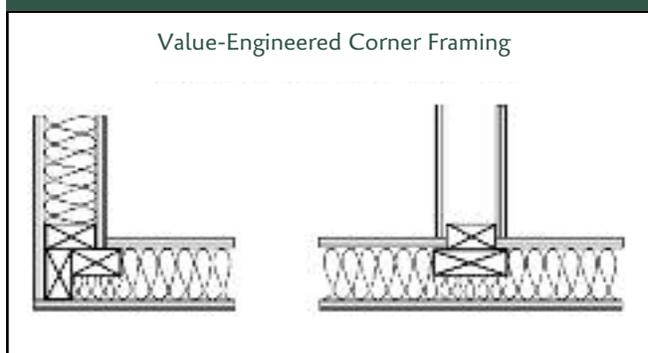
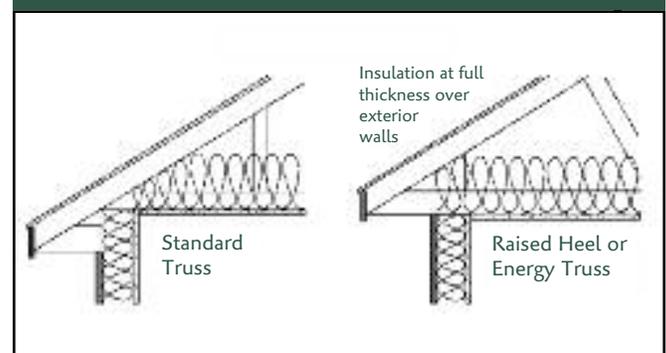


Figure 3.5.2 Roof Truss Insulation



- D. Windows must meet or exceed Energy Star criteria for Windows by 10 percent or more.
- E. Window air leakage shall not exceed 0.2 cubic feet per minute of air leakage per linear foot of window pane (CFM/FT).
- F. Air leakage tested to less than or equal to 0.25 air changes per hour (ACH).
- G. Duct leakage is tested to less than or equal to 3.0 CFM25 per 100 square feet to the outdoors.

- H. All ductwork must be insulated to a minimum of R-6 if located in an unconditioned space, including attics, basements, and exterior walls. Exceptions include insulation for exhaust air ducts or ducts within HVAC equipment. In addition, instances where the design temperature difference between the air in the duct and surrounding air is 15 degrees or less at the most extreme temperature differential are exempt from this provision.
- I. HVAC piping in unconditioned spaces conveying fluids at temperatures above 120 degrees or chilled fluids at less than 55 degrees must be insulated to a minimum of R-5.
- J. Circulating hot water systems flowing through unconditioned areas must be insulated to a minimum of R-4.
- K. All heating and cooling distribution systems must be designed to minimize their total run or length of ductwork, be as compact as possible, and minimize direction and size changes.
- L. Heating and cooling systems, including boilers, furnaces, heat pumps, programmable thermostats, and air conditioners, must meet or exceed Energy Star labeled product standards.
- M. Range hoods must be provided and vented to the outdoors.
- N. Mechanical rooms must be enclosed and insulated to a minimum of R-11.
- O. Ventilation must at a minimum be provided through a bath fan rated for continuous use and set on an independent timer.
- P. Insulation values throughout new construction must meet the following minimum standards based on the planned glazing percentage.
1. The Planned Glazing Percentage equals:

$$100 \times \frac{\text{The Glazing Area (square feet)}}{\text{Gross Wall Area}}$$

Performance Standards	Planned Glazing Percentage				
	10%	13%	15%	18%	25%
Window U-Value	0.35	0.33	0.31	0.30	0.27
Ceiling R-Value	38	38	38	38	38
Above Grade Wall R-Value	19	19	21	21	21
Floor R-Value	30	30	30	30	30
Door U-Value	0.35	0.35	0.35	0.35	0.35
% AFUE Efficiency	85	84	86	90	87
Basement Wall R-Value	13	19	19	19	19
Slab R-Value	10	10	10	10	13
Standard Roof Assembly R-Value	49	49	49	49	49
Raised Truss Roof	38	38	38	38	38
Cathedral Ceiling: up to 500 S.F.	30	30	30	30	30

IV. NON-RESIDENTIAL CONSTRUCTION STANDARDS

For all non-residential new construction and substantial improvements, buildings must comply with the following:

- A. Whenever possible the building must incorporate high-efficiency mechanical equipment that meets or exceeds Energy Star ratings, for those products rated by the EPA Energy Star Program. Products that are not reviewed by the EPA should be selected from the most energy efficient available.
- B. All insulation R-values must exceed [*State/Local*] building code standards by at least 15 percent.
- C. All new buildings must demonstrate a 20 percent improvement of the proposed building performance rating over the baseline building performance rating per State Building Codes/ASHRAE 99 by a whole building project simulation using Appendix G, Building Performance Rating Method, of ASRAE/IESNA Standard 90.1-2004. Existing building renovations must demonstrate a minimum 15 percent improvement of the overall building performance rating.
- D. Cargo doors and loading docks must have weather seals to minimize air infiltration when vehicles are parked in the doorway.
- E. Vestibules must be provided as a buffer between the interior conditioned air and the outdoors. Interior and exterior doors must be a minimum of seven feet apart when both sets of doors are closed.
- F. Recessed lighting fixtures must be Type IC rated and sealed, prohibiting air infiltration between conditioned and unconditioned air spaces. OR Type IC or non-IC rated fixtures must be installed inside a sealed box constructed with ½ inch gypsum wall board, or other air tight assembly, with a minimum ½ inch clearance from combustible materials and a minimum 3 inch clearance from insulation material.
- G. All windows must have a U-Value of .35 or lower.
- H. The applicant must demonstrate (through either computer simulation or other manual computation of indoor light measurements that the proposed building provides a minimum daylight illumination level of 25 horizontal footcandles in 75 percent of the occupied areas. Measurements shall be based on clear sky conditions, at noon, on the equinox, 30 inches above the finished floor. Measurements must be taken on a 10-foot grid and documented on the building floor plans. Exception: This provision may be waived if the applicant can demonstrate that the indoor area use would be hindered or impeded by the introduction of daylight.
- I. The building's lighting design must provide individual lighting controls for 90 percent of the building occupants/users (either as individuals or groups) to make adjustments to suit their individual (or group) needs and preferences.
- J. The building's thermal comfort design must provide controls so that 50 percent of the building's occupants/users (either as individuals or groups) may make adjustments to suit their individual (or group) needs and preferences.

- K. Design all HVAC systems to meet the requirements of ASHRAE's Thermal Comfort Conditions for Human Occupancy.
- L. Building HVAC ductwork must be placed in insulated or conditioned spaces or must be insulated to exceed the R-values specified in the *State/Local* building code standards by at least 15 percent. Exception: Dust insulation is not required on ducts located within equipment or when the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15 degrees.
- M. There shall be no use of CFC-based refrigerants in new building construction for heating, ventilation, air conditioning, and refrigeration systems or CFCs as found in fire suppression systems. For conversions or renovations to existing building, there must be a complete CFC phase out prior to building completion.
- N. All non-residential new construction or major renovations must provide bicycle racks for 5 percent of the building's occupants or users within 200 yards of the building entrance and separate shower facilities for men and women.
- O. Window air leakage shall not exceed 0.2 cubic feet per minute of air leakage per linear foot of window pane (CFM/FT)
- P. Air leakage tested to less than or equal to 0.25 air changes per hour (ACH).
- Q. Duct leakage is tested to less than or equal to 3.0 CFM25 per 100 square feet to the outdoors.

ZONING ORDINANCE ARTICLE

I. PURPOSE

The purpose of this Article is to encourage and provide for energy efficient development within [Community] for both new and substantially improved buildings. It is intended to reduce energy consumption and promote the use of alternative fuel sources. This Article was established in order to meet the goals related to energy efficiency set forth in the [Community] Master Plan.

II. AUTHORITY

The provisions of this Article are adopted pursuant to RSA 674:17 I (j) and are for the purpose of promoting the use of solar, wind, or other renewable energy systems and to protect access to energy sources by the regulation of orientation of streets, lots, and buildings, establishment of maximum building height, minimum set back requirements, and limitations on type, height, and placement of vegetation.

III. APPLICABILITY

The provisions of this Article are permitted as a conditional use within *all zoning districts* defined in this ordinance. Any building constructed to meet the energy efficiency standards of this Article shall be certified by the *Community Zoning Department/Planning Department/Building Inspector* as an Energy Efficient Building.

IV. DEFINITIONS

Demand: The rate at which energy is delivered to loads and scheduling points by generation, transmission or distribution facilities. It is the produce of voltage and the in phase component of alternating current measured in units of watts or standard multipliers thereof, e.g., 1,000 W=1kW.

Energy Efficient Building: Any building that is proven to exceed the minimum legal efficiency standards provided by the Statewide Energy Codes, including the International Energy Conservation Code 2000 for residential construction and ASHRAE 99, or any subsequent revisions adopted by the State, for commercial and industrial development.

Load Profiling: The process of graphing a customer's demand for energy over a period of time, typically a day, season or year.

Renewable Energy Generation: The energy generation from renewable resources including, but not necessarily limited to, biomass, solar thermal, photovoltaic, wind, geothermal, small hydropower of 30 megawatts or less, digester gas, landfill gas and municipal solid waste generation technologies.

Substantial Improvement: Any combination of repairs, reconstruction, alteration, or improvements to a structure in which the cumulative cost equals or exceeds 50 percent of the market value of the structure. The market value of the structure should equal either the appraised value prior to the start of the initial repair or improvement.

Utility Distribution Companies: The entities which will continue to provide regulated services for the distribution of electricity to customers and serve customers who do not choose direct access.

V. CONFORMANCE AND INCENTIVES

Applications under this *Article* are eligible for status as an Energy Efficient Building and density bonuses based on their energy efficiency performance as demonstrated by completion of the checklists provided in section VI of this *Article*; and computation of their energy efficiency score as provided below.

Communities can modify the minimum score provision, provided in section V.B, to earn a bonus. The density bonus proposed in section V.C is also malleable and should be reviewed to ensure the bonus is sufficient within the local market. Alternatively, density bonuses could instead be based on how much an application exceeds the State Energy Codes' baseline building performance rating standards. The standards provided in section VI could then serve as an educational piece to help applicants achieve efficiency levels beyond existing code requirements.

Communities should also inform applicants of other incentives to creating an energy efficient building, such as the State's local option property tax exemption program, the Energy Policy Act of 2005 tax credits, net metering, and others that may become available in New Hampshire.

A. An applicant's score is calculated as follows:

For residential applications: Add the score earned in section VI.A to the score earned in VI.B, divide by a maximum possible score of [*insert the total number of checklist items in sections VI.A and VI.B*] and multiply by 100.

For non-residential applications: Add the score earned in section VI.A to the score earned in VI.C, divide by a maximum possible score of [*insert the total number of checklist items in sections VI.A and VI.C*] and multiply by 100.

B. To earn the status of an Energy Efficient Building, an application under this Article must earn a minimum score of 50 out of a maximum 100.

C. All applications that earn the status of an Energy Efficient Building under this Article are eligible for a density bonus of 15 percent.

VI. ENERGY EFFICIENCY STANDARDS

The following standards should serve as a check list for applicants. All applicants under this *Article* shall complete section VI.A and then either section VI.B for residential applications or section VI.C for non-residential applications.

A. All applicants under this Article, both residential and non-residential applicants for new construction and substantial improvements to existing structures, should consider the following methods to achieve energy efficiency. Applicants should check off all energy efficient principles on this list that are utilized in the proposal. All subdivision and site plan review applications must document that these check points have been included in the design, and be certified by a registered architect or engineer or other qualified third party testing entity.

Check all those that have been incorporated in this application:

- The proposal represents an optimized resource efficient design and minimizes the building materials to be consumed.
- Buildings have been oriented on the site to maximize passive solar heating and cooling opportunities and to minimize wind loads on the structure.
- Windows have been placed, and appropriately shaded, to maximize solar penetration during the winter months and minimize solar impacts during the summer months.
- Utilize additional passive cooling and heating systems.
- All insulation R-values exceed code standards by at least 5 percent.
- Building HVAC duct work is placed in insulated spaces.
- Building materials will be reused by recycling demolition materials and seeking used materials for new construction or rehabilitation.
- The project uses building materials that provide long-term durability or decreased maintenance costs.
- The project provides for adequate storage and collection of recyclables both during and post construction.
- Landscaping is designed to provide shading and cooling during the summer months while minimizing reduction of solar heat penetration during the winter months.
- Environmentally sensitive landscaping, which should include native drought resistant plants and designs and a reduced need for chemical pest control.
- Building design features have been employed to discourage pest infestation, such as sloped roofs to minimize pigeons roosting.
- Includes onsite renewable energy generation. Type: _____

Score: the total number of checkmarks out of a possible [*insert the total number of checklist items in sections VI.A*].

B. All residential construction applicants for new construction and substantial improvements to existing structures should consider the following additional methods to achieve energy efficiency. Applicants should check off all energy efficient principles on this list that are utilized in the proposal. All subdivision plan and site plan applications must document that these check points have been included in the design, and be certified by a registered architect or engineer or other qualified third party testing entity.

Check all those that have been incorporated in this application:

- Meets Energy Star criteria for Homes or LEED-R.
- Wood framed construction utilizes “value-engineered framing” to improve the building envelope’s energy efficiency.

- Air leakage tested to less than or equal to 0.25 ACH.
- Windows exceed Energy Star criteria for Windows by at least 5 percent.
- Duct leakage is tested to less than or equal to 3.0 CFM25/100 square feet to the outdoors.
- Heating and cooling systems meet or exceed Energy Star standards for HVAC systems.
- All appliances are certified Energy Star appliances.
- All installed lighting fixtures use energy efficient fixtures and controls.
- The house perimeter and gross area are smaller than the local averages as determined by the [*Community Building Inspector/Code Enforcement Officer*].

Score: the total number of checkmarks out of a possible [*insert the total number of checklist items in sections VI.B*].

- C. All non-residential construction applicants for new construction and substantial improvements to existing structures should consider the following additional methods to achieve energy efficiency. Applicants should check off all energy efficient principles on this list that are utilized in the proposal. All subdivision plan and site plan applications must document that these check points have been included in the design, and be certified by a registered architect or engineer or other qualified third party testing entity.

Check all those that have been incorporated in this application:

- Incorporate day lighting as much as possible based on the structure typology to reduce demand for electric lighting fixtures.
- Utilize appropriate window glazings with low-E coatings and high R-value or low U-factor ratings.
- Optimizes the electrical lighting design to minimize the need for artificial lighting.
- Utilize full cutoff lighting fixtures outdoors to eliminate light pollution.
- Lighting fixtures are energy efficient.
- Incorporate high-efficiency mechanical equipment.
- Optimize HVAC systems.
- Utilize energy efficient appliances and office equipment that meet or exceed Energy Star ratings whenever possible.
- Provide bicycle racks for five percent of the building's occupants or users within 200 yards of the building entrance and separate shower facilities for men and women.

Score: the total number of checkmarks out of a possible [*insert the total number of checklist items in sections VI.C*].

The lists of performance standards in section VI are not fixed lists, but instead suggestions of ideal content, and can be modified by the planning board after careful review. Once a fixed list is established, the total number of items on each list needs to be inserted into the score calculation text in this section and in section V.

VII. CERTIFICATION OF COMPLIANCE

- A. Written confirmation of energy efficient system performance shall be provided by the applicant from an independent licensed engineer or architect, or other agency certified to perform energy efficiency audits. Additional independent third party testing of the projects energy efficiency shall be conducted upon completion of construction and submitted to the [*Community Building Inspector/Code Enforcement Officer.*] The [*building inspector/code enforcement officer*] shall verify that each of the energy saving systems is installed and functions properly.
- B. No certificate of occupancy shall be issued for an Energy Efficient Building without written confirmation of the building's energy efficiency performance as required in section 7.1 above.

Municipalities may also elect to require a performance guarantee, similar to a road bond, based on the percent of the total building value to ensure compliance. The guarantee may be structured to designate a specified number of years to bring the efficiency performance up to the permitted level or the town will utilize the funds to carry it out.

VII. MONITORING AND ENFORCEMENT

- A. This article shall be administered by the [*Planning Board/Local Planning Department/ Building Inspector/Code Enforcement Officer*]. Applications for the provisions provided under this *Article* shall be made to the planning board and shall be part of the submission of an application for site plan or subdivision plan approval.
- B. The applicant or building owner is required to monitor the energy saving systems and document their performance over time, through tracking and documenting the number of energy units from either their electrical, oil, natural gas monthly bills or in the case of on site power generation the units of energy produced by those sources, to certify that they are in fact achieving the energy savings that approval of the project was based on. This documentation should be provided to the [*Community Building Inspector/Code Enforcement Officer*] semi-annually following issuance of a certificate of occupancy.

REFERENCES

The following documents and websites provide a good general understanding of energy efficient development. Many of these explain the overall how-to's, demonstrate ways to create a successful energy efficient design, and provide a general background on energy efficient development.

AIA Vermont. 2005. *Benefits of High Performance: Building Owner's Guide*. Vermont: Author.

City of Burlington Planning and Zoning. 2005. "Design Review Guide: Energy Efficient Construction." www.ci.burlington.vt.us/planning/dguide/energy_efficiency.pdf, October 24, 2005.

Energy Star. 2006. "Features of ENERGY STAR Qualified New Homes." (See also associated fact sheets by clicking on the links) energystar.gov/index.cfm?c=new_homes_features.hm_es_label, February 1, 2006.

Howard, Bion D. 2005. "Greener Building Basics: Special Report" energy-builder.com/greenhome-basics.htm, October 24, 2005.

- Lober, Joe, Lowell Ungar, David Weitz, and Harry Misuriello. 2005. *Building on Success: Policies to Reduce Energy Waste in Buildings*. Washington, DC: Alliance to Save Energy. www.ase.org/images/lib/buildings/Building%20on%20Success.pdf, October 24, 2005.
- Public Technology, Inc. 1996. *Sustainable Building Technical Manual*. Washington, DC: US Department of Energy. www.sustainable.doe.gov/pdf/sbt.pdf, October 24, 2005.
- Urban Land Institute. 2000. *The Practice of Sustainable Development*. Washington, DC: Author.
- US Green Building Council. 2005. "An Introduction to the US Green Building Council and the LEED Green Building Rating System." www.usgbc.org/chapters/newyork/docs/ppt/usgbcintroBRANY.ppt, October 24, 2005.
- US Green Building Council. 2006. "LEED: Leadership in Energy and Environmental Design" www.usgbc.org/DisplayPage.aspx?CategoryID=19, March 29, 2006.
- Rocky Mountain Institute. 2005. "Community Energy Workbook: Excerpts." rmi.org/sitepages/pid307.php, October 24, 2005.
- Wolcott, Barbara. 2004. "Sun, Wind, Water, Earth," *Planning*, Vol. 70 No. 11, December 2004, pp 4-7.

The following references are existing energy efficient regulations and standards that go beyond standard energy codes and were developed either by local governing bodies or building related organizations. Also included here are guidelines for creating such regulations.

- American Planning Association (APA). 2004. "Policy Guide on Energy." www.planning.org/policyguides/energy.htm, October 19, 2005.
- Built Green Colorado. "Environmental Benefits." www.builtgreet.org/government/environment.htm, October 24, 2005.
- Burlington Electric Department. 2001. "Guidelines for Energy Efficient Constriction for the City of Burlington, Vermont." www.burlingtonelectric.com/EnergyEfficiency/constord.htm, October 24, 2005.
- Minnesota Planning Environmental Quality Board. 2000. *From Policy to Reality: Model Ordinances for Sustainable Development*. Minnesota: Author. www.mnplan.state.mn.us/pdf/2000/eqb/ModelOrdWhole.pdf, October 24, 2005.
- National Association of Home Builders Research Center. 2004. *NAHB Model Green Home Building Guidelines*. Washington, DC: National Association of Home Builders. www.nahbrc.org/greenguidelines/complete_guidelines.pdf, October 24, 2005.
- US Green Building Council. 2005. "LEED for Homes Pilot Checklist." www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=851, March 29, 2006.
- US Green Building Council. 2005. "LEED-NC: Green Building Rating System for New Construction and Major Renovations, Version 2.2." www.usgbc.org/FileHandling/show_general_file.asp?DocumentID=1095, March 29, 2006.
- Vermont Builds Greener. 2005. "Vermont Builds Greener." www.bsr-vt.org/vermontbuiltgreenprogram.html, January 27, 2006.

The following are links to many of the existing energy efficiency programs offered by the State of New Hampshire or by the U.S. Government. These programs can serve as valuable incentives to developers and communities. Many provide financial or planning support.

Database of State Incentives for Renewable Energy. www.dsireusa.org, October 26, 2005.

National Association of Home Builders Research Center. 2002. *Summary of Existing Green Building Programs*. Colorado: National Renewable Energy Laboratory. www.nahbr.org/Docs/MainNav/GreenBuilding/3643_Summarycomplete.pdf, October 24, 2005.

New Hampshire Office of Energy and Planning. 2005. “Energy Efficiency Programs in New Hampshire.” nh.gov/oep/programs/energy/resources.htm, October 25, 2005.

New Hampshire Office of Energy and Planning. 2005. “Renewable Energy Incentives and Tax Exemptions in New Hampshire.” nh.gov/oep/programs/energy/renewableenergy/RenewableEnergyIncentivesandTaxExemptionsinNewHampshire.htm, October 24, 2005.

New Hampshire Partnership for High Performance Schools. 2005. www.nhphps.org, October 24, 2005.

State of New Hampshire. 2005. “Chapter 72 Persons and Property Liable to Taxation, Sections 72:61 to 72,” *State of New Hampshire Revised Statutes Online*. www.gencourt.state.nh.us/rsa/html/indexes/V.html, October 20, 2005.

United States Department of Energy: Energy Efficiency and Renewable Energy. 2005. “EERE State Activities and Partnerships.” www.eere.energy.gov/states/state_specific_information.cfm/state=NH, October 24, 2005.

United States Department of Energy: Energy Efficiency and Renewable Energy. 2005. “Partnerships,” *Solar Energy Technologies Program*. www.millionsolarroofs.org/articles/static/1/1102001401_1023713684.html, October 24, 2005.

United States Department of Energy. 2006. “The Energy Policy Act of 2005.” www.energy.gov/taxbreaks.htm, February 1, 2006.

For more information on existing regulations and energy planning in New Hampshire, energy consumption and other base data, refer to the following publications.

Building Environmental Science and Technology. 2005. “Good for the Environment — Good for the Economy!” energybuilder.com/nrgeffic.htm, October 27, 2005.

New Hampshire Governor’s Office of Energy and Community Services. (2002. *New Hampshire Energy Plan*. New Hampshire: Author. nh.gov/oep/programs/energy/StateEnergyPlan.htm, October 24, 2005.

New Hampshire Office of Energy and Planning. 2005. “New Hampshire Eighteen Month Price Trend for Petroleum-Based Fuels July 2004-December 2005.” www.nh.gov/oep/programs/energy/documents/NH20MonthPriceTrend1205.pdf, February 1, 2006.

New Hampshire Public Utilities Commission. 2006. “Energy Codes.” www.puc.state.nh.us/EnergyCodes/energypg.htm, March 29, 2006.

State of New Hampshire. 2005. *House Bill 185*. www.gencourt.state.nh.us/legislation/2005/HB0185.html, October 24, 2005.

State of New Hampshire Office of the Governor. 2005. "Governor Signs Executive Order Directing State Agencies to Cut Energy Use by 10 Percent." www.nh.gov/governor/news/071405SaveEnergy.htm, October 24, 2005.

Public Service of New Hampshire. 2006. "Impact of Energy Prices," *Living with Energy*, January 2006, pp 3.

The following organizations and websites provide a wealth of information on energy efficiency.

Alliance to Save Energy. www.ase.org

BuildingGreen, Inc. www.buildinggreen.com

Building Science Corporation. www.buildingscience.com

Efficiency Vermont. www.encyvermont.com

Energy Federation, Inc. www.efi.org

Energy Star. energystar.gov

Healthy Building Network. www.healthybuilding.net

McDonough Braungart Design Chemistry. www.mbdc.com

New Hampshire Sustainable Energy Association. www.nhsea.org

Northeast Sustainable Energy Association. www.nesea.org

Sustainable by Design. www.susdesign.com

The Jordan Institute. www.thejordaninstitute.org

US Green Building Council. 2006. www.usgbc.org

3.6 Landscaping

BACKGROUND AND PURPOSE

Properly executed landscaping provides a variety of ecological, community, and visual benefits including an aesthetically appealing environment, creating a balance between hard streetscapes and soft landscapes, establishing or enhancing vegetative buffers, creating rain gardens to abate stormwater impacts, promoting native and water efficient plantings, and protecting and enhancing wildlife habitat. While communities may be particularly interested in promoting landscaping to achieve one of these functions, good landscape designs typically address a combination of these benefits.

ECOLOGICAL SERVICES PROVIDED

When properly designed and installed landscaping provides substantial ecological benefits. For example, deciduous trees can reduce energy demands on heating and cooling systems for buildings by providing shade during summer months and allowing sunlight to pass through to heat building exteriors during winter months. Trees can also shade paved parking areas and roads thereby reducing the heating effects created as a result of these paved areas. Landscaping can also contribute to a reduction in noise through use of vegetated buffers, water pollution from improved erosion control, and air pollution through filtering of air borne particulates.

WILDLIFE HABITAT

The types of wildlife species attracted to a site will depend on the food and cover provided by layers of vegetation. Canopies formed by the tallest tree branches; under-story vegetation created by smaller trees, shrubs and vines; low lying ground covers; and the underlying soil each attract different species of wildlife. When combinations of plant types are provided the resulting vegetation will likely attract a wide variety of wildlife to a single lot, big or small.

RELATED TOOLS:

- Stormwater Management
- Habitat Protection
- Steep Slope and Ridgeline Protection

FIGURE 3.6.1



Landscapes with multiple layers of plants provide several ecological services that include: filtering of pollutants; providing habitat for a wide array of wildlife; and slowing the force of rainfall as droplets break into smaller and smaller units until they soak into the ground resulting in reduced soil erosion and runoff.

FIGURE 3.6.2



A tree-lined street provides a shadier, cooler, more inviting, and an aesthetically pleasing environment. Studies show that people spend more time in a business area where trees are included in the streetscape.

WATER USE EFFICIENCY

Lawn and landscape watering are non-essential water uses. Properly located and designed landscapes promote water use efficiency through the selection of plants that are appropriate for and tolerant of the site conditions. For example, native species planted in proper locations, typically require less watering than non-native species. Many ornamental varieties and/or hybrids including grasses, which are now available, have been selected specifically for their drought tolerance. In addition, trees and plants in landscaped environments have root systems that help to promote on-site infiltration by slowing the flow of water. Non-living landscape materials such as crushed stone or pervious pavement, when combined with vegetated environments, also support efficient water use.

PROTECTING SOILS

Healthy landscapes are based on healthy soils. The most valuable soils on site will most likely be those that are undisturbed by human impacts, which contain soil life and soil horizons. Before any construction begins, it is critical to protect the site's existing soil.

ESTABLISHING OR ENHANCING BUFFERS

Landscaping can be used to create buffers between types of uses such as commercial and residential. In districts that allow for a mix of uses vegetated buffers can be used to create a sense of separation and privacy for the respective uses while also improving the aesthetics of a site and the district as a whole.

SOFTENING THE STREETScape

Similar to the function of vegetated buffers in separating uses, streetscapes can be softened by using landscape strips, low hedges, stone walls, and other features to

distinguish the street from the uses fronting on the street. This effect creates a more pleasant environment for pedestrians. In some circumstances the visual effects of a narrowed street can help slow passing traffic, also known as traffic calming.

AESTHETICS

New Hampshire communities possess a variety of natural and cultural features, which may include mountains, water bodies, forestland, open fields, agriculture, parks, tree-lined streets, wetlands, gardens, and stone walls. Regionally appropriate and well-planned development that incorporates and highlights these features supports community character, which in turn can have a positive effect on local economies and quality of life.

FIGURE 3.6.3



Landscaping enhances Manchester's mill girl, reminding people of the past and connecting them to the present.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

When considering the impacts of development on the environment, preservation of the existing landscape is generally the most desirable though not always a practical or feasible option. Most new, expanded, or re-development construction projects require at least some new landscaping following site construction and development.

If a municipal master plan includes goals such as promoting water use efficiency, maintaining community character through landscape standards, or creating and preserving wildlife habitat through site design, zoning and regulations can be adopted to support those goals. It is important to understand whether the goals apply town-wide or to a specific zoning district such as a “Village District” or “Industrial District” so the standards can be developed accordingly.

Each proposed development within the district(s) where landscaping standards apply, will present a unique landscaping opportunity. While a set of minimum standards can be developed as part of a local zoning ordinance, adopting more comprehensive landscaping requirements as part of a community’s subdivision and site plan regulations will allow greater flexibility for considering how the regulations can and should apply to each site.

LEGAL BASIS AND CONSIDERATIONS IN NEW HAMPSHIRE

The following discussion presents the legal basis for, and an overview of, how landscaping requirements can be integrated into the local land use planning process.

ZONING ORDINANCE

Pursuant to RSA 674:18, communities seeking to adopt local landscaping requirements as part of zoning ordinance must, as a prerequisite to adopting such zoning, have identified within the municipal master plan goals that support the proposed zoning. When identified as a goal in a municipal master plan landscaping standards can assist municipalities with accomplishing some of the basic purposes of zoning as provided in RSA 674:17, including promoting general health, safety, and welfare, providing adequate light and air, facilitating the adequate provision of water, and assuring proper use of natural resources.

Though landscaping is not explicitly included among the list of innovative land use controls provided in RSA 674:21,I, it is consistent with the methods contained in the statute, and is therefore permitted under this statute. Landscaping is an innovative planning technique because it promotes energy efficiency, reduces air and water pollution, supports wildlife habitat, conserves soil and helps prevent erosion, while maintaining and enhancing a community’s character.

SUBDIVISION AND SITE PLAN REGULATIONS

RSA 674:36 authorizes planning boards to adopt subdivision regulations, which may “require innovative land use controls on lands when supported by the master plan.”

In addition, the statute permits subdivision regulations to provide harmonious development of the municipality and its environs; including provisions that will create conditions favorable to health and safety; and, efficient development that promotes retention of wildlife habitat.

Similarly, RSA 674:44 grants planning boards the power to adopt site plan review regulations that may “require innovative land use controls on lands when supported by the master plan.” More specifically, the statute permits site plan regulations to guard against inadequate protection of groundwater and undesirable pollution, provide for safe and attractive development, and provide for development harmonious and aesthetically pleasing with the municipality and its environs.

EXAMPLES AND OUTCOMES

The following example highlights various approaches to promoting green spaces, minimizing air and water pollution, conserving energy, soil and water resources, and creating harmonious and visually appealing development, through landscaping.

BEDFORD, NEW HAMPSHIRE Route 3 Corridor Performance Zoning District

In 1993, the town of Bedford adopted a U.S. Route 3 Corridor Performance Zoning District. While conventional zoning tends to separate incompatible uses, the performance zoning approach was designed to provide greater flexibility in the planning process in order to promote a mix of compatible uses. A wide range of types of uses are permitted in the district, and compatibility is determined based on consideration of the appropriateness (i.e. type, intensity, scale) and quantifiable impact of a proposed use.

Included among the performance standards for the district are minimum and general landscape standards as well as landscape standards for signage. Intended to preserve and enhance the aesthetic qualities of the Route 3 corridor, the landscape standards are a matrix of planning options that provide design flexibility and creativity for the owner/developer, while ensuring a measure of uniformity and compatibility of landscape choices throughout the corridor. For example, while the landscape standards include a minimum side and rear planting requirement for visual screening, the standards identify a range of appropriate landscape options for that purpose, which can be used either individually or in combination.

According to Karen White, Bedford’s former planning director, “the community has been generally pleased with the results.” Professional landscape architects have enjoyed working with the ordinance, and it has been well received by builders and owners. White acknowledges two challenges they have had with the landscaping standards. First, the housing and retail boom in recent years has limited the availability of trees and shrubs that meet the minimum, at-planting, height requirements. Thus, the planning board has had to be flexible with reducing the minimum height requirements, in some cases. The second challenge has been keeping up the landscaping once it is installed. Some sites require enforcement by the town for removal and replanting of dead material. (See margin note in model language section below regarding temporary irrigation systems.)

Model Language and Guidance for Implementation

When considering the impacts of development on the environment, preservation of the existing landscape may be generally desirable, but is not always a practical or an available option. Most new, expanded or re-development construction projects require buildings, pavement, and, if required, at least some new landscaping. The model language below is designed to assist communities with striking a balance between preserving existing resources (i.e. vegetation, topography, and soil) and establishing requirements for selection, design, installation, and maintenance of new landscaping features. The model language addresses a combination of landscaping functions that provide a variety of environmental, economic, and social benefits to communities.

Due to the unique characteristics presented with each site, the applicability of landscaping standards should be considered on a site-specific basis. Including comprehensive landscaping requirements within a community's subdivision and site plan regulations, rather than the zoning ordinance, provides greater flexibility for considering the unique characteristics of each site.

A model zoning ordinance and model subdivision and site plan review regulations are presented below.

MODEL ORDINANCE FOR ZONING

ARTICLE __: LANDSCAPING

I. PURPOSE

The purpose of this article is to protect, enhance and promote the economic, ecological and aesthetic environment and protect and conserve the water resources of the Town/City of _____ through the use of certain landscape elements.

II. AUTHORITY

The provisions of this Article are adopted pursuant to RSA 674:16, Grant of Power and RSA 674:21, Innovative Land Use Controls.

III. APPLICABILITY

The requirements of this Article shall apply to _____ zoning district(s), and are consistent with the goals of the Town/City of _____ Master Plan (adopted on _____) including _____.

IV. DEFINITIONS

Arboriculture: The planting and care of woody plants (trees, shrubs, vines, and groundcovers).

Caliper: Diameter of a tree at 6 inches from the ground for trees 4 inches and under in caliper, and measured at 12 inches from the ground for trees measuring over 4 inches in caliper.

Damage: In reference to landscaping, includes any intentional, negligent, or accidental act that will cause vegetation to decline or die within a period of two years, including but not limited to, injury by heavy equipment; soil compaction by vehicular or pedestrian overuse; natural grade changes (cuts or fills); snow plow or snow load injury; fire injury or secondary infections through disease or pest infestation.

Dripline: An imaginary vertical plumb line that extends downward from the tips of the outermost tree branches and intersects the ground.

Drought Tolerant or Drought Resistant: A tree, shrub, or other plant that once established, will require limited or no regular irrigation for adequate appearance, growth and disease resistance.

Ground Cover: Low plants which generally form a continuous cover over time that are typically 3 feet or less in height.

Impervious Surface: Land surface with a low capacity for soil infiltration, including but not limited to pavement, roofs, roadways, human structures, paved parking lots, sidewalks, driveways (gravel and paved), and patios. Total impervious cover shall be calculated by determining the total of all impervious surfaces on a site as described above, regardless of whether the impervious surfaces are contiguous or non-contiguous.

Invasive (Plant) Species: Any plant species included on the most current list of prohibited invasive species prepared by the New Hampshire Invasive Species Committee.

Landscaped Area or Landscaping: That area within the boundaries of a given lot that is devoted to, and consists of, landscaping material, including but not limited to, trees, shrubs, perennials, vines, grasses, or other groundcovers, and annual flower beds. Hardscape materials may be included such as planters, brick, stone, placed rocks or boulders, water forms, and aggregates.

Landscape Plan: Graphic and written specifications for design, planting, and maintenance as well as detailed plans to create, arrange, and modify natural and man-made features.

Maintain, Maintenance: In reference to landscaping includes mulching, mowing, spraying, irrigating, fertilizing, propping, bracing, treating for disease or injury, snow removal, proper pruning techniques based on current arboriculture standards, and any other similar acts which promote the life, growth, health, safety, or beauty of the landscape vegetation.

Mulch: An organic material such as tree bark, wood chips, pine needles, leaf litter, grass clippings, or seed hulls used to control weed growth, reduce soil erosion and reduce water loss.

Native (Plant) Species – Plants that currently (or historically) grow as part of natural ecosystems that have co-evolved within the same planting zone.

New Development: Any construction or land disturbance of a parcel of land that removes or alters the vegetation or soil.

Parking Lot: Any off-street, unenclosed ground level facility used for the purpose of temporary storage of motor vehicles. Enclosed parking facilities, such as single or multi-story garages or parking facilities constructed within the confines of a larger building or structure, or parking facilities associated with single-family and duplex residential development are not included within this definition.

Parking Lot Island: A planting island contained completely within the confines of a parking lot.

Redevelopment: The reuse of a site or structure with existing man-made land alterations. A site is considered a redevelopment if it has 35 percent or more of existing impervious surface, calculated by dividing the total existing impervious surface by the size of the parcel and converting to a percentage.

Sediment: Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Shrub: A bushy, woody-stemmed plant, usually with several permanent stems usually less than 15-20 feet at maturity.

Site: The area, lot, or lots upon which development is to occur or has occurred.

Stormwater: Water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

Tree: Any self-supporting woody perennial plant which normally attains an overall height of at least ten 10 feet at maturity, either with one main stem or trunk or multiple stems or trunks as commonly grown in the nursery industry.

Vegetated Buffer: Land area used to visibly separate one use from another or to shield or block, noise, light or other nuisances. Vegetated buffers may include such things as fences or berms as well as all forms of plant growth, whether planted or naturally occurring.

Vegetation: Includes trees, plants, shrubs, vines, groundcovers, grasses, herbaceous perennials, or other forms of plant growth whether naturally occurring or planted.

V. SPECIAL PROVISIONS

- A. Site disturbance shall be minimized and existing vegetation and undisturbed soil shall be retained whenever possible. When site disturbance is necessary, top soil shall be stock-piled and stabilized for on-site redistribution within new landscaped areas. Stock-piled soil shall remain covered to prevent soil loss and sedimentation of nearby surface waters.
- B. Existing non-invasive vegetation shall be preserved wherever possible. Maximum effort should be made to preserve small stands of trees, rather than individual trees, to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of

existing trees. Protective barriers shall be installed around each plant or group of plants that are to remain on site. Snow fence installed around the dripline of the tree canopy is an example of an acceptable barrier.

- C. Development shall follow the natural contours of the landscape to the maximum extent possible to minimize grading.
- D. Cut and fill shall be minimized, with the maximum height of any fill or depth of any cut area, as measured from the natural grade, not greater than 10 feet and preferably limited to four to six feet.
- E. Any contiguous area of disturbance, not associated with the installation of a roadway, shall be limited to 20,000 square feet for residential development and to 100,000 square feet for other types of development. Contiguous areas of disturbance shall be separated by at least 20 feet of area maintained at natural grade and retaining existing, mature vegetated cover.
- F. Lawn or grass covered areas may comprise no more than ___ percent or ___ square feet of the total vegetated area. A minimum of 2 different grass species with three or more preferred shall make up the seed or sod.
- G. Plants shall be selected based on consideration of site conditions and plant function. Use of native species is encouraged; hybrid varieties of native plants, and plants that are non-native and non-invasive are also permitted. Use of invasive species included on the N.H. Invasive Species Committee's most current list of prohibited invasive species, is not permitted in accordance with New Hampshire Agricultural Rule NH AGR 3800.

NH AGR 3800 states that "no person shall knowingly collect, transport, sell, distribute, propagate, or transplant any living or viable portion of any listed prohibited invasive species including all of their cultivars, varieties and specified hybrids."

As an alternative to exclusively requiring native species plantings, communities should consider requiring non-invasive species that provide ecological and wildlife values consistent with the site conditions and plant functions. For example, if the site design includes frontage along a state highway and retaining natural vegetation is not an option, drought and salt-tolerant plant species should be selected. The New Hampshire Invasive Species Committee maintains a list of invasive plants prohibited from sale, transport, distribution, propagation or transplantation in New Hampshire, which can be found on the NH Department of Agriculture, Markets and Food website www.agriculture.nh.gov. Information about the Invasive Species Committee is also available on that website. The UNH Cooperative Extension's "Alternatives to Invasive Landscape Plants" identifies plants with similar aesthetic and functional attributes for suggested use in place of invasive species, and is available at www.extension.unh.edu.

- H. Layered plantings of trees, shrubs, vines, perennials, groundcovers and leaf litter are encouraged to promote biological diversity in the landscape.
- I. Low maintenance landscapes are encouraged.
- J. The type and location of vegetation shall not interfere with utilities and the safe and efficient flow of street traffic or pedestrians.
- K. Nothing herein shall affect in any way the present or future acquired rights of any public utility or the Town/City of ___ to clear trees and/or other growth from lands used by the public utility or town/city. Using current arboriculture standards when pruning within public rights-of-way is strongly encouraged, as well as leaving a vegetated understory to prevent erosion.

- L. No ground disturbed as a result of site construction and development shall be left exposed to bare soil at the conclusion of construction. All areas, including landscape islands and strips, exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of 6 inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials. After planting, areas between plants where exposed soil remains shall be mulched at a depth no greater than 3 inches.

M. Tree Coverage

1. To promote the replacement of trees removed during site construction and development:
 - a. Developments serving single-family homes and duplexes must plant and maintain at least one tree for every 35 feet of frontage, with a minimum of one tree per lot. Trees shall have a minimum caliper of 2 inches when planted.
 - b. Developments serving uses other than single-family homes and duplexes must plant and maintain at least one tree for every 35 feet of frontage, with a minimum of one tree per lot, or at a density of one tree for every 400 square feet of paved area for non-street surfaces. Trees shall have a minimum caliper of 2-2½ inches when planted. To foster biological diversity when more than 10 trees are planted at the same time the “10-20-30 Rule” shall be used. (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
 - c. Trees shall be planted in locations that provide site value such as aesthetics, shading, and cooling of buildings or parking areas for energy efficiency, wildlife habitat, and stabilization of soils in disturbed areas. Trees shall not be planted in locations that block safe sight lines for vehicles and pedestrians entering and exiting the site.

FIGURE 3.6.4



Winterberry holly (Ilex verticillata), a native with red berries that persist into winter, attracts birds and is showy against snow.

FIGURE 3.6.5



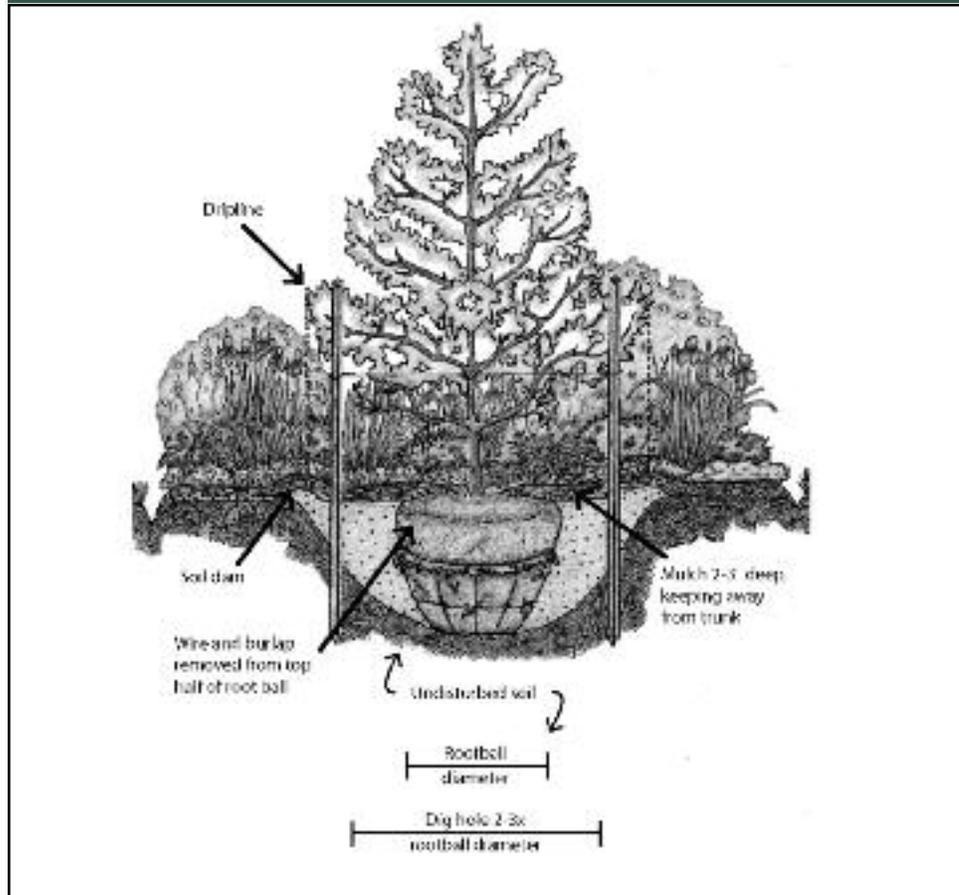
Landscapes that include many layers and varieties of plants begin to mimic natural ecosystems. These landscapes require less maintenance resulting in reduced energy use and lower energy costs.

Communities that adopt landscaping standards may also want to consider adopting screening standards in order to encourage screening of visually undesirable features from public view, protect the privacy of residents, and promote the community as one that cares about its appearance.

Planting trees and shrubs at proper depth is critical to their survival. Look for the trunk flare, the point where the trunk widens and roots begin to branch from the trunk. Remove any soil that covers the trunk flare. The trunk flare should be even with the surface of the ground. Take time to measure the rootball and dig the hole no deeper than this measurement. Illustration by Lauren Chase-Rowell, Outdoor Rooms Sustainable and Ecological Landscape Design Services.

N. All trees and shrubs shall be planted, maintained, or transplanted in accordance with accepted nursery and horticulture standards such as those specified by International Society of Arboriculture or the American Nursery and Landscape Association (See Figure 3.6.6).

FIGURE 3.6.6



VI. ENFORCEMENT

Any landscaping installed in accordance with the requirements of this Article or the Town/City ____ Subdivision or Site Plan Regulations shall be maintained in good order in perpetuity to achieve the objectives of this Article and applicable Subdivision and/or Site Plan Review Regulations. Failure to install, maintain or replace dead, diseased or damaged landscaping as required shall be considered a violation of this ordinance.

Communities will need to consider enforcement of landscaping standards. Communities with limited enforcement resources may choose to enforce these requirements on a complaint-driven basis, while communities with more advanced enforcement mechanisms may choose to regularly inspect all sites or all non-residential sites, for example. To ensure that applicants for building permits are familiar with local landscaping requirements, communities should consider amending building permit applications to include a note calling attention to such requirements and/or adding an item to a building permit checklist that identifies landscaping requirements.

MODEL SUBDIVISION REGULATIONS

SECTION _____: LANDSCAPING

A landscaping plan designed to preserve existing resources and features, promote wildlife habitat, conserve water resources, and support on-site stormwater control shall be submitted with all applications for subdivision. The landscaping plan shall be prepared by a licensed landscape architect, professional landscape designer, or nursery professional. The landscaping plan must address and comply with the requirements set forth herein:

I. PRESERVATION

Existing vegetation shall be preserved wherever possible. Existing natural features of special interest, such as large trees or those having historic relevance, shall be delineated and located on the landscaping plan. Proposed lot lines shown on a subdivision plan shall consider the location of identified features, and such features shall be preserved whenever possible. A note should be added to the site plan indicating that identified feature(s) shall be protected during site clearing and construction through the use of construction fencing or other adequate protective barriers. Maximum effort should be made to preserve small stands of trees rather than individual trees to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of existing trees. Protective barriers shall be installed around each plant and/or groups of plants that are to remain on site. Snow fence installed around the drip line of the tree canopy is an example of an acceptable barrier.

II. BUFFERS

Subdivisions shall provide a vegetated buffer along the street or right-of-way providing frontage to the existing lot of record (see Figure 3.6.7).

- A. The buffer shall be a minimum of 20 feet in width and comprised of preserved natural non-invasive vegetation.
- B. As an alternative to II.A, the buffer may be designed in accordance with one or more of the following options. If existing vegetation in the buffer is predominantly comprised of lawn or grass, the buffer shall be designed in accordance with one or more of the following options:
 1. A minimum of one tree per 35 linear feet or portion thereof excluding curb cuts, densely planted with a combination of shrubs, perennials, vines, and groundcovers planted en masse to form a year-round dense screen at least 6 feet high within 3 years. A combination of both deciduous plants and evergreens are encouraged.
 2. A fence or wall of uniform appearance no more than 6-feet high (cannot be concrete block) may be used in conjunction with plant materials with a minimum 10 foot buffer between the fence and the street. A minimum of one tree per 35 linear feet, or portion thereof excluding curb cuts, with a

FIGURE 3.6.7



Design vegetative buffers with a variety of layers that include both deciduous plants and evergreens. These buffers blend with natural landscapes and have more aesthetic appeal than the commonly planted row of Arborvitae.

combination of shrubs, perennials, vines, and groundcovers planted en masse per 35 linear feet. A combination of both deciduous plants and evergreens are encouraged.

3. Spacing between individual trees shall not be more than 35 feet, not more than 6 feet for individual shrubs, and not more than 3 feet between individual perennials and groundcovers.

III. SIDEWALKS

Where sidewalks are required, a minimum four-foot buffer shall be provided between the street edge and a paved sidewalk or walkway area. It is strongly recommended that the buffer area be vegetated with perennials, groundcovers, and shrubs (30 inches or less at maturity). If grass is used, it shall be a mix of at least two different species with three or more preferred.

IV. CUL-DE-SACS

Where cul-de-sacs are permitted, the island or center area of the cul-de-sac shall remain in a natural vegetated state, with any invasive species removed. If it will be used as a biofilter for stormwater treatment, the area shall be vegetated with a combination of living plant material including trees, shrubs, and groundcovers.

Non-living landscape material may cover up to 20 percent of the island or center area. When planting of vegetation is required, cul-de-sac landscaping shall be installed after construction of the street is complete.

V. STREET TREES

When new streets are proposed as part of the subdivision, new streets shall be bordered with trees on both sides. To avoid damage to trees during construction, street trees shall be installed upon completion of the street construction, and street trees shall conform to the following standards:

- A. Trees shall be salt and drought-tolerant, native or non-invasive species, and have a structure and growth form which prevents them from obstructing sidewalks and walkways.
- B. Trees shall have a caliper of no less than 2-2½ inches when planted.
- C. Trees located under utility wires should be a low-growing species.
- D. To foster biological diversity trees planted along a given street shall use the “10-20-30 Rule” (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
- E. Trees shall be located no more than 35 feet apart.

- F. Trees should be located to avoid obstruction for driver visibility, and to avoid interference between root systems and utilities. Trees may be planted individually or clustered.
- G. All newly planted trees, shrubs and other vegetation shall have a watering plan during the establishment period (for trees, one-year-per-inch in caliper at planting, shrubs and other vegetation generally establish within one growing season). Mulching trees, shrubs, and plants helps retain soil moisture, moderates temperature fluctuations, provides protection from mechanical damage by mowers and trimmers, and serves as temporary covering of exposed soil until understory plants and ground covers fill in. However, thick applications of mulch (such as “volcano mulching”) will kill trees and other vegetation. Mulch shall be no greater than 3 inches in depth and shall not be in contact with the bark or stems of plants.
- H. Incentive Bonuses:
 - 1. Two existing healthy and non-invasive trees, with a caliper of 3 inches or greater, preserved using proper protection methods within the required planting area, may be substituted for one required tree, to be determined by the planning board.
 - 2. Where an applicant proposes leaving a significant portion of healthy trees within the construction area, alternative landscaping designs will be considered.

VII. VEGETATION

Vegetation planted in accordance with the requirements of this section shall be native or non-invasive species selected for their adaptability to the climatic, geologic and topographical conditions of the site.

- A. Shrubs and hedges shall be a minimum of 24 inches in height when measured immediately after planting. Groundcovers and perennials may be less.

VIII. DOCUMENTATION

A note should be added to the plan indicating that “Development of lots shown on an approved subdivision plan shall comply with the landscaping requirements set forth in the Town/City of ____ Zoning Ordinance and Subdivision Regulations.”

IX. PERFORMANCE GUARANTEE

- A. To ensure that landscaping is installed in accordance with the final approved landscaping plan, a performance guarantee shall be provided as a condition of approval in an amount determined by the planning board. The performance guarantee shall be released following an inspection by the Town of [Name] Code Enforcement Officer.
- B. To ensure that landscaping functions as designed and all plants remain healthy, a performance guarantee shall be required, as a condition of approval, which will be held a minimum of 24 months after an approved inspection as required in Section __.IX.1.

X. MAINTENANCE

- A. If the street is to be a private street, cul-de-sac landscaping, street trees and other landscaping as required shall be maintained by a property owners association that is responsible, in perpetuity, for maintaining all landscaping in good condition and replacing as necessary to the standards herein, and to keep landscaped areas free of refuse and debris. The legal instrument establishing this requirement as part of the homeowners association shall be submitted to the planning board for review and comment by town counsel prior to the planning board taking final action on the application.
- B. If the street is to be dedicated to and accepted by the Town/City of ____, the town/city shall be responsible for maintaining street trees and cul-de-sac landscaping.

MODEL SITE PLAN REVIEW REGULATIONS

SECTION _____: LANDSCAPING

A landscaping plan designed to preserve existing resources and features, promote wildlife habitat, and support on-site stormwater control shall be submitted with an application for site plan review. Due to the variation of each site, creativity and diversity in landscaping is encouraged. The landscaping plan shall be prepared by a licensed landscape architect, professional landscape designer, or nursery professional.

The landscaping plan must address and comply with the requirements set forth herein:

I. GENERAL REQUIREMENTS

- A. Existing vegetation shall be preserved wherever possible. Existing natural features of special interest, such as those having historic relevance, shall be delineated and located on the landscaping plan. A note should be added to the site plan indicating that identified feature(s) shall be protected during site clearing and construction through the use of construction fencing or other adequate protective barriers. Maximum effort should be made to preserve small stands of trees, rather than individual trees, to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of existing trees. Before commencement of work, protective barriers shall be installed and maintained around each plant and/or groups of plants that are to remain on site until completion. Snow fence installed around the dripline of the tree canopy is an example of an acceptable barrier.
- B. Vegetation planted in accordance with the requirements of this section shall be non-invasive species selected for their adaptability to the climatic, geologic and topographical conditions of the site.
- C. Shrubs and hedges shall be a minimum of 24 inches in height when measured immediately after planting. Groundcovers and perennials may be less.
- D. Effective use and preservation of natural berms, existing topography and existing vegetation is encouraged.
- E. Landscaped beds shall be used to separate parking areas from the portion of a building providing access to the building.
- F. Vegetated Buffer: Plants or a combination of plants and other landscaping material shall be used to form a buffer between non-residential and residential uses. The buffer shall be at least 20 feet

FIGURE 3.6.8



Adding landscape plantings to separate uses provides a visual transition, and can increase property value.

wide, densely planted (or equivalent natural growth), and form a year-round dense screen at least 6 feet high within 3 years. A minimum of one tree per 35 feet or portion thereof, with a combinations of shrubs, perennials, vines, and groundcovers shall be planted enmasse among the trees. Spacing between individual trees shall not be more than 35 feet, not more than 6 feet apart for individual shrubs, and not more than 3 feet between individual perennials and groundcovers. A combination of evergreens and deciduous plants are encouraged. As an alternative, a fence or wall of uniform appearance not more than 6-feet high (concrete block cannot be used) and extending to within six inches of ground level may be used in conjunction with the above plant materials with a minimum 15 foot vegetative buffer.

- G. Plants, or a combination of plants and a solid visual barrier such as wooden fencing, or berms, shall be used to screen loading, waste disposal, material storage and other areas that are likely to generate noise, dust, or other potentially disruptive conditions.
- H. Landscaping shall be used to establish and/or maintain an attractive streetscape adjacent to roadways. A minimum of one tree per 35 linear feet or portion thereof.
- I. To promote on-site water retention and filtration, landscaped areas shall be designed in a manner that guides stormwater from on-site impervious streets, parking areas, sidewalks and walkways to vegetated areas or approved retention areas.

See the stormwater management chapter for more detailed requirements addressing **water quality**.

FIGURE 3.6.9



Openings in curbed-areas allow vegetation to filter, slow, and retain stormwater.

- J. Curbing or equivalent barriers shall be required to protect vegetation from vehicular damage. Barriers shall be designed with openings that allow stormwater to flow into vegetated areas.
- K. The type and location of vegetation shall not interfere with utilities or the safe and efficient flow of street traffic.
- L. No trees or shrubs shall obstruct the view between the street and the access drives and parking aisles near entries and exits. Plantings within 25 feet of an intersection shall not exceed a maximum mature height of 30 inches.
- M. When irrigation systems are proposed, a temporary watering plan/ schedule, or low volume (drip) irrigation system shall be required. Permanent irrigation

systems are prohibited, except as noted below. Temporary irrigation systems shall be designed and installed for efficient and effective water use to the landscaped area for a limited period of time determined by the plant material and site conditions. (See margin note.) For those exceptions when permanent irrigation is considered necessary, such as an athletic field, permanent irrigation shall utilize water saving technologies, including rain sensors, flow meters, and management systems that monitor current weather conditions.

N. A maintenance plan shall be provided with the site plan application. All landscaped areas shall receive regular maintenance and upkeep. Severely injured, diseased, or dead plant material shall be replaced in kind in perpetuity (avoid replacing landscape materials in the period from November to March.) Best practices to minimize environmental impacts such as the use of low phosphorous fertilizer and slow release nitrogen, shall be included in the management plan. If ownership of a site is conveyed to a new property owner the new owner shall be responsible for maintaining all landscaping in accordance with the approved final landscaping plan.

When developing local landscaping regulations, communities should consider adding criteria that specify circumstances to include a temporary low volume watering system (i.e. drip irrigation) as part of a landscaping plan until plants become established. Providing adequate water during the establishment period is critical to the long-term success of the landscape. The establishment period for trees is one-year-per-inch in caliper at planting. Shrubs and other vegetation will generally establish within one growing season. Permanent irrigation systems are generally not essential and may create inefficient water use if not properly maintained.

II. PARKING LOTS

- A. Interior landscaped beds shall be required for all parking lots with multiple adjacent parallel parking rows. Required interior landscaping shall be a minimum of 10 percent of the total area of driveways and parking. The maximum number of continuous parking spaces permitted shall be twenty. Interior landscaping shall be in addition to any required perimeter landscaping as specified below, and shall include trees, along with shrubs, perennials, and/or groundcovers planted enmasse among the trees. Plant materials shall be suitable for site conditions including location, soil conditions, and exposure to environmental factors.
- B. Bare soil is not acceptable. The introduction of groundcovers and/or perennials planted enmasse and the use of mulch as a soil covering is acceptable. However, no more than 20 percent of the minimum landscaped area may be covered with non-living landscaping material such as bark mulch, woodchips, or leaf litter.
- C. In order to break up the visual expansiveness of parking lots, interior landscaped beds shall be installed in the form of landscape strips and/or landscape islands. Depressed vegetated landscaped beds are encouraged to infiltrate stormwater.
- D. Landscape strips shall be a minimum of 15 feet in width.
- E. Landscape islands shall be a minimum of 20 feet in width.

FIGURE 3.6.10



Shrubs, perennials, and groundcovers planted among trees in landscape strips or islands minimize soil compaction from pedestrian foot traffic, and can capture and filter stormwater.

- F. Parking lots with more than 50 parking spaces shall have landscape islands serving as end-caps to each row.
- G. The interior of parking lots shall have no less than one tree for every 10 parking spaces. The trees may be clustered together in landscape islands with shrubs, perennials, and ground covers planted enmasse among the trees. This requirement is in addition to any trees required in Article __.VJ.b of the Town of _____ Zoning Ordinance.
- H. Snow storage shall not be permitted on any landscape area.
- I. **Incentive Bonuses:**
1. Each existing healthy and native or non-invasive tree, with a caliper of three inches or greater, preserved using proper protection methods within the interior parking lot area may be substituted for one tree required for every 10 parking spaces.
 2. Where an applicant proposes leaving a significant portion of healthy non-invasive trees and other vegetation within the proposed construction area, the planning board will consider alternative landscaping designs.
- J. **Perimeter Landscaping for Parking Areas:** Along the perimeter of parking lots with ten or more spaces a buffer of perimeter landscaping is required along at least 75% of the length of right-of-way. The buffer width shall be a minimum of 20 feet, though the planning board may require a wider buffer when the use, building or site conditions dictate that a larger buffer would better serve the intent of these regulations. The vegetated buffer shall include existing non-invasive plant material, where appropriate, in combination with new trees, shrubs, perennials and groundcovers of suitable type, characteristics to meet site-specific requirements in order to provide longevity of the landscape. The buffer shall include one or more of the following options:

FIGURE 3.6.11



This vegetative buffer serves several purposes: It shades cars in the parking lot, provides nice views for office workers, creates habitat for wildlife, reduces the amount of lawn maintenance required, and decreases stormwater runoff coming from the roof.

1. A minimum of one tree per 35 linear feet or portion thereof excluding curb cuts, with a combination of shrubs, perennials, vines, and groundcovers planted en masse. The trees may be clustered together with shrubs, perennials, and groundcovers planted enmasse among the trees. A combination of both deciduous plants and evergreens are encouraged.
2. A wall, or fence of uniform appearance 6 feet high of brick, stone or finished concrete (cannot be concrete block) may be used in conjunction with plant materials with a minimum 10 foot-buffer between the fence and the street. A minimum of one tree per 35 linear feet or portion thereof with a combination of shrubs, perennials, vines, and groundcovers planted en masse per 35 linear feet excluding curb cuts. A combination of both deciduous plants and evergreens are encouraged.
3. Spacing between individual trees shall not be

more than 35 feet, not more than 6 feet apart for individual shrubs, and not more than 3 feet between individual perennials and groundcovers.

4. If the area abutting the street is existing woodland, a 25-foot woodland buffer may be left in lieu of landscaping if approved by the planning board.

III. TREES

- A. Trees shall be salt and drought-tolerant, native or non-invasive species, and have a structure and growth form which prevents them from obstructing sidewalks and walkways.
- B. Trees shall have a caliper of no less than 2-21/2 inches when planted.
- C. Trees located under utility wires should be a low-growing species.
- D. To foster biological diversity trees planted along a given street shall use the “10-20-30 Rule” (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
- E. Trees shall be located no more than 35 feet apart.
- F. Trees should be located to avoid obstruction for driver visibility, and to avoid interference between root systems and utilities. Trees may be planted individually or clustered.
- G. All newly planted trees, shrubs and other vegetation shall have a watering plan during the establishment period (for trees, one-year-per-inch in caliper at planting, shrubs and other vegetation generally establish within one growing season). Mulching trees, shrubs, and plants helps retain soil moisture, moderates temperature fluctuations, provides protection from mechanical damage by mowers and trimmers, and serves as temporary covering of exposed soil until understory plants and ground covers fill in. However, thick applications of mulch (such as “volcano mulching”) will kill trees and other vegetation. Mulch shall be no greater than 3 inches in depth and shall not be in contact with the bark or stems of plants.
- H. **Incentive Bonuses:**
 1. Each existing healthy and non-invasive tree, with a caliper of 3 inches or greater, preserved using proper protection methods within the required planting area may be substituted for one required tree.
 2. Where an applicant proposes leaving a significant portion of healthy trees within the construction area, alternative landscaping designs will be considered.

The planning board may want to consider establishing provisions for existing parking lots, for example requiring existing lots to comply with this Section (re: parking) only if new spaces are added.

IV. PLAN REQUIREMENTS

- A. Landscaping plans shall include dimensions and distances and clearly delineate the existing and proposed parking spaces, or other vehicular uses, access, aisles, driveways, and the location, and description of all landscape materials, including the quantity and common and botanical names of all plants.

- B. Landscape plans shall be provided at the same scale as the engineering drawings unless otherwise required by the planning board for review purposes.
- C. Snow storage areas shall be clearly shown on the plan and are not permitted on any landscaped areas. In accordance with NH DES Best Management Practices snow storage areas and snow dumps shall be located so that snow melt runoff is directed to vegetated swales or filter strips created for that purpose.
- D. A planting plan shall provide specifications regarding the plant placement, type, size and spacing, and other features as required by this section. Trees and shrubs shall be specified according to the American Standard for Nursery Stock by the American Nursery and Landscape Association.
- E. Depending on the nature and scale of the proposed use, a temporary watering plan, or low volume (drip) irrigation system shall be required. When required, irrigation systems shall be designed and installed for efficient and effective use of water to the landscaped area. Permanent irrigation systems are generally prohibited.
- F. A maintenance plan shall be provided with the site plan application. All landscaped areas shall receive regular maintenance and upkeep. Severely injured, diseased, or dead plant material shall be replaced in kind in perpetuity (avoid replacing landscape materials in the period from November to March.) Best practices to minimize environmental impacts such as the use of low phosphorous fertilizer and slow release nitrogen, shall be included in the management plan.
- G. The Planning Board may seek an advisory opinion regarding the submitted landscape plan at the expense of the applicant.
- H. The Planning Board will seek an advisory opinion of the conservation commission or other municipal board or committee regarding the landscape plan, if deemed necessary.

V. SECURITY/PERFORMANCE BOND

- A. To ensure that landscaping is installed in accordance with the final approved landscaping plan, a performance guarantee shall be provided as a condition of approval in an amount determined by the planning board. The performance guarantee shall be released following and inspection by the Town of ____ Code Enforcement Officer.
- B. To ensure that landscaping functions as designed and all plants remain healthy, a performance guarantee shall be required, as a condition of approval, which will be held a minimum of 24 months after an approved inspection as required in Section __.IX.1.

VI. MAINTENANCE

- A. The property owner, or owners association if applicable, is responsible, in perpetuity, for maintaining all landscaping in good condition. Landscaping shall be kept free of refuse and debris, and shall be replaced as necessary to the standards herein.

- B. If the ownership of a site is conveyed to a new property owner, the new owner shall be responsible for maintaining all landscaping in accordance with the approved final landscaping plan.
- C. Proposed modifications of an approved landscaping plan shall be submitted to the planning board for review and approval. The planning board shall notify the owner of acceptance of the modified plan or request additional information within 60 days of receipt of proposed modifications. The currently approved plan shall remain in effect until notification of approval has been issued, or the 60 day period has lapsed.

Communities may want to consider requiring that a legal maintenance agreement be established to address all aspects of maintenance including vegetation replacement; pruning, fertilizing and insect and disease protection; litter or debris clean-up; and, drainage and tree protection if the proposed landscaping will create a change in the existing grade.

VII. ENFORCEMENT

- A. An inspection of all plantings to ensure compliance with the submitted landscape plan shall be conducted prior to the issuance of a certificate of occupancy.
- B. Ongoing inspections of landscapes shall be conducted to ensure compliance of landscape maintenance in perpetuity.

REFERENCES

Landscape Standards and Guidelines

American Standard for Nursery Stock, (2004 or more recent edition) www.anla.org/publications/index.cfm?

Best Management Practices Series, International Society of Arboriculture secure.isa-arbor.com/store/BMPs-C59.aspx

Lawn and Water Conservation

Guide to Lawn and Landscape Water Conservation (2002) and *Lawn and Landscape Water Conservation – An Addendum to the Water Conservation Standards for the Commonwealth of Massachusetts, added to the Conservation Standards by the Water Resources Commission as of October 10, 2002*, were referenced in the preparation of this chapter. The guide is available at www.mass.gov/envir/mwrc/pdf/LawnGuide.pdf, and the Addendum is available at www.mass.gov/dcr/waterSupply/intbasin/docs/lawnstandard.doc.

University of New Hampshire Cooperative Extension has an extensive list of landscaping topics including the following publications:

Integrated Landscaping Following Nature's Lead (2008)

Landscaping at the Water's Edge (2007)

Best Plants for New Hampshire Gardens and Landscapes (2003)

Information Fact Sheets

Alternatives to Invasive Landscape Plants

<http://extension.unh.edu/Pubs/HGPubs/altinvs2.pdf>

Drought Tolerant Plants for NH Landscapes

<http://extension.unh.edu/Pubs/HGPubs/drtolhom.pdf>

Efficient Water Use in Landscapes & Nurseries,

<http://extension.unh.edu/Pubs/HGPubs/effwtrcom.pdf>

Fertilizing Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/ferttshr.pdf>

Landscaping with Flowers

<http://extension.unh.edu/Pubs/HGPubs/landflwr.pdf>

Landscaping Woodland Areas

<http://extension.unh.edu/Pubs/HGPubs/landwood.pdf>

Planting and Mulching Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/CNMULCH.pdf>

Pruning Deciduous Shrubs in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/PrunDec.pdf>

Pruning Evergreens in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/PrunEverg.pdf>

Pruning Shade Trees in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/prunshad.pdf>

Relative Tolerance of Selected Tree Species to Air Pollution Injury

<http://extension.unh.edu/Pubs/HGPubs/treetol.pdf>

Sour Mulch

http://extension.unh.edu/news/2007/06/watch_out_for_sour_mulch.html

Steps to Follow When Planting Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/stepsppts.pdf>

Using Plants in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/uplandsc.pdf>

More publications and information on soil testing and plant diagnostic services can be found on the website at <http://extension.unh.edu>.

Invasive Plants

Alternatives to Invasive Landscape Plants (2005) by Catherine Neal, UNH Extension Specialist, University of New Hampshire Cooperative Extension, Provides a list of plants with similar ecological and aesthetic function and value as identified invasive plant species <http://extension.unh.edu/Agric/AGNLT/NLTLand.htm>

Guide to Invasive Upland Plant Species in New Hampshire (2005) prepared by the N.H. Department of Agriculture, Markets and Food (DAMF), Plant Industry Division and New Hampshire Invasive Species Committee includes a list and descriptions of invasive upland species that may be found in New Hampshire. <http://extension.unh.edu/forestry/Docs/invasive.pdf> or contact the DAMF.

Trees

Planting Trees in Designed and Built Community Landscapes: Checklists for Success (1998) by Mary K. Reynolds and H. Sharon Ossenbruggen (2nd Ed.). For more information on these resources contact the Division of Forests and Lands or visit the Division's website, www.nhdf.org.

Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance (2003)
 Urban Horticulture Institute, Department of Horticulture, Cornell University
 Ithaca, New York
<http://www.hort.cornell.edu/uhi/outreach/recurbtrees/pdfs/01cover.pdf>

Urban Ecosystem Research and Analysis for Cities and Towns

American Forests, an organization whose mission is to grow a healthier world, has conducted numerous studies, called Urban Ecosystem Analysis, to assess the advantages of tree canopies in communities. The analysis uses a GIS-based process to assess the community's stormwater runoff, air quality, summer energy savings, carbon storage and avoidance, and tree growth. To read an analysis report or view success stories, refer to the American Forests website at www.americanforests.org.

State and Municipal Regulations

Town of Bedford, N.H.

The Town of Bedford's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

Town of Durham, N.H.

The Town of Durham's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

City of Keene, N.H.

The City of Keene's Landscaping Requirements from Zoning and Regulations were referenced in the development of this chapter. Contact the city's Planning Department for a copy of the city's current land use code.

City of Nashua, N.H.

The City of Nashua Land Use Code landscaping requirements were referenced in the development of this chapter. The city's Land Use Code is available on the city's website, www.ci.nashua.nh.us.

Town of Northwood, N.H.

The Town of Northwood's Site Plan Review Regulations section on landscaping was referenced in the development of this chapter. Contact the Town Planner for a copy of the Site Plan Review Regulations.

City of Oklahoma City, Okla.

Oklahoma City's Landscaping Requirements (Ordinance No. 22,366, Effective January 30, 2004), were referenced in the preparation of this chapter. The ordinance is available on the city's website at www.okc.gov.

Town of Peterborough, N.H.

The Town of Peterborough's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

