Part III: Applications

7.0 Case Studies

7.1 Scenario 1: Sewering Dense Residential Neighborhoods

7.1.1 Residential Area in West Yarmouth, South of Route 28

Overview

This residential area is roughly 160 acres located south of Route 28 at the Yarmouth-Barnstable town line. The area is close to Route 28 commercial activity, and abuts significant natural resources areas. The neighborhood is bounded to the south by Lewis Bay and to the east by the Mill Creek subembayment of the Lewis Bay estuarine system. All but a small section of the neighborhood is within the South Lewis Bay watershed, which has been identified in the Yarmouth Comprehensive Wastewater Management Plan needs assessment as a priority area in need of off-site wastewater treatment. A large, fallow cranberry bog is located in the center of the neighborhood, serving as both a visual focal point and a functional wetland, probably helping to attenuate nitrogen from septic load generated by surrounding watershed land uses. All properties are serviced by individual onsite septic systems.

The applicable zoning district is R-25 (residential, 25,000 square foot minimum lot size), reflecting the predominantly small lot residential land use pattern that includes the Hyannis Park subdivision, which dates back to the early 20th century. Approximately 90 percent of the lots in this area are 25,000 square feet or less; 65 percent are 15,000 square feet or less; and 44 percent are 10,000 square feet or less. An oceanfront resort located in the southeast corner of the area is a pre-existing non-conforming commercial use.

The neighborhood is within the boundaries of the proposed *Sewer Area Master Plan*, which would be implemented in phases over several years. Phase 1 of the proposed sewer service area would include properties along Route 28, and some adjacent parcels to the north and south. In later phases, sewer service would extend to residential properties further south toward Nantucket Sound, and north of Route 28. At right, Figure 6 shows the proposed path of sewer service along Route 28 in red. The case study area, which will receive sewer service in later phases, is within the yellow square.

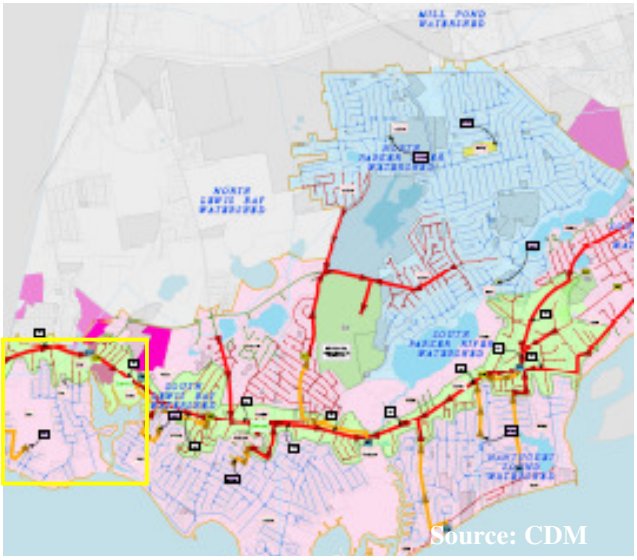


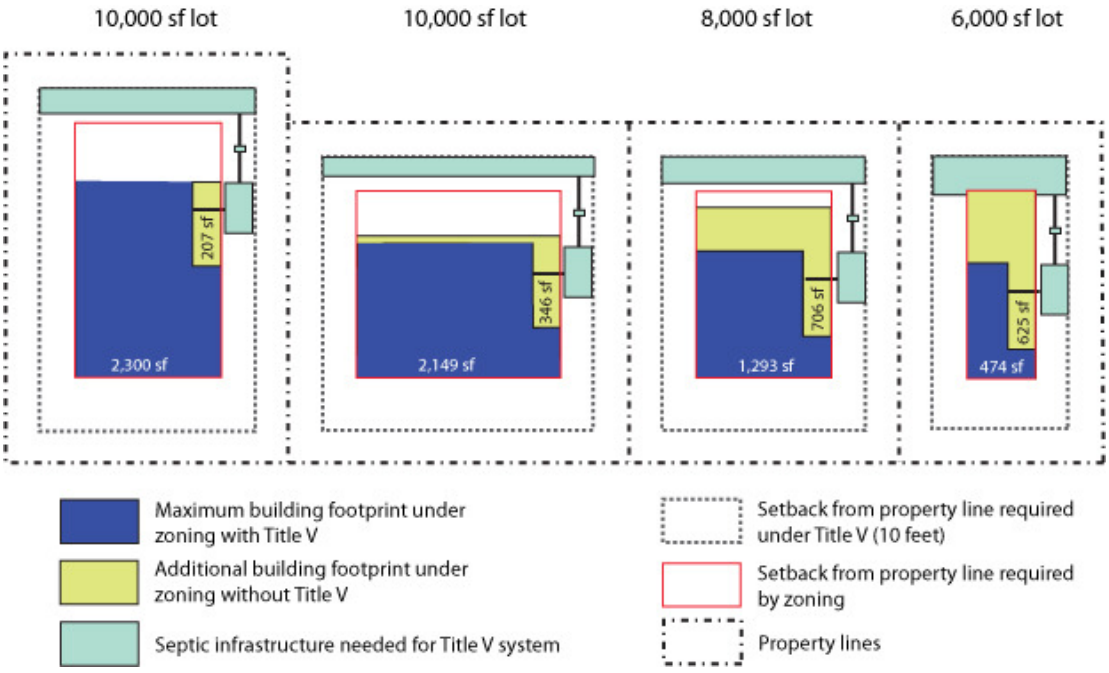
Figure 9. Wastewater Collection System, Spine and Tributary Areas, Yarmouth

Planning Issues, Tools and Strategies

Issue: *Ensure that sewering does not lead to intensification of structures that would increase wastewater flow or have a detrimental impact on natural resources or community character.* Impacts to wastewater flow could occur if expansion includes an increase in the number of bedrooms or expansion of the pre-existing commercial use. Impacts to natural resources or community character could occur from these or other forms of structural expansion that may or may not influence wastewater flow.

Discussion: As previously noted, sewers can have an impact on development by (1) removing Title 5 system site requirements, and (2) creating an attractive environment for investing in properties. For the purposes of this discussion it is assumed that if sewers were installed, homeowners would seek to maximize the development potential of their lots absent the requirements of Title 5.

Figure 10. Building Footprint with and without Title 5



This case study sought to quantify the change in development potential that could result if the lot area taken up for a Title 5 system became available, and to see how that change might apply to lots in the case study area. Figure 7 shows how zoning and Title 5 system and setback requirements combine to limit growth on three different lot sizes: 10,000 square feet (shown in two configurations), 8,000 square feet and 6,000 square feet. On the figure, the light blue areas show the location of the septic systems and leaching fields. For all lots in the figure, a three-bedroom system is assumed because it is the smallest system allowed under Title 5. The dark blue area shows the maximum building footprint that can be accommodated under zoning with Title 5 system and

setback requirements. If the septic system is removed and the Title 5 requirements no longer apply, the building footprint could expand to include the tan colored area and still comply with zoning setbacks and lot coverage requirements. Table 19. summarizes the change in footprint and building square feet that could result from the removal of the Title 5 system and setback requirements.

Table 19. Changes in Building Foot Print and Square Feet with Removal of Title 5

Lot Size (sf)	Foot print W/ Title 5	Add'l Footprint W/o Title 5	% Increase in Footprint	Add'l building sf w/2nd story w/o Title 5
10,000	2,149	346	16%	692
8,000	1,293	706	55%	1,412
6,000	474	625	132%	1,250

The data in Table 19 show that the potential additional footprint from removal of Title 5 requirements increases on a numeric and percentage basis as the lot size decreases. This is because maximum zoning coverage cannot be achieved on small lots given the Title 5 requirements, while lots above 10,000 square feet usually can accommodate a Title 5 system and achieve maximum building footprint. It is important to note that the illustrative examples in Figure 7 consider the effects of only zoning and Title 5 requirements, and do not consider proximity of wetlands, site topography or other issues that could influence development of a lot.

Visually, the increased footprint may not be perceptible from the street on a 10,000 square foot lot, even if a second story is built. On the other hand, the increased footprint could have a significant visual impact on the smaller lots, particularly if second stories are added. Visual depictions of the buildings before and after enlargement are shown in Figures 8 and 9. Enlargement of homes as depicted could block sunlight, views and vistas, and could substantially alter the character of neighborhoods that consist predominantly of smaller homes.

Beyond the visual impacts, there could be associated resources impacts from the increased size of buildings. For example, a larger footprint would result in greater impervious surface area and increased stormwater runoff. Any wetlands located on or adjacent to the site could be influenced by encroachment, landscaping or by stormwater runoff.

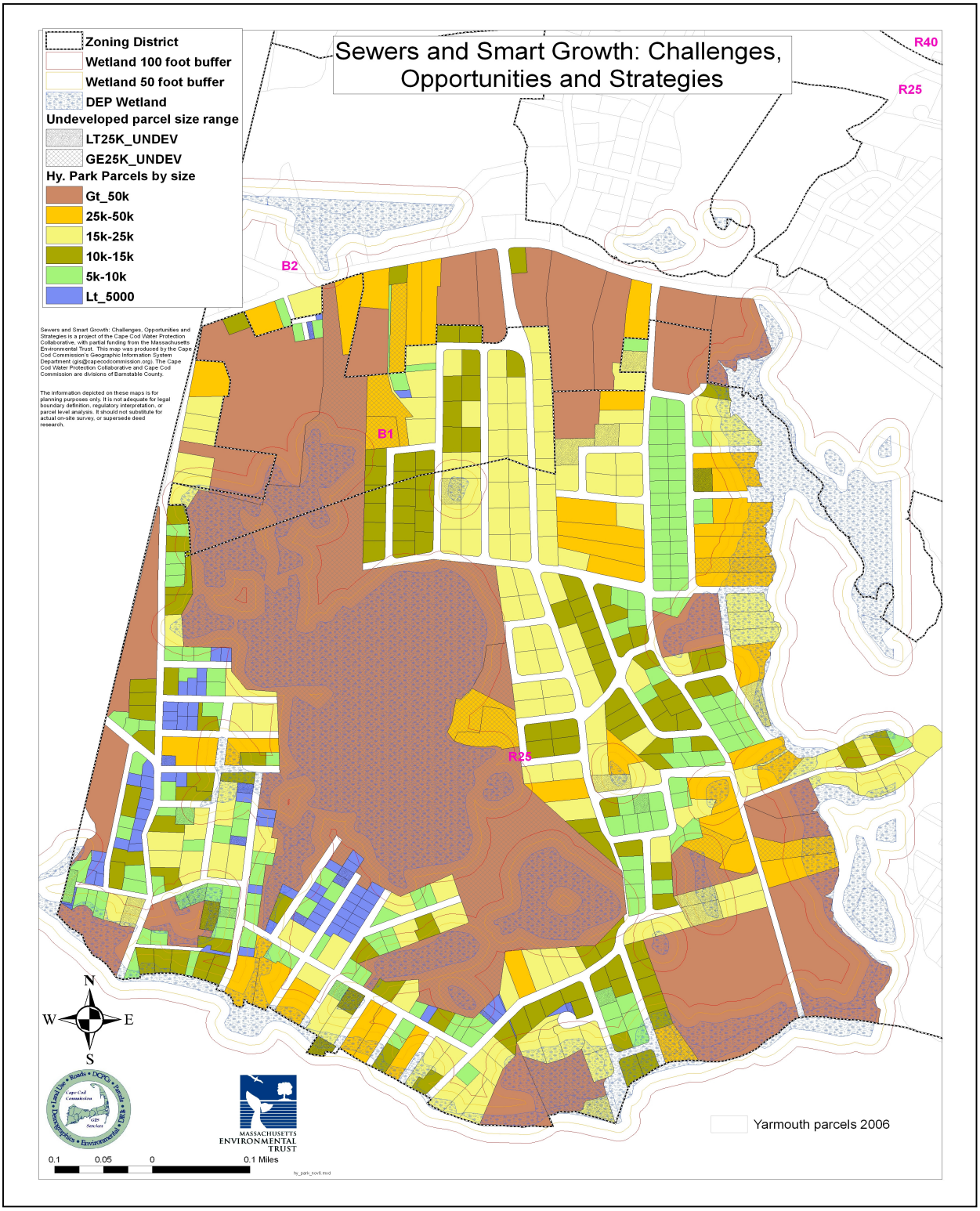


Figure 11. Residential Neighborhood South of Route 28, West Yarmouth
This area exemplifies a scenario 1 residential neighborhood where there are many small lots that could be developed, subdivided or further developed when the area is sewered and Title 5 criteria no longer apply.

Figure 12. Visualization of Maximum Lot coverage with Title 5 above shows homes built to the maximum lot coverage possible under zoning and septic setback requirements, on lots of 6-, 8- and 10,000 square feet, respectively (right to left.) **Figure 13. Visualization of Maximum Lot coverage without Title 5** below shows the amount of building expansion possible under zoning without septic setback requirements, and homes are expanded to their 2-story maximum.

The degree of building expansion described above could result in wastewater flow impacts to the extent that increase building area is devoted to bedrooms. Assuming the average sized bedroom is 100 square feet, the increase in footprint in any of the three lot sizes above could increase the number of bedrooms with or without a second story added. In the Yarmouth case study area, if only one bedroom is added to 75 percent of the 224 lots under 10,000 square feet there could be an increase of 168 bedrooms. At 110 gallons per day (gpd) of wastewater per bedroom, this translates into a potential increase in wastewater flow of 18,480 gpd. While the 110 gpd per bedroom may exceed actual wastewater flows based on water usage, the example serves to demonstrate that sewers could result in residential expansion that could in turn increase wastewater flow.

The examples above are intended to illustrate the types of visual, natural resources and wastewater impacts that may result from the installation of sewers. The nature and extent of these impacts would need to be evaluated in each community setting. Some of the tools towns can consider to address these impacts are discussed below.

Tools and Strategies:

Table 20. Overview of Applicable Policies and Regulations, Yarmouth R-25 Zoning District

	Existing	**For Consideration**
Land Use	Min lot size: 25,000 ft^2 Frontage: 150' Height: 35' Maximum Lot Coverage: 25% Maximum 10% for increase in footprint for a rebuild	Sliding scale for lot coverage to allow lower % coverage for smaller lots Strengthen treatment of alteration of non-conforming structures Square footage or FAR limitations for substantial renovation or rebuilding Design guidelines for all new construction, substantial renovation or rebuild
Natural Resource Protection	○ 100' buffer	50' no build/no disturb zone within 100' buffer
Nutrient & Flow Management	○ Title 5	Nutrient management (Bd of Health) regulation prior to sewer installation to set standards at 440 gpd per acre or less. Flow neutral connection regulation incorporated in future sewer regulations; set a limit on flow per property and/or limit number of bedrooms per residence.

7.2 Scenario #2: Sewering commercial and mixed-use centers

7.2.1 Route 28, Yarmouth

Overview

Route 28 is a state highway that extends slightly more than five miles through Yarmouth from Bass River/Dennis town line to the Barnstable town line. Land use along Route 28 in Yarmouth is predominantly strip development and tourism-based businesses including motels, cabins, restaurants and small retail stores. The Town initiated a corridor planning effort to address the challenges to natural resource protection and community character posed by the predominant auto-oriented development pattern. The community vision articulated through planning calls for strengthening a small number of activity centers located along Route 28 as either economic development centers or village centers. The activity centers were selected based on their potential to strategically accentuate some existing land uses while recapturing a village scale and scenic qualities along parts of the roadway. The vision also called for steps to reduce development density along portions of Route 28 that lie between activity centers through changes in zoning, redevelopment or open space reclamation. As a first step in implementing the vision, the Town adopted a hotel motel bylaw to facilitate redevelopment of numerous motel properties on Route 28 as either upgraded lodging facilities or as housing. Subsequent to the bylaw, the Town sought a Growth Incentive Zone (GIZ) application for the entire length of the Route 28 corridor. The GIZ includes the future South Yarmouth and Parkers River Marina activity centers. Phase 1 of the GIZ focused on the 35 motel properties that fall under the new bylaw. Subsequent phases of the GIZ will encompass further steps to achieve the land use vision.

The Route 28 corridor planning effort has coincided with development of the Town's comprehensive wastewater management plan (CWMP). The CWMP has identified a need to install sewers along the entire length of Route 28 to address nutrient loading to the Lewis Bay, Parker River, Nantucket Sound and Bass River subembayments. The sewers would serve existing and future commercial activity and residences along the corridor. In 2008, Yarmouth Town Meeting voted to fund the design and permitting for Phase 1 of the sewer plan, which includes sewer service to properties along the Route 28 corridor. Subsequent phases of the sewer plan would extend service off the Route 28 spine to serve residential properties north and south of Route 28, including the area around the residential area in West Yarmouth, south of Route 28 described in 7.1 above.

Planning Issues, Tools and Strategies

Issue: *Ensure that sewers support development in a manner that is consistent with the corridor vision plan.* Sewers present an opportunity to achieve compact mixed-use growth areas such as the economic centers and village centers identified in the Yarmouth Route 28 corridor vision map. To achieve this vision, development intensity must be directed into activity centers and away from areas between the centers where a lower

density of development is desired. It also means that within activity centers, sewer capacity is allocated to desired types of land uses that will contribute to a vibrant center.

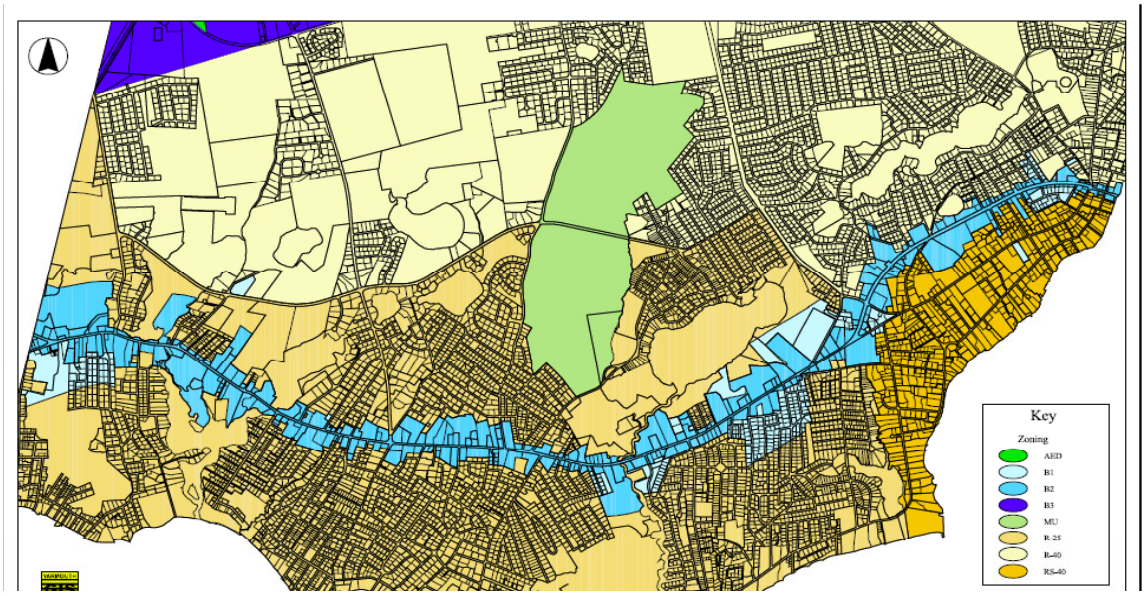


Figure 14. Zoning Districts along Route 28, Yarmouth (Yarmouth GIS)

Figure 14 above shows the entire Route 28 corridor in Yarmouth zoned for business (in blue). Figure 15 below shows proposed activity centers where future mixed-use growth is desired (red), with less intensive development between the centers.

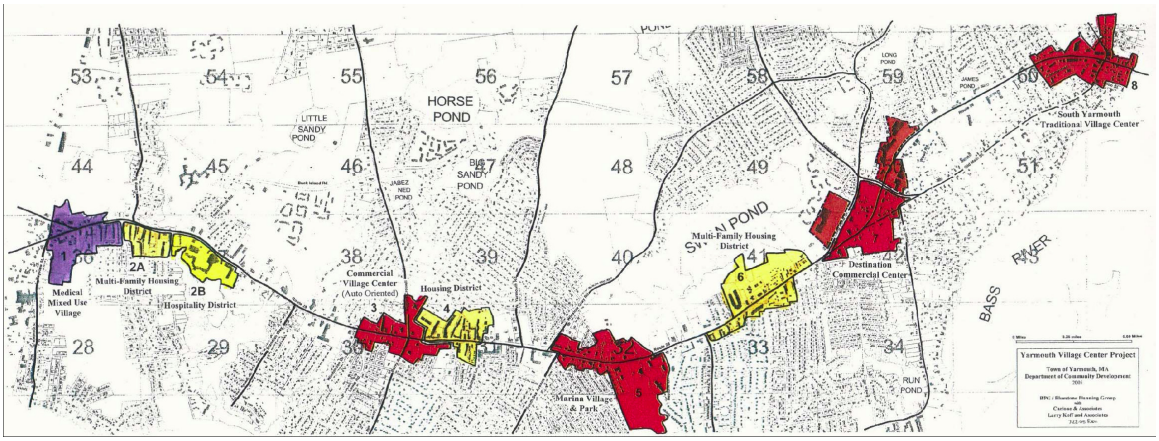


Figure 15. Proposed Activity Centers along Route 28 Yarmouth, (Bluestone Group Report)

Discussion: Sewers could catalyze growth along Route 28 either by removing the site and flow criteria of Title 5 or by altering the perceived ease or benefits of development. Sewers could encourage property owners to seek to invest in properties in ways that are both consistent and inconsistent with the community vision. Consistent growth would result in the desired types and intensity of commercial and mixed-use

development within and outside of activity centers. Inconsistent growth also could happen in a number of ways, as described below.

Supporting Compact Mixed-Use Centers. Adequate wastewater treatment is a prime component of infrastructure needed to support a compact mixed-use development pattern. The lack of wastewater treatment has prevented some communities from allowing multi-family housing in commercial areas, which could provide economically diverse housing options for the region's work force and retirees. Installing sewers along Route 28 allows the community to entertain a higher density of development in appropriate areas where it can contribute economic vitality and reduce automobile dependency. This density could be offset by reducing density along Route 28 between activity centers, or by reducing development potential elsewhere in town outside of the Route 28 corridor.

Conversion of Residential Uses. Residences are a desirable component of a mixed-use center whether within or outside of a designated activity center. Residences add vibrancy, daylong activity and a ready customer base for local businesses and typically are less intensive traffic generators than commercial uses. According to Assessor's records, currently there are roughly twenty properties within the commercial (B-2) zoning district along Route 28 that are in residential use. If sewers are installed, some of these properties may increase in value or desirability as commercial locations and be converted. Conversion of these properties could alter the character of the area and, depending on the type of commercial use, increase wastewater flow, traffic, and impervious surface area. On the other hand, redevelopment of these properties as mixed-use properties (ground floor retail with housing above) or as multi-family housing could further the planning objectives of a walkable mixed-use center.

Expansion of Commercial Uses. Expansion of certain commercial uses can enhance the pedestrian experience, economic vibrancy and market appeal of an activity center. On the other hand, expansion of incompatible uses within a center can detract from those qualities and make revitalization more difficult to achieve. Similarly, expansion of commercial uses outside of activity centers could attract business and activity away from the center, and encourage more auto dependency, as shoppers and patrons need to travel from business to business. Expansion of wastewater intensive commercial activities such as restaurants, laundromats, or carwashes also could increase wastewater flow and absorb capacity intended for other uses of service areas.

Allocation of Sewer Capacity to Desired Uses. Compatibility between land use regulatory controls and sewer connection regulations can help to ensure that sewer capacity is allocated to uses that adhere to community planning goals. Undesired expansion of wastewater intensive uses can be addressed through flow limits in sewer connection regulations, but also should be reinforced by use and development intensity regulations within the zoning bylaw. Local adoption of the Chapter 83A local option provision within the state wastewater regulations gives communities the ability to target sewering to areas where it is most needed. However it is not clear how towns will allocate capacity among properties within areas designated for sewering. Limiting flow

to the levels in existence as of the date of adoption of the local option may work in some cases, but this approach provides an advantage to existing high flow property uses, whether or not they are desirable from a community planning perspective. Properties with lower existing flow, even if their expansion would be consistent with town plans, are at a disadvantage.

Tools & Strategies:

Table 21. Overview of Applicable Policies and Regulations, Route 28 Yarmouth

	Existing	For Consideration
Land Use	Hotel/Motel Conversion Bylaw GIZ – provides relief from Cape Cod Commission review for qualified properties.	Adopt village center overlays for all activity centers and village centers. Components could include: • Increase allowed density and modify allowed uses to provide incentive for investment in activity centers. • Require developments that exceed a threshold level of net new development to include a mixed use component • Include elements of form-based code to reinforce the desired visual and functional impact of development Reduce allowed development density and modify allowed uses outside of activity centers to achieve desired level of growth and/or un-development.
Flow Management	Title 5	Adopt local option provision (Ch. 312 Acts of 2008) to select areas for sewer treatment Nutrient management (Board of Health) regulation prior to sewer installation to set standards at 440 gpd per acre or less. Flow neutral connection regulation incorporated in future sewer regulations; set a limit on flow per property and/or limit number of bedrooms per residence.

7.3 Scenario 3: Sewering Under-developed Residential Areas

7.3.1 East Harwich Village Center

Overview

The EHVC consists of a 100-acre commercial district surrounded by more than 300 acres of undeveloped residentially zoned land. At the center of the EHVC is the intersection f two well traveled regional roadways, Routes 137 and 39. The EHVC has been the focus of a community – based planning effort since 2005. The planning process has produced a community vision that seeks to balance the EHVC's position as a regional shopping destination with a desire among area residents for a pedestrian friendly mixed-use center that includes more "home grown", small-scale retailers, services and restaurants. Put another way, this vision would allow limited regional retail growth and promote infill with more village oriented commercial activity, and housing.

Figure 16. East Harwich Village Study Area

The East Harwich commercial district contains 371,000 square feet of retail and mixed commercial space that includes both regional (Stop & Shop, Talbots, movie theater, car dealership, etc.) and local (Post Office, bank, liquor store, video store, nail salon, take-out restaurants) facilities. The commercial district has undergone rapid development without the benefit of a village plan. As a result, the dominant development pattern consists of freestanding, single story commercial structures with multiple curb cuts that do not engender a pedestrian accessible village identity and do not address workforce housing needs. Without changes in regulation, policy and infrastructure supported by a community-based plan it is expected that future development would follow that pre-existing land use pattern

The EHVC includes significant acreage of undeveloped residentially zoned land. This includes 116 acres of undeveloped land in a R-R district (rural residential one-acre zoning) and 210 acres in the Six Ponds Overlay District (one and one half-acre zoning). Under current zoning the combined residential areas could accommodate 175 new houses. Planning for these undeveloped residential lands is being coordinated with planning for the commercial district to ensure that the areas complement each other and

provide opportunities for compact development with appropriate offsets and an effective transition zone to nearby single-family residential areas.

The entire EHVC is within a Water Resources Protection Overlay District (WPOD). The WRPOD's stricter lot and building coverage requirements and nitrogen loading limit have had the effect of precluding the addition of high wastewater generating commercial uses such as restaurants, and has discouraged use of a zoning provision to allow accessory apartments. It is reasonable to assume that the provisions of the WRPOD would be repealed if the area were sewered. Under current zoning, including the WRPOD, approximately 170,000 square feet of additional commercial space could be developed. If the WRPOD and other restrictive overlays are repealed, additional commercial growth could more than double that amount.

The EHVC is within the watershed of Pleasant Bay, a nitrogen sensitive embayment. There is a need for a significant reduction in existing watershed nitrogen load in order to achieve nitrogen TMDLs issued for Pleasant Bay. The Town of Harwich has initiated a CWMP, which will consider sewering and other options for the Pleasant Bay watershed, and sewering all or a portion of the EHVC is among the options that will be considered.

Planning Issues, Tools and Strategies

Issue: *Ensure that sewers support compact mixed use development in the East Harwich commercial district and preserves surrounding open space.* Sewers could support expansion of regional commercial retail uses without the benefit of adding pedestrian oriented retail or housing, which are in keeping with the community vision.

Sewers could lead to the repeal of the lot coverage, building coverage and nitrogen limits of the water resource protection district. Removal of these regulatory requirements is necessary to achieve a more compact pedestrian friendly development patter in the commercial district. However the repeal also could lead to growth in more wastewater intensive commercial uses, which could absorb planned sewer system capacity. Modifications to land use controls would be needed to compensate for the loss of the WRPOD and ensure that future growth did not overwhelm the district.

Finally, sewering could encourage more dense development of surrounding undeveloped residentially zoned land.

Discussion: Because comprehensive planning for wastewater and land use within the EHVC is occurring conterminously, there is an opportunity to design wastewater infrastructure to help achieve the community vision. The objectives of that vision—pedestrian orientation, more open space, and the addition of a mix of uses including workforce housing—can all best be accomplished by pursuing a compact development pattern, with allowed densities highest in the core of the EHVC and then transitioning to lower densities at the edges of the commercial district. A town center overlay district that allows compact densities and a mix of uses and that may include elements of form-based

code could be used to accomplish this. The area also is well suited to a transfer of development rights program that would relocate development potential in the surrounding residential areas to the area that is now the commercial district.

Further downzoning of residential areas is unlikely, and the undeveloped lands are not large enough for Natural Resource Protection zoning. The town has an optional OSRD bylaw, and this could become mandatory for subdivision of the undeveloped land. This would make the cluster provision consistent with an existing Board of Health requirement that subdivisions of five or more acres provide centralized treatment. Also a higher open space requirement in the cluster provision would increase the incentive to transfer development potential into the existing commercial district.

Tools & Strategies:

Table 22. Overview of Applicable Policies and Regulations, CH-2 Zoning District, East Harwich

	Existing	**For Consideration**
Land Use	Core: Commercial zoning (CH-2) with 50 ft front setbacks; 25 ft side/rear setbacks, 30 ft height limit Surrounding: Rural residential (RR) with 40,000 minimum lot size; a portion of residential land is in the Six Ponds District which requires 100,000 sf lots and a maximum 15% lot coverage	Adopt Village Center Overlay (see Table 15 elements of Town Center Zoning) to encourage mixed use growth. Transfer development rights from surrounding residential area into a mixed use village center
Natural Resource Protection	Water Resources District sets a 40% lot coverage with artificial recharge, and 15% without artificial recharge	Adopt stormwater management bylaw or regulation Adopt standards for Low Impact Development
Nutrient & Flow Management	Title 5	Adopt local option provision (Ch. 312 Acts of 2008) to select areas/exclude areas for sewer treatment

Figure 17. East Harwich Village Center Visualizations shows current conditions (above) and possible future compact village center growth (right) that could occur under revised village center zoning.

7.4 Scenario 4: Sewering in portions of multi-town watersheds

7.4.1 Pleasant Bay Watershed: Orleans, Chatham, Harwich and Brewster

Overview

The land area of the Pleasant Bay watershed consists of 15,118 acres in four towns: Orleans (35 percent), Chatham (24 percent), Brewster (23 percent) and Harwich (17 percent). The estuarine system, which covers more than 6,400 acres, includes nineteen subembayments and associated subwatersheds for which total nitrogen TMDLs have been issued. Six of the nineteen subwatersheds are shared by two or more towns.

Each town is at a different stage of wastewater planning: Chatham has an approved CWMP, Orleans has a draft CWMP. Chatham is proposing to sewer it full share of the Pleasant Bay watershed. Orleans' draft plan calls for sewering slightly more than half of its parcels in the Pleasant Bay watershed. Each town will implement their plans for sewers over two or more decades. Harwich's CWMP is in the development stages, and Brewster is just getting underway in assessing wastewater management needs. One of Brewster's first steps was to seek the designation of the Brewster Water Protection District of Critical Planning Concern, which encompasses the town's entire share of the Pleasant Bay watershed. The town is in the process of developing implementing regulations which may include measures designed to reduce nutrient loads from watershed land uses.

What each town decides to do to reduce nutrient loads from wastewater will have an impact on resource conditions throughout the entire system and therefore will have an impact on the other three towns. Through the Pleasant Bay Alliance, an inter-municipal organization involving all four towns, there is sharing of information about the status of each town's wastewater management planning. In addition, the Alliance undertakes joint studies to generate data that all towns can use to enhance planning efforts. However, in this context there is little exchange of information regarding land use planning in the watershed.

Planning Issues, Tools and Strategies

Issue: *Ensure that growth in development within the unsewered portion of a watershed does not push watershed nitrogen levels beyond TMDLs*. As described below, some areas within shared subwatersheds will be sewered and some will remain on on-site systems. Unsewered areas will be predominantly residential, and many areas within the watershed are fairly well developed. However, the shared subwatersheds include the East Harwich Village Center, as well as industrially zoned land in Brewster. Throughout the watershed there is potential for additional development which, without treatment, would increase watershed nitrogen load. Analysis conducted by the Cape Cod Commission for the Pleasant Bay Alliance estimated that unattenuated nitrogen loads in the shared subwatersheds would increase approximately 30-40% at buildout under current zoning.

Discussion:

The six subwatersheds shared by two or more towns each have a TMDL for Total Nitrogen, which will require significant reductions in watershed nitrogen loads.

Orleans and Brewster share the subwatersheds of Little Pleasant Bay, Arey's Pond, Namequoit River and Quanset Pond. Orleans proposes to sewer a portion of its share of each subwatershed. In each town there would be remaining land area within each subwatershed, which will remain on Title 5.

Chatham and Harwich share the subwatershed of Muddy Creek. Chatham proposes to sewer its share of the subwatershed. No plans are yet proposed for Harwich's portion, which accounts for 75 percent, although sewering all or a portion of Harwich's share of the subwatershed ultimately may be recommended. It is possible that some properties in the Harwich portion of the subwatershed that are not under conservation restriction will remain on Title 5.

The main basin subwatershed shared by all four towns is the largest subwatershed. Chatham has the smallest portion of it, which the Town plans to sewer. Orleans proposes to sewer a portion of its share. No plans are in place to sewer portions in Harwich or Brewster. There is potential for a substantial portion of land in this subwatershed to remain unsewered and subject to Title 5. This is depicted on Figure 18, below.

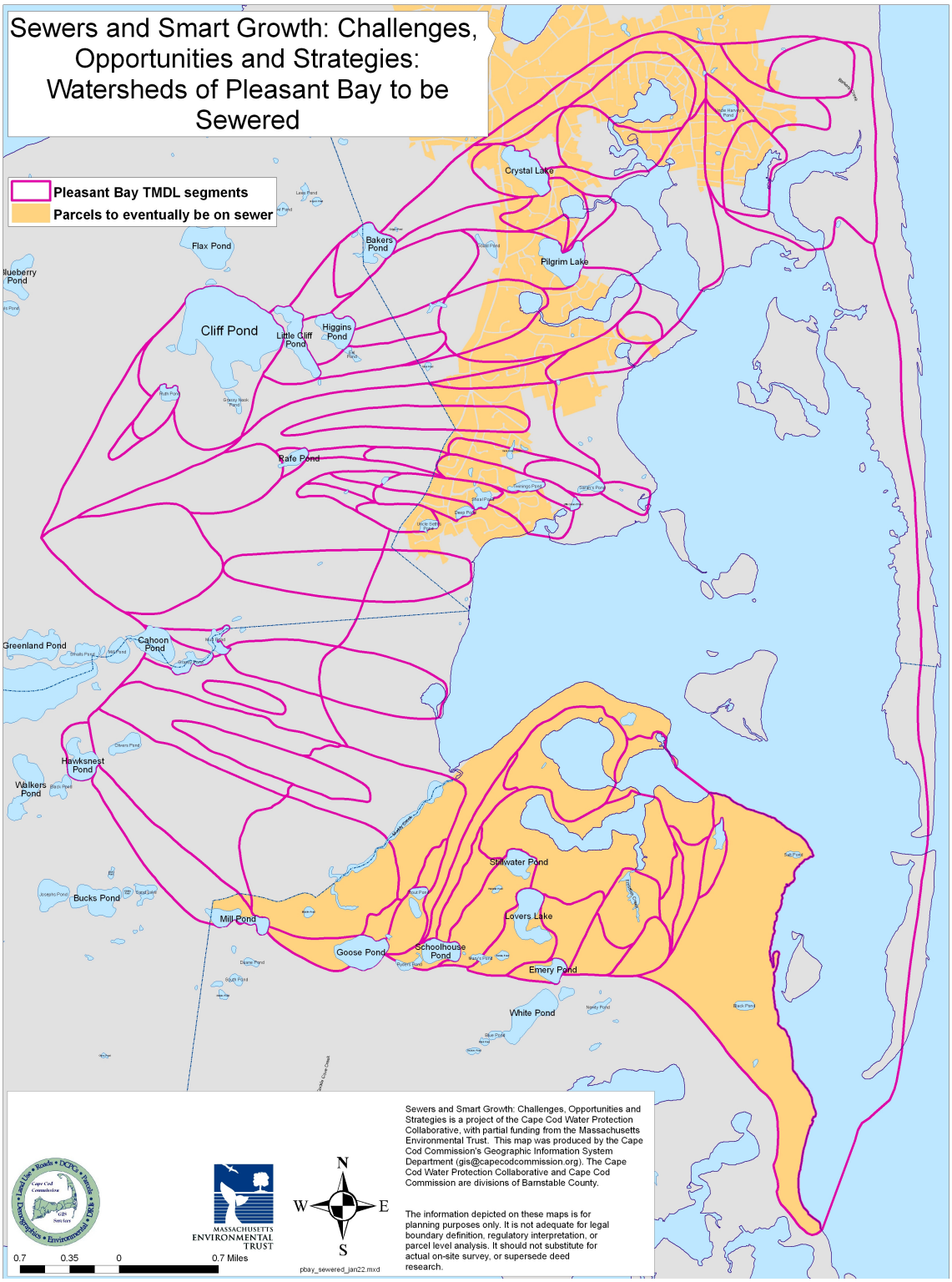


Figure 18. Proposed Sewered Areas within Pleasant Bay Shared Watersheds, depicts how large areas of the watershed may remain unsewered, including subwatersheds that cross town boundaries for which Total Nitrogen TMDLs have been issued.

Tools & Strategies

Table 23. Overview of Applicable Policies and Regulations, Pleasant Bay Watershed

	Existing	For Consideration
Land Use	All towns – Zoning is predominantly one-acre residential. The watershed also includes the East Harwich Village Center (see 7.3 above), the Brewster Industrial Park and commercial land along Freeman's Way, and neighborhood business zoning in Orleans. Orleans has established a sunset provisions on the ability to build a second house on qualifying lots.	In Brewster DCPC implementing regulations: • Elements of Natural Resource Protection Zoning (see 5.3.1) • Controls on intensive wastewater uses in the industrial zone Village Center Overlay for the East Harwich Village Center (see 7.3) Adopt mandatory cluster. Establish a TDR to transfer growth from unsewered areas to sewered areas Tighten treatment of non-conforming structures.
Nutrient & Flow Management	Title 5 in Harwich and Brewster. Chatham and Orleans adopted Nutrient Management Regulations (Board of Health.) Chatham has flow controls in sewer connection regulations. Harwich requires cluster system for projects over 2,000 gpd. (Board of Health)	Request DEP to enforce compliance with approved CWMP or no net nitrogen standard for all groundwater discharge permits in watershed; Require cluster system for projects under 10,000 gpd (not including single family homes) and apply same TMDL or no net standard. Adopt nutrient management bylaw in Harwich and Brewster.

8.0 Policies, Regulations, Bylaws

The purpose of this chapter is to provide examples of specific regulatory language to demonstrate approaches outlined in the preceding chapters of this report. **Please note that for brevity and cohesiveness, sections of applicable regulations are cited in the body of this chapter. Introductory sections, historical notes, administrative sections or other sections may not be included below**. Actual regulatory language is shown in italics, and some relevant sections are highlighted for emphasis. All regulations and bylaws cited below are available in their entirety and may be downloaded from the websites indicated below and at the Cape Keepers website, www.capekeepers.org.

The following regulations are discussed in this chapter:

8.1 Board of Health

8.1.1 Nutrient Management:

8.1.1.1 Interim Regulation for the Protection of Saltwater Estuaries, Barnstable
8.1.1.2 Nitrogen Loading Regulation, Chatham
8.1.1.3 Nutrient Management Regulations, Orleans
8.1.1.4 Part IX Section 14, Design Flows in Excess of 600 Gallons Per Day, Mashpee

8.1.2 Cluster System Requirement

8.1.2.1 Nitrogen Loading Regulation, Chatham Health Regulations
8.1.2.2 Falmouth Health Regulations (FHR) 15.0 SUPPLEMENTS TO 310 CMR 15.000: THE STATE ENVIRONMENTAL CODE TITLE 5
8.1.2.3 Section 1.2.11, Harwich Health Regulations
8.1.2.4 Section 185-17.3, Orleans Health Regulations
8.1.2.5 ARTICLE XIII Innovative and Alternative Systems § 360-37 and 38, Code of the Town of Barnstable

8.2 Flow Neutral Sewer Connection Regulations

8.2.1. Article II, Regulation of Sewer Flow, Chatham Sewer Connection Regulations
8.2.2 New Silver Beach Sewer By-Law, Falmouth General Bylaw
8.2.3 Sewer Rules and Regulations, Provincetown Sewer Regulations

8.3 Land Use Bylaws:

8.3.1 Non-Conformities
8.3.1.1 Dennis Zoning Bylaw, Section 2 Use and Intensity Regulations, 2.4 Non-Conforming Conditions
8.3.1.2 Shutesbury Zoning Bylaw, Article VI Nonconformity of Pre-existing Uses and Structures, Section 6.1 Nonconforming Uses and Structures

8.3.2 Cluster/Natural Resource Protection Zoning
8.3.2.1 Mashpee Zoning Bylaw Section 174-47. Cluster Development
8.3.2.2 Shutesbury Zoning Bylaw, Article V Open Space Design
8.3.2.1 Falmouth Zoning Bylaw, Article XX Wildlife Corridor Overlay

8.3.3 Village Center
8.3.3.1 Town Center Bylaws:
Dennis Zoning Bylaw, Section 8 DPVC – Dennisport Village Center Zone
Section 240-24.1-11 Hyannis Zoning Village Zoning Districts, Code of the Town of Barnstable; and Downtown Hyannis Design & Infrastructure Plan
Orleans Zoning Bylaw, Section 164-19.1. Village Center District

8.4 Conservation Bylaws

8.4.1 MACC Model Non-Zoning Wetlands Protection Bylaw/Ordinance

8.5 Stormwater Management and Low Impact Development General Bylaws

8.5.1 Model Stormwater Management Bylaw & Regulations
8.5.2 Towns of Duxbury, Marshfield, Plymouth; Model Low Impact Development Bylaw & Regulation

8.6 State Laws and Policies

8.6.1 Chapter 312 of the Acts of 2008
8.6.2 MassDEP "No Net Nitrogen" Approach to Groundwater Discharge Permitting

8.1 Board of Health Regulations

8.1.1 Nutrient Management

This section contains the following regulations adopted by Boards of Health aimed at controlling nutrients from on-site septic systems. These bylaws are discussed in section 4.2 and are summarized in Table 7.

8.1.1.1 *Interim Regulation for the Protection of Saltwater Estuaries*, Barnstable

Note: This regulation applies to watersheds for which a nutrient TMDL has been established. Applicable sections are shown below. The regulation is available at www.capekeepers.org or from the Town of Barnstable website.

SECTION 360-45. Interim Regulation for the Protection of Saltwater Estuaries.
A. PURPOSE
The findings of a state wide estuary investigation indicate that a substantial portion of the Town's salt water estuaries are in jeopardy from the long term build up of nitrate nitrogen, primarily from the subsurface discharge of sewage effluent. These findings have caused the Massachusetts Department of Environmental Protection to establish Total Maximum Daily Loads (TMDL) for nitrogen for the watershed areas of these estuaries. Watershed is defined as the area of land from which water flows downhill into a particular body of water. In these nitrogen impaired estuaries the TMDL will require an actual reduction in the amount of nitrate-nitrogen discharged into these embayments. Since most of the nitrate-nitrogen in these watersheds is from subsurface discharge of sewerage effluent into the groundwater that flows to these embayments and since it is likely that a plan for corrective action will take years to formulate and implement, the Board is adopting the following interim regulations to mitigate the adverse impact to these estuaries from such discharges. The Town has long recognized the need to protect its water resources and has imposed discharge limits on subsurface disposal of sewage in other nitrogen sensitive areas. The restrictions proposed herein are similar to those imposed by town ordinance and/or Board of Health regulation in other nitrogen sensitive areas in the Town. These regulations are temporary and will be in effect only until the Town adopts and implements a comprehensive plan to address the nitrogen reduction required in these estuary systems by the proposed TMDL. To date final reports have been produced for Popponesset Bay, Three Bays and the Centerville River watersheds. All three of these estuary systems will require a reduction in total nitrogen discharge in order to meet the state mandated TMDL. Further reports are expected on Lewis Bay and Barnstable Harbor. If these studies indicate a need for nitrogen reduction in those watersheds, the following rules will be applied to those watersheds also.

B. RESTRICTIONS
No permit for the construction of an individual sewage disposal system on a building lot shall be granted within the watersheds for the estuaries that have been identified as requiring a reduction in the current TMDL of nitrate-nitrogen as identified by the map entitled "Massachusetts Estuary Project, Zones of Contribution to Saltwater Estuaries, Town of Barnstable, March 10, 2008" unless the following standards are met:.
1. The maximum allowable discharge of sanitary sewage, based on the sewage design flow criteria listed in 310 CMR 15.203, Title 5, of the State Environmental Code, shall not exceed 440 gallons per forty thousand square feet of lot area with the following exceptions:
(a) For approved building lots on which no building currently exists and that

are less than thirty thousand square feet in area the maximum allowable sewage discharge shall be 330 gallons.
(b) For parcels with existing buildings the maximum allowable flow shall be either 440 gallons per forty thousand square feet except as described in 1(a) above or whatever is currently permitted, whichever is greater.
2. Nothing in this regulation shall prohibit the approval by the Board of Health of any application involving the maintenance, repair or alteration of an existing individual sewage disposal system, providing that said application does not involve an increase in design flow as defined by existing Board of Health regulations. Where an increase in design flow is involved, the applicant must demonstrate compliance with this regulation.

8.1.1.2 *Nitrogen Loading Regulation*, Chatham

Note: This town-wide regulation was among the first nutrient management or interim regulations adopted by a Board of Health on Cape Cod. It provides a baseline for establishing flow limitations under the Sewer Rules and Regulations (see 8.2.1.) The regulation is accessible at www.capekeepers.org.

8.1.1.3 *Nutrient Management Regulations*, Orleans

Note: This town-wide regulation was largely modeled after the Chatham regulation, but differs in that it provides for a transition period by making the effective date July 1, 2009 so that projects in the pipeline upon adoption of the regulation can proceed under the old rules. The regulation also exempts the Village Center, for which greater density is desired. The regulation is accessible at www.capekeepers.org.

Note: The Town of Falmouth is reviewing a possible ***Nutrient Management Bylaw***, which is structured as a general bylaw rather than a Board of Health regulation. A general bylaw adopted at Town Meeting may provide stronger evidence of community support should the regulation face a legal challenge. However, general bylaws can require greater coordination among town boards and commissions to ensure thorough compliance. Also, the general bylaw needs to specify a variance granting authority such as the Board of Health, otherwise the variance process may fall to the Board of Selectmen.

8.1.1.4 *Part IX Section 14, Design Flows in Excess of 600 Gallons Per Day, Mashpee*

A slightly different approach to nutrient management is embodied in the Mashpee Board of Health regulations. This regulation enables the Board of health to require a level of treatment not to exceed 10 mg/l total nitrogen for large systems (over 600 gpd) that otherwise would be below the limit of a groundwater discharge permit. However, the regulation applies to large systems and does not stipulate either cluster or a level of treatment for subdivisions, which could contain numerous smaller systems.

8.1.2 Cluster Systems Requirement

Four towns—Chatham, Harwich, Orleans, Barnstable and Falmouth—have provisions within their Board of Health regulation to require cluster systems within subdivisions.

8.1.2.1 *Nitrogen Loading Regulation,* Chatham

Note: The applicable section within the Chatham nutrient management regulation (see 8.1.1.2) is provided below. This provision requires a shared nitrogen removing systems for subdivisions of 3 or more lots

Section 4. Applicability
4.1.c. Division of Land
i.)The creation of a subdivision or Open Space Residential Development (OSRD) of three or more lots or the division of a tract of land into three (3) or more lots shall be served by a shared or common on-site subsurface sewage disposal system that provides nitrogen removal technology*. The system may be located anywhere within the subdivision or division, including the open space, if any, subject to all applicable rules regulations and laws. Subdivision or OSRDs to e connected to the town sewer are exempt from this provision. Said system shall be constructed in accordance with the Rules and regulations of the Chatham Sewer Department, In addition, said system shall be so located to maximize future connection to town sewer or other wastewater management facility.*

8.1.2.2 *Falmouth Health Regulation (FHR) 15.0 SUPPLEMENTS TO 310 CMR 15.000: THE STATE ENVIRONMENTAL CODE TITLE 5*

Note: Falmouth has adopted regulatory supplements to 310 CMR 15 that stipulate that subdivisions that are required to provide denitrification do so with use of a shared system and not exceed a limit of 12 mg/l. Subdivisions that would trigger this requirement would include those within the Coastal Pond Overlay district (section 240-98 of the Falmouth Zoning Bylaw) which includes all recharge areas of Coastal Ponds in the town. The relevant section is excerpted below. The proposed nutrient management bylaw currently under review would require a shared system for all subdivisions of five or more lots and all projects developed under a Comprehensive Permit under MGL Ch. 40B.

15.3 (7) Requirement for Use of Shared Systems. ***All subdivisions subject to the requirement of denitrification by any Board or Commission in the Town of Falmouth, shall be required to construct a shared septic system as defined in 310 CMR 15.002 and shall meet a limit of 12 mg/l Total Nitrogen*** *at the point where the treatment unit discharges to the soil absorption system. Individual onsite denitrifying septic systems shall be prohibited in subdivisions subject to denitrifying requirements*

8.1.2.3 *Section 1.2.11*, Harwich Health Regulations

Note: This section of the Harwich Board of Health regulation requires use of a shared septic system for subdivisions that generate more than 2,000 gallons per day. Within the Pleasant Bay watershed, which currently is the only watershed for which a TMDL has been issued, subdivisions of five lots or more must use a cluster system with de-nitrifying technology.

Any development, (including residential subdivisions, re-subdivision or ANR) with a septic

system or systems, new or upgraded, designed to accommodate sewage flow of 2,000 gallons or more per day shall require a hearing before the Board of Health before a permit for construction of either the system or systems of any buildings or facilities which would use the system or systems can be used.

In applying for a permit, the applicant shall submit data which shall include but not be limited to the following: Hydro-geologic data in sufficient detail to determine direction of the groundwater flow, elevation of the groundwater, soil conditions, the environmental impact the disposal system will have on public or private water resources, salt water estuaries, rivers, streams, fresh water ponds or wetlands.

Nitrogen loading calculations shall be submitted for development within the watersheds of salt water estuaries or Drinking Water Zone II and phosphorus impact evaluations for those within the watersheds for fresh water ponds including demonstration of the use of vertical separation and horizontal setbacks to maximize the attenuation of phosphorus in the soil; a written evaluation of the potential for the generation or use of toxic or hazardous waste on the site with a description of all such waste, which may reasonably be expected to be disposed of on the site and any such additional information deemed necessary by the Board of Health. Said data shall be prepared by a professional engineer, registered in Massachusetts whose qualifications to prepare such data shall be accepted by the Board of Health, and shall be submitted at the time of application.

The final report by the Massachusetts Estuaries Project (MEP) for the Pleasant Bay Alliance issued May, 2006, concludes that there is an excess of nitrogen from existing development. The report indicates that significant percentages of nitrogen must be removed from both existing and future development to restore and protect water quality. This report forms the scientific basis for Total Maximum Daily Limits (TMDL) imposed by DEP/EPA.

Therefore, as an interim measure and prior to the development and implementation of a Comprehensive Wastewater (nitrogen) Management Plan (CWMP) for Pleasant Bay, any development of a subdivision, re-subdivision or ANR, five lots or greater which is in whole or in part within the watershed of Pleasant Bay as defined in said report shall be served by a shared septic system that provides nitrogen removal technology. Removal limits shall be those approved by DEP for the technology proposed. The system may be located anywhere within the subdivision, including open space, if any, subject to all applicable rules, Regulations and laws.

If, after the hearing, the Board determines that the system or systems as designed would continue to create a negative environmental impact, the Board shall require the system or systems be redesigned so as to eliminate or mitigate said impact.

Nothing within this Regulation shall prohibit approval, by the Board of Health for any applications involving the maintenance and/or repair of an existing subsurface sewage disposal system, providing said application does not involve a change of use or expansion. Where a change of use or expansion is involved, the applicant must demonstrate compliance with this Regulation.

Variances from this Regulation may be granted by the Board of Health only if the applicant: a. demonstrates to the satisfaction of the Board that a literal enforcement of this Regulation would involve substantial hardship, financial or otherwise to the petitioners (i.e., would deprive the landowner of all reasonable use of the lot in question); or b. proves to the Board that the project would not have a measurable environmental impact to any water resource.

8.1.2.4. Section 185-17.3, Orleans Health Regulations

§ 185-17.3. General requirements.
(A).2) Building/Plumbing Permits/Subdivisions/Divisions
c) Subdivisions and Divisions: The creation of a subdivision of five (5) or more lots or the division of a tract of land into five (5) or more lots shall be served by a shared or common septic system that provides nitrogen removing technology. The system may be located anywhere within the subdivision or division including the open space, if any, subject to all applicable rules, regulations and laws. The nitrogen removing technology shall remove nitrogen at a minimum to 10ppm's discharge or 5ppm at the lot line.

8.1.2.5. ARTICLE XIII Innovative and Alternative Systems § 360-37 and 38, Barnstable Town Code

§ 360-37. Applicability.
A. This regulation shall apply to residential and nonresidential development meeting or exceeding the following criteria:
(1)Residential development of single-family or multifamily homes, lots and/or residential dwelling units held or controlled in common ownership with a Title 5 design flow of 1,650 gallons per day or more of wastewater; and
(2)Nonresidential development with a Title 5 wastewater design flow of 1,650 gallons per day or more, and the expansion or change of use of existing nonresidential developments that generate a wastewater design flow above the existing approved design capacity of the system; and
(3) In the case of residential condominium developments with a total wastewater design flow of 1,650 gallons per day or more, this regulation shall apply in the case of an expansion or change of use upon a determination by the Board that the existing system does not protect the public health, safety and welfare, or, upon a change of ownership or routine inspection if, upon inspection, the system fails inspection as defined in 310 CMR 15.00.

§ 360-38. Innovative/alternative systems and shared system requirements.

A. Consistent with the applicability provisions set forth above, the Board of Health may require any new development, and the expansion, alteration or modification or change in use of an existing development, to utilize an on-site innovative/alternative septic system or a shared innovative/alternative septic system.

8.2 Flow Neutral Sewer Connection

This section contains regulations and bylaws that have been adopted to ensure neutrality in the amount of flow generated on a property connected to a sewer system as compared to the same property under Title 5 or nutrient management regulations. These regulations are discussed in section 4.3 and are summarized in Table 8. Article II of Chatham's Sewer Rules and Regulations, and the New Silver Beach Sewer Bylaw were adopted by vote of the respective Town Meetings. The Town Sewer Commission promulgated Provincetown's sewer regulations.

8.2.1. *Article II, Regulation of Sewer Flow*, Chatham Sewer Connection Regulations

Section 1. Existing Structures.
Any structure in existence on May 10, 2005 regardless of its flow, may maintain that flow. No person shall modify an existing structure or change its use so as to increase its sewage flow. Design criteria contained in 310 CMR 15.203, and any Board of Health Regulation modifying such, shall be used to determine whether a proposed modification or change in use shall constitute an increase in sewage flow. ***Expansion or modification of existing structures, which may result in increased flow, shall not be allowed unless the increase is in compliance with the Board of Health's Regulations in effect on May 10, 2005, or a variance pursuant to Section 5 below*** *is first obtained; except as currently allowed under Part #1 of the Town of Chatham "Sewer Bank" Allocation & Permit Policy for properties connected to the sewer as of May 10, 2005.*

Section 2. Determination of Present Sewage Flow.
Sewage flow to the municipal sewer shall be determined using provisions set forth in 310 CMR 15.203: System Sewage Flow Design Criteria, and any local Board of Health Regulation modifying such in effect on May 10, 2005. The owner of any property shall, upon reasonable notice and request, allow an inspection of a property for a determination of flow by an agent of the Board of Health, except that in lieu of this inspection, the owner of the property may submit a floor plan with sufficient detail to account for all outside structure dimensions. This floor plan must bear the signature of approval of a Certified Septic System Inspector.

Section 3. Undeveloped Parcels.
For the purpose of determining sewer flow, any existing lot, otherwise qualified, may be permitted for that sewage flow as determined under the Board of Health's Regulations in effect on May 10, 2005 or 310 CMR 15,000 et. Seq, whichever is less.

Section 4. Rebuilding because of fire, flood, storm or other acts of nature.
A property owner may rebuild a structure destroyed by fire, flood, storm or other acts of nature as a matter of right provided that the new structure does not exceed the sewage flow of the structure being replaced.

Section 5. Variances.
In the case of unusual and substantial hardship, not the result of acts or omissions of the landowner, the Board of the Water and Sewer Commissioners, after a public hearing of which notice has been given by publication and posting for a minimum of two weeks, may grant a variance to this part of the regulation, provided that sufficient capacity exists and such relief may be granted without substantially derogating from the intent or purpose of this regulation.

The new Article II, Regulations of Sewer Flow, shall be inserted in the Table of Contents and in the text of the Rules and Regulations after Article I, Definitions. The existing Article II and all following Articles shall be renumbered accordingly.

8.2.2 *New Silver Beach Sewer By-Law,* Falmouth General Bylaw

This bylaw on available at the Town of Falmouth website, www.town.falmouth.ma.us.

ARTICLE VII, New Silver Beach Sewer Service Area

§ 180-37. Public health emergency.
Because of high ground water, high density of development, significant numbers of failed septic systems, groundwater contamination, recreational water contamination and the inability of property owners to meet the requirements for Title V septic systems, there presently exists a public health emergency in the area designated by Town Meeting, Article 19, Annual Spring Town Meeting, April, 1997, as the New Silver Beach Sewer Service Area.

§ 180-38. Mandatory connection.
The owner of any house, building or property located in the New Silver Beach Sewer Service Area which is used for human occupancy, employment, recreation or other purpose is hereby required, at his expense, to install suitable toilet facilities therein, including appliances required by § 180-48, and to connect such facilities directly with the public sewer in accordance with this chapter and the provisions contained herein, within ninety (90) days from the date the sewer shall be declared ready for operation by the Board of Selectmen. Any new construction occurring within the New Silver Beach Sewer Service Area after such date shall be properly equipped with suitable toilet facilities and connected with the sewer prior to the issuance of a certificate of occupancy.

§ 180-39. Limited treatment capacity.
The treatment plant for the New Silver Beach Sewer Service Area is designed with limited capacity. The design capacity is capable of properly treating the effluent of all existing lots in the district and the North Falmouth School provided that each residence is limited to a maximum of three (3) bedrooms plus allowance for residences in existence with more than three bedrooms as reflected in the Assessor's records as of January 1, 1999. A bedroom is defined in 310 CMR 15.002, Title V Regulations, and includes that circumstance where the total number of rooms for single-family dwellings exceeds eight (8), not including bathrooms, hallways, unfinished cellars and unheated storage areas, the number of bedrooms presumed shall be calculated by dividing the total number of rooms by two (2) then rounding down to next lowest whole number.

§ 180-40. Allocation of treatment capacity.
Each single-family residence in the New Silver Beach Sewer Service Area is presumed to have three (3) bedrooms. Residences with less than three (3) bedrooms may be expanded to three (3) bedrooms as a matter of right relative to sewer capacity. No residence may be expanded beyond three (3) bedrooms unless the owner shall first obtain a variance pursuant to this part of the chapter. New construction is limited to three (3) bedrooms.

§ 180-41. Existing residences.
Any residence in existence on January 1, 1999, regardless of its number of bedrooms, as determined by the Assessor's records, may maintain that number of bedrooms without regard to the three-bedroom limitation. Further expansion of existing residences beyond three (3) bedrooms as defined herein shall not be allowed unless a variance pursuant to § 180-46 is first obtained.

§ 180-42. Undeveloped parcels.
For the purposes of sewer capacity any existing lot, otherwise qualified, may be permitted for a three-bedroom single residence. Pursuant to MGL c. 41 § 81U, the Board of Health shall disapprove a definitive plan of subdivision of property within the New Silver Beach Sewer Service Area unless and until the applicant shall first obtain a variance pursuant to § 180-46. Without an approved variance, any approval by the Planning Board shall be on condition that no building or structure shall be built or placed upon the areas designated without benefit of a variance in accordance with § 180-46.

§ 180-43. Transferability of development rights.
The size of a residence or number of bedrooms on any particular parcel of land cannot be sold, exchanged, transferred or otherwise used to benefit another's right to connection or the number of bedrooms on another lot.

§ 180-44. Multiple-family and nonresidential uses.
Any multiple-family or nonresidential use legally in existence on January 1, 1999, may maintain its current level of activity, as measured by water consumption, as a matter of right. Any expansion of such multiple-family or nonresidential use cannot occur unless the owner or operator shall first obtain a variance pursuant to § 180-46. No new multiple-family or nonresidential use may be commenced unless the owner or operator shall first obtain a variance pursuant to § 180-46.

§ 180-45. Properties outside of the New Silver Beach Sewer Service Area.
Because of the limited treatment capacity, properties located outside of the New Silver Beach Sewer Service Area, with the exception of the North Falmouth School for which specific capacity was included in the treatment facility, that abut a sewer line may not, as of right, connect to the sewer. In cases of unusual hardship, not owing to the acts or omissions of the property owner, and with the permission of the Board of Selectmen after a public hearing and provided the Board of Selectmen shall first make a specific finding that adequate treatment capacity exists, such owner whose property is outside the New Silver Beach Sewer Service Area may connect to the sewer. Any costs associated with such connection are the responsibility of the individual seeking the connection.

§ 180-46. Variances.
In case of unusual and substantial hardship, not the result of acts or omissions of the landowner, the Board of Selectmen, after a public hearing of which notice has been given by publication and posting for a minimum of two (2) weeks, may grant a variance to this part of the bylaw, provided that sufficient capacity exists and such relief may be granted without substantially derogating from the intent of purpose of this bylaw.

§ 180-47. Rebuilding because of fire, flood, storm or other acts of nature.
Relating to this chapter, a property owner may rebuild a structure destroyed by fire, flood, storm or other acts of nature as a matter of right provided that the new structure does not exceed the number of bedrooms of the structure being replaced.

§ 180-48. Mandatory water conservation.
The Board of Selectmen, after public hearing, may adopt mandatory water conservation measures including restricted flow plumbing devices for the New Silver Beach Sewer Service Area. Such restrictions may be permanent.

§ 180-49. Termination and elimination of septic systems.
Within thirty (30) days of the property's connection to the public sewer, any septic system, cesspool, privy or other waste disposal system located on the property shall be pumped out and permanently decommissioned in accordance with methods and procedures approved by the Board of Health and the Sewer Division of the Department of Public Works.

§ 180-50. Violations.
A. Any person found to be violating any provision of this Part 3 shall be served by the town with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof.

B. Any person who shall continue any violation beyond the period permitted in Subsection A shall be guilty of a misdemeanor and subject to a fine in an amount not exceeding fifty dollars ($50) for each violation. Each day in which such a violation shall continue shall be deemed a separate offense.

C. This section shall in no way limit the town's power and authority to seek other remedies at law that it may have. Any person violating any of the provisions contained herein shall be liable to the town for any expense, loss or damage occasioned the town by such violation.

8.2.3 *Sewer Rules and Regulations*, Provincetown Sewer Regulations

Note: Provincetown's sewer regulations stipulate conditions under which properties must or may connect to the town sewer. Prior to commencement of the operation of the system, properties in the portion of town designated as the blue area were required to connect to sewers. Properties in the red, green and yellow areas of town were given the option of connecting, but that decision was intended to irreversible. Over time, as property ownership and uses have changed, some properties within the optional areas for which owners previously did not indicate a desire to connect have expressed a desire to connect. Section 6 of the regulations, below, sets forth conditions under which future connections may be made to the system. This section limits flow for any new connection to what previously existed on the property under Board of Health regulations or legal use, whichever is lower. Priority is given to connections for municipally important uses, such as affordable housing. The sewer regulations are available on the Town of Provincetown website, www.provincetown-ma.gov.

Section 6. Future Connections
A. ***After commencement of operations of the sewer system, additional connections shall be permitted within the Service Area by the Water and Sewer Board, subject to available Sewer Collection System capacity at that location as determined by said Board and Sewage Treatment Plant capacity as defined by the Massachusetts Department of Environmental Protection, upon certification by the Board of Health that:***
1. The on-site subsurface sewage disposal system on land abutting upon a private or public way in which a common sewer has been laid cannot comply with the provisions of 310 CMR 15.000, et seq.
2. In the case of new construction, expansion of an existing structure, a change in use, or increases in flow from land connected to the public Sanitary Sewer, such expansion, change in use, or increase in flow does not result in sewage flow in excess of the amount of Board of Health regulations flow capacity or actual flow resulting from a legal use of said land, whichever is greater, which existed on July

28, 2000 as determined by the Board of Health and stated in Section 3 of Chapter 157 of the Acts of 2000.

B. After commencement of operations of the sewer system, those owners of property identified by the Board of Health as a Yellow or Green Property on the Service Area map abutting upon a private or public way in which a common sewer has been laid who chose not to connect to the common sewer in Phase I pursuant to Section 2 of Chapter 157 of the Acts of 2000, and who do not qualify for connection pursuant to Section 6(A), shall only be permitted to connect to the common sewer as capacity of the Sewer Collection System and the Sewage Treatment Plant allows and at the sole discretion of the Water and Sewer Board upon written application of the owner to the Water and Sewer Board. If there is such sufficient capacity, the Water and Sewer Board will give priority to properties in the following order:
(a) properties identified by the Board of Health as having priority for connection based on public health factors;
(b) properties designated a Receiving Property based upon the following criteria: (i) the property has an economic development permit awarded by the Board of Selectmen pursuant to Section 5-15 of the General Bylaws of the Town and has a Growth Management Allocation Permit under Article 6 of the Zoning Bylaws of the Town;
(ii) the property has an affordable housing permit or a community housing permit issued by the Provincetown Local Housing Partnership and has a Growth Management Allocation Permit under Article 6 of the Zoning Bylaws of the Town; (iii) the property has entered into a covenant with the Water and Sewer Board whereby the Title 5 Wastewater Flow allocated to that property is reduced, which covenant may be amended or released by the Water and Sewer Board, upon approval of said amendment or release by the Board of Selectmen of the Town, if the Water and Sewer Board and the Selectmen determine that amendment or release is in the best interest of the Town.
(c) properties included within the area added to the Service Area by amendment of the final area of concern on June 8, 2006, provided such amendment is approved by DEP.
For properties having the same priority based on such factors, priority will be given in the order of application.

C. Notwithstanding anything to the contrary in Chapter 157 of the Acts of 2000 or in these regulations, the Water and Sewer Board may at any time permit extensions, new connections or increases in flow to the sewer system, subject to capacity, to serve municipal buildings, public restrooms, laundromats, or, subject to approval of town meeting, other public service uses.

D. Properties identified as Red Property by the Board of Health on the Service Area Map shall be allowed to connect to the common sewer at any time and shall be required to connect to the common sewer in the following circumstances:
1. prior to transfer of the property other than by inheritance, devise, mortgage to a bona fide third party mortgagee unrelated to the property owner, or foreclosure of such mortgage;
2. thirty (30) days after written notice from the Water and Sewer Board to the transferee in the event of transfer by foreclosure auction sale or deed in lieu of foreclosure of mortgage to such a bona fide mortgagee;
3. issuance of a building permit or, if no building permit is required, issuance of an occupancy permit for:
(a) change of use of all or a substantial portion of the property;
(b) substantial extension of use of the property;
(c) reconstruction, extension or structural change of a structure on the property;

(d) alteration of a structure on the property to provide for its use for a substantially different purpose or for the same purpose in a substantially different manner or to a substantially greater extent; or 4. the Board of Health determines that the septic system serving the property has failed. The Water and Sewer Board may extend the time for compliance with the sewer connection requirement based upon factors 1, 2 or 3 above upon application by the property owner and a hearing at which the property owner may offer proof of hardship that would be caused by connection prior to the above events and a plan for compliance within a reasonable and definite time following transfer of the property or issuance of a building or occupancy permit.

8.3 Land Use Bylaws

8.3.1 Treatment of Non-conformities

As noted in 5.2.3, all towns on Cape Cod allow alteration of non-conforming structures or uses certain circumstances. Where allowed, alteration of non-conforming uses and structures requires the granting of a special permit based on a finding that the alteration does not intensify the non-conformity and would not be substantially more detrimental to the surrounding neighborhood. The vague and subjective nature of these criteria often means that decisions about alterations of non-conforming structures are made without the benefit of a clear regulatory framework, resulting in overly permissive treatment that can detract from community character. Two bylaws are highlighted which provide more detailed criteria for reviewing alternations to non-conforming structures.

8.3.1.1 Dennis Zoning Bylaw*, Section 2 Use and Intensity Regulations, 2.4 Non-Conforming Conditions*

Note: Section 2.4.1.2(D) of this bylaw (excerpted below) provides numeric criteria for determining when an alteration to a single or two-family home creates and additional non-conformity and is substantially more detrimental to the neighborhood. Sections 2.4.1 (E) and (F) provide similar but slightly less detailed criteria for structures other than single and two family homes. This section of the bylaw can be downloaded from the Town website, www.town.dennis.ma.us.

2.4.1.2 D. Actions Requiring a Finding of Substantially More Detrimental
In the following circumstances, alteration, reconstruction, extension or structural change (collectively "alteration") to a single or two family residential structure shall be considered to create additional non-conformities and ***shall be considered to be substantially more detrimental than the existing nonconformity to the neighborhood:***

1. The creation of any new non-conformity where no non-conformity currently exists;

2. The increase in that portion of the floor space that is non-conforming by more than forty percent (40%) within any ten-year time period. (for the purposes of this section non conforming floor space shall mean the total area of finished living space on all floors, storage space, including basements and non-conforming sheds, or uncovered porch/deck located within a required setback area)

3. The addition of floor space to a lawfully pre-existing non-conforming structure on a site that exceeds the fifteen percent (15%) lot coverage restrictions, if said addition would exceed a floor space to lot area of thirty percent (30%) excluding basements and uncovered porch/deck.

4. The increase in the intensity of a setback non-conformity by further encroaching into a setback area than currently exists.

8.3.1.2 Shutesbury Zoning Bylaw, *Article VI Nonconformity of Pre-existing Uses and Structures, Section 6.1 Nonconforming Uses and Structures*

Note: This bylaw provides a detailed graphic presentation to describe when an alteration to a single of two-family home creates an additional non-conformity and requires a special permit finding of not substantially more detrimental.

6.1-3 Extension or Alteration

A. Except as provided in B below, a nonconforming structure shall not be reconstructed, extended, or structurally changed, nor shall any major exterior alterations be made except by Special Permit from the Zoning Board of Appeals. Except as provided in B below, a nonconforming use shall not be expanded except by Special Permit from the Zoning Board of Appeals. The Zoning Board of Appeals may grant a Special Permit to allow such reconstruction, extension, structural change, or major exterior alteration of a nonconforming structure, or expansion of a nonconforming use, provided that the Board finds that such reconstruction, extension, structural change, major exterior alteration, or expansion is not substantially more detrimental to the neighborhood than the existing nonconforming structure or use. In granting such a Special Permit, the Zoning Board of Appeals shall not be required to consider the Special Permit review criteria contained in §9.2-2.

B. Reconstruction, extension, structural change, or major exterior alteration (collectively hereafter "alterations") to a nonconforming single or two-family residential structure shall not be considered an increase in the nonconforming nature of the structure and shall be permitted by right under the following circumstances:

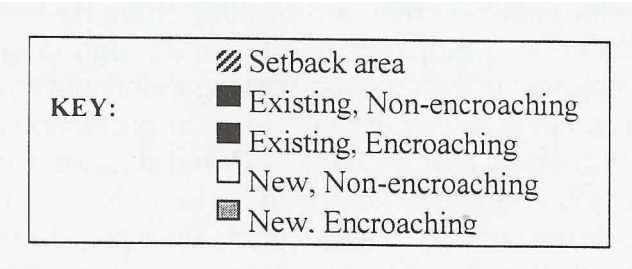
1. The proposed alterations comply with the setback requirements, or, if they do not comply, the proposed changes that encroach upon the setbacks satisfy the following conditions:

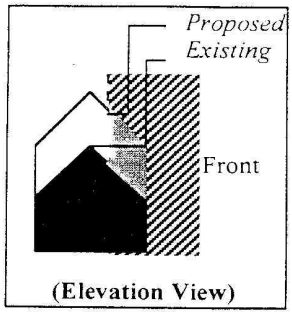
a. they do not decrease the distance between any lot line and the nearest point of the structure; and

b. the highest point on the roof line of these changes will be no higher than the highest point on the roof line of the existing structure; and

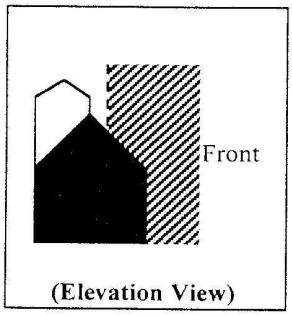
c. the proposed alterations do not violate or prevent compliance with any other applicable laws or regulations.

2. Examples:





An alteration which increases the overall height of the structure. This example proposes to add a second floor to a structure that encroaches upon the front setback. Since the height of the proposed addition within the setback (*Proposed*) is greater than the height of the existing structure (*Existing*), this alteration requires a special permit.



An alteration that increases the overall height, but does not encroach upon any setback. This example proposes to add a second floor to the portion of a structure that does not encroach upon any setbacks. This alteration is permitted by right.

This section of the Shutesbury bylaw contains **additional visual examples** of types of alterations that create a new or intensify an existing non-conformity, and can be viewed at www.capekeepers.org or by going to the Town of Shutesbury website, www.shutesbury.org.

8.3.2 Natural Resource Protection

Section 5.3 of this report addresses land use regulations to protect natural resources. These encompass cluster or Open Space Residential Development zoning bylaws, as well as bylaws aimed at habitat protection.

8.3.2.1 Mashpee Zoning Bylaw *Section 174-47. Cluster Development*

Note: Mashpee adopted amendments to its cluster bylaw in 2007, which require a cluster for subdivisions of five or more acres. This zoning bylaw is available at the town of Mashpee website, www.ci.mashpee.ma.us.

§174-47.Cluster development.
A. The purposes of this Section are to encourage the preservation of open space, to reduce the impact of new development of Town's water quality and natural resources, to promote the more efficient use of land and municipal infrastructure, and to protect and promote the health, safety and general welfare of the inhabitants of the town.
B. The Planning Board may grant a special permit approving a cluster development in any residential zoning district for a tract of land, ***containing at least twice the minimum lot area required in the applicable zoning district*** *in which some or all of the lots do not conform to the upland lot area, frontage, setback (except from water or wetlands) or yard requirements of Article VII of this chapter.* ***For any parcel of five (5) acres or more in area, no subdivision in a residential zoning district may be approved except pursuant to a special permit for a cluster development under the provisions of this section or of Section 174-46, except that the Planning Board may waive this requirement upon written request from the applicant where, at its sole discretion, the Planning Board finds that the applicant has demonstrated that a cluster development will not achieve the purposes of this Section as effectively as a conventional subdivision.*** *Approval shall require that the Planning Board makes a finding that the public good will be served and that the following criteria area met.*
(1) The proposed plan will promote the purpose of this section and shall be superior to a conventional plan in preserving natural open space, protecting wetlands, wildlife habitats, water quality and other natural resources, utilizing natural features of the land and allowing more efficient provisions for public service. Where applicable, the open land shall be located in Primary or Secondary Conservation Areas designated by the Mashpee Open Space Conservation Incentive Plan and in areas of prime agricultural soils as identified in the Soil Survey of Barnstable County, Massachusetts issued by the United States Department of Agriculture in March 1993. Open space should also be laid out so as to maximize buffer areas to water bodies and wetlands and to promote and protect maximum solar access within the development.
(2) Except as provided under Subsections B.(9) and (10) below, the total number of lots for building purposes within the tract shown on the plan shall be not more than the number of times that the total upland area of the tract, in square feet, exclusive of water, wetlands as defined under MGL C. 131, §40, existing or proposed streets, roadway rights-of-way or easements twenty (20) feet or more in width and overhead utility rights-of-way or easements twenty (20) feet or more in width, is wholly divisible by the minimum lot size, in square feet normally required for the zoning district in which the tract is located.
(3) The lots for building purposes shall be grouped in a cluster or clusters, and within each cluster the lots shall be continuous. Open space shall be contiguous within the subdivision, or to other existing or proposed open space to the maximum extent practicable.
(4) The design process should follow this sequence: 1) delineation of topography, wetlands, prime agricultural soils, Primary and Secondary Conservation areas, historic or archaeological sites and any active agricultural lands or facilities; 2)delineation of proposed open space; 3) delineation of

potential building sites; 4)location and alignment of access roads and driveways; 5) general design of stormwater management and treatment facilities and; 6) establishment of lot lines. Application materials shall include mapping and other evidence showing how this design sequence was implemented.

Later sections of the bylaw specify the amount of open space required, as well as bonuses for exceeding the requirement.

(8) All wetland areas as defined in MGL C. 131, §40, plus a minimum of fifty percent (50%) of the total upland area of the tract (excluding roads, street layouts and other traveled ways), including all land within one hundred (100) feet of said wetland areas, shall be preserved as open land as *described in criteria in Subsection B(6) and (7). Wetland areas and all uplands within 100 feet of any wetland area, at a minimum, shall be left in their undisturbed natural state. Otherwise, the portions of the proposed open space to be reserved in their undisturbed natural state, or reserved for agricultural use, as well as the approximate location of existing or proposed structures within said open space, shall be specifically delineated on the recorded plan and shall require approval by the Planning Board as part of its special permit decision.*

(9) For each 80,000 square feet in R-5 zoning districts, or 40,000 square feet in other zoning districts, of additional upland area set aside as permanently restricted open space, beyond the required fifty percent (50%) , on additional residential lot may be created*.*
(10) One of each ten lots allowed as part of such subdivision under the provisions of Subsection B(2), shall be reserved for construction only of a permanently deed restricted home meeting the low income affordability requirements of MGL Ch.40B. One additional lot may also be created, which will become buildable for a single family residence upon completion and sale of said deed-restricted home, or upon donation of, and recording of a deed to, the lot set aside for such deed-restricted home to the Town or to a public or non-profit housing agency or trust. The permanently deed-restricted affordable home or lot shall not be subject to the growth management provisions of Section 174-26. Where completion and sale of said deed-restricted home or donation of said lot is not done within three years of the approval of the special permit, the additional lot shall be considered permanently unbuildable and part of the restricted open space.

8.3.2.2 Shutesbury Zoning Bylaw, *Article V Open Space Design*

Note: This Shutesbury bylaw is the primary example of natural resource protection zoning as described in section 5.3 of this report. This approach provides a greater incentive to clustering and more flexibility that is provided for in cluster or OSRD bylaws on Cape Cod. The bylaw can be viewed at www.capekeepers.org or by going to the Town of Shutesbury website, www.shutesbury.org.

8.3.2.1 Falmouth Zoning Bylaw*, Article XX Wildlife Corridor Overlay*

Note: The Falmouth bylaw, shown below, is a frequently cited example of a wildlife protection overlay bylaw. It is referred to in the model bylaw for wetlands and wildlife protection found on the Town of Falmouth website, www.town.falmouth.ma.us, or Cape Cod Commission website, www.capecodcommission.org.

§ 240-91. Purpose.
Given that an enumerated purpose of zoning is the conservation of natural resources and that wildlife is a valued natural resource in Falmouth and finding that the Commonwealth of Massachusetts has established the importance of protecting wildlife through numerous laws, and finding that Falmouth

has a significant stock of wildlife which moves through a large, defined area of Town, and further finding that development under zoning can be designed to coexist with the wildlife and important habitat areas, the purpose of this Article is to establish and protect permanent and contiguous corridors and special areas for the feeding, breeding and normal home range movement of wildlife through the defined habitat areas.
§ 240-92. Applicability.
All uses of land within the Wildlife Overlay District as shown on the Official Zoning Map shall be subject to the requirements of these sections. This includes:
A. All subdivisions and divisions of land;
B. All special permits;
C. All site plan reviews;
D. As-of-right construction if it involves an area of disturbance greater than one-fourth (1/4) acre or movement of material equaling more than 2,000 cubic yards.
§ 240-93. Procedure.
A. Upon submittal to the normal reviewing agency of plans for development, all plans subject to this section shall be referred to the Natural Resources Department.
B. Within 35 days of such referral, the Natural Resources Department shall file a recommendation with the reviewing agency. This time may be extended at the request of the applicant. These recommendations shall be considered prior to the final decision of the agency, and all restrictions to the property added by the reviewing agency as a result shall be shown on the final approved plan.
C. All areas on the plan set aside for protection of wildlife habitat shall be permanently conveyed in accordance with § 240-130, Ownership of open spaces, or shall be subject to a permanent conservation easement, and/or restriction.
D. No easement or restriction imposed by this section shall:
(1) Permit public access on private property.
(2) Be used to control density of development.
(3) Cause any loss of lot coverage. Lot coverage shall be computed on the total area of the property
E. The Planning Board may waive subdivision rules pertaining to maximum dead-end road length, road width, curb-cuts and similar provisions to the extent necessary to permit the full use of any property.
§ 240-94. Standards.
A. For those sites within Area 1, Deer Migration Areas, the following standards shall apply:
(1) Subdivisions which total more than five acres in the AGA, AGB, RA, PU and RB Zones and more than 20 acres in the AGAA and RAA Zones shall submit to the Planning Board a preliminary cluster subdivision plan. The Planning Board shall encourage the submittal of a cluster-type definitive subdivision in accordance with Article XXV of this chapter if it facilitates the purpose of this Article.
(2) The applicant shall prepare a corridor plan. The proposed corridor shall be contiguous with any existing or potential corridors on abutting parcels.
(a) The applicants proposed corridor shall be subject to the approval of the reviewing agency under criteria A(2)(a)[1] and A(2)(a)[2] listed below. If more than one corridor is proposed the reviewing agency may allow the applicant to choose either or both proposed corridors.
[1] Actual use for: migration, browsing or bedding by white tailed deer; shelter or bedding by fox, coyote or other large or medium size mammals which typically do not thrive in proximity to human habitation; nesting by quail, grouse, pheasants or other ground nesting birds, which typically do not thrive in proximity to human habitation; egg deposition and/or migration of reptiles and amphibians.
[2] The presence of any rare/threatened or endangered species as listed by the U.S. or Massachusetts Division of Fish and Wildlife.
(b) On any parcel on which there is inconclusive evidence of wildlife use, a corridor shall be established that is no wider than necessary to permit migration of white tailed deer, to maintain contiguity of such corridors within the overlay district. No corridor under this section shall exceed

300 feet in width. Within this constraint, no corridor shall be greater in area than is equivalent to the actual area of observed wildlife use of the parcel divided by the total area of the parcel.
(c) Any covenant or restriction under this section shall be coordinated with any restriction of record by the State Wetlands Act, Town Wetlands bylaw, State Natural Heritage Program or similar laws.
(3) Fencing or any structural barrier to wildlife movement within corridors shall be prohibited.
(4) The applicant shall ensure drainage from roadways be diverted away from depressed areas that may be used as shelter for wildlife.
(5) Natural, indigenous vegetation shall be encouraged or enhanced by the project. Disturbed areas shall be revegetated as rapidly as possible or within a time required by the reviewing agency.
(6) Dramatic changes in topography shall be discouraged and the footprint of disturbed areas shall be limited.
(7) Speed limits shall be posted on all roads in the development to lessen the probability of wildlife vs. vehicle accidents.
(8) Natural indigenous vegetation shall be reestablished and maintained or enhanced by the project. Areas disturbed during construction shall be revegetated as rapidly as possible after construction is completed or within such further time as permitted by the reviewing agency.
§ 240-95. Annual review.
Annual reports from the Natural Resources Department shall be filed with the reviewing agency and the owner or owners of the subject property. These reports shall reevaluate the corridors and open space and make recommendations for any adjustments in vegetative plantings.
§ 240-96. Reduction in lot size.
Subdivisions of land as specified in § 240-94 may vary lot size by special permit from the Planning Board from that required by the applicable zoning district by up to 25% less than that required by § 240-67A, dimensional requirements, so long as the total number of lots is no more than the zoning district would allow under a conventional grid subdivision, and upon a finding by the Planning Board that this special permit is necessary to effect the purpose of this Article.

8.3.3 Compact Town Center

8.3.3.1 Town Center Bylaws

Section 5.4.1 and Table 15 of this report describe key elements of successful town center zoning. Further information about town center planning and zoning is available through the Cape Cod Guide to Town Center Revitalization available at www.apcc.org. The Cape Cod Commission also has a model bylaw, *Village-Style Development Bylaw/Ordinance for Towns in Barnstable County, Massachusetts,* which can be downloaded from the Commission's website, www.capecodcommission.org. Examples of successful town center zoning bylaws adopted in Cape Cod towns are listed below. These can be viewed at www.capekeepers.org, or by going to the individual town websites.

Dennis Zoning Bylaw*, Section 8 DPVC – Dennisport Village Center Zone*

This bylaw is available on the Town of Dennis Website, www.town.dennis.ma.us.

Barnstable Town Code *Section 240-24.1-11 Hyannis Zoning Village Zoning Districts;* and *Downtown Hyannis Design & Infrastructure Plan*

The zoning ordinance and design and infrastructure guide are available on the town of Barnstable website, www.town.barnstable.ma.us , Growth Management Department home page.

Orleans Zoning Bylaw, *Section 164-19.1. Village Center District*

This bylaw is available on the town of Orleans website, www.town.orleans.ma.us.

8.3.3.2 Form-Based Code

Section 5.4.2 and Table 16 provide a description of key elements of form-based code. More information about form-based codes is available from:

Form-Based Codes Institute website: www.formbasedcodes.org;
Congress for New Urbanism website: www.cnu.org;
MA Smart Growth Toolkit website: www.mass.gov/envir/smart_growth_toolkit.

8.4 Conservation Bylaws

8.4.1 MACC Model Non-Zoning Wetlands Protection Bylaw/Ordinance

Note: This is a comprehensive model bylaw approved by the Massachusetts Association of Conservation Commissions in 2006 for Inclusion in the 9th Edition of the MACC Environmental Handbook for Massachusetts Conservation Commissioners. The bylaw is accessible at www.capekeepers.org, or at the MAPCC website, www.maccweb.org.

8.5 Stormwater Management and Low Impact Development General Bylaws

8.5.1 Model Stormwater Management Bylaw & Regulations, **Towns of Duxbury, Marshfield, Plymouth**

Note: this model bylaw and regulation was adopted by the Towns of Duxbury, Marshfield and Plymouth and is available on the Massachusetts Citizen Planners Training collaborative website, www.umass.edu/masscptc/bylaws/ or at www.capekeepers.org.

8.5.2 Model Low Impact Development Bylaw & Regulation

Note: This model bylaw and regulation is included in the Massachusetts Smart Growth toolkit and is available at the following website: www.mass.gov/envir/smart_growth_toolkit or at www.capekeepers.org.

8.6 State Laws and Policies

8.6.1 Chapter 312 of the Acts of 2008

Note: the following two sections are taken from the Environmental Bond bill passed in 2008, as discussed in Section 1.4 of this report.

SECTION 5. *Section 6 of chapter 29C of the General Laws, as appearing in the 2006 Official Edition, is hereby amended by inserting after the words "cent", in line 34, the following words:- , but all permanent loans and other forms of financial assistance made by the trust to finance the costs of certain water pollution abatement projects on the department's intended use plan for calendar year 2009 to calendar year 2019, inclusive, that meet the criteria listed below shall provide for a subsidy or other assistance in the payment of debt service such that the loans and other forms of financial assistance shall be the financial equivalent of a loan made at a zero rate of interest, and the costs of water pollution abatement projects on an intended use plan that are eligible for a permanent loan or other financial assistance from the trust at the financial equivalent of a loan made at a zero rate of interest shall not exceed 35 per cent of the total costs of all water pollution abatement projects on the intended use plan. Projects that meet the following criteria, as verified by the department of environmental protection, are eligible for the zero rate of interest loans:*

(1) the project is primarily intended to remediate or prevent nutrient enrichment of a surface water body or a source of water supply;
(2) the applicant is not currently subject, due a violation of a nutrient-related total maximum daily load standard or other nutrient based standard, to a department of environmental protection enforcement order, administrative consent order or unilateral administrative order, enforcement action by the United States Environmental Protection Agency or subject to a state or federal court order relative to the proposed project;
(3) the applicant has a Comprehensive Wastewater Management Plan approved pursuant to regulations adopted by the Department of Environmental Protection;
(4) the project has been deemed consistent with the regional water resources management plans if one exists;
(5) the applicant has adopted land use controls, subject to the review and approval of the department of environmental protection in consultation with the department of housing and economic development and, where applicable any regional land use regulatory entity, intended to limit wastewater flows to the amount authorized under zoning and wastewater regulations as of the date of the approval of the CWMP.

SECTION 10. *Chapter 83 of the General Laws is hereby amended by inserting after section 1 the following 8 sections:*
Section 1A. Notwithstanding the provisions of sections 1 and 3 to the contrary, any municipality or sewer district adopting this section is hereby authorized to lay out, construct, maintain and operate a system or systems of common sewers and main drains in public or private ways for that part of its territory as it adjudges necessary to reduce or eliminate the impacts of nutrient enrichment on surface water bodies or sources of drinking water with such connections and other works as may be required for a system or systems of sewerage and drainage, and sewage treatment and disposal. Adoption of this section is subject to majority vote of the municipality and subject further to said municipality having an approved comprehensive water resources management plan hereinafter referred to as (CWMP) as defined by the department of environmental protection hereinafter referred to as (DEP).

Section 1B. At the commencement of operation of the municipalities' sewer system authorized by

section 1A, the owner of land abutting upon a private or public way in which a common sewer has been laid shall be required by the board or officer having charge of the maintenance and repair of sewers to connect such land with a common sewer only if the land in question is within the areas identified in the department of environmental protection-approved CWMP and has been specifically identified in the plan as requiring wastewater collection and treatment for flows in existence on said properties at the time of adoption of this act in order to protect surface waters or drinking water resources from the effects of nutrient enrichment; or the on-site subsurface sewage disposal system serving said land fails to comply with the provisions of 310 CMR 15.000, et seq. and an on-site subsurface sewage disposal system cannot be constructed on the property in compliance with said regulations and an enhanced treatment system under remedial use cannot be designed and constructed to adequately treat sewage from said property; or to service housing of which at least 15 per cent of the housing units are deed restricted to residents with incomes no greater than 80 per cent of the area median income paying no more than 30 per cent of their income towards housing. The town shall not allow an abutting property owner utilizing an enhanced treatment system under remedial use to opt out of connecting to the sewer system unless the town implements a monitoring and inspection plan approved by the department of environmental protection for such remedial system or systems. Such plan may include the assessment of a reasonable fee by the board of health to implement the monitoring and inspection plan.

Notwithstanding any provision of sections 1 and 3 to the contrary, owners of land not identified in the CWMP as needing to be connected to the municipal treatment works shall not be permitted to connect to the sewer system. Said plan may be amended from time to time by the board or officer having charge of sewers, after a public hearing conducted to consider such amendment, and upon approval of the department of environmental protection. The board or officer having charge of sewers shall adopt regulations within 120 days after the adoption of this act establishing publication and notification procedures to carry out the purposes of this section.

Section 1C. After commencement of operations of the sewer system authorized pursuant to section 1A, additional connections shall be permitted within the final area of concern by such board or officer having charge of the maintenance and repair of sewers, subject to available capacity, only upon certification by the board of health that the on-site subsurface sewage disposal system on land abutting upon a private or public way in which a common sewer has been laid cannot comply with the provisions of 310 CMR 15.000, et seq., or in the case of new construction, expansion of an existing structure, a change in use, or increases in flow from said land, such expansion, change in use, or increase in flow does not result in sewage flow in excess of the amount of said regulations flow capacity or actual flow resulting from a legal use of said land, whichever is greater, which existed on the date of adoption of this act as determined by the board of health. Notwithstanding anything to the contrary contained herein, the board or officer having charge of the maintenance and repair of sewers may at any time permit extensions, new connections or increases in flow to the sewer system, subject to capacity, to serve municipal buildings, public restrooms, or other public service uses, including but not limited to housing of which at least 15 per cent of the housing units are deed restricted to residents with incomes no greater than 80 per cent of the area median income paying no more than 30 per cent of their income towards housing.

Section 1D. Notwithstanding the provisions of chapters 80 and 83 to the contrary, a municipality acting under section 1A may make assessments upon owners of land abutting upon a private or public way in which a common sewer has been laid only at the time of actual connection to the common sewer. Nothing herein shall preclude the town from making estimated sewer assessments pursuant to section 15B. The municipality may make equitable adjustments to the annual charges established pursuant to section 16 for the use of common sewers by owners of land who connect under this act for the purpose of insuring an equitable distribution of the total sewer system costs, including

assessments and sewer use charges.

Section 1E. Every decision by the board or officer having charge of sewers permitting or denying a connection to the sewer system pursuant to sections 1A to 1D, inclusive, shall be made in writing. Any person aggrieved by such a decision may appeal said decision within 30 days of issuance pursuant to the provisions of section 14 of chapter 30A.

Section 1F. In carrying out the provisions of sections 1A to 1E, inclusive, a municipality shall not discriminate against any person on the grounds of race, color, marital status, physical disability, age, sex, sexual orientation, religion, ancestry or national origin in any manner prohibited by federal or state law.

Section 1G. Notwithstanding the provisions of any general or special law to the contrary, a municipality with a comprehensive water resources management plan under review or approved by the department of environmental protection may establish and maintain a separate account into which it may collect and deposit and expend funds from property owners for the difference in cost between a conventional subsurface wastewater disposal system as required in 310 CMR 15.00, et seq, and the cost of a subsurface wastewater disposal system designed to reduce the nitrogen discharge from said system as long as the property in question is identified in the CWMP as being a priority for the installation of a wastewater collection and treatment system for the purposes of reducing the impacts of excessive nitrogen on marine waters and drinking water supplies. Funds from this account may be used only for the purpose of the construction, maintenance and operation of said wastewater treatment and collection works and shall be applied to the costs of connection and or betterment assessed to the property in question.

Section 1H. Notwithstanding section 7 of chapter 44, a municipality or sewer district adopting section 1A may borrow and assess betterments for a term not to exceed 50 years or the useful life as approved by the department of environmental protection, whichever is shorter, for the construction its wastewater treatment systems and conveyances determined; and provided further that short term borrowing may extend for a period not to exceed 5 years.

8.6.2 MassDEP "No Net Nitrogen" Approach to Groundwater Discharge Permitting

MassDEP employs a "no net nitrogen" approach to issuing permits for groundwater discharge permits within watersheds for which TMDLs have been established.

The permitting approach is rooted in 314 CMR 5.06 which restricts MassDEP from issuing any groundwater discharge permit "when the discharge will cause or contribute to a condition in contravention of standards for classified waters of the Commonwealth." The permitting approach essentially requires developers of projects generating new nitrogen to offset the additional nitrogen to achieve a zero net impact. The offset could be achieved using a number of means, including the connection of abutting properties into a shared treatment system. The "no net nitrogen approach has already been applied to three projects on Cape Cod, each of which sought a Comprehensive Permits under MGL Ch. 40B. MassDEP allows phasing of the offsets if the threshold of 10,000 gpd is not met with initial phases of development.

Acknowledgements

Sewers and Smart Growth: Challenges, Opportunities and Strategies is a project of the Cape Cod Water Protection Collaborative. Partial funding for this project came from the Massachusetts Environmental Trust. The Collaborative Governing Board and Executive Director are to be commended for their foresight in identifying the need to explore the range of growth issues associated with sewering.

Special thanks are due to Susan Rask, Barnstable County Health & Environment Department, for her valuable expertise and insightful leadership as Project Manager for the Collaborative. Thanks also go to the Smart Growth Work Group Members for sharing their time and expertise in the development of this report:

Larry Ballantine, Harwich
Jack Barnes. Falmouth
Joanne Miller Buntich, Barnstable
Jane Crowley, Eastham
Patty Daley, Cape Cod Commission
Jillian Douglass, Brewster
Karen Greene, Yarmouth
Peggy Fantozzi, Bourne
Tom Fudala, Mashpee
Sue Leven, Brewster
George Meservey, Orleans
Jerry Potamis, Falmouth
Sharon Rooney, Cape Cod Commission
John Waterbury, Falmouth

Many thanks also to George Allaire and Terry Sylvia for their assistance in the development of case studies.

The Cape Cod Commission generated many of the graphics and visuals used throughout the report. Many thanks to Gary Prahm, Ryan Christenberry and Phil Dascombe.

This report was prepared by Ridley & Associates, Inc. Joel Russell Associates served as project advisor for land use components of this report.