

Chapter 7

Wastewater Areas of Concern

CHAPTER 7

WASTEWATER AREAS OF CONCERN (AOC)

7.1 INTRODUCTION

The previous three chapters have presented existing and future conditions in Chatham with respect to wastewater treatment and disposal, water supply, environmental resources, populations and demographics, and projected Town growth. Several of these existing and future conditions are focused at particular geographic areas of Town. This Chapter will present these conditions geographically and identify Wastewater Areas of Concern (AOC) throughout Chatham that will be the focus of future evaluations of this Study.

The existing and future conditions are summarized in report tables for each of the Areas of Concern in terms of the number of properties in each area and the wastewater flows that are expected from each area. Two methods of calculating the wastewater flows are presented: average annual wastewater flow (Ave. Annual) and Title 5 design flow (Title 5). Average annual flows are based on actual water consumption for the properties in the area and average water consumption per bedroom. This averaging method indicates the years average flow expected from this area in units of gallons per day (gpd). The Title 5 design flows are based on flow criteria found in the State's Title 5 sanitary code and represents the design flows that must be considered when designing on-site systems. These flows represent the maximum flow that is expected from the area on a peak day. These two flow estimates are presented because they will be used in the future to size and evaluate wastewater facilities for the areas.

7.2 COASTAL EMBAYMENT WATERSHEDS

Several coastal embayment watersheds have been identified in Chapter 4 and 6 as having existing or future nitrogen loadings that exceed the critical nitrogen loading values (assimilative capacity) of the embayment. These Coastal Embayment Watersheds AOC are identified below.

A. Muddy Creek Watershed. Nitrogen Loading into the Muddy Creek Watershed was evaluated by the Cape Cod Commission as part of the Pleasant Bay Nitrogen Loading Study (CCC, 1998) and the Pleasant Bay Resource Management Plan (Pleasant Bay TAC et al., 1998). The watershed is quite large and extends into Harwich. The watershed area in Chatham is heavily developed with residential properties and has a high existing and future nitrogen loading.

The outlet of Muddy Creek is restricted at Route 28 where the creek flows through a relatively small culvert. This culvert allows minimal tidal flushing of the creek.

Muddy Creek has significant water quality problems. Its current and future nitrogen loadings exceed the critical nitrogen value. Stormwater is discharged into the creek at the Route 28 crossing. The outer portion of Muddy Creek (between Route 28 and Pleasant Bay) is seasonally closed to shellfishing from July 1 to December 1 as a result of these problems.

The Muddy Creek Watershed is shown in the northern portion of Chatham in Figure 7-1, and the existing and future conditions for the Chatham portion of the Muddy Creek Watershed and summarized on Table 7-1.

B. Ryder Cove Watershed. Nitrogen loading into the Ryder Cove Watershed was evaluated by the Cape Cod Commission (CCC, 1998) and determined to have future nitrogen loadings that exceed the critical nitrogen loading value. A portion of this future loading is in the Frost Fish Creek Watershed, which makes up about half of the Ryder Cove Watershed. This nitrogen enters the outer part of Ryder Cove. Additional

Town of Chatham Wastewater Areas of Concern

This map is being made for Stearns & Wheler LLC, Environmental Engineers & Scientists for the purpose of studying Chatham's wastewater management needs. Parcels were digitized in 1996 from the 1996 assessors maps. Original mylar map linework was delineated by the James Sewall Company of Old Town, ME. Sewered parcels, sewer pipe lines, and the water pollution control facility were digitized in 1990 for the Cape Cod Commission's Regional Policy Plan. Other base map features such as coastlines, water bodies, and road names were automated by the Cape Cod Commission GIS department. Special technical assistance was provided by MassGIS of Boston, MA; the Mapworks Company of Norwell, MA; Earth Tech LTD; the East Coast Mapping Company of Concord, NH; and the Town of Chatham. Areas with low permeability soils are from the Town's 1990 Draft Wastewater Facilities Plan and discussions with the Town's Health Agent. The 10 foot contour is based on aerial photography taken in 1980 and converted to GIS format by Applied Geographics Inc. in 1998.

This map has been developed as a planning tool to investigate town-wide problems related to wastewater treatment and disposal. Much town-wide and regional information has been integrated to produce this map. The source information comes from a variety of dates, as noted above, and therefore may not reveal more recent changes. Also, the source information was digitized with a regional perspective and this may show inherent inaccuracies pertaining to individual properties. This map does not intend to provide design information or regulatory enforcement for individual properties.

- Legend**
- Wetlands with 100 foot Buffer Area
 - Wetlands
 - Surface Water Bodies
 - Sewered Parcels
 - Property that has High Groundwater Elevation or is in 100 Year Floodway (1)
 - Eliphamets Lane Area of Concern
 - Industrial Zoned Area
 - Areas with Low Permeability Soils (2)
 - Recharge Area of Nitrogen Impacted Coastal Embayments (3)
 - Perimeter of Coastal Embayment Recharge Area (3)
 - Property Lines
 - Sewer Lines
 - Coastline (Fresh & Saltwater)
 - Town Boundary
 - 10 Foot Contour
 - Water Pollution Control Facility

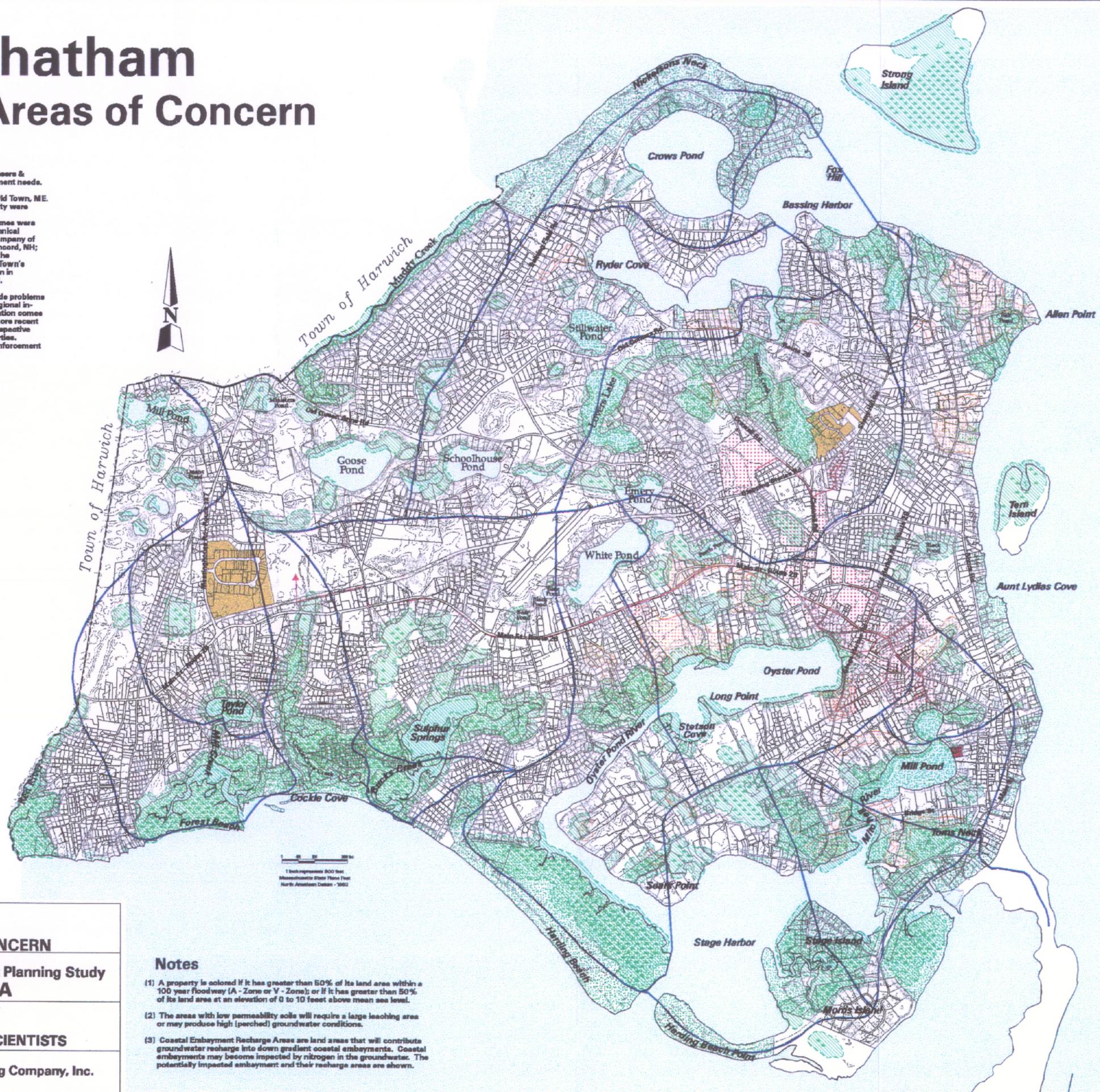


FIGURE 7-1

WASTEWATER AREAS OF CONCERN

Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

Stearns & Wheler, LLC
ENVIRONMENTAL ENGINEERS & SCIENTISTS

Map prepared by Harvard Design and Mapping Company, Inc.

Notes

- (1) A property is colored if it has greater than 50% of its land area within a 100 year floodway (A - Zone or V - Zone); or if it has greater than 50% of its land area at an elevation of 0 to 10 feet above mean sea level.
- (2) The areas with low permeability soils will require a large leaching area or may produce high (perched) groundwater conditions.
- (3) Coastal Embayment Recharge Areas are land areas that will contribute groundwater recharge into down gradient coastal embayments. Coastal embayments may become impacted by nitrogen in the groundwater. The potentially impacted embayment and their recharge areas are shown.

TABLE 7-1

MUDDY CREEK WATERSHED
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	488	528
Commercial	0	0
Industrial	0	0
Institutional	0	0
Undevelopable	23	23
Total	511	551

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	36,000	144,000	53,000	185,000
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Institutional	0	0	0	0	0
Undevelopable	0	0	0	0	0
Total	0	36,000	144,000	53,000	185,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	3,100	4,400
Impervious Areas ^(2,3)	400	500
Lawn Areas ⁽²⁾	700	1,000
Natural Areas ⁽²⁾	200	200
Total	4,400	6,100

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on CCC TB 91-001
3. From roof and road areas.

evaluations are needed to characterize nitrogen loading based on additional flushing information for the Ryder Cove Watershed, and on a modified watershed delineation for the Frost Fish Creek Watershed. This additional information is identified in Section 8.9, Data Gaps.

This watershed contains two existing water supply wells and two proposed future wells. Over half of the watershed is in the Town's Water Resource Protection District. The watershed also contains approximately one-third of the Enterprise Drive Industrial Area, which is discussed later in this Chapter.

The Ryder Cove Watershed is shown on Figure 7-1, and the existing and future conditions for this area are summarized on Table 7-2.

C. Little Mill Pond Watershed. This watershed provides groundwater recharge into Little Mill Pond, which is at the northeastern limit of the Stage Harbor Embayment System. Future nitrogen loading is projected to exceed the most stringent critical nitrogen loading value for this embayment.

This watershed is shown on Figure 7-1, and the existing and future conditions are summarized on Table 7-3.

A portion of this watershed is served by the existing centralized collection system as shown on Figure 7-1.

D. Sulfur Springs Watershed. The Sulfur Springs embayment is a relatively large and shallow water body connected to Nantucket Sound through Bucks Creek. It is close to the Chatham's south coast and is depicted in Figure 7-1.

The watershed is relatively large and its upper third extends into the Town's Water Resource Protection District. Existing and future nitrogen loading exceed the most stringent critical nitrogen loading value.

TABLE 7-2

**RYDER COVE WATERSHED
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA**

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	1,327	1,483
Commercial	39	74
Industrial	20	84
Institutional	85	85
Undevelopable	14	14
Total	1,485	1,740

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	135,000	380,000	197,000	532,000
Commercial	0	12,000	40,000	29,000	62,200
Industrial	0	900	1,800	5,000	17,800
Institutional	0	700	11,000	800	11,000
Undevelopable	0	0	0	0	0
Total	0	149,000	433,000	232,000	623,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	11,100	13,100
Impervious Areas ^(3,4)	1,400	1,600
Lawn Areas ⁽⁴⁾	2,400	2,900
Natural Areas ⁽⁴⁾	500	500
Total	15,400	18,100

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

TABLE 7-3

LITTLE MILL POND WATERSHED
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	130	146
Commercial	29	29
Industrial	0	0
Institutional	5	5
Undevelopable	7	7
Total	171	187

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	5,000	12,000	34,000	22,000	40,000
Commercial	11,000	10,000	20,000	21,000	20,000
Industrial	0	0	0	0	0
Institutional	0	2,000	4,000	2,000	4,000
Undevelopable	0	0	0	0	0
Total	16,000	24,000	58,000	45,000	64,000

35,000 10,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	3,800	1,500
Impervious Areas ^(3,4)	100	150
Lawn Areas ⁽⁴⁾	200	150
Natural Areas ⁽⁴⁾	20	10
Total	4,120	1,810

Notes:

1,100
1,420

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

The existing and future conditions for this watershed are summarized on Table 7-4.

E. Taylor Pond and Mill Creek. This pair of embayment watersheds is located in the southwestern corner of Chatham, as shown in Figure 7-1. The upper portion, of these watersheds, extends into the Town's Water Resource Protection District; and the Mill Creek watershed contains the South Chatham well field. Existing and future nitrogen loading into the Taylor Pond Watershed exceeds critical nitrogen loading limits. Future nitrogen loading into the Mill Creek Watershed only exceeds the most stringent water quality standards.

Taylor Pond is deeper than Mill Creek and may not completely mix during each high tide. As a result, it could accumulate nitrogen in the lower depths, which could cause additional water quality problems.

Both water bodies are impacted by stormwater discharges and both are closed to shellfishing from June 1 until October 31.

The Commerce Park Industrial Area is contained within the northern portion of the Taylor Pond Watershed and is discussed later in this Chapter.

Existing and future conditions for the Taylor Pond and Mill Creek Watersheds are summarized on Tables 7-5 and 7-6, respectively.

7.3 INDUSTRIALLY ZONED AREAS

Two areas of Town have industrial zoning which groups this land use into concentrated areas to support industrial activity, and provide year-round employment to the Town residents. The two areas are identified as the Enterprise Drive Industrial Area and the Commerce Park Industrial Area named for the two roads that access most of these industrial zoned properties. The properties in these areas are typically car and boat repair

TABLE 7-4

**SULPHUR SPRINGS WATERSHED
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA**

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	620	774
Commercial	43	171
Industrial	0	0
Institutional	22	22
Undevelopable	44	44
Total	729	1,011

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	62,000	169,000	104,000	273,000
Commercial	0	17,000	39,000	62,000	107,000
Industrial	0	0	0	0	0
Institutional	0	100	11,000	100	11,000
Undevelopable	0	0	0	0	0
Total	0	79,000	219,000	166,000	391,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	3,800	8,400
Impervious Areas ^(3,4)	500	700
Lawn Areas ⁽⁴⁾	1,000	1,300
Natural Areas ⁽⁴⁾	100	50
Landfill ⁽⁵⁾	206	206
Total	5,606	10,656

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001
5. Based on existing groundwater concentrations @ landfill and annual precipitation

TABLE 7-5

TAYLOR POND WATERSHED
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	407	451
Commercial	29	72
Industrial	29	103
Institutional	10	10
Undevelopable	12	12
Total	487	648

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	35,000	104,000	58,000	155,000
Commercial	0	3,000	9,000	22,000	35,000
Industrial	0	100	200	9,000	18,000
Institutional	0	800	10,000	900	10,000
Undevelopable	0	0	0	0	0
Total	0	39,000	123,000	90,000	218,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	3,800	4,300
Impervious Areas ^(3,4)	400	500
Lawn Areas ⁽⁴⁾	600	600
Natural Areas ⁽⁴⁾	30	30
Total	4,830	5,430

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

TABLE 7-6

MILL CREEK WATERSHED
 SUMMARY OF EXISTING AND FUTURE CONDITIONS
 Comprehensive Wastewater Management Planning Study
 Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	311	362
Commercial	7	36
Industrial	0	0
Institutional	6	6
Undevelopable	19	19
Total	343	423

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	29,000	95,000	44,000	132,000
Commercial	0	1,300	4,500	14,000	22,000
Industrial	0	0	0	0	0
Institutional	0	0	200	0	300
Undevelopable	0	0	0	0	0
Total	0	30,000	100,000	58,000	154,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	1,500	2,700
Impervious Areas ^(3,4)	200	300
Lawn Areas ⁽⁴⁾	500	600
Natural Areas ⁽⁴⁾	40	40
Total	2,240	3,640

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

businesses. They have a real potential to introduce contaminants into the groundwater system. These two areas will be evaluated for sewerage due to the need to remove their wastewater discharges from the Water Resources Protection District and their coastal embayments.

A. Enterprise Drive Industrial Area. The Enterprise Drive Industrial Area is located on the eastern side of Chatham, east of the Chatham High School and Frost Fish Creek. It is also located near a portion of the existing wastewater collection system that serves the Chatham Housing Authority properties along Stepping Stones Road. Approximately one-third of this area is contained in the Water Resources Protection District, which was created to protect existing water supplies and a future water supply well proposed for the Frost Fish Creek area. All of the area is contained in the Ryder Cove Watershed, which is a Coastal Embayment Watershed AOC.

Existing and future conditions for this area are summarized on Table 7-7.

B. Commerce Park Industrial Area. The Commerce Park Industrial Area is located on the western side of Chatham, west of the Chatham WPCF. It is located completely within the Water Resource Protection District due to its proximity to the South Chatham and Town Forest wells. It is also located within the Taylor Pond Watershed, which is a Coastal Embayment Watershed AOC.

Existing and future conditions for this area are summarized on Table 7-8.

7.4 HIGH GROUNDWATER AREAS AND 100-YEAR FLOOD ZONES

Several properties in Chatham are located in 100-year flood zones (A or V-Zones discussed in Chapter 4) or are in low elevation areas where the seasonal high groundwater elevations are close to the ground surface. These areas will typically require raised septic systems to meet the requirements of the State's Title 5 Sanitary Code.

TABLE 7-7

ENTERPRISE DRIVE INDUSTRIAL
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Industrial	20	84

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Industrial	0	2,000	4,000	6,000	12,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	100	300
Impervious Areas ^(3,4)	20	60
Lawn Areas ⁽⁴⁾	70	100
Natural Areas ⁽⁴⁾	1	1
Total	191	461

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

TABLE 7-8

COMMERCE PARK INDUSTRIAL
SUMMARY OF EXISTING AND FUTURE CONDITIONS
Comprehensive Wastewater Management Planning Study
Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Industrial	42	135

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Industrial	0	3,000	6,000	13,000	26,000

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	150	630
Impervious Areas ^(3,4)	20	70
Lawn Areas ⁽⁴⁾	140	460
Natural Areas ⁽⁴⁾	4	3
Total	314	1,163

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

Raised systems with bunkered walls will need to be constructed if the property is small and does not have sufficient area for the mounds to slope back to the natural ground elevations.

Figure 7-1 illustrates several properties that have 50 percent or more of the property within a 100-year flood zone or located at a ground elevation of less than ten feet above mean sea level (MSL). These are the properties that might have raised septic systems now or need them in the future.

This chapter section identifies areas of Chatham where several of these properties are grouped.

A. Eliphamets Lane Area. The Eliphamets Lane Area of Concern is at the west end of Eliphamets Lane on Mill Pond. It is made up of several properties that are at low elevations; are located in the 100-year flood zone; and have high groundwater elevations. Several of the properties are very small and have minimal space for Title 5 systems. One of the properties has a tight tank. The Town Health Agent requested that this area be evaluated for improved wastewater facilities.

The Eliphamets Lane AOC is shown on Figure 7-1, and the existing and future conditions for this area are summarized on Table 7-9.

B. Tom's Neck. This area has many small properties that are within 100-year flood zones, and have high groundwater conditions as shown on Figure 7-1. Many of these properties on Little Beach Road have already installed large bunkered systems, which have been expensive to install and are considered unsightly. Many of the houses have been elevated, also.

This area will be evaluated for improved wastewater facilities in following phases of this Study. It is noted that these raised systems meet the requirements of the Title 5 Sanitary Code and are providing adequate wastewater treatment.

TABLE 7-9

ELIPHAMETS LANE
 SUMMARY OF EXISTING AND FUTURE CONDITIONS
 Comprehensive Wastewater Management Planning Study
 Town of Chatham, MA

TOTAL NUMBER OF PROPERTIES		
Land Use Grouping	Existing	Future
Residential	6	6
Commercial	1	1
Industrial	0	0
Institutional	0	0
Undevelopable	1	1
Total	8	8

SUMMARY OF WASTEWATER FLOWS (gpd) ⁽¹⁾					
Land Use Grouping	Existing			Future	
	Sewered	Ave. Annual	Title 5	Ave. Annual	Title 5
Residential	0	800	1,500	1,000	2,100
Commercial	0	0	100	50	200
Industrial	0	0	0	0	0
Institutional	0	0	0	0	0
Undevelopable	0	0	0	0	0
Total	0	800	1,600	1,100	2,300

SUMMARY OF NITROGEN LOADING, kg/yr		
Nitrogen Sources	Existing	Future
On-site Systems ⁽²⁾	38	63
Impervious Areas ^(3,4)	2	2
Lawn Areas ⁽⁴⁾	12	12
Natural Areas ⁽⁴⁾	0	0
Total	52	77

Notes:

1. Average annual flows (Ave. Annual) are based on actual water consumption for the properties in the area and average water consumption per bedroom, and represent the average wastewater flow throughout the whole year. Title 5 Design flows (Title 5) are based on flow criteria found in 310 CMR 15.000 Title 5 regulations and represent the design flow values that must be considered when designing on-site systems. Title 5 flows represent the maximum flow that is expected from the area on a peak day.
2. Based on 1997 water consumption records and projected buildout conditions
3. From roof and road areas.
4. Based on CCC TB 91-001

C. Stage Island. This area also has a large number of properties that are within 100-year flood zones, and have high groundwater conditions as shown on Figure 7-1. These properties are larger than the ones on Tom’s Neck, and typically can fit a raised system without the concrete “Bunker” walls. This area does not pose a significant threat to the environment and does not require to be evaluated further.

D. Additional Properties with High Groundwater Conditions. There are additional properties in Chatham that are in low areas, have high groundwater conditions, or are in 100-year flood zones. These properties are scattered throughout the Town. The existing Title 5 regulations are adequate to address health concerns from these properties. Also, Section 2.18 of Chatham’s “Minimum Requirement for the Subsurface Disposal of Sanitary Sewage” provide detailed direction for upgrade of septic systems in 100-year flood zones. (See Section 5.3-E.)

E. Typical Raised System Costs. A raised system without retaining walls typically costs \$15,000 to \$25,000 to design and construct. This cost range increases to \$25,000 to \$35,000 if retaining walls are required. These costs are based on similar, recently-constructed, privately-bid projects.

F. Implementation Considerations. The alternative to raised bunkered systems is connection to the sewer and treatment at a cluster system or at the Chatham WPCF. These are also expensive solutions. If homeowners have already invested in an expensive bunkered system, they will be unwilling to connect to a sewer, especially if they are complying with current regulations and not causing a health concern.

7.5 AREAS WITH LOW PERMEABILITY SOILS

Section 4.2-B discussed the soil conditions in Chatham and identified several areas of low permeability soils. These areas are illustrated on Figure 7–1. These low permeability soils may prevent development in areas of Chatham if the soils do not

percolate fast enough to allow an on-site system to be sited. Low permeability soils are currently not causing existing systems to fail (based on discussions with the Chatham Health Agent) and are not currently causing a health threat for existing systems.

These areas of low permeability soils will be considered during future evaluations and potential siting of cluster treatment and discharge systems.

7.6 BUFFER AREAS AROUND FRESH WATER PONDS AND LAKES

Available water quality data was reviewed for the fresh water ponds and lakes in Chatham, and it was found that the fresh water bodies have good water quality.

As discussed in Chapter 4, fresh water systems are typically affected by excessive amounts of phosphorus, and are not affected by nitrogen, which typically affects coastal waters. Both phosphorus and nitrogen are available in septic system effluent. Unlike nitrogen, phosphorus typically does not travel far in the groundwater system and is attenuated in the soils. Soil type, groundwater pH, and travel distance are the main factors that determine if the phosphorus will be attenuated or will pass to the fresh water body.

As a result of this possible migration of phosphorus and potential water quality impact, the Cape Cod Commission has established a minimal performance standard (No. 2.1.1.2.B.1) that prevents siting of on-site treatment and discharge systems within 300-feet of fresh water bodies. Discussions with the Commission's Water Resource staff indicate that this 300-foot set back is appropriate for Cape Cod's sandy soils and conditions based on research documented in an USEPA study (W. Rask and F. Lee, 1975).

A 300-foot set back is illustrated on Figure 4-1. It is noted that much existing development is already within that buffer.

It is noted that once phosphorus enters a pond or lake, it tends to stay in the system and cycle between the sediments and water column where it fertilizes algal growth. Impacted ponds can be treated with alum or lime to tie up the phosphorus and precipitate it to the bottom. This type of treatment is expensive and can impact pond life. It should be avoided if possible.

7.7 NON-PROBLEM AREAS

The Project Scope required that the “Non-Problem Areas” of Chatham be identified. These are the areas of Town where

“... the DEP goal of full compliance described in 310 CMR 15.404(1) can be achieved and where sensitive environmental receptors will not be impacted”

Based on review and evaluation of Chatham’s existing and projected future conditions, the following areas are Non-Problem Areas.

- All watersheds that recharge directly into Pleasant Bay or Nantucket Sound, such as Chatham’s east coast, the north coast of Nickerson’s Neck, Hardings Beach, etc.
- Crows Pond and Bassing Harbor Watersheds.
- Oyster Pond, Oyster Pond River, Stage Harbor, and Mill Pond Watersheds.
- Bucks Creek Watershed.
- Cockle Cove Creek Watershed. This watershed is not identified as a problem area because excessive nitrogen loading could not be determined or observed in the creek. It will be monitored throughout the Study (as requested by Cape Cod Commission) because the Chatham WPCF and capped landfill are located at the upper portions of the watershed.

Existing septic systems in the Non-Problem Areas will need to be upgraded to the latest revision of Title 5 when the properties are sold or when the systems fail. Anticipated costs to upgrade an individual on-site system will range between \$3,000 and \$15,000 depending upon the septic systems components that can be reused and individual site considerations, such as topography and needed site restoration.