LOCAL COMPREHENSIVE PLAN CONTRIBUTORS

The Sandwich Local Comprehensive Plan

Reflections & Directions

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Background, Purpose & Vision

Background

The Town of Sandwich has experienced enormous growth over the past several decades. The year-round population increased by 867 percent from 1960 to 2000 (second highest on the Cape), fundamentally changing the nature of the town. The population has continued to grow from 20,136 in 2000 to approximately 23,000 residents in 2007.

To some degree, Sandwich was "discovered" by Boston commuters during the 1980s, accounting for a large part of the influx. According to the 2000 Census, 25.3 percent of the town's residents commuted off-Cape to work, second only to Bourne. The population of school-age children skyrocketed during the 1990s, with growth rates between 30 and 60 percent depending on the age group. As the community grew, school enrollments increased along with greater demand for police, fire, public works, and other municipal services. At the same time and despite the region's relatively low tax burdens compared to the rest of the state, Cape towns have been under increasing pressure to limit the degree of tax burden falling to the resident population. Recent population trends have demonstrated a flat population growth of about 1.8 percent for the town, compared to 1.2 percent for the county, and a slight reduction in student population.

To address local growth and plan for future development, cities and towns in Massachusetts are encouraged to prepare local comprehensive plans. The Sandwich Local Comprehensive Plan was last updated in 1996. This process began in the spring of 1992 with a grant from the Cape Cod Commission, and the Land Use Collaborative was hired to help the Sandwich Local Planning Committee (LPC) prepare the plan. Information was collected by the committee, and a series of workshops were held beginning in July of 1992. Initially, draft elements were prepared by the consultant; however, the final draft was prepared by the Director of Planning & Development and the LPC. Other committees and department heads provided significant contributions in preparing the plan.

In updating the Local Comprehensive Plan (LCP), the Town of Sandwich set out to prepare growth management strategies that preserve and enhance the community's historic character and cultural heritage, protect natural resources, and expand economic opportunity. In addressing and balancing these community goals, the town hopes to improve the overall quality of life of local residents.

Beginning in late 2007, the town partnered with the Sandwich Chamber of Commerce, the Cape Cod Canal Region Chamber of Commerce, Barnstable County, and the Cape Cod Commission to develop this extensive update and expansion of the 1996 LCP. This LCP update was made possible through a state grant from the Massachusetts Office of Travel and Tourism received by the Cape Cod Canal Region Chamber of Commerce (and in cooperation with the Sandwich Chamber of Commerce), a grant from Barnstable County acting through the Cape Cod Economic Development Council, and the Town of Sandwich.

With this update, Sandwich seeks to become one of the first towns in Massachusetts with a local comprehensive plan that incorporates the principles and design techniques of **smart growth** and **sustainable development**. For example, the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program and several low-impact design (LID) applications are incorporated into the elements of the comprehensive plan related to future

growth and development. These initiatives will not only save public funds and improve environmental health but will preserve the unique character of Sandwich as an outstanding place to live, work, play, and visit.

Definitions of Smart Growth and Sustainable Development

Smart Growth: *Well-planned development that protects open space and farmland, revitalizes communities, keeps housing affordable, and provides more transportation choices.*

Sustainable Development: *Development with the goal of preserving environmental quality, natural resources, and livability for present and future generations. Sustainable initiatives work to ensure efficient use of resources.*

To develop a truly "comprehensive" plan, the selectmen appointed a **local planning committee (LPC)** made up of citizens with a broad range of backgrounds and interests representing the diversity of Sandwich. Committee members include representation from the Board of Selectmen, Planning Board, Zoning Board of Appeals, Conservation Commission, Historic Commission, Economic Development Committee, Recreation Committee, Finance Committee, and other local interest groups. The LPC oversaw the development of the plan's elements, articulated the town's overall goals, provided direction to the consultant team, and facilitated public involvement.

A Plan with a Purpose

The Sandwich Local Comprehensive Plan will guide growth and conservation policies for the next five to ten years. The LCP defines the parameters by which growth should occur and identifies specific actions to shape growth and preserve town character. It defines the community's driving forces (statistical and geographical trends); provides a focused community vision for the future, and lays out a detailed plan for implementation.

A major objective of the LCP is to ensure that it is both accessible and useful to the people of Sandwich. Because the plan is a policy and guidance document (and not regulatory), actions that are outlined in the various elements require a public process in order for them to be implemented. Included below are examples of the manner by which town boards, departments, citizens, developers, and regional agencies might utilize the LCP:

- As the Board of Selectmen and other groups consider the need for additional town facilities such as schools, they may turn to the Plan's build-out analysis to better understand when growth will occur and what the magnitude of the growth will be;

- The town can use the LCP as background and support for grant applications involving capital facilities and services, property acquisitions, economic development, historic preservation, affordable housing, and other initiatives targeted for public benefit;

- The town can use the LCP as the foundation for updating and revising local land use regulations and growth management policies;

- Town groups and committees can use the planning analysis tools of the LCP to measure the pros and cons of different land acquisition strategies;

- Conservation groups and developers will be able to work toward preserving open space in those areas so identified in the LCP and to pursue building in the areas designed for development;

- All town boards will have a set of clear practical guidelines against which to create and administer land use regulations;

- When Developments of Regional Impact (DRI) come before the Cape Cod Commission, the commission will turn to Sandwich's Local Comprehensive Plan to determine whether the project furthers the community's goals; and

- Statistics on the town's population, capital facilities, and land holdings will be easily available in the plan and can easily be updated using the formats developed in the plan.

The Local Planning Committee firmly believes that the LCP should and will be a living and working document. The plan's format is such that it may be easily updated to reflect developing trends and changing values as they occur in Sandwich.

Key Features of the Updated Plan

Updated Community Maps – The Town of Sandwich has an excellent geographic information system (GIS) providing natural resources, property characteristics, infrastructure and various other attributes and constraints, making possible the development of numerous community maps. Additionally, the Commonwealth of Massachusetts has greatly expanded its geographic information system (MassGIS) since the 1996 LCP, providing higher-quality and expanded local mapping information. For example, the updated LCP includes townwide maps illustrating wind energy potential, developable lands by zoning district, and existing and potential future recreational facilities.

Economic Development Tools – The updated LCP enables Sandwich to take advantage of the development tools of the Cape Cod Commission including development agreements and Growth Incentive Zones (GIZ). The plan also aims to increase the town's competitiveness for state grants and smart growth incentives through the completion of a Commonwealth Capital Application. These tools make it easier to permit projects classified by the commission as "Developments of Regional Impact" while still protecting the cultural and environmental interests of the town.

Strategic Planning Areas – In preparing the updated LCP, the Local Planning Committee identified a number of areas in the community that needed particular attention to realize their full potential. Conceptual plans were prepared for selected areas illustrating potential future development patterns, mix of uses, and civic enhancements. These strategic planning areas included:

- South Sandwich Village Center (the Golden Triangle);
- Sandwich Industrial Park and District;
- The Town Marina/Tupper Road/Route 6A Area;
- Historic Sandwich Village; and
- Old Kings Highway Corridor – East Sandwich.

Smart Growth and Sustainable Development Strategies – Many of the growth management initiatives incorporated into the 2008 plan are sustainable development applications such as Leadership in Energy and Environmental Design (LEED) criteria, low-impact design (LID), smart growth conceptual plans for new and infill mixed-use development in targeted commercial districts, an assessment of the fiscal impacts of development on the tax base, transportation plans linking new and existing commercial districts, and consistency with the Cape Cod Commission's 2002 Regional Policy Plan. The plan will guide new development so that it becomes woven into the fabric of the town, achieved through recommended design guidelines, streetscapes, and development patterns that reflect and enhance the historic characteristics of the community.

Commonwealth of Massachusetts Sustainable Development Principles

The state strongly encourages planning and development that protects our natural resources, promotes social and economic health, and meets the needs of our residents. As a general guide to local officials, developers, and citizens, the Office of Commonwealth Development has released its list of sustainable development principles:

1. ***Redevelop First:*** *Revitalizing existing neighborhoods doesn't require expensive new infrastructure or consume forest and fields. It also finds new uses for historic buildings and underutilized brownfield sites.*
2. ***Concentrate Development:*** *Compact development conserves land and fosters vibrant and walkable districts.*
3. ***Be Fair:*** *The benefits and burdens of development should be equitably shared by all. Transparent and predictable permitting will result in cost-effective and fair outcomes.*
4. ***Restore and Enhance the Environment:*** *The conservation, protection, and restoration of water, land, and cultural resources provides a high quality of life and ecological health.*
5. ***Conserve Natural Resources:*** *Renewable energy and efficient use of building materials and water contribute to a healthier environment, limit waste, and are cost effective.*
6. ***Expand Housing Opportunities:*** *Expanding the number, affordability, and diversity of housing units will ensure that people of all abilities, income levels, and ages have appropriate housing options.*
7. ***Provide Transportation Choice:*** *Opportunities for public transit, walking, and biking should be expanded.*
8. ***Increase Job Opportunities:*** *Connecting people with jobs in their communities and close to homes and transportation infrastructure will expand our economy.*
9. ***Foster Sustainable Businesses:*** *Great potential exists for new innovative industries and for resource-based industries to contribute to the social, economic, and environmental health of our state.*
10. ***Plan Regionally:*** *Economic development, water, transportation, and housing are regional in nature; they don't stop at the town boundary. Regional planning recognizes this and results in inter-municipal coordination and better outcomes.*

Fiscal Impact Modeling – The town's planning approach and goals must be flexible enough to respond to changing social and economic conditions. The development of a municipal fiscal impact model is included in the updated LCP to help the town respond to changing conditions.

Commercial development, like residential development, requires public services, with different types of commercial development requiring different levels of service. Being able to evaluate the municipal fiscal impacts of mixes of commercial/residential development will help the town determine which developments can be economically viable, provide goods and services desired by the community, and spread out the tax burden.

Community Participation Program

Broad community participation was an integral part of developing the updated Sandwich Local Comprehensive Plan. Through this interactive and comprehensive process, the community was directly involved in evaluating current town growth management tools, recent and continuing trends, and in articulating their vision for the future. The Community Participation Program as summarized below was geared toward facilitating formal and informal interaction and input. The ***Partnering Model*** for public participation was employed, which involved engaging targeted leadership groups and the general public to set goals, clarify values, identify key topic areas, define priorities, and design and visualize ideas.

Some of the key elements of the Community Participation Program are described below, including:

Local Plan Committee Meetings – During the course of the LCP update, the LPC met bi-weekly to identify community issues, opportunities, priorities, and goals, review plan elements and facilitate public participation.

Focus Groups – Several meetings were held with local and regional committees, organizations, and interest groups to identify specific area issues, opportunities, and potential actions.

Sustainable Education Workshop and Visualization – To provide public education related to sustainable development tools, techniques, and applications for the updated LCP, written materials, graphic examples, and other materials were provided to the community. Additionally, a leader in the field of sustainable design and development presented a public workshop to educate local citizens about the latest sustainable issues, trends, principles, and applications for Sandwich such as smart growth, alternative energy, climate change, and low-impact design (LID).

Municipal Involvement – Town departments, boards, committees, agencies and civic organizations were directly involved in evaluating the effectiveness of existing municipal services and facilities, as well as any anticipated future needs. Specific projects and programs were identified as well as potential partnerships between the town, developers, and service organizations.

Office Hours – In order to provide better access to town staff and local residents, the consultant held regular office hours in the Sandwich Planning and Development Office once a week during the course of the project.

Comprehensive Plan Updates on the Homepage – Regular updates, concept plans, draft elements, and upcoming meetings were posted on the town's web site at the beginning of the project to keep citizens and stakeholders informed and involved on the progress of the plan.

Public Visioning Workshops – Public visioning workshops were conducted at strategic points in the planning process. The first workshop was a public discussion of community **Strengths,**

Weaknesses, Opportunities & Threats (SWOT) - The **STEPE Community Visioning Process** made up the second public workshop. The primary purpose of this visioning process was twofold. First, it informed the community of the existing conditions and driving forces—including Society, Technology, Environment, Policy, and Economics (or STEPE)—that has and will continue to shape Sandwich. Secondly, this workshop identified points on which residents agree or disagree, which helped the LPC work through the differences in building a common framework for growth management.

The third visioning workshop was an interactive **design charrette**. This public workshop was held over a three-day period to allow more people to participate. The design charrette was facilitated as an informal and interactive process with project team architects, planners, landscape architects, environmental scientists, and engineers. The primary objective of the design charrette was to prepare conceptual plans for the identified **strategic planning areas**. Project staff assisted participants in developing and illustrating their vision for specific areas.

Sandwich's Past Planning Efforts

Over the last 30 years, Sandwich has taken part in numerous planning initiatives. A list of key plans and initiatives that factored into the LCP update includes the following:

- Local Comprehensive Plan, 1970, 1987, 1996;
- Wastewater Facility Plans, 1980, 1989 and 1992;
- The Marina Study, 1993;
- Cross-Cape Trail Feasibility Study, 1995;
- Town of Sandwich Open Space and Recreation Plan, 2006;
- Recreational Ball Field Development Plan, Town of Sandwich, 2007;
- Sandwich Pathways Trail Plan, Cape Cod Conservation Trust, 2004;
- A Visitor Welcome, Wayfinding, and Accessibility Improvement Program, 2007;
- Community Affordable Housing Plan, 2004;
- Flood Hazard Mitigation Plan, 2002;
- Transportation Element, Sandwich Local Comprehensive Plan, Phase I, Existing Conditions Inventory and Capacity Analysis, Phase II Future Projections and Analysis, VHB, 2002;
- Water Resources Draft (plan element update), ESS, 2005;
- Sandwich Water District Water Demand Study, 2003;
- Nitrogen Loading in Public Water Supply Recharge Areas, Sandwich, CCC, 1995;
- Sandwich Public Schools Master Plan Study, HMFH Architects, Inc., 1997;
- Current Long-Range Plan, 2007;
- Current Capital Facilities Plan, 2007;
- Town of Sandwich Historic Preservation Plan, 2002;
- Sandwich Documentary Heritage Project, 2006; and
- Cape Cod Commission Regional Policy Plan, 2002

A full list and brief description of Sandwich's past planning studies, reports, and plans is included in Appendix A.

These existing town planning studies, policies, and reports were updated and incorporated into the local comprehensive plan as appropriate. This included reviewing and updating all of the statistical data that serve as a basis for the plan's trends analysis and planning decisions, as well as identifying which recommendations have been successfully implemented to date. If there are common themes to each of these planning efforts they are as follows:

- The people of Sandwich recognize and highly appreciate the town's exceptional natural and historic environment, and townspeople will work hard to protect that environment;

- The growth that overtook Sandwich in the 1980s was not foreseen—by Sandwich, or any other town for that matter—and much effort has and will continue to be spent on managing the impacts of that growth; and

- There is a strong sentiment among townspeople to protect Sandwich's rural character, and the town has used a variety of means to accomplish that goal.

Overall Community Vision Statement

The 1996 local comprehensive plan did not include an overarching community vision statement. Through the LCP update process, and with input from the Local Planning Committee and general public, the following community vision statement was prepared:

Sandwich Vision Statement

"A sustainable future will support the welfare and lifestyle of residents while preserving and enhancing the environment, providing education and housing, and providing business opportunities through guided economic development. The Town of Sandwich seeks to plan its future so that the historic, community, and cultural character and natural beauty of the community can be sustained for future generations. "

This overall community vision statement is aimed at developing community consensus and solidifying support for the LCP and future planning initiatives.

Local Comprehensive Plan Elements

The updated LCP was prepared in accordance with Chapter 41 Section 81D M.G.L, and satisfies the prerequisite requirements of the Commonwealth for state grants. All local comprehensive plans must include elements that address land use, natural resources, economic development, transportation, capital facilities, affordable housing, open space and recreation, and historic preservation. In this plan, each of these topics is addressed in the following elements:

1.0 Land Use and Growth Management;
2.0 Natural Resources;
3.0 Economic Development;
4.0 Transportation and Circulation;
5.0 Public Facilities and Services;
6.0 Housing and Neighborhoods;
7.0 Open Space and Recreation Resources;
8.0 Historic Preservation and Community Character;
9.0 Sustainability Plan; and
10.0 Implementation Plan

The key elements of the plan contain (at a minimum) an introduction and overview, an inventory, and an analysis of the issues, goals, policies and actions. Although complete, each element contained in this plan is interdependent with all the other elements. Recognizing that this could lead to repetition, this plan has been organized to refer the reader to the most appropriate element for each topic.

Implementation and Funding Program

An effective implementation and funding plan is essential in carrying out the comprehensive plan's goals and objectives, and in maintaining the document as a useful and accurate guide to making future growth decisions in Sandwich. Key sections of the implementation plan include the following:

Schedule of Municipal Actions – This schedule defines actions that will be necessary to achieve the goals and objectives of each element of the LCP over the next 10 years. The schedule includes short- and long-term policy and program strategies to be carried out and reviewed annually. Major progress re-evaluations are scheduled after 3 and 5 years. Once the elements were developed and conflicts resolved, specific recommendations and actions were prioritized and given a target date for implementation. Other issues addressed in this schedule are as follows:

- Specific programs required to accomplish the goals and objectives set for each functional plan element;
- Responsible organizations, departments, or entities for implementation;
- Public/private partnership opportunities; and
- Preliminary cost estimates of improvements and potential funding sources (i.e., private, local, state, federal, grants, etc.).

Funding Opportunities and Resources – These potential public and private implementation resources are identified and explained as they pertain to various types of projects. Commonly used as well as new incentive programs are identified, which may be used for smart growth, conservation, transportation and circulation, mixed-use development, affordable housing, downtown revitalization, and infrastructure projects. They are also rated based on their potential in Sandwich.

Smart Growth and Sustainable Design Management Program – This program includes specific recommendations and actions consistent with the new community vision statement and implemented through land use regulations, the capital improvement program, and creative conservation programs (i.e., Chapter 40R, transfer of development rights [TDRs], land trusts, conservation subdivision design, traditional neighborhood development [TND], acquisition and resale with restrictions, etc.). Some primary smart growth techniques included in the implementation plan are the following:

- Streets designed to balance the needs of both automobiles and pedestrians;
- Open spaces designed for social activity and recreation;
- Dimensional and use requirements to encourage less infrastructure development;
- Street design requirements to reduce speeds, provide internal connections, encourage pedestrian activity, improve safety, and fit the scale of new neighborhoods;
- Provisions for linking and networking open spaces between developments;
- Preservation of the natural environment during and after construction;
- Provision for on-site or nearby amenities to reduce vehicle trips; and

- Sustainable governance and management program recommendations.

Land Use Regulations Amendments – The implementation plan includes a process by which Sandwich's land use and development regulations such as the zoning by-laws, subdivision regulations, site plan regulations, and other pertinent town rules, policies and regulations should be amended to be consistent with the comprehensive plan. Recommendations for land use regulations that meet the goals of the updated LCP, including the creation of **Growth Incentives Zones** in strategic locations around Sandwich are included.

Plan Certification and Consistency

The connection between the Sandwich LCP and the Cape Cod Commission's Regional Policy Plan is important. The updated LCP was prepared to be consistent with regional and state plans and policy requirements, and to achieve the **Cape Cod Commission Certification Process** for comprehensive plans. Specifically, the LCP update focuses on the following:

- Integrating the goals of the Cape Cod Commission Regional Policy Plan 2002 (RPP) policies and adapting them to Sandwich conditions and trends;
- Ensuring the LCP complies with the RPP both in terms of process and substance;
- Ensuring that certification issues from the 1996 plan are addressed where appropriate, including coastal and transportation elements; and
- Seeking Town Meeting approval and applying for Cape Cod Commission Certification including presentations to Town Meeting and the Cape Cod Commission.

1.0 Land Use and Growth Management

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1.1 Introduction and Overview

The Land Use and Growth Management Element is intended to provide an inventory and analysis of past, present and future growth trends in Sandwich. The analysis illustrates a long-term pattern of residential growth and limited commercial and industrial development. The analysis also illustrates a steady growth in public and private conservation lands but, at the same time, a steady decline in agricultural and forested lands.

An updated build-out analysis was also conducted to determine where and how much growth can be anticipated in Sandwich's futures. The build-out analysis also serves as the foundation for recommended growth management strategies included in the Action Plan such as "smart growth" zoning, as well as "sustainable design" and development techniques.

In order to provide a more thorough analysis of existing land use patterns and necessary growth management strategies, Sandwich was broken down into 15 Strategic Planning Areas (SPAs). By defining the issues and opportunities specifically related to these SPAs, Sandwich is provided with the best opportunity to effectuate sustainable development, protect important natural and historic resources, and guide growth and development. In four of the SPAs, conceptual master plans have been prepared to define and illustrate the community's vision for the future of these targeted growth centers. These areas include the South Sandwich Village District (also know as the "Golden Triangle"), the Town Marina/Tupper Road/Route 6A Area, the Historic Village/Route 6A Area, and the Sandwich Industrial Park and District.

This element of the Local Comprehensive Plan is specifically intended to incorporate the recommended local land use goals and actions of the 2003 Cape Cod Commission's Regional Policy Plan (RPP) as well as the proposed 2008 amendments to the RPP and the Regional Land Use Map.

1.2 A Brief History of Sandwich's Development

Located on Cape Cod, Sandwich is located 57 miles from Boston. The town covers ten miles north to south and ranges approximately six miles in width. In area, Sandwich is the third largest town on Cape Cod, encompassing approximately 44 square miles, or 28,160 acres. The Town is bounded on the north by the Cape Cod Bay, on the east by the Town of Barnstable, on the south by the Towns of Mashpee and Falmouth, and on the west by the Town of Bourne. Approximately 15 square miles (9,600 acres) of the Massachusetts Military Reservation also lie within the confines of Sandwich.

Sandwich is one of the fifteen Cape Cod towns that comprise Barnstable County. Sandwich is also part of the "Upper Cape Region" along with the Towns of Falmouth, Mashpee and Bourne. Unlike other counties in Massachusetts, Barnstable County serves as a regional legislative body with the passage of the Barnstable County Home Rule Charter. Signed into legislation in July of 1988, the Charter guaranteed certain rights of home rule for the County and established a legislative body with the power to enact ordinances. Like all of the other towns, Sandwich elects one delegate to the Barnstable County Assembly of Delegates.

As part of Barnstable County, Sandwich is also a member of the Cape Cod Commission (CCC). The Commission is made up of nineteen members representing each of Barnstable County's fifteen towns as well as a County Commissioner, representatives for minorities and Native Americans, and a governor's appointee. The CCC serves as a regional planning and regulatory agency to prepare and implement a regional land use policy plan for all of Cape Cod, reviews and

regulates Developments of Regional Impact and recommends designation of certain areas as Districts of Critical Planning Concern (DCPC). Through its involvement with the CCC and the Barnstable County Assembly of Delegates, Sandwich participates in a number of regional bodies and task forces related to management of natural resources and planning issues of the Cape.

Sandwich is the oldest town on Cape Cod and to this day retains a great deal of its historic charm: a walking scale village center with a large and well maintained historic district, a number of history-oriented museums, lushly treed winding country roads, a few remaining farms, a varied collection of coastal and inland natural areas, and an overall character of a quaint New England town. The town's character today reflects each part of its history: its beginnings as a farming and fishing community, its years as a small industrial community, its role as a summer town, and its more recent emergence as a town from which people commute to urban areas. Each of these sides of the town's personality is reflected in its physical pattern of growth.

Archeological studies in Sandwich have uncovered finds rich in American Indian artifacts. Major Indian trails followed an east-west route through Town along what is now Route 6A and Old County Road, and north-south route along Cotuit Road and the north end of Route 130.[1] Sandwich was colonized by Europeans in 1637 as part of Plymouth Colony. Incorporated as its own town in 1639, Sandwich was named for a town in Kent, England. Sandwich was settled by English families seeking an escape from religious intolerance typical of seventeenth-century England.

Settlement was "usually strung out around the harbor and along the roads that led to it with only a moderate commercial and institutional core at the center."[2] This statement pertaining to Cape Cod in general certainly applied to colonial Sandwich. In Sandwich's case, the harbor was actually the tidal creek landings along the Northside (Shawme River, Old Harbor, Scorton River, etc.), the road was the King's Highway (now, Route 6A) and a core arose in Sandwich Center and East Sandwich.

Like many of the early Cape Coders, Sandwich settlers were farmers first and fishermen on the side. Sandwich had its share of famous sea captains, but remained more agricultural than most Cape towns. By the early 1800s, industrial activity began to take hold in Sandwich. The community's relative location closest to Boston meant that it was the first Cape town to enjoy the commercial advantages of rail transport in the 1840s. The famed Sandwich Glass factory was sited here owing to the extensive forests of the southern part of Town, which were needed in huge quantities to fuel the factory furnaces. The glass industries and related works spawned a number of supportive businesses, which continued through the end of the nineteenth century.

For 50 years after the Civil War, Cape Cod experienced an economic collapse. Fishing and whaling continued their decline, midwestern farms dominated the national markets and net migration of the population was off-Cape. The permanent population of Cape Cod dropped 20 percent between 1885 and 1895.[3]

The advent of the automobile brought about inevitable change. By 1920, Sandwich's population began its rebound from nineteenth century decline, as the idea of Cape Cod as a summer resort took a firm hold. People found jobs building homes along the southern coastal areas, and the

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[1] Mass. Historical Commission, town map files, Contact Period overlay.

[2] Mass. Historical Commission, Historic and Archaeological Resources of Cape Cod and the Islands, 1987, p. 90.

[3] Massachusetts Department of Natural Resources, the Outdoor Recreational Resources of Barnstable County, Massachusetts, 1963, p. 15.

foundation of the tourist economy took shape.

The U.S. Army Corps of Engineers took control of the Cape Cod Canal in 1918, purchasing title to it ten years later. In 1933, the canal was again widened and deepened to facilitate the passage of large ships between major ports in Boston, New Bedford, Providence and New York. The Bourne and Sagamore bridges were also constructed at this time. Two fish-freezing plants were constructed on the canal in Sandwich, as well as a large pulp mill.

Sandwich and Bourne border the Cape Cod Canal. With the widening of the Canal and construction of Sagamore and Bourne Bridges, Cape Cod became a strategic defensive post. While U.S. military training has occurred in Sandwich since 1911, a National Guard Camp was created on the 3,841-acre Coonamesset Ranch in the southwest corner of the town. Lombard Park on the south side of the ranch was donated to the town. Clearing and construction for an airstrip, water supply, and sewer treatment plant began in 1936. The facility was named Camp Edwards.

The U.S. Army took control of the camp in 1940 and proceeded to enlarge it considerably. In six-month's time, 1,500 new buildings were constructed, creating a huge military installation that had a tremendous impact on the town. Eventually, this base would expand into neighboring towns and represent nearly 10 percent of the land area of Cape Cod. It now includes the Otis Air Force Base and is known as the Massachusetts Military Reservation (MMR). Today, the MMR is a 22,000 acre property shared by the Towns of Bourne, Sandwich, Mashpee and Falmouth. The Cape Cod Canal remains as an important maritime economic and defensive corridor, but as tourism grew in the second half of the 20th Century, it has also become one of the Cape's biggest recreational resources with pleasure boating, fishing, bicycle trails, camping and adjacent beaches.

By the 1950s, spurred by the post-World War II boom, Sandwich's character as a seaside resort was well established. Since the mid-1900s, many of the former summer tourists have purchased homes and retired to Sandwich. Today, retirees represent the largest user group of the Cape's service economy.[4] This large and still growing retirement community has produced a greater awareness about "quality of life" issues in Sandwich and on the Cape. Before the Mid-Cape Highway (Route 6) was built in the 1950s, the Old Kings Highway was the primary roadway serving the bayside communities of the Cape.

In 1965 a large oil-fired electric generating plant (today known as the Mirant Power Plant) was constructed to augment the industrial contribution to the town's tax base. It was built on the Freeman Farm next to the Cape Cod Canal so oil tankers could easily dock there and because of ready access to water for cooling purposes. The plant was completed and became operational in 1968 along with the Sandwich Marina. This enormous structure now dominates the skyline from the marshes and beaches of Cape Cod Bay as well as portions of the Old King's Highway.

The intrusion of this industrial complex into the town's primarily rural landscape motivated residents to support the town's first historic preservation regulations. The Old Kings Highway has been named as one of America's most scenic highways, and in the 1970s, it was approved as a Regional Historic District, indicating the affection Sandwich citizens (and other Cape Coders) have for their gloried past.

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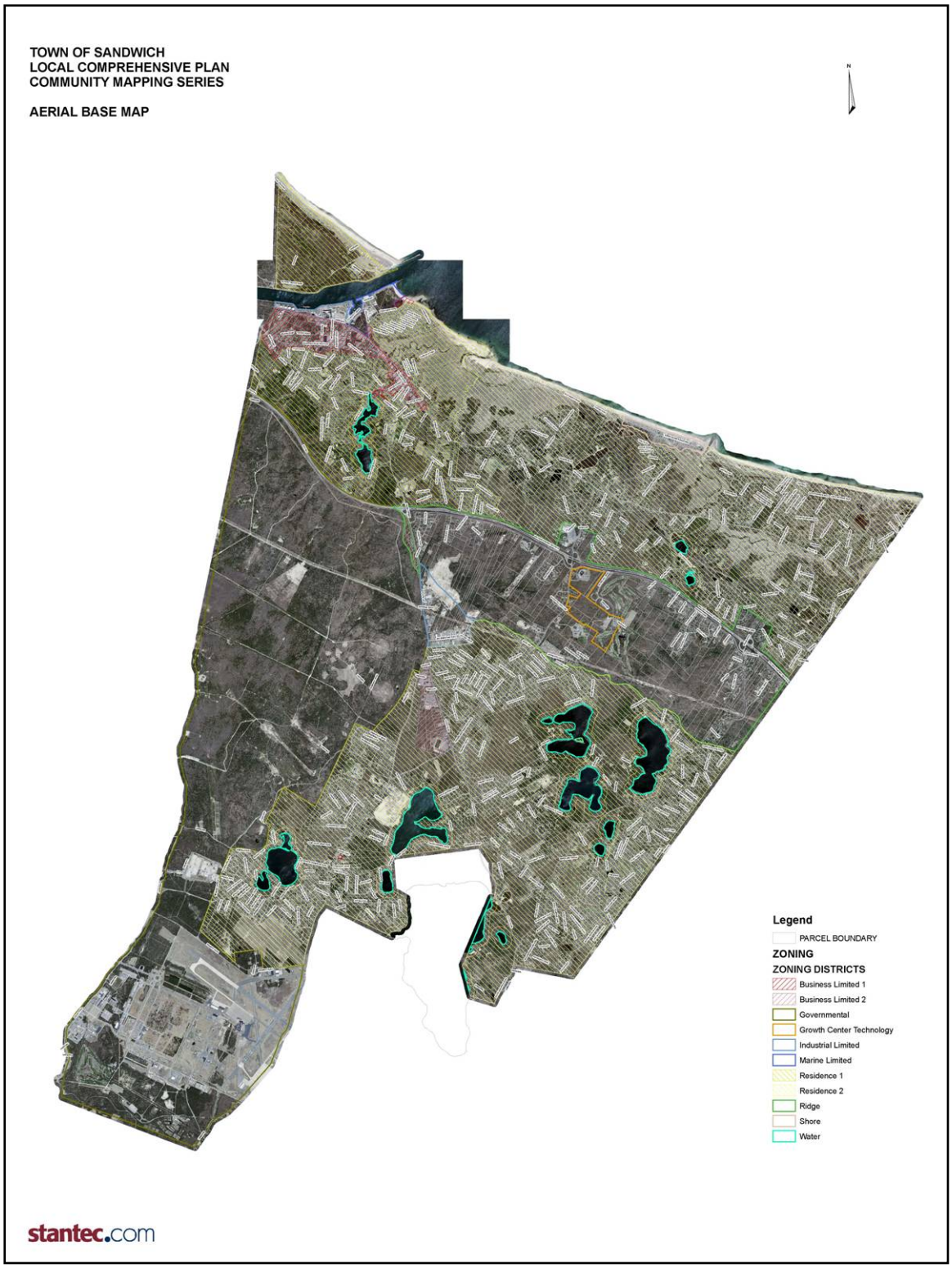
[4] Cape Cod Commission, "CapeTrends: Demographic and Economic Characteristics and Trends, Barnstable County - Cape Cod, 4th Ed.," 1997, p. 8



Sandwich was discovered by commuters during the 1980's with the improvements to Route 3 and Route 25. Families with children bought houses and large subdivisions sprung up throughout the community. An estimated 2,832 new homes were built from 1980 to 1990. To serve this new population, two new schools were built in the late 1980's, shopping centers were built along Cotuit Road and Route 6A, and the Sandwich Industrial Park was established.

Sandwich was once again discovered by commuters in the late 1990s and early 2000 with the extension of the Massachusetts Bay Transit Authority (MBTA) commuter rail line to Kingston and Plymouth. Sandwich residents could now easily and comfortably commute to South Station in Boston for a variety of employment opportunities. The expansion of commuter rail combined with soaring home prices on the "South Shore" created another housing boom in Sandwich.

Today, the Cape Cod peninsula is a well established and popular tourist destination. While traditionally reliant on agriculture, forestry, and commercial fishing, the Sandwich economy is now heavily dependent on the tourism industry as well as a thriving construction industry fueled by the area's desirability for retirement and second homes.

A few farms remain in production and are greatly valued by townspeople for both their open space and the productive use of the land that the farms represent. Another reminder of the town's past are the "wood lots". These lots stretch from the coast to the Ridge and gave settlers equal access to the natural resources of shoreline, marshlands, freshwater ponds and springs, upland meadows and forest.

For more detailed information regarding Sandwich's past, refer to *Section 8: Historic Preservation and Community Character*.

1.3 General Growth Trends

Population Growth

Sandwich hosts nine percent of the County's population on eleven percent of the land in the County. Growth in Sandwich, as on the rest of Cape Cod, has been dramatic in the past 50 years. At the turn of the century, Sandwich's population was approximately 1,500, a number essentially static in the first half of the 1900s as an off-Cape migration, associated with diminished Cape economic opportunities, continued.[5] Though the town's year-round population exploded between 1960 and 1990 (2,082 to 15,489), most of that growth was during the '70s and '80s. Sandwich had the second highest growth rate on the Cape (behind only Mashpee) between 1970 and 1990, with growth rates in those decades of over 40 percent.[6]

Local and Regional Population Trends, 1990 - 2007

Area	Density in 2000 (Pop/Mi)	1990	2000	% Change 1990 to 2000	2007*	% Change 2000 to 2007
Upper Cape Subregion	556.9	67,397	84,463	25.30%	90,623	7.29%
Bourne	457.6	16,064	18,721	16.50%	19,516	4.24%
Falmouth	738.2	27,960	32,660	16.80%	33,806	3.50%
Mashpee	551.4	7,884	12,946	64.20%	14,301	10.46%
Sandwich	***467.9***	***15,489***	***20,136***	***30.00%***	**23,000**	**14.22%**
Mid-Cape Subregion	844.8	75,987	88,601	16.60%	NA	NA
Lower Cape Subregion	353.8	43,221	49,166	13.80%	NA	NA
Barnstable County	561.9	186,605	222,230	19.10%	228,693	2.90%

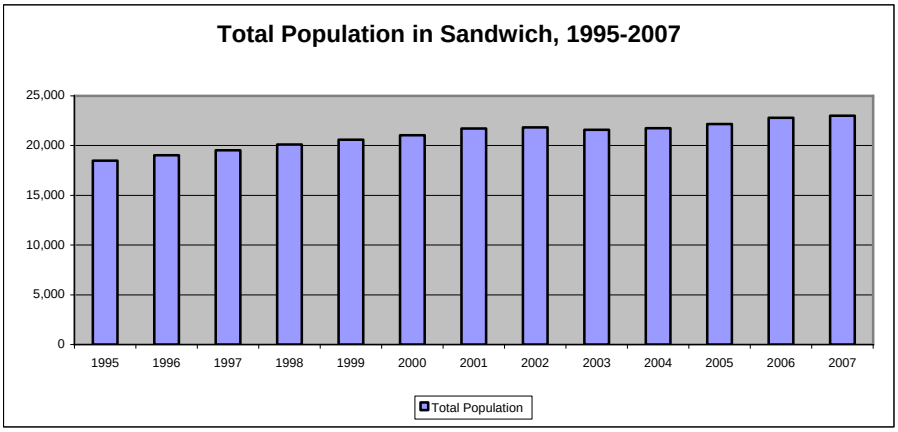
** Sandwich population estimates are for 2007; other towns and Barnstable County are for 2004*

Since World War II, population and housing development in Sandwich has increased steadily as its quality of life became evident to more and more vacationers, retirees and Boston commuters. Between 1950 and 1960 the year-round population more than doubled, (from 1,007 to 2,082), as did summer residents (3,120 to 7,000). The population boom continued, albeit at a slightly slower

[5] Sandwich Open Space and Recreation Plan, 1999, p.9.

[6] Cape Cod Commission, "Cape and Islands Population 1930-2000".

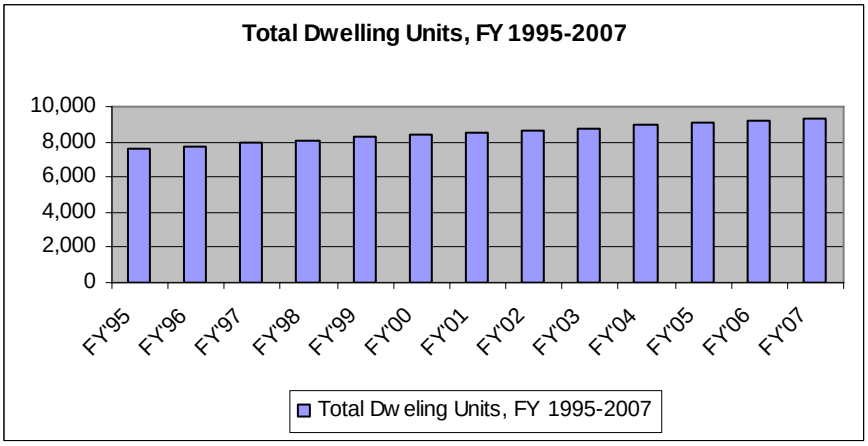
rate over the next four decades as illustrated in the figure below.



In 2007, the town estimated a local population of 23,000 year round residents. This represents an increase of over 23 percent since 1995 and an average growth rate of 1.4 percent. The latest Census estimates reveal that although the growth trend continued, the rate of growth has lessened in the past decade, falling to 30 percent between 1990 and 2000. However, the Cape continues to outpace the rest of the Commonwealth in its population growth rate, ranking third as of 2002 behind Martha's Vineyard and Nantucket.[7] The four Upper Cape towns (led by Mashpee and Sandwich) account for much of this growth. According to the latest US Census population estimates, Sandwich has continued to grow at a rate of about 1 percent a year.[8]

Housing Growth

Population growth in Sandwich was spawned by intensive speculative residential development, which in turn created the demand for even more development. Infrastructure and public services demands were significantly extended for period of time during the 1980s and 1990s.



The town estimates that there are a total 9,287 dwelling units in Sandwich in 2007. Since 1995, over 1,700 new housing units have been added, amounting to an increase of 22 percent in total housing stock.

7 From "CapeTrends" published in the August 1, 2002 issue (Vol. 12, No.14) of the Cape Cod Commission Reporter.

8 From "CapeTrends" published in the August 5, 2004 issue (Vol.14, No.12) of the Cape Cod Commission Reporter.

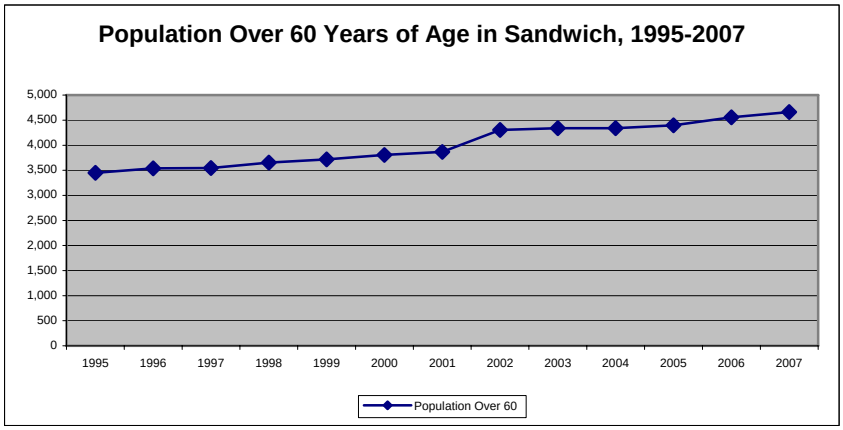
Seasonal Population

Each summer the town's population increases as vacationers and summer retirees come to Sandwich. Some roads become congested and parking at the beaches and ponds becomes more difficult. There is pressure for more development along the coastline and the conversion of seasonal homes to year-round homes continues. An important point concerning the physical impact of tourism, however, is that despite this influx of seasonal visitors each summer, Sandwich does not look like a tourism-oriented community. Residential neighborhoods are well established and local businesses are primarily year-round.

Although the entire Cape population is estimated to triple during the summer months, the seasonal influx of population is thought to be less in Sandwich than in other towns. While all Cape towns have a large number of seasonal homes and retirees, Sandwich tends to have a higher percentage of year-round residents than the rest of the region due to its relative convenience for commuters. According to town records, there are approximately 7,574 year round housing units in Sandwich and 1,174 seasonal (or occasional) units.[9] The seasonal increase in population is believed to be less than twice its year-round population.[10] The Town of Dennis, in contrast, grows in summer four and a half times its winter size.[11]

Age of Residents

As with other communities in Massachusetts and throughout New England, the population of Sandwich is aging, but moderately. In 2007, the town estimated that 4,664 (or 20 percent) of residents are over 60 years of age, and since 1995 the number of older residents has increased by 1,200 or 32 percent. The Census reported an increase in the median age between 1990 and 2000 from 35.4 to 39.5. This is older than the median age in Massachusetts (36.5), but younger than the Cape-wide median age of 44.6.



Population demographics can influence municipal facilities and service demands. For example, while residents young and old differ in their needs based on individual interests, there are some assumptions that can be made about the demand for facilities based on age. Families with young children tend to need neighborhood playgrounds. Teenagers and adults need playfields for team sports, and increasingly, areas for healthful exercise such as running, walking, and tennis. Activities such as boating and fishing are popular with mid-life adults. Elderly residents are in need of passive recreational opportunities such as pleasant places to walk, outdoor gathering places, and places to go for group outings.

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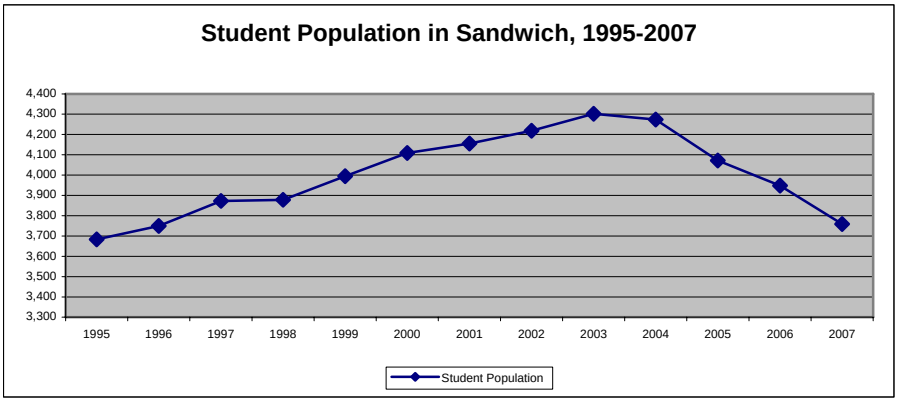
9 As reported by Town of Sandwich Planning Department, April, 2005.

10 Cape Cod Commission, CapeTrends, Fifth Edition, 1998.

11 *Sandwich Open Space and Recreation Plan,* 1999, p.10.

At the same time, Sandwich continues to have a large number of households that include families with children under the age of 18 (38.1 percent of all households). In 2007, the town estimates that the total number of school age residents was 3,759, representing 16 percent of the total population.



School enrollment continued to increase in the 1990s, rising from 2,800 in grades 1 to 12 in 1990 to 4,113 in 2000. This reflected a likely in-migration of families with children to Sandwich.[12] However, the student population began to decline in 2003 and has been on a downward trend over the past five years.

Education

In 2000, almost 95 percent of those 25 years and older had a high school diploma or higher and 38 percent had a college degree or higher. Those enrolled in school (nursery through graduate school) totaled 5,780 or 29 percent of the population. Those enrolled in nursery school through high school totaled 4,966, or 86 percent of the school age population and 25 percent of the total population.

Demographic Characteristics, 1990 and 2000

Characteristics	1990		2000	
	#	%	#	%
Population	15,489	100	20,136	100
Minority Population	345	2.2	453	2.2
Population Age 65+	2,184	14.1	2,757	13.7
Population 19 & under	4,558	29.4	6,097	30
Total Number of Households	5,558	100	7,335	100
Married Couples	3,832	68.9	4,768	65.0
Female Heads of Households	397	7.1	595	8.1
Non-family Households	1,236	22.2	1,820	24.8

Source: U.S. Census Bureau

Disability Status

Of the 2000 population of 5 to 20 years old, 355 or 7.2 percent had some disability. Of those residents in the population age group 21 to 64, 1,642 or 14.8 percent claimed a disability but 71.8 percent of this cohort was employed. Of residents in the population age group 65 years and older, 897 or 34 percent claimed some type of disability.

[12] U.S. Census, 2000.

Residency

In regard to persons who had moved to a different house during the last five years - involving 7,024 persons or about one-third of the total population -- 17.9 percent came from Barnstable County, 19.4 percent came from a different county, 11.5 percent came from the same state and 7.9 percent came from a different state. This represents significant mobility of the town's population.

Population projections indicate that Sandwich should expect continued but slow growth in its population over the next two decades, with growth concentrated in the age groups under 25 as well as those over 50.[13] For this reason, it is important that long term land use development, public facilities planning, and conservation efforts consider the needs of both youth and senior citizens.

1.4 Existing Land Use Inventory and Trends

Historic Growth and Development Patterns

Sandwich colonists originally divided their settlement into common property and private farming lands. Town Neck and the salt marshes were originally commons used for grazing cattle. Private land typically ran in north-south strips (called "long lots") from the beach back to the moraine ridges. This pattern enabled each colonist to have a slice of different habitat for various land uses: meadows for English hay in the richer soil near the shore, homes and yard gardens along the King's Highway, then pastures and woodlots in the poorer soils and rugged terrain south of the highway. This north-south strip pattern is still found today in some areas along the Northside and the Ridge District. This pattern is significant in that it creates a challenge to land assemblage for large-scale developments or conservation.

Current Land Uses

The Town of Sandwich is 43.95 square miles, including a portion of the Massachusetts Military Reservation (MMR). Public land uses are by far the single largest category in Sandwich with approximately 13,650 acres (or 56 percent of the total land base). As indicated in the table below, of the 24,407 acres of land in Sandwich, the Commonwealth of Massachusetts owns the greatest amount with 8,394 total acres.

Summary of Current Land Uses in Sandwich

Land Use Category	Land Use Description	Total Acres	# of Parcels	Average Lot Size	Total Building S.F.	Average Building S.F.	Average FAR
Agricultural Uses	Cranberry Bog	135.8	19	7.1	4,482	236	0.00
	Crop Land	33.6	5	6.7	3,954	791	0.00
	Miscellaneous Agricultural Land	1.4	2	0.7		-	0.00
	Pasture	14.7	3	4.9	1,262	421	0.00
Subtotal		**185.5**	**29**	**6.4**	**9,698**	**1,447**	**0.0**
Commercial Uses	Accommodations	119.7	19	6.3	237,483	12,499	0.05
	Automobile Sales and Repair Services	12.9	4	3.2	28,757	7,189	0.05
	Bank	13.5	6	2.3	22,889	3,815	0.04
	Child Care Facility	1.8	2	0.9	7,054	3,527	0.09
	Developable Commercial Land	80.4	34	2.4	5,816	171	0.00
	Eating and Drinking Establishment	16.3	10	1.6	47,937	4,794	0.07
	Gas Station, Carwash and Repair Station	3.7	5	0.7	15,314	3,063	0.09
	Hardware, Plumbing and Lumber Center	2.6	1	2.6	112	112	0.00
	Office Building	31.1	31	1.0	106,322	3,430	0.08

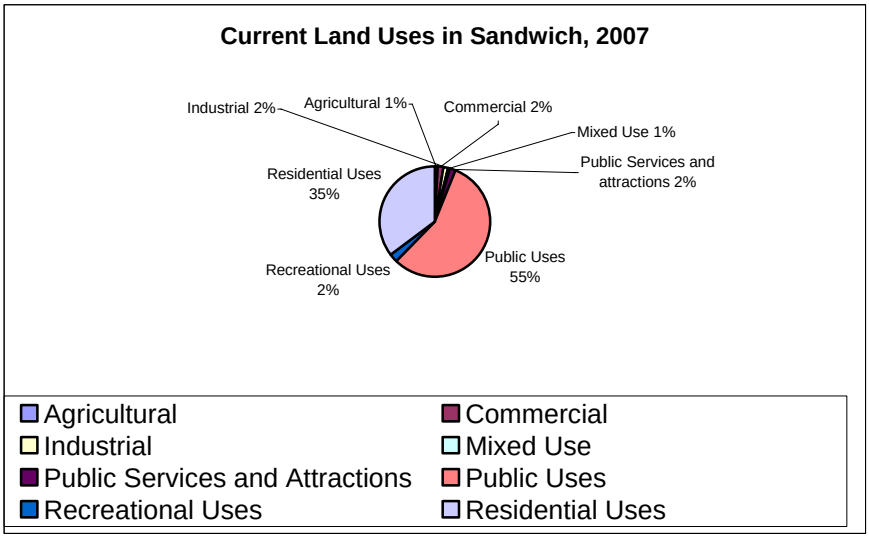
[13] From Massachusetts Institute for Social and Economic Research (MISER), 2000.

	Potentially Developable Commercial Land	6.2	3	2.1			0.00
	Retail Establishment	65.6	36	1.8	126,040	3,501	0.04
	Shopping Center	24.9	4	6.2	150,187	37,547	0.14
	Supermarket	24.7	2	12.4	155,185	77,593	0.14
	Undevelopable Commercial Land	1.1	3	0.4	365	122	0.01
Subtotal		**404.4**	**160**	**2.5**	**903,460**	**157,361**	**0.05**
Industrial Uses	Developable Industrial Land	126.1	18	7.0			0.00
	Electrical Generation Plant	132.4	15	8.8	98,496	6,566	0.02
	Industrial Storage and Utility Area	54.3	21	2.6	187,066	8,908	0.08
	Manufacturing Facility	12.4	3	4.1	108,128	36,043	0.20
	Sand, Gravel, Quarry and Other Mining Fac.	50.2	3	16.7	7,396	2,465	0.00
Subtotal		**375.5**	**60**	**6.3**	**401,086**	**53,982**	**0.02**
Mixed Use Land	Mixed Use Land	145.3	84	1.7	880,490	10,482	0.14
Subtotal		**145.3**	**84**	**1.7**	**880,490**	**10,482**	**0.14**
Public Services and Attractions	Cemeteries	308.6	20	15.4		-	0.00
	Charitable Service	228.9	7	32.7	70,603	10,086	0.01
	Function Hall or Conference Center	0.3	2	0.1	3,836	1,918	0.30
	Funeral Home	0.5	1	0.5	3,950	3,950	0.18
	General Public Services	3.1	2	1.5	4,172	2,086	0.03
	Hospital	63.7	5	12.7	66,529	13,306	0.02
	Libraries and Museums	53.5	4	13.4	50,821	12,705	0.02
	Post Office	0.8	1	0.8	7,019	7,019	0.20
	Religious Institution	54.7	11	5.0	86,947	7,904	0.04
Subtotal		**406.6**	**36**	**11.3**	**293,877**	**58,974**	**0.02**
Public Uses	Auxiliary Public Use	24.5	1	24.5	7,865	7,865	0.01
	Federal Land	421.1	4	105.3	53,276	13,319	0.00
	Improved Town Property	632.2	34	18.6	85,026	2,501	0.00
	Massachusetts Military Reservation	8,394.0	1	8394.0	1,408,344	1,408,344	0.00
	Other Vacant Public Land	97.8	23	4.3	3,271	142	0.00
	Private Conservation Land	154.5	15	10.3	216	14	0.00
	Private Educational Property	13.3	3	4.4	72,732	24,244	0.13
	State Land	857.6	45	19.1	63,798	1,418	0.00
	Town Conservation Property	2100.0	72	9.8	2,248	31	0.00
	Town Property	2,145.3	276	7.8	4,780	17	0.00
	Town Public Safety Property	6.5	4	1.6	21,574	5,393	0.08
	Town School Property	198.1	5	39.6	413,132	82,626	0.05
Subtotal		**13,649.8**	**483**	**28.3**	**2,136,261**	**1,545,915**	**0.00**
Recreational Uses	Active Recreational Use	425.1	6	70.8	101,518	16,920	0.01
	Golf Course	161.8	8	20.2	37,761	4,720	0.01
	Hiking Trail	18.9	1	18.9			0.00
	Outdoor Recreation Facility	0.4	1	0.4	235	235	0.01
Subtotal		**606.3**	**16**	**37.9**	**139,514**	**21,875**	**0.01**
Residential Uses	4-8 Unit Apartment Building	1.0	3	0.3	8,441	2,814	0.19
	8 + Unit Apartment Building	0.2	1	0.2	4,291	4,291	0.56
	Assessory Residential Land	262.0	28	9.4	33,436	1,194	0.00
	Developable Residential Land	1,191.6	533	2.2	29,895	56	0.00
	Housing Authority	20.7	5	4.1	41,378	8,276	0.05
	Miscellaneous Housing Use	10.7	3	3.6	38,342	12,781	0.08
	Multi-House Parcel	164.3	86	1.9	282,825	3,289	0.04
	Nursing Homes	7.0	1	7.0	55,462	55,462	0.18
	Potentially Developable Residential Land	65.0	78	0.8		-	0.00
	Residential Condominium	138.1	12	11.5	131,590	10,966	0.02
	Single Family Detached	6,258.5	8,268	0.8	14,714,192	1,780	0.05
	Three Family Dwelling	2.8	8	0.3	20,214	2,527	0.17

	Two Family Dwelling	55.1	60	0.9	120,611	2,010	0.05
	Undevelopable Residential Land	457.3	260	1.8	3,533	14	0.00
Subtotal		**8,634.3**	**9,346**	**0.9**	**15,484,210**	**105,458**	**0.04**
Grand Total		**24,407.7**	**10,214**	**2.4**	**20,248,595**	**1,955,494**	**0.28**

Source: Town of Sandwich Assessors Office, March, 2008

The following chart shows the distribution of land use as a percentage of all land in Sandwich. The Public Uses category includes land in the Massachusetts Military Reservation, which is effectively outside of the land use controls of the town. Cranberry bogs makes up the most amount of land use (135 acres) under the Agricultural Use category. The 132-acre Mirant Power Plant property is the singled largest industrial use in town, and accommodations (hotels, motels, and bed & breakfasts) at 120 acres makes up the single largest commercial use category. Single family homes cover 6,259 acres in Sandwich and are the largest residential use by a significant amount and the second largest land use in town.



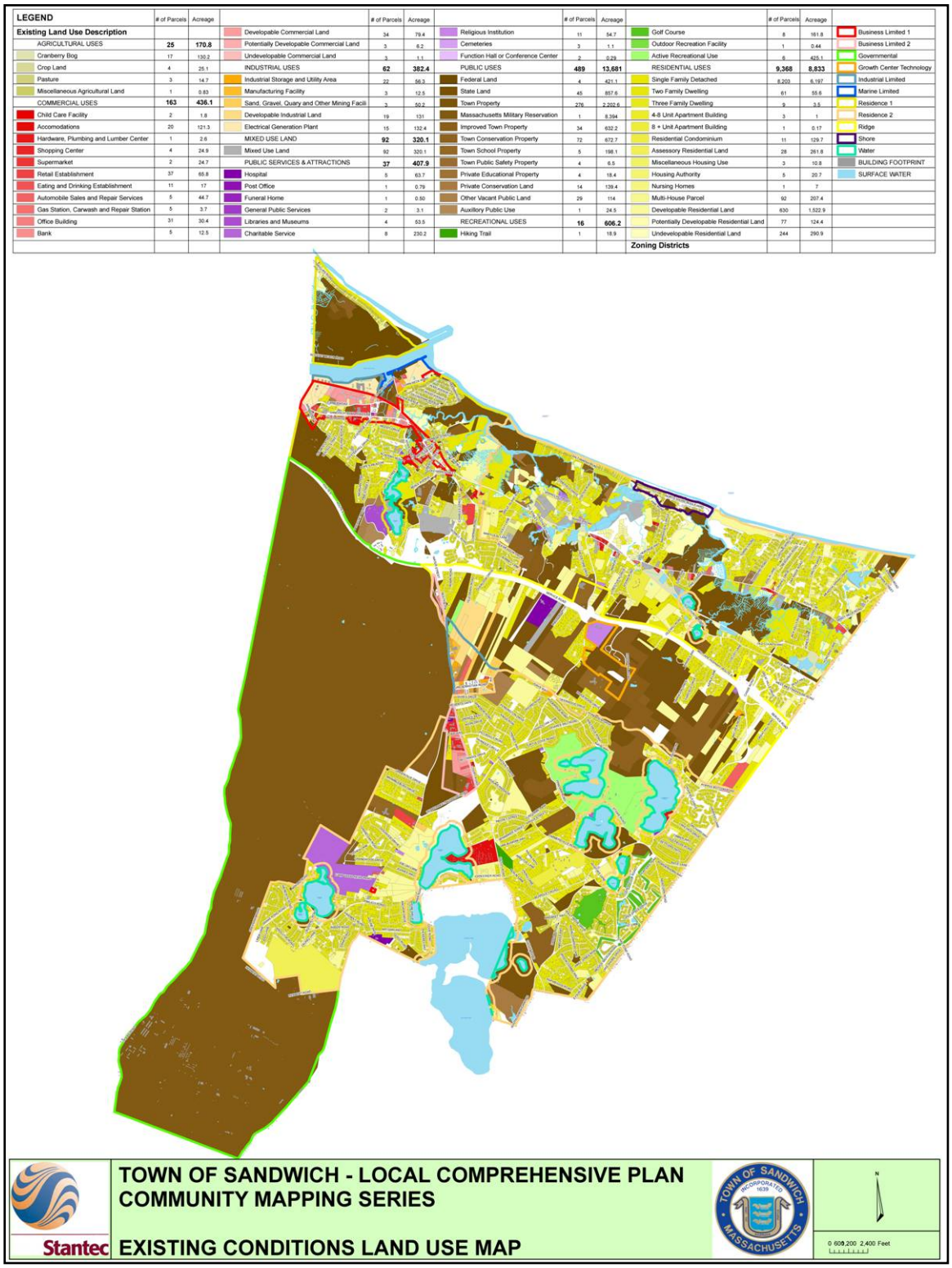
Since 1996, Agricultural (1 percent), Industrial (2 percent), Mixed[14] (1 percent) and Commercial (2 percent) Uses in Sandwich have remained the same in terms of there percentage of overall land use in town. Residential Uses have increased from 30 percent to 35 percent of the total land area, and Public Uses has declined slightly.

According to the Town Assessor's database there were almost 2,000 acres (11 percent) of residential, commercial, or industrial properties with development potential in 1996. In 2007, there were approximately 1,470 acres of developable lands remaining. This is about 6 percent of the total land in Sandwich outside of the Massachusetts Military Reservation. If not properly managed, future growth could impact regional resources, such as groundwater quality, coastal resources and wildlife migration that exist in Sandwich.

Sandwich's major recent land use trend is single family residential development. Sandwich's growth was one of the three highest in the state from 1980 to 1990. Between 1990 and 2007, an estimated 1,700 new homes were built in town. To service these new residents, shopping center development was the predominant form of non-residential land use development. Such land use trends resulted in a decrease in vacant land, increased population, more school children, more

[14] The Assessors Office considers Mixed Uses to includes any combination of two or more major land use classifications such as commercial and residential.

traffic and increasing pressure on the town's financial, open space and environmental resources.



Land Use Issues

The last two decades of residential growth have brought several land use issues to the forefront. The first is the need to consider how to use the few remaining large private and publicly-owned vacant parcels. Commercial and industrial uses have been relatively stagnant which poses the

challenge of examining intensity and appropriateness of uses within the Marina/Tupper Road/Route 6A Area, Industrial District off Route 130, and the South Sandwich Village Center. An inherent land use conflict occurs in the later two of these areas due to the fact that they lie within Zones of Contributions to public supply wells. Given the importance of Sandwich's groundwater supplies, it is critical that these supplies be protected.

1.5 Strategic Planning Areas

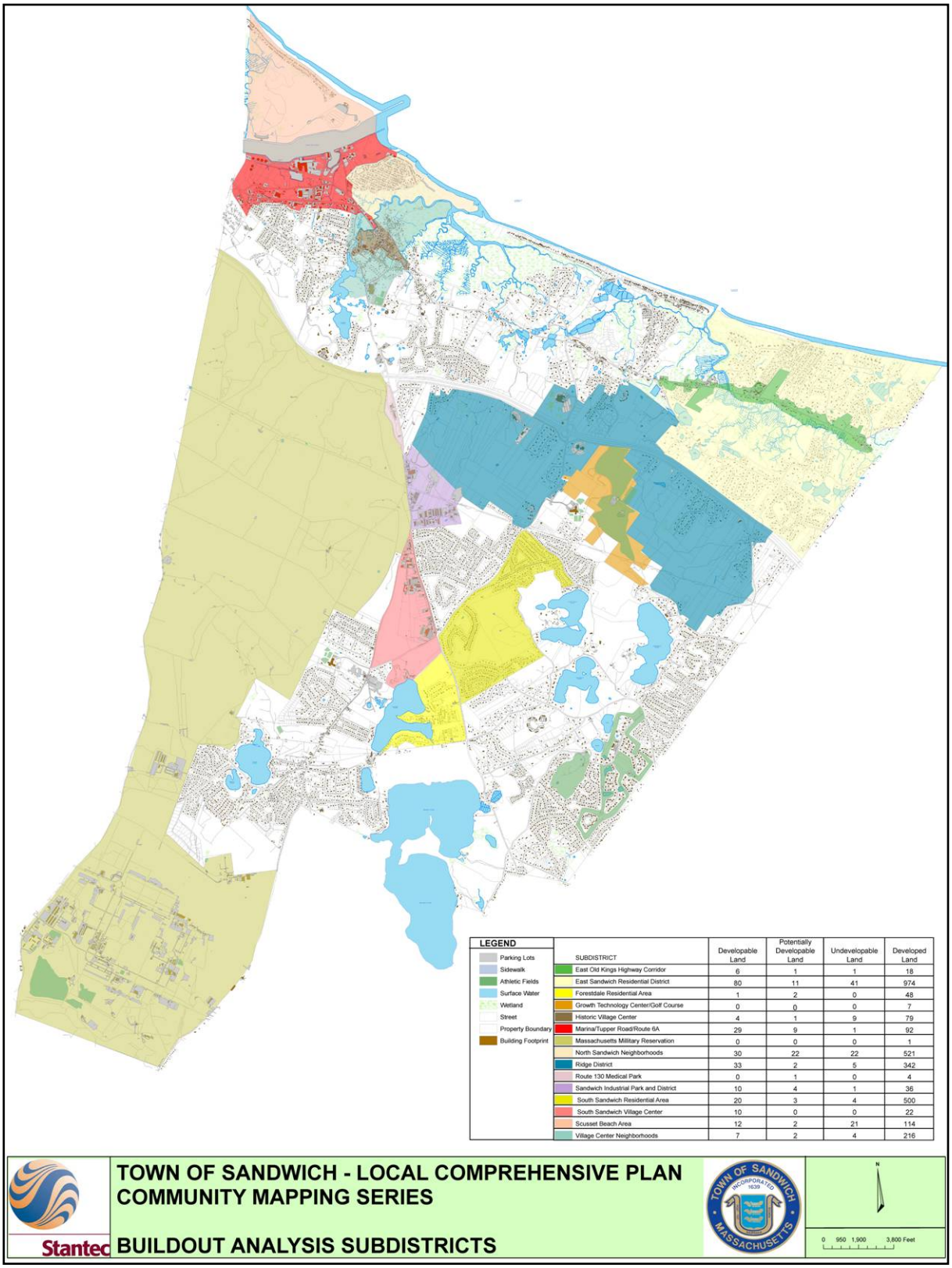
For the purposes of land use analysis, the Town of Sandwich was divided into 15 Strategic Planning Areas (SPA) as illustrated in the map below. The designation of these SPAs was based on zoning, land use patterns, parcel lines, topographic features and natural attributes, common development patterns, public facilities and existing regulations that reflect the general vision of various areas of town as they stand today.

Sandwich Strategic Planning Areas

Subdistrict Name (and #)	Total Acres	# of Parcels	Total Building Area (Sq. Ft)	% of Town-Wide Land Area	% of Town-wide Building SF
East Old Kings Highway Corridor (5)	288	122	260,008	1.2%	1.3%
East Sandwich Residential District (9)	2,879	1,918	3,241,813	11.8%	16.0%
Forestdale Residential Area (14)	2,370	1,752	2,892,395	9.7%	14.3%
Growth Technology Center/Golf Course (6)	397	55	12,263	1.6%	0.1%
Historic Village Center (3)	100	151	195,598	0.4%	1.0%
Marina/Tupper Road/Route 6A (1)	431	204	696,998	1.8%	3.4%
Massachusetts Military Reservation (8)	8,438	45	1,408,344	34.6%	7.0%
North Sandwich Neighborhoods (9)	2,716	2,031	3,303,802	11.1%	16.3%
Ridge District (12)	1,939	544	934,670	7.9%	4.6%
Route 130 Medical Park (7)	62	49	16,478	0.3%	0.1%
Sandwich Industrial Park and District (4)	444	93	488,033	1.8%	2.4%
Scusset Beach Area (10)	588	239	225,446	2.4%	1.1%
South Sandwich Residential Area (13)	3,869	3,222	5,756,404	15.9%	28.4%
South Sandwich Village Center (2)	298	73	297,229	1.2%	1.5%
Village Center Neighborhoods (11)	360	321	521,179	1.5%	2.6%
Town-Wide	**24,407**	**10,214**	**20,250,660**		

In each of these management districts, the input from the general public and Local Planning Committee was sought to determine the most appropriate forms of growth management in terms of the proper mix of residential, commercial, industrial and public and protected lands taking into account the following objectives:

- Addressing particular growth issues in a specific and innovative way;
- Balancing community concerns of land rights, economic opportunities, and land stewardship;
- Protecting significant natural resources, particularly wildlife habitat, scenic vistas and prime agricultural lands;
- Guiding appropriate development in targeted areas to fulfill economic and residential opportunities through smart growth land use regulations and capital improvements;
- Managing the impacts of growth on municipal infrastructure, schools, public safety, cultural and natural resources, and the overall quality of life; and
- Regulatory and policy changes that may be necessary to facilitate smart growth and sustainable design.



SUBDISTRICT	Developable Land	Potentially Developable Land	Undevelopable Land	Developed Land
East Old Kings Highway Corridor	6	1	1	18
East Sandwich Residential District	80	11	41	974
Forestdale Residential Area	1	2	0	48
Growth Technology Center/Golf Course	0	0	0	7
Historic Village Center	4	1	9	79
Marina/Tupper Road/Route 6A	29	9	1	92
Massachusetts Military Reservation	0	0	0	1
North Sandwich Neighborhoods	30	22	22	521
Ridge District	33	2	5	342
Route 130 Medical Park	0	1	0	4
Sandwich Industrial Park and District	10	4	1	36
South Sandwich Residential Area	20	3	4	500
South Sandwich Village Center	10	0	0	22
Scusset Beach Area	12	2	21	114
Village Center Neighborhoods	7	2	4	216

Town Marina/Tupper Road/Route 6A Area

The Town Marina/Tupper Road/Route 6A Strategic Planning Area includes all of the lands between the Cape Cod Canal, Tupper Road and Route 6A between the western boundary of Sandwich and Mill Creek to the west. The area includes an estimated 431 acres on 204 parcels with nearly 697,000 square feet of existing building space. The Sandwich Assessors office estimates that there are 29 acres of developable land and 9 acres of potentially developable land[1].

The Route 6A corridor is a well developed mixed use area with the largest number of commercial, retail, office and marine related uses in Sandwich. Much of the south side of the corridor is comprised of converted homes that are now used for professional offices, accommodations and small retailers. The north side of the corridor includes major commercial retail developments such as Stop and Shop Plaza and Merchant's Square. Toward the west end of the Route 6A corridor are several more commercial businesses as well as the Police and Fire Departments. The Tupper Road Area is predominately rural with scattered homes, commercial businesses and the office of the Sandwich Water District.

The Sandwich Marina boat basin was dredged in the 1960's and has not been dredged since that time. The dredge spoils were deposited in the area across from the Marina office on Ed Moffitt Drive. The Marina is owned by the U.S. Army Corps of Engineers, but has since the late 1980's been managed on a daily basis by the Town of Sandwich Harbormaster. All funds generated through the enterprise account (slip fees) are used to maintain and upgrade the Marina. No town funds are expended as part of the marina operation.

The Sandwich Marina contains space for 200 boats. The breakdown of slips is as follows: 100 pleasure slips, 27 transient slips (overnight and weekend), 39 slips utilized by commercial fishermen and 34 half slips that may have their access restricted depending on tidal conditions. Discussions have been held in the past over expanding and re-building the Sandwich Marina to accommodate more commercial and recreational boats, and perhaps even a whale watching vessel.

A 1993 study suggested that expanding the marina would be prohibitively expensive and require more than two dozen permits from federal, state and local agencies[2]. Despite this, there remains strong community support to explore opportunities for expansion and redevelopment in more detail. Another study sponsored by Mirant and completed in 2001 established a development plan for the Sandwich Marina and its surrounding area. The study clarified the constraints and opportunities associated with the asset and created a program that would build on existing resources, expand appropriate tourism activities, provide economic benefits, and enhance the attractiveness of the waterfront. Key findings and recommendations focused on redevelopment to support tourism-related uses that would enhance the overall vitality of the area. Given the amount of space available and the current levels of use, the town has reached its capacity for docking boats within the marina. The demand for marine commercial and recreational facilities is likely to increase as the retired population increases in the years and decades ahead.

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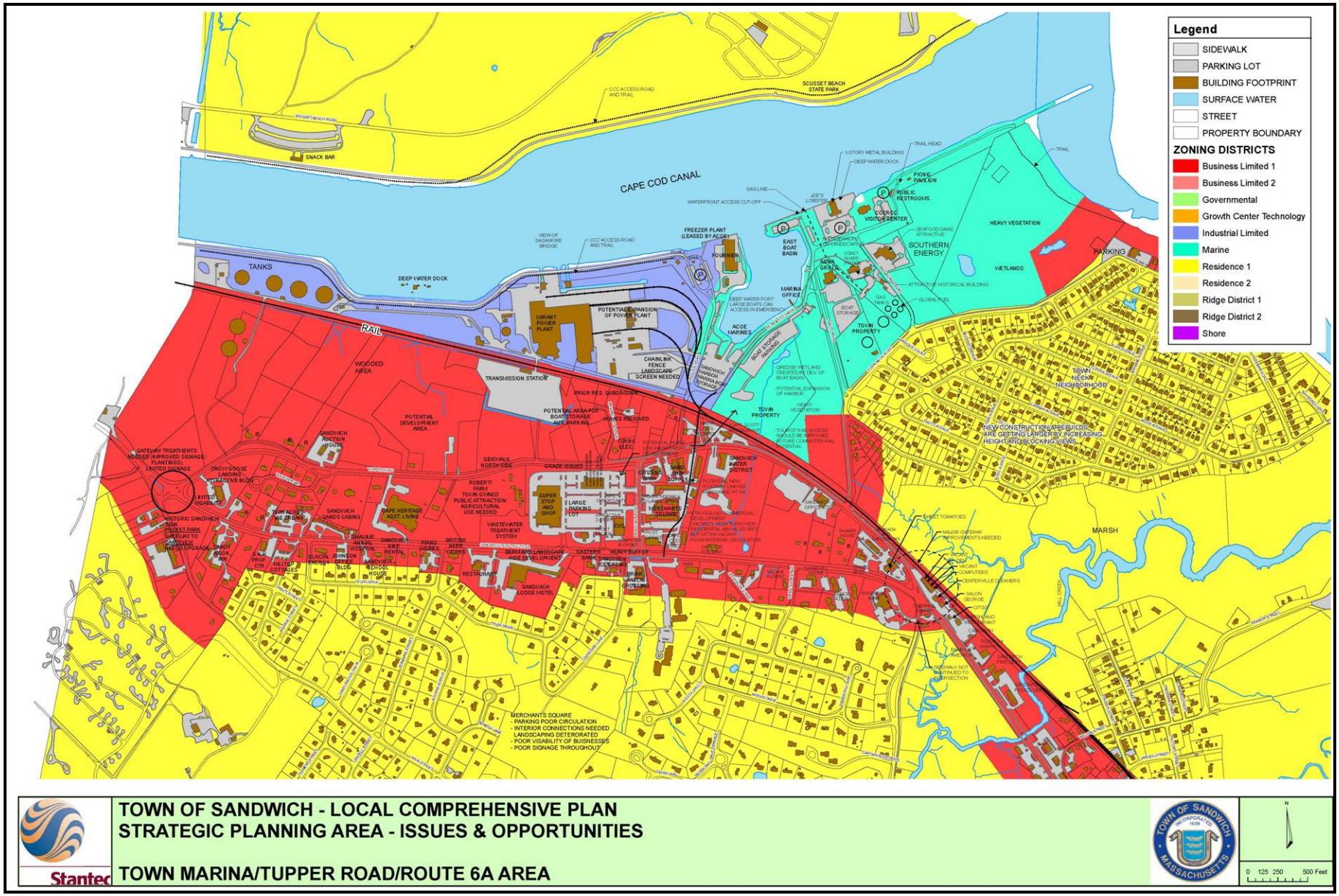
1 The Assessors Office identifies "Potential Developable Land" as developable land with some environmental constraints and limited legal restrictions. This is based on property records and field observations.

2 Comprehensive Marina Area Development Plan, Town of Sandwich, 1993, Cecil & Rizvi, Inc. with FXM Associates and Fay Spofford & Thorndike


Legend
SIDEWALK
PARKING LOT
BUILDING FOOTPRINT
SURFACE WATER
STREET
PROPERTY BOUNDARY
ZONING DISTRICTS
Business Limited 1
Business Limited 2
Governmental
Growth Center Technology
Industrial Limited
Marine
Residence 1
Residence 2
Ridge District 1
Ridge District 2
Shore
CAPE COD CANAL
SCUSSET BEACH STATE PARK
SNACK BAR
TANKS
DEEP WATER DOCK
RAIL
MIRANT POWER PLANT
POTENTIAL EXPANSION OF POWER PLANT
FREEZER PLANT (LEASED BY ACGE)
EAST BOAT BASIN
MARINA OFFICE
ACGE MARINES
SOUTHERN ENERGY
HEAVY VEGETATION
WETLANDS
PARKING
TOWN PROPERTY
TRANSMISSION STATION
WOODED AREA
POTENTIAL DEVELOPMENT AREA
SUPER STOP AND SHOP
LARGE PARKING LOT
SANDWICH WATER DISTRICT
MERCHANTS SQUARE
TOWN NECK NEIGHBORHOOD
NEW CONSTRUCTION & REBUILDS ARE GETTING LARGER BY INCREASING HEIGHT AND BLOCKING VIEWS
MARSH
MERCHANTS SQUARE
- PARKING POOR CIRCULATION
- INTERIOR CONNECTIONS NEEDED
LANDSCAPING DETERORATED
- POOR VISABILITY OF BUSINESSES
- POOR SIGNAGE THROUGHOUT
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREA - ISSUES & OPPORTUNITIES
TOWN MARINA/TUPPER ROAD/ROUTE 6A AREA
Stantec
TOWN OF SANDWICH
INCORPORATED 1639
MASSACHUSETTS
N
0 125 250 500 Feet

Many changes have taken place at the Sandwich Marina, where it is estimated over one million people visit annually. The addition of sidewalks, improved water access, parking and the rebuilding of docks have greatly enhanced this area of town.

Key Issues:

- A strong connection between Route 6A, Tupper Road, and the Marina is needed. There are currently few potential corridors suitable for making a connection to the Marina from Route 6A through Merchant's Square and the Boat Basin;
- The Old Kings Highway Historic District on Route 6A has authority to review all new development and expansions north of Route 6, which could significantly affect future redevelopment plans;
- Any proposed improvements to the Marina must involve the Army Corps of Engineers (ACOE) at an early stage. ACOE will determine the feasibility of various future land uses;
- ACOE will want to see strong community support, completed plans, a feasibility study, the cost-benefit in terms of fees, and the impact on property values;
- The town will likely have to fund the expansion to the Boat Basin while the ACOE would likely undertake the construction work. The town could pay for the expansion through user fees;
- There are significant wetlands on the town property between Ed Moffit Drive, Tupper Road, and Gallo Road. Any adverse impact on this resource would have to be mitigated if the marina is expanded and development occurs. Alternative plans that achieve the goals for redevelopment of the Marina without impacts to wetlands should be explored by the town;
- Freezer building has been an eyesore and is currently being removed. This property has great potential for redevelopment. It is, however, surrounded by ACOE property which may influence future redevelopment plans;
- There are multiple property owners in the district and multiple easements;
- Traffic congestion and parking can be difficult in season;
- There is very little screening of the Mirant Plant;
- Heavy landscaping buffer along Route 6A makes commercial development difficult to see which may lead to poor performance of some locations such as Merchants Square; and
- Flood hazards are present in much of this area. The town could plan to utilize hazard mitigation funds to relocate facilities out of these areas and develop a plan for redevelopment that accommodates and mitigates the flood hazards present in this area.

Key Opportunities:

- There are good opportunities for mixed-use and infill development throughout the area including along Route 6A, Tupper Road, and Marina;
- There is a strong demand for boat slips (a current waiting list of 1,200 names and 4-year moratorium);
- Expansion of the Boat Basin onto town-owned property would draw more visitors (by boat and land), improve surrounding property values and development opportunities, and support existing and new businesses;
- Direct connections (visual and physical) can be made to Merchant's Square;
- The sidewalk network should be extended between the Marina, Canal Access Road, Tupper Road and Route 6A;
- Gateway improvements along Route 6A at both ends of Tupper Road would create a more inviting and attractive entrance into the area;
- Streetscape improvements throughout the district would greatly enhance the visual experience;
- Connections and linkages by foot, bike, and transit to Merchant's Square, Downtown/Jarves Street, and Route 6A/Tupper Road area should be made;

- Tupper Road is town-owned and controlled allowing more flexibility for development;
- There may be an opportunity to acquire waterfront property and other accessory properties from Mirant for redevelopment that are vacant and underutilized;
- The Sandwich Harbor Master's office and boat storage needs to be relocated and improved on a more suitable site, opening up new development opportunities;
- Parking lots can be better organized, coordinated, and connected;
- Conceptual plans prepared in 2001 proposed a small rotary on Tupper Road/near Merchant's Square (similar to the one on Route 149 in Barnstable);
- A Jitney bus and train service could connect this district to the Historic Village;
- A railroad connection creates a real opportunity for tourism, the possibility of commuter rail, and the potential for a Chapter 40R Smart Growth project;[3] and
- A traffic mitigation plan is needed (this has been an issue with previous plans). Redevelopment plans for the district must include the additional and interconnected parking areas, linkage through the proper use of streetscape, and making the area pedestrian friendly

South Sandwich Village Center Area (The Golden Triangle)

The South Sandwich Village Center (SSVC) area (also known as the Golden Triangle) is located between Cotuit Road, Quaker Meetinghouse Road, and Route 130 in South Sandwich. It also includes the Oak Crest Cove property owned by the Town of Sandwich on Peter's Pond between Quaker Meetinghouse Road and Cotuit Road. The SSVC contains approximately 298 acres on 73 parcels and 297,229 square feet of building space. The Sandwich Assessors office estimates that there are approximately 10 acres of developable land which does not include potential infill or redevelopment opportunities.

A large portion of the district (114 acres) is owned by the Massachusetts Dept. of Environmental Management (DEM) and managed for wildlife habitat. Most of the existing development in the district consists of retail, restaurant, entertainment and professional office uses constructed over the past 25 years. Some of the larger developments include Tradewinds Plaza, Heritage Plaza, Canterbury Plaza, Marshland Plaza, and the Stop and Shop Plaza. There are also town owned facilities in the district including the Pop Warner Football field, Skatepark and Hansen Village (an elderly housing complex owned by the Sandwich Housing Authority).

Key Issues:

- The SSVC boundaries and buffers along Cotuit Road need to be defined and protected. Strong edges are needed between the neighborhoods on the north side of Cotuit Road and the mixed uses on the south side;
- Traffic congestion and safety (especially at the two intersections - Route 130/Cotuit Road and QMH/Cotuit Road) need to be improved. There are inconsistent lane alignments at Cotuit Road/QMH intersection and both are unfriendly pedestrian environments;
- There is a high concentration of private septic systems. This area of town is part of the Poppenesset Marine Estuary Recharge Zone and the limits for additional discharge are very strict and set by DEP Title V regulations;
- Public wastewater treatment is currently unavailable in the district and the nearby Forestdale School expansion is an unlikely option;
- Future uses need to be clearly defined and provided for in the revised zoning districts;

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3 MGL Chapter 40R is a new state statute offering a framework and financial incentives for municipalities to create "smart growth zoning districts" in eligible locations such as cities, towns, village centers/commercial districts, around transit stations, and in other appropriate smart growth locations. Districts must meet minimum density requirements, have the necessary infrastructure in place, and provide affordable units.

- Existing development is largely unattractive and invisible to potential customers because of the large setback and buffer from Cotuit Road and Route 130;
- Recreational activities are currently limited in the district (Pop Warner Field has limited access and State DEM lands have few marked trails);
- Gateway and directional signage is current not adequate;
- Architecture is a mix of traditional Cape Cod and commercial strip styles;
- Internal access is limited. Shared curb cuts, parking, and internal roadways are needed to reduce the number of trips onto Route 130 and Cotuit Road;
- A partial internal connector road (Tom's Way) links some of the larger plazas but is not well marked or known;
- Intermodal transportation opportunities are very limited;
- Ownership patterns create an opportunity for significant change. There are three primary owners – the Town, the Sandwich Housing Authority, and Mr. Thomas Tsakolos;
- The local sign code is prohibitive and ineffective. Slat signs for individual businesses at entrances on Route 130 and Cotuit Road are hard to read and have a cluttered appearance to the passing driver. Sign code revisions would be appropriate as part of future zoning amendments;
- Traffic congestion along Cotuit Road is a growing issue. Vehicles often pass on the right over private yards because of the lack of curbing on the street;
- Pedestrian and bicycle facilities are limited. There is a five-foot asphalt sidewalk on the south side of Cotuit Road and no sidewalk along Route 130. A new sidewalk is under construction along Quaker Meetinghouse Road. There are also no sidewalk or bicycle connections to surrounding areas such as Forestdale School, the Industrial Park, Oak Crest Cove, or adjacent neighborhoods;
- Streetscape is very limited on Cotuit Road, Quaker Meetinghouse Road, and Route 130. There is no formal street tree plantings or curbing. Design guidelines as part of future zoning amendments would be appropriate; and
- Some good locally-owned businesses are struggling because of location and poor visibility.

Heritage Plaza off Cotuit Road

<u>Key Opportunities:</u>

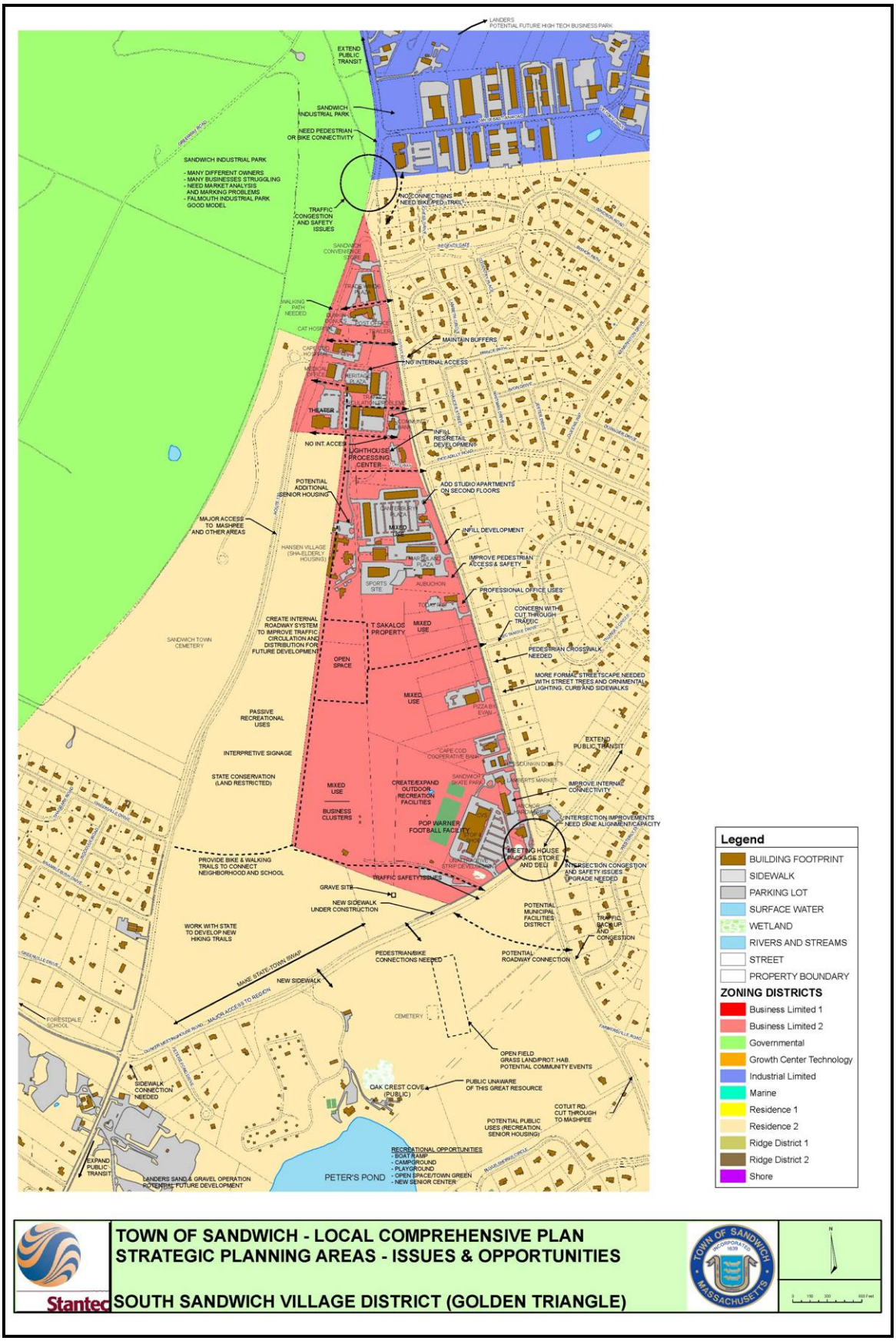
- SSVC must have a destination theme to be sustainable and not just a trend;
- Centralized, coordinated and shared on-site parking should be a criterion for development and redevelopment. On-street parking should also be included with new

roadways;

- Internal access and circulation is key to reducing traffic on surrounding streets;
- Public restrooms should be included in future plans;
- Recreational facilities should be expanded and better connections should be made to Pop Warner, Oak Crest Cove, DEM conservation lands and new fields and facilities;
- Trail connections and interpretive signage should be made on State DEM lands, private lands within the Triangle and to surrounding neighborhoods, the Sandwich Industrial Park, Oak Crest Cove, and Forestdale School;
- Higher density, higher quality, and vertical mix of uses are desired in the SSVC. Uses should include various types of retail, restaurant, professional offices and services, institutional and public uses, and residential (varied types and income levels);
- Connections should be made to other Activity Centers such as the Historic Village, Town Marina, Industrial Park, and schools. This can be accomplished with trails and sidewalks;
- While the buffer between development and Cotuit Road needs to be maintained with landscaping and compatible uses (ie-residential), better visibility and access should be created along Route 130 for existing and new commercial and mixed use development;
- Provide good signage for businesses (attractive but visible from roadway);
- An overall bike access plan should be prepared including connections and maintenance to existing bike trails such as to the Historic Village, the Marina and town beaches;
- New housing (from market rate to basic work force) should be the predominate upper floor use for new mixed use development as well as moderate density residential uses (i.e. townhouses, garden apartments and congregate housing) in the fringe areas of the SSVC;
- Safety and traffic issues need to be sufficiently addressed:
    - Cotuit Road – congestion, multiple curb cuts, pedestrian/bike safety
    - Snow storage needs to be considered in the design
    - Connections to Peters Pond with sidewalks and crosswalks
    - Cotuit Road and Quaker Meetinghouse Road intersection upgrades with consistent lanes and alignment
    - Upgrade the intersection at Cotuit Road and Route 130

- A new roadway that bypasses the Cotuit Road/Quaker Meetinghouse Road intersection on the southeast corner would significantly reduce congestion;
- The internal road (Tom's Way) should be expanded into a network or grid which connects to all properties, reducing traffic and turning movements on Cotuit Road, Quaker Meetinghouse and Route 130;
- Future public uses should include an educational component such as a museum (i.e. bogs), a new branch library, and new senior center;
- Include a Town Green or similar types of formal public open spaces. Future uses should include public festival and gathering spaces for a farmers market;
- Traditional village center design should be incorporated into future development. Architecture should be attractive but not necessarily in the Cape Cod style;
- Sidewalks with bike trails should be combined. Install paved pathways around the perimeter of the SSVC;
- Light industrial and office uses (such as back office uses) should be considered in the mix of uses in the SSVC;
- A new Municipal Campus should be considered at the southeast corner of the Quaker Meetinghouse and Cotuit Road intersection. This is town-owned land (Oak Crest Cove) and may include a new Sandwich administrative building and safety complex containing the police department, fire department and rescue; and
- Businesses of "necessity" that local residents use on a regular basis such as the grocery store, restaurants, hardware, and professional services should be the primary

commercial uses in the SSVC.


LANDERS POTENTIAL FUTURE HIGH TECH BUSINESS PARK
EXTEND PUBLIC TRANSIT
SANDWICH INDUSTRIAL PARK
NEED PEDESTRIAN OR BIKE CONNECTIVITY
SANDWICH INDUSTRIAL PARK
- MANY DIFFERENT OWNERS
- MANY BUSINESSES STRUGGLING
- NEED MARKET ANALYSIS AND MARKING PROBLEMS
- FALMOUTH INDUSTRIAL PARK GOOD MODEL
TRAFFIC CONGESTION AND SAFETY ISSUES
NO CONNECTIONS NEED BIKE/PED TRAIL
SANDWICH CONVENIENCE
WALKING PATH NEEDED
CAT HOSPITAL
POST OFFICE
MAINTAIN BUFFERS
NO INTERNAL ACCESS
CARPENTER HOUSE
MEDICAL OFFICES
HERITAGE PLAZA
THEATER
NO INT. ACCESS
LIGHTHOUSE PROCESSING CENTER
INFILL RES/RETAIL DEVELOPMENT
POTENTIAL ADDITIONAL SENIOR HOUSING
ADD STUDIO APARTMENTS ON SECOND FLOORS
MAJOR ACCESS TO MASHPEE AND OTHER AREAS
CANTERBURY PLAZA
MIXED USE
INFILL DEVELOPMENT
HANSEN VILLAGE (SHA-ELDERLY HOUSING)
MARSHALL PLAZA
IMPROVE PEDESTRIAN ACCESS & SAFETY
SPORTS SITE
AUBUCHON
PROFESSIONAL OFFICE USES
TOWER
CONCERN WITH CUT THROUGH TRAFFIC
CREATE INTERNAL ROADWAY SYSTEM TO IMPROVE TRAFFIC CIRCULATION AND DISTRIBUTION FOR FUTURE DEVELOPMENT
T SAKALOS PROPERTY
MIXED USE
SANDWICH TOWN CEMETERY
PEDESTRIAN CROSSWALK NEEDED
OPEN SPACE
MORE FORMAL STREETSCAPE NEEDED WITH STREET TREES AND ORNIMENTAL LIGHTING, CURB AND SIDEWALKS
MIXED USE
PIZZA BY EVAN
PASSIVE RECREATIONAL USES
EXTEND PUBLIC TRANSIT
CAPE COD COOPERATIVE BANK
INTERPRETIVE SIGNAGE
DUNKIN DONUTS
STATE CONSERVATION (LAND RESTRICTED)
SANDWICH SKATE PARK
LANDERS MARKET
IMPROVE INTERNAL CONNECTIVITY
MIXED USE
CREATE/EXPAND OUTDOOR RECREATION FACILITIES
BUSINESS CLUSTERS
POP WARNER FOOTBALL FACILITY
INTERSECTION IMPROVEMENTS NEED LANE ALIGNMENT/CAPACITY
MEETING HOUSE PACKAGE STORE AND DELI
PROVIDE BIKE & WALKING TRAILS TO CONNECT NEIGHBORHOOD AND SCHOOL
STRIP DEVELOPMENT
INTERSECTION CONGESTION AND SAFETY ISSUES UPGRADE NEEDED
TRAFFIC SAFETY ISSUES
GRAVE SITE
NEW SIDEWALK UNDER CONSTRUCTION
POTENTIAL MUNICIPAL FACILITIES DISTRICT
TRAFFIC BACK UP AND CONGESTION
WORK WITH STATE TO DEVELOP NEW HIKING TRAILS
PEDESTRIAN/BIKE CONNECTIONS NEEDED
POTENTIAL ROADWAY CONNECTION
MAKE STATE TOWN SWAP
NEW SIDEWALK
CEMETERY
FORESTDALE SCHOOL
OPEN FIELD GRASS LAND/PROT. HAB. POTENTIAL COMMUNITY EVENTS
SIDEWALK CONNECTION NEEDED
OAK CREST COVE (PUBLIC)
PUBLIC UNAWARE OF THIS GREAT RESOURCE
COTUIT RD. CUT THROUGH TO MASHPEE
POTENTIAL PUBLIC USES (RECREATION, SENIOR HOUSING)
RECREATIONAL OPPORTUNITIES
- BOAT RAMP
- CAMPGROUND
- PLAYGROUND
- OPEN SPACE/TOWN GREEN
- NEW SENIOR CENTER
EXPAND PUBLIC TRANSIT
LANDERS SAND & GRAVEL OPERATION POTENTIAL FUTURE DEVELOPMENT
PETER'S POND
Legend
BUILDING FOOTPRINT
SIDEWALK
PARKING LOT
SURFACE WATER
WETLAND
RIVERS AND STREAMS
STREET
PROPERTY BOUNDARY
ZONING DISTRICTS
Business Limited 1
Business Limited 2
Governmental
Growth Center Technology
Industrial Limited
Marine
Residence 1
Residence 2
Ridge District 1
Ridge District 2
Shore
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREAS - ISSUES & OPPORTUNITIES
SOUTH SANDWICH VILLAGE DISTRICT (GOLDEN TRIANGLE)
TOWN OF SANDWICH INCORPORATED 1639 MASSACHUSETTS
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Historic Village District

The Sandwich Historic Village District includes the core properties along Jarves Street, Pleasant Street, Main Street, and Route 6A between Mill Creek and Liberty Street. There are approximately 100 acres on 151 parcels containing a total of 297,229 square feet of building space. This district is relatively small in comparison to other strategic planning areas in town with only 1.5 percent of the total land area and 2.6 percent of building stock town-wide. Nonetheless, the Historic Village is one of the most important districts in Sandwich – it is the heart and soul of the community and reflects both visitors and residents impression of Sandwich.

Jarves Street Looking South

The Historic Village is well preserved and includes a vital mix of residential, commercial, public, recreational, and entertainment uses. Some of the key assets are the Town Hall, Public Library, Daniel Webster Inn, Belfry Inn, Doll House, Dexter's Grist Mill, Shawme Pond, and Sandwich Glass Museum. According to the Sandwich Assessors office there are approximately 30 acres of developable land in the Historic Village. However, most of this is located on Route 6A and very little new development is possible in the core area along Main Street and Jarves Street. There is, however, greater potential for renovation, infill development and expansion, and conversion of existing residential properties to limited commercial use.

Key Issues:

- The Village serves as Sandwich's traditional downtown with a mix of small-scale gift stores, services, accommodations, and restaurants. It also includes public and institutional uses and well established historic neighborhoods;
- There is no public sewer system in the Village, and stormwater and wastewater problems are prevalent on Jarves Street which significantly limits new development, redevelopment and reuse potential;
- Protecting the many attractive buildings, storefronts, local business, and landscapes;
- The BL-1 zoning does not fit the scale and character of the village in terms of uses and dimensional characteristics;
- The National Historic District includes everything north of Route 6 and is very restrictive on the Historic Village and surrounding neighborhoods;
- Commercial strip development along Route 6A creates an unattractive gateway and entrances into the Historic Village. This portion of Route 6A is very wide with limited

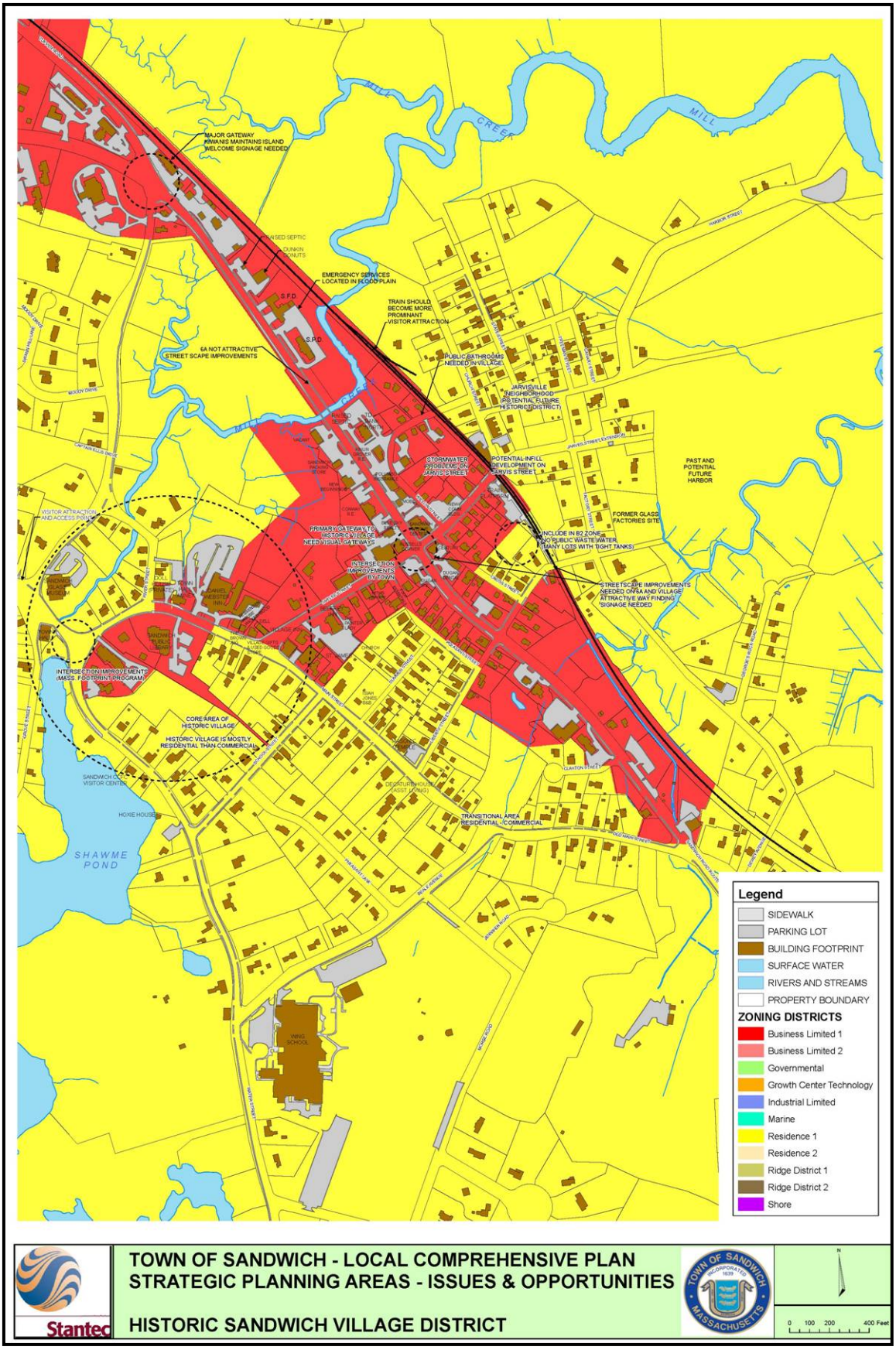
streetscape making it very uninviting to visitors;

- Historic Jarvesville Neighborhood has become cut off and isolated from the Village by Route 6A;
- The train platform in Jarvesville is deteriorated and underutilized;
- There is very limited wayfinding signage, informational kiosks or gateway treatments into the village;
- Some commercial or institutional buildings are being used for residential purposes (i.e. commercial block on Jarves Street used for apartments, and the Doll House is a private residence);
- Several village homes are being converted into other uses such as commercial offices, accommodations, or apartments (i.e. Decatur House is now an assisted living facility);
- The intersections at Jarvis/Main and Main/Route 130 are being reconstructed to improve traffic flow and pedestrian safety while maintaining the Village character;
- The lack of public wastewater treatment limits renovation, expansion, and infill development opportunities;
- Off-street parking is limited and not well-marked; and
- The Old Kings Highway Historic District on Route 6A has authority to review all new development and expansions north of Route 6, which could significantly affect future redevelopment plans

Historic Dexter Grist Mill

Key Opportunities:

- Improve the Route 6A corridor between Mill Creek and Liberty Street to establish an attractive gateway to the Village. Streetscape improvements should include a formal sidewalk, green strip and street tree planting scheme. Infill buildings should be similar in use, density and architectural character to the village and serve as an extension of the Historic Village;
- Install attractive high quality wayfinding signage and gateway treatments;
- Explore possibilities for communal and package wastewater treatment systems that would provide better opportunities for infill, expansion and renovation;
- Improve inter-connections and expand off-street parking areas where possible; and
- The salt marshes between Main Street and Route 6A have extensive fragmites growth that must be cleared out to improve the view of the old harbor


MAJOR GATEWAY
KIWANIS MAINTAINS ISLAND
WELCOME SIGNAGE NEEDED
EMERGENCY SERVICES
LOCATED IN FLOOD PLAIN
TRAIN SHOULD
BECOME MORE
PROMINANT
VISITOR ATTRACTION
6A NOT ATTRACTIVE
STREET SCAPE IMPROVEMENTS
PUBLIC BATHROOMS
NEEDED IN VILLAGE
JARVISVILLE
NEIGHBORHOOD
(POTENTIAL FUTURE
HISTORIC DISTRICT)
STORMWATER
PROBLEMS ON
JARVIS STREET
POTENTIAL INFILL
DEVELOPMENT ON
JARVIS STREET
PAST AND
POTENTIAL
FUTURE
HARBOR
FORMER GLASS
FACTORIES SITE
INCLUDE IN B2 ZONE
NO PUBLIC WASTE WATER
(MANY LOTS WITH TIGHT TANKS)
PRIMARY GATEWAY TO
HISTORIC VILLAGE
NEED VISUAL GATEWAYS
INTERSECTION
IMPROVEMENTS
(RIVER WAY)
STREETSCAPE IMPROVEMENTS
NEEDED ON 6A AND VILLAGE
ATTRACTIVE WAY FINDING
SIGNAGE NEEDED
INTERSECTION IMPROVEMENTS
(MASS. FOOTPRINT PROGRAM)
CORE AREA OF
HISTORIC VILLAGE
HISTORIC VILLAGE IS MOSTLY
RESIDENTIAL THAN COMMERCIAL
SANDWICH COC
VISITOR CENTER
HOXIE HOUSE
SHAWME
POND
TRANSITIONAL AREA
RESIDENTIAL - COMMERCIAL
WING
SCHOOL
MILL
CREEK
Legend
SIDEWALK
PARKING LOT
BUILDING FOOTPRINT
SURFACE WATER
RIVERS AND STREAMS
PROPERTY BOUNDARY
ZONING DISTRICTS
Business Limited 1
Business Limited 2
Governmental
Growth Center Technology
Industrial Limited
Marine
Residence 1
Residence 2
Ridge District 1
Ridge District 2
Shore
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREAS - ISSUES & OPPORTUNITIES
HISTORIC SANDWICH VILLAGE DISTRICT
TOWN OF SANDWICH
INCORPORATED 1639
MASSACHUSETTS
N
0 100 200 400 Feet

Sandwich Industrial Park and District

The Sandwich Industrial Park and District is located along Route 130 and Jan Sebastian Drive south of Route 6/Exit 2 and just north of Cotuit Road. There are 444 acres on 93 parcels containing 488,000 square feet of total building space in this strategic planning area.

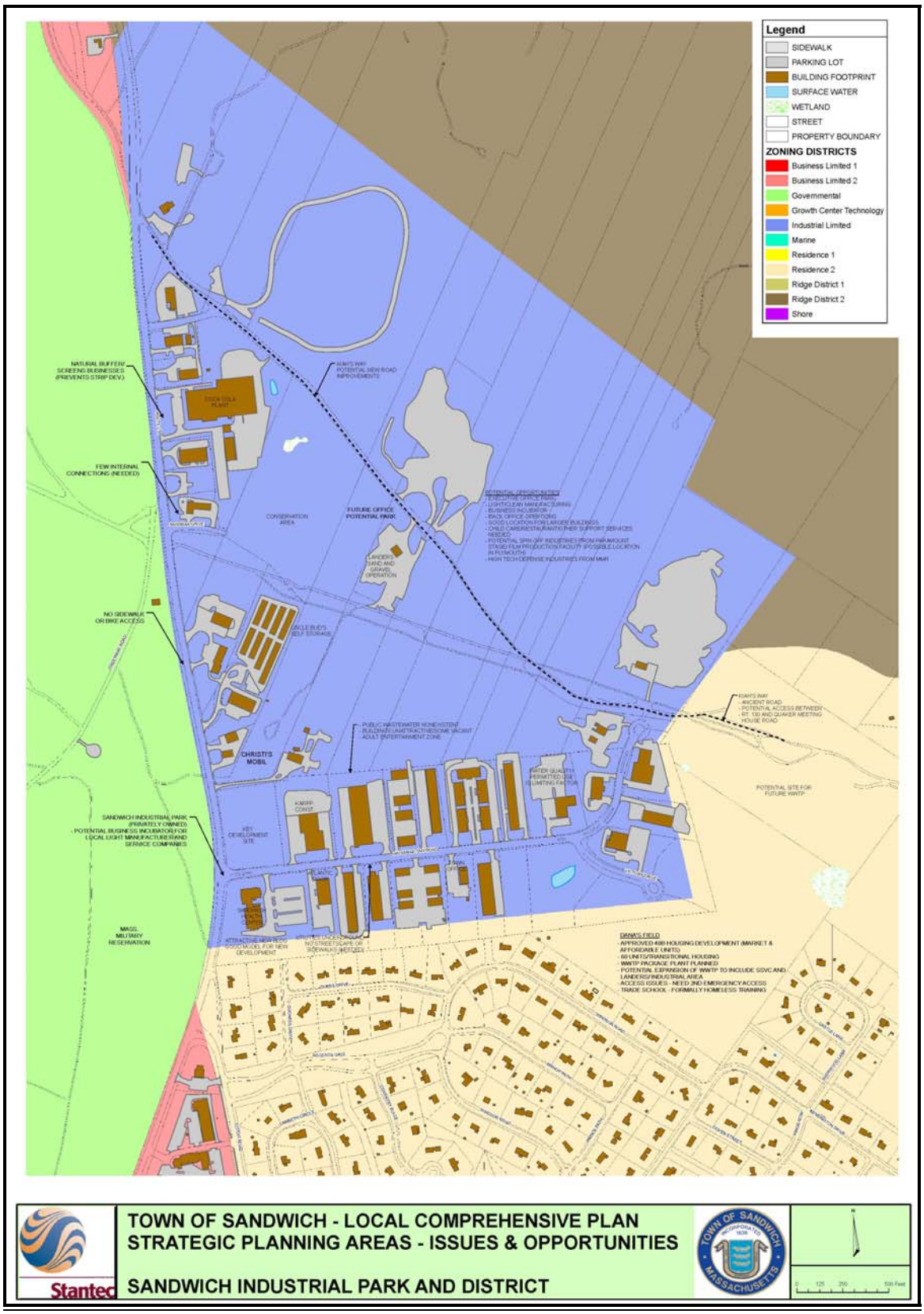
The Sandwich Industrial Park was established in the 1980s and currently includes 21 developed properties and numerous businesses. Most are service related and consist of such uses as construction, landscaping, and building materials businesses. There are also medical offices such as the new Sandwich Health Center as well as Town departments including Planning and Development, Board of Health, Building, Natural Resources and Engineering. Other businesses in the district include storage, fuel, bottling, sand and gravel, and auto repair services. The Sandwich Assessors office estimates that there are approximately 13 developable parcels containing over 226 acres.

Key Issues:

- There is limited streetscape on Jan Sebastian Drive. Electric utilities are underground but there are no formal streetscape improvements or sidewalks and only limited private landscaping;
- Jan Sebastian Drive is excessively wide with an unbroken center turn lane and no center landscaped median;
- Most buildings in the park are prefabricated metal and unattractive;
- The new Sandwich Health Center at the entrance to Jan Sebastian Drive is well designed and should serve as a model for future developments in the park;
- Currently there is a fair amount of building vacancy in the Industrial Park. There are also five vacant lots available for development;
- Businesses are predominately small service industries, storage, extraction, and small manufacturing operations;
- Permitted uses in the Industrial Zoning District are a limiting factor. Any form of mixed use would require a change in zoning;
- The park is designated as an adult entertainment zone;
- The park is located in a Zone 2 Groundwater Recharge Area which currently is a limiting factor for development;
- Internal access to areas within the Industrial District needs to be improved. Kiah's Way is a possible opportunity for improved access;
- Some portions of the area are mapped rare species habitat, and some future development activities will require review by Natural Heritage and Endangered Species Program;
- There is no central wastewater treatment system in the district;
- Dana's Fields is a permitted 40B affordable housing development with 60 units at the end of Victory Drive off Jan Sebastian Drive. It is a residential use and may not be compatible with the industrial district;
- Dana's Field has potential access and septic issues. They plan on building their own wastewater treatment system and there is a preliminary agreement with the Town to provide land for a possible public wastewater treatment plant to serve the park and possibly the South Sandwich Village Center; and
- The community has identified high tech businesses, medical and professional offices, selected light industry, marine-related businesses, and green industry as a desired use for the district, but the market demand is unproven

Key Opportunities:

- The Sandwich Industrial Park provides good opportunities for small service and start up businesses. Space is inexpensive and flexible. Other near-term potential uses are medical facilities and back office operations;
- Additional services may be needed in the future for employees such as food services and child care;
- Connections are needed between parks, nearby neighborhoods, and the South Sandwich Village Center with walkways, trails and bikepaths;


Legend
SIDEWALK
PARKING LOT
BUILDING FOOTPRINT
SURFACE WATER
WETLAND
STREET
PROPERTY BOUNDARY
ZONING DISTRICTS
Business Limited 1
Business Limited 2
Governmental
Growth Center Technology
Industrial Limited
Marine
Residence 1
Residence 2
Ridge District 1
Ridge District 2
Shore
NATURAL BUFFER SCREENS BUSINESSES (PREVENTS STRIP DEV.)
FEW INTERNAL CONNECTIONS (NEEDED)
NO SIDEWALK OR BIKE ACCESS
SANDWICH INDUSTRIAL PARK (PRIVATELY OWNED) - POTENTIAL BUSINESS INCUBATOR FOR LOCAL LIGHT MANUFACTURER AND SERVICE COMPANIES
MASS. MILITARY RESERVATION
CONSERVATION AREA
FUTURE OFFICE POTENTIAL PARK
CHRISTY'S MOBIL
POTENTIAL SITE FOR FUTURE WWTP
DANA'S FIELD
- APPROVED 408B HOUSING DEVELOPMENT (MARKET & AFFORDABLE UNITS)
- 60 UNITS/TRANSITIONAL HOUSING
- WWTP PACKAGE PLANT PLANNED
- POTENTIAL EXPANSION OF WWTP TO INCLUDE SSVC AND LANDERS/INDUSTRIAL AREA
- ACCESS ISSUES - NEED 2ND EMERGENCY ACCESS
- TRADE SCHOOL - FORMALLY HOMELESS TRAINING
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREAS - ISSUES & OPPORTUNITIES
SANDWICH INDUSTRIAL PARK AND DISTRICT
Stantec
TOWN OF SANDWICH MASSACHUSETTS
0 125 250 500 Feet

- The land swap between the town and Landers consolidates undisturbed property and created better development opportunities in the park;
- Industrial zoning revisions should be made to provide better opportunities for mixed uses;
- The Sandwich Industrial Park provides a good opportunity for a business incubator for small local companies that have the potential for growth;
- The town could create an overlay district for desired future development with specific performance standards to ensure groundwater protection in the Zone 2 recharge area;
- P.A. Landers owns a large amount of property in the district and has prepared conceptual plans for an executive office park along with light, clean manufacturing; and
- There is potential to site a public wastewater treatment plant to serve the park and SSVC. Ownership, management, and financing strategies would have to be worked out. This would help address the Mass. Marine Estuary and Zone 2 recharge area resource issues in the park and SSVC.

East Sandwich/Old Kings Highway Corridor

The Route 6A Corridor through East Sandwich extends from Quaker Meetinghouse Road west to the Barnstable Town Line. It is part of the Old Kings Highway National Historic District and there are several historic properties in Sandwich along the corridor. This Strategic Planning Area includes approximately 288 acres on 122 parcels with over 280,000 square feet of building space. There are clusters of small retail shops and services near the intersection of Wing Boulevard East and Sandy Neck Road including the Colonial Motel Shopping Plaza.

Most of the businesses along the corridor occupy converted homes and are oriented toward travelers. North of the corridor are predominately residential neighborhoods along the bay and south of the corridor is a large marsh and wetland associated with Scorton Creek. The Sandwich Assessors office estimates that there are approximately 14 acres of developable land and 1.5 acres of potentially developable land along the corridor. However, both the Old Kings Highway National Historic District and wetlands greatly restrict new development and redevelopment potential, and anticipated future uses are expected to be mostly renovations and reuses of existing buildings.

<u>Key Issues:</u>

- A fair number of deteriorated buildings exist along the corridor between Sandy Neck and Quaker Meetinghouse Road;
- The corridor is not attractive to new businesses, but has a good collection of existing businesses;
- Incentives, including tax increment financing (TIF) should be provided to existing businesses to improve properties; and
- A lack of sidewalks or bikepaths along Route 6A or Old Country Road limits alternative transportation modes.

<u>Key Opportunities:</u>

- Install a combined sidewalk and bikepath along Route 6A and Old Country Road to connect neighborhoods and commercial areas;
- Encourage high quality renovation, re-use and redevelopment of commercial and residential properties along the corridor;
- Provide more flexibility in development regulations to facilitate and encourage appropriate development; and
- Add attractive wayfinding signage in strategic locations along the corridor.

Growth Technology District-Golf Course Area

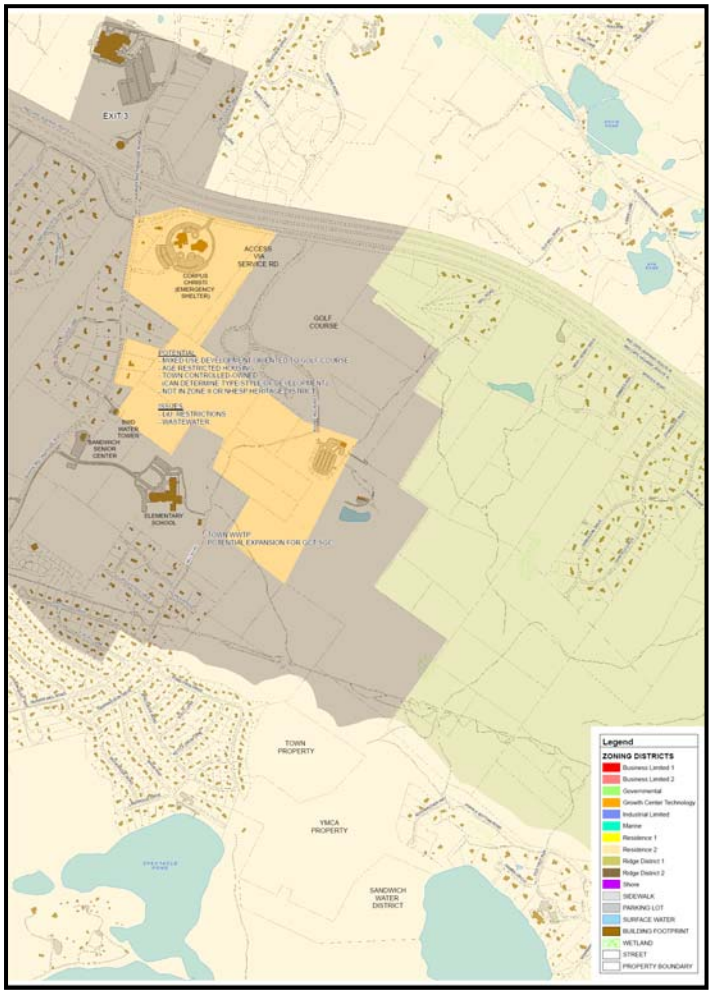
The Growth Technology District is located along the Service Road and east of Quaker Meetinghouse Road at Exit 3. The district is made up of the Sandwich Hollows Golf Course, Land Bank/town land, and the Corpus Christi Church. There are 397 acres on 55 parcels in the district with approximately 12,000 square feet of existing building space.

The town acquired the majority of land in the district several years ago to prevent a proposed residential subdivision from being constructed. The town also acquired the Sandwich Hollows Golf Course for the same purposes. While the land is highly developable and desirable for its proximity to Exit 3 and views of the Bay, the Sandwich Assessors office has determined that there is not development potential in the district. While the land is zoned for various business and residential uses, the vast majority of the land is under conservation restrictions.

Key Issues:

- Most of the town land is restricted from future development;
- The Sandwich Hollows Golf Course is owned and operated by the town the golf course revenues are being used to pay off land acquisition bonds which were used by the town to purchase the facility;
- The district is near Exit 3 and is easily access from off-Cape. However, the only access to the district is through the Service Road; and
- This is a beautiful setting with rolling hills, forests and views of the bay.

Key Opportunities:

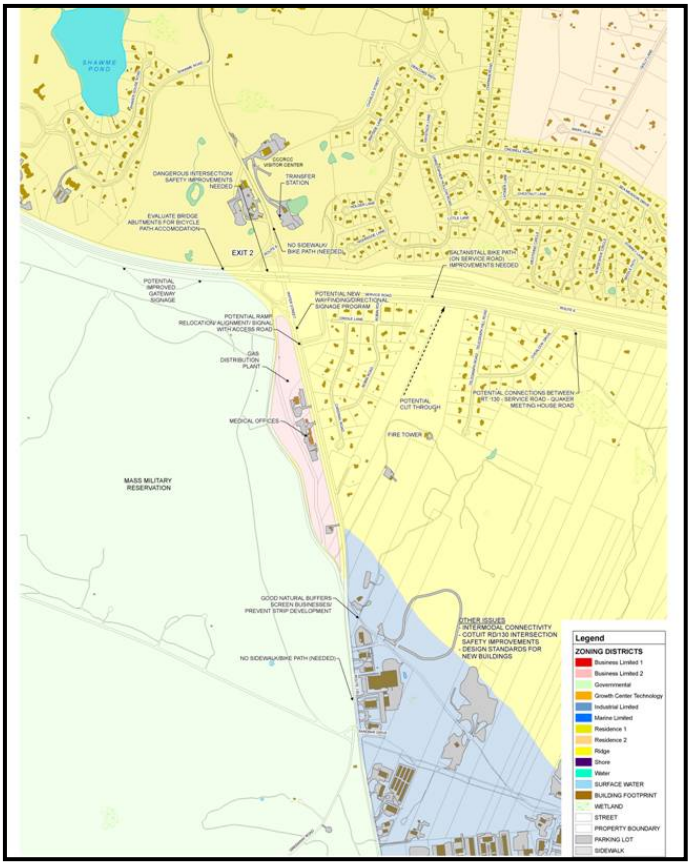


- There are some fringe parcels along the access road and golf course that would be well suited for higher end and age restricted residential uses, a small hotel/conference center, and other uses that would compliment and support the golf course;
- The clubhouse should be renovated and could potentially be redeveloped into a combination of accommodations, conference space, and golf facilities;
- Zoning regulations would need to be modified to allow for a mix of uses;
- There is potential for active and passive recreational enhancements on unused portions of the golf course and conservation land such as for athletic fields and trails;
- Selected high-quality development would compliment and add value to surrounding residences; and

- The land is town-owned and can be controlled in terms of the appropriate and acceptable mix and quality of uses.

Route 130 Medical Office District

The Route 130 Medical Office District is located along the west side of Route 130 and just south of Exit 2/Route 6. The district contains 62 acres on 49 parcels with approximately 16,500 square feet of existing building space. All of the existing buildings are used for medical offices and services and have been built over the past 20 years. The Sandwich Assessors office estimates that there is no remaining developable land based on current zoning constraints and the limitations for expansion onto the surrounding Massachusetts Military Reservation.



Key Issues:

- The district is located near Exit 2/Route 6 which can be very congested. Accessing Route 130 can be difficult;
- The land is zoned BL-2 and is predominately built up under current development requirements;
- Expansion is limited by a public gas line and easement as well as MMR which still owns some of the property; and
- Steep grades along Route 130 may pose a safety issue for access to and from the district. There are no sidewalks or bike trials currently connecting to other areas. The Saltonstall Bike Path is designated along the Service Road but no improvements have been made. There is a possibility of improvements but existing bridge abutments are not wide enough for a desired multi-modal trail.

Key Opportunities:

- Connect to other areas including the Historic Village, RHCI, Sandwich Industrial Park, and South Sandwich Village Center with new sidewalks or bike paths;
- Exit 2 improvements are currently being designed by the state; and
- Some remaining properties could be developed in the future with revisions to the zoning bylaws.

Massachusetts Military Reservation

The Massachusetts Military Reservation (MMR) is the largest single property owner in Sandwich with over 8,000 acres of land and occupying most of the western section of town. There is extensive development on the MMR including military, residential, and supporting facilities and infrastructure. There is also an extensive amount of open space on the Reservation that supports a variety plant and wildlife habitats. Future development potential is unknown at the MMR and is entirely dependant on federal and state authorities. Discussions have taken place regarding future economic development opportunities similar to the Devens Commerce Center in Central

Massachusetts. The town has been working with MMR on possible uses or connection to MMR's wastewater treatment facility to possibly service South Sandwich in the future.

East Sandwich Residential District

The East Sandwich Residential District includes the area east of Quaker Meetinghouse Road and north of Route 6 to the Bay and Barnstable Town Line. This district contains approximately 2,879 acres, of which approximately 2,081 acres are residentially developed. Most of the remaining acres are in public uses including public beaches and conservation areas. Residential development in this area was largely seasonal until the last 30 years when a trend began in converting, expanding or redeveloping summer homes into year round residences. As a result, there are concerns over stormwater, flooding and private septic systems as more residents are now living in the lowland coastal area. According to the Sandwich Assessors office there still remain over 300 acres of developable land in East Sandwich and 100 acres of potential developable land (Detailed natural resource constraints in the East Sandwich Residential District are discussed in detail in *Section 7: Natural Resources*).

North Sandwich Neighborhoods

The North Sandwich Neighborhoods include the residential area north of Route 6 and west of Quaker Meetinghouse Road except for the Route 6A/Tupper Road/Marina Area, Historic Village and the Historic Village Neighborhoods. There are approximately 2,716 acres in the district of which 1,412 acres (and 2,031 parcels) are in residential use. This represents the second highest number of dwelling units in town next to the South Sandwich Residential Area. Most of the remaining acres are in public uses such as for public beaches and conservation areas.

The Town Neck neighborhood along Sagamore Beach was originally developed in the early 1900s as a seasonal resort. This neighborhood is the most densely developed in Sandwich with most lots under 10,000 square feet. Many of the other neighborhoods in the district (i.e. those off of Route 6A and Route 130) were constructed in the last half of the 20th century and have more suburban characteristics including larger frontages and lot sizes and non-traditional architecture. The Sandwich Assessors office estimates that the North Sandwich Neighborhoods has approximately 268 acres of developable land and 31 acres of potentially developable land.

Scusset Beach Area

The Scusset Beach Area includes the northern tip of Sandwich north of the Cape Cod Canal and Sagamore Bridge. The area includes 588 acres on 239 parcels. Most of the land (477 acres) is in public ownership, including Scusset Beach State Park and the Cape Cod Canal access road (trail). There are 67 residential lots located on the bay side which are used for a combination of seasonal and year round residences. The Sandwich Assessors office estimates that there are approximately 8 acres of developable land in this area that would primarily be used for residential use.

Village Center Neighborhoods

The Village Center Neighborhoods are those older residential areas that surround the Sandwich Historic Village. These neighborhoods include 360 acres on 321 parcels of which 241 parcels are in residential use. There has been limited new construction in this area over the last 20 years and substantial renovations and additions have been made to older homes. These neighborhoods are considered some of the most prestigious in Sandwich. There are, however, isolated areas of deterioration, such as in Jarvesville. The Sandwich Assessors office estimates there are approximately 6 acres of developable and potentially developable land in this area.

Ridge District

The Ridge District includes all of the area south of Route 6 and north of Kiah's Way except the Growth Technology/Sandwich Hollows Golf Course. There are 1,939 acres of 544 parcels and 934,670 square feet of building space. Most existing development is in newer residential uses (832 acres on 421 residential parcels). A commercial use includes the RHCI facility on the Service Road between Exits 2 and 3. The Sandwich Assessors office estimated that there are 262 acres of developable lands remaining in the Ridge District.

The district includes some of the most developable lands remaining in Sandwich, but a large portion (913 acres) is publicly owned conservation land. Some of the land is also designated wildlife habitat. Limited accessibility is also a key issue, particularly between Route 130 and Quaker Meetinghouse Road. It has been suggested over the years (including in the 1970 Local Comprehensive Plan) that Kiah's Way should be upgraded to make this connection, opening up the Ridge District and improving local traffic circulation. This idea, however, has proven to be very controversial and has never been acted on. While the town owns property along the Kiah's Way corridor, it has not allowed for interconnection between Route 130 and Quaker Meetinghouse Road.

South Sandwich Residential Area

The South Sandwich Residential Area includes all of the land south of the Ridge District and east of Route 130. The area includes 3,869 acres on 3,222 parcels with 5.7 million square feet of building space. Most of the residential development in Sandwich between 1960 and 2000 occurred in this district. A total of 2,383 acres (62 percent) of the land area in this district is in residential use, predominately single family homes on one acre lots. Most of the remaining lands (1,414 acres) are in public conservation, schools or recreational uses. This includes the Oak Ridge School, YMCA summer camps, and town conservation lands in the 3-Pond Area. The Sandwich Water District services most of the district providing public water supply. However, all wastewater is treated on individual septic systems except for the Oak Ridge School, which has a small wastewater treatment plant which also takes in the Sandwich Hollows Golf Course wastewater. The Sandwich Assessors office estimates that there are approximately 251 acres of developable lands remaining in the district, most of it in the 3-Pond Area.

Forestdale Residential Area

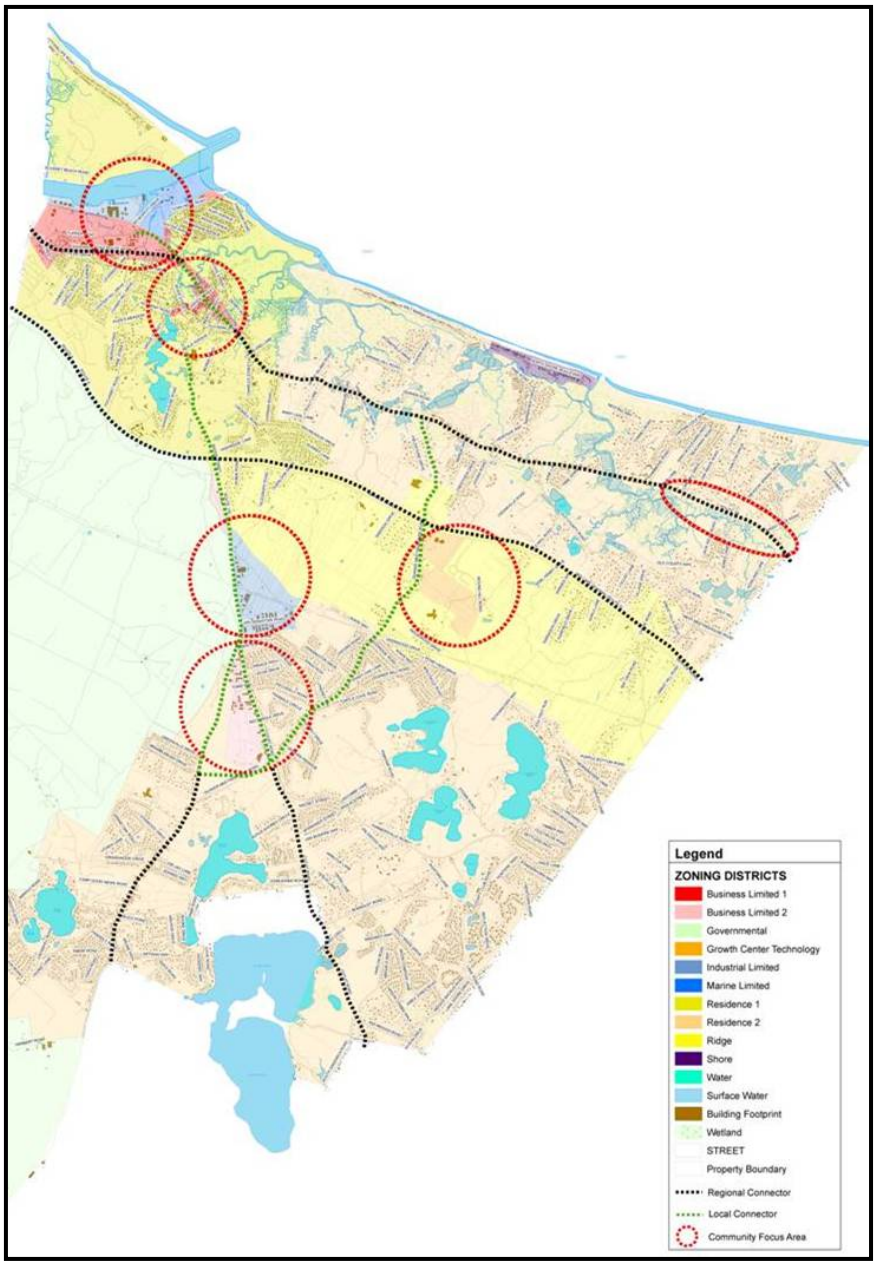
The Forestdale Residential Area includes the area in south central Sandwich between Route 130, the Massachusetts Military Reservation, and the Mashpee Town Line. There are approximately 2,370 acres in the district on 1,752 parcels and 2.9 million square feet of building space. There are approximately 1,545 acres (65 percent) in residential use and 671 in public uses, including the Forestdale School and recreational facilities associated with Snake Pond and Peters Pond. Most of the residential development in this area occurred between 1960 and 2000.

P.A. Landers Sand and Gravel operation off Route 130 and on Peter's Pond is a significant commercial property, and there are scattered commercial uses along Route 130 toward the Mashpee Town Line. The Sandwich Assessors office estimates that there are approximately 277 acres of developable land and 7 acres of potentially developable land in the Forestdale Residential Area.

Corridors and Roadside Districts

While not designated as Strategic Planning Areas or Growth Centers, the Local Comprehensive Plan recognizes several transportation corridors in Sandwich that serve as key connectors to established districts in town. These include the Route 130 Corridor between the Historic Village and South Sandwich Village Center, Quaker Meetinghouse Road between Route 6A and Route 130, the entire length of Route 6A and the Service Road.

These local and regional connectors are key to targeted growth and development in Sandwich. Maintaining the rural character of these corridors, controlling access and managing curbcuts, and providing multi-modal transportation facilities (such as sidewalks and bike trails) are important land use objectives.



Sandwich Exisitng Land Use By Strategic Planning Area

Land Use Category	Town-Wide		Subdistrict																													
			EOKH		ESRD		FRA		GTC		HVC		MT6A		MMR		NSN		RD		R130MP		SIP		SSRA		SSVC		SBA		VCN	
	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels	Total Acres	# of Parcels
Agricultural Uses Total	185.5	29	0	0	95	12	7	1	0	0	0	0	0	0	0	0	59	11	0	0	0	0	0	0	9	1	0	0	0	0	0	0
Commercial Uses Total	404.4	160	24	17	17	10	96	5	0	0	15	32	112	57	0	0	27	7	32	1	3	1	17	6	8	3	84	22	0	0	1	2
Industrial Uses Total	375.5	60	0	0	0	0	6	1	0	0	0	0	145	28	0	0	0	0	12	2	2	1	213	29	0	0	0	0	0	0	4	1
Mixed Use Land Total	145.3	84	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Public Services/Attractions Total	406.6	36	1	2	5	2	234	5	0	0	4	6	1	1	0	0	60	5	90	5	0	0	0	0	10	8	2	1	0	0	2	2
Public Uses Total	13,649.8	483	104	15	636	96	438	68	351	10	10	7	79	10	8,394	1	1,113	108	913	70	14	3	71	10	825	45	158	5	477	10	99	31
Recreational Uses Total	606.3	16	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	16	1	0	0	0	0	589	14	0	0	0	0	0	0
Residential Uses Total	8,634.3	9,346	115	44	2,081	1,754	1,545	1,628	2	1	26	61	50	64	0	0	1,412	1,856	832	421	0	0	99	4	2,383	3,107	10	1	67	185	210	241
Grand Total	24,407.7	10,214	288	122	2,879	1,918	2,370	1,752	397	55	100	151	431	204	8,438	45	2,716	2,031	1,939	544	62	49	444	93	3,869	3,222	298	73	588	239	360	321

Developable Land by Strategic Planning Area

Subdistrict	Developed Land		Undevelopable Land		Potentially Developable Land		Developable Land	
	# of Parcels	Acres	# of Parcels	Acres	# of Parcels	Acres	# of Parcels	Acres
East Old Kings Highway Corridor	82	269.36	3	2.77	2	1.40	10	13.99
East Sandwich Residential District	1,695	2,718.62	92	112.63	26	102.78	181	330.65
Forestdale Residential Area	1,656	3,438.67	22	6.44	7	7.23	128	276.83
Growth Technology Center/Golf Course	13	367.66	0	0.00	0	0.00	0	0.00
Historic Village Center	107	53.72	9	5.25	0	0.00	5	1.74
Marina/Tupper Road/Route 6A	140	343.19	1	0.47	4	6.72	37	56.35
Massachusetts Military Reservation	1	8,393.96	0	0.00	0	0.00	0	0.00
North Sandwich Neighborhoods	1,862	2,832.48	60	57.03	31	8.07	100	268.44
Ridge District	460	1,758.25	7	25.53	1	0.50	52	262.17
Route 130 Medical Park	6	20.45	0	0.00	0	0.00	0	0.00
Sandwich Industrial Park and District	49	296.46	1	0.26	0	0.00	13	226.84
Scusset Beach Area	159	532.47	29	13.62	1	0.16	13	8.19
South Sandwich Residential Area	3,123	4,044.80	12	52.28	5	2.91	127	251.38
South Sandwich Village Center	25	308.98	0	0.00	0	0.00	8	30.72
Village Center Neighborhoods	265	300.45	11	15.20	3	0.83	9	5.89

1.6 Land Use Regulations

Sandwich has both a comprehensive Zoning By-law and Subdivision Regulations that contain a number of innovative growth management techniques including growth control, cluster development, surface water protection, and an affordable housing conditional density provision. Sandwich's zoning also has some weaknesses: a very limited site plan review provision, an undefined planned unit development provision and a variety of uses that should be reconsidered. The Land Use Action Plan identifies particular land use regulations within the town that should be revised, adopted, eliminated and/or streamlined.

Zoning By-law
The Sandwich Zoning By-Law divides the town into 11 regular zoning districts and 6 overlay districts including the following:

- Residence Districts (R-1 & R-2);
- Ridge District (RD-1 & RD-2);
- Shore District (S);
- Business Limited (BL-1 & BL-2);
- Marine Limited (MAR);
- Industrial Limited (IND);
- Governmental District (GD);
- Growth Center Technology District;
- Adult Entertainment District;
- Flood Plain Districts ;
- Parking Overlay District;
- Surface Water Protection District;
- Three Ponds District Water Resource Overlay District; and
- Wireless Telecommunications Overlay District

The boundaries of these districts are defined by the Sandwich Zoning Map that was last amended on May 2, 2005.

The majority of land within Sandwich is zoned for residential use, with only five relatively limited areas zoned for business activities and two for industrial purposes. A Marine District and a Shore District each allow for special waterfront uses. The extensive Massachusetts Military Reservation (MMR) has its own Government District designation. Another special district is the Ridge District, which is intended to provide for flexible development of large-scale tracts while "preserving or enhancing views of the bay from public ways; and preserving or enhancing landscaping or tree cover." The Business Limited 1(BL-1) zoning district specifically addresses protecting the character of historic environs" in its purpose section, while the Business Limited 2 (BL-2) district is intended for more intense commercial development. The Industrial Limited District reserves certain lands for exclusive industrial and commercial use "while providing a visually pleasing landscaped area compatible with the town's history."

District Purposes and Location – The purpose of the primary zoning districts as defined by the zoning by-law are as follows:

- **Residence R-1:** To provide higher-density residential environment in areas serviced with public utilities. The R-1 District includes most of the residential neighborhoods in the northwest side of Sandwich north of Route 6;
- **Residence R-2:** To provide for low-density residential environment in areas of good

accessibility while protecting the quality of air, surface water and ground water of the area. The R-2 District includes most of the area in the southeast area of Sandwich including neighborhood areas in the 3-Pond Area and around Peter's Pond;

- **Ridge RD-1 & RD-2:** To provide for flexible development of large-scale tracts, allowing development for regional service and residences near expressway interchanges and to allow variety and choice in residential development; at the same time preserving or enhancing views of the bay from public ways; preserving or enhancing landscaping and tree cover; and minimizing visibility of parked autos, avoiding creation of hazards or congestion, and assuring compatibility with low-density residential development. The RD-1 and RD-2 Districts include the rural residential areas south of Route 6 and north of Kiah's Way;
- **Shore (S):** To provide for travel accommodations in areas already containing such uses. The Shore District includes the North Shore Boulevard Neighborhood along the Bay in north central Sandwich;
- **Business Limited (BL-1):** To provide for small-scale business development for local and transient service, at the same time preserving or enhancing ocean views from highways, protecting the character of historic environs, preserving or enhancing landscaping, and minimizing visibility of parked autos and avoiding creation of hazards or congestion. The BL-1 District is located along Route 6A and Tupper Road in northwest Sandwich, the Historic Village, on Sagamore Beach (Horizon's Restaurant) in the Town Neck Neighborhood and small area along Route 130 in Forestdale;
- **Business Limited (BL-2):** To provide for all scale of business development for local, regional, or transient service, with purposes otherwise the same as for BL-1. The BL-2 District is located in the Route 130 Medical District and the South Sandwich Village Center between Route 130, Cotuit Road and Quaker Meetinghouse Road in South Sandwich;
- **Marine Limited (MAR):** To preserve oceanfront for ocean related uses consistent with ecological protection. The MAR District is located along the Cape Cod Canal in north Sandwich and includes the Sandwich Marina and recreation area;
- **Industrial Limited (IND):** To preserve uniquely serviced areas for exclusive Industrial or commercial use, while providing a visually pleasing landscaped areas compatible with the town's history. The IND District is located along the Cape Cod Canal and includes the Mirant Power plant, and the Sandwich Industrial Park and adjacent areas along Route 130;
- **Government District (GD):** To provide for necessary governmental functions, public recreation, and conservation on publicly owned lands. The GD District includes the Massachusetts Military Reservation; and
- **Growth Center Technology District (GCTD):** To provide for small and medium scale business or commercial developments related solely to research, development, manufacturing, assembly or transmission of goods or information related to computers, medicine, high-technology, finance, science, education and electronic transmission of information and other specified related uses. Also, to provide for small and medium scale office space for medical doctors and patient services. The GCT District includes the area along Quaker Meetinghouse Road and the Service Road at Exit 3, south of Route 6 and adjacent to the Sandwich Hollows Golf Course

Overlay Districts - The Adult Entertainment Overlay District (Section 3920), Flood Plain District (Section 4310), Parking Overlay District (Section 3111), and Water Resource Overlay District (Section 5010) are superimposed over any other district. The Surface Water Protection District (5100), which comprises the area within 300 feet of any surface water pond, is also superimposed over any other district. The Wireless Telecommunications Overlay District (Section 3820) is established as an overlay district for new telecommunications facilities that are

constructed exclusively for the purpose of transmitting and receiving television, AM/FM radio, digital, microwave, cellular, telephone or similar forms of electromagnetic radiation.

The Overlay Districts are superimposed over other districts to impose supplementary requirements or provide a mechanism to encourage or shape development. A few of these districts are intended to protect natural resources, including the Flood Plain District (whose boundaries are based on the 100-year flood elevations established by the Federal Emergency Management Agency), the Surface Water Protection District (applying to any area within 300 feet of surface water ponds), and the Water Resource Overlay District (to preserve Sandwich's groundwater resources).

- **Three Pond District:** This district, encompassing approximately 692 acres and Lawrence, Spectacle and Triangle ponds, is one of the least developed areas in Sandwich. It has been a location of large summer camps, which suggests that it is a cultural landscape worthy of special protections. The sensitive environmental qualities of the area have prompted the town to overlay additional regulations on the existing R-2 low-density residential district. Among the objectives stated for this district in Article VII of the zoning bylaw is to "*preserve the scenic character of district roads as well as views of pond shores and woodlands*." Uses are more limited than in the underlying district, and some are subject to obtaining a Special Permit. To date these conditions have served to limit development in the district. The purpose and objectives of the Three Ponds District are to accomplish the following:

  - Protect to the greatest extent possible surface and groundwater quality;
  - Preserve rare and endangered species and habitat existing within fragile ecosystems;
  - Preserve the scenic character of district roads as well as views of pond shores and woodlands;
  - Provide for carefully planned land uses such as small-scale, densely clustered residential development with recreational amenities of an appropriate scale;
  - Preserve existing single-family homes;
  - Foster the existing open space and recreation land uses including summer camps and uses that encompasses both recreation and education;
  - Allow for additional recreational uses compatible with resource protection; and
  - Manage growth in a manner that will not adversely affect municipal infrastructure

  Within Article VII of the Three Ponds District, a plan was prepared by the Cape Cod Commission in 2001. The plan delineated a "Preservation Zone" to be applied to areas too environmentally sensitive for development and was made a "sending" zone in a "Transfer of Development Rights" (TDR) provision. TDRs are sophisticated regulations that serve to address property rights issues arising when development is totally disallowed on certain tracts of land. The regulation allows development that would previously have been allowed on one tract, a "sending zone," to be transferred to a "receiving zone". In Sandwich's case, the receiving zone would be an adjacent parcel. The adjacent land may then be developed to a higher intensity of use, in excess of the number of units that would have been otherwise allowed. Pond shoreline buffer requirements, limiting what can happen within 300 feet of the three ponds, serve to protect potential archaeological sites, as noted previously. The Three Ponds District also requires 100-foot setbacks and landscape buffering for new structures located along designated Scenic Road Corridors, which are portions of Farmersville Road, Pinkham Road, Great Hill Road and all of Stowe Road. Shared driveways are encouraged in the district.

- **Parking Overlay District** – The Parking Overlay District is located within the historic village center and the Town Hall Square Historic District. This relatively recent amendment to the zoning bylaw allows for shared use of parking lots and specifically allows religious institutions to use town-owned parking lots towards satisfaction of their parking needs and requirements. This helps reduce the pressure to abandon historic religious structures, many of which are located in thickly settled areas and do not have adequate land to provide off-street parking.

- **Water Resource Protection District** – The purpose of Article V of the zoning bylaw is to protect the town's groundwater resources in order to ensure a safe and healthy public water supply. The designated area is extensive, covering primarily low density residential and the government districts, though it also extends into industrial and commercial districts. This regulation provides a dampening effect on the amount of development that can be accommodated, thereby preserving existing patterns of development and some significant cultural landscapes.

Intensity and Use Requirements – The Sandwich Zoning Bylaw establishes dimensional standards (i.e. minimum lot size, height, frontage, setbacks, etc.) under Section 2600 which are as follows:

Sandwich Zoning By-Law Dimensional and Intensity Requirements

Dimensional Requirements	R-1	BL-1(a), MAR, S	BL-2	IND	R-2, GD	RD-1	RD-2
Minimum lot size in square feet (b, h, l)	40,000	20,000	40,000	40,000	60,000	60,000	60,000
Minimum lot frontage in feet	150	125	150	150	200	200	200
Minimum front yard in feet (c)	30	30	30 (f)	30 (f)	50	40	40
Minimum side & rear yard in feet (c, d, e, i)	25	0	0	30 (m)	45	30	30
Maximum lot coverage %	25	None	None	None	25	25	25
Maximum building height (g) in feet (Amended STM 4/1/96)	35	35	35	45	35	35	35
Maximum shape factor (k)	22	22	22	22	22	22	22

Intensity Of Use Schedule Notes:

a.) Permitted residential uses must conform to the requirements at the nearest residential district.

b). Hotels, motels, motor courts, lodging houses and cottage colonies must meet this requirement and must provide not less than 12,000 square feet per dwelling or guest unit.

c). On special permit from the Board of Appeals, may be reduced to the lesser of thirty percent (30%) of lot depth or the average of the setbacks of the buildings on the lot next thereto on either side, a vacant lot or a lot occupied by a building set back more than the minimum requirement being counted as though occupied by a building set back by the minimum.

d). One-story accessory buildings may be located within a required yard, but not less than ten (10) feet from lot lines other than street lines; except an accessory building of one hundred (100) square feet or less may be located no closer than six (6) feet to the line.

e). No building or any part thereof, except steps, shall be built within twelve (12) feet of any other building.

f). If abutting an arterial street, sixty (60) feet front yard setback is required and to be maintained with vegetation.

g). A special permit may be granted by the Board of Appeals in accordance with Section 4160 for a height greater then the maximum building height for the District. (Amended 1/14/08). A special permit may be granted by the Board of Appeals in accordance with Section 4160 for a height greater then the maximum building height for the District. (Amended 1/14/08)

h). For two family dwellings on lots shown on a plan recorded at the Barnstable County Registry of Deeds prior to March 1, 1982, increase the lot area by fifty (50) percent of present requirements; for all others increase lot area by one hundred (100) percent of present requirements, except as authorized under Section 4130.

i). Any business abutting a residential district, or an existing residence in a business district will, in the Business Limited-l, Shore, and Marine Districts be required to have a minimum side and rear yard setback of twenty (20) feet. In the Business Limited-2 District, the minimum side and rear setback will be thirty (30) feet. The minimum side and rear yard setback will only apply to those yards directly abutting a residence.

j). A special permit may be granted by the Board of Appeals to construct an addition to a structure with an existing nonconforming setback, provided, however, that this nonconformity is not increased.

k.) The lot shape factor shall be obtained by dividing the square of the perimeter enclosing the lot area necessary for zoning compliance (P) by the minimum lot area required in the Zone (A) i.e.: [P (squared)/A < 22]

l). Minimum lot area requirements for all principal uses in residential districts located within a Water Resource District, as described in Section 5000, shall be 87,120 square feet.

m). Any industrial use abutting any other district shall be required to have a minimum rear and side yard of 100 feet.

n). Any use within the RD-2 District which entails medical office or medical services and technology use(s) shall be located on a parcel or lot of no less than five (5) acres and shall be accessory to a principal use as a Hospital, Continuing Care Retirement Community (CCRC) or Rehabilitation Hospital

o). Within the RD-2 District, multiple principle non-residential buildings may be authorized under special permit as provided in Section 1320. A special permit shall not be required for any Accessory Building or Use.

The majority of the land in Sandwich is zoned for residential use and is divided between three established residential districts: R-1, R-2, and Ridge. R-2 is intended to provide lower density development and R-1 is intended to provide higher density development in areas that are serviced by public utilities. Minimum lot size in the R-2 and Ridge districts is 60,000 square feet, and R-1 is 40,000. The Ridge district is intended to provide flexible development for large scale tracts of land. Given that there is no public wastewater treatment facility in Sandwich, the minimum lot size, coverage, and setback requirements appears to be well suited to local conditions for residential development. The required frontage, however, at 125 to 150 feet may be unnecessarily wide resulting in longer roadways that are more expensive to construct and maintain. Permitted uses appear to be appropriate in the residential districts.

The use regulations provide for a variety of different agricultural, commercial, residential, industrial, institutional, recreational and accessory uses. Most uses, however, are not allowed by right but by special permit from the Planning Board or Zoning Board of Appeals. This can make the process of development review lengthy and cumbersome even for uses that would typically be permitted in given districts.

In the two established business districts, BL-1 and BL-2, the use table provides for a very limited number of business development activities. While the intensity regulations in terms of lot size appear to fit local conditions with a lack of public wastewater treatment, the required frontage, coverage and setbacks are more characteristic of strip commercial development than traditional town centers. This is a particular issue in the Historic Village where developments have narrow lots (typically 50-100 feet), and significantly higher coverage and floor area ratios (FAR) than are permitted in the zoning bylaw. These dimensional requirements will also make it difficult to create village design and uses in targeted areas such as the South Sandwich Village Center and the Route 6A/Tupper Road/Marina Area.

Permitted Uses by Zoning District

PRINCIPAL USES	R-1, R-2 (6)	BL-1, BL-2	IND	MAR	RD-1, RD-2	S	GD	Comments
AGRICULTURAL USE								
Farm with pigs, foxes, mink; more than 100 cattle or 1000 poultry **(1)(2)**	Y	Y	Y	Y	Y	Y	Y	Large farms may not be compatible or desirable in certain residential areas or business and industrial districts. Additional performance standards are needed
Others **(2)**	Y	Y	Y	Y	Y	Y	Y	
COMMERCIAL USE								
Animal kennel or hospital	N	S	S	N	N	N	N	
Bank, funeral home	N	S	N	N	N	N	N	Banks should be allowed by right in Bus. Districts but drive-thru and funeral home parking should be controlled by performance standards
Boat and motor vehicle servicing and repair	N	SA	SA	SA	N	N	N	

Boat and watercraft storage building	N	N	N	N	S	N	N	Should be allowed by SP and with performance standards in MAR and IND zone
Car wash	N	SA	SA	SA	N	N	N	
Commercial Marine Fishing Equipment Storage	N	N	Y	Y	N	N	N	
Dry cleaning	N	SA	SA	N	N	N	N	
Major commercial complex **(3)**	N	S	N	N	N	N	N	
Marine Medical & Rehabilitation Facility	S **(6)**	N	N	S	N	N	N	
Medical Offices	N	N	N	N	RD-1 N RD-2 Y	N	N	Should be allowed by SP and with performance standards in BUS and IND zone
Medical Services and Technology (See Definitions)	N **(6)**	S	S	N	N	N	N	Same as above
Office (See Definitions)	N	S	S	N	N	N	N	Should be allowed by right in BUS, MAR and IND zones
Other retail business or service	N	S	S **(5)**	S	N	N	N	Should be allowed by right in BUS and MAR zones
Restaurant	N	S	S	S	N	N	N	Should be allowed by right with performance standards in BUS and MAR zones
Tattoo/Body Art Establishment	N	N	N	S	N	N	N	Should not be allowed in MAR but with SP in Bus zones
Technology Business or Service	N	N	S	N	N	N	N	Should be allowed by right in BUS, MAR and IND zones
Wholesale and Retail Warehouse (STM 92)	N	N	S **(7)**	N	N	N	N	
INDUSTRIAL/UTILITY USE								
Bulk storage, warehouse	N	N	S	N	N	N	N	Should be allowed by right in IND zone with performance standards
Contractors yard	N	N	S	N	N	N	N	Should be allowed by right in IND zone with performance standards
Covered road salt stockpile on impervious surface	N	N	SA	N	SA	N	SA	
Disposal Area:								
Disposal – Public, Salvage yard	N	N	SA	N	N	N	N	
Sanitary landfill	N	N	SA	N	SA	N	N	
Private	N	N	N	N	N	N	N	
Earth removal (See Section 4200)	N	N	S	N	N	N	N	
Heliport	N	S	S	N	N	N	N	
Manufacturing, processing, trucking terminal	N	N	S	N	N	N	N	Should be allowed by right in IND zone with performance standards
Metal plating	N	N	SA	N	N	N	N	
Municipal sewage treatment with onsite disposal of secondary-treated effluent	N	N	SA	SA	N	N	N	
Power generation (Amended 5/4/98)	N	N	S	S	N	N	N	
Research laboratory, Chemical, bacteriological lab	N	SA	SA	SA	SA	N	N	Should be allowed in IND district by right with performance standards
Sale, storage or distribution of fuel oil or gasoline as principal activity	N	S **(4)**	N	N	N	N	N	
Use of toxic or hazardous materials in quantities greater than associated with normal household or agricultural use	N	SA	SA	SA	SA	N	N	
INSTITUTIONAL USE								
Cemetery	S	S	N	N	Y	S	N	
Hospital, nursing home, convalescent home (See Definitions)	S	S	N	N	S	S	N	
Municipal use not more specifically cited	Y	Y	Y	Y	Y	Y	Y	

Museum	S	S	N	N	Y	S	N	
Philanthropic institutions, clubs	S	S	N	N	Y	S	N	
Rehabilitation Hospitals (See Definitions)	N	N	N	N	R-D1 N RD-2Y	N	N	
Religious Use	Y	Y	Y	Y	Y	Y	Y	
School: Public, sectarian denominational, or by a non-profit educational corporation	Y	Y	Y	Y	Y	Y	Y	
RECREATIONAL USE								
Bicycle club, bicycle club competition facilities	N	N	N	S	N	N	N	Unusually specific use
Campground	N	N	N	N	N	N	N	Should be allowed in specific districts with performance standards
Cinema, theatre, auditorium, indoor sports are, health club, bowling, game room, (Amended 11/18/97)	N	S	S	N	N	N	N	Should be allowed by right in BUS district with performance standards
Commercial picnic area, bath house, beach	S	S	N	S	S	S	N	
Drive in movie theatre, race track, amusement park, cart track, miniature golf, token or coin operated video arcade, pinball machines, (Amended 11/18/97)	N	N	N	N	N	N	N	
Golf course standard or 3 par	S	S	S	N	S	S	N	
Marina	S	S	N	S	N	S	N	Would not be appropriate in BUS districts
Outdoor recreational facility (See section 4150)	S	S	N	N	S	S	N	May be appropriate in MAR and IND districts
Recreation Facility	N	S	N	S	S	S	N	May be appropriate in any district
Stables, riding school (8)	N	S	N	S	S	S	N	May not be appropriate in BUS districts but rural residential districts
Spa 11	S	N	N	N	N	N	N	May be appropriate in IND district with such large land requirements
Sportsmen's club, game preserve	Y	S	N	S	S	S	N	
RESIDENTIAL USE								
Single-family	Y	S	N	N	Y	Y	N	Appropriate in BUS and MAR district if attached
Two-family	S	N	N	N	N	N	N	
Multi-family (see section 4115)	S	S	N	N	N	S	N	Appropriate in MAR district if mixed use is desired
Bed and Breakfast (See Article VII Definitions)	S	S	N	N	S	S	N	
Cluster Development (See Article 4400)	S	S	N	N	S	S	N	
Continuing Care Retirement Community	S	S	N	N	S	S	N	May be appropriate in IND district
Cottage Colony	N	S	N	S	S	S	N	
Lodging House	N	S	N	S	S	S	N	Would be appropriate along with hotels and conference centers in BUS, IND and MAR districts with performance standards
Mobile Home Park	N	N	N	N	N	N	N	
Motel or Motor Court	N	S	N	S	S	S	N	
2320. ACCESSORY USES								
Accessory Apartment (see Section 4115)	Y	N	N	N	Y	Y	N	May be appropriate in MAR and BUS districts if mixed use is desired
Accessory Dwelling Unit (see Section 4130)	S	S	N	N	S	S	N	
Camper Storage (see Section 4120)	Y	Y	Y	Y	Y	Y	N	
Commercial Marine Fishing Equipment Storage	Y	BL-1 Y BL-2 N	Y	Y	Y	Y	Y	
Common Driveway	S	S	S	S	S	S	S	

Home Occupation (12) (See Section 4110)	Y	Y	Y	Y	Y	Y	N	
Lodging for not more than six guests	Y	Y	Y	Y	Y	Y	N	Would be appropriate along with larger hotels and conference centers in BUS, IND and MAR districts with performance standards
Parking (10)	Y	S	S	S	S	S	N	Parking should not be controlled as an accessory use or by SP but through proper design criteria and performance standards
Private Garage, boat house	Y	Y	Y	Y	Y	Y	N	
Sales of produce, 50% or more raised premises	Y	Y	Y	Y	Y	Y	N	
Stables(9)	Y	Y	Y	Y	Y	Y	Y	
Temporary construction office	Y	Y	Y	Y	Y	Y	N	
Residential Wind Turbines (See S. 4160) STM 1/14/08	S	N	N	N	S	S	N	

Use regulation schedule notes:

Y = A permitted use.

N = An excluded or prohibited use.

S = Use authorized under Special Permit as provided for in Section 1320 herein.

SA = Use authorized under Special Permit as provided for in Section 1380 herein. (Amended 5/4/98)

1 Only on premises of five (5) acres or more, otherwise "N". Structures containing such animals not to be located within 100 feet of a lot line or within 200 feet of a dwelling not on the same lot.

2 Not more than two cattle per acre or their equivalent in terms of waste products shall be allowed unless special waste handling procedures satisfactory to the Board of Health are provided.

3 See definition.

4 Reserved for future use. (Amended 5/4/98)

5 No more than 40% of the floor space to be used for retailing. Products to be retailed must be directly related to the primary industrial activity.

6 May be allowed in the R-1 and R-2 Districts only on lots having both a minimum of 200 feet of frontage on Route 130 and a minimum of two acres in lot area. In the R-1 and R-2 Districts, all buildings, structures and parking areas for this use shall have a minimum side and rear setback of 50 feet.

7 Only on lots of fifteen (15) acres or more, within a single building containing at least 10,000 square feet of floor area, of which no more than 75% is used for retailing. (Added STM 8/92)

8 Only on parcels of five (5) acres or larger

9 But not more than one horse on less than one acre.

10 For six (6) or more cars.

11 Not allowed on parcels less than 25 acres in area. Setback requirements of the district are doubled for spa lots. The spa lot must maintain a 50' undisturbed vegetated buffer around the lot perimeter.

12 Tattoo/Body Art Establishments shall be prohibited as home occupations.

13 In the R-1, R-2, Ridge, Shore and BI-1 such storage shall be limited to one boat and one boat trailer per principal use.

14 Any permitted use allowed as a matter of right ("Y") within the RD-2 District shall be subject to, at the discretion of the Building Inspector, Site Plan Review, which shall include a review by the appropriate town agencies and departments prior to the issuance of a building permit, said review to be coordinated by the Town of Sandwich Office of Planning and Development.

The Shore district, a small strip along Cape Cod Bay, allows uses related to travel accommodations (i.e. small hotels, bed and breakfasts) where such uses already exist. Most uses in this district, however, are only allowed by special permit. The industrial district is intended exclusively for industrial or commercial uses. Industrial zones exist along the Canal and Route 130 and include the Mirant Power plant, the former town landfill, Jan Sebastian Drive (the Sandwich Industrial Park) and the gravel pits near Peters Pond. While commercial and residential uses may not be appropriate in the Sandwich Industrial Park, they may be suitable and complimentary to surrounding uses in the Industrial district on Tupper Road near the Town Marina.

The Town of Sandwich has established a special Marine district to allow uses that are compatible with preservation of the oceanfront. Commercial and residential uses, however, are fairly

restricted in this area which deters mixed use along the Canal and new opportunities for economic development.

There are two zoning districts in Sandwich that are largely unusable. The first is the Governmental District that encompasses the Massachusetts Military Reservation. The second is the Growth Center Technology District, which is located along Quaker Meetinghouse Road south of Route 6. While it provides for uses related to research, high-tech, and other related uses as well as medical offices and services, most of the land is in public conservation and can not be developed for these purposes.

Historic Preservation - Within the general purpose section of the Zoning Bylaw, rationale are cited that have a bearing on the preservation of historic resources: preventing the overcrowding of land; conserving the value of land and buildings, including the conservation of natural resources and the prevention of blight; and preserving and increasing the amenities of the town. Landscaping and screening requirements are applicable to all districts and, depending upon how applied, may either help or hinder the maintenance of the town's historic character.

Two articles in the bylaw indirectly relate to preservation of historic character and resources. The first, Article II, Section 2430 "Restoration," is an innovative regulation reflecting the community's goal of allowing legally non-conforming structures damaged by fire or other catastrophe to be rebuilt. In a community like Sandwich, the ability to reconstruct a historic structure is factored into the limitations placed on non-conforming uses. Most other communities disallow reconstruction if the damage exceeds 50% of the structure. Second, Article III of the General Regulations requires setbacks of fifty feet from ponds and lakes (Section 3600, Pond Setback Requirements). This regulation has the effect of protecting potential archaeological sites, as these are most probably found near water features.

Subdivision Rules & Regulations

The subdivision regulations for the Town of Sandwich reflect those typically found across the state, with specific design standards, submission requirements and review procedures, all in accordance with state enabling legislation. The law states that the health board or officer for the jurisdiction must be notified of all subdivision applications and given 45 days to respond.

Sandwich Roadway Design Standards

Type of Street	Commercial & Industrial	Collector	Minor	Lane
Width of Right of Way	80'	68'	50'	50'
Width of Roadway	30' *	24' *	20'	20'
Minimum Centerline Radii	500'	500'	150'	100'
Minimum Centerline Grade	1%	1%	1%	1%
Maximum Centerline Grade	6%	6%	10%	12%
Minimum Curb Radius @ Intersection (90 Degrees)	30'	30'	20'	20'
Minimum Intersection Angle	80°	60°	60°	60°
Minimum Curb Radius @ Intersections Acute Angle Side	35'	35'	25'	25'
Minimum Curb Radius @ Intersections Obtuse Angle Side	30'	25'	15'	15'
Minimum Centerline Tangent Reserve Curve	100'	100'	0'	0'

The subdivision regulations also contain the town's roadway design standards. These regulations are appropriate for a community the size and composition of Sandwich. There are, however, some standards such as large right-of way and pavement requirements for commercial and industrial roads, and pavement width for lanes that appear excessive. There are also very limited standards for streetscape design and sidewalks.

In some regard, Sandwich's subdivision regulations go beyond most. In the general section dealing with design of required improvements, the regulations state the "due regard shall be shown for all natural features and community assets, which if preserved will add attractiveness and value to the subdivision." Another section entitled "Protection of Natural Features" is more specific and reiterates that "due regard shall be shown for all natural features such as large trees, water courses, scenic points, historic spots and similar community assets which if preserved, will add attractiveness and value to the subdivision." Since required plans must illustrate all existing buildings, stone walls, large trees and other structures, the Planning Board has both the information and the power to protect to some degree the community's significant historic resources in the course of its normal review of subdivision requests. Another provision of the subdivision regulations is that all electrical, telephone and other utility wires shall be placed underground unless infeasible. This provision, although only being implemented in new development areas, serve to enhance the overall historic and scenic character of the town.

1.7 Developable Lands in Sandwich

The Town of Sandwich Assessors office evaluates development potential on a lot by lot basis using state guidelines. The Assessors Office estimate that the total amount of developable land remaining in Sandwich is approximately 1,398 acres (6% of the land base). Additionally, the Assessors office estimates there are approximately 71 acres of potentially developable land that may have some form of environmental and legal constraints including wetlands or deed restrictions.

Sandwich Developable Land By Zoning District, 2008

	Developed Land		Undevelopable Land		Potentially Developable Land		Developable Land	
Subdistrict	**# of Parcels**	**Acres**	**# of Parcels**	**Acres**	**# of Parcels**	**Acres**	**# of Parcels**	**Acres**
BL-1	190	284.83	11	12.18	4	6.72	39	54.77
BL-2	26	124.09	0	0.00	0	0.00	7	29.72
GD	1	8,393.96	0	0.00	0	0.00	0	0.00
GROWTH	12	428.32	0	0.00	0	0.00	0	0.00
IND	42	296.60	1	0.26	0	0.00	8	154.95
MARINE	12	108.78	0	0.00	1	0.23	2	3.44
R-1	1,898	2,136.08	72	49.97	36	9.36	83	83.71
R-2	6,144	7,813.81	129	320.42	33	45.33	350	643.81
RIDGE	535	1,871.59	9	62.66	1	7.36	49	263.47
SHORE	103	46.27	18	6.17	4	0.85	8	3.61
SURPRO	365	1,415.71	23	6.73	2	1.31	39	160.61
Total	**9,328**	**22,920**	**263**	**458**	**81**	**71**	**585**	**1,398**

Source: Sandwich Assessors Office, April 2008

Most of the remaining developable land (907 acres or 65%) is located in the R-2 and Ridge zoning districts, and another 155 acres in the Industrial district. The Assessors office estimates there are approximately 84 acres of developable lands in the BL-1 and BL-2 districts. However, this does not consider the larger opportunities for infill development and redevelopment.

Additional properties are owned by the town or other entities (totaling over 3,100 acres) and are assessed as "vacant land". Some of these properties have some protection from development, but others may have potential for development in the future. A more complete inventory of town-wide open space is included in *Section 7: Open Space and Recreational Resources*.

In addition to town-wide growth potential, it is useful to analyze village and neighborhood

development trends because Sandwich is a large town in area and public facilities that may serve the needs of one neighborhood may be too distant to be readily available for use by residents of other neighborhoods or villages. Sandwich Center and Sagamore Beach have few tracts remaining for development and can be considered essentially "built-out" relative to the rest of town. East Sandwich has been heavily subdivided, but more vacant lots remain here than in its western village neighbors. Heavily developed along its eastern perimeter, South Sandwich and the Ridge District contain the greatest potential for more large subdivisions, if access is improved in the interior woodlands of the Ridge in the future, or if the summer camps are developed. Forestdale has vast new suburban-style residential developments.

The Northside villages (Sandwich and East Sandwich) exhibit some of the most rural patterns of development (large old farmsteads) and some of the most suburban patterns (acre-lot, grid subdivisions popular in the 1970s, such as Carleton Shores.) The fate of the Northside depends on the retention of enough larger estates and small farms to retain the rural character of the area.[1]

Beyond the spatial considerations of development in Sandwich, there is also a temporal component. Less so than in most Cape towns, Sandwich has approximately 15% of its homes occupied only seasonally. More and more of these summer homes can be expected to be converted to year-round use as baby boomers begin to retire, converting their summer homes to retirement homes.[2]

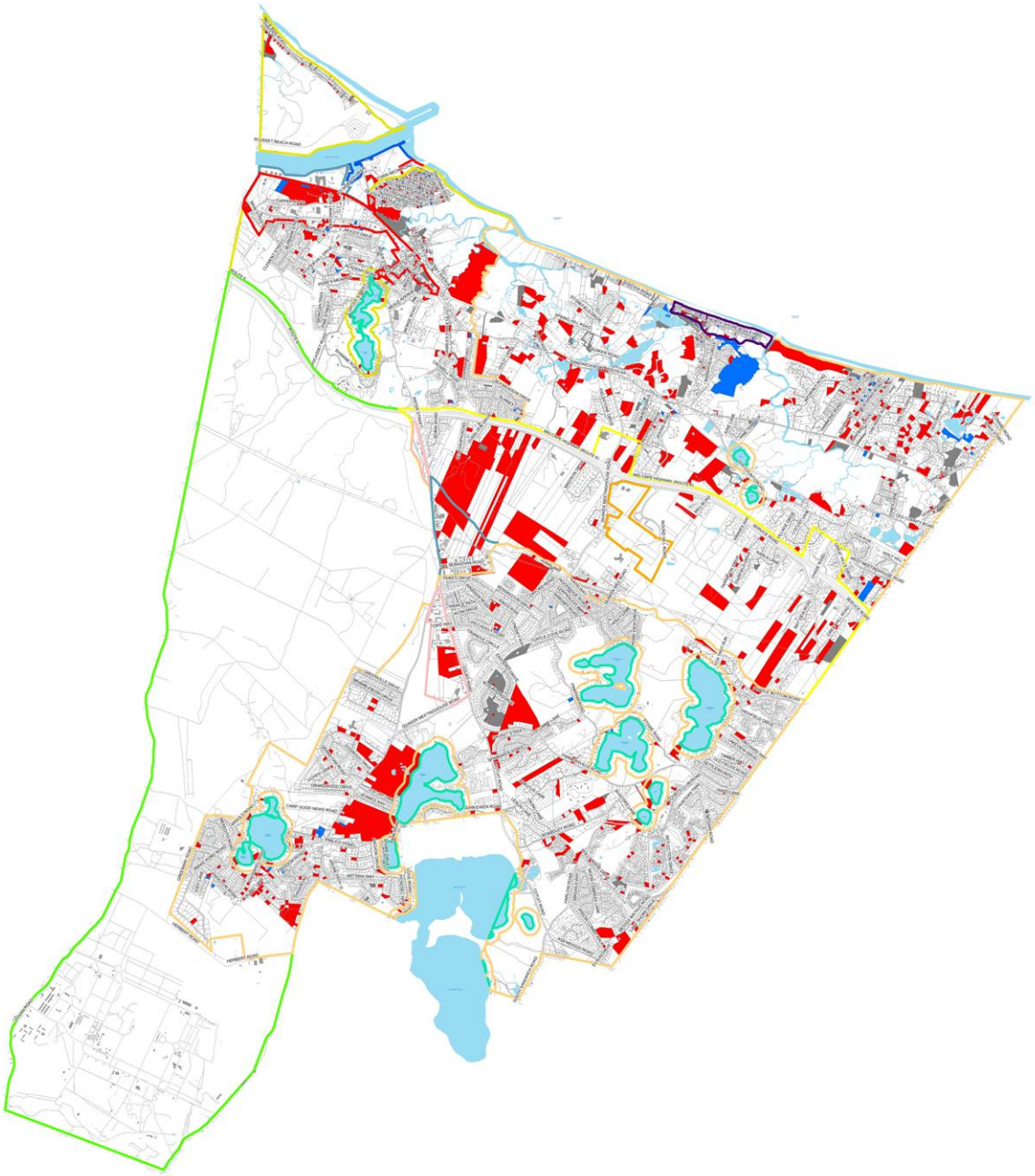
[1] Sandwich Open Space and Recreation Plan, 1999, p.17.

[2] Sandwich Open Space and Recreation Plan, 1999, p.17.

LEGEND

ZONING DISTRICT	DEVELOPED LAND		POTENTIAL DEVELOPABLE LAND		DEVELOPABLE LAND		UNDEVELOPABLE LAND	
	# OF PARCELS	ACRES	# OF PARCELS	ACRES	# OF PARCELS	ACRES	# OF PARCELS	ACRES
BUSINESS - 1	190	286.4	3	6.5	38	52.8	11	12.2
BUSINESS - 2	24	123.1	0	0	8	30.7	0	0
GOVERNMENTAL	1	8,394	0	0	0	0	0	0
GROWTH CENTER TECHNOLOGY	12	428.3	0	0	0	0	0	0
INDUSTRIAL	40	259.7	0	0	10	191.8	1	0.26
MARINE	13	109	0	0	2	3.4	0	0
RESIDENTIAL - 1	1,929	2,072	34	8.9	87	176.4	60	47.6
RESIDENTIAL - 2	6,406	9,122	36	113.7	458	918.6	151	203.3
RIDGE	524	1,822.4	0	0	60	346.2	7	22.5
SHORE	101	44.7	5	1.2	8	3.7	17	5.6

BUILDING FOOTPRINT
SURFACE WATER
STREET



TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
COMMUNITY MAPPING SERIES

DEVELOPMENT POTENTIAL BY ZONING DISTRICT

Stantec

N

0 650 300 2,600 Feet

1.8 Future Build Out Analysis

Building Trends

Most of the land in town that could support housing construction had been built upon by the year 2000. Recently built homes now occupy old upland forest areas south and east of the Historic Village in planned subdivisions and as infill within existing developed areas along the town's roads and highways. Many summer cottages along the beach roads have been converted to year-round residences. Today Sandwich primarily functions as a bedroom and retirement community with a limited amount of resort and second home activity in the summer months.

Most new development has some impact on the environment although many of these impacts can be minimized by strict enforcement of federal, state and local environmental regulations. The major impacts are an increase in paved areas which can contribute to flooding, erosion and sedimentation during construction, pollution potential from industrial processes, as well as loss of open space and wetlands. The biggest, persistent problems related to Sandwich's growth and development patterns are environmental and public health issues related to wastewater disposal. Despite its high density in certain areas, which typically is a favorable factor for installing sewers, Sandwich continues to rely solely on on-site septic systems.

There are few places immune to development in Sandwich, except wetlands. The town must assume, therefore, that development will continue to consume open spaces throughout town. If physical impediments do not prevent development in areas that are ecological fragile, legal and political means must be used to manage growth.

Build-out Methodology

The last build-out analysis for Sandwich was conducted in 2003 by the Cape Cod Commission. Through a series of maps and corresponding charts, this build-out analysis illustrated the maximum development permitted according to the current local zoning in place and excluded wetland areas for all types of development. This information was used to estimate future demands on public infrastructure and the environment. The analysis projected an addition of 5,094 new residents at build-out, and indicated the potential for an additional 2,371 total residential units based on current zoning and available land. The analysis also projected 2,168,544 square feet of new commercial and industrial development.

The build-out analysis was intended to be used as a tool to guide development, but did not estimate the rate of development or how long it would take to reach build-out. Additional limitations of undeveloped land or the potential for redevelopment of existing parcels was not necessarily considered in the analysis. Therefore, the potential development densities and projected new units may be higher or lower than projected.

A new Build-out Analysis was performed as part of this Local Comprehensive Plan update. The data upon which this analysis was based were drawn from the complete 2008 assessor's property records, natural and man-made constraints, and growth trends and characteristics observed in Sandwich over the past 30 years. It should be pointed out that there are several ways to conduct a build-out analysis. All methods contain many variables and none are without flaws.

This build-out is based on several underlying assumptions. First, the Strategic Planning Areas (SPA) were used as the basis for analysis rather than the zoning districts to allow for a more

thorough evaluation on regions of town with similar growth characteristics as well as specific areas targeted for growth. Additionally, four (4) of the SPAs are targeted for economic development and mixed use that will require zoning revisions. These include the Route 6A/Tupper Road/Marina Area, Sandwich Industrial Park and District, South Sandwich Village Center, and Historic Village/Route 6A Area. Conceptual plans were prepared for these SPAs based on public design workshops. These concepts were then translated into lot by lot development potential (see Section 1.9 below).

The second major assumption in the build-out analysis is that the Exit 3 Growth Technology District (former Striar property) will not be developed except for the possibility of future public recreational facilities and golf course improvements. A third assumption is that the majority of future single family home construction will be year-round housing versus seasonal given the Town's attractiveness to year-round residents.

The Cape Cod Commission assisted with the build-out analysis for those Strategic Planning Areas not targeted for economic development and mixed use. The CCC used the following methodology:

1. Applied the Mass EOEA methodology, except for those parts as noted.
2. Utilized 2005 Parcel data and 2008 Assessors (latest available). The assessors data was attached to the parcel data to calculate build out. CCC added fields to the attribute table including wetlands, water resources protection district, protected open space, and zoning.
3. Established a layer of Developable Lands.
    a. Developable Lands excluded:
        i. All land under some kind of permanent conservation restriction;
        ii. All wetlands (wetlands cannot be included in lot area under Sandwich zoning); and
        iii. Other parcels with land use codes that were assumed to be un-developable (i.e. improved municipal lands, non-profit owned with improvements).
    b. Developable Lands included:
        i. Parcels coded as developable, potentially developable and agricultural by the Sandwich Assessor; and
        ii. Un-developed and unprotected municipal land, some recreational land (i.e. there are several recreational camps that are under-developed) and areas zoned residential that were classified as being accessory to a residence (i.e. accessory buildings on their own property, cluster subdivisions and other miscellaneous classifications). All parcels were reviewed with the Town and LCP consultant.
    c. Added in parcels that were under-developed (i.e. single-family residences on lots that could be subdivided into more than two residential lots).
    d. Parcels were assumed to be developable if they had the net minimum lot size (after wetlands were removed), and no account was taken for whether lots had minimum frontage.
    e. Many of the records turned out to be "sliver polygons". These result when digital maps are combined (as they were in this exercise) and similar features from different sources are not absolutely identical and don't align perfectly. For example, where a zoning district line represents a parcel line, but when overlain on parcels, the two sources do not fall exactly on top of each other. To eliminate these, lots that were less than 4,500 s.f. were considered un-developable for the purpose of this analysis.
4. Using the Sandwich zoning by-law, established a formula for calculating the additional

potential development as follows:

a. For commercially zoned properties, an effective floor area ratio (FAR) was calculated using the EOEA methodology and consistent with prior build outs done by the CCC for Sandwich. The effective FAR is calculated by combining an estimate of the parking and building area needed to meet zoning requirements.
b. For residentially zoned properties, the formula was based on the minimum lot size for each district and overlay, and a constraint factor applied that accounts for irregularities in the lot shape and redundancy in a new subdivision. This is also consistent with the EOEA methodology and consistent with prior build outs done by the CCC for Sandwich.
c. Formulas were applied to the spreadsheet of developable parcels to generate the build out number. For under-developed parcels, the lot area needed to support the existing residential development was subtracted before the formula was applied.

Major assumptions in the CCC's build-out analysis for selected Strategic Planning Areas were as follows:

- Assumed that the development did not trip any Commission thresholds;
- Assumed no Chapter 40-B Comprehensive Plans;
- Assumed that access to parcels that appeared land-locked was possible if the assessor's records showed them as "developable";
- Assumed owners would make highest and best use of their properties, maximizing lots in residential areas and building commercial buildings in commercial areas; and
- Where zoning straddled a parcel, applicable formula was applied to a portion of the parcel in each zone separately.

Four (4) of the SPAs targeted for economic development and mixed use include the Route 6A/Tupper Road/Marina Area, Sandwich Industrial Park and District, South Sandwich Village Center, and Historic Village/Route 6A Area. For these areas, the build-out analysis considered development potential on a lot by lot basis. Several assumptions were made including those zoning changes based on public input during the planning process would eventually lead to higher density mixed use than is currently allowed. Additionally, floor area ratios were assigned to each property based on setting and intended use (ranging from .15 to .40), public water and sewer would eventually be provided to these areas, and traffic capacity and safety improvements would also be made as necessary.

Build-out Results

Based on the above methodology, it is estimated that the remaining acres of open land provide for a potential of 2,696 additional housing units. This means the final number of housing units in Sandwich at build-out is likely to be approximately 11,983. Additionally, another 971,270 square feet of commercial space, 146,000 square feet of civic space, and 1,307,045 square feet of light industrial/business park space is projected for Sandwich at build-out over the next 30 years.

For the purposes of using a single figure when calculating the many potential impacts from growth, a maximum build-out figure of 11,983 units of housing was used. This figure is high enough to ensure that planning will take into account most of the highest potential impacts that may affect the Town.

Since 1980 there has been a steady increase in the person per housing unit figure. In 1980 the person per housing unit was 2.15; in 1990 it was 2.23; and in 2000 it was 2.72. The analysis

projects that at build-out the mix of residential dwelling types will change from predominately single family (92% currently) to a more balanced mix of single family attached and multi-family units. This should result in a reduction in persons per household and for the purposes of the built-out analysis a figure of 2.4 is used. Therefore, Sandwich's project population at build out is projected to be approximately 28,759.

Sandwich Build Out Analysis by Strategic Planning Area

Planning District	Existing Acres	Existing Building Area (Sq. Ft)	New residential units	New Commercial SF	New Civic SF	New Industrial/ Bus Park SF
East Old Kings Highway Corridor	288	260,008	25	-	-	-
East Sandwich Residential District	2,879	3,241,813	391	-	-	-
Forestdale Residential Area	2,370	2,892,395	365	12,719	-	-
Growth Technology Center/Golf Course	397	12,263	11	-	-	-
Historic Village/Route 6A District	100	195,598	68	30,000	-	-
Massachusetts Military Reservation	8,438	1,408,344	NA	NA	NA	NA
North Sandwich Neighborhoods	2,716	3,303,802	437	-	-	-
Ridge District	1,939	934,670	166	-	-	-
Route 130 Medical Park**	62	16,478	-	135,344	-	-
Sandwich Industrial Park & District	444	488,033	66	-	-	880,636
Scusset Beach Area	588	225,446	13	-	-	-
South Sandwich Residential Area	3,869	5,756,404	434	-	-	-
South Sandwich Village Center (GT)	298	297,229	458	540,670	110,000	-
Town Marina/Tupper Rd/Route 6A Area	431	696,998	229	250,996	36,000	426,409
Village Center Neighborhoods	360	521,179	33	1,541	-	-
Total	**24,407**	**20,250,660**	**2,696**	**971,270**	**146,000**	**1,307,045**
Build Out Rate Over 30 Years						
0-5 years	NA	NA	449	161,878	24,333	217,841
5-10 years	NA	NA	449	161,878	24,333	217,841
10-15 years	NA	NA	449	161,878	24,333	217,841
15-20 years	NA	NA	449	161,878	24,333	217,841
20-25 years	NA	NA	449	161,878	24,333	217,841
25-30 years	NA	NA	449	161,878	24,333	217,841

** The parcels in this area are either owned by DEM or the Town

The current percentage of school age children is 16%, decreasing slightly over the past 10 years. Assuming that this general trend will continue and combined with a broader mix of residential units including smaller homes, a figure of 14% is used for the purposes of the build-out analysis. As a result, an estimated 4,026 student-aged persons will reside in Sandwich at build-out in 30 years.

Even if one assumes that the growth will be slower than is projected, build-out is still inevitable and new municipal facilities will be needed in the near future. It will also mean that whatever land use pattern is in place in the next five years will be the one that the Town must live with for many years.

A key to growth for the community is to channel growth into appropriate areas where it can be best managed and community services provided most efficiently. Another key is to encourage Smart and Sustainable Growth in the Strategic Planning Areas targeted for economic development. The table below illustrates both the current land use patterns and applied new growth to be mostly infill development or redevelopment. The anticipated demand for infrastructure is projected on this table as well.

Sandwich 30-Year Build Out Analysis for Selected Strategic Planning Areas

Parcel	Number of Properties	Land Acres	Land Value	Main Bldg Value	Detached Bldg Value	Total Bldg Value	Total Value	Existing Bldg S.F.	Existing Land S.F.	Current FAR	Story Height	Year Built	Existing D.U.s	Maximum Potential Total New/Additional Building S.F. @ FAR of 0.15 to 0.40	Maximum Potential Commercial S.F.	Maximum Potential Light Ind./Comm Office S.F.	Maximum Potential Civic S.F.	Maximum Potential New D.U.
South Sandwich Village Center																		
Total Development	33	352.7	$ 26,839,900	$ 30,610,300	$ 298,900	$ 30,909,200	$ 58,192,800	343,306	15,363,612				50	**1,095,627**	**540,670**		**110,000**	**458**
Average Development Values		11.02	$ 838,747	$ 1,530,515	$ 74,725	$ 30,909,200	$ 1,818,525	16,348		0.09	1.20	1986						
Average Weekday Trip Generation								9,098					300	18,286	14,328	0	1,210	2,748
Average Parking Spaces Needed								1,717					100	4,169	2,703	0	550	916
Average Water Demand (gpd)								10,814					5,250	68,586	17,031	0	3,465	48,090
Average Wastewater Flow (gpd)								21,457					10,500	136,847	33,792	0	6,875	96,180
Sandwich Historic Village/Route 6A Area																		
Total Development	125	101.8	$ 23,769,400	$ 28,247,200	$ 608,500	$ 28,956,300	$ 52,725,700	229,105	1,982,851				65	**89,997**	**30,300**	**-**	**-**	**68**
Average Development Values		0.86	$ 199,743	$ 288,237	$ 14,151	$ 292,488	$ 443,073	2,633	19,251	0.26	1.64	1885						
Average Weekday Trip Generation								6,071					390	1,211	803	-	-	408
Average Parking Spaces Needed								1,146					130	288	152	-	-	136
Average Water Demand (gpd)								7,217					6,825	8,094	954	-	-	7,140
Average Wastewater Flow (gpd)								14,319					13,650	16,174	1,894	-	-	14,280
Town Marina/Tupper Road/Route 6A Area																		
Total Development	163	343.3	$ 73,607,600	$ 45,866,600	$ 558,800	$ 46,425,400	$120,033,000	613,168	14,953,277				58	**966,180**	**250,996**	**426,409**	**36,000**	**229**
Average Development Values		2.52	$ 668,564	$ 595,952	$ 11,164	$ 46,425,400	$120,033,000	11,271	124,971	0.15	1.24	1969						
Average Weekday Trip Generation								16,249					348	12,259	6,651	3,838	396	1,374
Average Parking Spaces Needed								3,066					116	4,025	1,255	2,132	180	458
Average Water Demand (gpd)								19,315					6,090	48,649	7,906	15,564	1,134	24,045
Average Wastewater Flow (gpd)								38,323					12,180	98,008	15,687	31,981	2,250	48,090
Sandwich Industrial Park and District																		
Total Development	59	124.7	$ 8,502,600	$ 7,178,600	$ 354,000	$ 6,537,800	$ 16,035,200	142,107	5,433,633				0	**880,637**	**0**	**880,636**	**0**	**66**
Average Development Values		5.67	$ 654,046	$ 897,325	$ 118,000	$ 817,225	$ 1,145,371	23,685	258,744	0.14	1.13	1984						
Average Weekday Trip Generation								1,279					-	8,322	-	7,926		396
Average Parking Spaces Needed								711					-	4,535	-	4,403		132
Average Water Demand (gpd)								5,187					-	39,073	-	32,143		6,930
Average Wastewater Flow (gpd)								10,658					-	79,908	-	66,048		13,860
TOTAL DEVELOPMENT	**380**	**922.5**	**$132,719,500**	**$111,902,700**	**$1,820,200**	**$112,828,700**	**$ 246,986,700**	**1,327,686**	**37,733,373**				**173**	**3,032,441**	**821,966**	**1,307,045**	**146,000**	**821**

Dwelling Units are estimated at 1 unit per 8,000 s.f. of land; and an average of 1,000 s.f. per unit of floor area

Projected Weekday Trip Generation for Commercial Development is based on average of retail and commercial office (mixed use) per 1,000 s.f. based on latest edition of ITE Trip Generation Book

Projected Weekday Trip Generation for Industrial Development is based on average manufacturing use per 1,000 s.f. based on latest edition of ITE Trip Generation Book

Projected Weekday Trip Generation for Residential is based on average attached dwelling units from the latest edition of ITE Trip Generation Book

Projected parking needs are based on the required number of spaces by use from the Sandwich Zoning Bylaws

Projects water and wastewater demand is based on the latest estimates by use in gallons per day

Projected public water demand - gallons per year at BO = 60,007,121

Projected wastewater generated - gallons per day at BO = 330,936

1.9 Smart Growth Center Concept Development Plans

The Local Comprehensive Plan in 1996 designated two (2) growth centers including the Industrial Zone along Route 130, and the South Sandwich Business District (also known as the Golden Triangle). The 2008 Local Comprehensive Plan designates four (4) Smart Growth Center including the following:

- The South Sandwich Village Center (or Golden Triangle) between Route 130, Cotuit Road, and Quaker Meetinghouse Road;
- The Route 6A/Tupper Road/Town Marina Area between the Cape Cod Canal and Route 6A;
- The Sandwich Industrial Park and District; and
- The Historic Sandwich Village/Route 6A Area

These designations come with the acknowledgment that current zoning may need to be amended in order to address existing and future land use conflicts and goals as described above.

Guiding Principles and Practices

Conceptual master plans were prepared for these four Strategic Planning Area and future land use goals were identified through the public participation process including community surveys, visioning workshops and design charettes. These areas have been targeted for development or redevelopment. In order to prepare the conceptual development plans, a public design workshop was held over a three-day period. During this process design team members worked with the community to prepare concept plans, perspective drawings and related graphic materials. The key objectives of the design charette and conceptual plans were to:

- Identify and illustrate perceived opportunities and constraints of the project area (existing infrastructure, access, surrounding neighborhoods, tourism, etc.);
- Establish a list of priorities and conceptual plans for targeted public and private projects;
- Define the strategic positioning of projects within the local and regional marketplace;
- Outline and illustrate flexible design recommendations to accommodate future changes in the marketplace;
- Evaluate and conceptualize steps that can be taken to solidify and enhance the historic character of Sandwich, as it relates to the focus areas; and
- Define and illustrate specific techniques for a more compatible relationship between the focus areas and surrounding residential area.

Land use patterns, architectural styles, and streetscapes are generally consistent with the traditional and historic development patterns of Sandwich and Cape Cod, and illustrate the following characteristics:

Development Scale and Mix of Uses – The design charette helped to define the desired scale and dimensional characteristics of new development, appropriate renovations and expansions, architectural themes, historic preservation, buffering techniques for surrounding neighborhoods, the appropriate mix of uses, and the physical plan implications of attracting new residents and commercial development.

Relationship to Surrounding Areas - Through design and mitigation elements, potential conflicts between existing residential and commercial areas were addressed through civic

enhancements, traffic and circulation improvements, pedestrian and bicycle connections, and traditional new mixed-use villages.

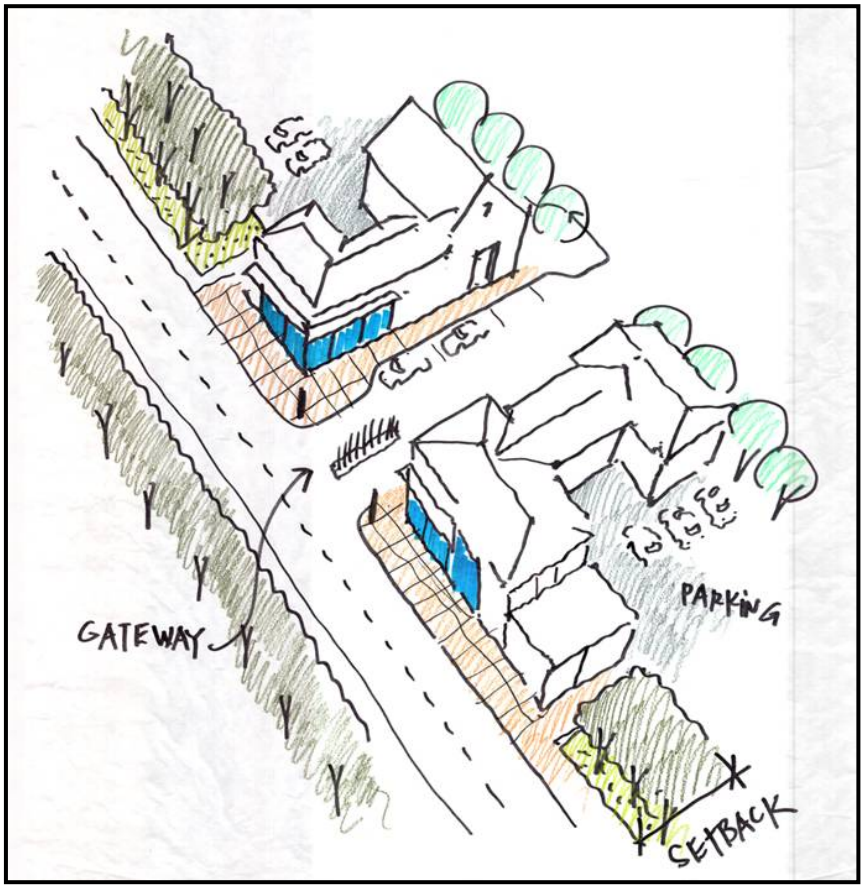
Public Enhancements – The concept plans include an enhanced pedestrian environment, streetscape and gateway treatments, new parks and open space, parking and circulation improvements, and intermodal access. All the infrastructure needs related to new growth and development have been evaluated for the four focus areas.

Business Development – The concept plans illustrate visual strategies to enhance commercial development components in the focus area, and regulations as they pertain to business operations

Sustainable Planning and Design Techniques - Sustainable design techniques and applications are integrated into the concept master plans. Specifically, Leadership in Energy and Environmental Design Neighborhood Development (LEED-ND) criteria for LEED-ND have been incorporated into the conceptual plans as well, low-impact development (LID) techniques such as best management practices for alternative energy and site design.

South Sandwich Village Center (Golden Triangle)

The issues and opportunities in the South Sandwich Village Center (SSVC) are well defined in Section 1.5 above. This area is in the Business Limited 2 zoning district and is one of the key areas for economic development. Through the public participation process the key elements of the concept plans include moderate density mixed uses, formal streetscapes, intermodal connections, new civic uses and spaces, and buffering from surrounding neighborhoods.



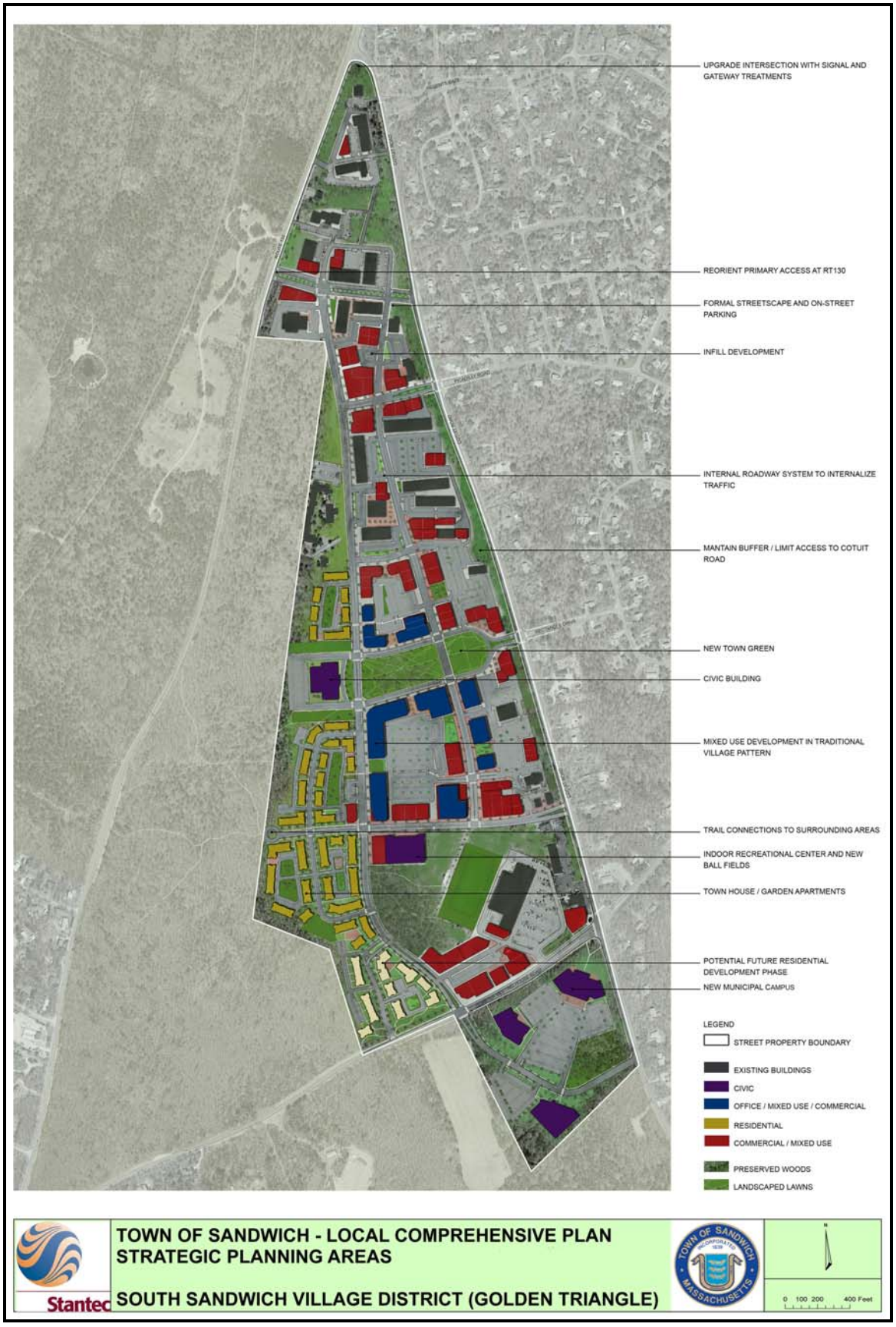
Conceptual Drawing of Smart Growth Design in South Sandwich Village Center

The SSVC conceptual plan will require zoning amendments which emphasize mixed uses and new site design procedures, such as the creation of internal connecting roadways and walkways. The key land use goals for the district are as follows:

- High quality office space focusing on financial, legal, health care services, and possibly education facilities (ie- a corporate training center);
- High technology businesses such as environmental, communications, biotechnology within the restrictions of the water recharge area regulations;
- Entertainment opportunities including movie theaters, bowling alley, arts center, high quality sports facilities);
- Condominium and congregate housing opportunities;
- Retail stores that focus on the surrounding neighborhoods as the primary market; and
- Civic uses including town facilities, services, and passive and active open spaces.

The conceptual plan for the South Sandwich Village Center includes an estimated 540,670 square feet of new commercial space, 110,000 square feet of new civic space and 458 dwelling units. Commercial space is illustrated as mixed use with retail, restaurant and entertainment predominately on the ground floor with office and residential uses above. The residential development is predominately condominiums, townhouses, garden apartments and congregate living facilities. There are no new detached single family homes planned.

Potential Cross-Section for New Mixed Use Development and On-Street Parking in SSVC


UPGRADE INTERSECTION WITH SIGNAL AND GATEWAY TREATMENTS
REORIENT PRIMARY ACCESS AT RT130
FORMAL STREETSCAPE AND ON-STREET PARKING
INFILL DEVELOPMENT
INTERNAL ROADWAY SYSTEM TO INTERNALIZE TRAFFIC
MANTAIN BUFFER / LIMIT ACCESS TO COTUIT ROAD
NEW TOWN GREEN
CIVIC BUILDING
MIXED USE DEVELOPMENT IN TRADITIONAL VILLAGE PATTERN
TRAIL CONNECTIONS TO SURROUNDING AREAS
INDOOR RECREATIONAL CENTER AND NEW BALL FIELDS
TOWN HOUSE / GARDEN APARTMENTS
POTENTIAL FUTURE RESIDENTIAL DEVELOPMENT PHASE
NEW MUNICIPAL CAMPUS
LEGEND
STREET PROPERTY BOUNDARY
EXISTING BUILDINGS
CIVIC
OFFICE / MIXED USE / COMMERCIAL
RESIDENTIAL
COMMERCIAL / MIXED USE
PRESERVED WOODS
LANDSCAPED LAWNS
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREAS
SOUTH SANDWICH VILLAGE DISTRICT (GOLDEN TRIANGLE)
TOWN OF SANDWICH
MASSACHUSETTS
N
0 100 200 400 Feet

Civic space includes a series of new public facilities as well as passive and active open spaces. A new town administrative building as well as public safety building (combining police, fire and rescue services on a new municipal campus at the corner of Cotuit Road and Quaker Meetinghouse Road). Other public facilities include a new senior center, indoor recreation facility, branch library, ballfields and town green. Maintenance of open space is also necessary to accommodate nitrate loading requirements for the area.

Maximizing pedestrian use of this area and minimizing vehicle entry and exit onto bordering roadways is emphasized in the concept plan. There is an extensive internal road system with formal streetscape treatments and on-street parking. Major access points are at Route 130 and Quaker Meetinghouse Road de-emphasizing individual curb cuts onto Cotuit Road. Pathway connections are made to the DEM property, Oak Crest Cove, and the surrounding neighborhoods.

At build-out over a 30-year period the total project infrastructure demand in the South Sandwich Village Center will be as follows:

Potential Future Development in the South Sandwich Village Center	
Total Commercial Development	1,095,627 s.f.
New Dwelling Units	458
Average Weekday Trip Generation	18,286
Average Parking Spaces Needed	4,169
Average Water Demand (gpd)	68,586
Average Wastewater Flow (gpd)	136,847

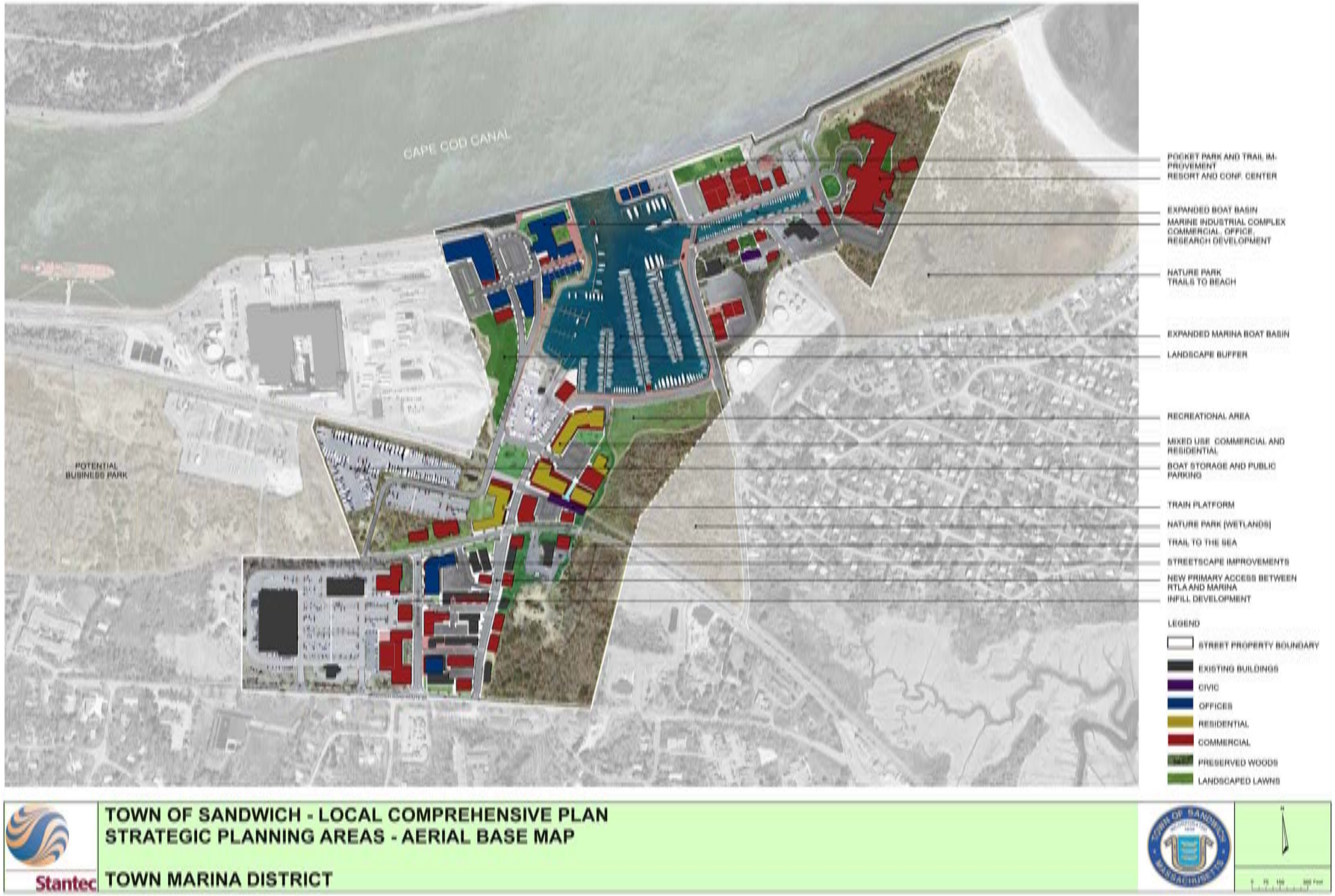
If the district is fully built out, significant infrastructure improvements will be necessary including traffic capacity improvements and a public wastewater treatment and distribution system. In terms of the traffic volumes, the total weekday traffic could be substantially less than projected through internal roads and connections between developments. Also much of the traffic generation would be on Route 130 and Quaker Meetinghouse Road where expansion potential is greatest. Wastewater will be a key issue in future development. The best potential options at this point are connections to the facility at the MMR or a new local wastewater facility to service the SSVC as well and Sandwich Industrial Park. This could be constructed through a public-private partnership with land owners and developers.

Route 6A/Tupper Road/Town Marina

This area in the northwestern part of town is defined by the boundaries of Route 6A and the Cape Cod Canal. While there are some existing large-scale commercial buildings, the majority of the commercial buildings are designed to be compatible with the historic character of Sandwich. The planning strategy between Route 6A and Tupper Road is to preserve and support infill and mixed use development in character with the surrounding area**.**

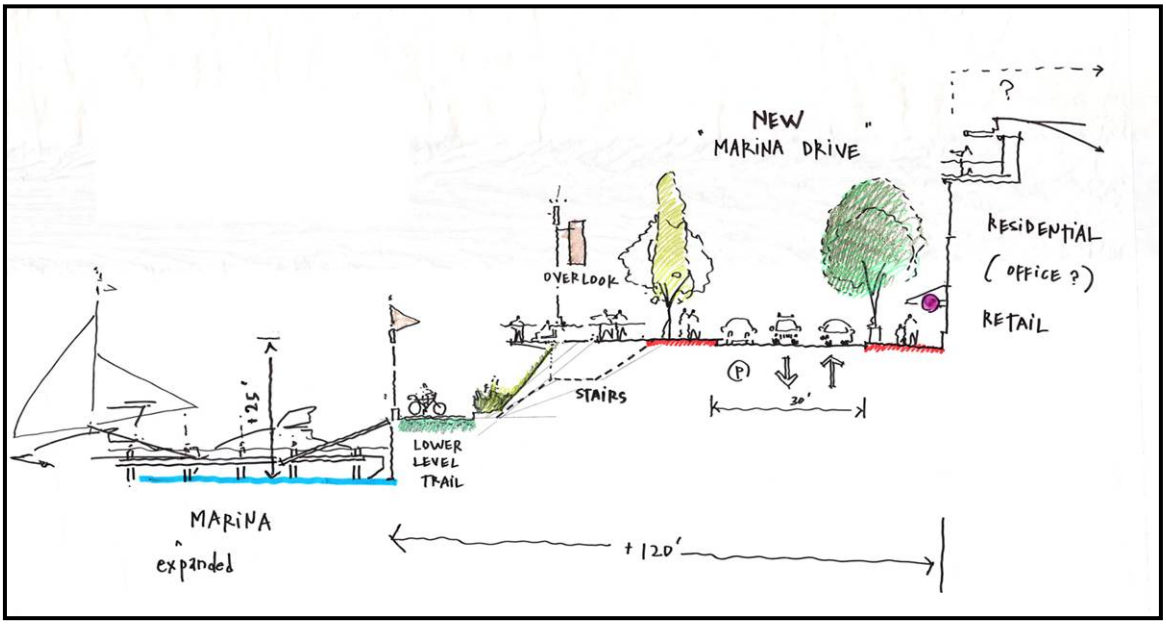
The Town Marina borders the Cape Cod Canal and the business district on Tupper Road and Route 6A. Allowed uses within this district include agriculture, home occupation, boat storage, lodging (less than 6 guests), and some special permit uses such as restaurants, retail services, and commercial picnic areas. Changes to the zoning bylaw will be necessary in all areas of the district to facilitate the desired mix and character of development identified by the public in the planning process.

The conceptual plan illustrates several infill buildings intended for mixed use to create more of a village atmosphere and to take advantage of the economic opportunity currently wasted on some of the older strip development sites on Route 6A. The concept plan also includes a new connecting roadway between Route 6A, Tupper Road and the Marina through Merchants Row. This will provide a visual connection as well as route traffic through an under-performing portion of the site.


CAPE COD CANAL
POTENTIAL BUSINESS PARK
POCKET PARK AND TRAIL IMPROVEMENT
RESORT AND CONF. CENTER
EXPANDED BOAT BASIN
MARINE INDUSTRIAL COMPLEX
COMMERCIAL, OFFICE, RESEARCH DEVELOPMENT
NATURE PARK
TRAILS TO BEACH
EXPANDED MARINA BOAT BASIN
LANDSCAPE BUFFER
RECREATIONAL AREA
MIXED USE COMMERCIAL AND RESIDENTIAL
BOAT STORAGE AND PUBLIC PARKING
TRAIN PLATFORM
NATURE PARK (WETLANDS)
TRAIL TO THE SEA
STREETSCAPE IMPROVEMENTS
NEW PRIMARY ACCESS BETWEEN RTLA AND MARINA
INFILL DEVELOPMENT
LEGEND
STREET PROPERTY BOUNDARY
EXISTING BUILDINGS
CIVIC
OFFICES
RESIDENTIAL
COMMERCIAL
PRESERVED WOODS
LANDSCAPED LAWNS
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
STRATEGIC PLANNING AREAS - AERIAL BASE MAP
TOWN MARINA DISTRICT

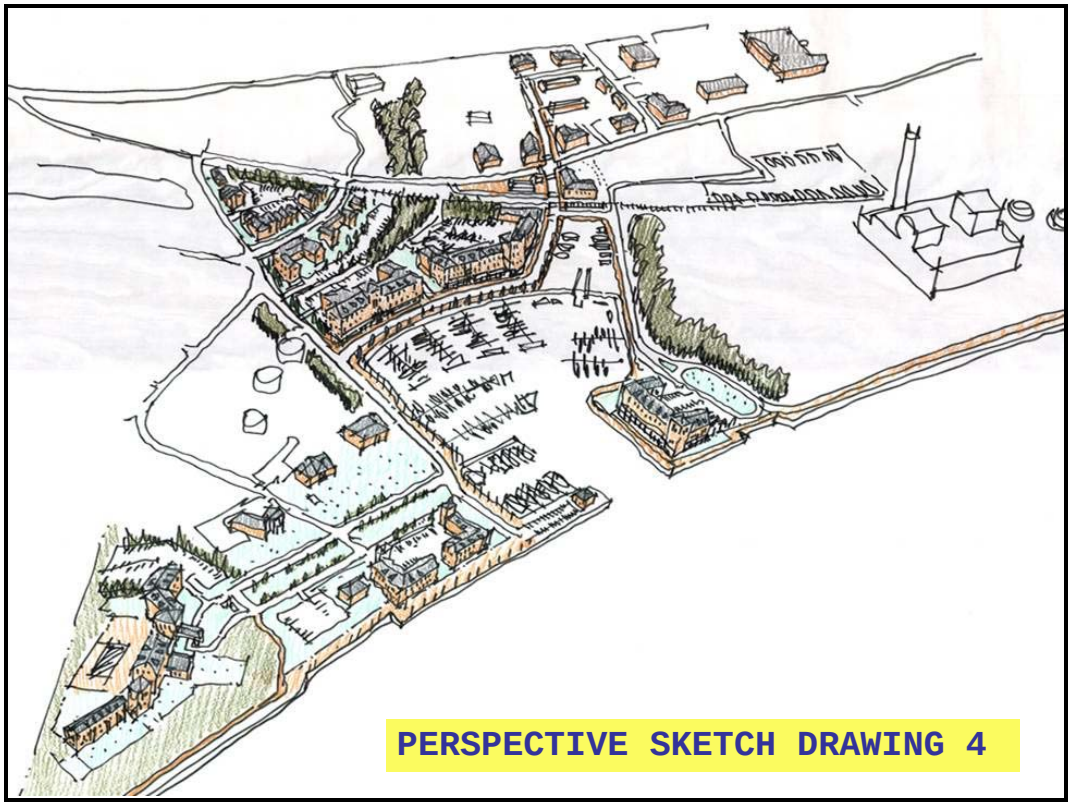
The Route 6A/Tupper Road/Town Marina Area is the western gateway to Sandwich, and should be recognized for its value in attracting visitors to the area. Because of its location in the extreme northwestern portion of town, municipal uses are not a primary planning goal for this area except around the boat basin. The concept plan illustrates a mixture of marine, commercial, residential and recreational uses for this district including the following:

- Small-scale business and professional offices mixed with the complementary residential and commercial uses that currently exist;
- Uses designed to provide services to pedestrians and boat visitors from the Marina;
- Small retail activity suitable to serve surrounding neighborhoods, visitors to the Marina, and commercial fishermen;
- Marine research and technology;
- Boating and other outdoor recreation activities;
- Commercial aquaculture ventures;
- Business parks and corporate offices (off Tupper Road);
- Resort and conference center; and
- Active and passive recreational activities



The **key opportunity in this strategic planning area is to utilize the area framing the boat basin with higher density mixed uses**. The concept plan illustrates a series of new infill buildings providing new commercial (retail, entertainment, and office), marine research and industry, and residential development. In order to provide the space for new development, much of the boat storage and additional public parking has been relocated to a large area behind the Mirant power plant and adjacent to the public boat launch. The concept plan also includes an expanded boat basin with over 200 new boat slips, formal streetscape improvements, and a new

resort and conference center at the end of Moffit Drive with trail connections to Town Neck Beach.



Perspective Drawings of Potential Marina Area Development from Public Design Charette

If the Route 6A/Tupper Road/Town Marina is fully built out, significant infrastructure improvements will be necessary including traffic capacity improvements and a public wastewater treatment and distribution system. Wastewater will be a key issue in future development. The best potential option is a new public wastewater treatment facility and distribution system to service this area as well as the Historic Village/Route 6A area. This could be constructed through a public-private partnership with land owners and developers. Potential sites for a wastewater treatment plant are on the Mirant property or elsewhere on Tupper Road.

Cross Section of Potential New Roadway to Town Marina Through Merchants Square

Potential New Development in the Route 6A/Tupper Road/Town Marina Area	
Total Comm./Light Ind. Development	966,180 s.f.
New Dwelling Units	229
Average Weekday Trip Generation	12,259
Average Parking Spaces Needed	4,025
Average Water Demand (gpd)	48,649
Average Wastewater Flow (gpd)	98,008

Sandwich Historic Village/Route 6A Area

Preserving the character of the Sandwich Historic Village is a primary land use goal of the community. Maintaining and improving its attractiveness to residents and tourists alike cannot be overemphasized. Because of limited parking availability, activities that promote pedestrian use are of utmost importance. The general land use principals for the Historic Village and Route 6A area are the following:

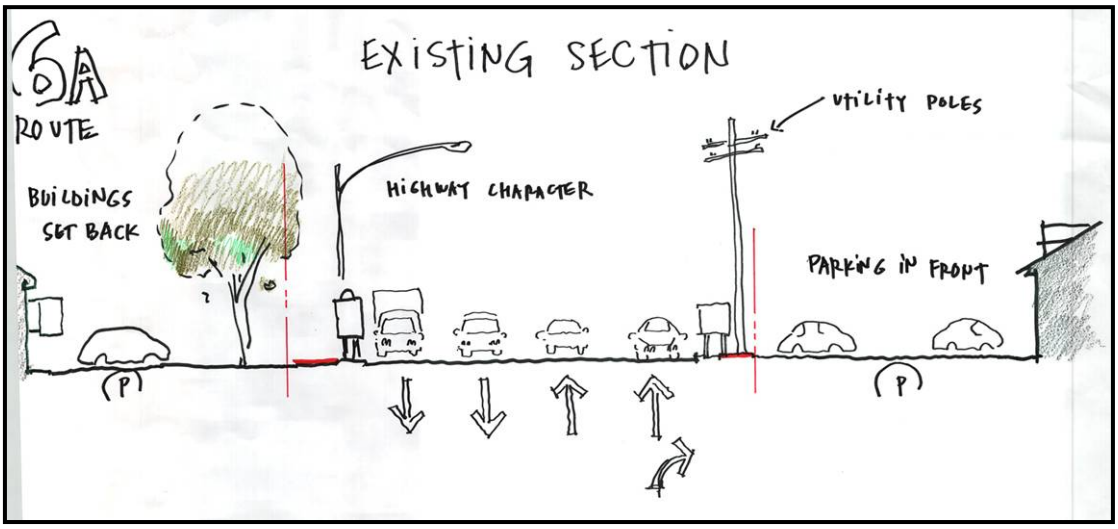
- Visually improve the area from Jarves Street to the Route 6A/Tupper Road split, through creative landscaping, screening, enforcement of the sign code, decreasing curb cuts, and rehabilitating, expanding and improving the appearance of existing buildings. New commercial ventures should be discouraged along Route 6A from Charles Street to Quaker Meetinghouse Road to maintain the compact development pattern of the Historic Village. Every effort will be made to preserve the remaining open space and agricultural land in this area;

- Encourage small-scale economic development in existing buildings that would also attract pedestrian tourists (e.g., small outdoor cafes, specialty shops, country store etc.);

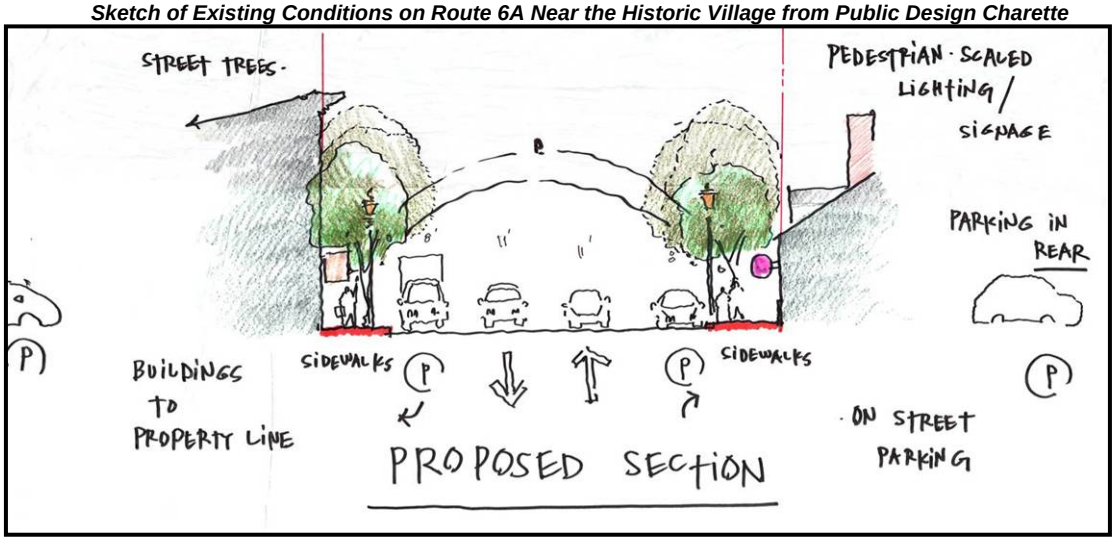
- Direct pedestrians exiting the train at the rail station toward the Boardwalk area as well as toward the village;

- Upgrade the public rest room across from Town Hall and encourage the railroad owners to upgrade the train station and install a rest room; and

- Create a Village zoning district that would be sensitive to the historical character of the Village and at the same time, allow, appropriate mixed uses that would compliment the traditional development patterns of the Historic Village.

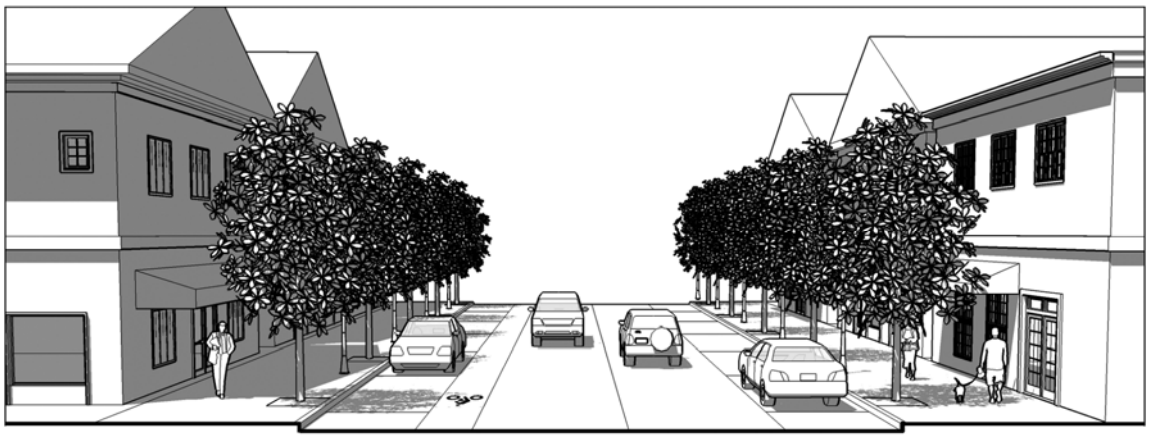


Sketch of Existing Conditions on Route 6A Near the Historic Village from Public Design Charette



Sketch of Potential Future Conditions on Route 6A Near the Historic Village from Public Design Charette

The concept plan for the Historic Village focuses on the Route 6A Corridor between Mill Creek and Jarvis Street. New infill buildings and expansion of existing buildings would provide new economic opportunities while complimenting existing businesses and homes in the core area of the village. Building design and scale would also provide for mixed uses (commercial and residential) and be consistent with the Historic Village. Essentially, the traditional development patterns on Jarves Street would extend down Route 6A creating more economic opportunity as well as expanding of the village and creating an attractive gateway for visitors.

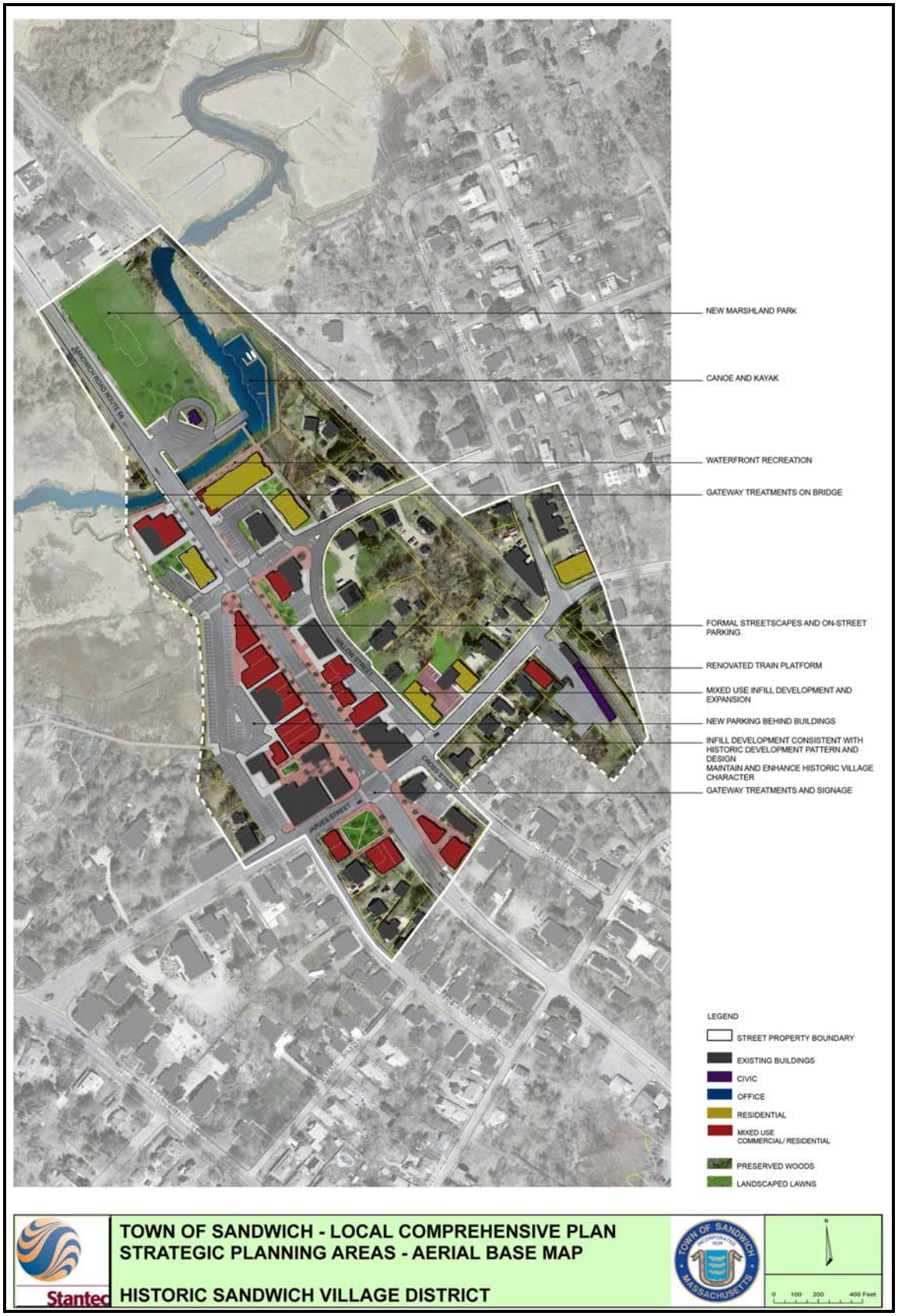


Cross Section Potential Future Conditions on Route 6A Near the Historic Village

The concept plan illustrates a series of streetscape improvements along Route 6A that would include new street trees, wide sidewalks (allowing for outdoor dining and other activities), bike lanes, and on-street parking. Pedestrian safety would be enhanced through a series of curb extensions (also referred to as bulb-outs) making it easier to cross the road.

The Route 6A corridor would be framed with a series of expanded existing buildings and new infill buildings (2 to 3 stories) with traditional architectural styles. Because a portion of the area is located in the floodplain, buildings would be elevated a few feet to the base flood elevation. Parking to support new development would be located behind the buildings and could also be

used by existing businesses on Jarves Street. Curb-cuts would be reduced to a few access points to maintain on-street parking, reduce traffic and improve the pedestrian environment.



Passive and active recreation would be improved with the creation of a small public park on Mill Creek with an area designated to launch canoes and kayaks. This pocket park would replace the existing police department building (which may be relocated to the proposed municipal campus in South Sandwich) and provide spectacular views of the marshlands. Two other small pocket parks would be created near the Route 6A and Jarves Street intersection, and a third small park established in the Jarvesville Neighborhood.

Potential Future Development in Sandwich Historic Village/Route 6A Area	
Total Commercial Development	89,997 s.f.
New Dwelling Units	68
Average Weekday Trip Generation	1,211
Average Parking Spaces Needed	288
Average Water Demand (gpd)	8,094
Average Wastewater Flow (gpd)	16,174

According to the build-out analysis, there is potential for an additional 89,000 square feet of commercial development and 68 dwelling units in the Historic Village, the vast majority being located on Route 6A. Wastewater generated by both new and existing development is a key issue that must be addressed in the future. As stated above, the most viable option may be to construct a public wastewater treatment plant at the Canal which would service the Town Marina, Tupper Road, Historic Village, and Route 6A Corridor.

Sandwich Industrial Park and Zoning District

This area is located on Route 130 off Exit 2 of the Mid-Cape Highway and is presently loosely divided into two distinct areas, the Jan Sebastian Drive development and the gravel pits area. Because of the park's location within a zone of contribution, existing and new uses should be carefully monitored to ensure the safety of this public supply well. New uses should be added that are found to be appropriate in scale and compatible with the conditions and the restrictions associated with water resource protection. Such uses may include but not necessarily be limited to the following, as technologic advances or innovative solutions for environmental problems are developed:

- Clean, light industry;
- Light manufacturing;
- Large-scale office complexes;
- Recreation or entertainment facilities;
- Distribution or warehousing centers; and
- Service businesses

New Business Park featuring Light Industry, Technology, Corporate Offices and Medical Facilities
POND
TRAILS
ENTRY
Apply Low Impact Design and Alternative Energy Techniques, follow LEED design guidelines and recommendations
FUTURE CONNECTION
POND
EXISTING INDUSTRIES
Improved Internal Access and Connections
POND
FUTURE CONNECTION
Potential Wastewater Treatment Facility
Route 130 ENTRY
Streetscape Enhancements
EXPAND POND

The concept plan for the Sandwich Industrial Park and District illustrates a series of streetscape enhancements and new infill buildings along Jan Sebastian Drive to create a more attractive setting for private investment and future development. This portion of the district is extended into the gravel pit areas through a series of new roadway connections using an upgraded Kiah's Way as the primary access. Streetscape improvements would be extended through the new portion of the business park and roadways may also be extended to other areas including Meetinghouse Road and the Service Road to improve access and traffic distribution.

The concept plan illustrated a flexible business campus design allowing for varied lot sizes, shared access and interconnected parking lots located behind and to the side of new buildings. This approach will allow the town to maximize the economic potential of the park by working with prospective developers and desired businesses to create sites specifically designed for their needs rather than a series of predetermined dimensional standards.

Potential Development in the Sandwich Industrial Park and District	
Total Development	880,637 s.f.
New Dwelling Units	66
Average Weekday Trip Generation	8,322
Average Parking Spaces Needed	4,535
Average Water Demand (gpd)	39,073
Average Wastewater Flow (gpd)	79,908

The build-out analysis for the Sandwich Industrial Park and District estimates potential for 880,637 square feet of new office and light industrial development, and 66 new dwelling units (based on the permitted Dana's Field 40-B project which has not yet been constructed). New development will generate impacts in the form of both large amounts of traffic and wastewater. Each impact will require some form of mitigation that will need to be addressed by area roadway improvements and possibly a new public wastewater treatment plant that could service both the Park and the South Sandwich Village Center.

(More discussion on projected traffic and potential improvements based on the build-out analysis is included in *Section 4: Transportation and Circulation*. More discussion of water and wastewater demands is included in *Section 5: Community Facilities and Services*).

2.0 Natural Resources

Contents

2.1 Background and Overview

2.2 Water Resources

2.3 Coastal Resources

2.4 Wetlands, Wildlife and Plant Habitat

2.5 Geology, Soils, Topography, and Vegetative Cover

2.6 Environmental Challenges and Recent Actions

2.1 Background and Overview

One of the prime considerations in planning for the future of Sandwich is the importance of natural resources to the quality of life in the community. This element inventories significant natural resource attributes and constraints in town, and evaluates policies and strategies for protecting and managing such areas. Areas of high priority for conservation, such as water supply protection zones and wildlife habitat are identified and mapped. An assessment and description of Sandwich's surface water resources, ground water resources and ecological/landscape resources has also prepared. The Natural Resources Element fully integrates the *Sandwich Open Space and Recreation Plan, 2006* prepared by Taintor & Associates, Inc., the *Sandwich Pre-Disaster Mitigation Plan, 2004* and the *Sandwich LCP Water Resources Element Update, 2004* by the ESS Group.

2.2 Water Resources

Roughly 12,000 years ago, the last of the four great Pleistocene glaciers, the Wisconsin, receded from southern New England leaving in its wake the islands of Nantucket and Martha's Vineyard, and the great sand bar known as Cape Cod. The Cape primarily consists of two fundamentally different glacial deposits: the Sandwich and Buzzards Bay Moraines with high ridges of unconsolidated glacial material pushed down from the north and left at the glaciers leading edge as its forward movement stalled; and a gently sloping outwash plain extending to the south and east from the moraine.

The moraine gives the Cape its greatest topographic relief, reaching ridge heights of over 200 feet above sea level in Sandwich. The outwash plain extends from an elevation of 80 - 100 feet above sea level near the ridge to about 20 feet near the Cape's south shore. These glacial deposits extend to depths of 300 to 500 feet below sea level, except below Bourne and Sandwich where it decreases to 150 feet. Beneath the glacial material is bedrock similar to that found on the mainland.

Within the pores of these deposits, caused by an average of 40 inches of precipitation per year, lies our fresh water reservoir--the **Cape Cod Sole Source Aquifer**. This ground water body appears in cross-section to be shaped like a lens extending from shore to shore across the Cape. Because salt water is more dense than fresh, the fresh water floats atop the sea water beneath and surrounding it. The water table in Sandwich reaches levels upwards of 60 feet above sea level, and the lens itself measuring some 240 feet in depth.

The local aquifer, the **Sagamore Lens**, is an unconfined aquifer shared with the Towns of Bourne, Falmouth, Mashpee and Barnstable. Ground-water flows from its highest elevation (approximately 70 feet above mean sea level) in the Massachusetts Military Reservation area westward towards Buzzards Bay, northerly toward Cape Cod Bay, southerly towards Mashpee and Falmouth and easterly toward the Town of Barnstable.

The Upper Cape overlies that portion of the aquifer with the highest potential fresh water yield. Protection efforts for this aquifer must be given the utmost priority, as any damage to any portion of this ground water will have far-reaching and disastrous consequences.

Drinking Water Supply

The Town of Sandwich and the **Sandwich Water District** have been active in evaluating water resource availability and demand for the town's residents over the past several years. Since the last version of the Local Comprehensive Plan in 1996, several studies and planning efforts have been completed to document the dynamic nature of water demand and resources for town residents, including those served by the Sandwich Water District as well as those on private domestic wells.

Private Wells – There are an estimated 2,500 private wells for individual homes in Sandwich used for drinking water purposes. These wells are located throughout town but are predominantly located in the eastern part of Sandwich where public water supply is not currently available. The Barnstable County Lab performs water quality analyses for a small number of new wells and samples for wells in real estate transfers. The results of these analyses indicate that both nitrate-nitrogen and sodium contamination occurs unpredictably throughout the community. Likely sources include septic system effluent, lawn fertilizer application, salt water intrusion and road salts.

Private wells serving single family dwellings draw groundwater from a very limited portion of the aquifer. These wells are generally shallow and typically penetrate only 10 to 12 feet into the aquifer. This factor, in conjunction with the low and intermittent pumping, restrict the contribution area to a limited land area.

In addition to private residential wells, Sandwich has four small volume community wells which are classified by the state as nontransient/noncommunity wells and transient community wells. These wells generally supply domestic water to condominiums, restaurants, motels, and office buildings. Because these wells tend to supply water to tourist-oriented facilities, much of the water provided by these wells is used by visitors to Cape Cod. Future review of densely developed areas utilizing private wells is suggested in ensure potable water supplies and assist in planning efforts for future water service demand.

Small Volume Community Well Inventory in Sandwich

Location	Type	Address
Sandy Neck Motel	NC	32 Meadow Springs Dr
Amari's Restaurant	NC	674 Route 6A
Spring Garden Motel	NC	578 Route 6A
Southpoint Condo's		
Peter's Pond Campground		
Town Hall Spring		

Source: Small Volume Well Inventory, CCC, January 1994

Sandwich Water District - The Sandwich Water District was established in 1947 and operates independently of the town government. In 2006, the Sandwich Water District (SWD) provided water to 6,643 metered service connections and withdrew 642 million gallons of water from all five well sources. This public water supply system serves only Sandwich and does not provide service to any other communities. However, emergency reciprocal arrangements are in place with adjacent towns. SWD is the only water district within Sandwich and was originally mainly in the Historic Village Area. Today, approximately 75 percent of the land area within Sandwich and an estimated is serviced by the District. Individual private wells service the remaining 25 percent of the town. More detailed information on the Sandwich Water District is contained in *Section 5: Municipal Facilities and Services.*

Watershed Assessment

Sandwich lies within the Cape Cod watershed. The watershed encompasses all of the towns in Barnstable County and has a drainage area of approximately 440 square miles.

Ponds and Lakes - The town's primary freshwater resources are its 63 ponds, totaling approximately 698 acres of surface area[1]. These ponds are scattered throughout the town, primarily in the geologic areas of outwash plain and glacial lake deposit.

Ten of the ponds are greater than ten acres in size, which classifies them as Great Ponds of the Commonwealth. The public owns Great Ponds and is entitled to access, while other ponds can be owned privately by surrounding landowners and public access can be prohibited. Only six of Sandwich's Great Ponds have been officially surveyed as being greater than ten acres in area by the state, but it is probable that six others may meet the test. Five ponds are private by size, but have public access through publicly-owned land, such as the well fields of the Sandwich Water District around their shores. Several ponds were created by impoundment, including the Shawme Ponds and the Twin Ponds on Route 6A. Most, however, are classic kettlehole ponds, continually recharged by groundwater and without surface inlet or outlet.

Recreationally, the most important swimming ponds are Mashpee Wakeby Lake, Peters Pond, and Snake Pond, which have important town conservation/recreation land abutting them. An annual bathing water quality sampling program has been instituted by the town and the analysis is completed by the Barnstable County Lab per state law. Peter's Pond is 54 feet deep making it perhaps the crown jewel for the sport fisher. It is regularly stocked not only with trout, but was one of only three Cape ponds to receive Atlantic salmon broodstock in 1996. Peter's Pond is also considered by state fisheries officials as one of the best Cape ponds for small mouth bass fishing. Peter's Pond also has the distinction of having the highest elevation (height of surface water 67 feet above sea level) of any pond on Cape Cod. It is classified as a "very sensitive" pond in terms of acidification, but its recent trend has been positive.

Peter's Pond, Mashpee Lake, Pimlico Pond, Lawrence Pond, Spectacle Pond, and Snake Pond are available for trailered boats, but most pond boating is limited to canoes, rowboats and other small craft. An anadromous fish run for blueback herring and alewife species extends into Lower Shawme Lake and Mashpee Lake.[2] Coldwater stratified ponds, those whose depth to surface area ratio prevents seasonal mixing of waters, are preferred by trout and only five in Sandwich claim that distinction: Peters, Spectacle, Lower Shawme, Mashpee Lake and Hoxie Pond.

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[1] Cape Cod Pond and Lake Atlas, Cape Cod Commission, 2003

[2] A fish ladder, extending from Lower Shawme to Upper Shawme Pond, was abandoned in 1972. The Town, led by its Conservation Department, has been working to acquire land to fix the Upper Shawme Pond dam and restore the extended run.

Sandwich Ponds

Pond Name	Surface Acreage	Shore Length (miles)	Max. Depth (ft.)	Median Depth (ft)	Water Type	Description	Activities	Public Access	Comments
Great Ponds (As determined by the State)									
Mashpee Lake and Wakeby Pond	729	0.3	87	20	Warm	Wakeby Pond is located in South Sandwich, bordering with the Town of Mashpee, west of Cotuit Road and west of the southern end of Harlow Road. This is a double pond. Mashpee-Wakeby is the largest (743 acres) on Cape Cod with Sandwich shores on both the east and west and an unconnected section (private) of the Town of Mashpee on its north shore. The shores are mostly heavily wooded, with the Lowell Holly Reservation occupying the Conaumet Neck which separates the two pond areas. The Conservation Commission managed Ryder Property affords the town its second freshwater swimming facility. The state stocks the pond with trout, bass, pickerel, white and yellow perch. Activities cover all aquatic sports and recreation, as well as picnicking and nature trails on its shores.	Fishing, Swimming Boating	Mashpee state ramp; Sandwich shorefront	Ryder Cons. Lands
Lawrence Pond	138	2.3	27	15	Warm	Lawrence Pond is located in East Sandwich south along Great Hill Road. Access is from Exit 4 off Mid-Cape Highway. The pond is surrounded by wooded lands all of which are privately owned. The Massachusetts Division of Fisheries and Game stocks the pond with large-mouth bass, yellow perch, and chain pickerel. Access to the pond is provided by a town way located off of Great Hill Road in the southeastern edge of the pond, and includes a public boat ramp. Activities at the pond include boating, swimming, water-skiing, fishing, ice fishing, and camping (quasi-private).	Boating Fishing Swimming	Poor town ramp, Great Hill Rd.	Rare plants
Peter's Pond	127	2.9	54	22	Cold	Peters Pond is located in the southern part of the Forestdale area. Access to the pond is provided by a public boat ramp and a right-of-way at John Ewer Road west off Cotuit Road. Access is further permitted under legal restriction as stated in the great pond's classification. Oligotrophic in nature, the pond is deep. The water is cold and well suited for the trout stocking program managed by the Division of Fisheries and Game. Land development around the pond consists of residential development, a large trailer park area amidst wooded setting, and a corporate employee recreation park. At present an industrial facility for sand, gravel and pavement mix distribution occupies leased land at the northwest side of the pond.	Fishing, swimming, boating	State ramp, John Ewer Rd, Oak Crest Cove	Boyden Farm conservation lands
Spectacle Pond	91	2.6	43	25	Warm	Spectacle Pond is located at the eastern end of Kiah's Way, northwest of Stowe Road and northeast of Pinkham Road. Spectacle Pond is bordered by high density residential development. Public access is available at a boat ramp on the southwest shore. The Department of Fisheries and Game stocks the pond with trout and small mouth bass. Activities include swimming, boating, canoeing, fishing, ice skating and fishing.	Boating Fishing, swimming; SS YMCA	Town ramp off Pinkham Rd.	1992 liming; rare plants
Triangle Pond	84	2	30	15	Warm	Triangle Pond is located between Stowe Road and Farmersville Road, Triangle Pond is surrounded by low-density, privately owned residential developments. The area is 60-69% wooded land. One large camp (Quincy YMCA) is located at the northern end of the shore, and consists of 549 acres. Another 59 acres in this area is undeveloped and privately owned. No public access is available to this pond; however, legal implications for access under the great pond classification apply. The Department of Fisheries and Game stocks the pond with small mouth bass. Activities include swimming, fishing and ice fishing.	Swimming SS YMCA	Informal, off Stowe Rd	Rare plants

Snake Pond	83	1.6	33	18	Warm	Snake Pond is located on Snake Pond Road in southwest Sandwich. Shallow banks located all along the edge of this pond make it ideal for recreation. With the exception of a 0.9 acre town-owned beach area (see below), lands about the pond are privately owned. A public boat access is located off Snake Pond Road. The pond is stocked by the Division of Fisheries and Game for yellow perch, chain pickerel and bullhead. Activities include water-skiing, boating, swimming, fishing, ice fishing and ice skating.	Swimming, boating Fishing	Town beach and ramp	1991 liming
Presumed Great Ponds (Public ponds with surface area greater than 10 acres)									
Lower Shawme	24	1.5	16	NA	16	Shawme Pond is located in the Sandwich Village area south of and next to the Sandwich Town Hall, east of Grove Street and west of Water Street (Route 130). Once constructed as a mill and factory pond, this lower of the two Shawme Ponds is today a large attraction in Sandwich. Visitors are attracted to Thornton W. Burgess Museum and shop, the Grist Mill which still operates, and spring water from an artesian well. Benches have been placed along the shoreline. Forty percent of the land about the pond is town-owned open land. Other land uses include residential and town-owned operations. Access to the pond is informal. No public boat ramp exists. Activities include ice skating, canoeing, ice fishing, and fishing for trout, bass, perch and pickerel.	Fishing Historic scene	Town land on Grove and Water St., Cook Farm	Herring run
Upper Shawme	20	0.8	24	NA	Cold	Upper Shawme Pond is located south of Shawme Pond. It is separated from the lower Shawme Lake by an earthen dam. While there is no direct surface inflow except runoff from shore, the principal water source is through springs which abound in this area. Activities include the same aquatic sports as its lower neighbor.	Fishing Trail	Cook Farm	Herring run Rare plants
Weeks Pond	15	0.76	15	NA	Cold	Weeks Pond is located on the south side of Snake Pond Road in southwest Sandwich. It is bordered by high density residential development. Weeks Pond is located in an overgrown naturalistic setting which is surrounded by privately owned low-lying bush and wetlands vegetation.	UND	None; through wellfield	Rare plants
Pimlico Pond	16.4	0.57	23	12	Warm	Pimlico Pond is located in southeastern Sandwich on Pimlico Pond Road. Access is available by town right-of-way, with a hard boat ramp off Pimlico Pond. Public access is also guaranteed in accordance with Great Pond classification. Activities include boating, fishing, and swimming.	Trout-stocked	Town dirt ramp	
Goodspeed Cemetery	11	0.76	UND	UND	UND	Great Pond	Loop trail	Ryder Conservation Land	
Lower Hog Pond	7.8	UND	26	12	Warm	Little Hog Pond is located south of Hog Pond. No public access exists. The majority of lands surrounding the pond are privately owned farmlands and woodlands.	UND	None - Farmersville Rd.	
Upper Hog Pond	11.3	0.57	20	14	Warm	Hog Pond is located between Percival Lane and Farmersville Road in southeast Sandwich, Hog Pond is privately owned. No public access is provided and use is restricted to private owners in this area. Eighty to eighty-nine percent of the land abutting the pond is wooded.	UND	Private - Farmersville Rd.	
Private Ponds with Public Access (Less than 10 acres but publicly-owned frontage or access)									
Hoxie Pond	8.5	0.42	35	12	Cold	Hoxie Pond is located in East Sandwich, west of the State Game Farm, and off Old County Road and railroad tracks. Hoxie Pond is located in a wooded area with swamplands interspersed. It is used primarily for light boating (no motor), swimming, fishing, aesthetics and cranberry bog irrigation purpose. Access is poor and informal over private lands.	Trout-stocked	None; state game farm DCR	Rare plants

Twin Pond	6.4	0.57	5	UND	UND	Private pond with public access	Cranberry bogs	Route 6A; State highway	Impoundment
Nye Pond	6	0.38	32	12	Cold	Nye Pond is located across the Old County Road from the Nye Family Homestead and the State Fish Hatchery. There is no surface inlet to the pond; it is fed by strong bottom springs releasing ground water from a recharge area reaching as far south as Popple Bottom Road and the area of Lawrence Pond. Bordering the southern side is property of the Sandwich Water District. A public water supply well is located on SWD property.	Historic scene	Old County Rd; wellfield	
Boiling Springs Pond	5	0.68	UND	UND	UND	Private pond with public access	Historic scene	through wellfield and Briar Patch CC	
Doughnut Pond	1.3	0.06	UND	UND	UND	Private pond with public access	UND	state land; off Rt. 130	Shawme-Crowell
Private Ponds (Less than 10 acres; no public access; surrounded by private property)									
Little Hog Pond	8	0.38	26	UND	UND	Private pond with no public access	Holly Ridge GC	None; off Percival Lane	
Lily Pond 1	4.8	UND	UND	UND	UND	Private pond with no public access	UND	UND	
Lily Pond 2	5.1	0.3	UND	UND	UND	Private pond with no public access	Bog pond	None; off Old County Rd	RR Tracks
Bog Pond	2	0.23	UND	UND	UND	Private pond with no public access	Bog pond	None; off Old County Rd.	Impoundment
UTES Pond	0.2	UND	UND	UND	UND	Private pond with no public access	UND	UND	
Bog Pond	1.5	0.19	UND	UND	UND	Private pond with no public access	Bog pond	None; off Old County Rd.	Impoundment
Old Quaker Mtghouse Pond	UND	UND	5	UND	UND	Private pond with no public access	UND	UND	
Ox Pond	0.3	UND	UND	UND	UND	Private pond with no public access	UND	UND	
Dead Swamp Pond	1.4	0.23	UND	UND	UND	Private pond with no public access	Bog pond	none; Solomon Pond Rd.	House lots
Spring Hill Pond	0.5	0.1	UND	UND	UND	Private pond with no public access	UND	none; off Juniper Hill Lane	House lot
Small Mill Pond	0.4	0.19	UND	UND	UND	Private pond with no public access	UND	none; off Nye Rd	Impoundment
CG Town Pond	0.2		UND	UND	UND	Private pond with no public access	UND	None	
Grassy Pond	0.3	UND	UND	UND	UND	Private pond with no public access	UND	None	
Round Hill Pond	0.3	0.1	UND	UND	UND	Private pond with no public access	Golf course	none: through Round Hill GC	
Historical Ponds (Ponds no longer in existence)									
Game Farm Pond	-5.8	UND	UND			Historical pond	Reversion to salt marsh	State game farm	impoundment breached

In 1986, the Town of Sandwich Environmental Task Force reported that, despite an abundance of freshwater ponds, "the town possesses little pond-front property, severely limiting access by residents to these 'public' waters. Consequently, a very high priority for the town is acquisition of pond frontage suitable for recreational uses."[3] Since that time, additional lands were purchased at Peters Pond and Spectacle Pond. However, Lawrence Pond, the town's largest pond, currently has poor public access along its 2.3-mile shoreline. A marginal boat access is all that is legally-accessible. Adequate pond recreational access must be balanced with the need to protect sensitive environmental resources along these ponds.

Most of the ponds in Sandwich are classic kettlehole ponds, formed on the Cape as deep depressions in the glacial outwash left by stagnant ice blocks. Most are isolated (that is, they do not drain to the sea). These ponds, dependent solely on the fluctuation in the water table for their own surface level, often expose a wide shore during the months when the water table is low. These exposed shorelines comprise the unique habitat called "coastal plain pondshores," which may harbor rare and endangered plants, such as Maryland meadow beauty and redroot, and rare animals, such as the comet darner and New England bluet (damselflies).[4]

Part of the significance of Sandwich's ponds lies not only in their importance for recreation and the fact that they are sensitive habitat for rare plant and animal species. Specifically, Hog, Weeks, Snake, Triangle, Spectacle and Lawrence Ponds harbor this rare habitat niche. However, water quality is a growing concern is some of Sandwich's most valuable ponds. The Cape Cod Pond and Lakes Atlas Report by the Cape Cod Commission in 2003 reported that Peter's Pond and Pimlico Pond had incurred various levels of eutrophication. It was recommended that the town consider a more refined pond assessment program including monitoring on dissolved oxygen levels, nutrients, and chlorophyll a concentrations throughout the summer; and a sediment characterization and land use assessment of shoreline and watershed properties to forecast weather water quality is likely to worsen. Since 1996, the Ponds and Lakes Stewardship Program (PALS) has provided limited data on the health of the town's ponds for nitrogen and phosphorus levels.

Streams and Water Courses - Sandwich has a number of small freshwater streams which provide important habitat for anadromous fish as well as corridors for wildlife. Historically, the most important stream in Sandwich was Scusset River, whose headwaters nearly touched the headwaters of Monument River flowing west into Buzzards Bay. The Pilgrims used this connection to conduct trade with the Rhode Island and New Amsterdam colonies to the south and west. They realized early on the commercial potential in creating a through-route by joining the two streams and, after several failed attempts, they were merged and the Cape Cod Canal was created in the early 1900s.

Sandwich has several other small streams many of which have been artificially manipulated over the years by roadway construction, development, and ditching for cranberry irrigation or mosquito control. A program to thoroughly identify and document Sandwich's obscure watercourses would educate the community of the vital role they play in ensuring water quality in ponds, tidal rivers and bays.

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[3] Town of Sandwich, Environmental Task Force, Conservation and Recreation Plan for Town of Sandwich, January 1986.

[4] Association for the Preservation of Cape Cod, Cape Cod Critical Habitats Atlas, 1990.

Sandwich's Water Courses

Name of Stream	Headwaters	Receiving Body	Approx. Length (miles)
Scusset Mill/Bass Creek	Wilson Rd. Pond	Cape Cod Bay	1
Cow House River	Twin Ponds	Long Creek/Scorton Harbor	1.5
Mill Pond Creek	Lily Pond, ES	Scorton Creek	0.3
Ford Creek	Fish Hatchery	Old Harbor	0.5
Parsonage Creek	Chipman Pond	Old Harbor	1.5
Ox Pasture Creek	unnamed pond	Old Harbor	0.5
Mill River	Shawme Ponds	Old Harbor	2
Springhill Creek	Boiling Springs Pond	Old Harbor	1.5
Springhill Creek	Juniper Hill Pond	Old Harbor	0.3
Old Harbor Creek	Van Buskirk Bog	Old Harbor	0.1
Shove Creek	Lawrence Hole	Scorton Harbor Creek	0.5
Jeremy's Dam River	Bog Ponds/Old Co. Rd.	Scorton Harbor Creek	0.5
Mill Creek (E. Sand.)	Nye Pond	Scorton Harbor Creek	1
Dead Swamp Pond Creek	Solomon Pond	Cape Cod Bay	0.3

1Source: Sandwich Open Space and Recreation Plan 1999

Groundwater Recharge Areas[5]

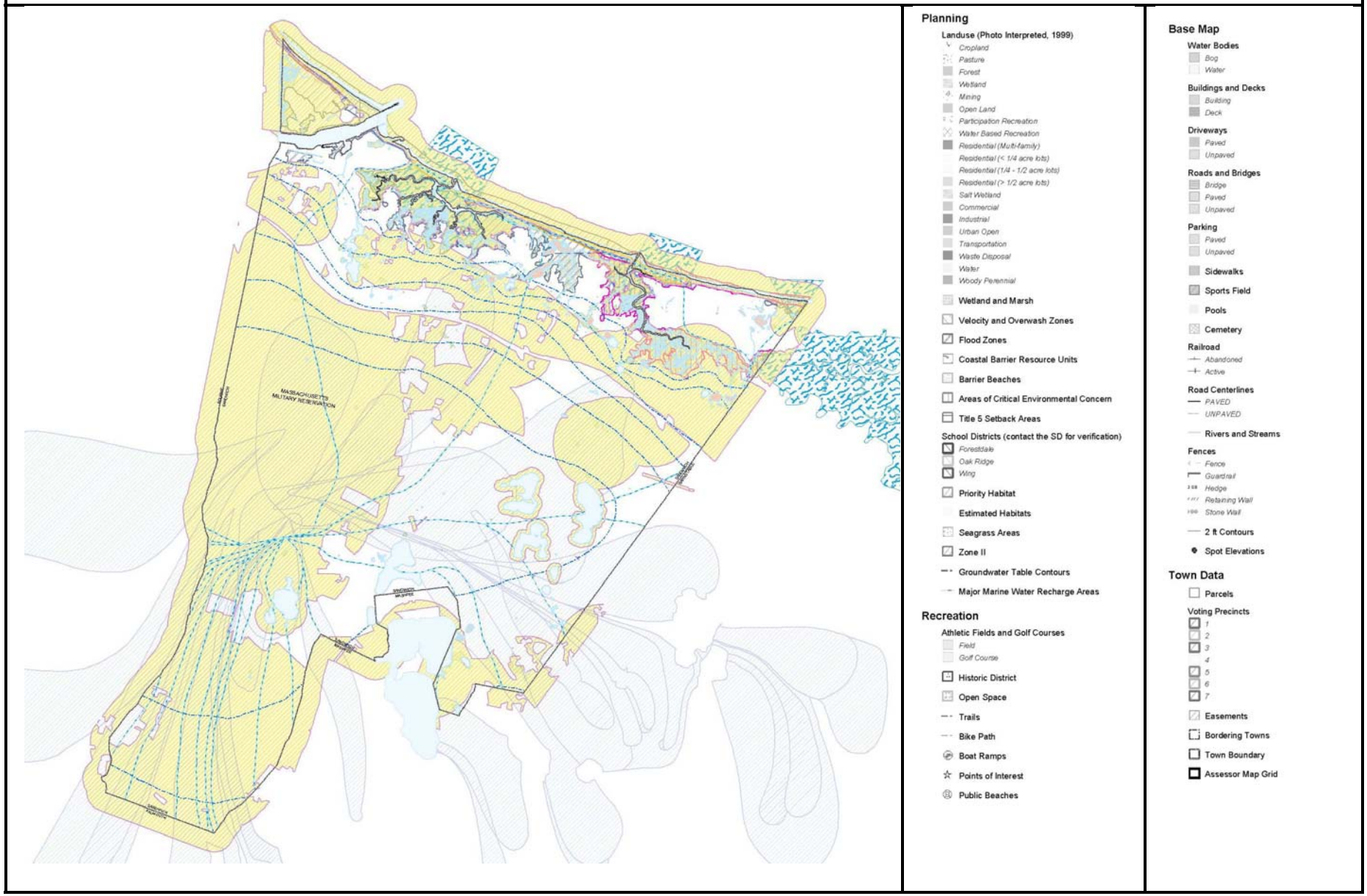
Recharge areas are land areas that contribute ground water flow to surface water bodies, such as ponds, streams and bays. Recharge areas are much more relevant on Cape Cod, where sandy soils readily transmit groundwater. As a result, land uses within recharge areas significantly influence surface water quality.

In recognition of the importance of groundwater to the quality of ponds, a surface water protection district has been adopted under the town's zoning to regulate development within 300 feet of ponds and associated wetlands. In 2000 the Cape Cod Commission declared the Three Ponds area of South Sandwich a District of Critical Planning Concern in recognition of the need to further protect these important freshwater resources.

Sandwich hosts many important springs or groundwater discharge points. The Town Square well is probably the most well know and visited daily by residents and tourists. Lawrence Hole is a spring feeding into Scorton Creek east of Talbot's Point Conservation Area. A wooden cask captures the pure flow of a spring along the walking trail at Talbot's Point. Other visited springs are found behind the Wing Family Homestead at Spring Hill and the Town Hall Annex. The Meadow Spring on the north side of Route 6A near the corner of Meadow Spring Drive was a significant "rest stop" for horseback riders in early days. The Great Spring on Ploughed Neck is by the presumed homesite of colonist Thomas Burgess. An artesian spring is located near the former office at the East Sandwich Game Farm. The town might consider these natural attractions as part of a historical tour, as well as an interesting way to educate citizens and visitors about the aquifer.

[5] Sandwich Open Space and Recreation Plan, 1999

Sandwich Natural Resources



In 1982 the U.S. Environmental Protection Agency designated all of Barnstable County as a Sole Source Aquifer in recognition of the region's complete reliance on groundwater as its potable water supply. Sandwich is served by the Sagamore Lens, the largest of six discrete components of the aquifer. This lens provides water for all of the Cape towns from Bourne to Yarmouth; Bass River serves as its easterly discharge point.

Of the 46 inches of precipitation that falls on the Cape in a typical year, approximately 16 inches reaches the water table underground to replenish or "recharge" the aquifer. The freshwater lens in Sandwich is "thick" (more than 60 feet in water table depth through most of the town) relative to Lower Cape towns, which means it can provide greater yield and has more volume to dilute potential contamination. Unfortunately, Sandwich's proximity to the contamination associated with Camp Edwards military base makes it more vulnerable to ground water pollution issues. Most of Sandwich's public supply wells have long, linear zones of contribution, meaning that spills or contamination in the far south end of town can still affect supply wells at the far north of town. Thus, aquifer protection must be considered on a townwide basis, not limited to discrete sections of certain villages.

A 1994 study by the US Geological Survey found that only about 5.8 percent of the Sagamore Lens land area (Bourne through Yarmouth) was useful for siting new public supply wells, not including land within Camp Edwards or within the moraine, where great depths to water table and variable soils make for difficult wellfields. A recent follow-up study, determined that only about 6,100 acres have any potential for future water supply development in Sandwich outside of Camp Edwards. These areas are limited to portions of the Ridge District, the YMCA camps at the South Sandwich ponds, Ryder Conservation Area and within some of the existing wellfields as the most suitable spots for further exploration.

Inter-town cooperation is needed to manage the quantity and quality of this aquifer. Sandwich's ground water protection overlay zoning district, for instance, helps to protect the zone of contribution to the Centerville-Osterville-Marstons Mills Water District's wellfields off Race Lane.

While Sandwich's public supply wells draw groundwater from within its own municipal borders, all of Sandwich's neighboring towns rely on Sandwich groundwater to supply some of their wells. Cooperative regional management of ground water quality is therefore essential. The Upper Cape Water Supply Collaborative was formed in 2001 after the Army provided to the towns of Sandwich, Falmouth, Mashpee, Bourne three wells and a water tank on the MMR. The Collaborative sells water to each of the towns. In 2006, the Upper Cape Water Resource Collaborative was formed to provide environmental stewardship on the MMR. The Resource Collaborative seeks to protect the Upper Cape water supply on the MMR by monitoring activities on the facility to ensure that the water resource is not further contaminated.

Flood Hazard Areas

Floodplains are delineated on the basis of topography, hydrology and development characteristics of the area. The 100 and 500 year floodplains in Sandwich were delineated in 1989 by the Federal Emergency Management Agency (FEMA) in the form of Flood Insurance Rate Maps (FIRM) and appended by the Town of Sandwich Flood Insurance Study (FIS) in 1991 and subsequent revisions.

The 100-Year Floodplain

The land adjacent to streams, lakes or rivers which is likely to flood during a storm event is known as the floodplain. Floodplains are categorized according to the average frequency of flooding. Thus, the 100-year floodplain is the area of land that is likely to be flooded once every 100 years. In other words, there is a 1% chance that the land will be flooded in any given year.

The principal flood problems occur along the coast of Sandwich generally resulting from storm tides caused by northeasters that are prevalent in the winter (Flood Insurance Study, 1991). Existing development and future development/redevelopment potential is high along the coast and therefore the flood hazard is high. Minimal flood hazards potential was determined for the lakes and ponds in Sandwich because of the limited development potential (Flood Insurance Study, 1991). Recent storm tides that have caused damages in Sandwich occurred in February 1940; December 29, 1959; February 6 and 7, 1978; October 30, 1991; and, December 12, 1992. Hurricane damages also occurred with Edna on September 11, 1954 resulting from northwest winds as the hurricane moved north over the Cape.

Floodwaters from Cape Cod Bay will enter the Cape Cod Canal, Sandwich Harbor and Scorton Harbor inundating the marshes behind the barrier beaches and surrounding uplands. One of the most critical hazard areas, inland from the Bay, is access along Route 6A between Scorton Creek and the Great Marshes in East Sandwich and Barnstable. Storm tides entering Barnstable Harbor will merge with those entering Scorton Creek by crossing Route 6A in two locations and leaving all of Scorton Neck an island. Another type of inland flooding is due to the restriction of floodwaters in their seaward exit resulting in an increased retention time. Tide gates and undersized culverts in tidal creeks cause this hazard. These have recently been identified and mapped by the Cape Cod Commission as part of Project Impact. Furthermore, the Cape Cod Commission has facilitated the completion of both the Flood Hazard Mitigation Plan (2003) and Pre-Disaster Mitigation Plan (August 2004). The Pre-Disaster Plan acts as a complement to the FEMA approved Flood Hazard Mitigation Plan and will serve to assist the town in the adoption of aggressive and proactive goals to mitigate future damages from flooding and flood-related erosion.

Sandwich Flood Zones

Flooding Source	Stillwater Elevation (feet NGVD)				Zone	Base Flood Elevation (Feet NGVD)
	10-year	50- year	100-year	500-year		
Cape Cod Bay	9.1	10	10.4	11.4	A	10 to 12
Bourne town line					V	13 to17
Barnstable town line	9.3	10.3	10.6	11.6	A	11 to 12
					V	13 to 26
	Shallow Flooding – Average Depth 2.0 Foot				AO	--

Source: Flood Insurance Study (FIS), 1991.

Upland areas that are protected by the barrier beaches and abut the salt marshes are not erosional but are being submerged due to sea level rise. In a previous study (Geise et al, 1987), it was estimated that passive retreat of Sandwich's coastal upland would result in the loss of between 54 and 188 acres by the year 2025 under historic (0.01 ft/yr) and high scenario (0.035 ft/yr) estimates, respectively. Recent Intergovernmental Panel on Climate Change (IPCC) predicted rates of rise (0.0135 - 0.0187 ft/yr) could result in land losses could vary from 113-157

acres by 2050 and 194-270 acres by 2100.

The Sandwich Floodplain Overlay District regulates development in order to protect the health and safety of people in the area and to protect property. Unregulated development in the floodplain can increase the likelihood of flooding by increasing the surface runoff into the stream channel. In addition, water contamination from flood-damaged sewage or septic systems and debris swept downstream from flooded properties can result in unnecessary hazards to those downstream. The overlay district is based on the FEMA designated flood hazard areas. These areas are indicated as the 100-year floodplain on the FIRM and as defined by the FIS. Filling or building in these areas is prohibited in order to preserve the flood-mitigating effects of these vital resources. The only permitted uses in this district include recreation, agriculture, and structures that do not impede the flow of flood waters.

Water Resource Issues

Potential Contamination Sources - Threats to water quality in Sandwich are similar to those typically observed in many suburban and rural areas: the impacts of on-site septic systems with respect to nitrogen loading and their being a source for a variety of other contaminants; road runoff, salt from highway de-icing practices, underground gasoline storage tanks, and synthetic organic chemicals from various commercial and industrial facilities are other examples of threats to water quality that Sandwich faces. Cranberry bogs are an important agricultural and cultural resource for southeast Massachusetts. However, they require pesticides and herbicides and often use aerial spraying to apply them. Water withdrawal can also be another sensitive issue. Other potential concerns include mercury, personal care products and pharmaceuticals.

An additional and well documented water quality contamination threat is the suite of plumes emanating from the MMR. In fact, one of the six Sandwich Water District well fields (the Weeks Pond well) was shut down so that the contamination plume would not be drawn into Snake Pond. Because of high permeability associated with the glacial deposits in the town's overall water supply area, contaminants are potentially easily transported from their sources to the pumping wells. As a result, it is critically important to understand the potential contamination sources and the mechanisms and actions that may be employed to mitigate and prevent such contaminants from compromising Sandwich's water quality. It is important to acknowledge that there are on-going efforts that have had considerable success in cleaning up the contaminated water resource (i.e. Forestdale remediation program's extraction and injection well).

Nitrogen loading increases to surface waters as well as groundwater supply sources have been recorded over the past decade on Cape Cod according to the Cape Cod Commission. This is attributed to the increased development throughout the region and the lack of centralized wastewater collection and treatment. Individual on-site wastewater disposal systems predominate in Sandwich as all other Cape towns with new construction. The Sandwich Water District screens for potential pollutants in order to protect the public water sources.

The Massachusetts Estuaries Project will assit communities on the development of both technical and institutional nitrogen reduction strategies, and the development of a roadmap for changes in state policy and regulation to support innovative nitrogen reduction strategies, including watershed-based permitting and nutrient trading. The MEP will also serve to inform future land use planning decisions and assist the town in implementing solutions to improve water quality. The work of the MEP will be completed within two years, although information is currently available and TMDL's have been established for Popponesset Bay in Mashpee and Barnstable's

Three Bays. As the results of the Project become available, calculating the nitrogen fair share allotment on a watershed basis should be incorporated into the town's land use planning activities, particularly in areas that are targeted for future growth. The town should also consider fair share allotments for land uses affecting marine embayments outside of Sandwich.

Point and Non-Point Source Pollution Discharge - The prime locations of point and non-point discharge threats in Sandwich are as follows:

- Ponds in central and south Sandwich - Residential lawn and roadway runoff are partially responsible for eutrophication of these ponds. The older subdivisions in this area have very poor drainage systems. Stormwater has no way of gradually entering the soil and instead flows directly into nearby ponds;
- Coastal embayments - Septic systems and roadway runoff are the suspected causes of water quality deterioration;
- Well field zones - The Boiling Springs Well Field Zones of Contribution contain the Industrial Park and South Sandwich Village Center. These two sites provide the greatest commercial and industrial development potential in Sandwich's future. According to the Sandwich Water District, all of their zones of contribution pass through some part of the South Sandwich Village Center;
- Massachusetts Military Reservation - MMR's underground contamination plume from Fuel Spill - 12 is moving toward Weeks Pond Well. As a result, the Weeks Pond Well is no longer being used. The possibility exists that there are other undiscovered plumes emanating from the MMR; and
- J. Braden Thompson contamination plume – This is a shallow plume that is slowly moving toward Mashpee-Wakeby Pond. The DEP has completed a containment plan and will soon be constructing the containment facility.

Stormwater Systems and Discharge Areas - The following storm water systems have discharge problems for various reasons:

- Lakefield Farms on Great Hill Road - This subdivision of 1/2 acre lots discharges into Lawrence Pond, compounding nitrate loading problems.
- Snake Pond - Forestdale Shores - This older subdivision with a few vacant lots may cause drainage problems unless carefully managed.
- Mill Creek (and State, Jarves, part of Main Street and Willow) - These streets all discharge into the creek near the railroad crossing.
- Wing School-Water Street, Pheasant Lane, Morse Road and Beale Avenue area - This area discharges into Mill Creek.

Other Water Resource Issues - The Sagamore Lens extends into Barnstable, Falmouth, Mashpee and Bourne. Therefore, ongoing communication directly between towns, MMR and the Barnstable County will be important to ensure that multi-town aquifer issues are addressed in all future development projects. Existing local and state regulations provide some protection for the Sandwich's water resources. However, due to the fact that the town is in a sole source aquifer, local regulations will need to be regularly evaluated and updated to ensure protection of the community's water supply. Defining the carrying capacity of the aquifer is essential to this effort. Date from USGS modeling is available to quantify the capacity of the Sagamore Lens, but that constraints to water supply development are primarily created by land use patterns, and existing sources of contamination. The areas of land available for future water supply development can be estimated as a percentage of the town and if the MMR is counted (as it is designated as a Water Supply Reserve), Sandwich has more than twice the potential land area for future water supplies as any other Cape town. The town should also update nitrogen loading calculations to

match the updated build-out in order to establish the water quality "carrying capacity" at maximum build-out.

2.3 Coastal Resources

Since earliest settlement, Sandwich has been dependent on its water resources. The bay frontage, with its several estuarine openings and their inherent marsh formations has not only provided a rich source of food, but also ready access to the sea for fishing and transport. The saltwater beaches of the upper Cape differ dramatically with location. Those along the north shore bordering Cape Cod Bay, such as Sandwich, are generally characterized by cool water and shoreline. In the summer months, the surf is negligible.

The six principal beaches of Sandwich occupy 7.5 miles of the bayfront. Sagamore Beach, at the westerly end of the Bay, stretches 1.5 miles from the Bourne town line southeasterly to the Scusset State Beach at the Cape Cod Canal entrance. The Town Beach begins at the easterly jetty of the Cape Cod Canal and runs easterly 1.2 miles to the entrance of Old Sandwich Harbor with its delta of rivers and creeks.

On the east side of the harbor entrance are Spring Hill and East Sandwich Beaches, stretching 2.5 miles along a magnificent sandy shore and dunes easterly to the mouth of Scorton Creek. Scorton Shores runs easterly for 3 miles to Scorton Neck Beach, which ultimately connects with Sandy Neck Beach.

Besides natural attributes of the various beaches, the bayfront has significant manmade facilities. The entrance of the Cape Cod Canal is protected by stone jetties. These jetties, which are both tourist attractions and are accessible to fishermen, inhibit the natural longshore movement of sand from the Sagamore Highlands to the Sandwich Town Beach and beyond. As a result, beaches on the easterly side of the jetty are pebbly and of poorer quality than the sandy beaches west of the canal. Just inside the mouth of the Canal, on its southern bank, is the Sandwich Marina serving recreational purposes as well as important commercial uses benefiting the town.

Coastal Recreational Uses

Sandwich has 27 miles of salt water shorefront which is a primary focus of informal outdoor activities and foundation of the town's tourist-based economy, including swimming, fishing, hunting, and boating. Sandwich beachgoers are concentrated at Town Neck Beach, East Sandwich Beach, and Scusset Beach State Park, which combined account for only 1.5 miles of Sandwich's 7.5-mile long Bayshore. Spring Hill Beach and Scorton Neck conservation lands provide contiguous coastal access, as well.

Most of the remaining shoreline is private development on small lots or private association beaches. The Massachusetts Division of Marine Fisheries (MA DMF) purchased a 1.5-acre beach property (Ladenburg) on the west side of the mouth of Scorton Creek in 1999 to provide better public fishing access. Flyfishing for sea-run brown trout, hickory shad and striped bass along Scorton Creek is considered among the best on Cape Cod.

A key recreational issue is centered on the access, parking and management of the Scorton Neck/Sandy Neck Recreation Area. The majority of the beach lies within the Town of Barnstable, however, access to the property is through the Town of Sandwich. There is a need for more inland parking at this facility and the agreements are needed between the two towns as to where

it should be located and who will be responsible for maintenance and collection the fees. Sandy Neck in Barnstable and Scorton Neck in Sandwich provide a major coastal recreation area for the townspeople in both communities. Intergovernmental cooperation regarding management decisions for this ecosystem is critical for successful long-term management of this resource area.

Sensitive Coastal Environments

Almost the entire coast line of Sandwich could be classified as sensitive coastal environments. Each part of Sandwich's coastline faces a variety of land use challenges. The area in and around the Scorton Neck Conservation land to the east makes up the landward connection of the Sandy Neck Barrier Beach. This unusual ecosystem provides critical wildlife habitats and has spawned a wide variety of unusual plant species within the Scorton Neck area. This ecological diversity was the basis for the area nomination and designation as an Area of Critical Environmental Concern (ACEC).

Westward from the Scorton Neck area is the East Sandwich and Spring Hill barrier beach system. Overall the potential for new development in this area is reduced, given that most of the lots have already been subdivided. Those areas that are buildable must meet appropriate local, state, and federal controls and regulations. There are many homes that exist within the barrier beach system, and conversion of seasonal structures to year-round homes is a concern. The prime management concern for these coastal resources is to educate the property owners in this area on best management practices for preserving and enhancing the integrity of the dune volume, flora, and fauna. The indiscriminate creation of walking paths and trails, and other similar activities, throughout the dune system will negatively affect dune structure and wildlife and plants within the area. New development in this area is strongly discouraged and mitigation measures outlined in the 2004 Pre-Disaster Mitigation Plan should be implemented.

Between Scorton Shores and East Sandwich Beach, Scorton Creek exits to Cape Cod Bay. This creek and adjacent tidal marsh system provide an exceptionally beautiful and environmentally sensitive ecosystem. The threat to this system stems from the operation of power boats moving through the tidal marshes, eroding marsh banks. Any reconstruction of existing docks or piers, or construction of additional docks or piers in the marshes is regulated by local and state authorities.

The widespread closure of shellfish beds is prime indication that coastal embayments in Sandwich are experiencing water quality problems. Spring Hill and East Sandwich beaches are particularly vulnerable. Shellfish beds near and in the Scorton Creek area have been closed due to high bacteria counts. The exact cause of the high *E. Coli* counts is not known, but it is likely that it results from a combination of high levels of septic system discharge, animal feces, boat discharge, and drainage runoff from adjacent roadways. The long term management challenge for the town will be to decrease, to the maximum extent, the impacts coming from septic systems and road runoff within the watershed.

Along the westerly end of Spring Hill Beach and westward to Town Neck Beach, the key management issue is the erosion of the coastal system. Following the construction of the Cape Cod Canal and the elevation of the westward jetty in the late 1960s, the accretion of sand on beaches west of the jetty, and depletion of sand on eastern beaches, has continued without the benefit of normal renourishment. Agencies from the federal, state, and town government must respond to this problem. Conversations have been ongoing with the Army Corps of Engineers concerning strategies to directly move sand around the Canal. While the environmental consequences of this loss of sand are uncertain, the recreational value provided by these beaches and thus the loss of available beach space to Sandwich residents and visitors has been a significant concern.

Lying next to Town Beach is the Town Neck and Old Harbor area. One issue that needs to be addressed in this area is the breakthrough near the Old Harbor. The key management concern, however, is the high number of septic systems on small lots within the Town Neck area. A recent town program to locate cross connections between septic systems and storm drainage systems, identify failed septic systems, require tight tanks for larger problematic septic systems, and to educate the public on proper septic system maintenance are initial steps for approaching the problem. In some cases, new Title V regulations have also helped address existing concerns.

The next portion of Sandwich's coast line consists of the Cape Cod Canal as it extends and meets with the Sandwich Marina. Dredging was last performed in this harbor in the 1960's and the Harbor Master reports that dredging will most likely be needed in the next five years. The town has established an enterprise account for the marina and any revenues associated with commercial and pleasure boats moored in the harbor in placed in this account. The Canal, while completely outside of the jurisdiction of the town, poses its own set of challenges primarily related to its interference with the natural movement of sand in a southward direction as mentioned above.

The canal area and its impacts also extend to the west side of the Canal onto Sagamore Beach. The Sagamore Beach Marsh restoration project and septic system upgrades in this area are key initiatives that should result in improved protection of fragile coastal resources.

Strategies are needed for mitigating the various impacts on sensitive coastal environments from encroachments. Some possible measures may include buy-outs, nourishment (with connection to ACOE canal dredging project), mandatory relocation and elevation in key locations. Cumulative and substantial improved standards are needed that result in the implementation of key recommendations of the 2004 Pre-Disaster Mitigation Plan to effectively protect Sandwich's sensitive coastal resources.

Coastal Resource Issues

High Hazard Development Areas – Flooding and erosion vulnerability are the primary concerns of existing oceanfront development along Sandwich's shoreline and barrier beaches. An inventory for each of the six beach areas indicates that there are approximately 300 habitable dwellings seaward of the first major access road along these beaches and an additional 79 dwellings located on the landward side of the roads that are situated on the barrier beaches.

Oceanfront Shoreline Dwellings in Sandwich (approx. #)

Location	Seaward	Landward	Total
Sagamore Beach	86	43	129
Town Beach	33	Upland	33
Springhill Beach	62	0	62
East Sandwich Beach	97	36	133
Scorton Shores	18	Upland	18
Scorton Neck Beach	7 (pre '78)	Upland	7
Barrier Beaches	245	79	324
Upland Areas	58	NA	58
Total	303	79	382

Source: Sandwich Pre-Disaster Mitigation Plan, 2004

All of these 382 dwellings are potentially vulnerable to some level of a flood, erosion or flood-related erosion hazard. All dwellings are located in the 100-year floodplain except those located adjacent to Scorton Shores and Scorton Neck Beach. Based on the long-term erosion rates, 33 dwellings along Town Beach are the most threatened and 97 dwellings along East Sandwich Beach are the least threatened but they are still in danger since they are located in protective dunes and therefore velocity zones.[6]

Based on the short-term erosion rates, 18 dwellings along Scorton Shores Beach are the most threatened (at 2.9 ft/yr) and East Sandwich Beach remains the least threatened (at 0.58 ft/yr).

Ranking of Developed Beaches in Sandwich with Erosion Problem

Location	Erosion Rate	Oceanfront Dwellings	Marsh Edge Dwellings
Long-Term Erosion Problem (1860-1994)			
Town Beach	-1.57 ft/yr	33	NA
Springhill Beach	-0.95 ft/yr	62	0
Scorton Shores Beach	-0.59 ft//yr	18	NA
Scorton Neck Beach	-0.56 ft/yr	7	NA
Sagamore Beach (Central)	-0.40 ft/yr	38	18
East Sandwich Beach	-0.08 ft/yr	97	36
Short-Term Erosion Problem (1952-1994)			
Scorton Shores Beach	-2.90 ft/yr	18	NA
Scorton Neck Beach	-2.61 ft/yr	7	NA
Springhill Beach	-1.89 ft/yr	62	0
Town Beach	-1.67 ft/yr	33	NA
Sagamore Beach (Central)	-1.21 ft/yr	38	18
East Sandwich Beach	-0.58 ft/yr	97	36

Source: Sandwich Pre-Disaster Mitigation Plan, 2004
NA = not applicable

Historic shoreline change data together with dwelling proximity to the beach and protective dunes conditions must be taken into account to fully understand the vulnerability or risk specific properties face. On Scorton Neck Beach, dwellings are set back from the beach and healthy dunes insure a high level of protection in spite of the high short-term erosion problem. In contrast, close proximity to the beach for some dwellings and no dune protection on East Sandwich Beach account for a higher level of vulnerability in spite of the low short-term erosion rate. As a result, no predictions are possible for estimating the number of homes at risk under short or long-term erosion rates.

Unlike bayfront properties, upland properties surrounding the marshes in Sandwich are vulnerable to stillwater rise of flooding without waves and erosion which ranges in elevation from 10-12 feet above mean sea level as shown on the flood insurance rate maps. However, these properties are more vulnerable to the effects that sea level rises will have on future storms. With

[6] Sandwich Pre-Disaster Mitigation Plan, 2004

a rise of anywhere between 0.5 and nearly 1.0 feet in the next 50 years, the currently predicted 100-year flood levels will be reached sooner by more frequent storms.

Dwellings that would be potentially most affected by sea level rise are ones located along Boardwalk Road, Canary Road, Church Street, Willow Street, Factory Street, Jarves Street and Liberty Street west of the State Fish Hatchery, as well as Pine Road and Barbara Lane off Ploughed Neck Road and Jones Road, Betty Avenue, Kenneth Street and Jack Kelly Road south of Route 6A in E. Sandwich.

There are no sections of Sandwich that lie within high hazard areas where significant amounts of development will occur in the future. About ninety percent of the available land within the barrier beach systems that could have been built on in the past has been developed. The Sandwich Board of Health has passed regulations governing the rebuilding of septic systems in the case of homes located within the barrier beach system. Elevated bed sand systems are required in many cases. New technologies approved by Title 5 revisions may present new opportunities for owners of existing structures to lessen the potential negative impacts of their septic systems on dune and estuarine ecology. Regulations added to the Sandwich Protective Zoning By-law will further ensure that development does not occur in high hazard development areas.

The current erosion affecting Town Beach and Spring Hill Beach area needs local, state, and federal attention. The definite cause, possible solutions and costs for restoring these areas to their past configurations is a critical need. The benefit to the town will be an improved recreational resource. Homeowners in the area would also benefit significantly.

Coastal Water Quality - While all of the waters in the Town of Sandwich are deemed safe for swimming, evidence exists of deteriorating water quality, as illustrated by the closure of many shellfishing areas. As previously discussed, the exact causes of the pollution that is damaging the shellfish beds are unknown, although high fowl concentrations, poorly operating or failed septic systems, introduction of non-point source pollution and road runoff are all suspect. Furthermore, water quality degregation of ponds and coastal waters is a direct result of land use decisions and the location of development. The interconnection of these decisions and how they adversely impact water quality are vital to better understand given that the town will continue to development and is also approaching build-out. Since 2005, the town has initiated the Massachusetts Estuary Program (MEP) per the Clean Water Act. The program evaluates the nutrient loading and its impact on the health of the coastal estuaries. The MEP will also serve to inform future land use planning decisions and assist the town in implementing solutions to improve water quality in the future.

Waterfront Access Limitations - Access to the coast throughout Sandwich is limited mainly due to the extensive private land holdings along coastal areas. Limited access due to high numbers of private piers is not presently a problem. Limited access points (e.g., boat ramps, public piers) contribute to the problem.

Commercial and Recreational Water Dependent Uses Along the Shoreline - The majority of the land uses along the coast are residential. The exceptions to this are the Sandwich Marina area with its boating related facilities and the Town Neck's small commercial area near Town Neck Beach. Future commercial uses are expected to be very limited and specific to the marina area.

As Sandwich's population has grown there has been be an increasing demand for access to the waterfront for recreation. As the town gets closer to its buildout population, parking at some beaches will be a problem. The town currently has 147 acres of public beaches. While there are enough beaches available for the demands that can be generated in Sandwich, one limiting factor could be parking. Encouraging off-site parking where persons could be shuttled and/or periodic trolley stops at area beaches could help alleviate this problem. Bicycle racks would also be useful and practical. The town should also promote the restoration of shellfish beds that have been damaged over the past several years.

2.4 Wetlands, Wildlife and Plant Habitat

Wetlands

Inventory - Wetlands comprise approximately 1,313 acres or 4.8 percent of the land mass in Sandwich. There are 358 acres of freshwater wetlands and 955 acres of estuarine wetland systems. The majority of the wetland resource areas are located along Cape Cod Bay shoreline adjacent lowlands. These wetland resources are comprised of two major estuarine systems. The western most system, Old Sandwich Harbor, is comprised of Mill Creek, Dock Creek, Spring Hill Creek and Old Harbor Creek. The eastern most system is comprised of many unnamed creeks, discharges to Cape Cod Bay through Old Sandwich Harbor. The Scorton Creek estuarine system characterizes East Sandwich and discharges to Cape Cod Bay via Scorton Creek. These estuarine systems, buffered by fresh water wetland, receive fresh water from surface water bodies, streams, ground water and direct runoff from the adjacent land areas.

Many upland wetlands are located south of Route 6 near various kettlehole ponds. These are all fresh water wetlands fed by the water flowing into and out of the South Sandwich pond system via groundwater and some streams.

The Significance of Sandwich's Wetlands

Wetlands, including marshes, swamps and bogs, serve a number of vital roles in both the natural and built environments. First, wetlands are highly productive systems, and provide important habitat for many species of wildlife. They also act as "sponges" absorbing and detaining surface waters. In this latter role, wetlands are critical to maintaining the *quantity* of water supplies by maintaining relatively stable groundwater levels and preventing downstream damage from flooding. They also protect water *quality* by filtering out pollutants and thereby reducing the contamination of streams, lakes and groundwater. Because of the important roles played by wetlands, it is essential that they be protected. Activities which replace wetlands with impervious surfaces result in increased runoff rates, reduced flood storage, and elevated peak flows, leading to greater damage from storms. Filling of wetlands also reduces wildlife habitat and plant diversity and can increase

contamination of streams, rivers and ponds due to reduced filtration of pollutants. Under the Wetlands Protection Act (M.G.L., Ch. 131, sec. 40) wetlands are defined in terms of vegetative cover (rather than on the basis of soil characteristics), and the Act regulates dredging, filling or altering areas within 100 feet of such wetlands.

Wetland Habitats - Sandwich is fortunate to contain a wide variety of wetland habitats extending from the tidal marshes along Scorton Creek to the inland wetland areas surrounding the ponds of East Sandwich. A salt marsh's high biomass makes it excellent habitat for birds, shellfish, and finfish nurseries. About two-thirds of commercially-important finfish spend some of their life cycle feeding or spawning in or near salt marshes. Cranberry bogs are becoming increasingly recognized as suitable habitat for a number of species, particularly ducks and spotted turtles.[7]

Wetland Protection Conflicts - Sandwich's wetland protection efforts are quite effective and consist not only of the ongoing administration and enforcement of the Wetland Protection Act by the Conservation Commission and Natural Resources Officer but also the presence of a local wetlands bylaw and a surface water protection district present in the Sandwich Zoning By-laws. This surface water protection district provides protection to the ponds and the adjacent wetland areas. It restricts the types of construction that can occur within 300 feet of these water bodies.

In addition to administration of the Massachusetts Wetlands Protection Act, the town simultaneously administers a local wetlands protection bylaw that strengthens minimum state performance standards, such as tightening regulations for building on dunes and asserting town jurisdiction over small wetlands, such as vernal pools of any size. Septic system leaching fields must be located over 100 feet from wetlands, rather than the 50-foot state standard.8

The primary threats to the health of wetlands in Sandwich are from storm water and road runoff from roadways throughout the community, septic systems, runoff from cultivated uplands and by boating activity. Prior to the 1970's the storm water drainage systems were poorly designed and constructed in relation to introduction of contaminants. Runoff from these areas flows from yards and lawns to paved streets directly and indirectly to wetlands and water bodies. An on-going, town-funded program of improving the storm water drain systems through the construction of retention/detention ponds and other pretreatment systems will be necessary. A concerted effort to educate the public will also be necessary to remind property owners of the negative impacts from using inappropriate amounts of chemicals on their lawns and gardens. A continuous monitoring program to test the water quality of these wetlands and water bodies should also be supported by the Town of Sandwich. Stronger septic system monitoring and education efforts will also be needed.

Fisheries and Wildlife Species

Cape Cod is located at the juncture of two major wildlife zones: the Virginian and the Acadian biogeographic regions. The Cape separates the warm Gulf Stream waters of Nantucket Sound (northern edge of the Virginian zone) from the cold Labrador Current coursing down through the Gulf of Maine into Cape Cod Bay (southern edge of the Acadian zone). As a result, different marine species inhabit the north and south sides of Cape Cod. Sandwich's only shoreline lies at the southerly end of the Gulf of Maine. The marine life of Sandwich includes a variety of mollusks that inhabit coastline and estuaries such as soft-shelled clams, quahogs, blue mussels, sea clams, loligo squid, lobsters, and a variety of hard shell crabs.

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[7] *Sandwich Open Space and Recreation Plan* 1999, p. 37.

[8] *Sandwich Open Space and Recreation Plan* 1999, p. 38.

Birds - The waters of Sandwich also support a wide array of pelagic birds, such as fulmars, gannets, shearwaters and alcids (guillemot, murre, and razorbill) all attracted to the abundant baitfish. The Great Marshes/Scorton Creek complex is part of one of only five Cape embayments identified as important wintering areas for black ducks, a National Species of Special Emphasis.9 Shore birds include terns (common, least and an occasional roseate) and piping plovers, all listed as protected rare species in Massachusetts. The Massachusetts Audubon Society's (MassAudubon) Coastal Waterbird Program notes that five of its 30 monitored nesting sites are in Sandwich. In addition, all of Sandwich's coastal beaches have been identified by the MassAudubon as IBAs (Important Bird Areas), sites providing essential habitat to one or more species of breeding, wintering, and/or migrating birds. Human beach activity and a high level of predation during nesting season (April – August) have been problems in terms of fledgling mortality.

Other important or interesting breeding birds can be found in Sandwich include osprey, northern parula warbler, bobwhite quail, pine warbler, orchard oriole, eastern bluebird, savannah sparrow, sharp-tailed sparrow, eastern meadowlark, red-tailed hawk, killdeer, woodcock, horned lark, ruby-throated hummingbird, eastern phoebe, great horned owl, willet, and mute swan.10 Rare upland bird species include barn owl, grasshopper sparrow and upland sandpiper, the latter two species associated with the extensive grasslands at the south end of Camp Edwards. The first wild turkeys to be located on Cape Cod since the 1600s were reintroduced on the Massachusetts Military Reservation (MMR) near the Coast Guard antenna farm in Sandwich in 1989. The population continues to expand, spreading well beyond the border of the MMR. An interesting sight is the regular congregation of herons (great blue, green, black-crowned night herons) roosting above the Fish Hatchery. Ospreys, which nest on platforms erected in the Old Harbor Marsh, are also regular visitors feeding at the fish hatchery.

Mammals, Reptiles and Amphibians - Mammals in Sandwich include common adaptive species such as red and gray squirrel, white-tailed deer, raccoon, red fox, rabbit, skunk, otter, opossum, shrew, muskrat, bat, weasel, woodchuck, mice and voles. In recent years, a top-of-the-food-chain predator, the eastern coyote, has extended its range throughout all of Cape Cod and is seen throughout Sandwich, particularly along salt marsh edges, where they stalk mice and voles.

Fish and Other Marine Life - Sandwich has one of the most limited shellfisheries of any town on the Cape; species once harvested recreationally included soft-shell clams, quahogs, sea clams, blue mussels and razor clams. In the mid-1980s, the shellfishery was closed, owing to high levels of coliform bacteria. Cumulative stormwater discharge from the Town Neck neighborhood is another obstacle to re-opening the beds. Through a grant from the Massachusetts Coastal Zone Management Office, the town has been working to remediate stormwater problems at Town Neck. The Massachusetts Division of Marine Fisheries has been analyzing water quality data in the Scorton Creek and Old Harbor areas to determine if minimum standards can be met in order to re-open the closed shellfish beds.11

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9 U.S. Fish and Wildlife Service, Concept Plan for Preservation of Black Duck," cited in U.S. Environmental Protection Agency, "Priority Wetlands in New England," September 1987, p. 55.

10 Richard Veit & Wayne Petersen, Birds of Massachusetts, Massachusetts Audubon Society, 1993.

11 Town of Sandwich Annual Report, 2003.

Anadromous fish runs (species, such as alewives and blueback herring, which live in saltwater but spawn in freshwater) are a part of Sandwich's history. Through the Revolution Period, "the sale of five to seven hundred barrels of herring each year at public auction was an important part of the town's income."12 Household limits for personal consumption were imposed by the mid-1770s, perhaps as a result of over-fishing or the rise of mills obstructing fish passage to spawning grounds.13 While limited runs may still persist in other locations, today the major "herring run" exists up Mill Creek to Shawme Ponds. About 4,000 fish successfully migrated into Lower Shawme Pond in 1998.14 In 2003, the town received a grant from the U.S. Natural Resource Conservation Service to reconstruct the Upper Shawme Dam and fish ladder. Herring and alewives are significant as the primary forage fish for other important sport and commercial species, such as striped bass and bluefish, which enter nearshore waters. White perch and sea-run brook trout are other anadromous fish found in Sandwich streams. Catadromous fish, such as eels and elvers (juveniles) migrate form Sandwich's ponds to spawn in the Sargasso Sea and return.

The Critical Habitat Atlas prepared by the Association for the Preservation of Cape Cod reports that three anadromous fish runs exist in Sandwich: Mill Creek to Shawme Ponds, Dock Creek to the State Fish Hatchery and Scorton Creek to Nye Pond through the former Salmon Hatchery.

Rare, Threatened and Endangered Vertebrates and Invertebrates - Rare species found in Sandwich include the Eastern box turtle, which prefers woodlands with access to water, spotted turtles (known to inhabit cranberry bogs as well as ponds), and threatened and rare invertebrates, such as dragonflies (comet darner) and moths (water willow stem borer, barrens daggermoth).15

Rare, Threatened and Endangered Vertebrates and Invertebrates

Scientific Name	Common Name	State Rank*	Most Recent Observation
Hemidactylium scutatum	Four-Toed Salamander	SC	1997
Clemmys guttata	Spotted Turtle	SC	1987
Terrapene carolina	Eastern Box Turtle	SC	2000
Ammodramus savannarum	Grasshopper Sparrow	T	1995
Bartramia longicauda	Upland Sandpiper	E	2001
Charadrius melodus	Piping Plover	T	1996
Haliaeetus leucocephalus	Bald Eagle	E	1905
Rallus elegans	King Rail	T	1880
Sterna antillarum	Least Tern	SC	1998
Sterna hirundo	Common Tern	SC	1992
Tyto alba	Barn Owl	SC	1983
Leptodea ochracea	Tidewater Mucket	SC	1949
Anax longipes	Comet Darner	SC	1996
Enallagma laterale	New England Bluet	SC	1996
Acronicta albarufa	Barrens Daggermoth	T	1999
Anisota stigma	Spiny Oakworm	SC	1999
Bagisara rectifascia	Straight Lined Mallow Moth	SC	1999
Catocala herodias gerhardi	Gerhard's Underwing Moth	SC	1998
Cicinnus melsheimeri	Melsheimer's Sack Bearer	T	1997
Cingilia catenaria	Chain Dot Geometer	SC	1999

12 R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 209.
13 R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 209.
14 Personal communication, Mark Galkowski, Conservation Officer, February 1998.
15 *Sandwich Open Space and Recreation Plan* 1999, p. 51.

Faronta rubripennis	The Pink Streak	T	2001
Hemileuca maia	Barrens Buckmoth	SC	1998
Itame sp 1 nr inextricata	Pine Barrens Itame	SC	1999
Metarranthis pilosaria	Coastal Swamp Metarranthis Moth	SC	1997
Papaipema sp 2 near pterisii	Ostrich Fern Borer Moth	SC	1997
Papaipema sulphurata	Water-Willow Stem Borer	T	1996
Zale sp 1 nr lunifera	Pine Barrens Zale	SC	1997

Source: Massachusetts Division of Fisheries & Wildlife, Natural Heritage and Endangered Species Program, 2005.
**E = Endangered, T = Threatened, SC = Special Concern*

Wildlife and Plant Habitat

Rare Plant Communities16 - Sandwich's main contribution to global biodiversity, particularly in relation to plants, are its coastal plain pondshores (primarily at the Hog Ponds, but also Spectacle/Lawrence and Triangle Ponds, Snake Pond and Hoxie Pond), its pine/scrub oak barrens (northern Camp Edwards) and its sandplain grasslands (Camp Edwards and powerlines). Rare plants in Sandwich protected under the 1991 Massachusetts Endangered Species Act include those listed as Endangered, Threatened and Species of Special Concern and are listed in the table below. State regulations prohibit the taking or habit alteration of these species without a state permit.

The only known Eastern Massachusetts site of the leafy white orchid (Platanthera dilatata), a threatened species associated with wet seeps in alkaline soils, is in Sandwich, perhaps associated with Sandwich's prevalence of artesian springs, despite the acidic soils here. The regionally-rare bluebead lily (Clintonia borealis) is found at Talbot's Point Conservation Area.17 Phragmites, now confirmed in Sandwich, is a native species in the region.

Rare, Threatened and Endangered Vascular Plants

Species Name	Common Name	State Status	Most Recent Observation
Aristida purpurascens	Purple Needlegrass	T	1997
Carex mesochorea	Midland Sedge	E	1987
Claytonia virginica	Narrow-Leaved Spring Beauty	E	2000
Dichanthelium scabriusculum		T	1995
Eupatorium aromaticum	Lesser Snakeroot	E	2001
Eupatorium leucolepis var novae-angliae	New England Boneset	E	1996
Helianthemum dumosum	Bushy Rockrose	SC	1905
Lachnanthes caroliana	Redroot	SC	1880
Liatris borealis	New England Blazing Star	SC	1998
Linum intercursum	Sandplain Flax	SC	1992
Linum medium var texanum	Rigid Flax	T	1983
Lipocarpha micrantha		T	1949
Malaxis bayardii	Bayard's Green Adder's-Mouth	E	1996
Ophioglossum pusillum	Adder's-Tongue Fern	T	1996
Platanthera dilatata	Leafy White Orchis	T	1999
Polygonum puritanorum	Pondshore Knotweed	SC	1999
Rhexia mariana	Maryland Meadow Beauty	E	1999
Rhynchospora torreyana	Torrey's Beak-Sedge	E	1998
Sabatia kennedyana	Plymouth Gentian	SC	1997
Sagittaria teres	Terete Arrowhead	SC	1999

16 *Sandwich Open Space and Recreation Plan* 1999, p. 47.

17 Botanical Club of Cape Cod, Newsletter, Vol 2, No. 1, March 2000, p.3

Scleria pauciflora var caroliniana	Papillose Nut-Sedge	E	2001
Setaria geniculata	Bristly Foxtail	SC	1998
Spartina cynosuroides	Salt Reedgrass	T	1999
Sphenopholis pensylvanica	Swamp Oats	T	1997
Spiranthes vernalis	Grass-Leaved Ladies'-Tresses	T	1997
Triosteum perfoliatum	Broad Tinker's-Weed	E	1996

Source: Massachusetts Division of Fisheries & Wildlife, Natural Heritage and Endangered Species Program, 2005.

**E = Endangered, T = Threatened, SC = Special Concern*

Ponds provide important habitat for endangered and threatened species. One small complex is in Sandwich -- Upper and Lower Hog Ponds (the last purchase made under the Land Bank Program). Unfortunately, almost all of the shoreline of these two ponds is owned privately and, therefore, not protected from development. Only a thin set-aside buffer protects the ponds' eastern shorelines from the fairways of the Ridge Club golf course.

The designation of the South Sandwich Ponds (Spectacle, Triangle and Lawrence Ponds) as a District of Critical Planning Concern (DCPC) by the Cape Cod Commission should help to protect the rare plant habitats on these water bodies, though the Hog Ponds were not included. Among the most significant plants found here is New England boneset (Eupatorium leucolepis var.), an Endangered Species under state law.

Sensitive Wildlife Habitat Areas - The primary habitats of concern are the plant and animal ecosystems that occur within the Ridge District and within the watersheds of the South Sandwich ponds. The town should pursue public land protection programs in these habitats and watersheds and direct future development to uses with the fewest impacts. The major management challenge will involve limiting the number of additional houses that can be built adjacent to these areas. In some cases the high level of existing subdivision of the land will make this challenge difficult. However, significant opportunities exist in other areas to shape future development so minimum impact on the wildlife habitat occurs.

Critical Wildlife and Plant Habitats - Vegetation corresponds to geographic location, which includes topography, climate and land-use as factors. Sandwich's location on the northern coastal plain results in diverse vegetative communities ranging from tidal estuaries on Cape Cod Bay to coastal maritime forests. There are several types of wetland within the town and several areas identified by the Massachusetts Natural Heritage Program as having rare or endangered species. The use of the Mid-Cape Highway aids in the invasion of exotic plant species, as do some activities of private residents. Barnstable County and Sandwich should actively advise residents concerning property management and the use of indigenous plant species vs. exotics.

The Natural Resources Officer reports that larger species of wildlife are increasingly being confined to small pockets of habitat as a result of continued development. The need exists to diversify the habitats on town properties to counteract these losses to some degree and provide a more productive habitat. Also active enforcement of wetland buffers and open space and the development of protection corridors would aid in this critical issue.

Tidal Estuaries and Salt Marsh Vegetation - The larger wetland areas in Sandwich are in the tidal estuaries adjacent to Cape Cod Bay. Flat surface deposits of clay and silt have built up to the average high water level to form salt marshes. Salt marshes are located in the narrow, winding tidal streams or tidal creeks. There are several areas of salt marsh scattered throughout

the coastal region. The largest area of salt marsh is an area known as the Great Marsh and it includes salt marshes associated with the Scorton River, Scorton Creek, and its tidal tributaries. An area of equal size is the Old Sandwich Harbor Salt Marsh.

The Significance of Sandwich's Salt Marshes

Salt marshes provide significant protection to marine fisheries and shellfish. They also aid in the prevention of pollution and provide significant storm damage prevention. A salt marsh produces large amounts of organic matter. A significant portion of this material is exported as detritus and dissolved organics to estuarine and coastal waters, where it provides the basis for a large food web that supports many marine organisms, including finfish and shellfish. Salt marshes also provide a spawning and nursery habitat for several important estuarine forage finfish. Salt marsh plants and substrata remove pollutants from surrounding waters. The network of salt marsh vegetation roots and rhizomes bind sediments together. These sediments absorb chlorinated hydrocarbons and heavy metals such as lead, copper, and iron. The marsh also retains nitrogen and phosphorous compounds, which in large amounts can lead to algal blooms in coastal waters. The underlying peat also serves as a barrier between fresh ground water landward of the salt marsh and the ocean, thus helping to maintain the level of ground water. Salt marsh cord grass and underlying peat are resistant to erosion and dissipate wave energy, thereby providing a buffer that reduces wave damage.

Marsh vegetation appears in several well-defined zones which are determined by individual species' tolerance to salinity and tidal inundation. This is most readily seen by the distinct distribution of two dominant plant species: the coarse, broad leafed salt marsh cord grass (Spartina alterniflora), occurring in the low marsh, and the smaller salt meadow grass (Spartina patens), or salt hay, in the high marsh. Bordering the upper zone between high marsh and upland vegetation is seaside goldenrod, blackrush and panic grass. Marsh ground subject to fresh water is colonized by cattails and phragmites.

Fresh Water Wetland Vegetation - Sandwich's fresh water wetlands tend to be smaller in area than the salt marsh systems. The primary vegetation in the swamps and bogs are red maple (*Acer rubrum)*, black tupelo (*Nyssa sylvatica*), alder (*Alnus*), arrowwood (*Viburnum*), high bush blueberry (*Vaccinium corymbosum*), willows (*Salix*), and milkweed (*Asclepias*).

The inland wetland areas (bogs, swamps, streams, ponds and isolated depressions) are protected to varying degrees by the regulations implementing the Wetlands Protection Act. These areas are likely to be significant, in varying degrees, to public and private water supply, ground water supply, flood control, storm damage prevention, prevention of pollution and the protection of fisheries. Impacts resulting from development could be significant, depending on the type of wetland (e.g. stream versus wooded swamp) and should be carefully monitored by the Sandwich Conservation Commission. These inland wetlands can be critical to the town's future.

Wildlife Migration Corridors – Wildlife corridors enable animals, particularly upland mammals, to migrate to new territories in search of food or breeding grounds. Biologists estimate that undisturbed linear areas of a minimum of 300 feet in width are necessary for many species to feel comfortable moving undetected through an area. Owing to the dispersal of residential development throughout Sandwich and its continuing saturation, wildlife corridors are fewer and narrower than perhaps they should be.

The major wildlife migration corridor identified in Sandwich consists of an east to west route along the Ridge District, which is currently heavily forested with interspersed development. Major roadways cross this corridor. Another corridor runs from north to south through the Massachusetts Military Reservation from Shawme-Crowell State Park, across Route 6 to Mashpee. Other wildlife migration that occurs moves from Barnstable across Route 6 through the Scorton Creek watershed. The extensive bog and wetland systems that lie adjacent to Old County Road are a good example of a contiguous wetland corridor. The major barrier to wildlife migration within the community, besides Route 6 itself, is the presence of chain-link fencing on each side of the highway. Consideration should be given to providing controlled passageways for species that migrate across the Route 6 corridor.

Other than these barriers, Sandwich is well situated to manage land for its native wildlife populations. The presence of the Ridge District and the location of Route 6 on that ridge essentially divide Sandwich into two separate physiographic regions: the lower being the Scorton Creek coastal region which is contained within itself; and the other being the upland region that flows from the south side of the ridge district down to the South Sandwich ponds. The town is in need of a wildlife corridor management plan in conjunction with a Conservation Land Management and Acquisition Plan that will maintain and improve the regional and local greenbelt system identified in *Section 7.0: Open Space and Recreation*.

Areas of Critical Environmental Concern and Districts of Critical Planning Concern - The State may designate Areas of Critical Environmental Concern (ACEC) for natural areas of regional or statewide significance. The designation encourages all state agencies, local governments and private parties to work to minimize adverse impacts on those areas. Most importantly, the designation requires that development projects within the ACEC that involve some state agency action must be reviewed under the Massachusetts Environmental Policy Act (MEPA). Any such project located within an ACEC which trips particular thresholds (unless it consists solely of one single family dwelling), must file an Environmental Notification Form. In 1978 Scorton Creek and surrounding marsh and creek was designated as part of the larger Barnstable Harbor ACEC. This remains the only ACEC located in Sandwich.

On Cape Cod, Districts of Critical Planning Concern (DCPC) allow a town or a group of towns to adopt special rules and regulations to protect areas of regional, statewide, or national significance. The rules then govern development in the designated DCPC area. Established in 1999 as a DCPC under the Cape Cod Commission Act, the Three Ponds are of South Sandwich is a 692-acre area encompassing the shorelines of Lawrence, Spectacle and Triangle Ponds and the three YMCA summer camps along their shores.

Wetland and Habitat Issues

Wetlands in Need of Restoration - The saltwater estuaries provide tremendous resource value as shellfish habitats, finfish breeding grounds, and recreational areas. Yet, virtually all of the existing shellfish beds in Sandwich are closed due to contamination. Impacts on breeding finfish are largely unknown. The likely sources of existing contamination are poorly operating or failed septic systems and roadway runoff which discharge directly to the surface waters. The geology and soils within the watershed area suggest potential problems with septic systems due to poor percolation and high water table characteristics. In such areas, septic system effluent is unable to percolate adequately due to non-permeable soils and/or high water tables (which fluctuate with tides in this area) and runs off to adjacent surface waters.

Altered Wetlands - Data from the Massachusetts Remote Sensing Project indicates that from 1971 to 1990, Sandwich lost five acres of freshwater wetland and 11 acres of saltwater wetland. The 1990 acreage of freshwater wetlands was 358 acres and 984 acres of saltwater wetland.

Wetland Protection Conflicts - Sandwich is fortunate to contain a wide variety of wetland habitats extending from the tidal marshes along Scorton Creek to the inland wetland areas surrounding the ponds of East Sandwich. Sandwich's wetland protection efforts are quite effective and consist not only of the ongoing administration and enforcement of the Wetland Protection Act by the Conservation Commission and Conservation Officer but also the presence of a local wetlands bylaw and a surface water protection district present in the Sandwich Zoning By-laws. This surface water protection district provides protection to the ponds and the adjacent wetland areas. It restricts the types of construction that can occur within 300 feet of these water bodies.

The primary threats to the health of wetlands in Sandwich are from storm water and road runoff from roadways, septic systems, runoff from cultivated uplands and by boating activity. Prior to the 1970's the storm water drainage systems were poorly designed and constructed in relation to introduction of contaminants. Runoff from these areas flows from yards and lawns to paved streets directly and indirectly to wetlands and water bodies.

An on-going, town-funded program of improving the storm water drain systems through the construction of retention/detention ponds and other pretreatment systems will be necessary. A concerted effort to educate the public will also be necessary to remind property owners of the negative impacts from using inappropriate amounts of chemicals on their lawns and gardens. A continuous monitoring program to test the water quality of these wetlands and water bodies should also be supported by the Town of Sandwich. Stronger septic system monitoring and education efforts will be needed.

Estuary Pollution - Another threat to the estuarine system is eutrophication. Similar to lake and pond eutrophication, estuaries can become overloaded with nutrients and can become excessively productive, resulting in dense weed and algae growth, oxygen depletion, fish kills, noxious odors, and other aesthetic problems. In the case of estuaries, nitrogen is commonly thought to be responsible for eutrophication problems. Sources of nitrogen include, but may not be limited to septic systems (including properly functioning Title V systems), fertilizers, and road runoff.

The risk of both acute and chronic discharges of toxic and hazardous chemicals to the estuaries is another possible threat to the estuarine system. An acute discharge may be the result of a transportation accident along Route 6A, which lies within a critical watershed area to saltwater estuaries, or a chemical or gas spill. Chronic sources include leaking underground fuel tanks and road runoff (which contains petroleum hydrocarbon and metallic residues). The environmental impacts of these discharges range from the chronic bioaccumulation of hydrocarbons and metals in fish tissue to acute fish kills.

2.5 Geology, Soils, Topography and Vegetative Cover

Geology and Topography[18]

Sandwich's three distinct physiographic regions and its major landscape features were formed during the retreat of the Wisconsin Glacier about 15,000 years ago. Wind, wave and storm action have shaped dunes, beaches and other shoreline features, but Sandwich is primarily characterized by its glacial past.

During the retreat of the last glacier, ice lobes occupied what is now Buzzards Bay and Cape Cod Bay. A series of advances and retreats plowed up the glacial materials into a series of irregular ridges known as moraines. The highest hills on Cape Cod occur near the intersection of the two moraines left by the two ice lobes, near the northwest corner of what is now Camp Edwards.

Sandwich claims the second highest hill on Cape Cod (Telegraph Hill, 295 feet) and the largest area of high moraine (above 200 feet) of any Cape Cod town. (Pine Hill, in Bourne, at 306 feet above mean sea level is the highest point on Cape Cod). This is characterized locally as the Ridge District given to the town's large-lot zoning district stretching east-west along the moraine south of the Mid-Cape Highway. This Ridge District has been traditionally difficult to develop, given the steep topography and poor access. Very few ponds (only Boiling Springs and Nye's Ponds) are found in the moraine given the great depth to groundwater. In the 1930s this rugged hinterland hosted Sandwich's portion of the "Berkshires to the Capes Trail," a public bridle path laid out by the Civilian Conservation Corps. In the 1950s it was chosen to host the layout for the Mid-Cape Highway since the roadway would traverse an unpopulated area. Significant elevations in Sandwich are listed in the table below.

The Ridge (actually a series of ridges) still represents much of the "wilds" left in Sandwich and has been the focus of open space acquisition for the past 20 years, including the 525-acre purchase by the town of the Striar property and other larger parcels. The Ridge has been eyed by trail advocates for a connection for Cape Cod Pathways, a regional walking trail network, given its large expanse internally and its proximity to the 1,200-acre West Barnstable Conservation Area. This area continues to be the town's largest block of contiguous forested lands and home to many species of wildlife. The Conservation Commission, through the efforts of the Natural Resources Officer, has developed diversified wildlife openings throughout the eastern portion of the Ridge.

Significant Elevations in Sandwich

Named Hills	Height in Ft above sea level	Location	Use / Comments
Telegraph (Bournes) Hill	292	off Rt. 130	DEM fire tower
Discovery Hill	280	off Kiahs Way	town conservation land
Townline Hill	277	Spruce Swamp Road	Camp Edwards
Great Hill	240	off Chase Road powerline great public overlook	
Sam Nyes Mountain	210	off Mill Road	town conservation land
Faunces Mountain	160	east end of DEM Shawme Crowell campground	
Round Hill	150	off Cedarville Road	north of Route 6

18 *Sandwich Open Space and Recreation Plan,* 1999. Section 4, Part A: Geology, Soils, and Topography, pp. 18-22.

Elephantback Hill	130	off Charles Street	south end Crows Farm
Spring Hill	80	Spring Hill Road	private residences
Sextant Hill	80	Moody Drive, S. Center private residences	
Sagamore Hill	74	off Scusset Beach Rd DEM Scusset State Beach	
Town Neck Hill	60	Town Neck	private residences

Source: The Compact of Cape Cod Conservation Trusts, Inc., 1999, using USGS topographic quadrangles.

Also of significance in the moraine are some of its depressions, known locally as "kettleholes" or "hollows," formed when stagnant ice blocks of the glacier melted. The largest is known as Great Hollow, now within Camp Edwards, and can be seen to the west from Route 130 at the powerline crossing. This massive gulf descends steeply from 250 feet high on Route 130 to about 80 feet high in the gulf just 1,000 feet west of the road.

Lands generally north of Route 6A comprise the second physiographic region: glacial lake and lake bottom deposits found inside the Cape Cod Bay shoreline. The richest soils are found in this north part of town. Extensive salt marshes and broad tidal flats fringe these glacial lake delta deposits. There are a few small, shallow ponds, the most significant one being Hoxie Pond. Most of the town's remaining cranberry bogs are found in the "lake deposits" zone. Marine erosion and deposition has smoothed the shoreline of Sandwich, building sand spits and barrier beaches across the ragged glacial lake shoreline. Scorton Neck, which rises 90 feet high directly abutting the sea, and the smaller Spring Hill and Town Neck Hill share a geological bond as delta deposits, formed as the glacier retreated.

The southern half of Sandwich is composed of outwash plain deposits, sands and gravels sorted by meltwater running south off the glacier. The generally flat surface is pitted in places where blocks of ice became separated from the main mass of the glacier, were buried in the drift and later melted, leaving steep sided depressions, known locally as kettle holes. The deeper depressions extend below the water table and now contain most of the town's many ponds. The land surface is very uniform throughout this third physiographic unit: no land above 150 feet high exists south of the Ridge District and most of the area averages about 100 feet high. Though a 1795 town map labeled it as "Waste Land,"19 this flat surface, combined with its underlying coarse sands, makes Forestdale and South Sandwich very developable resulting in the center of the town's population over the last fifty years.

Soils[20]

The type, wetness and slope of soils often determine the suitability of land use development in a community. Soils affect drainage, erosion, sedimentation, agriculture, vegetation, wildlife habitat, sewage disposal, and suitability of concrete foundations. In Sandwich, particular concern should be given to uses of soil that are easily eroded, excessively or poorly drained, unstable or ecologically-important. The USDA Natural Resources Conservation Service classifies soils by type and five general associations are found in Sandwich.

Carver - Windsor Association sands comprise about 33 percent of the town's area, typically, within the outwash plain south of the Mid-Cape Highway to Farmersville Road. These droughty, nutrient-poor soils are usually found on level or gently sloping land. Most of Sandwich's

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19 R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, p. 250.

20 *Sandwich Open Space and Recreation Plan 1999*, pp. 22-24.

freshwater ponds are found here. These soils have few limitations for development, but, the ready permeability of the soils allows potential contaminants to reach the water table. A common complaint of Cape Cod health officials is that sandy soils are unsuitable for development of septic systems because they percolate *too quickly* rather than too slowly. Viruses and nitrogenous compounds from wastewater can easily reach the aquifer before soil adsorption can occur. Lawns and athletic fields may also be difficult to establish and maintain due to droughty nature of the soils.

The *Enfield Association* covers 19 percent of the town, south of Farmersville Road. Formed in outwash, they are generally coarse sands overlain with a one to three feet thick silt mantle that Carver - Windsor typically does not have. Its permeability is similar to Carver - Windsor.
An upland soil which comprises only four percent of the town's area, but which are important agricultural soils is the *Paxton- Belgrade - Scituate Association* found on the Northside, north of Route 6A. The Northside locale coincides with the first colonial settlements in Sandwich, where small farmsteads benefited from the relatively rich loamy sand. The usefulness of this soil is seen today in the town's public "U-pick" blueberry patch and Crow Farm, but commercial agriculture has essentially vanished from Sandwich as land has become too valuable for residential development rather than crops.

Wetland soils include tidal beach, dune sand and beach sand (three percent of town) and the peat, muck and sanded muck association of freshwater swamps, bogs and marshes (three percent) found scattered throughout the town.

Even though most of Sandwich was originally stabilized by vegetation, and a thin veneer of topsoil began to accumulate over it, supporting upland forests, the colonists soon stripped the timber from the woods and the topsoil blew away, leaving loose sand in many areas. In 1822 historian Timothy Dwight recorded that "the road from Sandwich to Barnstable was hilly and in a great degree bare, bleak and desolate."21 Despite recovery in the visual sense, neither soils nor topography, with the exception of wetlands, has since proven to be an effective impediment to development. Retaining open space by relying on natural development constraints is not a realistic approach in Sandwich.

Vegetation

Forest Land - In 1620 the Mayflower Pilgrims described Cape Cod's lofty forests of "oaks, pines, sassafras, juniper, birch and holly."22 Subsequent research into the pre-colonial state of the forest on Cape Cod reveals a stratified habitat. At high elevations (above 100 feet) as in Sandwich, pitch pine and oaks dominated, as they do today. Oaks, beech, red maple and white pines were prevalent, in taller and better form, since they were in moister soils and in hollows and hence not as vulnerable to the intense prescribed burns set by Native Americans.

By 1706 the Town of Sandwich began allotting the 20,000 acres of common woodlands of the moraine and outwash plains to the 100 resident families as private property. Many of these lots were long, narrow parcels, "since these lots ran over the moraine, they were hilly, and for fairness

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21 Timothy Dwight, Travels in New England and New York, 1822.

22 "Mourt's Relation", cited in Leona Rust Egan, Provincetown as a stage: Provincetown, The Provincetown Players and the Discovery of Eugene O'Neill, p. 45.

they were laid out in long strips so that the terrain was better shared, giving rise to the term Long Lots."23 As the population developed, residents decimated the woods to build wharves, ships, houses, salt vats, fences, windmills and for large amounts of firewood. Unchecked forest fires claimed some of the Cape's forest stands.24

The vast forests of Sandwich provided the backdrop for the establishment of the Sandwich Glass Works at Jarvesville in 1825. Manufacturer Deming Jarves was attracted to Sandwich as a glass-making site, not because of its sand (which actually was inferior for glass-blowing), but because of its expansive forest so close to town. He bought 1300 acres of woodland to provide fuel for the furnaces. Sheep pasturing also decimated the forests, until that was abandoned around the turn of the last century. Finally, the forest began to regrow, punctuated by often severe wildfires throughout this century. The founding of 8300-acre Shawme-Crowell State Forest in Bourne/Sandwich in 1923 had more to do with the encouragement of a forest renaissance there than with the preservation of an existing one. Because the opportunistic species of pitch pine and oak in the 20th century are not of millable quality, (and pitch pine is a poor type of fuel wood) the new forest of Sandwich does not face the same commercial threat that the original one did. Today, the threat to forestland is primarily from displacement by residential development.

Despite its lack of rich and varied soils, Sandwich still supports some interesting plant communities in addition to the typical pitch pine and oak (red, black, scrub, scarlet oaks) association found throughout Cape Cod. There are areas where white pine predominates, such as in the Ridge District. Large red maple swamps are found along Route 6A, such as east of the Fish Hatchery. Other tree species found scattered throughout town include black cherry, sassafras, gray birch, and tupelo. Stands of American beech are magnificent at the Ryder Conservation Lands and the Lowell Holly Reservation and along pond shorelines, such as Shawme Ponds. An emerging white cedar swamp is located at the Three Town Kettleholes area on Asa Meigs Road; a relict white cedar swamp borders the railroad and cranberry bog at the intersection of Old County Road and Route 6A. A large and dense Eastern spruce plantation is found at the southwest end of Windstar Farm.

At present, the benefits of the forest to the community of Sandwich as open space, wildlife preserve, and small cordwood production remains. Because of their proximity to some of the largest residential subdivisions, these woodlands can and do play a major role in passive recreation. More than any other town on Cape Cod, Sandwich still has the opportunity to create meaningful linkages of large forest tracts. Such tracts are critical to creating and maintaining the type of quiet "forest interior" habitat needed by breeding songbirds, such as the scarlet tanager and pine warbler of the neotropical migrants, a declining bird community in New England.25

The habitat significance of the woodlands of Sandwich primarily lies in its ability to provide migratory corridors and refuge for wildlife from the heat and openness of the beaches, marshes and the built-up environment. The recreational value of these wooded areas for humans is also significant. For much of the off-season, the woodlands offer important shelter and relief from the winds off the Bay.

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[23] R.A. Lovell, Jr., Sandwich: A Cape Cod Town, Sandwich Archives and Historical Center, 1984, 1996, cited in Town of Sandwich, Conservation and recreation Plan, 1986, p. 39

[24] Simeon L. Deyo, History of Barnstable County, Massachusetts, 1890, p. 469-70.

[25] Compact of Cape Cod Conservation Trusts, Inc., "Cape Cod Wildlife Conservation Project," Narrative Report, 1998.

A 1995 study of the eight miles of Route 6A in Sandwich found that black locust was the dominant species in the shade canopy, some of more than six feet in diameter. Sandwich's portion of Route 6A has more shade canopy than other Route 6A towns.[26] The same study recommended vista pruning along Route 6A near Mill Creek, Scorton Creek and the Twin Ponds. Another black locust stand filters sunlight onto Route 6 near Exit 2.

2.6 Environmental Challenges and Recent Actions

Many of the environmental challenges which Sandwich faces are a direct result of its development pace and pattern over the past three hundred years. As described in previous sections, the biggest and most persistent problems are environmental and public health issues related to wastewater disposal. Despite areas of existing or planned higher density (i.e. the Historic Village and Marina), which typically is a favorable factor for installing sewers, Sandwich continues to rely solely on on-site septic systems. Though most of the town's soils are highly permeable, there are still failed systems due to overloading, particularly during the summer. Because the soils are highly permeable, nitrates and viruses are readily transmitted off-site to surface waters, particularly ponds and streams, and ground water. There is insufficient depth to ground water on many lots, leading to the design of "mounded" systems, which can be aesthetically displeasing to many people as well as enabling development to go where it otherwise should not.

Ground water contamination associated with military base operations is an ongoing concern. Over the past two decades, several millions of dollars have been spent studying the MMR contamination and clean-up efforts are continuing. What is new in recent years is the possibility that plumes emanating from the base (and the Crocker Property) may also affect pond waters and fish health as well, particularly in Mashpee Lake.[27] Remediation is in place resulting in the cleanup of plumes and the elimination of infiltration into resources. In particular, the Jay Braden plume remediation efforts have resulted in the plume not migrating towards Mashpee Lake.

Nonpoint source pollution (resulting from surface runoff from driveways, lawns, and other impervious surfaces) is a concern in more developed areas of Sandwich as well as along major transportation routes. Impervious surface areas increase the problems associated with nonpoint source pollution. Water can no longer be absorbed into the soil and is carried over the surface until it finds a drainage outlet. As the runoff is carried over these surfaces, coliform bacteria from mammalian waste, oil and other debris are carried into the drainage paths causing pollution of streams, ponds, lakes and other water bodies which are the various endpoints of the runoff. This can be a particular problem in storm events of one (1) inch or less.

Other resource management problems include illegal trash dumping in public conservation areas; unauthorized trail creation on town conservation lands; unauthorized off-road vehicle use in all town properties; vandalism of open space facilities, particularly gates, signs and structures; lack of staff and volunteer supervision; and, providing improved access to coastal recreation areas.[28]

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[26] Cape Cod Commission, "Route 6A Vegetation Management Plan," August 1995, p. 17.

[27] *Sandwich Open Space and Recreation Plan* 1999, p. 59.

[28] *Sandwich Open Space and Recreation Plan* 1999, p. 60.

The town's utilization of the Workamper Program at two (2) facilities – Oak Crest Cove and Ryder Conservation Lands – has gone a long way to curb the issues of vandalism and staff shortages.

Water Quality

All of Sandwich's waters are generally of high quality, though problem spots exist. In its 2002 Water Quality Assessment Report for Cape Cod, the Massachusetts Department of Environmental Protection assessed Scorton Creek as Class SA for water quality. This designation is the highest for marine waters and indicates excellent habitat for fish and other wildlife, high aesthetic value, and usability for primary and secondary recreation. The same report gave all of Sandwich's freshwater ponds a Class B ranking, the top ranking for freshwater that are not a source of drinking water.

However, another assessment of three of Sandwich's ponds was undertaken for the Cape Cod Pond and Lake Atlas (completed in May, 2003) and provides a snapshot of water quality indicators for 2001. According to that report two of the three Ponds assessed (Peters Pond and Pimlico Pond) have indications of potential water quality problems, while Snake Pond seemed to be relatively unimpacted. The Atlas recommended further monitoring to determine if restoration activities would be necessary for the two impacted Ponds.29

Eutrophication is the process by which a pond experiences algal blooms, oxygen depletion, fish kills, noxious odors and visual deterioration as a result of excessive nutrient inputs (usually from runoff and septic systems). Some of Sandwich's smaller ponds may be experiencing eutrophication, but the only study done so far has been for Upper and Lower Shawme Ponds in 1997. It found that there was "almost 12 feet of highly organic muck in the middle of [Upper Shawme] pond"...and that "Lower Shawme is basically filling in with organic plant matter." A grassroots residents group called Sandwich Pond Watch was formed in 1998 to further study remediation of eutrophying ponds. As of 2005, their investigation and data remain unreported to town departments.

Freshwater ponds on the Cape tend to be naturally acidic due to a lack of alkaline materials in the soils, and accelerated acidification seems apparent in several ponds. Between 1983-1985, the Acid Rain Monitoring Project, coordinated by the University of Massachusetts at Amherst, sampled 3,370 surface waters throughout the state. Sandwich and the other Upper Cape towns were considered to be "endangered" (middle of range) in terms of mean alkalinity and buffering capacity. Nevertheless, five of 18 ponds sampled in Sandwich were considered to be already "acidified" or "critical." A private contractor monitored water quality, surveyed fish populations and treated Lawrence and Snake Ponds with limestone during the period May 1986 through December 1991 to improve the water's acidity.30

Hazardous Waste Sites

The Department of Environmental Protection (DEP), Division of Hazardous Waste, classifies oil or hazardous material disposal sites (or Chapter 21E sites) using a tier system. Tier 1 sites are considered to be high priority but vary in ranking from 1A to 1C. Sandwich has four Tier 1 sites that are being monitored by DEP.

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29 Cape Cod Commission Water Resources Office, *Cape Cod Pond and Lake Atlas*, May 2003.

30 *Sandwich Open Space and Recreation Plan* 1999, p. 33-34.

Some gasoline filling stations and other types of service uses in Sandwich may pose environmental problems. These uses are primarily considered to be *non-priority sites* by the DEP, or Tier 2. Sandwich contains four sites that are classified in this category. This Tier is the lowest priority to the DEP. While there is reason to be concerned, the sites in this classification are generally disposal sites which have the least impact on the environment of all classified sites. There is relatively little oversight by the DEP in these cases and the owner is responsible for cleanup and monitoring the environmental hazards. The site number, name, location and status information of hazardous waste sites are provided by the DEP but many sites are listed as *undetermined* indicating further investigation or an update is needed. There are three sites in Sandwich in this classification.31

Floodplains and Shoreline Changes

Sandwich participates in the Federal Flood Insurance Program, which requires that new shorefront development meet engineering standards for floodproofing, but does not prohibit development. Flood velocity zones, or V-zones, are land areas where storm surge or direct wave action occurs. A 1988 analysis by the Massachusetts Coastal Zone Management Office found that in the 1970s, Sandwich had more structures built in the velocity zone than any other Cape Cod town except Bourne, Falmouth and Dennis. There are about 50 buildings located in the V-zone, primarily on Sagamore Beach, East Sandwich Beach, Town Beach, and Spring Hill Beach.

State and local wetlands protection legislation should be sufficient to control future development in this high hazard area. In addition, little additional construction is envisioned since 90 percent of the barrier beach area in Sandwich was developed previously. With the significant rise of property values since 2000, redevelopment of many of these structures in problematic.

Landward of the velocity zones are other flood-prone areas (A-Zones) in which standing waters can be expected during five to 100-year storm events. These areas consist mostly of salt marshes and shorefront uplands up to about the 12-foot contour. Both commercial and residential developed areas, including portions of Route 6A near Sandwich Center, the south side of the developed barrier beaches, and the south side of Scorton Neck, occur in the A-Zone. At the May 1999 Town Meeting, voters failed to adopt (by lacking 2/3rd majority) stringent new changes in the town's floodplain bylaw, prohibiting new homes, enlargement of existing homes and soil relocation. The proposed change is an action item in the town's Flood Hazard Mitigation Plan.32

Stormwater Mitigation

In an on-going effort to minimize stormwater impacts to the community, the Town of Sandwich has developed Stormwater Management Plan (SMP). The SMP outlines current laws and regulations, past accomplishments, on-going efforts, future actions and Best Management Practices (BMP's) to address stormwater impacts. The intent of this SMP is twofold: 1) to meet or exceed the NPDES Phase II Regulations and 2) to provide the town with a comprehensive stormwater plan which it can build upon to protect its valuable water resources. In general, the SMP includes a presentation of the following areas:

- The Sandwich Landscape & Regulated Area;
- Areas of Concern;
- Current Laws/Regulations and Recent Town Actions;

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31 Massachusetts Department of Environmental Management, Waste Site Cleanup List http://www.mass.gov/dep/bwsc/sites/report.htm, April, 2005.

32 Town Planning Department staff, April, 2005.

- Six Minimum Control Measures;
- Follow-Up Evaluation and Reporting;
- Conclusion & Long Term Commitment; and
- Examples of Current Stormwater Policies

Stormwater Mitigation Plan – Recent and On-Going Town Actions	
Location	**Project Description**
Stormwater Runoff Reduction Measures	
Town Neck (Mill Creek)	Illicit Discharge Detection and Elimination - The Mill Creek Estuary is a recreational shellfishing area closed per order of the Division of Marine Fisheries since August 1985. In 1990, the town undertook an illicit connection inspection and performed water sampling in the Town Neck area. Where identified, illicit connections were corrected. The most important finding of the study was the presence of pollution in the stormwater system; this ultimately led to the installation of BMP's in this area, as described below.
Town Neck (Mill Creek)	Stormwater Mitigation - Five stormwater outfalls serve the adjoining Town Neck development. In an effort to minimize stormwater impacts in the Town Neck area, the town sought and received three "Coastal Pollution Remediation" grants from Coastal Zone Management (CZM) from 2000 to 2002. The cost for design and construction of the BMP's in Town Neck totaled over $575,000. At a 25% match, the town contributed over $144,000. The installed system will capture the first flush of stormwater and discharge into the ground via new infiltration facilities. It is hoped that the BMP's will improve the water quality of Mill Creek and return recreational shellfishing to this area.
Sandwich Village	Shawme Pond and Mill Creek - In a continued effort to improve water quality in Mill Creek, the town has been awarded another CZM grant to evaluate stormwater conditions upstream of Town Neck, in Sandwich Village. It is hopeful that this grant will lead to construction of BMP's in the Village area. Additionally, recent studies have been performed monitoring the quality of water in Upper and Lower Shawme Pond in the Village. Sources of pollution were also evaluated as part of this study.
Lakewood Hills - Spectacle Pond	In the Fall of 2000, the town installed a new drainage system in the Lakewood Hills area of Sandwich to minimize stormwater impacts to the adjacent Spectacle Pond. With the help of a state grant, a leaching system was installed to capture the first flush of stormwater and to discharge it into the ground. The project cost totaled over $200,000.
Great Hill Road – Lawrence Pond	In August of 2001, the town repaved (including berms) and installed drainage along Great Hill Road. These measures greatly minimized stormwater runoff into Lawrence Pond by conveying the road runoff to designated drainage areas and leaching basins. Previously, road runoff flowed down driveways and off the road edge directly into the Pond.
Snake Pond Road – Snake Pond	The town completed roadway and drainage improvements along Snake Pond Road in the fall of 2001. Stormwater improvements included constructing waterways to channel runoff into vegetated areas in an effort to reduce direct discharge into Snake Pond. This construction occurred east of Snake Pond. Stormwater runoff west of Snake Pond has been identified as an area of concern and is incorporated as part of this SMP.
Scorton Creek	In 1996, the town undertook a stormwater discharge and sampling study in the 1,540 acre Scorton Creek watershed area. Due to direct discharge and water quality concerns in this area, Scorton Creek has been identified as an area of concern While most of the stormwater runoff into Scorton Creek is likely from Route 6A (State Highway), the town will continue to focus on this area for future improvements within the town's jurisdiction.
Town Pollution Control and Mitigation Measures	
Mercury Shed	The town constructed a mercury shed in 2003 to contain all mercury at the DPW Transfer Station. The shed will safely store mercury and prevent contaminants from entering stormwater runoff.
DPW Environmental Audit (EPA Audit Incentive Program)	In 2001, the town performed an environmental audit as part of the EPA's Audit Incentive Program. The report identified two issues that required attention, an old salt shed and outside vehicle washing. The town has committed to construct a new salt shed and provide an internal vehicle washing area to contain pollutants from these two sources.
Golf Course Wastewater Connection	In 2001, the town connected a failed septic system at its public golf course to a biological secondary treatment plant at the Oak Ridge School.
Landfill Capping	The town capped its landfill in 2001. All runoff from the landfill is contained on-site. The landfill is inspected and maintained by the DPW.
Wastewater Holding Tank	In 1993, the town installed an industrial wastewater holding tank for floor drains at the DPW Garage. This permitted tank (DEP Permit Transmittal No. 48698) is periodically pumped and transported off-site by a licensed contractor.
Septic Lagoons Cleanup	In 1993, the town cleaned and properly disposed (in accordance with DEP) wastes from its septic lagoons. The lagoons are now closed.
Wastewater Disposal	The town has a permit to dispose of DEP approved tight-tanks for biological secondary treatment at two wastewater treatment plants in Sandwich, the Oak Ridge and Forestdale schools.
Waste Oil Burning	The town has a permit to burn its waste oils at the DPW Highway Garage. Proper procedures and equipment are in place to minimize spilling of wastes at a designated waste oil area.

Removal of Underground Fuel Tanks	The town has removed its underground fuel tanks at the DPW facility and relocated them to a secured above ground fuel depot. Gas and diesel tanks are used to fuel town vehicles. A grooved concrete slab surrounds the fuel stations to contain minor spills from these tanks.
Maintenance Programs	The DPW has maintenance programs related to catch basin cleaning, street sweeping and vehicle service. These programs have procedures to appropriately handle and dispose of wastes.
Other Efforts	
Board of Health Water Monitoring	The Board of Health continues to monitor the quality of water for Sandwich water bodies. Future monitoring of areas of concern, particularly DEP-listed impaired waters, is addressed in the Six Control Measures.
Public Education	Educational brochures, guidelines and information related to water quality created by the town and other agencies are distributed, posted or currently available at town buildings.
Household Hazardous Products Collection	The Town of Sandwich organizes several Household Hazardous Products Collection days throughout the year. This program allows residents to properly dispose of hazardous products from their homes. The town will continue this effort in the future.

The town has been actively improving and installing large stormwater systems that are financed by a combination of state grants and town matches. Additionally, the DPW improves, maintains and repairs small drainage facilities as part of their daily operations. The town has also conducted sampling, research and studies in an effort to identify problem areas and minimize impacts created by stormwater runoff. Some of these recent actions are identified above.

Flood-Prone Roadways in Sandwich

Arrowhead Circle	Foster Road	North Shore Boulevard Ext.	Spring Hill Road
Barbara Lane	Freeman Avenue	Nye Road	Stonefield Drive
Bay Beach Lane	Georges Rock Road	Old Main Street	Torrey Road
Beach Way	Grove Street	Pine Road	Town Neck Road
Boardwalk Road	Holway Road	Ploughed Neck Road	Tupper Road
Captain Cole Road	Jarves Street Ext.	River Street	Water Street
Captain Crocker Road	Jones Lane	Roos Road	White Cap Path
Captain Hook Road	Main Street	Route 6A	Willow Street
Dewey Avenue	Marshview Circle	Saltmarsh Road	Wood Avenue
Ed Moffitt Drive	North Shore Blvd	Sandy Neck Road	Wood Avenue Ext.

Climate Change

The impacts of global climate change (warming) may be especially significant for Sandwich's coastal areas and are fundamental for any long-range plan for natural resource management. The threats posed by climate change far exceed any single other environmental issue facing the community and region. A few specific impacts that should be anticipated are as follows:

- Changes in precipitation and storm patterns from past records of 100-200 years;
- Rising water levels of the Atlantic Ocean that will change Cape Cod coastline characteristics;
- Decreased pH (acidity) of marine waters that will affect coastal marine life productivity vital for diverse economic activities;
- Changes in the biodiversity of the region due to seasonal shifts (earlier spring, later fall, etc.). Impacted biodiversity will include terrestrial and marine vegetation, animals (migratory & resident), and microbes (beneficial & pathogenic);
- Changes in conditions for agricultural/horticultural activities (cranberries, fruits, vegetables, forestry, etc.); and
- Climate change will likely bring sea level rise and associated impacts in coast erosion and shoreline change; flood hazards will increase and the potential for greater and increased storm activity is predicted; coastal resources will seek to migrate landward as sea level rises, necessitating greater and further landward buffer zone areas than are currently provided for in Sandwich's local regulations.

Section 9: Community Sustainability addresses climate change in a local context in terms of what Sandwich residents can do to minimize our contribution to climate change, and how we can best prepare for the inevitable changes that will occur. One consideration is that the 100 year flood levels are based on historical weather patterns which are highly unlikely to be repeated. Current V-zones and A-zones will change. Zoning restrictions on construction need to be modified to anticipate future flood patterns, not to past experience.

3.0 Economic Development

Contents

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3.1 Introduction

Economic development is a high priority in Sandwich. The overall economic goal of the community is to expand the non-residential tax base by supporting targeted commercial and light industrial development while recognizing that Sandwich's historic character and natural beauty are fundamental to a successful economy.

The Economic Development Element provides the town with the tools to facilitate and guide desired commercial, light industrial and mixed-use growth and development to targeted locations in Sandwich providing residents with local employment and business development opportunities. The proposed business development plan for Sandwich fits the current economic conditions and trends while providing new and developing business and entrepreneurial opportunities that compliment the community's historic, cultural and natural history.

This element also provides the town with a foundation to access the Cape Cod Commission and State economic development tools such as Growth Incentive Zones, Development Agreements, and the Commonwealth Capital program that provides municipalities with the eligibility and access to a variety of economic development programs. The conceptual development plans for the Strategic Planning Areas included in *Section 1: Land Use* are evaluated under this section in terms of their fiscal costs and benefits to the community by the Fiscal Impact Model. This model factors in sustainable development and design techniques that match Sandwich's quality of life objectives such as mixed use development, LEEDS criteria and LID techniques and resource protection. These conceptual development plans will be a tool to provide guidance to developers in targeted areas of Sandwich appropriate for economic development while ensuring protection of natural and cultural resources.

3.2 General Economic Conditions and Trends

Various data sources were used and incorporated to create an **Economic Profile,** which qualifies the potential for (and constraints to) future economic growth in Sandwich. In order to complete this profile an analysis was completed on local and regional economic trends and conditions.

Population Trends and Characteristics- Past, Present and Future Population
Sandwich hosts approximately nine percent of Barnstable County's population on eleven percent of the land in the County. Growth in Sandwich, as on the rest of Cape Cod, has been dramatic over the past 50 years. At the turn of the century, Sandwich's population was approximately 1500, a number essentially static in the first half of the 1900s as an off-Cape migration, associated with diminished Cape economic opportunities, continued.

Local and Regional Population Trends

Location	Density in 2000 (Pop/Mi)	1990	2000	% Change 1990 to 2000
Upper Cape Subregion	556.9	67,397	84,463	25.30%
Bourne	457.6	16,064	18,721	16.50%
Falmouth	738.2	27,960	32,660	16.80%
Mashpee	551.4	7,884	12,946	64.20%
Sandwich	***467.9***	***15,489***	***20,136***	***30.00%***
Mid-Cape Subregion	844.8	75,987	88,601	16.60%
Lower Cape Subregion	353.8	43,221	49,166	13.80%
Barnstable County	561.9	186,605	222,230	19.10%

Though Sandwich's year-round population exploded between 1960 and 1990 (2,082 to 15,489), most of that growth occurred during the '70s and '80s. To some degree, Sandwich was "discovered" by Boston commuters during the 1980s, accounting for a large part of the influx. Sandwich had the second highest growth rate on the Cape (behind only Mashpee) between 1970 and 1990, with growth rates in those decades of over 40 percent.

The latest Census estimates reveal that although the growth trend continues, the rate of growth has lessened in the past decade falling to 30 percent between 1990 and 2000. However, the Cape continued to outpace the rest of the Commonwealth in its population growth rate. The four Upper Cape towns (led by Mashpee and Sandwich) accounted for much of this growth (see table above). According to the 2000 US Census population estimates, Sandwich has continued to grow at a rate of approximately one percent annually.

Seasonal Population - Although the entire Cape population is estimated to triple during the summer months, the seasonal influx of population is thought to be less in Sandwich than in other towns. While all Cape towns have a large number of seasonal homes and retirees, Sandwich tends to have a higher percentage of year-round residents than the rest of the region due to its relative convenience for commuters. According to town records, there are approximately 7,574 year round housing units in Sandwich and 1,174 seasonal (or occasional) units.[1]

Sandwich Population & Household Trends

Population	**Sandwich**	***Sandwich % of County***	**Barnstable County**
2012 Projection	20,430	*9%*	226,154
2007 Estimate	20,276	*9%*	225,957
2000 Census	20,136	*9%*	222,230
1990 Census	15,208	*8%*	186,605
Projected Growth 2007-2012	*154*		*197*
% Projected Growth 2007-2012	*0.760%*		*0.087%*
% Growth 1990 - 2000	32.40%		19.09%
Households			
2012 Projection	7,532	*8%*	98,328
2007 Estimate	7,463	*8%*	97,697
2000 Census	7,201	*8%*	94,822
1990 Census	5,461	*7%*	77,586
Projected Growth 2007-2012	*69*		*631*
% Projected Growth 2007-2012	*0.92%*		*0.65%*
% Growth 1990 - 2000	31.86%		22.22%

Source: *Claritas Site Reports,* 2007, and FXM Associates

Households – The number of households grew by 32 percent in the 1990s exceeding the county average of 22 percent as more families discovered Sandwich as a relatively easy place on Cape to commute (particularly with the extension of the MBTA line) and the reputation for good public schools. In 2007, the total estimated number of households in town is 7,463, which indicates a significant decrease in growth over the last 7 years compared to the 1990s. According to the 2000 Census, fewer Sandwich residents live in poverty (only 3.1 percent of all residents are reported below federal poverty limits (the Cape-wide rate is 6.9 percent). This is likely the result of the number of families that have moved to Sandwich and commute to work as well as retirees that have settled in town over the past 15 years.

Disability Status - Of those in the 2000 population ranging in age from 5 to 20 years old, 355 or

[1] As reported by Town of Sandwich Planning Department, April, 2005.

7.2 percent had some disability; in the population age 21 to 64, 1,642 or 14.8 percent claimed a disability but 71.8 percent of this cohort was employed. The population 65 years of age or older, 897 or 34 percent claimed some type of disability.

Age of Residents - Population demographics can influence economic development opportunities as well as public service and facilities needs. As with other communities in the Commonwealth and throughout New England, the population of Sandwich is aging, but moderately. The Census reported an increase in the median age between 1990 and 2000 from 35.4 to 39.5. This is older than the median age in Massachusetts (36.5), but younger than the Cape-wide median age of 44.6. The percentage of its population over 55 is 23.3 percent, far below the county-wide rate of 34.6 percent.

At the same time, Sandwich continues to have a large number of households that include families with children under the age of 18 (38.1 percent of all households). This reflects a likely immigration of families with children to the town over the past several years. Population projections indicate that Sandwich should expect a continued increase in its population over the next two decades, with growth concentrated in the age groups under 25 as well as those over 50. For this reason, it is important that long term economic development initiatives consider the needs of both youth and senior citizens.

Education – Education level in a community is a key factor in defining market characteristics and economic development opportunities. In 2000, nearly 95 percent of those 25 years and older had a high school diploma or higher and 38 percent had a college degree or higher. These high levels of resident education are maintained in 2007 as identified in the table below:

Sandwich Education & Occupation Trends

Characteristics	Sandwich	*% of Town*	Barnstable County	*% of Barnstable County*
2007 Est. Pop. Age 25+ by Educational Attainment	**13,490**		**169,245**	
Less than 9th grade	207	*1.5*	3,423	*2.0*
Some High School, no diploma	505	*3.7*	10,500	*6.2*
High School Graduate (or GED)	2,917	*21.6*	46,339	*27.4*
Some College, no degree	3,106	*23.0*	37,202	*22.0*
Associate Degree	1,584	*11.7*	15,145	*8.9*
Bachelor's Degree	3,201	*23.7*	34,692	*20.5*
Master's Degree	1,447	*10.7*	15,678	*9.3*
Professional School Degree	370	*2.7*	3,725	*2.2*
Doctorate Degree	153	*1.1*	2,541	*1.5*
High School or above	**12,778**	***94.7***	**155,322**	***91.8***
Bachelor's or above	**5,171**	***38.3***	**56,636**	***33.5***
2007 Est. Civic Employed Pop 16+ by Occupation	**10,163**		**106,315**	
Management, Business, and Financial Operations	1,694	*16.7*	13,608	*12.8*
Professional and Related Occupations	2,559	*25.2*	23,781	*22.4*
Service	1,347	*13.3*	19,312	*18.2*
Sales and Office	2,820	*27.7*	29,273	*27.5*
Farming, Fishing, and Forestry	38	*0.4*	711	*0.7*
Construction, Extraction and Maintenance	974	*9.6*	11,706	*11.0*
Production, Transportation and Material Moving	731	*7.2*	7,924	*7.5*
2007 Est. Pop 16+ by Occupation Classification	**10,163**		**106,315**	
Blue Collar	1,705	*16.8*	19,630	*18.5*
White Collar	7,073	*69.6*	66,553	*62.6*
Service and Farm	1,385	*13.6*	20,132	*18.9*

Source: *Claritas Site Reports,* 2007, and FXM Associates

Sandwich exceeds the county average in achievement of high school and higher education degrees. There are also higher percentages of residents in management and professional services than other communities on the Cape.

Socioeconomic Trends

Place of Work - Where Sandwich residents work and how many non-residents are employed in the community may impact the market potential for various businesses and economic development opportunities. Some residents who work in other communities may purchase products and services near their place of work. On the other hand, non-residents who work in Sandwich may utilize local stores and services during, before or after their work hours.

The percentage of Sandwich residents commuting off-Cape to work has increased over the past two decades. In 1970, 7.2 percent of Sandwich workers commuted to sites off-Cape. In 1990, that percentage increased to 25 percent. The table below displays the place of work of Sandwich residents in 2000. Twenty-nine percent (29 percent) of the town's workforce work in Sandwich, 45.7 percent work in other towns in Barnstable County, and 22.4 percent work in the Boston metropolitan area outside of Barnstable County. As this information demonstrates, nearly 70 percent of Sandwich residents commute outside of Sandwich to work in nearby communities.

Sandwich Workforce by Place of Residence, 2000

Place of Work and Residence	Number	% of Resident Workforce
Total Sandwich Resident Workforce	**9,588**	
Place of Work		
Sandwich	*2,780*	*29.00%*
Neighboring Counties		
Barnstable County (not including Sandwich)	4,384	45.70%
Plymouth County	881	9.20%
Suffolk County (includes Boston)	442	4.60%
Norfolk County	387	4.00%
Middlesex County	207	2.20%
Bristol County	186	1.90%
Regional Employment		
Boston CMSA[1] (does not include Barnstable County)	2,147	22.40%
Providence CMSA	106	1.10%
Total Employees (residents and non-residents)	**6,249**	
Place of Residence		
Sandwich	*2,780*	*44.50%*
Non-Residents		
Barnstable County (not Sandwich)	2,506	40.10%
Plymouth County	569	9.10%
Bristol County	166	2.70%
Norfolk County	35	0.60%
Suffolk County (includes Boston)	23	0.40%
Middlesex County	13	0.20%
Boston CMSA	745	11.90%
Providence CMSA	119	1.90%

1[1] Consolidate Metropolitan Statistical Area (CMSA), geographic area defined by the U.S. Census for 2000. Includes cities and surrounding communities.

The table above also lists the number of people who work in Sandwich by their place of residence. Approximately 45 percent of the people who work in Sandwich are residents. The majority (55 percent) commute from other communities to work in Sandwich, with a large portion of those from Barnstable County. This would suggest that Sandwich acts as a regional employment center for the Cape.

Sandwich is increasingly becoming a "bedroom community" within relatively easy reach of both Boston and Providence. To an extent, the increase in percentages of people earning incomes elsewhere and spending it locally has helped the economic base. Unfortunately, the wholesale/retail sector in the town (particularly for clothing, housewares, etc.) has not met the needs of residents, and many people are purchasing these goods either off-Cape, or in other Cape towns.

Occupation and Employment - Sandwich's employment and occupation trends indicate that it does not substantially differ from the region as a whole. Jobs in manufacturing decreased from 7 percent of total employment in 1972 to 4 percent in 1991 to 2 percent in 2007. Service occupations (whose focus is primarily domestic) have increased from 27 percent in 1972 to 31 percent in 1991 to 47 percent in 2007. It appears the trend will continue unless efforts are actively directed toward increasing the light industrial/manufacturing/research sector along with other sectors that provide a stable, year-round, economic base.

Sandwich Trends in Employment and Wages by Industry, 2001-2006

Industry	2006				Δ 2001 - 2006			
	Establish-ments	Total Wages	Average Employ-ment	Average Weekly Wage	Establish-ments	Total Wages	Average Employ-ment	Average Weekly Wage
Total, All Industries--All Ownership	**627**	**$192,836,108**	**5,381**	**$ 689**	**104**	**$41,655,078**	**332**	**$ 113**
Total, All Industries--Private Ownership	**607**	**$160,893,680**	**4,630**	**$ 668**	**105**	**$36,751,477**	**342**	**$ 111**
Agriculture, Forestry, Fishing & Hunting	7	$744,839	15	$ 955	3	$ 452,160	9	$ 66
Construction	86	$15,597,898	351	$ 855	22	$ 4,688,097	55	$ 147
Manufacturing	12	$3,283,190	87	$ 726	**-1**	**$(2,428,628)**	**(59)**	**$ (25)**
Wholesale Trade	41	$11,632,480	188	$ 1,190	1	$ 5,022,202	77	$ 40
Retail Trade	75	$15,983,038	681	$ 451	**-4**	$ 1,578,314	**(81)**	$ 87
Transportation and Warehousing	7	$831,945	25	$ 640	**-3**	**$ (415,777)**	**(14)**	$ 29
Information	9	$2,066,046	56	$ 709	**-1**	**$ (903,828)**	3	**$ (362)**
Finance and Insurance	25	$8,341,234	162	$ 990	2	$ 1,735,257	12	$ 142
Real Estate, Rental and Leasing	21	$944,518	37	$ 491	7	**$ (334,104)**	**(6)**	**$ (85)**
Professional & Technical Services	78	$15,482,290	290	$ 1,027	28	$ 7,783,884	103	$ 236
Administrative and Waste Services	45	$11,439,424	326	$ 675	3	$ 5,852,790	123	$ 146
Health Care and Social Assistance	55	$31,050,364	828	$ 721	11	$10,185,081	55	$ 202
Arts, Entertainment, & Recreation	12	$5,095,047	211	$ 464	1	$ 52,380	**(20)**	$ 45
Accommodation & Food Services	44	$14,121,948	827	$ 328	2	$ 2,432,671	28	$ 47
Other Services, Ex. Public Admin	80	$3,684,877	191	$ 371	33	$ 1,416,069	43	$ 77

A comparison with other Cape communities in Barnstable County in the table below shows how Sandwich's socioeconomic characteristics distinguish it from its neighbors. As with the rest of the Cape, service producing industries in Sandwich lead in average employment over goods producing industries in 2007. Within the service industries, Education and Health Services is the largest employers (with 19 percent of all employment), Trade, Transportation and Utilities ranked second, and Leisure and Hospitality ranked third. In comparison of service trades with

Barnstable County trends, Sandwich is strong in depository institutions, museums, social services, motion pictures, membership organizations and miscellaneous repair services. The town is weak in comparison to insurance, investment services and amusement and recreational services.

Sandwich Industries, Jobs, and Business Sales, 2007

Industries	Sector	Establish-ments	Share of Local Estab.	Jobs	Share of Local Jobs	Business Sales (Million $)	Share of Local Sales
All Industries		**984**		**8,583**		**$ 832**	
	All Manufacturing (SIC 20-39)	38	*3.9%*	299	*3.5%*	$ 24	*2.9%*
	All Services (SIC 60-89)	463	*47.1%*	4,675	*54.5%*	416	*50.0%*
	All Retailing (SIC 52-59)	185	*18.8%*	1,763	*20.5%*	$ 170	*20.4%*
	Public Administration (SIC 90-97)	33	*3.4%*	276	*3.2%*	$ -	*0.0%*
Industry by 2 Digit SIC Codes							
07	Agricultural Services	19	*1.9%*	176	*2.1%*	$ 7	*0.9%*
All Building Industries							
15	Building Construction and General Contractors	44	*4.5%*	255	*3.0%*	$ 72	*8.7%*
16	Heavy Construction, Except SIC 15	8	*0.8%*	43	*0.5%*	$ 5	*0.6%*
17	Construction-Special Trade Contractors	84	*8.5%*	385	*4.5%*	$ 58	*6.9%*
All Manufacturing (SIC 20-39)							
20	Food and Kindred Products	4	*0.4%*	83	*1.0%*	$ 7	*0.8%*
23	Apparel and Other Fabric Products	2	*0.2%*	11	*0.1%*	$ 1	*0.1%*
27	Printing, Publishing and Allied Industries	11	*1.1%*	30	*0.3%*	$ 2	*0.3%*
32	Stone, Clay, Glass and Concrete Products	4	*0.4%*	20	*0.2%*	$ 2	*0.3%*
34	Fabricated Metal Products	3	*0.3%*	17	*0.2%*	$ 2	*0.3%*
35	Industry and Commercial Machinery and Computers	4	*0.4%*	8	*0.1%*	$ 1	*0.1%*
36	Electrical and Electronic Equipment(Ex. Computers)	3	*0.3%*	106	*1.2%*	$ 7	*0.8%*
38	Measuring and Analyzing Instruments	3	*0.3%*	17	*0.2%*	$ 2	*0.2%*
39	Miscellaneous Manufacturing Industries	4	*0.4%*	7	*0.1%*	$ 1	*0.1%*
41	Local, Suburban and Interurban Transportation	7	*0.7%*	111	*1.3%*	$ 6	*0.7%*
42	Motor Freight Transportation and Warehouse	3	*0.3%*	7	*0.1%*	$ 1	*0.1%*
43	U.S. Postal Service	2	*0.2%*	34	*0.4%*	$ 0	*0.0%*
44	Water Transportation	3	*0.3%*	20	*0.2%*	$ 3	*0.4%*
47	Transportation Services	6	*0.6%*	19	*0.2%*	$ 6	*0.7%*
48	Communication	5	*0.5%*	32	*0.4%*	$ 4	*0.5%*
49	Electric, Gas and Sanitary Services	8	*0.8%*	109	*1.3%*	$ 9	*1.1%*
50	Wholesale Trade-Durable Goods	24	*2.4%*	197	*2.3%*	$ 33	*3.9%*
51	Wholesale Trade-Non-Durable Goods	15	*1.5%*	107	*1.2%*	$ 19	*2.2%*
All Retailing (SIC 52-59)							
52	Building Materials, Garden Supply and Mobile Homes	20	*2.0%*	276	*3.2%*	$ 37	*4.5%*
53	General Merchandise Stores	1	*0.1%*	2	*0.0%*	$ 0	*0.0%*
54	Food Stores	12	*1.2%*	251	*2.9%*	$ 36	*4.3%*
55	Automobile Dealers and Gas Service Stations	9	*0.9%*	68	*0.8%*	$ 17	*2.0%*
56	Apparel and Accessory Stores	8	*0.8%*	29	*0.3%*	$ 2	*0.2%*
57	Home Furniture, Furnishings and Equipment	24	*2.4%*	82	*1.0%*	$ 15	*1.9%*
58	Eating and Drinking Places	39	*4.0%*	790	*9.2%*	$ 38	*4.6%*
59	Miscellaneous Retail	72	*7.3%*	265	*3.1%*	$ 25	*2.9%*
All Services (SIC 60-89)							
60	Depository Institutions	10	*1.0%*	102	*1.2%*	$ 29	*3.5%*
61	Non-Depository Credit Institutions	5	*0.5%*	38	*0.4%*	$ 12	*1.4%*
62	Security and Commodity Brokers and Service	8	*0.8%*	27	*0.3%*	$ 5	*0.6%*
63	Insurance Carriers	0	*0.0%*	0	*0.0%*	$ -	*0.0%*
64	Insurance Agents, Brokers and Service	7	*0.7%*	39	*0.5%*	$ 9	*1.1%*

65	Real Estate	39	*4.0%*	288	*3.4%*	$ 38	*4.6%*
67	Holding and Other Investment Offices	1	*0.1%*	4	*0.0%*	$ 1	*0.1%*
70	Hotels and Other Lodging Places	29	*2.9%*	351	*4.1%*	$ 15	*1.9%*
72	Personal Services	49	*5.0%*	175	*2.0%*	$ 8	*1.0%*
73	Business Services	51	*5.2%*	213	*2.5%*	$ 31	*3.7%*
75	Automobile Repair, Services and Parking	10	*1.0%*	40	*0.5%*	$ 3	*0.3%*
76	Miscellaneous Repair Services	17	*1.7%*	48	*0.6%*	$ 6	*0.7%*
78	Motion Pictures	6	*0.6%*	42	*0.5%*	$ 3	*0.4%*
79	Amusement and Recreational Service (Ex. Movies)	18	*1.8%*	135	*1.6%*	$ 9	*1.1%*
80	Health Services	79	*8.0%*	942	*11.0%*	$ 60	*7.2%*
81	Legal Services	27	*2.7%*	66	*0.8%*	$ 12	*1.5%*
82	Educational Services	14	*1.4%*	667	*7.8%*	$ 72	*8.6%*
83	Social Services	28	*2.8%*	540	*6.3%*	$ 50	*6.0%*
84	Museums, Art Galleries, Zoos, Etc.	4	*0.4%*	51	*0.6%*	$ 1	*0.2%*
86	Membership Organizations	22	*2.2%*	682	*7.9%*	$ 23	*2.7%*
87	Eng, Acct, Research and Mgmt Related Services	39	*4.0%*	225	*2.6%*	$ 29	*3.5%*
Public Administration (SIC 90-97)							
91	Exec., Leg. and Gen. Govt. (Except Finance)	19	*1.9%*	114	*1.3%*		
92	Justice, Public Order and Safety	4	*0.4%*	82	*1.0%*		
93	Public Finance, Taxation and Monetary Policy	1	*0.1%*	4	*0.0%*		
94	Administration Of Human Resource Programs	2	*0.2%*	6	*0.1%*		
95	Admin. Of Environ. Quality and Housing Programs	3	*0.3%*	12	*0.1%*		
96	Administration Of Economic Programs	1	*0.1%*	10	*0.1%*		
97	National Security and International Affairs	3	*0.3%*	48	*0.6%*		
99	Non-Classifiable Establishments	16	*1.6%*	75	*0.9%*		

Source: *Claritas Site Reports,* 2007, and FXM Associates

Industries with **STRONG** local presence relative to Sandwich's overall share of County jobs and sales

Industries with **WEAK** local presence relative to Sandwich's overall share of County jobs and sales

Even with a growing service sector in Sandwich over the last several years, there is still potential for additional growth. As the median age increases and more retirees are locating in town, the need for financial and legal services is expanding. One of the local constraints to this sector is the limited availability of quality office space. Local officials and business organizations recognize this issue and have promoted the concept of mixed use development which includes professional office space in future development.

Sandwich and Barnstable County Industries, Jobs, and Business Sales, 2007

Sector	Establish-ments	Share of Barnstable County	Jobs	Share of Barnstable County	Business Sales (Million $)	Share of Barnstable County
All Industries	**984**	***6.2%***	**8,583**	***5.9%***	**$ 832**	***6.0%***
All Manufacturing (SIC 20-39)	38	*7.7%*	299	*5.2%*	$ 24	*4.8%*
All Retailing (SIC 52-59)	185	*4.9%*	1,763	*4.7%*	$ 170	*4.4%*
Public Administration (SIC 90-97)	33	*6.2%*	276	*2.9%*	$ -	

Relative to the region, the town has a larger percentage of residents employed in management, professional and related occupations, which tend to pay the highest overall annual wages and a lower percentage of people in service, construction, and manufacturing (which tend to have lower annual wages than other occupations).

Sandwich Labor Force Requirements of Businesses, 2007

Labor Force Requirements of Businesses in Sandwich				Barnstable County	
Description	**Total**	**Share of Town Total**	***Sandwich Share of Region***	**Total**	**Share of County Total**
Total Employment	**8,581**	100%	***5.9%***	**146,373**	100%
Executive and Professional	2,858	33%	*6.1%*	47,204	32%
Management	679	8%	*6.3%*	10,738	7%
Sales and Marketing	881	10%	*4.8%*	18,376	13%
Health-Legal-Social	538	6%	*8.2%*	6,557	4%
Engineer-Science-Computer Professional	137	2%	*5.0%*	2,727	2%
Educators	500	6%	*8.2%*	6,124	4%
Journalists-Creative Professional	123	1%	*4.6%*	2,682	2%
Administration and Support	2,065	24%	*5.9%*	34,873	24%
Management Support	227	3%	*5.3%*	4,269	3%
Admin-Clerical Support	1,551	18%	*6.0%*	25,909	18%
Technical Support	287	3%	*6.1%*	4,695	3%
Service Personnel	1,624	19%	*5.7%*	28,527	19%
Health Care Personnel	185	2%	*6.5%*	2,845	2%
Food and Beverage	999	12%	*5.6%*	17,772	12%
Personal Services	364	4%	*6.1%*	5,936	4%
Protective Services	76	1%	*3.9%*	1,974	1%
Trade and Labor	2,034	24%	*5.7%*	35,769	24%
Construction	401	5%	*6.9%*	5,836	4%
Installation and Repair	610	7%	*5.4%*	11,336	8%
Craft Production	98	1%	*5.7%*	1,723	1%
Machine Operators	100	1%	*5.2%*	1,916	1%
Assemblers	70	1%	*6.9%*	1,019	1%
Transportation	297	3%	*5.3%*	5,555	4%
Agriculture	200	2%	*5.7%*	3,489	2%
Laborers	258	3%	*5.3%*	4,895	3%

Source: *Claritas Site Reports*, 2007, and FXM Associates

HIGH concentrations in Sandwich relative to town share of overall region

LOW concentrations in Sandwich relative to town share of overall region

Within the Trade Sector, retail trade and accommodation/food services lead in Cape-wide employment followed by accounting. In Sandwich, all retail trade accounts for 18 percent of employers, 21 percent of local jobs, and 20 percent of business sales. Compared with the County, only building materials and garden supply businesses share a strong presence in Sandwich relative to other communities. Several other retail business sectors in Sandwich, however, are weak relative to the County averages.

Employment Rates - Though fluctuating from about 3 percent to 6 percent between summer and winter months owing to the influences of its tourist economy, Sandwich's average unemployment rate of 4.0 percent in 2007 is among the lowest on Cape Cod, and is significantly lower than the statewide average of over 6 percent.

Sandwich Average Annual Laborforce, Employment & Unemployment*

Year	Labor Force	Employed	Unemployed	Unemployment Rate
2008**	10,644	10,045	584	5.6%
2007	11,542	11,082	460	4.0%
2006	11,659	11,171	488	4.2%
2005	11,643	11,201	442	3.8%
2004	11,710	11,218	492	4.2%
2003	11,629	11,133	496	4.3%
2002	11,297	10,870	427	3.8%
2001	10,977	10,648	329	3.0%
2000	10,763	10,503	260	2.4%

* Not Adjusted Seasonally

** Figures for 2008 are for January and February only

Median Income - The median household income in Sandwich ($72,400) is one of the highest on Cape Cod and over $17,000 higher than the Cape-wide median. The median per capita income ($32,162) in Sandwich also exceeds the county-wide median. This trend has been consistent for three decades.[2]

Sandwich Household Income, 2007

Characteristic	Sandwich	% of Town	Barnstable County	% of County
2007 Tenure of Occupied Housing Units	7,463		97,697	
Owner Occupied	6,574	*88%*	75,993	*78%*
Renter Occupied	889	*12%*	21,704	*22%*
2007 Average Household Size	2.69		2.41	
2007 Est. Households by Household Income	7,463		97,697	
Income Less than $15,000	426	*6%*	9,679	*10%*
Income $15,000 - $24,999	449	*6%*	9,920	*10%*
Income $25,000 - $34,999	460	*6%*	9,838	*10%*
Income $35,000 - $49,999	889	*12%*	15,219	*16%*
Income $50,000 - $74,999	1,682	*23%*	20,466	*21%*
Income $75,000 - $99,999	1,367	*18%*	13,225	*14%*
Income $100,000 - $149,999	1,521	*20%*	12,838	*13%*
Income $150,000 - $249,999	467	*6%*	4,396	*4%*
Income $250,000 - $499,999	131	*2%*	1,468	*2%*
Income $500,000 and over	71	*1%*	648	*1%*
2007 Est. Average Household Income	$87,100		$70,940	***123%***
2007 Est. Median Household Income	$72,400		$55,122	***131%***
2007 Est. Per Capita Income	$32,162		$31,058	***104%***

Source: *Claritas Site Reports,* 2007, and FXM Associates

As the table above shows, over 40 percent of households have incomes between $50,000 and $100,000. The majority of wage earners work in the service industry, followed closely by workers in the wholesale and retail sector. The largest employer in Sandwich is the town itself.

While this data would suggest that, in general, Sandwich is an affluent town, it is important to provide open space and recreation services that are accessible and affordable to all. There are a number of residents and families in Sandwich who are living on limited means. For example, the poverty rate for female-headed households is 9.8 percent and 4.1 percent for individuals over the age of 65.

[2] CapeTrends, as published in the August 21, 2003 issue of the Cape Cod Commission Reporter.

In addition, at least 15 percent of households in Sandwich are low income households.[3] While higher income households are able to pay for more goods and services, low and moderate income families are more dependent on public resources and well-paying local jobs.

3.3 Existing Land for Economic Development

In terms of existing commercial building space, there are approximately 60,000 square feet of space available (mostly professional office units, except for several units in Canterbury Plaza and the Industrial Park). The Route 130 Medical Office District is one of the newer business districts but has a limited amount of available building space (no vacancies at present) and limited future development potential. Route 6A has a scattering of existing commercial office spaces, including Merchant's Row, which has a fair amount of vacant and available space.

There is an estimated total of over 488,000 square feet of commercial and industrial space in the Sandwich Industrial Park, of which approximately 20 percent is vacant. The physical appearance of the Industrial Park has discouraged many from locating there, although there is ample space for moderate-sized facilities, and the location is close enough to the highway to facilitate access for workers from out of town without adversely impacting residential areas.

Sandwich Build Out Analysis by Strategic Planning Area

Planning District	Existing Acres	Existing Building Area (Sq.Ft)
East Old Kings Highway Corridor	288	260,008
East Sandwich Residential District	2,879	3,241,813
Forestdale Residential Area	2,370	2,892,395
Growth Technology Center/Golf Course	397	12,263
Historic Village/Route 6A District	100	195,598
Massachusetts Military Reservation	8,438	1,408,344
North Sandwich Neighborhoods	2,716	3,303,802
Ridge District	1,939	934,670
Route 130 Medical Park**	62	16,478
Sandwich Industrial Park & District	444	488,033
Scusset Beach Area	588	225,446
South Sandwich Residential Area	3,869	5,756,404
South Sandwich Village Center (GT)	298	297,229
Town Marina/Tupper Rd/Route 6A Area	431	696,998
Village Center Neighborhoods	360	521,179
Total	**24,407**	**20,250,660**

At first glance, there appear to be limited commercial and industrial lands available for economic development. However, as described in *Section 1: Land Use* there may be significant opportunities for infill development and redevelopment in key locations in Sandwich. The focus of these opportunities is in the four strategic planning areas: Route 6A/Tupper Road/Town Marina Area; Route 6A/Historic Village Area; Sandwich Industrial Park and District; and the South Sandwich Village Center (the Golden Triangle).

Undeveloped, commercially-zoned land not owned by the town amounts to approximately 86 acres (classified as developable and potentially developable), most of it lying within water

[3] Households earning less than 50% of Median Family Income are considered low income. The MFI is derived from regional Census data for the Barnstable-Yarmouth Metropolitan Statistical Area ($54,728 for the 2000 Census).

recharge zones, and therefore currently restricted in use. There are two Industrially-zoned areas (land located adjacent to Mirant Electric and along Rte. 130), two Business-Limited areas (South Sandwich Business District and Tupper Road), and some property zoned Marine-Limited. There are also approximately 100 acres in the Ridge District recently zoned as a Growth Technology Park. However, development in this district is unlikely as most of the land is now under conservation restrictions. In terms of residentially-zoned land, the large wedge of land on the north side of Tupper Road to the Cape Cod Canal and adjacent to Mirant may be suitable for business development.

Potential Development Lands in Sandwich, Fiscal Year 2004 and 2008

Assessor Classification Description of Developable or Potentially Developable Land[1]	FY04 Acres	FY04 % of Sandwich[2]	FY08 Acres	FY08 % of Sandwich[2]
Residential	1,783.20	9.6	1,191.6	6.3
Commercial	86.22	0.5	80.4	0.4
Industrial	125.68	0.7	126.1	0.6
Total Developable Land	**1,995.10**	**10.7**	**1,398.1**	7.5

[1] Town Assessor's database lists land as "developable" or "potentially developable".

[2] Calculated based on estimated total land area of 18,560 acres (excluding the Massachusetts Military Reservation).

Attracting manufacturing, distributors, and research industries to Sandwich has been impeded by lack of infrastructure and a cumbersome permitting process. The permitting process is presently being reviewed, and development in the strategic planning areas may be expedited by adherence to the approved guidelines.

3.4 Capacity for Economic Growth

As discussed in *Section 5: Community Facilities and Services*, the lack of infrastructure is a limiting factor presently for economic development in Sandwich. While the Sandwich Water District has the capacity to support significant growth, a large amount of land in the Industrial District is located in the water recharge zones. There is no public wastewater system in town that could support higher density mixed use development. However, potential exists for small wastewater treatment plants to be located in targeted growth districts or utilizing septage treatment capacity at the Massachusetts Military Reserve in the future (see further discussion of public infrastructure issues in *Section 5: Community Facilities and Services*).

As discussed in *Section 4: Transportation*, the existing roadway system is adequate to handle a limited amount of future growth. However, traffic capacity, safety and circulation enhancements will have to be made in key areas such as along Route 6A and between Route 130/Cotuit Road/Quaker Meetinghouse Road to support significant new development.

3.5 Existing Economic Development Initiatives

There are several economic development initiatives taking place in Sandwich currently. The Sandwich Economic Development Committee has been working on proposed bylaws to establish the **Sandwich Economic Initiative Corporation (or SEIC)**. These organizations are authorized under state law (MGL Chapter 121) and can be very helpful in fulfilling the goals and objectives of the town if they are well coordinated and focused on the economic objectives of the Local Comprehensive Plan. SEIC's are eligible to apply for and receive funding for planning and implementation of development projects. This has been helpful to other nearby towns (such as Bourne and Falmouth), particularly those with limited budgets for planning and development.

In order for the SEIC to be successful in achieving the town's development goal of maximizing commercial tax base while protecting the town's historic, cultural and natural resources, the town should first implement the LCP and other economic development plans developed by the town. The work of the SEIC should also be consistent with the work of the Economic Development Committee, the Planning and Development Department, and the development goals of both the Town Administrator's Office and the Board of Selectmen.

The **Cape Cod Canal Region Chamber of Commerce** now serves as an economic development arm of the Town of Sandwich. The Chamber obtained a state grant from the Massachusetts Office of Travel and Tourism (MOTT) to update the Local Comprehensive Plan, working with the Sandwich Chamber of Commerce and members of the SEIC task force. The Cape Cod Canal Region Chamber markets the Sandwich area in various venues, such as the Massachusetts Getaway Guide and AAA Tour Book. It also operates the visitor center on Route 130, which generates thousands of year-round referrals to area businesses. A total of 90,000 Guidebooks are printed annually to promote the region. Thousands of direct referrals are also made from the Buzzards Bay and Sagamore visitor centers sending direct traffic into Sandwich.

The **Sandwich Chamber of Commerce** performs several economic development programs including existing business support, recruitment, marketing and promotion. The Sandwich Chamber produces and distributes 60,000 Sandwich Guidebooks and implements a destination advertising campaign in national and international media which generates over 2,300 requests for the guidebook from visitors with the specific intent to visit Sandwich. The Chamber Visitors Center, housed in the same historic building as the Thornton Burgess Museum serves around three-hundred visitors a week, most on a walking tour of the historic Village area. The Sandwich Chamber is also seeking ways to work in conjunction with the Canal Region Chamber of Commerce on various marketing and promotional activities.

The **Sandwich Association of Financial and Legal Professionals** (SAFLP) is a committee of the Sandwich Chamber of Commerce. This committee is working toward creating more high quality commercial office space in town. The non-profit organization recognizes the potential for growth in various professional services and is trying to fulfill this potential by working with the community and local land owners on developing or redeveloping space for new offices.

The Sandwich Chamber offers support and advocacy to the town's **Visitors Services Board** in the implementation of the Wayfinding Signage Plan starting with new signs on Route 6 and at Exit 2 on Route 130. The Sandwich Chamber recently launched a Shop Sandwich First campaign to promote the benefits to the community of shopping at local, independently owned businesses.

The **Town of Sandwich** is working with the Cape Cod Commission on rewriting the BL-1 zoning regulations in the South Sandwich Village Center. The objective for this area is to facilitate moderate density mixed use development (including commercial, residential and civic uses) by incorporating Smart Growth techniques in terms of infrastructure planning, uses and dimensional requirements. The community is also interested in including sustainable design techniques into site planning and building construction in this strategic planning area.

3.6 Municipal Impact of Economic Growth

As a component of the updated Local Comprehensive Plan, a Municipal Fiscal Impact Model was created for use by the town as a tool for understanding the fiscal impacts of different types of development. The fiscal impact model projects the direct, current and public costs and revenues associated with residential or non-residential growth to the town. Direct costs include the tax revenue generated and the cost of services required by a project such as from road upgrades

and maintenance to public education.

The model is specifically geared to the conceptual development plan for the South Sandwich Village Center (see *Section 1: Land Use*). This model evaluates the fiscal impact of the Smart Growth and Sustainable development techniques (vs. conventional) incorporated in the conceptual plans which identify the optimal mix of residential, civic and commercial development in this strategic planning area.

Specifically, the Fiscal Impact Model is a tool that can assist with the following:

- help the town accommodate a diversity of commercial spaces attractive to local entrepreneurs and professionals in light of recent trends toward national retail chains and service providers;
- help the town evaluate the potential for larger commercial and mixed-use development opportunities. If found fiscally desirable, the town may suggest changes in zoning that support an increase in mixed-use development, and a vibrant mix of business activity with local ownership and skilled employment opportunities;
- Estimate the costs of providing a diversity of housing for residents of all ages and income levels with particular focus on school costs;
- Help identify the relationship between diversity in housing stock and economic potential;
- help the town identify infrastructure improvements that are financially viable and support sustainable successful economic growth; and
- help the town estimate the cost of adding new development to the current mix (i.e., its marginal cost).

The model does not consider indirect costs and benefits, such as a project impact on surrounding property values or its ripple effect on the larger economy. The model estimates the direct costs of a development as if it were in place today. The goal is to have an impartial and comprehensive evaluation of proposal impacts and possible alternatives.

3.7 Challenges and Opportunities

Balancing Economic Development and Quality of Life

Sandwich is presently dealing with a balancing act of promoting economic development in a way that will preserve the present and future quality of life including, but not limited to: water quality, historical appearance and image, open space preservation, minimal traffic impact, and appropriate use of resources.

Improving the economy in general can generate jobs and diversify the tax base. Expected continuing growth toward buildout generates the need for additional capital facilities and infrastructure, all of which will substantially increase the tax rate over approximately the next ten years. Key strategies, however, in economic development differ according to the varying priorities of the townspeople.

Over the past several decades, the town has made a commitment to residential zoning that today leaves 85 percent of the non-military land area residentially zoned. Not only has that led to the explosive growth the town has sustained, but also it has created a planning challenge for the small amount of land available for commercial and industrial opportunities. This plan has identified four strategic planning areas targeted as growth centers: the Route 6A/Tupper Road/Town Marina Area; the Sandwich Industrial Park and Zoning District; the Route 6A/Historic Village; and the South Sandwich Village Center. Other areas selected for a limited development include existing development areas along the Route 6A corridor, the RHCI area in the Ridge District, and the Route 130 Medical Office District. These designations will provide support for

existing business while allowing new business to develop in a way that will not endanger the existing mixed-use quality.

Infrastructure Needs

A key issue in Sandwich is the lack of public wastewater infrastructure in the commercial zones. None of the strategic planning areas have sufficient existing infrastructure available that would make these areas particularly marketable. The town must create a plan that would provide appropriate infrastructure to these areas.

Lands already zoned commercial or industrial, which comprise the logical sites for development of growth or activity centers, mostly fall within water recharge areas for present and future town wells. When approaching development of these areas, this issue will need to be addressed. Approaches for meeting required nitrate loading restrictions include: limiting the size and scope of buildings and/or increasing open space in other areas within the zones of contribution, considering wastewater treatment facilities that would convey wastewater from these areas out of the zone of contribution, encouraging water recycling and innovative conservation technologies, and sewering. The town must actively investigate such innovative solutions that will protect its water resources.

Diversifying the Tax Base

In 1984, the Canal Electric Company was the largest single taxpayer in the town, providing significant support to the tax base. It remains the largest taxpayer today and accounts for over 6 percent of the total tax base in Sandwich. In 1994, changes in State law allowed for the devaluation of the utility property. Anticipated future taxes derived from utility assessment can no longer be relied upon. The combined effects of unprecedented growth and increased reliance on the residential property owner to provide funds for services has created a situation of an ever-increasing tax rate concomitant with decreasing services. Limited appropriate and desirable space availability for economic development, along with a recently precarious economy, has combined to nearly halt new business development in Sandwich. Although there appears to be agreement that the tax rate will not decrease in the near future, creating a more positive climate for business development can, in the long run, help to stabilize the tax base and mitigate the impact of taxes on the residential property owner.

Providing High Quality Local Jobs

Approximately 24 percent of Sandwich's work force commutes to employment off-Cape, while 29 percent work in the town. The percentage of off-Cape workers has increased from 7.2 percent in 1970. In addition to the work force commuting off-Cape, residents must travel to other communities for goods and services. The lack of sufficient building space (particularly professional offices) and limited building sites has contributed to this problem. Properly planned economic development and revitalization will add to the local economy by creating year-round job opportunities, providing goods and services not currently available, and will stimulate the retention of capital within the local economy.

A recent study done for the Cape Cod Commission[4] defines the economic base of a region as consisting of, "those business sectors that sell their goods and services to customers whose income is earned outside the region - manufacturing, banks/insurance, business services, research companies, and small retailers that cater to tourists (e.g., hotel/motel, gasoline, clothing, fishing, etc.). Categories of people from which most Cape towns derive their economic base include tourists, retirees, commuters who work off-Cape, and military personnel stationed here temporarily. Nearly 60 percent of the region's economic base comes from tourists and retirees,

[4] "The Cape Cod Economic Base" by Edward Moscovitch, 2004

many of whom spend summers here and winters elsewhere. These figures illustrate an underlying problem with the region's economic base, in that the majority of its income is seasonal. Stable, year-round economic activities such as manufacturing and research have declined markedly in the region as a whole over the past twenty years. According to study, the region cannot achieve economic health without increasing its economic base.

Regulatory Procedures

Developers considering Sandwich for potential commercial or industrial development encounter a complicated permitting process. Procedures to assist and guide applicants through the permitting and regulatory processes need to be more carefully delineated in order to expedite business relocation or expansion. The consolidation of the various inspection and regulatory departments in one building has decreased the amount of legwork formerly required to obtain a building permit, however a guide or description of the steps needed to acquire a permit would be most helpful. Some developments also must meet special permitting regulations of the Cape Cod Commission and the State.

To attract development, it is essential to analyze the permitting process with the goal of streamlining certain aspects. Designing a flow-sheet to assist developers through the various required actions is a first step. Additionally, the town needs to assess whether it is adequately staffed for the volume of permits being issued. Approval of a Local Comprehensive Plan that is certified by the Cape Cod Commission will allow the creation of development agreements within the growth and village centers, thus expediting the review process. Informative materials, to be designed and distributed by the Sandwich Economic Development Committee, will highlight Sandwich's positive qualities and market its business areas to potential developers or new commercial endeavors.

Market Expansion Opportunities

Tourism - Tourism in Sandwich is already a thriving market area. Many private organizations continue to expand and support tourist-related activities within the town, including the Cape Cod Region Chamber of Commerce, Sandwich Chamber of Commerce, and other committees such as the Holly Days Committee and the Boardwalk Days Committee. The thrust of many of these activities is to encourage tourism during the off-season. Off- shoulder events, such as Christmas in Sandwich and Holiday at Heritage attract visitors into the area. Sandwich should continue to take advantage of business opportunities created by the attraction of its museums, beaches, ponds, and historic village center, and support new ventures that fit with community character and allow the off-season market to expand.

Increased tourism, however, does intensify certain infrastructure problems. Road deterioration, and traffic congestion that requires additional police time, are two concerns exacerbated by increased tourism. Other problems associated with tourism include additional water usage and solid waste generation. To date, there has been no formal analysis of the physical impacts of increased tourism on the town's infrastructure and service capabilities. This is an area that requires further exploration.

Retired and Second Home Market - According to the US census data, the retired age group comprises 25 percent of Sandwich's population. The median age of town residents has increased over the past few decades from 33.7 years in 1980 to 35.4 years in 1990, to 39.5 in 2000. These demographics impact the town both socially and financially, and the town must ensure that the support services required by retirees will be maintained and improved. These services include, but are not limited to, adequate health care, active and passive recreational opportunities, various housing options, access to appropriate social service agencies, and efficient regional transportation.

The Town of Sandwich should consider methods for expanding the second/vacation home market. Although vacation homes require some services such as fire and emergency, they do not add to the school population, and thus are attractive financially. The town should explore creative zoning and planning to attract second-home buyers, and marketing strategies designed to expose Sandwich's advantages to potential buyers.

Utilizing Economic Development Tools- Growth Incentive Zones (GIZ) and Development Agreements

In accordance with the goals of the Regional Policy Plan (RPP), the Cape Cod Commission (CCC) established a process for designating **Growth Incentive Zones** whereby towns may enhance village centers and other areas of existing development by encouraging a concentrated mix of residential and commercial uses within these locations while ensuring that all growth is properly served by adequate infrastructure. As part of the GIZ designation process, towns must protect land outside these areas through the implementation of transferable development rights, downzoning, conservation restrictions, and other land protection measures.

Theoretically, Sandwich would apply for a GIZ for designated growth centers such as the South Sandwich Village Center or the Route 6A/Tupper Road/Town Marina Area. The challenge is that it is a lengthy process, and the definition of land areas eligible for a GIZ requires that there be some existing development or infrastructure (i.e., a GIZ is much more appropriate for downtown areas than for a largely undeveloped districts). In fact, only two GIZ districts have been established on the Cape (Downtown Hyannis and a section of Yarmouth on Route 28). If the South Sandwich Village Center was a designated a Growth Incentive Zone under the Commission's regulations, previously "dedicated" open space can be purchased or obtained up to three years prior to application as an "offset" to future growth. This would be an advantage to the town.

As a means of encouraging mixed-use development inside GIZs, Developments of Regional Impact (DRIs) within these areas qualify for certain reduced Minimum Performance Standards (MPS) and requirements set forth in the RPP in the following areas: nitrogen loading, traffic mitigation, open space, and community character. In addition, as part of its GIZ application, a town may request that the Commission grant modifications to existing DRI thresholds.

As an alternative to a GIZ, the town should consider negotiating a **Development Agreement** with the Cape Cod Commission, governing the permitting and approval process for designated growth centers (ie- the Falmouth Technology Park is an example of this).

The Development Agreement is designed for special and often large multi-phased projects. A Development Agreement is very appropriate for strategic planning areas such as the South Sandwich Village Center. In conceptual terms, a Development Agreement is a hybrid between planning and regulation - still subject to the Regional Policy Plan's Minimum Performance Standards, but with flexibility allowed in order to achieve goals that are mutually agreed upon by the Commission, the applicant, and the town. Specifically, Chapter D, Section 5(e) states: "The Commission may approve a Development Agreement which is inconsistent with the Act or the Regional Policy Plan or a Local Comprehensive Plan if the inconsistency is necessary to enable a substantial segment of the population to secure adequate opportunities for housing, conservation, environmental protection, education, recreation, or "balanced economic growth".

Finally, being a third party (e.g., signatory) to a Development Agreement would give the town more political and legal weight (and in turn give the Commission more legal cover) in arguing that an inconsistency with the Regional Policy Plan - such as accepting previously dedicated open space as mitigation for a development project - is warranted. In order to be a third party, the town

must adopt a local Development Agreement bylaw and also have a LCP that is certified by the Cape Cod Commission. This is a relatively simple task which requires Cape Cod Commission review and endorsement by Town Meeting.[5]

Commonwealth Capital - The town can prepare and file a Commonwealth Capital application with the state. This application will position Sandwich for grant funding necessary to implement the LCP. The Commonwealth Capital Program, coordinated by the Office for Commonwealth Development, directs state capital spending programs that affect development patterns to ensure that state investments promote projects consistent with the Sustainable Development Principles. It also establishes partnerships with municipalities seeking to advance the Commonwealth's development interests.

The Commonwealth Capital Program explicitly endorses planning and zoning measures that are in accord with Administration policy and encourages municipalities to implement them by linking state spending programs to municipal land use practices. More than 20 state grant programs representing $97 million in grants and $450 million in low interest loans provide a financial incentive to encourage communities to implement smart growth consistent land use policies.

- Public Works Economic Development Program (EOT)
- Bike and Pedestrian Program (EOT)
- Transit Oriented Development Bond Program (EOT)
- Community Development Action Grant (DHCD)
- Affordable Housing Trust Fund (DHCD)
- Housing Stabilization Fund (DHCD)
- Economic Development Fund/CDBG (formerly Ready Resource Fund, DHCD)
- Housing Development Support Program (DHCD)
- Commercial Area Transit Node Program (DHCD)
- State Revolving Fund (EOEA - DEP)
- Urban Brownfields Assessment Program (EOEA)
- Self-Help Program (EOEA - DCS)
- Urban Self-Help Program (EOEA - DCS)
- Land & Water Conservation Fund (EOEA - DCS)
- Agricultural Preservation Restriction Program (EOEA - DAR)
- EOEA Land Protection Programs (EOEA - DCR, DFG)
- Drinking Water Supply Protection Grant Program (EOEA)
- Urban River Visions Implementation Program (EOEA)
- Coastal Pollutant Remediation Grant Program (EOEA - CZM)
- Off-Street Parking Program (EOAF)
- Smart Growth Technical Assistance Program (EOEA)

Communities are not required to submit a Commonwealth Capital application to be eligible for funding, but their proposals are significantly less competitive without one.

District Improvement Financing Program (DIF) – Chapter 40Q of the Act of 2003 authorized the District Improvement Financing Program (or DIF). DIF is a public financing alternative available to all municipalities that provides for a variety of tools to promote development in targeted growth centers such as the South Sandwich Village Center. In particular, the DIF program enables municipalities to finance public works and infrastructure projects in designated areas by “capturing” the increase in property tax revenues derived from new housing, commercial, or industrial activity in the area and applying such revenues towards the

[5] From memo to BFDC by Lipman Development Strategies, LLC on July 8, 2008.

municipality's development program. This "tax increment" can be pledged entirely or partially to the invested revenue district and associated development program. A municipality can bond against future tax revenues or it can use these funds from year to year.

A **Development Program**, which is required as part of a DIF, is a statement of means and objectives adopted by the municipality and approved by Economic Assistance Coordinating Council (EACC). It is designed to improve the quality of life, physical facilities, and structures and the quality of pedestrian and vehicular traffic control and transportation within the district. This may also include a means and objective statement for affordable and market rate housing. The procedures for DIF are established in 402 CMR 3.01 through 3.18 and administered by the EACC. They are responsible for reviewing and approving "development districts" and "development programs."

The town is in an excellent position to create a **District Improvement Financing (DIF)** for strategic planning areas designated a growth centers. This would create a revenue stream for financing infrastructure needed to facilitate mixed use development and to attract perspective businesses. The town may also be able to secure grants and low-interest loans to subsidize or finance selected development. Currently, no other towns on the Cape are using DIF as an infrastructure and economic development tool.

Economic Opportunity Area (EOA) – The Town of Sandwich is within a state-designated Economic Target Area (ETA) and may seek designation from the State and approval by the town as an Economic Opportunity Area (EOA), which will qualify existing and prospective local businesses for certain benefits, including an annual 5 percent state income tax credit on business investment (improvements and equipment). Under this designation, the town can also make available certain **Tax Increment Financing** (or TIF) options, which are negotiated exemptions and deferrals of property tax. Sandwich already has the designation as an EOA, and Article 29 of the 1996 Town Meeting approved a TIF for Cape Cod Ice. Further applications of the EOA designation and TIF agreements would provide commercial businesses and prospective light industrial developers to locate in the community.

Other Opportunities

The Economic Development Committee and Local Planning Committee have identified several other potentially beneficial and practical **economic enhancement strategies** based on the above analysis, the public visioning process, and the regional economic development plan. These strategies include the following:

- Revisions to land use regulations and policies to effectuate the type and location of economic development desired by the community and supportable by the local market;
- Potential revisions to local tax structure and programs balancing the desire to lessen the residential burden for local services while providing incentive for new economic investment and expansion of the tax base;
- Infrastructure improvements needed to support existing development and to attract new development to targeted areas;
- Innovative new programs, activities and potential funding sources for targeted types and locations of economic enhancement (such as BID, TIF and DIF);
- Detailed business retention, expansion and recruitment strategies with targeted employment opportunities for low, moderate, and middle-income residents;
- Possible "arts/museum" enterprises (Sandwich has many museums, hence the nickname "Museum Town");
- Opportunities related to the current Mass Development planning process for new uses on the Mass. Military Reservation;
- Expanding home occupation, remote offices and WiFi as a potential methods of creating

a sustainable economy;

- Opportunities and barriers to increasing foreign tourism;
- Potential for targeted or desired industrial sectors such as professional, medical and financial services; and
- Policies to support economic growth that enhances rather than impacts the town's historical, cultural, economic and environmental assets. This includes clarifying potential impacts to the town's cultural and natural heritage and lifestyle from business types, as well as identifying ways to encourage business on a continuum from those that enhance community attributes, to those that have a benign impact, to those that have a manageable impact.

4.0 Transportation and Circulation

Contents

4.1 Background and Introduction

4.2 Local Trends and Regional Context

4.3 Existing Transportation Conditions and Trends

4.4 Future Conditions and Needs

4.1 Background and Introduction

The Transportation and Circulation Element fully incorporates and updates the *2002 Transportation Element of the Local Comprehensive Plan: Phase I and II by Vanesse Hangen Brustlin, Inc.* The VHB report includes a comprehensive existing conditions report and future projections and analysis of the local transportation system. The element identifies specific actions and initiatives to create a safe and efficient transportation system that enhances the beauty of the town, respects and reflects its historic character and natural resources, and recognizes the needs of local businesses, residents, and thru traffic. The updated transportation and circulation elements were prepared with the intent of being consistent with the Cape Cod Commission's Regional Policy Plan.

Following the 2002 plan, the updated Transportation and Circulation Element includes three primary sections:

- Existing Conditions Inventory and Capacity Analysis;
- Future Projections and Analysis; and
- Transportation Improvements and Actions

The Existing Conditions section describes the general characteristics of the town, local demographics and travel patterns, and its context within the regional transportation system. It also describes the existing conditions for the system of transportation facilities and services available within the town and the operating characteristics of each. The Capacity Analysis defines the local roadway system, analyzes traffic operations and safety issues, describes public parking, public transportation, bicycle and pedestrian resources available, and roadway improvement projects currently underway within the town. This section concludes by identifying existing transportation needs and deficiencies.

The Future Projections and Analysis Section provides a methodology for developing future transportation demand estimates based on projected land use and density. This section presents traffic analysis for key intersections and roadway links throughout Sandwich under annual average and peak season traffic conditions, and a comparison of existing and future analysis results. Probable impacts on public parking, public transportation, and bicycle and pedestrian resources are also discussed as are regional roadway, public transportation, and pedestrian and bicycle projects planned for the future.

The Transportation Improvements and Action Plan summarizes the findings of the existing and future conditions transportation analysis. It also identifies locations where physical improvements and management strategies may be needed to address the anticipated transportation issues in Sandwich. Finally, the Transportation and Circulation Element provides guidance and next steps in the following up on the 2002 VHB Report and implementing transportation system improvements such as the following:

- Assessment of non-structural (Transportation Demand Management and Transportation System Management) mitigation measures for transportation improvements;
- Assessment of land use regulations and potential revisions to support transportation improvements;
- Development and evaluation of structural mitigation measures, where applicable;
- A schedule of implementation for action items identified in the Transportation Element; and
- Development of Local Policy Plan minimum performance standards specific to the Town of Sandwich and consistent with the CCC Regional Policy Plan

4.2 Local Trends and Regional Context

Demographic and Travel Patterns

Sandwich comprises about 44 square miles of land area. The Town estimates as of January 2007 that the population is about 23,000. Travel behavior by local residents provides a useful indication of employment related transportation activity in the town. According to the Massachusetts Division of Employment and Training, approximately 10,163 Sandwich residents are employed, the remaining 13,000 are either retired, children or not employed outside the home. In addition to residents of Sandwich, the Massachusetts Division of Employment and Training estimates that there are approximately 8,583 jobs in Sandwich as of 2008. The following sections describe the travel behavior for workers who reside or are employed in Sandwich.

Regional Distribution of Work Trips - Travel patterns to and from work constitutes a large portion of the transportation activity generated by Sandwich during the year and helps to define the prevailing travel patterns through the town. The regional destination of work trips for working residents of Sandwich indicate that the majority of commuters work in Sandwich and its immediate neighboring towns. Likewise, the majority of people employed in Sandwich live in Sandwich and surrounding towns. Estimates of the regional distribution of work trips for residents of Sandwich are presented in the table below.

Commuting Patterns of Employed Sandwich Residents, 2000

Characteristics	Number	% of Resident Workforce
Total Resident Workforce[1]	9,588	
Place of Work		
Sandwich	*2,780*	*29.00%*
Neighboring Counties		
Barnstable County (not including Sandwich)	4,384	45.70%
Plymouth County	881	9.20%
Suffolk County (includes Boston)	442	4.60%
Norfolk County	387	4.00%
Middlesex County	207	2.20%
Bristol County	186	1.90%
Regional Employment		
Boston CMSA[2] (does not include Barnstable County)	2,147	22.40%
Providence CMSA	106	1.10%
Means of Travel to Work		
Car, truck, or van -- drove alone	8,152	85
Car, truck, or van -- carpooled	495	5.2
Public transportation (including taxicab)	234	2.4
Walked	100	1
Other means	49	0.5
Worked at home	558	5.8
Mean travel time to work (minutes)	**30.2**	**(X)**

[1] As defined by the U.S. Census, includes workers over 16 years of age.

[2] Consolidate Metropolitan Statistical Area (CMSA), geographic area defined by the U.S. Census for 2000. Includes cities and surrounding communities.

The table above indicates that travel on local roadways within the town serves the majority on commuting activity. Twenty-nine percent Sandwich residents work within town and 74 percent work in Sandwich or surrounding towns. The number of residents working within the immediate region declined slightly during the 1990s. The data also indicates that U.S. 6, Route 3, and Interstate 195 are important commuting routes for

employees working in Sandwich and residents commuting to other locations. The Census indicates that approximately 22 percent (up from 16 percent in 1990) of the commuting trips by Sandwich residents use Route 3, 6 percent use Interstate 195 (I-195).

Many regional commuters use Route 130 through Sandwich to get to Falmouth and Mashpee. Others use Cotuit Road to South Sandwich Road as a shortcut to work in Falmouth and Mashpee. South Sandwich Road is a residential street and the intersection at Cotuit Road can be difficult. Part of the problem is that regional commuters have to go around the Massachusetts Military Reservation to access other towns on the Upper Cape.

Mode of Transportation to Work - The automobile is the most prevalent mode of transportation for Sandwich residents. Mode choice for work trips indicates that about 90 percent of the work trips by Sandwich residents are made by automobile. Of this 90 percent, 85 percent drove alone and only 5 percent carpooled. While the percentage of commuting resident drivers was down slightly between 1990 and 2000, the percent driving alone increased to 85 percent while carpooling declined sharply to 5 percent. Compared to the 93 percent auto use, 79 percent driving alone, and 14 percent carpooling in 1990. Carpooling activity by Sandwich residents yields a vehicle occupancy rate of 1.2 for work trips. The remaining 10 percent of work trips occurred by walking, bicycling or other means. Approximately two percent of Sandwich residents (or 234 residents) used public transit to commute to work in 2000.

Travel Times to Work - Commute times for Sandwich residents average 30 minutes and range from less than five minutes to over 90 minutes. Approximately 65 percent of Sandwich residents commute for 30 minutes or less. When these travel time estimates for Sandwich residents are compared with the geographic distribution of workplaces, it can be inferred that the travel time distribution of employees working in Sandwich will be similar although it is likely that a higher percentage will have commutes of less than 30 minutes.

Regional Access

Sandwich is one of first towns encountered on Cape Cod from the North (Route 3 and 6) via the Sagamore Bridge. Sandwich is 15 miles west of Hyannis (the largest village on Cape Cod), 57 miles southeast of Boston and 61 miles east of Providence, Rhode Island.

Highway Connections - The primary roadway linking Sandwich to the rest of Cape Cod, Eastern Massachusetts, and Rhode Island is U.S. Route 6: a four-lane, limited-access, median-divided highway, connecting Sandwich with the following roadways and locations:

- **State Route 3** - A limited-access highway connecting Sandwich to Plymouth, the South Shore and metropolitan Boston. U.S. 6 connects with State Route 3 at the flyover located just over the Sagamore Bridge, approximately 2 miles west of Sandwich; and
- **State Route 25** - A limited-access highway connecting Sandwich to Providence, Rhode Island via I-195 and the extreme southern and western suburbs of Boston via Interstate 495 (I-495).

Other minor state numbered routes also connect Sandwich to surrounding communities on Cape Cod. Route 6A is an east-west highway beginning at the Sagamore Bridge and continuing east into Sandwich. Route 6A traverses the northern portion of the town and then enters Barnstable to the east. Route 130 is a north-south highway beginning at Route 6A in the northwest portion of the town connecting with U.S. 6, and continuing south to the Mashpee Town Line.

Intercity, Commuter, and Local Bus Services – Very few public transportation services are available in Sandwich. Although paratransit services are available to Sandwich residents, none of the Cape Cod

Regional Transit Authority's (CCRTA) scheduled services operate in the town. Also, connections to the commuter bus services operated from Cape Cod must be made in the surrounding towns of Sagamore, Falmouth, and Barnstable. The two public transportation services available in Sandwich are described below.

Intercity and commuter bus services are provided by the Plymouth and Brockton Street Railway Company (P & B) and Bonanza Bus Lines. P & B operates two routes connecting Cape Cod to Boston serving Sandwich through stops in Sagamore, Barnstable and Hyannis. The park-and-ride lot located at the Sagamore flyover is the primary stop serving Sandwich residents. Studies indicate that about 80 percent of the cars parked in the Sagamore lot come from Sandwich. P & B also offers other commuter bus routes accessible at stops along Route 3. Bonanza operates one bus route linking Sandwich to New York City via stops in Bourne, Falmouth, and Hyannis. Bonanza also operates a route linking Sandwich to Boston via stops in Bourne, Falmouth and at Otis Air Force Base.

Local bus services on Cape Cod are provided by the Cape Cod Regional Transit Authority (CCRTA), which operates four bus routes through several Cape Cod communities from a terminal in Hyannis. None of the CCRTA fixed-route services serve Sandwich directly. The CCRTA also operates demand responsive transit services in the region including Sandwich.

The CCRTA B-Buses provide door-to-door, ride-by-appointment service for people of all ages for any purpose including school, work, shopping, college, doctor's appointments, visits to friends within the town, and longer trips to Falmouth, Hyannis and Mashpee. Medical trips to Boston are also available on a stand-by basis. Each B-Bus carries 19 passengers and has a two-way radio and a hydraulic lift for handicapped passengers. The services are offered between 8:00 a.m. and 4:00 p.m. Monday through Saturday, and Sundays 12 noon to 4:00 p.m.

Sandwich is significantly under-serviced by local and regional transit service. On average, Cape Cod community populations and land areas within ½ mile of a transit route are 45 percent and 37 percent. Virtually none of Sandwich's population or land area is within ½ mile of a transit route – the lowest on the Cape.

One seasonal public transit service, the Glasstown Trolley, operated in Sandwich during the tourist season for a few years. The service was operated by the Atichinson Bus Company but has not operated for the past few years.

Railroads - The Mass Coastal Railroad Corporation operates limited freight service on a rail alignment through the northern portions of Sandwich. The Mass Coastal Line begins in Yarmouth and Hyannis, continues through Barnstable, Sandwich, Sagamore and Bourne where it meets a spur serving Falmouth and Otis Air Force Base. The railroad then crosses the Cape Cod Canal. Once over the canal, the railroad roughly follows the alignment of I-495 until it connects with the CSX railroad system in Middleboro. Shipments to most points in the Eastern United States can be made on the CSX system via the Middleboro Line and Attleboro Secondary.

Cape Cod Central Railroad (CCCRR) recently obtained the contract for hauling waste from the Cape to the SEMASS resource recovery facility in Wareham. In addition to this service, CCCRR operates scenic train rides over the same railway. These trips begin in Hyannis, stop in Sandwich and continue along the Cape Cod Canal to Bourne.

Commuter Rail service to Boston is available to residents of Sandwich using the Massachusetts Bay Transportation Authority's (MBTA) Old Colony and Kingston lines. Connections can be made at park-and-ride lots located in Kingston, Plymouth, and Middleboro.

Park and Ride Lots - There are no existing park and ride lots in Sandwich, however, park and ride facilities are available along U.S. 6 in Hyannis and at the Sagamore Flyover. Observations of current parking activity at these lots indicate that they are heavily used by commuters. Other park and ride lots are along Route 25 in Wareham, and at several exits along Route 3 to the north. According to the Cape Cod Commission, about 1.2 percent of Cape workers commuted to work in 2000 via public transportation (including local and interregional bus service). Working residents of Sandwich Village have the largest percentage of workers commuting by public transportation. This is probably due to the interregional bus service to Boston available at the Sagamore park-and-ride lot.

Air Transportation - The closest airport serving Sandwich is the Barnstable Municipal Airport located to the east. This airport provides commercial passenger and freight service in addition to private and charter air services. The primary commercial passenger services operating from Barnstable are to Boston, Nantucket, Martha's Vineyard and to New York City. Other airport services are available at New Bedford airport and Plymouth airport located to the west and north of Sandwich.

Boston-Logan International Airport is the largest commercial airport to Sandwich and is located about 60 miles north of Sandwich via Route 3. Commercial air service to most domestic and international destinations is available from Boston-Logan International Airport.

Providence - T. F. Green Airport is located about 70 miles west of Sandwich. It provides commercial air service to most domestic destinations. Service to and from Providence has expanded greatly over the past few years with the recent renovation of terminal facilities, parking expansion and introduction of service by Southwest Airlines. This may now be the primary commercial airport for Sandwich residents. There is also new business service available from Sandwich to T.F. Green.

4.3 Existing Transportation Conditions and Trends

Local Roadway Network

The principal roadways and intersections in Sandwich are described below in terms of physical characteristics, geometric conditions, adjacent land uses, and current operating conditions.

Roadway Classification - Roadways in Sandwich are defined in the four different classes described below:

- **Principal Arterial -** Principal arterials provide high levels of mobility within the region and to other regions. In general, these are the roadways that are designated to handle the largest volumes of traffic and have highest land access control.
- **Minor Arterial/Major Collector** - This category of roadways provides mobility within towns and between adjacent towns. In general, these roadways provide moderate mobility and provide managed access to land uses along the roadway;
- **Collector** - These are roads that typically serve local traffic but also provide mobility between neighborhoods and other local land uses. In general, these roadways provide high land access and constrained mobility; and
- **Local** - These are roads that typically provide mobility within similar land uses and within neighborhoods. These roadways are intended primarily to provide access to adjacent lands rather than for providing mobility.

Sandwich contains a total of 216 miles of roadway. The majority of this is local roadway with about 160 miles (or 74 percent of the total). Compared with other communities on the Cape, Sandwich tends to have more local and arterial roadway miles but less collector roadway mileage. The average number of residents and households per mile in Sandwich is 96 and 33, respectively. This indicates a suburban residential pattern - a relatively extensive roadway system serving a relatively small population.

Town of Sandwich Street Listing								
Road Jusrisdiction	**Number**	**% of Total No.**	**Length (feet)**	**Length (miles)**	**% of Total Mileage**	**Paved Length**	**Unimproved Length**	**Unbuilt Length**
Discontinued Roadway	1	0.1%	8,700	1.65	0.7%			
Private Driveways	13	1.8%	2,897	0.55	0.2%	2,897		
Federal Roadways	2	0.3%	3,690	0.71	0.3%	3,690		
Private Roads	279	37.8%	329,121	74.18	30.4%	163,950	122,255	40,078
State Roads	19	2.6%	112,062	21.20	8.7%	108,362		
Town Roads	424	57.5%	766,857	146.06	59.8%	752,251	14,487	633
Total	**738**		**1,223,327**	**244.35**		**1,031,150**	**136,742**	**40,711**

Source: Sandwich DPW as of 10/31/2006

Town and County Roadway Mileage By Population and Households					
Jurisdiction	**Sandwich**		**Barnstable County**		
	Miles	**% of Total**	**Miles**	**% of Total**	**Ave. Per Community**
Town Road	146.06	60%	1,685.93	65%	112.40
All Other Roadways	98.29	40%	903.84	35%	60.26
Total Mileage	**244.35**		**2,589.77**		**172.65**
Ave. No. Residents Per Mile	***85***				***88***
Ave. No. Households Per Mile	***30.0***				***36.6***

Designated Scenic Roads – In addition to the functional classifications described above, some roadways within the town are noted for their scenic or historic value. The Town of Sandwich has designated 48 local roads as "Scenic Road" through Town Meeting approval including the following:

Designated Scenic Roads in Sandwich		
Atkins Road (1)	Gully Lane	Pleasant Street
Beale Avenue	Harbor Street	Ploughed Neck Road
Boardley Road	Harlow Road	Quaker Road
Charles Street	Howland Lane	River Street
Canary Street	Jarves Street	Route 130 (3)
Chase Road	John Ewer Road	Sandy Neck Road
Cranberry Trail	Jones Lane	School Street
Cross Street	Liberty Street	Shawme Road
Dewey Avenue	Newtown Road	Snake Pond Road
Discovery Hill Road	Nye Road (Street)	Spring Hill Road
Factory Street	Main Street (2)	State Street
Farmersville Road	Old County Road	Stowe Road
Freeman Street	Pheasant Lane	Summer Street
Gilman Road	Pimlico Pond Road	Tupper Road
Great Hill Road	Pinkham Road	Water Street
Grove Street	Pine Street	Willow Street

1. From 6A to southerly intersection of Crestview
2. East from Town Hall to Rt. 6A
3. Quaker Meetinghouse Road to Mashpee Line

These roads are afforded protection through the Scenic Road Bylaw with the purpose of maintaining the scenic beauty, aesthetic value and historic significance of these roads. Under this bylaw, any repair, maintenance, reconstruction or paving work done on designated scenic road may not involve or include the cutting down or removal of significant trees, or the tearing down or burial, relocation or destruction of stone walls without prior consent of the Planning Board.

Upon recommendation or request of the Planning Board, Conservation Commission or Historical Commission, any road may be designated as a Scenic Road with a majority vote at any Town Meeting.
In determining which roads or portions of roads should be recommended for designation as Scenic Roads, the following criteria are considered:

- Overall scenic beauty;
- Overarching tree canopy and other contributions of vegetation to scenic beauty;
- Contribution of stone walls, fences, narrow shoulders and other elements, natural or man-made, to scenic beauty;
- Age and historic significance of way, trees and stone walls, including preservation of historic way width, grade, and alignment; and
- Potential for lessening of scenic beauty, aesthetic value or historical significance of natural and man made features by alteration.

Key Roadways - There are eight key roadways within Sandwich. Speed limits on all roads range from 30-40 mph. Each of the key roadways is described in detail below including its classification, function, roadway geometry, and adjacent land uses.

- **U.S. 6** – This is a primary state-owned and maintained east-west four-lane divided highway. Traversing the Cape from the Canal to Provincetown, U.S. 6 is classified as a principal arterial with full access control. U.S. 6 provides regional access to the town. Full interchanges with U.S. 6 are provided at Route 130 (Exit 2), Quaker Meetinghouse Road (Exit 3) and Chase Road (Exit 4). Stop sign control is provided at the U.S. 6 eastbound and westbound off-ramps at all of these exits. The posted speed limit along U.S. 6 is 55 miles per hour (mph).
- **Route 130** – This is a north-south, town-owned, two-lane roadway. The northern portion of the roadway passes through the historic village area. The roadway begins at Route 6A near the Bourne town line and continues south past the historic village area and is classified as a collector roadway. Route 130 intersects U.S. 6 about 3 miles from its beginning and continues as Forestdale Road, a principal arterial. About 1½ miles south of U.S. 6, Route 130 intersects Cotuit Road. At all minor roads and driveways traffic is typically controlled by stop signs. The posted speed limit ranges from 30 to 45 mph. Land use along the roadway is a mix of residential, commercial and office uses.
- **Route 6A** – This is a secondary state-owned roadway that is comprised of one lane in each direction, running west to east along the northern portion of Sandwich. Route 6A is classified as a major collector roadway and as a scenic way. Near the Bourne Town Line, Route 6A intersects Route 130 and Tupper Road and continues east past the historic village area. Route 6A continues east connecting with Quaker Meetinghouse Road and eventually enters Barnstable to the east. The speed limit along Route 6A is 35 to 40 mph. Land uses along Route 6A are a mix of commercial and residential.
- **Service Road** – This is an east-west 2-lane roadway classified as a collector roadway. Service Road begins at Route 130 and runs parallel to U.S. 6 and provides access to residential areas south of U.S. 6. Service Road intersects Quaker Meetinghouse Road about 2 miles east of Route 130 and intersects Chase Road in another 2½ miles. After Chase Road, Service Road continues into Barnstable. The speed limit along Service Road is 40 mph.

- **Quaker Meetinghouse Road** – This is a north-south roadway beginning at Route 6A and continuing south through residential areas. Quaker Meetinghouse road is classified as a major collector north of U.S. 6 and as a minor arterial south of U.S. 6. Quaker Meetinghouse Road provides access to U.S. 6 approximately 1 mile south of Route 6A. Service Road also intersects Quaker Meetinghouse Road near the U.S. 6 interchange. It is important to note that Quaker Meetinghouse Road provides access to two of the town's schools, Sandwich High School and the Oakridge School. Quaker Meetinghouse Road continues in a southerly direction intersecting Cotuit Road about 1½ to 2 miles south of the Oakridge School. The roadway continues for another ½ mile before ending at Route 130.
- **Chase Road** – This is a two lane, north-south roadway beginning at Old County Road and intersecting U.S. 6 about ½ mile further south. Chase Road is classified as a major collector roadway and passes through a primarily residential area. Chase Road intersects Service Road at the U.S. 6 interchange and continues south where it becomes Great Hill Road, a minor arterial, which continues south along the eastern edge of town ending at Farmersville Road to the south.
- **Farmersville Road** – This is a two lane, east-west roadway beginning at Cotuit Road and continuing east connecting with Great Hill Road where it becomes Race Lane and enters Barnstable. Farmersville Road is a minor arterial roadway and passes through primarily residential areas.
- **Cotuit Road** This is a two-lane, north-south, minor arterial roadway that begins at Forestdale Road (Route 130) and continues south to an intersection with Quaker Meetinghouse Road about 1 mile further south. Cotuit Road then intersects with Farmersville Road in another ½ mile and continues south to the Mashpee town line. Cotuit Road serves a number of commercial developments near Route 130 and Quaker Meetinghouse Road. The land use along Cotuit Road is primarily residential south of Farmersville Road.

Bridge Conditions in Sandwich

Category	No.
Total Bridges	9
Functional Bridges	3
Functionally Obsolete Bridges	6
Structurally Deficient Bridges	0

Intersections - There are seven key intersections providing access to U.S. 6 or that are important intersections between the major roadways in town. These six intersections include:

- **Route 130 at U.S. 6 Eastbound and Westbound Ramps (Exit 2) -** The U.S. 6 eastbound and westbound ramps intersect Route 130 to form 2 three-way unsignalized intersections. Each of the Route 130 approaches contains one general purpose lane. The U.S. 6 eastbound and westbound ramp approaches contain exclusive left and right-turn lanes that are channelized by raised islands. The left-turn movements from the ramps are under STOP-sign control while the right-turns are under YIELD-sign control. The land use in the vicinity of the intersection is primarily wooded with a mix of residential and commercial development.

Key Intersections in Sandwich	
Key Intersections	
Route 130 at U.S. 6 Eastbound and Westbound Ramps (Exit 2)	
Chase Road at U.S. 6 Eastbound and Westbound Ramps	
Quaker Meetinghouse Road at U.S. 6 Eastbound and Westbound Ramps (Exit 3)	
Route 6A and Jarves Street	
Route 130 at Quaker Meetinghouse Road	
Quaker Meeting House Road at Cotuit Road	
Cotuit Road @ Harlow Road/South Sandwich Road	
Other Intersections of Importance	
Route 130 at:	Service Road
	Cotuit Road
	Grove Street/Tupper Road (w)/Main Street
	Snake Pond Road
Route 6A at:	Quaker Meetinghouse
	Tupper Road (e)
	Tupper Road (w)
	Merchant Road
	Jones Lane
	Old County Road
Chase Road at:	Service Road
	Old County Road
Farmersville Road at:	Cotuit Road
	Race Lane/Newtown Road
	Great Hill Road
	Tupper Road at Merchant Road
	Service Road at Quaker Meetinghouse Road

- **Chase Road at U.S. 6 Eastbound and Westbound Ramps -** The U.S. 6 eastbound and westbound ramps intersect Chase Road to form 2 three-way unsignalized intersections. Each of the Chase Road approaches contains one general purpose lane. The U.S. 6 eastbound and westbound ramp approaches contain exclusive left and right-turn lanes that are channelized by raised islands. The left-turn movements from the ramps are under STOP-sign control while the right-turns are under YIELD-sign control. The land use in the vicinity of the intersection is primarily wooded and residential.
- **Quaker Meetinghouse Road at U.S. 6 Eastbound and Westbound Ramps (Exit 3) -** The U.S. 6 eastbound and westbound ramps intersect Quaker Meetinghouse Road to form 2 three-way unsignalized intersections. Each of the Quaker Meetinghouse Road approaches contains one general purpose lane. The U.S. 6 eastbound and westbound ramp approaches contain exclusive left and right-turn lanes that are channelized by raised islands. The left-turn movements from the ramps are under STOP-sign control while the right-turns are under YIELD-sign control. The land use in the vicinity of the intersection is primarily wooded and residential.
- **Route 6A and Jarves Street -** The intersection of Jarves Street and Route 6A forms a four-way signalized intersection. This intersection is a key gateway to the Historic Village from Route 6A. The existing lane configurations consist of a single general purpose lane on all approaches. Land use in the vicinity of the intersection consists of commercial and residential properties.

Intersection Types			
	Sandwich	Barnstable County	
Treatments	No.	No.	Ave. Per Town
Signalized Intersection	9	112	7.5
Pedestrian Crossing Signals (Mid-Block)	0	4	0.3
Circular Intersection	3	23	1.5

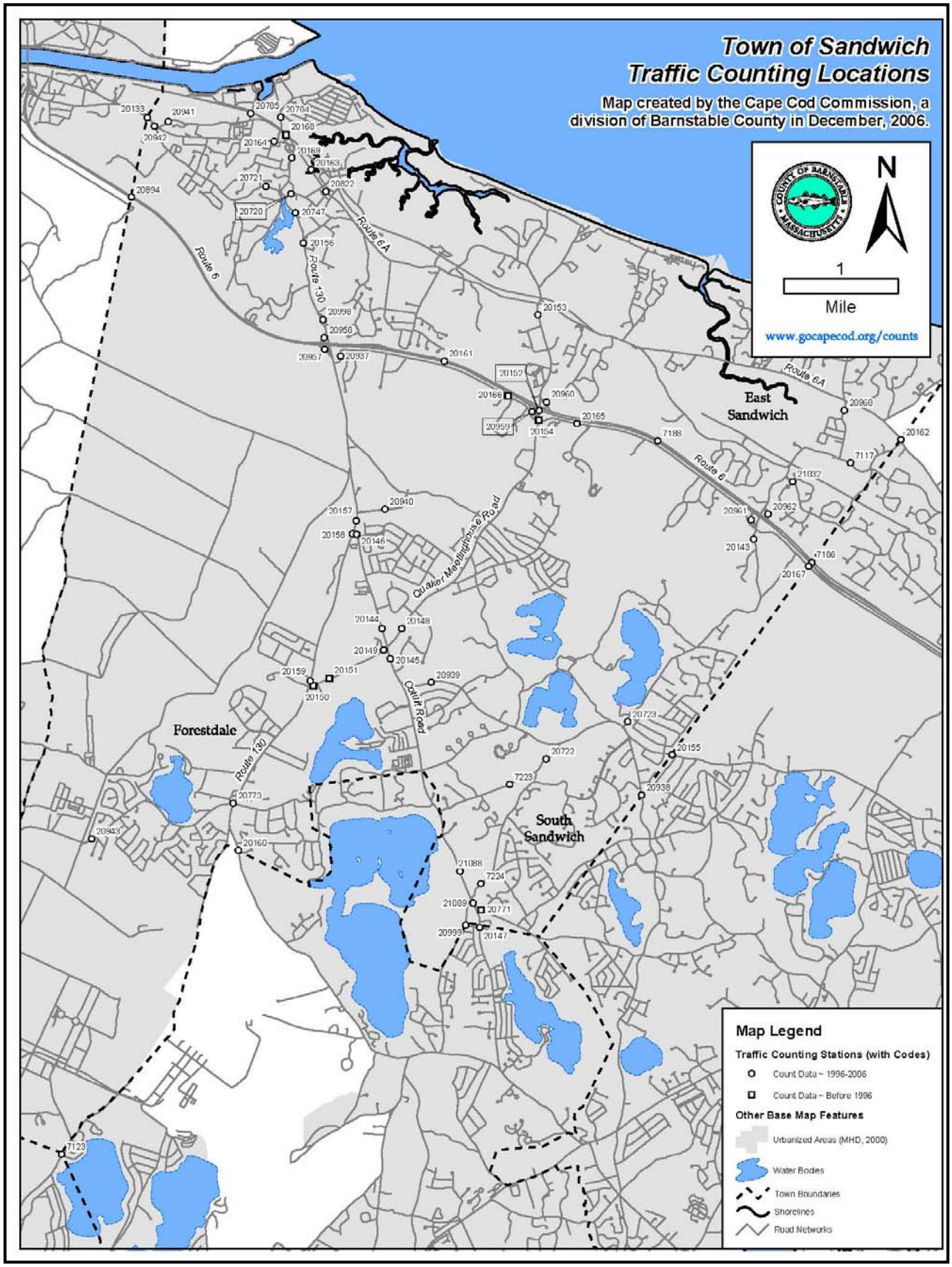
- **Route 130 at Quaker Meetinghouse Road -** Quaker Meetinghouse Road intersects Route 130 to form a four way intersection under the control of a fully actuated traffic signal. The northbound and southbound approaches to the intersection consist of an exclusive right-turn lane and a single through/left-turn lane. The eastbound and westbound approaches to the intersection consist of a single general purpose lane. Land use in the vicinity of the intersection consists of residential use.
- **Quaker Meeting House Road at Cotuit Road**. These roadways intersect to form a four-way signalized intersection. The Cotuit Road approaches to the intersection each provide an exclusive left-turn lane, a through lane and a right-turn lane. The southbound Quaker Meetinghouse Road approach provides a shared left-turn/through lane, a through lane and a right-turn lane. The northbound Quaker Meetinghouse Road provides an exclusive left-turn lane, a through lane, and a through/right-turn lane.
- **Cotuit Road/South Sandwich Road/Harlow Road** – The Engineering Department has an intersections afety study of this intersection and has determined that the annual accident rate is higher than the state average. A number of short term improvements were made to the intersection in 2001 including clearing and grading to improve site distance.

In addition to the seven primary intersections described above, there are an additional 17 locations that are important in terms of traffic and safety in Sandwich.

Traffic Analysis

The Cape Cod Commission provided traffic volume data for many of the town roadways and intersections. The remaining intersection data was complied through work previously completed in the *2002 Transportation Element of the Local Comprehensive Plan*. In place of traditional weekday morning, evening, and Saturday peak hour observation, the weekday evening peak hour was used as a design hour upon which analysis was conducted.

To assess quality of flow, roadway and intersection capacity analyses were conducted with respect to existing traffic volumes, intersection geometry and traffic control. These capacity analyses were conducted for both roadway segments and for intersections. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them and provide an important indication of where problem areas exist. Roadway segments are evaluated on the basis of a volume-to-capacity (v/c) ratio, which helps to identify roadways where traffic volumes are approaching the roadway capacity potentially causing traffic congestion and other operational problems. For intersections, roadway operating conditions are classified by calculated levels of service. The following sections present roadway segment and intersection traffic operations analysis.


Town of Sandwich
Traffic Counting Locations
Map created by the Cape Cod Commission, a division of Barnstable County in December, 2006.
N
1
Mile
www.gocapecod.org/counts
Route 6
Route 6A
Route 130
Quaker Meetinghouse Road
Cotuit Road
East Sandwich
Forestdale
South Sandwich
Map Legend
Traffic Counting Stations (with Codes)
Count Data ~ 1996-2006
Count Data ~ Before 1996
Other Base Map Features
Urbanized Areas (MHD, 2000)
Water Bodies
Town Boundaries
Shorelines
Road Networks

Traffic Volumes – Traffic data was collected over a number of years during different months. The Cape Cod Commission provides traffic volume counts in several permanent and interim locations in Sandwich. The table below represents the most recent traffic data through 2007 in Sandwich.

Sandwich Roadway Segment Average Daily Traffic (ADT) Counts Through 2007

Site #	Year	Route	Orient-ation	Road	Axle Adjusted ADT	AADT	Peak Hour Volume	Total 4-5 PM Average	# of Counts	Latest Year/ Range of Years
7117	2007	Old County Ln	E of	Jones Ln	692	595	61	56		2007
				Ave. Annual Increase	16	16	1	1	12	1984-2007
7186	2005	Route 6	@	Sand/Barn TL	54,440	41,919		3,145		2005
				Ave. Annual Increase	(902)	(555)		(164)	4	1996 to 2005
7188	2007	Route 6	Btwn	Exits 3&4	60,676	47,934		4,670		2007
				Ave. Annual Increase	10	228	-	20	7	1996 to 2007
7223	2007	Boardley Rd	W of	Harlow Rd	1,685	1,449	172	156		2007
				Ave. Annual Increase	9	26	1	1	6	1998-2007
7224	2006	Harlow Rd	E of	Cotuit Rd	4,061	3,127	454	386		2006
				Ave. Annual Increase	170	102	20	17	5	1995 to 2006
20133	2007	Route 6A	@	Bourne/Sand TL	13,160	10,331	1,033	1,004		2007
				Ave. Annual Increase	(169)	(70)	(15)	(16)	20	1987 to 2007
20143	2006	Chase Rd	S of	Service Rd	4,384	3,376	409	396		2006
				Ave. Annual Increase	116	96	9	12	6	1988 to 2006
20144	2007	Cotuit Rd	N of	Quaker Mtghouse Rd	16,284	14,004	1,338	1,322		2007
				Ave. Annual Increase	288	311	22	27	6	1986 to 2007
20145	2007	Cotuit Rd	S of	Quaker Mtghouse Rd	16,280	14,001	1,360	1,361		2007
				Ave. Annual Increase	331	343	27	30	9	1986 to 2007
20146	2007	Cotuit Rd	S of	Rt 130	9,153	7,185	738	686		2007
				Ave. Annual Increase	218	126	3	12	5	1989 to 2007
20147	2005	Cotuit Rd	@	Sand/Mash TL	4,382	3,418	380	363		2007
				Ave. Annual Increase	85	27	5	6	7	1989 to 2007
20148	2007	Quaker MH Rd	E of	Cotuit Rd	10,071	8,661	830	800		2007
				Ave. Annual Increase	209	215	17	16	7	1986 to 2007
20149	2007	Quaker MH Rd	W of	Cotuit Rd	10,137	7,907	839	806		2007
				Ave. Annual Increase	240	199	18	17	8	1986 to 2007
20150	2007	Quaker MH Rd	E of	Rt 130	10,086	8,674	855	850		2007
				Ave. Annual Increase	255	210	21	21	3	1989 to 2007
20151	2007	Quaker MH Rd	N of	Peter Ponds Dr	7,495	5,921	784	654		2007
				Ave. Annual Increase	166	66	19	14	2	1987 to 2007
20152	2004	Quaker MH Rd	S of	Rt 6	11,833	9,111	934	911		2007
				Ave. Annual Increase	88	96	7	9	5	1988 to 2004
20153	2003	Quaker MH Rd	S of	Rt 6A	7,444	7,370	658	635		2007
				Ave. Annual Increase	88	152	5	8	3	1988 to 2003
20154	1985	Quaker MH Rd	N of	Service Rd	6,744	5,598	616	575	1	1985
20155	2007	Race Ln	@	Sand/Barn TL	7,476	5,906	717	716		2007
				Ave. Annual Increase	178	132	18	19	11	1988 to 2007
20156	2007	Rt 130	S of	Beale Way	11,448	9,845	937	905		2007
				Ave. Annual Increase	59	130	2	4	6	1990 to 2007
20157	2007	Rt 130	N of	Cotuit Rd	20,565	17,686	1,632	1,598		2007
				Ave. Annual Increase	324	240	22	21	6	1988 to 2007

20158	2007	Rt 130	S of	Cotuit Rd	14,293	11,291	1,215	1,206		2007
				Ave. Annual Increase	352	230	29	29	4	1988 to 2007
20159	2007	Rt 130	N of	Quaker Mtghouse Rd	10,472	9,006	884	878		2007
				Ave. Annual Increase	202	96	16	17	5	1987 to 2007
20160	2007	Rt 130	@	Sand/Mash TL	10,047	8,640	859	840		2007
				Ave. Annual Increase	119	159	10	11	12	1988 to 2007
20161	2007	Rt 6	Btwn	Exits 2 & 3	58,023	45,258		4,289		2007
				Ave. Annual Increase	386	414		27	6	1993 to 2007
20162	2007	Rt 6A	@	Sand/Barn TL	5,266	4,529	470	444		2007
				Ave. Annual Increase	(8)	2	(0)	(1)	12	1988 to 2007
20163	2007	Rt 6A	E of	Tupper Rd (east end)	11,762	9,174	994	923		2007
				Ave. Annual Increase	(144)	(61)	(12)	(10)	9	1987 to 2007
20164	2004	Rt 6A	W of	Tupper Rd (east end)	10,264	7,903	887	820		2004
				Ave. Annual Increase	(43)	6	(7)	(6)	6	1987 to 2004
20165	1999	Service Rd	E of	Quaker Meetinghouse Rd	1,717	1,648	168	149		1999
				Ave. Annual Increase	9	23	1	0	3	1985 to 1999
20166	1985	Service Rd	W of	Quaker Meetinghouse Rd	910	755	90	65	1	1985
20167	2006	Service Rd	@	Sand/Barn TL	766	590	71	62		2006
				Ave. Annual Increase	22	18	1	0	2	1993 to 2006
20168	1994	Tupper Rd (E end)	N of	Rt 6A	6,551	5,634	643	522		1994
				Ave. Annual Increase	(130)	48	(4)	(12)	3	1987 to 1994
20169	1999	Tupper Rd (E end)	S of	Rt 6A	6,257	4,818	584	446		1999
				Ave. Annual Increase	82	90	7	(3)	3	1987 to 1999
20720	2007	Main St	E of	Rt 130	4,073	3,197	432	328		2007
				Ave. Annual Increase	19	(7)	4	0	4	1994 to 2007
20721	2005	Rt 130	N of	Tupper Rd	4,354	3,701	367	356		2005
				Ave. Annual Increase	(27)	(27)	(4)	(2)	5	1994 to 2005
20722	1999	Boardley Rd	E of	Harlow Rd	4,434	4,257	443	400	1	1999
20723	2005	Great Hill Rd	N of	Newtown Rd	4,436	3,416	396	394		2005
				Ave. Annual Increase	174	113	15	17	3	1994 to 2005
20747	2005	Rt 130	S of	Main St	12,144	9,351	1,011	941		2005
				Ave. Annual Increase	141	147	10	7	4	1994 to 2005
20771	1995	Asa Meiggs Rd	E of	Cotuit Rd	2,345	2,146	212	206	1	1995
20773	2005	Snake Pond Rd	W of	Rt 130	6,011	4,689	566	544		2005
				Ave. Annual Increase	3	(22)	(0)	(0)	3	1995 to 2005
20784	2007	Town Neck Rd	N of	Tupper Rd	4,149	3,257	352	314		2007
				Ave. Annual Increase	(191)	(131)	(14)	(14)	4	1995 to 2007
20785	2002	Freezer Rd	N of	Tupper Rd	3,633	2,870	352	292		2002
				Ave. Annual Increase	(74)	(100)	(3)	(2)	2	1995 to 2002
20822	2004	Rt 6A	E of	Jarves St	11,866	9,137	1,017	947		2004
				Ave. Annual Increase	179	21	15	10	2	1996 to 2004
20894	2007	Rt 6	@	Bourne/Sand TL	62,580	48,812		4,504		2007
				Ave. Annual Increase	(393)	(86)		(34)	7	1996 to 2007
20937	2007	Service Rd	E of	Rt 130	1,843	1,438	170	132		2007
				Ave. Annual Increase	(157)	(164)	(14)	(12)	5	1989 to 2007
20938	2005	Newtown Rd	@	Sand/Barn TL	2,137	1,645	189	168		2005
				Ave. Annual Increase	93	21	5	8	3	1999 to 2005
20939	2005	Farmersville Rd	E of	Cotuit Rd	7,712	5,938	669	642		2005
				Ave. Annual Increase	89	(51)	(5)	4	3	1999 to 2005
20940	2006	J. Sebastian Dr	E of	Rt 130	3,950	3,042	392	376		2006

				Ave. Annual Increase	100	(12)	10	14	4	1999 to 2006
20941	2000	Tupper Rd (W)	N of	Rt 6A	4,174	4,007	476	267		2000
				Ave. Annual Increase	650	624	145	(55)	2	1999 to 2000
20942	2005	Rt 130	S of	Rt 6A	3,573	2,787	327	307		2005
				Ave. Annual Increase	(396)	(487)	(38)	(31)	3	1999 to 2005
20943	1999	Snake Pond Rd	E of	MMR Gate	3,078	2,339	324	250	1	1999
20957	2007	Rt 6 Ramp EB	@	Exit 2	7,833	6,188	672	628		2007
				Ave. Annual Increase	0	0	0	0	2	1999 to 2007
20958	2007	Rt 6 Ramp WB	@	Exit 2	8,380	6,578	663	592		2007
				Ave. Annual Increase	(58)	(29)	(6)	(13)	2	1999 to 2007
20959	1999	Rt 6 Ramp EB	@	Exit 3	4,565	3,515	411	302	1	1999
20960	2006	Rt 6 Ramp WB	@	Exit 3	4,518	3,479		393		2006
				Ave. Annual Increase	23	18		3	2	1999 to 2006
20961	2006	Rt 6 Ramp EB	@	Exit 4	2,290	1,763		170		2006
				Ave. Annual Increase	27	21		1	2	1999 to 2006
20962	2006	Rt 6 Ramp WB	@	Exit 4	2,486	1,914		218		2006
				Ave. Annual Increase	33	25		5	2	1999 to 2006
20968	2006	Jones Rd	S of	Rt 6A	1,222	941	103	102		2006
				Ave. Annual Increase	15	(4)	(0)	2	4	1999 to 2006
20998	2006	Landfill Drive	S of	Landfill Gate House	1,694	1,304	147	42		2006
				Ave. Annual Increase	148	112	1	7	2	2001 to 2006
20999	2006	S. Sandwich Rd	@	Sand/Mash TL	5,497	4,233	633	568		2006
				Ave. Annual Increase	34	16	(8)	(8)	2	2001 to 2006
21032	2007	West MH Rd	E of	Chase Rd	2,037	1,752	189	180		2007
				Ave. Annual Increase	110	123	13	15	3	2003 to 2007
21088	2006	Cotuit Rd	N of	S Sandwich Rd	7,522	5,792	683	619	1	2006
21089	2006	Cotuit Rd	S of	S Sandwich Rd	6,563	5,054	632	578	1	2006
21143	2007	Route 130	S of	Quaker Mtghouse Rd	14,893	12,808	1,232	1,190	1	2007

Using annual background growth and seasonal adjustment factors provided by the Cape Cod Commission, all data was adjusted to reflect 2007 peak season volumes and further adjusted to reflect 2007 annual average traffic volumes. The table below presents a summary of the observed daily and peak hour traffic from on key roadways in Sandwich for 2007.

Key Traffic and Transportation Terms

Level of service (LOS) – This Term is used to denote the different operating conditions that occur at a given intersection under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometrics, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of an intersection. Level-of-service designations range from A to F, with LOS A representing the best operating conditions with little or no delay and LOS F representing the worst operating conditions with highly congested operations and long delays. In an urbanized area or at activity centers, LOS D or better is generally considered an acceptable operating condition. In rural areas, LOS C or better is generally considered an acceptable operating condition. The evaluation criteria used to analyze area intersections are based on the Institute of Transportation Engineers (ITE) Highway Capacity Manual.

Sandwich Roadway Link Capacity Analysis[1]

Location	Hourly Capacity[1]	2000 Peak Season Design Hour (Evening Peak Hour)							2007 (Evening Peak Hour)					
		NB/EB Vol.[2]	SB/WB Vol.[2]	Peak Direction v/c Ratio	Weekday Daily[1]	Volume[2]	"K" Factor[3]	Directional Distribution[4]	Axle Adjusted ADT	AADT	Peak Hour Volume	Total 4-5 PM Average	"K" Factor	Peak Hour Total V/C Ratio
Chase Road (South of Service)	850	115	185	0.22	3,700	300	8.10%	61% SB	4,384	3,376	409	396	9.33%	0.48
Cotuit Road (Sandwich/Mashpee TL)	850	260	290	0.34	6,400	550	8.60%	53% SB	4,382	3,418	380	363	8.67%	0.45
Cotuit Road (South of Route 130)	850	505	695	0.82	15,700	1,200	7.60%	58% SB	9,153	7,185	738	686	8.06%	0.87
Cotuit Road (South Quaker Mtghouse)	850	640	810	0.95	17,300	1,450	8.40%	56% SB	16,280	14,001	1,360	1,361	8.35%	1.60
Farmersville Road (East of Cotuit)	850	375	325	0.44	8,400	700	8.30%	54% EB	7,712	5,938	669	642	8.67%	0.79
Great Hill Road (North of Newtown)	850	160	190	0.22	4,100	350	8.50%	54% SB	4,436	3,416	396	394	8.93%	0.47
Jones Road (South of 6A)	1,000	55	45	0.06	1,300	100	7.70%	53% NB	1,222	941	103	102	8.43%	0.10
Old County Road (East of Jones)	1,000	30	20	0.03	800	50	6.30%	60% EB	692	595	61	56	8.82%	0.06
Quaker Meetinghouse (East of Cotuit)	850	380	370	0.48	9,600	750	7.80%	51% EB	10,071	8,661	830	800	8.24%	0.98
Quaker Meetinghouse (East of Rt 130)	850	305	295	0.36	7,800	600	7.70%	51% EB	10,086	8,674	855	850	8.48%	1.01
Quaker Meetinghouse (South of Rt 6A)	1,000	435	315	0.44	13,100	1,000	7.60%	58% NB	7,444	7,370	658	635	8.84%	0.66
Quaker Meetinghouse (South of US 6)	850	580	420	0.68	9,900	750	7.90%	58% NB	11,833	9,111	934	911	7.89%	1.10
Race Lane (Sandwich/Barnstable TL)	850	295	405	0.48	7,400	700	9.50%	58% WB	7,476	5,906	717	716	9.59%	0.84
Route 130 (North of Cotuit)	1,150	940	710	0.82	22,000	1,650	7.50%	57% NB	20,565	17,686	1,632	1,598	7.94%	1.42
Route 130 (North Quaker MH)	1,150	495	555	0.48	12,700	1,050	8.30%	53% SB	10,472	9,006	884	878	8.44%	0.77
Route 130 (Sandwich/Mashpee TL)	1,150	425	425	0.37	10,800	850	8.00%	50% SB	10,047	8,640	859	840	8.55%	0.75
Route 130 (South of Route 6A)	1,000	435	215	0.44	7,800	650	8.30%	67% NB	3,573	2,787	327	307	9.15%	0.33
Route 6A (East of Jarves)	1,000	565	485	0.57	12,800	1,050	8.20%	54% EB	11,866	9,137	1,017	947	8.57%	1.02
Route 6A (East of Tupper Road east)	1,000	540	810	0.81	14,800	1,350	9.10%	60% WB	11,762	9,174	994	923	8.45%	0.99
Route 6A (Sandwich/Barnstable TL)	1,000	300	350	0.35	7,300	650	8.90%	54% WB	5,266	4,529	470	444	8.93%	0.47
Service Road (East of Route 130)	500	75	75	0.15	2,000	150	7.50%	51% WB	1,843	1,438	170	132	9.22%	0.34
Service Road (East Quaker Mtghouse)	500	110	90	0.22	2,300	200	8.70%	56% EB	1,717	1,648	168	149	9.78%	0.34
Snake Pond Road (West of Rt 130)	1,000	390	260	0.39	7,400	650	8.80%	60% EB	6,011	4,689	566	544	9.42%	0.57
Tupper Road East (North of Rt 6A)	1,000	365	285	0.37	8,400	650	7.70%	56% NB	6,551	5,634	643	522	9.82%	0.64
Tupper Road West (North of Rt 6A)	1,000	150	250	0.25	4,700	400	8.50%	62% SB	4,174	4,007	476	267	11.40%	0.48
U.S. 6 (between exits 2 and 3)	3,150	2,040	2,210	0.7	59,400	4,250	7.20%	52% WB	58,023	45,258		4,289	0.00%	-
U.S. 6 (between exits 3 and 4)	3,150	2,135	2,315	0.73	61,100	4,450	7.30%	52% WB	60,676	47,934		4,670	0.00%	-
U.S. 6 (Sandwich/Barnstable TL)	3,150	2,210	2,490	0.79	64,900	4,700	7.20%	53% WB	54,440	41,919		3,145	0.00%	-

1. Number of vehicles per day
2. Number of vehicles during the peak hour
3. "K" Factor is the percentage of daily traffic that occurs during the peak hour
4. Estimated based on peak hour volumes

Roadway Capacity - Volume-to-capacity (v/c) ratios were determined for several roadway links within town. A summary of these capacity analysis results for annual average and peak season existing conditions is presented in the table below. Volume-to-capacity ratios were calculated for peak hour, peak direction traffic volumes for both annual average and peak season conditions. Typical roadway capacities were provided by the Cape Cod Commission based on Massachusetts Highway Department default hourly capacities. Sandwich roadways were divided into the following categories:

- Urban Principal Arterial (Divided) - Full access control, rolling terrain, capacity: 3,150 vehicles per hour per direction;
- Urban Principal Arterial (Undivided) - No access control, rolling terrain, capacity: 1,150 vehicles per hour per direction;
- Urban Minor Arterial - No access control, rolling terrain capacity: 850 vehicles per hour per direction;
- Urban Local Roadway - Capacity: 500 vehicles per hour per direction; and
- Rural Major Collector - Capacity: 1,000 vehicles per hour per direction.

As the table shows, a majority of the roadways operate at a v/c ratio of less than 0.50 under annual average conditions. This indicates that a majority of the major roadways carry less than half of the traffic volume they are capable of carrying. The highest v/c ratio can be found along Cotuit Road, south of Quaker Meetinghouse Road.

During the peak season, 9 roadway links operate at v/c ratios above 0.50. Five of these links operate at v/c ratios greater than 0.75 and Cotuit Road south of Quaker Meetinghouse Road operates at or near capacity with a v/c ratio of 0.95. The largest volume increases are found along Route 6 and Route 6A, which are both heavily traveled by tourists during the summer months.

The results of the capacity analysis show that most roadways in the town operate well within their capacity with the exception of Cotuit Road during the peak season. These results illustrate that intersection operations, as described in the following section, rather than roadway link capacity are likely to be the key determinant of traffic flow quality in the town.

Intersection Level-of-Service (LOS) - For signalized intersections, the LOS analysis considers the operation of each lane or lane group entering the intersection and for overall conditions at the intersection. For unsignalized intersections, however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The level of service is only determined for left turns from the main street and all movements from the minor street. The unsignalized intersection level-of-service designation is for the most critical movement, often the left turn out of the side street.

Sandwich Key Intersection Turning Movement Counts TMC 2007

No.	Intersection Location		Date	Report Hour	Peak Hour	Traffic From East			Traffic From East			Traffic From East			Traffic From East		
	Major Road	Minor Road				Left-Turn	THRU	Right-Turn	Left-Turn	THRU	Right-Turn	Left-Turn	THRU	Right-Turn	Left-Turn	THRU	Right-Turn
1	Boardley Rd	Harlow Rd	05/31/2001	4:00 PM	4:00 PM	8	0	121	184	64	0	0	55	16	0	0	0
2	Chase Rd/Great Hill Rd	Great Hill Rd (ext.)	07/15/1996	4:00 PM	4:00 PM	5	0	0	1	117	0	0	69	6	0	0	0
3	Cotuit Rd	Asa Meigs Rd	06/05/1997	4:00 PM	4:00 PM	16	0	81	130	127	0	0	91	17	0	0	0
4	Cotuit Rd	Farmersville Rd	05/25/1995	4:00 PM	4:00 PM	7	0	196	272	315	0	0	214	9	0	0	0
			06/24/1997	4:00 PM	4:00 PM	8	0	248	265	309	0	0	246	4	0	0	0
			05/30/2001	4:00 PM	4:00 PM	6	0	315	331	375	0	0	204	2	0	0	0
5	Cotuit Rd	South Sandwich / Harlow Rd	06/11/1997	4:00 PM	4:00 PM	33	56	22	43	158	47	27	113	21	53	65	50
6	Farmersville Rd	Boardley Rd	06/28/2001	4:00 PM	4:00 PM	199	264	0	0	0	0	38	0	142	0	229	40
7	Great Hill Rd	Farmersville Rd	06/23/1999	4:00 PM	4:30 PM	0	301	47	54	0	124	0	0	0	115	293	0
			07/02/2001	4:00 PM	4:00 PM		402	55	50		104				127	323	
8	Old County Rd	Chase Rd	06/15/1999	4:15 PM	5:00 PM	34	3	0	0	0	0	49	0	53	0	7	38
9	Quaker Mtghouse Rd	Cotuit Rd	06/24/1997	4:00 PM	4:00 PM	97	301	80	63	152	101	108	143	65	89	318	132
			07/01/1999	4:00 PM	4:00 PM	76	338	53	66	150	72	101	150	88	113	416	140
			08/17/2000	4:00 PM	4:00 PM	111	403	86	64	186	122	135	181	98	115	450	180
			06/14/2007	4:15 PM	5:00 PM	77	287	50	63	126	110	101	109	35	104	395	132
10	Quaker Mtghouse Rd	Rt 6 Ramp EB	06/11/1996	4:00 PM	4:00 PM	0	0	0	0	366	38	123	213	0	63	0	42
11	Race Ln	Newtown Rd	06/24/1999	4:00 PM	4:00 PM	21	322	0	0	0	0	83	0	22	0	225	94
			07/05/2001	4:00 PM	4:00 PM	42	339					118		22		248	121
12	Rt 130	Artisan Way	07/25/1996	4:00 PM	4:00 PM	9	0	33	55	427	0	0	386	11	0	0	0
13	Rt 130	Cotuit Rd	07/01/1997	4:00 PM	4:00 PM	3	0	317	524	415	0	0	308	8	0	0	0
			08/19/1997	4:00 PM	4:00 PM	6	0	349	532	463	0	1	316	13	0	0	0
			08/07/2007	4:00 PM	4:00 PM	8		355	554	577			506	17			
14	Rt 130	Jan Sebastian Way	07/11/2001	4:15 PM	4:30 PM	62	0	52	39	659	0	0	437	29	0	0	0
15	Rt 130	Main St	06/16/2005	7:00 AM	8:00 AM	15	0	20	25	191	0	0	241	25	0	0	0
			06/16/2005	4:00 PM	4:00 PM	93		54	48	398			377	103			
			08/25/2005	4:00 PM	4:00 PM	79	0	80	67	377	0	0	375	89	0	0	0
16	Rt 130	Pimlico Pond/Snake Pond Rd	06/06/1996	4:00 PM	4:00 PM	7	27	11	29	328	199	48	319	28	226	66	52
			07/10/2001	4:00 PM	4:00 PM	18	25	27	32	338	194	45	308	25	210	63	56
17	Rt 130	Quaker Mtghouse Rd	06/07/1994	4:00 PM	4:00 PM	223	15	35	34	337	17	4	275	224	6	13	16
			08/19/1997	4:00 PM	4:00 PM	199	1	29	33	364	2	0	266	163	1	0	2
			06/29/1999	4:00 PM	4:00 PM	276	0	65	47	453	5	2	400	267	2	2	4
			09/22/2000	8:00 AM	8:00 AM	157	67	21	34	223	39	41	348	221	23	37	21
			09/28/2000	2:00 PM	2:00 PM	271	22	34	25	283	20	13	326	197	15	24	10
			09/28/2000	4:00 PM	4:00 PM	273	20	42	40	387	10	28	326	265	23	37	34
			08/07/2007	4:00 PM	4:00 PM	301	10	49	12	488	1	0	482	266	2	0	4

18	Rt 130	Service Rd	06/09/1999	4:00 PM	4:00 PM	18	0	47	44	919	0	0	759	21	0	0	0
19	Rt 130	Tupper Rd/Grove St	08/13/1996	4:00 PM	4:00 PM	224	6	33	21	121	7	14	165	110	9	14	37
			08/25/2005	4:00 PM	4:00 PM	265	0	21	10	155	1	0	187	258	1	0	0
20	Rt 6 EB Ramp	Rt 130	08/02/2007	4:00 PM	4:00 PM				0	489	56	84	925		50		528
21	Rt 6 WB Ramp	Rt 130	08/02/2007	4:00 PM	4:00 PM					509	22	404	519		110		33
22	Rt 6A	Jarves St	06/30/1999	4:00 PM	4:00 PM	18	410	20	11	20	21	101	22	36	19	399	65
			07/09/2001	4:00 PM	4:00 PM	11	427	15	22	15	25	57	17	23	18	410	56
23	Rt 6A	Jones Ln & Carleton Dr	07/09/1996	4:00 PM	4:00 PM	13	249	8	2	0	12	18	0	10	14	268	10
			06/24/1999	4:00 PM	4:00 PM	21	285					26		24		262	24
24	Rt 6A	Old County Rd	06/04/1996	4:00 PM	4:00 PM	11	274	24	8	10	14	27	10	11	16	303	55
25	Rt 6A	Quaker Meetinghouse Rd & Spring Hill Rd	07/26/1993	4:00 PM	4:00 PM	128	370	1	4	35	13	84	23	132	6	372	103
			06/25/1997	4:00 PM	4:00 PM	135	301	4	3	11	13	243	21	120	8	318	104
26	Rt 6A	Sandy Neck Rd	08/07/1996	4:00 PM	4:00 PM	0	271	44	86	0	93	0	0	0	37	265	0
			08/07/2001	4:00 PM	4:00 PM	0	257	38	55	0	79	1	0	0	32	268	2
27	Rt 6A	Tupper Rd (East)	07/01/1999	4:00 PM	4:00 PM	50	356	204	133	110	12	76	98	48	7	411	134
28	Service Rd	Round Hill Rd	07/30/1996	4:00 PM	4:00 PM	7	45	0	0	0	0	9	0	8	0	48	17
29	Snake Pond Rd	Greenway Rd	08/20/1997	4:00 PM	4:00 PM	38	109	0	6	6	8	0	3	125	1	177	3
30	Tupper Road	Town Neck Rd	07/30/2001	4:00 PM	4:00 PM	0	222	152	121	0	53	0	0	0	66	161	0

Capacity analyses were conducted for annual average and peak season existing conditions at the three **signalized intersections** within Sandwich. A summary of the capacity analyses results is presented in the table below.

Existing Signalized Intersection Capacity Analysis

Location	2000 Existing Annual Average			2000 Existing Peak Season		
	V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS
Route 6A at Jarves Street	0.61	15	B	0.91	27	D
Route 130 at Quaker Meetinghouse Rd	0.60	10	B	0.84	16	C
Cotuit Rd at Quaker Meetinghouse Rd	0.61	14	B	0.92	21	C

[1]Volume-to-capacity ratio
[2]Average delay expressed in seconds per vehicle
[3]Level-of-Service
[4]Delay is greater than 60 seconds or v/c is greater than 1.2

As the table shows all three of the signalized intersections provide an acceptable LOS B under annual average conditions with minimal delays. During the peak season, however, traffic volumes and delays at these intersections increase, resulting in a decreased level of service. The intersections of Route 130 at Quaker Meetinghouse Road and Cotuit Road at Quaker Meetinghouse Road operate at LOS C under peak season conditions. Also, the intersection of Route 6A and Jarves Street, located in the historic village area (a major activity center in Sandwich) operates at LOS D under peak season conditions compared with LOS B under annual average conditions. However, the intersection of Route 6A and Jarves Street is vulnerable to cut-through traffic when there are problems on U.S. 6. When such conditions exist, this intersection is likely to operate at a deficient LOS (E or F).

Capacity analyses were also conducted for **unsignalized intersections** within Sandwich. A summary of the capacity analyses results for annual average and peak season existing conditions is presented below.

Existing Unsignalized Intersection Capacity Analysis

Location	2000 Existing Yearly Average			2000 Existing Seasonal Peak		
	Demand	Delay[2]	LOS[3]	Demand	Delay	LOS
Route 130 at Service Road	75	10	B	105	24	D
Route 130 at U.S. 6 EB Ramp	50	16	C	65	38	E
Route 130 at U.S. 6 WB Ramp	80	28	D	110	>60	F
Chase Road at Service Road	65	4	A	80	5	A
Route 130 at Cotuit Road	5	42	E	5	>60	F
Route 130 at Grove Street (East Side)	25	6	B	35	7	B
Route 130 at Grove Street (West Side)	15	5	B	15	7	B
Merchants Road at Tupper Road	175	5	A	230	7	B
Route 6A at Quaker Meetinghouse Road	40	11	C	55	18	C
Service Road at Quaker Meetinghouse Road	130	10	B	175	20	C
Route 130 at Tupper Road (East Side)	220	10	C	290	22	D
Route 130 at Tupper Road (West Side)	15	4	A	20	4	A
Route 6A at Tupper Road East	305	>60	F	405	>60	F
Route 130 at Snake Pond Road	285	53	F	380	>60	F
Route 130 at Main Street	45	5	A	60	6	B
Route 6A at Route 130/Tupper Road	110	12	C	150	26	D
Route 6A at Merchant's Road	245	15	C	325	>60	F
Chase Road at U.S. 6 EB Ramp	70	5	A	95	6	B

Chase Road at U.S. 6 WB Ramp	25	5	B	35	6	B
U.S. 6 WB Ramp at Quaker Meetinghouse Road	170	10	C	225	20	C
U.S. 6 EB Ramp at Quaker Meetinghouse Road	55	13	C	75	26	D
Cotuit Road at Farmersville Road	10	17	C	15	36	E
Great Hill Road at Farmersville Road	70	25	D	95	>60	F
Race Lane at Newtown Road	115	17	C	140	42	E
Route 6A at Jones Lane	20	10	C	30	16	C
Route 6A at Old County Road	25	9	B	30	13	C
Chase Road at Old County Road	95	5	A	130	5	B

1. Demand of critical movement from minor street
2. Average delay expressed in seconds per vehicle
3. Level of service. Generally represents conditions on the minor street approach to an intersection

As the table shows, most of the unsignalized intersections evaluated within Sandwich provide an acceptable level of service under annual average conditions. Only the following three intersections provide LOS E or F during annual average conditions:

- Route 130 at Cotuit Road;
- Route 6A at Tupper Road (East); and
- Route 130 at Snake Pond Road.

During the peak season, many more intersections provide deficient level of service. In addition to the three intersections above, the following six locations operate at LOS E or F:

- Route 130 at U.S. 6 Eastbound Ramps;
- Route 130 at U.S. 6 Westbound Ramps;
- Route 6A at Merchants Road;
- Cotuit Road at Farmersville Road;
- Great Hill Road at Farmersville Road; and
- Race Lane at Newtown Road

In addition to the intersections above, the following two intersections located outside of the designated urbanized area in Sandwich provide LOS D under peak season conditions:

- Route 130 at Tupper Road (East Side); and
- Route 6A at Route 130/Tupper Road (West Side)

At these unsignalized intersections, poor level of service is an indication of high volumes on the major road and difficult turning movements from the minor street. Although these intersections are outside the official urbanized area of Sandwich, the intersections provide access to key activity centers in the town including Merchants Row, the Town Marina, and the Historic Village, indicating that LOS D may be representative of an acceptable LOS for such locations.

Safety Analysis

In order to identify accident trends and/or roadway deficiencies in Sandwich, accident data were obtained from the Massachusetts Highway Department for the town for the six-year time period from 1995 to 2001. A review of the three years of data provided information regarding the number of accidents occurring at each intersection within town. None of the intersections within Sandwich were reported in the 2001 MassHighway High Accident Intersection Report of the Top 1,000 high accident locations in the state.

The following six intersections in Sandwich averaged 5 or more accidents per year over the three year period analyzed:

- U.S. 6 at Route 130;
- Route 6A at Tupper Road (East);
- Route 6A at Route 130/Main Street/Tupper Road (West);
- Cotuit Road at Harlow Road/South Sandwich Road;
- Cotuit Road at Quaker Meetinghouse Road; and
- U.S. 6 at Quaker Meetinghouse Road.

According to public opinion, the Route 6/Exit 2 intersection and Cotuit Road are the top two safety problem areas in Sandwich. [1] The highest accident incidences occurred at U.S. 6 and Route 130 and Route 6A and Tupper Road. Both intersections show 28 accidents over the 3-year period, an average of over 9 accidents per year. A majority of the accidents at the U.S. 6/Route 130 intersection are of the rear-end type. The high number of accidents may be attributed to cars traveling at highway speed exiting onto local roadways.

Crash Rates in Selected Transportation Corridors, 1999 - 2001

Route 6	All Crashes (Ave. Annual)	Fatal Crashes (Ave. Annual)	Crashes Per Million VMT	Fatal Crashes Per 100 Mil. VMT
All Towns	814	4.0	0.90	0.44
Sandwich	58	0.7	0.24	0.27
Ave. Per Community	68	0.3		
Route 6A				
All Towns	329	0.7	2.64	0.53
Sandwich	37	0.3	1.49	1.33
Ave. Per Community	47	0.1		

Source: MassHighway

At Route 6A and Tupper Road (East) the majority of accidents are of the angle type. This may be indicative of a heavy volume of turning vehicles. It is important to note that MassHighway does not distinguish between Route 6A and Tupper Road east or west. Therefore, it is possible that the number of accidents at this intersection are fewer, while accidents at Route 6A and Route 130/Tupper Road (West) may be higher than the 16 accidents reported (average of about 5 accidents per year). Most of these 16 accidents reported at the Route 6A and Route 130/Main Street/Tupper Road (West) intersection were also of the angle type.

A high number of accidents (27) were also reported at the Cotuit Road and Quaker Meetinghouse Road intersection. Again, the majority of these are of the angle type, indicating heavy turning volume at the intersection. A moderate number of accidents (15 over the three year period) were also reported at the intersection of U.S. 6 with Quaker Meetinghouse Road. The majority of these accidents were of the rear-end type and are likely a result of cars traveling at high speed exiting onto the local roadway, much like at the U.S. 6 and Route 130 intersection.

Accidents at the following intersections: Quaker Meetinghouse Road (12), and Merchant Road (12); Route 130 with Grove/Main/Tupper/Water (13), and Snake Pond Road (10) and Cotuit Road with Farmersville Road (10), and Route 130 (12) round out the locations where ten (10) or more accidents were reported over a three year period.

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[1] From the Cape Cod Regional Transportation Plan, 2007

These accidents may also be the result of high travel speeds, unsafe distances between cars, or high turning volumes. The majority of these accidents occurred during clear weather conditions, during off-peak traveling hours, and resulted in property damage only. No fatalities were reported at any of the intersections within the study area for the three-year period studied.

In addition to vehicle accidents, four bicycle-vehicle accidents and three pedestrian-vehicle accidents were reported in Sandwich between 1999 and 2001. This accident rate is significantly lower than the Cape-wide average of 11 and 11 per year, respectively, in each community.

Recent and Ongoing Roadway Improvement Projects

Several roadway improvements projects have recently been completed or are currently underway in the Town of Sandwich, as described below:

- **Route 130** - The Massachusetts Highway Department completed improvements for Route 130 stretching from the Mashpee Town Line to just north of Snake Pond Road and from just south of Cotuit Road to just north of Jan Sebastian Drive. The project also included repaving and maintenance of the segment from Jan Sebastian Drive to just beyond U.S. 6. The project included widening a portion of the roadway near Cotuit Road and Jan Sebastian Drive to a four-lane cross section, and installation of traffic signals at Snake Pond Road, Cotuit Road and Jan Sebastian Drive;
- **Route 6A** - The Massachusetts Highway Department recently completed a resurfacing, drainage improvement, and sidewalk project on Route 6A. Some improvements associated with this project and the Stop & Shop redevelopment have recently been made at the intersection of Route 6A and Merchants Road. These improvements included widening of the Route 6A eastbound approach to provide two general purpose lanes, widening of the Merchants Road to accommodate exclusive turning lanes, and installation of a new traffic signal. A traffic signal and widening of Route 6A to provide two general purpose eastbound and westbound lanes is proposed at the Tupper Road (East) intersection. Minor improvements to the traffic signal at Jarves Street were also completed; and
- **Service Road** - The Town of Sandwich had planned to reconstruct the Service Road providing a bikeway on the north side of the roadway. However, due to community concerns about highway noise from U.S. 6 caused by selected tree removal to provide space for the bikepath, this project was scaled-back to a resurfacing project.

These roadway projects were intended to improve traffic operations at five intersections within the town as summarized below:

- Route 130 at Cotuit Road (completed including Jan Sebastian);
    - Improves Annual Average operating conditions from LOS E to LOS B
    - Improves Peak Season operating conditions from LOS F to LOS B
- Route 130 at Snake Pond Road;
    - Maintains Annual Average operating conditions at LOS B
    - Improves Peak Season operating conditions from LOS F to LOS B
- Route 6A at Merchants Road;
    - Maintains Annual Average operating conditions at LOS B
    - Improves Peak Season operating conditions from LOS F to LOS C
- Route 6A at Tupper Road (East) (completed including Stop & Shop);
    - Improves Annual Average operating conditions at LOS C
    - Improves Peak Season operating conditions from LOS F to LOS D
- Route 6A at Jarves Street;
    - Maintains Annual Average operating conditions at LOS B

  - Improves Peak Season operating conditions from LOS D to LOS B2
- Eastern Section of Route 6A – Resurfacing from Charles Street to the Barnstable town line;
- Route 6 and Route 130 Intersection (Exit 2) – The state has completed a survey and the Cape Cod Commission is reviewing accident information from the town. Preliminary design has been initiated by an engineering firm contracted through MassHighway;
- Route 130 (water Street) at Main Street – This is the Town Square Area. Improvements are underway to refonfigure the intersection, landscaping and pedestrian improvements; and
- Main Street and Jarves Street Intersection - Improvements are underway to refonfigure the intersection, landscaping and pedestrian improvements.

Summary of Roadway System Deficiencies

Given the roadway improvements expected at the locations above, there are five remaining locations with a deficient level of service under peak season conditions. These locations include:

- Route 130 at the Route 6 Eastbound Ramps;
- Route 130 at the Route 6 Westbound Ramps;
- Cotuit Road at Farmersville Road;
- Cotuit Road at Harlow Road and South Sandwich Road;
- Great Hill Road at Farmersville Road; and
- Race Lane at Newtown Road.

With the proposed improvements described in the previous section, no intersections will operate at deficient level-of-service under annual average conditions.

Public Parking

Very little public parking is provided in Sandwich. The majority of this parking is in the historic Sandwich Village area in the northern part of the town. The majority of parking in the remaining portion of Sandwich is provided by private land owners and is associated with various businesses.

The Cape Cod Commission (CCC) performed a parking study for the Town of Sandwich, which analyzed parking conditions in northern Sandwich during peak parking periods in the summer of 1994 and 1995. The parking study was conducted to identify existing deficiencies in the parking system and to recommend measures to alleviate these deficiencies.

The CCC Parking Study considered two primary public parking areas in northern Sandwich, the Village and Marina Area. The study also considered parking at facilities along Route 6A, the majority of which are private facilities. These areas are not included in the following summary of the parking analysis since they are privately controlled. The results of the parking analysis for each of these areas are summarized below.

Historic Village - The historic village ("The Village") is the center of tourist activity in Sandwich and several different land uses including retail, inns, restaurants, museums and other tourist attractions drive parking demand in this part of town. Village residences also contribute to the parking demand. The study evaluated seven (7) parking lots including:

- The Hoxie House;
- First Church of Christ;
- Daniel Webster Inn;

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[2] Additional Westbound lead phase included to accommodate moderate left-turning volume. No new lane assignments assumed.

- Sandwich Glass Museum;
- The Belfry Inn;
- Town Hall Annex; and
- Sandwich Public Library.

The study also considered public parking on Main Street, Grove Street, River Street, Water Street, and Jarves Street.

According to the study, public parking in the Village peaks at 12:00 PM with a utilization of 53 percent and private parking peaks at 1 PM with a utilization of 30 percent. Overall Village parking peaks at 12:00 PM with a utilization of about 39 percent. The study notes that parking in the Village is high-turnover and that there is constant parking activity during the course of the day.

The study also identifies some specific problems related to the distribution of parking areas and parker awareness in the village. The study notes the following deficiencies:

- Parking supply and demand in the Village is unbalanced. There are often locations near capacity when adjacent lots are well below capacity since drivers are not aware of all available parking areas;
- When public parking is near or at capacity, it has a spill-over effect on nearby private lots. The same holds true when large private functions force a spill-over onto public parking resource;
- Parking in Town Hall Square at the site of the artesian well is inadequate to safely accommodate the needs of well users. Even though sufficient spaces are provided, people park illegally to minimize their trip from the well. Illegal parking and high turnover at this location creates hazardous walking and driving conditions that are exacerbated by uncontrolled movements at the intersection of Main and Water Streets; and
- The pavement markings for street parking do not delineate individual spaces, but instead block in a whole section for all vehicles to park. This type of design causes spacing problems and decreases the amount of parking available.

The parking study presents several general recommendations for the Historic Village area including the following:

- Parking in remote lots, particularly the Wing School, with shuttle service;
- Public awareness and educational brochures encouraging walking;
- Improved directional signage to underutilized parking areas;
- Implementation of time restrictions to reduce all day parking in high demand areas;
- Provision of bicycle facilities throughout the town;
- Improved pavement markings for on-street parking; and
- Improved pedestrian facilities.

Marina and Beach Area - The northside parking area as defined in the CCC parking study includes eight parking lots designated for public parking. These facilities are located in the Sandwich Harbor area and serve recreational users for the most part. The northside parking facilities include:

- Sandwich Marina;
- Sandwich Recreation;
- Joe's Lobster;
- Sandcatcher Recreation;
- Bulkhead Recreation;
- Hemisphere Beach;

- Town Neck Beach; and
- Boardwalk

Public parking in the northside zone peaks at 2:00 PM with a peak utilization of about 51 percent. As a whole, the northside parking did not experience any deficiencies. However, some public lots did approach capacity at certain times. With increasing interest in recreational areas along the Cape Cod Canal, it is expected that these areas will reach capacity during summer months in the near future.

The CCC parking study recommends improving signage to all lots in the northside area to help alleviate overflow parking when canal bike/walking path use peaks. The study recommended investigating the creation of more spaces in the area or buying/leasing spaces from area landowners.

Pedestrian and Bicycle Facilities

Pedestrians and bicycle activity in Sandwich is an important component of the local and regional transportation system. Pedestrians are accommodated by sidewalks located along some of the town's roadways. The town also encourages bicycle use on these sidewalks. Pedestrian and bicycle activity is also accommodated by the town's roadway system where sidewalks do not exist. The following sections describe the town's sidewalk network and its principal bicycle facilities and routes.

Sidewalks - Sidewalks are provided on many streets in the town. Sidewalks are most prevalent in the historic village area and also along roadways providing access to the town's schools. Key sidewalks and walkways which allow pedestrian connections between important centers in town are described below.

- **Historic Village Area** – Sidewalks are provided along most streets in the Village area. Main Street is the most prominent pedestrian corridor in the Village and sidewalks are provided on both sides of the roadway between Water Street and Liberty Street. The sidewalk on the north side of the roadway extends west beyond Tupper Road nearly to Dale Terrace and east to Route 6A. Sidewalks are also provided on both sides of Jarves Street in the Village area providing a connection between Main Street, Route 6A and the neighborhood to the north of Route 6A. Sidewalks in the Village also provide connections to the H.T. Wing Elementary School. These pedestrian connections are important to provide safe walking routes to the school for students, teachers and other employees as well as in allowing the Wing School to serve as a parking resource for the Village during the peak tourist season. The primary pedestrian connections to the Wing School include sidewalks on Water Street (Route 130), School Street, and Beale Avenue. Other sidewalks in the Village area are provided on Tupper Road, Freeman Street, State Street, Harbor Street, Church Street, and Pleasant Street;
- **Route 6A/Tupper Road/Town Neck Road -** Sidewalks link the Historic Village area to the Town Marina, Cape Cod Canal Service Road multi-use paths and the beach. Sidewalks are provided along Route 6A beginning at Main Street and continuing through Tupper Road. The sidewalk continues on the north side of Tupper Road through Briarwood Avenue providing connections to Merchants Road near the Stop and Shop supermarket. From Tupper Road, a sidewalk is provided along the west side of Town Neck Road and continues to the end of the roadway at the beach;
- **Route 130/William Richards Road -** Sidewalks are provided along Route 130 in the vicinity of the Forestdale Elementary School. The sidewalk on the west side of the roadway extends for about 1.2 mile from Greenville Drive to the north, to about 0.8 miles beyond the intersection of Quaker Meetinghouse Road/William Richards Road. A sidewalk is also provided on the east side of the roadway for about 0.8 miles south of Quaker Meetinghouse Road. These sidewalks connect with a sidewalk on the south side of William Richards Road which connects to the Forestdale Elementary School;

- **Quaker Meetinghouse Road -** Two segments of sidewalk are provided along Quaker Meetinghouse Road. The first of these runs for about 0.2 miles along the west side of the roadway beginning at Cotuit Road. The second provides access to the Oakridge School along the east side of the roadway. This segment begins at Kiah's Way and continues to the school, a distance of about 0.4 miles. An extension to the sidewalk in under construction on the east side of Quaker Meetinghouse Road south of Cotuit Road. Design plans are also being prepared for extension of the sidewalk along Quaker Meetinghouse Road between Route 6A and Cotuit Road; and
- **Cotuit Road –** A sidewalk is provided along the west side of Cotuit Road between Quaker Meetinghouse Road and Bishop Path linking the commercial land uses along this corridor. The sidewalk is approximately 1-mile long.

Two other short segments of sidewalk are provided along the access road to Sandwich High School and along the west side of Ploughed Neck Road. There are several critical links missing in the town's sidewalk network, as described in the next section.

Bicycle Paths and Routes - Bicycle activity in Sandwich occurs on dedicated pathways and along the public roadway and sidewalk network. While bicycle activity can be found throughout the town, the primary pathways and routes through the town are described below. There are also some important gaps in the town's bicycle facilities described in the following section.

- **Cape Cod Canal Multi-Use Paths** - The service roads along the Cape Cod Canal, maintained by the U.S. Army Corps of Engineers are used extensively by recreational bicyclists. These roadways are wide and accommodate many different types of recreation including walking, roller-skating, and bicycling. There are pathways on both the east and west sides of the canal. The paths begin in Sandwich and continue south for about seven miles to the Cape Cod Railroad Bridge. Bicyclists can cross the canal by walking their bicycles across the Bourne and Sagamore Bridges. Both pathways (east and west) can be accessed in Sandwich. The path on the west side of the canal can be accessed in Scusset Beach State Park. The path of the east side of the canal can be accessed from a parking area near the Sandwich Marina;
- **Claire Saltonstall Bikeway** - The Claire Saltonstall Bikeway (also known as State Bicycle Route 1) is a bike route linking Boston to Provincetown on the Outer Cape. From Route 3A and the Sagamore Bridge, the Saltonstall Bikeway passes through Sandwich following Route 6A to Route 130 near the Historic Village. The bike route then proceeds south along Route 130 to the Service Road where it heads east to the Barnstable Town Line;
- **Route 6A** - Route 6A, also known as the "Old King's Highway" is a designated historic district and bicycle activity along this roadway is common. However, Route 6A is best suited for experienced bicyclists because it is a narrow, winding highway that is heavily traveled by cars and other motorized vehicles;
- **Forestdale School Path** – This path connects Route 130 to the Forestdale School. Users can walk or bike from nearby neighborhoods and the shared path serves the needs of students traveling to and from the school. The Forestdale School Path is 0.4 miles, 10 feet wide, and has 2 roadway crossings; and
- **Low Volume Roads** – Bicyclists and pedestrians in Sandwich can utilize low volume roads with minimal automobile conflict. An average daily trip (ADT) of 1,000 is equivalent to about one vehicle every 35 seconds during daylight hours. These roads must be considered as part of the bicycle and pedestrian network since trips usually begin and end on side streets and rural roads in low traffic neighborhoods.

Mileage of Bike Trails and Routes

Location	Bike Trails	Bike Routes
All Cape	83.8	333.0
Upper Cape	22.2	166.1
Sandwich	***2.5***	***22.5***
Average Per Community	5.6	22.0

Source: Cape Cod Commission, 2004

Sandwich has an estimated 2.5 miles of bike paths and 22.5 miles of bike routes. By comparison, Sandwich has slightly more mileage of bike routes but has significantly less bike trail miles than the average for Cape Cod communities.

4.4 Future Conditions and Needs

This section involves the evaluation of future transportation conditions within the Town of Sandwich. It describes the methodology used to develop estimates of future transportation demand within the town and presents potential traffic operations for both annual average and peak seasonal future traffic conditions.

Future Trip Generation Methodology - The first step in estimating future transportation demand requires the identification of regional changes and land development within the Town of Sandwich that might affect travel demands in the area. Future transportation demands are based on regional growth estimates and projected estimates of land build-out considering the amount, type and density of future development.

To develop the trip generation and distribution for new commercial or housing development, it was first necessary to locate potential areas of growth within Sandwich. Using data provided by the Town Planning Department and Assessors Office, “developable” and “potential developable” parcels throughout town were identified as well as underutilized parcels that could accommodate additional development. Assumptions were made about the potential build-out of parcels based on local land use regulations (existing and proposed) as well as CCC Regional Policy Plan requirements. The geographical location and size of potential growth areas is presented in *Section 1.0: Land Use*.

An increasing number of commuters to the metropolitan Boston area are residing in Sandwich. Additional residential development is expected to occur in Sandwich, the majority of which will be infill of existing vacant parcels and development of smaller-sized residential neighborhoods. The largest potential for residential development in Sandwich exists on the several recreational camps located in the southern portion of the town. Although no commercial or residential development is currently planned or projected for these camps, they represent a large portion of the available land in town. Development of these camps is not restricted in any particular way beyond the standard provisions of local zoning, therefore they were assumed to be developed as residential areas in this analysis.

There are three growth centers of potential mixed use, commercial and industrial development in Sandwich. One of these is the proposed South Sandwich Village Center (the BL-2 area bounded by Route 130, Cotuit Road, and Quaker Meetinghouse Road known as the Golden Triangle). A substantial amount of mixed uses including civic, recreational, residential, retail, office and light industrial development is anticipated for this area. The second area in which mixed use development has potential to occur is the Town Marina/Tupper Road/Route 6A Area located in the northwest portion of town. A moderate amount of light industrial, office, residential and retail development is also expected for this area. The third potential mixed use growth center

is the Historic Village/Route 6A Corridor between Mill Creek and Liberty Street centered on Jarves Street. Potential development in this area is anticipated to include a mix of residential, retail, restaurant and professional office space.

A fourth potential growth center is the Sandwich Industrial Park (on Jan Sebastian Way) and adjacent industrial district. This large area has the potential for various types of light industrial, service, manufacturing, and office park type uses.

Between these designated growth centers and the remainder of town it is projected that an additional 2,696 housing units, 971,270 square feet of commercial development, 146,000 square feet of civic/public facility development, and 1.3 million square feet of light industrial/business park development could occur within Sandwich. The trip generation expected by this development was identified in previous traffic studies for the BL-2 district[3] and therefore was subtracted from the potential build-out. However, the traffic impacts of this development are included in subsequent analysis.

Trip Generation - A regional background growth rate for the area of 1.61 percent annually for the upper Cape area is projected by the CCC. Recognizing that this growth rate includes a large portion of the traffic developed for new housing and commercial uses within Sandwich, a growth rate more characteristic of the through-traffic along major roadways is appropriate. Therefore, a regional growth rate of one percent per year was applied. This rate is more representative of the increase in traffic traveling through Sandwich, with origin and destination points outside of town.

After establishing the estimated number of future housing units and non-residential development, the number of weekday evening peak hour trips expected is generated by development type.[4] The land use codes (LUC) used for future development were LUC 340 (general office building), LUC 400 (manufacturing), LUC 325 (retail establishment), LUC 102 (residential condominium), and LUC 356 (general public services). It is estimated that the majority of new trips will be created by an increase in housing. Trip generation is calculated by multiplying the ITE trip rate by either square footage or number of housing units. When estimating trip generation for a retail component, 25 percent of the trips generated are considered “pass-by” trips. This percentage represents vehicles already on the adjacent roadway stopping at the retail establishment in route to their destination. Pass-by trips are diverted off and then back on the roadway network and not added as new trips. The table below presents the trip generation derived from the various land-use components listed above.

Projected Trip Generation from Future Development– Evening Peak Design Hour

Land Use	LUC[1]	Trip Rate[2]	Entering Trips	Exiting Trips	Total Trips
Residential	102	1.01	902	504	1,406
Manu./Light Industrial	400	0.98	22	166	188
Office/Public Service	340,356	1.49	20	105	125
Retail[3]	325	3.74	44	48	92

1. Land Use Code
2. Based on data from Trip Generation, Sixth Edition, Institute of Transportation Engineers, Washington, DC
3. Total trips assuming 25% pass-by rate

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[3] BL-2 Internal Road Transportation Benefits and Detriments, Cape Cod Commission November 1998

[4] Based on data compiled by the Institute of Transportation Engineers (ITE) in *Trip Generation*.

Trip Distribution - For each of the developments included in this evaluation, a directional distribution was developed to distribute the projected traffic on the roadway network. For developments located in the BL-2 area, trip distribution was obtained from the BL-2 Traffic Study[5]. For the remainder of the developments, current trends of those commuting to/from Sandwich were identified in the 1990 and 2000 U.S. Census journey-to-work data presented in Section 4.2. It is assumed that traffic generated by the new developments will follow current travel trends.

Traffic expected from regional growth (one percent per year) was distributed along Route 6A, Route 130, Quaker Meetinghouse Road, Cotuit Road, and Farmersville Road.[6] Since this growth is representative of traffic with origin and destination points outside of the town, traffic was added only to the through movements along these roads.

The 2010 future build-out networks were developed by applying the growth rate to the average annual and peak season existing condition networks and adding traffic generated by specific developments. The future annual average and peak season traffic volume networks are presented below.

Future Roadway Volumes - Future traffic growth reflecting build-out in Sandwich exceeded traffic growth rates supplied by the Cape Cod Commission in many cases. Therefore, simply adjusting the existing traffic data by a background growth factor to reflect projected daily traffic volumes and peak hour roadway volumes would underestimate the number of vehicles expected on each roadway link. As a result, a combination of specific development traffic and background growth was used to most accurately estimate projected peak hour roadway volumes. Forecasted roadway link volumes and turning movements for full build-out were used to calculate future v/c ratios. Calculated v/c ratios were then compared to default hourly capacities provided by the Cape Cod Commission. Roadway capacity analyses are shown in the traffic operations section below.

Traffic Operations Analysis - Future roadway and intersection capacity analyses were conducted to assess the anticipated quality of flow within Sandwich. Using projected future traffic volumes and intersection geometry and traffic control planned to be in effect during the horizon year, capacity analyses provide an indication of how roadway facilities are expected to serve the traffic demands placed upon them. Capacity analyses also provide an important indication of where problem areas will arise.

Roadway segments are evaluated on the basis of a volume-to-capacity (v/c) ratio. This ratio helps to identify roadways where traffic volumes are approaching the roadway capacity potentially causing traffic congestion and other operational problems. For intersections, roadway operating conditions are classified by calculated levels of service ranging from LOS A to LOS F. The following sections present roadway segment and intersection traffic operations analyses.

Roadway Links - Volume-to-capacity ratios were projected for peak hour, peak direction traffic volumes for both annual average and peak season future conditions. Typical roadway capacities were provided by the Cape Cod Commission based on Massachusetts Highway Department default hourly capacities. A summary of the results for annual average and peak season future conditions is presented in the table below.

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[5] BL-2 Internal Road Transportation Benefits and Detriments, Cape Cod Commission, November 1998

[6] The Cape Cod Commission projects a .99 Average Annual Growth Rate for Upper Cape Towns based on traffic growth trends between 1995 and 2005. This growth rate has a +/- .22 95% Confidence Interval.

As the table shows, it is anticipated that only five of the 28 roadway links will operate at a v/c ratio of greater than 0.70 under future annual average conditions. Under existing conditions, seven of the 28 roadways operate at a v/c ratio of greater than 0.70. In addition, the highest v/c ratio is expected to be 1.12 (compared to an existing v/c ratio of 0.69) along Cotuit Road, south of Quaker Meetinghouse. This indicates that a majority of the major roadway links are expected to operate at or near capacity in the future, with the Cotuit Road link expected to operate above capacity.

During the peak season, 16 roadway links are expected to operate at v/c ratios above 0.70, with five of these links at v/c ratios greater than 1.00. The largest volume increases are expected to be along Route 130, Route 6 and Route 6A, which are all heavily traveled by vacationers during the summer months.

The results of the roadway link capacity analysis show that five of the major roadways in Sandwich are expected to have demands exceeding their capacity during the peak season. Several other roadways operate near capacity during the peak season. These results illustrate that traffic flow quality is expected to become contingent upon both intersection and roadway link congestion.

Projections/Horizon Year Roadway Link Capacity Analysis[1]

Location		2010 Annual Average Design Hour (Evening Peak Hour)			2010 Peak Season Design Hour (Evening Peak Hour)		
	Hourly Capacity [1]	NB/EB Volume[2]	SB/WB Volume[2]	Peak Direction v/c Ratio[3]	NB/EB Volume	SB/WB Volume	Peak Direction v/c Ratio
U.S. 6 (between exits 2 and 3)	3,150	1,800	1,950	0.62	2,390	2,590	0.82
U.S. 6 (between exits 3 and 4)	3,150	1,885	2,040	0.65	2,502	2,715	0.86
U.S. 6 (Sandwich/Barnstable TL)	3,150	1,960	2,205	0.70	2,590	2,920	0.93
Route 6A (East of Tupper Road east)	1,000	870	795	0.87	1,105	1,030	1.11
Route 6A (East of Jarves)	1,000	780	670	0.78	1,010	940	1.01
Route 6A (Sandwich/Barnstable TL)	1,000	465	475	0.48	600	635	0.64
Route 130 (South of Route 6A)	1,000	615	565	0.62	775	680	0.78
Route 130 (North of Cotuit)	1,150	845	740	0.73	1,055	910	0.92
Route 130 (North Quaker Mtg House)	1,150	800	970	0.84	945	1,200	1.04
Route 130 (Sandwich/Mashpee TL)	1,150	430	475	0.41	555	600	0.52
Quaker Meeting House (S. of Rt 6A)	1,000	240	255	0.26	280	295	0.30
Quaker Meeting House(South of US 6)	850	430	580	0.68	510	720	0.85
Quaker Meeting House(East of Cotuit)	850	565	455	0.66	690	575	0.81
Quaker Meeting House(East of Rt 130)	850	540	545	0.64	675	690	0.81
Chase Road (South of Service)	850	200	230	0.27	240	290	0.34
Cotuit Rd (South Quaker Mtg House)	850	745	955	1.12	930	1210	1.42
Cotuit Rd (South of Route 130)	850	425	745	0.88	535	915	1.08
Cotuit Road (Sandwich/Mashpee TL)	850	315	490	0.58	400	620	0.73
Service Rd (East of Route 130)	500	90	95	0.19	125	125	0.25
Service Rd (East Quaker Mtg House)	500	80	95	0.19	100	130	0.26
Farmersville Road (East of Cotuit)	850	565	395	0.66	680	485	0.80
Tupper Road East (North of Rt 6A)	1,000	395	455	0.46	520	555	0.56
Tupper Road West (North of Rt 6A)	1,000	100	170	0.17	140	210	0.21
Great Hill Road (North of Newtown)	850	240	285	0.34	315	370	0.44
Race Lane (Sandwich/Barnstable TL)	850	425	525	0.62	580	660	0.78
Snake Pond Road (West of Rt 130)	1,000	335	365	0.37	430	455	0.46
Jones Road (South of 6A)	1,000	60	85	0.09	80	105	0.11
Old County Road (East of Jones)	1,000	110	75	0.11	135	95	0.14

1 Based on default hourly capacities provided by the Cape Cod Commission for different roadway types.
2 Number of vehicles during peak hour.
3 Volume-to-capacity ratio for peak hour, peak direction traffic volumes.

Signalized Intersections - Capacity analyses were conducted for annual average and peak season future conditions at the seven intersections within the town that are expected to be under traffic signal control during the ten-year horizon of this study. A summary of the capacity analysis results is presented below.

Future Signalized Intersection Capacity Analysis							
Location	Peak Hour	Future Annual Average			Future Peak Season		
		V/C[1]	Delay[2]	LOS[3]	V/C	Delay	LOS
Route 6A at Jarves Street	Weekday Evening	0.44	6	B	0.65	7	B
Rt. 130 at Quaker Meeting House Rd	Weekday Evening	0.62	12	B	0.80	25	C
Cotuit Rd at Quaker Meeting House Rd	Weekday Evening	0.90	24	C	>1.20	>60	F
Route 130 at Snake Pond/Pimlico Pond Rd*	Weekday Evening	0.53	10	B	0.79	13	B
Route 130 at Cotuit Road*	Weekday Evening	0.57	12	B	0.71	31	D
Route 6A at Tupper Road (East)*	Weekday Evening	0.87	33	D	>1.20	>60	F
Route 6A at Merchant Road	Weekday Evening	0.23	8	B	0.31	10	B

1 Volume-to-capacity ratio
2 Average delay expressed in seconds per vehicle
3 Level-of-Service
* Currently unsignalized locations, but are currently planned for installation of new traffic signals

As the table above shows, it is anticipated that all of the signalized intersections will provide an acceptable LOS under annual average conditions. During peak season, however, two intersections are expected to operate at an unacceptable LOS. To achieve the LOS reflected above, the following minor traffic signal adjustments are expected to be necessary in the future:

- **Route 130 at Quaker Meetinghouse Road** – Adjustment of signal phasing to provide a southbound Route 130 lead phase and an eastbound/westbound Quaker Meetinghouse Road split phase, and restriping of the westbound Quaker Meetinghouse Road approach to provide an exclusive left-turn lane and a shared right-turn/through/left-turn lane;
- **Cotuit Road at Quaker Meetinghouse Road** - Adjustment of signal cycle length, restriping of the southbound Quaker Meetinghouse Road approach to provide an exclusive left-turn lane and a shared right-turn/through lane, and adjustment of signal phasing to provide a northbound/southbound Quaker Meetinghouse Road protected left-turn phase;
- **Route 130 at Snake Pond/Pimlico Road** – Signal timing adjustment during the peak season;
- **Route 130 at Cotuit Road** – Signal timing adjustment during the peak season; and
- **Route 6A at Tupper Road (east)** – Signal timing adjustment during the off-peak months, adjustment of cycle length and addition of a southbound (Tupper Road) lead phase during the peak season.

Without these changes, these intersections are expected to operate at LOS F as the town approaches build-out. While the mitigation measures recommended at the intersections of Route 6A and Tupper Road and Quaker Meetinghouse Road and Cotuit Road will not provide acceptable LOS during the peak season, it is important to note that they will greatly improve operations at those intersections.

The planned improvements at the intersection of Route 6A and Jarves Street are expected to improve the level of service from D to B under future conditions. However, this intersection is still vulnerable to cut-through traffic when there are problems on U.S. Route 6.

Unsignalized Intersections - Capacity analyses were also updated for the key unsignalized intersections within Sandwich. Several unsignalized intersections within town are projected to provide an unacceptable level of service under annual average conditions. The following eight intersections are expected to provide LOS E or F during annual average conditions:

- Route 130 at Service Road;
- Route 130 at Route 6 Eastbound Ramp;
- Route 130 at Route 6 Westbound Ramps;

- Service Road at Quaker Meetinghouse Road;
- Route 130 at Tupper Road (East Side);
- Quaker Meetinghouse Road at Route 6 Eastbound Ramp;
- Cotuit Road at Farmersville Road; and
- Great Hill Road at Farmersville Road.

The three deficient intersections previously identified under existing average annual conditions (Route 130 at Snake Pond Road, Route 130 at Cotuit Road, and Route 6A at Tupper Road) have plans for signalization by 2010 and are included in the above "signalized intersections" section (refer to page 4-32). During the peak season, four additional intersections are expected to provide deficient level of service. In addition to the eight intersections above, the following four locations operate at LOS E or F:

- Route 6A at Quaker Meetinghouse Road;
- Route 6A at Route 130/Tupper Road;
- Quaker Meetinghouse Road at Route 6 WB Ramps; and
- Race Lane at Newtown Road.

At the above unsignalized intersections, poor level of service is an indication of high volumes on the major road and difficult turning movements from the minor street.

Traffic Operations Comparison - Analysis of roadway segment capacities indicates that both intersection and roadway link operations are likely to impact traffic flow quality in the future. Under annual average conditions (both existing and future), the highest volume-to-capacity ratio is on Cotuit Road south of Quaker Meeting House Road (0.69 and 1.12 respectively). In the peak season, the following five roadway segments are projected to have greater than their current theoretical capacities:

- Route 6A, east of Jarves Street;
- Route 6A east of Tupper Road (East);
- Route 130 north of Quaker Meetinghouse Road;
- Cotuit Road south of Quaker Meetinghouse Road; and
- Cotuit Road south of Route 130.

These five roadway segments operated at v/c ratios between 0.75 and 0.95 under existing conditions. The roadway segment of Cotuit Road south of Quaker Meetinghouse Road is a particularly critical link in the future.

Intersection capacity analysis demonstrates that most of the intersections studied provide an adequate level of service under existing annual average traffic conditions with only three of the intersections operating at LOS E or F. In the existing peak season, nine of the intersections operate at deficient levels of service E and F. However, eight intersections are expected to operate at deficient LOS under future average annual conditions, and 14 under future peak season conditions.

Projections and Horizon Year Future Unsignalized Intersection Capacity Analysis (For Weekday PM Peak Hour)

Location	2010 Annual Average			2010 Peak Season		
	Demand	Delay[2]	LOS[3]	Demand	Delay	LOS
Route 130 at Service Road	95	38	E	125	>60	F
Route 130 at Route 6 EB Ramp	75	>60	F	90	>60	F
Route 130 at Route 6 WB Ramp	85	>60	F	115	>60	F
Chase Road at Service Road	50	6	B	60	7	B
Route 130 at Grove Street (East Side)	25	9	B	35	11	C
Route 130 at Grove Street (West Side)	20	5	B	20	6	B
Merchants Row at Tupper Road	175	5	B	230	7	B
Route 6A at Quaker Meetinghouse Road	100	27	D	115	>60	F
Service Road at Quaker Meetinghouse Road	155	32	E	200	>60	F
Route 130 at Tupper Road (East Side)	440	>60	F	520	>60	F
Route 130 at Tupper Road (West Side)	15	4	A	20	5	A
Route 130 at Main Street	45	6	B	60	7	B
Route 6A at Route 130/Tupper Road	120	16	C	160	>60	F
Chase Road at Route 6 EB Ramp	80	6	B	100	8	B
Chase Road at Route 6 WB Ramp	45	6	B	55	7	B
Route 6 WB Ramp at Quaker Meetinghouse Rd	190	28	D	245	>60	F
Route 6 EB Ramp at Quaker Meetinghouse Rd	70	34	E	90	>60	F
Cotuit Road at Farmersville Road	30	>60	F	35	>60	F
Great Hill Road at Farmersville Road	70	>60	F	95	>60	F
Race Lane at Newtown Road	115	25	D	140	>60	F
Route 6A at Jones Lane	25	13	C	35	23	D
Route 6A at Old County Road	40	13	C	45	20	D
Chase Road at Old County Road	110	5	A	145	6	B

1 Demand of critical movement from minor street

2 Average delay expressed in seconds per vehicle

3 Level of service

Improvements are planned or are currently under construction at five of these intersections:

- Route 130 at Cotuit Road;
- Route 130 at Snake Pond Road;
- Route 6A at Jarves Street;
- Route 6A at Merchants Road; and
- Route 6A at Tupper Road (East).

These improvements allow the intersections to remain at acceptable levels of service under future conditions, with the exception of Route 6A at Tupper Road (East). This intersection is expected to operate at an unacceptable LOS under future peak season conditions.

Public Parking

Further development and tourism in Sandwich is expected to increase demand on public parking resources within the town. As described in Section 4.2, publicly provided parking resources in the town are limited and are concentrated in the Historic Village and Town Marina area. These facilities are generally adequate to meet the current demands.

In the Village, the peak parking utilization rate is 53 percent for public parking spaces including the Wing School. When the expected residential build-out is complete (an 18 percent increase), peak public parking utilization in the Village is expected to increase to approximately 62 percent. In the Marina, the current peak public parking utilization rate is 51 percent. It is expected to increase significantly with full build-out of residential areas. While the overall capacity at these two areas should be able to meet future needs, increased demand for parking may exacerbate some of the issues identified in Section 4.2.

Public Transportation

Sandwich is significantly under-serviced by local and regional transit service. On average, Cape Cod community populations and land areas within ½ mile of a transit route are 45 percent and 37 percent. Virtually none of Sandwich's population or land area is within ½ mile of a transit route – the lowest on the Cape.

No fixed-route public transportation services are available currently in Sandwich. As build-out of the town progresses, demand for additional public transit services may develop. This demand may be for fixed-route service to other parts of Cape Cod or commuter service to Boston. The most likely route for public transit service in Sandwich is along Route 130 from the Village to Cotuit Road and continuing into Mashpee with additional connections to the CCRTA Sea Line. However, initially the town should focus on providing service in a concentrated area, such as Sandwich Village, to determine the demand for such service. The results of this limited service should be used to determine the need for expanding the service to other corridors.

In addition to bus operations, there is the potential for expansion of the rail service to Buzzards Bay and potentially to Sandwich. A detailed and comprehensive study of the regional traffic impacts associated with expanded rail service would need to be completed before this service could be operated. It is anticipated that a park-and-ride facility to accommodate rail passengers would be necessary if service were expanded to Sandwich.

Pedestrian/Bicycle

Most of the sidewalks are concentrated in the Village area with other sidewalks providing links to schools. As residential development continues in town, sidewalks should be developed to link these areas to activity centers. New roadways in the town should also be sized to encourage bicycling and bicycle links between major activity centers. Encouraging walking and bicycling could help to reduce the traffic demands that new development will cause in Sandwich.

5.0 Community Facilities and Services

Contents

5.1 Background and Overview

5.2 Municipal Buildings and Administrative Services

5.3 Educational Facilities and Services

5.4 Public Safety Facilities and Services

5.5 Public Works and Transportation Services

5.6 Parks and Recreational Facilities

5.7 Health Care Facilities and Services

5.8 Town Boards and Committees

5.9 The Tax Base

5.10 Capital Improvement Planning

5.11 Municipal Facilities and Services Challenges

5.1 Background and Overview

The Capital Facilities and Services Element is intended to provide an inventory, analysis, and plan for the lands, buildings, and services that the Town of Sandwich provides today and must provide in the future. The emphasis of this element is on the physical needs of the town departments rather than staffing needs, although it is acknowledged that additional staffing is needed in some departments to adequately provide services for the population of the future.

Much of the information for this element was provided by the 1996 and 2000 Local Comprehensive Plan Capital Facilities and Services Sections, the Board of Selectmen's Annual Long Range Strategic Plan, and interviews with department heads. The **Long Range Strategic Plan** has been created to provide a sense of stability and coherence that clarifies the town's goals and objectives while providing direction and guidance to the Board of Selectmen, Town Administrator and Town employees in delivering services to the citizens of Sandwich.

An underlying assumption behind the analysis in this element is that financial needs and resources vary widely from year to year, but that a firm commitment to regularly providing for the capital needs of departments, within an overall long-term vision of a capital facilities program, is essential. This Plan provides a framework of analysis and objectives that will allow departments to meet both short-term and long-term goals, without causing extreme fiscal uncertainty from one year to the next.

The most important long-term capital facility issue for Sandwich officials and residents is that the town will reach its maximum capacity for people and housing units in the next 15 to 25 years. Sandwich's combination of location, relative proximity to Boston, easy access to interstates, historic character, natural beauty, excellent services for a variety of age groups and cultural interests, and relative affordability will all contribute to future growth. For good or bad, Sandwich has all the ingredients many families and retirees are looking, and these people will continue to come to Sandwich.

Sandwich Community Characteristics

Characteristics	1995	2006	Difference	% Change
Total Population	18,479	22,778	4,299	23.26%
Student Population	3,683	3,948	265	7.20%
Over 60 Population	3,450	4,557	1,107	32.09%
House Units	7,584	9,156	1,572	20.73%
Ave. Home Assess.	$134,400	$412,500	$278,100	206.92%
Average Tax Bill	$1,917	$3,861	$1,944	101.41%

According to the updated community build out analysis, there remains large amounts of developable land and redevelopment opportunities in Sandwich in a number of residential, commercial and industrial zoning districts. If growth proceeds at a conservative pace of 90 units per year (170 units a year is the current growth cap rate), construction of a possible 2,696 additional housing units will be complete by the year 2038. The rapidly growing population of the past two decades has already stressed the capacity of existing public infrastructure and services. Additionally, there is the potential for an additional 971,270 square feet of commercial development and 1.3 million of light industrial and business park development over the next 30 years.

These scenarios create a "good-news, bad-news" situation for the town. The bad news is that the investments required to service increased population and economic development must be made over

the next 10 to 15 years. The good news is that, once these investments are made, growth-related investments will be complete. In other words, the spurt of growth experienced by the town over the past 15 years and that new growth projected to come in the next 15 years will bring the town to a stable population level. After that time, general town services and school costs may increase, but as a result of factors other than growth.

5.2 Municipal Buildings and Administrative Services

Municipal Buildings

Town services are housed in a variety of buildings and locations throughout Sandwich, as shown in the table below.

Sandwich Municipal Facilities and Service Locations

Facility Type	Address	Area	Dept./Uses
Emergency Facilities			
Human Services Building	270 Quaker Meetinghouse Rd	E. Sandwich	Recreation, Council on Aging, Public Health Nurse, Emergency Operations Center
Emergency Shelter/SHS	377 Quaker Meetinghouse Rd.	E. Sandwich	Emergency Services - Oak Ridge School
Town Government Buildings			
Town Hall	130 Main Street	Sandwich	Town Administrator, Selectmen, Treasurer, Accountant
Town Hall Annex	145 Main Street	Sandwich	Tax Collector, Clerk, Assessing, Archives
Town Office Building	16 Jan Sebastian Drive	Sandwich	Planning, Engineering, Building, Natural Resources, Inspections, Conservation, Health
Town Library	142 Main Street	Sandwich	Library Services
Public Safety			
Police Headquarters	117 Route 6A	Sandwich	Police
Fire Headquarters	115 Route 6A	Sandwich	Fire and Ambulance
Forestdale Fire Station	Route 130	Forestdale	Fire and Ambulance
East Sandwich Fire Station	456 Route 6A	E. Sandwich	Un-manned; used for Fire Dept equipment and storage)
Schools			
Clark Haddad Building	16 Dewey Ave.	Sandwich	Former School Administration
Sandwich High School	377 Quaker Meetinghouse Rd.	E. Sandwich	Public Schools, School Administration
Henry T. Wing School	33 Water Street	Sandwich	Public Schools
Oak Ridge School	260 Quaker Meetinghouse Rd	E. Sandwich	Public Schools
Forestdale School	151 Route 130	Forestdale	Public Schools
Elderly Services			
Senior Center	270 Quaker Meetinghouse Rd.	E. Sandwich	Council on Aging
Public Water Supply			
Sandwich Water District	Off Tupper Road	Sandwich	SWD Administration
Public Works			
DPW Highway Garage	85 Route 130	Sandwich	Highway and Parks

Municipal departments and services are currently dispersed throughout town. Despite recent building renovations, purchase of a municipal building on Jan Sebastian Drive, and consolidation of related departments in single buildings, some coordinated municipal functions are still inadequate. Construction of new facilities and re-use of some town buildings should be considered as an option for increasing the efficiency of municipal services. Other options, such as computer networking among departments, can be considered as well.

The Town Administrator maintains a comprehensive inventory of building and capital needs. Some of the key facilities issues are identified below:

- Facilities such as the Town Hall, Town Hall Annex, Police Headquarters and Fire headquarters may not meet the long-term service needs of the community as it grows over the next several years;
- A central municipal building would vastly improve capacity, communication, coordination, delivery, and cost of services. There would also be a substantial improvement in operating costs with various departments brought together and sharing space in a new building;
- The town may be able to sell 3 or 4 buildings, such as the Town Hall Annex, Police Headquarters, Fire Central Station, and the Dewey building (old school administration building) to be renovated for appropriate and compatible uses. The sale of some or all of these buildings could generate revenues that could be used to build new facilities to better serve the community today and into the future;
- The town would only need to build municipal facilities once more because Sandwich is approaching buildout over the next 30 years;
- The town should also consider a performance contract for selected buildings (such as at the Wing School) that are in need of significant improvements. Energy management companies should be considered to provide services and products. It would be less expensive to contract this service in the near future with the growing cost of maintenance;
- A study should be commissioned to evaluate both the necessity of a joint public safety building and if additional fire substations would be needed;
- The Highway Department Barn is in poor shape and will require replacement in the near future;
- The Agilent property (Oak Crest Cove on Peters Pond) needs a property manager. This facility may also be a good location for the Recreation Department in the future;
- Generators are needed for the four public schools. Oak Ridge School is used as an emergency shelter; and
- Between FY07-FY12 the town will be dropping a substantial amount of debt service (about $500,000). This could provide an opportunity to fund significant capital improvements (public buildings and infrastructure) while maintaining a similar amount of debt service and minimizing the impact on tax payers.

Administrative Services

The Town of Sandwich provides a variety of administrative services related to management, financial services, human resources, facilities, permitting, cultural and resource protection. Like other services, administrative staffing levels have changed very little over the past several years as the town's population has grown. As indicated in the table below, general government staffing in Fiscal Year 2008 is 173 employees (year-round, full-time equivalent). This represents an increase of 34 employees over the last 11 years (or 24% increase in staffing). The town's population, however, has growth significantly grown over the last 30 years.

General Government Personnel by Department, FY98-08
(Year-Round, Full-Time Equivalent - FY'98 to Present)

Department	FY'98	FY'99	FY'00	FY'01	FY'02	FY'03	FY'04	FY'05	FY'06	FY'07	FY'08	Δ FY98-08
Administrative Depts.												
Administrator/Selectmen	4	4	4	4	4	4	4	4	4	4	4	0
Accounting Office	3.5	3.5	4	4	4	4	4	3	3	3	3	-0.5
Assessing Office	6.5	6	6.5	6.5	6.5	6.5	6.5	6	6	6	6	-0.5
Treasurer's Office	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4	0.5
Tax Collector's Office	4	4	4	4	4	4	4	4	4	4	4	0
Human Resources	0	0	0	2	2	2	2	2	2	2	2	2
Town Clerk's Office	3	3	3	3	3	3	3	3	3	3	3	0

Natural Resources	2	2	2	2	2	2	2	2	2	3.5	4.5	2.5
Planning & Development	2	2.5	2	2	2	2.5	2.5	2.5	2.5	2.5	2.5	0.5
Facilities Management	0	0	0	0	0	0.5	0.5	0.5	2.5	2.5	2.5	2.5
Information Technology	0	0	0	0	0	0	0	0	0	1	1	1
Public Safety												
Police Department	34.5	34.5	34.5	34.5	36.5	37.5	36.5	36.5	36.5	35.5	35.5	1
Fire Department	31.5	31.5	31.5	31.5	36	41	40	40	40	40	41	9.5
Inspections	5	5	5	5	6	6	5.5	5	5	5	5	0
DPW - Engineering	3	3	3	3	3	3	3	2	2	2	2	-1
DPW - Highways	8	9	8	8	8	8	15	14	14	15	15	7
DPW - Sanitation	3	3	3	3	3	3	0	0	0	0	0	-3
Health Department	2	2	3	3	3	3	3	3	3	3	3	1
Nursing Department	2	2.5	3	3	3.5	3.5	2.5	2	2	2	2.5	0.5
Other Services												
Council on Aging	2.5	2.5	2.5	2.5	3	3	3	3	3	3	3	0.5
Library	9.5	9.5	10	12.5	13.5	14.5	14.5	14	15.5	15.5	15.5	6
SHGC	0	0	0	9	11	12	11	11	10	7	7	7
Recreation Department	1	1.5	1.5	1	2	2.5	1.5	2	2	2	2	1
Sandwich Marina	5	5	5	5	5	5	5	5	5	5	5	0
DPW - Parks	3	3	4	4	4	5	0	0	0	0	0	-3
Archives	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0	-0.5
GEN. GOVT. TOTAL*	**139**	**141**	**143.5**	**156.5**	**169.5**	**180**	**173.5**	**169**	**171**	**170.5**	**173**	**34**

*Year-Round, Full-Time Equivalent

Town Administrator - The Town Administrator's Office is responsible for handling the day-to-day administrative affairs of the town and for implementing the policies set forth by the Board of Selectmen. The Town Administrator is appointed by the Board of Selectmen and is responsible for the administration and supervision of all town departments and appointed personnel. The Town Administrator is charged with preparing the annual operating budget and capital improvement budget for all non-school departments and accounts. Additionally, the Town Administrator serves as the chief procurement officer responsible for purchasing of all supplies, materials, equipment and services for the town.

Accounting - The Town Accountant's Office is located in the Sandwich Town Hall and responsible for producing and processing payroll and vendor accounts payable for all town departments. The Town Accountant keeps detailed records of all receipts and expenditures of the town and prepares all financial, statistical and operational reports for local, state and federal purposes. The Accounting Office is also responsible for selling cemetery lots for the Town Cemetery on Route 130.

Some of the key issues identified by the Accounting Office are as follows:

- Lack of storage;
- Retirees utilizing more reverse mortgages due to poor savings rates;
- Older residents having difficulties selling homes, creating a mobility issue that is expected to continue for the next 6 to 10 years; and
- The four financial departments (accountant, clerk, collector and assessors) are split but should be located in the same facility.

Assessing - The Assessing Department is located in the Town Hall Annex and comprised of two sections - the Appraisal section and the Assessment Administration section. The Appraisal Section is responsible for the valuation of all real and personal property. In accordance with state law, updated values are certified every third year, with the review of, and approval by, the Massachusetts Department of Revenue. The Appraisal Section reviews all existing values and values all new construction annually. Data quality is reviewed annually by way of a cyclical inspection program that calls for a portion of the town to be visited for any changes. The Appraisal Section is also responsible

for the review of value appeals or abatements on property. The Assessment Administration section is responsible for providing administrative support to the department. Functions include processing requests for abatements and exemptions on real estate, personal property, motor vehicle excise and boat excise. This section also processes all deeds and plans received from the Registry of Deeds, reviews and certifies abutters lists, and answers inquires from the public. Key issues identified by the department are as follows:

- Re-evaluation was completed last year and values decreased and are anticipated decrease further next year;
- The Mirant facility provides approximately 6.5 percent of the entire town's tax base (down from approximately 12 percent ten years ago). This is somewhat due to housing values rising but also to declining values at Mirant. The town needs to expand the tax base; and
- Baby boomers and tax abatements are having a big impact on services and revenues.

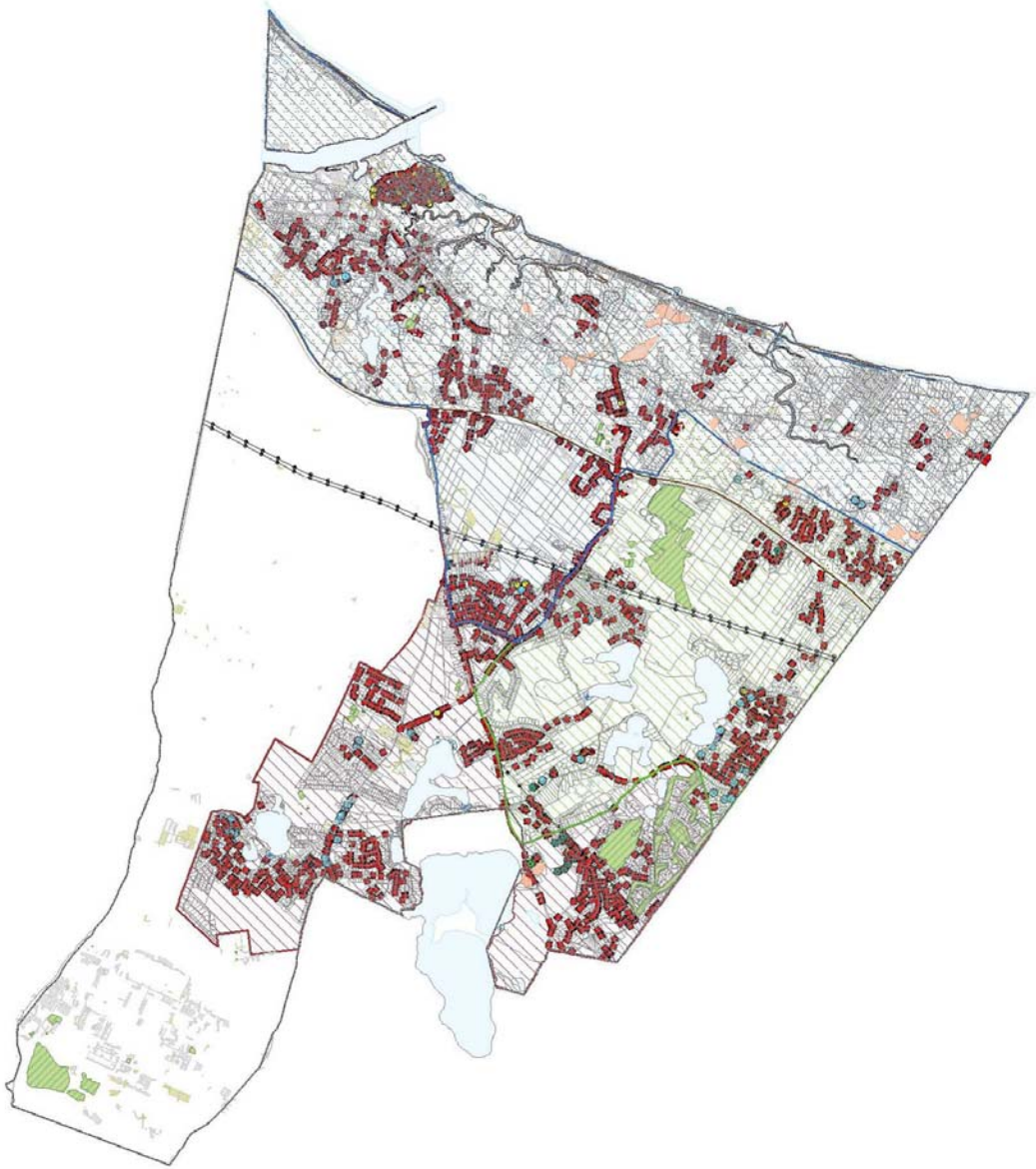
Building - The Building Department is located in the Jan Sebastian Municipal Office Building and responsible for the review of plans for building permits and inspections of new construction to ensure public safety in compliance with the Massachusetts State Building Code, 780 CMR and other applicable codes. The department also oversees the issuance of electrical, plumbing and gas inspections and permits. In addition, the Building Department issues sign permits, enforces the town's Protective Zoning By-Laws and the Old King's Highway Regional Historic District regulations.

Some of the key issues identified by the Building Department are as follows:

- New state codes are creating more inspections;
- Additions and renovations have remained steady while new construction has been off in the last few years;
- A new commercial code is expected to be coming out soon by the state. Municipal aid for inspections is being added to the laws; and
- The department has 1 ½ staff and needs an additional inspector, ½ administration position and a zoning code enforcement officer.

Council on Aging - The Council on Aging (COA) is located in the Human Services Building on Quaker Meetinghouse Road. The COA is responsible for advocating on behalf of Sandwich elders age 60+ and their families in addressing their needs by identifying and developing resources for assistance. The COA provides information, referral, outreach, nutrition and health services, in cooperation with other town departments and area agencies; enhances quality of life for seniors and the community by providing educational, recreation, cultural programs and activities; and sets policy for operation of the Senior Center along with an eleven (11) member Advisory Board appointed by the Board of Selectmen.

Sandwich Public Facilities



Base Map

- Water Bodies
  - Bog
  - Water
- Buildings and Decks
  - Building
  - Deck
- Driveways
  - Paved
  - Unpaved
- Roads and Bridges
  - Bridge
  - Paved
  - Unpaved
- Parking
  - Paved
  - Unpaved
- Sidewalks
- Sports Field
- Pools
- Cemetery
- Railroad
  - Abandoned
  - Active
- Road Centerlines
  - PAVED
  - UNPAVED
- Rivers and Streams
- Fences
  - Fence
  - Guardrail
  - Hedge
  - Retaining Wall
  - Stone Wall
- 2 ft Contours
- Spot Elevations

Town Data

- Parcels
- Voting Precincts
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
- Easements
- Bordering Towns
- Town Boundary
- Assessor Map Grid

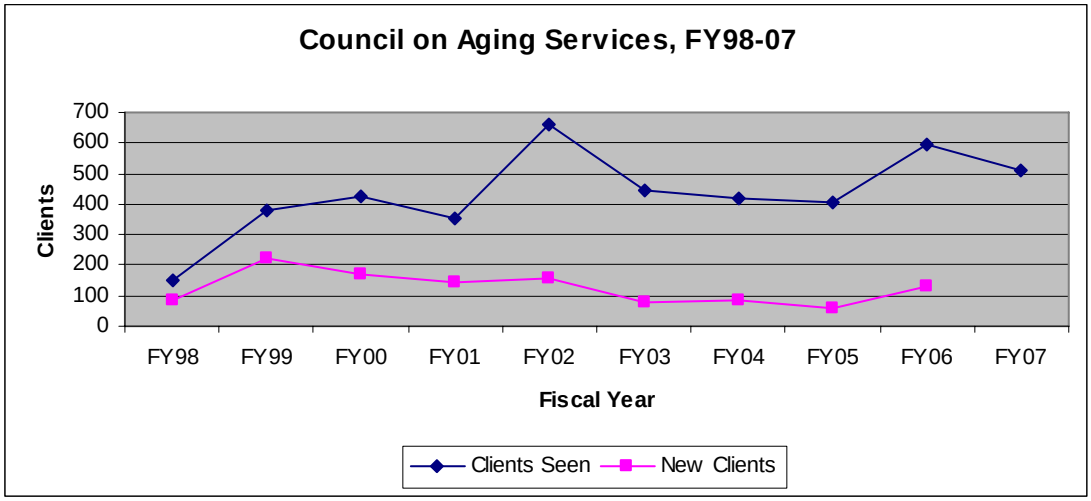
DPW

- Catch Basins and Manholes
  - Inlet
  - Leaching Galley
  - Drain Manhole
  - Leaching Chamber
  - Leaching Pit
  - Outlet
  - Leaching Basin
  - Catch Basin
- School Districts (contact the SD for verification)
  - Forestdale
  - Oak Ridge
  - Wing
- Priority Habitat
- Estimated Habitats
- Seagrass Areas
- Zone II
- Groundwater Table Contours
- Major Marine Water Recharge Areas

Recreation

- Athletic Fields and Golf Courses
  - Field
  - Golf Course
- Historic District
- Open Space
- Trails
- Bike Path
- Boat Ramps
- Points of Interest
- Public Beaches

With a growing elderly population, the COA is very busy and relies on volunteers for support in carrying out services. The COA has been working with an architect on plans for a new Senior Center which is needed to meet the current and future service needs of Sandwich's elderly population.



Facilities Management - The Facilities Management Department is responsible for overseeing the maintenance, repairs and alterations of town property and buildings. The department has only two full time employees to manage a large number of older buildings.

Health (Board of Health) - The Board of Health is comprised of three elected citizens from the community. Board members serve for three years. The Health Department is located in the Jan Sebastian Municipal Building and implements and oversees the policies and regulations as mandated by the Board of Health, the Massachusetts Department of Public Health and the Department of Environmental Protection, with the responsibility of preserving and protecting the health of the community. The Health Department issues permits, licenses and conducts inspections for the following: public swimming pools, retail food establishments, mobile food & ice cream, food service establishments, bed & breakfast's, hotel & motels, septic systems, sewage haulers, septic installers, solid waste haulers, children's recreational camps, cabins, trailers, parks & camps, private drinking water wells, burial permits, funeral directors, stable permits, body massage, body tanning, and body art. Additionally, the Health Department addresses concerns of air quality, noise control, indoor air quality, animal & insect control, food protection, communicable disease reporting and any issues that affect the public's health.

Human Resources - The Human Resources Department is located in the Human Services Building and is responsible for advertising, posting, interviewing and hiring for all positions within the town with the exception of the School Department. Working with the Personnel Board and the Town Administrator, the department works to define and classify job positions, classification systems, and personnel policies and guidelines for non-union employees. In addition, the department is responsible for handling all workers compensation claims for the town including fire, police and school departments. The department also maintains all personnel records for general government employees. Additionally, workshops and seminars are arranged by HR for personnel to assist with professional and personal development. The Director assists the Town Administrator and other department heads in personnel matters as required and actively participates in union negotiations for the five different bargaining units that exist within the general government.

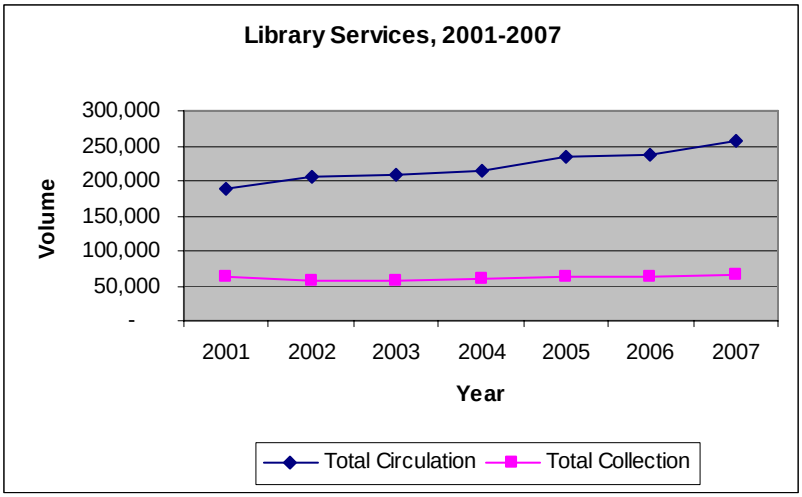
Natural Resources - The Natural Resources Department is located in the Jan Sebastian Municipal Building and administers the daily workload of the Conservation Commission and serves as the Land

Bank Committee liaison. The department is entrusted with developing and implementing conservation land management strategies (including trail development & wildlife habitat diversification); enforcing the town Wetlands Bylaw, Wetlands Protection Act; shellfish management; alewife (herring) run development and management; oil spill response; enforcing other environmental laws and regulations, including shellfishing, fishing, hunting, and trapping; and illegal dumping.

Planning & Development - The Office of Planning & Development is located in the Jan Sebastian Municipal Building and administers a broad range of community development and planning activities. The department assists the work of the Planning Board, an elected body, and the Board of Appeals, the Economic Development Committee and the Local Housing Committee, which are appointed committees.

Public Health Nurse - The Public Health Nurse is located in the Human Services Building and provides the following services and programs: flu clinics, children & adult immunizations, blood pressure clinics, communicable disease follow-up, elderly home visit assessments, maternal child visits, well women's, men's & children's clinics, lead screening clinics, and DME loan closets.

Public Library - The Sandwich Public Library is located on Main Street in the Historic Village and provides the following services to the public: Old Colony Library network, reference, CD-ROM products, financial publications, glass reference collection, interlibrary loan, computerized magazine index, periodicals and newspapers, fax service, video collection, CDs, books on tape, large print collection, homebound delivery, computers and typewriters for public use, book discussion group, coupon exchange, museum passes and many children's resources and programs.



Circulation of materials is currently approximately 257,000 and a total volume of about 66,000 volumes. The library changed networks from CLAMS to OCLN (Old Colony) which has increased circulation. Since 2001, circulation has increased by about 36 percent. According to library staff, the facility is highly overused. They are currently working with a building consultant to identify expansion and renovation options. They are also considering long terms plans for a branch library in South Sandwich where the majority of local users come from.

Town Archives and Historical Center - The Town Archives and Historical Center is located at the Sandwich Public Library and maintains information, records and photographs of historical importance to Sandwich. The collection includes family files, with information on people who lived in Sandwich, general files on Sandwich history, and a collection of photographs. The extensive preserved photograph collection provides a pictorial history of Sandwich and its inhabitants since the late 1800's. The Archives Center also houses the files of the Sandwich Historical Commission's inventory

of historic assets, which includes information on houses in Sandwich, generally those built prior to 1900. Additionally, the Archives Center maintains forms and information on cemeteries, monuments and areas of historical importance.

Town Clerk - The Town Clerk is located in the Town Hall Annex and acts as the town's chief election official, registrar of vital statistics (births, marriages, and deaths), keeper of public records, recording officer, and licensing officer. The Clerk works with the Board of Registrars to oversee polling places and the general conduct of all elections. The Clerk maintains records of adopted regulations, bylaws, oaths of office, appointments and resignations. The office issues state licenses and permits, including marriage, hunting, dog and cat, fishing and trapping licenses. The Clerk's Office also handles passport applications and voter registration. Copies of all town regulations, bylaws and maps are available in this office. The Clerk's Office also responds to inquiries from the public and serves as the central information point for the town. The Town Clerk is an elected position with a three-year term.

Town Collector - The Town Collector is located in the Town Hall Annex in the Historic Village and is responsible for the printing, mailing and collection of all tax bills issued by the town. These include: motor vehicle excise tax, boat excise tax, real estate tax and personal property tax. The Town Collector's office issues and maintains records of all Municipal Lien Certificates to be filed at the Registry of Deeds in Barnstable. This office also collects fees for and issues all transfer station stickers and beach stickers. Real estate and personal property tax bills are issued semiannually but are collected quarterly. Staffing and the lack of storage are key concerns of the Town Collector. More bills and permits are being issued with same number of staff.

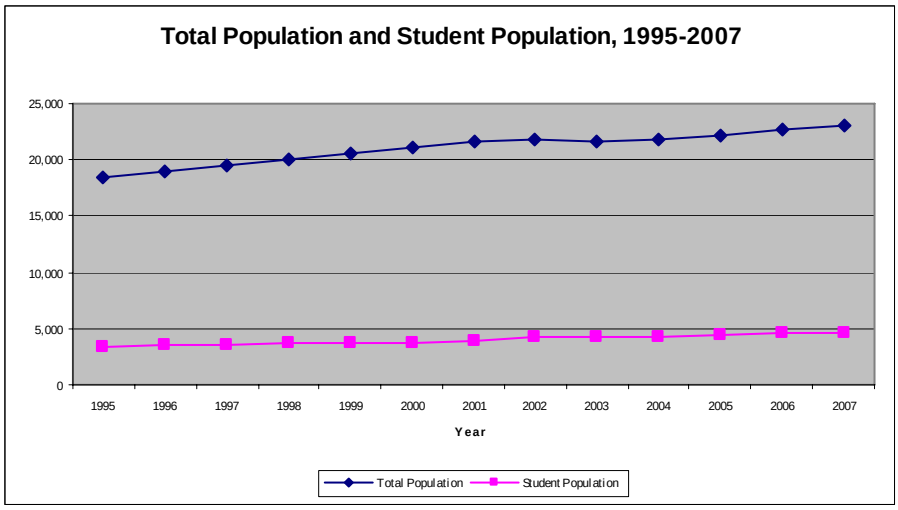
Treasurer - The Town Treasurer is located in the Sandwich Town Hall and receives all money belonging to the town and expends and accounts for it according to the order of the town's authorized officers. The Treasurer performs duties in accordance with Massachusetts General Laws as it relates to the management of all town borrowing and investments; the dispensation of town scholarship and accounts payable checks; and tax title collections, redemptions or foreclosures. The Treasurer's Office is responsible for processing paperwork on new, terminating and retiring employees and for the administration of all employee benefits. The Treasurer's Office also handles the production and disbursement of the employee paychecks for every town and school department. The Treasurer anticipates an impact from the aging baby boomer population in town and 70+ tax abatements are a growing issue.

5.3 Educational Facilities and Services

Sandwich has undergone substantial changes in its educational system in the past 20 years. In 1991, Forestdale and Oak Ridge K-8 schools were built to accommodate the high population growth rates experienced by the town in the 1980s. These two schools both have capacities to hold 780 children. The Wing Elementary School (built in 1927) has a capacity of 850 students, and the high school can accommodate 1,400 students. (The high school had an addition put on a few years ago, which increased capacity. Each of the newer elementary schools has portable classrooms attached) In addition to the four public schools, the Community School Program has had a child care center since 1987. This facility may eventually be incorporated into School Department through the Wing School.

The table below compares total town population with school population. In the 2007/2008 school year, there were an estimated 3,622 students enrolled in Sandwich public schools. Since 1975, the percentage of children within the Sandwich School System has averaged approximately 19 percent of the total town population each year. Despite dramatic town population increases in the 1980s, this percentage has remained consistent. If this trend continues as it has over the last twenty years,

including the time when the town has experienced its largest population increases, it can be estimated that a total of 4,026 school aged children will reside in Sandwich at buildout.



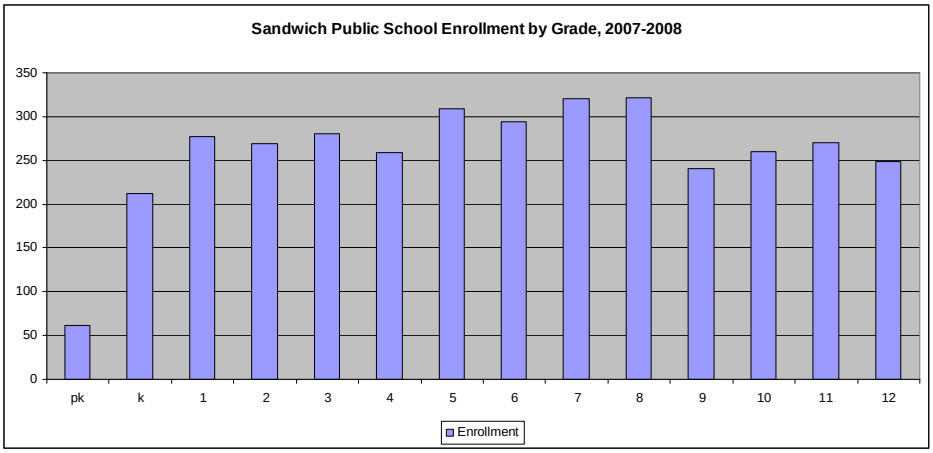
The assumptions presented in the analysis regarding estimated school growth are conservative and are based on the premise that zoning regulations for residential development will continue to limit town population growth which in turn will limit school growth as well. Additionally, the build-out analysis projects that most residential development in the future will occur in specific areas as part of larger mixed use projects, and will be primarily single family attached units (such as condominiums, townhouses, and garden apartments) which tend to have fewer school age residents than detached single family homes. This trend is a departure from Sandwich's past residential development patterns which were predominately single family homes and separate lots.

Sandwich Public Schools Indicators (2006-07)

Characteristic	District %	State %
Grade 9-12 Dropout Rate	2.7	3.8
Attendance Rate	95.4	94.6
Average # of days absent	7.9	9.3
In-School Suspension Rate	0.1	3.2
Out-of-School Suspension Rate	0.1	5.8
Retention Rate (2005-06)	1.2	2.5
Graduation Rate	95.8	80.9
Total # of Teachers (07-08)	239	70,717
Student/Teacher Ratio (07-08)	15.2 to 1	13.6 to 1
Students per "modern" Computer	4.6	3.4
Classrooms on the Internet (%)	100.0	98.7
Plans of High School Graduates (2006-07)		
4-Year Private College	39	31
4-Year Public College	38	27
2-Year Private College	1	2
2-Year Public College	12	20
Other Post-Secondary	1	3
Work	5	10
Military	2	1
Other	1	1
Unknown	1	6

When examining school population growth since 1975, it can be determined that school growth has been cyclic - increasing dramatically in the mid-seventies, leveling in the early eighties, increasing in the mid-eighties, leveling in the late eighties, and steadily increasing during the 1990s and early 2000s. Since 2002, there has been a decline in school enrollment of 593 students or 14% over a six-year period. Over the past fifteen years, the school population has grown on the average of less than 1% per year.

With a declining enrollment over the past six years, Sandwich's schools are slightly below the designed capacity based on state-mandated capacity levels of current school buildings. However, elementary schools continue to have classes in "portables classrooms". Continued growth will require that Sandwich either accommodate additional children in existing structures, or build another school. The build-out analysis projects that over the next 30 years, Sandwich's school population will grow by approximately another 404 students (from 3,622 to 4,026 children in K-12).



The high school has recently made renovations and expanded its stated capacity from 1,000 to 1,400 students. The three K-8 schools have a total capacity of 2,410 students, although enrollments presently exceed that number. The Oak Ridge School, Forestdale School and the high school can be increased in size through additions. Additional spaces, however, cannot be added to the Wing School.

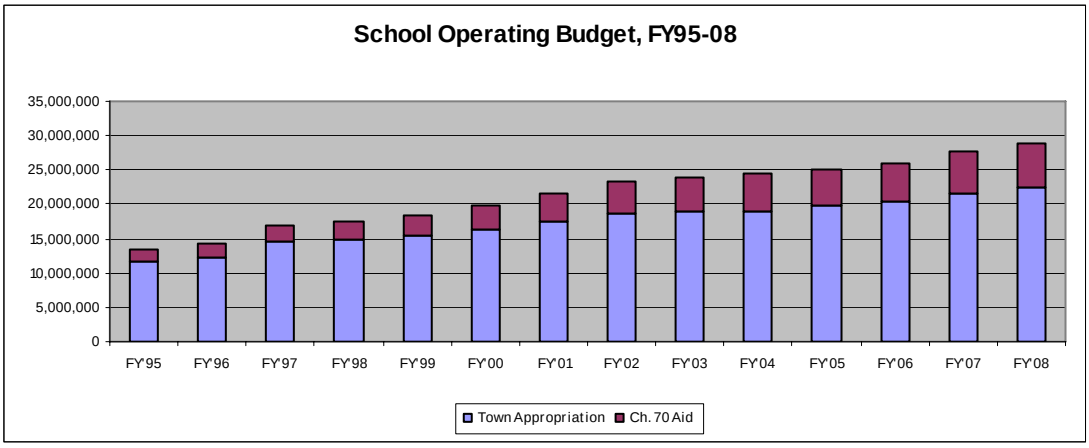
Sandwich Public Schools Capacity and Current Enrollment

Facility	Area	Grades	Capacity	Current Enrollment
Sandwich High School	E. Sandwich	9 thru 12	1,400	1,017
Henry T. Wing School	Sandwich	K thru 8	850	800
Oak Ridge School	E. Sandwich	K thru 8	780	953
Forestdale School	Forestdale	K thru 8	780	850

The Sandwich School Administration is located at the High School. There are an estimated 239 teachers in 2008, as well as administration and support staff. The total school operating budget for Fiscal Year 2008 was just over $29 million. This includes $22.3 million in town appropriations and $6.69 million in appropriation from the state's Chapter 70 fund. Since FY95 school appropriations have increased by $15.5 million(a 115 percent increase).

School administration officials have identified the following key issues:

- New HVAC and roofs are needed on Forestdale and Oak Ridge Schools;
- Oak Ridge School needs improvements to address a wind problem;
- Wing School needs window and roof replacement;
- An energy management system is needed for all school buildings (only the high school currently has one);
- The School Department wants to enter into a performance contract for repair and renovation work on the various schools;
- The Department is evaluating the need for a middle school; and
- A new football stadium at the High School is being evaluated.



5.4 Public Safety Facilities and Services

The continued growth of South Sandwich will drive the need for a relocation of emergency service facilities in the future. As population growth continues, the area south of Route 6 will see rising needs for emergency services relative to other areas of the town. In particular, ambulance and fire facilities will need to be more accessible to the southern part of town. Emergency response times to the far reaches of town have increased to unacceptable limits.

Police Department

The Police Department (SPD) is responsible for providing law enforcement services in the community. The department is comprised of Administration, Detective, Enforcement and Animal Control divisions. The department issues firearm licenses in accordance with state law. The SPD also serves as the town's E911 Public Safety answering point and manages the following programs and services: Community Policing, Bicycle Patrol Team, ATV and motorcycle, COPS in Schools Program, New Horizons After-School Programs for Youth -DARE/School Resource Officers, Elderly Liaison Officer, and Court Officer/Accident Reconstruction.

The police station is located in Sandwich Village on Route 6A. The principle fire station is located next door. Both buildings are located in a FEMA-designated A-zone (flood plain). The police station was built in 1973 and has long been overcrowded. The facility was built for a smaller town population the structure's design has not kept pace with the town's growth over the past 40 years. There has long been a need for either a larger facility or a remodeling of the current structure to provide more record-keeping and interview space.

The police station was built on refilled marsh which has caused sinking and cracking in the building. In recent years the town has spent approximately $500,000 million on renovations including a major renovation to the second floor and a new dispatch center. The department reports that the building's heating system cannot be regulated properly. In 2000, there were plans to build a new station but those plans were dropped. Over $275,000 has been spent on the HVAC and heating system, window replacements, and exterior work recently. These repairs do not completely solve building problems and a new Police building would be desirable.

The Department has a force of 35.5 full-time year-round positions. Staffing levels for the department have changed very little over the past 10 years with only one new full time position since 1998. The force includes 16 full-time officers, 2 detectives, the Police Chief, and 12 permanent interim officers (those that fill in for sick officers and those retiring) or special officers who are primarily retired and work road details. Full and part-time staffing increased from approximately 11 in the mid 1990s due primarily to the availability of federal grants. These staffing additions include 1 full-time officer and 6

part-time officers and administrative staff.

In terms of staffing, the Police Department is very understaffed by general criteria and in comparison to other similar towns both on the Cape and elsewhere. Typically, the department deploys 3 cruisers per shift and no adjustments are made for the summer influx of population and tourists. Additionally, three police officers are currently providing dispatch service. These officers could be replaced by four civilian dispatchers allowing them to return to patrol service in the community.

There are approximately 8,000 to 8,500 legitimate calls each year of which about ¾ are service calls. In 1992, the Police Department responded to a total of 6,164 calls. In 2007, the number of calls responded to rose to 8,578, and increase of about 40 percent over the past 15 years. South Sandwich accounted for most of the police department calls averaging about 48 percent of the total responses in the last 5 years. East Sandwich accounted for about 25 percent of responses and Village about 27 percent of calls. Trends show that the busiest months of the year are typically July and August, and the busiest day is typically a Saturday.

Sandwich Police Department Calls, 1992-2007

Year	Total Calls	Sandwich Village		South Sandwich		East Sandwich		911 Calls	
		Calls	% of Total	Calls	% of Total	Calls	% of Total	Calls	% of Total
2007	8,578	2,467	29%	4,041	47%	2,070	24%	3,119	36%
2006	8,269	2,328	28%	3,928	48%	2,013	24%	3,192	39%
2005	8,574	2,415	28%	4,113	48%	2,046	24%	3,250	38%
2004	8,680	2,295	26%	4,130	48%	2,255	26%	3,160	36%
2003	8,395	2,041	24%	4,144	49%	2,210	26%	2,728	32%
2002	7,725	1,954	25%	3,689	48%	1,905	25%	3,012	39%
1992	6,142	1,842	30%	2,692	44%	1,630	27%	NA	NA

In terms of service, some priorities of the Police Department are traffic safety, community policing, domestic violence, and juvenile programs. There is limited availability of support services, outside of probation, for domestic violence and juvenile issues that can address treatment for the accused and support for the victim.

The accepted standard for the ratio of full-time police department positions to every 1,000 people is about 2.0 to 2.5 officers. With a population of 23,000 full-time residents, Sandwich's ratio is about 1 officer to 648. As with a number of visitor-oriented communities, Sandwich has an extended population including non-resident second homeowners, and seasonal vacationers. This extended population and growing tourism in the region creates a sizable workload for the department's small staff.

In terms of capital needs, the Department has four cruisers that will have to be replaced periodically over the next several years. There is also a need to provide a secured parking area behind the station for police vehicles and equipment. In the long term, the department is very supportive of the possibility of building a public safety complex in South Sandwich (near the intersection of Quaker Meeting House Road and Cotuit Road) that would contain police, fire and rescue services.

Animal Control Officer

The Animal Control Officer is under the direction of the Department of Natural Resources, and is responsible for animal care and protection for the town, and enforces all laws pertaining to animals. The Animal Control Officer handles sick wildlife calls, animal abuse-neglect cases, and education and training for pet owners on basic animal care and welfare.

Fire and Rescue Services

The Fire Department provides fire prevention and control services as well as emergency ambulance services. The Fire Department responds to limit the effects of fire and other disasters, medical emergencies, and to assist neighboring communities through an extensive mutual-aid network. The Fire Chief also serves as the town's Forest Warden responsible for issuing burn permits.

The department's mission is to establish aggressive fire prevention and training programs and develop its service to a level which will provide fire and/or advanced life support equipment with trained personnel at the scene of an emergency incident in 95 percent of Sandwich, 95 percemt of the time, within six minutes of notification of the emergency units.

Sandwich has three stations including the central station on Route 6A in the Historic Village and two fire sub-stations are located in East Sandwich and Forestdale. Central station, adjacent to the Police Department, is located in a FEMA-designated A-zone. The East Sandwich sub-station is un-manned. The department recommends that this sub-station be opened on a full time basis to achieve its mission and reduce current response time to more acceptable levels.

Department apparatus includes two engines, one heavy rescue/engine, a 95-foot platform/ladder truck, four advanced life support ambulances, two brush breakers, one tanker, three boats, and four command and support vehicles. The department's staff consists of 35 career firefighters, five civilian, and eight call firefighter personnel. Since 1998, full-time year round staffing has increased by 9.5 positions. There are eight department staff members on duty (a full shift) 88 percent of the time. The department estimates that an additional eight firefighters are needed for effective respond to increasing calls for service and to improve response time in key areas.

The department primarily utilizes ground water for fire suppression. There are approximately 1,306 wet hydrants connected to the Sandwich Water District distribution lines.

The Department averages about 3,600 calls per year which has increased by approximately 19 percent over the past five years. Most calls are medical-related and the demand for ambulance service has risen steadily over the past 10 years. This can be partially attributed to a rising vehicle accident rate, aging local population, and the increasing year-round population.

Sandwich Fire Department Responses 2002-2007

Year	Total Incidents	Medical Calls	Fire Related	Other Emergencies	Mutual Assistance Provided
2007	3583	2356	123	1104	NA
2006	3434	2314	141	1120	48
2005	3487	2159	174	1154	89
2004	3293	2089	136	1068	58
2003	3204	2020	141	1043	47
2002	3011	1904	164	943	56

The Fire Department has established five response districts including four quadrants representing the NE, NW, SE, and SW regions of Sandwich as well as the Scusset Beach Area on the north side of the Sagamore Bridge and Cape Cod Canal. The majority of calls are ambulance related and located in the northwest quadrant where the central fire station is located, and response time for fire and ambulance are below the six minute goal set by the department. The southwest quadrant (Forestdale) has the second highest number of calls. Response times to this region as well as other areas do not meet the department goals. According to the department, Chase Road is the longest response time for fire and ambulance calls. Response time from the central station is approximately 19 minutes.

Sandwich Fire Department Calls by Response District, 2007

District	Description	Total Incidents	Medical Calls	Fire Related	Other Calls	Average Response Time (Minutes)	
						Fire	Ambulance
District 1	Northwest Quadrant	1433	1006	36	391	5.35	5.09
District 2	Northeast Quadrant	648	410	31	207	8.93	9.07
District 3	Southwest Quadrant	1105	737	42	326	6.94	6.43
District 4	Southeast Quadrant	290	190	16	84	10.53	10.16
District 5	Scusset Beach Area	29	16	3	10	13.33	13.13

Over the next 20 years, several facility and service changes are anticipated. The Fire Department is evaluating possible facilities expansion and relocation needs. In 1988, the "Manpower and Facility Review of the Sandwich Fire Department" study was prepared by MMA Consulting Group. That study examined staffing, equipment, and facility needs for the department. The study recommended a new, centrally-located fire station be built and the present main station be downgraded to a sub-station. The Forestdale and East Sandwich sub-stations were recommended to be sold.

This plan was deemed most feasible and practical in planning for future town growth. The town is shaped similar to a triangle and emergency services should be more centrally located. Lacking a centrally-located station, and realizing a need to improve response times to the South Sandwich/Forestdale area, the department renovated and staffed the Forestdale sub-station. This is not considered to be a permanent solution to reducing response times to all areas of the town.

5.5 Public Works and Transportation Services

Public Works Department

The Department of Public Works (DPW) is located at the town Highway Barn on Route 130 near Route 6/Exit 2. The department is responsible for maintaining all town roads, parks, and cemeteries. It is also responsible for snow and ice operations. The Engineering Department (located in the Jan Sebastian administration building) provides services related to road maintenance, construction inspection, drainage design, and building maintenance and improvements. The Tree Warden is responsible for care and maintenance of all shade trees within the limits of town roads. The DPW also operated the town's transfer station.

The DPW currently has 17 full-time staff (15 employees in the DPW division and 2 in the Engineering division). The department has lost 4 full-time positions since 1998 including 3 in the former sanitation division. It is estimated that DPW needs an additional two to three staff positions including two laborers and one administrative position. The department is below other similar towns in terms of staffing per capita and road mileage.

Sandwich's 148 miles of town-owned roads have been well maintained by the Public Works Department, and approximately 90 percent of roads are in good to excellent condition. The 10 percent of roads in poor condition require large expenditures to reconstruct, reducing available funds for maintenance of good roads. With necessary reconstruction of poor roads depleting funds for road maintenance, roads presently in good condition can be expected to deteriorate to poor or fair condition within five to 10 years according to the Director of Public Works.

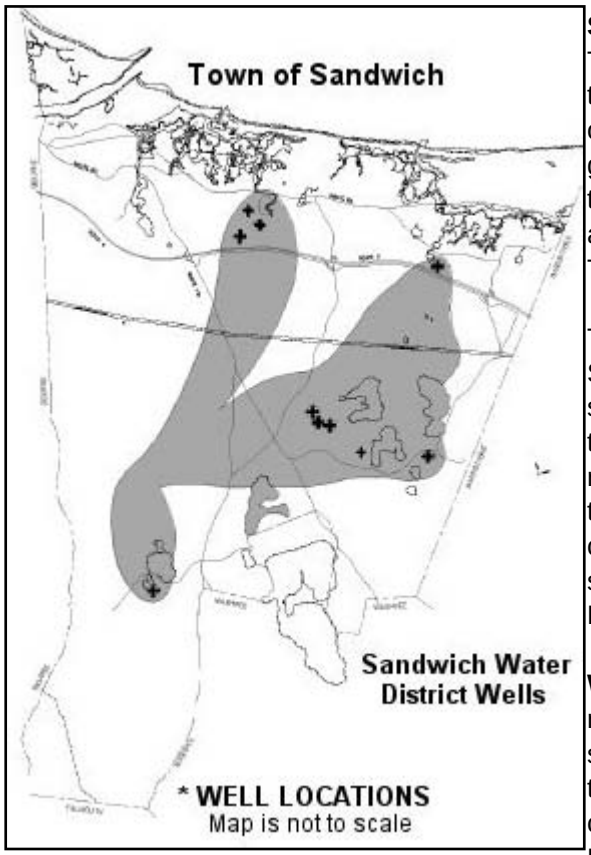
A pavement survey was done several years ago and a recommendation was made for the town to provide funding for regular road maintenance and repair. This would need to be done through an override. Major road projects have been funded by debt exclusions which are bonded for 10 years, but repairs are completed within the first three years. When the bond is paid off, more major road

repairs are needed. Approximately $400,000 by override would be required for routine repairs to keep roads up to standard, and an override for that amount and purpose is recommended in the action plan (this assumes contingent funding from the state in the amount of $600,000).

Solid Waste Management Facilities

Sandwich's municipal solid waste is collected by private haulers or brought by homeowners to the transfer station on Route 130 next to the Public Works Highway Barn. Materials are moved from the Sandwich facility to the Massachusetts Military Reservation where they are consolidated for rail shipment to the SEMASS incineration and waste-to-energy facility in Rochester, Massachusetts. The town's former landfill has been capped and is currently used for composting purposes only. The transfer station is on state-owned land. It was established several years ago and is significantly undersized and unequipped to handle the town's current population and estimated 1,200 trips per day.

The town must continually support and participate in regional efforts to provide recycling and disposal options for solid and hazardous wastes. The town sponsors one household hazardous waste collection day a year, and participates in 3 others in surrounding communities. Construction debris is carried by private haulers to the transfer station and to regional landfills. Continued efforts will also be needed to educate the public on the importance of recycling and proper management of household hazardous waste. The Regional Policy Plan has set a goal of diverting 60 perent of the town's waste from incineration by 2012 (through recycling and composting programs) and the town should work to implement programs that will allow it to meet this regional goal. Sandwich is also participating in regional efforts to construct a septage pretreatment facility at the Massachusetts Military Reserve.



Sandwich Water District

The Sandwich Water District (SWD) was created by the Massachusetts General Court in 1947 and operates independently of the Town of Sandwich government. It is the only public water district within the town. SWD has the power to raise its own taxes and set water rates. The SWD office is located on Tupper Road across from the Town Marina.

The map at left depicts the Sandwich Water District Service Area and its well locations. This system serves only Sandwich and does not provide service to any other communities; however emergency reciprocal arrangements are in place with adjacent towns. This is the only water system in the community. There are no private community systems. The original District was mainly in the Historic Village area of Sandwich.

Water Resource Protection - Since Sandwich relies on groundwater for all of its drinking water supply, there is public concern about this issue in the town. Already one public supply well has been closed due to contamination from the MMR. Expanding the quantity of the water supply is not as problematic in Sandwich as is providing the continued high quality of the water. Sandwich lies over the Sagamore lens, the largest lens of fresh groundwater on the Cape, supplying water to Bourne,

Falmouth, Mashpee, Barnstable, and Sandwich. The quantities of water available from this source exceed those of any other groundwater supply in New England.
Overall, the town's water protection efforts are strong which is essential with about 2,200 households (mostly in East Sandwich) relying on private domestic wells. Through health regulations, the town has enhanced the state Title 5 septic system-to-well separation of 100 feet to 150 feet for lots subdivided in the past 16 years. Water resources, however, may be in jeopardy because of common use of the water supply by surrounding communities, and potential contamination from hazardous chemical spills on the MMR. These threats to the water supply must be considered in future planning and development initiatives by the town as local protection efforts will affect the efforts of surrounding communities. The town should also work to protect public water supplies through more careful land use planning and efforts to control density (refer to page 2-13 for additional information on the potential for pollution threats).

Water Distribution - Today, approximately 75 percent of the land area within town is serviced by the District. Individual private wells service the remaining 25 percent of the town, primarily in the eastern portion of town. In 2006, the Sandwich Water District provided water to 6,643 metered service connections. A total of 5,745 feet of new water mains were installed in 2006 for a system total of approximately 145 miles.

The Sandwich Water District maintains a total of 1,306 hydrants to provide fire protection service.
Fire-protection service has characteristics that are markedly different from other types of water service. The service provided is principally of a standby nature--that is, readiness to deliver relatively large quantities of water for short periods of time, while the total annual quantity of water delivered is relatively small.

The District serves a winter population of 17,000 and an estimated 25,000 consumers in the summer months. The District's ten groundwater wells are located at various locations throughout the town. Connections have also been made with other nearby water districts in case there is a need for additional water supply including the South Sagamore, Centerville, Osterville, and Marstons Mills Water Districts, and the Upper Cape Water Supply Cooperative.[1]

Water Supply - There are six wellfields as part of the Sandwich Water District public supply wells. Combined, the well fields can provide in excess of 6,000 gallons per minute (gpm). The public supply wells and general information regarding them is presented in the table below.

Sandwich Water District Supply Wells

Well Field Name	Location	Pumping Stations	Pumping Yield
Boiling Springs	Off Route 6A	#2, #3 and # 9	#2 and #3 @ 500 gpm
			#9 @ 700 gpm
Pinkham Road	Off Pinkham Rd.	#4, #6 and #10	Each @ 700 gpm
Weeks Pond	Off Robinwood Circle	#5	700 gpm
Nye Pond	Off Old County Road	#7	700 gpm
Holly Ridge	Off Farmersville Road	#8	700 gpm
VanBuskirk	Off Farmersville Road	#11	700 gpm

District Storage Tanks - The District operates five two-million gallon steel and concrete storage tanks. A listing of the storage tanks location and material is presented in the table below.

[1] Sandwich Water District

Sandwich Water District Storage Tanks			
Location	**Material**	**Type**	**Capacity**
Shawme-Crowell State Forest (in Bourne)	Concrete	Storage Facility	2 MG
Quaker Meetinghouse Rd	Concrete	Reservoir	2 MG
Quaker Meetinghouse Rd	Steel	Stand Pipe	2 MG
Grand Oak Cir. Extension	Steel	Stand Pipe	2 MG
Off of Popple Bottom Rd.	Pre-stressed Concrete	Stand Pipe	2 MG

Water Usage – In 2006, the SWD withdrew approximately 642 million gallons of water for all sources. The District withdrew the maximum daily amount of water 4.808 million gallons in August of 2006.

Future Demands from Growth - As part of the build-out analysis performed for the Local Comprehensive Plan, estimates were made of future water demand and an estimated residential, commercial, industrial and municipal water use was calculated. Residential demand increases with the number of users, with the average yearly consumption per household being 65,000 gallons, or a daily average of 178 gallons. Commercial use over the last five years averaged approximately 20,000 gallons per day; industrial use is 5,000 gallons per day; municipal use is at 25,000 gallons per day with a yearly increase reflecting school growth.

At present the SWD obtains its water from five well fields, two of which are multi-well well fields. The water system, because of extreme elevations in the ridge portion of town, is divided into three individual pressure zones. All three zones are connected together with large diameter pipe lines. The capability of moving water between the three zones has been accomplished through the use of either pumps or pressure reducing valves.

Because two of the SWD well fields support more than one pumping station, potential contamination problems could be disastrous to the community's ground water supply. Therefore, the Sandwich Water District relies heavily on the town's Water Resource Protection Zoning By-law and Board of Health regulations to ensure safe drinking water for its future.

At build-out, presuming current zoning and potential mixed use development in selected areas of town (see Section 1: Land Use), there will be a demand for an additional 60 million gallons of water per year. The current use level is over 640 million gallons per year. The current well system has the capacity for approximately 8 million gallons per day. Therefore, water supply capacity appears to be sufficient for future projected growth. Another three to five well sites will be needed to meet this present buildout demand. Working with the water district, the open space necessary to protect zones of contribution for new wells will need to be identified and, if possible, acquired, or protected through zoning.

Adequacy of Existing SWD Supply to Meet Future Peak Day Demands			
Available Supply 24 Hr. Period (MDG)	**Available Supply 24 hr. Period (MDG)/Largest Groundwater Supply Off-Line**	**Available Supply 18 Hr. Period (MDG)**	**Available Supply 18 hr. Period (MDG)/Largest Groundwater Supply Off-Line**
7.970	6.948	5.978	5.211

Potential Future Water Sources - Concerns about the high potential for increased residential, commercial and industrial development have fueled additional concerns about maintaining an appropriate water supply to service a growing community. The Sandwich Water District has already identified the need for additional wells in the near future.

SWD is currently assessing new sources for future public water supplies, both within and outside of the town boundaries. The District, in conjunction with adjacent towns, is considering a future public water supply within the Massachusetts Military Reservation. District plans and studies also point out that an additional potential source of public water should an extreme need arise may be surface water bodies (i.e., ponds) within the town boundaries.

Potential sources of future water supplies include the VanBuskirk Well Field, Massachusetts Military Reservation and other sites yet to be designated with the town. The potential sources are considered adequate to meet future demands and of high quality. Additionally, the District has identified the potential for expansion of several existing tank sites including the following:

- 2 million gallon concrete storage facility within Shawme-Crowell State Forest in The Town of Bourne;
- 2 million gallon concrete reservoir at 343 Quaker Meetinghouse Road;
- 2 million gallon steel stand pipe 290 Quaker Meetinghouse Road;
- 2 million gallon steel stand pipe Grand Oak Circle Extension; and
- 2 million gallon pre-stressed concrete standpipe off Popple Bottom Road on conservation land.

Wastewater Treatment Facilities

There is no public sewer service available at the current time in Sandwich. There are an estimated 8,100 individual on-site septic systems in town of which only 16 have enhanced treatment. All homes in Sandwich are on septic systems and septage is pumped by private haulers and transported and deposited to various facilities (primarily to the municipal facility in Yarmouth). The former Sandwich septage lagoons have been closed since 1993.

Currently Sandwich has no plan to utilize new private sewage treatment plants. New municipal facilities, and possible a limited amount of private development, could be located to use excess capacity in the existing plants at the Forestdale and Oak Ridge Schools. The Sandwich public schools all have small on-site wastewater treatment plants. The location and types of systems are listed in the following table:

Sandwich Public Schools Wastewater Treatment Plants

School	Type of Treatment
Wing School	Biological, anaerobic tanks with chlorination
Oak Ridge School	Biological, aerobic rotating contactors
Forestdale School	Biological, aerobic rotating contactors
High School	Biological, extended, aerated activated sludge with chlorination

The town is currently participating in the Massachusetts Estuaries Program (MEP). Sandwich is within the watershed of numerous embayments with origins in other communities. The town is working together with other communities to reduce nitrogen contributions and towards restoring these estuary environments. Specifically, the town is participating in the studies associated with Popponnessett Bay in Mashpee, Three Bays in Barnstable, and Waquoit Bay in Mashpee/Falmouth.

Plans are underway for the construction of a septage pretreatment facility by the towns of Mashpee and Sandwich at the Massachusetts Military Reservation (MMR). The effluent from the pretreatment facility will discharge to the new wastewater treatment facility constructed by the military. Currently, the MMR wastewater treatment facility has a treatment capacity of 800,000 gpd but services only the reservation. Once construction is completed, the facility will have the capacity to process an average

of 9.5 million gallons of septage per year. Sandwich generated an estimated 1.3 million gallons of septage in 1994. Future wastewater planning efforts should also focus on utilizing the MMR as a shared community wastewater disposal system, clustering as a means to improve existing problems with small treatment systems, and water conservation and alternative technologies as a remedy to reduce wastewater generation. Furthermore, other forms of wastewater systems should be considered, including groundwater discharge permit systems and alternative denitrifying systems (both those under permit as well as provisional). Currently, alternative denitrifying systems are in use at both Sandwich Stop and Shop's, the Riverview School and RHCI. Discussions should be held about the viability of hooking up adjacent parcels to the existing systems.

A centralized wastewater system may be necessary in the future to reduce the town's current nitrogen load and to support future economic development. Based on the build-out analysis, the project sewage generated from new development in town will be approximately 331 million gallons per year at build out in 2038. This is in addition to wastewater generated today by existing development in the community (refer to the June 2003 Barnstable County Wastewater Tools Report for further detailed information).

Stormwater Collection, Treatment, and Discharge Areas

There are three types of stormwater management systems in place in Sandwich. Pre-development drainage structures (pre-1960s era) are mainly in the north side of town and consist of ditched water into low points on the land. There are very few sub-surface drainage facilities in these areas. Approximately 25 percent of the town contains this type of road drainage.

Sub-surface drainage (1960-1970s) comprises approximately 50 percent of the town and is based on sub-surface leaching and catch basins that drain to ponds and streams adjacent to the road or subdivision. There are no drainage lots in these developments, and as these systems fail, the town will need to address the drainage problem. Since the 1980's subdivision drainage systems have been built according to current stormwater standards. The wetlands are identified, drainage lots are set aside, and retention areas are provided. Examples of this type of facility are found in Country Farm, Southfield, and Great Hills subdivisions. They comprise 25 percent of the town's road drainage system.

Some areas in each type of system have problems that were created from poor oversight or poor construction. These problem areas are as follows:

- The Lakewood Hills (into Spectacle Pond) system drains ten streets, which results in a large amount of discharge. Animal coliform has been found in Spectacle Pond;
- The Lakefield Farms (on Great Hill Road) subdivision on 1/2 acre lots discharges into Lawrence Pond. Though this is not as severe as Spectacle, there are nitrate problems in Lawrence Pond;
- Snake Pond-Forestdale Shores contains lots yet to be developed and drainage may cause problems unless carefully managed;
- Mill Creek (and State, Jarves, part of Main Street, and Willow) all discharge into the creek behind the Cape Cod Bank and Trust. There may be a need to better control and monitor all drainage from this area through the use of a basin and dike collection system that allows for settling of sediments and controlled discharge of water onto the wetland area; and
- Town Neck discharge is a large problem area with no easy solutions, but must be addressed for possible effects on shell-fishing.

There are a few other areas in Sandwich including some institutional or commercial areas (e.g., schools and other large buildings with parking lots) that are known to cause drainage problems including the following:

- The Wing School (including Main Street, Pheasant, Land-Morse Street, and the Beale Avenue areas) discharges into Mill Creek and is combined with waste water from the school; and
- Route 6A from Tupper Rd. to the Barnstable Line has very poor drainage in various places along this stretch of roadway.

Stormwater runoff is typically a significant source of nitrogen loading in watershed depending on the amount of impervious surface (roofs, driveways, parking lots, etc.). A recent study estimated the total amount of nitrogen load created by Sandwich in the Waquoit Bay East and Popponnessett Bay watersheds[2]. These estimates are provided in the table below:

Estimated Existing and Future Nitrogen Loading from Sandwich Sources, 2007

Watershed	Wastewater Nitrogen Load (kg/yr)		Non- Wastewater Nitrogen Load (kg/yr)		Total Nitrogen Load (kg/yr)		% Wastewater Nitrogen Load	
	Existing	Future	Existing	Future	Existing	Future	Existing	Future
Waquoit Bay East	4,500	5,400	1,200	1,300	5,700	6,700	79%	81%
Popponesset Bay	12,000	14,000	2,300	2,500	14,000	16,000	86%	88%

To reduce nitrogen loading created by stormwater runoff, the town can encourage Low Impact Design to regulate the amount of impervious surfaces and to reduce the amount of runoff that flows over paved roads. It is also important to note that septic systems area contributor to nitrogen loading that can have an adverse impact on both coastal embayments and public water supplies. Per the EPA and DEP Phase 2 requirements, the Town of Sandwich has developed a stormwater management plan to address both the concerns and benefits of stormwater and its impacts on the town. See *Section 9: Community Sustainability* for more information about specific recommended techniques.

Streetlights - The town owns 250 streetlights. The maintenance and repairs of the equipment is contracted to a private electric service company.

5.6 Parks and Recreational Facilities

Recreation Department - The Recreation Department offers a variety of programs and activities for the youth and adults of Sandwich throughout the year, such as swimming, sailing, tennis, basketball, arts & crafts, cheerleading, football, baseball, soccer, track, 4th of July events, volleyball, lacrosse, ski trips, exercise classes, teen drop-in center, and other special events. The department oversees lifeguards and activities at Snake Pond, Wakeby Lake and Peters Pond Property throughout the summer. The department is also a sponsor of local youth sports leagues. The Recreation Committee advises the Recreation Department on activities. For more information regarding the department and facilities see *Section 7: Open Space and Recreation*.

Sandwich Hollows Golf Club - The town offers challenging and affordable golf at Sandwich Hollows Golf Club. Sandwich Hollows is a beautiful 18-hole, par 71 championship golf course carved from 120 wooded acres of rolling terrain. The lush fairways at Sandwich Hollows were designed to include

[2] Mashpee Sewer Commission Final Technology Screening Report, Sterns & Wheeler, November 2007

some of the most scenic elevations on Cape Cod. The golf course blends the tranquil seclusion of tree-lined fairways with breathtaking open views of Cape Cod Bay. Sandwich Hollows also offers a two-acre grass tee practice range open April through November. The clubhouse at Sandwich Hollows offers casual dining restaurant and a complete function facility with panoramic views of Cape Cod Bay for weddings, golf outings, and social gatherings.

The Golf Course Superintendent has identified the following capital and service needs for the golf course over the next few years:

- Building and facilities improvements that need to be made in the clubhouse. The HVAC system needs to be replaced and ADA compliance requires an elevator; and
- The golf club needs to development other sources of income to maximize revenues.

Sandwich Marina/ East Boat Basin - The East Boat Basin/Sandwich Marina offers residents and visitors with outstanding recreational and commercial boating activities at the Cape Cod Canal of Cape Cod Bay. The Marina offers boaters the following services:

- Recreational and commercial slip leases;
- Transient slip leases;
- Gasoline and diesel fuel sales;
- Boat launch ramp; and
- Winter boat storage

The Harbor Master reports there are over 1,200 transient boat slip visitors each year. There is also a waiting list for recreational slips of over 1,300 which is estimated to be the longest on Cape Cod.

Without intervention, the ratio between the town's population and its available open space will increase. Planning efforts will be needed to estimate the population generated by additional residential development, and determine how much additional open space will be required to maintain the ratio at present-day levels. Adequate open space is necessary to maintain the quality of life in Sandwich and provide appropriate recreational opportunities for residents of all ages. See *Section 7: Open Space and Recreation* for a more detailed discussion.

5.7 Health Care Facilities and Services

Health care for Sandwich residents is provided by numerous physicians located in Sandwich and surrounding towns. Services are presently in a state of flux, as new physicians are increasingly establishing practices in town. The major hospitals that service Sandwich residents include Falmouth Hospital, Cape Cod Hospital, Tobey Hospital, and Jordan Hospital. The Sandwich Nursing Agency provides home care and wellness clinics to the Sandwich population. Several years ago Falmouth Hospital had a trauma center in the medical building on Jan Sebastian Drive. This facility closed, however, and was replaced by an urgent care center, which had walk-in service. This center has since cancelled its walk-in service and requires appointments in advance.

Local business leaders have identified the need for additional high-quality professional office space, including medical office space, and a key to the local economy. A group of local health professionals has also identified a potential need for a local twenty-four hour trauma/primary triage care center with observation rooms.

The Rehabilitation Hospital of the Cape Cod and Islands (RHCI) located on Service Road opened in October of 1995 and services Cape residents as well as patients from off-Cape. The facility includes 60-bed inpatient care and various outpatient rehabilitation services. In addition to the main facility, RHCI has additional medical offices and facilities on Route 130 and Route 6A. Representatives from

RHCI have indicated that they would like to consolidate services at the main facility on Service Road as well as expand facilities and rehabilitation services. This would include inpatient support, pediatrics, new medical office space and additional outpatient facilities. The hospital would also like to develop a retirement facility with different levels of personal care which is significantly needed on the Cape.

5.8 Town Boards and Committees

Board of Appeals - The Board of Appeals is responsible for hearing requests related to special permits and variances from zoning by-laws and the sign code. The Board is appointed for five-year terms by the Board of Selectmen and consists of five regular members and up to four alternate members.

Board of Health – See Health Department (refer to page 8, above).

Board of Selectmen - The Board of Selectmen is comprised of five members elected at large for a three- year term. The Board of Selectmen serves as the chief policymaking body and executive board of the town. They appoint a Town Administrator to carry out the day-to-day operations of the town and appoint members of various standing committees. The Board of Selectmen is responsible for setting guidelines for the preparation of the annual budget and to present the budget to Town Meeting. The Selectmen are also responsible for setting the date and warrant articles for the Town Meeting and any Special Town Meeting. The Board of Selectmen serves as the licensing board for the town.

Capital Improvement Planning Committee - The Capital Improvement Planning Committee (CIPC) is a five-member committee appointed by the Town Moderator for a one-year term. The CIPC is comprised of two members of the Finance Committee and three members at-large. The Town Administrator serves as an ex-officio staff member without the right to vote. The CIPC's charge of duties is as follows: define and study all proposed capital projects and improvements involving major tangible assets and projects. The Committee should focus on long-term capital planning needs relative to timing, cost, prioritizing, funding methodology of these expenditures, and the effect each will have on the financial position of the town. The Committee should prepare an annual report, recommending a capital budget for the next fiscal year and forecasting for the following five fiscal years, and present the report to the Selectmen and Finance Committee for their consideration and to Town Meeting for its approval.

Commission on Disability - The Sandwich Commission on Disability is a five-member committee appointed by the Board of Selectmen. The Commission is charged with assisting in the inclusion and integration of people with disabilities in the activities, services and employment opportunities of the community in accordance with federal and state disability laws. The Commission sponsors the Handicap Parking Enforcement Program, a group of volunteers that document and report handicap parking violations to local authorities.

Conservation Commission - The Conservation Commission is a volunteer board comprised of seven full and three alternate/associate members. The Commission is responsible, through a review and permit process, for administering and enforcing the Massachusetts Wetlands Protection Act and developing, administering and enforcing the Town of Sandwich Wetlands Bylaw, and its regulations. The Commission, through the Natural Resources Officer, manages 1,500+ acres of conservation land, initiates conservation programs, works with the Land Bank Committee to acquire additional lands, procures conservation and agricultural restrictions, and educates local citizens.

Cultural Council - The Sandwich Cultural Council is responsible for re-granting money appropriated by the Massachusetts Cultural Council to individuals and organizations that contribute to the cultural scene of Sandwich. Grant awards are disbursed annually to selected applicants. The Board of Selectmen appoints members of the Cultural Council annually.

Economic Development Committee - The Economic Development Committee (EDC) is tasked with various community development activities in their charge from the Board of Selectmen. The Board of Selectmen appoints the committee for an indefinite term. There are five members representing the business community and the community at large with a member of the Board of Selectmen serving in an ex-officio capacity.

Emergency Management Committee – The EMC **c**oordinates efforts of public safety agencies and relief services during a crisis, develops and updates Comprehensive Management Plan, and operates Emergency Operations Center during a state of emergency.

Finance Committee - The Finance Committee's primary statutory responsibility is to advise and make recommendations to Town Meeting on the budget and other financial matters. The Finance Committee is primarily responsible for reviewing the proposed budget submitted by the Town Administrator and forwarding it to the Board of Selectmen with its recommendations. The Finance Committee is also charged with submitting a written budget report to the Annual Town Meeting and a written report to the Annual Town Meeting and any Special Town Meeting with its advisory recommendations on all financial warrant articles, and the projected tax impact of the proposal. The Finance Committee is a nine member committee appointed by the Moderator with each member serving a one-year term.

Golf Advisory Committee - The Sandwich Golf Advisory Committee is responsible for advising and assisting the Board of Selectmen on matters pertaining to Sandwich Hollows Golf Club operations and facilities. Committee members are appointed by the Board of Selectmen.

Historic District Committee - The Sandwich Old King's Highway Historic District Committee is a five-member board charged with administering the Old King's Highway Regional Historic District Act, Chapter 470 of the Acts of 1973. The Act provides protection for visual character and setting so that all exterior changes to buildings, signs, and other construction are reviewed for congruity, compatibility, and appropriateness with the historic character of Sandwich. The Sandwich Old King's Highway Historic District includes all properties within the area north of the centerline of Route 6 to the Cape Cod Bay low water line, extending from the Town of Bourne to the border with the Town of Barnstable. The Sandwich Historic District also includes that part of Sandwich along the Cape Cod Bay which is on the western side of the Cape Cod Canal. The Sandwich Historic District Committee must approve all exterior changes to structures within the District prior to the commencement of work, including new construction, alterations/additions, demolitions, and painting. This includes construction or alterations to sheds, decks, windows, hedges, signs, walls, walkways, berms, driveway paving and aprons, fences, arbors, light posts, etc. Upon Historic District Committee approval, a Certificate of Appropriateness is issued.

Old Kings Highway Historic District Commission

Year	Applications	Approved Exemptions
2006	215	87
2005	237	84
2002	275	3% denied

Four of the Historic District Committee's five members are elected for terms of four years and must reside in the historic district. The fifth member must be an architect/builder and is appointed annually

by the Board of Selectmen. The Selectmen also annually appoints one person residing in the district to serve as an alternate member of the Committee.

Historical Commission - The Sandwich Historical Commission is charged with identifying, evaluating, and protecting the town's important historical and archaeological resources. The Board of Selectmen appoints Commission members for a three-year term.

Local Housing Committee - The Local Housing Committee's (LHC) mission is to foster the development of affordable housing. The Committee is appointed by the Board of Selectmen.

Community Preservation Committee (Land Bank Committee) - The Sandwich Open Space Committee (commonly referred to as the Land Bank Committee) became the Community Preservation Committee after the town adopted the Community Preservation Act. The CPC is appointed by the Board of Selectmen and charged with acquiring land and interests in land for the protection of public drinking water supplies, open space, and conservation land, the creation of walking and biking trails, and the creation of recreational areas. Funds are made available for these acquisitions through a local 3 percent property tax excise. The membership of the Land Bank Committee is comprised of two members of the Board of Selectmen, two members of the Conservation Commission, a member of the Sandwich Water District and a member of the Sandwich Conservation Trust.

Planning Board - The Planning Board is responsible for hearing applications to subdivide property, site plans from commercial development, and several types of special permits. The Board is elected for three-year terms and consists of seven regular members.

Recreation Committee - See Recreation Department above.

Visitor Services Board - The Visitor Services Board was established by the Massachusetts Legislature in 1997 and revised in 2008. The Board's primary purpose is to recommend to Town Meeting an amount of money to be appropriated for programs and projects that enhance the beautification, recreational resources, public safety, promotional and marketing activities, events, services and public improvements which are of clear mutual interest to the residents and visitors of Sandwich and which strengthen the town as an attractive center for tourism. A portion of funds raised through the local room occupancy tax is deposited annually into the Sandwich Promotions Fund and available for expenditure by the Town Administrator upon approval of the Visitor Services Board. The Board of Selectmen appoints the seven-member committee annually. One member of the Board must be nominated by the Cape Cod Canal Regional Chamber of Commerce, one by the Sandwich Chamber of Commerce, one member by the Sandwich Economic Development Committee, one member must represent the hospitality interests within the town, and three members who are members at large.

Veteran's Affairs - The Town of Sandwich is a member of the Barnstable Department of Veterans Services District and is served by a Veterans Agent. The Veterans Agent assists veterans and their families handle applications for financial and medical assistance, arrange transportation to VA facilities, visits homebound veterans and those in hospitals and nursing homes, provides housing assistance, and advises veterans of the resources of the community and benefit entitlements.

Weights & Measures - The Sealer of Weights & Measures is responsible for inspecting and certifying the operation of commercials scales and fuel pumps in town. This service is provided through a contract with the Town of Barnstable.

5.9 The Tax Base

The average annual new growth for the past 12 years is $576,991. In 2007 this figure was $593,443. During this period the tax rate has gone from $14.23 per $1,000 in value to $9.36. This is due primarily to reappraisals conducted every three years. In FY2007, the average home assessment in Sandwich was $428,600. There has been a significant increase in value over the past 13 years as the average assessed value in FY1995 was $134,000. This represents an average annual increase in home values of over 18 percent (and 218 percent overall) the past 13 years.

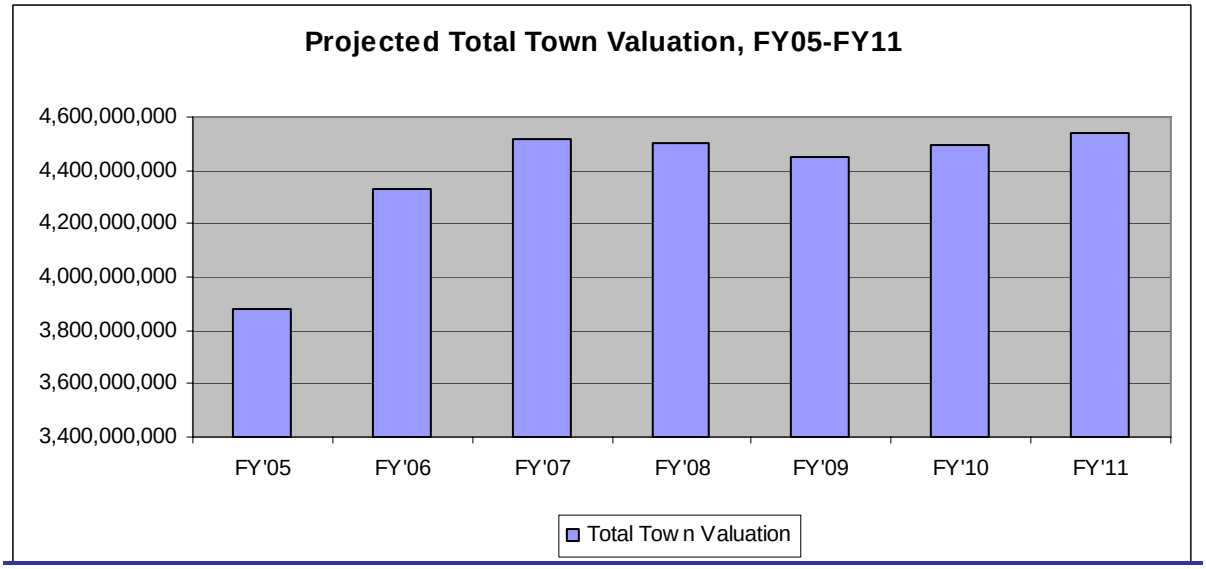
New Growth/Added Property Value in Sandwich, FY95-07

Year	New Growth	Added Growth in Total Assessed Value**	Tax Rate Used*
FY'95	$ 356,541	$ 25,055,587	14.23
FY'96	$ 366,243	$ 25,683,240	14.26
FY'97	$ 802,304	$ 56,026,816	14.32
FY'98	$ 472,171	$ 29,884,241	15.80
FY'99	$ 825,008	$ 51,627,534	15.98
FY'00	$ 462,007	$ 31,644,315	14.60
FY'01	$ 547,982	$ 38,320,420	14.30
FY'02	$ 618,745	$ 46,175,000	13.40
FY'03	$ 612,031	$ 47,591,835	12.86
FY'04	$ 616,694	$ 52,306,531	11.79
FY'05	$ 641,794	$ 62,920,980	10.20
FY'06	$ 602,373	$ 63,141,824	9.54
FY'07	$ 593,443	$ 63,402,030	9.36
Ave. Annual New Growth	$ 578,257		

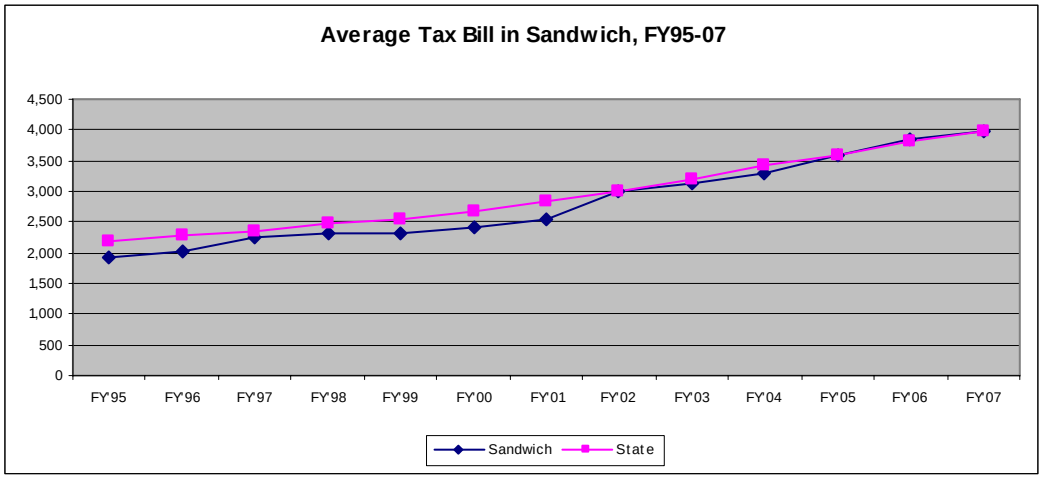
*Calculation of Growth based on value

** adjusted between Fiscal Years, times prior year tax rate

The following chart illustrates the past and projected total assessed valuation in Sandwich. In FY07 this figure exceeded $4.5 billion. This chart combined with the table above illustrate that as the total assessed valuation increases the tax rate decreases, even though tax bills do not necessarily decrease.

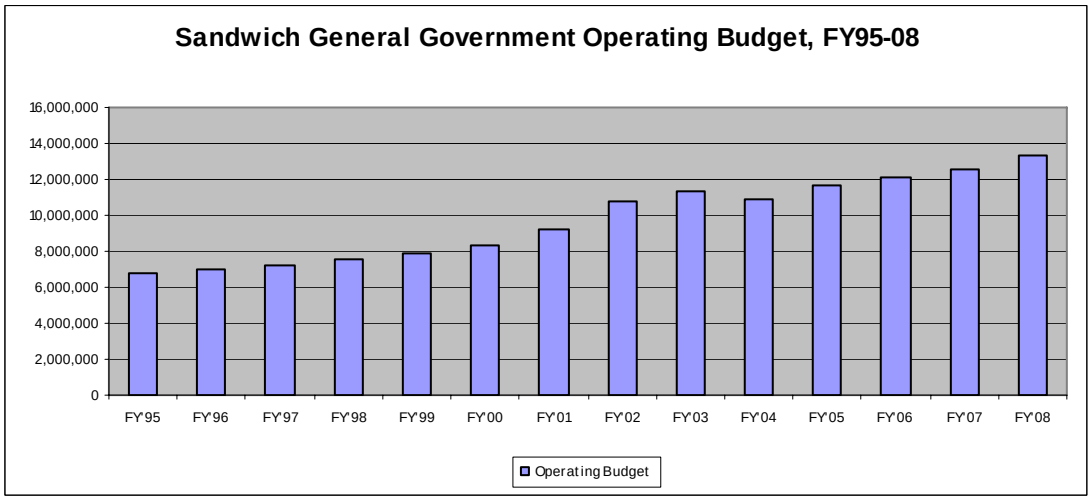


The average annual tax bill in Sandwich in 2007 was $3,986. Over the past 13 years, the tax bill has risen by an annual average of $172 dollars or 9 percent. In comparison to the state, Sandwich has been below the state average except for the last 2 years. In 2007, Sandwich ranked 114th out of 339 municipalities reporting.



The general government operating budget increased from $6,833,129 to $12,549,216 over the past 13 years, or an 83.65 percent increase. This equates to an average annual operating budget increase of 6.97 percent. The School Department operating budget has increased from $13,485,104 to $27,691,505 over the past 13 years, or a 105.35 percent increase. This equates to an average annual operating budget increase of 8.78 percent. The Upper Cape Cod Regional Vocational Technical School operating budget has increased from $280,655 to $1,261,967 over the past 13 years, or a 349.65 percent increase. This equates to an average annual operating budget increase of 29.14 percent. Increases in health insurance costs have taken a major bite out of the operating funds available to the town, increasing annually be an average of 17.85 percent over the last 13 years.

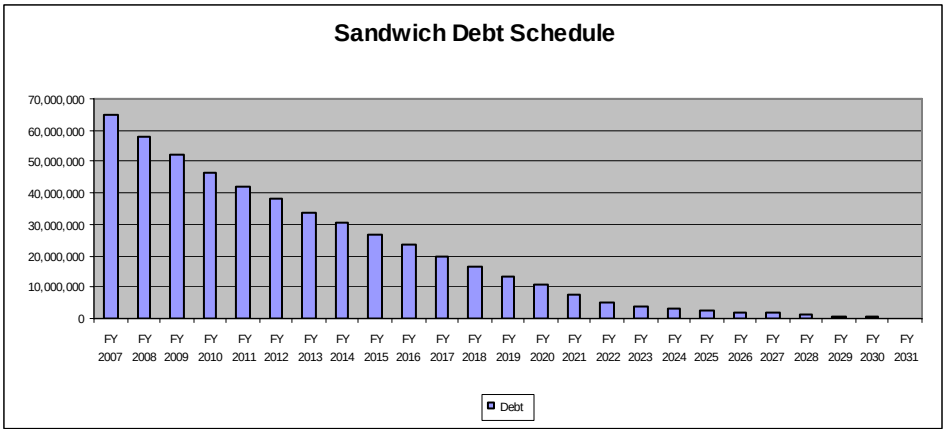
While the town tax bill is about average in comparison to the state, local residents may be having greater difficulty paying for public services and facility improvements. The average household income for the Sandwich families appears to be close to the average for the state at $61,000 according to the most recent federal census data. A closer look, however, reveals that the average personal income in Sandwich is well below the state average at $31,000. There may be a significant number of individuals in Sandwich working more than one job to make up that average household income.



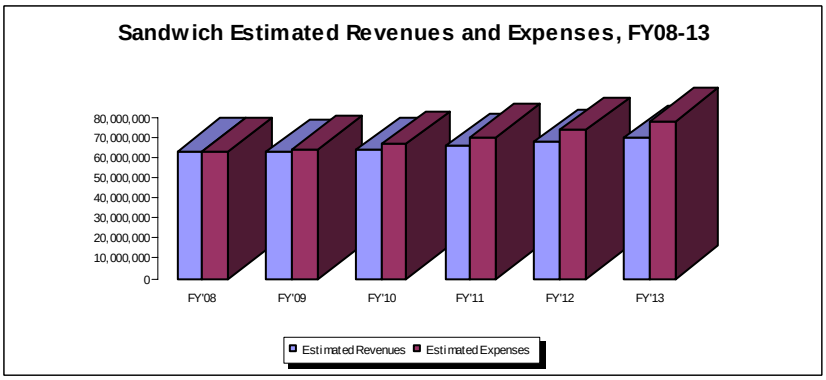
In Fiscal Year 2006, over 87 percent of the town's taxes are being paid by homeowners as opposed to commercial, industrial, and personal property taxpayers. This has been a consistent trend over several years. The historical reliance on a single, private taxpayer (the Commonwealth Electric/Mirant Canal power plant) to provide a large share of the town's taxes over the past 40 years has changed significantly. One of the long-term challenges for Sandwich is the need to expand its non-residential tax base and manage demands for all town services, especially educational costs and related State funding.

5.10 Capital Improvement Planning

During the growth periods of the 1970s and 1980s, stress on the operating budget resulted in deferred maintenance and repair of town buildings. Over the past ten fiscal years, there has been a concerted effort to repair buildings and replace equipment as funds have become available. The figure below illustrates this commitment to capital improvements made through municipal bonding. (The figure represents debt schedule, but not all debt is related to capital facilities improvements).
In 2001, the town authorized a bond of $1.255 million for building repairs that would address the most critical priorities. Work on these projects is substantially complete. However, the projects approved by the town were only those that were most critical. Expenditures for various capital purposes are often subject to funding by overrides, many of which have failed, however ongoing evaluation and commitment to building maintenance and repair is necessary to avoid further deterioration.



The town does an excellent job of capital planning. Each year the Town Administrator and the Board of Selectman update and adopt the Long Term Financial Plan. This plan includes a description of town departments and committees, recent budget history & 5-year projections, tax levy & tax bill history, local receipts, fees & account balances, demographic & school enrollment history, and related budget Information. According to the Long Range Plan, Projected revenues and expenses in Sandwich between Fiscal Year 2008 and 2012 are illustrated in the figure below.



The most recent Long Range Plan identifies the following capital budget projects between Fiscal Year 2008 and 2012:

Sandwich 5-Year Preliminary Capital Budget Fiscal Year 2008-2012							
Projects	**Projected Amount**	**Funding Source**	**FY'08**	**FY'09**	**FY'10**	**FY'11**	**FY'12**
Capital Budget:	-						
>$10,000	$ 5,351,600	Capital Plan	$984,500	$1,935,100	$1,535,500	$846,500	$50,000
<$10,000	$157,300	Capital Plan	15,500	68,900	56,900	16,000	0
*Capital Reserve Fund		Capital Plan	0	0	0	0	0
Capital Budget Expenses	**$5,508,900**		**$1,000,000**	**$2,004,000**	**$1,592,400**	**$862,500**	**$50,000**
Other Capital Expenses:	-						
Upper Shawme Dam Replacement	$400,000	CPA	0	0	0	0	0
High School Track	$500,000	CPA	500,000	0	0	0	0
Old Harbor/Beach Management Plan	$1,000,000	Debt Excl.	0	1,000,000	0	0	0
Road Maintenance, Impr.& Rehab	$600,000	Override	0	0	0	0	0
Sandwich Hollows Irrigation System	$600,000	Debt Excl.	0	0	0	0	0
Sidewalk Construction (Various)	$250,000	Capital Excl.	0	0	0	0	0
Town Property Driveway Repairs	Unknown	Unknown	0	0	0	0	0
Other Capital Expenses	**$3,350,000**		**$500,000**	**$1,000,000**	**$ -**	**$ -**	**$ -**
Future Muni & School Buildings:			-	-	-		
Municipal Building	$10,637,500	Debt Excl.	0	0	0	0	0
Joint Public Safety Building	$12,017,500	Debt Excl.	0	0	0	0	0
Senior Center	$4,600,000	Private	0	0	0	0	0
Branch Library	$8,625,000	Debt Excl.	0	0	0	0	0
Community Center	$7,618,750	Debt Excl.	0	0	0	0	0
Schools	$ 1,525,900	Unknown	0	0	0	0	0
Future Building Expenses	**$45,024,650**		**0**	**0**	**0**	**0**	**0**
TOTAL CAPITAL EXPENDITURES	**$53,883,550**		**$1,500,000**	**$3,004,000**	**$1,592,400**	**$862,500**	**$50,000**

**Funds to be held for emergency/reserve purposes until released by CIPC and Town Administrator.*

5.11 Municipal Facilities and Services Challenges

Sandwich faces many challenges relative to maintaining, constructing, and replacing capital facilities for the next ten years. Build-out is projected to occur sometime around the year 2037 for commercial and industrial development, but the next ten to fifteen years will be a critical growth period for residential development.

Perhaps unlike other growth periods in its history, Sandwich is not only planning for accommodating future growth, it is also in the position of having to accommodate unprecedented growth that occurred over the past decade. The positive side of this issue is that at the completion of the next ten years, most, if not all, the major capital facilities required to support the buildout population will be complete.

The major challenge Sandwich faces is to provide additional capital facilities and infrastructure improvements at a rate that will have the most predictable effect on the tax rate; that is to say, at a rate that is even enough that taxpayers can plan enough in advance for what is required to achieve capital improvement goals. To complete necessary projects and provide enough money to accommodate routine repairs and maintenance of equipment will, unfortunately, require a monetary commitment that may place a strain on taxpayers' fiscal ability. However, having in place a ten-year plan that will achieve the capital improvements needed for a buildout population will hopefully engender community support through the upcoming fiscally difficult years.

The following municipal facilities and services will need to be addressed in the near future:

Education - Space for approximately 400 additional students will be needed for the projected build-out population. This number translates into approximately 24 additional classroom spaces (25 spaces per classroom). There are several potential options a future School Building Committee can consider for adding these spaces:

A. Build one new elementary, K-8, or middle school (depending upon selected educational plan);
B. Add classroom spaces to Oak Ridge and Forestdale K-8 existing schools. However, there exists the potential adverse impact on educational quality inherent in having unusually large schools; and
C. A combination of a new building and addition. Other planning and scheduling options such as year-round schools or double sessions.

Municipal Facilities - Municipal services are scattered over a number of different locations, causing frustration to those taxpayers and government officials who must communicate with more than one department frequently. Having all municipal government and permitting departments within the same building would maximize efficiency and probably reduce some duplicated operating costs. Most importantly it would improve the delivery of public services to the community.

Additionally, outdated public safety buildings and the necessity for having emergency services located more closely to the geographical center of town, create the need for a new combined public safety building. This building would be designed to dispatch both fire/emergency and police personnel from a central location.

Despite the additional space created by the recent Library addition, the increasing demand for a variety of Library services suggests that the Library will outgrow its current space toward the end of the Ten-Year planning period.

Roads - Of the approximately 94 percent of roads that are presently in good condition, 34 percent are category #3 roads, or roads that will shortly need extensive repairs to maintain their condition. Without the ability to maintain and improve these roads, the number of roads that will deteriorate into poor condition will escalate. The DPW proposes a five-year plan to improve the condition of these marginal roads.

Waste Management Facilities - In 1989 the town completed construction of a solid waste transfer station and has entered into an agreement to build a septage pretreatment facility with Mashpee on the Massachusetts Military Reservation. Still remaining, is the landfill capping, at a cost of $2 million, and payment of a $1 million wastewater treatment facility bond. After the ten-year planning period, the town can expect to have additional, unspecified, costs associated with the wastewater facility and/or sewering.

Water Protection, Land Acquisition, and Open Space - An important priority for land acquisition is the protection of future water supplies. Parcels, carefully selected to coordinate with the position of proposed new wells, should be considered for acquisition. Furthermore, an open space plan that includes land acquisition, as well as modified zoning that preserves open space, can potentially reduce land available for residential development.

Stormwater Management - Problem areas identified earlier should be evaluated and addressed. A plan to deal with the most pressing drainage problems should be developed and initiated. Land use regulations should also be revised to adopt best management practices and low impact design standards.

Capital Equipment Replacement - Historically, the town has struggled to meet ongoing capital equipment needs due to tight fiscal times subsequent to the passage of Proposition 2 ½. Concerted effort has been made recently to allocate at least $400,000 annually for replacement of capital equipment. Despite this annual allocation, some department requests continue to be postponed. After discussion with department heads and submission by them of their ten-year capital needs, a more appropriate ongoing amount for capital equipment replacement should be established to achieve capital planning goals.

An option to consider, which has been done in other towns, consists of creating an Infrastructure Investment Fund (IIF) or District Improvement Financing (DIF). Beginning with a designated amount in the created IIF fund plus the amount of money required to pay proposed or existing non-exempt debt in the first year of the fund, the town would continue to raise taxes to that level, even though debt payments decrease. For example, if the town were to have a payment of $300,000 in principal and interest on debt in the first year of borrowing, that $300,000 would be collected in all subsequent years, even though the actual amount required to pay the debt would be decreasing. This “captured” money would be added to the infrastructure Investment Fund for future capital projects. This plan would both eliminate fluctuations in the debt portion of the tax rate, and would create a mechanism for having funds available to pay for future small capital projects without dramatically increasing the tax rate. An independent board would supervise the investing and expenditures from the fund. The DIF option is discussed in *Section 3: Economic Development*.

6.0 Housing and Neighborhoods

Contents

6.1 Introduction and Background

6.2 Housing Inventory and Trends

6.3 Housing Needs Assessment

6.1 Introduction and Background

This element of the Local Comprehensive Plan is designed to define the Town of Sandwich's goals of providing quality neighborhoods and of achieving and maintaining affordable housing for our residents. This includes a detailed Action Plan for achieving that goal which is included in *Section 10: Implementation*.

Background

The Town of Sandwich has many amenities that have caused the town to grow at a rate greater than anticipated. This rapid growth, compounded by the high cost and limited availability of land, has made Sandwich a costly community in which to live. While the higher values have resulted in increased property assessments and tax revenues, higher housing costs have had a negative impact on the low- and moderate-income residents and families, including our teachers, town employees, retail workers, and service workers.

Sandwich experienced rapid growth in the 1980's, bringing it much closer to "build-out" than had been anticipated. In fact, Sandwich is estimated to be "built-out" at 10,000 units while there are currently about 9,300 units. The overwhelming majority of the units built are single-family, detached homes on large lots, further hindering the construction of affordable homes. The residents of Sandwich have a higher household income, thereby increasing the overall median income of the town.

In 1988, in an effort to increase the affordable housing stock, Town Meeting approved two zoning measures designed to serve as incentives to create affordable housing in the community. These initiatives, an Accessory Dwelling Unit By-law and an Affordable Housing/Conditional Density Program, have been sparsely utilized and have not provided enough of an incentive for developers and homeowners to create new affordable housing due to the lot size and percentage affordability requirement (50 percent).

In 2000 the Board of Selectmen created the **Local Housing Committee** in recognition of the escalating housing market, making affordable housing a higher priority for the town. Later in the year the Sandwich Local Housing Committee stated that the provision of affordable housing in Sandwich was vital to the well being of the town and its residents and that a long-term community education campaign was pivotal to realizing such development.

In the spring of 2002, the Town of Sandwich hired Karen Sunnarborg to develop updates to the Town's **Housing Needs Assessment**, completed in 1997, and the **Housing Action Plan**, completed in 1998. This work included the following specific tasks:

- Inventory of existing housing and housing types;
- Current demographic and population figures;
- Cost analysis of existing market conditions;
- Analysis of income categories;
- Analysis of the obstacles to affordable housing;
- Needs that result from the above factors;
- Review of existing programs, resources, regulations and by-laws;
- Determination of the most appropriate government and community actions necessary to address the most pressing housing needs; and
- Review and analysis of existing housing needs assessment and action plan.

Subsequent to the completion of the updated Housing Needs Assessment and Housing Action Plan, the Town of Sandwich determined that it required more comprehensive information,

including fleshed-out housing strategies, to guide its work in promoting affordable housing over the next decade. Pivotal to this work was a public process that would enable Sandwich residents to have input into the development of the Plan and help define a community vision for affordable housing in all areas of Sandwich. With the assistance of the housing consultant, the town conducted this planning process in early 2003 which included engaging the town in a dialogue about the need, location and form of affordable housing in Sandwich. Based on input from public workshops, the Sandwich Housing Needs Assessment, the Regional Policy Plan Recommended Town Actions, the Community Housing Plan was completed.

The Housing and Neighborhoods Element fully incorporates and updates the *2004 Community Affordable Housing Plan* prepared by Karen Sunnarborg for the Local Housing Committee.

Defining Affordable Housing

There are a number of definitions of affordable housing, as various federal and state programs target specific criteria. For example, the federal government identifies units as affordable if gross rent, which includes the costs of utilities borne by the tenant, is no more than 30 percent of a household's net or adjusted income with a small deduction per dependent, for child care, extraordinary medical expenses, etc. or if the carrying costs of purchasing a home, including mortgage, property taxes and insurance, is not more than 30 percent of gross income. If households are paying more than these thresholds they are experiencing housing affordability problems, and if they are paying 50 percent or more for housing they are defined as having severe housing affordability problems.

Affordable housing is also defined according to percentages of median income for the metropolitan statistical area (MSA), and most housing subsidy programs are targeted to particular income ranges depending upon programmatic goals. Extremely low-income housing is directed to those earning at or below 30percent of area **median family income (MFI)** as defined by the U.S. Department of Housing and Urban Development. For the Barnstable MSA in 2008**,** $74,000 is the median family income and $22,200 represents 30 percent of the MFI for a family of four. Very low-income is defined as households earning less than 50 percent of area median income**,** $37,000 for a family of four, and sometimes 60 percent of area median income is used for particular low-income programs**,** $59,200 for a four person household. Low-income generally refers to the range between 51 percent and 80 percent of area median income, $48,250 for a family of four at the 80 percent level. Moderate-income is typically from 81 percent to 100 percent, and sometimes 110 percent and 120 percent of median income. Middle-income is typically defined by the state's Executive Order 418 as incomes of up to 150 percent of area median income for a family of four.

In general, programs that subsidize rental units are targeted to households earning within 60 percent of median income for a family of four. However, first-time homebuyer programs typically apply income limits of up to 80 percent of area median income. It is worth noting that approximately one-third of Sandwich's households are likely to be income-eligible for affordable housing using 80 percent of area median income level.

The state typically counts a housing unit as affordable if it is subsidized by state or federal programs that support low- and moderate-income households at or below 80percent of area median income. Chapter 774 of the Acts of 1969 established the Massachusetts Comprehensive Permit Law (Massachusetts General Laws Chapter 40B) to facilitate the development of affordable housing for low- and moderate-income households (defined as any housing subsidized by the federal or state government under any program to assist in the construction of low- or moderate-income housing for those earning less than 80 percent of median income) by permitting the state to override local zoning and other restrictions in communities where less than 10

percent of the year-round housing is subsidized for low- and moderate-income households. Additionally, most state-supported housing assistance programs are targeted to households earning at or below 80 percent of area median income, some at lower income thresholds.

Planning for Future Needs

In the spring of 2008, Sandwich had 270 units of affordable housing, or 3.56 percent of total housing units. In order to achieve the goal of the citizens of Sandwich and the Commonwealth, another 800 units will have to be created. It is unrealistic to assume that half of all new units built will be affordable, therefore it is imperative that strategies be implemented to locate and designate affordable housing. The specific goal is to create and maintain a minimum of ten (10 percent) percent of total housing units as affordable housing by January 1, 2017.

In order to meet the overall goal, address the range of local housing needs, and maintain better control over affordable housing development, the Town of Sandwich needs to follow the **Planned Production Program** laid out in the Action Plan which estimates that at least 130 new affordable units need to be constructed annually over the next 10 years. While this is a very ambitious plan that will take considerable resources, it is essential that the town address housing needs as strategically as possible to best leverage the investment of its limited resources and guide new development for the benefit of existing residents and future generations.

6.2 Housing Inventory and Trends

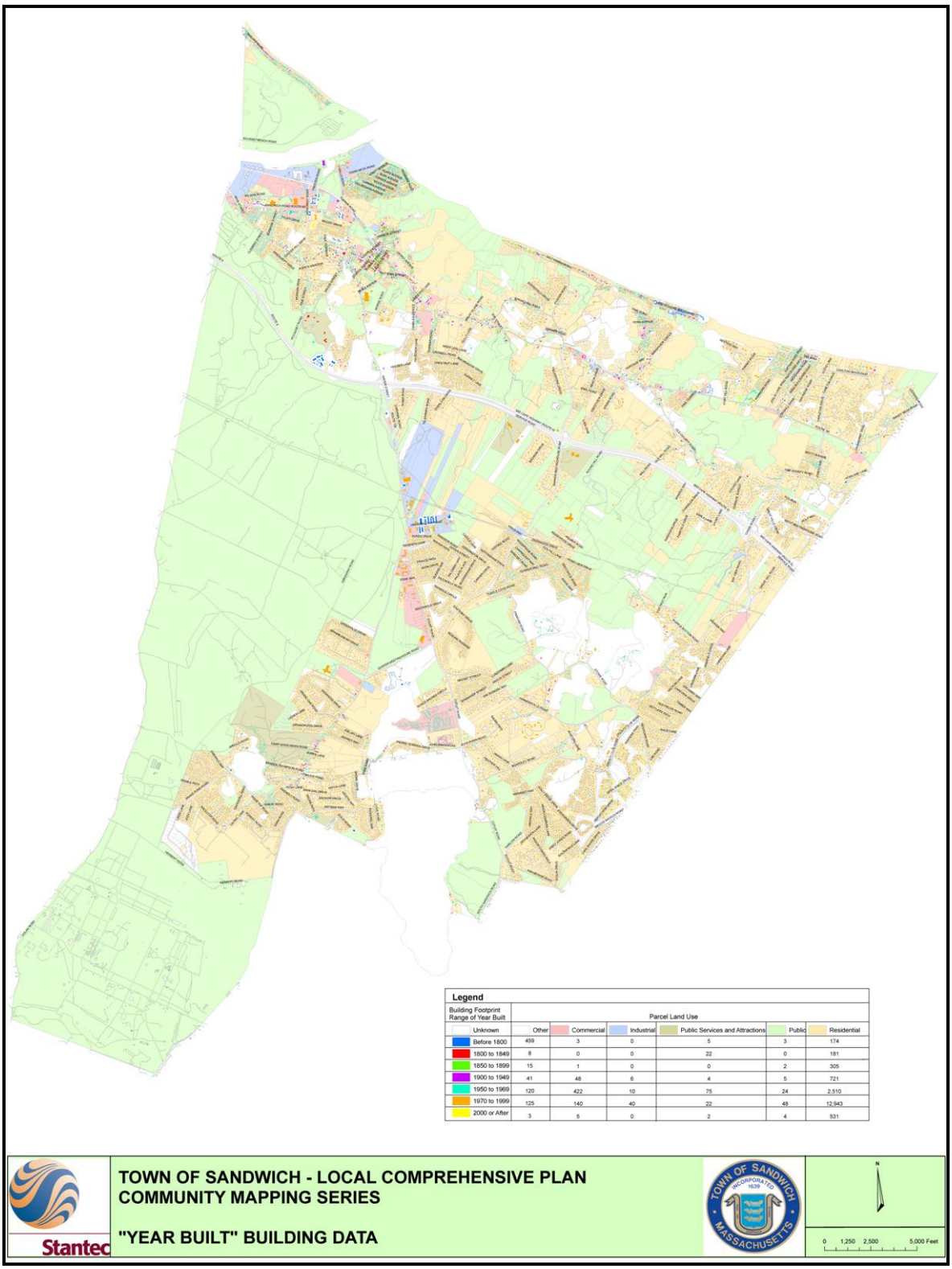
General Trends and Conditions

The 2000 census counted 8,748 total housing units in Sandwich, up 21 percent from 7,236 units in 1990 and an increase of 101 percent since 1980 when there were only 4,358 units. The town estimated that in Fiscal Year 2007 there were a total of 9,287 dwelling units. Since 2000, this represents an increase of 1,012 new units, and 11.6 percent increase in total housing stock.

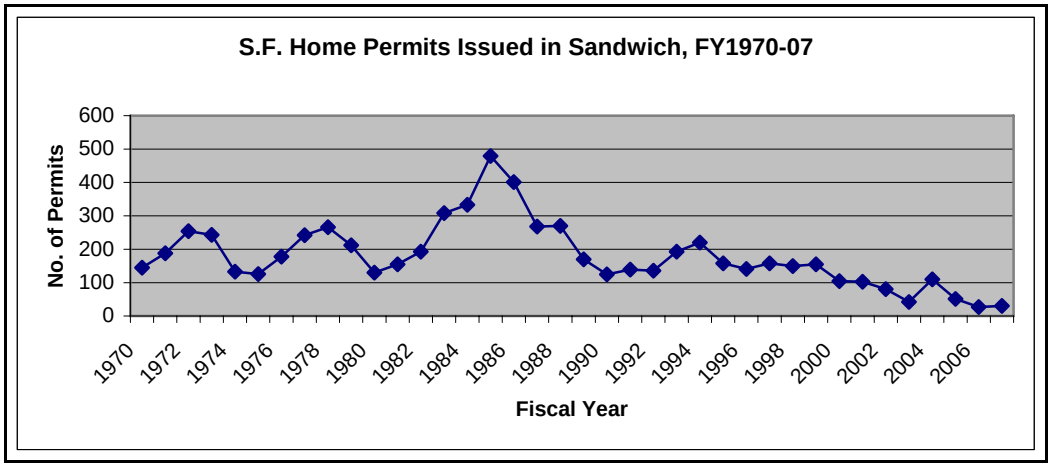
Sandwich Housing Units, Fiscal Year 1995 to 2007

Fiscal Year	Units	Change	percent Change
FY'95	7,584		
FY'96	7,784	200	2.64percent
FY'97	7,935	151	1.94percent
FY'98	8,116	181	2.28percent
FY'99	8,275	159	1.96percent
FY'00	8,409	134	1.62percent
FY'01	8,531	122	1.45percent
FY'02	8,659	128	1.50percent
FY'03	8,758	99	1.14percent
FY'04	8,959	201	2.30percent
FY'05	9,052	93	1.04percent
FY'06	9,156	104	1.15percent
FY'07	9,287	131	1.43percent
Total Change		**1,703**	**22.46percent**
Average Annual Change		**142**	**1.87percent**
Change between FY98 and FY07		**1,171**	**14.43percent**

Source: Sandwich Long Range Plan, 2007


Legend
Building Footprint Range of Year Built
Parcel Land Use
Unknown
Other
Commercial
Industrial
Public Services and Attractions
Public
Residential
Before 1800 459 3 0 5 3 174
1800 to 1849 8 0 0 22 0 181
1850 to 1899 15 1 0 0 2 305
1900 to 1949 41 48 6 4 5 721
1950 to 1969 120 422 10 75 24 2,510
1970 to 1999 125 140 40 22 48 12,943
2000 or After 3 5 0 2 4 531
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
COMMUNITY MAPPING SERIES
"YEAR BUILT" BUILDING DATA
TOWN OF SANDWICH
INCORPORATED 1639
MASSACHUSETTS
N
0 1,250 2,500 5,000 Feet

This high rate of growth is evidenced in the numbers of single family home building permits issued over the past several decades, with almost 2,000 permits approved in the 1970's, 2,700 permits in the 1980's, and 1,575 permits approved during the 1990's. Since 2000, there has been a significant drop-off of permits as land becomes scare and more costly, and the town approaches its build-out capacity.



Since 1970 a total of 6,818 building permits for new single-family homes have been issued, representing an average of 179 permits annually and ranging from a high of 479 permits in 1985 to a low in 2007 with only 27 permits.

This significant decrease in construction since 2000 is likely related not only to dramatic increases in the costs of property, but also to the relative reduction in the amount of land most amenable to development. Additionally, more residents are choosing to remain in their current homes due to the prohibitive costs of "buying up".

Key Housing Characteristics

According to the 2000 Census, 88percent of all housing units were owner-occupied units and the remaining 12 percent are rental units. This represents a slight increase of 4 percent in the number of owner occupied dwelling units. The homeowner vacancy rate was less than 1 percent, less than the 2.2percent owner vacancy rate in 1990. However, the rental vacancy rate increased from 4.3 in 1990 to 11.9 percent in 2000. It is unclear how this vacancy rate could be so substantial given the tight housing market conditions and without indications of vacancies in town.

Occupied Housing Units, 1990 and 2000

Characteristics	1990		2000	
	#	percent	#	percent
Total # housing units	7,236	100	8,748	100
Occupied units	5,557	77.0*	7,335	83.8*
Occupied owner units	4,653	84.0**	6,455	88.0**
Occupied rental units	904	16.0*	880	12.0*
Seasonal and recreational	1,214	16.8*	1,174	13.4*
Owner vacancy	157	2.2*	70	0.8
Rental and other vacancy	308	4.3*	1,041	11.9

Source: 1990 and 2000 U.S. Census Bureau

* Percentage of total housing units

** Percentage of occupied housing units

During the 1990s, the Census indicated a reduction of seasonal and recreational housing units by 67 units. In 2000, this represented 13.4 percent of the total housing stock and 1,174 units that involved seasonable, recreational or occasional use. This trend indicated that more homes in Sandwich are being converted to year-round use.

Most of the housing units in Sandwich are in single-family, detached structures (92.2 percent) with 3.5 percent in single-family, attached dwellings or two-unit structures. The remaining 353 units, or 4 percent of the housing stock, are comprised of residences with 3 or more units and the census also counted 27 mobile homes. Only 23 percent of the housing stock was built prior to 1970 with 545 units or 6.2 percent of housing units constructed prior to 1939. The majority of housing units, 57.1 percent, were built between 1970 and 1989 and almost 20 percent, or 1,730 units, were built in the 1990's, 130 units between January of 1999 and March 2000.

According to the 2000 Census, the median number of rooms per housing unit was 6.2, indicating that the average home had three bedrooms. The great majority, 63.5 percent, had between five to seven rooms, with only 5.5 percent with three rooms or less and 9.5 percent with 9 rooms or more. Of the 7,335 occupied housing units, 60.7 percent of the occupants moved into their units since 1990, indicating significant mobility in the housing market. More than 80percent of the households had two vehicles representing significant parking needs. The 2000 census also counted 34.8 percent of the housing units using gas and 52.6 percent using oil. Less than 1 percent of housing units lacked complete plumbing facilities, kitchen facilities or telephone service.

The predominant housing type in Sandwich is a fairly new and moderately sized single-family detached structure, which is increasingly becoming less affordable as housing values soar. Homes are typically occupied by increasingly prosperous working professionals and their children. Overall, town residents are becoming more affluent based on census income data and regional median family income estimates. A household of four, however, with an income of $73,500 (the 2008 median) is discovering that it is difficult to find adequate housing that is affordable at market prices.

Sandwich Housing Units, 1995 to 2007

Fiscal Year	Est. D.U	Change	percent Change	Ave. Assess.	$ Change	percent Change
FY'95	7,584			134,400		
FY'96	7,784	200	2.64percent	141,200	6,800	5.06percent
FY'97	7,935	151	1.94percent	142,800	1,600	1.13percent
FY'98	8,116	181	2.28percent	145,900	3,100	2.17percent
FY'99	8,275	159	1.96percent	157,700	11,800	8.09percent
FY'00	8,409	134	1.62percent	169,700	12,000	7.61percent
FY'01	8,531	122	1.45percent	189,200	19,500	11.49percent
FY'02	8,659	128	1.50percent	233,800	44,600	23.57percent
FY'03	8,758	99	1.14percent	266,400	32,600	13.94percent
FY'04	8,959	201	2.30percent	323,000	56,600	21.25percent
FY'05	9,052	93	1.04percent	374,700	51,700	16.01percent
FY'06	9,156	104	1.15percent	412,500	37,800	10.09percent
FY'07	9,287	131	1.43percent	428,600	16,100	3.90percent
Total Change, FY95-07		**1,703**	**22.46percent**	294,200	294,200	218.90percent
Average Annual Change		**142**	**1.87percent**	24,517	24,517	18.24percent
Change between FY98-07		**1,171**	**14.43percent**	**148,300**	**291,100**	**2**

Source: Sandwich Long Range Plan, 2007

Affordable Housing Inventory

Of the 7,574 year-round housing units in Sandwich based on DHCD estimates as of April 2002, only 270 units or 3.56 percent have been determined to be affordable by the Commonwealth of Massachusetts. Since 2001, the town has increased the number of affordable units by 129 and, as a percent of total housing stock, by 1.7 percent. Compared with other Cape Cod Communities, Sandwich ranks fourth in production of new units since 2001 (after Barnstable, Falmouth and Bourne) and is above average in terms of increasing affordable housing as a percentage of total housing stock (the County average was a 1.3 percent increase between 2001 and 2008).

The State requires that each municipality have no less than 10 percent of its year-round housing stock set-aside for low- and moderate-income residents. Not meeting this affordability standard makes the locality vulnerable to a state override of local zoning if a developer wants to build affordable housing through the **comprehensive permit** process. [1] If Sandwich were to reach the state standard, based on current DHCD numbers, it would have to convert another 486 units of existing housing into subsidized housing. While most nearby communities have yet to meet this 10percent standard, most have a higher percentage than Sandwich. (Sandwich ranks 11th out of 15 towns on the Cape in terms of percentage of affordable housing units).

Affordable Housing Inventory in Barnstable County Communities, 2001-2008

Community	2000	2001		2005		2008		Δ 2001 - 2008	
	Year Round Units	Affordable Units	percent Affordable 10/1/01	Affordable Units (1)	Subsidized Unit percent (1)	Affordable Units	percent Affordable 5/2/08	Affordable Units	percent Affordable 5/2/08
Barnstable (3)	20,266	953	4.70percent	1,267	6.25percent	1,357	6.70percent	404	2.00percent
Bourne	7,787	375	4.82percent	521	6.69percent	549	7.05percent	174	2.23percent
Brewster	4,379	200	4.57percent	277	6.33percent	257	5.87percent	57	1.30percent
Chatham	3,596	121	3.36percent	122	3.39percent	175	4.87percent	54	1.51percent
Dennis	8,079	272	3.37percent	331	4.10percent	327	4.05percent	55	0.68percent
Eastham	2,642	38	1.44percent	52	1.97percent	59	2.23percent	21	0.79percent
Falmouth	14,440	527	3.65percent	757	5.24percent	792	5.48percent	265	1.83percent
Harwich	5,862	214	3.65percent	253	4.32percent	261	4.45percent	47	0.80percent
Mashpee	5,578	183	3.28percent	198	3.55percent	223	4.00percent	40	0.72percent
Orleans	3,317	256	7.72percent	282	8.50percent	298	8.98percent	42	1.26percent
Provincetown	2,062	135	6.55percent	130	6.30percent	128	6.21percent	(7)	-0.34percent
Sandwich	7,574	141	1.86percent	261	3.45percent	270	3.56percent	129	1.70percent
Truro	999	6	0.60percent	9	0.90percent	9	0.90percent	3	0.30percent
Wellfleet	1,430	40	2.80percent	39	2.73percent	39	2.73percent	(1)	-0.07percent
Yarmouth	12,056	287	2.38percent	332	2.75percent	373	3.09percent	86	0.71percent
County Total	**100,067**	**3,748**	**3.75percent**	**4,831**	**4.83percent**	**5,117**	**5.11percent**	**1,369**	**1.36percent**

Source: Cape Cod Commission

(1) As of 9/1/05 DHCD report

(2) As of 9/1/05. Permitted projects with construction completed or underway.

(3) Barnstable's 87 approved amnesty apartment units permitted individually under Chapter 40B are not included in the town's project total, i.e. 18 instead of 105; however, the 87 units are included in the town's comprehensive permit project units total for this analysis.

[1] Chapter 774 of the Acts of 1969 established the Massachusetts Comprehensive Permit Law (Massachusetts General Laws Chapter 40B) to facilitate the development of affordable housing for low- and moderate-income households – defined as any housing subsidized by the federal or state government under any program to assist in the construction of low- or moderate-income housing for those earning less than 80% of median income – by permitting the state to override local zoning and other restrictions in communities where less than 10% of the year-round housing is subsidized for low- and moderate-income households.

The above numbers, however, do not take into account population and housing growth, and the fact that the 10 percent figure is a moving target. DHCD's 10percent goal will be updated with the 2010 census, therefore as more units are produced the higher the 10 percent state target. Given housing growth since 2002 and recently approved developments that include affordable housing, the total year-round housing figure is currently about 8,000 units. Therefore, the 270 units that are eligible to be counted as part of Sandwich's Affordable Housing Inventory now reflect 3.4 percent of the year-round housing stock.

Of the 270 affordable housing units that are currently considered affordable by the State, 98 units are owned and managed by the **Sandwich Housing Authority**. This includes the following developments: Hansen Village, George Fernandes Way, Forestdale Houses, and Osprey Lane. It is important to note that the Sandwich Housing Authority has a significant waiting list of almost 1,000 applicants with three to five year waits for available units.

In addition to housing production, the Sandwich Housing Authority manages rental assistance programs through the Section 8 Program with 35 to 40 certificates/vouchers, Massachusetts Rental Voucher Program (MRVP) with 2 vouchers, and Affordable Housing Voucher Program (AHVP) with 2 vouchers. These programs subsidize the rents of qualifying households who locate units in privately owned apartments. Because the rental housing supply is limited in Sandwich and becoming increasingly unaffordable, some rental voucher recipients are forced to look beyond Sandwich for a qualifying apartment. The Housing Assistance Corporation (HAC) has a Cape-wide waiting list of 1,200 applicants for Section 8 rental assistance, of which 44 are currently residents of Sandwich.

Sandwich Affordable Housing Inventory - Existing and Planned, May 2008

Development	Location	Description	Total Units	Afford. Units	Total Acres	Total Lot SF	Lot Area Per D.U. (SF)	Project Type	Date Appvd.	Project Status
Single Family Home	Forestdale	In 1974 the Housing Authority purchased a single-family home in the Forestdale section of Sandwich to provide housing for a low-income family, which it continues to own and manage. Another house was financed by HUD and is included in the Affordable Housing Inventory.	1	1	UND	UND	UND	Rental	Jan-74	Occupied
Single Family Home	Forestdale	See Description Above	1	1	UND	UND	UND	Rental	Jan-74	Occupied
Shawme Heights I	Leveridge Lane	This project was built in 1981 and includes 44 total units all of which are affordable to income-eligible seniors.	44	44	6.70	291,852	6,633	Rental	Aug-81	Occupied
George Fernandes Way	East Sandwich	This Sandwich Housing Authority family development provides housing for 12 low-income families in a small neighborhood community with rent based on 25percent of monthly income. The project was developed in 1989 through state Chapter 705 funding and includes a combination of two- and three-bedroom units in four buildings.	12	12	10.00	435,600	36,300	Rental	Jan-88	Occupied
Cranberry Village	Early Road Circle	This project includes 16 total units developed through the state's Homeownership Opportunity Program (HOP) in 1989, of which 5 units were dedicated as affordable.	16	5	8.36	364,162	22,760	Ownership	Jan-89	Occupied
Ryder Woods	Sconset Circle	This development was produced through the state's Homeownership Opportunity Program (HOP) in 1990, with 79 total units of which 26 are affordable.	79	21	38.16	1,662,250	21,872	Ownership	Feb-90	Occupied
Hansen Village	Tom's Way	This 48-unit development is owned and operated by the Sandwich Housing Authority. It incorporates four different state programs and agencies at one site including Chapter 667 for elderly and disabled residents and Chapter 689 Special Needs funding through the Department of Mental Health and Department of Mental Retardation. The project is designed in a village community setting and incorporates an eight-bedroom, single-story house that provides congregate living for its elderly or disabled residents.	48	48	10.00	435,600	9,075	Rental	Jul-92	Occupied
Sherwood Forest	Nottingham/Kensington	In 1996 this project was completed involving the development of 36 total units through the Local Initiatives Program (LIP) with 9 of these units created as affordable under the Chapter 40B guidelines.	36	9	25.01	1,089,436	30,262	Ownership	Nov-95	Occupied
Shawme Heights II	Leveridge Lane	This second phase broke ground in 2001and was occupied in 2003 with 50 affordable units for seniors.	50	50	4.30	187,308	3,746	Rental	Oct-99	Occupied
Osprey Lane		This project is the Sandwich Housing Authority's most recent development. It was developed jointly with The Community Builders and owned by the TCB Sandwich Limited Partnership with the Housing Authority as managing agent. The project involves 36 modular units of one- to three-bedroom apartments for those earning at or below 60percent of area median income or $32,600	36	36	10.00	435,600	12,100	Rental	Jun-00	Completed

		for a family of three. The project is currently occupied.								
Farmview Estates	Sandwich	Approved with 79 Units off of Snake Pond Road and backing up to the Airforce base. There is a concern over the decibel level from aircraft activity. The project been approved after appeals but has not been developed yet.	79	20	62.90	2,739,924	34,683	Ownership	Nov-01	Current Status/Unknown
Granite Ridge	Quaker Meeting House Road	This project was completed by Champion Builders, which is using MassHousing's Housing Starts/comprehensive permit process. The project is located in East Sandwich and involves the creation of 32 new homes including 8 affordable homes for first-time homebuyers. The comprehensive permit was issued in February 2003, and occupancy is expected in early 2004.	32	8	12.35	537,966	16,811	Ownership	Jun-02	Constr. Completed
Dana's Field	Victory Lane (Sand. Ind. Park)	This rental project of 65 units proposes to serve as a transitional work program for formerly homeless individuals. There is also an agricultural component with a working farm concept. The applicant (HAC) reached a settlement agreement with abutters and the Town in January 2007. HAC is in the process of securing state funding for the project.	70	TBD at least 25percent	46.50	2,025,540	28,936	Rental	Aug-02	Final Approvals
Woodside Village	Broadley Road	This project, brought forward by McShane Construction, was approved by the Board of Appeals in October 2003. The development will provide 31 homeownership units, 12 affordable to those at 80percent of median, 11 available to those at 120percent of median income and 8 market rate units. It will be developed as a cluster subdivision under a comprehensive permit. The project was completed in 2004.	31	13	21.00	914,760	29,508	Ownership	Mar-03	Project Completed
Beech Wood Grove	Craft Road, Forestdale	This project consists of one existing single-family dwelling on several merged lots. The proposal is to add two more dwellings to these properties and through MassHousing's Housing Starts Program make one of the units affordable to households at or below 80percent of area median income. This project brings forward a small-scale approach to scattered-site affordable housing that is desirable.	3	1	2.27	98,881	32,960	Ownership	Jul-03	Final Cost Cert Approved
Autumnwood	East Sandwich	Approved by appeal in 2003 with 272 units off Quaker Meetinghouse Rd. of which 68 are planned to be affordable.	272	68	47.54	2,070,842	7,613	Ownership	Dec-03	Comp Permit Obtained
Annie's Pasture	Route 130, Forestdale	Approved off Route 130 near Brightside it includes 28 total units. Only 2 or 3 have been constructed to date.	20	5	12.00	522,720	26,136	Ownership	Jul-04	Final Approval Pending
The Homesteads	Off Osprey Lane, East Sandwich	This project involves a parcel that was donated by a former Selectman for the purpose of creating 16 single-family homes, 11 of which are affordable to first-time homebuyers earning within 80 percent of area median income and 5 being moderate income units. The project will be developed by the Housing Assistance Corporation through the town's new Affordable Housing Conditional Density Bylaw. A significant modification to	16	11	UND	UND	UND	Ownership	Nov-04	Completed

		the Osprey Lane comprehensive permit is required for road access.								
Chase Circle		Has not yet been constructed.	4	1	UND	-	-	Ownership	Jun-06	Final Approval Pending
Settler's Knoll		Has not yet been constructed.	120	30	UND	-	-	Ownership	Jul-06	Recently Approved/Extended
Brightside Lane	Route 130, Forestdale	Designed as starter homes or dwelling units for single householders, this townhouse design project was approved by the Board of Appeals in October 2003. The Project is comprised of modular townhouses including a total of 42 units, 11 of which are available to those at 80percent of median income.	40	11	9.70	422,532	10,563	Ownership	Jan-07	Under Construction
Seashell Village	South Sandwich	Has not yet been constructed.	10	5	UND	UND	UND	Ownership	May-07	

Another 74 affordable units have been created or recently approved through the state's Homeownership Opportunity Program (HOP), Local Initiatives Program (LIP) or Housing Starts including the following specific developments: Cranberry Village, Ryder Woods, Sherwood Forest, Granite Ridge, Woodside Village, Brightside Lane, Beech Wood Grove, and Homestead (Fleet) Project.

Sandwich has had another 94 affordable units created as affordable through the HUD Section 202 Program, funding directed to the production of rental housing for seniors. These projects include the Shawme Heights 1 and Shawme Heights 2 developments, built in 1981 and 2003, respectively. An additional 5 scattered site units were financed through the Rural Housing Service's Section 502 Home Mortgage Program in 1979.

There are currently an additional 135 affordable housing units that are in various stages of the development pipeline including the following: Dana's Field, Autumn Woods, Farmview Estates, Annie Pasture, Settler's Knoll, Chase Circle, and Sea Shell Village. If added to the current housing stock the total affordable units would be 405 units or about 5.3 percent, leaving an existing gap of about 352 units to meet the 10 percent state target. Given projected build-out under current zoning, the town can anticipate another 2,696 units towards a total of about 12,000 residential units suggesting that the gap to meet the state's 10 percent goal into the future is approximately 595 units, representing an ambitious production goal.

Recent changes to Chapter 40B allow communities to reject comprehensive permit applications if the town has a state-approved affordable housing plan in place and is making progress towards its production goals of at least .50 percent new units produced per year, referred to as a **Planned Production Program.** These guidelines suggest that town-sponsored development of approximately 38 units per year including "friendly" Chapter 40B developments and other supported development projects would enable the town to reject new comprehensive permit applications.

To be counted as affordable, housing must be dedicated to long-term occupancy of income-eligible households through re-sale restrictions, affordable rental agreements and units must be fairly and affirmatively marketed. The following table presents the income limits for the affordable units based on the 2008 HUD guidelines for Barnstable County directed to those earning at or below 80 percent of area median income adjusted by family size.

Using these income guidelines, a family of four could afford to purchase a house for about $175,000[2] and rent for a maximum of about $1,500 a month[3] Based on the housing market information described above, such purchase prices and rents are increasingly rare in Sandwich. Additionally, the current housing market is significantly limited to those earning below the median income. The 2008 home sales statistics indicate that the median sales price for single family homes is $327,500 and $198,000 for condominiums. The sales statistics also indicate that 2008 has shown very slow sales with 72 single family homes and 6 condominiums.[4]

[2] Based on 95% financing, interest of 6.5%, 30-year term and annual property tax and insurance costs of $2,100.
[3] Assumes that a tenant should pay no more than 30% of gross income on rent and annual utility costs of $1,500.
[4] Warren Report as of May 1, 2008

Barnstable County MSA Targeted Income Levels for Affordable Housing, 2003 & 2008

# Of Persons in Household	30percent of Median Income		50percent of Median Income		60percent of Median Income		80percent of Median Income	
	2003	2008	2003	2008	2003	2008	2003	2008
1	$12,650	$15,550	$21,100	$25,900	$25,300	$31,080	$33,750	$41,450
2	$14,450	$17,750	$24,100	$29,600	$28,900	$35,520	$38,600	$47,350
3	$16,300	$20,000	$27,150	$33,300	$32,600	$39,960	$ 43,400	$ 53,300
4	$18,100	$22,200	$30,150	$37,000	$36,200	$44,400	$ 48,250	$ 59,200
5	$19,550	$24,000	$32,550	$39,950	$39,100	$47,940	$ 52,100	$ 63,950
6	$21,000	$25,750	$34,950	$42,900	$42,000	$51,480	$ 55,950	$ 68,650
7	$22,450	$27,550	$37,400	$45,900	$44,900	$55,080	$ 59,800	$ 73,400
8+	$23,900	$29,300	$39,800	$48,850	$47,800	$58,620	$ 63,700	$ 78,150

Source: HUD

MFI in 2003 for a 4-person household was $58,600 and in 2008 it is $74,000

6.3 Housing Needs Assessment

As housing values have soared in recent years, it is becoming increasingly difficult for individuals and families to find affordable housing in the private market. And the private market, without subsidies, is neither able nor interested in producing housing that is affordable to low- and moderate-income households given existing regulations. As a result, it becomes necessary to increasingly rely on regulatory relief and housing subsidies in some form to preserve affordable housing and to produce enough housing to meet the pressing affordable housing needs and demands. Escalating market prices for both the purchase and rental of housing have generated concerns that many long-term residents might be experiencing difficulties paying their taxes, maintaining their homes or affording market rentals. Children who grew up in Sandwich may find it very difficult to find suitable housing in which to raise their families. Town employees are confronted with longer commutes as the affluence of the Upper Cape squeezes many out of the local housing market.

Cost Analysis of Existing Market Conditions

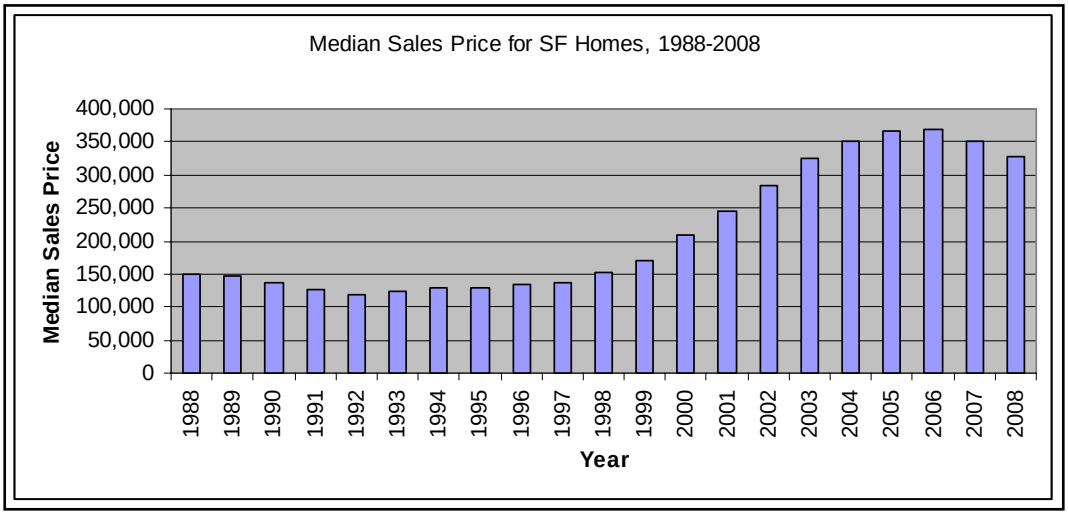
Escalating market prices for housing have not only reduced the supply of affordable housing in Sandwich but provide a further challenge to creating affordable housing. Census data from 2000 provided information on housing values for homeownership and rentals. The census indicates that the 2000 median house value was $178,000, up 11.5 percent from the median in 1990 of $159,700. In 2000, only 1.6percent of the housing stock was valued at less than $100,000 while 13. 4percent or 794 units were assessed for more than $300,000. There were 2,091 units or 35.2 percent of the housing stock valued between $150,000 and $199,999 that includes the bulk of the more affordable housing stock.[5] In Fiscal Year 2008, the average assessed value for residential properties was $428,600. This represents an increase of nearly $271,000 in assessed value or a 153 percent increase since FY2000.

[5] Census housing values are derived from Assessor's data.

Sandwich Housing Values, 2000		
Value	Number of Units	percent Of Units
Less than $50,000	20	0.3
$50,000 to $99,999	80	1.3
$100,000 to $149,999	1,568	26.4
$150,000 to $199,999	2,091	35.2
$200,000 to $299,999	1,379	23.2
$300,000 to $499,999	670	11.3
$500,000 to $999,999	113	1.9
$1,000,000 or more	11	0.2
Median (dollars)	$178,000	-

Source: 2000 U.S. Census Bureau

The median gross rental in 2000 was $783. This figure is likely to be skewed to the low end of the market range as the census included subsidized rents in addition to market rentals. Of the 864 rental units analyzed, 158 units or 18 percent had gross rents of less than $500, and at the other end of the range 26percent or 221 units were rented at more than $1,000 per month. Sixty-three units were reported as having no cash rent.



Market data from Banker & Tradesman for the period January through April 2008 indicated a median sales price of $327,500 for single-family homes and $198,000 for condominiums.[6] These sales figures for single-family homes are comparable to the Multiple Listing Service data. Local realtors claim that any house priced in the low $200,000 range is sold within days and fewer homes are coming on the market as residents feel that they cannot afford to “buy-up” in the current market.

Trends indicate that Boston commuters searching for affordable communities to raise their families have been forced further south along the coastline towards the Upper Cape, finding Sandwich more affordable than Duxbury or other coastal towns and putting pressure on the town’s housing market. This attraction of young families has been a major contributing factor to increased school enrollments. Another pressure point on existing housing prices is the second home market that has been further buoyed by the sagging stock market as investors turn to real estate. While it is acknowledged that it is likely purchasers may get more house for their dollar in

[6] Town Stats, Banker & Tradesman, the Warren Group, May 1, 2008.

the Forestdale section of Sandwich, nevertheless, modest Capes in this area are selling in the high $200,000s.

With regard to rentals, local realtors that manage with summer rentals have indicated that rental property rarely comes on the market, particularly year-round property[7]. Sandwich has very little multi-family housing, most of which is managed by the Sandwich Housing Authority or has in some form been subsidized. Also, most of the rental stock is in private condominiums renting at $1,200 to $2,500 per month not including utilities or maintenance expenses. Waterfront rentals command up to $3,500 per week in the summer season, and modest two-bedroom rentals located a couple blocks from the beach are priced at about $950 per week. Small rental units such as a studio or efficiency are scare with the exception of illegal apartments. The new 36-unit Sandwich Housing Authority project at Osprey Lane attracted almost 200 applicants due to the scarcity of rentals, much less affordable rentals.

Gaps Between Existing Housing Needs and Current Supply

As housing prices escalate the affordability gap widens. This gap is defined as being the difference between the cost of housing and the proportion of income that is reasonable to pay for housing, typically defined as 30 percent of gross income. To afford the median sales price of $327,500 for a single-family house, a household would have to earn approximately $90,000, well over the 2008 median family income of $74,000. The borrowing power of the average household, based on the median income, would allow that household to afford a home costing about $250,000, increasingly rare in Sandwich as noted above. The affordability gap is then about $77,000 - the difference between the price of the median priced home and what a median income household can afford. The affordability gap is much higher if the analysis focuses on those low- and moderate-income households earning at or below 80 percent of area median income.

While current housing market data tells us that the great majority of town residents cannot afford the median house price and only about one-third of town residents can afford rents at the lower end of the price range ($1,200 per month), it is also useful to identify numbers of residents who are currently living beyond their means due to their current housing costs. The 2000 census provides data on how much households spend on housing whether for ownership or rental. Such information is helpful in assessing how many households have affordability problems, which are defined as spending more than 30 percent of their income on housing. Based on 1999 data, the census indicated that more than a quarter of homeowners in Sandwich are spending 30 percent or more of their incomes on housing, and 18.9 percent are spending more than 35 percent. In regard to the renters, 28.1 percent spent 30 percent or more on housing and 22.7 spent more than 35 percent of their income on rent. This data suggests that at least a quarter of Sandwich residents are living in housing that is by common definition beyond their means and unaffordable.

As the above affordability analysis indicates, gaps remain between what most current residents can afford and the housing that is available. In fact the current housing market is substantially limited to those earning below the median income and not accessible to low- and moderate-income households. There is therefore a sizable population of those who are seniors, have special needs and/or have very low incomes who have significantly reduced capacity to secure decent, safe and affordable housing. A broader range of housing options is required to meet these varied needs.

[7] Sandwich Affordable Housing Plan, 2003

Local Constraints to Affordable Housing Production- Land Use Regulations

As is the case in most American communities, a zoning by-law is enacted to control the use of land including the patterns of housing development. Typically, zoning has increasingly embraced large-lot subdivisions to maintain low housing densities, thus severely constraining the construction of affordable housing. Sandwich is no exception, with the minimum lot size between 40,000 square feet to two full acres, a result of major zoning changes enacted in the 1970's and 1980's to discourage development, which instead guided the explosive growth that has occurred throughout the last two decades.

The town has added some provisions in the Zoning By-law to allow higher densities for the production of affordable housing including an accessory apartments and the Affordable Housing Conditional Density Bylaw. While the town has made revisions to these regulations in an effort to provide greater incentives to developers to produce some affordable housing, it has not been effective. Unlike some other Cape towns that have had success with similar regulations (i.e. Barnstable), the Sandwich by-law still requires a 40,000 square foot minimum lot size for affordable units which does not provide the incentive for their production.

In 1989 the town adopted the accessory housing bylaw. While a total of 60 permits were issued in the first five years, the number of permits issued since 2004 have dropped off significantly (a total of 7 permits in the last 5 years). It is also difficult to determine if the intended effect of creating affordable units and assisting elderly and low income homeowners reduced the tax burden because no follow up analysis has been done. Additionally, these new units have not been counted as part of the affordable housing stock in Sandwich.

Accessory D.U. Permits Issued in Sandwich, 1989-2008

Years	Permits Issues
1989-2003	60
2004	4
2005	2
2006	0
2007	0
2008*	1

** As of June 10, 2008*

In 2003, Sandwich Town Meeting approved an **Affordable Housing Conditional Density Development Bylaw** that revised a previous zoning bylaw that went unutilized because it was unwieldy, complicated and did not offer adequate incentives. This new amendment simplified the town's Zoning Bylaw by providing requirements for increased density (units per acre) based on the percentage of affordable units and type of housing as follows:

Affordable Housing Conditional Density Development Bylaw Standard

Homeownership	
4 units per acre	100 percent affordable units
2 units per acre	50 percent affordable units
Rental/1 bedroom units or units deed restricted to age 55 and older	
8 units per acre	50 percent affordable units
Rental/2 bedroom units	
4 units per acre	50percent affordable units

While this bylaw was a step in the right direction, it has been scarcely utilized and has produced less than 5 affordable units. Local developers have indicated that the home ownership density provisions of 4 units/acre at 100 percent affordable and 2 units per acre at 50 percent affordable are not a realistic incentive. According to some local developers, 25 percent would be preferable.

The town is currently exploring other opportunities to promote affordable housing opportunities in Sandwich through zoning amendments such as designated growth centers providing for higher density mixed-use development and possibly a Transfer of Development Rights program. At this time, 97 percent of the affordable housing that has been built in Sandwich has used the Chapter 40B (comprehensive permit) process to override zoning requirements.

School Enrollment - Given the high rate of population growth, especially the increase in number of families, Sandwich has been challenged by expanding school enrollments during the 1990s and early 2000s. While enrollment has declined over the past few years, many residents continue to voice concerns about the prospects of building more housing that will require new schools, likely leading to increases in property taxes and concerns about where these new facilities can be located.

Environmental Concerns - Most Sandwich residents are aware of the Cape's natural treasures and are rightly concerned about conserving the environment. The Cape has very active conservation groups that promote the preservation of open space and are skeptical about the impacts of new development. Additionally, regulations to protect the environment (e.g., wetlands, aquifers, septic systems) significantly constrain new building activity, reducing the amount of buildable land and increasing the time and costs of new development.

Infrastructure - A major constraint to new development is the lack of infrastructure, public water and sewer services in particular. Sandwich has no sewer service, and while two-thirds of the town does have access to water service, there are zones of nitrogen sensitivity throughout town that restrict density. The northeast corner of Sandwich has no water service at all. The reliance on wells, in some areas, and septic systems throughout town will continue to significantly restrict development, currently limiting some higher densities in commercial centers that could provide a wider range of residential and commercial opportunities in Sandwich. The higher costs of dealing with these infrastructure constraints will be a continued challenge to affordable housing development.

Availability of Subsidy Funds - Financial resources to subsidize affordable housing preservation and production as well as rental assistance have suffered budget cuts over the years, making funding more limited and extremely competitive. Communities are finding it increasingly difficult to secure necessary funding and must be creative in both determining how to finance projects and tenacious in securing these resources.

Community Perceptions - Affordable housing, subsidized housing, low-income housing, projects, Section 8, etc. – these terms can conjure perceptions from local residents of potential neglect that undermine property values, increase crime, and provoke tensions concerning class and race. If one has not directly witnessed the benefits that affordable housing can bring to a community, images of distressed high-rise apartments might instead emerge. On the other hand, with soaring real estate prices, community perceptions are beginning to tilt towards the realization that affordable housing is indeed needed in the community. More people are recognizing that

local teachers, service workers that support the local economy, grown children, or the elderly may not be able to afford to live or remain in the community. It is this growing awareness and impending 40B developments which are spurring communities to take a more proactive stance and sponsor or support affordable housing projects.

Inventory of Potential Affordable Housing Sites

Publicly-owned Properties - The Sandwich Planning & Development Department and Local Housing Committee have identified a number of parcels that are owned by the town, portions of which are likely to be suitable for affordable housing development. Another state-owned parcel has also been identified that should be considered for affordable housing purposes.

Publicly-owned Properties with Potential for Affordable Housing Development

Town Parcel*	Nitrogen Sensitive	Constraint	Type	Map/Parcel	Total Acres	Housing Units	Projected Total Units (Affordable Units)
1	Yes	Topography	Ownership	4/42, 43	1	1	4 (2)
2	Yes	Wetland	Ownership	3/48, 49	10	8	32 (16)
3	No	Topography	Ownership	25/78	8	8	32 (16)
5	Yes	None	Ownership	13/166	21	21	84 (42)
8	Yes	Other uses	Rental	17/138	57	10	40 (20)
9	Yes	Other uses	Rental	17/196	83	5	20 (10)
Total					**180**	**53**	**212 (106)**

* Parcel numbers are the same as recorded on Housing Potential Map.

The above projections were based on the following assumptions:

- Parcels located in water resource districts that are nitrogen sensitive are estimated to include four (4) units per acre;
- Parcels located outside of nitrogen sensitive areas are projected to include an average of eight (8) units per acre unless topography suggests fewer units;
- Sandwich has decided to develop affordable housing that will be harmonious with the surrounding community. Therefore, the town proposes to put somewhat higher density rental housing closer to commercial or in-town areas and homeownership units in the more outlying areas;
- Sandwich has determined that it wants to maximize the number of affordable units per project, and depending upon the project location, objectives, and feasibility estimates that 50 percent to 100 percent of the new units will be available as affordable. However, another housing goal is to provide housing for those along the full range of incomes, and on average approximately 10 percent of the units will be targeted to more moderate and middle income households that will enable the town to provide housing for those households earning above 80 percent of area median income but priced out of the current housing market. Additionally, market rate units will provide internal subsidies to help support project feasibility; and
- The number of acres set-aside for housing involves an estimate of the buildable area. This estimate recognizes town concerns for maintaining open space in most developments, as well as the need for infrastructure (including water and sewer treatment facilities) as well as other uses on site and other topographical constraints.

Private Properties - The Local Housing Committee has also identified privately owned properties that might be appropriate for incorporating some affordable housing development. The same criteria for projecting numbers for the town-owned properties were used in this analysis. A list of these properties, without reference to current ownership, is provided in the following table:

Privately-Owned Properties with Potential for Affordable Housing Development

Parcels	Nitrogen Sensitive	Constraint	Housing Type	Parcel Acres	Housing Acres	Projected Total # Units/(Affordable units)
4	No	Pond	Ownership & Rental	72	18	146 (73)
6	Yes	Pond	Ownership	10	10	40 (20)
7	Yes	None	Rental	17	17	68 (34)
10	Yes	None	Rental	44	44	44 (22)
11	Yes	None	Rental	25	3	12 (6)
12	No	None	Ownership	23	23	46 (23)
13	No	None	Ownership	53	5	40 (20)
14	No	None	Ownership	1.5	1.5	12 (6)
Total				**245.5**	**121.5**	**408 (204)**

Because town-owned properties are limited and with strong competition for other uses such as open space, most of the affordable housing must come from privately owned parcels. The town should seek opportunities to work cooperatively with existing owners or for profit and non-profit developers to develop these properties to incorporate affordable housing. In fact, the town has received inquiries from potentially interested developers on a number of the parcels included above, including affordable units to be owned and managed by the Sandwich Housing Authority as part of a mixed-use development in the South Sandwich Village Center.

In addition to the parcels listed above, it is likely that developers will continue to pursue comprehensive permit applications to produce housing that includes at least one-quarter of the units as affordable. In fact, 97 percent of the affordable housing that has been built in Sandwich has used the Chapter 40B (comprehensive permit) process to override zoning requirements. It will be incumbent on the town, primarily through the Director of Planning and Development, to negotiate with these developers.

7.0 Open Space and Recreational Resources

Contents

7.1 Introduction and Overview

7.2 Scenic Resources and Unique Environments

7.3 Inventory of Lands of Conservation and Recreation Interest

7.4 Assessment of Needs

7.1 Introduction and Overview

This element of the Local Comprehensive Plan incorporates the *Sandwich Open Space and Recreation Plan, 2006* and the *Recreational Field Development Plan, 2007*. The Open Space and Recreation Plan continues the ongoing efforts by the Town of Sandwich to protect natural resources, conserve open space, and provide a variety of recreational opportunities. The previous Open Space and Recreation Plan was approved by the Massachusetts Division of Conservation Services in 2000 and subsequently qualified for town equivalency to the Open Space and Resource Planning requirements of Executive Order 418.[1] The preparation of this 2005 Open Space and Recreation Plan update coincides with the development of a town Long Range Plan, the completion of the Housing Plan in 2004, the Pre-Disaster Mitigation Plan of 2004, and a Historic Preservation Plan in 2002. These together will assist town officials in shaping the future character of development within Sandwich.

Sandwich is blessed with abundant open space and recreational resources, and the town understands the importance of wildlife and its habitat and indigenous vegetation. As a result, the town has made a significant commitment to conservation land acquisition and open space, with approximately 3,700 acres (13% of town-wide land base) owned by the town. In addition, the Sandwich Water District owns 406 acres of protected open space. Finally, there is an estimated 9,568 acres of state land including Shawme-Crowell State Park and the Massachusetts Military Reservation in Sandwich, which is predominantly open space. In total, these open space holdings amount to an estimated 50% of all land in Sandwich.

It is evident from past and present planning efforts that the Town of Sandwich is committed to conserving natural resources, preserving open space, and providing sufficient recreation opportunities for its residents. Between 1999 and 2005, the town completed the following action items identified in the 1999 Plan:

- Three Ponds area in South Sandwich was nominated and accepted by the Cape Cod Commission as a District of Critical Planning Concern;
- The town has made a number of purchases such as the Cook/Rubican property on Shawme Pond (purchased outright with Land Bank funds), the development rights on 79 acres of the YMCA Camp on Lawrence Pond, and the Agilent property on Peters Pond (bought with debt exclusion);
- The town acquired 107 additional acres of open space through a land exchange with PA Landers in 2002 in the Ridge District;
- Trails were added and improved at Cook Farm and the Maple Swamp Conservation Area;
- Structural work on the restoration of tidal marsh at the Scusset River has been completed in cooperation with the Massachusetts Wetlands Restoration Program, the Town of Bourne, and federal officials; and
- New town access was added to Peters Pond at Oak Crest Cove, Town Neck Beach, and East Sandwich Beach.

Building on these positive achievements, the 2006 Open Space and Recreation Plan continues to provide a framework for town officials and residents to make informed decisions impacting open space and recreation.

[1] The Massachusetts Division of Conservation Services (DCS) must approve a Town Open Space and Recreation Plan and subsequent updates every five years in order for the community to be eligible for DCS grants.

This Plan includes an updated inventory of the town's conservation and recreation lands along with an analysis of needs used to define a new set of goals, objectives, and strategies. Towards this end, this Plan revisits the 1999 Action Plan to evaluate why specific action items were completed or not in order to outline a new Action Plan for the next five years and for future generations to come.

7.2 Scenic Resources and Unique Environment

Cultural Character[2]

The human eye delights in scenes where land meets water, and it does so in Sandwich with dramatic frequency and variety. In addition to its multitude of ponds, Sandwich has 1,128 acres of salt marsh and the broad sweep of these "meadows," as the colonists knew them, is breathtaking from the Boardwalk and the Scorton Creek Bridge on Route 6A. The large (ten-foot) tidal range assures different perspectives even at the same location during various times of day. The more intimate shoreline scenes are prized as well, such as the bridge crossings along Route 6A.

Occasional fields, such as the Crow Farm orchard and the former Roberti dairy farm (now owned by the Town) provide upland vistas in the absence of the large farms found elsewhere in Massachusetts. The primary pond views along well-traveled roadways are of Snake Pond, Hoxie Pond, Twin Ponds and Shawme Pond in the Village Center. In addition, long-distance water views across Cape Cod Bay are available from Route 6A from Sextant Hill, Telegraph Hill on Route 130, and Quaker Meeting House Road at the Mid-Cape crossing.

More than in any other Cape Cod town, however, it is the rugged terrain of Sandwich which makes its mark in the public consciousness. For hundreds of years, The Ridge district was virtually uninhabited, a place to for Sandwich residents to haul wood out of and then retreat to lowland life along the shore. Now it is traversed daily by thousands traveling the Mid-Cape Highway east-west along its backbone, and by many more local commuters driving north-south across the moraine on Route 130 and Quaker Meetinghouse Road.

Culturally, the main streets of Sandwich Village and East Sandwich are a visually distinctive part of Massachusetts. In fact, the mix of historical architecture and natural splendor is what attracts many tourists and residents to Sandwich. Sandwich wears its colors proudly: the gold of its marshes, the silver of its beaches, the blue of its ponds, the green of its woods, and the red of its bogs.

Agricultural Resources[3]

The farming community that was Sandwich in the 18th and 19th centuries is long gone. Even remnants of that heritage are hard to find in town – a stone wall here and there marking on old pasture, a few gnarled apple trees of an abandoned orchard, and livestock barns that now shelter only automobiles. Nevertheless, there are still a few working farms in Sandwich, where the public can experience the rich tradition of Cape agriculture. Perhaps the most visible and well-known is the Crow Farm on Route 6A near Charles Street.

The largest farm on Cape Cod, Windstar Farm in South Sandwich, suffered a setback in 1998 when the Britt family, which owned and operated it for 21 years, lost it to private foreclosure. Previously advertised as the largest pumpkin farm in Massachusetts, Windstar Farm is one of the only Cape Cod farms protected under the state's Agricultural Preservation Restriction program.

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[2] *Sandwich Open Space and Recreation Plan* 1999, Section B: Landscape Character, pp. 25-26.

[3] *Sandwich Open Space and Recreation Plan* 1999, pp. 24-25.

In 1983, the Britts sold the state the development rights to the farm. Its fate remains undetermined, but it will not be developed as a residential subdivision. A portion of the former Roberti Dairy Farm on Route 6A, now the property of the town, is not currently in active use. The town is currently considering future uses for this property, including agricultural uses.[4]

The Town of Sandwich is a leader in the municipal trend in sponsoring public gardening on the Cape. Eight towns on the Cape have town-operated community gardens, but Sandwich hosts not one but two.[5] A quarter-acre lot next to the railroad tracks on Liberty Street was established on tax title land in 1998. For the past 30 years, the town has run a very popular public blueberry picking patch on Route 6A in East Sandwich. A third community garden has been cleared out of pine woodlands at the Community Recreation Center in South Sandwich.

Scenic Landscapes and Roadways

Sandwich abounds in beautiful natural scenes that are also environmentally-sensitive areas, such as pondshores, salt marshes, barrier beaches, cranberry bogs and wooded moraines.[6] A 1963 state survey identified four areas of Sandwich as meriting priority consideration as open space: Dock and Mill Creeks (near the Boardwalk); Hoxie Pond; Scorton Creek ("one of the most outstanding scenic views in the county"); and, Spectacle Pond ("most of the attractive shoreline is undeveloped"). A more analytical 1981 state survey included a small portion of the Sandy Neck dunes in Sandwich as rating a "Noteworthy" classification on a statewide basis.[7]

Sandwich has enacted a Scenic Roads By-law to identify and protect roads valued for their scenic, aesthetic and historic character. Forty-eight (48) roads have been designated as Scenic Roads upon recommendation of Town Meeting. Old Kings Highway was chosen as one of the ten Most Outstanding Scenic Byways in America in 1993.[8] When the Cape Cod Commission classified the Old Kings Highway for scenic resources in 1995, the Spring Hill segment of Route 6A route was considered to have a High Concentration of Scenic Elements.[9]

Cranberry bogs are another important feature of the town's scenery. Solomon Hoxie planted one of the first bogs on the Cape in 1846, probably located at the east end of what is now Solomon Pond (or Dead Swamp Pond) off Cranberry Trail in East Sandwich. The 1850s and 1860s were a time of "Cranberry Fever" in Massachusetts and Sandwich's five acres of planted bogs in 1855 grew rapidly to as many as 135 acres planted by 1889. The still-operating Cape Cod Cranberry Growers Association was founded in Sandwich in 1888. Throughout the nineteenth century, Sandwich consistently placed within the top six of Cape towns in cranberry acreage and/or production.

Cranberrying altered the environment in many ways: cedar swamps and other wetlands were displaced to make working bogs, dikes were used to impound streams, adjacent banks were mined for sand, and isolated ponds were given artificial outlets and their water levels manipulated with flumes. Large cranberry bogs do not remain in Sandwich today; the largest is approximately 18 acres compared with 75-acre bogs still found in Falmouth or Yarmouth. Yet bogs are well known in Sandwich because of their visibility along major roads, such as Route 6A and Spring Hill Road. The dramatic view across the Halunun Bog on Cotuit Road to Mashpee Lake, which graced the cover of the New England Telephone book in the 1980s, is an archetypal Cape Cod scene.

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[4] Sandwich Planning Department staff, April 2005.

[5] Cape & Islands Self-Reliance Corp., "The Self Reliance Commentator," September 1997, p. 6.

[6] *Sandwich Open Space and Recreation Plan* 1999, p. 53.

[7] *Sandwich Open Space and Recreation Plan* 1999, p. 54.

[8] Scenic America, Inc.

[9] Cape Cod Commission, Old King's Highway / Route 6A Corridor Management Plan, April 1995, map after p. TCF-6.

Today, over 125 acres of bogs are in production in Sandwich.[10] While the state Rivers Protection Act of 1996 and other regulations provide a streamlined permitting process on the state and local level for returning abandoned bogs back into production, the cranberry market crash of the late 1990s stymied the conversion.

Major Characteristics and Unusual Geologic Features[11]

From a regional standpoint, several areas or features of Sandwich's natural environment are still significant or outright unique. The 1986 Open Space Plan noted the archetypal importance of the moraine: "Often cited as the classic example of this type of glacial terrain, the moraine gives Sandwich more topographic relief than can be found anywhere else on Cape Cod...While awareness of the fragility and value of wetlands and coastal marshes has led to preservation of these areas, upland forests are being sacrificed to development at an alarming rate." Mindful of this, a number of the Town's open space purchases in 1998 to 2004 (Cashman, Inismore, Striar, Fish, Deutchman, SS YMCA) were in the morainal Ridge District, including the 525-acre Striar purchase, which staved off 75 approved house lots from reaching the market.

Another significant ecological feature is the coastal area generally bounded by Route 6 and Cape Cod Bay. While Sandwich lacks one large central salt marsh, as found in Barnstable's Great Marsh or Yarmouth/Dennis' Chase Garden Marsh, only Wellfleet rivals it as a Cape Cod town having so many salt creeks interwoven with residentially developed areas on "necks" of upland (Town, Ploughed and Scorton Neck, Spring Hill), often surrounded on three sides by marsh. Sandwich is unique as being the only town with significant salt marsh on the south side of Route 6A (Mill Creek, Scorton Creek).

Almost half of the Massachusetts Military Reservation (MMR) is situated within the corporate limits of the Town of Sandwich, but municipal jurisdiction does not apply there. What is unique about the MMR is not only the size, but also the type of forest there. Pine barren habitat--pitch pine with a scrub (not tree) oak understory--cover more than 5,000 acres on the northern portion of the base, much of it in Sandwich. This is the largest intact area of barrens on the Cape and one of the largest in New England. It is the last stronghold for box turtles, northern harriers, whip-poor-wills and a suite of rare moths adapted to live exclusively in barrens habitat. Sandwich Selectmen have supported a plan to have the northern portion of the MMR managed for wildlife and water supply protection.

7.3 Inventory of Lands of Conservation and Recreation Interest

Sandwich's natural resources have helped to create a distinctive landscape and a richness of culture that makes the town an attractive and interesting place to live and visit. Protection of these natural resources ensures a healthy environment that can provide safe drinking water, clean air, and outdoor recreation opportunities and sustain healthy wildlife habitats and populations. Land use decisions that consider the community's natural constraints and opportunities will work to protect and preserve surface and groundwater resources, reduce air and noise pollution, limits erosion, moderate temperatures, and protect places of natural beauty and critical environmental concern.

In many cases, open space protection can be a reactive measure, mobilizing community funding to preserve the "last wetland" or "last farm." This method can not only be costly, but can also result in disconnected fragments of conservation land. Establishing criteria to prioritize open space parcels for protection would help the town and regional conservation partners to be strategic about which lands to acquire. Such a strategy can focus on developing a network of large connected parcels of open space (green infrastructure) which have higher ecological value. Because natural systems do not necessarily

[10] From Town Assessors Database, April, 2005.

[11] *Sandwich Open Space and Recreation Plan* 1999, pp. 52-58.

adhere to political boundaries, natural resource protection is best achieved through regional collaboration. This approach emphasizes connections between natural habitat areas and corridors, and collecting inventory information for unique sites of special importance such as vernal pools or endangered or rare habitats and species.

The open space and recreation areas in the Town of Sandwich encompass a variety of types of land and water sites, as well as cultural and historic resources, both publicly and privately owned. The purpose of this inventory is to identify areas of conservation and recreation interest in the town in order to evaluate current and future open space planning needs. Areas of interest include open spaces that are valued for one or more of the following factors: recreation opportunities, protection of natural resources, historic and scenic character.

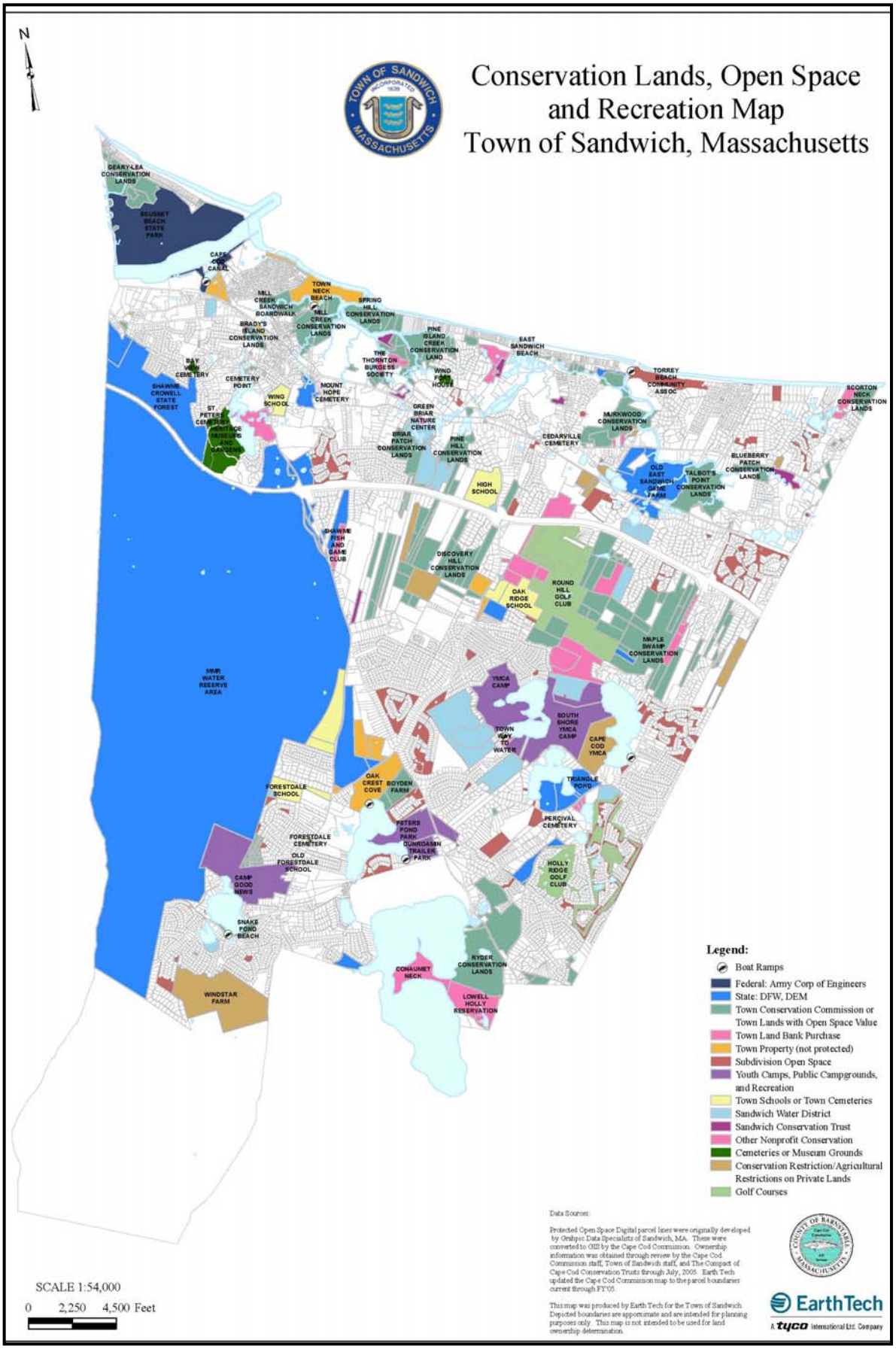
The inventory is divided into two sections –public or non-profit land and private open space. Within these sections, land has ranging degrees of protection, which prevent or restrict land uses and development. Protected open spaces are private or public parcels that are permanently committed to conservation or recreation purposes by deed restriction or easement. Unprotected open spaces are areas that are of conservation or recreation interest to Sandwich, but are not permanently protected as open space. Partially protected open spaces are areas that have a partial or short-term restriction on development, but are not protected forever. The inventory includes information about ownership and management, current use and condition of the land, recreation potential, accessibility, and types of protection. Map 5 shows the distribution of protected and unprotected open spaces.

Though Sandwich was active in the 1970s and mid-1980s acquiring large tracts of town conservation lands, from 1987 until 1998 this activity was essentially dormant. The town's approval of the Cape Cod Land Bank legislation in 1998 helped revive open space protection efforts.

In 1998, Sandwich received a $50,000 grant from Barnstable County's Cape Cod Pathways program to acquire the 1.5-acre Inismore subdivision lot near the entrance to the Maple Swamp Conservation Area to preserve an existing trail. The town also negotiated a successful bargain purchase of the 5-acre Cashman parcel in the Ridge District. The Sandwich Adventure Playground opened at the Oak Ridge School. In April 1999, Town Meeting voted to acquire the 525-acre Striar properties (accounting for fully 2% of Sandwich's land mass) in the Ridge, including the Round Hill Golf Club, as town conservation and recreation land. In May 1999 the Town Meeting acquired its second land bank property, 5.4 acres at the Murkwood trailhead.

Since the completion of the 1999 Open Space and Recreation Plan, an additional 633.79 acres of open space land have been purchased by the town. In 2002, Sandwich approved four land acquisitions or land exchanges. The town also agreed to a land exchange with P.A. Landers, Inc. in the Ridge District near the industrial park on Jan Sebastian Drive and the Service Road. The arrangement consolidated a number of parcels owned by each party and resulted in an additional 38 acres of open space for the town.

Town voters approved the purchase of development rights for 79 acres of the Camp Lyndon property along Lawrence Pond in the Three Ponds District of Critical Planning Concern. The acquisition would restrict future development to camping uses only. At the same time, voters approved use of land bank funds to buy 42 acres of the Cook/Rubincam property in Sandwich Village abutting Shawme Pond. Finally, voters also approved acquisition of 83 acres of property (Oak Crest Cove) with frontage on Peters Pond (the former Agilent Property).


Conservation Lands, Open Space and Recreation Map
Town of Sandwich, Massachusetts
N
GEARY-LEA CONSERVATION LANDS
SCUSSET BEACH STATE PARK
CAPE COD CANAL
MILL CREEK SANDWICH BOARDWALK
TOWN NECK BEACH
MILL CREEK CONSERVATION LANDS
SPRING HILL CONSERVATION LANDS
BRADY'S ISLAND CONSERVATION LANDS
PINE ISLAND CREEK CONSERVATION LAND
EAST SANDWICH BEACH
THE THORNTON BURGESS SOCIETY
WING FORD HOUSE
BAY VIEW CEMETERY
CEMETERY POINT
MOUNT HOPE CEMETERY
WING SCHOOL
SHAWME CROWELL STATE FOREST
ST. PETER'S CEMETERY
HERITAGE MUSEUMS AND GARDENS
GREEN BRIAR NATURE CENTER
BRIAR PATCH CONSERVATION LANDS
PINE HILL CONSERVATION LANDS
TORREY BEACH COMMUNITY ASSOC
MURKWOOD CONSERVATION LANDS
CEDARVILLE CEMETERY
SCORTON NECK CONSERVATION LANDS
BLUEBERRY PATCH CONSERVATION LANDS
OLD EAST SANDWICH GAME FARM
TALBOT'S POINT CONSERVATION LANDS
HIGH SCHOOL
SHAWME FISH AND GAME CLUB
DISCOVERY HILL CONSERVATION LANDS
OAK RIDGE SCHOOL
ROUND HILL GOLF CLUB
MAPLE SWAMP CONSERVATION LANDS
MMR WATER RESERVE AREA
YMCA CAMP
SOUTH SHORE YMCA CAMP
TOWN WAY TO WATER
CAPE COD YMCA
TRIANGLE POND
OAK CREST COVE
BOYDEN FARM
FORESTDALE SCHOOL
PERCIVAL CEMETERY
PETERS POND PARK
DUNRODAMIN TRAILER PARK
FORESTDALE CEMETERY
OLD FORESTDALE SCHOOL
HOLLY RIDGE GOLF CLUB
CAMP GOOD NEWS
SNAKE POND BEACH
RYDER CONSERVATION LANDS
CONAUMET NECK
LOWELL HOLLY RESERVATION
WINDSTAR FARM
Legend:
Boat Ramps
Federal: Army Corp of Engineers
State: DFW, DEM
Town Conservation Commission or Town Lands with Open Space Value
Town Land Bank Purchase
Town Property (not protected)
Subdivision Open Space
Youth Camps, Public Campgrounds, and Recreation
Town Schools or Town Cemeteries
Sandwich Water District
Sandwich Conservation Trust
Other Nonprofit Conservation
Cemeteries or Museum Grounds
Conservation Restriction/Agricultural Restrictions on Private Lands
Golf Courses
Data Sources:
Protected Open Space Digital parcel lines were originally developed by Grahpic Data Specialists of Sandwich, MA. These were converted to GIS by the Cape Cod Commission. Ownership information was obtained through review by the Cape Cod Commission staff, Town of Sandwich staff, and The Compact of Cape Cod Conservation Trusts through July, 2005. Earth Tech updated the Cape Cod Commission map to the parcel boundaries current through FY05.
This map was produced by Earth Tech for the Town of Sandwich. Depicted boundaries are approximate and are intended for planning purposes only. This map is not intended to be used for land ownership determination.
SCALE 1:54,000
0 2,250 4,500 Feet
EarthTech
A tyco International Ltd. Company

Town Land

Over 3,700 acres of open land are owned by the Town of Sandwich. A large portion of these lands were acquired for conservation purposes (approximately 2,100 acres) and fall under the jurisdiction of the Conservation Commission. Town-owned cemeteries cover approximately 85 acres. The quasi-public Sandwich Water District controls approximately 400 acres of land. Approximately 700 acres of town properties provide areas for various recreational activities, including access for boating and fishing, beaches for swimming, athletic fields, and playgrounds.

Town of Sandwich Conservation Properties

Facility Name	Location	Area (Acres)	Description/Comments
Blueberry Patch Conservation Lands	South side of Route 6A and corner of Jones Lane in East Sandwich	17.0	Part of the Great Marsh system abutting Scorton Creek. Cultivated lands for blueberry picking. Provides wildlife nesting and feeding areas
Boyden Farm Conservation Area	Cotuit Rd.	55.5	Frontage on Peter's Pond, wildlife viewing, walking trail. Scrub pine and oak woods make up habitat for deer, red fox, wild turkey, owls and hawks
Brady's Island Conservation Area	Jarves St. / Route 6a	21.2	Salt marsh, walking trail
Briar Patch Conservation Area	Behind Green Briar Nature Center on Route 6A	59.6	Ownership shared with Thornton Burgess Society, trails.
Cow House River	Quaker Road	3.0	
Cummings Conservation Area	Grandwood Dr / Windsong Rd / Lichen Ln /	23.3	Abuts Camp Good News
Discovery Hill Conservation Area	Kiahs Way / Jan Sebastian Dr / Discovery Hill Rd / Rte 6 / Quaker Meeting House Rd / Thicket Run Rd	314.1	Contains old roads that make up the present trail system extending from Service Road and Mill Road
Factory Creek Conservation Lands	of Dewey Avenue	4.0	Marsh and wildlife area for birds
Geary-Lea Conservation Lands	Sagamore coastal area off Phillips Road	45.0	Barrier beach, salt marsh wetlands wildlife refuge; Excellent views of the cliffs that line the Plymouth Coast
Great Marshes Conservation Area	Sandy Neck Road	10.1	View of Sandy Neck dunes. Wildlife area for nesting birds and wetland plant species
Maple Swamp Conservation Area	Service Road Between Exits 3 And 4 Off Of Route 6	647.1	Views, trails
McLaughlin/McArdle Conservation Area	Dewey Ave / Boardwalk Rd / Georges Rock Rd / Town Neck Rd	67.2	Salt marsh. Habitat for wildlife and birds
Murkwood Conservation Area	Rte 6A	113.8	Trails
Ox Pasture Marsh	Rte 6A	5.0	
Pine Hill Road Conservation Area	Rte 6 / Rte 6a	48.4	abandoned cranberry bog, stream, fresh water wetlands and pine barrens
Pine Island Creek / Old Harbor Conservation Area	Great Island Rd / Pine Island Creek / Spring Hill Creek / Spring Hill Rd / Stonefield Dr	123.1	Salt marsh
Ryder Conservation Area	Cotuit Road	295.0	Walking trails, abandoned cranberry bogs
Scorton Neck (Sandy Neck) Conservation Area	Sandy Neck Rd	27.6	Sandy beach and dunes
Spring Hill Salt Meadow	Foster Rd / North Shore Blvd / Spring Hill Beach / Salt Marsh Rd	78.2	
Talbots Point Conservation Area	Old County Rd	105.1	Trails, Scorton Marsh
Three Town Kettleholes	Meiggs Backus Rd / Evsun Dr	9.3	

Source: Town of Sandwich Assessors Records

Most of Sandwich's organized recreation facilities (including fields, courts and indoor facilities) and playgrounds are located on the approximately 200 acres of school properties. An estimated 400 additional acres of town open space is not designated for a specific use. These various lots are scattered throughout the town, some abutting other town properties and others in isolated locations. As a community, Sandwich has made a strong commitment to the setting aside of lands for public use and natural resource protection. The following tables provide a list of open space and recreation properties by use.

The most popular town conservation areas, in terms of frequent use, are the Ryder Conservation Lands, particularly the western portion along Mashpee Lake; the Maple Swamp; the Briar Patch; Boyden Farm; Murkwood Conservation Area; Talbot's Point; and the marshes along the Boardwalk over Mill Creek.

The Natural Resources Department is responsible for day-to-day management of all town conservation areas. Uses of conservation lands include passive recreation, such as walking, nature study, picnicking and photography. Hunting is allowed in some larger areas where MA DFW regulations and state laws permit.

Sandwich Water District - Another major portion of protected open space (406 acres) consists of large blocks of woodland held by the quasi-public Sandwich Water District for public water supply wells and wellfield protection. The District maintains ten wells throughout the Town for public water supply.

Town Parks and Recreation Properties – Passive and active open space properties in Sandwich include land managed by the Town Selectmen or the Recreation Department, which are used for community gardens, sports facilities, parks, swim beaches, and boating access.

Town Parks, Beaches, and Passive Recreation Lands

Facility Name	Location	Use / Description	Acres
Town of Sandwich Conservation Land	Jones Ln. / Rte 6A	Agriculture (blueberry patch)	24.47
Community Garden	Liberty St	Agriculture	0.25
Community Garden	Off Quaker Mtgh Rd	Agriculture	6.12
East Sandwich Beach	North Shore Blvd	Beach	3.12
Town Neck Beach	Wood Ave	Beach	73.2
Scorton Neck Conservation Land	Sandy Neck Rd	Beach	27.58
Lombard Park / Snake Pond	Snake Pond Rd	Beach / Park	12.66
Peters Pond / Oak Crest Cove	Quaker Meetinghouse Rd	Beach / Playground / Camping / Conference Facility	83.01
Ryder-Wakeby Park	South Sandwich Road	Beach / Park	
Pocket Park	Main St	Park	0.5
Pocket Park	Jarves St	Park	0.51
Kiwanis Park	Rte 6A	Park	2.38
Lions Club Park	Main St	Park	0.39
Lower Shawme Pond Park	Water St	Park	2.89
Spectacle Pond	Pinkham Rd / Spectacle Pond Rd	Park	0.84
Sandwich Marina	Freezer Road	Boat marina with parking, includes concession area, shower facilities and playground.	23.39
Town Recreation Area (Golden Triangle)	Quaker Meetinghouse Rd / Cotuit Rd	Recreation area with ball fields, parking, and picnic area.	52.68
Sandwich Hollow Golf Club	Mill Rd	Public golf course.	281.4

Source: Based on Town of Sandwich Assessors Database, April, 2005.

There are three saltwater and three freshwater beaches in Sandwich. Saltwater beaches include the Town Neck Beach and Boardwalk on Wood Avenue, East Sandwich Beach on North Shore Boulevard and Sandy Neck Beach (for residents only) on Sandy Neck Road. Fresh water beaches include Snake Pond Beach (for residents only) on Snake Pond Road, Ryder-Wakeby Park on South Sandwich Road and the Oak Crest Cove (for residents only) on Peters Pond.

In 1997, the town set aside land in South Sandwich for recreation facilities to be managed by the Recreation Department. The facilities are located in the area off of Cotuit Road and Quaker Meetinghouse Road and include a Community Center, Pop Warner football field, other play fields, a fitness trail, horseshoe pits, volleyball court and community gardens. The Recreation Department also manages the Kenneth Benjamin Fleet Skatepark on Cotuit Road which was opened in 2002. Three play fields were also constructed on Water District land in South Sandwich in 1997 and are used by local youth sports teams.

Inventory of Sandwich Active Recreation Facilities and Fields, 2007

Activity	Total Number (fields, courts, etc)	Location
Soccer	8 (only 2 are regulations size)	6 at school, 2 at Water District
Field Hockey	1	High School
Lacrosse	0	Boys share soccer field space at High School and Oak Ridge School, girls lacrosse shares High School field hockey field
Football	2	1 at High School, and 1 at Town Recreation Area (Pop Warner), also share soccer fields at other locations
Baseball (Full Size)	4	1 at each of the schools
Baseball (Little League, Softball)	7	3 at Wing Elementary School, 2 at High School, 1 at Forestdale and Oak Ridge Schools
Track	1 (not useable)	High School
Basketball (outdoor)	3 (all poor/unusable condition)	1 court at each of the K-8 schools
Basketball (indoor)	4	1 full court at each of the schools
Tennis Courts	5 sites (2 poor,2 fair,[one not open to public without parking sticker], 1 good)	1 each at High School, three K-8 schools, Oak Crest Cove
Pool	1	High School
Golf Course	1	Sandwich Hollows
Playgrounds	7	1 at each K-8 school, 1 at Sandwich Marina, 1 at Oak Crest Cove, Adventure Playground, Ryder Conservation Property

Source: Sandwich Recreation Department

All recreational field and facilities, with the exception of the Pop Warner field at the intersection of Quaker Meetinghouse Road/Cotuit Road and the Water District fields (adult soccer only), are located on school property. Hence, the use of these fields and facilities are governed by the Community Schools who report to the Facility Use Committee, a division of the School Department. Nearly 100 percent of all Recreation Department field requests are for fields on school property. This creates a strong dependency on the Community Schools.

In 1999, Sandwich purchased the 18-hole Round Hill Country Club (renamed Sandwich Hollows) as a town facility. Besides offering golf in season, it provides cross-country skiing in the winter. The town also has six cemeteries (in addition to other private cemeteries). These range in size from a tenth of an acre (Godspeed Cemetery) to almost 80 acres (Sandwich Town Cemetery). Cemeteries provide residents several opportunities for passive recreation such as walking or jogging.

Town Cemeteries		
Name	**Location**	**Area (Acres)**
Cedarville Cemetery	Ploughed Neck Rd	2.1
Freeman Cemetery	Main St	0.48
Godspeed Cemetery	Cotuit Rd	0.11
Mt Hope Cemetery	Rte 6A	2.6
Old Town Cemetery	Grove St	1.43
Sandwich Town Cemetery	Rte 130	79.95

Source: Town of Sandwich Assessors, April, 2005.

State and Federal Land

State-Owned Lands in Sandwich		
Facility Name	**Manager**	**Acreage (approx.)**
Shawme-Crowell State Forest	DCS	495
Scusset State Beach	DCS	325
Land off Rte 130 in "Golden Triangle"	DFW	114
East Sandwich State Forest	DFW	22
Maple Swamp Conservation Land	DFW	10
Scorton Creek	DFW	5.5
State Game Farm	DFW	155
Triangle Pond	DFW	82
Trout Hatchery	DFW	37
Land off of Harlow Road	DFW	25.5

Source: Town of Sandwich Assessors, April, 2005.

The Commonwealth of Massachusetts owns the 9,500 acres in Sandwich that is part of the Massachusetts Military Reservation, managed by the Military Reservations Commission. The northern third of the base was appropriated out of Shawme-Crowell State Forest in the 1930s, to which it will revert if the current proposal to convert the northern part of the base to a water supply and wildlife refuge becomes reality.[12] The Department of Conservation Services (formerly the Dept. of Environmental Management) owns approximately 930 acres of land in Sandwich, including the Shawme-Crowell State Forest and the Scussett Beach State Reservation.

The Massachusetts Division of Fisheries and Wildlife (DFW) has several properties in Sandwich totaling approximately 380 acres. These include the former State Game Farm along Scorton Creek, which was closed in 1987. Today the property is leased and is being renovated by volunteers under the direction of the Thornton Burgess Society for use as a nature classroom and passive recreation site. Abutting the Game Farm is a 20-acre site on Old County Road, formerly used as a supplemental trout hatchery that was closed in the 1990s.

The DFW operates a trout hatchery on 35 acres on Route 6A near the center of Sandwich. One of only four state hatcheries in Massachusetts, it is the only one that provides a brood stock of trout: brown trout, sea-run brown and sea-run brook trout. A public picnic grounds is provided at the hatchery.[13]

The 82-acre property along the southeast side of Triangle Pond (formerly owned by the Massachusetts Audubon Society) is now owned by the DFW and falls within the newly designated District of Critical Planning Concern. The DFW also owns scattered sites in the south part of Sandwich, most important being the approximately 100 acres at the southwestern side of the South Sandwich Village Center. The town has sought to undertake a three (3) acre land swap with the DFW in exchange for other town

[12] *Sandwich Open Space and Recreation Plan* 1999, p. 64.
[13] *Sandwich Open Space and Recreation Plan* 1999, p. 65.

land.[14]

MassHighway is primarily represented by its Route 6 right of way, running through Sandwich as a double-barreled, limited access highway from Bourne to the Barnstable line, along some of the highest points of the moraine. The Route 6 right of way varies in width, but averages 300 feet, though the actual road bed rarely exceeds 100 feet wide. The wide shoulders, therefore, otherwise provide a natural greenbelt to the highway.

The federal government is represented in Sandwich's outdoor recreation by the Cape Cod Canal, perhaps the most popular year-round outing site in town. Formally known as the Sandcatcher Recreational Area, this 29-acre linear park, controlled by the U.S. Army Corps of Engineers, ends at the south jetty of the Canal, abutting the 32-acre beach and maritime forest owned by Southern Energy.

Land Owned by Nonprofit Organizations

Augmenting the acres of publicly-owned (town, state, federal, and water district) open space lands are approximately 1,565 acres of land owned by nonprofit organizations. These lands have varying degrees of protection against development. Many of these properties often enhance the value of abutting public lands, such as the 75-acre Lowell Holly Reservation owned by The Trustees of Reservations alongside the town's Ryder Conservation lands. The 27-acre Thornton Burgess Society's property abuts the town's Briar Patch and provides the public with parking and environmental education and property monitoring. The 94-acre Heritage Plantation, which includes at least 36 acres of still vacant woodland, augments the adjacent Shawme-Crowell State Forest.[15]

Sandwich Conservation Trust Lands

Parcel	Address	Acreage
08-005	77 Cotuit Road	0.31
27-012	Kiahs Way	8.6
31-030	12 Howland Lane	0.99
35-049	12 June Lane	0.67
36-082	662 Route 6a	14.4
50-064	41 Sandy Neck Road	0.64
61-014	51 Ploughed Neck Road	3.99
67-028	Off Great Island Road	6.36
69-022	51 Roos Road	7.37
75-017	Great Island Road	7.28
77-030	14 Salt Marsh Road	0.37
82-038-002	Tupper Road	1.64

The Sandwich Conservation Trust (SCT) was founded in 1985 to provide a private, non-profit vehicle to dedicate natural lands to conservation in town. SCT owns 12 lots totaling 52 acres, most having been acquired as outright gifts of land title. The most significant acquisition was donated by Gifford Foster in 1994 to forestall the development of a proposed Costco retail warehouse in the industrial zone. Public access is allowed on lands held in fee by SCT, though it is not actively promoted.[16] Sandwich Conservation Trust properties are listed in the table to the left.

The National Wildlife Federation is another conservation-based nonprofit organization that owns land in Sandwich. The table below lists the nonprofit properties in Sandwich of which all or some is protected open space.

Private Open Space and Conservation Lands in Sandwich

[14] As of April, 2005 this negotiation was in its final stage, having received approval from the State and the Town Planning Board.

[15] *Sandwich Open Space and Recreation Plan* 1999, p.67.

[16] *Sandwich Open Space and Recreation Plan* 1999, pp.67-68.

Owner	Facility Name	Location	Acres	Comments
The Trustees of Reservations, Inc.	Lowell Holly Reservation	South Sandwich Rd	5.13	old bog
The Trustees of Reservations, Inc.	Lowell Holly Reservation	South Sandwich Rd	70	abuts Ryder Conservation Lands; trails
Thornton W. Burgess Society	Green Briar Nature Center	Discovery Hill Rd	1.77	abuts Boiling Springs wellfield
Thornton W. Burgess Society	Green Briar Nature Center	Discovery Hill Rd	1.13	abuts Boiling Springs wellfield
Thornton W. Burgess Society	Franks Island	off Great Island Rd	7.4	on Pine Island Creek
Thornton W. Burgess Society	Great Island	Great Island Rd	1.1	abuts town conservation land
Thornton W. Burgess Society	Great Island	Great Island Rd	9.7	abuts town conservation land
National Wildlife Federation	- -	Country Farm Rd	0.72	lot in subdivision with old bog
		Non-Profit Conservation	**96.95**	
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Pocasset Rd	11.19	abuts Shawme-Crowell State Forest
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Shawme Rd	24.82	abuts Shawme-Crowell State Forest
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Grove St	46.9	Upper Shawme Pond
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Shaker House Rd	0.91	
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Grove St	9.21	
Heritage Plantation of Sandwich, Inc.	Heritage Plantation	Grove St	0.04	
Wing Family of America, Inc.	historical marker	55 Grove St	0.17	abuts Heritage Plantation
Wing Family of America, Inc.	Fort Wing House	63 Spring Hill Rd	3.68	abuts town conservation land
Wing Family of America, Inc.	Fort Wing House	67 Spring Hill Rd	2.9	abuts town conservation land
Wing Family of America, Inc.	Fort Wing grounds	73 Spring Hill Rd	0.95	abuts town conservation land
		Museum Grounds	**100.77**	
Shawme Fish & Game	Shawme Fish & Game Club	Route 130	16.6	clubhouse and woods; abuts DEM land
		Private Hunt Clubs	16.6	Acres
Forestdale Cemetery Association	Forestdale Cemetery	Route 130	0.56	
South Sandwich Cemetery Assoc.	South Sandwich Cemetery	Boardley Rd	0.5	
Spring Hill Cemetery Association	Spring Hill Cemetery	Route 6A	0.52	
Roman Catholic Diocese of Fall River	St. Peter's Catholic Cemetery	Grove St/Pine St	5.89	
Bay View Cemetery Association	Bay View Cemetery	Route 130 (Main St)	4.9	
		Private Cemeteries	**12.37**	
		TOTAL	**226.69**	

Trails and Bike Paths

Sandwich has approximately 20 miles of authorized walking/hiking trails within its existing conservation lands. Town residents have expressed support for additional trails as well as improving trail markings and updating the Sandwich trails map.

Sandwich has endorsed the concept of Cape Cod Pathways, a countywide effort to create a Cape network of linked walking trails, primarily using existing trails and public open space. Sandwich cooperated with Mashpee and the Cape Cod Commission in 1995 to design a suggested north-south linked route through South and East Sandwich. In 1997, Barnstable County appropriated funds to assist towns in purchasing lands for pathways, resulting in the acquisition of the Inismore lot at the Maple

Swamp trailhead.[17] Another link is planned in East Sandwich near the town line.

Authorized Hiking/Nature Trails in Sandwich

Site	Miles
Brady's Island	0.18
Briar Patch	2.03
Talbot's Point	1.72
Murkwood	0.87
Boyden Farm	1.01
Ryder Lands: Pond	3.66 (not including extension into Lowell Holly)
Ryder Lands: East	2.46
Maple Swamp	4 -5 (approximate)
Cook Farm	1.5
TOTAL	17 – 18 (approximate)

The only separate, dedicated bike paths currently in Sandwich are 1.8 miles of paved paths owned and maintained by the U.S. Army Corps of Engineers along either side of the Canal. These very popular public paths, on federal land, are continuous with an additional seven miles on each side through Bourne.

The 1996 Sandwich Local Comprehensive Plan indicated Route 6A's desirability as a biking route, but also pointed out the danger of shared use of the roadway (which has many curves, narrow shoulders, and high traffic volumes). A 1995 report on Route 6A by the Cape Cod Commission found that "A bicycle path running parallel to the roadway (Route 6A) is not recommended due to the high number of residential curb cuts and, in certain areas, constraints and impacts on existing [natural and cultural] resources." Nevertheless, Route 6A is still used by long-distance riders and for several sanctioned bicycle races, such as the Boston to Provincetown Challenge.

The recent repaving of the Service Road, which parallels the Mid-Cape Highway, would enable the Town to promote it as a safer alternative through-route, but opposition by residents prevented this from becoming an established bike trail. Nonetheless, the Service Road is currently listed, as are Main Street and Water Street through the historic Center, as part of a recommended long-distance bike trail on regional bike maps.

Private Land

In addition to the private nonprofit lands listed in the table above, there are approximately 3,673 acres of privately owned land in Sandwich for recreation or conservation uses. While some of this land is permanently or partially protected from development, much of it is not currently protected or restricted, although it is undeveloped open space.

It is important to realize that some of these parcels will play vital roles in creating open space and recreation opportunities in Sandwich. In some cases, unprotected open space may be the missing links in creating connections between protected open spaces. In other cases, some of these parcels might be acquired by the town to meet the growing demand for recreation lands.

Partially Protected Lands - There are a variety of open spaces in Sandwich that are under partial protection. Some of these properties are enrolled in the State's Chapter 61 program. Chapter 61, 61A and 61B are tax laws that allow for significant reduction of property taxes for landowners willing to maintain their land as managed forest, outdoor recreation, or agriculture. If a landowner chooses to withdraw land from this classification, the owner must pay a penalty tax equal to the number of years a reduced tax has been paid on the land. When the land is put up for sale, the city or town has a right of first refusal to consider whether or not to buy the land outright. Fifteen (15) properties currently have Chapter 61A or 61B status. Chapter 61A is for active agricultural use, 61B is for recreation, and 61 is for active forested land. Two private golf courses, Ridge Club and Holly Ridge are not enrolled in chapter 61B and not all of the active cranberry bogs are enrolled in 61A.

[17] *Sandwich Open Space and Recreation Plan* 1999, p. 72.

Partially Protected Private Open Space and Agricultural Land

Parcel	Location	Owner (Operator)	Acres	Type of Protection	Use
28-060	190R Discovery Hill Rd	Morse Family Trust & Wisentaner	39.6	CR with Town	
33-076	341 Service Rd	Pimental, Richard L	24.98		
34-093	Cedarville Rd	Cullity Nominee Trust	12.48	CR with Historic New England (SPNEA)	
50-001	5 Meadow Spring Drive	Murray, Walter J	15.32	CR with SCT	
34-089	3 Cedarville Rd	Cullity Nominee Trust	6.43	CR with SCT	
20-128	6 Popple Bottom Rd	Ray, Douglas M & Laurie A	26.19	CR with CCC (DRI required set aside)	
35-054	25 Old County Rd	Canning, Craig A & Martine	11.4	APR	
06-008	22 Greenhouse Rd	Sandwich Hills LLC	228	APR	
56-056	65 Cranberry Trail	Canning, Richard E Jr & Shirley	15.3	APR	
06-008	22 Greenhouse Road	Sandwich Hills LLC (Windstar Farm)	228	Chapter 61A	inactive
38-051, 43-015 & -016	Charles Street	Crowell, Howard P. (Crow Farm)	23.45	Chapter 61A	Vegetables, orchards, and farmstand
58-029 & 030	Gully Lane	Constance S Crowell Trust	15.03	Chapter 61A	Horse pasture
59-015-001	Route 6A	Douglas Allen Family Trust (F.W. Schumacher, Co)	4.4	Chapter 61A	Nursery, seed farm
62-010	12 Marshview Cr	Fleet, Edith Lucille (Fleetwood Farm)	72.79	Chapter 61A	Vineyard
68-031	0 Spring Hill Rd	Allen, Donald H & Caroline B (F.W. Schumacher, Co)	1.07	Chapter 61A	Nursery, seed farm
68-032	22 Spring Hill Rd	Reiss, Malcolm A & Judy	7.94	Chapter 61A	Hay
11-246 & 253	Route 130	Carr, Debra J	9.3	Chapter 61B	
13-044	Cotuit Road	Peters Pond Trust	18.9	Chapter 61B	Trails
57-004 & 005	Cranberry Trail	Bosworth, W Chandler Jr	7.7	Chapter 61B	Nature study

Source: Sandwich Open Space and Recreation Plan 1999 and Town Assessors, April 2005.
Abbreviations: CR = Conservation Restriction, CCC = Cape Cod Commission, DRI = Development of Regional Impact, SCT = Sandwich Conservation Trust, APR = Agricultural Preservation Restriction.

Agriculture properties remain vulnerable to development. Today, approximately 100 acres of cranberry bogs remain in active production. These bogs are a part of Sandwich's historic and scenic landscape and worth consideration for preservation if any of them should cease operation. Some of the bogs are under Chapter 61 protection or have a Conservation Restriction on their deed, but not all.

Several properties have turned over development rights to the Commonwealth under the Massachusetts Agricultural Preservation Restriction. The program offers to pay farmers the difference between the fair market value and the agricultural value of their farmland in exchange for a permanent deed restriction which precludes any use of the property that will have a negative impact on its agricultural viability.[18]

Conservation restrictions, also called conservation easements, are voluntary yet binding legal agreements between a landowner and the town or conservation organization, such as the Sandwich Conservation Trust. The landowner is offered incentives through estate tax and federal income tax deductions and property tax relief to keep parcels in an undeveloped state. The owner keeps control over the land, while the holder of the restriction promises to enforce the terms of protection. The state Secretary of Environmental Affairs and the Selectmen must approve each restriction based on the land's environmental significance or other public benefit.[19]

[18] Massachusetts Dept. of Agricultural Resources, 2005.
[19] *Sandwich Open Space and Recreation Plan* 1999, p.86.

In 1987 the Town of Sandwich endorsed a policy encouraging the use of restrictions as a means of preserving natural areas without the town having to purchase them. According to Sandwich's Conservation Restriction Formula, both permanent and temporary restrictions are considered. There is a two-acre minimum size requirement. Property valuation would be reduced by as much as 95% for lands under permanent restriction. Between 1977 and 1999, 17 restrictions covering about 505 acres were approved in Sandwich. Unfortunately, all but five of those 17 restrictions were temporary easements and none of the temporary easements have been renewed. More recent restrictions were exacted by the Cape Cod Commission as part of Development of Regional Impact decisions.

Summer Camps - Institutional lands (particularly summer camps) in Sandwich are of conservation interest because of their size, strategic location alongside several Great Ponds, and their vulnerability to development. There are 535 acres of summer youth camps and 92 acres of commercial campgrounds in Sandwich, more than in any other Cape Cod town. The town has tried to maintain the rural character of the South Sandwich ponds, establishing a District of Critical Planning Concern around their shores. As a result, 83 acres were purchased from the Southshore YMCA on Spectacle and Lawrence Ponds and a conservation restriction was purchased on 79 acres of the CC YMCA on Lawrence Pond.

Private Youth Camps and Recreation Areas in Sandwich

Parcel	Location	Village	Facility Name	Acres	Feature
11-57	Route 130	FD	Camp Good News	183.97	Snake Pond
11-59	off Route 130	FD	Camp Good News	0.15	Snake Pond
11-60	off Route 130	FD	Camp Good News	0.2	Snake Pond
11-61	off Route 130	FD	Camp Good News	0.55	Snake Pond
11-61-1	off Route 130	FD	Camp Good News	0.19	Snake Pond
11-62	off Route 130	FD	Camp Good News	0.15	Snake Pond
11-63	Route 130	FD	Camp Good News	2.18	office
			Subtotal Acres	**187.39**	
18-122	Pinkham Road	SS	YMCA Camp Burgess/Hayward	12.95	Spectacle Pond
18-124	Pinkham Road	SS	YMCA Camp Burgess/Hayward	12.58	Spectacle Pond
19-1	Stowe Road	SS	YMCA Camp Burgess/Hayward	168.71	Spectacle Pond
19-43	Stowe Road	SS	YMCA Camp Burgess/Hayward	4.26	Triangle Pond
19-44	Stowe Road	SS	YMCA Camp Burgess/Hayward	17.1	Triangle Pond
19-45	Stowe Road	SS	YMCA Camp Burgess/Hayward	0.94	Triangle Pond
23-468	Pinkham Road	SS	YMCA Camp Burgess/Hayward	131.61	Spectacle Pond
			Subtotal Acres	**348.15**	
			Summer Youth Camps Total Acres	**535.54**	
13-8	Cotuit Road	SS	Peters Pond Park Campground	73.4	Peters Pond
13-44	Cotuit Road	SS	Peters Pond Park Campground	18.9	Ch. 61B; trails for campers
			Private Rec. Areas & Campgrounds Total Acres	**92.3**	
			Grand Total	**627.84**	

Large Undeveloped Parcels - In addition to the properties inventoried in previous sections, there are approximately 2,317 acres of vacant or sparsely developed land on privately held lots that are not currently protected from development in any way. The table below includes those parcels that are approximately 30 acres or greater, which would trigger review by the Cape Cod Commission for Developments of Regional Impact. Also included on the table are abutting lots that are owned by the same owner, which together form a contiguous large parcel of open space. Several of these lots are located near existing protected open space.

Large Developable Parcels in Sandwich

Map/Parcel	Acres	Owner	Location	Comments
27-001, 32-056	105.36	Sandwich Industrial Land Trust	Kiahs Way	2 abutting lots, sand pit; forest, trail, Telegraph Hill

12-022 & -154, 17-215 & -216	95.89	P.A. Landers Inc.	Rte 130	Developable residential land
74-064	77.33	John & Olga Liberty	Dewey Ave	40 acres marsh; access problems
75-002	74.3	Eugene Theroux & Colleen Pankratz	Rte 6a	Single Family
62-010	72.79	Edith Fleet (Fleetwood Vineyards)	Marshview Circle	under Chap. 61A; five acres cultivated; 50 ac. upland
11-241,242, 12-094-097	69.24	George & Phyllis Thompson	Off Rte 130	Wooded lots abutting Peters Pond, developable residential land
36-009	68.49	Abby Henneman	Old County Rd	Single family lot; abuts Talbots Pt., Scorton Creek
27-006, 33-061	63.93	P.A. Landers, Inc	Kiahs Way	2 lots, including about 20 developable forested acres
01-001	63.08	Snake Pond Realty Trust	Snake Pond Rd	failed 20-lot subdivision; abuts MMR
38-234	53.31	Frances H. Smith	Water St	house; rugged forest on Elephantback Hill; abuts Crow Farm
83-037	48.56	Harbor St Realty Trust	Harbor St	Single Family
28-037	47.54	Mark Wisentaner	Discovery Hill Rd	Developable Land
18-092	44.46	First Sand Realty Trust	Farmersville Rd	Water District declined to buy; abuts wellfield
28-041& -042	40	Housing Assistance Corporation	Kiahs Way	2 abutting vacant lots, powerline access
28-060	39.6	Morse Family Trust & Mark Wisentaner	Discovery Hill Rd	Conservation restriction expires 2005; access problems
63-017	37	J Albert Torrey	Torrey Rd	Developable Land
39-146	33.36	P A Landers, Inc	Service Rd	Abuts Telegraph Hill, developable residential land
67-014	33	Irving Freeman	Rte 6a	Single family; scenic greenbelt along Rt. 6A & railroad
31-019	32.23	V Adrian Parsegian	Old County Rd	Single Family
93-009	31.5	(Canal Electric) Southern Energy	Town Neck Rd	beach and maritime pine forest @ East Jetty
25-013	28.01	Heirs of W. F. Makepeace	Great Hill Rd	rugged forest between town conservation land
43-004	27.78	Georgette Pola	Water St	Single Family, abuts Town land along Shawme Pond

Source: Sandwich Assessors, March 2005. Updated Table 3.1 from Sandwich OSRP 1999. Excludes private camps and recreation areas

Private Recreation Facilities - Augmenting town recreation lands and facilities are a few private, commercial enterprises. A private campground is located at Peters Pond Park. Sandwich Center hosts a small, seasonal mini-golf. Holly Ridge in South Sandwich is a private golf course open to the public. The Ridge Club is a private golf course in South Sandwich. The Sportsite Health and Racquet Club was established in 1988 in South Sandwich as an indoor fitness center open to the public. Cape Cod Bike Rental is located near the Bourne line on Route 6A. Additionally, the Rehabilitation Hospital of the Cape and Islands (RHCI) is located off of Service Road in East Sandwich and has a field that is made available for public use.

Open Space in Subdivisions - There are more than a dozen open space or "cluster" subdivisions in Sandwich, in which a common area of at least 30 percent of the parcel's area is provided for neighborhood use. These open areas may be comprised of either undeveloped land or active recreational sites. Some cluster developments have open space parcels as large as 40 acres (Torrey beach), though most are smaller. Most of these cluster subdivisions are located in the parts of town (East Sandwich and South Sandwich) where larger subdivisions were more recently built. There are also smaller park lots reserved for subdivision use. None are open to the general public unless specifically allowed by the owners.

7.4 Assessment of Needs

The following section assesses Sandwich's recreational and open space needs based on a preliminary analysis of community demands for recreational facilities and an inventory of the existing recreational facilities. This assessment is intended to assist the town in establishing its recreation priorities for the next five years.

Summary of Resource Protection Needs

Sandwich's population continues to grow and population projections predict a slow yet steady rate of growth in the coming decades. With the region's attractiveness for vacation homes and as a destination for retirees, there will continue to be a demand for development of new housing. At the same time, there has been broad community support for protecting open spaces. As available developable land dwindles and housing costs rise, finding a balance between the provision of housing and preservation of open spaces will continue to pose a challenge for Sandwich.

Since the completion of the last Open Space and Recreation Plan, the town has been successful in protecting additional acres of open space through acquisition. Sandwich's greatest potential for land use change is within the remaining large private land holdings. In order to maximize funding resources and meet resource protection goals, it will be important to prioritize which of these lands should be the focus of future land preservation efforts. Resource protection concerns that should be factored into this prioritization include:

- Protecting water quality and supply of both groundwater and surface water sources;
- Linking fragmented wildlife habitat and maintaining forested and riparian wildlife corridors; and
- Preserving Sandwich's unique landscapes such as salt marshes, cranberry bogs, shorelines, and farmland.

Summary of Community's Needs

An assessment of population trends in Sandwich shows a growing percentage of seniors, while at the same time families with children still account for almost 40 percent of all households. Population projections indicate that Sandwich should expect population growth to be concentrated in the age groups under 25 as well as those over 50. Meeting the recreation needs of the year-round population is perhaps even more important in Sandwich than elsewhere on the Cape as the seasonal influx of population is thought to be less in Sandwich than in other towns. Therefore, the town will need to provide playgrounds and recreation programs and facilities for children, while also accommodating elder populations and single adults.

Neighborhoods with a high density of population present Sandwich with a challenge to serve recreation needs of households in those areas where available land is scarce. In addition, while Sandwich is a relatively affluent town, there are a number of residents and families in Sandwich who are living on limited means. It will be important to provide open space and recreation services that are accessible and affordable to all.

Traditionally, Sandwich has relied on school properties to serve the recreational needs of its residents, particularly for youth sports teams and other community recreation programs. However, although participation in these programs is increasing and demand for field space has risen sharply in the past few decades, the town's last new school was built in the late 1980s and there are no current plans to build a new school in the near future. Furthermore, while the town has been successful in acquiring open space, only a small percentage of town-owned open space is dedicated and equipped for active recreational use for organized team sports. Provision of additional active recreation facilities and improvement of existing sports fields should be a priority for Sandwich in the next five years.

Of particular concern for the youth and adult sports leagues in Sandwich are the coordination and maintenance of sports fields. Remarks at the public meeting indicated that there is concern that existing fields are overused, creating maintenance problems due to the heavy wear and tear of three seasons of use. In addition, the number of teams relying on the available fields creates difficulty associated with scheduling time for regular upkeep and maintenance. Participants in the public meetings also pointed out that many of the play fields were lacking facilities such as public restrooms and equipment storage.

Scheduling of school field use is coordinated by the Sandwich Community School. While representatives of the various youth sports programs indicated that it was important to have a centralized point of contact for field scheduling, they suggested that this process could be improved by designating a staff person to address questions and concerns about sport field use and maintenance in addition to scheduling coordination.

Existing Recreational Facilities

As demonstrated in Section 7.3 above, Sandwich has a limited number of fields and facilities to serve most organized sport activities. Most of these are located at the schools, with the exception of the football field at the South Sandwich Town Recreation Area and the soccer fields on the Water District land and RHCI. Many of the sports share fields with other teams for practices and games. Sandwich High School has teams in the following outdoor sports: football, baseball, softball, soccer (boys and girls), field hockey, lacrosse (boys and girls). All of these have junior varsity and varsity level teams and soccer, field hockey, and football also have freshmen teams. There are also town recreation leagues for youth soccer, Little League baseball, girls' softball, youth lacrosse, Pop Warner football and men's basketball. This means that all of the fields and courts are heavily used for 3 seasons.

The schools provide 16 tennis courts (including 6 lighted courts at the High School) and 4 outdoor basketball courts. The town's Youth Basketball program – serving Sandwich youth from grades 3 through 8 – makes use of the indoor courts located at each of the elementary schools. The Recreation Department provides a number of other programs at local recreational facilities including youth sailing and swimming lessons at Mashpee Lake, and skating lessons at Gallo Arena in nearby Bourne.

In addition to the 18-hole Sandwich Hollows public golf course owned by the town, there is one other 18-hole public golf course (Holly Ridge), and another 18-hole private golf course (the Ridge Club).
Sandwich is unique on Cape Cod for having a year-round indoor swimming pool in its high school, which is open to the general public on a fee basis. The Sandwich Community School coordinates public use of the high school swimming pool. Public programs offered include lessons, family and lap swims, water aerobics, and a masters program for water life saving skills.

Outdoor water-based recreation includes both swimming and sailing lessons at Mashpee Lake. Two additional freshwater beaches are found at Snake Pond and Oak Crest Cove at Peters Pond. The primary saltwater beach, operated by the town, is the 20-acre Town Neck Beach. Three other saltwater beaches are found at Town Neck Beach and North Shore Boulevard. A state operated public beach is located at Scusset Beach. A small boat basin inside the Canal is heavily used by recreational small craft in summer. The boathouse and bathhouse at Ryder Beach were re-opened for use in 1990 and the facility has undergone a major renovation in 2004 and 2005.

Level of Service

Level of Service (LOS) is a method developed by the National Recreation and Park Association (NRPA) to assist with park and recreation planning. In order to develop a LOS, a community must first develop an inventory of the types of recreation facilities that are currently available. The community must then ascertain the types of activities or programs that are currently used or are needed to satisfy demand. The final step will be to determine the minimum population that should be served by each facility or park class.

The community may then compare this standard with the actual number of recreational resources available to determine if needs are being met. Where specific data on level of use for each individual park is unavailable, a community survey can help determine user preferences. In addition, it is often useful to do a comparative inventory of recreation supply with other communities in the region.

National Recreation and Park Association (NRPA) Level of Service Analysis

LOS is a quantification of the park and recreation systems in a community and how effectively these meet community needs. In the past, the NRPA has provided a national standard that assigned specific space and facility needs based on population size. These standards were applied in communities as a way to determine the adequacy of park and recreation services -- for example, 10 acres of park land for each 1,000 in population or 1 tennis court per 2,000 in population. However, because of the discrepancy between community resources and the variation in resident needs and preferences, the application of universal standards is no longer encouraged. The revised approach is to assess the particular needs of consumers (residents) and develop standards based on expected use.

As summarized in Section 7.3, there are approximately 5,100 acres of town and state owned open space in Sandwich.[20] Of these, approximately 900 acres of public or quasi-public properties accommodate a variety of recreational uses (playgrounds, sports fields or exercise areas, golf, beaches, and boating facilities). The four school properties provide athletic fields and playgrounds that service community recreation needs on a limited basis. Sandwich Water District property on Farmersville Road is used by the public for an athletic field. A field at RHCI on the Service Road is available for public use through an agreement with the town. The remaining open spaces can be classified as natural resource areas where land has been set aside to preserve a significant natural resource, remnant landscape, or to provide a visual buffer. While these areas may accommodate varying levels of public use, their primary purpose is resource protection rather than recreation. For this reason, LOS standards are not generally applicable for natural resource areas.

Including all of the public recreation areas, Sandwich has about 40 acres of recreation land per 1,000 in population. While this may seem high compared to a commonly used national standard of 10 acres per 1,000 people, the types of activities these areas support is often more important than the total acreage provided. For example, while the town may provide plenty of areas for what is generally called “passive recreation” – including wildlife observation areas and hiking trails – there may be less available for recreational pursuits that require more specialized facilities such as sports fields and paved off-road trails for jogging or biking. In addition, providing neighborhood parks with a modest number of recreational amenities (playground, multi-use field, picnic areas) that can be easily accessed by foot or bicycle helps provide a better overall level of service.

Level of Use

A facility survey was completed in the 2007 Recreational Ball Field Development Plan to determine individual rates of use. The most popular youth programs provided by the Recreation Department, in terms of number of participants are soccer, baseball, basketball, football, softball, tennis, and cheerleading. Adult activities include basketball, softball, walking groups, soccer, and tennis. There are five locations for tennis courts (4 on school property, 1 at Oak Crest Cove) and three sites for outdoor basketball courts (all are in poor condition).

Level of use can be estimated by the participation numbers in recreation programs and organized school sports activities. The Sandwich Recreation Department, High School Athletic Department and the various youth sports organizations provided participation numbers by sport for 2007. This information is summarized in the table below.

[20] This excludes the land in the Massachusetts Military Reservation.

Annual Organized Sports Program Participants, 2005				
Activity	**School Participation**	**Youth Recreation Program Participation**	**Adult Recreation Leagues**	**Misc.**
Community School	-	-	-	698
Soccer (Fall)	122	1,500	90	
Soccer (Spring)	-		-	900
Lax (Boys)	48	200	85	-
Lax (Girls)	18	100	-	-
Field Hockey	59	14	-	-
Football	75	450	-	-
Baseball	69	150	-	-
Legion/ Cranberry Baseball	-	-	-	36
Softball	30	150	150	-
Little League	-	750	-	-
Basketball	60	900	75	-
Tennis	60	43	130	-
Total	541	4,257	530	1,634
Total participants using outdoor recreation facilities				5,391
Total participants using indoor recreation facilities				1,571
Grand Total				**6,962**

Source: Sandwich Recreational Field Development Plan, 2007

By comparing the total number of program participants with the total number of facilities, it is possible to estimate the demand carried by each type of field or other facility as illustrated in the table below.

Organized Sport Demand Per Facility						
Facility Type	**# of Facilities**	**Estimated # of Organized Sports Users Per Facility Per Season**				**Estimated # of Days Used**
		Fall	**Winter**	**Spring**	**Summer**	**Per Year**
Soccer / Lax	8	113		88		180
Field Hockey / Lax	1	59		207		180
Football	2	175				80
Baseball	4			80		60
Little League / Softball	7			229		60
Basketball (indoor)	4		288			72
Tennis	5			4	22	72

While this information provides a rough estimate of use, it would be more useful to start tracking field and facility use on an annual basis. The easiest data to track is the number of hours each field or other facility is used during the year. Documenting use and the overall condition of facilities annually is often the best way to establish guidelines on how much use each facility can adequately handle.

The table below illustrates field use by number of hours used. It is important to note the figures do not include fall soccer and adult soccer figures. The Recreation Department's research concludes that a field can withstand 155 hours of use per year without degradation. Based on current total use figures, 22 fields out of 28 exceed the recommended hours of use per year.

Annual Hours of Use Per Field in Sandwich, 2005

Activity	Fields						
	Field #1	Field #2	Field #3	Field #4	Field #5	Field #6	Field #7
Oak Ridge School							
Little League		131					
Girls Lacrosse			32	32			
Boys Lacrosse			154	154			
Babe Ruth	100						
Sr. Babe Ruth	25						
Adult Co-ed Softball		10					
School (recess/gym class)	36	36	36	36			
Interscholastic Sports	35	70	35	35			
High School Teams	40	247	8				
Totals	***236***	***247***	***265***	***257***			
Forestdale School							
Little League						131	
Babe Ruth	100						
Pop Warner	132	132	132		132	132	
Soccer (Fall)				60			
Soccer (Spring)			160	160			
Adult Co-ed Softball						10	
School (recess/gym class)	12	12	12	12	12	12	
Interscholastic Sports	35	35	35	35		35	
Totals	***279***	***179***	***339***	***267***	***144***	***320***	
Wing School							
Little League (Spring)	140		133			140	
Little League (Fall)	21					21	
Babe Ruth					100		
Sr. Babe Ruth (Spring)					25		
Sr. Babe Ruth (Fall)					18		
Soccer (Fall)		96	96	96			
Soccer (Spring)		160	160				
School (recess/gym class)	12	12	12	12	12	12	
Interscholastic Sports		35	70	35	35		
Totals	***173***	***303***	***471***	***143***	***190***	***173***	
High School							
Little League (Spring)	122						
Girls Lacrosse		48					
7th/8th Grade Softball					10		
Field Hockey Clinic		9					
Adult Co-ed Softball	10				10		
High School Gym Class	60	60	60	60	60	60	60
High School Interscholastic	90	188	196		58		141
American legion Baseball							48
Cranberry League Baseball							48
Totals	***282***	***305***	***256***	**60**	**138**	**60**	**297**
Quaker Meeting House/Cotuit Road							
Pop Warner		72					
Smart Soccer Program		4					
Totals		***76***					
Water District Fields							
Sand. Soccer Club	120	120					

Cape Cod Y. Men's League	20	20					
Rec. Dept. Adult Soccer	12	6					
Maple team	20	20					
Paul Turner Clinics	160	160					
Totals	**332**	**326**					

Source: Sandwich Recreational Field Development Plan, 2007

Regarding athletic field space, it is difficult to determine how much play a certain field can carry due to a number of variables that influence the overall wear (such as weather, field construction, and types of use). An ideal situation is to have an adequate numbers of fields so that use can be limited. It is best to have game and practice fields dedicated to only one sport to eliminate compound wear of two or more sports. Additionally, there should be a sound turf maintenance program that promotes turf growth and recovery. Unfortunately, budgets for field management are often the most limiting factor.

Field Needs and Potential Development by Sport

Soccer is cited by the Recreation Department as most constrained by space limitations. The demand for fields is high and sharing these fields for lacrosse, field hockey and football practice creates additional demand on the facilities. The result is overused fields in need of repair. The lack of fields is cited by Sandwich Youth Soccer as a roadblock to their expansion.[21]

Sandwich Field Use and Demand by User Group*

Group	Current # of Fields Used	Additional Number of Fields Requested	Could Use Two Turf Fields (Yes/No)
Little League/Softball	6	4	yes**
Babe Ruth	3	1	yes**
Youth Soccer	3 + practice field	1 regulation size; 3 smaller 6 v 6 fields	yes
Youth Lacrosse	2 + limited HS use		
-Boys	---	1 to 2	yes
-Girls	---	1 to 2	yes
Pop Warner	1	1 and practice field (prefer to expand current location)	yes

Source: Sandwich Recreational Field Development Plan, 2007

** This table explains current number of fields, lists the additional fields requested by the Sandwich Youth Groups, and the impact on use of two new synthetic turf fields*

*** Baseball/Softball could use turf fields for infield practice, throwing and running drills.*

High seasonal demand for baseball and softball fields has caused the Sandwich Little League to create a waiting list, cutback on the number of games, and reduce practice space.22 In order to meet this demand the League states it needs additional fields including: one field dedicated to softball, one field for T-ball and one field for the 8 to 12 year olds.

The Sandwich Youth Lacrosse program is growing and program members anticipate their field needs will double in the next few years. Sharing the high school and Oak Ridge fields with the high school teams has created the need for additional practice space.23

Football has also created a need for additional practice space. The Pop Warner program has found that the game field is heavily overused for this reason. In addition, Pop Warner has indicated that there is a

[21] From Memo to Sandwich Recreation Department from Sandwich Youth Soccer, March 2005.

[22] From Memo to Sandwich Recreation Department (Sandwich Little League and Softball Program) dated March 9, 2005.

[23] Correspondence with Sandwich Recreation Department Sandwich Youth Lacrosse, December 2004 and March 2005.

need for additional parking abutting the field to accommodate heavy traffic on game days.24 In response, the town has been working with the developers that submitted the winning proposal to develop the 50 acres of commercially zoned town-owned land adjacent to the Pop Warner football field to help design a plan that could potentially include shared parking on the commercial property for both the new commercial development and Pop Warner's activities.

Based on the estimated demand for field space and the input received from the various sports organizations, the highest priorities for Sandwich are multi-use fields that can accommodate soccer as well as lacrosse and other field sports. Multi-use fields would also accommodate space for football. The addition of field space would alleviate the heavy levels of use carried by the existing fields. Adding lighting to existing or new fields would enable evening games to help reduce scheduling conflicts. Limiting a facility's carrying capacity helps reduce wear and tear, lowering maintenance costs in the long term.

Statewide Comprehensive Outdoor Recreation Plan

The Statewide Comprehensive Outdoor Recreation Plan (SCORP), Massachusetts Outdoors 2000, is a five-year plan which assesses recreation demand and supply. The plan helps determine future needs and guides state-wide outdoor recreation policies. It can also be a useful community planning tool. For the Cape and Islands, the 2000 SCORP reported that the region has a high number of recreation areas (.73 acres per capita), but also has high demand due to a significant influx of tourists throughout the year. The most popular activities for the Region as reported by the plan were swimming, walking, sightseeing and wildlife watching. Significant activity rates were also reported in fishing, golfing, biking and picnicking. As far as facility use, the Region recorded high rates of use of beaches and water areas, golf courses, neighborhood parks and playgrounds. Bike paths, in response to both excellent facilities and flat terrain, report a high rate of use. The most pressing needs reported by the plan for the Region (as with the Town) were to restore and improve existing recreational areas, maintain existing facilities and improve access for the disabled. The plan reported a regional need for improvement to or addition of facilities for swimming, biking, walking, tennis, and playgrounds.

The public has suggested increasing the available field space outside of school properties and improving the overall quality of these facilities should be a priority for Sandwich. In particular, adding fields that can be shared as practice space for all field teams would help alleviate scheduling problems. Representatives from the recreation community have also indicated that space for equipment storage, bathroom facilities, adding lights for evening games, and improving parking would help to accommodate the community's growing demand for organized sports.

Potential Field Development Scenarios - The fields needed and proposed would supplement School Department fields, not replace them as the school fields are in desperate need of rest and improvement. In addition, this proposal does not conflict with the work of the Sandwich Sports Complex Committee or the efforts at Sandwich High School to improve the athletic field complex, nor does it conflict with the potential for using Community Preservation Act funding for the track, etc. These efforts should continue regardless of this project.

Each athletic field requires certain acreage. Part of this calculation must take into account Landscaping and Screening Laws that require "at least 30 percent of the space be retained in its natural state, with no more than the minor removal of existing trees and ground vegetation place" (Zoning By-laws Section 3510).

After multiple discussions with various departments, many factors have been taken into consideration to

24 Memo to Sandwich Recreation Department from Sandwich Youth Football, Inc., March 10, 2005.

assess the location of town-owned parcels that could accommodate new athletic fields. These factors include acres per field, minimum parking spaces required per field, square footage for parking spaces and Vehicle Occupancy Rate. All were part of the calculation to determine the acreage required for each field. The following table depicts the preferred plan for new athletic fields in Sandwich.

Preferred Plan for New Athletic Fields in Sandwich

Type of Facility	Comments	Number of Fields	Acreage Required
Little League/Softball	Includes parking & req. open space	3	11.8
Football/Soccer/Lacrosse Artificial Turf	Includes parking & req. open space	2	7.7
Subtotal		**5**	**19.5**
Optional Babe Ruth Baseball Field	Excludes parking & req. open space, which already exist at SHGC	1	4.5
Total		**6**	**24**

Source: Sandwich Recreational Field Development Plan, 2007

Potential Site Analysis - The 2007 Recreation Ball Field Development Plan evaluated over 400 properties as potential sites new additional recreational fields. A set of preliminary criteria was applied to each parcel of land screened as possible sites including town ownership, clear title, topography, and conservation restrictions.

The initially screened sites were then subjected to secondary criteria for further evaluation including land use, economic impacts, environmental impacts and permitting realities, site access, utilities, zoning, demographics, and plan consistency. Based on this analysis the following properties were identified as potential sites for new recreational fields and facilities:

- **Quaker Meetinghouse Road Site** – 22.5 acres: this town-owned area would house two synthetic turf fields, four little league/softball diamonds, two outdoor basketball courts, tennis courts and a paved walkway around the perimeter of the entire area, with a restroom facility and parking;

- **Asa Meiggs Road Site** – this 8.0-acres site is an ideal location for two natural grass fields;

- **Sandwich Hollows Golf Course** – this 4.5-acre site is an old driving range at the Sandwich Hollows Golf Course and is a great fit for a new regulation-size baseball field with lights. This town-owned land would be home to a new field and will benefit the growing Babe Ruth and new Senior Babe Ruth programs, as well as the American Legion team. Also, having lights will enable more time to play games and handle make-up games due to inclement weather. There is parking and restroom facilities at Sandwich Hollows therefore alleviating the need for more land for this segment of the project; and

- **Other Potential Sites** - another option is the potential expansion of existing school fields including: Oak Ridge, land abutting SHS, and the possibility of one more Little League field at HTW. The “Triangle” parcel off Cotuit Road near the Water District soccer fields is also a favored site. However, acquisition of this privately owned land is problematic and has issues associated with a questionable title. Other areas with suitable land area could become available through land swaps, purchase of development rights and/or purchase.

Recreation Accessibility Needs

Accessibility Improvements for the Disabled - Sandwich has improved access for the disabled in recent years but additional improvements are necessary and efforts should be ongoing. With the coordination of the Sandwich Commission on Disability, town-owned recreational facilities and conservation areas need to be improved to continue to provide barrier free facilities within the Town of Sandwich.

In an effort to better accommodate the needs of the disabled, the Commission on Disability identified improvements that are necessary at each recreation facility, as well as identified needs for new or additional facilities, programs or accommodations. The identified needs generally involve improving access to existing facilities through eliminating barriers at access points, improving parking arrangements and making use of surfaces that can accommodate wheelchairs.

Small efforts such as adding curb cuts and making use of appropriate surfaces (mats rather than wood chips) would improve accessibility to many town recreation facilities. Educating the designers of facilities as to the needs of the disabled would assist in this regard. In addition to improving accessibility to recreation areas, the town should improve efforts to provide equipment that allows the disabled to participate in activities.

Program and Facility Accessibility - The town completed a self-evaluation of all town–owned facilities as part of an Americans with Disabilities Act (ADA) Compliance Report prepared in 1993. Subsequently, a facilities access survey was completed in 1998 by the Recreation Commission and Conservation Department. Both of these were included in the 1999 Open Space and Recreation Plan. The inventories determined that structural changes were necessary to ensure that all facilities and recreation properties comply with ADA standards.

Since the completion of the 1999 Open Space and Recreation Plan, few improvements have been made to improve access to Sandwich recreation areas. For this reason, the town should make a concerted effort to make significant progress in this area over the next five years. It is important that the town work closely with the Sandwich Disability Commission on these improvements. The Disability Commission has recommended that the town should prioritize clearly marked parking at all town lands and public facilities. In addition, the Commission has suggested that the town make it a priority to improve at least one of Sandwich's conservation areas to have accessibility throughout, including trails, railings, and interpretive facilities. This would be an important step that would bring the town closer to this Plan's goals of improving recreational offerings for persons of all abilities. Comments on the status of access improvements and recommended changes for each facility are included below.

Recreational Facilities Accessibility Plan

Facility	Description	Accessibility Comments
Boyden Farm Conservation Area	The Farm is on Cotuit Road, just south of Farmersville Road. This farm consists of 48 acres of conservation land. The area includes 730-foot frontage on Peters Pond, a large wildlife management area, and walking trail.	Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Brady's Island Conservation Area	Town conservation land located off Jarves St. and Route 6a.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Briar Patch / Pine Hill Road Conservation Lands	The conservation area is located off of Gully Lane and Discovery Hill Rd in East Sandwich. The property has about ¾ mile of trail and some wooden benches. The property's primary uses are passive recreation and wildlife habitat.	Trail width, surfaces and slopes are not constructed for access. Town should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that

		accommodates people with disabilities is feasible.
Cow House River	Town conservation land located off Quaker Meetinghouse Road.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Cummings Conservation Area	Town conservation land located along Grandwood Dr, Windsong Rd, and Lichen Lane.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
East Sandwich Beach	Public Town beach extending from Plough Neck Road to North Shore Boulevard.	Additional accommodations for access should be prioritized, including ramps, parking, rails, and restroom facilities.
Discovery Hill Conservation Area	Town conservation land located along Kiahs Way / Jan Sebastian Dr / Discovery Hill Rd / Rte 6 / Quaker Meetinghouse Rd / Thicket Run Rd.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Great Marshes Conservation Area	Town conservation land located along Sandy Neck Road along the Barnstable border at the edge of the Great Marsh.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Lower Shawme Pond Park	Land bank conservation land located off Water St along Lower Shawme Pond.	Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Maple Swamp Conservation Lands	The conservation area is located off of Popplebottom Rd and Service Road in East Sandwich. The property has about 5 miles of trails, some wooden benches, and a parking area to accommodate approximately 30 vehicles. The property's primary uses are passive recreation, wildlife habitat, and hunting.	Trail width, surfaces and slopes are not constructed for access. Parking area is not marked for parking. Sandwich should prioritize having accessible and appropriately marked parking. The Town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
McLaughlin/McArdle Conservation Area	Town conservation land located along Dewey Ave / Boardwalk Rd / Georges Rock Rd / Town Neck Rd. along Dock Creek. Land abuts the Town Neck Beach and Sandwich Boardwalk.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Murkwood Conservation Lands	The conservation area is located off Route 6A in East Sandwich. The property has about one mile of dirt trails with some bridges, some wooden benches, and a parking area to accommodate approximately 5 vehicles. The property's primary uses are passive recreation, waterfowling, and scenic views.	Trail width, surfaces, slopes, and parking areas are not constructed for access. Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Ox Pasture Marsh	Town conservation land located along Route 6A.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Pine Island Creek / Old Harbor Conservation Area	Town conservation land located along Great Island Road, Spring Hill Road and Stonefield Drive along Old Harbor Creek and Springhill Creek. Lands abut Spring Hill Beach.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Ryder Conservation Lands	The conservation area is located off of Cotuit Road and South Sandwich Road. The property has about 2 miles of trails, some wooden benches, and a parking area to accommodate approximately 35 vehicles. The property's primary uses are passive recreation, waterfowling and wildlife habitat.	Trail width, surfaces and slopes are not constructed for access. Parking area is not marked for parking. Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Ryder-Wakeby Park	The pond with public beach is located off of South Sandwich Rd. The property has a beach, rest rooms, picnic facility, benches and a parking area.	A ramp should be added to allow clear accessible path from parking area to beach. Additional accommodations for access should be prioritized, including clearly marked parking areas, ramps, rails, and restroom facilities.
Sagamore Marsh / Geary-Lea Conservation Area	Town conservation land located off Phillips Road abutting Scusset Beach State Park.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Sandwich Hollow Golf Club	Sandwich Hollows Golf Club has been owned and operated by the Town of Sandwich since 1999.	Since the purchase of the property many improvements have been made to the course.

		Provision of services and parking will continue to be a priority.
Scorton Neck (Sandy Neck) Conservation Area	Town conservation land located on the northeastern corner of the Town bordering the Town of Barnstable and Cape Cod Bay.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Snake Pond / Lombard Park	The pond with public beach is located off of Snake Pond Rd in Forestdale. The property has a large beach, restroom facility, and a parking area to accommodate approximately 30 vehicles.	A ramp should be added to allow clear accessible path from parking area to beach. Parking area is not marked for parking. Town should prioritize providing accessible and appropriately marked parking.
Spectacle Pond	Town land with boating access to Spectacle Pond.	Sandwich should prioritize having accessible and appropriately marked parking.
Spring Hill Salt Meadow and Spring Hill Beach	Includes conservation land and beach which is habitat for piping plover and least terns. Access for saltwater fishing in Cape Cod Bay.	Sandwich should prioritize having accessible and appropriately marked parking.
Talbot's Pond Conservation Lands	The conservation area is located off of Old County Rd. in East Sandwich. The property has about 1 mile of trails, some wooden benches, and a parking area to accommodate approximately 5 vehicles. The property's primary uses are passive recreation, waterfowling, and wildlife habitat.	Trail width, surfaces and slopes are not constructed for access. Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Three Town Kettleholes	Conservation land located off of Meiggs Backus Rd and Evsun Dr.	Primary uses for these lands are wildlife conservation and preservation of wildlife habitat. No formal public access is provided to this conservation area.
Sandwich Boardwalk and Town Neck Beach	Long boardwalk crosses Mill Creek and Town Neck Marsh to Old Sandwich Harbor and Cape Cod Bay. About 1.5 mi. walk including Town Neck Beach. Parking off Boardwalk Rd.	Sandwich should prioritize having accessible and appropriately marked parking. The town should also evaluate whether the addition of an accessible trail with interpretive facilities that accommodates people with disabilities is feasible.
Town Recreation Community Center	The recreation area is located on Quaker Meeting House Rd in Sandwich. The property has picnic tables, spectator seating, ball fields and a parking area near the field for approximately 50 vehicles. There is also a community recreation building with parking for approximately 10 vehicles.	Building should be equipped for access, spectator seating should provide room for seating. Parking area should be marked for parking. Addition of bathroom facilities should be considered as well.
Schools	The Town's four schools (three K-8 and one high school) provide many of the recreational facilities used by the residents of Sandwich. There are playgrounds located at each of the elementary schools. All schools have tennis courts and athletic fields. The high school also houses an indoor swimming pool. The high school track is currently unavailable for non-school use due to maintenance concerns. There is parking at all locations.	All spectator seating should provide room for seating. Parking area should be marked for parking. Playgrounds should be improved to accommodate children of all abilities.
Sandwich Marina	The marina is located on Freezer Rd on the Cape Cod Canal. The property has roofed picnic areas, a playground, board docks, and a parking area.	The town has no recommended improvements at this time.

Recreational Management Needs

Proper management and adequate staffing of recreational programs and facilities is important to meeting Sandwich's open space and recreation goals in a strategic manner. Currently, the Sandwich Recreation Department has only 1 ½ full time staff and no supplemental support staff during the tourist season. Specifically, it is necessary for the town to have the tools and policies at hand to manage the recommendations of the plan. These include creating a mechanism for funding and managing recreational facilities such as user fees, and using case studies and models from other communities in managing difficult facilities such as skateboard parks.

Criteria for Acquisition of Open Space and Recreation Land

It is important for the town to be able to assess the relative importance of various parcels for acquisition and preservation; otherwise, it is likely to be placed in the position of reacting to individual parcels as they become available for acquisition and/or development. The 2007 Recreation Fields Development Plan

provides a good foundation for the acquisition of active recreational facilities. A detailed acquisition plan is also needed for passive and conservation land that clearly defines the qualities and general areas for open space acquisitions that should be created and utilized in future decision-making. In the course of the planning process, four basic objectives were identified: protecting sensitive wildlife habitat, providing additional playing fields, adding and improving public amenities at existing fields and beaches, and improving accessibility to open space and recreation areas. Based on these objectives, the acquisition decision making criteria should include the following:

- Linkages to existing public open space, to recreation facilities, and in some cases to similar areas in adjacent communities;
- Access to water areas (freshwater ponds and streams, ocean);
- Environmental sensitivity and importance of the parcel such as the presence of aquifers, rivers, wetlands, wildlife, wildlife habitat, or scenic qualities;
- Location in areas that do not have enough public open space or are threatened by continued development;
- Outdoor recreation potential (this includes both athletic fields as well as trails and wildlife observation areas);
- Cost and availability of the parcel (this should account for the amount residents are willing to pay to purchase open space and the availability of funding sources that would be available if a particular property were targeted for acquisition);
- The financial impact that removing this parcel from development will have on the town (for example, a residential parcel might cost the town for additional services while a commercial property may be a positive contribution to the tax base); and
- Aesthetic benefits to the general public and preservation of the town character.

8.0 Historic Preservation and Community Character

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8.1 Introduction and Overview

Background

Historic structures, farms, scenic roads, landscape vistas, museums, and the Cape Cod Canal are several of the resources that comprise the community character of Sandwich. From the Boardwalk to the long, narrow wood lots that stretch from the shoreline up over the ridge, Sandwich's character has been shaped by unique land use decisions.

Despite the building booms of the late nineteenth and early twentieth century, Sandwich resisted the modern features of suburban growth and development that were attractive to other towns. In addition, because of a decline in both residential development and population during this time period, new residents occupied existing old houses. The streets remained curved and picturesque, and much of the traffic was funneled onto Old King's Highway.

Some of Sandwich's key historic preservation efforts over the past 60 years includes[1]:

- **1939, Town Anniversary -** Historical Society rooms were open to the public for free, sites were identified and marked, and printed material was made available for use in locating and studying these sites.

- **1957, Hoxie House -** A committee was named to investigate restoration of the Hoxie House on Water Street. In 1958, the committee's report was accepted, and the town also decided to purchase the Dexter Mill and an adjacent 19th century building, with the intention of restoring the Mill. The Hoxie House opened to the public on May 28, 1960. The Grist Mill was opened in 1962.

- **1963, Historic District -** The town established a study committee to administer historic tourist attractions. This was the beginning of the effort to form a Historic District under state law Chapter 40C. In 1965, the town established the Historic District, which is still in place today.

- **1967, Heritage Plantation -** The colonial home, which is now used as an office for the present Heritage Plantation, was originally a Wing Family home from approximately 1687. The 76-acre Charles O. Dexter Estate, which included this home, was sold in 1967 to Josiah K. Lilly III of Falmouth. In 1969, Heritage Plantation was opened to the public by Mr. Lilly.

- **1992, Boardwalk Restoration -** The Sandwich Boardwalk was originally built in 1875 (by one man for $500.00) to provide access to the beach and the mouth of Old Harbor. The Footbridge section over Mill Creek was swept away by Hurricane Bob in August 1991, and the boardwalk section crossing the marsh was also severely weakened. The October 30, 1991 storm irreparably damaged the bridge. On June 14, 1992, members of the Sandwich Boardwalk Reconstruction Committee officially christened a new boardwalk, which has more than 1700 planks inscribed with personal messages. Many claim the boardwalk represents the "heart and soul of this town".

- **1996 Local Comprehensive Plan –** Included an element for Historic Preservation and Community Character. This element contained a summary of previous preservation efforts, an

[1] from "Sandwich, A Cape Cod Town" by Russell Lovell

inventory of historical assets, an analysis of levels of protection, threats to resources, and goals, polices and recommendations.

- **2002 Historic Preservation Plan -** The *Sandwich Historic Preservation Plan, June 2002* prepared by Neil Larson & Associates was a comprehensive inventory, analysis and action plan for historic preservation, much of which is incorporated into this element.

Preservation Planning Process

Sandwich has placed a high value on its character-defining historic resources. Preserving these resources has been an important part of planning initiatives in the town over the past 30 years. The implementation program for the 1996 Comprehensive Plan led the Planning and Development Department, with the encouragement of the Sandwich Historical Commission (SHC) to apply for a grant from the Massachusetts Historical Commission (MHC). In the fall of 2001, a historic consultant was selected and in 2002 the Sandwich Historic Preservation Plan was completed.

Major Issues Addressed by the 2002 Sandwich Historic Preservation Plan

- Public awareness of the historic resources in the community and their significance, especially among those new to the community
- Development of stronger political/public support for preservation initiatives & ongoing activities
- Protection, preservation and reuse of specific historic properties – the most cited properties were the Town Hall and the First Unitarian Church (aka the Doll Museum)
- Preservation of the town functions within the historic village; concern about the area becoming a sort of outdoor museum where busloads of tourists crowd out the everyday business of the townspeople
- Centralization and accessibility of archival material for both townspeople and visitors
- Preservation of the historic character of Route 6A, including land uses, historic buildings, vistas, view sheds, as well as the roadway itself and open spaces beyond
- The design and appropriateness of improvements to state highways running through town, including the Mid-Cape Highway
- Identification and preservation of cultural landscapes
- Long-term preservation of the physical resources
- Coordination between various groups involved in historic preservation
- Coordination and effectiveness of heritage tourism activities
- Adequate public and private funding and volunteer efforts to support preservation efforts

The goals of this plan involve the engagement of Sandwich residents, policymakers and visitors in the appreciation and preservation of our historic resources. Several interviews were conducted with residents whose knowledge would help clarify and organize the issue areas defined by the SHC. A variety of historical and background materials, including the historic inventory and survey forms, were reviewed and a windshield survey of the town was conducted. With this preparation, the public identified issues and offered a wide range of solutions, which provided the basis for the proposed historic preservation goals, objectives and actions contained herein. The most often cited areas related to historic preservation viewed as important to Sandwich were Heritage Tourism (30 responses), Historic Resources (23), Building Maintenance/Deterioration (23), and Local Education (21). Funding also ranked fairly high with 19 responses. Regulatory control received the fewest responses (7).

As this plan moves into the implementation phase, the increased involvement of the public will be crucial to its success. Indeed, the more residents are involved, the richer the quality of life will become for all who live, work and play in Sandwich.

8.2 A Brief History of Sandwich

Known as "the oldest town on Cape Cod," Sandwich is rich in history and historic character. In order to plan adequately for its preservation, one must consider the events not only of the past four hundred years, but also its long geological and cultural history before European colonization.

The formation of Cape Cod began over two million years ago during the various ice ages and interglacial periods. The fourth and last ice age, known as the Wisconsin Stage, created the moraines and pitted plains of the region. This so-called "kettle and knob" topography can be seen in Sandwich today with its elevations ranging from sea level to over 200 feet. The glacial lake deposits, having high percentages of clay and silt, and rich marshlands, made the region well suited for agriculture and husbandry both of which were important to the early development of Sandwich.

The existing archaeological record indicates that with the re-establishment of plant and animal communities shortly after the retreat of the last glacier, hunter-gatherers entered New England. Artifacts and remains believed to belong to the Paleo Indian Period (12,000 to 9,000 years ago) provide tangible evidence that the Indians traversed Cape Cod as well. Although the Outer Cape contains among the most extensively studied and best dated archaeological sites in the state—over 600 recorded on the Cape and another 270 on Martha's Vineyard and Nantucket—far less is known about the resources in the Sandwich area.

Prehistoric occupation of Cape Cod appears to have increased sharply during the Middle Archaic period (approximately 8,000-6,500 years ago). Sixty-one percent of known Middle Archaic period sites are located in the Mid-Cape area. During the Late Archaic period (6,000-3,000 ago) there was a greater increase of activity on Cape Cod and the Islands. Several distinct cultural traditions appeared and human populations became firmly fixed across the landscape.

The recent pre-history of Sandwich revolves around the Wampanoag Indians who inhabited the area centuries before English colonists first stepped ashore at Plymouth in 1620. From early accounts, they were widely settled throughout the region, primarily in coastal locations such as Scusset, Pocasset and Scorton. Their principal village, Shawme, near the spring-fed Shawme Pond, provided a favorable situation for settlement as evidenced by its continual development and redevelopment that has evolved into today's Sandwich Village.

Within the larger story of the European colonization of North America, Sandwich's role is significant, linked as it is with the 17th century founding of Plymouth Colony. The friendly reception by the Indians in this area, along with early treaties forged with the Great Sachem, Massasoit, bolstered the immediate survival of the English settlers, in contrast to the difficulties experienced in the Virginia colonies. The relations that began as friendly, at least on the part of the Wampanoags, deteriorated during the first fifty years of colonization. Through relentless settling of the region by European immigrants, confinement of the Wampanoags to more and more limited land areas coupled with religious and cultural intolerance toward them, friction inevitably developed and violent conflicts broke out. As happened across the entire continent, the First Americans of this region ultimately lost their sovereignty and rights to their homeland.

Setting the stage for colonial settlement in Sandwich was the establishment in 1627 of the Aptucxet Trading Post on the southern shore of the Monument River, near what is now Buzzards Bay. The first European families arrived in the town from Saugus (now part of Lynn), Duxbury and Plymouth. The first meetinghouse was built in 1638. Though it was actually never formally incorporated, Sandwich has been

considered a legal municipality since 1639. Initially the town stretched between Buzzards Bay on the west and Cape Cod Bay on the north, covering approximately 90 square miles. Sandwich's eastern boundary with Barnstable was first set in 1672 and then adjusted in 1916. The southern boundaries between Sandwich and the Towns of Mashpee and Falmouth were established during the 18th and 19th centuries. Finally in 1884, the western section of Sandwich separated and was established as the Town of Bourne, leaving 43.95 square miles within the current boundaries of Sandwich.

Agriculture was the cultural and economic base for the early town, with corn, oats, rye and wheat being cultivated along with the raising of livestock, particularly sheep. The availability of fish and shellfish was exploited by both the Wampanoags and Europeans. The trading post at Aptucxet provided opportunities for economic activities that were expanding throughout the Buzzard's Bay area. Regional trails established by the Native Americans intersected in the Shawme Pond area, and they were adopted by the English settlers, becoming the basis for transportation routes that continue to exist today. The principal east-west trail followed portions of Main Street, the Old King's Highway (present day Route 6A) and Scorton Road (present day Old County Road) through the town. Additional trails following routes southwest to Buzzard's Bay and southeast to the Vineyard Sound originated in Sandwich Center. North-South Route 130, Old Falmouth Road, was also a key transportation route from early days.

The population grew slowly but steadily during the Colonial era. There were 136 heads of households recorded within the town in 1730. This figure did not include the Quakers who settled in the area of East Sandwich. By 1765, census figures indicated that the number of families had increased to 245; there were but 200 houses. The total population that year was recorded at 1,449, five percent of which were natives. The original Wampanoag Indian population had greatly diminished.

Inlets off Cape Cod Bay became ports of exchange for small coastal vessels shipping lumber and crops to Boston and Plymouth. Settlement gradually spread eastward from the village center into Spring Hill, East Sandwich and Scorton's Neck areas, and westward to Scusset. Social and economic activity continued to be focused in Sandwich Center, where shops and public inns had appeared. By the end of the 17th century, three gristmills—Thomas Dexter's, Benjamin Nye's in East Sandwich, and Elisha Bourne's on Herring River—were in operation, building upon the vibrant production of corn, oats, rye and wheat. Another five would be built before the mid-19th century, including Samuel Wing's on Spring Hill River, established in the 1740s.

Physical improvements, such as larger and more impressive dwellings, reflected the maturing community. Larger houses with two-story facades and center entrances were built in significant numbers. The Hoxie House, a two-story, three-bay saltbox built in the village center in 1675 and reconstructed in 1959-60, remains (along with a number of other buildings) from the Colonial period. There is also a number of surviving one-story houses that represent the residences of families at the middle and lower parts of the social and economic scales. All are distinguished by the prominent regional feature of a massive center chimney. A third rebuilding of the meetinghouse occurred in 1704. Other improvements included improving the east-west Cape Cod Bay route through Sandwich in 1684 to become the "King's Highway." This land transportation link to Boston played a significant role in the Revolutionary War.

In 1811, Stephen Wing built Sandwich's first factory, a small cotton mill at the northern end of Shawme. The second industrial enterprise was the establishment of the Boston & Sandwich Glass Company in 1825. The glassworks introduced Sandwich to the Industrial Age, causing dramatic changes in the social and cultural composition of the community by attracting a substantial group of Irish and English artisans. The population of Sandwich grew rapidly. The influx of Irish Catholics led to the establishment of St.

Peter's Chapel in Jarvesville, the first Catholic Church on the Cape. The splintering of the Congregational Church and the founding of Methodist and Unitarian congregations led to further religious diversity.

The Glass Company provided small cottages and tenements for its workers in a Factory Village—"Jarvesville"—in the State Street-Freeman Street area. The export of glassware led to the expansion of wharf facilities along Dock Creek. Despite the success of the Cape's largest manufacturing industry, agriculture remained the primary occupation in Sandwich throughout the 19th century.

The prominence of the glass works encouraged the first railroad connection to Sandwich. In 1848, the Cape Cod Branch Rail Road was completed from Middleboro to a terminus at the village center, linking Sandwich to Boston via the Fall River Line. This event further stimulated the center's growth as a regional commercial hub. A Hyannis link was begun in 1853, and the Cape Cod Rail Road developed from there. By 1855 the population in Sandwich reached 4,496 with a consequent building boom. The Greek Revival style influenced much of the new architecture in this period, and a significant number of these buildings remain to this day.

Sandwich had grown little since the glass factory's heyday, and at the end of the 19th century development had not strayed from the village center and satellite communities along the Kings Highway in the northern coastal section of the town and along the southeasterly route to Mashpee and Buzzard's Bay. In fact, population was on the decline, and not only because the Town of Bourne separated from Sandwich in 1884. The population of the Town of Sandwich at that time was 1,500 (equal to the population prior to the Revolution).

The principal event that precipitated this population decline was the closing of the glass works by 1869. Cheaper glass imported from the Midwest had a severe impact on sales of goods produced in Sandwich. In subsequent years, several attempts were made to restart the glass works, producing specialty and art glass, yet none were successful. The farm economy had diminished as well, although increasing numbers of cranberry bogs were appearing to replace outmoded forms of traditional agriculture. Tourism was the one bright spot, although the town lagged other Cape Cod resorts in this respect, due to the colder waters in the Bay in comparison to those on the south side of the Cape. Building in the town was curtailed by the downturn in the economy and the exodus of population, yet a few houses designed in the eclectic, picturesque styles of the late Victorian era are evident in the town center, as well as new and altered commercial buildings.

The Cape Cod Canal was an oft-delayed civil project that was constructed to connect Cape Cod and Buzzards bays so that shipping could avoid the dangerous waters east of the Cape and around the islands. The Cape Cod Canal Company was chartered in 1880, but the waterway was not officially opened until 1914. Perhaps its most significant impact on the town was to sever its physical connection to the mainland.

The Federal government introduced important changes in the 20th century. The U.S. Army Corps of Engineers took control of the Cape Cod Canal in 1918, purchasing title to it ten years later. In 1933, the canal was again widened and deepened to facilitate the passage of large ships as part of a WPA-funded project. The Bourne and Sagamore bridges were constructed at this time. Two fish-freezing plants were constructed on the canal in Sandwich, as well as a large pulp mill. The Manomet Point Station, opened by the Life Saving Service in 1921, was replaced with the present Coast Guard Station in 1935.

A National Guard Camp was created on the 3,841-acre Coonamesset Ranch in the southwest corner of the town. Lombard Park on the south side of the ranch was donated to the town. Land clearing began in 1936 and subsequent construction included an airstrip, water supply, and sewer treatment plant. The facility was named Camp Edwards in honor of Major General Clarence R. Edwards, commander of the 26th Division in World War I. The U.S. Army took control of the camp in 1940 and proceeded to enlarge it considerably. In six-month's time, 1,500 new buildings were constructed resulting in a huge military installation that had a tremendous impact on the town. Eventually, this base would expand into neighboring towns and represent nearly 10 percent of the land area of Cape Cod. It now includes the current Otis Air Force Base—named for the Lt. Frank Jesse Otis, Jr. M.D. of the Massachusetts National Guard. The population of the camp was approximately 8,727 military personnel in 1980.

Sandwich's population and economic decline extended into the 20th century. By 1940, the town's population amounted to only 1,360. With the loss of industrial jobs, its ethnic population was reduced significantly. However, the tourist industry was growing. While this event provided a promising solution to the town's economic woes, it would bring significant changes to the community. Shoreline development began on Cape Cod Bay along Springhill Beach, Ploughed Neck, Wing Boulevard, Hammond Road, in Town Neck and Scusset on the north side of the Canal. This development took the form of small summer cottages, often built in clusters. Motor courts and rental cottage colonies appeared along the Old King's Highway, which was improved through a number of projects in the 1920's as part of the construction of U.S. Route 6 which became a primary automobile tourist route on Cape Cod. A bypass around Main Street in Sandwich Center was constructed in 1930. A large subdivision intended for summer houses was platted on Town Neck in 1949 to meet the increasing demand for vacation houses (though by 1977 fewer than half had been built upon). The small fifty-by-fifty lots created concerns about safety and public health and led to the establishment of a zoning bylaw by the town.

In 1965 a large oil-fired electric generating plant was constructed in order to augment the industrial contribution to the town's tax base. It was built on the Freeman Farm next to the Cape Cod Canal so that oil tankers could easily dock there and because of ready access to water for cooling purposes. The plant was completed and became operational in 1968. This enormous structure now dominates the skyline from the marshes and beaches of Cape Cod Bay as well as portions of the Old King's Highway. The intrusion of this industrial complex into the town's primarily rural landscape motivated residents to support the town's first historic preservation regulations. The Sandwich Historical Commission was established in 1971 and a Chapter 40C historic district was created at the Village Center. In 1973, with interest in preserving the historic character of Route 6A and its environs increasing, the state legislature created by law a regional historic district—The Old King's Highway Regional Historic District. The district includes northern sections of six towns, from Sandwich to Orleans, located between the Bay and the Mid-Cape Highway. Today it remains one of the largest historic districts in the country. In 1975 the Town Hall Square Historic District was listed on the National Register of Historic Places.

Since World War II, the population and economy of Sandwich has increased steadily as its quality of life became evident to more and more vacationers, retirees and Boston commuters. Between 1950 and 1960 the year-round population more than doubled (from 1,007 to 2,082), as did summer residents (3,120 to 7,000). The population boom continued, albeit at a slightly slower rate.

This population growth was spawned by intensive speculative residential development, which in turn created the demand for even more development. Infrastructure and public services, such as schools, have been stretched to the maximum. Recognizing that this trend was occurring throughout the Cape and that a more comprehensive approach to planning was needed for the entire region, the voters of

Barnstable County approved the Cape Cod Commission Act, which established the Cape Cod Commission in March 1990.

Most of the land in the town that could support residential construction had been built upon by 2000. Recent dwellings now occupy old upland forest areas south and east of the center in planned subdivisions and as infill within existing developed areas along the town's roads and highways. Many summer cottages along the beach roads have been converted to year-round residences. To help relieve the increasing traffic congestion on Route 6A and local roads, especially during the summer season, the Mid-Cape Highway was constructed in the 1950's after passage of the 1954 Interstate Highway Act. The highway is still the main route on the Cape for commuters and tourists alike. The Old King's Highway was reduced to secondary rural road status and its character granted protection by the regional historic district. Today Sandwich primarily functions as a resort, retirement and bedroom community.

Conservation and historic preservation issues are now paramount in the town, as residents are anxious to protect the environmental and cultural features that attracted them to Sandwich. Those whose families have lived here for generations believe that the effort has come later than it should have. Future growth will be limited by lack of available land and adequate water resources, current development, and the town's evolving regulations. The next ten years may pose the greatest threat to the community's historic resources than at any time in its history. Other towns and cities have already experienced the alarming trend of historic properties being purchased with the idea of demolishing them and building anew. This is of particular concern where land is desirable because of its location, resulting in a "build-out" situation where undeveloped lots are unavailable. In fact, Sandwich is already experiencing this phenomenon on the shore of Cape Cod Bay where historic beach cottages are being demolished so that larger houses can be built.

This brings us to the present and the creation of this element of the Local Comprehensive Plan that will assist the Town of Sandwich in preserving the many historic properties, upon which its reputation and ambiance are based.

8.3 The Regulatory Environment for Historic Preservation

A variety of laws govern the preservation of historic properties. Such regulations provide the means by which a community's historic preservation goals are implemented. Because they are more specific than guiding policies in general planning documents, they are more direct in their impact. However, some regulations actually run counter to the overall direction of a community's historic preservation policies—such as certain building code requirements. For this reason, it is particularly important to understand the laws and their particular requirements, as well as the adverse effects they may have on historic properties. An overview of the regulatory framework in which preservation actions take place follows.

Federal Laws

National Historic Preservation Act of 1966 - The first federal law concerning historic preservation was the National Historic Preservation Act of 1966 (NHPA). It established a comprehensive program to preserve the historic and cultural foundations of the nation as a living part of community life and created the National Register of Historic Places, which is the official list of properties worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. The National Park Service, under the Secretary of the Interior, administers the National Register program and involves the states through official State Historic Preservation Offices (SHPO). In Massachusetts, the SHPO is MHC and has responsibility for commenting on all nominations to the National Register of Historic Places and National Historic Landmark Program.

Properties listed in the National Register include districts, sites, buildings, landscapes, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register includes:

- all historic areas in the National Park System;
- National Historic Landmarks that have been designated by the Secretary of the Interior for their significance to all Americans; and
- properties significant to the nation, state or community which have been nominated by state historic preservation offices, federal agencies, and tribal preservation offices, and have been approved by the National Park Service.

Listings in the National Register can fall into one of two categories – individual properties and group of properties (or district). Individual properties, as noted above, are recognized as outstanding examples of their type, period or method of construction, or for their association with significant events or persons. A group of resources proximate to each other can be listed as a "district". The advantage to this second approach is that properties that would not otherwise qualify for listing can be designated, because together they convey a sense of history.

Listings in the National Register do not provide absolute protection for a resource from private property owners' actions, such as insensitive remodeling or even demolition. In general, private owners can do what they like to their properties, despite being listed on the National Register. On Cape Cod, however, listing on the National Register gives the Cape Cod Commission regulatory review and approval authority over demolition and substantial alterations to these historic properties, if located outside local or regional historic districts.

The NHPA and subsequent amendments does provide for two important incentives for historic preservation efforts: 1- income tax credits for the costs of rehabilitation work that meets the Secretary of Interior's Standards, and 2– some protection against actions by federal government agencies that adversely impact the historic integrity of properties listed on the National Register. This latter provision, commonly referred to as Section 106 Review, stipulates that agencies funding or issuing permits for projects must consult with state historic preservation offices (the Massachusetts Historical Commission in the case of the Commonwealth of Massachusetts) and take potential adverse effects on historic properties into consideration. If such adverse effects are unavoidable, Section 106 requires project proponents to mitigate them. This protection is crucial because each year the federal government is involved in a variety of projects that impact historic properties.

Sandwich currently has four listings on the National Register of Historic Places. They are Forestdale School, Benjamin Nye Homestead, Town Hall Square Historic District, and the Wing Fort House. A recent historic resource survey has identified numerous other properties and districts eligible for listing on the National Register.

State Law

Massachusetts state laws directly related to historic preservation are administered by the Secretary of State and the Massachusetts Historical Commission (MHC). These include the following:

Chapter 9: Section 26C. State Register of Historic Places - The MHC is responsible for maintaining a state register of historic places, which includes all properties listed on or determined eligible for the National Register, as well as locally designated landmarks and districts, historic properties with preservation restrictions and inventoried archeological sites.

Chapter 40C – Historic Districts Act - Under Chapter 40C of the Laws of Massachusetts, cities and towns may establish local "historic districts" that consist of one or more parcels or lots of land, or one or more buildings or structures on one or more parcels or lots of land. Once established according to the procedures set forth in the law, a historic district commission is empowered to review proposed exterior changes to all properties included in the district and to issue certificates of appropriateness, which are required before a building or demolition permit can be issued. Factors to be considered by the commission include the historic and architectural value and significance of the site, building or structure; the general design, arrangement, texture, material and color of the features involved; and the relation of such features to those of similar buildings and structures in the surrounding area. Broad discretion is provided to the commission to protect the historic character of entire neighborhoods and, presumably limiting the size of additions and alterations. Appeals of commission decision are to the superior court sitting in equity for the county in which the city or town is situated, which tends to encourage compliance with historic regulations.

However, there is one major limitation placed on Sandwich in its use of Chapter 40C law. A local district cannot be established within the Old King's Highway Regional Historic District. In fact, the enactment of this regional district, which also affects six other towns on the Cape, voided the one pre-existing local district designation established in 1965 for Sandwich Center. This was done to avoid overlapping jurisdictions and potentially conflicting directions from two different oversight commissions. For further discussion of the Old King's Highway District refer to the section on Local Laws, below.

Archaeology - The Chair of the Massachusetts Historical Commission appoints the State Archeologist, who is responsible for the preservation and protection of the archeological resources of the Commonwealth. Duties of this position include compiling and maintaining an inventory of historical and archeological sites and specimens (not a public record) and recommending sites within the Commonwealth to be considered for state archeological landmarks or for preservation and conservation restrictions. In addition, the State Archeologist can recommend that any land owned by the Commonwealth or a political subdivision, including any forfeited to a city or town for the nonpayment of taxes on which sites or specimens are located or may be found, be reserved from sale, provided that the area be confined to the actual location of the site or specimens. Archaeological excavations on public lands are overseen by the State Archaeologist, whose permits ensure that these important resources are properly conserved. The State Archaeologist also reviews development projects that affect archaeological properties and negotiates solutions to protect the sites.

Environmental Review and Public Planning - The Massachusetts Historical Commission is authorized by state law to review and comment on state licensed, permitted, or funded projects to determine whether or not the proposed project will have an impact on historic or prehistoric properties. This process echoes the Section 106 Review for federal projects and requires all state agencies to notify MHC of projects they plan to initiate. MHC checks the state register to determine whether the project poses a threat to a historic property within the impact area. If so, the project proponents and MHC jointly explore alternatives to eliminate, minimize, or mitigate any damaging effects. The MEPA (Massachusetts Environmental Protection Act) regulations also take into account historic and cultural resources. Action on properties for which MHC makes a determination of eligibility and that will involve full or partial demolition will trigger environmental protections.

State Building and Fire Codes - The state has established uniform standards and requirements for construction and construction materials compatible with accepted standards of engineering and fire prevention practices, energy conservation and public safety. The state building code is periodically

updated to reflect advancements in building technology and new safety issues. These results in an ever-widening gap between the way historic buildings were constructed and how new structures are required to be built. Consequently, restoration projects often trigger code requirements that could mandate the loss of historic fabric and authentic architectural details. A change of use, which is often required in order to save a building from abandonment or demolition, may be prevented by these same issues. For example, if an owner desired to remove vinyl siding and small non-historic windows from an insensitive remodeling project and restore windows to their original size and configuration, the code requirement that windows cannot be less than 18" from the floor, would pose a contradiction. Similarly, railing heights, open stairways, and handicapped accessibility are some of the other issues that continually come into conflict with uniform building codes in projects involving historic properties.

Fortunately, Massachusetts provides certain considerations for historic buildings in **Chapter 34** of the State Building Code—Repair, Alteration, Addition, and Change of Use of Existing Buildings—if they are listed on or eligible for the National Register of Historic Places or the Massachusetts State Register, as certified by MHC. This chapter gives local building officials substantial latitude to determine how the code applies with respect to either "totally preserved" or "partially preserved" historic structures. Moreover, if significant historic fabric is threatened by code requirements, the cost becomes unreasonably high, or the local building inspector is overly conservative in his decisions, a property owner may appeal the decision of a local building official to the State Building Code Appeals Board.

Scenic Roads - In 1992, the state adopted legislation, enabling cities and towns to designate scenic roads under Chapter 40, Section 15C. Sandwich has designated numerous scenic roads. Regulations require that a scenic road permit from the Planning Board be issued before a driveway can be constructed along it, and tree removals also require a hearing. (*See Section 7: Transportation and Circulation* for a listing of roads that have been designated in Sandwich).

Subdivision Control Laws - State enabling legislation gives town planning boards review and approval authority over subdivisions. However, in Chapter 41: Section 81P of Massachusetts Laws provides for an unusual procedure by which land parcels can be recorded without review and approval under a town's normal subdivision authority. This law provides a major loophole through which land divisions occur that could have negative impacts upon historic properties.

Regional Regulations

Cape Cod Commission - The Cape Cod Commission (CCC) Act was created in 1980 with powers and duties under Chapter 34, Chapters 81 to 88, inclusive, and Chapter 140 of the General Laws. Thus, it has the rights and responsibilities of referral and comment for land use issues, including historic preservation, as noted previously with regard to comment on certain impacts to National Register properties. In addition, the CCC has provided guidance to the towns through a wide range of plans. These include suggested architectural and site design review guidelines that provide for excellent resources for Sandwich.

Old King's Highway Historic District - The most effective protection of Sandwich's historic resources to date has been afforded by the creation of the regional historic district, named the Old King's Highway Regional Historic District (OKHRHD) on Cape Cod. This district was established by the Massachusetts Legislature (Chapter 470 of Acts of 1973) "to promote the general welfare of the...towns...through the preservation and protection of buildings, settings and places within the boundaries of the regional district and through the development and maintenance of appropriate settings...compatible with the historic, cultural, literary and aesthetic tradition of Barnstable County as it existed in the early days of Cape Cod."

It includes sections of the towns of Sandwich, Barnstable, Yarmouth, Dennis, Brewster and Orleans. In Sandwich, the district includes all the land between the centerline of Mid-Cape Highway (Route 6), and the mean low water line of Cape Cod Bay, approximately 14 square miles. When the Old King's Highway district was instituted, the locally designated Sandwich Center Historic District was eliminated. As noted above, this was done to avoid the possibility of overlapping and inconsistent design review requirements being placed on property owners. The district does not, however, replace landmarks or districts listed on the National Register of Historic Places, but rather supplements the limited protection that National Register listing provides.

Local District Committees, one in each of the six towns within the OKHRHD, have responsibility to administer the act within their own jurisdiction, including review and approval authority over a wide range of physical improvements to structures within the district. These include alterations, additions, demolition of existing buildings, signs, and the design of new construction. All such changes must be issued a certificate of appropriateness or a certificate of exemption. The decisions of these committees can be appealed to the district-wide Old King's Highway Regional Historic District Commission, which is made up of the chairs of each local District Committee. Determinations by that commission may be appealed to the district court having jurisdiction over the town in which the disputed action was taken. Route 6A is considered a scenic highway, but jurisdiction within Sandwich lies with the OKHRHD Committee.

Needed Regulatory Tools

One important preservation tool that Sandwich lacks is the authority to undertake general architectural and site plan review throughout the town, even for commercial properties. Because the historic character is not limited to the Old King's Highway Historic District, but rather permeates all areas of town, the ability to review projects with potential physical and visual impacts would be very appropriate for Sandwich. To date, informal review has been done for those developers open to guidance from the Planning and Development Office. However, review is not mandatory and therefore cannot produce consistent results.

Intrusion of extraordinarily large residential structures into established neighborhoods of small houses can easily destroy the valued historic character of these neighborhoods.

A second tool that would be appropriate for Sandwich to implement is a special neighborhood preservation or conservation zoning district that would limit the size and massiveness of new structures, or additions, within neighborhoods made up of uniformly modestly sized dwellings. Cabin colonies and residential areas like Town Neck contain many houses that are now nearing fifty years of age, the threshold for eligibility for the National Register of Historic Places. While individual dwellings in neighborhoods such as Town Neck may not be individually significant, as a group they clearly constitute historic resources that are distinctive to a specific historical era and type of development important to Sandwich's history.

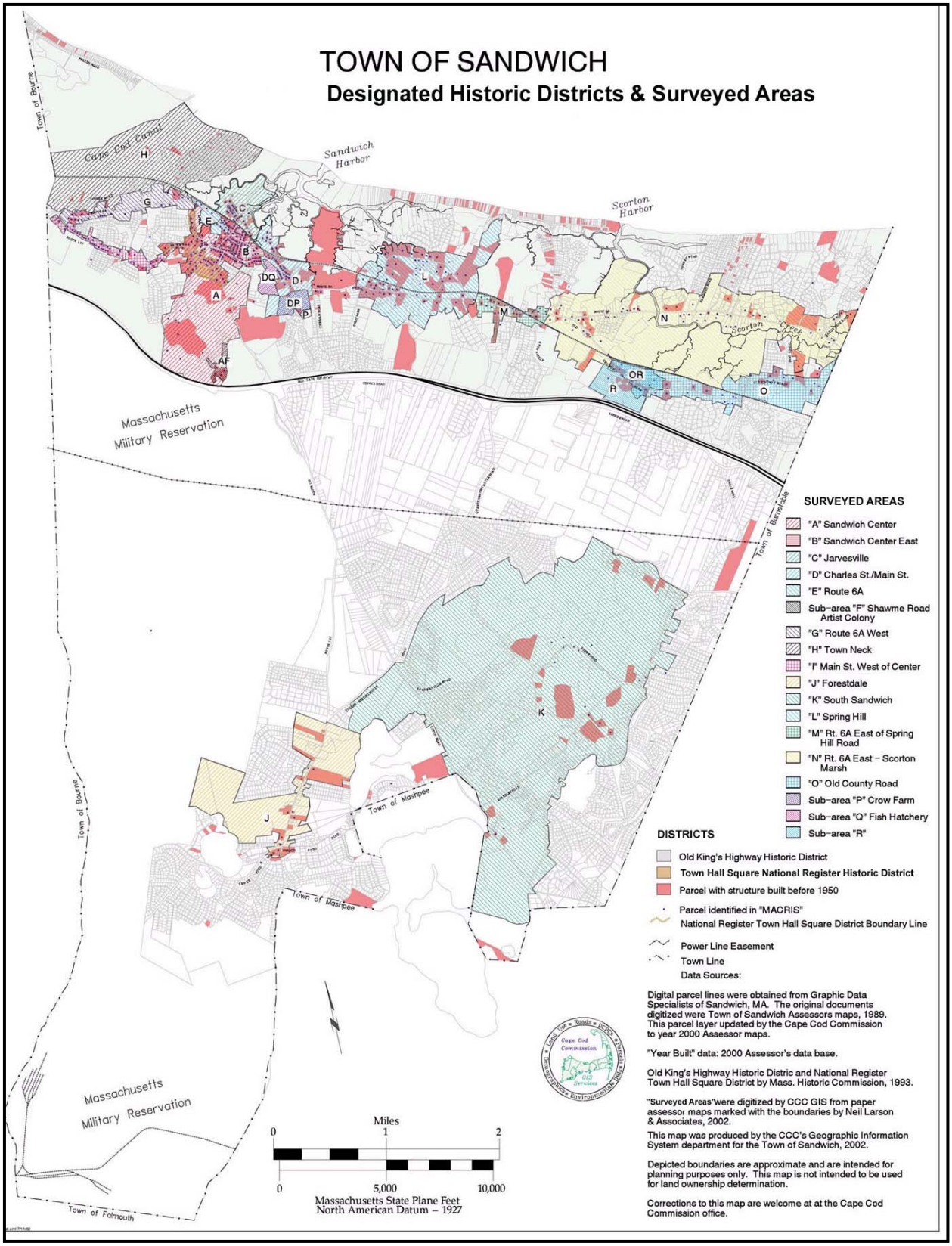
Given the real estate market in the Boston area and the fact that Sandwich is fast approaching build-out, the modest dwellings that make up these cohesive neighborhoods are likely targets for realtors and speculative homebuilders responding to demands for larger houses. Such uncoordinated neighborhood transformation would easily result in visual disorder, uneven and inequitable property values, loss of

affordable housing stock, and the unfortunate dilution of the town's historic character. While some of these areas are within the OKHRHD and therefore have the protection of design review, a zoning bylaw is the more reliable and uniform way to address the problem of incompatible development. Specifically, precise measurements based on the prevailing lot size, setbacks, building heights and FAR (Floor Area Ratios) should be developed to provide the standards and limits for selected neighborhoods. Another approach is to develop a by-law allowing for the establishment of Neighborhood Conservation Districts. However, this latter approach would not be allowable within the OKHRHD. See Appendix E for an article concerning this issue and the Cambridge, Massachusetts Neighborhood Conservation District Ordinance.

A Demolition Delay ordinance is another tool that has been considered over the past several years, and one that has provided other towns on the Cape with a safeguard mechanism against loss of historic buildings due to demolition. (A Demolition Review was defeated at Town Meeting in 2007). Because the necessary survey, evaluation and nomination work will take some time to complete, a demolition delay ordinance will provide assurance that significant buildings won't be destroyed before they can be identified and protected. Although it doesn't absolutely prohibit demolition of historic resources, a demolition delay ordinance provides time to explore alternatives to demolition. It must be recognized, however, that a number of steps must be taken in tandem with passing such a by-law. These include finding buyers for threatened historic properties, educating the public about acceptable expansion and improvement options for historic houses and sites to which threatened buildings can be moved.

The Town of Sandwich has a by-law in place that allows for the designation of historic districts and individual properties. The same by-law established the Sandwich Historical Commission, which has review of designated historic properties. Although the by-law was effectively amended in 1974 to exclude local historic districts within the Old Kings Highway Regional Historic District, individual historic properties and districts located outside the OKHRHD can be established by bringing specific by-laws defining such designations to annual town meetings.

The validity of historic preservation regulations has been well tested in the courts and provides the underlying legal basis for instituting the regulatory tools necessary for a community to protect its historic character. At the same time, it must be kept in mind when crafting new by-laws and implementing existing regulations, that case law on the application of local land use regulations has established that a private property owner has a right to a reasonable use of his property. Finding the appropriate balance between the welfare of the community and its historic resources and the concerns of property owners will be the key to formulating any new regulations for the Town of Sandwich.


TOWN OF SANDWICH
Designated Historic Districts & Surveyed Areas
Town of Bourne
Cape Cod Canal
Sandwich Harbor
Scorton Harbor
Scorton Creek
Massachusetts Military Reservation
Town of Barnstable
Town of Mashpee
Town of Falmouth
SURVEYED AREAS
"A" Sandwich Center
"B" Sandwich Center East
"C" Jarvesville
"D" Charles St./Main St.
"E" Route 6A
Sub-area "F" Shawme Road Artist Colony
"G" Route 6A West
"H" Town Neck
"I" Main St. West of Center
"J" Forestdale
"K" South Sandwich
"L" Spring Hill
"M" Rt. 6A East of Spring Hill Road
"N" Rt. 6A East - Scorton Marsh
"O" Old County Road
Sub-area "P" Crow Farm
Sub-area "Q" Fish Hatchery
Sub-area "R"
DISTRICTS
Old King's Highway Historic District
Town Hall Square National Register Historic District
Parcel with structure built before 1950
Parcel identified in "MACRIS"
National Register Town Hall Square District Boundary Line
Power Line Easement
Town Line
Data Sources:
Digital parcel lines were obtained from Graphic Data Specialists of Sandwich, MA. The original documents digitized were Town of Sandwich Assessors maps, 1989. This parcel layer updated by the Cape Cod Commission to year 2000 Assessor maps.
"Year Built" data: 2000 Assessor's data base.
Old King's Highway Historic Distric and National Register Town Hall Square District by Mass. Historic Commission, 1993.
"Surveyed Areas"were digitized by CCC GIS from paper assessor maps marked with the boundaries by Neil Larson & Associates, 2002.
This map was produced by the CCC's Geographic Information System department for the Town of Sandwich, 2002.
Depicted boundaries are approximate and are intended for planning purposes only. This map is not intended to be used for land ownership determination.
Corrections to this map are welcome at at the Cape Cod Commission office.
Miles
0 1 2
0 5,000 10,000
Massachusetts State Plane Feet
North American Datum – 1927

8.4 Overview of Existing Survey and Needs

Existing Surveys

A number of historic surveys have been conducted in Sandwich over the years. Typical of most old New England towns, historians and preservationists have maintained lists, both formal and informal, of historic landmarks over a century. The documentation of historic resources began in the late 19th century with the publication of regional Cape Cod and town histories. The History of Cape Cod (Frederick Freeman, 1858) and the History of Barnstable County, Massachusetts (Simeon L. Deyo, ed., 1890) included references to many historic buildings and the prominent families associated with them. Mrs. John S. Smith wrote a series of short articles describing about twenty old houses in Sandwich in 1890 that were published in the local newspaper in 1903. In 1904, local schoolteacher Ella Frances Ellis published an article in the local newspaper on the "Nye Houses in Sandwich." She followed this up with an article entitled "Old Houses of Sandwich" in 1907. Ellis also laid out a grid over the Old Town Cemetery and recorded the markers that remained there as well as wrote a descriptive listing of all those who were buried there. This work was published in 1908. Her efforts culminated in the incorporation of the Sandwich Historical Society in 1907, which went on to compile an expanding record of historic resources in the town over the next thirty years.

In 1939, the town celebrated its tercentennial with a three-day celebration. At that time, sixty-one buildings and sites were marked with wooden signs, and a list was printed so that the places could be visited. By this time, research and writing projects concerning historic buildings seem to have reached a plateau, and it appears that little more was published about them. Interest in historic resources was rekindled in 1965 when the town adopted a by-law to create a historic district in Sandwich Center. A review board was impaneled to oversee development in the district, and the venerable buildings at the core were recorded and publicized once more. A historic commission was established in 1971 to identify and document historic resources to recommend to the town for designation.

The first formal historic resource survey in the town was conducted in 1974-75 after the Old King's Highway Regional Historic District was designated in 1973 by an act of the state legislature. In Sandwich, a volunteer survey effort was mounted to inventory historic resources. Over 600 forms were completed with photographs of the buildings, structures and sites in the district. Most of these forms were submitted to the Massachusetts Historical Commission for inclusion in the statewide inventory. Following up on this inventory, the major portion of the Sandwich Center Historic District, which had become part of the Old King's Highway Regional Historic District, was listed on the National Register of Historic Places in 1975 as the Town Hall Square Historic District.

Two important publications appeared in the 1980's that provided further documentation of historic resources and presented them to the community. The Town of Sandwich published the thick volume titled Sandwich, A Cape Cod Town, written by Russell A. Lovell, Jr. in 1984. In recognition of the 350th anniversary of the founding of the Town of Sandwich, Rosanna Nye Cullity and John Nye Cullity published A Sandwich Album in 1987. This volume contains valuable historical photographs of buildings and landscapes in the town. In addition, the Massachusetts Historical Commission conducted a Reconnaissance Survey in the town and prepared a report in 1984. This report established period and thematic contexts by which to identify and assess the significance of historic resources in the town. This agency also produced a report on the Historical and Archeological Resources of Cape Cod and the Islands in 1987, although it did not make any substantive recommendations for survey in the Town of Sandwich.

The Massachusetts Historical Commission and the Cape Cod Commission awarded Sandwich a grant in 1993 to review the 1974-75 historic survey forms, update the record to current standards and make recommendations for National Register eligibility of individual resources and areas. The report proposed designations in fifteen areas. The most recent inventory of historic resources in the Town of Sandwich was published as part of its 1996 Master Plan. It was an abbreviated list when compared to the hundreds of inventory forms that are on record, appearing to reiterate the traditional list of venerated landmarks.

Assessment

The effectiveness of preservation planning and actions by the town and its historic commission relies on a comprehensive survey of historic resources. The Town of Sandwich is in a position where the diminished survivals of 17th- and 18th-century resources are well-documented and protected by town ordinance and/or strong public affection, where 19th-century resources are more selectively recognized and less assiduously preserved, and where 20th-century resources—now completely representative of a "past" century—are not as significantly regarded as they should. In part, this is due to the greater number of these resources and the complex and contradictory nature of their architectural significance in the community. Still, the effort needs to be made to survey and assess the role of these resources in the town's history, whether perceived as good or bad. Many of these resources will not survive this current century, which is all the more reason to develop a record of them now. Landscapes are an immediate concern, as the remaining open space and historic land patterns in the town are becoming increasingly threatened. Much has been lost already without adequate documentation. Sandwich should ensure that the cultural landscape is carefully recorded and its significance established so that effective decisions can be made regarding its preservation.

A list of areas and themes warranting survey follows:

- Sandwich Marina
- Northern Coastline along Cape Cod Bay (cultural landscape)
- Agricultural land and farm landscapes (bring the Tufts study to a comprehensive level)
- Early 20th century domestic architecture, notably Cape Cod/Colonial Revival types
- Early 20th century commercial properties, including resorts, motel and cabin developments, summer camps
- Post-World War II Subdivisions (up to 1960)
- 20th century beach houses and colonies
- Water-control structures
- Stone walls, heritage trees & designed landscape features
- Prehistoric archeological sites

Historic Contexts Relevant to Sandwich

As the community considers what more needs to be surveyed and protected to preserve its historic resources, it needs to be aware of the wide variety of categories or "contexts" into which these resources fall. Historic contexts provide a historical understanding of the resources and help ensure that important buildings and sites are not overlooked when considering what should be preserved.

Valuable contextual documentation for significant historical activities in the town is available from the Town Archives and the Sandwich Historical Society. The following is a list of historic contexts appropriate for Sandwich. This list is not intended to be exhaustive:

- Native American Settlements
- Settlement & agriculture (relics of early life and land-use)
- Maritime Life
- Military Affairs

- Industries: Extractive, Processing, Manufacturing
- Agriculture & Rural Life
- Transportation and Communication
- Tourism & Seasonal Residency
- Resident groups (resort workers, builders, tradesmen)
- Cultural & ethnic groups
- African-American presence
- Educational institutions
- Religious institutions (i.e. the Society of Friends, Corpus Christi Parish)

National Register Listings

At present there are only four (4) listings on the National Register of Historic Places in Sandwich. They are:

- The Forestdale School (now known as Greenville School) located at 87 Falmouth--Sandwich Rd.
- Benjamin Nye Homestead located at 85 Old County Rd.
- Town Hall Square Historic District roughly bounded by Main, Grove, Water streets, and Tupper Road from Beale Avenue to Route 6A
- Wing Fort House, Spring Hill Road

In addition to these listing there are several more properties could be listed in Sandwich as noted above. Five (5) are immediately apparent:

- Initiate National Register nominations based on the recommendations on the 1993 Public Archeology Laboratory, Inc. study that reviewed existing survey forms completed by volunteer efforts in 1974 and made numerous eligibility determinations based on new fieldwork. A list of these recommendations is below.
- Investigate the possibility of nominating the Old King's Highway as a historic district on the National Register.
- Evaluate the open spaces identified in the 1999 Open Space and Recreation Plan for historic significance using National Register criteria.
- Evaluate the cultural landscapes listed in the 1999 Tufts study using National Register criteria. Compare these properties for overlap with the open spaces identified in the Open Space and Recreation Plan.
- Identify those properties relating to historic contexts, themes, and periods that have been overlooked in previous surveys for future National Register nomination efforts.

Districts and individual properties determined eligible for the National Register of Historic Places by the P.A.L. survey, May 1993 follows.

Historic Districts

Sandwich Center Village Historic District (Town Hall Square H.D. Expansion) - The Sandwich Center Village Historic District meets the National Register criteria for architecture and history, and it possesses integrity of design and setting of the historic center of the town for a period of significance between c1638 and 1960. It likely also contains archeological resources that are eligible for the National Register. (*1993 survey report for Area A - old areas S11, S12, S15, S16, and S17).* The expanded historic district would incorporate the existing Town Hall Square Historic District and continue westerly along Main Street and southerly along Grove Street.

Sandwich Center – East Historic District - This historic district is located south of Rt. 6A and abuts the Sandwich Center Village Historic District on the west, from which it extends easterly along Main Street and includes Jarves, Summer, Liberty, School and Pleasant Streets. The Sandwich Center – East Historic District meets the National Register criteria for architecture and history, and it possesses integrity of design and setting for a period of significance between c1740 and c1940. This area of glass company workers housing and commercial buildings is associated with the history Boston & Sandwich Glass Company. It likely also contains archeological resources that are eligible for the National Register. (*1993 survey report for Area B - old areas S3, S4, S9, and S10).*

Main Street – Rt. 130 Historic District - This historic district abuts the Sandwich Center Village Historic District on the east, from which it extends westerly along Main Street to Windswept Drive. The Main Street – Rt. 130 Historic District meets the National Register criteria for architecture and history, and it possesses integrity of design and setting for a period of significance between c1647 and c1960. This residential area developed as an extension of the town center, serving as a neighborhood for skilled workers, many employed by the glass company. (*1993 survey report for Area I - old area S21).*

Jarvesville Historic District - This historic district is located north of Rt. 6A and contains the core of historic Jarvesville where the glass works formerly existed. The Jarvesville Historic District meets National Register criteria for architecture and history, and it possesses integrity of design and setting for a period of significance between 1825 and 1900. The factory buildings are gone, but the neighborhood of worker dwellings remains substantially intact to convey the significance of the town's industrial era. It likely also contains archeological resources that are eligible for the National Register. (*1993 survey report for Area C - old areas S6, S7, and S8).*

Main – Charles Streets Historic District - This historic District is located in the area where Main and Charles streets intersect Rt. 6A and includes portions of Dewey Avenue and George's Rock Road. The Main – Charles Streets Historic District meets the National Register criteria for architecture and history, and it possesses integrity of design and setting for a period of significance between 1734 and c1930. This residential area is associated with the significance of the town's industrial era. It likely also contains archeological resources that are eligible for the National Register. The 1993 Report suggested that the properties in this district might be better incorporated into the Jarvesville Historic District above. (*1993 survey report for Area D - old areas S1, S2, and S5).*

Shawme Road Historic District - This historic district is located on Shawme Road at the southern end of Lower Shawme Pond and between the entrances to Shaker House Road. The Shawme Road Historic District meets the National Register Criteria for architecture and history, and it possesses integrity of design and setting for a period of significance between c1890 and c1945. This residential area is associated with a group of artists that distinguished the Town of Sandwich in the broader context of summer art colonies on Cape Cod. (*1993 survey report for Area F - old area S14).*

Old County Road Historic District - The historic district is located on Old County and Old Mill Roads in East Sandwich (74-108 Old County Road; 255-157 Old Mill Road). The Old County Road Historic District is centered on the town's second grist mill built by Benjamin Nye before 1670; the district's development was influenced by the Nye family. There are a number of building sites, as the mills fostered the growth of a small community that once included a tavern and cobbler, hatter and blacksmith shops. With outstanding examples of 17th and 18th century architecture amid an unspoiled agricultural landscape, the district evinces the town's agricultural origins. *(1993 survey report for Area O - old area ES14).*

Forestdale Historic District - The historic district is located on Route 130, aka Falmouth Road, north of Pimlico Road in South Sandwich (35-75 Falmouth Road). The Forestdale Historic District is significant as an example of a small village cluster that developed in the wooded upland section of the town known as South Sandwich. Forestdale offers a contrast to the town's older communities that developed along the marshlands along Cape Cod Bay. The period of significance extends from c1790 to 1945. (*1993 survey report for Area J - old area S22).*

Individual Properties

Canal Fish and Freezing Company Building - The Canal Fish and Freezing Company Building was located at the north end of Freezer Road in the Sandwich Marina but was demolished in the spring 2008. It was eligible for the National Register as a rare and distinctive example of a fishing industry building in the town and for its association with the economic improvements fostered by the Cape Cod Canal. Built in 1916 on the site of a previous fish plant, the building was significantly deteriorated prior to demolition.

Roberti Dairy Farm - The Roberti Dairy Farm is located between Tupper Road and Rt. 6A west of Merchant Lane. It is eligible for listing on the National Register as a distinctive example of an intact farm in Sandwich with a period of significance between c1850 and c1945. It meets the National Register criteria for architecture and history and is the only dairy farm surviving in Barnstable County. It possesses the integrity of an agricultural setting and contains contributing barns and outbuildings in addition to a 19th-century farmhouse. (*1993 survey report for Area H).*

Crow Farm – The Crow Farm is located at 24 Charles Street. It is eligible for listing on the National Register as a distinctive example of an intact farm in Sandwich with a period of significance in the 20th century and meeting the National Register criteria for architecture and history. The farm possesses the integrity of an agricultural setting and contains contributing outbuildings in addition to a Craftsman style farmhouse. The site derives further significance as the site of a 19th-century almshouse and poor farm. *(1993 survey report for Sub Area P within Area D).*

Sandwich Fish Hatchery- The Sandwich Fish Hatchery is located on Rt. 6A east of Charles Street. It is eligible for listing on the National Register as a distinctive example of a facility once more common on Cape Cod. Today, it is the only surviving fish hatchery in Barnstable County. The building retains its integrity of design and materials and meets the National Register criteria for architecture and history with buildings and fish pools illustrating the characteristics of early 20th-century aquaculture. The period of significance extends from 1906 to 1945. (*1993 survey report for Sub Area Q within Area D).*

Thomas Nye House - The Thomas Nye House is located at 405 Route 6A. It is eligible for listing on the National Register as a distinctive example of a mid-18th century Cape house. The building retains its integrity of design and materials and meets the National Register criteria for architecture and history. Its setting is further enhanced by surrounding active farmland in use as Orchardside Farm. The period of significance extends from 1764 to 1945. (*1993 survey report for Area M and Form 43).*

Shady Pines (Pine Grove) Cabins – The Shady Pines Cabins are located at 361 Rt. 6A. They are eligible for listing on the National Register as distinctive examples of early-20th century roadside architecture associated with the automobile-related tourism that developed in the town with the construction of the Rt. 6A highway in the 1920's. The resource retains its integrity of design and materials and meets the National Register criteria for architecture and history. The cabins are surrounded by woods that enhance the original rural appearance, even though the area has experienced more recent commercial and residential development. Built in the 1930's, this group of small-scale cabins

is a rare surviving example of motor court accommodations of the period. (*1993 survey report for Area M and Form 718).*

East Sandwich Rail Road Station - The East Sandwich Rail Road Station is located at 404 Route 6A. It is eligible for listing on the National Register as a distinctive example of a railroad-related resource and its association with the Cape Cod Railroad. Built c1885, the building retains its integrity of design and materials and meets the National Register criteria for architecture and history. The period of significance extends from c1885 to 1945. *(1993 survey report for Area M and Form 705).*

Wing – Holway House - The Wing – Holway House is located at 390 Route 6A. It is eligible for listing on the National Register as a distinctive example of a mid-18th century Cape house. Built c1742 by Samuel Wing and owned by generations of the Holway family from c1800 to the mid-20th century, the building retains its integrity of design and materials and meets the National Register criteria for architecture and history. The period of significance extends from 1742 to c1940. *(1993 survey report for Area M and Form 44).*

Holway House and Nye House and Shop - The Holway House and Nye House and Shop are located at 379 Route 6A. The property is eligible for listing on the National Register as containing two distinctive examples of mid-18th century houses. (The Nye House and Shop has been moved to the site.) Both houses are associated with prominent local families and retain integrity of design and materials that meet the National Register criteria for architecture and history. The period of significance extends from c1700 to c1940. *(1993 survey report for Area M and Forms 45 and 16).*

House at 20 Old County Road - The House at 20 Old County Road is eligible for listing on the National Register as a distinctive example of an early 18th century house on Scorton Neck. Built in 1728, it was moved to its present location on the lot with the construction of the railroad in 1854. The house retains integrity of design and materials that meet the National Register criteria for architecture and history. The period of significance extends from 1728 to 1945. (*1993 survey report for Area N and Form 46).*

Moody-Fish House - The Moody-Fish House is located at 23 Old County Road. It is eligible for listing on the National Register as a distinctive example of a 17th century house in East Sandwich. Home to the Moody and Fish families from its construction in c1690 to the early 20th century when it was bought and restored by architect John Barnard, the building has evolved reflecting the forms and tastes popular in the town from the 17th to the 20th centuries. The house retains integrity of design and materials that meet the National Register criteria for architecture and history. The period of significance extends from c1690 to 1945. (*1993 survey report for Area N and Form 24).*

Freeman House - The Freeman House is located at 11 Ploughed Neck Road. It is eligible for listing on the National Register as a distinctive example of an early 18th century house on Ploughed Neck. Home to the Freeman family from its construction in 1705 to 1952, the building has evolved reflecting the forms and tastes popular in the town in the 18th and 19th centuries. The house retains integrity of design and has well-documented family associations that meet the National Register criteria for architecture and history. The period of significance extends from 1705 to 1952. (*1993 survey report for Area N and Form 20).*

Thomas Freeman House - The Thomas Freeman House is located at 432 Rt. 6A. It is eligible for listing on the National Register as a distinctive example of a Federal Period Three-quarter Cape house on Ploughed Neck. The house also has important associations with the Freeman family that settled the

Neck. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from 1810 to 1945. *(1993 survey report for Area N and Form 41).*

Commercial Building at 594 Rt. 6A - The Commercial Building at 594 Rt. 6A is eligible for listing on the National Register as a distinctive example of early-20th century roadside architecture associated with the automobile-related tourism that developed in the town with the construction of the Rt. 6A highway in the 1930's. The resource retains its integrity of design and materials and meets the National Register criteria for architecture and history. The period of significance extends from 1930 to 1945. (*1993 survey report for Area N and Form 621).*

Solomon Hoxie House - The Solomon Hoxie House is located at 663 Route 6A. It is eligible for listing on the National Register as a distinctive example of an early 18th century two-story house in East Sandwich. Home to the Hoxie family from its construction in 1705 to the present, the building has evolved reflecting the forms and tastes popular in the town in the 18th and 19th centuries. The house retains its integrity of design and has a rare surviving rural setting that meets the National Register criteria for architecture and history. The period of significance extends from 1705 to 1945. *(1993 survey report for Area N and Form 25).*

Bennett Wing House - The Bennett Wing House is located at 21 Sandy Neck Road. It is eligible for listing on the National Register as a distinctive example of a Federal Period two-story house on Scorton Neck. Home to the Wing family from its construction in 1790 to 1954, the building has important family associations. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from 1790 to 1954. (*1993 survey report for Area N and Form 26).*

Samuel Blossom House - The Samuel Blossom House is located at 24 Sandy Neck Road. It is eligible for listing on the National Register as a distinctive example of a Federal Period Half-Cape house on Scorton Neck. The house also has important association as a former ship landing. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from 1810 to 1945. *(1993 survey report for Area N and Form 27).*

Edward Wing House - The Edward Wing House is located at 11 Wing Boulevard. It is eligible for listing on the National Register as a distinctive example of a mid-18th century two-story house that retains some of its original agricultural setting. Constructed in c1757, it was home to members of the notable Wing family. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from c1757 to 1945. (*1993 survey report for Area N and Form 29).*

Goodspeed House - The Goodspeed House is located at 121 Old County Road. It is eligible for listing on the National Register as a distinctive example of a mid-18th century Cape house. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from c1770 to 1945. *(1993 survey report for Area O and Form 78).*

Jabez Nye House - The Jabez Nye House is located at 122 Old County Road. It is eligible for listing on the National Register as a distinctive example of a mid-18th century Cape house. The house retains integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from 1768 to 1945. *(1993 survey report for Area O and Form 33).*

Zachariah Jenkins House - The Zachariah Jenkins House is located at 247 Old County Road. It is eligible for listing on the National Register as a distinctive example of an early 18th century First Period Cape house with a bow roof. The house retains integrity of design setting that meet the National Register criteria for architecture and history. The period of significance extends from c1700 to 1945. (*1993 survey report for Area O and Form 37)*

Howland House - The Howland House is located at 11 Howland Lane. It is eligible for listing on the National Register as a rare and distinctive example of an early 19th century connected farmstead on Cape Cod. The house retains integrity of design setting that meet the National Register criteria for architecture and history. The period of significance extends from c1840 to 1945. (*1993 survey report for Area O and Form 11).*

Benjamin Percival House - The Benjamin Percival House is located at 15 Percival Lane in Farmersville, South Sandwich. It is eligible for listing on the National Register as a distinctive example of a late-18th century five-bay house enlarged from an older, relocated Cape house. The house retains its integrity of design and setting that meet the National Register criteria for architecture, history and association with Benjamin Percival who served 19 terms as selectman and 6 terms as state representative. The period of significance extends from c1750 to 1945. (*1993 survey report for Area K and Form 546).*

House at 16 Boardley Road - The House at 16 Boardley Road is eligible for listing on the National Register as a distinctive example of a mid-18th century Cape house that was updated at the turn of the 20th century. The house retains its integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from c1750 to 1945. (*1993 survey report for Area K and Form 551).*

Lawrence House - The Lawrence House is located at 1 Great Hill Road. It is eligible for listing on the National Register as a distinctive example of a Federal Period hipped roof house in South Sandwich. This unusually elaborate architectural form in a well-preserved rural setting is a particularly notable aspect of its local significance. The house retains its integrity of design and setting that meet the National Register criteria for architecture and history. The period of significance extends from 1812 to 1945.
(1993 survey report for Area N and Form 27).

8.5 Historic Resources

Threatened Resources

Losses of important historic resources in the past can serve to alert the community to the need for special protective measures for buildings and other historic resources that may be threatened by a number of forces. These threats include vacancy, which can lead to vandalism and arson, lack of maintenance, which can threaten the physical integrity of a structure, and new development, which replace open cultural landscapes with residential subdivisions. The following list consists of significant historic resources that could be lost unless concerted efforts are made to ensure their preservation.

- First Unitarian Church (aka the Doll Museum; recently renovated and converted to a private residence)
- Benjamin Nye Grist Mill, Grange and House
- Boat House on Grove Street
- Camps in the Three Ponds area
- Canal Fish and Freezing Company Freezer Plant

- Christopher's Hollow
- Clark Haddad Building (Sandhill School)
- Cottage Colonies
- Cranberry Bogs
- Fish ladders, especially the one by Dexter Grist Mill
- Old King's Highway/Route 6A
- Percival Farm
- Quail Hollow Farm (including the Henry T. Wing House)
- Roberti Dairy Farm
- Route 130
- Scorton Boat Yard
- Shawme Pond Dam
- Town Hall
- Town Neck neighborhood
- Artifacts from Sandwich's agricultural past, such as the crib on the marsh

Public Buildings

The town-owned buildings included on the following list are either historic properties or buildings older than 50 years:

- Dexter Grist Mill
- Deacon Eldred House
- Greenville School (Old Forestdale
- School)
- Hoxie House
- Town Hall
- Town Hall Annex
- Clark Haddad Building
- Sandwich Marina
- Henry T. Wing School
- Route 6A Fire Station
- East Sandwich Fire Station
- Forestdale Fire Station
- Sandwich Library
- Round Hill Golf Clubhouse

The Old Town Hall in Sandwich is a significant historic resource deserving of special attention. In the fall 2007, Town Meeting CPA funds were allocated for the restoration of the second floor of Town Hall. This restoration is scheduled to take place during 2008.

Cemeteries

There are several historic cemeteries in Sandwich as listed in the table below.

Sandwich Historic Cemeteries

Name	Owner (Assessors' records)	Address	Acreage	Comment
Saddle & Pillion Cemetery	Town of Sandwich	6 Tupper Road	79	
Spring Hill Cemetery	Spring Hill Cemetery Association	224 Route 6A	52	

Percival Cemetery	Commonwealth of Massachusetts, Division of Fisheries & Wildlife	78 Farmersville Road	20.36 (entire property)	
Forestdale Cemetery	Forestdale Cemetery Association	109 Route 130	0.56	opposite Baptist Church
Boardley Road Cemetery	South Sandwich Cemetery	12 Boardley Road	5	This is a private cemetery, but Assessors' map does not provide name of owner or association ownership or address.
New Town Cemetery	Town of Sandwich	Route 130 (address from Assessors' Map as of 2 November 2006)	79.95	"begun about 1977" (capecodgravestones.com)
St. Peter's Cemetery	St. Peter's Catholic Church	0 Grove Street (address from Assessor's Map as of 2 November 2006)	5.89	
Cedarville Cemetery	Town of Sandwich - Cedarville Cemetery	3 Ploughed Neck Road	2.1	
Freeman Cemetery	Town of Sandwich	94 Main Street	48	
Joe Wilson Cemetery	Town of Sandwich	61 Quaker Meetinghouse Road	3	Black (African-American) Civil War Veteran - 73rd United States Colored Infantry – Company I; Born 1824, Died 3 May 1886, on property where he lived; Wife Caroline Phillips Wilson died 21 September 1891, probably lived on same property after her husband's death; much information in Sandwich archives file. She is said to be a Mashpee Indian. 1880 census indicates quite different ages for him and his wife. Fall, 2006: Chairman of Cemetery Commission, Tom Keyes, stated at a public meeting of the Commission that this cemetery and the entire property would be preserved.
Wakeby Cemetery	Town of Sandwich – Wakeby Cemetery	0 Cotuit Road (address from Assessors' Map as of 2 November 2006); Wakeby Cemetery is actually part of Ryder property which is 23 Cotuit Road)	0.11	
Poor Farm Burial Ground	Town of Sandwich	0 Crowell Lane (address from Assessors' Map as of 2 November 2006)	0.15	"1823-1845 – no gravestones (capecodgravestones.com); currently (2006) black locust woodland; for a history of the Poor Farm see files in the Town Archives, especially Carolyn Crowell's "Sandwich Almshouse and Poor Farm" (*The Village Broadsider* – June 8, 1979).
Old Town Cemetery	Town of Sandwich	0 Grove Street (address from Assessors' Map as of 2 November 2006)	1.43	
Mount Hope Cemetery	Town of Sandwich	183 Route 6A	2.6	
Tobey Cemetery	Town of Sandwich	34 Quaker Meeting House Road	UND	
Jones Cemetery (Mashpee, formerly in Sandwich)		Jones Road (Mashpee)		
Bay View Cemetery	Bay View Cemetery Association	79 Main Street	4.9	
Quaker Cemetery	East Sandwich Friends Meeting	6 Quaker Road	3.5	

8.6 Challenges and Recent Accomplishments

Public Awareness and Support for Historic Resources

Challenges - There is strong sentiment in Sandwich that there is not substantial public or political support for additional preservation initiatives. Yet many residents have expressed that preserving Sandwich's heritage is critically important to their overall quality of life, a sentiment that has been expressed repeatedly in virtually every planning document produced over the past 30 years. This presents a dilemma about which steps to take first to start to change the situation. In order for high profile initiatives to succeed, there must be the support of public policies and funding, along with private initiatives. Often it takes a crisis before the issue is addressed, but historic preservation is more effective when there is a consensus and planning mechanisms are in place before a problem surfaces.

Long-time Sandwich residents worry that new residents in the community may not have a sufficient understanding of the town's history, or an appreciation for the significance of the historic resources found here. Certain historic properties are highly visible and consequently recognized and valued by the townspeople (e.g. Sandwich Town Hall, Hoxie House, and Grist Mill). Open space, including beaches and dunes, marshlands, ponds, cranberry bogs, views to the bay, and agricultural lands are also seen as important to preserve. They enhance the historic context of the town as well as provide a sense of its once pristine setting.

There is some distrust of protective regulations, based on what is perceived as losing autonomy over ones property. Yet there is clear evidence—nationally, regionally and locally—that strong preservation efforts can benefit both the community at large and individual property owners. Before additional regulatory protections of historic resources can be successful, the general public will need to be made more aware of the importance of Sandwich's history and the benefits of preservation, not only for the quality of life it affords, but also as a vital component of a strong tax base.

Recent Accomplishments - The adoption by Sandwich of the Community Preservation Act (CPA) has led in recent years to an increased appreciation and awareness by the community of the importance of historic preservation. The community, together with Sandwich Community Preservation Committee, has shown a willingness to endorse and finance numerous initiatives for the preservation of both historic structures and historic documents. In this undertaking, the Sandwich Historical Commission's work in recent years in the development of planning documents has made it possible to garner a larger share of Community Preservation funds than would have been expected. The historic projects which have been voted by the Sandwich Town meeting are listed below:

- There is an on-going oral history program that will capture information about the past using video or other up to date technologies;
- The Internet is being utilized to disseminate background information about historic homes, historic preservation activities and events, how to research the history of a house, and preservation regulations, with links to the town and Chamber of Commerce websites;
- A Historic Assets List is being fined tuned and will be available on the town's website in 2008;
- A program with the Sandwich Area Cable Access TV has been produced on Sandwich's historic houses by Sandwich "town historian" Russell Lovell;
- A plaque program for historic properties has been created; and
- Owners of deteriorating historic properties have been contacted to encourage repair and maintenance.

It is also noteworthy that during the last four years Sandwich realtors have awarded annually two $2,000 scholarships to seniors in the Sandwich High school that require projects involving a personal investigation of one Sandwich's most historic buildings.

Preservation & Documentation Activities

Challenges - The preservation of Sandwich's town records is a major concern to many in the community. The material in the town-owned archives cannot be sold or given away, which makes it imperative that they are well managed and maintained to professional standards. The physical conditions in which they are presently kept pose a significant threat to the archival material—from fire as well as damage due to fluctuating temperatures and humidity. The archives are primary used for genealogical research. However, they are irreplaceable records of the town's history in much the same way as its architecture or landscapes. The Sandwich Historical Society at the Glass Museum maintains another archival collection, which complements the Town Archives.

There is a need for a centralized location for archival material—a location that is more accessible to diverse groups of people. An up-to-date facility would encourage more donations from personal and family collections and improve the information value of the archive. Another need is that these fragile materials must be protected from the wear and tear of use. Paper and electronic facsimiles should be made, and be accessible through digital technology. This will reduce the need for an intermediary to gain access to them. Addressing these issues requires building broader support for the archives both in the general population and on the Board of Selectmen.

On a larger level, the landscape, buildings and various structures in the town constitute a primary record of the community's development. Because of its many historic resources, Sandwich can be seen as a kind of laboratory for the study of the evolution of the built environment and changes in the landscape. Detailed surveys and inventories, along with historic building analyses are an important aspect of historical documentation. While the Massachusetts Historical Commission has a substantial record of these resources on file, it is far from complete. Collecting, organizing, maintaining, updating and disseminating this information are critical to the preservation of Sandwich's historic fabric. In addition, archeological resources have not been well documented and attention needs to be paid to these as well.

Recent Accomplishments - The Sandwich Public Library has now become the site of the town's Archival and Historical Center. This allows for increased access by the public, and the reference staff has integrated the archives into the library's resources. Through the use of Community Preservation Act (CPA) funds a project is now underway - A Project to Preserve the Town's Historical Manuscripts and Photographs. This involves ten key town institutions: Sandwich Public Library; Sandwich Town Archives & Historical Center; Sandwich Glass Museum; Thornton W. Burgess Society; Heritage Museums and Gardens; First Church; Corpus Christi Church; St. John's Church; Sandwich Meeting of the Society of Friends; Nye Association/Benjamin Nye Homestead & Museum. Additional accomplishments under this goal include the following:

- The Archives and Historical Center Committee was reconvened to assist with the development of the Town Archives, in cooperation with the Board of Trustees of the Sandwich Public Library, ensuring it has representation from the Sandwich Historical Commission and other appropriate historical organizations. An archival center has been established within the public library as described in the Library's Long Range Plan 2000. The Town Archives have been moved from the 2nd floor of the Annex to the MacNight Room in the Town Library. The town historian heads up the archives and the archives are supported by FOSTA (Friends of Sandwich Town Archives). CPA funds are being used to identify and organize the collections in the Archives.

- Historical objects and records have been displayed in the public library along with a reference to the archival center. This display is maintained by library staff. Another display is planned for Town Hall when it has been renovated.
- An official Town Historian has been appointed and provided a small stipend.

Protecting the Historic Character of Sandwich

Challenges - The Town of Sandwich has retained a sense of its history to a much larger degree than many other communities on the Cape. This character is palpable, adding force to the description of Sandwich as "The Oldest Town on Cape Cod." It must be fiercely guarded if it is not to be lost.

The historic character of Sandwich is not due simply to the presence of a great number of highly significant historic buildings, but also to the expansive landscapes that allow residents and visitors alike to imagine what the area must have been like when the Wampanoags inhabited the region or the first European settlers landed on the Cape. From the beaches and adjacent salt marshes to the ridge top marking Richard Bourne's survey of the town boundary in 1684, these spaces provide glimpses into what the surroundings were like in times past and how they have been modified over the past four centuries.

The historic character of the community has been generally strengthened by the choices that new home owners have made in the past, which have tended to respect the scale, style and materials of historic homes in Sandwich—even in areas where there has been no design review of new construction. In those areas of the town built after World War II, a preference for Colonial and Cape Cod style buildings hints at the pervasiveness of a community character that has continued to attract people to the town in the past decades. Care should be taken in the design of new commercial buildings to demonstrate that the community is able to respond to current market standards without abandoning its commitment to retaining its historic character.

Recent Accomplishments - Preservation funds are now being used to create two National Register Historic Districts in Jarvesville and Spring Hill and to expand the existing Town Hall Square District. Preservation funds are also being used to repair the 1675 Hoxie House and a preservation study will soon be undertaken of the 1663 Old Town Burial Ground. Other recent accomplishments include:

- A bylaw to protect the Three Pond Area – an important cultural landscape;
- A Demolition Delay Bylaw has been prepared but voted down at Town Meeting; and
- An inventory of properties with obvious maintenance needs has been prepared.

Strengthening Heritage Tourism Activities

Challenges - The preservation community in Sandwich understands that heritage tourism is an important tool for achieving preservation of historic resources in Sandwich. What is important to keep in mind is that not all schemes to increase tourism are appropriate and indeed many can be counter-productive. Studies show that vacationers seeking historic sites tend to stay longer in their destinations of choice and spend more money per day than general tourists. The caveat is that this kind of traveler is seeking an authentic experience, reinforcing the need to incorporate accurate historical content into promotional materials. The town should tap the growing interest in genealogy to heighten awareness of its many historic resources and thereby develop greater support for them.

The challenge is to balance increased visitation with preservation of historic sites to ensure their long-term viability. For instance, a way-finding system to guide tourists around the community, as well as interpretive signage, should be carefully designed to enhance the historic character of the area. Minimizing the size of such signs would be important. Those protections and improvements that enhance the quality of life for residents ultimately make the community attractive to visitors and vice versa. The

result can be a win-win situation, especially if tourist-generated dollars can be used for improvements that residents enjoy year-round.

Recent Accomplishments - The most significant accomplishment was the creation in 2007 of the Sandwich Museum & Cultural Alliance. A local bank initiated this Alliance through a grant to create a brochure to promote and describe Sandwich as a Cape Cod's Museum town and to encourage the town's ten museums to work cooperatively to emphasize Sandwich as a historic destination.

9.0 Community Sustainability

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9.1 Introduction

Sandwich cares for the built and natural environment by promoting sustainable development through integrated energy and environment, housing and economic development, transportation and other policies, programs, investments, and regulations. Good planning practice should generate patterns of growth that will benefit the people of Sandwich. "Sustainable Growth" is designed to promote desired development while protecting the environment, encouraging social and economic equity, and conserving energy and water resources.

With sustainable growth comes new jobs, opportunities for advancement, homes for people of various incomes, and many other amenities of life. By contrast, growth patterns that have occurred over the past 30 years often waste precious resources, degrade the natural and built environment, and exacerbate inequality throughout the region. Over time, this can harm the community's (and the region's) competitiveness and damage many of the characteristics that make Sandwich a special place to live, work and play. The town seeks to advance these principles in partnership with regional and municipal governments, non-profit organizations, business, and other stakeholders as described in this section of the Local Comprehensive Plan.

9.2 Community Sustainability Index

Sandwich, like all communities, is composed of systems – social, natural, economic and political. Information regarding the effective functioning of these systems has been collected and evaluated in the previous LCP elements and organized into a Community Sustainability Index (CSI). The CSI measures existing quality-of-life indicators (called benchmarks) as well as desired future goals. For example, the index measures current demographic characteristics and trends, average commute time to work, acreage of protected open space, local businesses and jobs, municipal service cost per resident, and what measurable improvement the community desires over the next five years.

The Sandwich CSI not only sets goals and priorities but helps make them happen by gearing specific Comprehensive Plan actions and strategies toward their attainment. The Sandwich CSI is also compared to the regional index identified in the *Cape Cod Sustainability Indicators Report, 2004*[1] as described below.

Environmental Sustainability Indicators

Air Quality - According to the latest Cape Cod Sustainability Indicators Report (2003) there have been no quantitative improvements in the air quality of Barnstable County, and Cape Cod continues to have the worst air quality in the Commonwealth.[2] The DEP monitors air quality in Truro and the various levels of atmospheric ozone are well documented up through 2002. The public is informed by weather forecasts of the air quality index (AQI) scaled from 0 to 500 with breakpoints for definitive levels of health impairment in accordance with an EPA color coded scale.[3]

[1] *Cape Cod Sustainability Report – An Uncertain Future, 2004.* Prepared by the Cape Cod Sustainability Council in cooperation with the Cape Cod Center for Sustainability.
[2] Charles Kleekamp, Cape Clean Air
[3] It should be note that there is no apparent threshold below which health effects do not occur, particularly for extremely sensitive individuals.

Town of Sandwich Community Sustainability Indicators, Benchmarks & Goals

Indicator	Past Sandwich Benchmark	Current Benchmark		Sandwich 5-Year Goal	Description & Notes
		Sandwich	Barnstable County		
General Community Characteristics					
Total Year-Round Population	20,107 (1998)	23,000 (2007)	186,605 (1990); 222,230 (2000); 228,230 (2007)	NA	Approx. 2,890 new residents and 14% increase over the past 10 years. 867% growth between 1960-2000 (second highest on Cape)
Total Seasonal Population	NA	25,000 (SWD est. 2007)	NA	NA	Estimated to be less than twice year round population. Less than other Cape towns such as Dennis where season pop. is 4 times year round op.
Land Area (Acres/Square Miles)	NA	28,160 Acres/44 Sq. Miles	395 square miles	NA	
Population Year-Round Population Per Square Miles (Density)	468 (2000)	534 (2007)	562 (2000); 579 (2007)	NA	Sandwich population density is less than Capewide average
Percent Population Growth, 1990 - 2000		30%	19%	NA	
Median Age	33.7 (1980); 35.4 (1990)	39.5 (2000)	44.6 (2000)	NA	Median age is 36.5 statewide
Percent of Population Over 60 Years of Age	18.2% (1998)	20.1% (2007)	NA	NA	4,664 residents over 60 in Sandwich in 2000; Between 1995 and 2007 this figure increased by 1,700 or 32%
Minority Population	345 or2.2% (1990)	453 or 2.2% (2000)	NA	NA	U.S. Census
Population Age 65+	NA	2,757 or 13.7% (2000)	51,265 (23.1%)	NA	U.S. Census
Population 19 & under	NA	6,097 or 30% (2000)	NA	NA	U.S. Census
Percent Change in Population 65+ Years of Age, 1990 to 2000		26.2%	24.6%	NA	Census information
Percent of Population Claiming to Have a Disability	NA	2,894 or 14% (2000)			34% of Sandwich residents 65+ claim to have some type of disability.
Student Population	3,878 (1998)	3,759 (2008)	NA	NA	Town records
Percent of Population of School Age	19.3% (1998)	16.3% (2008)	NA	NA	Town records
Total Housing Units	8,116 (FY98)	9,287 (FY07)	NA	NA	Increase by 1,171 D.U over past 10 years or 14.4%; 2,832 new dwelling units between 1980 and 1990
Estimated Number of Households, 2007	NA	4,763	97,697	NA	Sandwich has consistently comprised 8% of the County total households
Average Number of People Per D.U.	2.41 (1998)	2.47 (2007)	2.34 (2007)	NA	From Town records
Average Number of Students Per D.U.	.459 (1998)	.389 (2007)	NA	NA	From Town records
Percentage of Residents with a High School Diploma	NA	95% (2000)	92% (2000)	NA	85% statewide in 2000
Percentage of Residents with a Bachelor's Degree	NA	38% (2000)	34% (2000)	NA	32% statewide in 2000
Average Tax Bill (single family homes in FY08)	$1,917 (1995)	$3,861 (2006)	NA	NA	An increase of 101% between 1995 and 2006
-	-	-	-	-	-

The Environment					
Air Quality Index (100 to 500)					
Weighted Average	NA	NA	10.7 (2003); 11.3 (2005)	8	Barnstable County has the worst Average AQI (ozone) in the State in 2005; Ozone/air quality measured by DEM in Truro
101- 150/Orange Days/Unhealthy to Sensitive Individuals	NA	NA	21 (2003); 22 (2005)	15	
151-200/Red Days/Unhealthy	NA	NA	6 (2003); 8 (2005)	4	
201-300/Purple Days/Very Unhealthy	NA	NA	1 (2003); 0 (2005)	0	
Wind Energy Development	NA	None to date		New Turbine	Sandwich has not yet started a municpally sponsored wind energy program
Water Quality					
Nitrate Levels (ppm) in Public Supply Wells < or = .05 ppm (Very Clean)	NA	SWD Range 0.07-1.7	57% (1993); 43% (2004)	All Samples <= 0.05	SWD water quality is generally higher than the Capewide average for public water supplies.
Nitrate Levels (ppm) in Public Supply Wells = .05 - 5.0 ppm	NA	Some in SWD	43% (1993); 53% (2004)	Exceed CC Ave.	
Nitrate Levels (ppm) in Public Supply Wells > 5.0 ppm	NA	None in SWD	1% (1993); 4% (2004)	Exceed CC Ave.	
Nitrate Levels (ppm) in Private Wells < 5.0 ppm	NA	UND	85% (1993); 88% (2004)	Exceed CC Ave.	
Nitrate Levels (ppm) in Private Wells > 5.0 ppm	NA	UND	15% (1993); 12% (2004)	Exceed CC Ave.	
Public Drinking Water Consumption (gallons per year)	NA	640 million (2006)	11 billion (2004)		Cape Cod Commission estimates that 14 billion gpy will be used at built-out on Cape Cod.
Energy Consumption					
Per-Capita Consumption (kWh/Person/Year)	< 6,000 kWh (2000)	> 6,000 kWh (2004)	<7,000 kWh (2000); >7,000 kWh (2004)	Reduce energy consumption	Sandwich had the lower per capita consumption in County in 2004
Per-Capita Emission in Pounds SO2	NA	25 (2004)	30 (2004)	Reduce	Sandwich had the lower per capita emission in County in 2004
Per-Capita Emission in Pounds NOx	NA	9 (2004)	12 (2004)	Reduce	Sandwich had the lower per capita emission in County in 2004
Per-Capita Emission in Pounds CO2	NA	4 (2004)	4 (2004)	Reduce	Sandwich had the lower per capita emission in County in 2004
Art, Culture & Historic Preservation					
Town Financial Support Per Capita for Arts Organizations	UND	UND	UND	Support	Support arts organization as an economic and education investment
Public library Materials Circulated Per Capita	8.7 (2001)	11.2 (2008)	NA	15	
Public Library Volumes Per Capita	2.8 (2001)	2.9 (2008)	NA	3.5	SPL has approximately 66,000 volumes and a circulation of 257,000
Number of Scenic Roads designated	41 (2002)	48 (2008)	NA	50	Protected by Local Bylaws
Number of Museums	NA	4 (2008)	NA	N	

Buildings Listings on the National Register of Historic Register	NA	4 (2008)	NA	10	There are several more properties that are eligible for the National Register
Number of State Registered Historic Districts	NA	8 (2008)	NA	5	
Number of Individual Buildings on the State Register of Historic Buildings	NA	25 (2008)	NA	30	There are several more buildings that are eligible for the State Register
Number of National Historic Districts	2 (2002)	4 (2008)	NA	5	Old Kings Highway District, Town Hall Square National HD
Recreation					
Estimated Sandwich Harbor Transient Boat Visitors	NA	1,200+ (2007)	NA	Inc. by 5%	
Estimated Waiting List for Recreational Boat Slips	NA	1,300 (2007)	NA	Reduce by 50%	Considered the longest on Cape Cod.
Recreational Lands Per 1,000 Population	NA	Approx. 40 acres (2005)	NA	Maintain	10 acres per 1,000 is used as a standards by the National Recreation and Parks Association but typically includes more active recreational lands than are available in Sandwich presently
Recreation Department Annual Organized Sports Participants	NA	6,962 (2005)	NA		
Number of Participants in Recreation Programs Per Capita	NA	30%	NA	Inc. by 5%	
Economy					
Total Business Establishments, 2007	NA	984	15,871	Inc. by 5%	State Division of Employment and Training
Total Jobs in Sandwich	4,450 (1996); 6,249 (2000)	8,581 (2007)	146,373 (2007)	Inc. by 5%	Massachusetts Division of Employment and Training
Estimated Workforce 16+ by Occupation Classification, 2007	8,900 (1996); 9,588 (2000)	10,163 (2007)	81,779 (1990); 99,197 (2000); 106,315 (2007)	Inc. by 5%	State Division of Employment and Training
Blue Collar	NA	1,705 (16.8%)	19,630 (18.5%)	NA	Claratas
White Collar	NA	7,073 (69.6%)	66,553 (62.6%)	NA	Claratas
Service or Farm	NA	1,385 (13.6%)	20,132 (18.9%)	NA	Claratas
Private Sector Job Growth, 2001-2007	NA	342	NA	NA	State Dept. of Employment & Training
Percentage of Workforce in Professional and Technical Sectors	NA	33%	32%	NA	State Dept. of Employment & Training
Percent of Employment in Retail & Service Sectors	NA	20.5%	26.0%	NA	Claratas
Total sales volume of all businesses, 2007 (in million $)	NA	$ 832	$ 13,867	NA	Claratas
Unemployment rate	2.4% (2000)	4.0% (2007)	NA	Keep under 4% year round	Estimated 6% statewide; State Dept. of Employment & Training
Retail Sales Per Capita	NA	$7,391 (2007)	$16,140 (2007)	Inc. by 5%	$170 million in Sandwich retail sales estimated in 2007
Percent Total Tax Based Commercial/Industrial Property Value	NA	12% (FY2006)	NA	Inc to 15%	Mirant Canal Electric is the largest single C/I tax payer accounting for over 6% of total but has fallen significantly in past several years
Average Employment Per Firm	NA	8.7 (2007)	9.2 (2007)	NA	InfoUSA or Claratas

Room Tax Collection (Tourism)	$353,412 (FY02)	$317,563 (FY04)	$11,608,939 (FY04)	Inc. by 5%	Between FY02-04 Sandwich room occupancy tax collection declined by 9.8% while Barnstable County declined by 4.4%
Median Family Income	$58,600 (2003)	$87,100 (2007)	$59,200 (2007)	NA	Claratas
Median Household Income	$61,250 (2000)	$72,400 (2007)	$45,933 (2000); $55,122 (2007)	NA	Statewide $50,502 in 2000
Median Per Capita Income	$26,895 (2000)	$32,162 (2007)	$25,318 (2000); $31,058 (2007)	NA	Statewide $25,952 in 2000
Ratio of Local Jobs to Labor Force (working residents)	.50 (1996); .65 (2000)	.84 (2007)	NA	0.90	State Dept. of Employment & Training
Ratio of Local Jobs to Year-Round Housing	.71 (2000)	.92 (2007)	NA	1.00	1.5 Ratio considered optimal
Percentage of Local Jobs Held by Sandwich Residents	50% (1990)	45% (2000)	NA	60%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Residents Earning Below the Poverty Limit	4.5% (1980); 4.8% (1990)	3.1% (2000)	6.9% (2000)	Reduce by 1%	Census
Employees working in Hometown	7,460 or 31% (1990)	9,588 or 29% (2000)	81,779 or 51% (1990); 99,197 or 42% (2000)	Inc. by 5%	Census
Work at Home	NA	558 or 5.8% (2000)	NA	Inc. by 5%	Census
Number of Residents Living Below Poverty Level	NA	611 or 3.1% (2000)	5.8% in 1990; 4.6% in 2000	<3%	From U.S. Census
Housing					
Total year-round housing units (estimated)	7,236 (1990); 8,748 (2000)	9,287 (2007)	NA	NA	U.S. Census and Town Estimates
Total seasonal housing (estimated)	1,214 (1990); 1,174 or 13.4%(2000)	1,174 (2005)	52,214 or 35% (2000)	NA	Between 1990 and 2000 there was an increase of 22% in resident occupied dwelling (seasonal conversions) in Barnstable County
New Housing Units, 1995 - 2007	NA	1,700+	NA	NA	22% increase over 12 year period
Percent of Housing Stock Affordable (Meeting 40B requirements)	141 or 1.86% (2001)	270 or 3.58% (2008)	1,369 or 1.36% (2008)	Inc. to 5%	State Requires 10% of Total Housing Stock as Affordable (40B) Units
Average annual residential building permits issues over past 5 years	NA	142	NA	NA	Town data
Median Home Value	NA	$178,000 (2000)	$178,800 (2000); $333,000 (2004)	NA	Census
Percentage of Total Housing Stock in S.F. Homes	88% (1998)	92% (2007)	NA	Decrease by 10%	Town records
Average Assessed Value of Home	$145,900 (FY98)	$412,500 (2006); $428,600(FY07)	NA	NA	An increase of 207% between 1995 and 2006
Median Sales Price of a Single Family Home	$149,000 (1998)	$327,500 (2008)	NA	NA	The Warren Group Estimate
Median monthly rental housing cost	NA	$783 (2000)	NA	NA	CACI, Inc.

Barnstable County 80% of Median Income for 4-Person Household	$48,250 (2003)	NA	$59,200 (2008)	NA	U.S. Census
Total Number of Households	7,335 (2000)	NA	NA	NA	U.S. Census
Married Couples	4,768 or 65% (2000)	NA	NA	NA	U.S. Census
Female Heads of Households	595 or 8.1% (2000)	NA	NA	NA	U.S. Census
Non-family Households	1,820 or 24.8% (2000)	NA	NA	NA	U.S. Census
Permitted Accessory Dwelling Units, 1989-2008	NA	60	NA	Inc. by 10 units	Town Estimates
Persons Per Household	2.15 (1980); 2.23 (1990)	2.72 (2000); 2.69 (2007)	2.41 (2007)	NA	Census and County information
Median Owner Occupied Housing Costs > 35% of HHI	18.9% (2000)	NA	18.3% (2000)	NA	
Median Renter Occupied Housing Costs > 35% of HHI	22.7% (2000)	NA	30.5% (2000)	NA	A maximum of 30-35% of Household Income used for home costs is a typical standards used to measure affordability
Housing Costs Exceeding 30% of Household Income	NA	NA	25% (2000)	NA	17% overall in Massachusetts
Estimated % of Owner Occupied Household, 2007	NA	88%	78%	NA	
Estimated % of Renter Occupied Household, 2007	NA	12%	22%	NA	
Home Ownership Affordability Gap	NA	- $77,100 (2008)	- $37,100 (2005)	Reduce by 5%	The affordability gap is the difference between the median 4-person HHI and the income needed to buy a median priced home based on prevailing interest rates.
Percentage of Residents that Moved to Different House in last 5 Years - Mobility (2000)	NA	7,024	NA	NA	From U.S. Census
From Barnstable County	NA	17.90%	NA	NA	From U.S. Census
From within the State	NA	11.50%	NA	NA	From U.S. Census
From Different State	NA	7.90%	NA	NA	From U.S. Census
Education					
School Enrollment	2,800 (1990); 3,918 (1998); 4,113 (2000)	3,619 (2007)	NA	NA	Over last 10 years enrollment has dropped by 299 students or 7.6%
Public School Expenditures Per Student	NA	$9,560 (06-07)	NA	NA	$11,859 Statewide
Drop Out Rate (Grade 9-12)	NA	2.7% (06-07)	NA	NA	3.8% Statewide
High School Graduation Rate	NA	95.8% (06-07)	NA	NA	80.9% Statewide
Student/Teacher Ratio (07-08)	NA	15.2 (07-08)	NA	NA	13.6 Statewide
General Government					
General Government Personnel (Full-Time Equivalent)	139 (FY98)	173 (FY08)	NA	NA	Town records
Total Town Valuation	$3,877,389,600 (FY05)	$4,520,832,800 (FY07)	NA	Inc. by 5%	Town information
Transfer Station Average Trips Per Day	NA	1,200 (2007)	NA	NA	DPW
Maximum Available Public Water (SWD) Supply Over 24 hours	NA	7.97 mgd (2007)	NA	NA	Sandwich Water District

Public Safety					
Police Calls	6,142 (1992); 7,7,25 (2002)	8,578 (2007)	NA	NA	Police Department
Full-time Police Department Positions	NA	35.5 (2008)	NA	NA	Police Department
Ratio of Full-Time Police Officers per Net Population	NA	1 per 647 (2008)	NA	> 1 per 500	There are 16 FT officers in 2008. Acceptable standard is 2 to 2.5 fulltime officers per 1,000 residents
Fire Department Uniformed Firefighters	NA	35	NA	NA	Fire Department
Fire Department Uniformed staff Per Net Population	NA	1 per 657 (2008)	NA	NA	Fire Department
Fire Department Incidents	3,011 (2002)	3,583 (2007)	NA	NA	
Fire Apparatus Response Time - Longest (in minutes)	NA	13.33 (2007)	NA	<6 minutes on Average	Scusset Beach Area; Chase Road yields the longest response time of about 19 minutes on average
Ambulance Response Time - Longest (in minutes)	NA	13.13 (2007)	NA	<6 minutes on Average	Scusset Beach Area
Transportation and Mobility					
Total Roadway Miles	NA	244.35 (2007)	2,589.77 (2000)	NA	Average roadway mileage for Cape Cod communities is 172.65
Average Number of Residents Per Roadway Mile	NA	85 (2007)	88 (2007)	Maintain	DPW
Miles of local roadway per square mile (44 square miles in Town)	NA	5.6 miles	6.5 miles	Maintain	DPW
Average Number of Households Per Roadway Mile	NA	30.0	36.6	Maintain	DPW
Population within 1/2 mile of transit route	NA	0%	45%	Inc. by 10%	DPW
Land Area within 1/2 mile of transit route	NA	0%	37%	Inc. by 10%	DPW
Miles of Bike Routes, 2007	NA	22.5	330	Inc. by 5	22 average per community on Cape Cod
Miles of Bike Trails, 2007	NA	2.5	83.8	Inc. by 5	5.6 average per community on Cape Cod
Linear Feet of Bike Paths Per Capita	NA	.57 per resident	1.93 per resident	Inc. by 10%	DPW
Percentage of Local Workers that are employed in Sandwich	27% (1990)	29% (2000)	NA	Inc. by 5%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Local Workers that are employed in Surrounding Towns	39% (1990)	45% (2000)	NA		1990 and 2000 U.S. Census Journey-to-Work Data.
Mean Travel Time to Work	NA	30.2 Minutes (2000)	NA	Reduce by 5 minutes	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Commuting Workers that Use Personal Vehicle	93% (1990)	90% (2000)	NA	Reduce by 10%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Commuting Workers that Drive Alone	79% (1990)	85% (2000)	NA	Reduce by 10%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Commuting Workers that Carpool	14% (1990)	5.2% (2000)	NA	Inc. by 10%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Commuting Workers that Use Public Transit	<1% (1990)	2.4% (2000)	1.2% (2000)	Inc. by 10%	1990 and 2000 U.S. Census Journey-to-Work Data.
Percentage of Commuting Workers that Use Non-Motorized Travel (bike, walk, etc.)	7% (1990)	6.5% (2000)	NA	Inc. by 10%	1990 and 2000 U.S. Census Journey-to-Work Data.

Commuting Work Trip Vehicle Occupancy Rate	NA	1.2/vehicle (1990)	NA	NA	1990 and 2000 U.S. Census Journey-to-Work Data.
Park and Ride Lots Located in Sandwich	0 (2002)	1 (2007)	NA	Inc. by 1	Sagamore Flyover Lot is Closest to Town
No. of Key Roadways at >90% Peak Season PM Design Hour Capacity (v/c ratio)	1* (2000)	6 (2007)	NA	Reduce by 2	*Cotuit Road at Quaker Meeting House Rd (.95 v/c ratio); Cotuit Rd South of QMH (1.6); Quaker Meetinghouse East of Cotuit (.98); Quaker Meetinghouse East of Rt 130 (1.01); Route 130 North of Cotuit (1.42); Route 6A East of Jarvis (1.02); Route 6A East of Tupper Road East (.99)
No. of Unsignalized Intersections Operating at LOS F During Peak Season	NA	6 (2000)	NA	Reduce by 2	
No. of Intersections Averaging 5 or More Accidents Over a 3 Year Period	NA	5 (1997-1999)	NA	Reduce by 2	Between 1997-1999 - U.S. 6 at Route 130; Route 6A at Tupper Road (East); Route 6A at Route 130/Main Street/Tupper Road (West), Cotuit Road at Quaker Meetinghouse Road, and U.S. 6 at Quaker Meetinghouse Road.
Number of Regular CCRTA Public Transit Routes in Sandwich	NA	0 (2008)	NA	Inc. by 1	Only CCRTA-B paratransit service available by appoint in 2002.
Average Crash Rate Per Million VMT, 1999-2001	NA	0.24	0.9		
Designated Scenic Roads	NA	48	NA	Inc. by 2	
Natural Resources					
Percentage of Total Town Land Base in Protected Open Space	NA	3,700 acres (13%)	NA		
Estimated Wetlands	NA	1,313 or 4.8%	NA		Majority are estuary wetlands (955 acres) located along Cape Cod Bay
Number of Rare, Threatened and Endangered Vascular Plants Identified	NA	26	NA		Mass. Division of Fisheries & Wildlife, 2005
Number of Rare, Threatened and Endangered Vertebrates and Invertebrates Identified	NA	27	NA		Mass. Division of Fisheries & Wildlife, 2005
Number of Hazardous Waste Sites Identified	NA	4	NA		Mass. DEP, 2005
Potentially vulnerable shoreline dwellings	NA	382	NA		33 dwellings along Town Beach are the most vulnerable; Sandwich Pre-Disaster Mitigation Plan, 2004 (Town Beach, Spring Hill and East Sandwich Beaches)
Land Use & Growth Management					
Land Use in FY2008 (acres)					
Agricultural	NA	185.5 (1%)	NA	Inc. by 10%	Sandwich Assessors Office
Commercial	NA	404.4 (2%)	NA	NA	Sandwich Assessors Office
Industrial	NA	375.5 (2%)	NA	NA	Sandwich Assessors Office
Mixed Use	NA	145.3 (1%)	NA	NA	Sandwich Assessors Office
Public Services	NA	406.6 (2%)	NA	NA	Sandwich Assessors Office
Public Uses	NA	13,649.8 (55%)	NA	NA	Including MMR

Residential Use	NA	8,634.3 (35%)	NA	NA	Sandwich Assessors Office
Recreational Uses	NA	606.3 (2%)	NA	NA	Sandwich Assessors Office
Total Parcels	NA	10,214	NA	NA	A total of 9,346 parcels (92%) are in residential use
Developable and Potential Developable Land in Sandwich (Classified by Assessors Office)	1,995 (FY04); 2,000 acres or 11% (FY00)	1,470 acres or 6% (FY08)	NA		MMR contains 8,394 acres but is not included in this assessment of development potential
Developable Commercial Land	86.22	80.4	NA	Utilize 10%	Focus on Activity Centers
Potentially Developable Commercial Land	NA	6.2	NA	Utilize 10%	Focus on Activity Centers
Developable Industrial Land	125.68	126.1	NA	Utilize 10%	Focus on Activity Centers
Developable Residential Land	1,783.20	1,191.60	NA	Maintain	Maintain through infill development and redevelopment
Potentially Developable Residential Land	NA	65	NA	Maintain	Maintain through infill development and redevelopment
Protected Lands (acres)	NA	13,764 or 50% (2008)	41%	Inc. by 10%	Without MMR (8,394 acres the percentage of protected public lands is 22%
Federal Land	NA	421.1	NA	NA	Sandwich Assessors Office
Private Conservation Land	NA	154.5	NA	Inc. by 10%	Sandwich Assessors Office
State Land	NA	857.6	NA	NA	Sandwich Assessors Office
Town Conservation Land	NA	2100	NA	Inc. by 10%	Sandwich Assessors Office
Active Recreation Land	NA	425.1	NA	Inc. by 10%	Sandwich Assessors Office
Total Building Square Footage	NA	20,250,660 (2008)	NA	NA	Sandwich Assessors Office

What is Ozone?

Ozone is formed in the atmosphere by chemical reactions of nitrogen oxides and unburned hydrocarbons primarily from power plants and vehicles. That chemical reaction is exacerbated by higher temperatures and direct sunlight. Therefore, the three-year average will tend to smooth ozone data from extremes in seasonal meteorological variations such as a cool and cloudy spring or a long spell of hot and sunny days.

Barnstable County Weighted Air Quality Index, 2003-2005

County	Weighted AQI Average	AQI: 101 to 150 Orange Days	AQI: 151 to 200 Red Days	AQI: 201 to 300 Purple Days
		Unhealthy to Sensitive Groups	Unhealthy	Very Unhealthy
2003				
Barnstable	10.7	21	6	1
2004				
Barnstable	9.8	17	7	1
Bristol	9.0	18	6	0
Suffolk	7.2	15	3	1
2005				
Barnstable	11.3	22	8	0
Bristol	10.7	23	6	0
Suffolk	7.5	16	3	1

The condensed air quality data in the table above is taken from the American Lung Association's weighted average of so called "exceedence days" (days when the AQI is above 100 as measured by DEP monitors in Truro and elsewhere in the Commonwealth). By comparison to Cape Cod, the AQI results in Greater Boston (Suffolk County) are considerably lower (some oil fired power plants in this metropolitan region have been replaced in recent years by cleaner burning natural gas units which may explain why there AQI is lower). Bristol County (including nearby Fall River, New Bedford and the Somerset Area) have some of the largest coal and oil fired power plants in the state, and invariably has the second worst air quality. The AQI weighted average on Cape Cod remains about 50 percent higher than in the Greater Boston area as reported in the individual monitor data presented in the 2003 Indicators Report.

The air quality as measured by the DEP monitor in Truro cannot distinguish where the ozone originates. As a result, it is somewhat difficult to identify the precise sources. However, Brayton Point (in Somerset) and the Mirant Canal Plant in Sandwich are two of the largest coal and oil fueled power plants in the State, and potential source of ozone. A Harvard University report in 2000[4] on the health impacts of local power plant emissions indicated that the maximum intensity of primary pollutants falls within 5 to 20 miles of the source. This is a significant concern for Sandwich.

The second air quality concern is the significant influx of automobiles and trucks in the summer season which coincides with the maximum ozone forming conditions. This also is a significant concern for Sandwich as Route 6 carries the most traffic on Cape as travelers drive to their destinations to the east.

The third air quality concern is based on the Cape's geography. Cape Cod is a long peninsula and meteorological conditions create a dual sea breeze front. This condition is apparent in early morning as offshore prevailing winds carry pollutants out to sea, but in the late morning and afternoon the winds reverse and bring many of those pollutants back for deposition over the Cape's land mass. Finally, the Cape is downwind of the numerous Midwest coal burning

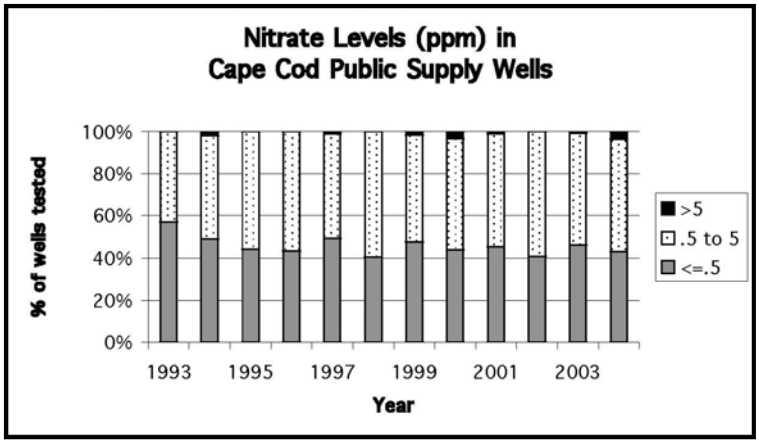
[4] "Estimated Public Health Impacts of Criteria Pollutant Air Emissions from the Salem Harbor and Brayton Point Power Plants," Jonathan Levy, John Spengler, Harvard School of Public Health, May, 2000, p. 4.

power plants in Ohio, Pennsylvania and Virginia. Thus, the Cape is subject to the "transport" phenomenon of pollutants originating from upwind states. Although difficult to quantify, the DEP estimated that up to half our pollution is from the upwind states[5], the balance being from sources closer to home.

The major parameters contributing to air quality that can be affected by responsible action on the Cape are the generation and use of electrical energy, the use of heating fuels, and vehicular efficiency and traffic. The Town of Sandwich, together with other local officials and the Cape Cod Commission, should support stringent national emission regulations for upwind power plants to contend with national air quality criteria pollutants and for carbon dioxide emissions.

Effective programs focusing on energy efficiency such as the Cape Light Compact's voluntary plan should be encouraged with emphasis on public participation. More stringent future emission regulations in place for regional power plants should be helpful in improving air quality in Sandwich and on Cape Cod when compliance is achieved.

The Cape and Islands are fortunate to have substantial non-polluting and sustainable energy resources from the wind and sun. The use of these resources must become a part of the total energy plan for the Cape to reduce unhealthful fossil fuel emissions and avoid substantial carbon dioxide production. Incentives for the use of fuel efficient vehicles and the establishment of major public transportation facilities must also be encouraged to improve our air quality and reduce carbon emissions. Sustainability can be achieved with new technologies at reasonable costs that conserve our energy, use renewable resources while limiting unhealthful emissions as well as those responsible for global climate change and rising ocean levels.[6]



Water Quantity - Cape Cod's drinking water quality is generally very good, but there has been a trend towards water quality degradation during the past decade. Between 1993 and 2004, the percentage of public water supply wells whose nitrate levels tested at or below .05 parts per million (considered very clean) decreased from 57 percent to 43 percent. During the same period, the percentage of wells that were between 0.5 and 5-parts per million (the nitrogen-loading standard) increased from 43 percent to 53 percent. Between 1993 and 2004, between 1 percent and 4 percent of these tested wells reached a level above 5-ppm of nitrate.[7] The Sandwich Water District analysis for nitrate levels in 2007 indicated range of 0.07 to 1.7 ppm with the highest level detected at 1.7. This indicated high quality of water samples with no violations of DEP standards.

[5] "Development of a Dispersion Modeling Capability for Sea Breeze Circulations and other Air Flow Patterns over Southeastern Massachusetts, Upper Cape Cod Modeling Study," by Egan Environmental, REF File Number 1J2, January, 2002. Preformed for the MA Department of Public Health.
[6] Charles Kleekamp, Cape Clean Air
[7] Massachusetts Department of Environmental Protection, Drinking Water Program

Although the trend indicates higher nitrate concentrations from development, the proportion of "clean" wells is a general reflection of the large amounts of protected undeveloped lands surrounding the public supply wells, and larger residential lots that predominate in wellhead protection areas.

Sandwich Water District Water Quality Data, 2007

Contaminant	MCLG	MCL	Highest Level Detected	Range of Detections	Violation	Typical Source in Drinking Water
Organics						
Tetrachloroethylene (PCE)* (ppb)	0	5	3	ND – 3.0	No	Leaching from vinyl-lined transite water mains.
1.1.1.-Trichloroethane (ppb)	200	200	0.7	ND – 0.7	No	Discharge from metal degreasing sites and other factories.
Radionuclides	*The Massachusetts Department of Environmental Protection has reduced the monitoring requirements for radionuclide's to less often than once per year because the source is not at risk of contamination. The last sample collected was in 2003 and results are reported in this table.*					
Alpha Emitters (pCi/l)	n/a	15	0.8 +/- 1.1	0.4 +/- 1.7 -	No	Erosion of natural deposits.
(Data from 2003)				0.8 +/- 1.1		
Radium-226 (pCi/l)	n/a	5	0.1 +/- 0.3	0.0 +/- 0.2	No	Erosion of natural deposit
(Data from 2003)				0.1 +/- 0.3		
Unregulated	*Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining their occurrence in drinking water and whether future regulation is warranted.*					
Chloroform (ppb)	n/a	n/a	2	ND – 2.0	No	Trihalomethane: By-product of chlorination (In non-chlorinated sources, Chloroform may be naturally occurring)
Methyl Tertiary Butyl Ether (MTBE in ppb)	n/a	70****	1	0 – 1.0	No	Ingredient in gasoline.
Sulfate ** (ppm)	n/a	250**	9	6.0 – 9.0	No	Natural sources.
Sodium *** (ppm)	n/a	20***	30	12.0 – 30.0	No	Erosion of natural deposits, road salt run-off
Inorganics						
Nitrate (ppm)	10	10	1.7	0.07 – 1.7	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
Microbiological			**Highest # of Positives # of Samples**	**# of Positives To Locations sampled**		
Coliform (colonies present)	0	1 Positive/ month	4	4 out of 25	YES	Naturally occurring in the environment
Metals			**90th Percentile**	**Sampling Sites above the AL**		
Lead (data from 2005)	0	AL=15	4	1 out of 37	No	Corrosion of household plumbing systems.
Copper(data from 2005 in ppm)	1.3	AL=1.3	0.34	0 out of 37	No	Corrosion of household plumbing systems.

An analysis of drinking water from small-volume, non-community supply wells indicate higher levels of nitrate/nitrogen as compared to public supply wells. Of the 166 small-volume wells tested in 2000, 85 percent were below 5 parts per million (ppm) and 15 percent were greater than 5 ppm. Of the 189 small-volume wells tested in 2004, 88 percent were below 5 ppm and 12 percent were greater than 5 ppm. Based on this, the overall percentage of contaminated small-

volume wells is much greater than that for public water supply wells (4 percent).[8] These higher levels are indicative of smaller volumes of water pumped, shallower well depths and the close proximity of septic systems to the wellhead.

Water quality data available from coastal embayments, whose ecosystems are more adversely affected by nitrogen than human health, indicates that many of these systems are severely impacted by nitrogen. Eelgrass has nearly disappeared from most of the embayments along Vineyard and Nantucket Sounds, and some waters are experiencing regular low-dissolved oxygen conditions.[9]

Analyses conducted by DEP certified laboratories are an integral part of ensuring that the public water in Sandwich meets or surpasses the state and federal standards for quality and safety. The water quality data in the table below shows only the substances SWD detected when conducting over 750 water quality tests. The table includes water quality results from both the Sandwich Water District and the Upper Cape Regional Water Cooperative.

Marine Resources[10] **-** Evaluating the extent to which current activities and uses are sustainable as they relate to coastal and marine resources is a challenging undertaking. State and local agencies are crafting measures to produce information and data that will shed light on the condition of our coastal waters, and their response to human activities in the marine environment and on adjacent lands. This is an evolving field, and different strategies have been developed for reporting the results of ongoing science and its implications for the management of coastal and marine resources.

Assessing the relative sustainability of the Cape's coastal environment presents challenges in terms of measuring relationships and changes in the environment, and the use of planning and management tools to address the broader context of sustainability. Towns on the Cape derive direct and indirect economic benefit from the marine and coastal environment through recreation, navigation, tourism, fishing and aquaculture. In addition, communities benefit from less tangible services such as key cultural and social characteristics derived from their relationship with the sea, and the scenic beauty of the coast and the moderating effect of the ocean on the Cape's climate. These same coastal resources also serve as a receptor, a repository for some of the Cape's wastes and a substrate supporting communication lines and energy cables and other infrastructure.

For the purposes of evaluating coastal resources in the context of sustainability, three measures were used including: Cape Cod Tidal Restrictions, Cape Cod Fish Passage Restrictions, and Cape Cod Stormwater Discharge Points. The maps below illustrate these coastal resources sustainability indicators cape-wide as well as in Sandwich.

These measurements were chosen to demonstrate the relationship between human activities and coastal and marine ecosystems. These three topics are not intended to serve as adequate measures of the full complement of human activities and the resulting effect on the Cape's coastal resources. Rather, they are intended to draw attention to the links between activities conducted on land and subsequent, often diffuse and unseen impacts to the coast and the marine environment.

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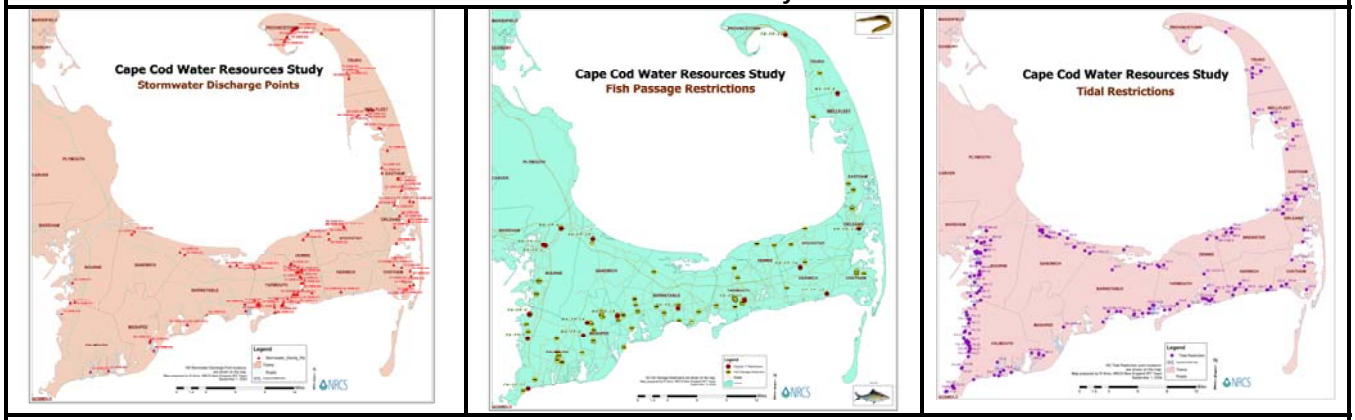
[8] Massachusetts Department of Environmental Protection, Drinking Water Program
[9] Donna McCaffery and Gabrielle Belfit, Cape Cod Commission, 2004
[10] This section is by Steve Tucker, *M.M.A.*, Massachusetts Bays National Estuary Program and Cape Cod Commission.

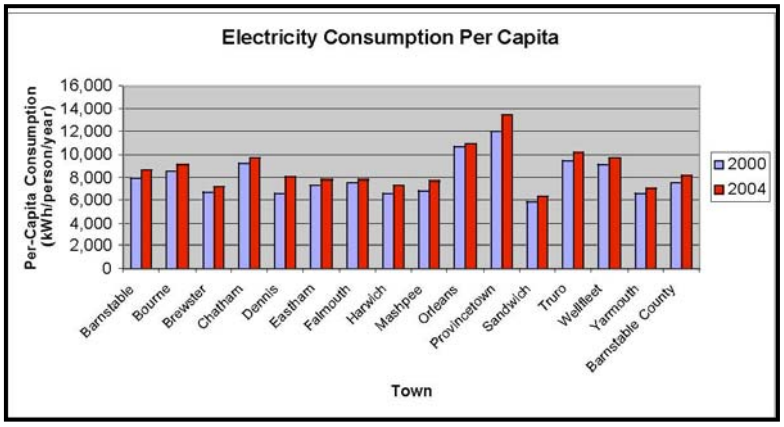
Marine Resource Sustainability Indicators



Source: Cape Cod Sustainability Indicators Report, 2004

Sustainable Energy Indicators

Electricity Consumption - Metered electricity consumption continues to increase steadily on Cape Cod both in overall and per-capita basis, despite sustained investments in energy efficiency and initial market entry for consumer-side distributed resources.[11] While the per capita electricity consumption in each community (including Sandwich) increased between 2000 and 2004, Sandwich had the lowest per capita consumption in Barnstable County and is well below the overall average. This is an unsustainable trend, given Cape Cod's current reliance on finite sources of fuel that have adverse impacts on local communities, the fact that these sources of fuel must be imported from elsewhere and are subject to global demand pressures. Over the longer term, however, increased electricity consumption could underlie the transition to a sustainable energy economy, characterized by reliance on abundant and inexhaustible renewable resources that reduce the local "emissions footprint" associated with electricity consumption and support a switch to emissions-free technologies in the transport and heating sectors. [12]

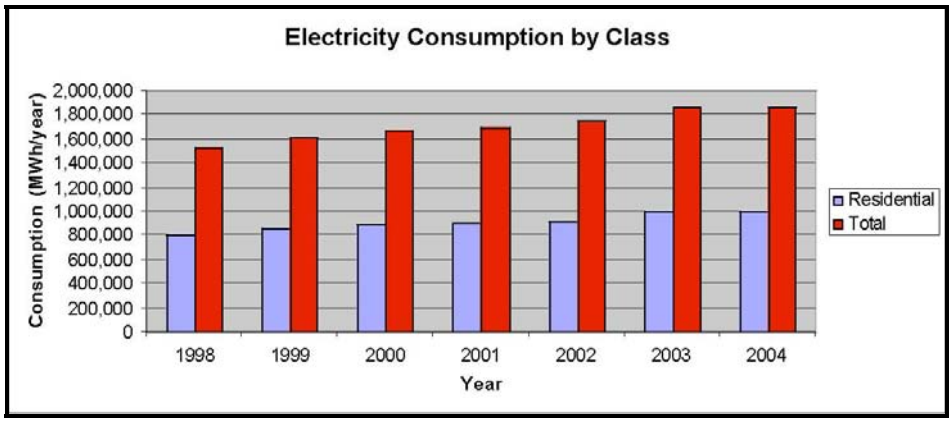


The primary electrical generating infrastructure on the Cape is the Mirant Canal Electric Plant in Sandwich, which is predominantly an oil-fired facility. The facility generated as much electricity as was consumed on Cape Cod in 2004. The Mirant Canal plant also released almost 20 million pounds of sulfur dioxide (SO2) and more than 5 million pounds of nitrogen oxides (NOx) into the local environment. It also released more than 1.7 million tons of carbon dioxide (CO2),

[11] Sources: Data from Cape Light Compact and US Census Bureau; analysis by WEE*info* Services.

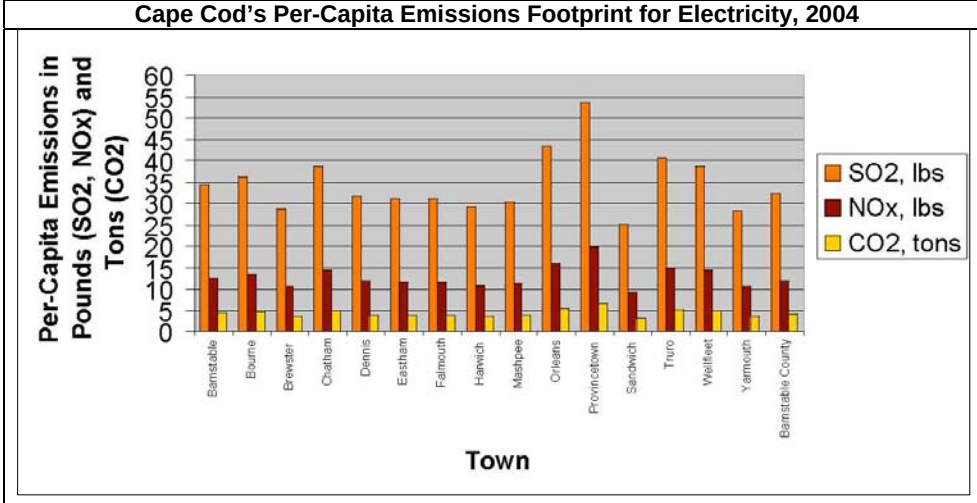
[12] Chris Powicki, WEE*info* Services

contributing to the atmospheric accumulation of greenhouse gas.[13]



The Cape Light Compact and NStar provide the primary contract electrical services[14] on Cape Cod based on average emissions for the New England electricity supply mix. The emissions from these sources are smaller than the "physical path" footprint, reflecting the regional reliance on natural gas, nuclear power, and other sources with lower emissions than oil. However, total emissions on the contract services are still substantial, as illustrated below, amounting to more than 30 pounds of SO^2, almost 12 pounds of NO^x, and more than 4 tons of CO^2 per person in Barnstable County during 2004. Sandwich ranks lowest in Barnstable County in terms of per capita emissions in pounds of SO^2 and NO^x, and tons of $CO.^2$

Cape Cod's Per-Capita Emissions Footprint for Electricity, 2004



By relying on electricity generated by fossil fuels, every Cape consumer has an "emissions footprint" reflecting "true costs"—the adverse environmental, social, and social impacts that do not show up on electric bills but are experienced within local communities. Currently, local solar and wind power systems produce only a small amount of electricity. However, they are

[13] Sources: Data from Cape Light Compact, New England Generation Information System, Mirant, and US Census Bureau; analysis by WEEinfo Services.

[14] On behalf of local consumers, the Cape Light Compact and NStar enter into contracts with power suppliers that own the rights to energy generated by facilities located throughout New England. These agreements define the "contract path" for the power purchased by local consumers.

decreasing the emissions footprint and the true costs associated with their energy consumption. Green power products available through the Cape Light Compact offer local consumers opportunities to decrease their emissions footprints. These products, available for a small premium, are based on power produced by bioenergy, small hydro, solar and wind energy systems in New England. By purchasing these products, Sandwich consumers offset their reliance on conventional system power products while building demand for renewable energy.

The electrical system power mix is dominated by fossil fuel plants, including the Mirant Canal Electric Plant and the Brayton Point Station upwind of Cape Cod. Together, these facilities supplied more than 60 percent of the regional power mix in 2004. Nuclear power plants, including the Pilgrim Plant in Plymouth, accounted for 28 percent of the regional mix. Facilities considered renewable (but not necessarily environmentally benign) include large-scale hydro facilities and plants burning wood, construction debris and municipal wastes. These facilities generate most of the remainder of the power. Wind and solar energy installations dispersed throughout New England, including some in local communities, produced a negligible amount of electricity.[15]

Wind Energy Development[16] - Many local communities are actively pursuing the capture of wind resources on municipal property. The Town of Orleans proposed two 1.65-MW wind turbines supplying emissions-free power to the town that were ultimately not locally approved. Also, the Green Communities Act was passed in July 2008, which made net metering law. While Sandwich may be behind other communities in this form of energy development, wind promise to help reduce municipal electricity bills and/or to create new revenue streams, thereby supplementing town budgets and freeing up resources for other uses. Wind energy represents a highly visible indicator of a future in which Cape Cod relies on renewable resources to supply increasing amounts of energy.

Municipal Wind Project Development Status by Town As of March 2006

	Project Being Actively Pursued	Meteorological Tower Installed	1 Year of Wind Data Collected	Feasibility Study Completed	Project Development Approved	Project Development Initiated	Green Power Being Generated
Barnstable	■	■					
Bourne	■	■	■				
Brewster	■	■					
Chatham							
Dennis							
Eastham	■	■	■	■			
Falmouth	■	■	■	■			
Harwich	■	■	■				
Mashpee							
Orleans	■	■	■	■	■		
Provincetown							
Sandwich							
Truro	■						
Wellfleet	■						
Yarmouth	■						

Community wind projects are helping focus attention on multi-faceted challenges that must be

[15] Chris Powicki, WEE*info* Services

[16] From report by Chris Powicki, WEEinfo Services for the Cape Cod Sustainability Indicators Report, 2004

addressed to ensure that regionally abundant renewables are tapped in ways that maximize local benefits. For these initiatives, the most significant barriers are economic: all wind installations require substantial up-front investments in exchange for long-term returns, yet individual municipal projects do not offer economies of scale. At the state level, new legislation may improve project economics by increasing net metering limits. Alternative development, financing and ownership models also are being examined by towns and by the Massachusetts Technology Collaborative (MTC) as possible remedies.

Cape Cod's first grid-connected wind turbine (1.739 kW) at Cape Cod Regional Technical High School in Harwich began generating green power in June 2005. By years end, it had harnessed local energy flows to produce more than 1300 kWh of electricity. Its net generation was equivalent to approximately 40 percent of the demand of an average home. Its total fuel cost was zero, as were some of its "true cost" impacts - no pollutants or greenhouse gases were released, and no finite fuel resources were extracted elsewhere and imported to the Cape.

In 2006, the first large-scale, grid-connected wind turbine started spinning on at the Massachusetts Maritime Academy (MMA), and other land-based wind installations are scheduled. The MMA and Cape Cod Tech turbines represent a small but significant harbinger of the region's energy future.

More than 500 MW of wind generating capacity remained under active consideration for sites in Nantucket Sound and within almost every town on Cape Cod. If only those wind projects being actively pursued by private developers and by local communities, institutions, businesses and residents were to be constructed as proposed, they would (on average) satisfy more than 75 percent of the Cape's electricity demand. At maximum capacity, this wind generating capacity would transform the Cape into a net exporter of green power, even during peak demand periods.[17]

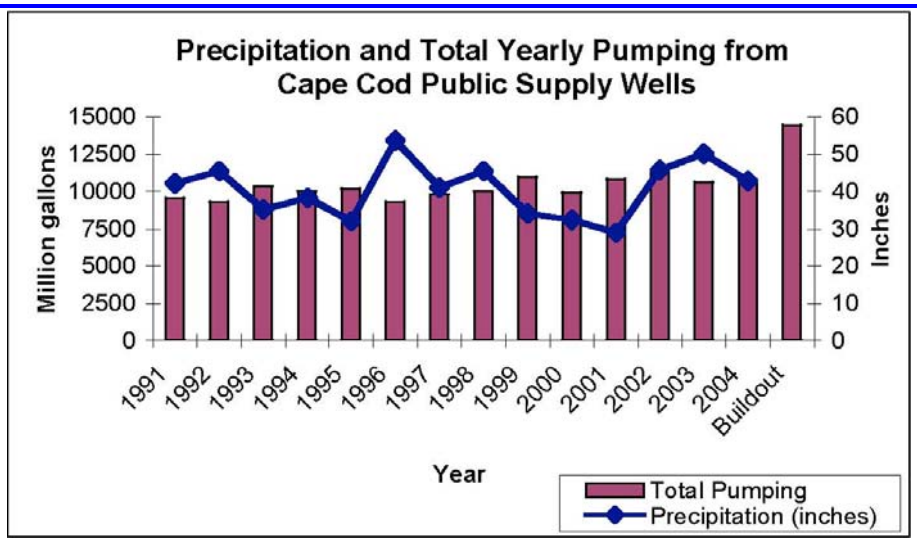
Sustainable Infrastructure

Drinking Water Volumes[18] - Public water suppliers pumped approximately 11 billion gallons in 2004, which is approximately 18 percent higher than the lowest amount pumped over the past ten years (nine billion gallons pumped in 1996). By comparison, the Sandwich Water District pumped 640 million gallons in 2006, or about 6 percent of the Cape-wide total.[19] Variations in pumping are dependent on precipitation amounts, summer temperatures, tourism numbers and internal water department operations, among other factors. The estimate of water use under build-out conditions is approximately 14 billion gallons per year. This number is based on the additional amount of water that would be needed to support potential residential and commercial growth under current zoning.

[17] Data from Massachusetts Technology Collaborative, Electric Power Research Institute, and Cape & Islands Energy Information Clearinghouse (www.cirenew.info/oceanEnergy.htm); analysis by WEEinfo Services.

[18] By Donna McCaffery, Cape Cod Commission and Gabrielle Belfit, Cape Cod Commission for the Cape Cod Sustainability Indicators Report, 2004.

[19] Massachusetts Department of Environmental Protection, Drinking Water Program



A sustainability goal for Sandwich is to adequately support the local and regional tourism-based economy, which is depends on the quality of the Cape's fresh and marine waters – natural assets that attract commerce to the Cape. This goal depends upon the community's ability to provide clean drinking water to support transient populations, economic development and the year-round population. While drinking-water and ecology protection have their own respective issues, the protection of both is dependent upon appropriate planning, technology and infrastructure adequate for achieving community sustainability goals.

Wastewater[20] - Appropriate management of wastewater and stormwater is critical to protecting drinking water supplies because the Cape Cod Aquifer is the repository for wastewater and stormwater runoff. Wastewater and stormwater management are also important to the ecological and aesthetic quality of the Cape's freshwater ponds, estuaries and marine embayments because the aquifer discharges to these coastal systems and contributes nutrients derived from these non-point sources. Sandwich, like most of Cape Cod, has historically relied upon on-site wastewater treatment and disposal. There are only limited areas on the Cape (i.e. Buzzards Bay, Falmouth, Barnstable, Chatham and Provincetown) connected to sewer with advanced wastewater treatment. On-site wastewater systems treat wastewater to various levels depending on their size and whether those systems are permitted under the DEP's Ground Water Discharge program. However, the vast majority of the Cape's on-site systems are standard Title-5 septic systems that are not designed to remove nutrients. Sandwich should carefully explore the potential applications of new wastewater treatment technologies and small public wastewater systems in targeted activity centers for the long term protection of water resources and sustainability of future development.

Stormwater[21] - As with wastewater, the Cape Cod Aquifer is the repository for stormwater runoff in Sandwich. As stormwater travels over the land, it picks up chemical contaminants and materials that are not naturally found in our waterways. Some contaminants are toxic, even in small amounts. The pollution of waterways from stormwater runoff can result in unpleasant and unsafe boating, swimming and fishing. Cape Cod waterways are especially important to fisheries and tourism, making it important to minimize stormwater pollution. It is increasingly important for

[20] Prepared by Gab Belfit and Scott Michaud of the Cape Cod Commission for the Cape Cod Sustainability Indicators Report, 2004

[21] Prepared by Gab Belfit and Scott Michaud of the Cape Cod Commission for the Cape Cod Sustainability Indicators Report, 2004

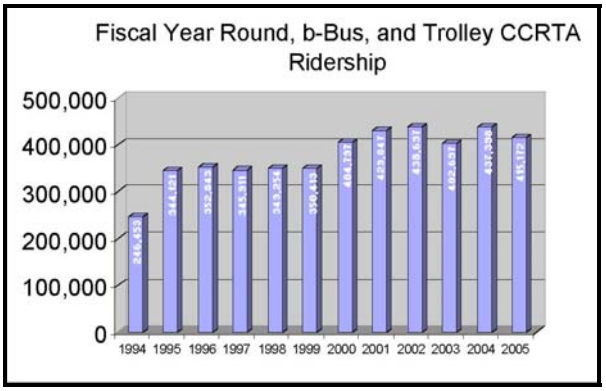
stormwater pollution to be controlled as the population of Sandwich grows and development increases.

Employing the techniques of Low Impact Development (LID) in stormwater design is a goal for future development and redevelopment in Sandwich. Unlike traditional stormwater control techniques, LID strategies prioritize resource conservation and increasing green space, while simultaneously controlling runoff discharge volume and quality to reach levels of preconstruction stormwater control. One of the primary goals of LID design is to dampen peak flow and find beneficial uses for water, including direct recharge to groundwater rather than handling and discharging it as a waste product into storm sewers.

Integrated Management Practices, or IMPs, is one such LID technique that uses small-scale stormwater management controls to strategically distribute stormwater throughout a site. This helps to maintain natural flow patterns, filter pollutants and recreate or maintain a site's hydrology. Development and redevelopment should strive to break up stormwater discharge to several smaller systems, utilize integrated landscaped bio-retention practices and plan landscape designs with efficient irrigation that can both retain water and not need fertilizers or pesticides. The use of these controls in combination with conservation practices, minimizing development impacts and maintaining site runoff rates creates a customized stormwater management design that helps maintain overall watershed integrity and functions.

Public Transit Coverage and Ridership[22] - The existing seasonal and year-round public transportation service available on Cape has been in place for a number of years with minimal change. Some additional summer services were tested in recent years but not continued due to lack of ridership. A major new year-round service was implemented in June 2006 on the Outer Cape called The Flex that serves Brewster, Harwich, Orleans, Eastham, Truro and Provincetown. No significant change or expansion of the public system has occurred in the Upper Cape Sub-region including the Town of Sandwich.

Over the last 10 years, public transit ridership has increased steadily Cape-wide to about 400,000 trips. While this growth trend appears to have leveled off in recent years, the Cape Cod Regional Transit Authority (CCRTA) is projecting a significant increase in ridership over the next few years (over 520,000 trips) resulting from the new service on the Outer Cape.



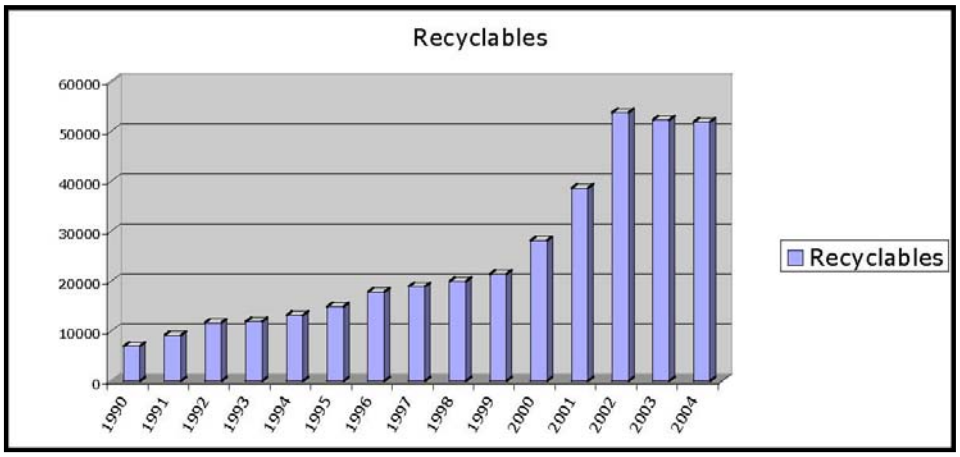
A number of local transportation centers have been proposed by the *5-Year Plan for Public Transportation on Cape Cod, 2002*. The local centers are intended to compliment the regional

[22] Clay Schofield, Cape Cod Commission for the Cape Cod Sustainability Indicators Report, 2004.

Hyannis Transportation Center (opened in September 2002), and expected to provide key transfer and assembly points for public transportation. Sandwich should be included among these local transportation centers as one of the key automobile gateways on the Cape.

Solid Waste Disposal and Recycling[23] - While overall tons of municipal solid waste generated by almost all Cape towns (and the Cape overall) rose from 1995 to 1999, the per capita numbers show a decrease between 1999 and 2003 (approximately 29 percent). This may be attributed to a host of factors, including an increase in the overall effectiveness of local recycling programs combined with a decline in the amount of waste being discarded. More recent figures, however, show that the per capita waste generation for the Cape is again increasing. These fluctuations are likely reflective of economic activity.

As shown in the figure below, recyclables increased 54 percent on Cape Cod between 1995 and 2002, and decreased slightly (less than 3 percent) between 2002 and 2004. Recycling markets on Cape Cod, like in many parts of the country, may have peaked temporarily. However, as state governments add new materials to the list of waste bans, recycling rates may again increase.



While it is difficult to measure, the reuse and recycling of construction materials is a key sustainability indicator. Construction demolition tonnages delivered to the Bourne Integrated Solid Waste Management Facility have fluctuated significantly over the last fifteen years. This is due to the cyclical nature of disposal costs and the development of alternative permitted construction demolition disposal facilities. A number of new disposal facilities that have come on line in the southeast region over the last several years allow generators of construction demolition to shop competitively for the least expensive disposal fee. It is anticipated that construction materials tonnages will remain relatively stable for the foreseeable future due to alternative regional disposal capacity and recycling programs that will be mandating removing significant portions of the construction demolition stream (wood, asphalt brick and concrete, and metal).

Fluctuations in the amounts of waste generated and disposed (whether it be solid waste, construction demolition or recyclable materials) can be good indicators of economic activity, population growth and possible environmental degradation. An increase or decrease in the purchase and consumption of goods will serve to either increase or reduce the generation of discarded materials, thereby impacting waste management activities and costs that must be borne by either the individual homeowners or the municipality. Economic activity, population

[23] Greg Smith, formally of the Cape Cod Commission, for the Cape Cod Sustainability Indicators Report, 2004.

growth and environmental degradation can also be considered sub-indicators, revealing trends that may serve as overall indicators of sustainability on Cape Cod.

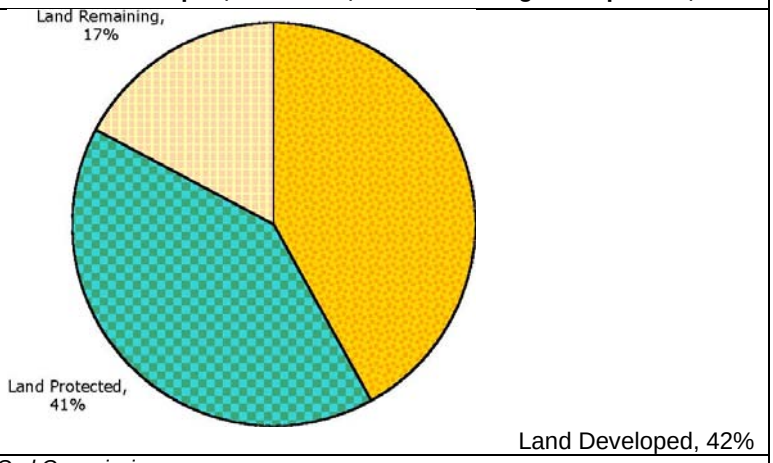
Aggressive recycling programs and policies enacted at both the state and local level may play a role in the reduction of solid waste generation. One example is the "Pay as You Throw" municipal solid waste disposal programs that was instituted by the Town of Barnstable as a pilot program in 2004. This program may become viable for other Cape towns such as Sandwich in the future.

Sustainable Land Use and Policy Indicators

Land Protected vs. Land Developed - The Land Developed/Land Protected Indicator is a snapshot of the percentage of Sandwich and Cape Cod developed, protected and remaining. The relationship of these figures is a measure of the balance our community maintains between the land where we live, work, and shop, and the natural landscape that protects our water supply, provides wildlife habitat and places to recreate, preserves the character of the Cape landscape, and by extension supports the economy of the Cape which is closely tied to the beauty of and access to our environment.[24]

According to the most recent data (2004) the Cape Cod Center for Sustainability indicates that 42 percent of land Cape-wide is developed, 41 percent is protected and 17 percent is remaining. By comparison, Sandwich has an estimated 13,764 acres of protected lands between town-owned open space (3,700 acres), the Sandwich Water District (406 acres), Shawme-Crowell State Park (1,174 acres), private conservation lands, the Massachusetts Military Reservation (8,394 acres), and other public use categories. This amounts to approximately 50 percent of all land in Sandwich. Without the MMR, approximately 22 percent of lands in Sandwich are protected.

Percentages of Land Developed, Protected, and Remaining on Cape Cod, 2004



Source: Cape Cod Commission

Mixed Use Zoning[25] - Mixed-use zoning, or land use regulations to allow for a concentrated mix commercial, residential, and institutional uses in strategic locations (i.e. villages, downtowns and corridor nodes) can be considered as a basic principal of "Smart Growth" and sustainable design. As shown in the chart below, a number of towns have instituted some type of mixed-use zoning in their downtowns and other areas. What these findings indicate is the extent to which different

[24] Heather McElroy, Cape Cod Commission and Anne Reynolds, Cape Cod Commission
[25] This section prepared by John Lipman, former Acting Director of the Cape Cod Commission

towns on the Cape are accommodating growth in a form that is considerably more beneficial from a land-use perspective than suburban sprawl. What these findings cannot easily demonstrate is the amount of additional growth these bylaws allow, their effectiveness in stimulating real estate investment, whether the areas zoned for mixed-use contain the infrastructure to properly accommodate additional density, and the extent to which development potential and sprawl development is being prevented outside of these areas. This is simply a snapshot of one aspect of smart growth, albeit an essential one from a land-use perspective. It thus serves as a useful basis for further research and public dialogue.

Cape Cod Towns with Mixed Use Zoning By Right or Special Permit	
Barnstable	Hyannis allows height of 3 stories, residential uses on upper floors; allowed amnesty for illegal apartments if made affordable in perpetuity; down-zoned much of Barnstable to 2acre zoning; clustering allowed.
Bourne	Allows mixed use; no height restriction on buildings (controlled by special permit).
Brewster	Allows apartments in commercial/industrial zones.
Chatham	Allows mixed use (apartment incidental to a commercial use) in the GB1, GB2 and GB3 districts by special permit, and by right in Industrial districts.
Dennis	Dennisport allows mix of retail, commercial, professional; upper floor residential/commercial mix; residential units required for new commercial development (25% affordable); reuse encouraged thru permit streamlining; purchased outlying open space to reduce density outside of downtown.
Eastham	No areas identified
Falmouth	Allows mixed use on Main Street; in areas zoned for business; in industrial zones.
Harwich	Allows mixed use in all commercial districts by special permit.
Mashpee	Mixed-use allowed through TDR in almost all of the Town through Open Space Incentive Development (OSID) zoning bylaw and in all commercial zoning districts through TDR of residential units allowed through Commercial Center by-law.
Orleans	Allows mixed use town-wide in commercial districts and village centers.
Provincetown	Allows mixed use throughout commercial center of town.
Sandwich	**Property owner can apply for special permit to allow mixed use.**
Truro	No areas identified
Wellfleet	Mixed use allowed in C1 and C2 commercial districts; mixed use allowed in the Main Street Overlay District.
Yarmouth	Hotel conversion bylaw allows mixed use with 3 stories/35 feet and up to 16 residential units per acre with 25% affordable housing. Mixed use allowed in certain situations by right.

Socio-Economic Indicators

Housing Affordability[26] - Housing appreciation overall on the Cape has averaged nearly 7 percent a year for the past 30 years, and appreciation has been much higher (15 percent per year) over the past several years. Until recently, trends would have indicated the rate of appreciation would stay relatively stable given that retiring baby boomers were likely to continue buying or converting homes.

Housing Ownership Affordability Gap on Cape Cod			
Year	**Median HHI 4-Person Family**	**Income Needed to Buy Median Priced Home**	**Affordability Gap**
1998	$44,700	$40,925	- $3,775
2002	$56,500	$77,275	- $20,775
2005	$65,700	$102, 800	- $37,100
* As of September 2005 ** Interest rate- Freddie Mac national average each year			

High levels of housing value appreciation have prevented many families new to the housing market from being able to purchase a home in Sandwich and Capewide. With Americans carrying higher and higher levels of debt, it is expected that fewer people will retire at traditional ages and will instead work an extra five or even ten years. If there is housing depreciation as

26 Prepared by Arthur Kimber, Barnstable Housing Authority and Paul Ruchinskas, Cape Cod Commission for the Cape Cod Sustainability Indicators Report, 2004.

there was in the late 1980's, then some owners may end up owing more than their home is worth, which will increase the occurrence of foreclosures.

It appears that buying a first home will continue to become more and more difficult, particularly impacting those in the 25-35 age cohort. The number of people in that cohort who will choose to make their permanent home on Cape Cod is likely to decline. The growing "affordability gap" is likely to continue to increase in Sandwich as it has Cape-wide over the last several years.

The amount of rental housing in Sandwich is very limited and relatively expensive. Capewide, the rental market is complex. High sales prices have resulted in high rents in relation to median incomes. However, because rents are not high enough in relation to the costs of development, rental housing is a relatively poor investment on Cape Cod. Some owners are forced to cover monthly costs out of other income. Others buy because they want to have a property on the Cape and have the income needed to support it.

There are no public wastewater systems in Sandwich and relatively few parcels zoned to accept relatively large rental projects. Some developers are even reluctant to build multi-unit rental comprehensive permit projects because the monthly return on investment is so low or even nonexistent. Market rents need to be higher to justify investment by the private sector in rental development, but the income base is not here to pay higher rents.

While Cape Cod added over 17,000 residential units from 1990 - 2000, the number of dedicated year-round rental units on the Cape declined by 415 units during that same period. However, the data indicates there has been a softening of the rental market since 2002, possibly caused by increased more supply and less demand (e.g. younger households leaving the Cape in part due to high housing costs).

The affordability gap on Cape Cod for renters, using 80 percent of median income, is relatively small, meaning that higher income renters, with more than 80 percent of median income, can often afford to pay market rents. However, many potential renters have incomes below 80 percent of median income. There is also a shortage of traditional rental developments for households needing or wanting to rent.

Cape Affordability Gap - Rental			
Year	**80% Median Income 3-Person Household**	**Income Needed to Rent Median 2 Bedroom Apt.**	**Affordability Gap**
1998	$34,250	$42,000	$7,750
2002	$40,700	$55,200	$14,500
2005	$47,300	$48,600	$1,300

A sustainability goal for Sandwich is to provide more modestly priced market rental developments to attract or keep young people entering the labor market here on Cape Cod rather than being forced to live elsewhere. The shortage of jobs paying median income or above is also a factor influencing people to choose not to live in Sandwich or on the Cape. According to the recent nexus study by the Cape Cod Commission, 50 percent of the Cape's net job growth since 1990 has been from occupations that pay less than $25,000 per year and 95 percent of the projected job growth over the next several years will come from occupations that pay less than the Cape average wage, which is already 27 percent less than the state average.

The state has set a goal for each community to have at least 10 percent of its year round housing stock be affordable to lower income households - those earning less than 80 percent of the area's

median income. Sandwich has added 129 units and Barnstable County added 1,369 new affordable units between 2001- 2008. However, even this progress left the region over 5,000 units short of the 10 percent state goal. If Cape Cod continues to add affordable units at the same rate as the last four years, it will take from 20- 25 years to achieve 10 percent.

Percentage of Cape Affordable Housing Stock	
Year	**Affordability %**
1997	3.76%
2001	3.75%
2005	4.80%

There needs to be a strong emphasis on public policies that encourage and enable the development of both market and affordable rental housing. Developments need to be allowed that are large enough to justify the investment of on-site wastewater treatment systems and are proximate to both Sandwich's designated activity centers and public transportation. Rental housing development needs to be profitable for developers and creative mechanisms need to be employed to do so. Three options that should be considered are allowing tax abatements, (i.e. such as in Provincetown), creating a very-low interest loans program, and finding ways to underwrite monthly investment returns.

Employment Diversity[27] - Recent employment data, collected from employers in Barnstable County that participate in the unemployment insurance system, clearly show an economy dominated by service industry employment (90.6 percent of total employment). Between 2001 and 2004, Education and Health Services lead both in terms of its share of total employment (22.4 percent) and in employment growth (9 percent). This is consistent with demographics trending toward a large elderly population in the region. Retail trade and Leisure & Hospitality follow with 18.5 percent and 18.8 percent share of total employment. Growth rates in these two industries, 5 percent for Retail and 3 percent for Leisure & Hospitality, have been closer to the average of 4 percent for all industries in the region.

Barnstable County Covered Employment & Wages	Average Monthly Employment				
	2001	2004	2004 % Total	Change %	Change #
Total, All Industries	89,761	93,215	100%	4%	3,454
Goods-Producing Domain	8,879	8,791	9.4	-1%	(88)
Service-Providing Domain	80,882	84,424	90.6	4%	3,542
Retail Trade	16,379	17,210	18.5	5%	831
Wholesale Trade, Transportation and Utilities	4,419	4,302	4.6	-3%	(117)
Information & Financial Activities	6,633	6,466	6.9	-3%	(167)
Professional and Business Services	8,755	8,979	9.6	3%	224
Education and Health Services	19,186	20,855	22.4	9%	1,669
Leisure and Hospitality	16,895	17,485	18.8	3%	590
Other Services	3,555	3,816	4.1	7%	261
Public Administration	5,059	5,311	5.7	5%	252

Source: Covered Employment & Wages (ES202)

In looking at changes in employment over time, it is important to consider the wages associated

[27] By Leslie Richardson, Cape Cod Commission, for the Cape Cod Sustainability Index 2004

with the job gains and loses. The following table provides the average weekly wage by industry for Barnstable County and compares the wages from 2001 to 2004 (the period between the previous sustainability report and the present information). Overall, the data shows strong wage growth (12 percent or $69/week) across all industries. The largest percentage increases occurred in Professional and Business Services (15 percent), followed by Retail and Information & Financial Activities. It is important to note that the weekly wage for Retail is below the average ($501 versus $666/week) and far below the two other top growth sectors. While the largest single employment sector, Education & Health Services, pays an above average weekly wage ($746) and shows average growth in wages, the two other top employment sectors, Retail and Leisure & Hospitality, pay wages significantly below average despite respectable rates of growth.

Barnstable County Covered Employment & Wages		**Average Weekly Wages**		
	2001	**2004**	**% Chg**	**# Chg**
Total, All Industries	$597	$666	12%	$ 69
Goods-Producing Domain	$768	$835	9%	67
Service-Providing Domain	$578	$648	12%	70
Retail Trade	$442	$501	13%	59
Wholesale Trade, Transportation and Utilities	$767	$839	9%	72
Information & Financial Activities	$783	$886	13%	102
Professional and Business Services	$747	$861	15%	114
Education and Health Services	$664	$746	12%	82
Leisure and Hospitality	$347	$382	10%	35
Other Services	$437	$487	11%	50
Public Administration	$830	$925	11%	95

Source: Covered Employment & Wages (ES202)

Overall, Cape employment and wage data indicate that traditional sectors relating to tourism, larger year-round and elderly populations continue to dominate the region's economy. By comparison, Sandwich has seen a decline in manufacturing, information, transportation and real estate. However, there appears to be new opportunities in manufacturing, retail, and services. Continued efforts to diversify employment options, particularly in areas sensitive to the area's natural resources and historic scale, must remain a priority for the region.

Tourism[28] - Tourism is generally measured by the room occupancy tax collections. The State of Massachusetts collects a 5.7 percent Room Occupancy Tax. Tracking the revenue generated by this tax is an indicator of tourism activity in the County over time and relative to the balance of the state. The data below suggests that tourism activity has yet to regain pre-9/11 levels, although some of the change may be due to a reduction in the tax base (rooms rented for $15 or more per day). In addition to the state tax, each municipality in the state may opt to levy an additional tax of up to 4 percent on room occupancy.

As indicated by the table below Sandwich's room tax collection has declined as has much of the Cape over the past few years. Between FY02 and FY04, Sandwich room occupancy tax collection declined by 9.8 percent while Barnstable County as a whole declined by 4.4 percent.

[28] By Wendy Northcross, Cape Cod Chamber of Commerce for the Cape Cod Sustainability Indicators Report, 2004

Rooms Tax Collected from Barnstable County by Town								
Town/County/MA	FY 02	FY 03	FY 02 - FY 03 Change		FY 04	FY 03 - FY 04 Change		
			Dollars			Percent	Dollars	Percent
Barnstable	2,208,165	2,355,245	147,080	7%	2,311,401		(43,844)	-2%
Bourne	164,544	176,529	11,985	7%	134,195		(42,334)	-24%
Brewster	665,720	743,612	77,892	12%	788,686		45,074	6%
Chatham	1,280,213	1,321,482	41,269	3%	1,311,241		(10,241)	-1%
Dennis	651,339	652,166	827	0.10%	585,837		(66,329)	-10%
Eastham	319,811	348,624	28,813	9%	329,999		(18,625)	-5%
Falmouth	1,486,953	1,385,355	(101,598)	-7%	955,828		(429,527)	-31%
Harwich	457,945	546,204	88,259	19%	477,499		(68,705)	-13%
Mashpee	228,639	195,539	(33,100)	-14%	201,306		5,767	3%
Orleans	297,276	315,954	18,678	6%	291,624		(24,330)	-8%
Provincetown	1,257,066	1,342,247	85,181	7%	1,276,903		(65,344)	-5%
Sandwich	***353,412***	***345,381***	***(8,031)***	***-2%***	***317,563***		***(27,818)***	***-8%***
Truro	422,087	457,917	35,830	8%	390,139		(67,778)	-15%
Wellfleet	161,520	174,859	13,339	8%	164,618		(10,241)	-6%
Yarmouth	2,189,909	2,119,326	(70,583)	-3%	2,073,000		(46,326)	-2%
Barnstable County	12,144,589	12,480,440	335,851	3%	11,608,939		(871,501)	-7%
Massachusetts	92,867,643	83,154,882	(9,712,761)	-10%	88,890,383		5,735,501	7%

Source: Massachusetts Department of Revenue via the Cape Cod Commission

Visitor spending supports Sandwich's local businesses, artisans and institutions. Tourists spend money in the local and regional economy but do not add to the permanent population base. If a mix of domestic and international visitors were encouraged, a sustainable tourism industry could be maintained on a year round basis, filling the bedrooms in Sandwich and throughout Cape Cod. By encouraging visits year round, jobs become less seasonal and thereby more attractive for residents.

Jobs-to-Housing Ratio - The Sandwich jobs-to-year-round housing unit ratio is 0.92 (i.e. there are 0.54 jobs for every year-round home within town). The number of local jobs to homes increased in town over the past seven years (.71 in 2000) but is still low by most economic indicators. A 1.5+ jobs-to-homes ratio to be optimal by most measurements but Sandwich is reasonably adequate given its suburban setting and changing economy.

Jobs-to-Laborforce Ratio – Sandwich appears to have a higher local jobs-to-laborforce ratio (.84 in 2007) compared to other communities in Barnstable County, and the County as a whole. This is due to the suburban and seasonal nature of the Cape. Sandwich itself has a reasonably good balance between local jobs and the total laborforce, which has been increasing over the past 10 years. However, the high rate of commuters implies that a large portion of local jobs are being filled by workers who do not live in the community. This trend may also indicate that jobs are difficult to fill within the local labor market, or that there is a disconnect between new jobs and the skills of the laborforce.

9.3 Energy Conservation and Alternative Source Development

Over the years Sandwich has followed through on a number of energy conscious initiatives aimed

at reducing energy consumption and utilizing efficient fuels. Additionally, new municipal construction continues to follow energy conscious practices. The Board of Selectmen continues to work for lower energy costs as a benefit to Sandwich consumers through the town's active participation in the Cape Light Compact. Energy issues are addressed through a proactive approach to community involvement through education, access to information and outreach to local and regional groups working on energy issues and policies. The inventory details what Sandwich has accomplished in the areas of energy efficiency and reducing power costs to consumers. The analysis also discusses past accomplishments, current needs and issues, as well as outlines a plan to address current and anticipated future needs and issues. The energy component of the Sustainability Action Plan calls for the exploration and development of renewable energy sources, education and a general recognition that support for energy efficient practice and design as well as support for County initiatives aimed to reduce energy costs to the consumer are key components to forwarding the cause of energy efficiency.

In July 2008, the Green Communities Act was signed into law. Under the new law, the state has made energy efficiency programs compete in the market with traditional energy supply. Utility companies will be required to purchase all available energy efficiency improvements that cost less than it does to generate power, ultimately saving money on consumers' electricity bills. Utility companies will offer rebates and other incentives for customers to upgrade lighting, air conditioning, and industrial equipment to more efficient models, whenever those incentives cost less than generating the electricity it would take to power their older, less-efficient equipment. Customers who take advantage of these incentives will save money as they reduce how much energy they use. The incentives will encourage more efficient energy use, lowering the overall demand on the system and reducing greenhouse gas emissions. The Green Communities Act promotes renewable energy by requiring utility companies to enter into 10- to 15-year contracts with renewable energy developers to help developers of clean energy technology obtain financing to build their projects.

The Town of Sandwich, like many other towns across the State, is facing pressures to reduce energy consumption. These pressures comes from many factors, including: (a) the financial realities of municipal structural budget deficits resulting from various expenses, including utilities, increasing at greater than 2½ percent per year; (b) environmental concerns about our nation's over-reliance on fossil fuels; and (c) larger political concerns about the jeopardy to our nation's national security resulting from our dependence on foreign oil. As a result, Sandwich is actively looking at various issues related to municipal energy consumption. The town's approaches to energy consumption range from specific projects to town-wide goals, policies and programs.

In 2007, the Sandwich Board of Selectmen requested the Town Administrator's Office explore possible future "alternative energy initiatives" for the Town. The result was the development of the ***Sandwich Alternative Energy Initiative Report, 2007***. This document was intended to provide a brief summary of the town staff's general understanding of these issues, including efforts to solicit public input about the topic, and to recommend a direction for the Board to pursue in the future.

The document provides brief technical background information, describes the Town's energy usages and conservation efforts to date, briefly discusses planning considerations and available funding opportunities, highlights public input sought, summarizes other Towns' committees' missions, and provides specific recommendations. These include certain immediate actions and other longer-term recommendations.

Non-Renewable Energy Consumption

Non-renewable energy resources are understood to include fossil-fuels such as oil, coal, and natural gas. In 2005, fossil fuels accounted for 86 percent of all energy consumed in the United States. In that same year, renewable sources supplied about 6.5 percent of total energy

consumed and nuclear accounted for the remainder.[29]

It is estimated that most of the Town's total energy consumption is based on non-renewable energy sources, including conventional fuel sources such as petroleum-based products, coal, and other fossil fuels. Major components of the Town's energy usage include:

[29] National energy consumption percentages based on United States Department of Energy's Energy Information Administration energy usage data: http://www.eia.doe.gov/cneaf/solar.renewables/page/trends/table1.html

2007 Sandwich Energy Forum

A public forum was held in September 2007 to gather input on the Town's exploration of alternative and renewable energy applications. The Board of Selectmen and Town staff provided background on the Town's motivations to explore alternative and renewable energy resources and their understanding of some of the issues and possible approaches that could be taken. The audience was encouraged to provide input on areas related to planning the Town's approach, specifically:

- *Overarching goals and prioritization of those goals.*
- *Technologies that the Town should consider or exclude.*
- *Locations that should be considered or avoided.*

Participants provided input as summarized by category below:

Goals

- *Overarching goals were identified as follows:*
  - *Energy independence*
  - *Long-term sustainability*
  - *National security*
- *Support and/or preference for environmental benefits were expressed by multiple attendees.*
- *Support for pursuit of alternative/renewable energy in general was expressed by attendees.*

Technology

- *Support was expressed for considering wind, solar, tidal, alternative fuels (in general), biodiesel, and fuel cell technologies.*
- *Concern was expressed about demand for biofuels causing problems with food supply.*
- *Several attendees recognized that some technologies may not be feasible.*

Locations

- *It was suggested the Town consider locating renewable energy generation facilities at:*
  - *emergency shelters (and other dual-purpose applications)*
  - *municipal buildings (specific buildings were not mentioned.)*
  - *the Mirant power plant*
  - *schools*
- *It was suggested that wind power facilities are not appropriate for the historic district.*

Other Issues & Opportunities

- *A representative from the Cape Light Compact spoke about number of issues including the importance of energy conservation, opportunities to pursue renewable energy generation, the Green Power energy supply option, and funds currently available from the MTC.*
- *It was suggested the Town:*
  - *promote or support homeowner-scale efforts,*
  - *seek assistance from the MTC Community Wind Collaborative,*
  - *considered energy efficiency and reduction in waste equally if not more important than energy generation,*
  - *promote recycling by changing to a pay-per-bag system at the waste collection/ transfer station,*
  - *promote non-motorized transportation (e.g. sidewalks and bike paths) ,*
  - *provide incentives to grow food locally,*
  - *provide incentives to design more energy-efficient homes,*
  - *improve mass transit opportunities,*
  - *gather information on renewable energy and make it available at the library,*
  - *collaborate with Mirant on new generation projects at the canal power plant property.*
- *Good public communication is critical and should be maintained throughout the process.*
- *Energy generation systems should be diversified and decentralized.*
- *We need to educate people on the subject and to get more information out to residents.*

Electricity (mainly used to run lighting, equipment, and air conditioning) - The Town currently purchases electricity from ConEdison Solutions at a municipal rate through the Cape Light Compact. ConEdison is a supplier that purchases power for resale from a large number of regional generation facilities. The recent mix of generation sources is reported to be approximately 8 percent from renewable sources, 62 percent from fossil fuels, and 30 percent from nuclear.[30] Locally, a portion of electricity used at the Forestdale School is generated on-site by photovoltaic (solar) panels. These were installed on the school's roof with help from the Cape Light Compact and Massachusetts Renewable Energy Trust as part of the "Solarize Our Schools" program during 2006. The system is capable of producing 2 kilowatt (KW) in ideal conditions. [31] This is equivalent to the power required to run 50 40-watt light bulbs.

Heating fuels – Most Town buildings use natural gas-fired heating equipment, and several have oil-fired equipment. All natural gas and heating oil purchased by the Town is derived from non-renewable sources.

Vehicle fuels - All Town vehicles run on either conventional diesel or gasoline. Regular unleaded gasoline in this region of the U.S. contains as much as 10 percent ethanol, a type of biofuel.[32] Otherwise, the remainder of gasoline blends and all diesel purchased are manufactured from non-renewable sources.

Quantifying the Town's overall energy consumption is not simple. Usage data appears to be only available through utility or vendor invoices issued for individual meters or uses. Some Town facilities have multiple meters for various functions. Additionally, administration of the various Town facilities is split between several Town departments. Given these complexities, determination of the Town's total energy consumption is not achievable but this information will likely be needed for future planning efforts. Representative usage has been estimated for a few buildings with more readily-usable data and is presented in the table below.

Annual Energy Usage of Selected Town Buildings in Fiscal Year 2007

Facility	Electricity			Natural Gas	
	Usage (KWH)	Peak Demand (KW)	FY'07 Expense	Usage (CCF)	FY'07 Expense
Town Hall	27,788	11	$ 5,002	2,903	$ 5,259
Town Hall Annex	50,950	19	$ 8,665	2,063	$ 3,706
Offices at Jan Sebastian Dr.	51,320	26	$ 8,905	2,619	$ 4,759

Energy Conservation

Sandwich has made efforts to address energy efficiency in municipal structures through a number of initiatives. The Local Planning Committee hosted a public meeting to hear resident's ideas and opinions on this issue. Many of the comments were very relevant to community energy policy as described below:

[30] Energy generation distribution percentages based on ConEdison disclosure label data: http://www.conedsolutions.com/NR/rdonlyres/elefu7q3i7d65qexu6ce6ztft6idzqqfoij2r4ucxncxtelpw7abr7ctvcdesa25uat7ybhnmvlnz32loweejmtandg/Mass+Disclosure+Label+Q2+2007.pdf

[31] Forestdale School solar panel array data is available at: http://view2.fatspaniel.net/CapeLightPortal/ForestdaleSchool.html

[32] Gasoline content based on reported regional EPA laboratory testing data: http://www.epa.gov/otaq/regs/fuels/rfg/properf/sprng-ma.htm

- Connection between energy policy, transportation issues and air quality were highlighted. Improving public transportation could result in a decrease in energy consumption and also a decrease in auto emissions;
- Identification of likely sites for wind driven turbines to generate power was requested;
- It was requested that the town acquire or develop a sample set of energy efficient house designs and construction specifications to be available through the building department;
- A plan to work with the gas utility to promote the connection of homes to this more efficient fuel was suggested;
- A strong effort to provide continuous power to utility consumers was encouraged. A program to bury utilities should be developed; and
- The benefits of the Community Energy Loan Program were described. It was suggested to encourage the participation of local and regional banks.

The Town's initiative to examine alternative energy opportunities is focused on the development of new generation facilities as well as energy conservation practices. It is generally accepted that wasteful energy consumption practices need to be minimized before starting a potentially long and costly process of building new generation facilities. This approach is promoted by both the State and Barnstable County programs. Along these lines, the Town has taken steps to reduce energy consumption and continues to looks for ways to further reduce usage. The Facilities Maintenance Department plays a large role in this through their efforts with Town Buildings. This includes:

- Energy audits conducted by the Cape Light Compact (at the Town's request);
- Interior lighting has been upgraded to high-efficiency units throughout Town buildings;
- Exterior photo-sensor lighting has been replaced with timer-based units to reduce unnecessary lighting;
- Thermostats have been or are planned to be upgraded to programmable models to avoid excessive heating or cooling and regulating buildings during unoccupied times;
- Heating equipment at several buildings has been upgraded to high-efficiency gas-fired boilers. Upgrades at additional buildings are underway or planned;
- Energy-star rated equipment is sought whenever replacement is necessary;
- A maintenance program has been established to regularly service and check the efficiency of heating and cooling equipment;
- Supplemental insulation has been added at several buildings; and
- A number of buildings are winterized in advance of the heating season every year. This includes weather-stripping and installing temporary window covers at occupied buildings and decommissioning seasonal buildings to avoid heating altogether.

Additionally, the Information Technology Department has taken steps to reduce power consumed by the Town's many computers and other electronic equipment. Despite rate increases in recent years, the Facilities Maintenance Department reports that total electric and gas utility expenses have remained generally level. This indicates that the conservation efforts are paying off. Even so, it is possible that additional savings could be achieved. The Town should consider conducting a comprehensive assessment of Town buildings' energy efficiencies. Such a study would identify potential efficiency improvements and examine the relative economy of each. This would require technical assistance from specialized consultants.

The Cape Light Compact

In November of 1997 Massachusetts passed a law that allows organizations to entertain bids for power supply. The hope was and is that such competition will decrease high electric costs for the consumer. As a result of this legislation the Cape Light Compact was formed in 1997. The members of this compact are 14 of 15 of Cape Cod towns (Orleans chose not to participate), Barnstable County, the six towns on Martha's Vineyard, and Dukes County (Nantucket). This group represents more than 17,000 power consumers. The ultimate goal of the Compact is to provide a choice in vendors to power consumers. This would take a similar form to the choices being offered to long distance telephone service consumers. To date the Compact has entered into a contract with a supplier to provide power to any municipally owned facility. They are working on another contract to supply power to all businesses and residences. This will provide the consumer a choice in power suppliers.

Renewable Energy Potential

The term 'alternative energy' can be defined as energy generated from renewable resources. The Massachusetts Division of Energy Resources (DOER) offers the following definition of renewable energy resources:

"Renewable energy resources are ones which derive from the natural movements and mechanisms of the earth and are naturally replenishable at a rate proportionate with their rate of use. Renewable energy resources include sunlight, wind, biomass, moving water, and the heat of the earth".[33]

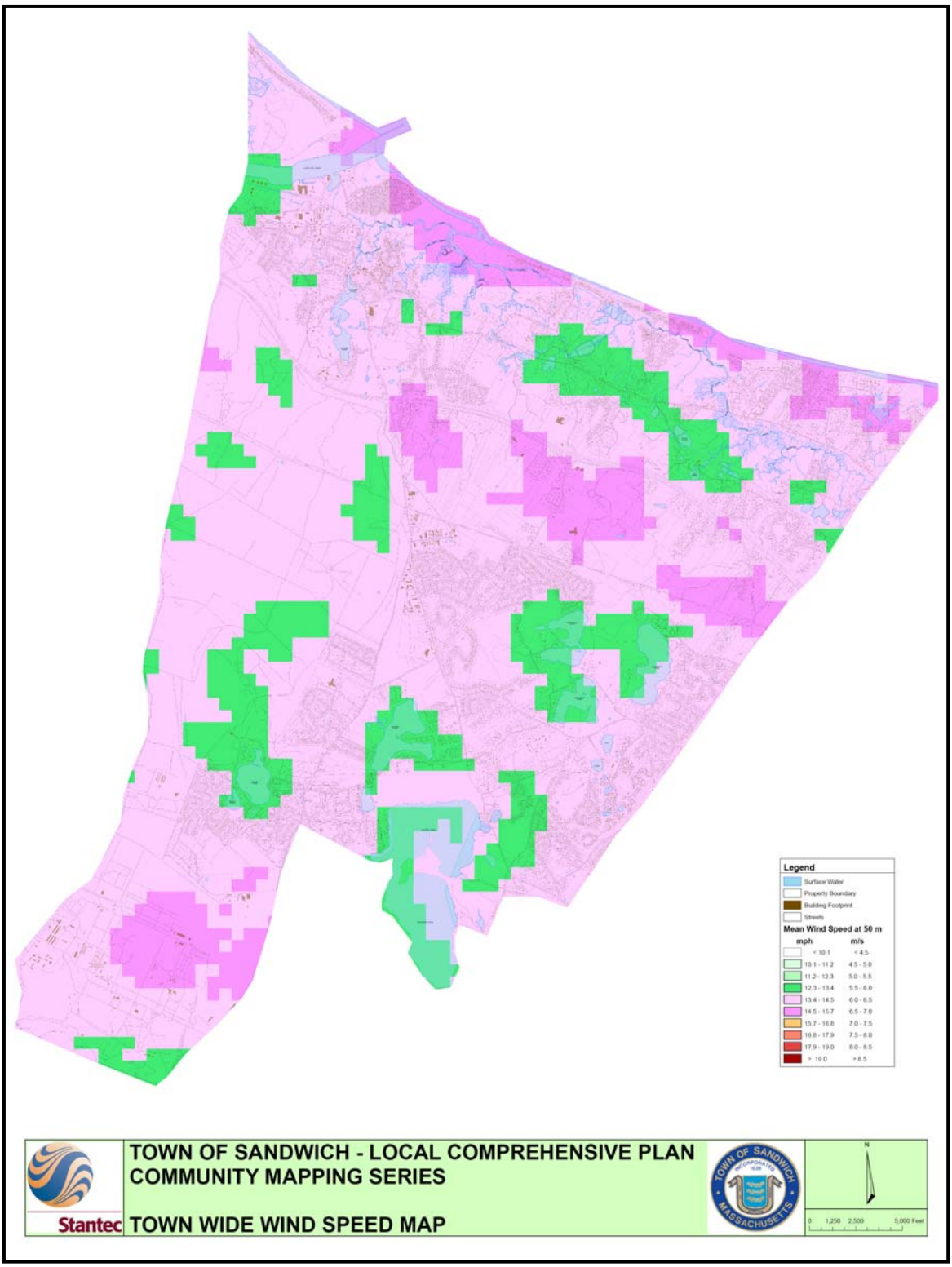
There are a variety of renewable energy technologies and approaches to renewable energy the Town of Sandwich could explore and the level of development of these technologies varies widely. Some are in the research stage and may not be currently suitable to consider for full-scale implementation. Some are more readily available and have been viable in regional applications. These include:

- Wind power[34] - Wind turbines such as the 10-kilowatt turbine at Upper Cape Tech or the 660-kilowatt facility at the Massachusetts Maritime Academy;
- Photovoltaic - Solar panels that produce electricity, usually roof-mounted;
- Solar heating - Solar panels that produce hot water, usually roof-mounted;
- Hydroelectric - Typically located in or adjacent to a stream or river;
- Geothermal – In this region, limited to heat capacity of the earth used for smaller-scale heating and cooling only;
- Biodiesel – Plant or animal-based fuel usable in diesel engines; and
- Purchasing alternatives - Deregulation of energy supply in Massachusetts has made it possible for consumers to choose energy suppliers. Cape Light Compact's Green Power program allows consumers to purchase power generated from existing renewable resource generating facilities. The program is available for municipalities and is available at 50 percent and 100 percent renewable levels. Costs have recently been one to two cents per kWh more than conventional supplier rates. It was recently reported that NStar is developing a similar program based primarily on regional wind power.[35]

[33] Definition obtained from the Massachusetts Division of Energy Resources Renewable Energy & Distributed Generation Guidebook: http://www.mass.gov/Eoca/docs/doer/pub_info/guidebook.pdf

[34] Regional wind power potential is assessed in a joint report "Assessment of Distributed Generation Technology" produced by the Cape Cod Commission, Cape Light Compact, and Massachusetts Technology Collaborative: http://www.capelightcompact.org/pdfs/AssessmentofDGTechnology.pdf

[35] NStar's green energy supply option is as reported by the Cape Cod Times 10-17-2007: http://www.capecodonline.com/apps/pbcs.dll/article?AID=/20071017/NEWS/710170315


Legend
Surface Water
Property Boundary
Building Footprint
Streets
Mean Wind Speed at 50 m
mph m/s
< 10.1 < 4.5
10.1 - 11.2 4.5 - 5.0
11.2 - 12.3 5.0 - 5.5
12.3 - 13.4 5.5 - 6.0
13.4 - 14.5 6.0 - 6.5
14.5 - 15.7 6.5 - 7.0
15.7 - 16.8 7.0 - 7.5
16.8 - 17.9 7.5 - 8.0
17.9 - 19.0 8.0 - 8.5
> 19.0 > 8.5
Stantec
TOWN OF SANDWICH - LOCAL COMPREHENSIVE PLAN
COMMUNITY MAPPING SERIES
TOWN WIDE WIND SPEED MAP
TOWN OF SANDWICH
MASSACHUSETTS
N
0 1,250 2,500 5,000 Feet

Other alternative energy technologies are potentially promising but less developed at the present time. Tidal and water current energy, for example utilize the extraction of energy from ocean level fluctuations and currents. The potential power of the Cape Cod Canal tidal currents was recently evaluated through a project funded by the Massachusetts Renewable Energy Trust. In that report dated October 2006, the Energy Power Research Institute determined that insufficient space exists to safely site currently available technologies without interfering with the Canal's navigational function.[36] At some point in the future, it may be possible to overcome this conflict. However, the Town may be better served to pursue more feasible options that are more likely to be achieved in the near future.

As the Town explores the development of new renewable energy generation facilities, careful and detailed concept-level planning should be undertaken first to identify the most beneficial projects with the greatest chances of success. Given the array of renewable energy technologies and the potential locations throughout Town, there appears to be many projects the Town could explore. In order to make best use of the Town's resources, it will be important to establish a process to screen possible applications to select the most feasible projects suitable for the Town. These should then be prioritized to identify the most beneficial and feasible alternative to pursue.
Some of the issues that may arise are listed below. However, these items are only a sample and a more comprehensive list should be developed early in the planning process.[37]

- Site considerations – As with any development project, issues such as site access, zoning restrictions, impacts on natural resources, topographic limitations, deed restrictions, and ownership issues must be accounted for;
- Technology specific considerations – Aspects of certain technologies require special consideration. For example, wind turbines, because of the size of some modern structures, may require special geotechnical investigations to ensure underlying soils can provide support. Also, the height of some structures may require permitting by civilian and military aviation authorities as well as special analysis for interference with the PavePAWS radar defense facility;
- Energy availability - The amount of available renewable energy may vary significantly from one location to another. For example, wind energy is dependent on local geography and can be highly variable within relatively short distances;[38]
- Surrounding uses – Compatibility and support from abutting property owners is essential for project success. For example, large, visible technologies such as wind turbines can draw substantial criticism from neighboring property owners for a variety of reasons;
- Visual impact – The size of some technologies may alter the visual characteristics of the surrounding area in ways that are highly subjective. Others, such as smaller-scale geothermal heating and cooling systems may have very little visual impact; and
- Legal and regulatory restrictions – The legal framework governing energy generation and distribution in Massachusetts is complex. There are a number of issues in this area that may influence the feasibility and economy of projects. An introduction to the subject is available through the Massachusetts Division of Energy Resources' Renewable Energy & Distributed Generation Guidebook.[39]

[36] Cape Cod Canal tidal power feasibility as reported by the Energy Power Research Institute October 2006: http://archive.epri.com/oceanenergy/attachments/streamenergy/reports/Tidal_003_MA_Site_Survey_Report_REV_1.pdf
[37] Additional discussion of planning issues can be found in a joint report "Assessment of Distributed Generation Technology" produced by the Cape Cod Commission, Cape Light Compact, and Massachusetts Technology Collaborative: http://www.capelightcompact.org/pdfs/AssessmentofDGTechnology.pdf
[38] Wind energy variability based on estimated wind energy distribution for the Upper Cape maps prepared by the Cape Cod Commission, Cape Light Compact, and Massachusetts Technology Collaborative in 2004: http://199.232.150.166:2784/regionalmaps/windenergy/UpperCapewindsuit.pdf
[39] Introductory discussion on legal and regulatory issues are contained in the Massachusetts Division of Energy Resources Renewable Energy & Distributed Generation Guidebook: http://www.mass.gov/Eoca/docs/doer/pub_info/guidebook.pdf

Energy Conservation and Renewable Energy Initiatives around the Cape

Over the past two decade energy supply and efficiency has become a key issue of interest among the leadership of Barnstable County and the fifteen towns on Cape Cod. In 1994 the Barnstable County Energy Task Force prepared The Barnstable County Energy Management Plan. This plan proposed twelve recommendations, including establishment of a Barnstable County Energy Committee to carry out the other eleven recommendations. This county committee, comprised of representatives from the fifteen towns, has worked on the following issues:

- Studying electric utility deregulation and assessing impacts to the county and creating the Cape Light Compact to compete in the deregulated market.
- Energy conservation through the Community Energy Loan Program (CELP) a loan program that assists homeowners with energy efficient renovations administered through local banks.
- Researching the potential for renewable energy sources on Cape Cod.
- Research on and recommendations for transportation programs to provide an alternative to the automobile.

Municipal-level initiatives have also been launched in recent years. At least two other Cape Cod towns, Bourne and Orleans, are currently evaluating whether to establish an energy committee, and several other towns already have established committees. These local energy committees have varying charges of duties. Some include very specific charges to evaluate the feasibility of specific alternative energy projects, while others include broader language about general assistance to the town in investigating, researching and considering energy conservation, alternative sources of energy, or simply energy "issues."

9.4 Planning for Climate Change

The Role of the Sandwich Community

Action needs to be taken in response to climate change. The community must commit to a thorough, comprehensive new approach to physical, social and economic planning. Local officials and leaders must promote a shift in the public policies that drive development decisions, growth and infrastructure investment.

Over the past decade, local and regional planners have focused on smart growth and sustainability and have not always seen them as directly connected to climate change. Physical change has been gradual, and the global warming crisis has not been taken seriously. Recent rapid physical changes to various part of the planet and national and state policies have made it essential for planners to respond to climate change issues.

Planning can play an important role in changing societal actions that can slow the pace of climate change, mitigate the changes that do occur and allow adaptation to the ultimate effects of climate change. Sandwich's role will be extremely important because it will deal with such basic issues as community design and increasing development density. While planning for and implementing this type of change requires significant time, there is an urgent need for the adoption of these policies, in order to provide guidance for citizens, developers and elected officials.

While Smart Growth and Sustainable Design are important objectives, planners need to understand that adapting to climate change is just as important as mitigating it. Sandwich officials can have a significant effect on climate change mitigation through encouraging higher density development patterns, seeking to reduce the number of vehicle miles traveled (VMT), and encouraging the use of green building techniques. However, due to the extent of climate change

that is projected under even the most aggressive mitigation scenarios, the community will still need to address rising sea levels, greater drought conditions and new flooding circumstances in **adaptation** planning efforts.

The policies and actions included in the **Implementation Plan** seek to strengthen connections between traditional planning and the emerging field of community and regional climate change planning. A comprehensive approach is vital because the traditional measures of addressing the built environment are not enough to mitigate climate change.

Air Quality

Air quality is an important issue for all Cape Cod communities. For much of the year the Town and the Cape experience relatively healthy air quality. Unfortunately, the Cape and the rest of Massachusetts also experience some of the worst air pollution events in the country.

Ozone - Massachusetts is designated as a Serious Non-Attainment area for ozone pollution by the U. S. Environmental Protection Agency. This designation means that emissions that form ozone should be reduced. This pollution is caused by the chemical reaction in sunlight and heat between volatile organic compounds (VOC) and oxides of nitrogen (NOx). On a typical spring, summer or fall day, ozone will form over the length of the day but will dissipate at night as cooler temperatures and the lack of sunlight prevails. During long hot spells, ozone will build during the day and, due to the lack of significant cooling and limited air movement, will continue to linger into the following day. This leads to the build up of ozone and ultimately to ozone levels exceeding healthy standards.

Ozone pollution is a significant multi-region problem which has led to its being addressed on a regional basis through the creation of an Ozone Transport Region. Massachusetts is in an Ozone Transport Region that extends south to Washington, DC and west to Ohio. Ozone Transport Region modeling of air quality illustrates that much of Sandwich and Massachusetts' worst air quality days are exacerbated by air pollution that is transported into the region by prevailing winds out of the west. Local activities on these ozone non-attainment days serve to exacerbate the local situation and promote even worse air pollution events further north within the transport region, in particular coastal areas of Maine.

Particulate Matter (PM-10) – PM-10 has been a significant pollution issue for Massachusetts in the past. PM-10 non -attainment could be caused whenever the air surpassed a particular concentration of air born matter (dust, soot etc.) in excess of 10 microns. Sandwich is currently in compliance for PM-10.

Carbon Monoxide (CO) – CO "hot spots" were once a problem in Massachusetts. CO hot spots generally occur in cold temperatures in locations with relatively little air flow. These problem areas usually consisted of localized problems within a few hundred feet of a congested intersection within communities with dense urban development. Sandwich is unlikely to experience CO hot spot problems due to development patterns that do not create the stagnant pockets of air required for CO concentrations to occur.

Greenhouse Gases - The emission of so-called greenhouse gases (primarily Carbon Dioxide [CO_2]) has been a topic of much regional attention. CO_2 emissions are regulated by an international treaty on Global Warming. However, no specific policies have been put into place as yet. CO_2 emissions are important to Sandwich, in that global warming will provide an increased number of warm days and increased temperatures on these warm days. As average

summer temperatures increase due to global warming, ozone non-attainment days will also increase as the conditions for the formation of ozone will also increase. Other pollution emissions of importance include mercury and sulfur dioxide.

Air Pollution Sources - The major emitters of VOC's, NOx, PM-10, CO, and CO_2 include motor vehicle fueling and tailpipe emissions, the smokestacks of factories and power plants, lawnmowers and of-road vehicles, evaporation from latex paint, and numerous other household chemicals. Mercury emissions are primarily from the use of low-grade coal in midwestern power plants, although significant contributors are waste incinerators due to improper disposal of batteries. Sulfur dioxide emissions are also most commonly associated with power plants.

Sandwich hosts Cape Cod's most significant stationary point source of emissions – the Mirant Canal Electric Plant. Emissions from this site include emissions from the combustion of fuel as well as the escape of emissions from the adjacent fuel storage tanks. Other significant individual sources of pollution include emissions from the Sandwich Public School Buildings and local industrial facilities. In addition, stationary area (home and commercial heating systems) sources and mobile (automobiles) sources are source of pollution. Although new automobiles are getting cleaner, traffic volumes in and around the town are growing rapidly.

The Town and the region must also deal with the problem that makes the area most attractive. In particular, warm summer weather is a boon to the local economy, yet data suggest a correlation between warm summer weather peak pollution problem periods. The continued growth and development of both Sandwich and the Cape may lead to continued increased air emissions. Each new home, restaurant or hotel room that is built in town adds to vehicle miles traveled on the roads and thus, to increased air emissions. Each new home increases the local population which in turn brings additional lawn mowers, boats and recreational vehicles (such as all-terrain vehicles, snowmobiles, jet-skis), all of which contribute to air pollution emissions.

Pollution Reduction Strategies - The Massachusetts DEP is responsible for implementing the requirements of the Clean Air Act. In order to accomplish this, the DEP developed a State Implementation Plan (SIP) to reduce pollution emissions in the state. The SIP includes a number of strategies aimed at reducing pollution emissions including:

- new stricter regulations for stationary sources such as industry, commercial heating systems, etc.;
- reducing the VOC content of a number of products by following the lead of the California Air Resources Board for latex paint, deodorant, hairspray etc.;
- requiring annual inspection and maintenance of cars and trucks including the Enhanced Emission and Inspection Program that tests vehicle emissions at operating speeds rather than at idle;
- reducing excessive idling of engines;
- reducing vehicle miles traveled by encouraging employee ridesharing, improving mass transit systems and adding more high-occupancy vehicle lanes to highways; and
- monitoring ambient air, estimating emissions and testing the sources of those emissions.

Stationary Sources - DEP estimates that stationary point sources, which are large sources of pollution that can be individually identified and regulated through an emissions permit (such as industries and utilities) contribute only 6 percent of VOC emissions due to years of regulation dating back to the early years of the first Clean Air Act. Stationary area sources, smaller sources of pollution that are not as easily regulated through a permitting process (such as residential heating systems, gasoline stations, auto body shops and dry cleaners) contribute 45 percent of

VOC emissions, however these sources, except for home heating systems, have also been a major target of past and present Clean Air regulations. On-the-road mobile sources (such as cars, trucks and buses) contribute 26 percent, while off-road mobile sources (such as boats, trains, recreational vehicles, construction and lawn/garden equipment) contribute 22 percent of the VOC emission inventory. These figures represent statewide averages which may vary slightly from town to town.

Stationary sources of pollution need to be recognized as major participants in the localized air quality issues in Sandwich. Canal Electric, the adjacent tank farms, and other major emitters including the Sandwich schools, town and Massachusetts Highway Department public works garages etc. must all be recognized as part of the air pollution equation.

Mobile Sources

The land use patterns of future development can make an important difference in air quality. However, the implementation must be made feasible economically and politically. The LCP strongly encourages compact, mixed use developments which promote a jobs/housing balance as a means of reducing the need for private automobile trips and to make the use of alternate transportation modes such as transit, walking and bicycling more viable. However, the residential component of these projects must be included or the vision that citizens have of being able to live and walk to work or shopping will not be accomplished. Densely developed mixed use centers as major destinations can also promote multi-purpose trip making, and thus accomplish the reduction in total trips when compared to less densely developed sites. While the Regional Policy Plan's policies of concentrating growth in designated growth centers, protecting open space, and encouraging alternatives to private automobile travel all may help to reduce air emissions, this will only come true if the growth centers are designed to truly address the area's travel, residential and employment needs.

9.5 Hazard Mitigation Planning

This section outlines Sandwich's strategy to reduce our vulnerability to the effects of natural hazards. By looking at the vulnerable areas of Sandwich and assessing existing protection measures the town can address gaps in protection.

The Town of Sandwich, in accordance with existing federal guidelines and regulations, developed a Flood Hazard Mitigation Plan that was adopted by the Board of Selectmen and subsequently approved by The Federal Emergency Management Agency (FEMA) in 2003. Sandwich chose to participate in the Regional Pre-Disaster Mitigation Planning Project by developing a Pre-Disaster Mitigation Plan in 2004 as a complement to the Flood Hazard Mitigation Plan. This plan addresses natural hazards that have the potential to cause disaster in Sandwich such as wind, wildfire and geologic hazards.

The action plan in *Section 10: Implementation* includes a multi-layered strategy for pre-disaster mitigation and hazard planning, identifying each goal, developing a specific mitigation objective and recommending a corresponding action necessary to achieve each objective including those responsible for implementing each action with a timeframe for implementation.

By adopting the Flood Hazard Mitigation Plan, the Town began the implementation process but also positioned the Town for a better standing in the Community Rating System, reducing flood insurance premiums for citizens and make the town more competitive for state and federal grant programs for flood hazard mitigation.

Natural Hazards

Sandwich has experienced damage from natural events in the past. The following is a brief summary of historical damage and natural events that have caused damage:

- Flood Related Hazards - See *Section 2: Natural Resources*;
- Wind Related Hazards - In the years 1938, 1944, 1954 and 1991 storms caused downed power lines, interruption of emergency services and damage to public and private structures;
- Fire-Related Hazards - The 1982 Massachusetts Military Reservation wildfire is the most recent example of wildfire in Sandwich. Historically, fire has damaged hundreds of acres of land as well as public and private structures. Of particular concern during a fire are the tank farms near the Cape Cod Canal. While that area has a relatively small amount of open land, the risk of explosion and contamination from a fire is great as is the risk of significant damage to the historic village center; and
- Geologic Hazards - Earthquake may have some potential to create disaster in Sandwich. There have been small seismic events on Cape Cod within the past 30 years. Sandwich should understand the risk to the Town in terms of critical facilities such as public water supply delivery infrastructure, roadway network, public buildings, childcare, frail and eldercare group facilities, power supply and emergency medical facilities as well as the potential for damage to coastal banks and other parts of the shoreline.

Hazard Identification Matrix

Historically, Sandwich has sustained damage from flooding, storm surge, and high winds associated with hurricanes, nor'easters, and heavy rains. The following Hazard Identification Matrix describes possibility of natural hazards the community:

Hazard Identification Matrix

Natural Hazard	**Likelihood of Occurrence** 0 = Unlikely 1 = Possible 2 = Likely 3 = Highly likely		**Location** 1 = Small area 2 = Medium area 3 = Large area		**Impacts** 1 = Limited 2 = Significant 3 = Critical 4 = Catastrophic		**Hazard Index**
Flood Hazards	*See Below*						
Wind Related Hazards • Hurricanes • Coastal Storms • Winter Storms	Highly Likely	3	Large area	3	Critical	3	9
Fire Related Hazards • Drought • Wildfires • Urban Fires	Highly Likely	3	Large area	3	Critical	3	9
Geologic Hazards							
• Shoreline Erosion	Highly Likely	3	Small area	1	Critical	3	7
• Associated Landslides Coastal Banks	Likely	2	Small area	1	Limited	1	4
• Earthquake	Unlikely	0	Medium	2	Significant	2	4
Tornadoes	Unlikely	0	Small area	1	Significant	2	4

Vulnerability Assessment

Flood and Erosion Vulnerability - The primary focus of flood hazard and vulnerability in Sandwich is on the developed oceanfront shoreline and barrier beaches. A count of habitable dwellings was made for each of the six beach areas as part of the Pre-Disaster Mitigation Plan.

Oceanfront Shoreline Dwellings (approx. number)

Location	Seaward	Landward	Total
Sagamore Beach	86	43	129
Town Beach	33	Upland	33
Springhill Beach	62	0	62
East Sandwich	97	36	133
Scorton Shores	18	Upland	18
Scorton Neck	7 (pre '78)	Upland	7
Barrier Beaches	245	79	324
Upland Areas	58	NA	58
Total	303	79	382

Source: Sandwich Pre-Disaster Mitigation Plan, 2004

There are approximately 300 dwellings seaward of the first major access road along these beaches and an additional 79 dwellings located on the landward side of the roads that are situated on the barrier beaches. All of these 400 dwellings are potentially vulnerable to some level of a flood, erosion or flood-related erosion hazard.

All dwellings are located in the 100-year floodplain except those located adjacent to Scorton Shores and Scorton Neck Beach. Based on the long-term erosion rates, 33 dwellings along Town Beach are the most threatened and 97 dwellings along East Sandwich Beach are the least threatened but they are still in danger since they are located in primary dunes and therefore velocity zones.

Ranking of Developed Beaches with Long-Term Erosion Problem, (1860-1994)

Location	Erosion Rate	Oceanfront Dwellings	Marsh Edge Dwellings
Town Beach	-1.57 ft/yr	33	NA
Springhill Beach	-0.95 ft/yr	62	0
Scorton Shores Beach	-0.59 ft//yr	18	NA
Scorton Neck Beach	-0.56 ft/yr	7	NA
Sagamore Beach (Central)	-0.40 ft/yr	38	18
East Sandwich Beach	-0.08 ft/yr	97	36

Source: Sandwich Pre-Disaster Mitigation Plan, 2004; NA = not applicable

Based on the short-term erosion rates, 18 dwellings along Scorton Shores Beach are the most threatened (at 2.9 ft/yr) and East Sandwich Beach remains the least threatened (at 0.58 ft/yr).

Ranking of Developed Beaches with Short-Term Erosion Problem, (1952-1994)

Location	Erosion Rate	Oceanfront Dwellings	Marsh Edge Dwellings
Scorton Shores Beach	-2.90 ft/yr	18	NA
Scorton Neck Beach	-2.61 ft/yr	7	NA
Springhill Beach	-1.89 ft/yr	62	0
Town Beach	-1.67 ft/yr	33	NA
Sagamore Beach (Central)	-1.21 ft/yr	38	18
East Sandwich Beach	-0.58 ft/yr	97	36

Source: Sandwich Pre-Disaster Mitigation Plan, 2004; NA = not applicable

Use of these historic shoreline change data alone cannot be used to fully understand the vulnerability or risk specific properties face. Dwelling proximity to the beach and existing conditions of protective dunes must also be taken into account. On Scorton Neck Beach, dwellings are set back from the beach and healthy dunes insure a high level of protection in spite of the high short-term erosion problem. In contrast, close proximity to the beach for some dwellings and no dune protection on East Sandwich Beach account for a higher level of vulnerability in spite of the low short-term erosion rate. As a result, no predictions are possible for estimating the number of homes at risk under short or long-term erosion rates.

Given the unpredictable nature of coastal storms and the complex interaction of flooding and erosion, particularly in sand dune environments, flood-related erosion is a new concern of the National Flood Insurance Program. If a dwelling is undermined during a storm whose water elevations are below the elevation of the dwelling, the flood-related erosion is responsible for the damage and insurance claims can be made. This condition potentially exists along the barrier beach areas of Sagamore Beach, Springhill Beach and East Sandwich Beach, the dune fronted uplands of Town and Town Neck Beach and the coastal banks along Scorton Shores and Scorton Neck.

The vulnerability of upland properties surrounding the marshes in Sandwich is more easily understood and not as complex as it is for properties fronting on the Bay. The stillwater rise of flooding without waves and erosion must be taken into account, as well as ranges in elevation from 10-12 feet above mean sea level as shown on the flood insurance rate maps. However, these properties fronting the Bay are more vulnerable to the effects of sea level rise from future storms. With a rise of anywhere between 0.5 and nearly 1.0 feet in the next 50 years, the currently predicted 100-year flood levels will be reached sooner by more frequent storms.

Dwellings that would be potentially most affected by sea level rise are ones located along Boardwalk Road, Canary Road, Church Street, Willow Street, Factory Street, Jarves Street and Liberty Street west of the State Fish Hatchery, as well as Pine Road and Barbara Lane off Ploughed Neck Road and Jones Road, Betty Avenue, Kenneth Street and Jack Kelly Road south of Route 6A in E.

Natural Hazard Location Matrix

Critical Facilities and Infrastructure mapping was used in the Pre-Disaster Mitigation Plan to develop the Hazard Location Matrix below. Additional areas were to the matrix based on past experience, local knowledge and potential risk.

Natural Hazard Location Matrix

Hazard	Descriptive Location	# of People Affected	Land Use	Critical Facilities
Wind				
• Hurricanes • Coastal Storms • Winter Storms	Spring Hill Beach	NA	Residential	Beach community emergency access and evacuation roadway
	Town Neck Neighborhood	NA	Residential	Beach community emergency access and evacuation roadway
	Phillips Road Neighborhood	NA	Residential	Beach community emergency access and evacuation roadway
	Salt Marsh Road Neighborhood	NA	Residential	Beach community emergency access and evacuation roadway
	North Shore Blvd. Neighborhood	NA	Residential	Beach community emergency access and evacuation roadway
	Scusset Beach State Park – Hurricanes during peak season of particular concern	NA	Recreation	Emergency access and evacuation roadway
	Power line easement	NA	Electric Transmission Lines	Power lines
	Canal Station Power Plant	New England Power Grid	Electric Power Generation	Power plant
Fire				
Wildfire	Ridge area conservation lands	+/- 3500	Residential Open Space	Mid Cape Highway a major evacuation route. Significant Natural Resources Area Unfragmented Forest
	Salt Marsh along Sandwich coast	+/- 5500	Conservation Recreation Residential	Rail road, Cape Cod Canal East Boat Basin (Marina)
	Salt Marsh at Scusset	+/- 2000	Conservation Recreation Residential Seasonal Population	Evacuation Route
	Division of Fish & Wildlife Property and adjacent town owned lands in southern Sandwich near commercial district	+/- 2000	Commercial Residential Conservation Recreation	Regional roadways, Senior/Special Needs Housing, Pre-school, Forestdale School
	Sandwich Hollows Golf Course	NA	Recreation	Regional roadways, proximity to power lines, Oak Ridge School
	Holly Ridge and Ridge Club Golf Courses	NA	Recreation Residential	Regional and local roadways
Urban Fire				

	Industrial District off Route 130	+/- 1500	Light Industrial Commercial	Power lines
	Tank farms near power plant and marina area	+/- 1000	Heavy Industrial	Power lines Cape Cod Canal Power Generation Evacuation route
	Canal Station Electric Generation Plant	SE Mass.	Heavy Industrial	Power plant, power lines, Cape Cod Canal
Geologic				
Coastal Bank Landslide	Scorton Neck	NA	Residential	
Source: Sandwich Pre-Disaster Mitigation Plan, 2004; NA = not applicable				

Fortunately for Sandwich, most of the critical facilities are located outside of the 100-year floodplain. However, there are some facilities located within areas vulnerable to wildfires. These facilities include town office buildings, schools, daycare facilities, nursing homes and emergency shelters. The police station and main fire station and sections of Route 6A, a major evacuation corridor, are located in the 100-year floodplain.

Existing Hazard Mitigation Protection Programs

The Town has adopted the Flood Hazards Mitigation Plan which has several protection programs included. However, there are currently no specific local protection measures for wind, fire or geologic hazards. Barnstable County and the State have several hazard mitigation regulations and programs in place as described in the table below.

Barnstable County and State Hazard Mitigation Protection Regulations and Programs

Existing Protection	**Description**	**Area Covered**	**Effectiveness Enforcement Capability**	**Necessa**
Barnstable County				
All Hazards				
Regional Policy Plan	Adopts goals and policies to provide both guidelines for evaluating DRIs and a framework for the development and implementation of Local Comprehensive Plans.	DRIs reviewed if project meets review threshold	DRIs are mandatory.	Discretio to fullest
District of Critical Planning Concern	Critical resource areas can be designated and afforded heightened levels of protection	Delineated by resource identification. A hazard DCPC is possible.	Implementing regulations enforced by Cape Cod Commission and towns.	Limited u
Wind				
Regional Emergency Planning Committee		Barnstable County except Town of Falmouth	Voluntary	The REP mission hazardou able to lo point.
Fire				
Cape Cod Cooperative Extension Wildfire Assessment & Preparedness Program.		Barnstable County	Voluntary	More par
Cape Cod Cooperative Extension	Technical assistance available regarding hazard mitigation	Barnstable County	Voluntary	Relies on boards. Towns m assistanc
Geologic				
None known				
State of Massachusetts				
Existing Protection	**Description**	**Area Covered**	**Effectiveness Enforcement Capability**	**Necess**
All Hazards				
Massachusetts State Hazard Mitigation Plan		Commonwealth		
Barnstable County PDM Plan		Barnstable County		
Wind				
State Building Code 780 CMR 1611.0	In wind zone 3 roofs must be designed to withstand sustained winds of 90 mph.	Barnstable County	Building inspector	Zone 3 c Categor
Fire				
State Fire Prevention Code 527 CMR	Safe practices that would prevent or reduce the spread of fire or contamination	State wide	Local Fire Chief, Fire Prevention Officer	Addition Extensiv
310 CMR Environmental Management	Open Burning Regulations	State wide	Local and State Forest Wardens	Allowan Extensiv
Chapter 148 MGL	Fire Prevention Laws	State wide	Fire Chief and designees	Extensiv
State Building Code 780 CMR 2104.0	Seismic requirements		Building inspector	
Geologic				

State Building Code 780 CMR 1612.0	Earthquake loads	State wide	Building Inspector	Training determin
State Building Code 780 CMR 2104.0	Seismic Requirements	State wide	Building Inspector	Training determin

Flood Protection Measures - Three general types of protection measures for flood hazard mitigation include the following:

- Modify the hazard – by the physical means of dams, levees, revetments and seawalls;
- Moderate the impacts – by flood-proofing, elevating structures, dune restoration and beach nourishment; and,
- Reduce the risk – by land-use management, flood insurance, relocation and public acquisition.

In Sandwich, each of the three general types of protection has been utilized as detailed below:

- A number of dams exist at Upper and Lower Shawme Pond, stone revetments exist along Scorton Shores, Springhill Beach and Sagamore Beach;
- dwellings have been elevated on pilings and dune restoration/beach nourishment has been used along Town and Town Neck Beach and Springhill Beach; and
- A strict land-use management regulation exists through a Board of Health bylaw that prohibits new septic systems in sand dunes.

Without doubt, the best flood control measure that protects Sandwich is the natural barrier beach and marsh system along the north side of town. Unfortunately, dense development and certain land-use practices on the barrier beach may threaten the long-term flood and erosion control values that exist, unless more protective measures are taken. These measures may have to be land-use related to moderate the impacts and reduce the risk since structural protection is not environmentally acceptable.

Dam Hazards - The Massachusetts Department of Conservation and Recreation (DCR) maintains inventories of dams across the state. The 2004 Massachusetts State Hazard Mitigation Plan includes a map of these dam locations and their ranking for their potential to cause loss of life or damage should they fail. Based on this hazard ranking provided by DCR, there are two dams ranked as significant hazards in Sandwich as listed on the table below:

Dam Hazards in Sandwich

Dam Hazard Ranking	Location	Dam Name	River	Owner
Significant	Sandwich	Upper Shawme Lake Dam		Georgette Cook
Significant	Sandwich	Shawme Lake Dam	Mill Creek - Spring Fed	Town Of Sandwich

Dams classified as “Significant Hazard” are dams that are located where failure or mis-operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads, or cause interruption of use or service of relatively important facilities.

Hazardous Materials and Recycling - Sandwich’s recycling stream is growing due to identification of new pollutants and greater participation of homeowners. However, management of the waste stream by the DPW is demanding more resources. Sandwich must balance the goals of recycling as much of the waste stream and work towards hazardous materials reduction while keeping municipal costs at a manageable level. Sandwich’s policies, by-laws, and other regulatory controls for hazardous materials, especially in Zone II districts, must be continually reviewed and updated as necessary to protect the community from threats of contamination,

spills and leakages.

Evacuation Planning - Sandwich is in the unenviable position of being one of the last towns through which evacuees will travel on Route 6. The bridges over the Cape Cod Canal are closed when winds reach 75 MPH. Past experience teaches us that Route 6 becomes congested to the point of gridlock when many people try to leave Cape Cod at the same time. During a hurricane, which is likely to impact the Cape during the high tourist season, should an official evacuation or even a public perception that an evacuation is necessary occur, Sandwich could very well be left to cope with an inordinate number of people requiring shelter, emergency supplies and medical attention. It is imperative that federal, state and regional hazard and emergency management planning address this regional issue.

Feasibility Analysis - The Action Plan in *Section 10: Implementation* is drafted to suggest policies that will serve to carryout effective hazard mitigation in high risk areas in the Town of Sandwich. *Section 10* will ensure consistency with the State and County approach of using both non-structural and structural projects, and to use a non-structural hazard mitigation approach before undertaking a *structural* approach. As part of the Pre-Disaster Hazard Mitigation Plan, a STAPLEE analysis was created to assess the feasibility of selected measures listed in the Action Plan to be pursued by the Town. A consensus of the *Hazard Planning Team* resulted in the findings listed below:

STAPLEE Analysis - Feasibility of Potential Flood Hazard and Coastal Erosion Mitigation Measures

Sandwich Hazard Mitigation Measures	**S** Socially Acceptable	**T** Technically Feasible	**A** Administratively Possible	**P** Politically Acceptable	**L** Legal	**E** Economically Sound	**E** Environ mentally Sound
Emergency Evacuation							
• Status quo	●	●	●	●	●	●	●
Public Information							
• Flood and Erosion Hazard Maps for public use	●	●	●	●	●	●	●
Planning A. Flood Zones							
• A1	◐	●	◐	◐	●	●	●
• A2	●	●	●	●	●	●	●
• A3	◐	●	●	◐	●	●	●
• A4	◐	●	●	◐	●	●	●
• A5	●	●	●	●	●	●	●
• A6	●	●	●	●	●	●	●
Planning B. Shoreline Erosion	●	●	●	●	●	●	●
• B1	●	●	◐	●	●	●	●
• B2	●	●	●	●	●	●	●
• B3							
Planning - C. Land Use							
• C1	◐	●	●	●	●	●	●
• C2	●	●	●	●	●	●	●
• C3	◐	●	●	◐	●	●	●
Planning - D. Inland Flooding							

Hazards • D1	●	●	●	●	●	●	●
Engineering - A. Flood Zone • A1 • A2 • A3	● ● ●	◐ ◐ ◐	● ● ●	● ◐ ●	● ● ●	◐ ◐ ◐	◐ ● ◐
Engineering - B. Shoreline Erosion • B1 • B2 "	● ●	● ●	● ●	● ●	● ●	● ●	● ●
Engineering - C. Land Use • C1 • C2	● ●	● ●	● ●	● ●	● ●	● ●	● ●

Source: Pre-Disaster Mitigation Plan Notes: U = Not Acceptable ◐ = Somewhat Acceptable ● = Acceptable

Funding for the recommended mitigation measures is not a major issue since most of the measures are nonstructural, which address regulatory, policy and code revisions. As individual projects or opportunities arise that address flood proofing or land acquisition, the project proponent will address funding and grant applications.

The implementation of the FHMP will take place over a number of years. It is also suggested that the Massachusetts Environmental Management Agency or the state Flood Hazard Management Program be involved with the monitoring of implementation.

The implementation for the Hazard Mitigation Plan should include a specific group appointed by the Board of Selectmen that has the necessary expertise to assist in the appropriate execution of the plan. The membership of the implementation group should consist of the Sandwich Inspector of Buildings, Natural Resources Officer, Health Agent, Chief of Police, Fire Chief, Assistant Town Administrator, Planning Director, the Director of Public Works, and Town Engineer

9.6 Smart Growth and Sustainable Design

Recommendations and actions consistent with the Sandwich Community Vision Statement and consistent with the principals of Smart Growth and Sustainable Design are included in *Section 10: Implementation Plan*. Specific implementation is accomplished through changes to the land use regulations, the capital improvement program, and creative conservation programs (i.e., Chapter 40R, TDRs, land trusts, conservation subdivision design, TND, acquisition and resale with restrictions, etc.).

Some primary Smart Growth techniques to be considered in this element are the following:

- Streets designed to balance the needs of both automobiles and pedestrians;
- Open spaces designed for social activity and recreation;
- Dimensional and use requirements to encourage less infrastructure development;
- Street design requirements to reduce speeds and provide internal connections;
- encourage pedestrian activity, improve safety and fit the scale to new neighborhoods;
- Provisions for linking and networking open spaces between developments;
- Preservation of the natural environment during and after construction; and
- Provision for on-site or nearby amenities to reduce vehicle trips.

Sustainable Governance

Sandwich's capital expenditures should focus on infrastructure and community services related to growth management, and the potential for sustainable management applications and programs such as the EcoStar program, a greenhouse gas reduction program, alternative energy source production, use of biofuels in the town vehicle fleet, and others pertaining to infrastructure and other planned capital improvements.

Sustainable Land Use Regulations

Sandwich's land use and development regulations such as the zoning by-laws, subdivision regulations, site plan regulations, and other pertinent town rules, policies and regulations should be amended to be consistent with the Comprehensive Plan. Recommendations for land use regulations that meet the goals of the updated LCP include the creation of Growth Incentives Zones and Development Agreements with the Cape Cod Commission in designated Activity Center around Sandwich. Sustainable growth management tools that have proven effective in preserving community character, fulfilling economic opportunities and protecting environmentally sensitive areas include the following:

- **Form Based (Typological) Standards and Design Guidelines**: A series of detailed illustrations and diagrams of dimensional requirements, definitions, street types, architectural guidelines, performance standards, and landscaping provisions that are specifically tailored to strategic planning areas;
- **Performance-Based Standards**: This standards technique regulates the characteristics of uses rather than the uses themselves. Sandwich should consider performance-based standards for uses in various districts that enable an appropriate mix of uses, ensure protection against potential negative impacts, and manage growth based on the capacity/expansion of local infrastructure;
- **Node Development**: Node Development Districts established along commercial strips can create new vitality for designated areas. Between commercial nodes, lower density commercial, civic, residential and open space uses should be encouraged;
- **Traditional Neighborhood Development (TND):** Many communities have adopted TND ordinances as a tool to combat sprawl. Unlike conventional ordinances and bylaws, which tend to prevent traditional patterns of walkable, mixed-use neighborhoods, a TND bylaw can re-introduce historic development patterns;
- **Open Space Development (OSD)**: The OSD bylaw is a modified form of cluster development that enables land development while simultaneously preserving community character, reducing environmental impacts, protecting rights of property owners, and producing a high-quality project;
- **Conventional Suburban Development (CSD)**: Conventional subdivisions are still the most common forms of residential development in Sandwich. Many of the principles of Open Space Development, Node Development and Traditional Neighborhood Development, however, can be incorporated into conventional design without changing the overall subdivision framework;
- **Establish a Growth Incentive Zone (GIZ)**: In accordance with the Act, and to implement the goals of the Regional Policy Plan (RPP), the Cape Cod Commission established a process for designating Growth Incentive Zones. Through designated GIZs, towns may enhance village centers and other areas of existing development by encouraging a concentrated mix of residential and commercial uses within these locations while ensuring that all growth is properly served by adequate infrastructure. As part of the GIZ designation process, towns must protect land outside these areas through the implementation of transferable development rights, downzoning, conservation restrictions, and other land protection measures.

As a means of encouraging mixed-use development inside GIZs, Developments of Regional Impact (DRIs) within these areas qualify for certain reduced Minimum Performance Standards (MPS) and requirements set forth in the RPP in the following areas: nitrogen loading, traffic mitigation, open space, and community character. In addition, as part of its GIZ application, the town may request that the commission grant modifications to existing DRI thresholds.

Governor Patrick's Sustainable Development Principles

The Commonwealth of Massachusetts shall care for the built and natural environment by promoting sustainable development through integrated energy and environment, housing and economic development, transportation and other policies, programs, investments, and regulations. The Commonwealth will encourage the coordination and cooperation of all agencies, invest public funds wisely in smart growth and equitable development, give priority to investments that will deliver good jobs and good wages, transit access, housing, and open space, in accordance with the following sustainable development principles. Furthermore, the Commonwealth shall seek to advance these principles in partnership with regional and municipal governments, non-profit organizations, business, and other stakeholders.

1. Concentrate Development and Mix Uses - *Support the revitalization of city and town centers and neighborhoods by promoting development that is compact, conserves land, protects historic resources, and integrates uses. Encourage remediation and reuse of existing sites, structures, and infrastructure rather than new construction in undeveloped areas. Create pedestrian friendly districts and neighborhoods that mix commercial, civic, cultural, educational, and recreational activities with open spaces and homes.*

2. Advance Equity - *Promote equitable sharing of the benefits and burdens of development. Provide technical and strategic support for inclusive community planning and decision making to ensure social, economic, and environmental justice. Ensure that the interests of future generations are not compromised by today's decisions.*

3. Make Efficient Decisions - *Make regulatory and permitting processes for development clear, predictable, coordinated, and timely in accordance with smart growth and environmental stewardship.*

4. Protect Land and Ecosystems - *Protect and restore environmentally sensitive lands, natural resources, agricultural lands, critical habitats, wetlands and water resources, and cultural and historic landscapes. Increase the quantity, quality and accessibility of open spaces and recreational opportunities.*

5. Use Natural Resources Wisely - *Construct and promote developments, buildings, and infrastructure that conserve natural resources by reducing waste and pollution through efficient use of land, energy, water, and materials.*

6. Expand Housing Opportunities - *Support the construction and rehabilitation of homes to meet the needs of people of all abilities, income levels, and household types. Build homes near jobs, transit, and where services are available. Foster the development of housing, particularly multifamily and smaller single-family homes, in a way that is compatible with a community's character and vision and with providing new housing choices for people of all means.*

7. Provide Transportation Choice - *Maintain and expand transportation options that maximize mobility, reduce congestion, conserve fuel and improve air quality. Prioritize rail, bus, boat, rapid and surface transit, shared-vehicle and shared-ride services, bicycling, and walking. Invest strategically in existing and new passenger and freight transportation infrastructure that supports sound economic development consistent with smart growth objectives.*

8. Increase Job and Business Opportunities - *Attract businesses and jobs to locations near housing, infrastructure, and transportation options. Promote economic development in industry clusters. Expand access to education, training, and entrepreneurial opportunities. Support the growth of local businesses, including sustainable natural resource-based businesses, such as agriculture, forestry, clean energy technology, and fisheries.*

9. Promote Clean Energy - *Maximize energy efficiency and renewable energy opportunities. Support*

energy conservation strategies, local clean power generation, distributed generation technologies, and innovative industries. Reduce greenhouse gas emissions and consumption of fossil fuels.
10. Plan Regionally - *Support the development and implementation of local and regional, state and interstate plans that have broad public support and are consistent with these principles. Foster development projects, land and water conservation, transportation and housing that have a regional or multi-community benefit. Consider the long-term costs and benefits to the Commonwealth.*

Low-Impact Design Applications

The low-impact development, or LID, site design approach is a precise arrangement of natural and engineered technologies. The devices, or Integrated Management Practices (IMPs), function as a comprehensive system across the site to achieve the goals of:

- Peak flow control;
- Volume reduction;
- Water quality improvement (filter and treat pollutants); and
- Water conservation.

Future development in Sandwich should use LID principles, which can be generally described as incorporating a series of techniques in the conceptual site plans with decentralized stormwater management to reduce the environmental footprint of new development. This approach improves water quality, minimizes the need for expensive conventional infrastructure (termed "pipe-and-pond" stormwater systems), and creates more attractive development features. Described below are the specific LID site design applications that are incorporated into the conceptual plans.[40]

Site Design and Layout - LID applications used in Sandwich should integrate hydrology and stormwater management into site design using existing conditions to influence the location and layout of roadways, buildings, and parking areas. Buildings and roadways are placed in areas less sensitive to disturbance, and the stormwater management system design creates a symbiotic relationship between the development and natural hydrology. The attention to natural hydrology and nonstructural stormwater management creates a more attractive, multifunctional landscape.

The objectives of LID site design for future development in Sandwich are to:

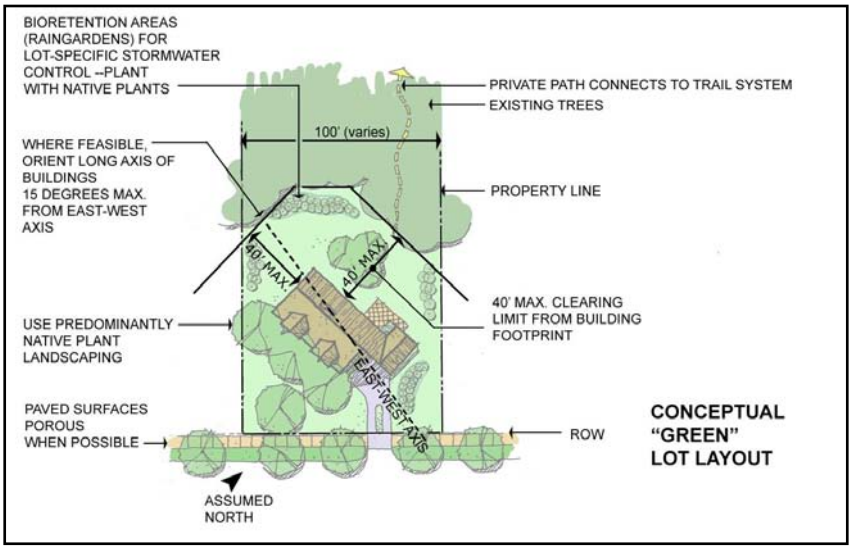
- Develop a site plan that reflects natural hydrology;
- Minimize impervious surfaces;
- Treat stormwater in numerous small, decentralized structures;
- Use natural topography for drainageways and storage areas;
- Preserve portions of the site in undisturbed, natural conditions;
- Lengthen stormwater travel paths to increase time of concentration and attenuate peak rates; and
- Use "end-of-pipe" treatment structures only for quality/rate controls of large storms.

[40] Information provided in the *Massachusetts Smart Growth Toolkit, Horsley and Witten.*

Conventional vs. LID Approaches to Stormwater Treatment

Conventional development treats stormwater as a secondary component of site design typically through "pipe-and-pond" systems that collect rainwater and discharge it off site. This typically concentrates large volumes of stormwater runoff in storm sewers and delivers it to a few large detention/retention ponds. This increases the speed and volumes of runoff. LID seeks to create multiple small drainage basins on site and treat runoff close to the source in small structures. LID also seeks to maximize the travel time for stormwater runoff, allowing for more infiltration to occur. This is accomplished by providing as much overland or sheet flow as possible, the use of open drainage systems, long travel paths, and use of vegetation to create surface roughness.

Identification of important natural features such as streams, drainageways, floodplains, wetlands, groundwater recharge protection areas, soil conditions (i.e., high-permeability and erosion-prone soils), steep slopes, woodland and farmland conservation areas, and protected species plant and wildlife habitat are all important factors in site design.



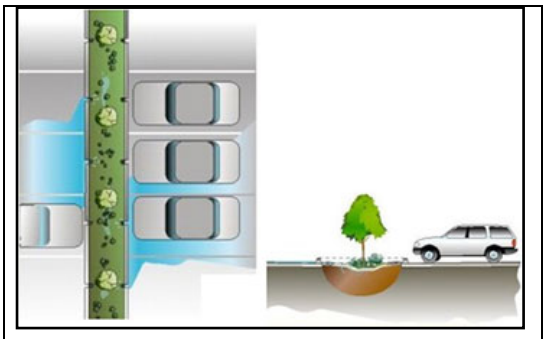
From this analysis, a determination can be made regarding "conservation" areas that are to be protected from development and possibly incorporated into the LID stormwater system. The "development envelope" is also defined through this process. In this case, the envelope included the areas where development would have the least impact on hydrology and other ecological features. This generally included upland areas, ridgelines, and gently sloping hillsides. The remainder of the site is left primarily with a cover of mature trees with limited clearing and grading.

In locating development and roadways in Sandwich, some of the key LID site design objectives are to reduce the total impervious surface areas, reflect the existing topography, and utilize existing drainageways, swales, depressions, and storage areas in their natural state. The goal is to minimize the amount of runoff that must be treated in a stormwater management system. In order to reduce site coverage while maintaining square footage of development, some of the techniques employed are to cluster buildings together, provide for shared parking and possibly parking structures where appropriate, reduce the total number of parking spaces to the amount that is actually needed (rather than required by the Sandwich zoning bylaws), and provide for

taller buildings (two to four stories) using a smaller footprint relative to floor area. Other techniques included reduced road widths, smaller parking areas, permeable paving (where appropriate), and green roofs.

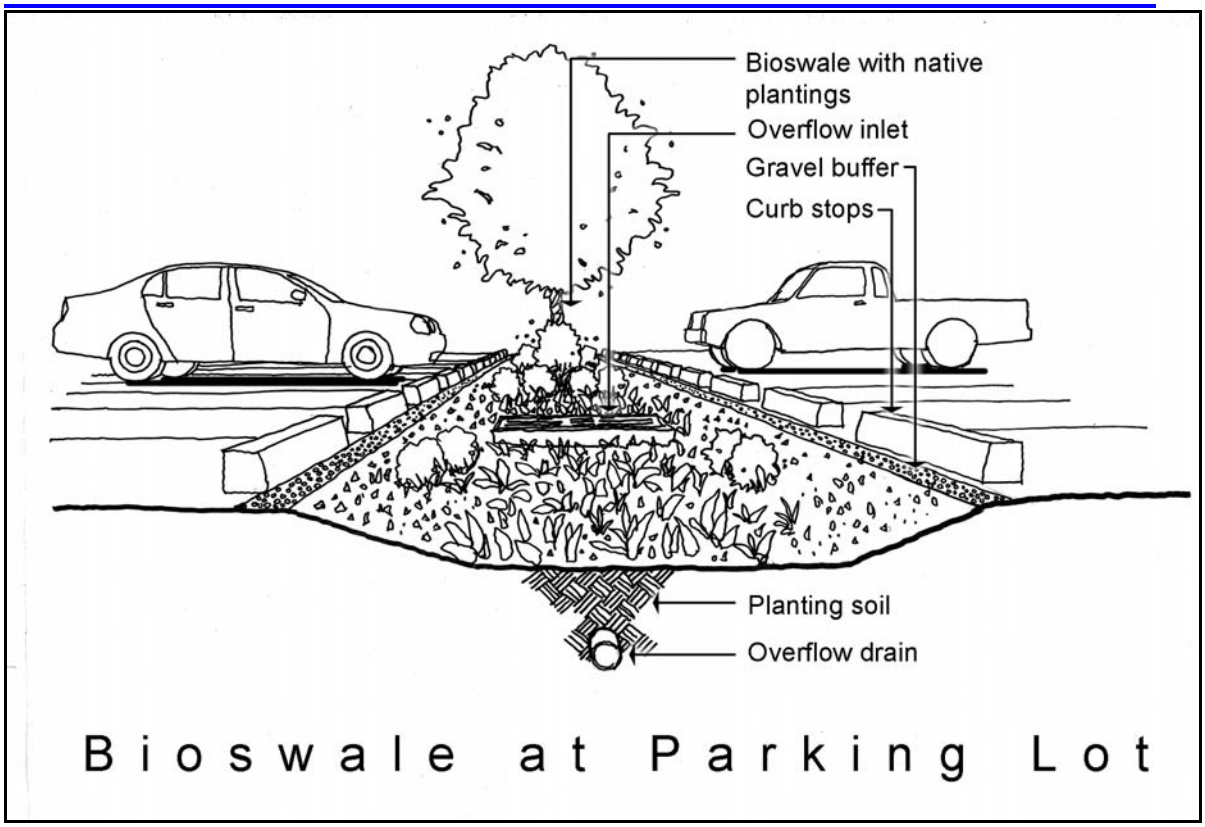
Decentralized Stormwater Treatment System - The goal for Sandwich is to reduce impervious surface areas that drain directly into conventional pipe-and-pond stormwater systems. Creating small drainage basins and more natural treatment systems such as swales, bioretention areas, infiltration structures, and filter strips should include LID stormwater treatment design. Small drainage basins can be created by grading and crowning paved areas (i.e., roadways and parking areas) so that they run into these treatment areas. Runoff from each of these small drainage areas is sent to a different bioretention area, swale, or filter strip. These multifunctional open drainage and treatment systems also help to fulfill landscaping or open space requirements. These LID stormwater structures should be sized to treat the stormwater from frequent, low-intensity storms for water quality and infiltrate into the ground or slowly release it. Some of these techniques that are applicable in Sandwich are described below:

Filter Strips – Filter strips are bands of densely vegetated slopes, designed to reduce water runoff volume and improve water quality prior to entering stormwater drainage basins. Filter strips are typically designed to break up impervious surfaces (such as parking lots) and provide initial stormwater treatment by filtration. They also provide infiltration of water, reducing the overall runoff. Filter strips are a commonly used LID process and are incorporated into roadway and parking lot designs in Sandwich.

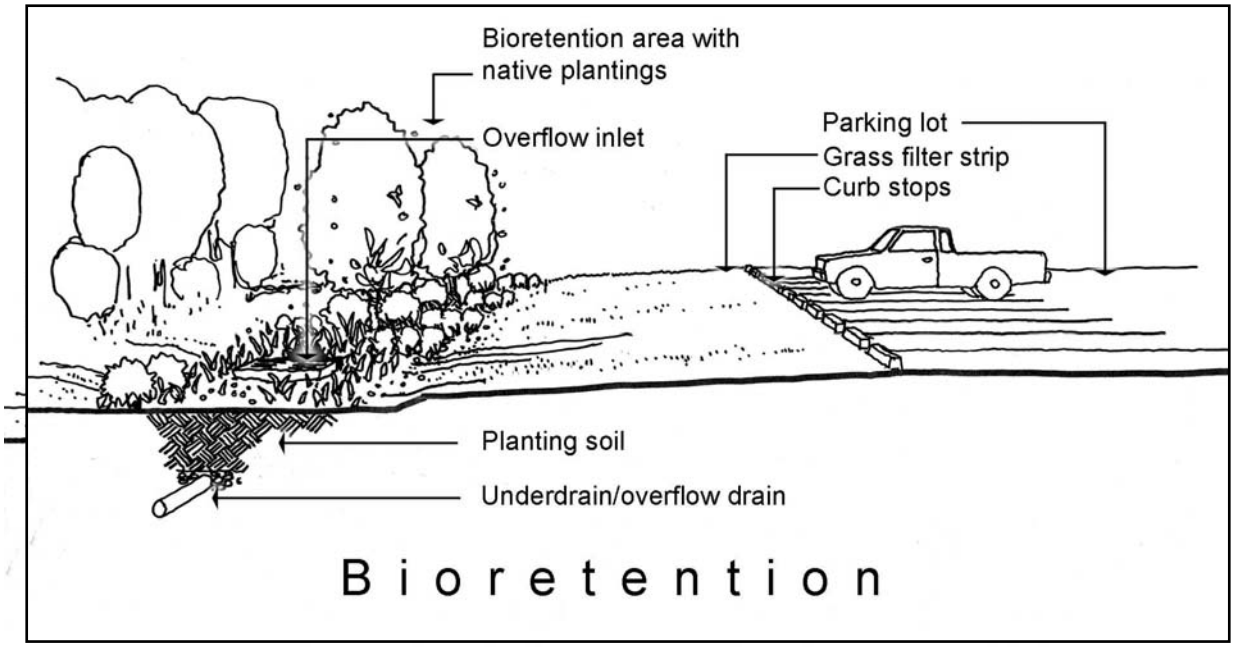


Bioretention cell schematic
Courtesy Pierce County, Washington and AHBL, Inc.

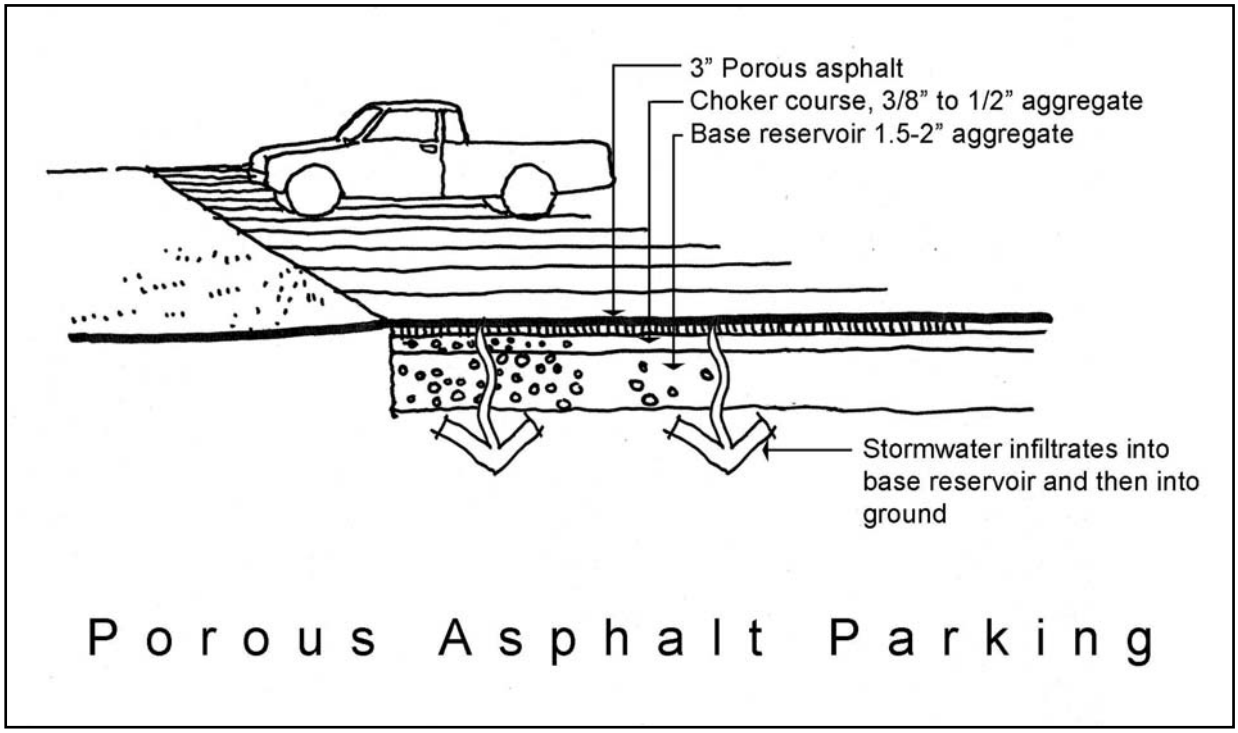
Bioretention Cells (Rain Gardens) – Rain gardens, also known as bioretention cells, are vegetated depressions that store and infiltrate runoff. Rain gardens are designed to encourage vegetative uptake of stormwater to reduce runoff volume and pollutant concentrations. A well designed rain garden has an engineered soil, which maximizes infiltration and pollutant removal while avoiding stormwater ponding for longer than 24 hours. Combined with filter strips, bioretention cells are important components of the LID treatment process and are incorporated into roadway and parking lot designs in Sandwich.

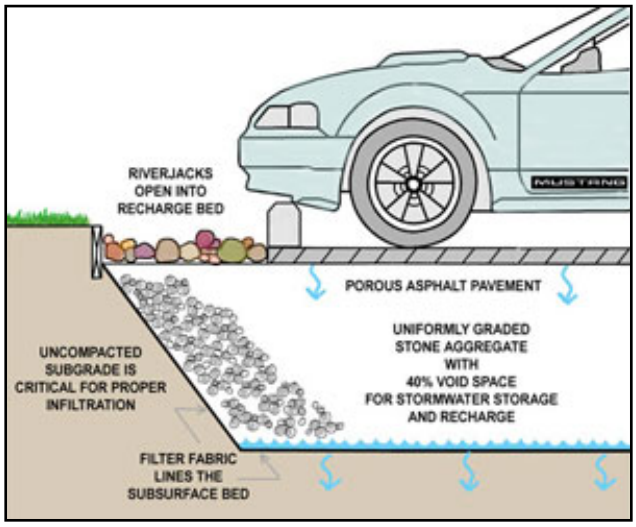


Vegetated Swales (Bioswales) – Vegetated swales are broad, shallow channels designed to convey and infiltrate stormwater runoff. The design of swales in Sandwich should seek to reduce stormwater volume through infiltration, improve water quality through infiltration and vegetative filtering, and reduce runoff velocity by increasing flow path lengths and channel roughness.



Infiltration – Infiltration includes designs that enhance water percolation through a media matrix that slows and partially holds stormwater runoff. Infiltration practices also promote groundwater recharge and facilitate pollutant removal.





Subsurface Retention Facilities (Stormwater Vaults) – Subsurface retention facilities are typically constructed below parking lots (either permeable or impervious) and can be built to any depth to retain, filter, infiltrate, and alter the runoff volume and timing. This practice is well suited to dense urban areas or areas with constraints of open space uses such as in Sandwich Activity Centers. Subsurface facilities can provide a considerable amount of runoff storage. The figure below shows that the porous parking bay has an infiltration gallery (with 40 percent void space) below it for stormwater retention. The water is filtered through the stone aggregate and infiltrates into the ground. An alternative strategy is to construct the subsurface facility with a filtering and pumping mechanism so that collected water can be reused for nonpotable uses such as irrigation or flushing of toilets. Similar techniques include gravel storage galleries, sand filters, infiltration basins, and infiltration trenches (for areas with space constraints).

Pocket Wetlands – Pocket wetlands are constructed wetland systems designed to control

stormwater volume and facilitate pollutant removal. Pocket wetlands generally have less biodiversity than natural wetlands, but still require a base flow through the wetland to support the aquatic vegetation present. Pollutant removal in these systems occurs through the settling of larger solids and coarse organic material and also by uptake in the aquatic vegetation.

Roadway Design

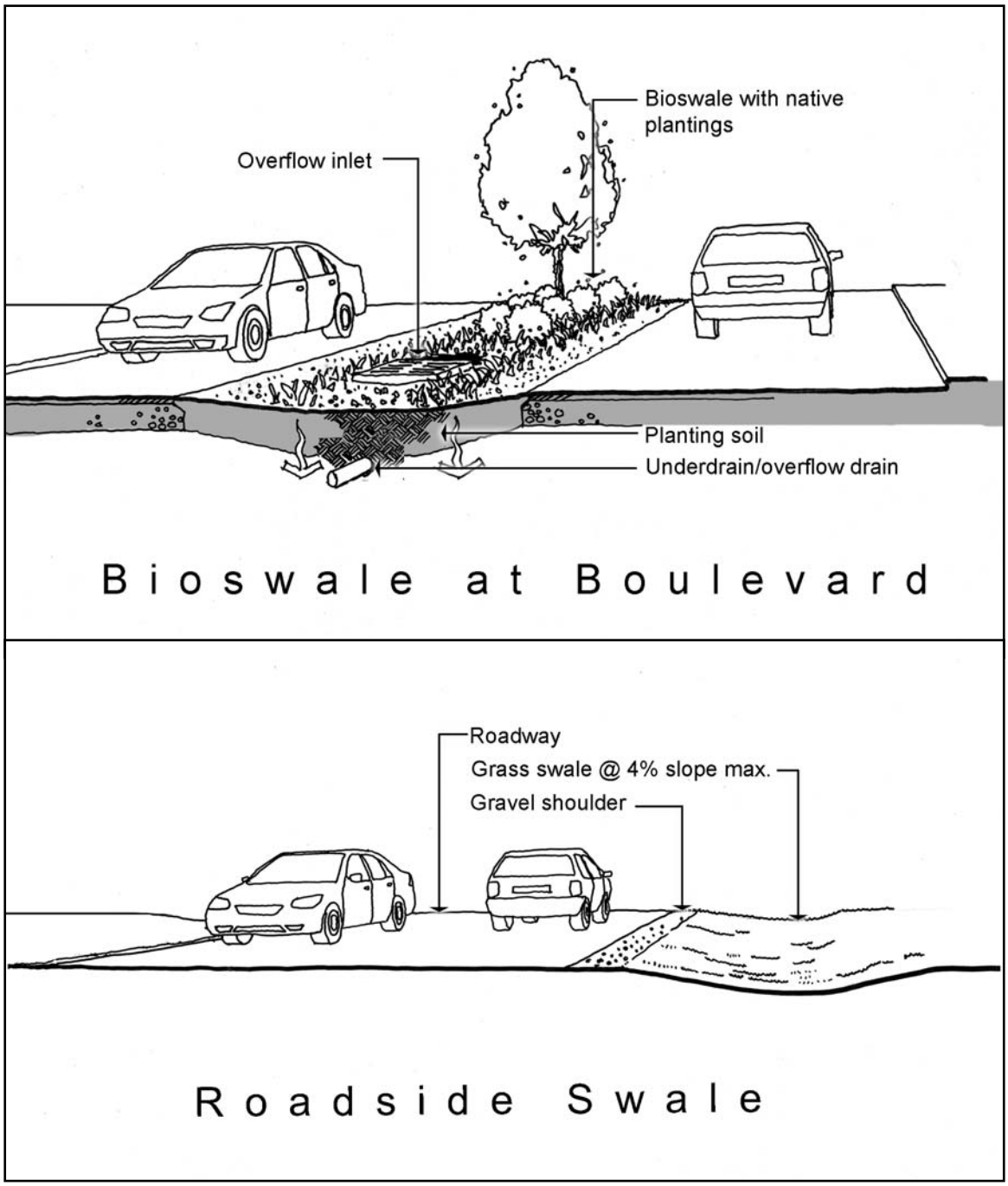
Basic strategies for low-impact roadway design in Sandwich should include narrow road widths, shared driveways, and open-section roadways. Parking lot design includes breaking up large paved areas into smaller lots, maximizing shared parking, providing adequate parking (based on actual demand rather than general standards), and using permeable paving where appropriate. The design objectives for roadways and parking lots are to:

- Reduce total impervious surfaces;
- Reduce road and parking construction and long-term maintenance costs;
- Provide safe access and adequate parking;
- Minimize disturbance to natural site hydrology;
- Create opportunities for stormwater treatment and infiltration; and
- Improve site appearance.

There are two main roadway types proposed for the Sandwich Industrial Park. A **Boulevard** provides access to the business park from off site connecting the SIP with Route 130. The boulevard includes two 11-foot travel lanes separated by a variable-width, natural green strip with large existing trees. The second roadway type is the **Access Road**. This is a 22-foot roadway providing internal connections between development phases and buildings. Both the Boulevard and Access Road are **open-section roadways,** which include roadside swales located between the roadway and the sidewalk or trail. It may also include a permeable paving parking lane depending on demand.

Example Open-Section Road For LID Development in NH

Conventional roadway design standards for new development typically require excessively wide streets with curb and gutter profiles generating large volumes of runoff and concentrating it in storm sewers. However, low-impact roadways use a narrower, more traditional design that enhances site character and produces less runoff, which is directed to roadside swales for treatment and conveyance. This technique helps to filter roadway runoff, promote infiltration, and reduce runoff velocity, resulting in lower peak discharge rates. If properly designed, open section roadways will be no more prone to flooding than conventional roadway profiles.

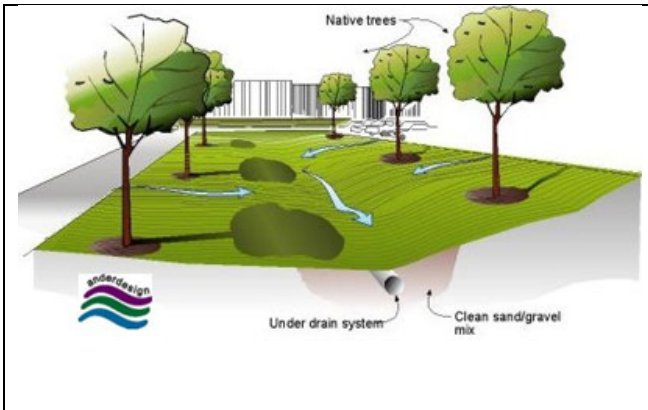


Recommended Minimum Street Widths in Sandwich	
Source	**Minimum Width**
National Fire Protection Administration	20 feet
Massachusetts State Fire Marshall	18 feet (minimum)
AASHTO	22 feet
SmartCode®	Variable
Town of Sandwich Street Design Standards	30 feet
Proposed Open-Section Boulevard Road	2 11-foot travel lanes separated by variable width natural bioswale
Proposed Open-Section Access Road	22 feet

Turnarounds and Cul-De-Sacs - Cul-de-sacs should be designed to reduce runoff and improve character, while still providing sufficient room for emergency vehicles and delivery trucks to maneuver. One treatment for the circles is landscaped islands built as bioretention areas with proper grading to catch and treat roadway runoff.

Parking Lot Design - Expansive parking lots that drain to catch basins create large volumes and high velocities that require pipe-and-pond stormwater infrastructure. LID parking design should be incorporated into new developments in Sandwich to create multiple parking areas at different elevations that can reduce the amount of grading necessary to preserve natural hydrology.

Permeable paving is generally not appropriate for use in high-traffic parking lots in certain Activity Centers in Sandwich. However, it can be incorporated as a hybrid parking lot, which uses conventional paving for driveways and aisles, and permeable paving for parking stalls. Permeable paving may also be appropriate for overflow parking areas, which are generally used only a few weeks out of the year.



Example Bioswale Treatment in Parking Lots

Natural Landscaping and Xeriscaping - Natural resource preservation and Xeriscaping™ can be used to minimize the need for irrigation systems and enhance property values. Preserving existing wooded areas, mature trees, and natural terrain can give new developments a premium "mature landscape" appearance and provide residents with additional recreational amenities. Both of these features can improve marketability. Xeriscaping refers to landscaping with plants native to area climate and soil conditions. These plants thrive naturally, requiring less maintenance and irrigation than most hybrid or imported varieties.

When selecting plants for the new landscape designs, it is important to have knowledge of the site conditions. Plant materials should be selected for their form, color, and texture, as well as solar, soil, and moisture requirements. Plants that do well in various microclimates on a site are considered "site appropriate." It is also recommended that native plants (vegetation that grows naturally in particular climates or regions) be used because of their performance, site enhancement, and life-cycle cost benefits. Native plants typically cost more initially (depending on local availability); however, they are more cost-effective in the long run because they require less water and fertilizer, and are more resistant to local pests and diseases than non-native ornamentals. Life-cycle costs are reduced due to fewer maintenance and replanting requirements. Additionally, native plants provide habitat for local/regional wildlife. Care should be taken to not plant invasive species as they tend to crowd out the native species. Some common groundcovers, shrubs, and vines are invasive and are prohibited from being planted. Refer to your state list of invasive plants.

Native plants are also known to be very effective in managing stormwater because many species have deep root systems which stabilize soil and facilitate the infiltration of storm water runoff. Natural and reintroduced vegetation may also be effective in pollutant removal. Vegetated areas intercept and infiltrate rainfall, decreasing stormwater volumes. Plants, trees, and other vegetation remove pollutants from infiltrated stormwater through root zone uptake. Incorporating vegetation into the landscape is a stormwater management technique that utilizes environmentally beneficial mechanisms naturally occurring in the environment.

Proper maintenance of the natural and formal landscape is also an important low-impact design application. Soil amendments increase the infiltration and water storage capabilities to reduce runoff from a site. Additionally, the compost, lime, or organic materials alter the physical, chemical, and biological characteristics of the soils to improve plant growth. Aeration of the soil, which can be done in conjunction with routine mowing activities, can increase the storage, infiltration, and pollutant filtering capabilities of grassed areas. Proper fertilizer and pesticide applications will significantly contribute to lowering nutrients and chemical impairments. These include fall fertilization to decrease nutrient runoff. However, it is important to note that for bioretention areas fertilizing is counterproductive to the nutrient removal function (other than in the initial growth period). Also, pesticides should not be applied in bioretention areas, where the goal is to improve water quality. Furthermore, the landscape maintenance issues with bioretention should not be overlooked, as maintenance is significant and essential for proper function of these areas. The placement of hardwood mulch should be mentioned in the design specifications for all biorentention areas.

Sustainable/Green Building and Energy Techniques

New development in Sandwich, where applicable, should be designed using innovative energy efficiency and waste treatment technology. This may include passive and active solar building components, on-site recycling of certain trash, and on-site sewage treatment. New developments should also consider the feasibility of clean on-site power generation, possibly including wind power, a fuel cell cogeneration facility, and geothermal energy. The goal is to create sustainable and attractively priced power services, as well as minimized impact upon the surrounding environment.

Integrating alternative energy infrastructure may also create a distinctive image among prospective commercial and light industrial tenants which will differentiate Sandwich from locations in the region. Future development in Sandwich may include some of the following techniques: innovative building design, construction techniques, and interactive uses as key

components of green design and the sustainable principles desired in Sandwich.

LEED Certification – The Leadership in Energy and Environmental Design (LEED) program is a system of measuring the sustainability and environmental soundness of development and construction projects. Buildings should be encouraged to apply for and receive LEED certification by the U.S. Green Building Council.

Downspout Redirection – Building downspouts are commonly directly connected to centralized sewer or stormwater systems. A LID design application is to redirect roof runoff onto pervious surfaces, most commonly a lawn. This simple act reduces the amount of directly connected impervious area in a drainage area.

Rain Barrels/Cisterns – Rain barrels are placed outside of a building at roof downspouts to collect and store rooftop runoff, which can later be reused for lawn and garden watering.

Green Roofs – Green roofs are designed to support plants and mitigate heat island effects on water quality by filtering, absorbing, and detaining rainfall. There are two basic types of green roofs: extensive and intensive. Extensive roofs form a thin vegetated sheath. Their low profile allows them to be added to existing buildings. By contrast, intensive roofs are integral to the roof structure, permitting the use of trees and walkways. A greater depth of media and a greater roof structural capacity may be required to accommodate larger vegetation and surface features. Green roofs are highly encouraged on future development in the Sandwich Industrial Park.

Solar Power – Sandwich may have an excellent opportunity to expand the use and development of solar power – both photovoltaic and solar-thermal. Photovoltaic (PV) cells convert sunlight directly into DC electricity. Solar-thermal power uses solar energy for heating water or building space rather than producing electricity. Unlike other energy sources, no environmental permitting is required. Excess power can also be sold back to the grid. Currently photovoltaic power is relatively expensive to produce (averaging $8.50/Kw vs. wind at $2.30/Kw). Also, efficiency of production is much lower than wind (15 percent solar efficiency conversion is average). PV solar design is orientation sensitive. In terms of the future buildings in Sandwich, a south facing direction, uninterrupted sunlight, and roof pitch of 10 to 12 is optimal. PV solar panels typically produce 1 Kw per panel, which is approximately 100 square feet. Panels are good for approximately 20 years.

Commonwealth Solar is the state of Massachusetts' initiative to vastly expand the use and development of solar energy. The goal is to produce 250 megawatts (Mw) statewide by 2017 (currently there are only approximately 4 Mw produced statewide). New funding programs and initiatives will be implemented by the state to achieve this goal. To date, schools have provided the best opportunity in the state in terms of funding and combining renewable energy with curriculum. Several municipal and regional schools have been equipped for solar energy as well as a number of secondary schools such as community and technical colleges.

Other Energy Conservation Opportunities – There are many more opportunities to improve energy efficiency and protect the environment as future growth occurs in Sandwich such as the following:

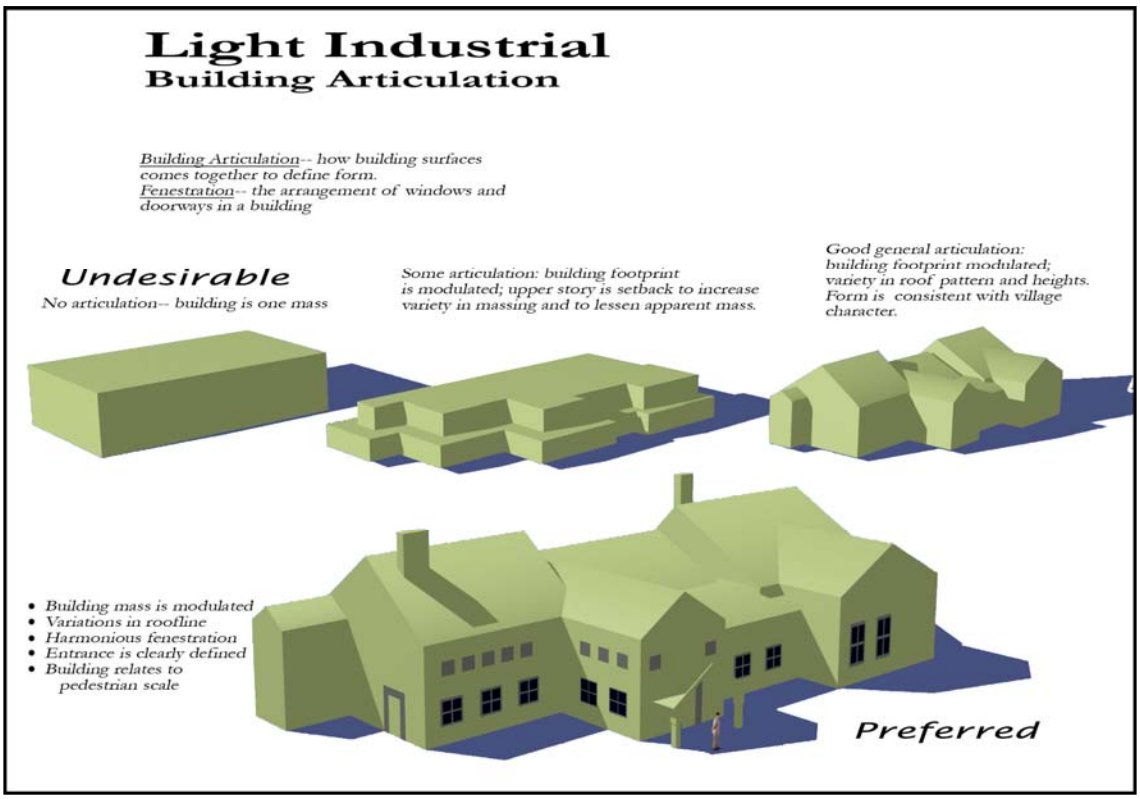
- Green walls and green blocks;
- Increased insulation (i.e., R-26 and triple-glazed windows);
- Energy Star rated appliances;
- EcoStar Program (shared recycling streams between park tenants);
- Dual-flush and waterless toilets;

- Ultra-efficient heat and hot water systems;
- Open and simple floor plans (i.e., square and cubes);
- Improved building air seal (i.e., taped sheathing);
- Greywater systems; and
- Geothermal energy.

Aesthetic Impacts and Design

Minimizing the aesthetic impact and preserving the natural and undisturbed resources of the site to the maximum extent possible are primary objectives of Sandwich. Accordingly, the conceptual master plan lays out developed areas in clusters to minimize the potential visual and environmental impacts on the site and in the surrounding areas. This spatial arrangement also provides the opportunities to retain as much natural open space as possible.

As future development occurs in Sandwich, specific design guidelines should be prepared for new construction that provide for LEED-certified buildings and architectural details that create an attractive setting for future investment. Building design and an attractive setting are important issues as high quality industries are targeted for Sandwich.



9.7 Community Sustainability Action Plan

The Community Sustainability Action Plan for Sandwich (*Section 10: Implementation Plan*) is intended to correlate to the Cape Cod Commission's set of goal for air pollution reduction in the region, climate change, energy conservation and development, hazard mitigation and adaptation, land conservation, and Smart Growth Development, but provides specific actions for Sandwich to consider either for the Town to pursue or for others to pursue. Key topic areas covered in the sustainability plan include:

- General Reduction of Greenhouse Gases;

- Air Pollution Reduction;
- Water Conservation;
- Energy Conservation and Renewable Sources;
- Natural Resources and Open Space;
- Transportation Systems;
- Hazard Mitigation Planning;
- Economic Development;
- Land Use and Development; and
- Long-Term Adaptation Planning To Climate Change.

Planning is an essential part of climate change solutions, but planning policy and practice must lead to changes in communities and development patterns to reduce greenhouse gas (GHG) emissions and climate change impacts. There must be a collaborative approach that includes all levels of government, the diverse interests that will be affected by climate change and the various professional disciplines that can contribute to solutions. Additionally, the people and places that are most impacted but least able to address change on their own must receive special attention to provide social justice and appropriate action for critical sites. The action plan below includes a balance among educational efforts, creation of incentives and regulatory tools.

Climate change plans should reflect the adage that one should think globally and act locally. As with many environmental issues, small incremental impacts may have broad cumulative impacts. Local initiatives and participation encourage a greater sense of ownership and consequently greater buy in to responsibility. Town initiatives should encourage personal responsibility in the daily actions of local communities and the individuals who live in them.

To be more sustainable, Sandwich should manage their resources to meet today's needs while retaining resources for future generations to use. They help address climate change because they use energy and water resources more efficiently, and thus reduce greenhouse gas generation from carbon-based fuel consumption.

To be more resilient, Sandwich should respond to changes in the environment, the economy, technology and other areas in a way that continues their appeal as places to live and work. They help address climate change because they accommodate future residents in existing places, reducing greenhouse gas emissions because they decrease the pressure to expand urban areas outward and use carbon-based resources to pave new areas, build new structures and extend vehicle trip lengths.

To be more regenerative, Sandwich should facilitate design that not just minimizes damage to the natural environment, but actually restores the natural systems of the community and the connections of people to community. This evolving design approach helps address climate change because it restores natural 'green infrastructure' instead of relying on engineered systems that require higher energy and carbon inputs. By strengthening the connections between people and the town's unique natural setting, Sandwich may help build the political will and civic engagement that are essential to modify lifestyles and expectations enough to have an impact on climate change trends.

The focus of attention for flood and erosion related mitigation measures in Sandwich are along the immediate Cape Cod Bay coastline. A range of mitigation measures are possible from relatively inexpensive wooden walkways over the dunes to somewhat expensive property acquisition. The most discussed mitigation measure was beach nourishment with use of dredged

materials from the Cape Cod Canal.

Sandwich town government shall work to protect the public interests in the coast and rights for fishing, fowling and navigation, to preserve and manage coastal areas so as to safeguard and perpetuate their biological, historic, maritime, and aesthetic values, and to preserve, enhance and where appropriate, expand public access to the shoreline.

10.0 Implementation Plan

10.1 Introduction

An effective Implementation Plan is essential in carrying out the Comprehensive Plan's goals, policies and actions, and in maintaining the document as a useful and accurate guide to making future growth decisions in Sandwich. Key sections of the Implementation Plan include the following:

The Action Plan
The Action Plan below defines actions that will be necessary to achieve the goals and objectives of each element of the LCP over the next 10 years. The schedule includes short-term, medium-term and long-term policy and program strategies to be carried out and reviewed annually. The Action Plan has been prioritized by the Local Planning Committee, which took into account the general public's comments and priorities obtained during public participation in the Local Comprehensive Plan Update. Major progress re-evaluations should be scheduled after 3 and 5 years.

Timeframe – Actions are listed under one of three categories: Short-Term; Medium-Term, and Long-Term. The meaning of these categories is as follows:

- Short Term - the action is immediately achievable without any real cost consideration, is one that needs to be undertaken on a regular and ongoing basis, or is one that is at a critical point in the community's future. The timeframe for accomplishment shall be one to two years;

- Medium Term - the action requires some lead time to organize and coordinate, funding will need to be obtained, and/or a political process may be involved; timeframe for accomplishment shall be one to five years; and

- Long Term - the action is more complex and requires involvement of multiple agencies or parties, it has greater funding requirements, it requires that a Short or Medium-Term action to be accomplished first, or it needs substantial public support that will take some time to develop; timeframe for accomplishment shall be one to ten years.

Although the priorities listed below provide a guide as to what can be expected to be accomplished over the next ten-year period, it may be that certain opportunities will come up that provide the means to achieve a stated objective sooner than indicated.

Leaders – The Action Plan lists a group, organization or agency that is seen as the natural lead or identifies a participant in undertaking the recommended action. An Implementation Committee should be formed and assigned those actions for which leads/participants could not be readily identified, or recommends new groups need to be formed. This is a guide and is intended to be flexible and inclusive in carrying out specific actions. The following codes have been used in the Action Plan:

Archives and Historical Center Committee (AHCC)
Army Corps of Engineers (ACOE)
Assessors (A)
Board of Appeals (BOA)
Board of Health (BOH)
Board of Selectmen (BOS)
Building Department (BD)
Canal Region Chamber of Commerce (CRCC)
Cape Cod Commission (CCC)
Community Preservation Act Committee (CPA)
Community School (CS)
Conservation Commission (CC)
Council on Aging (COA)
Department of Public Works (DPW)
Disability Commission (DC)
Emergency Management Planning Committee (EMPC)
Fire Department (FD)
Friends of the Library (FL)
Golf Advisory Committee (GAC)
Historical Committee (HC)
Implementation Committee (IC)
Local Housing Committee (LHC)
Massachusetts Highway Department (MHD)
Massachusetts Historical Society (MHC)
Natural Resource Department (NR)
Old King's Highway Regional Historic District Committee (OKH)
Planning and Development Office (PDO)
Planning Board (PB)
Police Department (PD)
Private Museums (PM)
Recreation Committee (RC)
Recreation Department (REC)
Regional Technology Development Council (RTDC)
Sandwich Area Cable Access Television (SACAT)
Sandwich Chamber of Commerce (SCC)
Sandwich Conservation Trust (SCT)
Sandwich Economic Development Committee (EDC)
Sandwich Economic Incentive Corporation (SEIC)
Sandwich Energy Committee (SEC)
Sandwich Harbor Master (HM)
Sandwich Historical Commission (SHC)
Sandwich Housing Authority (SHA)
Sandwich Public Library (SPL)
Sandwich School Department (SSD)
Sandwich Visitors Service Bureau (VSB)
Sandwich Water District (SWD)
School Committee (SC)
Town Administrator (TA)
Town Archives (TAR)
Town Council (TC)
Town Engineer (TE)
Town Meeting (TM)
Town of Sandwich (includes various departments) (TS)
Woods Hole Oceanographic Institute (WHOI)

In order for the actions identified in this section to moved forward, a number of organizations will need to take the lead in implementing one or more of them. Groups responsible for shepherding this plan are both public and private organizations. Key departments within the Town of Sandwich will play a major role in the implementation process such as the Town Administrator's office, Natural Resources Department, Recreation Department, Planning and Development office, Public Works, and the School Department.

Partners and Stakeholders - To achieve the far-ranging results these actions strive toward, there will need to be support from and outreach to other community and civic groups willing to assist on specific projects. Town offices, committees, boards, and local service clubs will be asked to assist in the implementation process. Local residents with particular concern or expertise should also be invited to participate in the implementation of those actions that relate to their areas of interest. Additionally, students at nearly all grade-levels can be tapped for special projects. The key to implementation is to

develop a network of individuals and organizations whose goals and missions overlap with the interests of the community and to foster ongoing partnerships with them.

Funding Opportunities and Resources – These potential public and private implementation resources are identified and explained as they pertain to various types of projects. Commonly used as well as new incentive programs are identified which may be used for smart growth, conservation, transportation and circulation, mixed-use development, affordable housing, downtown revitalization, and infrastructure projects. Based on a comparison of Sandwich's goals, policies and actions, the following local, state, federal and provide funding programs may be the most likely resources for given projects and programs:

Potential Funding Programs, Financing Methods and Other Resources	
Affordable Housing Trust Fund (DHCD)	Land and Water Conservation Fund (LWCF)
Agricultural Preservation Restriction Program (EOEA - DAR)	Low Income Housing Tax Credit (DHCD)
Bike and Pedestrian Program (EOT)	Massachusetts Environmental Trust (MET)
Coastal Pollutant Remediation Grant Program (EOEA - CZM)	Off-Street Parking Program (EOAF)
Commercial Area Transit Node Program (DHCD)	Public Works Economic Development Program (EOT)
Community Development Action Grant (DHCD)	Recreational Trails Program (RT)
Community Preservation Funds (CP)	Self-Help Program (EOEA - DCS)
District Improvement Financing (DIF)	Smart Growth Technical Assistance Program (EOEA)
Drinking Water Supply Protection Grant Program (EOEA)	State Revolving Fund (EOEA - DEP)
Economic Development Fund/CDBG (formerly Ready Resource Fund, DHCD)	Tax Increment Financing (TIF)
EOEA Land Protection Programs (EOEA - DCR, DFG)	Transit Oriented Development Bond Program (EOT)
Greenways and Trails Demonstration Grant Program (GT)	Urban Brownfields Assessment Program (EOEA)
HOME (Barnstable County and DHCD)	Urban River Visions Implementation Program (EOEA)
Housing Development Support Program (DHCD)	Urban Self-Help Program (EOEA - DCS)
Housing Stabilization Fund (DHCD)	Urban Self-Help Program (USH)
Land & Water Conservation Fund (EOEA - DCS)	Water Loss Prevention Grant Program (WLP)

10.2 Land Use Goals, Policies and Action Plan

Any policies and actions that would usually be derived from the Land Use Element would necessarily be repeated in another element. Therefore, the reader should refer to remaining elements for the policies and actions of this Plan. The foundation of all the goals, policies and actions of the Local Comprehensive Plan are embodied in the following Land Use and Growth Management goals:

Sandwich Land Use & Growth Management Goals	
Goal LGM-1	Sandwich shall encourage sustainable development that is consistent with the carrying capacity of the Town's natural, historic and social environments and supports economic health and quality of life.
Goal LGM-2	Sandwich shall minimize adverse impacts on the land by using land efficiently and protecting sensitive resources, and to create vibrant communities by directing growth and redevelopment to appropriate locations.
Goal LGM-3	Sandwich shall protect the distinct characters of its Villages, and prevent the extension or creation of new roadside "strip" commercial development that diminish the vitality of established villages.
Goal LGM-4	Sandwich shall direct new commercial, industrial and mixed use development to its Growth Centers. These Growth Centers are as follows: the Route 6A/Tupper Road/Town Marina Area; the South Sandwich Village Center; the Historic Village/Route 6A Area; and the Sandwich Industrial Park and Zoning District along Route 130.
Goal LGM-5	Sandwich shall closely review the existing Zoning By-law for its use and intensity and compare them to carrying capacities and desired future mix of uses to determine where revisions are necessary. Sandwich shall encourage "village", "cluster" and "smart growth" and consider regulatory tools to facilitate this type of growth in targeted areas including a transfer of development rights program, evaluation of site plan review regulations, design review regulations, and additional natural resources protection and hazard mitigation regulations.
Goal LGM-6	Sandwich shall work to protect and enhance the remaining camp lands in order to preserve their important scenic qualities, recreational opportunities and their intrinsic value as open space.
Goal LGM-7	Sandwich shall pursue a policy of equal and fair enforcement of all land use regulations, including special permits.
Goal LGM-8	Sandwich shall use the Comprehensive Plan as a guidance document. This document is intended to shape all land use policy throughout the Town from economic development to the preservation of open space.
Goal LGM-9	Sandwich shall work to protect and enhance the remaining active agricultural lands. New development adjacent to lands in active agricultural production shall maintain or provide a thickly vegetated buffer of sufficient width to prevent conflicts between the development and existing agricultural uses. New agricultural operations in developed residential areas shall also provide a buffer to minimize impacts on these adjoining areas.
Goal LGM-10	Sandwich shall provide capital facilities and infrastructure efficiently and in a manner that is consistent with Cape Cod's environmental, cultural, and economic strengths, and that reinforces traditional village-centered development patterns.

10.3 Natural Resource Protection Goals, Polices and Action Plan

Natural Resource Protection Action Plan				
Goals/ Policies/ Actions	**Action**	**Leaders**	**Partners and Stakeholder**	**Timeframe**
Goal NR-1	**Protect surface and groundwater water resources to ensure a sustainable supply of drinking water and to preserve and restore ecological integrity.**			
Policies				
NR-P-1.1	Encourage standards of development and redevelopment that comply with the Minimum Performance Standards established by the Cape Cod Commission for four primary water resource areas and their respective recharge areas: Wellhead Protection Areas, Fresh Water Recharge Areas, Marine Water Recharge Areas, and Potential Water Supply Areas (RPP 2.1.1.1-2.1.1.5).	NR	BOS, DPW, BOH, SWD	Ongoing
NR-P-1.2	Establish development review policies that support water conservation, improve wastewater management, limit non-point source pollution, and protect existing and future public water supplies (RPP 2.1.1.6-2.1.1.15).	NR	BOS, DPW, BOH, SWD	Ongoing
NR-P-1.3	Provide adequate stormwater management and treatment by encouraging the Minimum Performance Standards established by the Cape Cod Commission (RPP 2.1.3.1 – 2.1.3.7).	NR	BOS, DPW, BOH, SWD	Ongoing
NR-P-1.4	Protect the water quality of ponds and freshwater wetlands for fish, amphibian and wildlife habitat.	NR	BOS, DPW, BOH, SWD	Ongoing
Actions				
NR-A-1.1	Develop a Town water conservation plan to encourage the installation and use of water-saving techniques (RPP 2.1 Town A).	NR	BOS, DPW, BOH, SWD	MT
NR-A-1.2	Encourage best management practices in new development or redevelopment such as vegetated swales, and non-structured wetland detention basins to prevent direct discharge of untreated stormwater or wastewater into waterways (RPP 2.1.3.3 and 2.1 Town F) with particular emphasis along Scorton Creek.	NR	DPW, PB, BOA, BOS, BOH, CC	MT
NR-A-1.3	Encourage and support funding of volunteer water quality monitoring programs such as the Cape Cod Pond and Lake Stewardship program to monitor water quality of the Town's ponds, lakes and streams (RPP 2.1 Town G).	NR	BOH, CC	MT
NR-A-1.4	Continue to implement regulations for the Three Ponds District of Critical Planning Concern in South Sandwich.	NR	All Town boards	Ongoing
NR-A-1.5	Evaluate and, if necessary, mitigate stormwater drainage patterns into ponds and streams.	NR	DPW, BOH, CC	Ongoing
Goal NR-2	**Preserve and manage coastal areas to safeguard and perpetuate their biological, economic, historic, maritime, and aesthetic values (RPP 2.2.1).**			
Policies				
NR-P-2.1	Enable fishing, shellfishing, waterfowling, birdwatching, swimming and boating to continue for the enjoyment of residents and to support the town's tourist economy as well as native industries of commercial fishing and shellfishing.	NR	REC, DPW, BOH, CC	Ongoing
NR-P-2.2	Encourage development or redevelopment along coastal areas that does not interfere with or obstruct existing public access, traditional public rights of way, and environmentally appropriate use of the shoreline (RPP 2.2.1.1).	NR		Ongoing
NR-P-2.3	Encourage development and redevelopment that maintains and enhances views of the shoreline from public ways, waterways, access points, and existing development (RPP 2.2.1.4).	PDO	NR, DPW, BOH, CC	Ongoing
NR-P-2.4	Pursue management and opening of public vistas (e.g. Route 6 rest area at exit 2).	PDO		Ongoing
Actions				Ongoing
NR-A-2.1	Monitor and, if necessary, mitigate untreated stormwater or wastewater discharges into coastal waters or wetlands (RPP 2.2.3.2).	NR	BOH, DPW, BOH, CC	Ongoing
NR-A-2.2	Protect shellfish habitat, wetlands, and public access by prohibiting the construction or expansion of docks and piers in significant shellfish habitat areas and encouraging shared community docks and piers as alternatives to separate structures serving individual lots (RPP 2.2.3.4).	NR	NR, CC, BOS, BOH	Ongoing

NR-A-2.3	Encourage development or redevelopment that is designed to minimize direct or indirect adverse impacts on eelgrass beds and fish, shellfish and crustacean habitat (RPP 2.2.3.7 & 2.2.3.8).	NR	NR, CC, BOH	Ongoing
NR-A-2.4	Support nomination of portions of waterways as federal EPA No Discharge areas for boats (RPP 2.2 Town E).	NR	BOH, Harbormaster, NR, CC	MT
NR-A-2.5	Continue water monitoring to enable safe re opening of Scorton Creek for shellfishing.	NR	REC, CC, BOH	ST
NR-A-2.6	Cooperate in efforts to restore the Sagamore Marsh to a tidally flushed ecosystem.	NR	CC	Ongoing
Goal NR-3	**Protect Sandwich's unique natural features to maintain biological diversity and preserve the Town's scenic character.**			
Policies				
NR-P-3.1	Protect and preserve the value of identified lands for wildlife habitat, rare plants and animals, unfragmented woodlands and historic resources, farms and bogs, and scenic areas through regulatory and non-regulatory means.	NR	CC, BOS	Ongoing
NR-P-3.2	New development or redevelopment should be clustered away from sensitive resources and maintain a continuous corridor to preserve interior wildlife habitat and migration corridors (RPP 2.5.1.1).	NR	CC, BOS	Ongoing
NR-P-3.3	Protect the town's scenic resources by preserving the natural features, cranberry bogs, farms, fields and woodlands of Sandwich, in particular the Ridge, Scorton Creek and South Sandwich ponds, and ensure that views of these features are available to residents and tourists alike.	NR	CC, BOS	Ongoing
NR-P-3.4	Protect significant historical sites or areas by acquiring or protecting lands and structures, particularly along, but not limited to Route 6A, Spring Hill, Shawme Ponds, Twin Ponds, Cow River, Scorton Creek, Old Harbor Estuary, Hog Pond, Snake Pond, Pimlico Pond, Nye Pond, Weeks Pond, Triangle Pond, Lawrence Pond, Spectacle Pond, Hoxie Pond, Peters Pond views from the ridge, and the Ryder Bog/Mashpee Lake viewshed, which contribute to the unique Cape Cod character of the town, provide historical, prehistoric or educational perspectives, and/or meet the criteria of the National Register of Historic Places or the Massachusetts Historic Commission.	NR	CC, BOS	Ongoing
Actions				
NR-A-3.1	Amend town zoning bylaw to limit land clearing and alteration of natural topography prior to development review (RPP 2.4 Town C).	PDO	NR, PB, BOS, CC, NR	MT
NR-A-3.2	Identify and certify all vernal pools (RPP 2.4 Town A).	NR	CC	Ongoing
NR-A-3.3	Pursue protection of properties on or near The Ridge and Three Ponds Area for conservation/recreation use.	TA	PDO, PB, NR, CPA	Ongoing
NR-A-3.4	Encourage use of construction and design standards contained in "Designing the Future to Honor the Past: Design Guidelines for Cape Cod," Cape Cod Commission, 1994.	PDO	PB, NR, HC	Ongoing
NR-A-3.5	Where feasible, require placement of new utility lines underground.	PDO	PB	Ongoing
NR-A-3.6	Implement local recommendations of Route 6A Corridor Management Plan.	PDO	PB,HC, DPW, NR	Ongoing
NR-A-3.7	Where appropriate, the Town should encourage land owners to restore blighted or abandoned areas to open space, whether it be to landscaped parks or natural areas (RPP 2.5 Town H).	NR	CC & Various Town Boards and Agencies	Ongoing
NR-A-3.8	Work with MassHighway to open a viewshed to the Bay from the Route 6 westbound rest area on Telegraph Hill.	TA	BOS, PDO, DPW, Tree Warden, NR, CPA	Ongoing
NR-A-3.9	Continue to preserve land along Route 6A, particularly parcels in East Sandwich with fragile natural resources.	PDO	NR, LB, CPA, BOS	Ongoing
NR-A-3.10	Install proper signage and covenants to protect public usage of ancient ways, such as Kiah's Way.	DPW	PB, BOS, PDO, NR	Ongoing

Goal NR-4	**Mitigate natural hazards of storm flooding & sea level rise.**			
Policies				
NR-P-4.1	Establish Minimum Performance Standards for new development or redevelopment in all FEMA flood zones as recommended by the Cape Cod Commission (RPP 2.2.2.1 – RPP 2.2.2.13).	BD	PDO, NR, PB	Ongoing
NR-P-4.2	Respond to heavy public use of certain town and state properties by designing appropriate erosion control measures and relocating heavily used trails.	BD	PDO, NR, PB	Ongoing
Actions				
NR-A-4.1	Amend zoning bylaw to prohibit new non-water dependent development and redevelopment on barrier beaches or coastal dunes (RPP 2.2.2.3).	PDO	CC, NR, PB, TM	ST
NR-A-4.2	Amend zoning bylaw to ensure that new development or redevelopment is designed to accommodate relative sea-level rises and the landward migration of coastal resources (RPP 2.2.2.2, 2.2.2.7 & 2.2.2.8).	PDO	CC, NR, PB, TM	ST
NR-A-4.3	Amend local wetlands protection bylaw to accommodate inland migration of saltwater wetlands, where feasible, based on a 2 flood zones, except where the height of the first floor elevation meets or exceeds the 100 foot sea level rise.	PDO	CC, NR, PB, TM	MT
NR-A-4.4	Encourage the use of “soft” solutions to coastal erosion such as beach nourishment, beach grass plantings and related activities at town beaches, particularly Town Beach (RPP 2.2 Town C).	PDO	CC, NR, PB, TM	MT
Goal NR-5	**Encourage Alternative Transportation on Safe Routes to Reduce Congestion, Conserve Energy & Improve Air Quality**			
Policies				
NR-P-5.1	Promote walking and bicycle paths throughout town (except where safety precludes it, such as along Route 6A) and connecting to long-distance trail systems.	REC	PDO, BOS, DPW, RC	Ongoing
NR-P-5.2	Encourage the use of the Service Road as a safe bikeway alternative.	REC	PDO, BOS, DPW, RC	Ongoing
Actions				
NR-A-5.1	Explored development of the Service Road as a recreational corridor.	REC	PDO, BOS, DPW, RC	MT
NR-A-5.2	The Town should continue to work with the Cape Cod Commission, property owners, local organizations, and the Town of Barnstable to implement the Cape Cod Pathways project and to identify and promote alternative modes of travel on Cape Cod such as bicycling and pedestrian facilities, local and regional public transit systems, water transportation, and ride-sharing programs in order to reduce air emissions.	REC	PDO, BOS, DPW, RC	Ongoing
Goal NR-6	**Encourage the use of public and private sewage treatment facilities in appropriate areas where they will provide environmental or other public benefits and where they can be adequately managed and maintained.**			
Policies				
NR-P-6.1	Private treatment facilities should be constructed only if there are no feasible public treatment facility options available within three years of the proposed date of construction of a project.	BOH	TA, SD, DPW, TE, PDO	Ongoing
NR-P-6.2	All public and private communal sewage treatment facilities should be designed to achieve tertiary treatment with denitrification that meets a maximum total nitrogen discharge standard either through advanced treatment in the effluent or in groundwater at the downgradient property boundary.	BOH	TA, SD, DPW, TE, PDO	Ongoing
NR-P-6.3	The construction of private sewage treatment facilities (PSTFs) should not allow development to occur at a higher overall density than would be allowed by local zoning.	BOH	TA, SD, DPW, TE, PDO	Ongoing

NR-P-6.4	The construction of PSTFs should be consistent with municipal capital facilities plans. The town should be provided the opportunity to assume ownership and maintenance responsibilities for such facilities where desired by the municipality.	BOH	TA, SD, DPW, TE, PDO	Ongoing
NR-P-6.5	PSTFs should not be constructed in FEMA V-zones and floodways, Areas of Critical Environmental Concern (ACECs), wetlands and buffer areas, barrier beaches, coastal dunes, or critical wildlife habitats. PSTFs may be constructed in FEMA A-zones only to remediate water quality problems from existing development within such A-zones and consistent with CCC RPP Minimum Performance Standards 2.2.2.2 and 2.2.2.6, except as provided in Minimum Performance Standard 2.2.2.11.	BOH	TA, SD, DPW, TE, PDO	Ongoing
NR-P-6.6	The long-term ownership, operation, maintenance and replacement of PSTFs should be secured as a condition of approval in accordance with local, regional and state guidelines.	BOH	TA, SD, DPW, TE, PDO	Ongoing
NR-P-6.7	Applications for approval of public and private sewage treatment facilities should include a plan for sludge disposal.	BOH	TA, SD, DPW, TE, PDO	Ongoing
Actions				
NR-A-6.1	Evaluate the potential for use and expansion of the small wastewater treatment systems at the Forestdale School and Oakdale School for connections to surrounding existing and desired future development	BOH	TA, SD, DPW, TE, PDO	ST
NR-A-6.2	Rexamine the potential for a public wastewater treatment plant that would service the Historic Village, Route 6A, Tupper Road, Marina and Town Neck Area.	BOH	TA, SD, DPW, TE, PDO	ST
NR-A-6.3	Evaluate the potential to connecting to the wastewater treament plant on the Massachusetts Military Reservation to sevice the South Sandwich and Forestdale sections of town.	BOH	TA, SD, DPW, TE, PDO	ST
NR-A-6.4	Evaluate the potential for a new public wastewater treatment system within the South Sandwich Village Center or Sandwich Industrial Pak to service existing and potential growth in the surrounding areas.	BOH	TA, SD, DPW, TE, PDO	ST
Goal NR-7	**Protect the overall water quality of the aquifer and its resources by providing adequate storm water management and treatment.**			
Policies				
NR-P-7.1	Storm water should be managed and infiltrated on site to minimize runoff and maximize water quality treatment. Storm water treatment designs should be based upon a 25-year 24-hour storm and attain 80% total suspended solids removal and at a minimum be consistent with Massachusetts Storm Water Policy Guidelines.	DPW	PDO, BD, NR, PB	Ongoing
NR-P-7.2	Development and redevelopment should use low impact design (LID) and best management practices (BMP) such as vegetated swales and non-structured wetland detention basins for treatment prior to infiltration. Non-structured wetland detention basins and vegetated swales may be counted as open space within Wellhead Protection Areas.	DPW	PDO, BD, NR, PB	Ongoing
NR-P-7.3	Structured detention basins, infiltration basins and galleries should be considered in targeted economic centers provided that minimum performance standards for storm water are met. Infiltration basins or other storm water leaching structures should maintain a two-foot separation between maximum high water table and point of infiltration.	DPW	PDO, BD, NR, PB	Ongoing
NR-P-7.4	Larger development and redevelopment projects should prepare a storm water maintenance and operation plan for approval by the town. The plan should, at a minimum, include a schedule for inspection, monitoring, and maintenance and shall identify the party responsible for plan implementation.	DPW	PDO, BD, NR, PB	Ongoing
NR-P-7.5	In Wellhead Protection Areas, storm water systems for land uses that have a high risk of contaminating groundwater, such as vehicle maintenance areas and loading docks, should install a mechanical shut-off valve or other flow-arresting device between the catch basin or other storm water-capture structure draining this area and the leaching structures.	DPW	PDO, BD, NR, PB	Ongoing
Actions	*See Public Facilities and Services Action Plan*			
Goal NR-8	**Sandwich town government will play an active role in protecting and restoring town coastal resources.**			
Policies				

NR-P-8.1	Preserve and restore the quality and quantity of inland and coastal wetlands in Sandwich.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.2	Control development and redevelopment in high hazard areas in order to minimize loss of life and structures and the environmental damage resulting from storms, natural disasters and sea level rise.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.3	Maintain and improve coastal water quality to permit shellfishing and/or swimming in all coastal waters, and to protect coastal ecosystems which support shellfish and finfish habitat.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.4	Devise local regulatory approaches that mesh with or strengthen the zoning bylaws and other regulations governing land uses and activity along the coast. (See Sustainability Action Plan).	PDO	NR, BD, TE, BOH, TA	Ongoing
NR-P-8.5	Manage the variety of uses that occur along the coast and discourage the resulting negative impacts.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.6	Promote a range of active and passive nature opportunities along its coastline and will work to create and enhance parking facilities for the coastline.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.7	Maintain Sandwich's naturally sandy beaches and prevent erosion from damaging the town's shoreline.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.8	Pursue beach renourishment programs.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.9	Work to restore the Town Beach ecosystem to a more attractive recreation area.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.10	Manage and evaluate the use and reuse of the Marina to maximize its recreational and water-dependent uses while minimizing negative impacts.	PDO	HM, NR, BD, TE, BOH, TA	Ongoing
NR-P-8.11	Undisturbed buffer areas of at least 100 feet in width surrounding coastal wetlands and/or landward of the mean high water mark of coastal waterbodies should be protected.	NR	PDO, BD, TE, BOH, TA	Ongoing
NR-P-8.12	In addition to Scorton Creek (protected by an ACEC designation), the remaining Sandwich coastline, especially Old Harbor, should be protected by a District of Critical Planning Concern (DCPC). The goals of the DCPC would be to regulate development, protect the watershed, encourage use of denitrifying septic systems for non-seasonal units, decrease erosion, reduce road runoff and the use of fertilizers and pesticides. Furthermore, the town should support limiting development in the coastal zone (per RPP goal 2.2.2), particularly in high-hazard areas, in order to protect the natural beneficial functions of coastal resources so that they serve to prevent or minimize human suffering and loss of life and property or environmental damage.	NR	PDO, BD, TE, BOH, TA	Ongoing
Actions				
NR-A-8.1	Define coastal management districts through zoning or other town regulations within which coastal protection regulations or policies apply such as rebuilding provisions.	PDO	NR, BD, TE, BOH, TA	ST
NR-A-8.2	Ensure through site plan and special permit review that all development or redevelopment along the coastline shall not interfere with existing public access and appropriate uses of the shoreline.	PDO	NR, BD, TE, BOH, TA	ST
NR-A-8.3	Work toward adoption of a harbor management plan. Grant monies may be available to fund such a study.	HM	PDO, BD, TE, BOH, NR, TA	MT
NR-A-8.4	Address water quality issues in order to restore shellfish beds to allow recreation and commercial shellfishing. Licensing shellfish grants along the coastline should be reviewed by the Town.	NR	PDO, BD, TE, BOH, NR, TA	MT
NR-A-8.5	Adopt a beach management strategy. Work with the Army Corps of Engineers and other appropriate federal, state and local officials to mitigate the "Scusset Beach sand accretion-Town Beach sand erosion" problem. Explore a variety of options including sand pumping; removing or shortening ACOE jetties; and renourishment with dredge material or overland with sand from Scussett Beach. Increase public education about the importance of the protection provided by barrier beaches.	NR	PDO, BD, TE, BOH, NR, TA	MT
NR-A-8.6	Require upgrades and educate the public about the importance of proper septic system maintenance and replacement to the overall protection of coastal resources.	BOH	PDO, BD, TE, NR, TA	MT
NR-A-8.7	Review and evaluate the amount of staff provided to the environmental, health and planning departments in Town and determine whether increased support is necessary.	TA	PDO, BD, TE, BOH, NR	ST
NR-A-8.8	Require consistency with the Cape Cod Commission's Design Manual through a site plan review process.	PDO	BD, TE, BOH, NR, TA	MT

NR-A-8.9	Revise land use regulations as needed to address key upland issues related to coastal resource protection from obtrusive structures, which could detract from the visual impact from the coast of the horizon along the ridge. Evaluate the potential for design guidelines for development along the coastline to encourage consistency with desired maritime/architectural characteristics.	PDO	BD, TE, BOH, NR, TA	ST
NR-A-8.10	Implement the Sandwich Pre-Disaster Mitigation Plan to mitigate natural hazards.	NR	PDO, BD, TE, BOH, NR, TA	MT
Goal NR-9	**Prevent loss or degradation of critical wildlife and plant habitat, minimize the impact of new development on wildlife and plant habitat, and maintain existing populations and species diversity.**			
Policies				
NR-P-9.1	Measures to restore altered or degraded inland and coastal wetlands, including nonstructural bank stabilization, revegetation, and pond shore restoration and reclamation should be encouraged.	NR	PDO, BD, TE, BOH, NR, TA	Ongoing
NR-P-9.2	Stormwater management plans for new development shall preclude direct discharge of untreated stormwater into natural wetlands and waterbodies. New stormwater discharges shall be located a minimum of 100 feet from wetlands and waterbodies.	NR	PDO, BD, TE, BOH, NR, TA	Ongoing
NR-P-9.3	Construction of artificial wetlands for stormwater management may be permitted in appropriate areas where there will be no adverse impact on natural wetlands, waterways and ground water.	NR	PDO, BD, TE, BOH, NR, TA	Ongoing
NR-P-9.4	Management practices that would improve water quality and conserve water as recommended by the Soil Conservation Service should be encouraged in agricultural areas abutting wetlands and their buffers.	NR	PDO, BD, TE, BOH, NR, TA	Ongoing
NR-P-9.5	Disturbance of wetlands and buffer areas for operation and maintenance of underground and overhead utility lines (electrical, water, communication, sewer and gas lines) may occur under uncontrolled conditions and that the Conservation Commission has the authority to review these activities. Installation of new utility lines through these areas may occur where the permitting authority finds that the proposed route is the best environmental alternative for locating such facilities. In all instances, disturbance of wetlands and buffer areas shall be minimized and surface vegetation, topography and water flow shall be restored substantially to the original condition.	NR	PDO, BD, TE, BOH, NR, TA	Ongoing
Actions				
NR-A-9.1	Map all existing vernal pools. Vernal pools and all wetlands, including isolated wetlands, should be protected by a minimum of 100-foot naturally vegetated buffer strip.	NR	CC, BD, PDO	ST
NR-A-9.2	The Conservation Commission should enact Wetlands Regulations and Policies.	NR	CC, PDO	ST
NR-A-9.3	Replication of wetlands should be limited. As a policy, wetland alteration is not supported in Sandwich, and where impacts are unavoidable, the Conservation Commission may permit wetlands replications as mitigation. When allowed, the Conservation Commission should have detailed regulations for submittal requirements for application, performance standards, specific construction methodology standards and a specific monitoring program.	NR	CC, BD, PDO	Ongoing
NR-A-9.4	Board of Health setback regulations should be based upon the same wetlands definitions found in the Regulations promulgated under Chapter 7 of the Town Bylaw.	BOH	NR, PDO, BD	Ongoing
NR-A-9.5	New Title V and local regulations should be strongly enforced to reduce failed septic systems. The Board of Health Agent should give a report on compliance in the Town Report.	BOH	TA	Ongoing
NR-A-9.6	The Town Engineer and Director of Public Works should develop a plan with the Natural Resources Officer and Health Agent to mitigate road runoff and drainage problems. The plan should be consistent with the Towns Storwmater Management Plan. Conservation Commission Wetlands Regulations or Policies should address these issues.	DPW	TE, DPW, NR, CC, PDD	ST
NR-A-9.7	Integrate the wildlife corridors and enhance protection of ecosystems through the expansion of public land holdings.	NR	CC, RD, PDO	MT
NR-A-9.8	Special Permit requirements should include a wildlife and plant life inventory.	PDO	CC, BD, NR, PB	Ongoing
NR-A-9.9	Regulations should be enacted that would require undisturbed lateral buffers to reduce nitrate loading and phosphate loading within pond and embayment watersheds which is an increasing problem as evidenced by algae growth.	BOH	CC, BD, PDO, NR, PB	MT
NR-A-9.10	Clearing of vegetation and alteration of natural topography should be minimized, with native vegetation planted as needed to enhance or restore wildlife plant habitat. Standing specimen trees should be protected. Town Boards should require the plantings of indigenous plant species.	NR	CC, BD, PDO, PB	Ongoing

NR-A-9.11	Development that would adversely affect habitat of local populations of rare wildlife and plants should not be permitted. Developments may be permitted where the proponent can demonstrate that such development will not adversely affect such habitat. A wildlife and plant habitat management plan may be required as a condition of approval when development or redevelopment is permitted in critical wildlife and plant habitat areas.	NR	CC, BD, PDO, PB	Ongoing
Goal NR-10	**Implement the Flood Hazard Mitigation Plan**			
Policies				
NR-P-10.1	Update and improve understanding of natural and anthropogenic changes and development pressures on coastal systems (e.g., salt marshes, dunes, barrier beaches).	NR	CC, BD, PDO, PB	Ongoing
NR-P-10.2	Identify areas and specific structures that have and may sustain damage from coastal flood and erosion events.	BD	CC, NR, PDO, PB	Ongoing
NR-P-10.3	Disseminate information about floodplain and erosion hazards and mitigation measures to owners located to landowners along the shore.	NR	CC, BD, PDO, PB	Ongoing
NR-P-10.4	Adopt and implement mitigation measures that exceed minimum floodplain management requirements of the NFIP.	NR	CC, BD, PDO, PB	Ongoing
NR-P-10.5	Enhance shoreline erosion prevention measures.	NR	CC, BD, PDO, PB	Ongoing
Actions				
NR-A-10.1	Coordinate emergency evacuation measures, education and routes on a regional level. Emergency evacuation measures and plans shall be reevaluated and coordinated at a regional level to address evacuees backed-up on Rte. 6, Mid-Cape Highway and shelter needs at Camp Edwards or other suitable location. Funds shall be expended to procure additional professional assistance to assist the town in the development and upgrade of the Emergency Management Plan.	EMPC	TA and other departments or agencies as designated by the TA.	ST
NR-A-10.2	Increase public awareness, though signage and other appropriate methods, of evacuation routes and to increase public awareness about the geographic areas potentially subject to flood and erosion damage from coastal storms, hurricanes or any other causes.	EMPC	TA and other departments or agencies as designated by the TA.	ST
NR-A-10.3	Update the definitions of flood zones in the zoning bylaw according to the most recent FIRMs. The zones would include AE, AO, VE and X, at a minimum.	PDO	BD, NR, BOH	ST
NR-A-10.4	Implement Conservation Commission jurisdiction under the town wetlands by-laws in the 500-year flood plain at elevation 12 NGVD in anticipation of sea level rise.	NR	CC	MT
NR-A-10.5	Increase the base flood elevations also known as freeboard in AE zones by 1 foot.	PDO	BD, NR, BOH and Public Safety Agencies	MT
NR-A-10.6	Require all new or substantial improvement dwellings within 100 feet of the beach/dune boundary be relocated as far landward as feasible.	BD	NR, BOH, PDD	MT
NR-A-10.7	Require lowest structural members cross bracing to be perpendicular to the beach.	PDO	BD, NR, BOH and Public Safety Agencies	MT
NR-A-10.8	Evaluate and take appropriate measures to mitigate any downstream impacts of flooding from the failure of Shawme Pond Dam.	NR	DPW, TE	ST
NR-A-10.9	Prioritize acquisition of properties damaged by future storms from willing sellers with state and federal funds.	NR	NR, BD, DPW, TA in coordination with state and federal agencies.	ST
NR-A-10.10	Identify temporary evacuation shelter in Scorton Neck area that would be available when sections of Route 6A are isolated during flooding.	EMPC	TA and other departments or agencies as designated by the TA.	ST
NR-A-10.11	Identify, fund and implement actions necessary to participate in the Community Rating System.	NR	BD, DPW, TA in coordination with state and federal agencies.	ST
NR-A-10.12	Inventory and evaluate potential for flood damage from any inland flood sources such as dams, ponds and creeks.	NR	NR, public safety agencies, professional consultant.	ST

NR-A-10.13	Evaluate flood-prone roadways and take appropriate action to alleviate flooding on these roadways or portions of these roadways. Such actions include but are not limited to elevation of roadbed and construction of dikes or low walls. Improve drainage facilities to alleviate flooding caused by heavy rains. Develop appropriate standards to guide and govern reconstruction of flood-damaged roadways.	NR	PDO, FD, DPW, TE, PDD, EMPC	ST
NR-A-10.14	Elevate or flood-proof, above the base flood elevation at a minimum, all publicly owned buildings	BD	TA, BD, PDD, TE, BOH	MT
NR-A-10.15	Evaluate and take measures to mitigate tidal restrictions identified by the Cape Cod Atlas of Tidally Restricted Salt Marshes and any other sources.	NR	NR, DPW, TE, BOH	MT
NR-A-10.16	Maintain dune form and volume on the barrier beaches by prohibiting activities that remove the sand from the coastal system and by encouraging the planting of beach grass or other native non-invasive plant materials to keep the sand in the coastal system. Prepare public outreach through personal contact, signage and educational materials. Natural Resources Department, Conservation Commission.	NR	CC	MT
NR-A-10.17	Establish a Memorandum of Understanding with the U.S. Army Corps of Engineers and the Mirant power station and owners of any other properties, which require or may require dredging from within town limits, from the Cape Cod Canal or from other water bodies to formalize commitments, design and permitting to deposit compatible dredged material on town beaches as appropriate.	BOS	NR, TA, ACOE, Mirant	MT
NR-A-10.18	Monitor beach profiles with assistance from Woods Hole Oceanographic Institute Sea Grant Program. Coordinate coastal property owners, college students, high school students and other volunteers through the Natural Resources Department and Woods Hole Oceanographic Institute Sea Grant Program.	NR	WHOI	ST
NR-A-10.19	Evaluate, design and construct beach and dune nourishment programs along the Sandwich coastline.	NR	TA, ACOE, Mirant	MT
NR-A-10.20	Install sand retention devices and plant beach grass or other non-invasive native plant material to address erosion of coastal landforms.	NR	CC with other appropriate agencies.	MT
NR-A-10.21	Secure relocation funds from federal and state sources to assist willing landowners to move structures landward away from damage prone areas. Prioritize repetitive loss properties for acquisition by November 2003. Acquire properties as federal and state funds become available.	NR	TA, BD, TE	MT
NR-A-10.22	Fund and implement a program through federal and state funds to retrofit residential structures to alleviate damage from flooding.	NR	BOH, BD, TE	MT

10.4 Economic Development Goals, Polices and Action Plan

Economic Development Action Plan				
Goals/ Policies/ Actions	**Policies and Actions**	**Leader**	**Partners and Stakeholders**	**Timeframe**
Goal ED-1	**To promote a local economy that is compatible with Sandwich's environmental, cultural, and economic strengths, and to ensure appropriate and viable economic development.**			
Policies				
ED-P-1.1	Sandwich shall facilitate the development of a mix of clean, light industrial and commercial uses that provide steady year-round employment opportunities, diversify the tax base, provide positive opportunities for new and existing businesses, and service the needs of residents.	PDO	All Town Dept., BOS and Town Meeting	Ongoing
ED-P-1.2	Sandwich shall retain and develop local businesses within the scope of the overall economic development planning strategy. New businesses shall be evaluated for their job creation potential, and capability for providing needed services to residents. Sandwich shall also consider development impacts on the growth or activity centers where such businesses are to locate. Retention of capital now going outside the local economy, as well as occupational and salary opportunities for residents, shall be a high priority when determining desired business activities.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
Actions				
ED-A-1.1	Sandwich shall work with the Cape Cod Economic Development Council and other organizations to identify and attract businesses with year-round economic benefits. Potential opportunities include but are not limited to crafts; home occupations; tourism; marine science; business services of all types; clean, light industry or manufacturing such as computer information design and assembly; environmentally-oriented businesses; information networking; shellfishing and aquaculture; agriculture; health services; support services for the retired population; incubator businesses; and private cultural and recreational facilities.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
ED-A-1.2	Sandwich shall work with any appropriate economic and environmental agencies to resolve planning issues, in order to expedite the development and marketing of the Town's growth centers. Arrangements could include development agreements, financial assistance or incentives, marketing support, and streamlining the permitting and development review processes.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
ED-A-1.3	Sandwich shall work with the Regional Technology Development Council to attract resource-based economies such as agriculture, fishing and shellfishing, and aquaculture.	PDO	All Town Dept., BOS, EDC, SCC, RTDC	Ongoing
ED-A-1.4	Sandwich should consider the use of impact fees relative to infrastructure needs and to assist in directing growth to strategic planning areas.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
Goal ED-2	**Facilitate Desired Mixed Use Development in the South Sandwich Village Center District**			
Policies				
ED-P-2.1	The Business Limited 2 district in South Sandwich shall be revised to incorporate the principles of Smart Growth and Sustainable Design emphasizing moderate density mixed use, low impact design, integration of civic uses and open spaces, improved site design procedures, and the creation of internal connecting roadways and walkways.	PDO	CCC, PB, TA, BOS, EDC, SCC and Town Meeting	ST

Actions				
ED-A-2.1	The town shall work with the EDC, Sandwich Chamber of Commerce, developers and area residents to attract the following mix of business, civic and residential activities:	PDO	PDD, TA, BOS, EDC, SCC	ST
	For-profit financial and health care services, and education facilities such as a corporate training center.			
	High technology activities (environmental, communications, biotechnology etc.) within the restrictions of the water recharge area regulations.			
	For-profit entertainment opportunities (e.g., movie theater, bowling alley, arts center, high quality sports facilities).			
	Townhouses, garden apartment, congregate housing and other moderate density residential opportunities (e.g., Thirwood Place, Kings' Row) as a commercial venture.			
	Retail stores to service primarily the surrounding neighborhoods and passing traffic on Route 130.			
	Civic uses such as the new municipal campus, formal and informal open spaces and recreational facilities, senior center, and branch library.			
ED-A-2.2	Maintain open space to accommodate nitrate loading requirements for the area as necessary. Maximizing pedestrian use of this area and minimizing vehicle entry and exit onto bordering roadways shall be emphasized. The Town should explore the possibilities for future passive recreational uses of the State-owned land within the district.	REC	All Town Dept., BOS, EDC	ST
Goal ED-3	**Facilitate Desired Development in the Sandwich Industrial Park and Zoning District**			
Policies				
ED-P-3.1	Existing and new uses should be carefully monitored to ensure the safety of the public water supply recharge area zone of contribution. New uses shall be added that are found to be appropriate in scale and compatibility with the conditions and the restrictions associated with water resource protection.	SWD	All Town Dept., BOS, EDC, SWD	ST
Actions				
ED-A-3.1	The town shall work with the EDC, Sandwich Chamber of Commerce, developers and area residents to attract an appropriate mix of business in the following sectors:	PDO	TA, BOS, EDC, SCC	Ongoing
	Clean, light industries			
	Manufacturing			
	Large-scale office complexes.			
	Recreation or entertainment facilities.			
	Distribution centers and warehousing.			
	Service businesses.			
ED-A-3.2	The Town shall enforce existing permit conditions with regard to water resource protection and landscaping, and encourage visual beautification and landscaping improvements in new developments.	PDO	CCC, PB, TA, BOS, EDC, SWD and Town Meeting	ST
ED-A-3.3	The Town shall pursue viable methods for handling wastewater to more fully protect the public supply well zone of contribution. These methods could include sewering, waste pre-treatment, gray-water recycling, and water-saving devices. Installation of any wastewater treatment facility may allow for a heavier flow of wastewater to be treated for nitrogen and other nutrients so that a wider range of uses can be allowed in the Industrial Zone.	PDO	CCC, PB, TA, BOS, EDC, SWD and Town Meeting	ST
ED-A-3.4	Strict adherence to the prohibitions and limitations on the transfer, storage and handling of materials hazardous to the public water supply shall be maintained.	PDO	CCC, PB, TA, BOS, EDC, SWD and Town Meeting	ST

ED-A-3.5	Vehicle access to and circulation within the Industrial Park and Zone shall be planned to allow sufficient access to businesses without substantially increasing individual or excessively wide curbuts from Route 130.	PDO	DPW, TA, BOS, EDC	MT
ED-A-3.6	The Town shall provide incentives through the Economic Opportunity Area (EOA) designation to reclaim the gravel pit area or to allow businesses to actively reclaim the land.	PDO	TA, BOS, EDC, SCC	MT
Goal ED-4	**Facilitate Desired Development in the Route 6A/Tupper Road/Town Marina Area**			
Policies				
ED-P-4.1	Preserve and support the mixed-use character of the area. This is the western gateway to the town by land and by sea, and should be recognized for its value in attracting visitors to the area.		All Town Dept., BOS, EDC, SCC	Ongoing
ED-P-4.2	Planning efforts in this area shall be compatible with and supportive of existing development. Uses that may enhance this area include the following:	PDO	TA, BOS, EDC, SCC	Ongoing
	Small scale business and professional offices mixed with the complementary residential and commercial uses that currently exist.			
	Uses designed to provide services to pedestrians and boat visitors from the Marina.			
	Aquaculture			
	Small retail activity suitable to serve visitors to the Marina and commercial fishermen.			
	Marine research and institutional uses.			
	Boating and other outdoor recreation activities.			
	Commercial fishing.			
	Lodging and conference facilities			
	Moderate density residential (e.g. condominium, townhouses and similar residential uses)			
	Business park (potential on the north side of Tupper Road).			
Actions				
ED-A-4.1	The Town shall initiate a comprehensive parking and traffic flow assessment and strategy for the Route 6A/Tupper Road/Town Marina Area.	DPW	PDO, TA, BOS, EDC	ST
ED-A-4.2	The Town shall work with the Army Corps of Engineers and business community to expand the marina for seasonal boat slips, transient pleasure boats and commercial fishing.	HM	PDO, DPW, TA, BOS, EDC	MT
Goal ED-5	**Facilitate Desired Development in the Route 6A/Historic Village Area**			
Policies				
ED-P-5.1	Sandwich shall preserve the historical character of the Village while maintaining and improving its attractiveness to tourists.	HC	All Town Dept., BOS, EDC, SCC	Ongoing
Actions				
ED-A-5.1	With limited parking availability, activities that promote pedestrian use are of utmost importance and will be encouraged by the town.	BOH	PDO, DPW, TA, BOS, EDC	ST
ED-A-5.2	Visually improve the area from Jarves Street to the Rte. 6A/Tupper Rd. split, through creative landscaping, screening, enforcement of the sign code, decreasing curb cuts, and recycling and improving the appearance of existing buildings. Consider offering appropriate incentives to property owners or enlisting the help of local organizations to accomplish this. New commercial ventures will be discouraged along the Charles St. to Quaker Meetinghouse Rd. section. Every effort will be made to preserve agricultural land in this area.	PDO	DPW, TA, BOS, EDC	ST

ED-A-5.3	Encourage small-scale economic development in existing buildings that would also attract pedestrian tourists (e.g., small outdoor cafes, specialty shops, country store, etc.). Evaluate zoning bylaws to ensure that this type of use is encouraged in targeted areas such as in the Historic Village and Town Marina Area.	PDO	DPW, TA, BOS, EDC	Ongoing
ED-A-5.4	Direct pedestrians exiting the train at the rail station toward the Boardwalk area as well as toward the village. Consider developing a historical walking map that will highlight natural and historical landmarks as well as commercial enterprises in the Village that would be attractive to visitors.	PDO	DPW, TA, BOS, EDC	ST
ED-A-5.5	Upgrade the public restrooms across from Town Hall and encourage CCC Railroad to install a rest room at or near the train platform on Jarves Street.	PDO	DPW, TA, BOS, EDC	MT
ED-A-5.6	Facilitate the development of compatible uses and buildings along Route 6A between Mill Creek and Pleasant Street to expand economic development opportunities in the historic village, create more attraction for visitors and enhance the gateway into Sandwich. New development or redevelopment should be similar in design and follow the traditional village development patterns with mixed use, 2 to 3 stories, parking located to the side and behind the buildings, sidewalks and formal streetscapes.	PDO	DPW, TA, BOS, EDC	MT
ED-A-5.7	Create a Village zoning district that would be sensitive to the historical character of the Village and at the same time, allow, by special permit, more appropriate uses than currently exist within the Zoning By-laws.	PDO	All Town Dept., BOS, EDC, SCC, Town Meeting	ST
Goal ED-6	**Maintain and enhance the character of East Sandwich and Forestdale.**			
Policies				
ED-P-6.1	Sandwich will strive to maintain the rural/suburban character of these areas by encouraging a mix of residential and in-home businesses.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
Actions				
ED-A-6.1	Create a Village zoning district that would be sensitive to the historical character of the area and at the same time, allow, by special permit, more appropriate uses than currently exist within the Zoning By-laws. Businesses, such as a local general store, bank, small offices, retail stores, and post office shall be encouraged, to provide services for residents of the village areas and to create village centers.	PDO	All Town Dept., BOS, EDC, SCC, Town Meeting	ST
ED-A-6.2	Improve pedestrian access to Historic Village and Town Marina Area shops, restuarants and services by identifying and installing trolley bus stops along the way. Encourage tourists to park and use town transportation in conjunction with the pedestrian walkways.	PDO	All Town Dept., BOS, EDC, SCC	MT
Goal ED-7	**Facilitate selected economic development opportunities in the Ridge District.**			
Policies				
ED-P-7.1	Sandwich shall re-examine zoning in this area and consider eliminating the planned unit development requirement, which blocks the financial advantages of economic development. New zoning should be specifically designed to preserve the visual aspects and topography of the land, while allowing for economic growth areas such as medical, research, and technology. New zoning should not infringe upon the residential neighborhoods existing within the area.	PDO	PB, TA, BOS, EDC, SCC	ST
Actions				

ED-A-7.1	Sandwich shall consider designating available land in the area surrounding the Rehabilitation Hospital of Cape Cod and the Islands a "growth center" designed to attract medical offices, therapy center, or other businesses ancillary to its medical focus. This zoning, also, should not infringe upon the residential neighborhoods existing within the area.	PDO	PB, TA, BOS, EDC, SCC	ST
ED-A-7.2	Sandwich shall preserve the Popple Bottom Rd. land for local access, and consider re-zoning land bordering Lawrence Pond for for-profit recreational purposes.	PDO	All Town Dept., BOS, EDC, SCC	ST
ED-A-7.3	Sandwich will encourage exploration of other uses for the gravel pit area for enhancing the economic development of the Town.	PDO	All Town Dept., BOS, EDC, SCC	MT
ED-A-7.4	Adopt a long-term development strategy for land in the Ridge District adjacent to the industrial zone.	PDO	All Town Dept., BOS, EDC, SCC	MT
Goal ED-8	**To locate development so as to preserve Sandwich's rural/suburban character and cultural heritage, minimize adverse impacts, and enhance the quality of life. Light industrial, commercial, and mixed use development shall be located in the designated growth centers where adequate infrastructure can be provided or developed. Economic development shall not threaten natural resources, public and private water supplies, and shall maintain and improve the Town's rural/suburban and historical character.**			
Policies				
ED-P-8.1	The character of Sandwich's villages shall be maintained and enhanced by allowing a mixed use of new and existing small-scale retail businesses, offices, home occupations, and community activities in these village center areas.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
Actions				
ED-A-8.1	Sandwich shall promote the re-use and rehabilitation of existing public and private buildings in Economic Centers for future commercial growth. One vehicle for achieving this is to use the incentives available under the Economic Opportunity Area designation.	PDO	All Town Dept., BOS, EDC, SCC	Ongoing
ED-A-8.2	Sandwich shall direct new businesses to locate in the appropriate Economic Centers. Primary consideration shall be given to those enterprises that will diversify the tax base and provide stable employment opportunities.	PDO	TA, BOS, EDC, SCC	ST
ED-A-8.3	Sandwich shall address the redesign, revitalization and infill of existing strip commercial developments.	PDO	TA, BOS, EDC, SCC	LT
ED-A-8.4	Sandwich shall address transportation issues that maximize economic development while preserving the rural/suburban character of the Town. This would include, but not be limited to, designing interior roadways for Economic Centers and creating areas more oriented to pedestrians and public transit.	PDO	DPW, TA, BOS, EDC	MT
ED-A-8.5	The Town shall identify necessary infrastructure improvements for all Economic Centers. These needs should become part of a capital improvement plan and may be funded with any combination of public, private, and/or grant moneys.	PDO	DPW, TA, BOS, EDC	MT
ED-A-8.6	Create a committee composed of the EDC, Planning and Development Director, and others who will actively seek grants, seek companies appropriate for the Town, and promote the Town's economic development strategy. This committee will also function as the EOA committee. (Check the Article that set up the EOA relative to the constitution of the EOA Committee).	PDO	TA, BOS	ST
ED-A-8.7	Work with the real estate development industry to promote the town as a retirement destination for older Americans, promoting the marina and off-season tourism, and finding firms for the designated growth centers and EOA designated areas.	EDC	PDO, TA, BOS, EDC, SCC	ST

Policies				
ED-P-8.2	The EOA committee shall be charged with producing long-range economic development objectives for approximately 200 acres within the Sandwich portion of the Massachusetts Military Reservation. Uses to be considered include, but are not limited to, the following:	EDC	PDO, TA, BOS, EDC, SCC	MT
	Profitable light industry including financial and health care.			
	Corporate education facility.			
	High technology (environmental, computer, and communication) businesses that conform to standards set to protect the environment.			
	Hotel (including large resort-type)/conference center.			
	Other uses similar to those allowed in the Growth Technology District.			
Actions				
ED-A-8.1	Work with the Cape Cod Commission to draft and adopt an impact fee system, betterment districts or other tools appropriate for mitigating development impact.	CCC	All Town Dept., BOS, EDC, SCC	MT
Goal ED-9	**To encourage the creation of year-round full and part-time employment opportunities.**			
Policies				
ED-P-9.1	Sandwich shall market itself to businesses that provide year-round employment opportunities, particularly opportunities that would be available to Sandwich residents. Using the EOA designation incentives will help achieve this goal.	PDO	TA, BOS, EDC, SCC	Ongoing
Actions				
ED-A-9.1	Special consideration should be given in special permitting process to enterprises that offer flexible, full and part-time, scheduling patterns that accommodate growing families, such as job sharing, longer shifts, school hours, and on-site child care.	PDO	TA, BOS, EDC, SCC	Ongoing
ED-A-9.2	Sandwich shall work with the Sandwich Chamber of Commerce to promote shoulder and off-season tourism.	SCC	TA, BOS, EDC, SCC	Ongoing
ED-A-9.3	The Town shall work to combine housing and economic development strategies directed toward the retired population.	EDC	TA, BOS, PDO, SCC	Ongoing
ED-A-9.4	The Town shall review the Home Occupation Zoning By-law and recommend appropriate changes to encourage greater flexibility in home offices while protecting the residential character of the surrounding neighborhood.	PDO	TA, BOS, EDC, SCC	ST
Goal ED-10	**To facilitate business development.**			
Policies				
ED-P-10.1	**To facilitate business development programs and initiatives specific to Sandwich's opportunities and desired growth**	**PDO**	TA, BOS, SCC	Ongoing
Actions				
ED-A-10.1	Maintain and update the inventory of all commercial property and industrial properties and potential development sites in town. Use the inventory to recruit new businesses and research opportunities to develop, redevelop, swap, rezone or otherwise	PDO	TA, BOS, EDC, SCC	Ongoing
ED-A-10.2	Initiate and improve town cross-board communication.	TA	BOS, EDC, SCC	Ongoing
ED-A-10.3	Adopt the SEIC as a potential long-term economic tool for Sandwich.	TA	SEIC, BOS, EDC, SCC	ST
ED-A-10.4	Improve communications with the business community, developers, regional organizations, etc.	TA	EDC, BOS, EDC, SCC	Ongoing

ED-A-10.5	Continue communication and cooperation with the Cape Cod Commission on economic development programs appropriate for Sandwich including possible a GIZ, Development Agreement for selected growth centers, zoning revisions, and funding programs.	PDO	TA, BOS, EDC, SCC	Ongoing
ED-A-10.6	Fund a full time business development position to drive marketing and other economic development initiatives.	BOS	TA, EDC, PDO, Town Meeting	MT
ED-A-10.7	Create a Sandwich Mentor Action Response Team (SMART) to assist existing and start up companies in business planning and development.	EDC	PDO, SCC	ST
ED-A-10.8	Improve the use of MA state tax incentives, grants and financing tools for economic development. Submit a Commonwealth Capital application to be eligible and competitive for state funding and consider DIF for selected growth areas.	PDO	TA, BOS, EDC, SCC	ST

10.5 Transportation Goals, Policies and Action Plan

Maintaining an adequate transportation system is necessary for quality of life, economic vitality, and public safety in Sandwich. It is an important part of the town's infrastructure, providing a link between housing, jobs, and shopping areas. Conversely, an inadequate system deters visitors and frustrates residents.

In addition to cars, other transportation modes such as bus service, rail, walking, and bicycling should play a more important role in moving people around and through Sandwich. The local and regional transportation system should also respect Sandwich's natural and historic resources. There are obvious visual impacts when trees are removed and the landscape is permanently altered to accommodate road and intersection widening. Additional pavement also increases stormwater runoff that can negatively impact drinking water supplies and lead to pollution of the town's ponds and bays.

The transportation planning goals for Sandwich are based on these issues. Safety is of paramount importance. It is unacceptable for the safety of residents or visitors to be compromised. Secondly, the goals and actions encourage a balanced and efficient transportation system that considers all modes of transportation. In addition, the goals and actions below encourage alternatives to road widening where feasible.

Transportation Action Plan

Goals/ Policies/ Actions	Policies and Actions	Leaders	Partners and Stakeholders	Timeframe
Goal T-1	**To maintain an acceptable level of safety for all users of Sandwich's transportation system.**			
Policy				
T-P-1.1	Safety for all users of the transportation system is the most important transportation goal. Safety applies not only to motor vehicle operators and passengers but also to walkers, bicyclists, and bystanders. The town should make transportation safety a cornerstone of the local review process. Developing and adhering to the proper principles of access management and sight distance when considering driveway location is essential. In addition, the need for sidewalks and bikeways (shoulders, bike lanes, or separate paths) should be considered in any development review or any road improvement project.	DPW	PDO, TA, BOS	Ongoing
Actions				
T-A-1.1	The town will continue to identify safety problems and advance solutions to improve transportation safety.	DPW	PDO, TA, BOS	ST
T-A-1.2	The town will work with developers, CCC and the state to improve access management and to minimize new driveways and traffic conflict points (locations where vehicle paths cross) to improve safety. The towns should adopt access management bylaws and related driveway standards.	DPW	PDO, TA, BOS	ST
T-A-1.3	The towns should consider the needs of pedestrians and bicyclists as part of the review of any development or road improvement project.	PDO	DPW, TA, BOS	ST
T-A-1.4	The town's Police Department should provide crash data to the Cape Cod Commission on a regular basis.	PD	PDO, TA, BOS	Ongoing
T-A-1.5	Form a Transportation Advisory Committee to provide input on tranportation priorities for the community	BOS	DPW	ST
Goal T-2	**Traffic Reduction/Transportation Balance and Efficiency - To reduce and/or offset the expected increase in motor vehicle trips on public roadways, reduce dependency on automobiles, and reduce air and noise pollution. To promote a balanced and efficient transportation system that includes alternatives to automobile travel.**			
Policy				

T-P-2.1	Providing more bus, rail, better opportunities to bicycle between areas, and a more walkable community is an important quality of life factor in Sandwich. The town should work closely with the Cape Cod Commission, state, regional agencies, and other towns to provide better bus and rail services, expand the bicycle path network, and improve the ability of pedestrians to walk safely. Although automobiles are likely to remain the travel mode of choice on Cape Cod for the foreseeable future, it is important to offer alternative modes of travel. The Cape Cod Commission, various state and regional organizations, the towns, and developers all have roles and responsibilities in advancing alternatives to automobile travel.	PDO	DPW, TA, BOS	MT
Actions				
T-A-2.1	Alternative Modes in Bylaws and Capital Plans: The towns should include transit, pedestrian, and bicycle-oriented mobility requirements in zoning bylaws and capital improvement plans.	PDO	DPW, TA, BOS	ST
T-A-2.2	Commuter Parking Alternatives: The Town should create commuter parking opportunities at such locations as the Wing School, Sandwich High School, and other potential sites.	PDO	DPW, SSD, TA, BOS	ST
T-A-2.3	Educational Programs: The town should provide education materials for commuters, drivers, bicyclists, and pedestrians.	SCC	DPW, TA, BOS	ST
T-A-2.4	Travel Demand Management: The town should evaluate the potential for a local TDM program in the future as the program may be feasible with new growth and development.	PDO	DPW, TA, BOS	MT
Goal T-3	**Improve Traffic Operations on Key Roadways and Intersections in Town - To maintain travel times and Level of Service on regional roads and intersections and to ensure that all road and intersection construction or modifications are consistent with community character, historic, and scenic resources.**			
Policy				
T-P-3.1	It is important to match land use with the available transportation infrastructure. Maintaining the capacity of regional roadways can be accomplished by allowing denser development in the four Growth Economic Centers identified for Sandwich and reducing development potential in other areas less suited for additional development. In reviewing development, the town should first consider low-impact mitigation that does not require infrastructure changes. Access-management techniques such as driveway location, spacing, turn restrictions, and connections with adjacent parcels are initial low-cost ways to mitigate traffic impacts. Road and intersection widening should be considered as mitigation only in situations where there is a year-round, not seasonal, need and only in locations where community character, scenic, historic, or natural resources will not be adversely impacted.	DPW	PDO, TA, BOS	Ongoing
Actions	-	-		
T-A-3.1	Make Non-Structure Improvements to Key Intersections Where Appropriate: Investigate possible non-structural mitigation for the above intersections, including Transportation Demand Management (TDM) and Transportation System Management (TSM) strategies and land-use control. If necessary, structural mitigation measures such as alternative traffic control, widening, lane striping, and possible signalization should be considered. Identify possible structural and non-structural mitigation measures to aid in alleviating excessive congestion. As with the intersection improvement options, structural mitigation measures should be considered as a last resort in improvement recommendations.	DPW	PDO, TA, BOS	ST
T-A-3.2	Make Traffic and Circulation Improvements on Key Roadways: The town should initiate the design process for key roadway segments including Route 6A, Tupper Road, Jan Sebastian Drive, Cotuit Road, Quaker Meetinghouse Road, and Route 130 to enhance safety, intermodal capacity, traffic and circulation, and aesthetic appeal based on the conceptual plans for the Strategic Planning Areas in Section 1: Land Use.	DPW	PDO, TA, BOS	MT
T-A-3.3	Improve Traffic Circulation, Congestion and Safety around the South Sandwich Village Center: Roadway improvements in the BI-2 District between Cotuit Road, Route 30 and Quaker Meetinghouse Road (referred to in Section 1: Land Use as the South Sandwich Village Center Area should be initiated based on the conceptual plans identified above. These conceptual transportation plans include:	DPW	PDO, TA, BOS	ST
	An interior access road with access to surrounding roadways;			
	Improved intersections at the boundary roads of the district;			
	Traditional streetscapes serving vehicular, pedestrian and bicycle traffic;			

	Provision for public transportation linkages; and			
	Low impact design techniques on roadways and parking areas to reduce rate, pollutants and quantity of stormwater runoff.			
T-A-3.4	Mitigate current and future development impacts (individual and cumulative) to the transportation system in the Cotuit Road, Quaker Meetinghouse Road and Route 130 area, as well as within the interior of the district. Transportation mitigation would include the following actions:	DPW	PDO, TA, BOS	MT
	Add connectors between projects, providing access between projects in the short term and limited access to a future interior road. (This would relieve pressure on Cotuit Road, Quaker Meetinghouse Road and Rt.130 while ensuring that the new interior road with limited access would remain at an acceptable level of service.);			
	Improved intersections at new interior road and boundary roads;			
	Improved and consolidated site access from boundary roads for existing and future developments;			
	Develop systems for motorized and non-motorized conveyance with limited intersections and inter-model connections;			
	Developer contributions to district mitigation plan for projects with off-site impacts. (Contributions to the mitigation plan must remain equitable, commensurate with project impacts and shared); and			
	Facilitate the extension of an internal frontage/connector road particularly in the vicinity of the Cotuit Road/Quaker Meetinghouse Road Intersection and connecting Hess, Stop and Shop, Lamberts, and Sandwich Hardware.			
T-A-3.5	Make Traffic Access and Safety Improvements at Exit 2/Route 6 and Route 130: There is significant commercial, civic and residential development potential planned both south along Route130 (the South Sandwich Village Center and several residential 40B developments) and east on the Service Road (expansion of RHCI and other care facilities). All of these developments will use Exit 2, which is currently a congested intersection and public safety concern, particularly at the westbound ramp and at the eastbound ramp where it intersects with the queue for the Service Road. This location is problematic for several reasons as detailed below:	DPW	PDO, TA, BOS, CCC, MassHighway	MT
	The Service Road's close proximity to the Route 6 westbound off-ramp creates several turning and merging conflict areas on the high speed and high traffic volume Route 130;			
	The Route 6 westbound off-ramp is configured to allow motorists to directly merge onto Route 130 southbound without reducing speeds. Additionally, motorists traveling on the off-ramp are looking north towards on-coming Route 130 southbound vehicles and they do not see what is occurring at the Service Road intersection. These factors create obvious safety problems at the Service Road intersection, particularly when vehicles are queued on Route 130 waiting to turn left onto the Service Road;			
	The Service Road approach to Route 130 is on a steep decline, creating potential vehicular operating problems (e.g., braking) during snow and ice events. Route 130 is also on a decline as it approaches the Service Road intersection;			
	Curb cuts with infrequent traffic entering/exiting an intersection create a perception that the access is not used, thereby causing motorists to disregard this access. This creates a problem when a turning movement does occur at this location; and			
	Construction of the Algonquin Gas Pump Station project with access from Route 130 directly across from the Service Road may further limit future transportation improvements. The Town has met with the Massachusetts Military Reservation to discuss possible alternative eastbound ramp configurations. The Town of Sandwich and MassHighway have also been discussing options to improve the traffic flow and safety throughout the Route 6 Exit 2 interchange area.			
Goal T-4	**Enhance Public Parking Facilities in Town**			
Policy				
T-P-4.1	The Cape Cod Commission study of public parking facilities concluded that the parking resources in Sandwich are adequate in general. Isolated areas with parking deficiencies and conflicts are a result of poor usage of the available parking facilities. Also, special events occurring at specific locations create capacity deficiencies and result in congestion at other locations as well. The study also indicates that the Town may face parking capacity shortfalls in the Marina and Town Beach area on peak days for beach-going and recreational activities along the Cape Cod Canal. The future conditions analysis of public parking indicates that facilities will continue to provide adequate supply.	DPW	PDO, TA, BOS	Ongoing

Actions				
T-A-4.1	Improved signage and shuttle service to the Wing School for remote parking in the Village area.	PDO	DPW, SSD, TA, BOS	ST
T-A-4.2	Improve signage within the the Village to direct motorists to available public parking facilities.	DPW	PDO, TA, BOS	ST
T-A-4.3	Implementation of time restrictions to reduce all day parking in high demand areas.	DPW	PDO, TA, BOS	MT
T-A-4.4	Improved pavement markings for on-street parking in the Village area.	DPW	PDO, TA, BOS	MT
Goal T-5	**Expand and Enhance Pedestrian and Bicycle Facilities**			
Policy				
T-P-5.1	The pedestrian facilities in Sandwich provide an important means of transportation, particularly within the Historic Village area. Sidewalks also provide access to most of the Town's schools. However, the local network of sidewalks is limited and does not provide access to much of Sandwich. Given the Town's resources, character, and development pattern, a widespread program of sidewalk construction is unlikely. However, there are several short gaps in the current sidewalk system. Filling these gaps would lead to a more interconnected network of sidewalks in the Town and improve pedestrian access overall. Recreational bicycling is a popular activity in Sandwich. Currently, the only major off-road bicycle facility is the multi-use paths along the Cape Cod Canal Service Roads. Other key attractions for recreational bicyclists include the Town Beach area and the Historic Village area.	DPW	PDO, HC, TA, BOS	Ongoing
Actions				
T-A-5.1	Expand and enhance sidewalk and bicycle facilities in the following key areas:	DPW	PDO, TA, BOS	See Below
	5.1.1. Tupper Road south of Route 6A (80 feet);	DPW	PDO, TA, BOS	MT
	5.1.2. Water Street (Route 130) in front of the Wing School (approx. 0.1 miles);	DPW	PDO, TA, BOS	ST
	5.1.3. From Town Neck Road to the Marina (approx. 0.15 miles);	DPW	PDO, TA, BOS	MT
	5.1.4. Route 130 from the existing sidewalk south of the Forestdale School to the Mashpee Town Line (approx. 1.5 miles)	DPW	PDO, TA, BOS	MT
	5.1.5. Quaker Meeting House Road:	DPW	PDO, TA, BOS	See Below
	1) From Route 130 to existing sidewalk (approx. 0.5 miles)	DPW	PDO, TA, BOS	ST
	2) From Cotuit Road to the existing sidewalk near the Oakridge School (approx. 1.3 miles)	DPW	PDO, TA, BOS	ST
	3) From the Oakridge School to the Sandwich High School (approx. 1 mile)	DPW	PDO, TA, BOS	MT
T-A-5.2	The Town should consider constructing an off-road bicycle facility linking key local attractions to the Cape Cod Canal paths and other activity centers.	DPW	REC, PDO, TA, BOS	MT
T-A-5.3	The Town should update the Sandwich Pathways Trail Plan (2004) as needed and regularly evaluate the community's goal of "not having to drive to get to trails that link all parts of town."	REC	PDO, DPW, TA, BOS	ST
T-A-5.4	The Town should incorporate the use of architectural icons, projects and programs to tell the "Sandwich story" through local pathways and trails.	PDO	DPW, TA, BOS	MT
Goal T-6	**Expand and Enhance Public Transportation Services**			
Policy				

T-P-6.1	Currently, public transportation services in Sandwich are limited to the Cape Cod Regional Transit Authority's (CCRTA) B-Bus services. There are no regularly scheduled public transportation services connecting Sandwich with its surrounding towns and to the region. As the demographic data shows, 93 percent of the work trips for Sandwich residents are made by automobile. This data also shows that about two-thirds of Sandwich residents also work in Sandwich or surrounding towns. Improved public transportation services within Town could help to provide more commuting options for Sandwich residents and provide access to jobs for those who cannot drive or cannot afford an automobile. Also, improved connections to the regional commuter bus service to metropolitan Boston through stops in Sandwich would help Sandwich commuters by eliminating their need to cross the Sagamore Bridge to the existing park-and-ride lot near the rotary. In addition, the possible expansion of passenger rail service to Buzzards Bay could further eliminate the need for residents to use automobiles by providing a direct connection between Sandwich and surrounding Towns and metropolitan Boston.	PDO	CCC, DPW, TA, BOS	Ongoing
T-P-6.2	The Town should develop a plan to bring transit service to the community.	PDO	CCC, DPW, TA, BOS	Ongoing
Actions				
T-A-6.1	The Town should work closely with the Cape Cod Regional Transit Authority and Cape Cod Commission to demonstrate the need for expanded public transportation services in the community, including fixed route or flex service.	PDO	CCC, DPW, TA, BOS	Ongoing
T-A-6.2	The Town should consider the installation of designated bus stops on key routes and locations around Sandwich, including the Town Marina/Route 6A, Historic Village, South Sandwich Village Center, Sandwich Industrial Park, RHCI, and local schools.	PDO	CCC, DPW, TA, BOS	MT
T-A-6.3	The Town should explore the potential for passenger and commuter rail connections to major employment centers off Cape.	PDO	CCC, DPW, TA, BOS	LT
Goal T-7	**Carry Out Plans for New Directional and Wayfinding Signage Program**			
Actions				
T-A-7.1	The Town should move forward with the "Wayfinding Program," including completion of the preliminary design for various types of directional signage and an outline of permitting requirements as necessary to position the Visitors Services Board for construction grant funding. This should specifically address directional signage location, content, design (color, size and graphic design), and cost estimates, determine permitting authorities and order of application, and provide contact information. The priority locations for the first wayfinding signs should be across from the Exit 2 ramp on Route 130, and along Route 6A at both ends of Tupper Road and Jarves Street in identifying the Town Marina and Historic Village to visitors.	VSB	SCC, PDO, DPW, TA, BOS	ST
Goal T-8	**Revise Local Land Use Regulations to Support Sustainable Transportation Improvements**			
Policy				
T-P-8.1	The town shall strive to match the traffic intensity of development with the capacity of the transportation system, consistent with community character, scenic, historic, and natural resources. The Town should continue to analyze the capacity of its roadway system to resolve the possible land use conflicts between existing poor Level of Service and existing zoning particularly in commercial areas.	PDO	DPW, TA, BOS	Ongoing
T-P-8.2	The Town should not permit the construction of any new arterial roadways. Structural mitigation shall only be allowed on existing and proposed roadways as described in this Plan.	DPW	PDO, TA, BOS	Ongoing
T-P-8.3	Roadways shall continue to be constructed and/or reconstructed to maintain existing character.	DPW	PDO, TA, BOS	Ongoing
T-P-8.4	The Town shall actively pursue any available grant monies for the improvement, beautification and/or extension of our roadways, walkways and bikeways.	PDO	DPW, TA, BOS	Ongoing
Actions				
T-A-8.1	Local Traffic Thresholds: The town should incorporate thresholds for review of traffic impacts of proposed projects within the zoning or site plan review bylaws. The town should establish a traffic-impact assessment and mitigation program to identify and mitigate impacts of new development and redevelopment on the transportation system. Transportation mitigation should be consistent with the Regional Policy Plan, the Local Comprehensive Plan, and the Cape Cod Regional Transportation Plan.	DPW	PDO, TA, BOS, CCC	ST

T-A-8.2	Transportation Capacity: The town should adopt zoning bylaws to ensure that future levels of development are consistent with the capacity of the local transportation system.	PDO	DPW, TA, BOS, CCC	ST
T-A-8.3	Shared Parking and Access Management: The town should adopt bylaws that encourage shared parking, shared driveways and connections between adjacent businesses, consistent with the Cape Cod Commission Model Access Management Regulation.	PDO	DPW, TA, BOS	MT
T-A-8.4	Local Parking Requirements: The towns should revise parking bylaws and not allow parking in excess of minimal requirements under local zoning, except in well-documented circumstances. Towns should also institute more flexible parking requirements such as allowing shared parking lots, reducing the number of spaces required per development, requiring secure bicycle parking in shopping and business districts, allowing reserve parking strategies and, where safety permits, encouraging curbside parking in village centers in order to slow traffic and buffer pedestrians.	PDO	DPW, TA, BOS	ST
T-A-8.5	Scenic Roads: The Town shall continue to designate Scenic Roads. This shall include pursuing grant monies for tree plantings and design improvements that will protect and enhance the rural and scenic nature of these roadways.	PDO	DPW, TA, BOS	MT

10.6 Community Facilities and Services Action Plan

Community Facilities and Services Action Plan				
Goals/ Policies/ Actions	**Policies and Actions**	**Leaders**	**Partners and Stakeholders**	**Timeframe**
Goal CFS-1	**To provide community facilities and services that are adequate for the local population, and to cooperatively explore regional solutions to meet community and regional needs.**			
CFS-A-1.1	Appropriately fund community facilities to obtain a responsible level of services acceptable to the Town's residents and to institute sound management practices for overseeing Town facilities and services.	TA	All Town Dept., BOS and Town Meeting	Ongoing
CFS-A-1.2	Approve a Ten-Year Capital Plan that will provide capital facilities needed to accommodate past and future population growth.	TA	All Town Dept., BOS and Town Meeting	ST
CFS-A-1.3	Consider funding options that would mitigate the effect of capital expenditures to the residential tax payer by: exploring developmental impact fees for infrastructure; seeking and securing grants for municipal infrastructure improvements; seeking and securing joint general fund/private financing infrastructure improvements; allocating general fund annual investments for capital improvements; establishing a debt service or capital expenditure fund; encouraging economic development to diversify the tax burden.	TA	All Town Dept.	Ongoing
CFS-A-1.4	Institute a management plan for the maintenance and upkeep of municipal facilities.	TA	BOS	ST
CFS-A-1.5	The capital planning committee should continue long-term planning, make recommendations to the Finance Committee and Board of Selectmen about capital expenditures, and administer monies set aside for capital improvements.	TA	BOS	ST
CFS-A-1.6	Move forward in the long term planning and construction of new public facilities that will be needed to service a growing population and economic development: a new consolidated public administration building, public safety building, indoor recreation facility, DPW highway barn, branch library, senior center, and elementary or middle school building.	TA	All Dept.	LT
CFS-A-1.7	Consider creating a zoning enforcement officer position to ensure development is build according to local requirements and the protect natural resources.	BOS	PDO, NR	ST
Goal CFS-2	**To encourage energy conservation and improved energy efficiency, encourage and stimulate investment in energy conservation and renewable energy resources, and manage land uses to maximize energy efficiency.**			
CFS-A-2.1	The aesthetics and other impacts of such technologies will be weighed when considering proposed technologies.	SEC	All Dept.	Ongoing
CFS-A-2.2	Institute a comprehensive energy plan to include procedures for ensuring energy conservation during development and redevelopment. Incorporate energy saving transportation alternatives throughout Town.	SEC	TA, BOS	ST
Goal CFS-3	**To manage solid waste using an integrated solid waste management system that includes source reduction, recycling, composting, and incineration at SEMASS.**			
CFS-A-3.1	Divert 60% of municipal solid waste from incinerator through recycling and composting programs by 2012.	TA	BOS	LT
CFS-A-3.2	Continue recycling programs to achieve or exceed the diversion goal.	DPW	BOS	Ongoing
CFS-A-3.3	Continue to hold household hazardous waste collection days.	DPW	BOS	Ongoing

CFS-A-3.4	Adopt accounting methods that reflect all capital costs and operational expenses of municipal recycling and waste disposal services.	DPW	BOS	Ongoing
CFS-A-3.5	Develop an integrated system of waste management that involves recycling, composting, incineration, and landfilling for dealing with municipal solid waste, bio-solids, and construction and demolition materials.	TA	BOS	MT
Goal CFS-4	**To dispose of, in an environmentally sound manner, hazardous wastes generated by Sandwich households and businesses.**			
CFS-A-4.1	Development and redevelopment shall make reasonable efforts to minimize hazardous waste generation through source reduction, reuse, material substitution, employee education, and recycling.	PDO	TA, BOS	Ongoing
CFS-A-4.2	Development and redevelopment shall be in compliance with Massachusetts Hazardous Waste Regulations, 310 CMR 30.00.	PDO	TA, BOS	Ongoing
CFS-A-4.3	Commercial and industrial development and redevelopment that involves the use, treatment, generation, storage or disposal of hazardous wastes or hazardous materials shall not be allowed within Water Protection Districts.	PDO	TA, BOS	Ongoing
CFS-A-4.4	Adopt a toxic and hazardous materials bylaw or regulation, using the Cape Cod Commission's model bylaw or similar regulations.	TA	BOS	Ongoing
CFS-A-4.5	Continue to hold periodic household hazardous waste collection events and establish other programs at transfer stations to manage other hazardous wastes, universal wastes, or difficult-to-manage wastes.	DPW	BOS	Ongoing
CFS-A-4.6	Develop and maintain an emergency response plan for spills of hazardous materials during transit.	EMPC	BOS	
Goal CFS-5	**To plan long-term capital facilities that can adequately serve a potential ultimate year-round population levels and age groups as well as economic development potential at Build Out.**			
CFS-A-5.1	Approval of development and redevelopment that increases the intensity of use shall be based on existing infrastructure capability, or on a development's ability to provide for or contribute to the infrastructure and services necessary to support it.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.2	Installation of necessary infrastructure shall be timed to meet the need generated by the development, or a contribution of funds toward the necessary improvements shall be provided.	PDO	TA, DPW, SWD, BOH, BOS	LT
CFS-A-5.3	Development of new infrastructure shall occur only after an analysis of the impacts of this infrastructure with regard to municipal capacity for the land use, traffic, water quality, natural resources, potential for public health hazards, and the policies set forth by this Comprehensive Plan.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.4	Privately provided infrastructure (e.g., community buildings, sewers, traffic control devices) to service development and redevelopment shall be consistent with this Local Comprehensive Plan.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.5	Public investments that involve construction or expansion of infrastructure and facilities, including, but not limited to, municipal buildings, sewage collection and treatment, roads, and related facilities, should reinforce the traditional character of Sandwich and Cape Cod.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.6	Work cooperatively with the Sandwich Water District to facilitate economic development potential for commercial, industrial and mixed use development in targeted areas.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.7	Development and redevelopment, including proposed new capital facilities, should be designed to promote the efficient use of energy, while maintaining aesthetic appearance and character. This would include orienting structures to take advantage of solar gain, maintaining solar access for adjacent sites, and using energy-efficient construction techniques and materials.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing

CFS-A-5.8	All developments shall address how the quantities and types of solid waste to be generated will be handled. This includes allocating adequate storage space for interim storage of materials to be recycled, removing construction and demolition debris from construction sites, and disposing of waste in accordance with local and regional requirements. Sandwich will continually monitor this issue to determine if and when greater local regulatory or other public involvement should occur.	PDO	TA, DPW, SWD, BOH, BOS	Ongoing
CFS-A-5.9	Review zoning and other land use regulations and maps in order to plan for sufficient quantities of land in appropriate locations to serve community needs, including economic development, housing, water supply, police, fire, libraries, health and social services, government, waste disposal, education, community centers, and recreation.	PDO	TA, DPW, SWD, BOH, BOS	ST
CFS-A-5.10	Identify and plan for the provision of appropriate infrastructure improvements, such as public water supply and wastewater treatment facilities where needed in Economic Centers and other strategic planning areas to support concentrated development, and limit infrastructure improvements in areas where development is not encouraged.	PDO	TA, DPW, SWD, BOH, BOS	ST

10.7 Housing Goals, Polices and Action Plan

Affordable Housing Goals

These goals are based on the understanding that the Town should be promoting affordable housing to satisfy the full range of local needs – not just to satisfy the 10 percent Chapter 40B target – and that it was important for local residents to understand this commitment and, to the greatest extent possible, be involved.

Affordable Housing Goals and Policies	
Goals and Policies	
Goals	
Goal H-1	**Promote and Create Affordable Housing**
	To promote the provision of fair, decent, safe, affordable housing for rental or purchase that meets the needs of present and future Sandwich residents. At a minimum, the town shall seek to raise the affordable housing stock to 7.5 percent of all year-round units by 2010, and 10 percent of all year-round units by 2015.
Goal H-2	**Provide Fair Housing and Equal Opportunity**
	To promote equal opportunity in housing and give special consideration to meeting the housing needs of the most vulnerable segments of Sandwich's population, including but not limited to very low income (50 percent of median income); low income (51 to 80 percent of median income), single heads of household, racial minorities, and others with special needs.
Goal H-3	**Provide for Community Participation in Affordable Housing and Neighborhood Initiatives**
	To encourage the participation of all segments of the community to address the housing needs of Sandwich residents, with particular attention to the needs of low and moderate income households.
Goal H-4	**Provide Innovative Housing Strategies**
	To seek out, provide support for and encourage the development of innovative strategies designed to address the housing needs of Sandwich residents, with particular attention to the needs of low and moderate income renters.
Goal H-5	**Develop and promote strategies, plans, policies and actions that integrate the development of affordable housing with the protection of Sandwich and the Cape's natural environment.**

Housing Action Plan

The proposed programs of the Housing Action Plan are based on the goals and policies above that serve as important guiding principles in selecting project sites, determining the type of development, and identifying priorities. The Action Plan is based on the Housing Needs Assessment, recent interviews with local planning and real estate professionals, and the experience of other comparable municipalities on Cape Cod and throughout the Commonwealth. The strategies are grouped according to the type of action proposed – Planning and Regulatory Reform, Building Local Capacity, Housing Production, and Housing Preservation and timeframe for implementation in short-term, medium-term and long-term timeframes. All of these actions can be considered tools that the town will have available to promote the creation of new housing opportunities, each to be applied to particular circumstances and providing a powerful group of resources when available in combination.

Sandwich Affordable Housing Action Plan

Goals/ Policies/ Actions	Policies and Actions	Leaders	Par
Goal H-1	**Revise and expand planning and regulatory tools for the preservation of existing affordable housing stock and production of new affordable housing**		
Policies			
H-P-1.1	To seek out, provide support for and encourage the development of innovative strategies and regulations designed to address the existing housing needs of Sandwich residents, with particular attention to the needs of low and moderate income renters.	BOS	PDO
H-P-1.2	Provide the regulatory framework to encourage the creation of adequate and affordable housing for all residents in Sandwich along the full range of incomes.	BOS	PDO
Actions			
H-A-1.1	Continue to Evaluate Zoning Bylaw	PDO	LHO
H-A-1.2	Consider Inclusionary Zoning Bylaw	PDO	LHO
H-A-1.3	Consider Amnesty Program for Accessory Apartments	PDO	LHO
H-A-1.4	Amend Accessory Dwelling Bylaw with broader and more flexible applications (i.e. Town of Barnstable)	PDO	LHO
H-A-1.5	Explore Foreclosure Alert System	TA	LHO
H-A-1.6	Develop Road Taking Program	PDO	DPW
H-A-1.7	Advocate for Reform of 40B	PDO	S
H-A-1.8	Amend Affordable Housing Bylaw to require 25% affordable units	PDO	LHO
H-A-1.9	Explore Property Tax Exemption for Affordable Year-Round Rental Housing	PDO	LHO
Goal H-2	**Build local capacity to produce affordable housing**		
Policies			
H-P-2.1	To encourage the participation of all segments of the community to address the housing needs of Sandwich residents, with particular attention to the needs of low and moderate income households.	BOS	PDO
H-P-2.2	Maximize local interest and investment in affordable housing.	BOS	PDO
Actions			
H-A-2.1	Access HOME Program Funding	PDO	LHO
H-A-2.2	Obtain Approval for Affordable Housing Projects through CPA Program	PDO	CPA
H-A-2.3	Make Publicly-Owned Property Available for Affordable Housing	TA	PDO

H-A-2.4	Establish Non-profit Housing Organization	PDO	LHC
H-A-2.5	Establish Affordable Housing Fund	TA	LHC
H-A-2.6	Fund Assistant Planner Position	TA	PDC
H-A-2.7	Support Renovations and New Development of Sandwich Housing Authority	PDO	LHC
H-A-2.8	Conduct Educational Campaign on Affordable Housing	PDO	LHC
H-A-2.9	Hold Trainings for Real Estate Professionals	SCC	LHC
H-A-2.10	Improve Town Communication on Affordable Housing	PDO	LHC
H-A-2.11	Use Land Bank Funds to Support Affordable Housing	PDO	LHC
Goal H-3	**Expand affordable housing production**		
Policies			
H-P 3.1	To promote the provision of fair, decent, safe, affordable housing for rental or purchase that meets the needs of present and future Sandwich residents. At a minimum, the town shall seek to raise the affordable housing stock to 7.5 percent of all year-round units by 2010, and 10 percent of all year-round units by 2015.	BOS	LHC
H-P 3.2	Provide a wide range of housing alternatives to meet diverse housing needs.	BOS	LHC
H-P 3.3	Leverage other public and private resources in the preservation and production of affordable housing to the greatest extent possible.	BOS	LHC
Actions			
H-A-3.1	Give priority to rental housing in the disposition of Town-owned land or in Town-supported projects	PDO	LHC
H-A-3.2	Investigate feasibility of housing buy-down program for homeownership	PDO	LHC
H-A-3.3	Convert Existing Housing Stock to Affordability	PDO	LHC
H-A-3.4	Review zoning and revise as needed to promote adaptive reuse of existing buildings	PDO	LHC
H-A-3.5	Create Affordable Living Options for Seniors	PDO	LHC
H-A-3.6	Continue to Work with Developers to Fine-Tune 40B Applications	PDO	LHC
Goal H-4	**Preserve and improve existing affordable housing**		
Policies			
H-P-4.1	To promote equal opportunity in housing and give special consideration to meeting the housing needs of the most vulnerable segments of Sandwich's population, including but not limited to very low income (50 percent of median income); low income (51 to 80 percent of median income), single heads of household, racial minorities, and others with special needs.	BOS	PDC
H-P-4.2	Help Prevent Homelessness through Cooperative Efforts with Local and Regional Social Services	PDO	LHC
Actions			
H-A-4.1	Provide Low-income Homeowners with Rehab Assistance	PDO	LHC
H-A-4.2	Monitor Expiring-Use Properties	PDO	LHC
Goal H-5.1	**Promote, plans and policies that balance housing development with the protection of Sandwich's neighborhoods and the Cape's natural environment.**		
Actions			
H-A-5.1	Insure that new housing creation is harmonious with the existing community.	BOS	PDC
H-A-5.2	Promote diversity and the stability of individuals and families living in Sandwich.	BOS	PDC
H-A-5.3	Encourage the integration of smart growth principles in the development of housing.	BOS	PDC
H-A-5.4	Insure that Town Government is an active partner in the development of affordable housing.	BOS	PDC

Planned Production Program

As part of the Planned Production Program, Sandwich has projected affordable housing development over the next ten years that will create approximately the equivalent of 13 percent of the total estimated year-round housing stock. These production targets are based on the above goals and objectives and the Housing Action Plan as described above.

Sandwich Planned Production Plan for Affordable Housing

Time Frame	Property and Project	Total# Units	# Units < 80%	# Units >80%
Year 1 -- 2008	**Estimated Total D.U.s (DHCD, 2002)**	**7,574**		
	Estimated Affordable Housing Units	**270**	**270**	**0**
	Percent ADU as % of Total D.U.s	**3.56%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	10	10	0
	New Comprehensive Plan Permits	0	0	0
	New Accessory Apartments	1	0	1
	Private Development with Zoning Incentives	0	0	0
	Private Development with Tax Incentives	0	0	0
	Private Conversion of Existing Housing Stock	0	0	0
	Public Development on Town Owned Lands	0	0	0
	Subtotal	***11***	***10***	***1***
Year 1 -- 2009	**Estimated Total D.U.s (DHCD, 2002)**	**7,574**		
	Estimated Affordable Housing Units	**281**		
	Percent ADU as % of Total D.U.s	**3.71%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	25	*20*	*5*
	New Comprehensive Plan Permits	0	0	0
	New Accessory Apartments	10		10
	Private Development with Zoning Incentives	10	5	5
	Private Development with Tax Incentives	10	5	5
	Private Conversion of Existing Housing Stock	5	2	3
	Public Development on Town Owned Lands	0	0	0
	Subtotal	***60***	***32***	***28***
Year 1 -- 2010	**Estimated Total D.U.s (DHCD, 2002)**	**7,574**		
	Estimated Affordable Housing Units	**341**		
	Percent ADU as % of Total D.U.s	**4.50%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	35	30	5
	New Comprehensive Plan Permits	20	10	10
	New Accessory Apartments	10	2	8

	Private Development with Zoning Incentives	10	5	5
	Private Development with Tax Incentives	10	5	5
	Private Conversion of Existing Housing Stock	10	5	5
	Public Development on Town Owned Lands	20	20	0
	Subtotal	***115***	***77***	***38***
Year 1 -- 2011	**Estimated Total D.U.s (Projected)**	**9,500**		
	Estimated Affordable Housing Units	**456**		
	Percent ADU as % of Total D.U.s	**4.80%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	40	20	20
	New Comprehensive Plan Permits	40	20	20
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	20	10	10
	Private Development with Tax Incentives	20	10	10
	Private Conversion of Existing Housing Stock	20	10	10
	Public Development on Town Owned Lands	20	10	10
	Subtotal	**170**	**85**	**85**
Year 1 -- 2012	**Estimated Total D.U.s (Projected)**	**9,650**		
	Estimated Affordable Housing Units	**626**		
	Percent ADU as % of Total D.U.s	**6.49%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	40	20	20
	New Comprehensive Plan Permits	40	20	20
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	20	10	10
	Private Development with Tax Incentives	20	10	10
	Private Conversion of Existing Housing Stock	20	10	10
	Public Development on Town Owned Lands	20	10	10
	Subtotal	***170***	***85***	***85***
Year 1 -- 2013	**Estimated Total D.U.s (Projected)**	**9,800**		
	Estimated Affordable Housing Units	**796**		
	Percent ADU as % of Total D.U.s	**8.12%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	40	20	20
	New Comprehensive Plan Permits	40	20	20
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	20	10	10
	Private Development with Tax Incentives	20	10	10
	Private Conversion of Existing Housing Stock	20	10	10
	Public Development on Town Owned Lands	20	10	10
	Subtotal	***170***	***85***	***85***

Year 1 -- 2014	**Estimated Total D.U.s (Projected)**	**9,950**		
	Estimated Affordable Housing Units	**966**		
	Percent ADU as % of Total D.U.s	**9.71%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	20	10	10
	New Comprehensive Plan Permits	30	15	15
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	20	10	10
	Private Development with Tax Incentives	20	10	10
	Private Conversion of Existing Housing Stock	20	10	10
	Public Development on Town Owned Lands	10	5	5
	Subtotal	***130***	***65***	***65***
Year 1 -- 2015	**Estimated Total D.U.s (Projected)**	**10,100**		
	Estimated Affordable Housing Units	**1,096**		
	Percent ADU as % of Total D.U.s	**10.85%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	10	5	5
	New Comprehensive Plan Permits	10	5	5
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	20	10	10
	Private Development with Tax Incentives	20	10	10
	Private Conversion of Existing Housing Stock	20	10	10
	Public Development on Town Owned Lands	20	10	10
	Subtotal	***110***	***55***	***55***
Year 1 -- 2016	**Estimated Total D.U.s (Projected)**	**10,250**		
	Estimated Affordable Housing Units	**1,206**		
	Percent ADU as % of Total D.U.s	**11.77%**		
	Planned Product Strategies/Projected New ADUs			
	Production from Comprehensive Plan Units in the Pipeline	10	5	5
	New Comprehensive Plan Permits	10	5	5
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	10	5	5
	Private Development with Tax Incentives	10	5	5
	Private Conversion of Existing Housing Stock	15	10	5
	Public Development on Town Owned Lands	10	5	5
	Subtotal	***75***	***40***	***35***
Year 1 -- 2017	**Estimated Total D.U.s (Projected)**	**10,400**		
	Estimated Affordable Housing Units	**1,281**		
	Percent ADU as % of Total D.U.s	**12.32%**		
	Planned Product Strategies/Projected New ADUs			

	Production from Comprehensive Plan Units in the Pipeline	0	0	0
	New Comprehensive Plan Permits	10	5	5
	New Accessory Apartments	10	5	5
	Private Development with Zoning Incentives	10	5	5
	Private Development with Tax Incentives	10	5	5
	Private Conversion of Existing Housing Stock	15	5	10
	Public Development on Town Owned Lands	10	5	5
	Subtotal	***65***	***30***	***35***
Total ADUs		**1,346**	**834**	**512**

<80% includes units eligible for inclusion in Subsidized Housing Inventory

>80% includes units for households earning more than 80% of AMI but less than 120%/150% of AMI

In compiling these projections, Sandwich has made a number of assumptions concerning future development including:

- Development of town-owned property is estimated to incorporate a reasonable amount of the affordable units, especially to households earning at or below 80 percent of area median income and at least 10 percent affordable to those earning up to 150 percent of area median income, depending on project feasibility. Although the Local Housing Committee has attempted to achieve this on a small scale without success, the town must persist in providing affordable housing.

- Because many of the sites identified for development are privately owned, production will involve projects sponsored by private developers through the “friendly” comprehensive permit process or the Affordable Housing Conditional Density bylaw. The Town must continue to work with these private developers to fine-tune proposals to maximize their responsiveness to community interests. Additional incentives will be needed.

- The projections involve a mix of rental and ownership opportunities, and the Town will work with private developers on projects directed to particular populations with housing needs including families, seniors and other individuals to offer a wider range of housing options for residents. The potential amnesty program identified in the action plan may be beneficial.

10.8 Open Space and Recreation Goals, Polices and Action Plan

The planning process for updating the open space and recreation goals for the Town of Sandwich was guided by the Town Administrator's office with assistance from the Recreation Department, Planning Department, and Natural Resources Departments. Additional guidance was also provided by the Conservation Commission and the Recreation Committee on formulating the Action Plan.

The Open Space and Recreation goals and objectives for Sandwich are based on the values and concerns identified by the town staff, at the public meetings, as well as through discussions with representatives of various community recreation organizations. The *goals* are broad statements framed to indicate a desired future condition or achievement by the town. The *objectives* are more specific statements that outline measurable steps that will help Sandwich achieve these goals. These guide the development of the Action Plan outlined in the following section.

Public input to the Local Comprehensive Plan has continually advocated the provision of adequate recreation areas (including field space, ballfields, courts, as well as indoor facilities) and ongoing upkeep and maintenance of Sandwich's existing recreation areas, which should be a high priority over the next 5 years. While Sandwich has a good record for protecting open spaces, the quantity and quality of recreation areas have not kept pace with the growing needs of residents. The Analysis of Needs in *Section 7.4* has identified a significant gap between recreational supply and demand.

The uniqueness of Sandwich lies in its large areas of protected open space, used passively and actively, despite being one of Cape Cod's most rapidly developing towns. Sandwich's challenge is to preserve the natural and recreational qualities which make it unique, while promoting these features appropriately to attract tourism and bolster the economy. *A priority for the next five years should be the improvement of the quantity and quality of recreation areas town-wide.* Notations following the text indicate where references are made to the Cape Cod Commission's Regional Policy Plan (RPP).

Open Space and Recreation Action Plan

Goals/ Policies/ Actions	Policies and Actions	Leaders	Partners and Stakeholder	Timeframe
Goal OSR-1	**Identify opportunities for development of new recreation areas/facilities and retain lands of recreational value**			
Policies				
OSR-P-1.1	Identify available land for expansion of existing recreation facilities and for the development of additional facilities to serve school sports and broader community active recreation needs.	REC	PDO, TA, SSD, BOS	Ongoing
OSR-P-1.2	Dedicate appropriate areas of town-owned open space to athletic fields for local schools sports or community sports groups for practice and/or games.	REC	PDO, TA, SSD, BOS	Ongoing
OSR-P-1.3	Encourage retention of existing public and private recreational areas (particularly campgrounds, summer camps, and golf courses) and maintain their continued use for active recreation purposes.	REC	PDO, TA, SSD, BOS	Ongoing
Actions				
OSR-A-1.1	Establish criteria to protect recreation lands including the following factors:.	REC	RC, PDO, SSD, TA, NR, BOS	Ongoing
	Lands suitable for active recreation with priority for athletic fields, courts, and playgrounds.			
	Lands which abut existing public and private recreation and open space lands.			
	Lands where additional pedestrian or bicycle trails could be built.			
	Lands which could allow for expanded recreational facilities in parts of Sandwich presently under-supplied,			

	particularly Forestdale.			
	Lands providing public access for recreation to both freshwater and saltwater bodies.			
OSR-A-1.2	Explore possible use of town lands acquired with Land Bank funds for recreational purposes.	REC	RC, PDO, CPA, TA, NR, BOS	ST
	1.2.1. Identify properties.			
	1.2.2. Determine appropriate uses as allowed through Land Bank and CPA requirements.			
OSR-A-1.3	Explore use of available portions of Sandwich Hollows Golf Course for other recreational needs including athletic fields and an indoor sports facility.	REC	RC, RD, GAC, TA, BOS	ST
OSR-A-1.4	Identify private recreation properties (e.g. YMCA, Camp Good News) that would be suitable for public use.	REC	PDO, TA, RC, RD, BOS, Landowners	ST
	1.4.1. Identify properties with existing athletic fields or facilities.			
	1.4.2. Establish a dialogue with landowners to negotiate public use of those properties.			
	1.4.3. Pursue funding options, including consideration of user fees or designation of town funds.			
OSR-A-1.5	Review town-owned properties and identify possible locations suitable for development of new fields and courts.	REC	RC, PDO, SSD, TA, NR, BOS, GAC	MT
	1.5.1. Oak Crest Cove property.			
	1.5.2. 55-acres (Parcels 17-134, 137, 138) north of Quaker Meetinghouse Rd. and west of Cotuit Road.			
	1.5.3. Sandwich Hollows Golf Course.			
OSR-A-1.6	Identify privately-owned properties suitable for development of new fields and courts.	REC	RC, PDO, SSD, TA, NR, HM, BOS, Landowners	MT
	1.6.1. P.A. Landers property along Peters Pond abutting Oak Crest Cove.			
	1.6.2. Southern Energy (Canal Electric) property on Town Neck Rd near the Marina.			
	1.6.3. Property at (25 Old County Rd) next to Sandwich High School.			
	1.6.4. Property off Farmersville Rd next to the Water District land.			
OSR-A-1.7	Where appropriate, negotiate with homeowners' associations in subdivisions with designated open space for access and use of those properties for public recreational needs such as athletic fields or playgrounds (e.g. Lakewood Hills).	REC	PB, PDO, RC, RD, TA, TC, BOS, Landowners or representative	MT
	1.7.1. Identify subdivision open space properties where recreational uses might be appropriate.			
	1.7.2. Establish a dialogue with landowners to negotiate public use of those properties.			
	1.7.3. Pursue funding options for property improvements and/or lease or acquisition of the open space.			
Goal OSR-2	**Maintain and improve quality of recreational service while keeping costs within a limited municipal budget.**			
Policies				
OSR-P-2.1	Support and promote the use of CPA funds for recreation projects including both the development of new recreation areas, expansion of facilities, and improvement of existing recreation areas.	REC	CPA, RC, PDO, TA, BOS	Ongoing
OSR-P-2.2	Provide a diversified selection of year-round recreational programs for residents and visitors of all ages, income, and abilities.	REC	RC, PDO, TA, BOS	Ongoing
OSR-P-2.3	Develop, relocate, or expand indoor and outdoor recreation facilities to provide recreational opportunities that are easily accessible from all areas of the town.	REC	CPA, RC, PDO, TA, BOS	Ongoing
OSR-P-2.4	Work with private developers to provide suitable recreation and play areas to meet the needs of the residents in or near new development projects, such as ballfields, playgrounds, basketball courts or bicycle and walking paths.	PDO	REC, CPA, RC, TA, BOS	Ongoing
Actions				
OSR-A-2.1	Improve coordination with Community School, Recreation Committee, and independent sports organizations in the town for scheduling and use of school fields and gym space.	REC	SSD, RD, RC, CS,	MT

	2.1.1. Establish a formal policy and procedure for scheduling and monitoring field and gym space use.		Representatives of local sports organizations	
	2.1.2. Develop guidelines for use of all recreation resources.			
OSR-A-2.2	Monitor annual use of all town fields by tracking the total number of hours of daily use and number of users per field. Track field conditions and plan for ongoing funding for routine maintenance and upkeep.	REC	RD, RC, CS	ST
OSR-A-2.3	Provide supervision and funding for maintenance and upkeep of all Town recreational resources including athletic fields, gyms, trails, and beaches.	REC	Beach Committee, NR, CPA, RC, CS, TA, Local sports organizations, TM, BOS	Annual
	2.3.1. Budget annual funding for Recreation Department for equipment, staff, and maintenance costs associated with upkeep of all recreation properties.			
	2.3.2. Hire adequate full-time and seasonal Recreation Department staff to maintain all recreation properties.			
OSR-A-2.4	Designate funding and schedule necessary improvements to the Town's Skateboard Park.	REC	BOS, TM, RC, CPA, TA	ST
OSR-A-2.5	Review and update recreation program offerings as community needs dictate.	REC	RC, PDO	MT
	2.5.1. Conduct resident and user surveys on recreational needs and preferences.			
	2.5.2. Explore ways to expand recreation program offerings for all age groups and abilities.			
OSR-A-2.6	Work cooperatively to develop bike paths (particularly south of the Mid- Cape Highway) walking trails, and fitness trails that link various outdoor and recreation areas.	REC	PDO, DPW, NR, PB, BOA	Ongoing
OSR-A-2.7	Continue to explore the feasibility and funding opportunities for building an indoor multiple use recreation center for Sandwich.	REC	RC, TA, CPA, PDO, BOS	MT
	2.7.1. Identify possible sites.			
	2.7.2. Seek public and private funding for planning, design, and construction.			
OSR-A-2.8	Generate revenues via recreation facility user groups.	REC	RD, SCC, Town sports organizations	MT
	2.8.1. Market and advertise use of town recreation facilities for regional tournaments and other sports events.			
	2.8.2. Organize regional tournaments and other sporting events with entrance/participant fees.			
	2.8.3. Collect user fees and designate funds for maintenance, recreation department and event staffing, and development of additional facilities.			
OSR-A-2.9	Develop a consensus to prioritize CPA funds for recreational uses.	REC	RC, CPA, TA, BOS	ST
	2.9.1. Designate a recreation representative to the CPA Committee.			
	2.9.2. Educate CPA committee and residents about ability to use CPA funding for recreation projects.			
	2.9.3. Designate CPA funds for capital improvements to recreational facilities.			
OSR-A-2.10	Pursue funding opportunities for new or improvement of existing recreation areas and facilities through the Massachusetts Urban Self-Help Grants.	REC	RC, NR, CC	MT
Goal OSR-3	**Develop recreation facilities and programs that will help build local capacity for creating a recreation and sports industry that can be a significant economic contributor for Sandwich.**			
Policies				
OSR-P-3.1	Develop high quality outdoor and indoor facilities that raise money through registration and tournament fees to help fund maintenance.	REC	RD, BOS	Ongoing
OSR-P-3.2	Pursue development of a destination sports location for tournament and practice for world class athletes.	REC	RD, BOS	Ongoing
OSR-P-3.3	Encourage events that stimulate spin-off financial revenues to local businesses (e.g., motel tax, meal tax revenues.)	REC	RD, BOS	Ongoing

OSR-P-3.4	Maintain, promote and improve economically productive recreational resources, such as beaches, woodlands, boating access, and fishing areas. These areas should be maintained specifically for those uses and expanded where protected.	REC	RD, BOS	Ongoing
Actions				
OSR-A-3.1	Develop and implement a new comprehensive outdoor and indoor facility preferably on lands available to or associated with Sandwich Hollows Golf Course.	REC	CC, NR, CPA, GAC	MT
OSR-A-3.2	Develop and implement a fiscal management plan for maintenance, upkeep, patrol and improvement of recreational fields, facilities, and programs in Sandwich.	REC	RC, CS	MT
OSR-A-3.3	Design and distribute a recreational brochure to advertise and promote the town's recreational programs and facilities.	REC	SCC, RC, Local sports organizations	MT
Goal OSR-4	**Manage Town open space properties to protect natural resources while encouraging appropriate public use.**			
Policies				
OSR-P-4.1	Establish an acceptable use policy for all town lands to guide public access and management planning and to determine where higher intensity recreational uses may be most appropriate.	REC	RD, BOS	Ongoing
OSR-P-4.2	Evaluate town-owned undesignated-use open space to dedicate portions to conservation or recreation use.	REC	RD, BOS	Ongoing
OSR-P-4.3	Provide cost-effective means of controlling access to, patrolling, and providing maintenance for town-owned open space to prevent overuse, illegal dumping, unauthorized trail creation, and resource degradation.	REC	RD, BOS	Ongoing
OSR-P-4.4	Identify portions of public lands, conservation land and wellfields, where passive and active recreation experiences can be enhanced or expanded, such as creation of properly designed trails, picnic areas, or establishing new playing or practice fields (as at the Farmersville wellfields and Cook Farm).	REC	RD, BOS	Ongoing
OSR-P-4.5	Set aside portions of conservation land and wellfields to provide necessary wildlife habitat where no trails would be created or maintained, wildlife openings are created, and access is limited to existing cart roads.	REC	RD, BOS	Ongoing
Actions				
OSR-A-4.1	Assess the recreational use potential of all applicable town open spaces and establish guidelines for appropriate use of each property.	REC	CC, NR, RC, RD	MT
OSR-A-4.2	Develop natural resource inventory and management plan for major conservation areas, particularly Maple Swamp and Ryder Conservation Lands, identifying appropriate types and levels of recreational use.	NR	REC, CC	MT
OSR-A-4.3	Budget funds for care and upkeep of town conservation and recreation lands.	TA	RC, TM, BOS, CPA	Annually
OSR-A-4.4	Deputize appropriate town officials, including health agents, in addition to police, to bolster enforcement of MGL c. 270, s. 16, preventing illegal dumping on public land.	TA	RC, NR, PD, BOS, TM, BOH	MT
OSR-A-4.5	Partner with volunteer organizations, non-profit organizations, and private entities, to organize land clean ups of public and private open space and to implement trail care and maintenance.	NR	REC, RC, CC, Sandwich Conservation Trust, other non-profits, private businesses	Ongoing
OSR-A-4.6	Evaluate landfill/transfer station fees and collection policies to discourage residents from disposing of bulk items in unauthorized areas. Explore alternative means of legal disposal.	DPW	BOH, BOS	ST
OSR-A-4.7	Improve access and parking to areas where increased public use is appropriate.	DPW	REC, RDCC, NR, TM, CPA, TA	Ongoing

OSR-A-4.8	Regulate motorized and non-motorized use in town lands.	NR	REC, RC, BOS, PD, CC	Ongoing
Goal OSR-5	**Plan and coordinate protection of lands of recreation interest.**			
Policies				
OSR-P-5.1	Strive to devote 50 percent of Sandwich's open space to both active and passive recreational uses.	REC	RC, BOS	Ongoing
OSR-P-5.2	Identify available land for expansion of existing recreation facilities and for development of additional facilities to serve school sports and broader community active recreation needs.	REC	RC, BOS	Ongoing
OSR-P-5.3	Create and extend pedestrian and bicycle paths and trails where applicable.	REC	RC, BOS	Ongoing
Actions				
OSR-A-5.1	Lease and or acquire private lands which meet established criteria above as well as properties identified below.	TA	REC, PDO, BOS, TM, CPA, RC, SWD, Landowners	MT
	P.A. Landers property along Peters Pond abutting Oak Crest Cove.			
	Parcel 35-054 (25 Old County Rd) next to Sandwich High School to develop for athletic fields or related recreational facilities.			
	Former Canal Electric property (Parcel 93-009 off Town Neck Rd) for use of the land for public recreation.			
	Parcel 18-092 off Farmersville Rd next to the Water District property to develop for athletic field use or related recreational facilities.			
OSR-A-5.2	Secure funding for purchase or lease of private properties or for improvements to town-owned properties.	REC	TA, BOS, TM, CPA, RC, PDO, Private entities, Local sports organizations	MT
	5.2.1. Designate CPA funds.			
	5.2.2. Apply for Massachusetts Self-Help grants.			
	5.2.3. Seek financial support from private companies and recreation groups.			
OSR-A-5.3	Evaluate recreation potential of town owned parcels, acquired through tax title foreclosure. If appropriate, dedicate to recreation land.	TA	REC, RC, BOS	Ongoing
OSR-A-5.4	Cooperate with the Thornton Burgess Society and Division of Fisheries and Wildlife to create a linked walking/canoe trail from Talbot's Point to Murkwood.	NR	RC, CC	MT
OSR-A-5.5	Work to improve coordination between all town departments and the Sandwich Water District to develop municipal land for recreation use where appropriate.	REC	RC, NR, PDO, SWD, Various Departments and boards.	Ongoing
Goal OSR-6	**Plan and coordinate protection of lands of conservation interest.**			
Policies				
OSR-P-6.1	Acquire or protect, through regulatory and non-regulatory mechanisms, lands in or near sensitive natural or unique areas, open space lands and historic and/or natural landscapes identified in this plan.	REC	RC, HC, PDO, NR, BOS	Ongoing
OSR-P-6.2	Residential, commercial and industrial development which qualifies as a Development of Regional Impact shall provide permanently restricted upland open space in accordance with the methods prescribed in the Cape Cod Commission's Regional Policy Plan.	REC	RC, PB, CCC, PDO, BOS	Ongoing
OSR-P-6.3	Configure the design of new development to prevent adverse impacts to significant natural areas and in a manner that maximizes contiguous open space.	PDO	REC, PB, RC, NR	Ongoing
Actions				
OSR-A-6.1	Establish criteria for determining which lands to prioritize for protection including the following:	NR	REC, LB, TM, CPA, CC, BOS, TA	Ongoing
	Lands within or adjacent to designated protected conservation lands.			
	Lands within or adjacent to fresh and saltwater bodies, beaches, (salt and fresh water), wetlands, (marshes, swamps, bogs, meadows, ponds, and creeks), and floodplains.			

	Lands containing contiguous wildlife habitat, vernal pools or which provide refuge to federally or state listed endangered, or threatened species or species listed as of special concern;			
	Lands providing wildlife corridors which allow movement and migration of wildlife indigenous to Sandwich.			
	Lands providing access or parking for existing conservation areas.			
OSR-A-6.2	Evaluate conservation significance of town owned parcels, acquired through tax title foreclosure. If significant, dedicate to conservation land under MGL c. 40, s. 8C.	NR, BOS, TA	NR, BOS, TA	Ongoing
OSR-A-6.3	Negotiate with Sandwich Water District to exchange conservation restrictions on town and district lands that abut or are near each other, such as at Boiling Springs Pond, to assure water quality and permanent open space protection.	NR	REC, BOS, Sandwich Water District, TM, MA Legislature, TA	ST
OSR-A-6.4	Work with local land conservation organizations to identify, acquire and manage open space to meet projected community needs. Priority should be given to the protection of significant natural and fragile areas.	NR	CC, LB, BOS, TA	Ongoing
OSR-A-6.5	Conduct mailings and hold workshops for large landowners describing tax benefits (income tax, property tax, estate tax) associated with land preservation options, such as the town conservation restriction program.	TA	NR, BOS, CC, Sandwich Conservation Trust	ST
Goal OSR-7	**Expand and improve access to public open space and recreation areas.**			
Policies				
OSR-P-7.1	Enhance fresh & saltwater bathing & boating access facilities by designing creative means utilizing best management practices to expand sandy beach areas and ancillary support land.	REC	NR, HM, BD, BOS	Ongoing
Actions				
OSR-A-7.1	Consider ways to increase pond and saltwater access through acquisition of new land or other means.	NR	BOS, REC, CPA	MT
OSR-A-7.2	Improve signage and parking at public open space and recreation areas.	DPW	NR, CC, REC, TA, TM	MT
OSR-A-7.3	Update and distribute an open space and trail guide for use by town residents and visitors.	NR	REC, SCC, CC, CPA	ST
Goal OSR-8	**Provide universal access to facilities and programs.**			
No.	**Action**	**Leaders**	**Partners and Stakeholder**	**Timeframe**
Policies				
OSR-P-8.1	Ensure that experiences available at conservation areas, trails, parks, and playgrounds are accessible to people with a variety of levels of mobility, sense of awareness and mental capacity, mindful of site characteristics and financial considerations.	NR	REC, RC, CC, BOS	Ongoing
OSR-P-8.2	Acquire and develop trailheads or public access points, where practical to existing conservation areas.	NR	REC, RC, CC, BOS	Ongoing
Actions				
OSR-A-8.1	Ensure that any new recreational facilities include design specifications that incorporate accessibility codes.	REC	RC, NR, BOS, TA, DC	Ongoing
OSR-A-8.2	Review all town conservation and recreation lands and make specific recommendations for improvements for accommodations for people of all physical abilities (see Section 504 recommendations). File report with Assistant Town Administrator's office, the Building Inspector and the Natural Resources Officer.	DC	REC, BD, TA, BOS	ST

OSR-A-8.3	Prioritize list of accessibility upgrades and determine costs needed for existing facilities, based on inventory in this Plan.	REC	RD, NR, DC, TE	MT
OSR-A-8.4	Identify a conservation property where it would be appropriate and feasible to make enhancements that would allow for accessibility throughout, including trails, railings, and interpretive facilities for the disabled.	DC	REC, TE, NR, TA	MT
	8.4.1. Plan improvements.			
	8.4.2. Identify funding options.			
Goal OSR-9	**Coordinate protection and management of natural resource areas, recreational resources, and open spaces with multiple jurisdictions.**			
Policies				
OSR-P-9.1	Cooperate with nearby jurisdictions, such as the neighboring towns and water districts, to design compatible and integrated management of coastal and freshwater resource areas, migratory wildlife and other natural resources.	NR	CC, CCC, BOS	Ongoing
OSR-P-9.2	Cooperate with nearby jurisdictions to promote protection of regional recreational and natural resources, such as Sandy Neck, Mashpee and Mashpee Ponds, and regional trail networks.	NR	CC, CCC, BOS	Ongoing
OSR-P-9.3	Cooperate with nearby jurisdictions to promote protection of regional open space resources, such as the Cape Cod Commission regional greenbelt system, the Sagamore Lens Protection Project, and the Commonwealth of Massachusetts.	NR	CC, CCC, BOS	Ongoing

10.9 Historic Resources Action Plan

The following goals, polices and actions provide the strategic framework for the accomplishment of preserving Sandwich's historic resources and character. The action plan is based on the plan contained in the Sandwich Historic Preservation Plan, June 2002 and has been updated to account for recent achievements by Sandwich in historic preservation.

Sandwich Historic Preservation Action Plan

Goals/ Policies/ Actions	Policies and Actions	Leaders	Partners and Stakeholders	Timeframe
Goal HP-1	**Increase Public Awareness of & Support for Sandwich's Historic Resources**			
HP-A-1.1	Strengthen the presence of historic preservation issues in a wide range of public forums.			
	1.1.1. Nurture a group of writers in the community who will produce articles regularly for local newspapers on current historic preservation topics. Request that a local newspaper commit space for such articles.	HC	SCC, FL	ST
	1.1.2. Rerun newspaper articles from the past that highlight the history of the community.	HC	TA, SCC	ST
	1.1.3. Contact WGBH-TV Boston Public Television and/or SACAT Sandwich Area Cable Access TV about producing a special that would highlight the history of Sandwich.	HC	VSB	ST
	1.1.4. Prepare a series of informational brochures on a variety of preservation related topics. (e.g. Living in the Old Kings Highway Historic District, Historic Homes of Sandwich, Historic Preservation in Sandwich—How to Get Involved, etc.) Send to new homeowners in the community, perhaps together with other official Town of Sandwich mailings.	HC	SCC	MT
	1.1.5. Work with Historic Massachusetts to develop organizational capacity to undertake a variety of public awareness and promotion projects.	HC	SHC	MT
	1.1.6. Complete the going oral history program that will capture information about the past using video or other up to date technologies.	HC	TAR, SHC, SACAT	ST
	1.1.7. Develop a plaque program for historic properties.	HC	SHC, OKH, SCC	MT
	1.1.8. Use the Internet to disseminate background information about historic homes, historic preservation activities and events, how to research the history of a house, and preservation regulations, with links to the town and Chamber of Commerce websites.	HC	TAR, TS, OKH, SHC	ST
HP-A-1.2	Develop regular events that will educate residents about the significance of Sandwich's historic resources.			
	1.2.1. Develop a working relationship between the Sandwich Committee of the Canal Region Chamber of Commerce and preservation groups.	HC	SCC, CRCC	ST
	1.2.2. Request the Friends of the Library sponsor a yearly lecture series on the history of the town and related topics, to be coordinated with other venues and groups.	HC	FL	ST
	1.2.3. Hold public events during National Historic Preservation Week, such as an architectural scavenger hunt to enhance residents' appreciation of Sandwich's architectural heritage.	HC	PM, SCC, BOS	MT
	1.2.4. Ensure that heritage tourism events are planned and promoted locally, both to involve residents and to increase the understanding of their importance to the local economy.	HC	VSB	ST
	1.2.5. Work to increase local awareness of and participation in annual events such as the Christmas in Sandwich Historic House Tour. (Sandwich Chamber of Commerce now runs the Polar Express which has grown each year since it's inception).	HC	SCC	ST

HP-A-1.3	Increase the knowledge of school age children in history and historic preservation.			MT
	1.3.1. Work with the school district's curriculum director to update and expand local history component at all grade levels.	HC	SSD, MHC	MT
	1.3.2. Update the History of Sandwich workbook for younger school-age children.	HC	SSD, MHC	MT
	1.3.3. Seek grant funding for professional services to implement Actions 1.3.1 and 1.3.2.	HC	SSD, MHC	MT
	1.3.4. Institute a district-wide History Day for school-age children.	HC	SSD, MHC	MT
HP-A-1.4	Encourage the organization of a private non-profit historic preservation organization that will engage in activities unlikely to be done by the local government.			MT
	1.4.1. Provide information and assistance with restoration and preservation projects.	HC	BD, PDO, SCT	MT
	1.4.2. Encourage donation of preservation easements.	HC	PDO, TA	MT
	1.4.3. Monitor deed restrictions on historic homes.	HC	PDO, TA	MT
	1.4.4. Organize open houses, home tours & other events that showcase private historic resources in the community.	HC	SCC	MT
	1.4.5. Raise funds from individuals and foundations.	HC	FL	MT
	1.4.6. Establish emergency fund to acquire threatened properties for restoration.	HC	TA	MT
	1.4.7. Work with other organizations such as Historic New England and Sandwich Conservation Trust.	HC	SPNEA, SCT, Others	MT
Goal HP-2	**Increase Preservation & Documentation Activities**			
HP-A-2.1	Centralize access to all archival materials in Sandwich.			
	2.1.1. Seek funding and hire a professional to develop physical storage/architectural specifications for an archival center at the library.	HC	TS, TAR, PDO	MT
	2.1.2. Seek funding for digitizing and scanning historic documents so that they are accessible electronically.	HC	BOS, FL, TA	MT
	2.1.3. Continue to use CPA funds and other resources to catalog, digitize, or access already digitized archival materials from the Sandwich Historical Society/ Sandwich Glass Museum, the Nye Family of America, Inc., The Heritage Museums & Gardens (updated wording from Plantation), the Religious Society of Friends and others for inclusion in the new archives center. (CPA funds were allocated for analysis of 10 collections in town for the purposes of finding aids, an inventory, and cataloguing for each collection.)	HC	CPA, TAR, FL	LT
	2.1.4. Develop a web site with access to the digitized historical materials that can be downloaded and link with the town's web site.	HC	TA	ST
	2.1.5. Update and maintain at the archives an index of all the cemeteries and the grave plots within each.	HC	TAR	ST
	2.1.6. Fund and hire additional staffing for the new archival center.	HC	TAR, TA, BOS	ST
	2.1.7. Fund and maintain additional regular open hours for the archives.	HC	TAR, TA	ST
HP-A-2.2	Develop long-term institutional support for archival activities.			
	2.2.1. Reconvene the *Archives and Historical Center Committee* to assist with the development of the Town Archives, in cooperation with the Board of Trustees of the Sandwich Library.	HC	TAR, SPL	ST
	2.2.2. Increase annual operational funding for the Town Archives.	HC	TA, BOS, TM	LT
	2.2.3. Establish a line item for operational costs and capital improvements within the Town budget for the Town Archives.	HC	TA, BOS, TM	MT
	2.2.4. Begin to develop criteria and policies regarding donations and acceptance of archival materials, coordinated with local museums and archives.	HC	TAR, SPL, PM	MT
	2.2.5. Develop a group of volunteer assistants to work with the Town Archives.	HC	TAR	ST

HP-A-2.3	Promote archival activities.			
	2.3.1. Seek the assistance of media in promoting private donations of archival materials.	HC	TA, AHCC	LT
	2.3.2. Hold Public Open Houses to familiarize residents with the archives, how they are used, the range of records kept and the ongoing needs for documentation.	HC	TA, AHCC	LT
	2.3.3. Hold an annual event where the public is encouraged to bring in their private historic materials for evaluation and possible copying/scanning.	HC	TA, AHCC	MT
	2.3.4. Establish a publications fund to publish the historical research work of local historians.	HC	TA, AHCC	MT
HP-A-2.4	Develop an annual survey and inventory program of the town's historic resources.			
	2.4.1. Provide annual funding for the Sandwich Historical Commission.	HC	TA, BOS, TM	MT
	2.4.2. Establish a procedure and format for documenting individual historic Sandwich buildings and properties in consultation with MHC.	HC	SHC, MHC	ST
	2.4.3. Develop histories of cultural landscapes in Sandwich.	HC	SHC, MHC	MT
	2.4.4. Maintain a current list of threatened resources.	HC	SHC	ST
	2.4.5. Develop a base line of information on early Sandwich houses and other buildings and cross-reference with property identification suitable for incorporation into future GIS including, but not limited to, building type, form, materials, plan, method o construction, architectural style, and number of stories.	HC	TS, SHC, MHC	MT
	2.4.6. Seek grant funding to undertake "Historic Structure Reports" on early Sandwich houses and other buildings to verify their construction dates and changes over time.	HC	PDO, FL	LT
	2.4.7. Request the Cape Cod Commission to produce a set of maps for Sandwich that accurately illustrate designated historic properties, properties that have been surveyed and properties with conservation and/or preservation restrictions on them.	HC	TS, CCC, SHC	ST
	2.4.8. Continue to work with Scouts, school groups, college students and community organizations to conduct survey projects for historic structures such as stonewalls. Maintain a list of desired projects/studies and send out notice to such groups annually.	HC	SHC, TS	ST
Goal HP-3	**Protect the Historic Character of Sandwich**			
HP-A-3.1	Protect cultural landscapes from unwarranted development.			
	3.1.1. Develop bylaws to protect important cultural landscapes identified in the Open Space & Recreation Plan as well as others that may be identified in the future.	HC	TS, SCT	ST
	3.1.2. Support the continued acquisition of land parcels comprising cultural landscapes or protective easements.	HC	TS, SCT	ST
	3.1.3. Institute a meaningful referral and comment process between town boards, committee and departments with regard to all development proposals impacting open spaces.	HC	TS, SCT	ST
HP-A-3.2	Protect 20th century resources that will become the historic landmarks and districts of the future.			
	3.2.1. Draft a zoning bylaw establishing a "Neighborhood Conservation District" designation to establish basic protections for 20th century historic resources, especially groups of smaller homes.	HC	PDO	MT
	3.2.2. Develop a publication that illustrates how residents can update and expand their 20th century houses in ways that preserve their architectural character while meeting today's functional needs. Make this available through the town's Building Office, realtors and other appropriate venues.	HC	BD, PDO, SCT	MT
HP-A-3.3	Gain a meaningful role in determining roadway design for all Sandwich transportation routes.			
	3.3.1. Work with MassHighway to ensure that all planned improvements adhere to "Context Sensitive Design" and flexible highway design standards, as promoted by the Federal Highway Administration. The Sandwich DPW is very sensitive to the history of the town.	HC	DPW, PDO, MHD	ST

	3.3.2. Utilize the planning work accomplished in 1995 by the Cape Cod Commission to preserve the historic character of Route 6A.	HC	TS, SCC, OKH	ST
	3.3.3. Request assistance from the Cape Cod Commission in coordinating efforts with adjoining towns to consider nomination of Route 6A as an All American Road under the National Scenic Byway Program.	HC	TS, SCC, OKH	MT
	3.3.4. Work with the Sandwich Pubic Works Department to develop appropriate design parameters for important local scenic and historic roads.	HC	DPW, PDO, BOS	ST
HP-A-3.4	Establish methods of preserving intact historic buildings while allowing for their reuse.			
	3.4.1. Work with statewide preservation organizations, such as Histroric New England, PreservationMass and MHC, and other towns to lobby on an ongoing basis for maintaining flexibility in the State Building Code for historic structures.	HC	SHC	MT
	3.4.2. Work with Sandwich Inspector of Buildings to explore ways people can meet the current building code without losing significant original historic fabric and publicize this information.	HC	OKH, SHC	ST
	3.4.3. Work with The Massachusetts State Board of Building Regulations and Standards in their process of revising the Building Code, including Chapter 34 on Existing Buildings and the provisions for Historic Buildings, to develop exemptions and reasonable alternatives to modern building code standards for work on designated historic properties.	HC	BD, PDO	ST
HP-A-3.5	Increase the number of official designations of historic buildings and properties.			
	3.5.1. Develop bylaws that designate local historic landmarks and districts on a regular basis.	HC	SHC, MHS, TS	MT
	3.5.2. Consider designation of local historic districts in those areas outside of the Old King's Highway Historic District.	HC	SHC	MT
	3.5.3. Encourage private individuals to nominate their properties to the National Register of Historic Places, and to support additional district nominations.	HC	IC/SHC	MT
HP-A-3.6	Increase institutional support and enact regulatory protections that will discourage development that is incompatible with the established historic character of neighborhoods throughout the town of Sandwich.			
	3.6.1. Amend Sandwich's Protective Zoning By-Law to include language in the purpose section addressing the preservation of historic and archeological resources that constitute the town's greatest amenities.	HC	TS	ST
	3.6.2. Seek Certified Local Government Status for the Sandwich Historical Commission.	HC	TS/SHC	MT
	3.6.3. Bring a Demolition Delay Bylaw before the next Town Meeting.	HC	SHC/TS	MT
	3.6.4. Meet with local bankers and request that they earmark loan funds that can be tapped on short notice for emergency moving and repairs for historic properties.	HC	IC	ST
	3.6.5. Adopt a "Neighborhood Conservation Zoning' bylaw which limits the volume, height and square footage of houses within designated districts, even those within the Old King's Highway Regional Historic District, to avoid the impacts of out of scale infill development and replacement dwellings.	HC	TS/SHC/OKH	MT
	3.6.6. Consider hiring a historic preservation planner to provide staffing for the Sandwich Historical Commission, the Old King's Highway Historic District Committee, and coordinate a variety of preservation activities in concert with overall planning policies.	HC	TA, BOS, TM	MT
	3.6.7. Draft a bylaw requiring architectural and site plan review for all new commercial, industrial and marine development.	HC	PDO, BD, BOS, PB, TM	MT
HP-A-3.7	Develop a variety of means to enhance the preservation and maintenance of historic buildings.			
	3.7.1. Develop a bylaw that will address deferred maintenance of historic buildings.	HC	SHC, TS	MT
	3.7.2. Create an inventory of appropriate parcels to which historic buildings might be moved, as a last resort to demolition.	HC	PDO	

	3.7.3. Identify reputable contractors willing and able to move historic buildings.	HC	SCC	
	3.7.4. Develop a list of individuals or organizations interested in purchasing threatened historic properties.	HC	MHC	MT
	3.7.5. Cultivate relationships with realtors to educate them about the significance of individual properties and entire neighborhoods; encourage them to distribute background materials on the town's historic preservation regulations and related materials.	HC	TS, OKH	ST
	3.7.6. Support the efforts of individuals to re-establish the Village Improvement Society, a group dedicated to the protection, restoration and improvement of Sandwich Center, and possibly other historic parts of town.	HC	TS	ST
	3.7.7. Promote the use of preservation restrictions on private properties to safeguard significant historic resources from changes that would compromise their integrity.	HC	TS	MT
	3.7.8. Submit annual requests for needed maintenance and restoration/adaptive reuse projects for town-owned buildings to the Town Administrator.	HC	TS	MT
	Address archaeological resource protection throughout town.			
HP-A-3.8	Conduct a survey or adopt regulations to protect archaelogical resources through town wetland bylaws, subdivision regulations or other appropriate mechanisms.	HC	TS	MT
Goal HP-4	**Strengthen Heritage Tourism Activities**			
HP-A-4.1	Increase coordination among all parties interested in heritage tourism.			
	4.1.1. Convene an annual meeting involving all the major historic attractions in town to develop annual themes and overall coordination among programs and events (The Glass Museum, Hoxie House, Grist Mill, Heritage Plantation, Wing Fort House, Thornton Burgess Museum, Nye Homestead, Green Briar Nature Center and future Sandwich History Center).	HC	SCC, VSB, CRCC	ST
	4.1.2. Work with tourism committee of the Cape Cod Chamber of Commerce and the Canal Region chamber of Commerce to coordinate a variety of heritage tourism promotional events, such as an annual "Founders Day Celebration."	HC	SCC, VSB, CRCC	ST
	4.1.3. Hold an annual "familiarization tour" for new employees and others involved in retail services and other parts of the tourism industry.	HC	SCC, VSB, CRCC	ST
	4.1.4. Develop mutual promotional arrangements with related heritage tourism attractions such as Plimoth Plantation, Sturbridge Village; Quaker-related sites in Providence, RI; etc.	HC	SCC, VSB, CRCC	ST
	4.1.5. Develop a range of heritage tour "packages" related to different aspects of Sandwich's history to encourage deeper exploration and longer stays.	HC	SCC, VSB, CRCC	ST
	4.1.6. Identify B&B owners and operators who could form a Historic B&B Alliance to promote themselves, the history of their properties and develop special events designed to increase visitation during off-peak seasons.	HC	SCC, VSB, CRCC	ST
	4.1.7. Develop a Heritage Tourism Package with one ticket to all major historic attractions in town.	HC	SCC, VSB, CRCC	ST
HP-A-4.2	Develop and distribute additional promotional materials historic about the town's historic resources.			
	4.2.1. Use surveys of Sandwich's historic resources as a basis for tour map and brochures.	HC	SCC, VSB, CRCC	MT
	4.2.2. Develop and distribute a more comprehensive and attractive map or series of maps of the town's most significant resources and heritage attractions.	HC	SCC, VSB, CRCC	MT
	4.2.3. Ensure distribution of this map and Sandwich brochures at the main Cape Cod Visitor's Center on Routes 6/25.	HC	SCC, VSB, CRCC	MT
	4.2.4. Utilize the Internet to better promote all the historic attractions in Sandwich, linking various individual sites, including the Sandwich Visitors Board Website.	HC	SCC, VSB, CRCC	MT
HP-A-4.3	Develop history-based attractions, programs and events.			

	4.3.1. Seek TEA-21 funding to create a Sandwich Welcome Center on the Freeman Farm property after acquiring it or working cooperatively with the property owner to ensure its long-term preservation.	HC	SCC, VSB, CRCC	LT
	4.3.2. Increase and expand the number of regularly scheduled guided cemetery tours. Develop complementary maps and literature to enhance the experience.	HC	SCC, VSB, CRCC	LT
	4.3.3. Develop special tours geared to genealogists visiting town to do research (A possible money making action).	HC	SCC, VSB, CRCC	LT
HP-A-4.4	Make physical and program improvements to improve Sandwich's visitor friendliness.			
	4.4.1. Install "Welcome to Sandwich" signs at appropriate entry points into the town.	HC	SCC, VSB, CRCC	MT
	4.4.2. Develop a trail linking the Sandwich Marina with Village Center/Town Hall Square Historic District.	HC	SCC, VSB, CRCC	MT
	4.4.3. Develop special tours geared to genealogists visiting town to do research.	HC	SCC, VSB, CRCC	MT
	4.4.4. Develop a "history Trail"- a comprehensive way finding system that will enable visitors to locate out of the way historic resources.	HC	SCC, VSB, CRCC	MT
	4.4.5. Provide annual training for front-line service personnel (hotel clerks, shop keepers, etc) in the basic history of Sandwich and location of all historic and other attractions.	HC	SCC, VSB, CRCC	MT
HP-A-4.5	Develop mechanisms to control negative impacts of tourism activity.			
	4.5.1. Make visitors aware of privacy concerns and proper visitor etiquette as a part of all walking tour brochures and other tourism-oriented materials.	HC	SCC, VSB, CRCC	ST
	4.5.2. Develop materials that will engage visitors and develop a deeper understanding of the town's history and historic resources, including a Town Archival Center.	HC	SCC, VSB, CRCC	ST

10.10 Community Sustainability Goals, Policies and Action Plan

The following Community Sustainability Action Plan for Sandwich is intended to correlate with the Cape Cod Commission's set of goal for air pollution reduction in the region, climate change, energy conservation and development, hazard mitigation and adaptation, land conservation, and Smart Growth Development. The Action Plan also provides specific actions for Sandwich to pursue.

Sandwich Community Sustainability Action Plan				
Goals/ Policies/ Actions	**Policies and Actions**	**Leaders**	**Partners and Stakeholders**	**Timeframe**
Greenhouse Gas				
Goal CS-GG-1	**Facilitate local actions and support regional and state programs to reduce emission of greenhouse gas.**			
Policy				
CS-GG-P-1.1	The Town of Sandwich should support emission reduction goals and policies at federal, state, and local levels that will result in reducing greenhouse gas emissions at least 80% below 1990 levels by 2050, with appropriate near-term goals to reach that target and minimize cumulative emissions, such as reductions of 25-40% of 1990 levels by 2020.	BOS	All Town Departments	LT

	Justification - Emission reductions at this level, in conjunction with similar actions worldwide, have a 50% chance of stabilizing global average temperatures at 2°C (3.6°F) above pre-industrial levels. § The United Nations and European Union have both adopted the goal of stabilizing global temperature at no more than 2°C (3.6°F) above pre-industrial levels. (By comparison, 'best estimates' based on the continuation of current trends indicate an increase of 1.8°C to 4°C by 2100.) § Failure to reduce emissions to this level increases the likelihood of catastrophic impacts of climate change such as: melting ice sheets and rising sea levels, widespread land and marine species extinction, intensified natural disasters, and threatened water drinking supplies. § Global reduction of emissions to levels stabilizing temperatures at 2°C (3.6°F) above pre-industrial levels can be achieved using existing technology and technology anticipated to be available in coming decades. § Reducing greenhouse gas emissions to this level is estimated to reduce global GDP growth no more that 0.12% per year. § Near-term action is particularly important given the cumulative nature of greenhouse gas emissions (reductions in the near term result in a lower eventual atmospheric concentration than the same reductions delayed several decades into the future). § Continuing scientific research suggests that smaller increases in temperature may exceed critical ecosystem thresholds, resulting in more dramatic short-term effects than previously projected. The prospect of such abrupt ecosystem changes makes it even more important to stabilize global temperatures at or below these goals.			
CS-GG-P-1.2	The Town of Sandwich should support action by state, regional and other local governments to set greenhouse gas emission goals, develop and implement plans to address climate change, and include climate impacts in plans and development reviews. Justification - Regardless of federal policy on climate change, there is a need to act at the state, regional and local level. Impacts of climate change will be felt in different ways in different parts of the U.S., so state or regional plans are necessary to provide the appropriate guidance for specific areas and communities. In addition, decisions about development patterns and infrastructure investments will have an important impact on the nation's ability to reach greenhouse gas emission goals. These decisions are usually the responsibility of local governments so they should play an active role in planning for, and taking action on climate change.	BOS	All Town Departments	MT
CS-GG-P-1.3	The Town of Sandwich should work with the Cape Cod Commission to quantify and report estimated greenhouse gas emissions at the local and regional levels, and to compare community emission levels to state and regional averages. Where emissions cannot be precisely quantified, plans should discuss the impacts of recommendations on greenhouse gas emissions on a qualitative basis. Climate planning elements should be incorporated in comprehensive plans and considered in environmental and other development review processes. Justification - Understanding the impacts of plan recommendations and development proposals on greenhouse gas emissions is an essential first step. Allowing planners, elected officials and the public to judge the impact of a plan on emissions will help them evaluate the extent to which it contributes to greenhouse gas reduction goals and the long term consequences of climate change.	BOS	All Town Departments	MT
CS-GG-P-1.4	The Town of Sandwich should encourage coordination and collaboration in multi-jurisdictional planning initiatives to address climate change and its implications at a regional level, including adopting new requirements and structures for collective action on climate-related planning and projects.	BOS	All Town Departments	MT

	Justification - Action to address climate change involves decisions at all levels, including choices made by individual local jurisdictions. However, collaborations among jurisdictions can make it easier for each community to act because research, programs and facilities can be shared. Regional coordination will be necessary in order to meet aggressive targets for reduction of GHG emissions. Reaching these targets will not be possible based on the actions of individual jurisdictions or communities. In addition, action that affects regional investments or assets will be more effective if it is the result of regional initiatives and partnerships. Regional visioning programs and blueprint plans create excellent opportunities to build action agreements to address climate change and to set goals in conjunction with coordinated planning for regional development and infrastructure investment.			
CS-GG-P-1.5	Support intergovernmental transportation planning. Justification - Support the develop improved systems for integrating transportation planning at the state, regional and local levels to ensure a consistent approach towards developing transportation systems that reduce vehicle miles traveled by ensuring transportation choice. This will likely include shifting funding into transit, promoting enhancements and "complete streets", ensuring the interconnection of local, regional and national transportation systems and discouraging single occupancy vehicles as the primary source to transportation.	BOS	All Town Departments	MT

Climate Change

Goal CS-CC-1	**Climate Change - Support actions to address climate change that strike an appropriate balance between stakeholder costs and the benefits they receive from climate change mitigation or adaptation.**			
Policy				
CS-CC-P-1.1	Engage affected stakeholder groups in initiatives to create and implement climate change plans and incorporate public participation into climate planning. Justification - Success in addressing climate change will require many groups to change their current behaviors, business practices and investment decisions. These stakeholders should be part of the processes that create climate change goals, plans and implementation measures. An inclusive process allows diverse concerns to be considered and increases the potential that these stakeholders will support the plans and actions that result.	TA	BOS	ST
Goal CS-CC-2	**The Town of Sandwich should be recognized as a community that support the "Green Communities Act" – a place that is sustainable, resilient and neutral in their contribution to climate change.**			MT
Policy				MT
CS-CC-P-2.1	Restructure policies and public incentives to encourage investment and development decisions that support GHG emission reduction goals. Justification - Reduction of greenhouse gas emissions locally, regionally and nationally requires different patterns of development and community design than those that have been common in the past 50 years. Action to address climate change begins with local planning that alters these patterns, giving residents the ability to reduce their own greenhouse gas emissions. Similarly, area plans and plans for major developments should reduces greenhouse gas emissions from the activities that occur within their area and as a result of travel to and from destinations within the area covered by the plan. Neighborhood, commercial and industrial, and mixed use plans that are 'carbon-neutral' or achieve other greenhouse gas emission goals form the building blocks for communities and regions that can achieve their overall climate change goals.	BOS	All Town Departments	LT
CS-CC-P-2.2	Integrate spatial planning and transportation planning so that the development patterns support mobility choices and reduced trip lengths to meet basic needs thereby allowing the transportation facilities to help achieve community climate change goals.	BOS	DPW	MT

	Justification - Sandwich's ability to achieve climate change goals will depend on whether its residents can make choices that reduce greenhouse gas emissions. Since trip choices and lengths – whether to travel in a single-occupancy auto or take transit, whether to walk or drive to local shopping and restaurant areas, how long a route is required from home to work – all affect transportation-related greenhouse gas emission, it is important that residents be able to choose trips that lower these impacts. By closely integrating the planning for land uses and all forms of transportation, communities can make these choices more realistic and desirable for their residents.			
CS-CC-P-2.3	Incorporate new standards and regulations that promote sustainable practices and measure both performance and outcomes. Justification - Addressing climate change requires a dramatic departure from 'business as usual' for community design and development. While traditional measures of success are still important (such as adding jobs, building new subdivisions or increasing the tax base), reducing greenhouse gas emissions requires that Sandwich consider additional criteria for success.	BOS	All Town Departments	MT
CS-CC-P-2.4	The Town of Sandwich should support community education about climate change in through public outreach efforts undertaken. Public education programs should explicitly recognize and discuss climate impact and considerations in public review and participation process related to local comprehensive plans and the Regional Policy Plan. Justification - Success in addressing climate change requires different choices in the way communities are planned, developed and maintained. Members of the general public may have little knowledge and information about what their daily choices mean for the future of the planet. Whenever appropriate, information about climate change and strategies for mitigation and adaptation should be incorporated into public outreach campaigns.	BOS	All Town Departments	ST

Air Quality

Goal CS-A-1	**To maintain and improve Sandwich's air quality so as to ensure a safe, healthful, and attractive environment for present and future residents and visitors.**			
Policy				
CS-A-P-1.1	Encourage developments of appropriate scale that properly promote multi-purpose trip making capabilities.	BOS	PDO	ST
CS-A-P-1.2:	The Town should promote methods to reduce stationary source pollution emissions which have been identified by the US EPA as the easiest to "command and control" through regulations.	BOS	All Town Departments	MT
CS-A-P-1.3:	Work with the Cape Cod Commission, Cape Cod Regional Transit Authority and others to promote alternative modes of travel on Cape Cod such as bicycling and pedestrian facilities, transit systems, air and water transportation and ride-sharing programs in order to reduce air emissions.	TA	PDO	ST
CS-A-P-1.4:	Provide public education about ways that residents and businesses can improve air quality.	TA	PDO	ST
Actions				
CS-A-A-1.1:	Revise local zoning regulations to incorporate pedestrian scale projects and amenities that allow for, and promote, walking between neighboring development sites.	PB	PDO, DPW	ST
CS-A-A-1.2:	Discourage drive-through facilities except in situations where it can clearly be illustrated that the air quality benefits through the reduction in emissions associated with turning off and turning on the vehicle are off-set by any idling emissions incurred.	PB	PDO, DPW	ST
CS-A-A-1.3:	Request the assistance of the State and the Cape Cod Commission in acquiring a database of the licensed stationary source pollution emitters in Sandwich and the permitted level of pollution allowed for each licensee. This database should include any data available from the MMR clean-up project on emissions due to the evaporation and combustion of pollutants on the base.	BOS	TA	MT
CS-A-A-1.4:	Since pollution emissions are related to heating systems, encourage energy efficient heating systems in all new building construction and renovations. And also, require energy conservation measures, as a means of reducing overall heating requirements and thereby further reducing pollution emissions.	TA	PDO	MT

CS-A-A-1.5:	Encourage state regulators to require local pollution off-sets for any planned expansions of major stationary source polluters.	BOS	All Town Departments	LT
CS-A-A-1.6:	Promote the use of Best Available Control Technologies (BACT) where appropriate.	BOS	All Town Departments	ST
CS-A-A-1.7:	Request that the Regional Transit Authority review the needs of Sandwich residents for public transportation alternatives and provide new services to meet these needs.	BOS	TA, PDO	ST
CS-A-A-1.8:	Request that the RTA promote "Air Pollution Non-Attainment Day" fare free transit services as a means of reducing automobile travel on the worst anticipated pollution days.	BOS	TA	ST
CS-A-A-1.9:	Encourage the development of sidewalks and bicycle facilities serving the most central locations of town, and along the most heavily traveled corridors within the town.	PB	PDO, DPW	ST
CS-A-A-1.10:	Work with the Cape Cod Commission and other state and regional agencies to identify unnecessary regional automobile trip making which can be otherwise diverted, such as trips from Boston, New York etc., which could be accomplished through air, bus or rail service; freight and passenger trips to the islands that could be serviced by off-cape ports.	BOS	TA	MT
CS-A-A-1.11:	Promote activities and local new reports on how proper vehicle maintenance, reducing the number of short automobile trips and engine idling, use of efficient heating systems, reducing the use of gasoline- powered lawn and garden equipment, limiting wood and brush burning and related actions can all improve the quality of live of Sandwich residents.	BOS	TA	MT
CS-A-A-1.12:	Encourage the local newspapers and radio stations to promote the Caravan for Commuters, the statewide rideshare agency, program to encourage ridesharing when possible by Sandwich residents.	BOS	TA	MT
CS-A-A-1.13:	Request that the Local Access Channel listing include a page promoting the Caravan for Commuters programs.	BOS	TA	MT
CS-A-A-1.14:	Encourage local newspapers to include, during the state designated "Ozone Season," on Page 1 the previous days ozone measurements and the daily predicted ozone levels. Request the development of a local air quality monitoring station in Sandwich which can be used to monitor local air quality levels and publicize local pollution levels.	BOS	TA	MT
Water Conservation				
Goal CS-WC-1	**The Town of Sandwich supports efforts to reduce greenhouse gas emission related to the distribution and use of water.**			
Policy				
CS-WC-P-1.1:	Community Locations and Water Availability – The Town should direct development that connects to and sustains available water supply capacity. Water availability and quality should be considered in development reviews, planning decisions, and infrastructure investments. Justification - Transporting water over long distances requires systems of pumps and pipelines operated by electricity, currently provided mostly by greenhouse gas generating power plants. Greenhouse gas emissions from SWD water treatment, supply and distribution can be reduced by locating development and redevelopment in areas where water is available nearby.	BOS	SWD	MT
CS-WC-P-1.2:	Support planning and design that reduces water consumption per capita and support implementation of water conservation practices. Justification - More efficient use of limited water supplies helps address climate change because it reduces energy consumption in the operation of the water system. It can reduce the need for extensions of these systems to bring water from more distant sources, further reducing greenhouse gas emissions related to construction and energy consumption in distribution.	PB	SWD	ST
Energy Conservation and Renewable Sources				
Goal CS-E-1	**The Town of Sandwich supports efforts to reduce greenhouse gas emission related to the production and use of energy in the built environment.**			
Policy				

CS-E-P-1.1:	The Town of Sandwich supports initiatives that generate energy from local renewable sources as a part of economic development efforts. Justification - Electricity generation is responsible for about 1/3 of U.S. greenhouse gas emissions. Expanding the local generation of energy would meet the community's needs without the costs and greenhouse gas emissions related to long-distance transmission. In addition, the use of renewable sources reduces greenhouse gas emissions from carbon-based fuel sources. Additionally, this approach may form the basis for new economic opportunity as well. Changes in energy generation technology over time may mean that the energy source with the lowest level of greenhouse gas emission may change.	BOS	All Town Departments	Ongoing
CS-E-P-1.2:	Facilitate Renewable Energy Sources – The Town should plan for and establish strategies to facilitate the use of energy sources that generate lower levels of greenhouse gas emissions. Establish incentives, including expanded tax credits, for implementation of renewable energy generation, distribution, and deployment. Justification - Fossil-fuel based energy sources and long-distance transmission of energy are significant contributors to climate change. Planning and development in Sandwich must include efforts to reduce the need for these energy sources and systems. In the past, land use planning in many communities included delineation of transmission line routes, but it did not identify sites where energy could be generated locally. Some sites are of particular value for wind or geothermal energy. Other sites may also be desirable for alternative energy projects because of their unique characteristics (for example, sites that have ample sunshine, few other development constraints, and proximity to transmission facilities). By including energy production sites in comprehensive planning processes, their impacts on the environment and adjacent uses can be evaluated and those sites that have particular value can be planned and zoned for these uses.	BOS	All Town Departments	MT
CS-E-P-1.3:	Design for Solar Energy - Support design strategies that maximize use of alternative energy sources and passive solar architecture in buildings. Consider extending tax credits for the use of solar energy in design and construction practices. Justification - Site planning and building design have a significant effect on the amount of energy needed to heat, cool and light buildings to meet the needs of their occupants. Site and building design techniques can reduce energy consumption on-site, thus reducing demand for energy generated elsewhere and its related greenhouse gas emissions. Sandwich should incorporate planning and design in the site plan review process encourage the use of passive solar energy and other on-site alternatives.	BOS	All Town Departments	MT
Actions				
CS-E-A-1.1:	Eliminate Regulatory Barriers to the Use of Renewable Energy Systems - Examine existing zoning laws and development standards and revise or eliminate provisions that act as a barrier to the use of renewable energy systems. Justification - Zoning and other development standards can act as a barrier to the use of renewable energy systems. Examples include height restrictions that limit the use of wind energy conversion systems and design requirements that limit the placement of solar energy panels.	PB	PDO	ST
CS-E-A-1.2:	Integrate Solar Design into Local Regulations - Revise zoning bylaws and prepare design guidelines to allow for and encourage the integration of passive solar design, green roofs, active solar and other renewable energy sources. Justification - In many climates solar design and on-site solar systems have been shown to be effective in lowering overall building energy use. Design standards might include southern orientation of structures, extensive southern fenestration for winter heating, shielding of windows to prevent summer overheating, thermal mass to retain heat and coolness, and design for maximum natural summer ventilation, solar hot water heaters and photovoltaic electricity.	PB	PDO	MT
CS-E-A-1.3:	Renewable Energy Systems and Energy Efficiency in Public Facilities - Construct and renovate public facilities to serve as demonstrations of green building practices and include (where possible) renewable energy systems such as photovoltaic electricity or solar hot water panels.	BOS	TA	MT

	Justification - Sandwich public facilities can be visible examples of the benefits of renewable energy systems and act as models for the private sector to follow.			
Goal CS-E-2	**Involve the community and stimulate financial and other resource investment in energy conservation and renewable energy resources.**			
Policy				
CS-E-P-2.1:	The Town shall access research and technical assistance from available resources, including the Cape Cod Commission and Barnstable County Energy Committee, regarding financial incentives for energy conservation measures and achieving economic savings for the Town.	BOS	TA	ST
CS-E-P-2.2:	Savings derived from municipal energy conservation should be invested in expanding conservation measures.	BOS	TA	MT
Actions				
CS-E-A-2.1:	Form a Local Energy Committee - Through the Town's analysis and input from the Sandwich Community at the 2007 Energy Forum, that the Town should consider forming an energy committee with a broad scope of duties to include: ▪ Working with energy consultants hired on behalf of the Town, ▪ Providing recommendations to the Town regarding municipal and residential energy conservation, and issues surrounding the potential for renewable energy sources, and ▪ Soliciting input from the public and other Town Boards and Committees, as needed. Justification - Currently, Town staff technical expertise in this area is very limited as are resources available to assist the committee's efforts. It will be essential to form the new committee with individuals that are committed to serve and are proficient with complex technical issues. Preferably, some or all of the members will offer specific expertise with energy issues. While Town departments should make every effort to be responsive to committee requests, it is recommend that this be a true 'working committee' of individuals with the ability to research issues, assist Town departments in applying for grants, and do other tasks related to these efforts. It may also be beneficial to include representatives from the Board of Selectmen and the School Department or School Committee.	BOS	TA	ST
CS-E-A-2.2:	Establish a Thorough Energy Planning Process - Whether through the new Energy Committee or the focused and detailed energy study, establishing a thorough planning process to evaluate potential projects and build strong community support is essential. It is recommended that the following initiatives be considered: ▪ Clarify the purpose and scope for the Town's efforts and map out a decision-making process that includes ample opportunity for public input. ▪ Evaluate and provide recommendations on shorter-term projects. Some approaches, such as development of large-scale generation facilities, may involve long and complex planning, permitting, and implementation processes. It may be worthwhile to consider starting with shorter-term options such as the Cape Light Compact's Green Power program and enhancing energy conservation efforts. ▪ Obtain grant funding for consultant assistance. Because of the numerous issues involved, it may be beneficial for the Town to seek technical expertise early in the planning process, particularly to help guide the Town through the legal and regulatory framework. Funding through the Massachusetts Technology Collaborative's Clean Energy Choice program could be used directly or to leverage larger funds.	BOS	TA	ST
CS-E-A-2.3:	Prepare an Energy Conservation and Renewable Energy Development Plan - With the assistance of an energy consultant, conduct a Town-wide assessment of possible energy conservation and renewable energy generation projects and programs. The goal of this plan would be to identify the most feasible and beneficial projects suitable for the Town and could include the following: ▪ Inventory current energy uses and evaluate efficiencies. ▪ Evaluate current conservation practices and identify potential improvements.	BOS	TA	MT

	▪ Identify potential technologies and locations - Considering the limited financial resources of the Town and the apparent desire to implement in the near-term, it may be advantageous to limit consideration to only those technologies that are commercially available and proven in this region. ▪ Develop comprehensive evaluation criteria (including of potential constraints such as site issues, cost, permitting, etc.) ▪ Screen out the least feasible projects. ▪ Prioritize/rank feasible alternatives. ▪ Recommend most feasible and economic projects with best chance of success in near-term (i.e. 5 years or other as determined by the Committee). ▪ Present recommendations to Selectmen and seek support for implementation. Justification - Strong public involvement and support will strengthen the Town's position for future implementation renewable energy funding assistance and ultimate chances for success. It will be essential to seek public input throughout the process and to maintain broad public support. Meetings should be open and draft findings should be made available for comment prior to final submission. Once final recommendations are determined, support should be sought from the Selectmen.			
CS-E-A-2.4:	Initiate dialogue with townspeople on an annual basis on the issues of efficient energy use, conservation, and incentives. Offer programs for schools, homeowners, and commercial property owners that discuss issues such as energy conservation programs, energy audits and new residential energy saving devices and methods.	BOS	TA	ST
CS-E-A-2.5:	Publicly recognize commercial efforts to conserve and promote efficient energy utilization as a cost-saving mechanism. An annual town-initiated energy savings competition might provide incentives for some improvements.	BOS	TA	MT
CS-E-A-2.6:	Encourage homeowners to use alternative power including solar and wind and other market-proven technologies as created. Make appropriate changes to the zoning by-laws to facilitate installation of residential-scale facilities to accommodate these goals.	PB	PDO	MT
CS-E-A-2.7:	Efficiently track energy use by Town departments, including identifying type and amount of fuel used for heating/electric/gasoline (regular meter/gauge readings, etc.) and dollars spent for these activities.	TA	All Town Departments	MT
CS-E-A-2.8:	Educate and encourage municipal employees to incorporate energy-conserving measures in the work place and to identify measures that would improve energy use.	TA	All Town Departments	MT
CS-E-A-2.9:	Investigate grants and private/public partnerships to use financially feasible energy saving devices in public buildings.	BOS	TA	ST
CS-E-A-2.10:	Access Commission and County Energy Committee resources to help the Town explore alternatives for the most efficient and cost-effective energy purchase options when deregulation becomes effective. Ensure that low income family assistance and renewable energy programs and incentives for energy conservation measures are included in any contract.	BOS	TA	ST
CS-E-A-2.11:	Assist residents and businesses to take advantage of financial incentives through the Barnstable County Energy Investment Fund to improve residential and commercial buildings.	BOS	TA	ST
CS-E-A-2.12:	Establish a community energy alternatives information program by estimating total energy usage in the town and updating it yearly, estimating the potential impact of energy conservation, encouraging financially feasible alternative energy sources, cataloging homes in the community that use energy alternatives and how much money they spend on energy, cataloging wind farm sites, placement of municipal energy savings monies in a fund to promote greater energy efficiency, making municipal buildings more energy efficient, and more accurate accounting of energy expenditures.	BOS	TA	MT
CS-E-A-2.13:	Provide department heads an energy-saving incentive by giving back a percentage of their yearly energy savings to be used in their budgets.	BOS	TA	MT
Goal CS-E-3	**To encourage energy conservation and improved energy efficiency in residential, commercial, and municipal land uses and buildings.**			

Policy				
CS-E-P-3.1:	Development and redevelopment should be designed to promote the efficient use of energy, including orienting structures to take advantage of solar gain and to maintain solar access for adjacent sites.	PB	PDO	Ongoing
CS-E-P-3.2:	Provide incentives for use of energy conserving building improvements and renewable energy devices in existing and new buildings if cost-effective.	BOS	TA	MT
Actions				
CS-E-A-3.1:	Encourage residential and commercial property owners to do the following: (1) exchange conventional light bulbs for long-life compact fluorescent technology; (2) upgrade top loading washing machines to front-loading technology; (3) super insulate walls, attics, and foundations when renovating; (4) change electric dryers to gas; (5) install room occupancy sensors and timers on exhaust fans and lights in residential rooms, rest rooms, classrooms, lobbies, and hallways; (6) install automatic smart thermostats; and (7) incorporate the requirements of state energy codes in relevant renovations.	BOS	TA	Ongoing
CS-E-A-3.2:	Complete an updated energy audit of all municipal buildings. This can be done in conjunction with any proposed building maintenance plan or renovation. Include an inventory of energy-conserving technologies utilized town-wide to measure progress toward energy conservation goals and to provide interested parties with examples of how to undertake energy conservation on their own.	BOS	TA	ST
CS-E-A-3.3:	Require that all municipal building renovations or construction comply with updated energy codes.	BOS	TA	MT
CS-E-A-3.4:	When reviewing development proposals, the Town should develop incentives for use of energy conserving building construction materials and devices, uses of renewable energy sources within a development, and site design to optimize the potential for use of solar energy.	PB	PDO	Ongoing
CS-E-A-3.5:	Consider energy efficiency measures that exceed state building code standards to be a project benefit when reviewing developments.	PB	PDO	LT
CS-E-A-3.6:	The Planning Board should require new development to lay new utility lines underground for aesthetic and security purposes and to facilitate the development of walkways and bikeways.	PB	PDO	Ongoing
CS-E-A-3.7:	Develop a priority list of above ground utilities that could be placed underground during road or land reconstruction.	PB	DPW	ST
CS-E-A-3.8:	Develop a priority list of conversions to underground utilities to enhance safety, aesthetics, and historical preservation.	PB	DPW	ST
CS-E-A-3.9:	Promote residential and commercial energy conservation through recommending by-laws that bring existing residential and commercial buildings up to current code, working with banks to find ways to better utilize energy efficient mortgages, providing local and state incentives for financially feasible renewable energy devices, advocating for higher state energy codes, and establishing a program to improve the energy efficiency of low and moderate income homes and homes heated with oil or electricity.	BOS	BD	MT
CS-E-A-3.10:	Considering a residential energy conservation ordinance (RECO) that would require an update of a building toward current energy code requirements within a limited percentage of a sale price of a residence or commercial/industrial building.	BOS	BD	MT
Goal CS-E-4	**To maximize the use of energy saving transportation modes for accessing public and private areas.**			
Policy				
CS-E-P-4.1:	The Town shall encourage energy saving transportation activities including carpooling, mass transit programs, bicycling and walking.	BOS	TA	MT
CS-E-P-4.2:	Bikeways and walkways should be linked to create a network that ties together the entire Cape.	BOS	PDO, DPW	MT
CS-E-P-4.3:	Encourage large local employers to give financial incentive to employees who use alternative transportation modes to commute to work.	BOS	TA	MT
Actions				

CS-E-A-4.1:	Encourage large employers within the Town (including the Town itself) to develop incentives for employees to use alternative modes of transportation to commute to work.	BOS	TA	MT
CS-E-A-4.2:	Continue to contribute to the development of safe bikeways and walkways within the Town.	BOS	PDO, DPW	MT
CS-E-A-4.3:	Continue working with the Cape Cod Regional Transit Authority to establish a public transit system that includes Sandwich.	BOS	TA	MT
CS-E-A-4.4:	Create incentives for employers to encourage and establish alternative forms of transport for their employees to take to work.	BOS	TA	MT
CS-E-A-4.5:	Develop and circulate a map of bikeways and walkways that also designates alternative transit park and ride facilities. Make this map available on the Town web site.	BOS	TA	ST
CS-E-A-4.6:	Erect bicycle stands outside municipal buildings and request commercial enterprises do the same.	BOS	TA	ST
CS-E-A-4.7:	Expand the Town web site to include postings of public meeting times, school activities, municipal events, and agendas, encouraging use of electronic means, rather than motor vehicles, to ascertain relevance of meetings. Develop appropriate electronically formatted municipal forms to be downloaded by individuals who would otherwise travel to Town offices to obtain them.	BOS	TA	ST
CS-E-A-4.8:	Create a car-pooling directory that provides users with a mechanism to find alternative ways to get to work. Establish an "Alternative Way to Get to Work Day", or week, to educate and expose townspeople to this issue.	BOS	TA	MT

Natural Resources and Open Space

Goal CS-NR-1	**The Town of Sandwich should support actions that enable natural assets and open spaces to contribute to the health of community and region, and to reduce the overall contributions to climate change.**			
Policy				
CS-NR-P-1.1:	Natural Asset Protection - Protect important natural assets and areas of Sandwich to maintain their role as 'carbon sinks'. Justification - Throughout much of the 20th century, urban development relied on engineering methods and construction to modify the natural environments surrounding growing communities. The need to reduce greenhouse gas emissions adds another reason to support a different approach to natural assets – one in which they provide valuable benefits to the community and the region. Nature preserves and other areas that remain in a natural state – such as grasslands, wetlands or forest –serve as carbon sinks, trapping carbon from the atmosphere. Disturbance of these areas releases carbon into the atmosphere; protecting them prevents this release and additional plantings in these areas may trap additional carbon and reduce its levels in the atmosphere.	BOS	NR	Ongoing
CS-NR-P-1.2:	Green Infrastructure - Create, protect and manage systems of green infrastructure (i.e., urban forests, parks and open spaces, natural drainage systems) in Sandwich. Justification - When Sandwich uses and enhances its natural environmental assets as an integral part of its infrastructure, the community also reduces its impact on climate change and increases its ability to adapt to changes that may occur. For example, shade from the street trees in neighborhoods and villages reduces the need for air conditioning in the summer, thus reducing electrical demand and the greenhouse gas emissions caused by electrical generation and transmission. Preservation of street trees and forests found in floodplain or other low-lying areas also enables the community to adapt should future changes in global climate increase the intensity of flooding or raise sea levels. Programs to plant new street trees, and other green systems provide similar opportunities.	BOS	NR	Ongoing
CS-NR-P-1.3:	Methane Emissions from Landfills – The Town of Sandwich should support policies that result in the design, retrofitting, operation, and management of landfills (both existing and closed) so that methane emissions are controlled and, where feasible, used for energy production.	BOS	DPW	MT

	Justification - Methane is the second most common GHG, after CO2. Methane is produced in landfills as the result of the anaerobic decomposition of waste. Landfills are a major contributor of methane emissions, accounting for approximately 34% of all methane emission in the U.S. Methane is readily usable for the production of energy since it is a major component (95%) of natural gas. Land use planning and public facility siting policies should locate and design landfills so they provide energy resources and minimize methane emissions.			
CS-NR-P-1.4:	Local Food Production - Include the local production of food and energy among the uses addressed in planning initaitives and local regulations. Remove regulatory barriers to the distribution, consumption and purchase of locally produced food. Justification - Local food production can reduce "food miles" – the distance that food must travel – and consequently greenhouse gas emissions. Food in a grocery store typically travels 1,000 miles or more while the typical food in a farmers market travels 1/10th of that distance. Planning for land used for community farming can help protect and ensure the retention of these properties for local food and commodity production. The result will help minimize VMT by limiting food transport and avoiding regional imports of consumer goods that can be produced locally.	BOS	PDO	MT
CS-NR-P-1.5:	Agricultural Lands Preservation - Promote redevelopment and compact new development that will minimize the conversion of farmland and woodland for urban use. Support programs to help farmers incorporate environmental protection practices. Continue to support funding and tax incentive programs (such as the Chapter 61 program and CPA) for open space and active farmland preservation initiatives. Justification - Reducing our conversion of agricultural and woodlands to an urban use is important not only for food production, but the vegetation not destroyed is important to convert carbon dioxide to oxygen.	BOS	PDO	MT

Transportation Systems

Goal CS-T-1	**The Town of Sandwich should support the planning and development of multi-modal regional and local transportation systems that reduce greenhouse gas emissions by reducing vehicle miles traveled.**			
Policy				
CS-T-P-1.1:	Coordination with Land Use Planning - Incorporate planning for transit, bicycle and pedestrian networks within local and regional comprehensive planning. Encourage development patterns that support transit and multi-modal transportation networks. Justification - Transit, bicycle and pedestrian facilities give people the ability to choose non-automobile travel modes for their trips and thus reduce the amount of greenhouse gas emissions from cars. In areas where transit, pedestrian and bicycle networks have not yet been defined, identification of potential future networks through land use and comprehensive planning projects can help preserve the opportunity to create these travel options in the future.	PB	PDO, DPW	ST
CS-T-P-1.2	Transportation Investment Priorities - Give higher priority to funding for transportation infrastructure, programs and services that will reduce greenhouse gas emissions. Justification - Sandwich, like many other communities, does not have enough funding to build all the transportation infrastructure it needs. Thee typical process for establishing funding priorities considers a variety of factors, such as project traffic volumes, connectivity to other facilities, safety enhancement and local support. Investments that support an appropriate land use pattern and alternative transportation modes will help the community reduce its greenhouse gas emissions. These factors should be considered when transportation funding priorities are being set. This policy would apply to capital investments and also to investment in programs and services (such as transportation demand management or operation of a joint parking district) that enable residents to reduce vehicles miles traveled.	BOS	DPW	MT
CS-T-P-1.3	Encourage Regional Investment in Transit – Local transportation programs and policies should support substantially increasing state and county investment in transit on Cape Cod, including commuter rail, light rail, public bus transit, and private bus service. Transit has demonstrated significant GHG reduction capacity. Investment should support both the development of new systems and the expansion/maintenance of existing systems.	BOS	TA	MT

	Justification - Rail transit reduces greenhouse gas emissions because it reduces the vehicle miles traveled by auto. Providing transportation choice on a local and regional level allows growing regions such s Cape Cod to shape their growth around transit availability, maximizing open space and multimodal connections to activity centers. Congestion, an impediment to the flow of people and goods, is reduced via rail transit. In smaller communities, like Sandwich, local bus service is the only practical way to provide transit services throughout the community.			
CS-T-P-1.4	Local Street Network & Design - Support local street network connectivity and complete streets designed to accommodate all users and multiple transportation modes through context sensitive solutions. Justification - Local street networks with easy connections to a variety of uses enable transportation choice and increased mobility. Street design that includes right-of-way for existing or future fixed guideway transit, pedestrian-friendly sidewalks and street wall environments, bicycle lanes, and safe crossings encourages the reduced use of automobiles for short and long trips, and increases multimodal traffic capacity. By reducing the number and length of automobile trips, greenhouse gas emissions are also reduced.	BOS	PDO, DPW	MT
CS-T-P-1.5	Multi-Modal Transportation Corridor Improvements - Develop major transportation corridors for multi-modal operation to minimize transportation–related greenhouse gas emissions associated with travel in the corridor. Justification - Planning and construction of multi-modal transportation corridors (e.g. integrating auto, transit, bicycle, and pedestrian facilities) create alternatives for travelers, allowing them more efficient use of their time and money resources and providing travel choices that have lower greenhouse gas emissions. Some local applications may include Route 130, Quaker Meetinghouse Road, Cotuit Road, and Route 6A between economic and village centers.	BOS	PDO, DPW	MT
CS-T-P-1.6	Support Transportation Demand Management – Support the creation and implementation of local and regional Transportation Demand Management (TDM) strategies that result in more efficient use of transportation resources and reduce vehicle miles traveled (VMT). Justification - Transportation demand management (TDM) strategies focus on changing travel behavior – trip rates, trip length, travel mode, time-of-day, etc. – to reduce the number of vehicle trips and increase mobility options. Most TDM projects and programs reduce emissions through trip or VMT reductions or by shifting trips from peak periods to less congested periods. TDM strategies can achieve public goals such as reduced traffic congestion, improved air quality, and decreased reliance on non-renewable energy consumption, in addition to reducing greenhouse gas emissions.	BOS	TA	MT
Actions				
Action CS-T-A-1.1	Transportation Facility Siting and Community Design - Use community design and development review processes to secure rights-of-way and require provision of facilities needed to provide complete streets with transit, bicycle and pedestrian networks connecting to neighborhoods, village centers, employment centers, and surrounding communities. Justification - If transit, bicycle and pedestrian routes are not available from Sandwich neighborhoods to a desired destination, travel to that destination will involve a car. Routes for these alternative transportation modes should be located and provided for through the planning and subdivision processes in the same way as roadways are. Highly-connected street patterns facilitate travel by all modes, but are especially beneficial for walking and biking, since they eliminate the need to walk or bike on a busy arterial or collector street.	BOS	DPW	MT

Economic Development

Goal CS-ED-1	**Support planning efforts that incorporate and promote new technologies and sustainable businesses to further economic growth.**			
Policy				
CS-ED-P-1.1	Technology and Communications - Support technology and business practices that enable people to reduce vehicle miles traveled from home to work. These include the use of home offices and technology such as wireless communications and videoconferencing.	BOS	PDO	ST

	Justification - Evolving communications and computer technology allow people to work together without being in the same physical location. These changes allow effective collaboration with fewer vehicle miles traveled, and thus lower greenhouse gas emissions. They provide for more efficient use of space (i.e. building materials, parking, roads) when home offices are combined with "hot desking" (one desk shared by many people at the main office). They also can provide social and economic benefits by offering more flexibility to accommodate full-time parents, the handicapped, and part-time workers. Changes to development patterns that support these trends include increased flexibility for home office uses, the potential for satellite offices within Strategic Planning Areas with wireless communication to main office when some collaboration is desirable, and business support centers in neighborhood commercial areas.			
CS-ED-P-1.2	Green-Collar Jobs – Support planning initiatives to shift economic development programs to create local jobs in sustainable businesses. Justification - Businesses in 'green' industries (or businesses that use 'green' approaches to traditional industries) will become increasingly important to greenhouse gas reduction and to sustainable economies. As companies and individuals seek to reduce their 'carbon footprints', they will look for more sustainable materials, technologies and services. Support from the community for the businesses that are using green practices will make it possible for local climate change goals to be met. These businesses can also form the foundation for 'green' economic growth that can reduce reliance on fossil-fuel-based economies.	BOS	TA	MT

Land Use and Development

Goal CS-LU-1	**The Town of Sandwich should support development patterns in new development and redevelopment that minimize the emission of greenhouse gas from transportation and travel.**			
Policy				
CS-LU-P-1.1	Support development patterns in identified Strategic Planning Areas that mix land uses so jobs, services, schools, shopping and other destinations are near residents' homes and neighborhoods. Adopt specific incentives and requirements that promote mixed-use development, including removing barriers to mixed use project financing. Justification - Mixed-use development reduces climate change impacts in several ways. By locating diverse uses close to one another, it reduces the volume of daily vehicle trips, as well the need for private vehicles and parking facilities. Reducing travel distances reduces greenhouse gas emissions, even if the trips are taken in gasoline-powered vehicles. Shorter distances also make alternative travel modes – such as biking or walking – more feasible and likely, further reducing the emission of greenhouse gases.	BOS	PDO	ST
CS-LU-P-1.2	Plan for local in identified Strategic Planning Areas with higher density mixed-use development centers near transit stops and stations and in other compatible key locations. Regulatory and other incentives should be adopted to encourage higher density development. Development reviews policies and processes should acknowledge the GHG emission reduction impacts of higher density development and the negative climate impacts of sprawling, low density projects. Justification - Pollution generated from transportation constitutes a major portion of GHG emissions locally and regionally. Development patterns that reduce the number and length of trips in single-occupant motor vehicles will reduce these emissions. Higher intensity centers accomplish this objective in several ways. Higher intensity development itself means that more desired destinations are close by, making walking or biking feasible choices, and making it easier to take care of several tasks in a single trip. If these higher intensity centers are located near public transportation, then more people will be able to use transit for more trips.	PB	PDO	ST
CS-LU-P-1.3	Jobs-Housing Proximity - Plan for jobs and appropriately priced housing located close to one other so people at all income levels can live near their places of work. Adopt policies that incentivize mixed-income development near job centers and recognize the positive fiscal impacts on households in walkable, transit-accessible, high density locations.	BOS	PDO	MT

	Justification - In Sandwich, the limited amount of high paying local jobs prevents people from living and working within the the community. These residents must find employment opportunities in locations that are distant from their homes and may be accessible only by automobile. This development pattern results in increased vehicle miles traveled and increases in greenhouse gas emissions.			
CS-LU-P-1.4	Location of Public Facilities - Ensure that schools and public facilities are centrally located within the community and are accessible by walking, biking or transit. These facilities should be jointly located whenever feasible. GHG emission impacts, particularly through potential for VMT reduction, should be considered in all location and investment decisions for public facilities. Justification - Schools and other public facilities are major trip generators. Sandwich should seek to locate schools in areas with good transit, pedestrian and bicycle connections to their attendance areas, helping to make Safe Routes to School programs feasible and reducing the emissions from dedicated school transportation and parents driving children to school. Similarly, public facilities with significant customer traffic should be located where there is transit available, pedestrian or bike access. Co-location of public facilities, and location near population and growth centers, further helps to reduce greenhouse gas emissions by reducing the number and length of trips needed to use public services.	BOS	TA	MT
CS-LU-P-1.5	Compact Community - Support community design and public investment decisions that create compact development patterns and higher densities that reduce vehicle miles traveled within a community. Policies should also prioritize the modernization of infrastructure supporting such development. Justification - A more compact community will make it easier for people and goods to move within a community by walking, bicycling, utilizing mass transportation, and reducing automobile trip lengths. Conversely, by minimizing sprawling development (lots between 1 and 5 acres) on the edges of urban areas, a region can reduce greenhouse gas emissions from vehicles and retain natural areas that provide carbon sinks.	BOS	PDO	MT
CS-LU-P-1.6	Infill Development and Redevelopment - Promote infill development, redevelopment of existing neighborhoods, preservation of historic structures and the adaptive reuse of buildings within the currently-developed areas of Sandwich. Create new incentives and policies that promote infill investment. Prioritize infill development in local housing, transportation and infrastructure programs. Tax credits and other incentives and assistance should target the reuse and rehabilitation of vacant properties. Justification - Public and private sector investments have created infrastructure and amenities to serve homes and businesses in Sandwich. Reinvestment in these existing development area allows the town to accommodate new residents and businesses within its existing fabric. Such reinvestment maximizes the use of existing infrastructure, encourages the preservation and continued use of historic buildings and supports existing businesses and services. It reduces the need for new roads and infrastructure, and can encourage walking, biking and use of transit. It preserves open space and greenfields, thus reducing sprawl and retaining areas that serve as carbon sinks.	BOS	PDO	ST
CS-LU-P-1.7	Brownfields - Advocate the reuse of remediated brownfield sites to reduce distances between destinations and relieve pressures for greenfield development. Justification - Open, undeveloped land provides valuable resources and ecosystem services such as the local provision of food and fiber, carbon sequestration, habitat, and flood protection. The use of remediated brownfield sites returns land to productive use and increases the supply of land necessary to meet the demands of growing populations. This, in turn, reduces the demands on undeveloped open lands. Brownfield sites are typically within developed areas connected to existing infrastructure networks, reducing demands on communities to provide new infrastructure and reducing the need for travel outside of the community to equivalent greenfield sites. It helps address climate change because it reduces vehicle miles traveled and retains land for vegetation that can serve as a carbon sink.	BOS	TA	MT

CS-LU-P-1.8	Developer Incentives - Create developer incentives, including tax credits and regulatory reforms, to encourage development that reduces energy consumption and lowers greenhouse gas emissions. Encourage demonstration projects with evaluation mechanisms. Jurisdiction - Development incentives give developers a direct benefit for some concession on their parts. New regulations and standards should be paired with developer incentives. This is among the most effective, fiscally neutral strategies that can be used. Specific development incentives can include, among others, density bonuses, expedited local and regional permitting, fee reductions and waivers.	BOS	TA	MT
CS-LU-P-1.9	Reduce Heat Island Effects – Adopt land use policies for neighborhoods and individual development projects using techniques that reduce heat absorption. Justification - Heat island effects traditionally take place in urban areas where natural ground cover has been replaced with pavement, buildings, or other materials that tend to absorb and retain heat. While the resulting warmer temperatures may be benign or even welcome during colder times of the year, any such benefits are greatly outweighed by the negative impacts during hotter summer months when heat island effects significantly contribute to increased human health risk and increased use of air conditioning, resulting in greater energy use and greenhouse gas emissions.	BOS	TA	LT
Actions				
CS-LU-A-1.1	Zoning and Development Standards Reform - Implement changes in zoning and development standards, policies and regulations that promote mixed use development, transit-oriented design, and greater development intensity in Strategic Planning Areas to create land use patterns with reduced energy consumption, fewer vehicle miles traveled and reduced greenhouse gases. New zoning and development standards should incorporate climate change impacts and implications in required environmental reviews and decision-making. Justification - Zoning and other development standards should be made more flexible to allow for the creation of designated growth centers that allow for more pedestrian, bicycle, and transit use, thereby lowering transportation energy consumption. Changes need to be made from traditional suburban zoning laws that are based on separating land uses and creating single-use communities.	PB	PDO	ST
CS-LU-A-1.2	Green Building Standards - Support the development and application of green development standards. Justification - A variety of organizations have developed green building standards. An example is the LEED (Leadership in Energy and Environmental Design) green building rating system of the U.S. Green Building Council. Such standards "raise the bar" on the energy efficiency of new building construction and renovation. These standards can be used as guidance to set local standards for new construction or to specify the level of energy efficiency desired in new public facilities at the local level.	BOS	PDO	MT
CS-LU-A-1.3	Initiate a Public Education Program for Green Building - Support the creation education programs to encourage homeowners and developers to invest in energy-efficiency improvements. Jurisdiction - Many homeowners and developers want to improve the energy performance of their buildings, and may be concerned about climate change. Education programs can encourage more green building application and adoption of appropriate local regulations.	BOS	TA	MT
CS-LU-A-1.4	Consider adopting a transfer of development rights program (TDR) for areas such as such as the South Sandwich Village Center, Sandwich Industrial Park, and other Strategic Planning Areas in order to increase development intensity in these designated Activity Centers while protecting open space in areas such as the South Shore YMCA, Camp Good News, and Peter's Pond Park properties.	BOS	TA, PDO	ST
Hazard Mitigation Planning				
Goal CS-HM-1	**The Town of Sandwich will play an active role in protecting and restoring town coastal resources.**			
Policy				

CS-HM-P-1.1	Update and improve understanding of natural and anthropogenic changes and development pressures on coastal systems (e.g., salt marshes, dunes, barrier beaches).	BOS	NR	ST
Actions				
CS-HM-A-1.1	Identify areas and specific structures that have and may sustain damage from coastal flood and erosion events.	BOS	NR	ST
CS-HM-A-1.2	Disseminate information about floodplain and erosion hazards and mitigation measures to owners located to landowners along the shore.	BOS	NR	ST
CS-HM-A-1.3	Adopt and implement mitigation measures that exceed minimum floodplain management requirements of the NFIP.	BOS	NR	MT
CS-HM-A-1.4	Enhance shoreline erosion prevention measures.	BOS	NR	MT
Goal CS-HM-2	**Educate Residents and policy makers about natural hazard risk and vulnerability**			
Actions				
CS-HM-A-2.1	Increase the level of knowledge and awareness for Town residents about hazards that are potential threats to the area. Secure funding to collect educational materials about preparedness and mitigation strategies for private property owners for distribution to land use permit applicants and civic organizations. Display and offer documents in the public library and town offices. Post educational materials on Town website.	BOS	NR	ST
CS-HM-A-2.2	Educate property owners about the affordable, individual mitigation and preparedness measures to mitigate wind and wildfire hazards that can be undertaken before the next hazard event. Identify and seek funding to conduct educational workshops; create and distribute digital versions of the information; post information to Town website.	BOS	NR	ST
Goal CS-HM-3	**Encourage and inform effective public policy change**			
Actions				
CS-HM-A-3.1	Enhance the Town's capability to conduct hazard risk assessments, demonstrate funding needs, and track mitigation activities throughout town whether directly as part of this plan, or indirectly through the normal course of business.	BOS	NR	MT
CS-HM-A-3.2	Incorporate a Geographic Information System (GIS) to maintain current data in order to conduct a more detailed hazard risk assessment, track hazard mitigation in vulnerable areas and emergency services planning.	BOS	NR	MT
CS-HM-A-3.3	Ensure that current emergency services are adequate to protect public health and safety. Keep financial policymakers and the voting public informed as to emergency service needs and funding gaps. Identify and seek funding to conduct a needs assessment of emergency services.	BOS	TA	MT
Goal CS-HM-4	**Protect residents and their property; critical facilities; infrastructure and natural resources and landforms through implementation of cost effective and feasible mitigation projects.**			
Actions				
CS-HM-A-4.1	Augment the enforcement of the State Building Code by incorporating wind resistant design and construction techniques for new residential and commercial construction.	BOS	NR	MT
CS-HM-A-4.2	Maximize the use of available hazard mitigation grant programs to protect the Town's most vulnerable populations.	BOS	NR	MT
CS-HM-A-4.3	Establish a reserve fund for public facility and infrastructure repair that incorporates hazard mitigation measures.	BOS	TA	MT
CS-HM-A-4.4	Refine and complete estimates of population numbers exposed to individual hazards, including elderly populations, at risk populations and concentrated populations such as children in schools or day-care centers.	BOS	PDO	ST
CS-HM-A-4.5	Conduct build out and seasonal population analyses to determine if existing shelter capacity is sufficient for affected populations. If necessary identify additional locations and seek funding to implement measures to ensure that these facilities will protect the sheltered population.	BOS	PDO	MT
Goal CS-HM-5	**Coordinate Sandwich hazard mitigation planning with neighboring Upper Cape towns and with Barnstable County as a region.**			
Policy				

CS-HM-P-5.1	Continue participation in regional hazard mitigation planning efforts and updates to existing regional hazard mitigation plans.	BOS	TA	Ongoing
CS-HM-P-5.2	Continue participation in the County Wildfire Assessment and Prevention Program and identify at risk areas that are near highest concentrations of residentially used land.	BOS	NR	Ongoing
Actions				
CS-HM-A-5.1	Where feasible initiate inter-municipal mitigation project identification, apply for joint funding and coordinate project implementation.	BOS	TA	ST
CS-HM-A-5.2	Continue to inventory and evaluate mitigation measures that require a regional approach and ensure that they are appropriately prioritized in the regional plan. Examples of this action are: an independent evaluation of the vulnerability of the Cape Cod Canal bridges to high winds; mitigation of tidal restrictions that create flooding hazards along regional roadways owned by the Commonwealth; evaluation of the vulnerability of electric transmission lines to hazard events and the effect of the interruption of widespread electrical transmission on public safety operations.	BOS	NR	MT
CS-HM-A-5.3	Using assessor's data and Massachusetts Interlocal Insurance Association data quantify potential losses for critical facilities. Estimate potential losses for wind, flood and fire hazards and identify specific impact potential for each critical facility. Identify and seek funding for mitigation measures to reduce hazard impacts on these critical facilities.	BOS	NR	MT
CS-HM-A-5.4	Identify and prioritize areas vulnerable to wind and ice damage for burial of power lines. Evaluation factors should include vulnerability to power interruption, power transmission critical facility location and feasibility of burial or other mitigation measures. Identify project funding in coordination with local power distributors and state and regional agencies.	BOS	DPW	MT
Goal CS-HM-6	**Identify and prioritize areas vulnerable to coastal bank landslides**			
Actions				
CS-HM-A-6.1	Identify mitigation measures for private structures and work with homeowners to implement protection measures.	BOS	NR	ST
CS-HM-A-6.2	Work with willing landowners to acquire, with grant funds or other funding sources, properties subject to repetitive losses due to shoreline erosion.	BOS	TA	MT
Goal CS-HM-7	**Prioritize municipal structures that are also at-risk critical facilities and evaluate, seek funding for and implement mitigation structural measures.**			
Actions				
CS-HM-A-7.1	Identify the most at risk and vital critical facilities and evaluate structural mitigation measures for protecting each facility to ensure that all critical facilities are protected from the effects of natural hazards to the maximum extent possible.	BOS	NR	MT
CS-HM-A-7.2	Prioritize municipal structures that are also at-risk critical facilities, identify relocation area and seek funding for relocation.	BOS	TA	MT
CS-HM-A-7.3	Identify and prioritize structural mitigation projects that will lessen the risk of shoreline erosion and associated coastal bank landslides.	BOS	NR	MT
CS-HM-A-7.4	Work with the Army Corps of Engineers to discuss the feasibility and advisability of shortening the Cape Cod Canal jetty at Scusset to be shortened to restore to the maximum extent possible the natural shoreline processes and so allow sand now stranded north of the jetty to nourish sand starved beaches at Spring Hill and Scorton Shores.	BOS	TA	MT
CS-HM-A-7.5	Protect the overall water quality of the aquifer and its resources by providing adequate storm water management and treatment.	BOS	NR	Ongoing

	Justification - The quality of fresh and marine bodies of water and the Cape Cod Sole Source Aquifer has been at the forefront of environmental challenges across Cape Cod for many years. The Town of Sandwich has taken an active in minimizing stormwater impacts to local water bodies and resource areas with the development of regulatory policies, various studies and construction projects. Sandwich understands the importance of protecting these valuable resources and will remain proactive in protecting the quality of water through policy-making initiatives and innovative technology. New direct discharge of untreated storm water, parking-lot runoff, and/or wastewater into marine and fresh surface water and natural wetlands should not be permitted.			
Goal CS-HM-8	**Substantially and permanently reduce vulnerability to natural hazards by creating a program of activities to address natural hazard impacts potential.**			
Policy				
CS-HM-P-8.1	Educate residents and policy makers about natural hazard risk and vulnerability.	BOS	NR	Ongoing
CS-HM-P-8.2	Encourage and inform effective public policy changes.	BOS	NR	ST
CS-HM-P-8.3	Protect residents and their property; critical facilities, infrastructure and our natural resources and landforms through implementation of cost effective and feasible mitigation projects funded whenever possible with grant programs.	BOS	TA	MT
CS-HM-P-8.4	Coordinate Sandwich hazard mitigation planning with neighboring towns in the Upper Cape Cod Region and Barnstable County.	BOS	NR	MT

Long-Term Adaptation Planning To Climate Change

Goal CS-AD-1	**The Town of Sandwich supports the development of local and regional plans, strategies, and standards to better anticipate and prepare for the impacts of climate change.**			
Policy				
CD-AD-P-1.1	Incorporate Climate Change Adaptation into Disaster Planning - Develop a comprehensive approach to disaster planning that integrates the variety of climate change scenarios and includes pre-disaster planning, post disaster redevelopment planning and adaptation to climate change. Justification - Traditional disaster planning is often separated by hazard type and uses a short planning time horizon. The cycle for most disaster planning has normally been: event - warning - response – recovery - and back to event. It is only recently that pre-disaster planning has begun to enter the process. The Town should become more engaged in disaster planning in a comprehensive way and should include climate change adaptation in disaster mitigation plans.	BOS	All Town Departments	LT
CD-AD-P-1.2	Climate Change Scenarios – Support the integrate climate change scenarios into local, regional and state planning efforts. Hazard mitigation planning should address climate change-related scenarios and potential impacts. Justification - Climate change adaptation scenarios should be incorporated into standard hazard mitigation planning practice. Creating a resilient community in the face of climate change represents a new paradigm for land use planning.	BOS	All Town Departments	LT
CD-AD-P-1.3	Reduce Risk to Development in Risk-Prone Areas - Improve the ability to identify areas prone to greater risk from climate change and restrict development in those areas. Increase support for mapping and data collection of high risk areas and changes associated with climate change. Justification - Climate change is likely to bring increased risk of flooding to many areas, even those in which overall precipitation levels are less (due to greater storm severity, changes in the timing of precipitation, or changes in the proportion of precipitation that falls as rain versus snow). Improvements in our predictive capabilities relative to the impact of climate changes on land use should be made. Areas prone to significant risk from climate change should not be developed to minimize loss of human life and impacts to property. Development should be directed to low-risk, low hazard areas. Further development of buildings or infrastructure in flood prone areas and low-lying coast areas should be highly discouraged. Manage development in the urban/wildland interface area to minimize the risk from wildfire.	BOS	All Town Departments	LT

CD-AD-P-1.4	Diversification of Land Uses & Economies – Encourage the diversification of land uses to reduce risks that weather related disasters will overly impact particular land uses leaving communities without important services. Diversify and strengthening the local economy will allow it to better respond after disasters. Justification - Where possible, land use should be diversified and mixed. The Town should adopt policies that anticipate potential post-disaster economic impacts and seek opportunities for self-reliance and economic resilience by developing local resources. Disasters tend to cut links to outside resources. Surpluses and supplies are needed to support the community until outside links are re-established.	BOS	All Town Departments	LT
CD-AD-P-1.5	When considering climate change impacts, first seek to avoid impacts altogether, then minimize them, and finally, adapt to the unavoidable impacts as much as possible. Justification - The first decision choice on development in potential hazard areas should be avoidance. If avoidance is not possible or other requirements dictate a need to develop, evaluation should then move to minimization. This is akin to carbon footprints and the desire to minimize footprints. From a disaster planning standpoint it is minimization of areas at risk. The final decision step is mitigation to protect against the risk.	BOS	All Town Departments	LT
Actions				
CD-AD-A-1.1	The Town of Sandwich should develop a post-disaster redevelopment plan that discourages the reconstruction of buildings and infrastructure in hazard zones following climate related disasters. Justification - After major disasters, restricting rebuilding in hazard zones should be seriously considered. Abandoning intensive land uses in the hazard zone should be strongly considered with the Town considering specific methods of mitigate and relocation.	BOS	NR	MT
CD-AD-A-1.2	Develop scenarios to help the general public and decision-makers understand the potential risks associated with climate change and to develop contingencies for catastrophic events. As with floodplain management, expand the planning timeframe associated with disasters related to climate change to 100 years. Justification - Conventional planning horizons should be extended. FEMA Flood Insurance Rate Maps (FIRM) assesses flood potential into the 100 year and 500 year probability areas. Other hazard maps should also be extended into the 100 to 500 year frame. While the FIRMs are probability maps not time horizon maps, it is an easy shift to a time perspective for flooding and other hazards. As with the FIRMs, the zones in these maps are not no-build zones but zones where the development is constructed with conditions and potential risk factors.	BOS	NR	MT