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Cape Cod 2000



Regional Transportation Plan

Preserving & Enhancing the Cape's Transportation System

CAPE COD COMMISSION
Transportation Staff

Endorsed

January 11, 2001

Prepared on behalf of the

CAPE COD METROPOLITAN PLANNING ORGANIZATION

Massachusetts Executive Office of Transportation & Construction
Massachusetts Highway Department
Cape Cod Regional Transit Authority
Cape Cod Commission

in cooperation with

Massachusetts Department of Environmental Protection
United States Department of Transportation Federal Highway Administration
United States Department of Transportation Federal Transit Administration

Cape Cod Metropolitan Planning Organization

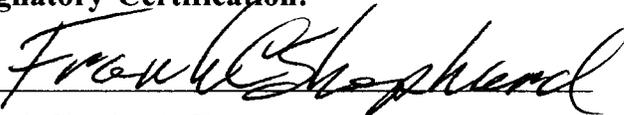
Endorsement of the Cape Cod 2000 Regional Transportation Plan and Air Quality Conformity Determination:

In accordance with 23 CFR Part 450 Section 322 (Metropolitan transportation planning process: Transportation plan) of the October 28, 1993 Final Rules for Statewide and Metropolitan Planning, the Committee of Signatories representing the Metropolitan Planning Organization (MPO) for Cape Cod hereby endorses the 2000 Regional Transportation Plan (RTP).

Also

In accordance with Section 176(c) (4) of the Clean Air Act as amended in 1990 [42 U.S.C. 7251 (a)], the MPO for Cape Cod has completed its review and hereby certifies that implementation of the Cape Cod MPO 2000 Regional Transportation Plan satisfies the conformity criteria specified in both 40 CFR Parts 51 and 93 (August 15, 1997) and 310 CMR 60.03 (December 30, 1994); furthermore this plan includes all regionally significant transportation projects contained in the previously endorsed Cape Cod MPO 2001-2006 Transportation Improvement Program (TIP). The projects in the TIP are of the same design and concept that were analyzed in the Regional Transportation Plan. Therefore, no new air quality analysis is required for the TIP. Both the Cape Cod 2000 Regional Transportation Plan and the Cape Cod MPO 2001-2006 Transportation Improvement Program are consistent with the air quality goals of, and in conformity with, the Massachusetts State Implementation Plan.

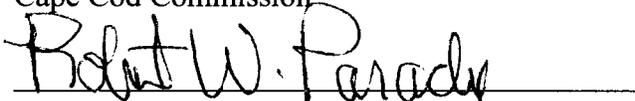
Signatory Certification:



Frank Shephard, Chairman,
Cape Cod Commission

1-11-01

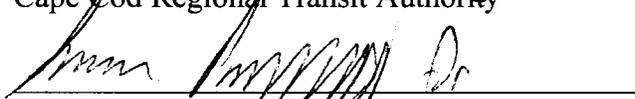
Date



Robert Parady, Chairman,
Cape Cod Regional Transit Authority

1-11-01

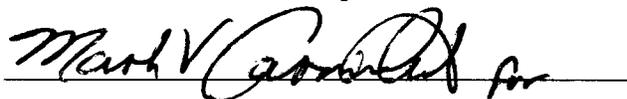
Date



Kevin J. Sullivan, Secretary,
Executive Office of Transportation and Construction

January 11, 2001

Date



Matthew J. Amorello, Commissioner,
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Acknowledgements

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Executive Summary

The Cape Cod 2000 Regional Transportation Plan is the long-range transportation plan for Cape Cod. Updated every three years under the Transportation Equity Act for the 21st Century (known as TEA-21), this is the Cape Cod Metropolitan Planning Organization's framework for transportation in Barnstable County for the first quarter-century of the new millennium.

Background

Federal law requires that all metropolitan areas produce a long range transportation plan. Federal legislation also requires the establishment of a Metropolitan Planning Organization (MPO) to carry out the required federal transportation planning process. MPO's are established for each urbanized area with a population of more than 50,000. The Cape Cod region, which includes an "urban core" - Hyannis/West Yarmouth (1990 Census population of 51,000) qualifies as a metropolitan area. In this region the responsibility for preparing the Plan is vested with the Cape Cod Metropolitan Planning Organization (MPO).

The Cape Cod MPO is composed of four voting members and an advisory committee. These entities are; the Cape Cod Regional Transit Authority (CCRTA), the Cape Cod Commission

(CCC), the Massachusetts Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MHD), and the Cape Cod Joint Transportation Committee (CCJTC) in an advisory capacity.

The Plan is a result of input from numerous public meetings starting in May 1999 and comments received via email, telephone, mail and surveys. Since the plan is updated every three years, this Plan builds on the 1997 Plan and incorporates the results of studies and planning done in the subsequent years as well as the public input.

Purpose and Objectives

The Plan serves three principal purposes;

- Documentation of the financial constraints of the region's long-term planning initiatives;
- Connection of long-range policies to short-term projects; and
- Demonstration of parity between recommended projects, financial considerations, and regional goals.

The Plan includes a review of existing conditions as they relate to the transportation system. This includes breakdowns by the various modes of travel and how these modes serve the various corridors and sub-regions of the Cape.



Regional Transportation Plan Goals

The Plan, and transportation projects coming from the Plan, must comply with the goals adopted in 1997:

The "Right" Transportation System

To establish and maintain a transportation system on Cape Cod for present and future year-round and seasonal needs which is safe, convenient, accessible, economical and consistent with the Cape's historic, scenic and natural resources.

To achieve this goal we must implement solutions which are consistent with the character of Cape Cod. These solutions will typically be non-invasive; that is, by better management of "people-flow" and more efficient use of automobile capacity, the traditional attempt to build our way out of congestion can be avoided.

Modes and Roads

To reduce dependence on private automobiles by developing and integrating alternate modes (e.g., rail, bus, ferry, air, bicycle and pedestrian) into the transportation system and by promoting substitutes for transportation such as telecommunications.

Achieving this goal will require a comprehensive package of substitutes to automobiles. New public transit service, bicycle and pedestrian facilities, and other important alternatives are necessary.

Land Use Causes Transportation Causes Land Use

To support transportation solutions which preserve and enhance Cape Cod's character by considering the interrelationship between changes in transportation capacity and changes in land use.

This goal recognizes the cycle of the influence that land-use has on transportation investment which spurs a change in land use. This endless game of leap-frog too often results in undesirable levels of development or an unsatisfactory transportation system or both. Transportation improvements (construction of new automobile capacity, increased public transit, more efficient use of the existing system, etc.), will have implications for land use. Recommendations are geared towards protecting transportation investment by controlling the potential impacts of new development.

Traveling Smarter

To promote an information-based consumer-oriented transportation system that encourages travelers to use the most environmentally sensitive and efficient means of travel.

New information technologies are being explored to help people make the best transportation choices. Travel decisions are influenced by the transportation system as well as the traveler's purpose. When alternatives to the automobile are not available (or acceptable), drivers may decide to travel at less congested times, plan their routes to make several stops as part of the same trip, or on some occasions, to cancel their trips altogether. Providing travel information is a benefit, even if it doesn't result in easily measurable reductions in congestion or increases in safety. *Excessive* signage adversely affects the scenic, historical and environmental characteristics of Cape Cod.



Working Together

To promote cooperation among the various transportation agencies which have responsibility for the Cape's transportation system.

For the Regional Transportation Plan to be effective, new partnerships that bring together the various levels of government will be formed to make sure that transportation "solutions" do not become problems.

Another step in the process that has room for improvement is educating, informing, and hearing the "customers." Bringing transportation plans to the public early on avoids surprises - and can provide planners with insights on how to make these plans better. Exploring new ways to inform and hear our customers - through e-mail and the world wide web - is one way to grow the forum of discussion.

What's New Since the 1997 Plan

Safety Chapter

"Keeping Cape Cod Alive," a local private group and others suggested that a chapter on safety issues on Cape Cod be included. This precipitated several meetings and research aimed at defining issues specific to the region. Three groups that deserve special consideration in the development of future transportation planning and design were identified:

- The Cape's growing elderly population - is the oldest average population in Massachusetts and is among the oldest county populations in the country.
- The Cape Cod Visitor - The large number of visitors that are unfamiliar with Cape Cod and some of the highway facilities such rotaries and

rural roadways.

- The Younger Driver - This category includes the year round driver as well as the visiting seasonal driver.

Public Transportation

Public Transportation on Cape Cod has attracted a great deal of attention since the 1997 Regional Transportation Plan. A Transit Summit was held in February 2000 and a Cape Cod Transit Task Force was appointed by the Massachusetts Secretary of Transportation to explore ways to improve the public transportation available to Cape Cod as well as on the Cape.

The Cape Cod Transit Task Force will be making recommendations in the Summer of 2001. A number of strategies have been included in this plan. These strategies are general in nature and are included to support the more specific recommendations anticipated from the Task Force.

Transportation Plan Projects

Two fundamental types of analysis were done in the prioritization of projects - objective and subjective - and are described below:

- Compatibility with regional goals and safety - Pass/Fail - projects inconsistent with any of the regional goals or considered to degrade transportation safety will be eliminated in this step of the evaluation. The extent to which the goals are met or safety is improved are estimated.
- Air Quality Analysis - The projects impact on regional air quality. Many of the proposed projects do not have a measurable impact on air quality but the major roadway projects do and this benefit or disadvantage can be evaluated by the regional traffic model.



The project listing included at the end of the text shows projects considered for the Plan.

Development of the list began with the 1997 Plan and continued as part of the on going studies and public outreach by the Cape Cod MPO agencies. In the list are a few projects that are being considered by the Canal Area Study. The study will be complete in early 2001. The list includes transportation projects and programs for the next 25 years. Programs have been identified as crucial to maintaining our transportation system and meeting future needs for alternate forms of transportation. It is impossible to anticipate all of the specific projects that are needed over the next 25 years - thus the need to identify the funding Programs in the list. The projects are capital projects identified in the planning process.

The list is in a prioritized order based on the criteria discussed previously. The Programs were considered essential and have been given the highest priority. The projects are listed in descending order based on their assigned score. Projects with a score of n/a have not been evaluated sufficiently to establish a score but are projects that are potentially significant for the region and may advance in future regional plan updates.

The list includes projected or estimated costs and a cumulative cost in current year dollars. The RTP must be fiscally constrained, or in other words we cannot plan projects we cannot pay for. The column "Fiscally Constrained" indicates if there is sufficient funding anticipated to accommodate the project or program. These fiscally constrained programs and projects are considered the transportation program currently planned for implementation in the next 25 years.

Total basic 25 year funding needs are estimated to be \$666.4 million. Currently, we have estimated that the region will be eligible for \$677.9 million in current year dollars over the next 25 years. In addition, \$11.5 million has been previously committed for projects expected to be constructed, bringing total funding for this RTP to \$689.5 million.





Cape Cod Regional Transportation Plan
Fiscal Analysis of RTP Projects

Years of Operation 25
 RTP Funding - Millions \$689

RTP#	Title	RTP Projected Cost	Score	Cumulative Within Funding		FUNDED?
				Cost (Millions)	Target?	
1000	Cape Cod Rail Trail Bridges	\$3,081,000	65	\$3.1	Yes	<input checked="" type="checkbox"/>
1001	Hyannis Intermodal Center - ph. 1	\$5,500,000	49	\$8.6	Yes	<input checked="" type="checkbox"/>
1002	Hyannis Intermodal Center - ph. 2+	\$3,000,000	47	\$11.6	Yes	<input checked="" type="checkbox"/>
900	Resurfacing PROGRAM	\$255,750,000	-	\$267.3	Yes	<input type="checkbox"/>
901	Bridge PROGRAM	\$51,150,000	-	\$318.5	Yes	<input type="checkbox"/>
902	Transit Operating PROGRAM	\$142,047,813	-	\$460.5	Yes	<input type="checkbox"/>
903	Intersection PROGRAM	\$26,640,625	-	\$487.2	Yes	<input type="checkbox"/>
905	Access Management PROGRAM	\$2,131,250	-	\$489.3	Yes	<input type="checkbox"/>
904	Bicycle/Pedestrian Projects PROGRAM	\$6,393,750	-	\$495.7	Yes	<input type="checkbox"/>
1021	Additional CCRTA Service PROGRAM	\$41,346,250	-	\$537.0	Yes	<input type="checkbox"/>
908	New Ferry Service - PROGRAM	\$5,328,125	-	\$542.4	Yes	<input type="checkbox"/>
907	TDM/TSM PROGRAM	\$10,656,250	-	\$553.0	Yes	<input type="checkbox"/>
909	Regional Bike Network PROGRAM	\$4,262,500	-	\$557.3	Yes	<input type="checkbox"/>
906	Transit Capital PROGRAM	\$38,362,500	-	\$595.7	Yes	<input type="checkbox"/>
1031	Cape-wide Highway Advisory Radio	\$250,000	520	\$595.9	Yes	<input type="checkbox"/>
1024	Permanent Traffic Counting Stations	\$200,000	350	\$596.1	Yes	<input type="checkbox"/>
1036	Harwich/Chatham Rail Trail Extension	\$985,000	183	\$597.1	Yes	<input type="checkbox"/>
1023	Variable Message Signs	\$1,250,000	136	\$598.3	Yes	<input type="checkbox"/>
1037	Rt 6 Eastham - Safety Improvements	\$1,200,000	117	\$599.5	Yes	<input type="checkbox"/>
1025	Expand/enhance Exit 6 Park & Ride	\$2,000,000	70	\$601.5	Yes	<input type="checkbox"/>



Cape Cod Regional Transportation Plan
Fiscal Analysis of RTP Projects

Years of Operation 25
 RTP Funding - Millions \$689

RTP#	Title	RTP Projected Cost	Score	Cumulative Within Funding		FUNDED? ↓
				Cost (Millions)	Target?	
1008	Rt 6 Reconfigure Interchange One	\$1,250,000	51	\$602.8	Yes	<input type="checkbox"/>
1015	Cape Cod Rail Trail Extensions	\$4,000,000	45	\$606.8	Yes	<input type="checkbox"/>
1014	Cape Cod Rail Trail Resurface & Widen	\$3,000,000	45	\$609.8	Yes	<input type="checkbox"/>
1022	Transportation Management Center	\$6,450,000	43	\$616.2	Yes	<input type="checkbox"/>
1016	Rt 28 Bike Accomodation: Hyannis-Dennis	\$5,000,000	38	\$621.2	Yes	<input type="checkbox"/>
1012	Rt 132 Boulevard	\$7,500,000	22	\$628.7	Yes	<input type="checkbox"/>
1030	Land Conservation	\$12,500,000	19	\$641.2	Yes	<input type="checkbox"/>
1006	Rt 28 MacArthur Boulevard Improvements*	\$10,000,000	10	\$651.2	Yes	<input type="checkbox"/>
1027	Interchange Improvements Rt 6	\$38,200,000	3	\$689.4	Yes	<input type="checkbox"/>
1009	Sagamore Rotary Reconfiguration	\$30,000,000	n/a	\$719.4	No	<input type="checkbox"/>
1004	Southside Connector	\$100,000,000	n/a	\$819.4	No	<input type="checkbox"/>
1003	Exit 6 1/2 - Hyannis Access	\$15,000,000	n/a	\$834.4	No	<input type="checkbox"/>
1005	Nickerson Park Access from Route 6	\$15,000,000	n/a	\$849.4	No	<input type="checkbox"/>
1010	Bourne Rotary Reconfiguration	\$30,000,000	n/a	\$879.4	No	<input type="checkbox"/>

1 - Introduction

Federal law requires that all metropolitan areas produce a long range transportation plan. Federal legislation also requires the establishment of an MPO to carry out the required federal transportation planning process. MPO's are established for each urbanized area with a population of more than 50,000. The Cape Cod region, comprised of Barnstable County, includes an "urban core" - Hyannis and West Yarmouth - of around 51,000 based on the 1990 Census. Following the 1990 Census, Cape Cod was designated as a Metropolitan Planning Organization area for the first time. In this region the responsibility for preparing the plan is vested with the Cape Cod Metropolitan Planning Organization (MPO).

The MPO is composed of four voting members and an advisory committee. These entities are; the Cape Cod Regional Transit Authority (CCRTA), the Cape Cod Commission (CCC), the Massachusetts Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MHD), and the Cape Cod Joint Transportation Committee (CCJTC) in an advisory capacity.

The plan serves four principal purposes;

- Documentation of the financial constraints of the region's long-term planning initiatives;
- Connection of long-range policies to short-term projects; and
- Demonstration of parity between recommended projects, financial considerations, and regional goals.
- Meeting the objectives of Environmental Justice to ensure that all segments of the population are able to fully participate in transportation planning processes, have access



to transportation facilities, and are not unjustly burdened by transportation improvements in the region.

This transportation plan update is the result of input from numerous public meetings in May, November, and December 1999, February 2000 and comments received via email, telephone, mail and in response to a survey form distributed at public meetings and published on the Cape Cod Commission's web site, www.gocapecod.org. The update is required every three years and builds upon the previous plan, in this case, the 1997 plan.

1.1 - Transportation Equity Act for the 21st Century (TEA-21)

TEA-21 is the federal transportation program that became public law on June 9, 1998. This program continues many of the provisions from the Intermodal Surface Transportation Equity Act (ISTEA), the previous transportation program. Among the most significant continuing provisions are the following:

- Local officials, in cooperation with the State and transit operators, remain responsible for determining the best mix of transportation investments to meet transportation needs.
- Metropolitan Planning Organizations are responsible for adopting the Regional Transportation Plan and the Transportation Improvement Program. The Governor approves the State Transportation Improvement Program.
- A 20-year planning perspective including; air quality conformity, fiscal constraint, and public involvement.
- A Congestion Management System is still required in larger (urbanized areas larger than 200,000 population) metropolitan areas.
- DOT certification of the planning process in urbanized areas larger than 200,000 population.



- An emphasis on alternatives to capacity additions is retained through the Single Occupant Vehicle project limit in larger (>200,000 pop.) metropolitan areas which are ozone nonattainment areas for air quality.

TEA-21 consolidates the previous planning factors into the following seven broad areas to be considered in the planning process.

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety and security of the transportation system for motorized and nonmotorized users;
- Increase the accessibility and mobility options available to people and for freight;
- Protect and enhance the environment, promote energy conservation, and improve quality of life;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

1.1.1 - Key TEA-21 Changes to ISTEA

- Modifies the general objectives of the planning process to include operation and management of the transportation system.
- Modifies the transportation planning area boundary relationship to nonattainment area boundaries. Boundaries established on date of enactment remain as is, but future expansions of nonattainment area boundaries do not force expansion of transportation planning area unless agreed to by Governor and MPO. New MPO planning area boundaries will reflect nonattainment areas as agreed to by Governor and local officials.



- Secretary shall encourage coordination of federally funded non-emergency transportation services in metropolitan planning areas, e.g., welfare to work.
- Adds provision requiring coordination where project crosses MPO planning area boundaries.
- Specifically identifies freight shippers and users of public transit on list of stakeholders to be given opportunity to comment on plans and TIPs.
- Adds a requirement for MPO, State, and transit agencies to cooperate in the development of financial estimates that support plan and TIP development.
- Clarifies the relationship between project selection and TIP development (project selection means implementation from a cooperatively developed TIP).
- Adds option of identifying additional projects for illustrative purposes that would be included in plans and TIPs if reasonable additional resources were available. Additional action by States, MPOs and the Secretary is required to advance such projects.
- Requires publication of an annual listing of projects for which Federal funds have been obligated in the preceding year.
- Adds requirement for public involvement during certification review.
- Modifies sanctions associated with triennial certification in TMA by changing options available to Secretary for withholding funds.
- Exempts MPO plans and programs as actions addressed by NEPA.
- Replaces the stand alone Major Investment Study requirement of FHWA/FTA's joint planning regulation with a directive that, for federally funded highway and transit projects, analyses under the planning provisions of the Act and NEPA be integrated.



1.2 - Regional Transportation Plan Requirements

The Federal-Aid Highway Act of 1962 first established the continuing, comprehensive, and cooperative transportation planning process that we use today. The Regional Transportation Plan is part of this process and it is intended that this plan be used to implement policies and investments which support a balanced multimodal system. The plan will be used to help evaluate proposed projects and programs and to identify areas (substantive and geographic) requiring further and more detailed analysis.

The 2000 Plan is one part of a continuing process of adjusting the region's transportation program to more accurately reflect federal mandates and fiscal realities. This plan builds on the 1997 Regional Transportation Plan as well as other planning efforts for the Cape Cod Region. The plan must address at least a 20 year planning horizon and be reviewed and updated at least triennially in air quality non-attainment areas such as the Cape Cod Region. This plan covers the fiscal years between 2000 and 2025.

Based on Federal policy dated April 8, 1999, the Plan shall:

- (1) Identify the projected transportation demand of persons and goods in the metropolitan planning area over the period of the plan;
- (2) Identify adopted congestion management strategies including, as appropriate, traffic operations, ridesharing, pedestrian and bicycle management.
- (3) Assess capital investment and other measures necessary to preserve the existing transportation system.
- (4) Include design concept and scope descriptions of all existing and proposed transportation facilities in sufficient detail, regardless of the source of funding, in nonattainment and maintenance areas to permit conformity determinations under the U.S. EPA conformity regulations. In all areas, all proposed improvements shall be described in sufficient detail



to develop cost estimates.

- (5) Reflect a multimodal evaluation of the transportation, socioeconomic, environmental, and financial impact of the overall plan, including all major transportation investments.
- (6) For major transportation investments for which analyses are not complete, indicate that the design concept and scope (mode and alignment) have not been fully determined and will require further analysis.
- (7) Reflect, to the extent that they exist, consideration of: the area's comprehensive long range land use plan and metropolitan development objectives; national, State, and local housing goals and strategies, community development and employment plans and strategies, and environmental resource plans; local, State, and national goals and objectives such as linking low income households with employment opportunities; and the area's overall social, economic, environmental, and energy conservation goals and objectives.
- (8) Indicate, as appropriate, proposed transportation enhancement activities.
- (9) Include a financial plan that demonstrates the consistency of proposed transportation investments with already available and projected sources of revenue. The financial plan shall compare the estimated revenue from existing and proposed funding sources that can reasonably be expected to be available for transportation uses, and the estimated costs of constructing, maintaining and operating the total (existing plus planned) transportation system over the period of the plan. The estimated revenue by existing revenue source (local, State, and Federal and private) available for transportation projects shall be determined and any shortfalls identified.

Proposed new revenues and/or revenue sources to cover shortfalls shall be identified, including strategies for ensuring their availability for proposed investments. Existing and proposed revenues shall cover all forecasted capital, operating, and maintenance costs. All cost and revenue projections shall be based on the data reflecting the existing situation and historical trends. For nonattainment and maintenance areas, the financial plan shall



address the specific financial strategies required to ensure the implementation of projects and programs to reach air quality compliance.

1.2.1 Public Participation

There must be adequate opportunity for public official (including elected officials) and citizen involvement in the development of the transportation plan before it is approved by the MPO. Such procedures shall include opportunities for interested parties (including citizens, affected public agencies, representatives of transportation agency employees, and private providers of transportation) to be involved in the early stages of the plan development/update process.

The procedures shall include publication of the proposed plan or other methods to make it readily available for public review and comment and, in nonattainment TMAs, an opportunity for at least one formal public meeting annually to review planning assumptions and the plan development process with interested parties and the general public. The procedures also shall include publication of the approved plan or other methods to make it readily available for information purposes.

The public participation elements associated with the development of the RTP for the Cape Cod region include;

- Spring 1999 - A series of public meetings to canvas for transportation priorities.
- Spring - Winter 1999/2000 - distribution of survey forms through public meetings and the Cape Cod Commission website.
- Fall/Winter 1999/2000 - A series of public meetings to receive feedback on RTP ideas crafted from the previous meetings and survey input.
- Discussion and guidance at public Cape Cod Joint Transportation Committee meetings.
- 30 day public review and incorporation of comments on the final draft of the Regional Transportation Plan.



1.2.2 - Air Quality Conformance

In nonattainment areas such as the Cape Cod region, the FHWA and the FTA, as well as the MPO, must make a conformity determination on any new/revised plan in accordance with the Clean Air Act and the EPA conformity regulations for transportation related pollutants.

1.3 - Transportation Plan Goals

The following sections reintroduce the goals adopted for the plan and describe issues related to implementing supporting strategies.

1.3.1 -The “Right” Transportation System

“To establish and maintain a transportation system on Cape Cod for present and future year-round and seasonal needs which is safe, convenient, accessible, economical and consistent with the Cape’s historic, scenic and natural resources.”

To achieve this goal we must implement solutions which are consistent with the character of Cape Cod. These solutions will typically be non-invasive; that is, by better management of “people-flow” and more efficient use of automobile capacity, the traditional attempt to build our way out of congestion can be avoided.

1.3.2 - Modes and Roads

“To reduce dependence on private automobiles by developing and integrating alternate modes (e.g., rail, bus, ferry, air, bicycle and pedestrian) into the transportation system and by promoting substitutes for transportation such as telecommunications.”

Achieving this goal will require a comprehensive package of substitutes to automobiles. New



public transit service, bicycle and pedestrian facilities, and other important alternatives are necessary.

1.3.3 - Land Use Causes Transportation Causes Land Use

“To support transportation solutions which preserve and enhance Cape Cod’s character by considering the interrelationship between changes in transportation capacity and changes in land use.”

This goal recognizes the cycle of land-use influencing transportation investment which spurs a change in land use. This endless game of leap-frog too often results in undesirable levels of development or an unsatisfactory transportation system or both. Transportation improvements, whether they be the construction of new automobile capacity, increased public transit, more efficient use of the existing system, etc., will have implications for land use. Recommendations are geared towards protecting transportation investment by controlling the potential impacts of new development.

1.3.4 - Traveling Smarter

“To promote an information-based consumer-oriented transportation system that encourages travelers to use the most environmentally sensitive and efficient means of travel.”

New information technologies are being explored to help people make the best transportation choices. Travel decisions are influenced by the transportation system as well as the traveler’s purpose. When alternatives to the automobile are not available (or acceptable), drivers may decide to travel at less congested times, plan their routes to make several stops as part of the same trip, or on some occasions, to cancel their trips altogether.

Providing travel information is a benefit, even if it doesn’t result in easily measurable reductions



in congestion or increases in safety. Signage, while recognized as a significant element to a safe and efficient transportation network, should be installed in such a way as not to visually detract from the region's scenic environment.

1.3.5 - Working Together

“To promote cooperation among the various transportation agencies which have responsibility for the Cape's transportation system.”

For the Regional Transportation Plan to be effective, new partnerships that bring together the various levels of government will be formed to assure a common goal of achieving transportation safety while preserve the scenic character of the region.

Another step in the process that has room for improvement is educating, informing, and hearing the “customers.” Bringing transportation plans to the public early on avoids surprises - and can provide planners with insights on how to make these plans better. Exploring new ways to inform and hear our customers - through e-mail and the world wide web - is one way to grow the forum of discussion.

1.4 - Conformity with other Planning Processes

The following sections describe the relationship between the Plan and other agencies' planning activities.

1.4.1 - Conformity with Federal Planning Process

The goals of TEA-21 are consistent with the goals for the Cape Cod Region. The seven TEA-21 and the five Cape Cod regional goals are compared in Table 1.1 below:



Table 1.1 - Federal Objectives and Regional Goals

Cape Cod Goals

TEA-21 Objectives		The Right System	Modes and Roads	Land use /Trans	Travel Smart	Work Together
Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.		◆		◆		
Increase the safety and security of the transportation system for motorized and nonmotorized users.		◆	◆			◆
Increase the accessibility and mobility options available to people and for freight.		◆	◆		◆	
Protect and enhance the environment, promote energy conservation, and improve quality of life.		◆		◆	◆	
Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.			◆		◆	◆
Promote efficient system management and operation.		◆			◆	
Emphasize the preservation of the existing transportation system.		◆		◆		



1.4.2 - Regional Planning

Transportation Solutions shall mean any project, program, strategy, or activity which support policies which help to meet the goals of the Regional Transportation Plan.

The Cape Cod MPO recognizes other regional planning efforts, such as Barnstable County Ordinance 96-8, otherwise known as the Cape Cod Commission's Regional Policy Plan (expected to be updated in 2001). The Regional Transportation Plan provides a framework for transportation decisions and activities with state and federal involvement. The Regional Policy Plan provides a framework for local and regional (Barnstable County) land use activities. In order to improve coordination among all regional planning activities, MPO actions where feasible and appropriate will be consistent with the Regional Policy Plan.

The Regional Policy Plan is a tool which the Cape Cod Commission uses to accomplish their purpose which is;

“the conservation and preservation of natural undeveloped areas, wildlife, flora and habitats for endangered species; the preservation of costal resources including aquaculture; the protection of ground water, surface water, and ocean water quality, as well as the other natural resources of Cape Cod; balanced economic growth; the provision of adequate capital facilities, including transportation, water supply, and solid, sanitary and hazardous waste disposal facilities; the coordination of the provision of adequate capital facilities with the achievement of other goals; the development of an adequate supply of fair affordable housing; and the preservation of historical, cultural, archaeological, architectural, and recreational values.”

The RPP includes issues, goals, and policies for a number of topics within the Commission's areas of responsibility. To address these issues, goals and policies, minimum performance standards are defined. The issues identified for transportation on Cape Cod center around



congestion and the growth of Cape traffic volumes. Based on a 1995 Cape Cod resident survey the preferred approach to dealing with traffic congestion is by the following strategies:

- Limiting population growth
- Acquiring developable land
- More stringent land use regulation including restrictions on new buildings and residential dwellings

85% of the survey responses favored provision of alternative forms of transportation and a majority of respondents were opposed to the widening of roads and intersections. The RPP calls for a plan that will;

- Provide a source of funding for desirable transportation improvements,
- Require that new development mitigate impacts in a manner consistent with Cape Cod's natural, scenic, and historic resources,
- Promote land, air, and marine based alternatives to automobile travel.

The RPP also includes three goals for transportation:

4.1.1 Goal: To establish and maintain a multimodal transportation system on Cape Cod for present and future year-round and seasonal needs which is safe, convenient, accessible, effective, economical, and consistent with the Cape's historic, scenic and natural resources, and land use development and growth management policy.

4.1.2 Goal: To decrease dependence on private automobiles, address demonstrated public needs for convenient, accessible, economical alternatives to private automobiles, and promote energy efficiency and reduced pollution by developing and integrating alternate modes (e.g., rail, bus, ferry air, bicycle and pedestrian) into the transportation system and by promoting substitutes for transportation such as telecommunications.



4.1.3 Goal: To support transportation solutions which preserve and enhance Cape Cod's character by considering the interrelationship between land use and transportation.

The RPP includes a number of minimum performance standards and development review policies. These standards and policies are used in the review of Developments of Regional Impact (DRIs) or developments that are referred to the Cape Cod Commission by the Cape towns for review. The intent of the policies is to mitigate transportation impacts, promote alternate forms of transportation and TDM measures, as well as insure consistency between transportation and other policy areas.

The RPP focuses on minimizing impacts to the transportation system based on localized development while the goals and objectives of the RTP tend to be more regional in their focus. The transportation plan goals and objectives are consistent with the RPP guidance.

1.4.2.1 - Statewide Buildout Analysis

The Executive Office of Environmental Affairs (EOEA) is developing buildout and current landuse information statewide in cooperation with the Cape Cod Commission for this region. Unfortunately, this information could not be included in the region's transportation model but is expected to be included in the model to be used for the next plan. The towns on Cape Cod are unique in that some will likely reach buildout before the RTP horizon year of 2025 and the current trend based projections for growth do not recognize this. The land-use buildout analysis will improve the Massachusetts Institute for Social and Economic Research (MISER) projections currently being used to model the transportation future of Cape Cod.

1.4.3 Local Comprehensive Plans

Many towns in the Cape Cod region have developed local comprehensive plans and these have been used to develop the land use scenarios and build out projections with EOEA. Where the



plans have been developed the transportation projects and goals are considered with respect to the individual town visions.

1.5 - Progress Since the 1997 Plan

Strategies, projects and programs that have occurred since the 1997 RTP are outlined by RTP goal in the following sections.

1.5.1 - Goal: The “Right “ Transportation System

Rural Roads Initiative - development of an exception process that will not require upgrading roads such as Route 6A to modern standards inconsistent with Cape Cod's character. Definition of this process has started and is expected to be complete in 2002. This study was included in TEA-21 as a “High Priority Project” for the Cape & Islands. The Memorandum of Agreement, which describes the scope of this project, is available in the appendix.

A balanced set of transportation improvements has included a mixture of intersection and signal upgrades, new connecting road links, bicycle path extensions, and others. Some examples include:

- Hadaway Road (Barnstable)
- Marstons Mills Roundabout - Race Lane/Route 149 (Barnstable)
- Setucket Road reconstruction (Dennis)
- Route 6A/Main St crosswalks (Orleans)
- Hyannis Area Trolley increased service to $1/2$ hour frequencies.
- Yarmouth Trolley increased service to $1/2$ hour frequencies.
- Woods Hole Trolley increased service to $1/2$ hour frequencies and added in the spring, beginning Memorial Day weekend and fall, terminating the end of September.



- Villager increased service to 10 round trips per day and extended service into downtown Hyannis and West Main St.
- Hyannis Park and Ride Shuttle was introduced as a new service that created a park and ride lot at Cape Cod Community College with direct services to downtown Hyannis and the ferry docks.
- Provincetown/Truro Shuttle was a new service that provided 20-minute service throughout the summer and into the fall with connections to Truro and Herring Cove Beach, Cape Cod National Seashore.
- Falmouth/Mashpee Trolley service was reconfigured to connect with Barnstable County Fair and extended into the evening to closing.

1.5.2 - Goal: Modes and Roads

Marine Study - developed information to support enhanced ferry service to Provincetown. This strategic plan was completed in January 2000. Other projects include:

- Cape Cod Rail Trail Spur (Harwich)
- Cape Cod Rail Trail Bridges designed (Harwich & Orleans)

1.5.3 - Goal: Land Use Causes Transportation Causes Land Use

Implementation of the Cape Cod Land Bank - This initiative resulted in the purchase of over 800 acres of land on Cape Cod in 1999.

1.5.4 - Goal: Traveling Smarter

Construction of a interconnected ‘smart’ signal system on Route 132 between Phinneys Lane and the Cape Cod Mall including Attucks Way/Hadaway Road.

Implementation and ongoing enhancement of the ‘Go Cape Cod’ (www.gocapecod.org) website



and participation in development of the Smart Guide. The Smart Guide is a brochure and website (www.smartguide.org) that presents ways to travel to and around the Cape & Islands without using an automobile.

MassHighway currently operates several variable message boards, moving them to various roadside locations, during summer periods. The boards inform motorists of expected congested travel times, maintenance work, etc.

Advancement of the CCRTA's "Cape Cod Advanced Public Transportation Systems Project" (see appendix).

Park & Ride Shuttle - the CCRTA, in partnership with the Steamship Authority and Hy-Line, created a Hyannis Parking Shuttle, which utilizes a variable message sign on Route 6 to direct visitors to Cape Cod Community College's park and ride lot. There, the free shuttle transported riders to downtown Hyannis and to ferry services to Martha's Vineyard and Nantucket.

1.5.5 - Goal: Working Together

Cape Cod Commission has worked with the Cape towns on numerous issues providing technical support and in the development of local comprehensive plans. The Commission has worked with neighboring Regional Planning Agencies on issues related to Steamship Authority traffic, and with the Cape Cod Chamber of Commerce to develop the Smart Guide.

The Commission is participating with state and local agencies in the development of the Rural Roads Initiative.

Improvements to the public participation process via CCC website.



A “Transit Summit” was held in February 2000. One result is the appointment of a Transit Task Force for Cape Cod by the Secretary of Transportation. This Task Force includes decision-makers at the local, regional, and state level as well as private sector transportation providers:

- Congressman Delahunt’s Office
- Executive Office of Transportation & Construction
- National Park Service
- Cape Cod Commission
- Cape Cod Central Railroad
- Barnstable County Human Services Department
- Barnstable County Assembly of Delegates
- Lower Cape Coalition
- Southeastern Massachusetts Private Motor Carriers Association
- Cape Cod Chamber of Commerce
- Cape Air
- Massachusetts Highway Department
- Cape Cod Regional Transit Authority
- Woods Hole, Martha’s Vineyard, and Nantucket Steamship Authority



2 - Project Evolution

The process by which a transportation project is funded is based on the type of project, the magnitude of the project and the potential impacts. Regional priorities that are eligible for federal funds are developed in the public process associated with the Regional Transportation Plan (RTP) and implemented in the Transportation Improvement Program (TIP) process.

The projects that are included in both the RTP and the TIP are the result of public process, maintenance needs, and projects developed by the Cape Cod Metropolitan Planning Organization (MPO) members. The MPO members must approve the RTP (every three years) and the TIP (annually).

Many projects begin in either the regional planning process, the local planning process, by MassHighway or some combination of the three. Projects are developed through the planning process from awareness of a transportation problem or need, to analysis of potential solutions, and conceptual design development. These projects are then recommended for inclusion in the proposed TIP by project proponents.

A major project generally requires several studies to advance to construction. Following problem identification and an alternatives analysis, the next stage for this type of project is the development of project feasibility which is often a study included in the region's Unified Planning Work Plan (UPWP) or an analysis done as part of the RTP process. The project, if found feasible and has demonstrated enough potential benefits with respect to the regional goals, becomes a regional priority. The project is then included in the regional transportation plan and



advances through the appropriate environmental and design phases to eventually be included in the TIP for implementation.

Funding for projects is available through a large number of programs at the state and federal levels. These programs are designed to support the state and federal goals and are available to local programs to encourage consistency with their programs. The Federal transportation program has the most significant effect on funding. The current federal program is the Transportation Equity Act for the 21st Century (TEA-21), and it will be in effect until September 30, 2003.

TEA-21 provided increased funding over the previous federal program (ISTEA) for all states with the exception of Massachusetts. Massachusetts lost approximately \$300 million per year or 41% of the funding provided by the previous federal program.

2.1 - Metropolitan Planning Organization (MPO)

Federal legislation requires the establishment of an MPO to carry out the required federal transportation planning process. MPO's are established for each urbanized area with a population of more than 50,000. The MPO for the Cape Cod region which is the county of Barnstable is composed of four voting members and an advisory committee. These entities are; the Cape Cod Regional Transit Authority (CCRTA), the Cape Cod Commission (CCC), the Massachusetts Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MHD), and the Cape Cod Joint Transportation Committee (CCJTC) in an advisory capacity.



2.2 - The Transportation Improvement Program

The Transportation Improvement Program for Cape Cod (TIP) is usually updated annually and the list contains additional years of proposed maintenance and improvement projects for the highway and public transportation system on Cape Cod, the next TIP begins with the remaining projects from the previous TIP. A schedule for TIP development is distributed, usually in December. Projects for the TIP are submitted in the first three months of the calendar year through the Cape Cod Joint Transportation Committee which has among its representatives, a spokesperson from each town and the major transportation providers. The projects are compiled into a list with those remaining from the previous TIP. A draft TIP is developed, distributed, a public comment period ensues and the TIP is presented to the MPO for endorsement. An MPO meeting is usually held in August when a majority of the MPO must endorse the TIP for any federal aid project to proceed. Following endorsement of the Cape Cod TIP, it is combined with all of the other Massachusetts regional TIPs into a State Transportation Improvement Program (STIP) and submitted to federal agencies for review. The current Cape Cod TIP is a six-year plan that was adopted on September 8, 2000 and is for the period between October 1, 2000 and September 30, 2006.

Federal regulations require that all projects receiving federal funding must be included in the TIP. Conversely, all projects to be placed on the TIP must be federal aid eligible. The federal funding categories in the TIP are based on the *Transportation Equity Act for the 21st Century* (TEA-21). The TIP must be financially constrained to proposed funding targets which are provided to the regions by the state.

The projects in the TIP must be ready for implementation during their programmed year. Therefore, design, engineering, proper permits, approvals and so on must be nearly complete for a project to be placed into the first year or annual element.



Projects are selected for inclusion in the TIP based on a consensus reached by the Cape Cod Joint Transportation Committee in a public forum in accordance with the Public Participation Program for the Cape Cod Region in coordination with MassHighway and the other MPO members. The CCJTC recommendation is presented to the MPO, and the MPO votes on TIP endorsement.

Projects listed in the current TIP need to be identified in this RTP. Likewise, subsequent TIPs will need to be consistent with this and/or future versions of the RTP. Before the MPO approves a TIP, a public review process is required. The TIP must also include a financial plan that demonstrates that the TIP can be implemented given expected funding.

The projects in the TIP must also conform to the Clean Air Act Amendment of 1990 (CAAA). The CAAA recognized that mobile sources are a major source of air pollutants--vehicular emissions include: volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two major precursors to ozone formation, and carbon monoxide (CO). Cape Cod is part of the Eastern Massachusetts Non-attainment Area which is classified as serious for ozone. As a result, the Cape Cod Commission transportation staff works with the Commonwealth of Massachusetts toward attainment of the National Ambient Air Quality Standards (NAAQS). The State Implementation Plan (SIP) sets forth a strategy program and emissions budgets designed to work toward attainment of the NAAQS for ozone. The CAAA also requires Metropolitan Planning Organizations (MPOs) within non-attainment areas to perform conformity determinations of their Regional Transportation Plans and Transportation Improvement Programs. To determine conformance with the CAAA all proposed projects and/or activities in the Plan and TIP must be reviewed by the MPO in order to certify that the proposed projects and/or activities:

- will not cause or contribute to any new violation of any standard in any area;
- will not increase the frequency or severity of any existing violation of any standard in any area; and



- will not delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

In addition, an air quality conformity analysis performed to demonstrate consistency with the emissions budgets for the state non-attainment areas. This air quality conformity update for the RTP has been required because the Environmental Protection Agency (EPA) and the Department of Environmental Protection (DEP) “have determined that a new set of emission factors must be applied to the output of the regional travel demand models. These new factors will reflect the current state of the Massachusetts’ enhanced vehicle inspection and maintenance (I/M) program.” The regional analyses will be combined at the state-level to develop the Eastern and Western Non-Attainment Area estimates.

2.2.1 - TIP Adjustment and Amendment Procedures

The Cape Cod MPO process follows an annual schedule for development of the Transportation Improvement Program (TIP) to be compatible with the development schedule of the Statewide Transportation Improvement Program (STIP) as is required under CFR 450.324.

The inclusion of a project in the TIP is sufficient for the project proponent to proceed toward implementation. Projects in the first years of the TIP, which have designs completed or well underway, should have public support in addition to the regional support. Inclusion on this list does not guarantee funding, the project proponent is responsible for completing the steps toward implementation. The Massachusetts Highway Department has committed to an annual statewide program. The Cape Cod Joint Transportation Committee recommends inclusion of the projects as programmed in this TIP for Cape Cod, with regional consensus and endorsed by the Cape Cod MPO, in the statewide program.



2.2.1.1 - Administrative adjustments

In the event a project in the annual element, or current Federal Fiscal Year, is not proceeding in the programmed year, the substitution of another project from the outer years of the TIP for implementation in the current year is considered by the Cape Cod MPO to be an administrative adjustment provided that the following conditions are true:

- consensus in the region for this project to move forward
- financial constraint of the TIP is maintained
- the project must be an exempt project, which means an air quality conformity determination is not required
- a letter requesting the administrative adjustment is forwarded to the Director of the EOTC/Bureau of Transportation Planning & Development to reflect the adjustment in the STIP

2.2.1.2 - TIP Amendment Process

A previously unlisted project maybe amended into the TIP. An action to add a new project is considered by the Cape Cod MPO to be an amendment if the following conditions are true:

- consensus in the region for this project to be included and move forward
- financial constraint of the TIP is maintained
- a Cape Cod MPO meeting to endorse the amendment(s)
- conformity determination is required unless the amendment(s) consist(s) entirely of exempt projects



2.3 - Transportation Funding Programs

Most funding categories in the TIP are based upon the Transportation Equity Act for the 21st Century (TEA-21). The following is a summary of the programs available to the Cape Cod region:

Congestion Management/Air Quality Improvement Program (CMAQ) - This funding category directs funds towards demonstration transportation projects in Clean Air Act non-attainment areas for ozone and carbon monoxide. Projects must contribute to attainment of national ambient air quality standards.

Bridge Replacement and Rehabilitation Program (BR) - This program provides for the replacement or repair of bridges on or off the federal aid system. This program is similar to the program of past years, although there is now a timber bridge component. Federal share is 80%, state share 20%.

Surface Transportation Program (STP-G) - This program provides funds for state and local roadways which are classified higher than Rural Minor Collector or Local. These funds, however, are flexible and may be used for a variety of other activities, such as transit projects. A portion of STP funds is for projects qualifying under one of the ten categories of Transportation Enhancements (STP-E). These are projects above and beyond the usual transportation project but directly related to transportation such as preservation of historic transportation facilities and stormwater mitigation. The projects will be chosen yearly based on project merit. Another type of STP funds is for safety projects (STP-S). Federal share is 80%, state/local share 20%.

National Highway System (NHS) - This program provides funds for roadways classified as part of the National Highway System. These are usually the interstates, principal arterials and connections to ports and intermodal facilities. The NHS system was designated in 1995.



Ferry Boat Discretionary (FBD). - This is a discretionary funding program for improvements related to ferryboat service.

Non Federal Aid (NFA) - These projects are not funded with federal dollars. Typically projects in this category are funded through state bonding. The Non Federal Aid projects that were included in a Massachusetts Transportation Bond Bill are designated as "**NFAB**".

High Priority Project (HPP) These are funds designated for specific projects in TEA-21; "NFA*" is used in the funding category for HPP projects for state accounting purposes.

Rail Freight Fund (RFF). - This state funded program is for improvements to rail lines.

Scenic Byways (SB). - This is a discretionary funding program for improvements related to scenic byways.

2.3.1 - Transit Funding Categories

The following are several funding categories related to transit:

FTA 5309 Formerly Section 3 (5309) - This category is discretionary funds for capital expenditures such as buses and terminal facilities; projects need federally earmarked 5309 funds to proceed.

FTA 5307 Formerly Section 9 (5307) - These funds are for operating assistance in small urban areas as well as capital expenditures. (Urban areas with a population of 200,000 or more are prohibited from using these funds for operating assistance under TEA-21 without special permission).



FTA 5310 Formerly Section 16 (5310) - This program funds public transit projects in rural areas.

FTA 5311 Formerly Section 18 (5311) - This program funds public transit projects in rural areas. Funds are granted on a discretionary basis by Massachusetts EOTC and FTA. Funds are for both capital and operating expenses.

Mobility Assistance Program (MAP) - This EOTC program funds capital improvements for transportation services for people who are elderly and/or have disabilities.



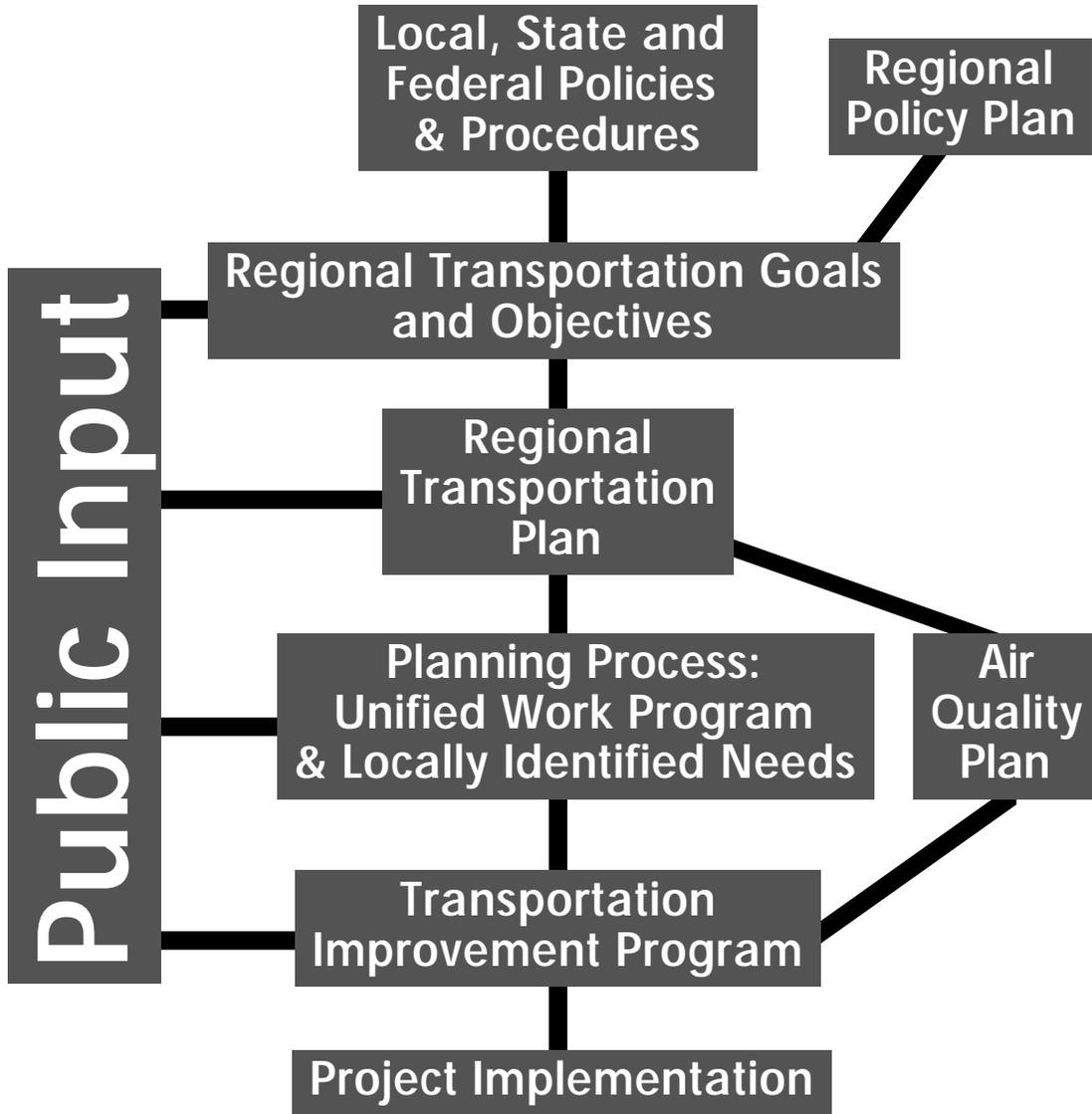


Figure 2.1 - Transportation Planning Process



2.4 - Fiscal Year 2001 Transportation Improvement Program

Table 2.1 presents the current fiscal year projects adopted for the Cape Cod region and illustrates the TIP process described earlier in this chapter (see section 2.2.). Reminder: for explanations of abbreviations see the list at the end of the document.

Table 2.1 - Fiscal Year 2001 TIP

RPA	DESCRIPTION	MUNICIPALITY	SID	FUND	FED FUNDS	STATE FUNDS	TOTAL FUNDS
CCC	Route 6 / Cape Cod Rail Trail BRIDGES, HARWICH	DEM, Har, Orl, Cape	602309	CMAQ	\$496,000	\$124,000	\$620,000
CCC	Route 6 / Cape Cod Rail Trail BRIDGES, ORLEANS	DEM, Har, Orl, Cape	602309	CMAQ	\$1,880,000	\$470,000	\$2,350,000
CCC	Route 28, shoulders and sidewalk construction, Falmouth Town Line to Rotary	MASHPEE	601930	STP	\$709,111	\$177,278	\$886,389
CCRTA	Intermodal Transportation Center, Ph II Construction	CCRTA, CAPEWIDE		HPP#781	\$432,000	\$0	\$432,000
CCC	Packetts Landing Acq & Bike Ped Improvements	YARMOUTH	602922 & 602923	HPP#404	\$590,625	\$357,500	\$948,125



CCC	Rural Roads Initiative, Cape & Islands	CAPEWIDE		HPP#247	\$295,760	\$177,490	\$473,250
CCRTA	Operating Assistance CCRTA	CCRTA, CAPEWIDE		5311	\$195,000	\$2,105,000	\$2,300,000
CCRTA	Operating Assistance CCRTA	CCRTA, CAPEWIDE		5307	\$325,000	\$975,000	\$1,300,000
CCRTA	Capital CCRTA, Transit Enhancements	CCRTA, CAPEWIDE		5307	\$200,456	\$50,114	\$250,570
CCRTA	Capital CCRTA, Intermodal Transportation Center Design	CCRTA, CAPEWIDE		5307	\$390,000	\$97,500	\$487,500
CCRTA	Capital CCRTA, Property Acquisition	CCRTA, CAPEWIDE		5307	\$150,000	\$37,500	\$187,500
CCRTA	Mobility Assistance Program request; 5 minibuses	CCRTA, CAPEWIDE		MAP			\$275,000
CCRTA	Mobility Assistance Program request; 2 vans	CCRTA, CAPEWIDE		MAP			\$79,000
CCRTA	Mobility Assistance Program request; mobile radios, base station, MDTs	CCRTA, CAPEWIDE		MAP			\$25,000
CCC	PHASE A Route 130 project; Resurfacing & related from state section for 4800 LF & Burke La+ to Mashpee TL 4500 LF	SANDWICH	600392	NFA	\$0	\$1,147,500	\$1,147,500
CCC	Lower County Road Bridge, BR# H-10-01 (SD, AASHTO= 30.8)	HARWICH	602293	NFA - BRIDGE	\$0	\$569,000	\$569,000



CCC	Route 6 Bridge over Depot St, BR# H-10-16 (SD, AASHTO=68)	HARWICH	600756	NFA - BRIDGE	\$0	\$737,000	\$737,000
	Bearses Way	BARNSTABLE	601916	Appendix A Other NFA	\$0	\$800,000	\$800,000
CCC	PHASE B Route 130 project; Resurfacing & related from state section for 4800 LF & Burke La+ to Mashpee TL 4500 LF	SANDWICH	600392	Appendix A Other NFA	\$0	\$347,500	\$347,500
SSA	Purchase 10 new shuttle buses	STEAMSHIP AUTHORITY	FOR INFO ONLY	SSA			\$1,000,000



3 - Existing Conditions

In this chapter we set the stage for dealing with the transportation issue. The following sections describe the geographical perspectives used in looking at the Cape as well as providing background on the people and place that have the needs and purpose for travel.

By looking at Cape Cod in smaller units - Sub-Regions - local issues and shorter distance travel needs were explored. Especially apparent was the lack of and need for comprehensive pedestrian and bicycling facilities.

3.1 - Study Areas and Corridors

Information is organized into three different perspectives. Transportation issues are detailed in the next chapter, however these perspectives are introduced in this chapter since they are useful for the discussion of this chapter. The first, “To and From the Cape,” addresses the relationships between Cape Cod and major off-Cape locations such as Boston or the islands of Martha’s Vineyard and Nantucket. For this perspective, the study area is focused on the Cape as a whole.

The second perspective looks at transportation issues organized by the major “corridors” - Routes 6, 6A, and 28, as well as the Cape Cod Canal area. This perspective uses the roadway system as a means to organize information. Despite the fact that automobiles are the current major component of travel on the Cape, it is logical to examine the other travel modes and land



use issues in the context of major roads as this is how transportation needs are organized. The map in Figure 3.1 shows the corridors examined in this study. Unless otherwise specified, all information is the most recent available data; traffic count information and crash data are from 1997, 1998, and 1999.

The third perspective examines shorter distance travel and local issues by looking at the Cape broken up into several Sub-Regions. While specific transportation issues exist on a town-by-town or even a village basis, organizing by Sub-Regions is a practical way to explore them. Figure 2.1 shows the four Sub-Regions examined in this study.

3.2 - To and From the Cape

Considered geographically, Cape Cod, or Barnstable County is comprised of fifteen towns in an essentially linear configuration and predominately surrounded by water. Transportation access to and from the Cape may be made via any one of three general categories: land, air, or water. People utilize one or more of specific travel modes including: pedestrian, bicycle, bus, rail, motor vehicle, airplane, or ferry.

For travel to or from Cape Cod, an estimated 200,000 people enter or leave the county and cross the Cape Cod Canal bridges on an average summer day. The majority make use of automobiles, evidenced by over 60,000 vehicles per day crossing over the bridges in January, and over 128,000 per day in July. A smaller but growing number of people make use of buses, ferries, and airplanes between the Cape and other destinations.

3.2.1 - Land: Road, Rail, & Path

The gateway by land to Cape Cod is through the Town of Bourne whose land mass is split by



the Cape Cod Canal. The western part of the Town of Bourne is connected to the adjacent region of Southeastern Massachusetts and regions beyond primarily by highways for vehicular traffic. The interregional system includes Route 3, Route 3A, Route 6, Route 28, and Route 25. These are the main roadways for linking to the interstate highway system which includes Routes 495, 195 and 95. The other ties by land are through bikeways, e.g. the Claire Saltonstall Bicycle Route--Boston to Provincetown, and a rail line (currently used for hauling trash to the incinerator in Rochester, Mass.).

Three existing bridges--two for vehicular traffic and one for rail - join the western part of Bourne to the eastern part of that town and the other fourteen towns east of the Cape Cod Canal. The eastern part of the Town of Bourne and the fourteen other Cape Cod towns are surrounded clockwise by water--the Cape Cod Canal, Cape Cod Bay, the Atlantic Ocean, Nantucket Sound, and Buzzard's Bay. Entrance from other regions by motor vehicle is limited to crossing through the Town of Bourne or on the ferries from the islands. Pedestrian and bicycle access through Bourne to the fourteen downcape towns is available via sidewalks on the road bridges. The Claire Saltonstall Boston-Cape Cod Bikeway makes use of the Sagamore Bridge.

The primary bus operators for interregional travel are Plymouth & Brockton Street Railway Company (P&B) and Bonanza Bus Lines. P&B provided 16 trips between Hyannis and Boston in the summer of 2000 during the morning (AM) peak hour. From Cape Cod, Bonanza ran 2 AM peak hour trips to Providence, and 5 AM peak hour trips to Boston. These bus operators combined furnished 100 trips per weekday to and from Cape Cod and Boston. There are also 15 trips daily to and from Providence, Rhode Island.

Most of the freight movement in New England is accomplished by trucks. According to the *Final Report, New England Transportation Initiative* eighty percent of freight was moved by trucks in 1991. When compared with 1982, freight movement in 1991 by trucks was up 37%,



the share of freight movement by rail was down 50%, by water down 41% and freight moved by air stayed level at one percent of the total.

The railroad bridge supports Cape Cod freight shipments which occur three to four times per day, year-round; this is primarily to transport trash to the SEMASS plant in Rochester, MA.

3.2.2 - Air

Barnstable Municipal Airport in Hyannis and Provincetown Airport have scheduled commercial airline service. Many people are driving from off-Cape to the airport in Hyannis in order to fly elsewhere, e.g. Nantucket (71% of traffic is to/from Nantucket). The Barnstable-Yarmouth Regional Transportation Study in technical memorandum number 2, January 1993, reported “that the primary role of the Barnstable Municipal Airport is as a park-and-ride facility, serving passengers who are flying to/from Nantucket.” Other origins/destinations include Martha’s Vineyard, Logan International Airport in Boston, Newark and New York. Only 15% of the airline passengers from Cape Cod use Barnstable Municipal Airport and 1% fly from Provincetown, 8% from Providence, and 76% from Boston.

The Barnstable Airport Commission, along with the Massachusetts Aeronautic Commission (MAC) are studying access issues and terminal needs for the airport and expect the use of this airport to grow 70% by 2015 (195,153 emplanements in 1999 to an expected 332,180 in 2015). The ENF for the project was filed in April 2000 and the study is expected to be complete sometime in 2001.

3.2.3 - Water

Other connections are made via the water. Currently, ferry boats transport people, motor vehicles, and goods between the Cape and Islands from Falmouth and Hyannis and a pilot freight service from New Bedford to the Islands was started in April 2000. In the mid-Cape area, a



seasonally operated ferry service carries passengers between Harwich and the Island of Nantucket. Off-Cape passenger ferries also operate during the summer season between Provincetown and Boston, Gloucester, and Plymouth.

3.3 - Moving within the Cape: Transportation Corridors

Although automobile travel is the predominate form of mobility on Cape Cod, transportation is more than just counts of cars on roads. The following sections describe transportation issues facing people adjacent to a major road. These people may wish to travel to destinations along or near the road or to other areas of the Cape. Within each of the following sections, the discussion is focused on the needs of travelers and the opportunities for other routes and/or modes of travel. The magnitude of the current and expected transportation impact is directly related to the travel demand forecasting assumptions described in Section 2.5.

3.3.1 - Route 6 Corridor

Route 6 is the major transportation corridor on the Cape, particularly for those travelling long distances. From where it enters Barnstable County in Buzzards Bay until its end in Provincetown, it provides the fastest way of travelling along the spine of the Cape, both for private automobiles and for transit. The Route 6 corridor in the Outer Cape also contains segments of “Bike Route One,” a chain of bicycle routes traversing the entire Cape.

In addition to being the main thoroughfare for the Cape as a whole, it also is the “Main Street” of several Cape towns. Buzzards Bay, Eastham, and to a lesser degree, Truro and Wellfleet, all use Route 6 as a downtown thoroughfare. This dual purpose for the road has created some conflicts for this corridor.



3.3.1.1 Route 6 License Plate Survey

In April and August of 1999, the Cape Cod Commission conducted a license plate survey of vehicles traveling on Route 6. The survey recorded the license plates optically with high speed cameras at a location in Sandwich and one in Wellfleet. The information was analyzed through optical recognition software and the license plate numbers were compiled. Out of state plates were compiled by state, province or country and Massachusetts plates were compiled by the city or town in which they were registered.

The most significant finding was that less vehicles registered in Cape Cod towns use Route 6 during the Summer survey than the Spring survey. This would indicate a Cape Cod year round resident driving behavior of making fewer trips in the summer, shifting some travel to late evenings, or finding alternate routes to Route 6. The map in Figure 3.1 shows the relative changes by town in the number of trips recorded in the April and August surveys.



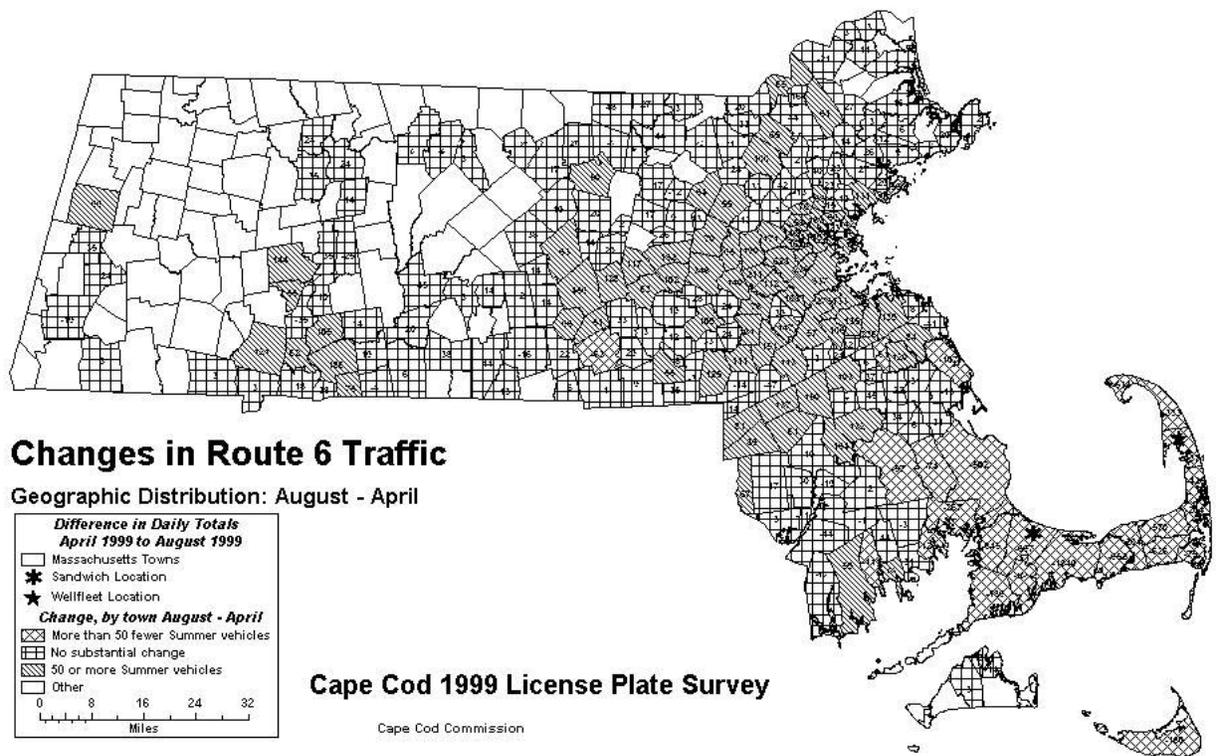


Figure 3.1 - Route 6 License Plate Survey - Massachusetts Towns



3.3.1.2 - Existing Conditions

On Cape Cod, Route 6 has four main segments:

- From where it enters the county in Buzzards Bay to where it crosses the Cape Cod Canal at the Sagamore Rotary it is a two- to four-lane road with curb cuts on both sides.
- From the Sagamore Rotary to just after Exit 9 in Dennis, it is a four-lane limited access highway with a grass shoulder and rest areas.
- From Dennis to the Orleans/Eastham rotary the road narrows to two lanes but remains limited access, with a raised median and yellow posts to reduce crossovers from one direction of traffic to the other. This section is actually built on what was designed to be one direction of a divided highway.
- Finally, from the Orleans Rotary until the road's end in Provincetown the road is once again a two- to four- lane road with curb cuts on both sides, although a grassed median does limit crossovers on sections of Route 6 in Truro and Provincetown.

The segments on the east side of the Sagamore Bridge evolved in the following construction phases as shown in Table 3.1:

Table 3.1 - Route 6 Completion Dates

<u>Year of completion</u>	<u>Configuration</u>	<u>Segment Description</u>
1950	two lanes	Sagamore Bridge to Hyannis (exit 6)
1954	four lanes	Sagamore Bridge to Hyannis (exit 6)
1955	two lanes	Hyannis (exit 6) to Dennis (exit 9)
1956	two lanes	Dennis (exit 9) to Harwich/Brewster (exit 11)
1958	two lanes	Harwich/Brewster (exit 11) to Orleans (exit 12)
1959	two lanes	Orleans (exit 12) to Orleans/Eastham Rotary
1967	two more lanes (4 total)	Hyannis (exit 6) to Yarmouth (exit 7)
1971	two more lanes (4 total)	Yarmouth (exit 7) to Dennis (exit 9)



Route 6 in the Outer Cape area was generally a consolidation of existing roadways and evolved over time since the 1930's.

Land Use

Adjacent land uses vary by location. In the limited access sections of the road there is some residential development and some industrial development along the corridor. In the sections with curb cuts there is more commercial development, including retail activity.

Congestion

Traffic flow along the corridor is reasonable in the winter but often operates poorly in the summer. During peak travel periods in the summer it is not unusual for west bound traffic to be stopped for several miles east of the Sagamore Rotary. Traffic volumes are presented in Table 3.2.

Table 3.2 - Traffic Volumes: Route 6 (1996-1999 counts)

<u>Town</u>	Summer <u>ADT</u>	Annual <u>ADT</u>	Summer P.M. <u>Peak Hour (4-5)</u>
Bourne	66,340	48,755	4,652
Sandwich	57,675	43,833	4,201
Barnstable	59,541	44,645	4,349
Yarmouth	56,428	42,885	4,345
Dennis	41,014	31,171	3,188
Harwich	30,500	23,180	2,404
Brewster	24,441	18,575	1,916
Orleans	19,053	14,480	1,446



Eastham	34,635	26,322	2,506
Wellfleet	26,179	19,896	1,930
Truro	22,750	17,290	1,899
Provincetown	18,150	13,794	1,512

Transit

Transit service on this corridor primarily consists of Plymouth and Brockton bus service from Boston to Hyannis, which stops at the Sagamore Park and Ride lot and the Barnstable Park and Ride lot at Exit 6 before completing its run in downtown Hyannis. This service runs 35 times a day in each direction. In addition, Plymouth & Brockton has 4 round trips a day that begin in Orleans, travel to the Harwich Park and Ride lot at the intersection of Route 6 and 124, and then stop at the Barnstable and Sagamore Park & ride lots and on to Boston. Service is reduced to 24 round-trips per day on weekends and holidays.

Other transit service includes the Bonanza Bus service from Providence via Bourne to Hyannis six round-trips a day, seven days a week. Plymouth and Brockton service from Boston to Orleans four times per day and Hyannis to Provincetown two times per day during the off-season and 5 round-trips per day during the peak summer season. The buses to and from Orleans run on a commuter schedule, stopping at the Harwich, Barnstable and Sagamore Park and Rides as well as in Dennis before continuing on to Boston. The Hyannis to Provincetown bus service runs along Route 6 with a stop at the Harwich Routes 6/124 Park & Ride lot and the Orleans CVS and continues on to Provincetown. There is a new summer shuttle that runs along Route 6A from Provincetown into Truro that operates from June through the second week in October.

Bicycle alternatives

Travel by bicycle along the corridor varies by location:



- Along the either side of the canal, bicycles can parallel Route 6 on the Army Corps of Engineers access roads.
- From Sagamore to Barnstable bicycles can travel the service road but are banned from Route 6 itself (ban extends from the Sagamore Bridge in Bourne to Orleans at the Eastham/Orleans Rotary).
- From Barnstable to Dennis there is no real option for bicycles other than local roads. However, in Dennis the Cape Cod Rail Trail begins, following roughly the Route 6 corridor all the way to Wellfleet.
- From Wellfleet to Provincetown most bicycles use Route 6, a portion of which is also designated part of the Claire Saltonstall Bicycle Route. However, this route is shared with high speed automobile traffic along this route. Efforts to extend the Rail Trail to Provincetown have been underway for some time.

Park and Ride Facilities

Three Park and Ride lots exist along Route 6, with parking for over 700 cars.

- The Sagamore Park and Ride is just off the Sagamore Rotary, with 377 spaces.
- The Barnstable Park and Ride is at Exit 6, with 300 spaces.
- The Harwich Park and Ride is at Exit 10, with 77 spaces.

The Barnstable Park and Ride is the most crowded. The MHD recently reconstructed this facility to include modern bus shelters, improved lighting, new pavement markings, curbing, landscaping, and a bicycle storage rack. The project increased the number of official spaces from 225 to 300. Curbing and landscaping have restricted the opportunity for unofficial parking. Therefore, the total number of vehicles parking on-site has decreased.

Roadway Alternatives

Alternative routes to Route 6 include Route 6A from Bourne to Yarmouth and again in Truro;



Route 39 in Harwich, Brewster and Orleans; Sandwich Road on the south side of the Canal; and Route 28 in Dennis and Harwich.

3.3.1.3 - Problem Identification

The primary debate surrounding Route 6 has been over balancing safety, capacity, and the environment. Some want to increase its capacity through structural improvements to accommodate high levels of traffic safely. As seen above in Table 3.2, the levels of traffic between Dennis and Orleans are lower than those between Sandwich and Dennis, but still above what many consider the capacity of a two-lane highway with limited access and unpaved shoulders. A few crashes along this stretch (see Table 3.3) in the past led to the creation of the raised median and stanchions. However, many residents of the region remain opposed to making any capacity improvements to that section of the road, based on concerns that such improvements would encourage more development. Note that “Fatal” category includes crashes with one or more fatality.

Table 3.3 - Crash Records (based on years '97, '98, '99): Route 6

	<u>AADT</u>	<u>Miles</u>	<u>Crashes</u>			<u>Fatal</u>		
			<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Bourne	48,755	7.02	218	262	262	1	3	1
Sandwich	43,833	15.2	63	54	60	1	0	0
Barnstable	44,645	8.28	48	62	96	0	0	0
Yarmouth	42,885	4.56	71	56	54	0	0	0
Dennis	31,171	2.04	37	36	48	0	0	0
Harwich	23,180	5.63	18	19	26	0	1	0
Brewster	18,587	2.92	5	5	10	0	0	0
Orleans	14,480	3.6	11	11	9	0	0	1
Eastham	26,322	6.12	91	113	125	1	1	1
Wellfleet	19,896	8.56	42	36	49	1	0	0



Truro	17,290	9.93	20	26	17	0	0	1
Provincetown	13,794	3.8	13	10	8	0	0	0

Route 6 2,428,827 (VMT)

	<u>Crashes per million vehicle miles</u>	<u>Fatal Crashes per 100 million vehicle miles</u>
Bourne	1.99	1.34
Sandwich	0.24	0.14
Barnstable	0.51	0.00
Yarmouth	0.85	0.00
Dennis	1.74	0.00
Harwich	0.44	0.70
Brewster	0.34	0.00
Orleans	0.54	1.75
Eastham	1.87	1.70
Wellfleet	0.68	0.54
Truro	0.34	0.53
Provincetown	0.54	0.00
Route 6	0.79	0.49

Similarly, on the lower Cape, many have sought some way to increase safety for pedestrians and cars along Route 6. In addition, the proliferation of curb cuts along that segment of the road have increased congestion and increased the potential for crashes. Also, in the segment along the Canal, traffic tends to travel faster than the roadway geometry design speed.



Another problem in this corridor is an insufficient supply of Park and Ride spaces at the Barnstable lot. Commission surveys at that lot have found it to usually be close to or over capacity. The Harwich Park and Ride, which opened in 1997, is showing regular usage.

3.3.1.4 - Alternatives

Improvements to consider for the Route 6 corridor include:

- Adding parking spaces at the Park and Ride in Barnstable and Harwich
- Providing more amenities at the Park and Rides
- Access Management along the “Scenic Highway” segment along the Cape Cod Canal
- Transit service to the Cape Cod National Seashore from the regional transportation centers
- Increased transit service along Route 6 on the outer Cape
- Identification of the Cape Cod Rail Trail bicycle alternatives to Provincetown
- Retain existing right-of-way where feasible to limit the future possibility of curb cuts and development on Route 6 in the Outer Cape.
- Additional strategies are also expected from the Canal Area Study currently underway.
- Improve the 4 lane/2 lane transition east of Exit 9 in Dennis.

3.3.2 - Route 28 Corridor

State Route 28 begins at the Eastham Rotary, runs counter-clockwise for almost sixty-five miles through Atlantic Ocean/Nantucket Sound/Buzzards Bay villages from Orleans Center to Bourne before crossing the Cape Cod Canal and continuing north to the New Hampshire border.

3.3.2.1 - Existing Conditions

Traffic flow along the corridor is generally heavy during the summer, with gridlock occurring in many locations. However, the level of traffic varies greatly along the corridor as shown in Table 3.4:



Table 3.4 - Traffic Volumes: Route 28 (1997-1999 counts)

<u>Town</u>	Summer <u>ADT</u>	Annual <u>ADT</u>	Summer P.M. <u>Peak Hour (4-5)</u>
Bourne	46,302	35,190	3,283
Falmouth	20,988	15,958	1,562
Mashpee	20,592	17,915	1,534
Barnstable	23,091	19,858	1,765
Yarmouth	38,264	29,081	2,547
Dennis	19,883	15,111	1,428
Harwich	9,095	7,822	620
Chatham	20,290	15,420	1,497
Orleans	12,354	9,389	1,006

The cross section of Route 28 varies greatly throughout the Cape:

- Four lanes from the county line across the Bourne Bridge to the Bourne Rotary
- Four lanes, divided from the rotary to Saconnesset Hills in Falmouth
- Two Lanes to the intersection of Old Stage Road in Barnstable
- Four Lanes from Old Stage Road to Phinneys Lane in Barnstable
- Predominately two lanes from Phinneys Lane to the Orleans/Eastham Rotary

Transit

Transit service varies along this corridor. CCRTA provides the Sea Line, year-round fixed route service that runs from Falmouth to Hyannis and a year round service from Hyannis to Orleans on Route 28 called the H₂O line. Other year-round services in the corridor have included the Villager (which primarily operates on Route 132) in Hyannis. The Cape Cod Central Railroad operates excursions from Hyannis. Summer trolley services are provided along segments of Route 28 in Falmouth, Yarmouth, and Dennis.



Bicycle Facilities

Bicycle travel along the corridor is common despite the fact that it can be quite challenging. This is partially due to the busy curb cuts along the corridor and partially due to the lack of alternatives on most sections of this corridor. Bicycle usage in the summer season is heavy due to the restaurants, motels, and other seasonal businesses along the corridor that attract seasonal workers who are often car-less. Bicycle facilities in the Route 28 corridor include the Shining Sea bicycle path between Falmouth and Woods Hole, a path to Route 28 along Route 130 in Mashpee from Great Neck Road, and a connection from Route 149 along Old Stage Road leading to a path along the south side of Route 28 to Bearses Way in Hyannis.

It should be noted that all CCRTA fixed-route buses are equipped with bicycle racks.

Roadway alternatives

Route 28 is more of a local road as it does not provide very direct inter regional travel options in most cases. Some alternative routes to 28 include Route 39, Great Western Road, Buck Island Road, Route 151 and, for longer trips, Route 6. Buck Island Road is currently programmed in the TIP for resurfacing and improvements.

3.3.2.2 - Problem Identification

Much of the Route 28 corridor is congested during summer peak hours. Traffic also slows when there is an incident, construction, or a bicyclist.

One major problem along the Route 28 corridor is how to provide for modes other than the automobile. Route 28 has a variety of conditions ranging from a limited access, divided highway to a two lane roadway.



Table 3.5 -Crash Records (based on years '97, '98, '99): Route 28

	<u>AADT</u>	<u>Miles</u>	<u>Crashes</u>			<u>Fatal Crashes</u>		
			<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Bourne	35,190	8.7	175	185	197	0	1	0
Falmouth	15,958	14.6	278	244	222	1	1	1
Mashpee	17,915	3.7	68	81	92	0	0	0
Barnstable	19,858	10.4	211	232	205	2	0	1
Yarmouth	29,081	5.2	254	224	249	2	0	0
Dennis	15,111	3.4	66	73	61	0	1	0
Harwich	7,822	6.4	51	55	55	0	1	0
Chatham	15,420	7.3	102	189	176	0	0	0
Orleans	9,389	4.9	48	46	45	0	0	1
Route 28	1,223,185 (VMT)							

	<u>Crashes per million miles</u>	<u>Fatal Crashes per 100 million miles</u>
Bourne	1.66	0.30
Falmouth	2.92	1.18
Mashpee	3.32	0.00
Barnstable	2.87	1.33
Yarmouth	4.39	1.21
Dennis	3.56	1.78
Harwich	2.94	1.82
Chatham	3.79	0.00
Orleans	2.76	1.99
Route 28	2.90	0.90



3.3.2.3 - Alternatives

Improvements to consider in the Route 28 corridor include:

- Enhance year-round fixed route service from the Hyannis bus station to Orleans and add bus stops & shelters
- Reducing need for bicycles to travel along Route 28, by improving bikeways along Buck Island Road in Yarmouth, Old Stage Road & Old Falmouth Road in Barnstable, Route 151 in Mashpee, and other alternatives and improve bicycle access from these parallel routes to Route 28.
- Further restricting commercial development along 28 to specified “village centers.”
- From Falmouth to Centerville:
 - Access Management
 - Encourage land use controls that limit traffic impacts
 - Increased public transit/shuttle service
 - Bicycle/pedestrian improvements
 - Road/intersection improvements
- Work with MassHighway to improve traffic signage in the region, especially on Route 28 from Chatham to Orleans (e.g., northbound traffic is designated for “Route 28 South”).

3.3.3 - Route 6A Corridor

Route 6A on Cape Cod is one of the oldest travel corridors in the country. Originally a path used by Native Americans, it was later adopted by colonists for travel from Plymouth out to Eastham. Later it served as state Route 6 until the construction of the current Route 6 in the 1950’s. Today it is also known as the Old Kings Highway and is a state Scenic Road. Due to the historic nature of this roadway, it has not been significantly widened or altered in this century.



3.3.3.1 - Existing Conditions

Route 6A is a narrow and windy two lane road with little or no shoulder. For this reason, passing zones are limited and biking can be difficult. Some segments have sidewalks (for example, in Barnstable Village and Brewster) but often it is difficult to travel along this corridor any way other than by automobile.

Adjacent land uses vary by location. Several village centers exist along the corridor, such as Barnstable Village, Yarmouthport, and Brewster. Several “new villages” have also sprung up as strip development in the last 20 years, such as the development in West Barnstable. In addition, Sandwich Center lies just off 6A to the south. Much of the corridor remains residential, or is undeveloped due to the proximity of wetlands.

Traffic flow along the corridor is generally heavy during the summer but rarely stopped.

However, the level of traffic varies greatly along the corridor as shown in Table 3.6:

Table 3.6 - Traffic Volumes: Route 6A (1997-1999 counts)

<u>Town</u>	<u>Summer ADT</u>	<u>Annual ADT</u>	<u>Summer P.M. Peak Hour (4-5)</u>
Bourne	16,584	12,604	1,311
Sandwich	11,786	8,957	930
Barnstable	9,717	7,385	776
Yarmouth	16,740	12,722	1,417
Dennis	14,290	10,860	1,370
Brewster	14,187	10,782	1,152
Orleans	16,241	12,343	1,300



Transit

Transit service is very limited on this corridor. A summer trolley runs in Sandwich Center and the Cape Cod Central Railroad goes along the corridor in Sandwich, but these services have almost no effect on traffic along the corridor. The Hyannis to Provincetown Plymouth and Brockton bus did travel the eastern portion of this corridor a few times a day, however, this service was discontinued in the Summer of 2000.

Bicycle Facilities

Bike travel along the corridor is common despite the fact that it is best suited for experienced bicyclists. This is due to the scenic nature of the corridor. The existing alternatives to Route 6A include the Claire Saltonstall Bikeway from Bourne to Barnstable Village and Setucket Road from Yarmouth to Dennis and the Cape Cod Rail Trail for areas of Route 6A in Brewster and Orleans. In 1999, the Cape Cod Commission produced a map that shows alternative routes for less experienced bicyclists. A related earlier effort was the creation of weatherproof maps for kiosks along the Cape Cod Rail Trail which show distances to typical destinations and facilities accessible from the trail.

Roadway Alternatives

Alternative routes to Route 6A include Setucket Road in Dennis and Brewster, Old County Road in Sandwich, Race Lane and Cotuit Road in Barnstable and Sandwich, and, for longer trips, Route 6.

3.3.3.2 - Problem Identification

Much of the Route 6A corridor is congested during summer peak hours but not at the level of other Cape corridors such as Route 28 in Yarmouth or Route 6 on the lower Cape. In fact, a major problem along the Route 6A corridor is how to provide for modes other than the automobile. Several studies have been conducted on this subject, including a bicycle



accommodation study and an alternate modes assessment conducted for the Commission in 1995. Recently an access management study was done that resulted in recommendations for improving access to Route 6A and other similar Cape Cod roadways.

Another issue is the scenic nature of Route 6A and the current process for funding roadway rehabilitation projects which require upgrading the width and alignment to modern standards. An ongoing initiative by the Cape Cod Commission (see Appendix) is to develop rural road design guidelines that will provide “footprint roadway” options to preserve the character of scenic roadways such as Route 6A.

Crash data, presented in Table 3.7, show that there is a wide variation in crash history depending on the location in question.

Table 3.7 -Crash Records (based on years '97, '98, '99): Route 6A

	<u>AADT</u>	<u>Miles</u>	<u>Crashes</u>			<u>Fatal</u>		
			<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Bourne	12,604	0.6	30	31	17	0	0	0
Sandwich	8,957	7.5	63	52	40	0	0	0
Barnstable	7,385	8.4	22	18	19	0	0	0
Yarmouth	12,722	3.7	71	62	61	0	0	0
Dennis	10,860	4.3	49	45	54	0	0	0
Brewster	10,782	7.8	85	89	105	0	0	0
Orleans	12,343	1.7	98	68	70	0	0	0

Route 6A 335,632 (VMT)



	<u>Crashes per million miles</u>	<u>Fatal Crashes per 100 million miles</u>
Bourne	9.42	0.00
Sandwich	2.11	0.00
Barnstable	0.87	0.00
Yarmouth	3.76	0.00
Dennis	2.89	0.00
Brewster	3.03	0.00
Orleans	10.27	0.00
Route 6A	3.13	0.00

3.3.3.3 - Alternatives

Improvements to consider in the Route 6A corridor include:

- Providing a trolley-type transit service in the summer with stops located off the roadway in village centers including restoration of the recently abandoned service.
- Reducing need for bicycles to travel along Route 6A by encouraging use of Cape Cod Rail Trail, bikeways along Setucket Road, Old County Road, and use of the Service Road along Route 6.
- Work with communities to restrict commercial development along 6A to specified “village centers”
- Construction of an exit ramp to Nickerson State Park in Brewster directly off of Route 6 to take that traffic off of Route 6A.
- Pedestrian enhancements such as “brick-style” crosswalks.
- Improvements appropriate to village scale similar to recent changes in Barnstable Village (replaced signals, sidewalk and crosswalk improvements, pedestrian amenities).
- Develop policies that respect the historic nature of the Route 6A corridor and limit signalization and road widening.



3.4 - Travel within Sub-Regions

Transportation on Cape Cod means different things to different people. Each town, village, business district, and even each neighborhood will have a slightly different (and in a handful of cases a drastically different) set of options and conditions that affect, and are affected by, travel. For a document of this scope it would be impossible, and imprudent, to provide such detail. Some comparisons and evaluation can be made at a larger scale. Therefore, transportation at the “local” scale is discussed for Sub-Regions (see Figure 3.2) as identified in the following sections:

3.4.1 - The Outer Cape

The Outer Cape towns include Provincetown, Truro, Wellfleet, and Eastham. They consist of 16% of the land area of Cape Cod, and contain an estimated 12,089 year round residents (6 % of the Cape). They also contain 6% of the jobs in the county.

Many workers commute into or out of this region, but even more workers commute within this region. A full 81% of the 4,593 jobs within the four town area are held by residents of these towns.

3.4.1.1 - Transportation Facilities

Transportation infrastructure includes over 430 miles of state and town maintained roadway, limited intercity and local bus services, commercial airline service and passenger ferry service. Various bicycle paths exist through the area, pedestrian facilities are primarily located in village centers.

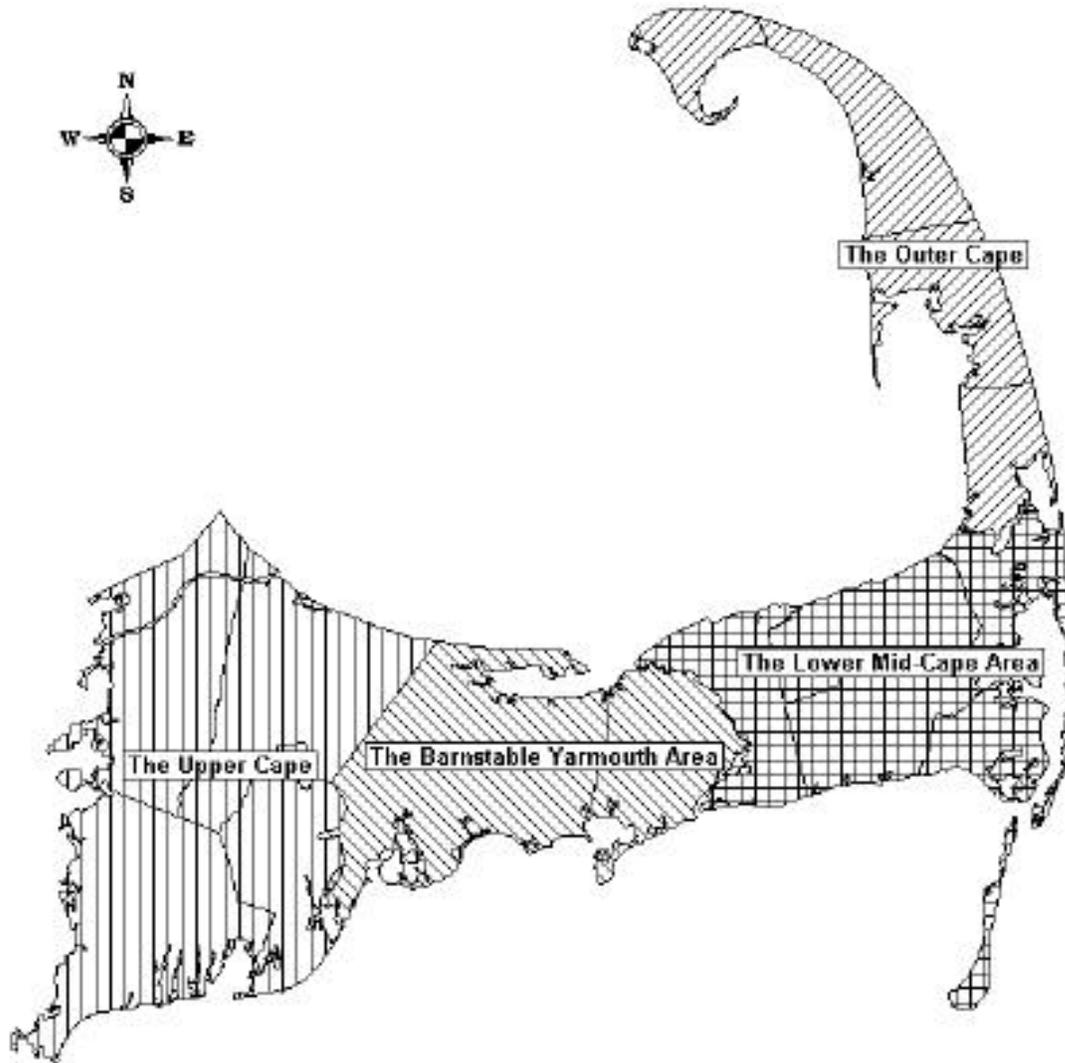
One major north-south corridor links the Outer Cape towns - both to each other and the other



sub-regions of Cape Cod. Small-scale commercial air services are available at the Provincetown Airport. Passenger ferries between Provincetown and Plymouth, Gloucester, and Boston operate a limited number of runs during the summer.



Figure 3.2 - Cape Cod Sub-Regions



3.4.1.1.1 - Roadway Network

The main road in the region, Route 6, includes a four lane undivided cross-section through most of Eastham without shoulders. From North Eastham to Truro, Route 6 is restricted to two lanes with shoulders and occasional left-turn lanes. In North Truro to Provincetown, Route 6 is four lanes with a vegetated median. Scheduled Plymouth & Brockton Street Railway Co. bus service operates from Provincetown to Hyannis. Currently the service is two round trips per day, includes stops in Provincetown, North Truro, Truro, Wellfleet, South Wellfleet, North Eastham, and Eastham. A paratransit service called the “b-bus” is available in these towns and is provided by the Cape Cod Regional Transit Authority (CCRTA) on an “on call” basis.

3.4.1.1.2 - Bike Facilities

The Cape Cod Rail Trail connects the area from other parts of the Cape. From Rock Harbor Road the trail follows former railroad right-of-way through Eastham to Lecount Hollow Road in Wellfleet. The State Bicycle Route 1 or Claire Saltonstall bikeway (which uses the trail) continues along side roads and bike path segments until North Truro and Provincetown where it follows Route 6A.

3.4.1.1.3 - Air Service

This region contains Provincetown Airport. Air service from and to Boston runs between 5 and 8 trips in each direction per day in the Summer and 6 trips per day in the Winter.

3.4.1.1.4 - Ferry Service

Passenger ferry service operates from Provincetown to Boston, Gloucester, and Plymouth during the summer. In the 1999 season there were 3 round trips a day between Provincetown and Boston and one roundtrip to both Gloucester and Plymouth. These services operate in the tourist season. The Cape Cod Commission Strategic Plan for Expanded Water Transportation to Provincetown, Cape Cod had several recommendations for expanding the service to the "shoulder



seasons" and increasing demand for service. The additional service will also benefit from the current reconstruction project at McMillian Wharf in Provincetown.

3.4.1.2 - Transportation Issues and Problems

Some Outer Cape roadways are operating near design capacities, due to the rise in tourism and year-round populations in the region and an increased reliance on single-occupant vehicles. However, geographic, cost, character issues and policy restraints preclude for the most part building additional highway systems or adding capacity to the existing roadways. In any case, in other parts of the country where widening has been possible, the new vehicular capacity was used quickly and consequently mobility was not enhanced for the long term. In general, the public consensus indicates a strong desire to find alternatives to widening roadways.

Some alternatives have been identified. Creation of a convenient trolley shuttle system and facilities to encourage use of bicycles for commuting will help by providing alternatives to driving alone.

3.4.2 - The Lower Mid-Cape Area

The towns of Dennis, Harwich, Brewster, Chatham and Orleans lie east of the heavily developed Barnstable/Yarmouth area and south of the Lower Cape. These towns make up the "elbow" of Cape Cod, and the region studied in the July 1996 Monomoy Capacity Study.

The Town of Dennis is usually included along with the Towns of Barnstable and Yarmouth as the "mid-Cape" area. These three towns do share some similarities with respect to urbanization and proximity to each other. It is felt that for environmental as well as geographic reasons it should be included in the Lower Mid-Cape study area. Dennis as well as the rest of the subregion as defined for the RTP are separated by marshes or rivers which the transportation system must cross.



This sub-region is 19.2% of the land area of the Cape. In 1990, these towns contained 45,000 residents (24% of the Cape) and 16,500 jobs (21% of the county total). Of the 16,500 jobs in this sub-region, 75% were held by residents of the sub-region. A small but growing number of residents of this region work in the Boston region; 165 according to the 1990 census.

3.4.2.1 - Transportation Facilities

This region has an extensive network of roads; 56 miles of state highways and over 400 miles of local roads. However, it has a limited transit system. It does, however, contain several bikeways and roads appropriate for biking. Mobility across this region is important because it provides the only land connection to the Outer Cape. It also contains several regional destinations such as Nickerson State Park, the Cape Cod National Seashore sites, and the commercial center of Orleans.

3.4.2.1.1 - Roadway Network

The Lower Mid-Cape sub-region roadways are not easily explained. Routes 6, 6A, and 28 all traverse the region from the Yarmouth boundary to the Orleans rotary, where they all meet. In addition, Routes 134, 124 and 137 cross the sub-region from north to south, Route 39 also cuts across Harwich and Chatham, providing a shorter route than Route 28 across the southern part of the sub-region. In 1996 a Park and Ride lot with room for 77 cars opened at the Route 6/124 interchange in Harwich.

Transit service is provided both by town shuttles and by Plymouth and Brockton. Dennis, Orleans and Harwich all ran shuttles in 1996, although Harwich and Orleans have since discontinued their service. P&B operates two round-trips a day along Routes 6 from Hyannis to Provincetown, and five round-trips a day during the summer. In addition, P&B offers four round-trips per day from Orleans and the Harwich Park and Ride to Boston. The CCRTA runs



six trips a day along Route 28 from Orleans to Hyannis.

It is interesting to note that the directional signs on some state routes in this sub-region are confusing due to the geography of the sub-region. For example, Route 28 is signed as Route 28 South as it heads from Dennis to Orleans despite the fact that it travels first east, then north before ending in the Orleans Rotary.

3.4.2.1.2 - Rail Service

Tracks coming from the west have been abandoned east of the Yarmouth transfer station and terminate in Dennis, where a lumber yard had received occasional shipments by train. Other than this service, there is no longer any rail service in this sub-region. The tracks that formerly crossed the region have now been replaced by the Cape Cod Rail Trail.

3.4.2.1.3 - Bike Facilities

The main bike facility in this sub-region is the Cape Cod Rail Trail, built on the old rail right-of-way from Dennis to Wellfleet. This route provides a major east-west corridor for (mostly recreational) bike traffic across the elbow of Cape Cod. A bike trail through Harwich and Chatham has also been completed recently. In addition, recreational bike facilities exist in Nickerson State Park. Currently bicycle bridges across Route 6 are programmed in the TIP in Harwich and Orleans for the Cape Cod Rail Trail.

3.4.2.1.4 - Air Service

There is only one airport in this region, Chatham Airfield, and no commercial traffic uses this airfield.

3.4.2.1.5 - Ferry Service

Passenger ferry service operates from Harwich to Nantucket during the summer.



3.4.2.1.6 - North/South Transportation Link: Rt 134

Route 134 in Dennis provides a link from Route 6A in the north and Route 28 in the south to Route 6. Local road connections at either end serve neighborhoods and beaches. This roadway is two lanes except for a four-lane section between Route 6 and Upper County Road. This section, near the Patriot Square shopping center also includes a center lane for turning. Traffic signals are located at the Route 6A, Old Chatham Road, Access Road, Patriot Square, Upper County Road, and at Route 28. Adjacent to Route 134 is the parking lot for the western end of the Cape Cod Rail Trail. The interchange at Route 6 and 134 often experiences delays and includes some potential hazards and implementing a solution to this situation has become a priority of the Town. A cloverleaf interchange is was advertised for construction in June 2000 for this intersection with Route 6 (exit 9) and MassHighway has recently awarded a contract for this work.

3.4.2.2 - Transportation Issues and Problems

This area is generally not congested, although certain road segments such as Main Street in Chatham west of downtown operate well over capacity during peak hours. However, as noted in the Monomoy Capacity Study, the roads of this region are predicted to become considerably more congested in the next ten years if current land use patterns and growth rates continue. If the current trend of converting seasonal housing to year-round use continues, congestion could become even worse and persist for longer portions of the year.

The Lower Mid-Cape region is also where Route 6 becomes a limited access highway with one lane in each direction. This is an unusual configuration, particularly because an entire section of the highway is built along only half of the right-of-way (which was acquired as part of the original plan to build a four lane highway all the way to the Orleans rotary from the Cape Cod Canal). Some would like to see the highway widened to a four lane configuration, or improved



with a paved shoulder. Others feel that widening the highway would simply allow more development to occur on the lower Cape, and note that current traffic levels are adequately served by one lane in each direction.

3.4.3 - The Barnstable/Yarmouth Area

The towns of Barnstable and Yarmouth make up the “urban core” of the Cape. They consist of 21% of the land area of Cape Cod, and contain 62,000 residents or 33% of the Cape’s population. They also contain 40% of the jobs in the county. Although a portion of workers commute into or out of this sub-region, 76% of employed persons living within the towns of Barnstable and Yarmouth work in these two towns. Along with the town of Dennis, Barnstable & Yarmouth are often referred to as the "Mid Cape." The effect of geography (transportation between Dennis & Yarmouth is restricted by water bodies such as Bass River) has made it more practical to address Dennis issues in the previous section which discusses the Lower Mid-Cape Area.

3.4.3.1 - Transportation Facilities

The transportation infrastructure for this sub-region includes 796 miles of roadway, intercity and local bus services, limited rail service, commercial airline service and ferry service. An intermodal transportation center to coordinate these different transportation services is programmed in the TIP for a location in Hyannis near the existing bus and railroad stations. Mobility to and within this “urban core” is beneficial for access to regional and local services, such as the transportation connections, the Cape Cod Hospital, Route 132 retail areas and downtown Hyannis. Other facilities in the Barnstable/Yarmouth area include Cape Cod Community College located on Route 132 with the YMCA and the Cape Cod Conservatory nearby.

The major west-east corridors (Route 6, Route 6A, and Route 28) link the towns of Barnstable and Yarmouth--both to each other and the other sub-regions of Cape Cod. Also, the railroad



right of way comes from the west into the Town of Barnstable and forks with one section of tracks heading through Yarmouth into Dennis to Route 134 and the other turning south near Willow Street toward termination in Hyannis. This sub-region also has links by air and water in the Hyannis area of Barnstable. Commercial air services are available at the Barnstable Municipal Airport and ferries operate from Hyannis Harbor to the islands.

3.4.3.1.1 - Roadway Network

The three roadway corridors are Route 6, Route 28 and Route 6A. Route 6 is a four-lane freeway divided by a vegetated median. Route 28 is a two-lane roadway with occasional turning lanes. Route 6A is an historic/scenic byway with two narrow lanes and roadside features such as stone walls and large trees. Scheduled Plymouth & Brockton Street Railway Co. bus service operates from Boston into Hyannis on Route 6 stopping at the Park and Ride commuter lot in Barnstable and continuing down Route 132 and Barnstable Road to the bus terminal in downtown Hyannis. The CCRTA operates a regional year-round fixed route bus service called the SeaLine from Falmouth to the P&B bus station in Hyannis. Along Route 28 in Orleans to Hyannis, the CCRTA operates the H2O bus line, a year-round bus service. During the summer months, the CCRTA operates summer shuttles from the south side of Yarmouth along the beaches in Yarmouth and Dennis connecting with the shuttles in Hyannis and other regional intercity services. the CCRTA also operates a paratransit service called the b-bus. The b-bus operates in all towns of the mid-Caped, 7 days a week, year round.

The limited access, four lane, median divided, Mid Cape highway or Route 6 has four access points through this section of Cape Cod. Major regional roadways emanate in both northerly and southerly directions from the Route 6 exits. Commercial areas have developed on two of these north/south connectors increasing travel demand and leading to sections of widened four lane roadway on Route 132 and Union Street/Station Avenue.



3.4.3.1.2 - Bike Facilities

The State Bicycle Route 1 or Claire Saltonstall bike route follows the Service/Access Road in Barnstable from the Sandwich town line across Route 149 to Route 132, Route 132 to Phinneys Lane, Phinneys Lane/Hyannis Road to Route 6A, and east to Setucket Road in Yarmouth. This route continues along Setucket Road as a bike path to Mayfair Road in Yarmouth and into Dennis. A north/south bicycle path branches from the Claire Saltonstall route at Route 149 and heads south along Old Stage Road leading to a path along the south side of Route 28 which runs east to Bearses Way in Hyannis. Many bicyclists are making trips in the sub-region though few roadways comfortably accommodate bicycle use.

3.4.3.1.3 - Air Service

This region contains the major commercial airport on Cape Cod, Barnstable Municipal Airport, as well as the Cape Cod Airport. Air service is available several times each day on several different carriers between the Barnstable Municipal Airport and other destinations including the Islands and Boston. At the junction of Route 149 and Race Lane, the Cape Cod Airport operates glider plane and biplane rides

3.4.3.1.4 - Rail Service

The Cape Cod Central Railroad operated excursion train service between Hyannis and Sandwich-four round trips on Tuesdays through Sundays from June through October prior to 1999. The service is under new ownership and a similar schedule is expected in 2000.

3.4.3.1.5 - Ferry Service

The Steamship Authority operates passenger, automobile, and truck and ferry service between Hyannis and Nantucket year-round. Private companies operate passenger service between



Hyannis and Nantucket year-round, and passenger service between Hyannis and Martha's Vineyard during the summer.

3.4.3.1.6 - North/South Transportation Links

There are four areas within the Barnstable-Yarmouth area that provide north/south transportation connections from the transportation “spine” of Route 6:

- In the western part of Barnstable, Route 149 (a two lane roadway) connects Route 6A and 28 as well as providing access to Route 6 at exit 5. A year round bus service connecting the villages of Cotuit with Marstons Mills, West Barnstable via Route 149 was tried from November 1995 through June 1996 and had little ridership. The area is primarily low density housing and north of Route 6 it is considered rural. The West Barnstable Railroad Station building was sold recently to a private concern but remains vacant and boarded up.
- Route 132 in Barnstable/Hyannis provides a link from Route 6A and Route 6 at Exit 6 to the Barnstable Municipal Airport and Route 28 at the Airport Rotary where Route 132 terminates. Route 132 is two lanes from Route 6A to just before the signalized intersection of Route 132 with Phinneys Lane where it widens to an undivided four lanes. The four lane cross section continues through three more signalized intersections to the signalized intersection of the Capetown Plaza and the Cape Cod Mall entrances where a small median barrier exists. Route 132 narrows as it approaches and connects with Route 28 at the Airport Rotary. The Cape Cod Regional transit Authority operates a local bus service called the Villager. The Villager service begins at the Barnstable County complex, travels along Route 6A to Route 132 and connects with each of the Malls and to the Barnstable Municipal Airport and terminates at the Plymouth & Brockton bus station, downtown Hyannis. The bus operates ten round-trips a day, Monday through Friday,



six round-trips a day on Saturdays. In addition, during the summer months, the CCRTA operates a trolley along the same corridor connecting all the Malls and then the Villager becomes an express to Cape Cod Community College. The route is then extended to Barnstable Harbor during the summer.

- Willow Street in Yarmouth at Route 6, exit 7 connects with Route 6A to the north and Yarmouth Road at the Barnstable town line which leads to Route 28 and into Hyannis for an alternative approach to downtown. This access to Main Street, Hyannis passes the new Steamship Authority parking lot at the corner of Yarmouth Road and Main Street; this lot is just east of the railroad tracks and the future intermodal transportation center site. In addition, this exit is the primary access route to the Cape Cod Hospital from Route 6. From Willow Street near the Route 6 exit ramps, Higgins Crowell Road provides a connection to Route 28 in West Yarmouth. Higgins Crowell Road also intersects with Buck Island Road--an alternative to Route 28 for east-west traffic in the area. Further south from Route 6 down Willow Street is Camp Street which also connects both to Buck Island Road and Route 28. Though travel demand is high in this area, few alternative provisions are present. P&B provides a connection originating in Provincetown into Hyannis via Willow Street. The Town of Yarmouth is working on improvements for Buck Island Road which include bicycle accommodation and this project is currently programmed in the TIP. Route 28 has bicycle traffic, especially in the summer season when seasonal workers commute via bicycle, yet the roadway has many access points and no markings for bicyclists.
- Union Street/Station Ave. at Exit 8 in Yarmouth is a main connector between Route 6A and Route 28 for destinations in Yarmouth and Dennis. This corridor includes an undivided four lane roadway and offers few alternatives to the automobile.



3.4.3.2 - Transportation Issues and Problems

Geography, environmental constraints, cost, character issues, and policy restraints generally make difficult building additional highway systems or adding capacity to the existing roadways. Many in the area have expressed a strong desire to find alternatives to widening roadways.

Development of a more balanced and coordinated system will improve the efficiency of the Barnstable/Yarmouth area infrastructure in a cost-effective and environmentally friendly manner thereby improving the quality of life. Town level policy and land use decisions affect the operation of the transportation assets and must include consideration of the transportation implications. Growth centers must be chosen which provide for efficient transit connections to encourage this alternative. With redevelopment or new development along major routes, the responsible agencies should require a transit oriented connection to the major roadways and require parking to be located at the back or side of the development. To support development of these alternate modes in the Barnstable/Yarmouth area, some alternatives have been identified:

- The intermodal center in Hyannis has the potential to create a more efficient, connected system for transfers between modes which will aid in allowing for more trips without an automobile. In addition, increased trips by pedestrians and bicyclists will be encouraged with improvements for safety of these trip types.
- Accommodation of bicycles with the addition of lanes for this mode should be considered for major routes such as Routes 28 and 132.
- It is recommended that the construction of new travel lanes on Route 132 be accompanied by a median from Route 6 to Bearses Way, access management and controlled land use, as well as bicycle and pedestrian accommodation.
- A bicycle connection to the intermodal center site as a spur from the westerly extension of the Cape Cod Rail Trail into Yarmouth and Barnstable will provide additional alternative mode benefits for the region.



3.4.4 - The Upper Cape

The Upper Cape towns of Bourne, Sandwich, Falmouth, and Mashpee include the mainland gateway to the Cape. They consist of 37% of the land area of Cape Cod, and contain 67,000 residents or 36% of the Cape's population. They also contain 33% of the jobs in the county. Although a portion of workers commute into or out of this sub-region, 63% of employed persons living within the four town area of Bourne, Sandwich, Falmouth and Mashpee work in these towns. The Upper Cape area includes regional and local services, such as the transportation connections, shopping centers and the Falmouth Hospital.

This area is identified as the Upper Cape even though it is physically south of the lower or outer Cape. This is due to the fact that you travel from the Cape "up" to Boston making the tip of the Cape the furthest or "lowest" and the Canal area the "upper" Cape.

3.4.4.1 - Transportation Facilities

The transportation infrastructure in this sub-region includes 1,195 miles of roadway, intercity and local bus services, limited rail service, and ferry service.

3.4.4.1.1 - Roadway Network

The Cape Cod Canal bisects the Town of Bourne and is bridged in just three places--two for vehicular traffic. The three major corridors connecting this sub-region to other parts of Cape Cod are Route 6A, Route 6 and Route 28. However, both Route 6A and Route 6 function more as intra-regional travel collectors from Falmouth and Mashpee as no direct connections are made to these towns by these corridors. Additional regional corridors serve as a network for the sub-region. Route 151 from Route 28 in Falmouth near the Bourne town line crosses through North Falmouth and connects to Route 28 in Mashpee. Route 130 from Route 6A to Route 6 in Sandwich and on to Route 28 in Barnstable just east of Mashpee/Barnstable town line connects Mashpee with Sandwich and allows access to Route 6.



Bonanza Bus Lines provides intercity service from this sub-region to Boston and Providence, Rhode Island. The Sea line, a regional year round fixed route bus service, travels from Falmouth through Mashpee primarily on Route 28 to the Plymouth & Brockton Street Railway Company (P&B) bus station in Hyannis. The Park and Ride commuter lot in Sagamore is serviced by P&B for trips to and from Boston. The Cape Cod Regional Transit Authority (CCRTA) has operated the “WHOOSH”, a summer shuttle, between downtown Falmouth and Woods Hole since 1993 with ridership increasing each year. Falmouth Hospital has contracted with the Cape Cod Regional Transit Authority to provide a free medical courtesy bus to transport riders to Falmouth Hospital for medical appointments. This Courtesy Bus is good for any individual living within the towns of Mashpee, Bourne, Sandwich, and Falmouth, and operates Monday through Friday. This service supplements the CCRTA’s b-bus service, the paratransit service operating seven days a week for any resident in the upper Cape.

3.4.4.1.2 - Ferry Service

This sub-region also has links by water between Falmouth and Martha’s Vineyard. The Steamship Authority ferries operate between Woods Hole and the Vineyard carrying passengers, bicycles, automobiles, and trucks. Two private ferry operators provide passenger service between Falmouth Harbor and Martha’s Vineyard. Steamship Authority traffic levels during 1999 are shown in Table 3.8:



Table 3.8 - Steamship Authority Usage
(one-way trips)

1999	Passengers	Autos	Trucks
January	84,182	22,075	4,604
February	82,876	21,916	4,394
March	98,893	25,523	5,823
April	148,186	32,127	6,838
May	216,760	35,279	7,080
June	250,921	38,634	7,157
July	342,049	45,067	6,396
August	367,079	46,943	6,358
September	243,515	39,330	5,981
October	222,387	39,708	6,029
November	133,136	30,716	5,561
December	115,136	29,071	5,440
Total for 1999	2,305,166	406,389	71,661

source: Steamship Authority

3.4.4.1.3 - Bike Facilities

The Boston to Cape Cod Bikeway, also known as State Bicycle Route 1 and the Claire Saltonstall bikeway reaches the Cape Cod region on Route 3A in Bourne and follows Route 3A to Meetinghouse Road which connects to the Sagamore Rotary and Bridge. Once over the Sagamore Bridge, this bicycle route connects with Route 6A to the intersection of Route 6A and Route 130 in Sandwich. State Bicycle Route 1 proceeds south on Route 130 to the junction with the Service Road in Sandwich. The bike route continues on the Service Road in Sandwich and into the Town of Barnstable. Other bicycle trails include the bike paths along both sides of the Canal in Bourne and the Shining Sea Bike Path in Falmouth to Woods Hole.



3.4.4.1.4 - Rail Service

The third bridge across the Cape Cod Canal is the railroad bridge. Cape Cod freight shipments by rail are made three to four times per day year round; this is primarily to transport trash to the SEMASS plant in Rochester. The Cape Cod Central Railroad operated excursion train service between Hyannis and Sandwich - four round trips on Tuesdays through Sundays from June through October prior to 1999. The service is under new ownership and a similar schedule is expected in 2000.

3.4.4.2 - Transportation Issues and Problems

- under-utilized third (rail) bridge over the Cape Cod Canal
- most of freight shipment is by trucks
- recent land development which is auto-oriented
- A need for more local transit service
- Canal related crossing limitations
- Ferry Service from off-Cape
- Maintenance of Bridges

3.5 - Land Use

As recognized in one of the Cape's regional transportation goals, land use creates transportation needs, and the creation of new transportation capacity usually induces new land uses. Land use patterns on the Cape have changed in the last 50 years from a village-centered pattern of relatively dense development in centers surrounded by little or no development, to a suburban-



style of subdivisions and strip malls. Such changes have transportation implications; and future land use patterns will both be affected by future transportation improvements and will create the need for new improvements.

3.5.1 - Current Land Use

Land use on Cape Cod is dominated by housing and open space. According to tax assessor's data collected from 1988 to 1996, 38% of land on Cape Cod (excluding Camp Edwards and Otis Air Force Base) is used for housing, while 26% is open space or recreational land. An additional 30% is publicly-owned land, of which much is open space. Less than 3 percent is used for employment.

Housing

Housing is not only the most common land use on Cape Cod; it is also the one that is growing the most quickly. As population grows, so does the need for places to live. In a region such as Cape Cod, that tends heavily toward single-family detached housing, this population growth translates into an increase in the use of land for housing. The housing density on the south shore and Buzzard's Bay coastline is greatest. Outer Cape development is more dense in the town center of Provincetown and Eastham than the rest of the sub-region. Generally, lot sizes are largest on the Cape Cod Bay side of the Cape. Multifamily housing units are concentrated in certain areas, such as Hyannis, Wellfleet Center and Dennisport. Other areas, such as Sandwich and Barnstable Village, are almost devoid of multifamily housing units. Falmouth, Yarmouth, Dennis, Chatham and parts of Barnstable are the "year-round core" of the Cape, where the population is still significant in the off-season. Meanwhile, Truro, Wellfleet, Eastham, and Brewster are far less densely populated, revealing the seasonal nature of their housing stock at present.



Seasonal Uses

In a tourist area such as Cape Cod, lodging units such as hotel and motel rooms also play an important role in regional transportation planning. Seasonal lodging is spread in clusters throughout the cape, including communities such as those in Provincetown, Chatham, Brewster, Harwich, Yarmouth, and Barnstable. There are also significant amounts of seasonal land uses along the south shore of the Cape.

Commercial and Industrial

Commercial and industrial land use varies by specific type, although generally they are more common uses on the Upper Cape than elsewhere:

- **Office Uses:** Office land uses are concentrated in Provincetown, Eastham, Chatham, Falmouth, Bourne and the Route 28 corridor from Hyannis to Dennis. To a lesser extent there is also office use along Route 132 and Route 6A in Sandwich.
- **Retail Uses:** Retail uses are more dispersed, although there is still a concentration along Route 28 from Hyannis to Dennis and Routes 132 in Hyannis, Route 28 in Bourne and Route 134 in Dennis.
- **Manufacturing Uses:** Manufacturing largely occurs inland from Barnstable to Dennis, in Provincetown, and in Falmouth and Bourne. On the whole there is not a large amount of manufacturing on Cape Cod.
- **Mining:** Mining is not widespread on Cape Cod, although there is some sand and gravel mining in Falmouth, Bourne and Barnstable.

Open Space

At present, a significant percentage of the land on Cape Cod is devoted to preservation as open space, recreational land, or public land. In addition, the Cape Cod National Seashore on the lower Cape not only preserves a great deal of land in that area, but also restricts the additional growth



of land already developed within its borders.

In 1998, the Cape Cod Land Bank Act was passed and in the first year nearly 800 acres have been approved for preservation across the region. Most of the parcels expected to be purchased are for conservation or passive recreational use but some towns are buying properties for other purposes such as future water supply well sites and trail links to the Cape Cod Pathways network.

Generally, open space uses are common inland and on the lower Cape, while not as common on the south shore of the Cape. The Cape Cod Bay and Buzzards Bay shores fall somewhere in between. Both transportation and local land use decisions have played a major role in the loss of open space. The one area that appears to suffer from a lack of open space uses is the south shore of the Cape from Hyannis to Harwich, where development pressures have been strong. On the rest of the Cape, “perceived” open space (undeveloped land as well as protected conservation land) is generally not hard to find, at present. Whether this condition will continue depends on the development and transportation policies adopted by the region and its towns in the future.



4 - Future Expectations

Transportation on Cape Cod has always been a challenging subject. In the past it was generally related to the summer tourist traffic. The summer traffic of the 1970's is now the traffic we currently see in all but the dead of winter. Transportation planning in the context of 2025 must consider year-round solutions as well as the ever increasing summer traffic.

The nature of the Cape's transportation system is becoming a critical issue from a variety of standpoints. An old issue is the balance of capacity and preservation of the character of Cape Cod. Constant pressure from the tourism industry to increase the capacity of the transportation system must be balanced with the ability to support the increases in traffic without "killing the goose that lays the golden eggs." This issue is also related to compliance with state and federal standards for roadway design that often requires modern design approaches such as wide shoulders when improving scenic roadways such as Route 6A.

Another newer perspective that must be considered is the increasing year round population. This trend is expected to continue and increase as the "baby boomers" born after World War II begin to seek retirement homes and turn to Cape Cod. This trend has several transportation implications other than more year round traffic. Barnstable County has one of the oldest populations in Massachusetts and over 40% of its population is expected to be over 50 by the year 2010 (compared to less than 20% nationwide). This trend will require more consideration of public and elderly transportation as well as design practices that will ensure system safety while increasing operational efficiency.



In addition to the increases in elderly population there has been an increase in sprawl statewide that has included Cape Cod. Increasing numbers of Cape residents commute to job centers such as Boston and Providence, RI. This trend has increased the demand for commuter options such as Commuter Rail between the Cape and Boston. Development of options such as this must be considered with respect to compromising the character of Cape Cod for that of a bedroom sprawl community.

Alternative forms of transportation to/from and around Cape Cod are an important component of the transportation planning for the future. This component can be a powerful tool in achieving other objectives consistent with the Cape Cod Commission's Regional Policy Plan. The transportation options such as access by rail could be a good solution if the service is crafted to support tourism and other forms of trips without creating pressure to accelerate the development of housing. Summer passenger rail service to the Cape has been supported by the Cape Cod Regional Transit Authority and others to bring visitors and tourists to the Cape during peak summer seasons. This includes service from Washington DC and New York City to the Cape as well as additional service from Boston to the Cape. It will assist in providing alternatives to driving to the Cape in the peak summer months.

4.1 - Cape Cod 2025

This transportation plan is for the years 2000 to 2025. Current projections used to estimate traffic demand are largely from the Massachusetts Institute for Social and Economic Research (MISER). The projections they have provided for the Cape Cod region are based on trends that have occurred in the past, extended to the future.

The MISER projections include expected population and land use changes between now and



2025 without any regard for the recent initiatives such as the Cape Cod Land Bank and the efforts by the Cape Cod Commission to mitigate developments of regional impact (DRI) as defined by the Commission's Regional Policy Plan. The MISER data is also blind to the fact that some of the towns on Cape Cod are expected to reach "buildout" or a state where all available land is being used for residential or commercial purposes before 2025 and no additional growth can occur. Other issues not considered by MISER are some of the unique issues facing Cape Cod such as ground water supply limitations and seasonal traffic demands.

The limitations of the MISER projections are understood by the MPO staff and adjustments have been made in many cases to provide more reasonable scenarios for the future. The MISER projections are anticipated to be accurate in the short term and will become less reliable as we go further into the future which is to be expected when looking ahead 25 years.

Efforts to create a more accurate projection for the Cape Cod region are underway by the Cape Cod Commission and the Executive Office of Environmental Affairs (EOEA). These projections, along with the 2000 census data will allow for a much more accurate vision of the future that will be incorporated into future transportation planning and plan updates.

The Regional Transportation Model

The Cape Cod Commission and the Massachusetts Highway Department have developed the computerized transportation model for the Cape Cod region. The model framework includes the major roads on Cape Cod and uses existing and future landuse to estimate the number of trips the system must accommodate. The model has the ability to assign the trips based on how congested roadways are, for example:

If a number of trips are expected to be made from residential area A to a retail area in shopping area B and there are, say, two ways to go - the short way and a longer way. The



regional model will assume that trips will take the short way until you have enough traffic from A to B as well as from all other trips that want to use the roadway associated with the “short way” that the longer way starts being more attractive and some trips from A to B are assigned to this “longer route”. This simulates human behavior where we all try to take alternate routes to try to avoid traffic.

The hypothetical areas (residential area A and shopping area B) used in this example are actual areas we call traffic analysis zones (TAZ’s). These are physical areas defined by census tracts where we have a good idea of the land use and population within these areas. Different types of land use and population (households) have trip making characteristics that have been defined over the years and are included in the model. Future traffic is based on changes to the land use expected by MISER in the TAZs. When we estimate the future transportation need it is based on the roadway network, changes to land use, and congested travel times.

In order to know if the model works we test it based on things we know. This is called the base calibration year which for this RTP update is 1997. We have counted traffic for key roads on Cape Cod for various times of the year in 1997 and have developed average observed traffic flows. The model was then run using the 1997 estimated landuse and population data. The results of the model were compared to actual traffic data and they matched well enough to assure that the model will portray future scenarios reasonably well.

The model can be used to test the effectiveness of proposed projects in providing for future traffic. This is done by making changes to the model’s roadway network and comparing the future traffic flows to the “no-build” or a scenario where the proposed changes are not included in the model’s roadway network. Information such as estimated travel times, total miles traveled, and air quality benefits can be forecast using this process and are part of the procedure for making project recommendations.



4.2 - Expected Changes 2000 to 2025

The following sections describe changes that are expected to affect transportation system over the next twenty-five years.

4.2.1 - The Population

The year-round population of the Cape has continued to rise, from less than 100,000 in 1960 to 148,000 in 1980 to an estimated 212,500 today. According to estimates by the Massachusetts Institute for Social and Economic Research (MISER), growth has been strongest in Mashpee, Sandwich and Barnstable, while only Chatham has experienced an estimated drop in population from 1990. However, these numbers in all likelihood underestimate population in the future as trends on Cape Cod are different than for the rest of Massachusetts and it is felt that the MISER model will not adequately allow for migration into the Cape region.

This rise in population is projected to continue. MISER has estimated that Cape's year-round population is expected to be 225,000 by 2025. Current population estimates indicate that this figure may be exceeded before 2025 and the 2000 Census will probably result in adjustments to the MISER forecasts. Meanwhile, the summer population also continues to grow. Estimates put the peak summer population in 1990 at 550,000, including residents. Lower Cape towns experience the largest influx of summer residents, while Upper and Mid Cape towns experienced less seasonal population fluctuations.

Although much of the increase in population is due to the arrival of retirees, much of it is also due



to an increase in working-age population, particularly those aged 35 and up. According to the U.S. Census, the only age segment on Cape Cod to experience an actual drop in population between 1980 and 1990 was those aged 10 to 19 (from 21,948 in 1980 to 19,730 in 1990). Also according to the Census, the median age of Barnstable County residents is estimated to have risen from 37.1 in 1980 to 39.5 in 1990.

Meanwhile, the diversity of the Cape's population has also continued to increase, albeit from a small base. From 1980 to 1990, the minority population of the Cape (nonwhite plus hispanic white) increased 53 percent, from 5,648 to 8,649. Much of that increase occurred in the "urban core" of Barnstable and Yarmouth, although towns such as Sandwich and Falmouth also experienced an influx of minorities.

In addition, the median household income of the Cape declined from 1980 to 1990 relative to Massachusetts as whole. While statewide, median household income increased 110 percent in that time, the median household income of the Cape increased 104 percent. However, this figure differed dramatically from town to town. While Brewster's median household income increased 129 percent, that of Orleans only increased 79 percent. This trend is changing as more recent census bureau estimates indicate that Barnstable County incomes increased 17% compared to a statewide increase of 5.6%.

Seasonal employment is a major factor on the Cape, with County-wide unemployment ranging from 7.6% in January 1999 to only 2.3% in August 1999. This pattern is similar for other years, although the magnitude is affected by the overall economy. A smaller portion of Cape households derived income from a wage or salary than in the state as a whole in 1990. Only 67 percent of all households on the Cape reported earning wages or a salary, as opposed to 78 percent of the state as a whole. This reflects the large retired and affluent segments of the Cape.



A significant number of those living on the Cape also work in the county. According to 1990 Census, of the 81,779 Cape residents working, 71,333 work on Cape. 10,446 work outside the county. Of these, over 2,000 people work in the city of Boston. Cape towns with the largest employment were Barnstable (with 24,966 jobs in 1998) and Falmouth (with 13,668 jobs in 1998).

From 1970 to 1990, the population of the Cape nearly doubled and on-Cape jobs nearly tripled.

4.2.2 - Where we're headed

Development pressures have been great in this region for the past 40 years and are likely to continue to be great in the future. Between 1971 and 1990 the amount of land used for residences increased by over 50%. Similarly, commercial uses increased significantly from 1971 to 1990.

Anticipated development is based on population and employment growth projections. These projections ignore some important facts about the nature of land development and transportation. One is that land use is strongly affected by changes in the transportation system. Another is that land that is considered useful for development is often environmentally sensitive. As land is developed, the use of the transportation system increases as people travel to or from new development.

There is a clear need for a balance in transportation and land use decisions. Any transportation improvements made in the future will not simply help accommodate new growth; it will also likely create more growth in that region. Standard travel demand forecasting generally does not allow for this interaction. While some newer travel demand forecasting packages do allow for this interaction, there is no guarantee that their predictions are accurate.

A great deal of land on the Cape is also considered environmentally sensitive. This land must be



treated carefully in any future development scenario; some of it should not be developed at all, while much of it can only be used for certain types of development.

4.3 - Regional Issues and the Regional Policy Plan

Transportation makes up an important part of Barnstable County's Regional Policy Plan (RPP). The Regional Policy Plan is an expression of the shared aspiration of Cape Codders for the future. It recognizes the Cape as a fragile and beautiful place. It is a Plan that seeks to protect habitat, in the awareness that Cape Cod is home to endangered species of global significance. It is a Plan with a goal to conserve a cultural landscape shaped slowly over 10,000 years of human habitation.

The Cape Cod MPO recognizes other regional planning efforts, such as the Regional Policy Plan (expected to be updated in 2001). The Regional Transportation Plan provides a framework for transportation decisions and activities with state and federal involvement. The Regional Policy Plan provides a framework for local and regional (Barnstable County) land use activities. In order to improve coordination among all regional planning activities, MPO actions where feasible and appropriate will be consistent with the Regional Policy Plan.

The Regional Policy Plan includes broad goals which set the direction for future and more detailed policies for the issues of land use/growth management, natural resources, economic development, community facilities and services (including transportation), affordable housing, and heritage preservation/community character. The RPP recognizes that dealing with our traffic problems by building new or bigger roads and intersections is not desirable. Not only have such strategies failed to keep up with travel demands caused by new development, they have done so at the



expense of the environment and natural beauty of the Cape. Furthermore, increasing capacity for cars does little to improve transportation for young people, for the elderly that may prefer not to drive, for those people who cannot afford a car, or for others who do not drive. Two RPP issue areas are discussed in the following sections.

4.3.1 - Environmental Concerns

Figure 4.1 shows a composite of some of the natural resources on Cape Cod. The shaded area includes:

- Unfragmented Forested Habitat
- Water Bodies and Land within 300' of their Shore
- 350' Buffer of Vernal Pools
- Salt and Inland Wetlands
- Public Water Supply Wellhead Protection Areas
- Potential Public Water Supply Areas
- Rare Wetland Wildlife Habitat and Priority Sites for Rare Species and Natural
- Communities from NHESP and from Association for Protection of Cape Cod
- Critical Upland Areas



Regional Policy Plan

Cape Cod Significant Natural Resource Areas

The categories of land considered as Significant Natural Resource Areas include unfragmented forested habitat, water bodies and land within 300 feet of their shore, 350 foot buffer of vernal pools, salt and inland wetlands, public water supply wellhead protection areas, potential public water supply areas, rare wetland wildlife habitat and priority sites for rare species and natural communities from NITESP and from APCC, and critical upland areas.

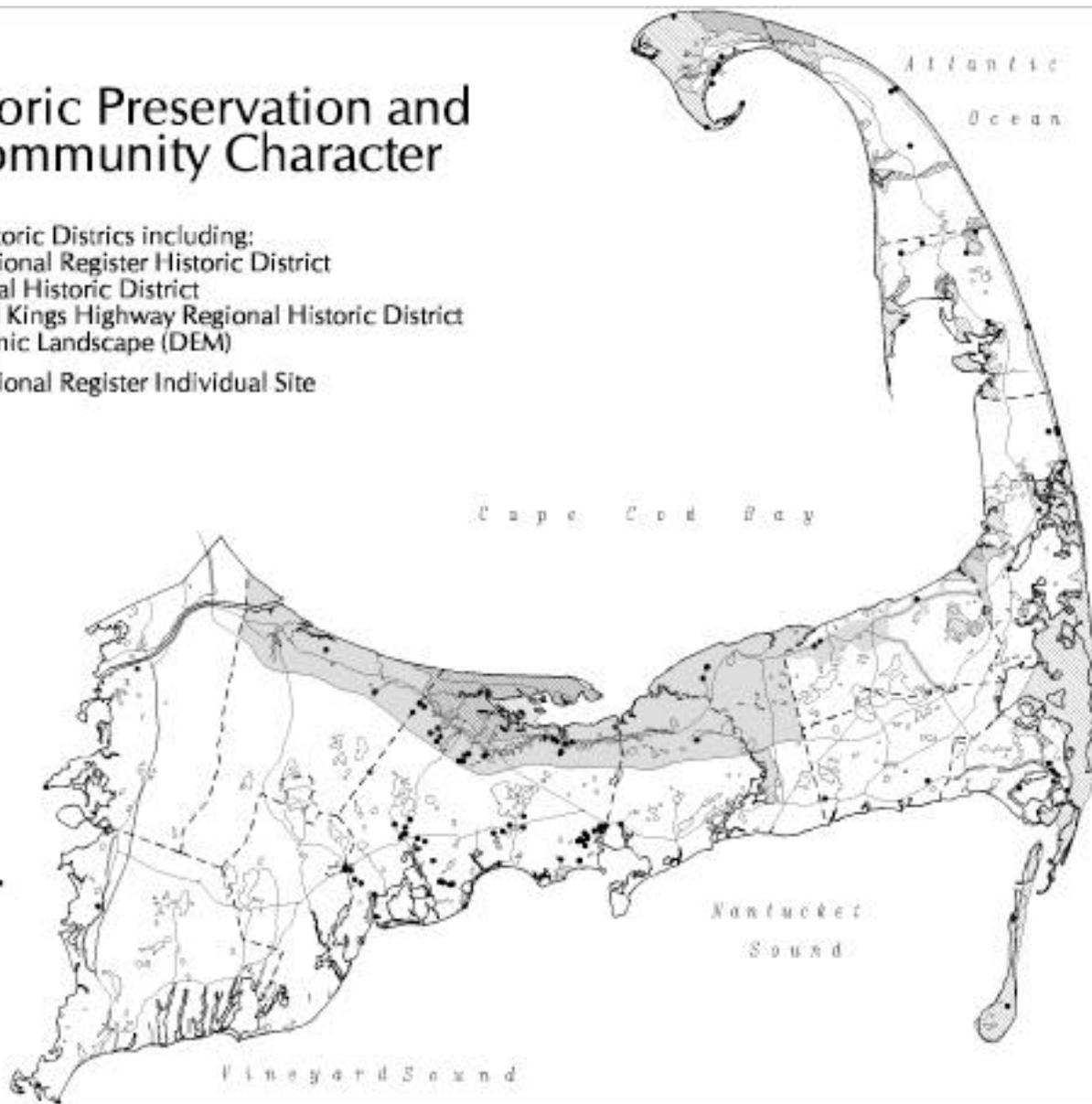


Cape Cod

Significant Natural Resource Areas

Historic Preservation and Community Character

- Historic Districts including:
 - National Register Historic District
 - Local Historic District
 - Old Kings Highway Regional Historic District
- Scenic Landscape (DEM)
- National Register Individual Site



4.3.2 - Scenic and Historic Concerns

The shaded area of Figure 2.6 shows the following historic features:

- National Register Historic Districts
- Local Historic Districts
- Old Kings Highway Regional Historic District

The cross-hatched area shows Scenic Landscapes designated by the Massachusetts Department of Environmental Management. Sites on the National Register are also indicated.

Rural Roads Initiative

Cape Cod Commission, together with the Martha's Vineyard Commission, the Nantucket Planning & Economic Development Commission, and the Cape Cod National Seashore, have received federal TEA-21 funding for the Cape & Islands Rural Roads Initiative. The Rural Roads Initiative is a study of design guidelines for public road construction and/or reconstruction projects, including recommendations for traffic controls, which meet standards for public safety while preserving the unique quality of rural roadways.

4.3.3 - Energy Use and Conservation

The 1997 Economic Census of Retail trade shows that gasoline service stations in Barnstable County had sales over \$171 million. This corresponds to 4.5% of the statewide total of \$3.8 billion.



4.4 - Demand for Travel

Travel on Cape Cod has two main components, year-round and seasonal:

Year-Round Travel:

Like most regions, there is travel by year-round residents to and from work and for shopping and social trips. As the Cape's year-round population continues to increase, this component of travel on the Cape will increase as well. This travel is easier to understand and analyze, since it represents travel for specific purposes and at fairly regular intervals.

Seasonal Travel:

A second, and significant, amount of travel, is created by tourists and part-time residents. This travel is often to recreational areas such as beaches, although some of it is also spent on trips to and from shopping, social events, and work. Although most of this travel used to occur in the summer, in recent years it has also been increasing in the “shoulder seasons” of the spring and fall. In the past 23 years, the number of trips across the Canal bridges in these shoulder seasons has increased by 52 percent, as opposed to a 46 percent increase in the peak summer months, likely reflecting the travel trends of tourists and part-year residents. As seen in Figure 2.7, 1999 average daily traffic across the bridges exceeded the level experienced in July 1987.

4.4.1 - Methodology and Assumptions

Understanding and predicting demand for travel on Cape Cod is not easy. Unlike many other regions, many of the trips are not to work or shopping, but instead travel for travel’s sake. There are no easy methods to predict the number of “scenic drives” that people may be making.

However, by integrating traditional travel demand forecasting with some adaptations for seasonal travel we are able to make some observations about current demand and predicted demand for the future. It should be noted up front, however, that like most travel demand models, ours is not



able to study the effects on land use that transportation improvements create. For this reason, our analysis in this section is limited to a study of future travel demand on our *current* road system.

Transit, bicycling and walking are feasible options to automobile travel in many instances on Cape Cod, particularly in the densely developed sections along the south shore of the Cape. However, most of the observations in this section are of demand for automotive travel, whether single occupant vehicles, carpools, or freight transport, since the roadway system is currently under far more stress than these other systems. This does not mean that they will not play a role in alleviating observed roadway congestion, however, as is discussed in the sections on proposed solutions to projected congestion.

4.4.2 - Current Conditions

At present, traffic on Cape Cod is mildly congested most of the year but experiences times of extreme congestion in the summer. Roads that experience year-round congestion during peak periods at present include:

- Route 28 from the Mashpee Rotary to West Main Street in Hyannis
- Route 28 from the Mashpee rotary to S. Yarmouth
- Route 132 from the Airport to Route 6

In addition, roads that experience peak period summertime congestion include:

- Route 6 from Eastham to Wellfleet Center
- Route 6A in Brewster
- Route 28 west of downtown Chatham (Main Street)
- Route 6A in Yarmouthport
- Route 151 in Hatchville and Mashpee
- Route 132 from Route 6 to the Airport Rotary



- Willow Street/Yarmouth Road from Route 6 to Hyannis
- Route 6 from Exit 9 to Exit 11
- Sandwich Road along the Cape Cod Canal
- Main Street and South Street in downtown Hyannis

However, it should also be noted that, even in the summertime, the vast majority of roads on Cape Cod are *not* congested. Of the 850 miles of regional roadway modelled, the most heavily used roads on Cape Cod, over 90 percent are not congested during the summertime afternoon rush hour (see Figure 2.11). Of the remaining thousand miles of public roads on the Cape, few if any experience systemic congestion.

In addition, people are generally able to get where they want fairly quickly at present, even in the summer. The average travel speed at rush hour at present is 26 miles per hour. This speed allows the average traveller to get to her or his destination in just over 15 minutes.

Ferry service to Martha's Vineyard and Nantucket attracts a large number of passengers and automobiles, particularly in the summer. In 1994 there were over 2.5 million passengers on Steamship Authority ferries alone, of which an estimated 450,000 travelled in August (see Figure 2.12). Over 500,000 cars and trucks travelled in that time period. In addition, an estimated 750,000 passengers used other ferry services.

Daily "auto equivalents" (1 truck = 2 autos) are expected to increase between Martha's Vineyard and the Cape from 1,895 in 1995 to 2,920 in the year 2020. Auto equivalent traffic between Nantucket and the Cape is expected to increase from 580 to 990 during the same period.

Air service has attracted a small but significant percentage of travel to and from Cape Cod. In 1999, 428,967 passengers went through Barnstable Municipal Airport, and 16,818 went through



Provincetown Airport in 1998.

4.4.3 - Future Scenarios

If present growth trends continue unabated, demand for travel on Cape Cod is projected to increase significantly between now and 2020, particularly in the summer months. Between 1996 and 2020, summer daily vehicle miles travelled are projected to increase from 6.3 million to 8.1 million, (see Table 2.1). In that same time period, summer peak hour average speeds are projected to decrease from 26 miles per hour to 20 miles per hour (see Figure 2.13). At the same time, summer peak hour average trip lengths are estimated to increase from 7.27 miles to 7.54 miles. In short, in the future, summer travel will take longer and be slower than at present; the average trip time will increase from 16 minutes to 22 minutes.

Table 4.1 - Vehicular Travel on Cape Cod

<u>Year</u>	Summer P.M. Peak Hour Average	
	<u>VMT</u>	<u>Trips</u>
1997	572,203	75,525
2003	603,150	78,356
2010	628,439	81,077
2020	664,567	84,964
2025	682,631	86,908

In the same time period, winter travel will also increase, but not as sharply. From 1996 to 2020, winter daily vehicle miles are projected to increase from 3.9 million miles to 5.1 million miles. Winter peak hour average speeds will decrease from 31.7 miles per hour to 28.5 miles per hour.



Similar trends are predicted in ferry travel from Cape Cod to the Islands. For example, annual passenger trips to Martha's Vineyard on the Steamship Authority are projected to increase 43 percent by 2005, from 2.1 million to 3.0 million. Annual auto trips are projected to increase by 24 percent in the same period, from 368,000 to 455,000. This increase will also have an effect on the roadways of Cape Cod.

Figures 4.3 through 4.14 show which roads on Cape Cod experience average daily Summer afternoon peak hour congestion in 1997 and the forecast for 2025 if no travel demand management strategies, roadway improvements or additional land conservation measures are implemented. These forecasts project that the congested areas listed above will become more congested. In addition, the following roadways will begin to experience winter peak hour congestion:

- Route 130 from Route 6A to the Mashpee town line in Sandwich
- Route 6A in Brewster
- Route 6 from Exit 9 to Exit 10 in Dennis and Harwich

Also, the following roadways will begin to experience summer peak hour congestion:

- Route 6 in Wellfleet and Truro
- Route 6 from Exit 11 to the Orleans Rotary
- Route 6A in Sandwich
- Route 28 in Falmouth
- Bearses Way in Hyannis

In short, certain specific roadway segments are projected to reach capacity in the next 25 years.

Of course, we do have congestion problems that need to be addressed. However, in proposing



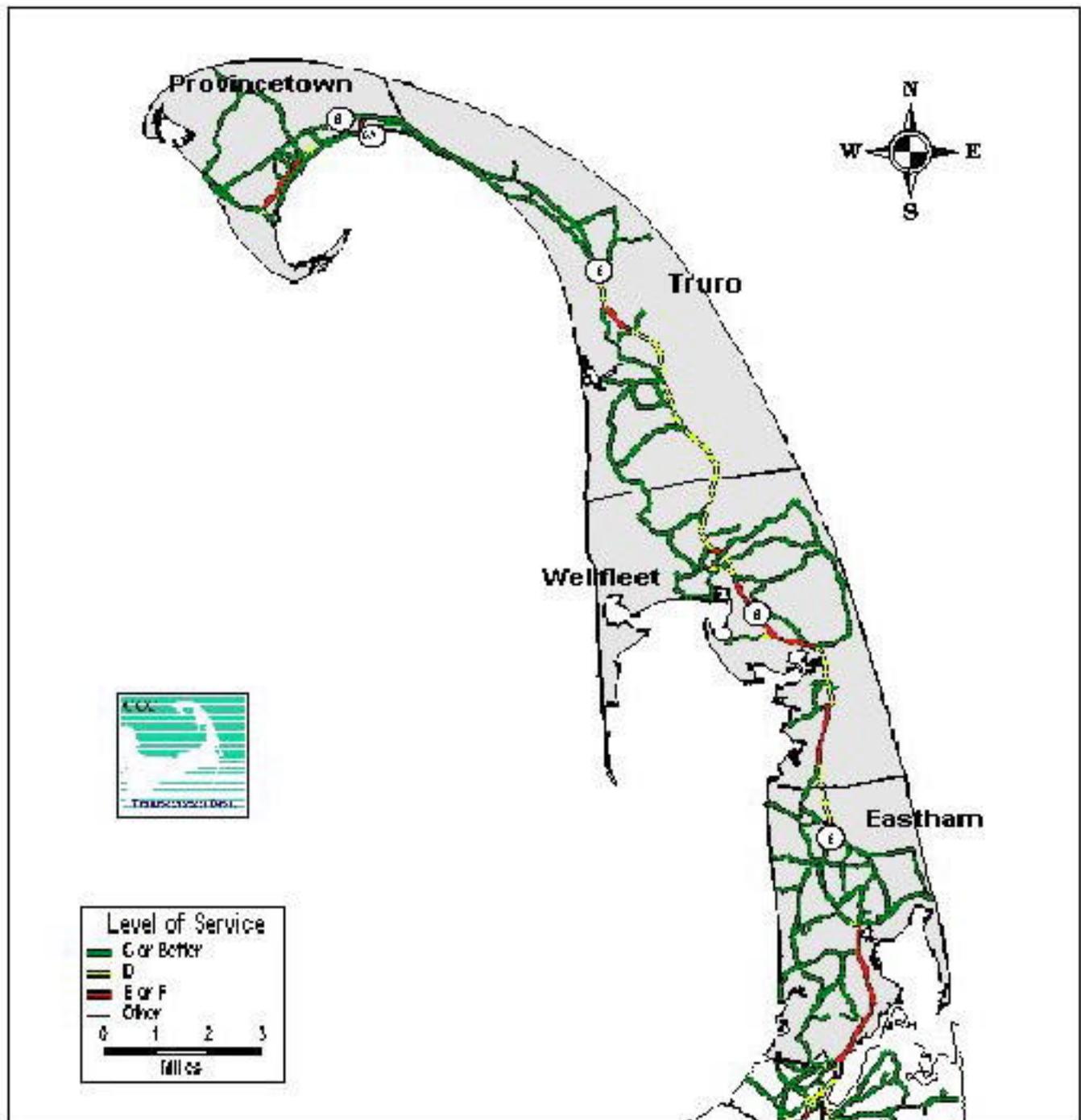
solutions we need to ensure that they truly are solutions and not simply temporary "band-aid" fixes. For example, when a road corridor is congested, often the solution proposed is to widen the roadway to the point where its design capacity is able to bear projected volumes. Sometimes this is the best solution. Often, however, increasing roadway capacity is only a temporary solution to the congestion problem. Many times increasing the capacity of a road will simply attract more travel that would not have otherwise occurred (or may have occurred at other times or using other modes).

In short, solutions to congestion are being carefully considered in order efficiently allocate public money. Public resources are too scarce to spend on solutions that will not be used or will not serve as actual solutions to identified congestion. In addition, the environmental and community character impacts of any proposal must be considered.



Roadway Level of Service Mapping Outer Cape Area

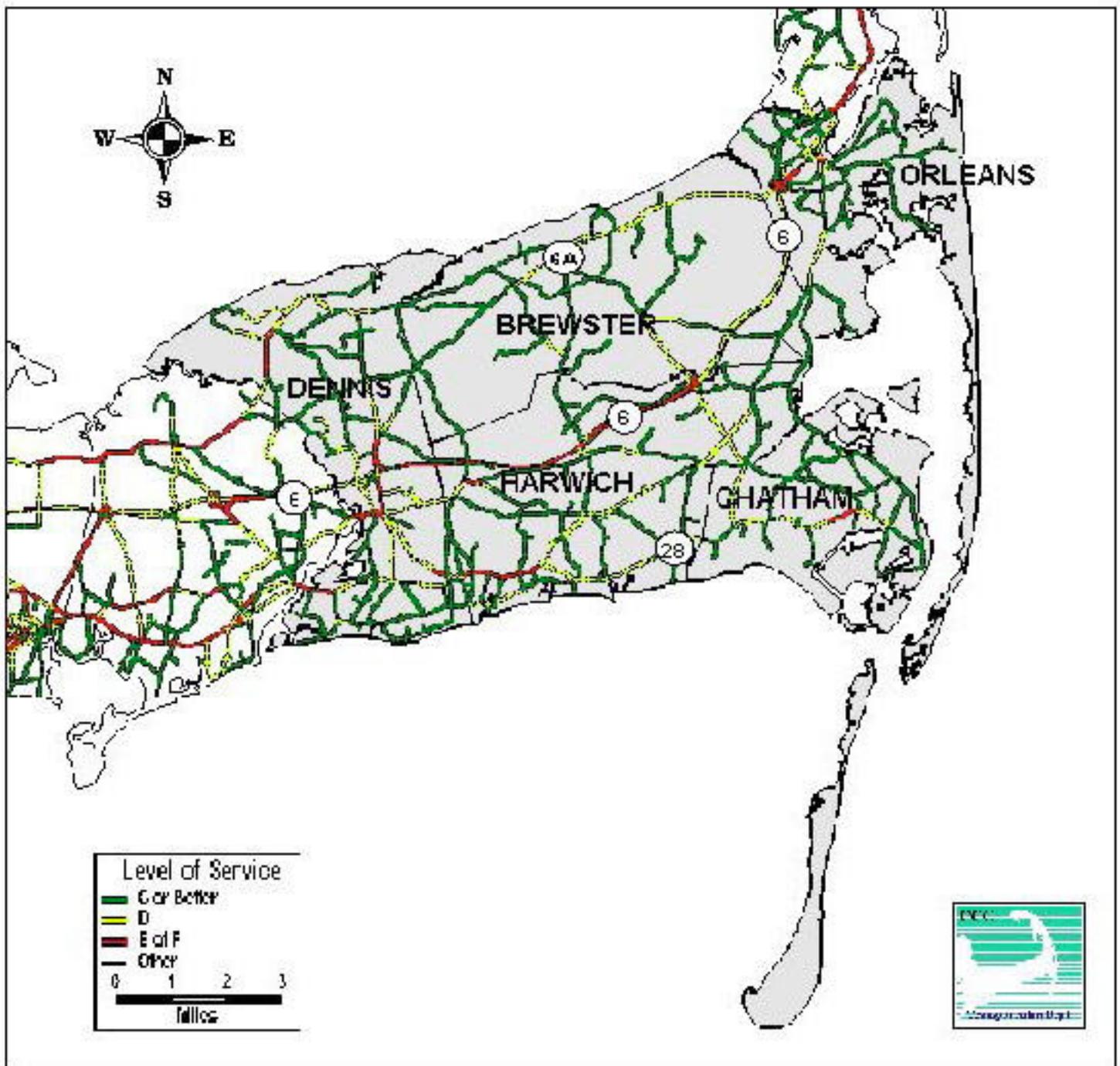
1997 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Lower Mid-Cape Area

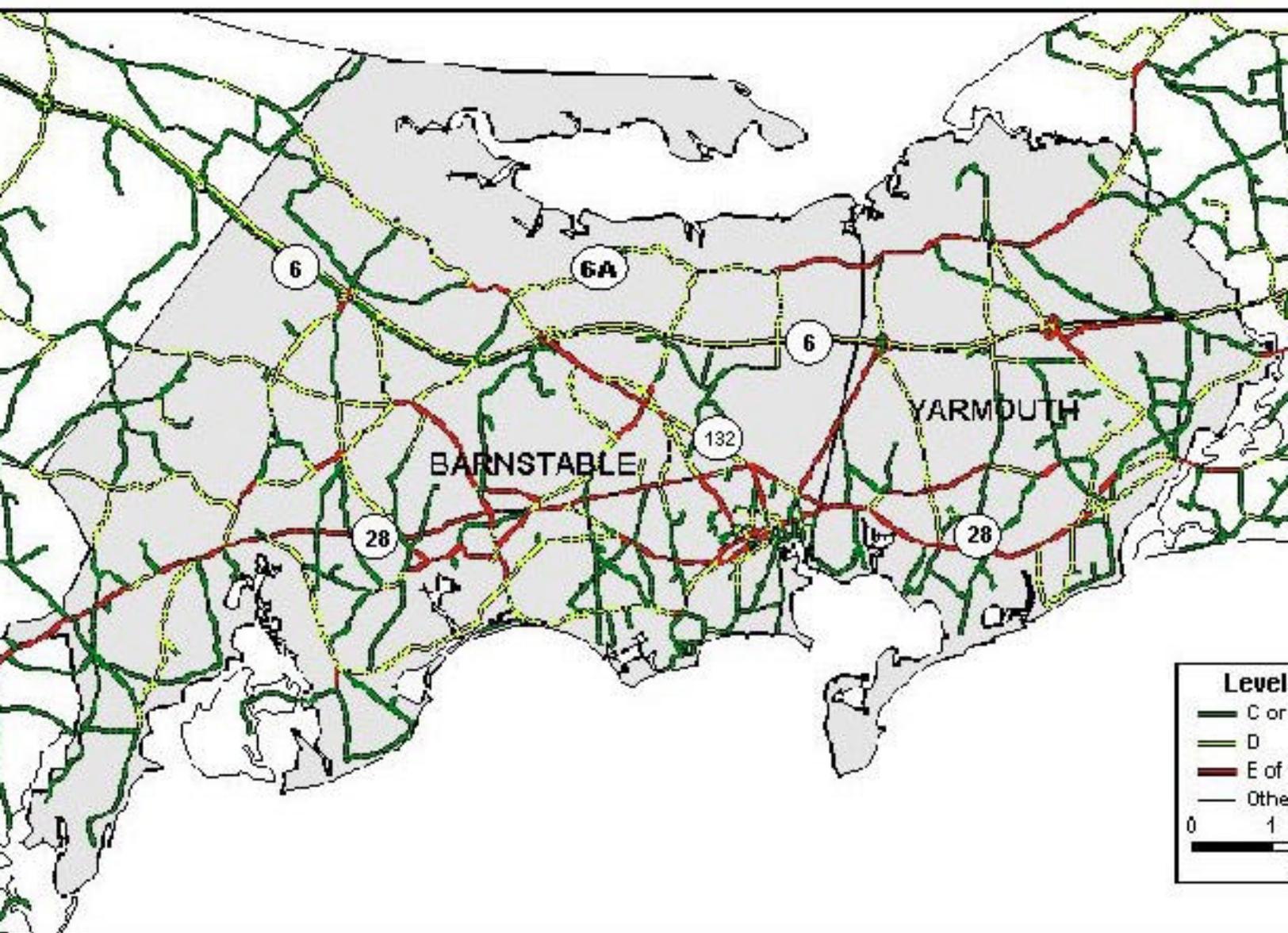
1997 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Barnstable - Yarmouth Area

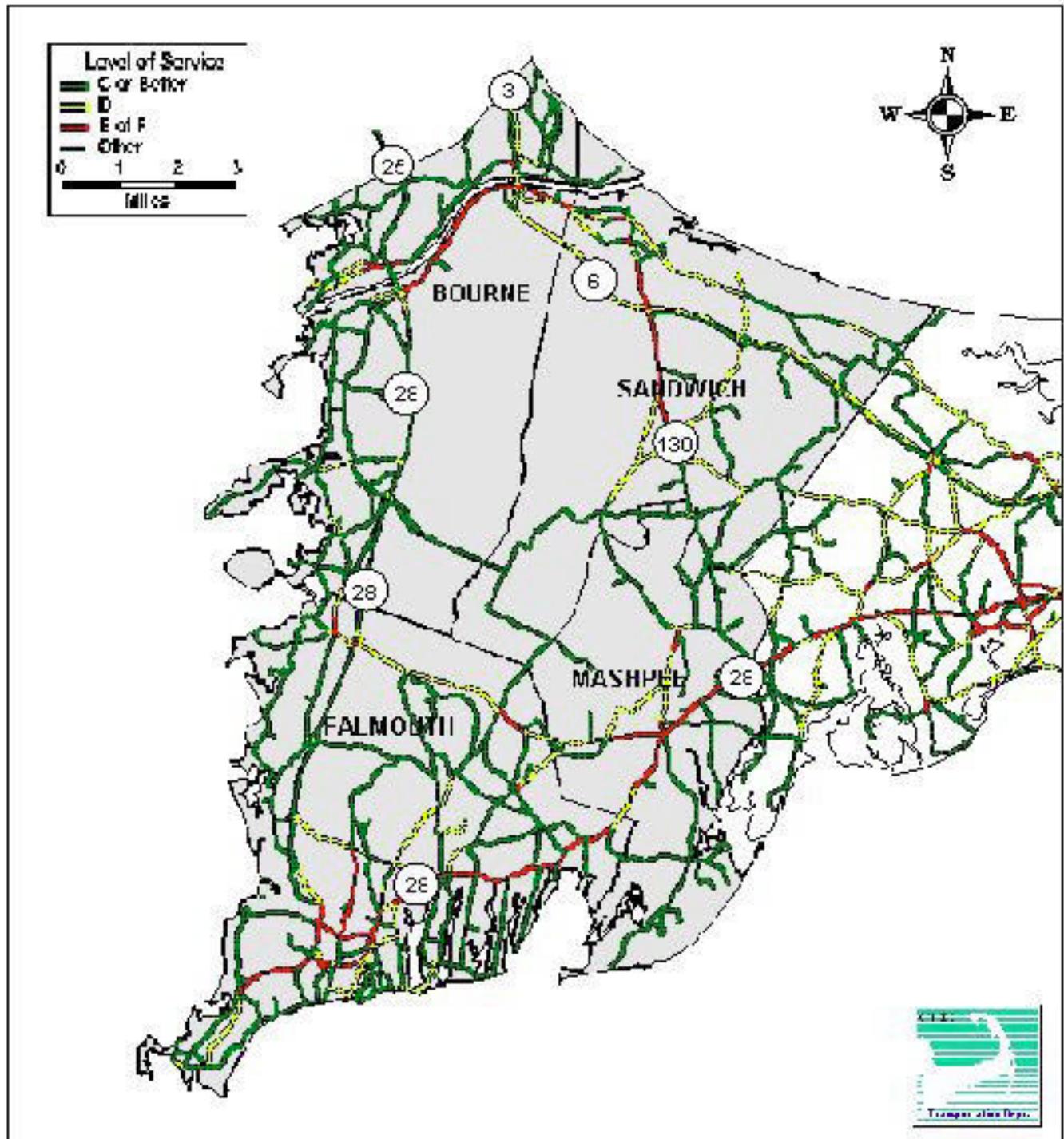
1997 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

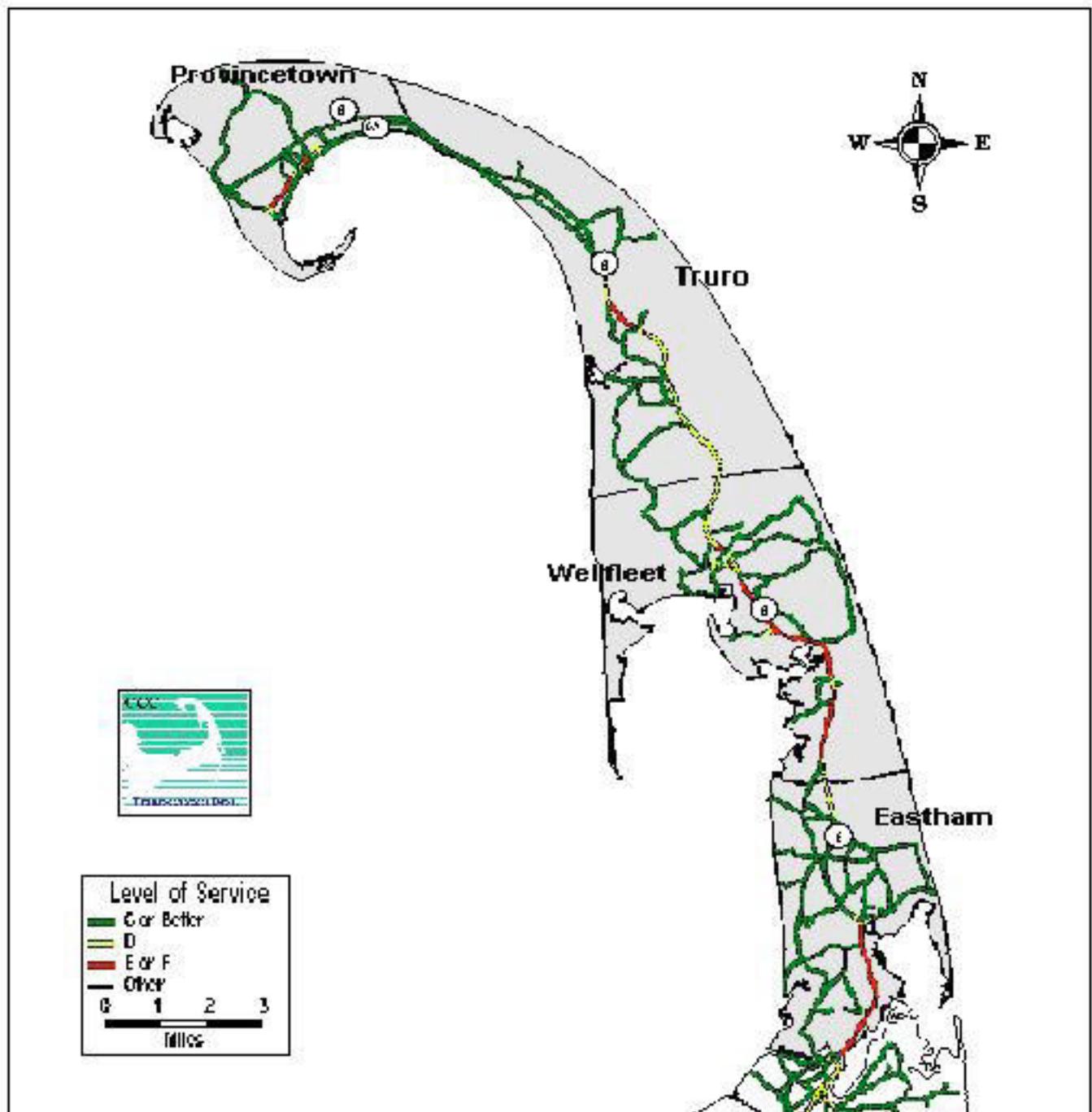
Upper Cape Area

1997 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping Outer Cape Area

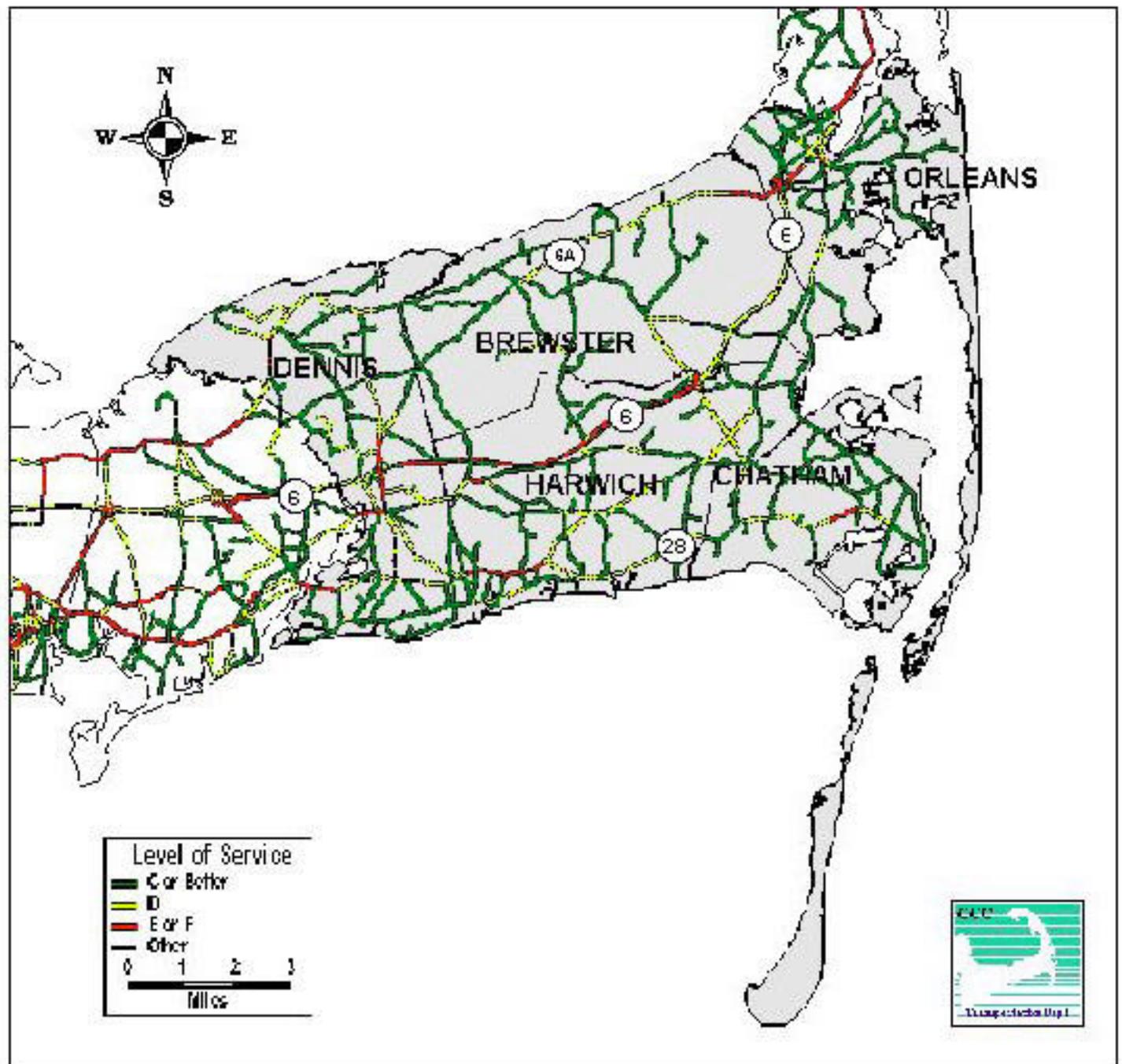
2003 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Lower Mid-Cape Area

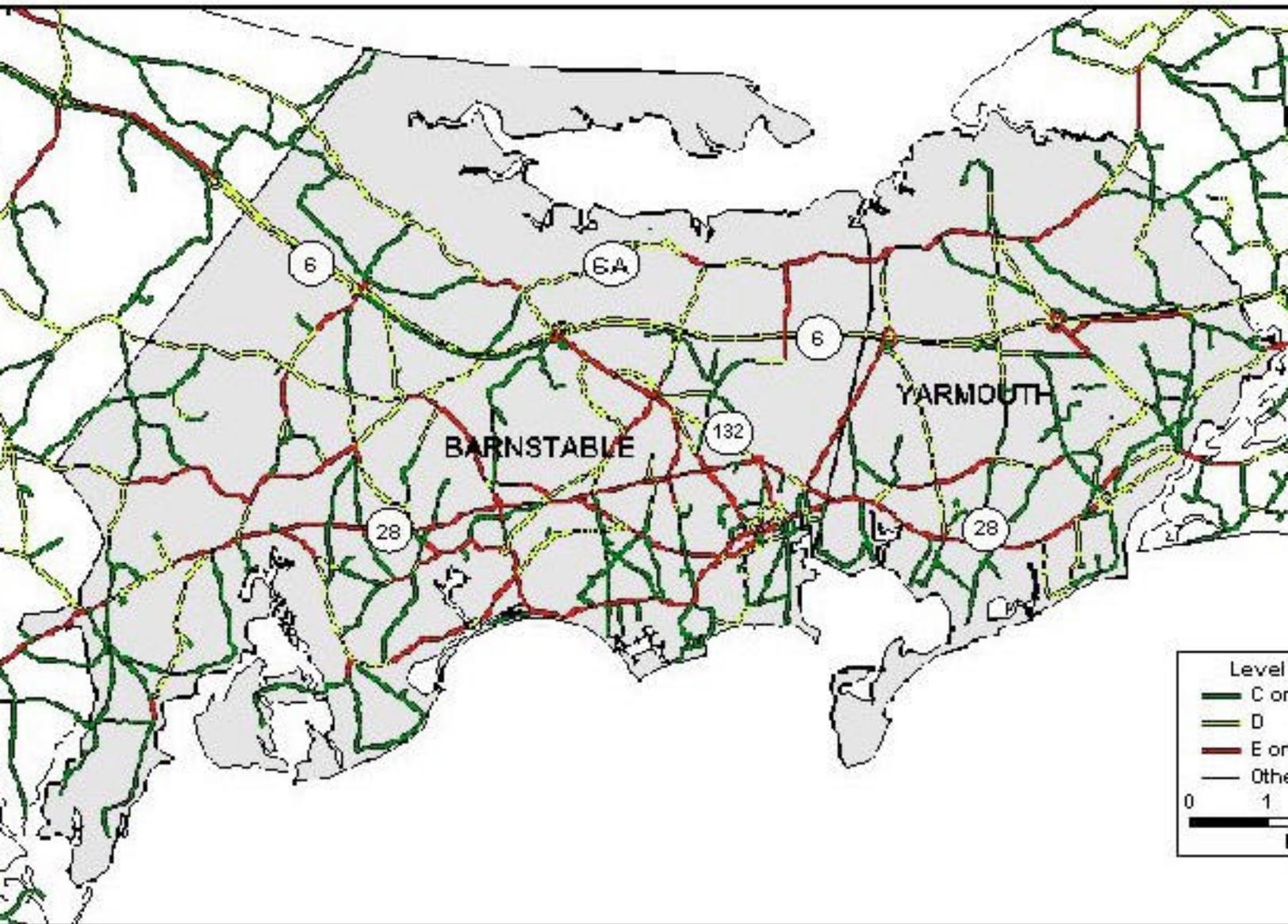
2003 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Barnstable - Yarmouth Area

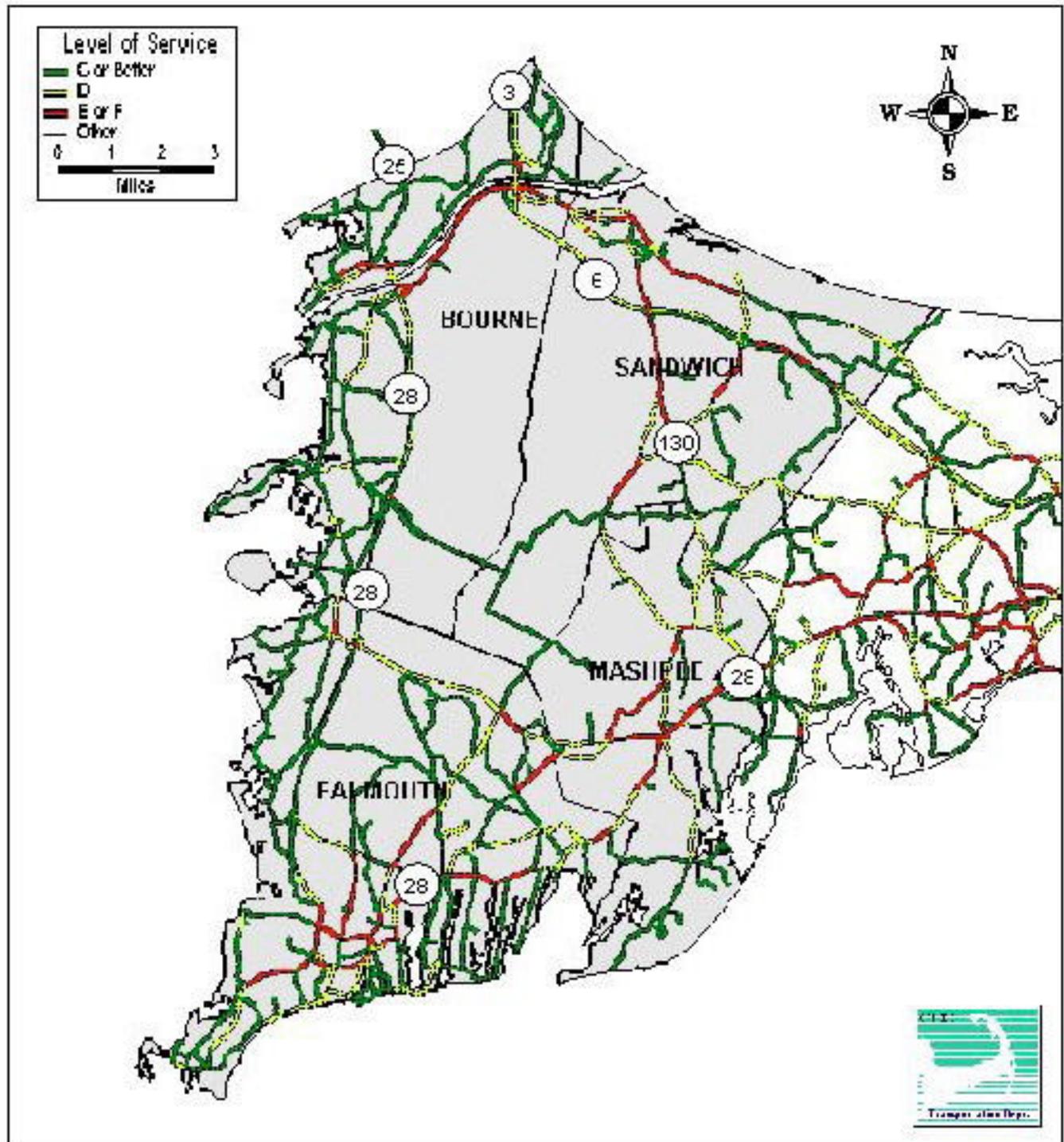
2003 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

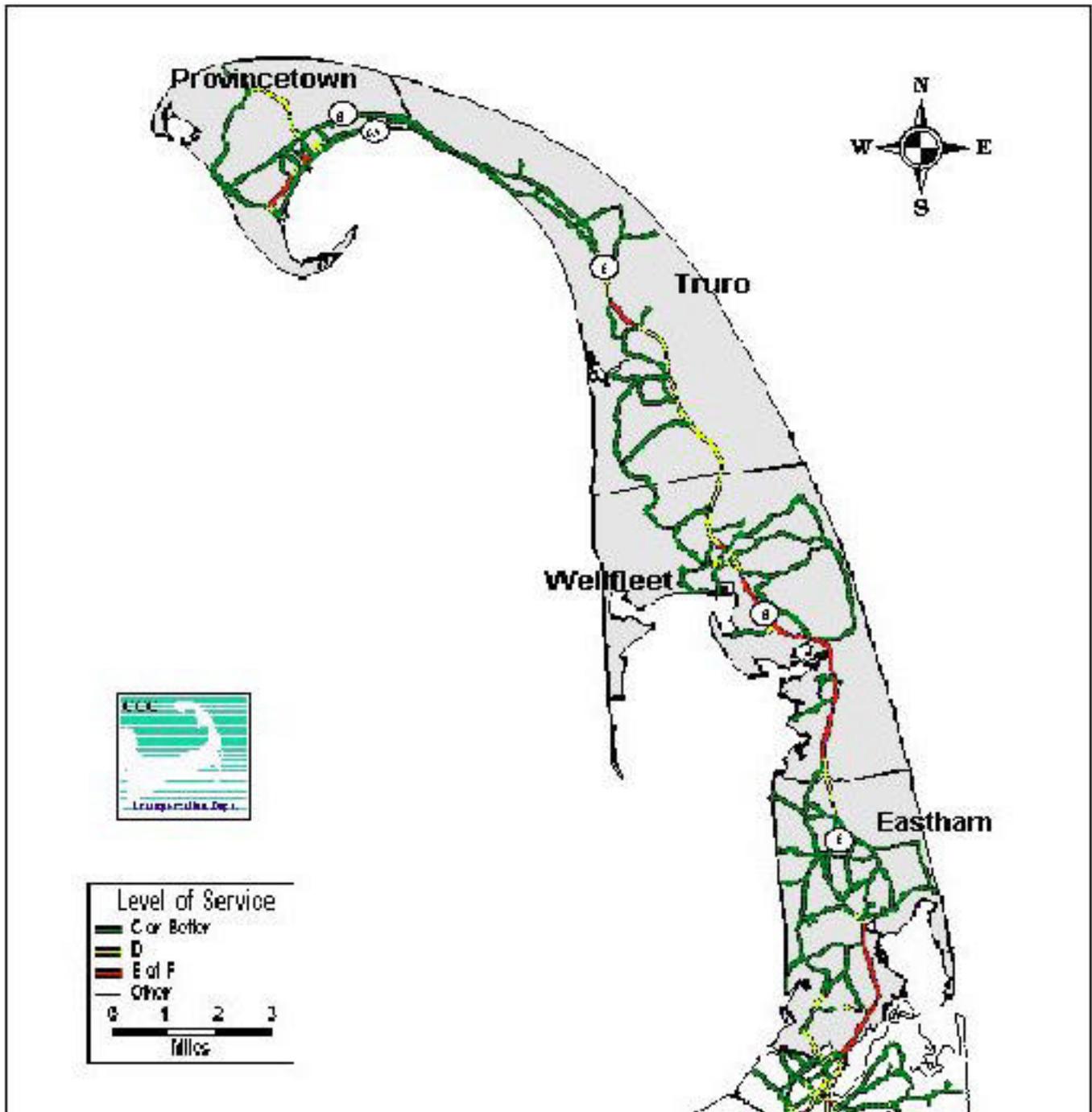
Upper Cape Area

2003 Summer Weekday P.M. Peak Hour



Roadway Level of Service Mapping Outer Cape Area

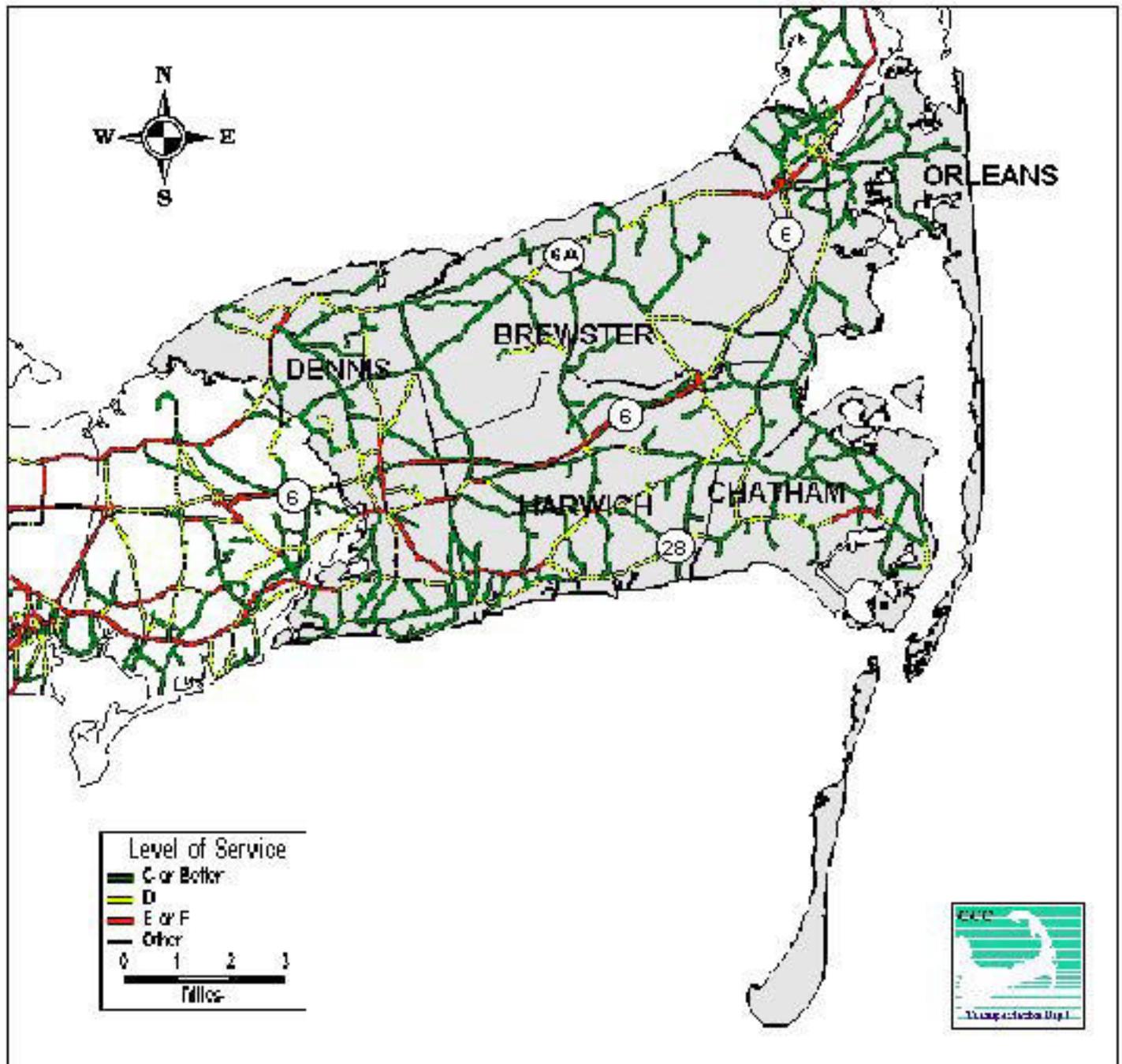
2025 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Lower Mid-Cape Area

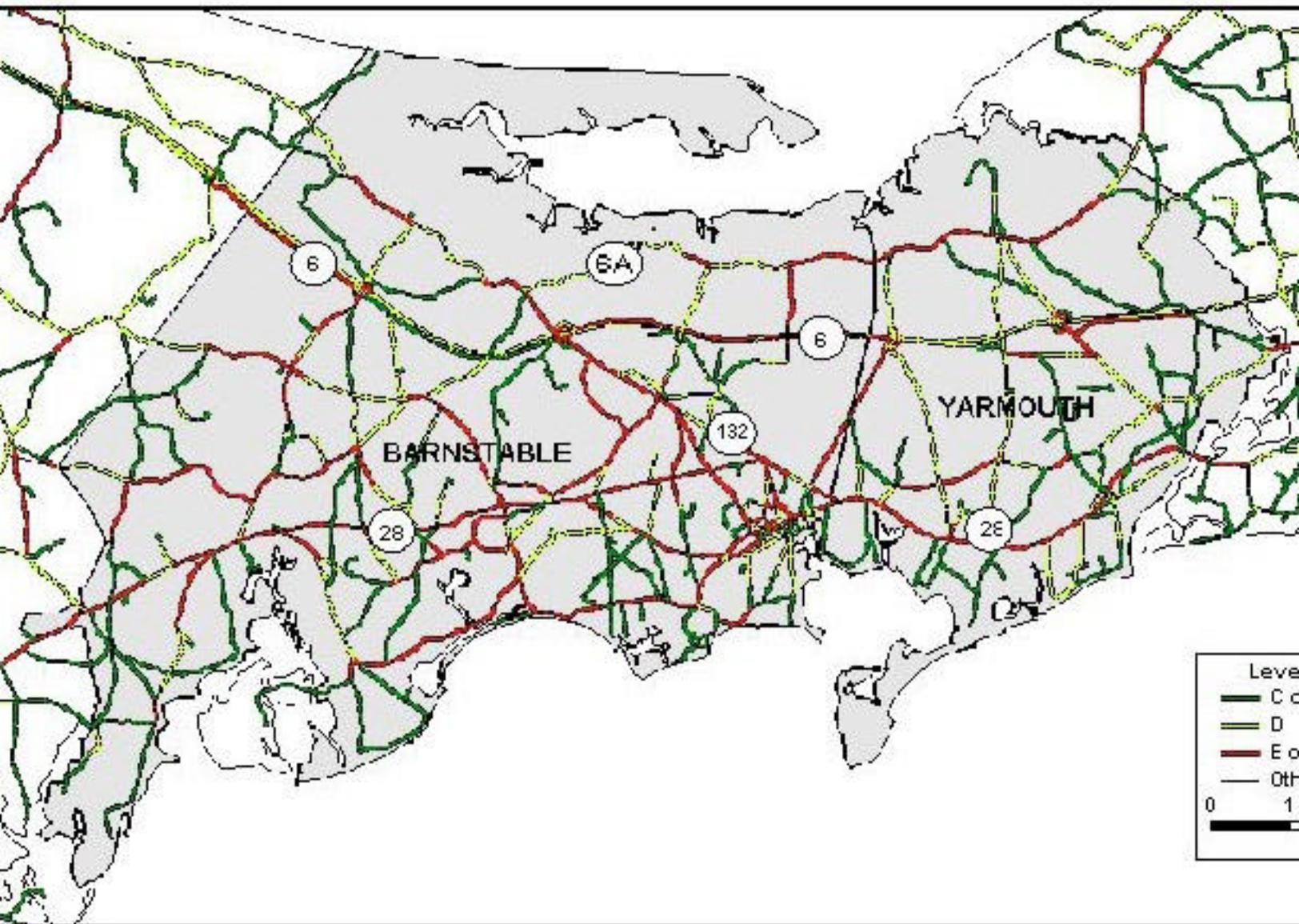
2025 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Barnstable - Yarmouth Area

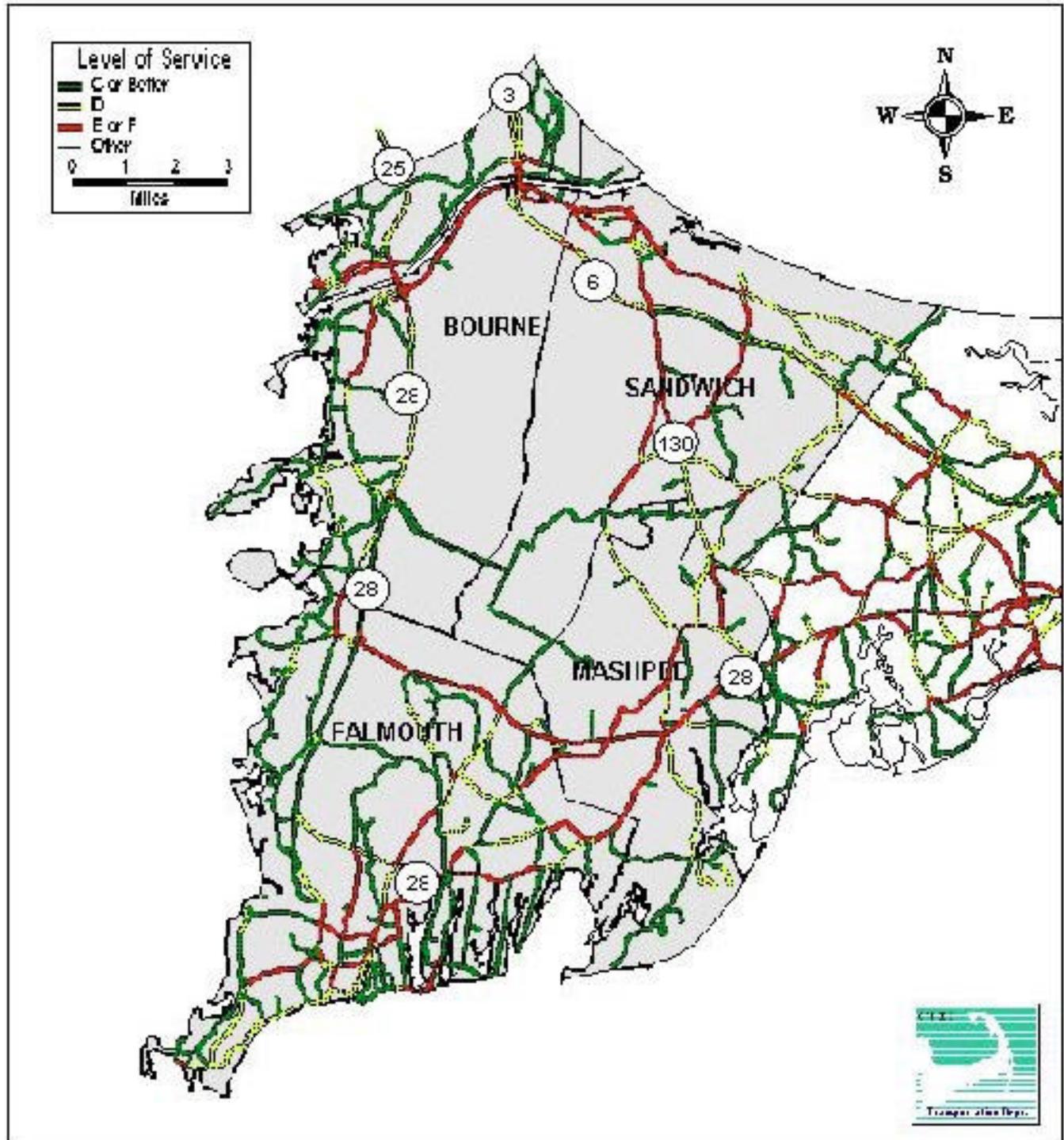
2025 Summer Weekday PM Peak Hour



Roadway Level of Service Mapping

Upper Cape Area

2025 Summer Weekday PM Peak Hour



4.5 - Future Funding Expectations

The regional transportation planning process is “fiscally constrained” which means it cannot propose projects unless we have identified funding to pay for them. Chapter 7 presents the expected funding available to the Cape Cod region over the next twenty-five years. The “fixed costs” such as the costs to maintain the existing roadways and bridges are also presented to develop the remaining funds that can be used for changes to the Cape’s transportation system.

The general trend in transportation is a reduction in the federal share that is available for new projects so “innovative strategies” for funding projects are also proposed in this section. One of the new proposed strategies in this plan update is exacting tolls from traffic crossing the Barnstable County line.



5 - Safety on Cape Cod Roads

This chapter includes descriptions of the seasonal and year-round issues affecting traffic safety including a description of the Cape demographics and some information about how they will change over time.

5.1 - The Cape Cod Driver - Introduction

Chapter 4 included a detailed discussion of the demographics of Cape Cod. The demographics depict a typical year round resident that is older than the rest of the population in the United States and is getting older. Older drivers require special considerations and with the trend toward an older population in America this has been recognized by the Federal Highway Administration through the publication of several recent documents and a special address to Congress by the National Highway Traffic and Safety Administration (NHTSA). The focus in both cases was on the behavior of older drivers with respect to the “typical” driver. The NHTSA Address also included issues related to younger drivers. Recommended guidelines for design standards that will help accommodate the needs of an older driver are also included in the literature.

The other dimension in defining the unique character of the Cape Cod driver is the seasonal driver. The Cape is flooded with drivers from other places that are not familiar with the Cape roads. Visitors to the Cape by car that cross the Cape Cod Canal are welcomed to the Cape by a roadway feature that many drivers are unfamiliar with, a rotary. Drivers that are used to city streets or parkways are also subjected to the scenic rural roads that are a significant part of the Cape character and their physical nature may be somewhat unfamiliar to drivers from off-Cape.



Among the drivers that flock to the Cape in the Summer are a large number of young drivers with less experience in familiar surroundings, much less in the Cape driving environment. This coupled with a holiday attitude requires more considerations for roadway design and planning. These considerations must also be balanced with the qualities that bring people to Cape Cod.

5.1.1 - The Senior Driver

A relatively large and increasing percentage of Cape drivers are 65 and older. This steadily increasing proportion of drivers will experience declining vision, slowed decision making and reaction times, exaggerated difficulty in dividing attention between potential conflicts and traffic information, and reductions in strength, flexibility and overall fitness. These diminished faculties will, in many cases, overcome the increased experience the older driver has in operating an automobile. The large majority of drivers who suffer from these diminished faculties are not aware that the problem exists and an educational process needs to be implemented.

The overwhelming majority of Cape intersections are at grade. Based on FHWA crash statistics, for drivers 80 years and over, more than 50% of fatal crashes occur at intersections, compared with 24% or less for drivers up to 50. Many studies reinforce dramatic increases in intersection crashes as driver age increases.

Typical at-grade intersection difficulties identified, based on observation, for older drivers include:

- Left Turns - from lack of sufficient caution and poor positioning on the road during the turn.
- Stopping - Failure to stop, failure to make complete stops at stop signs, and stops that were jerky or abrupt.



Comparisons of subjective surveys of drivers aged 66-68 verses those aged 77 and older showed the older group had more difficulty following pavement markings, finding the beginning of left hand turn lanes, and driving across intersections. Another study of older drivers indicated that the most challenging aspect of intersection negotiation is making left turns during the green, left turn permitted signal phase. The protected “green arrow” left hand turn has been identified as an important improvement for older drivers.

Night time driving is associated with a higher crash risk for all drivers, however the effects of aging on sight are particularly compounded by the effects of darkness. The aging process causes gradual declines in a variety of ways; acuity, contrast sensitivity, glare recovery, and peripheral vision. These declining functions make night driving particularly difficult for older drivers. The ability to notice and recognize objects at night and in low-light conditions such as dawn, dusk, rain, fog, haze and snow is a chief concern. Studies show that between age 20 and age 70, aging reduces contrast sensitivity by a factor of 3.0 placing the typical older driver at a relative disadvantage in low light conditions.

Studies of night time recognition of signs were conducted with age groups between 19 and 49 and with groups aged 65 to 80 were done to develop age related differences. As expected, the older drivers required significantly larger letters to read unfamiliar signs. Current sign standards are based on an assumed vision of 20/25 (as opposed to “perfect” 20/20 vision), the older driver test group required a standard of 20/46.

5.1.2 - Older Driver recommendations

Based on the issues associated with the older driving population on Cape Cod the following suggestions are recommended as considerations for Cape Cod roadway improvements. Many of these recommendations are from FHWA’s Older Driver Highway Design Handbook, January 1998 which should be consulted for more details. The Older Driver Handbook includes other



recommendations and guidelines that should be considered in Cape roadway design but their use should also be tempered with maintaining the character of Cape Cod's roadways.

Recommendations;

- Incorporate protected left turn phases into signalized intersections
- Maintain delineation more frequently through more frequent restriping and street cleaning
- Improve signage standards to include larger lettering
- Improve lighting level standards, in particular at intersections. Give consideration to placing utilities underground and installing breakaway safety poles for lighting.
- Consider "all red" phases for signalized intersections
- Establish driver education programs for older drivers

Mobility programs to provide options to driving also need to be improved. This was a major topic at Cape Cod's February 2000 Transit Summit. The recommendations from the Summit included a "dual challenge" of reducing auto dependency and meeting the needs of the transit dependant and those in need of human services. By improving mobility options, significant safety improvements may be realized. Currently a short term public transportation plan is being developed with an emphasis on human service needs.

5.1.3 - Young Drivers

Assessment of crash statistics indicate that younger driver (under age 25) problems exceed those of any other age group. On a per mile driven basis, older drivers (over 65) have a greater fatality rate than any other age group. But, by any other measure, young drivers outnumber, out travel, out crash, and die more frequently. There are slight differences between younger and older drivers in the types of crashes they experience. For example, young drivers have more speeding and alcohol related crashes. Younger driver crashes are frequently caused by inexperience, poor judgement and risk taking while older driver crashes are more often related to reduced physical



and cognitive capabilities.

Most crashes for all groups occur at intersections however young drivers show a greater tendency than other age groups to be involved in non-intersection crashes. NHTSA statistics show that drivers between 15 and 24 crash 43% of the time away from intersections while 41% between 25 and 64 and 31% between 65 and 74 of crashes are non-intersection crashes.

Younger drivers are more prone to risk taking behavior, and are subject to influences of youth culture and peer pressure. Many of these characteristics seem to be more evident in young visitors to Cape Cod.

5.1.4 - Younger Driver Recommendations

Recommendations to accommodate younger driver safety issues are divided between residents and visitors.

- Increased education for young drivers locally is recommended.
- Recommendations to accommodate safety issues related to young visitors are also generally beyond the scope of this plan and must be enforcement oriented.
- Develop and implement an advertising campaign and roadside signs stating that traffic and drunk driving laws are strictly enforced on Cape Cod

5.1.5 - Additional Recommendations

- Better signage for visitors directing them to popular destinations
- Signage explaining the rotary “rules of the road” and similar information to be included in visitor brochures and Cape related websites such as ‘Go Cape Cod’



5.2 - The Cape Cod Roadway

The significant roadways on Cape Cod are included in the Cape Cod Regional Transportation Model. The average posted speed on the Cape is less than 40 mph and, on average, the roadways carry 175% more traffic in July and August than they do in January and February.

Of the 1665 centerline miles of roadways accounted for in the regional traffic model, 49 miles are considered Principal Arterials, 53 miles are considered minor arterials, and 52 miles of the roadway system are considered major collectors. The remaining 91% of Cape roadways are considered local or rural roads. Only 2.2% of the roads accounted for in the regional models have more than 1 lane in each direction.

The character of the rural roads include narrow lanes and a typical speed limit of 35 MPH. Most roads do not have shoulders and bicycles must often share the lanes with motorists. Many of the older roads evolved from Indian trails and stage coach routes so the roadway geometrics are less accommodating than those designed to current state and federal standards. It is one of the fundamental goals of this long range transportation plan to preserve the scenic and rural character of the Cape's narrow, winding roads. Maintaining the rural character of Cape Cod's scenic roadways must be accompanied by a program of enforcement and education especially for the drivers that visit the Cape in the Summer.

Figure 5.1, based on NHTSA statistics, indicates 48.39 % of fatal crashes in Barnstable County occur in areas where the posted speed is between 35 and 40 MPH. But this must be tempered by the fact that 88% of the roadways on Cape Cod are posted at either 35 MPH or 40 MPH. Other speed limits include 9% posted at 30 MPH or less, 1% posted at 45 or 50, and 2% posted at 55.



	<u>Crashes per million miles</u>	<u>Fatal Crashes per 100 million miles</u>
Bourne	1.99	1.34
Sandwich	0.24	0.14
Barnstable	0.51	0.00
Yarmouth	0.85	0.00
Dennis	1.74	0.00
Harwich	0.44	0.70
Brewster	0.34	0.00
Orleans	0.54	1.75
Eastham	1.87	1.70
Wellfleet	0.68	0.54
Truro	0.34	0.53
Provincetown	0.54	0.00
Route 6	0.79	0.49

Table 5.2 - Crash Records (based on years '97, '98, '99): Route 6A

	<u>AADT</u>	<u>Miles</u>	<u>Crashes</u>			<u>Fatal</u>		
			<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Bourne	12,604	0.6	30	31	17	0	0	0
Sandwich	8,957	7.5	63	52	40	0	0	0
Barnstable	7,385	8.4	22	18	19	0	0	0
Yarmouth	12,722	3.7	71	62	61	0	0	0
Dennis	10,860	4.3	49	45	54	0	0	0
Brewster	10,782	7.8	85	89	105	0	0	0
Orleans	12,343	1.7	98	68	70	0	0	0
Route 6A	335,632 (VMT)							



	<u>Crashes per million miles</u>	<u>Fatal Crashes per 100 million miles</u>
Bourne	9.42	0.00
Sandwich	2.11	0.00
Barnstable	0.87	0.00
Yarmouth	3.76	0.00
Dennis	2.89	0.00
Brewster	3.03	0.00
Orleans	10.27	0.00
Route 6A	3.13	0.00

Table 5.3 - Crash Records (based on years '97, '98, '99): Route 28

	<u>AADT</u>	<u>Miles</u>	<u>Crashes</u>			<u>Fatal</u>		
			<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>
Bourne	35,190	8.7	175	185	197	0	1	0
Falmouth	15,958	14.6	278	244	222	1	1	1
Mashpee	17,915	3.7	68	81	92	0	0	0
Barnstable	19,858	10.4	211	232	205	2	0	1
Yarmouth	29,081	5.2	254	224	249	2	0	0
Dennis	15,111	3.4	66	73	61	0	1	0
Harwich	7,822	6.4	51	55	55	0	1	0
Chatham	15,420	7.3	102	189	176	0	0	0
Orleans	9,389	4.9	48	46	45	0	0	1

Route 28 **1,223,185 (VMT)**

	<u>Crashes per million miles</u>	<u>Fatal Crashes per 100 million miles</u>
Bourne	1.66	0.30
Falmouth	2.92	1.18
Mashpee	3.32	0.00
Barnstable	2.87	1.33
Yarmouth	4.39	1.21
Dennis	3.56	1.78
Harwich	2.94	1.82
Chatham	3.79	0.00
<u>Orleans</u>	<u>2.76</u>	<u>1.99</u>
Route 28	2.90	0.90



5.2.1 - Safety-Related Technology

With the advent of improved technology comes new options in enforcement of traffic laws. Studies undertaken by the Insurance Institute for Highway Safety and the Federal Highway Administration have favorable reviews of applications such as red-light enforcement and photo-radar. These techniques should be viewed in the context of education as well, since a goal is to improve safety by deterring unsafe driving. The greatest benefit of these techniques has been a “halo effect” whereby drivers are complying with traffic laws in un-monitored locations as well as those where the technology has been installed.

5.2.1.1 - Red Light Enforcement

Drivers who run red lights are responsible for 260,000 crashes each year - nationwide. Of these, approximately 750 are fatal. Motorists are more likely to be injured in crashes involving red light running than in other types of crashes; occupant injuries occurred in 45 percent of red light running crashes compared with 30 percent for other crash types.

Enforcing red light laws by traditional means poses special difficulties for police, who in most cases must follow a violating vehicle through a red light to stop it (endangering motorists and pedestrians as well as officers). Red light running violations decreased by as much as 60% at intersections where cameras automatically enforce the law.

In areas where red light cameras have been installed as well as areas without cameras, most drivers supported the use of red light cameras - 80 percent in cities with cameras and 76 percent in cities without.



5.2.1.2 - Photo Radar

Speeding poses problems for safety in the number of crashes and has the added effect of increasing severity. Effective speed enforcement using cameras connected to radar has benefits for safety as well as improving quality of life for residents. Photo Radar would complement Traffic Calming techniques (geometric changes to encourage safer travel speeds) by helping to identify aggressive and dangerous drivers.

5.2.2 - Recommendations

In the interest of preserving the character of Cape Cod and achieving safer roads, other methods of improving safety than traditional road-widening must be explored. The following recommendations for improving safety will not substantially change the character of the roadways on Cape Cod.

- Traffic Calming measures such as 4-way stop signs and roundabouts.
- Improved striping maintenance and use of more reflective treatments.
- Increase enforcement and police presence on rural roads such as 6A.
- Investigate photo enforcement of red light running and speeding.



6 - The Transportation Plan and Strategies

This chapter presents strategies to pursue for the 25 year horizon of this plan update. The strategies were developed through a variety of processes and sources. Many of the strategies were from previous plans and several other sources contributed to the following list. These sources included the public process for the development of this plan, the Transit Summit held in February 2000, and various studies done by the Cape Cod Commission in the past three years.

The most significant change in the strategies presented in this update is the focus on public transportation. This is in response to the efforts of the Cape Cod Regional Transit Authority (CCRTA) and the Cape's human service organizations to address the growing need for increased mobility options on Cape Cod. The other strategies that have been added are oriented toward preservation of the character of Cape Cod through design guidelines and access management.

The strategies are consistent with the five goals (described in Chapter 1 - and outlined in Table 6.1) adopted for this plan update and the projects included in the long range planning have been prioritized with respect to consistency with the goals as well as their support of individual strategies in addition to several other criteria.



Table 6.1 - Regional Transportation Plan Goals

1	The “Right” Transportation System	Goal: To establish and maintain a transportation system on Cape Cod for present and future year-round and seasonal needs which is safe, convenient, accessible, economical and consistent with the Cape’s historic, scenic and natural resources.
2	Modes and Roads	Goal: To reduce dependence on private automobiles by developing and integrating alternate modes (e.g., rail, bus, ferry, air, bicycle and pedestrian) into the transportation system and by promoting substitutes for transportation such as telecommunications.
3	Land Use Causes Transportation Causes Land Use	Goal: To support transportation solutions which preserve and enhance Cape Cod’s character by considering the interrelationship between changes in transportation capacity and changes in land use.
4	Traveling Smarter	Goal: To promote an information-based consumer-oriented transportation system that encourages travelers to use the most environmentally sensitive and efficient means of travel.
5	Working Together	Goal: To promote cooperation among the various transportation agencies which have responsibility for the Cape’s transportation system.

This report describes how all this will be paid for in the next chapter and limits the planned projects to the known funding sources. The Federal funding process known as the Transportation Improvement Program can only cover a portion. Towns will need to coordinate with their Local Comprehensive Plans, the Cape Cod Commission may need to adopt an impact fee system, and “Districts of Critical Planning Concern” - or similar mechanisms - will need to be designated to protect transportation capacity. The Regional Transportation Plan is a natural companion of the Cape Cod Commission and other agencies’ regulatory functions. Transportation decisions would support Land Use decisions and vice versa - as intended in Goal #3. Regional revenue sources need to be identified and one of the identified studies includes investigation of funding options.



One initiative from the 1997 Plan was to consider “Congestion Pricing” for the Canal bridges. This strategy has been included in this plan in a modified form; as cashless tolls at the County line. The strategy proposes off-peak discounts as a congestion pricing strategy.

6.1 - Public Transportation

Cape Cod is a challenging environment for public transportation due to the scattered nature of development. Outside of the relatively dense areas within the towns of Barnstable and Yarmouth, concentrations of jobs and housing that are important to the success of transit are rare.

Currently, transit is important to a small segment of the population of Cape Cod but it is expected to become a much more important element of transportation on Cape Cod over the next 25 years. One segment of the existing transit demand is the elderly. When the population ages on Cape Cod as described earlier, more people will be unable to drive and will become more transit dependant. Congestion levels on the Cape will demand higher occupancy concepts such as transit to help ease the burden on our roadways. The Goals and Objectives for this plan will depend on transit to accomplish the overall strategies that are proposed.

Strategies for transit include:

- Build the Hyannis intermodal center and seek other similar facilities elsewhere on Cape Cod to establish nodes where various independent public transportation modes can interface.
- Increase funding to improve public transportation on Cape Cod
- Address the human service needs for improved transportation.
 - Seasonal and year-round
 - Single or no-vehicle households



- Elderly/children/non-driving population
- People with disabilities
- Medical, work, shopping and recreational trips
- Improve intra- and inter-town coordination of services.
- Seek ways of providing public transportation advantages over the automobile such as high occupancy vehicle (HOV) facilities, remote parking lots with free or reduced cost parking, and employer incentives. HOV facilities should be considered along the railroad right of way in Falmouth, the existing rights of way for additional lanes for Route 28 and Route 6, and using existing roadways and/or property available on the MMR.
- Continue the process of monitoring ridership and improving the CCRTA routes and schedules to adapt to changing needs.
- Develop cost/benefit criteria for implementation of new transit service and maintenance of existing routes.
- Improve the appeal of transit by providing passenger amenities such as benches, shelters, information kiosks, improve on-time performance and service frequency.
- Continue the process for increasing awareness of public transportation on Cape Cod through various media including the internet.
- Improve connections with alternative modes to Cape access and improve mobility options for visitors to promote a “car free” Cape Cod vacation.
- Consider further uses for existing railroad rights of way such as self propelled rail trolleys such as diesel multiple units (DMUs), local service by the Cape Cod Central Railroad, and visitor oriented service from Boston to Buzzards Bay
- Encourage more intercity bus service to destinations such as T.F. Green Airport, Boston, Providence R.I., and more attractive services to bring visitors to the Cape without their automobiles.
- Encourage better utilization of the Barnstable Municipal Airport including air traffic and access improvements.



- Encourage private transportation providers to accept bicycles with no additional fee.

6.1.1 - Ferry Strategies

- Encourage establishment of more freight and high-speed passenger service between the Islands and off-Cape locations.
- Improve the viability of existing off-Cape freight service by increasing frequency of service, making schedules more convenient, and offering pricing incentives, if needed.
- Develop and promote congestion relief projects for Steamship Authority service from Woods Hole and Hyannis such as remote and off-Cape parking supported by shuttles and shuttle connections with mass transit providers, off-Cape passenger ferry services, and intelligent transportation solutions.
- Develop more facilities for water transportation and encourage more ferry service to Cape Cod as well as the establishment of water taxis in areas not currently served.
- Encourage limitations on ferry service and parking for Woods Hole and Hyannis that would respect the initiatives to hold service to 1997 levels.

6.2 - Roadway Strategies

Several studies related to Cape Cod's highways have been started or completed since the 1997 Regional Transportation Plan. These studies have become the basis of policy decisions with regard to Cape roads and many of the following strategies are expected to be included in the next update of the Regional Policy Plan.

6.2.1 - Rural Roads Initiative

Preserving the character of Cape Cod is the cornerstone of the Regional Transportation Plan strategy as well as for the Regional Policy Plan. Cape Cod Commission, together with the



Martha's Vineyard Commission, the Nantucket Planning & Economic Development Commission, and the Cape Cod National Seashore, have received federal TEA-21 funding for the Cape & Islands Rural Roads Initiative. The Rural Roads Initiative (see Appendix) is a study of design guidelines for public road construction and/or reconstruction projects, including recommendations for traffic controls, which meet standards for public safety while preserving the unique quality of rural roadways. The initiative is a regional priority and is expected to be complete in 2002. Guidelines for development of roadway design are included here to encourage the early implementation of some of the intended features of the Rural Roads Initiative. With regard to state highways, the end result of the process will be guidelines that MassHighway will accept for Cape roads. Relevant signage guidelines will conform to the Manual of Uniform Traffic Control Devices (MUTCD).

Elements of the initiative are expected to encourage the following:

- Underground utilities and upgrade street lighting to include breakaway safety poles
- View/scenic enhancement through preservation of natural vegetation within the right-of-way and grading of side slopes
- Use of native materials and indigenous grasses and wildflowers
- Use of historic/architectural design elements
- Pedestrian and bicycle facilities
- Consideration of alternative guard rail materials such as wood and weathering steel
- Use of curb and closed drainage systems to eliminate roadside ditches
- Preservation of historic stone walls and tree lines
- Consideration of appropriate sign size and placement to prevent blocking of views and to minimize clutter.
- Consideration of the needs of public transit and intermodal connections such as bus stops, transfer locations, and park and ride lots.



The guidelines anticipated from the rural roads initiative will also discourage the following

- Unnecessary Roadway widening
- Additional traffic signals for private entrances
- Traffic signal installations using cable bridges to support signal heads
- Multiple access driveways

It is anticipated that the design guidelines would take into account current traffic volumes, future traffic volumes based on land use projections, and the functional class of the roadway. These would be considered when weighing the factors of the road's scenic, historic, and cultural values as part of a public participation process. In many cases, it is expected that other (non-automobile) transportation solutions would be required in order to preserve roadway character.

6.2.2 - Access Management

Recently a study of access management was undertaken for Route 6A as an effort to preserve some of the road's rural character and improve safety. The recommendations from the study are consistent with preservation of the character of Cape Cod and are applicable and recommended for other similar roads on the Cape. It should be noted that access permits are controlled by various agencies depending on jurisdiction. Some of the strategies are listed for guidance purposes. Strategies from the Route 6A study include:

6.2.2.1 - Access Management Strategies- Existing Conditions

- Modification of existing driveways to conform with access management guidelines established for Route 6A.
- Closure of any unnecessary or narrow driveways, narrowing of unduly wide driveways.
- Interconnection or sharing of driveways.
- Closure of existing curb cuts, especially in areas where there are frequent traffic conflicts



such as on rotaries

- Maintain no access on the northbound side of MacArthur Boulevard
- Create a "no-access" line on Rt 6 in Provincetown and North Truro

6.2.2.2 - Access Management Strategies - New Development

- Access to new development from existing secondary roads, not principal roadways.
- Shared Parking and cross easements
- Pedestrian links between adjacent parcels
- Maintenance of setbacks for proper access control and to provide a landscape buffer.
- Driveways constructed opposite any existing driveways rather than off set. Driveway location should include consideration of property lines on the opposite side of the road so that potential future driveways can be aligned.
- Improve coordination among local land use permitting and state curb cut permitting.

The Cape Cod Commission has had extensive experience reviewing access for Developments of Regional Impact. As a result, there have been many cases of reduction in number of driveways, location of driveways on the lesser traveled road, and turn restrictions such as “right-turn-in, right-turn-out.” For more information, the Commission has prepared a technical bulletin on access management.

In the development of this Regional Transportation Plan several strategies were presented and reviewed by the public and many were suggested at the public meetings. These strategies are consistent with the goals and objectives developed for this plan and the 1997 Regional Transportation Plan and have been incorporated into the process for determining the projects to pursue in the 25 year program presented by this plan.



6.3 - General Strategies for Transportation on Cape Cod

1. Maintain Cape Cod's existing transportation system.
2. Preserve rights-of-way for transportation and/or conservation. If no transportation purpose is envisioned, development (and its resulting trip generation) should be prohibited when feasible. Conservation or low-impact recreational uses should be considered to preserve the right-of-way for future transportation needs.
3. Encourage practices that reduce demand for automobile access to Cape Cod such as:
 - Substituting Cape-to-Islands ferry service by increasing and promoting service from off-Cape to reduce unnecessary travel on Cape Cod.
 - Control land use: Limit development and reduce "build-out"
 - Discourage land uses that increase Bridge and Canal Area car traffic
 - Land conservation/land banking
 - Travel Demand Management
4. Give priority to solutions that will enhance mobility for travel within Barnstable County; encourage travelers coming to Barnstable County to use alternatives to the single-occupant automobile.
5. Make efficient and cost-effective road and intersection improvements. Some of the following strategies have major transportation implications and fall under the jurisdiction of a variety of agencies.
 - Design needed road and intersection improvements on Cape Cod in a manner that are efficient, cost-effective, and that respect the Cape's unique rural character
 - Work with MassHighway, and other project proponents, to address safety improvements that are appropriate to the scale and function of Cape Cod roads.
 - Work with MassHighway, and other project proponents, to locate necessary safety apparatus (guardrail, signs, markers, etc.) in such a way as to achieve the desired safety improvement, while not visually detracting from the region's scenic



environment.

- Consider modern roundabouts as an alternative to traffic signals where appropriate.
 - Implement "Footprint Road Program" - to allow reconstruction without any dimensional changes
6. Consider the impacts to existing and planned public transportation services and facilities from projects which increase roadway capacity.

6.3.1 - Studies to Pursue

1. Continue the EIR process to replace the Sagamore Rotary, while at the same time pursue more modest alternatives for interim safety improvements for the Canal Area road system.
2. Development of toll facilities for the Cape Cod region. The toll facility study will explore the feasibility of establishing tolls that will include variable pricing to help alleviate peak period congestion without impacting local mobility needs. Strategies such as local exemptions and no-stop "cashless" toll collecting techniques using transponders and video license plate readers will also be explored.
3. Participate in the development of the Cape Cod Transit Task Force short and long range plans for improving public transportation on Cape Cod.
4. Identify alternative funding sources for transportation on Cape Cod.
5. Peak Period Congestion Management Study - Develop solutions to congestion problems including local cut through congestion such as at exit 1 on Route 6. Strategies to be evaluated include ramp closures, ramp metering, variable message signs, traffic calming, and working with local rentals to stagger rental periods.
6. Potential use of existing rail lines for seasonal needs
7. Consider within the ongoing Route 6 Outer Cape study: Intersection improvements for problem locations; land acquisition to minimize future impacts; curbcut reduction;



commercial bypass road in the vicinity of Brackett Road/Route 6 intersection.

8. Develop long-term strategies for maintenance of the Bourne and Sagamore bridges and develop estimates of life-spans of the bridges based on maintenance strategies.

6.4 - Cape Cod Joint Transportation Committee Recommendations

In addition to the programs and projects recommended by the Metropolitan Planning Organization in this Plan, the following recommendations were endorsed by the Cape Cod Joint Transportation Committee (CCJTC) at its meeting on December 8, 2000:

Planning for Improved Crossing of the Cape Cod Canal

By the end of the Plan period (2025) the Cape Cod Canal highway bridges will have been in use for over ninety years. While carefully maintained bridges may last for many centuries, several issues factor in the decisions that will need to be made:

- **Functional obsolescence:** the ability of the bridges to safely and efficiently move vehicular traffic may be compromised by travel speeds, vehicle weights and widths, and quantity of flow.
- **Improvements to existing structures:** by relocating the existing sidewalk on each bridge, travel lanes could be widened to improve traffic flow and safety. This would require that the sidewalks (and utilities located under them) be cantilevered on the side of the bridges. A structural engineering study would be required to assess feasibility.
- **Options for increased capacity:** to accommodate increased vehicular demand, a new facility would be required (bridge or tunnel). Potentially, another means (car ferry) could also help meet this need.



- Consistency with other projects: the Sagamore Grade-Separation Study’s “Concept C” is predicated on a direct connection to the Sagamore Bridge. In the event of replacement of the Sagamore Bridge, one technique is to construct a new bridge adjacent to the existing bridge. This would require a major relocation of Concept C.

6.5 - Projects Considered in the Regional Transportation Plan

Table 6.2 contains an index of projects considered in the Regional Transportation Plan. Please note the project number (RTP#) of a particular project. since the following pages are organized by these. Chapter 7 presents summaries and analyses of the projects; detailed descriptions can be found in the Appendix.





Cape Cod Regional Transportation Plan Summary of Considered Projects

<u>Title/Description</u>	<u>Description</u>	<u>RTP Project# & Projected Cost</u>
Resurfacing PROGRAM	BUNDLED PROJECTS Roadway Resurfacing & Rehabilitation	900 \$255,750,000
Bridge PROGRAM	BUNDLED PROJECTS Bridge Replacement/Reconstruction	901 \$51,150,000
Transit Operating PROGRAM	BUNDLED PROJECTS Transit Operating Assistance	902 \$142,047,813
Intersection PROGRAM	BUNDLED PROJECTS Intersection Improvements	903 \$26,640,625
Bicycle/Pedestrian Projects PROGRAM	BUNDLED PROJECTS - bicycle and/or pedestrian facilities and programs	904 \$6,393,750
Access Management PROGRAM	Eligible for all state and local numbered routes. Curb cut consolidation, medians, other access improvements	905 \$2,131,250
Transit Capital PROGRAM	BUNDLED PROJECTS Transit Capital Needs	906 \$38,362,500
TDM/TSM PROGRAM	BUNDLED PROJECTS - Travel Demand Management/Transportation Systems Management projects	907 \$10,656,250
New Ferry Service - PROGRAM	BUNDLED PROJECTS - Passenger ferries connecting Cape Cod harbors	908 \$5,328,125
Regional Bike Network PROGRAM	BUNDLED PROJECTS - Regional links of bicycle trails and inter-town paths	909 \$4,262,500
Cape Cod Rail Trail Bridges	Cape Cod Rail trail bridges over Route 6 in Harwich and Orleans	1000 \$3,081,000

APPROVED



Cape Cod Regional Transportation Plan Summary of Considered Projects

<u>Title/Description</u>	<u>Description</u>	<u>RTP Project# & Projected Cost</u>
Hyannis Intermodal Center - ph. 1 APPROVED	Construction of facility for inter-city bus and rail operations with shuttles to airport & ferries, pedestrian links to downtown Hyannis.	1001 \$5,500,000
Hyannis Intermodal Center - ph. 2+ APPROVED	Completion of facility for inter-city bus and rail operations with shuttles to airport & ferries, pedestrian links to downtown Hyannis.	1002 \$3,000,000
Exit 6 1/2 - Hyannis Access	Barnstable - new interchange on Route 6 between exits 6 & 7 to improve access to downtown Hyannis	1003 \$15,000,000
Southside Connector	Bourne/Sandwich - Construction of a new divided highway between the Bourne Rotary and Route 6 near interchange 2	1004 \$100,000,000
Nickerson Park Access from Route 6	Brewster - Direct access via new interchange to Nickerson Park from Route 6	1005 \$15,000,000
Rt 28 MacArthur Boulevard Improvements*	Bourne - *Recommend MIS - - Construction of 2 new northbound lanes on Rt 28, reverse existing northbound, existing southbound becomes frontage road	1006 \$10,000,000
Rt 6 Reconfigure Interchange One	Improve westbound on-ramp near Sagamore Bridge during peak times for off-cape traffic flow: Route 6, Exit 1: Reconfigure WB on-ramp	1008 \$1,250,000
Sagamore Rotary Reconfiguration	Reconfiguration of Sagamore Rotary to allow traffic between Rt 3 and Sagamore Bridge to pass over or under the existing rotary	1009 \$30,000,000
Bourne Rotary Reconfiguration	Bourne - reconfigure Bourne rotary to allow traffic between Bourne Bridge to Route 28 (MacArthur Blvd)	1010 \$30,000,000
Rt 132 Boulevard	Barnstable - Construction of 2 new lanes from Rt 6 to Bearses Way (incl. landscaped median divider)	1012 \$7,500,000
Cape Cod Rail Trail Resurface & Widen	Eastham to Dennis - Resurface and widen original rail trail from 8'-10'	1014 \$3,000,000



Cape Cod Regional Transportation Plan Summary of Considered Projects

<u>Title/Description</u>	<u>Description</u>	<u>RTP Project# & Projected Cost</u>
Cape Cod Rail Trail Extensions	Extend Cape Cod Rail Trail to Provincetown in the north, Hyannis (or Bourne) in the west	1015 \$4,000,000
Rt 28 Bike Accomodation: Hyannis-Dennis	Construction, marking, and signage of Bicycle facility along Route 28 from Hyannis - Dennis	1016 \$5,000,000
Additional CCRTA Service PROGRAM	Public transit shuttle connecting villages along Route 6A from Sandwich to Orleans and other services	1021 \$41,346,250
Transportation Management Center	Operations center to monitor traffic operations, issue real-time reports to traveling public, control variable message signs and coordinated traffic signals	1022 \$6,450,000
Variable Message Signs	Remote operated variable message signs installed along all major routes - Rt 6, Rt 28 in Bourne & Falmouth, Rt 25 Extension, Rt 3	1023 \$1,250,000
Permanent Traffic Counting Stations	Install permanent traffic counting stations at strategic locations Cape-wide	1024 \$200,000
Expand/enhance Exit 6 Park & Ride	Barnstable - Expansion of park&ride capacity at Interchange 6 Park & Ride. Add amenities such as bicycle lockers, indoor ticketing/waiting.	1025 \$2,000,000
Interchange Improvements Rt 6	Mid-Cape Hwy - Implement improvements to Route 6 Interchanges	1027 \$38,200,000
Land Conservation	Strategic purchase of land to reduce sprawl and inefficient allocation of transportation resources	1030 \$12,500,000
Cape-wide Highway Advisory Radio	Provide travel information cape-wide via AM radio	1031 \$250,000
Harwich/Chatham Rail Trail Extension	Extend Cape Cod Rail Trail through Chatham	1036 \$985,000
Rt 6 Eastham - Safety Improvements	Eliminate conflict points along Route 6	1037 \$1,200,000



7 - The Financial Plan & Project Ranking

The ability to implement transportation solutions depends on many variables (design, environmental, etc.) but in the final analysis these have no meaning if funds are not available.

7.1 - Programs Essential to Maintaining the Existing System

The following items make up the various transportation projects and programs necessary to maintain the existing transportation system:

<u>Annual Projects</u>	<u>Annualized Cost</u>	<u>25 year cost</u>
CCRTA Capital Needs	\$1,800,000	\$45,000,000
CCRTA Additional Service	\$1,940,000	\$48,500,000
CCRTA Operating Assistance	\$6,665,000	\$166,625,000
Roadway Maintenance (min.)	\$12,000,000	\$300,000,000
Intersection Improvements	\$1,250,000	\$31,250,000
Bridge Maintenance	\$2,400,000	\$60,000,000
Access Management	\$100,000	\$2,500,000
TDM/TSM projects	<u>\$500,000</u>	<u>\$12,500,000</u>
Total basic 25 year funding need	26,655,000	\$666,375,000

7.1.1 - Basis for annualized needs

CCRTA Operating Assistance: capital and operating expenses for the Cape Cod Regional Transit Authority are presented in Table 7.1. Roadway maintenance: figures for the 15 Cape Cod towns are presented in Table 7.2 and are based largely on interviews with town DPW personnel.



Table 7.1 - Annual Transit Funding Needs

ANNUAL NEEDS for the CAPE COD TRANSIT SYSTEM			
TYPE	CAPITAL	OPERATING	
vehicle purchases	\$ 1,400,000		These vehicle purchases are for maintaining the existing fleet [local]
vehicles - new service	\$ 440,000		One new regional service in five years - capital cost (purchase 2+ vehicles per year)
existing routes, operating assistance		\$ 2,560,000	from Federal Transit Administration (FTA) 5311 funding & state funding from the Executive Office of Transportation & Construction (EOTC)
existing routes, operating assistance		\$ 3,600,000	from Federal Transit Administration (FTA) 5307 funding & state funding from the Executive Office of Transportation & Construction (EOTC)
operating-new service		\$ 1,500,000	Annual operating cost of one new regional service: 35 miles one way, 15 min weekday frequency & hourly weekends
Access to Jobs		\$ 105,000	Annual operating cost
ITC construction Phase II	\$ 600,000		This includes \$3 million for construction of Phase II of the Intermodal Transportation Center, over five years
ITC maintenance, ITS improvements, other	\$ 400,000	\$ 400,000	This includes ongoing maintenance for ITC (estimated at \$200,000 per year); ITS improvements for transit including Smart Cards; and may include other capital costs.
	\$ 2,840,000	\$ 8,165,000	
TOTAL ANNUAL NEEDS	\$ 11,005,000		
		\$ 9,065,000	Annual needs less the one new service in five years
For long range planning purposes the annual needs are based on: five years of actual needs for vehicle replacements; other capital projects, such as Phase II of the Intermodal Transportation Center; and existing annual operating assistance. The "one new service in five years" is included as an example only and is not a service that is designed.			



Table 7.2 - Annual Roadway Funding Needs

TOWN	MINIMUM annual needs estimate, roadway maintenance only	DESIRABLE Annual needs estimate, Roadway maintenance
BARNSTABLE	\$ 3,000,000	\$ 4,750,000
BOURNE	\$ 900,000	\$ 1,800,000
BREWSTER	\$ 400,000	\$ 600,000
CHATHAM	\$ 400,000	\$ 550,000
DENNIS	\$ 1,400,000	\$ 1,900,000
EASTHAM	\$ 300,000	\$ 550,000
FALMOUTH	\$ 1,200,000	\$ 2,800,000
HARWICH	\$ 600,000	\$ 1,800,000
MASHPEE	\$ 1,000,000	\$ 1,300,000
ORLEANS	\$ 500,000	\$ 1,000,000
PROVINCETOWN	\$ 100,000	\$ 300,000
SANDWICH	\$ 850,000	\$ 1,800,000
TRURO	\$ 150,000	\$ 400,000
WELLFLEET	\$ 200,000	\$ 450,000
YARMOUTH	\$ 1,000,000	\$ 2,000,000
	\$ 12,000,000	\$ 22,000,000

Intersection Improvements

5 intersections per year @ \$250,000 * 25 years = \$31.25 million

Bridge Maintenance

The funding projections are based on past spending, the average age for bridges on Cape Cod is 59 years and the average AASHTO bridge rating is 68 (on a scale of 1-100). 50% of the bridges on Cape Cod have an AASHTO bridge rating of 50 or less which generally means rehabilitation is required.



Access Management

Based on one project per year.

TDM/TSM Projects

Based on one project per year.

7.1.2 - Program Funding

The funding projected for Programs has been adjusted to accommodate the construction of projects and maintaining a fiscally constrained RTP. Additional funding sources will be sought. Total Program costs have been factored by 0.8525.

7.2 - Available Funding (2001-2025)

Estimated Statewide Road and Bridge funding (federal and non-federal)	\$13,144,333,000
Cape Cod Regional Share (4.59%)	\$603,324,885
Transit Funding (level-funding based on 2001 appropriation)	<u>\$74,556,550</u>
Total Available Funding	<u>\$677,881,435</u>
Previously Committed Funds (RTP# 1000-1002)	11,581,000
<u>Total Regional Transportation Plan Funding</u>	<u>\$689,462,435</u>



7.3 - Transportation Projects Evaluation & Ranking

The following sections present analysis of the projects listed for consideration in the previous chapter (for a 2-page listing see Table 6.2). The next section presents a one page analysis summary of each project. The section to follow presents a ranking of compatible projects to be considered within the financial constraints of the Plan.

7.3.1 - Projects Evaluated in the Regional Transportation Plan

Information for each project is presented in two sections. The upper section includes a description of the project as well as estimates of the costs associated with it. Note that the costs are estimated in current dollars. The "RTP Projected Cost" equals the "Annual Cost" multiplied by the analysis period, 25 years, added to any "Upfront Costs." This places capital projects on equal footing with projects incurring operating costs.

The "Goal Compatibility Analysis" is used as a screening of the project. Should the project detract from an RTP Goal, a finding of "Incompatible" will be noted. If one or more "Incompatible" statements occur, the project is considered incompatible and no further analysis is warranted. In addition, a determination is made regarding the amount that a project contributes to advancing the goal. These scores are numerical values based on qualitative evaluations.

In the lower section, several criteria are used in the analysis of projects. Criteria include:

- Travel Miles: the benefits quantified for this criterion are based on the output of the regional transportation model when available. 1 Benefit = 10,000 modeled VMT reduced. If a project is expected to have automobile travel mileage reduction but does not lend itself to modeling, best estimates of the benefits will be used.
- Travel Hours: the benefits quantified for this criterion are based on the output of the regional transportation model when available. 1 Benefit = 1,000 modeled VHT reduced. If a project



is expected to have regional travel time reduction but does not lend itself to modeling, best estimates of the benefits will be used.

- **Safety:** solutions for areas with the largest safety problems are likely to have the greatest benefit. Safety evaluations may be based on the “EPDO” method where the EPDO, or “Equivalent Property Damage Only” is calculated by assigning a value of 5 to each injury crash and 10 to each fatality crash. For intersections EPDO is adjusted by Million Entering Vehicles (MEV) and for road segments is adjusted by Million Vehicle Miles Traveled (MVMT). These figures are expected to be used in future improvements to the projects database.
- **Air Quality:** benefits are related to reductions in the precursors of ozone as determined from output of the regional transportation model air quality programs (when available). 1 Benefit = reduction of 100 kg of VOC or 100 kg of NOx.
- **Goal Benefit:** based on scores developed under the compatibility analysis, the scores are multiplied by weighting factors (currently 1) and added together to equal the goal benefit.

A transportation project may have benefits under several criteria. The magnitude of these benefits is comparable between projects. This means that a large project when compared to a smaller one (e.g., a multi-town transit service vs. a smaller service in a single village) would have greater quantified benefits (e.g., more reduced automobile mileage). All the criteria benefits are totalled together into a "Benefit Level."

The Benefit Level is then divided into the RTP Projected Cost (in millions of dollars) to come up with a "Score." This method allows the relative benefits of large and small projects to be compared on a benefit/cost basis. Please note that the Total Cost of Programs have been factored to funding levels. See section 7.1.2 for a discussion.





1

RTP# 901

Bridge PROGRAM

Description BUNDLED PROJECTS
Bridge Replacement/Reconstruction

Score
-
State I.D.

Annual Cost	\$2,400,000	RTP Projected Cost
Upfront Cost		\$51,150,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	5	goal 1	Compatible	Compatibility Compatible
	0	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: The ongoing inspections by MassHighway will be reviewed locally to establish the priority of bridge projects and these needs will be addressed.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	5.0
	Air Quality	
	Goal Benefit	5
	Benefit Level	10.0

Source of Origin	MS	KEY: SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SROt = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar - Cape Cod Marine Transportation Studies
	RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information
AQStatus
Exempt
Type
B - Operating and Maintenance
AQ Analysis Yr
N

Approved	Implemented
<input type="checkbox"/>	<input type="checkbox"/>



1

RTP# 902

Transit Operating PROGRAM

Description BUNDLED PROJECTS
Transit Operating Assistance

Score
-
State I.D.

Annual Cost	\$6,665,000	RTP Projected Cost
Upfront Cost		\$142,047,813

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	7	goal 1	Compatible	Compatibility Compatible
	5	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Funding has been provided by FTA section 5311, and 5307 for existing services and this is expected to continue. The Hyannis Intermodal Center is expected to begin construction in 2000. The CCRTA has submitted applications for funding of their proposed "smart card" program and implementation is expected in 2001.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
Goal Benefit	12
Benefit Level	14.0

A transit plan for the region involving CCRTA is expected to be developed in 2001/2002 which is expected to review the existing services and needs. Current needs are based on recent expenditures.

Source of Origin	MS
<p>KEY:</p> <p>SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SRot = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar - Cape Cod Marine Transportation Studies</p>	
RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved Implemented



1

RTP# 903

Intersection PROGRAM

Description BUNDLED PROJECTS
Intersection Improvements

Score
-
State I.D.

Annual Cost	\$1,250,000	RTP Projected Cost
Upfront Cost		\$26,640,625

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	0	goal 1	Compatible	Compatibility Compatible
	0	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Ongoing studies such as the Route 6 Outer Cape Improvement study are expected to generate a number of prioritized improvements. Additional needs will be identified through the TIP development process.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	7.0
	Air Quality	
	Goal Benefit	0
	Benefit Level	7.0

Source of Origin	MS	KEY: SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SROt = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar = Cape Cod Marine Transportation Studies
	RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information	
AQStatus	Exempt
Type	B - Operating and Maintenance
AQ Analysis Yr	N

Approved Implemented



1

RTP# 904

Bicycle/Pedestrian Projects PROGRAM

Description BUNDLED PROJECTS - bicycle and/or pedestrian facilities and programs

Score
-
State I.D.

Annual Cost	\$300,000	RTP Projected Cost
Upfront Cost		\$6,393,750

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	0	goal 1	Compatible	Compatibility Compatible
	7	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: For bike network links (bicycle paths) see RTP#909

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	2.0
	Air Quality	
	Goal Benefit	7
	Benefit Level	9.0

<p>Source of Origin</p> <p>SBP, SPP</p> <hr/> <p>RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input</p>	<p>KEY:</p> <p>SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SRot = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar - Cape Cod Marine Transportation Studies</p>
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Conformity Information
<u>AQStatus</u>
Exempt
<u>Type</u>
A - Capital Improvements
<u>AQ Analysis Yr</u>
N

Approved Implemented



1

RTP# 905

Access Management PROGRAM

Score
-
State I.D.

Description Eligible for all state and local numbered routes. Curb cut consolidation, medians, other access improvements

Annual Cost	\$100,000	RTP Projected Cost
Upfront Cost		\$2,131,250

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	7	goal 1	Compatible	Compatibility Compatible
	0	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Access management strategies were developed in the Route 6A Access Management Study. Implementation of the principals developed in the study are being required for traffic mitigation due to some Developments of Regional Impact (DRIs). Application of the strategies are anticipated for existing conditions.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	7.0
	Air Quality	
	Goal Benefit	7
	Benefit Level	14.0

Source of Origin	MS	KEY: SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SROt = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar = Cape Cod Marine Transportation Studies
	RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information
AQStatus
Exempt
Type
B - Operating and Maintenance
AQ Analysis Yr
N

Approved	Implemented
<input type="checkbox"/>	<input type="checkbox"/>



1

RTP# 907

TDM/TSM PROGRAM

Description BUNDLED PROJECTS - Travel Demand Management/Transportation Systems Management projects

Score
-
State I.D.

Annual Cost	\$500,000	RTP Projected Cost
Upfront Cost		\$10,656,250

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	6	goal 1	Compatible	Compatibility Compatible
	0	goal 2	Compatible	
	0	goal 3	Compatible	
	7	goal 4	Compatible	
	7	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Examples of related activities are underway - Cape Cod Bike Week every Spring, the first Cape Cod Alternative Transportation Week took place June 2000. Coordination with CARAVAN for Falmouth Technology Park ongoing.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	6.0
	Air Quality	
	Goal Benefit	20
<hr/>		
Benefit Level	26.0	

KEY:

Source of Origin	MS	SBP = State Bike Plan
		SPP = State Pedestrian Plan
		JTC = Cape Cod Joint Transportation Committee
		28 = Route 28 Corridor Study
		CATS-Canal Area Transportation Study
		BYTS = Barnstable/Yarmouth Transportation Study
		SRot = Sagamore Rotary Study
		ITS = Intelligent Transportation Systems Study
		MCS = Monomoy Capacity Study
		OCS = Outer Cape Capacity Study
		6A = Route 6A Corridor Management Plan
		Safe = Cape Cod Accident Record Information System
		TDF = Travel Demand Forecast
		LCP = Local Comprehensive Plan
		Mar = Cape Cod Marine Transportation Studies

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved Implemented



1

RTP# 908

New Ferry Service - PROGRAM

Description BUNDLED PROJECTS - Passenger ferries connecting Cape Cod harbors

Score
-
State I.D.

Annual Cost	\$250,000	RTP Projected Cost
Upfront Cost		\$5,328,125

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	5	goal 1	Compatible	Compatibility Compatible
	8	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status:

- Cost information preliminary estimate

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	4.0
	Air Quality	
	Goal Benefit	13
	<hr/>	
	Benefit Level	17.0

KEY:

Source of Origin
RPA, PUB, Mar

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
28 = Route 28 Corridor Study
CATS=Canal Area Transportation Study
BYTS = Barnstable/Yarmouth Transportation Study
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MCS = Monomoy Capacity Study
OCS = Outer Cape Capacity Study
6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan
Mar - Cape Cod Marine Transportation Studies

Conformity Information

AQStatus
Recommended for Study

Type
B -

AQ Analysis Yr
N

Approved Implemented



1

RTP# 909

Regional Bike Network PROGRAM

Description BUNDLED PROJECTS - Regional links of bicycle trails and inter-town paths

Score
-
State I.D.

Annual Cost	\$75,000	RTP Projected Cost
Upfront Cost	\$3,125,000	\$4,262,500

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	8	goal 1	Compatible	Compatibility Compatible
	8	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Includes expansions of regional bike path network. The "Shining Sea" Bike Path has been approved for design by the Town of Falmouth however the use of the right of way has not been decided.

For Cape Cod Rail Trail Extensions see RTP #1015. Also see RTP #904 for standalone pedestrian/bicycling BUNDLED projects

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	4.0
	Air Quality	
	Goal Benefit	16
	Benefit Level	20.0

Source of Origin	SBP	KEY: SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SROt = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar = Cape Cod Marine Transportation Studies
	RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information
<u>AQStatus</u>
Exempt
<u>Type</u>
A - Capital Improvements
<u>AQ Analysis Yr</u>
N

Approved	Implemented
<input type="checkbox"/>	<input type="checkbox"/>



2

RTP# 1000

Cape Cod Rail Trail Bridges

Description Cape Cod Rail trail bridges over Route 6 in Harwich and Orleans

Score
65
State I.D.
CCC006

Annual Cost		RTP Projected Cost
Upfront Cost	\$3,081,000	\$3,081,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	7	goal 1	Compatible
	6	goal 2	Compatible
	0	goal 3	Compatible
	0	goal 4	Compatible
	0	goal 5	Compatible

Compatibility
Compatible

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: This 100%-designed project is listed as an "Upcoming Project" in MassHighway's Transportation Investment in Massachusetts Since 1991.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	7.0
	Air Quality	
	Goal Benefit	13
	Benefit Level	20.0

Project is approved by MassHighway. Bids for the Harwich Bridge advertised 10/21/2000. Construction scheduled to begin Spring 2000.

Source of Origin	SBP
<p>KEY:</p> <p>SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SRot = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar - Cape Cod Marine Transportation Studies</p>	
<p>RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input</p>	

Conformity Information
AQStatus
Exempt
Type
A - Capital Improvements
AQ Analysis Yr
N

Approved Implemented



2

RTP# 1001

Hyannis Intermodal Center - ph. 1

Score
49
State I.D.
9606

Description Construction of facility for inter-city bus and rail operations with shuttles to airport & ferries, pedestrian links to downtown Hyannis.

Annual Cost		RTP Projected Cost
Upfront Cost	\$5,500,000	\$5,500,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	8	goal 1	Compatible
	8	goal 2	Compatible
	0	goal 3	Compatible
	3	goal 4	Compatible
	5	goal 5	Compatible

Compatibility Compatible

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Planning ANALYSIS

All benefits are estimates. Benefits are for first phase only.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	3.0
	Air Quality	
	Goal Benefit	24
	Benefit Level	27.0

KEY:

Source of Origin	SBP = State Bike Plan
BYTS	SPP = State Pedestrian Plan
	JTC = Cape Cod Joint Transportation Committee
	28 = Route 28 Corridor Study
	CATS-Canal Area Transportation Study
	BYTS = Barnstable/Yarmouth Transportation Study
	SRot = Sagamore Rotary Study
	ITS = Intelligent Transportation Systems Study
	MCS = Monomoy Capacity Study
	OCS = Outer Cape Capacity Study
	6A = Route 6A Corridor Management Plan
	Safe = Cape Cod Accident Record Information System
	TDF = Travel Demand Forecast
	LCP = Local Comprehensive Plan
	Mar = Cape Cod Marine Transportation Studies

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Non-Exempt*

Type
A - Capital Improvements

AQ Analysis Yr
Y-1999

Approved Implemented



2

RTP# 1002

Hyannis Intermodal Center - ph. 2+

Score
47
State I.D.

Description Completion of facility for inter-city bus and rail operations with shuttles to airport & ferries, pedestrian links to downtown Hyannis.

Annual Cost		RTP Projected Cost
Upfront Cost	\$3,000,000	\$3,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	4	goal 1	Compatible	Compatibility Compatible
	4	goal 2	Compatible	
	0	goal 3	Compatible	
	1	goal 4	Compatible	
	3	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Planning ANALYSIS

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
Goal Benefit	12
Benefit Level	14.0

All benefits are estimates. Benefits are for remaining phases only (beyond phase 1).

Source of Origin
BYTS

KEY:
 SBP = State Bike Plan
 SPP = State Pedestrian Plan
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 LCP = Local Comprehensive Plan
 Mar = Cape Cod Marine Transportation Studies

RPA = CCC Staff
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 MS = Management Systems
 PUB = Public Input

Conformity Information

AQStatus
Non-Exempt*

Type
A - Capital Improvements

AQ Analysis Yr
Y-2010

Approved Implemented



2

RTP# 1003

Exit 6 1/2 - Hyannis Access

Score
n/a
State I.D.

Description Barnstable - new interchange on Route 6 between exits 6 & 7 to improve access to downtown Hyannis

Annual Cost		RTP Projected Cost
Upfront Cost	\$15,000,000	\$15,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	<input type="text" value="7"/>	goal 1	<input type="text"/>
	<input type="text" value="0"/>	goal 2	<input type="text"/>
	<input type="text" value="3"/>	goal 3	<input type="text"/>
	<input type="text" value="0"/>	goal 4	<input type="text"/>
	<input type="text" value="0"/>	goal 5	<input type="text"/>

Compatibility
Insufficient information - compatibility not determined at this time

Technical Analysis	VMT Change	Emissions Change VOC
	-39,925	-47,630
	VHT Change	Emissions Change NOx
	-2,883	-60,599

SECTION 2 - QUANTITATIVE

Project Status: Currently undergoing review at MassHighway Environmental section.

Benefits Analysis	Travel Miles	4.0
	Travel Hours	2.9
	Safety	4.0
	Air Quality	1.1
	Goal Benefit	10
	Benefit Level	22.0

KEY:

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OCS = Outer Cape Capacity Study
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Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan
Mar - Cape Cod Marine Transportation Studies

Conformity Information

AQStatus
Recommended for Study

Type
A -

AQ Analysis Yr
N

Approved

Implemented



2

RTP# 1004

Southside Connector

Description Bourne/Sandwich - Construction of a new divided highway between the Bourne Rotary and Route 6 near interchange 2

Score
n/a
State I.D.

Annual Cost	RTP Projected Cost
Upfront Cost \$100,000,000	\$100,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	0	goal 1	Incompatible
	0	goal 2	
	0	goal 3	Incompatible
	0	goal 4	
	0	goal 5	

Compatibility
Compatibility not demonstrated

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	13,065	18,055
	VHT Change	Emissions Change NOx
	1,268	24,078

Project Status: Included in analysis for the Canal Area Transportation Study

Benefits Analysis	Travel Miles	-1.3
	Travel Hours	-1.3
	Safety	3.0
	Air Quality	-0.4
	Goal Benefit	0
	Benefit Level	0.0

KEY:

Source of Origin

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6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
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Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved

Implemented



2

RTP# 1005

Nickerson Park Access from Route 6

Description Brewster - Direct access via new interchange to Nickerson Park from Route 6

Score
n/a
State I.D.

Annual Cost		RTP Projected Cost
Upfront Cost	\$15,000,000	\$15,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	5	goal 1	<input type="text"/>
	0	goal 2	<input type="text"/>
	0	goal 3	<input type="text"/>
	0	goal 4	<input type="text"/>
	0	goal 5	<input type="text"/>

Compatibility
Insufficient information - compatibility not determined at this time

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

Project Status: This project is not currently being studied.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	4.0
	Air Quality	
	Goal Benefit	5
	Benefit Level	9.0

KEY:

Source of Origin

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PUB = Public Input

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Conformity Information

AQStatus

Type
A -

AQ Analysis Yr

Approved

Implemented



2

RTP# 1008

Rt 6 Reconfigure Interchange One

Score
51
State I.D.

Description Improve westbound on-ramp near Sagamore Bridge during peak times for off-cape traffic flow: Route 6, Exit 1: Reconfigure WB on-ramp

Annual Cost	\$50,000	RTP Projected Cost
Upfront Cost		\$1,250,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	4	goal 1	Compatible
	0	goal 2	Compatible
	0	goal 3	Compatible
	0	goal 4	Compatible
	0	goal 5	Compatible

Compatibility
Compatible

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	3,580	3,359
	VHT Change	Emissions Change NOx
	194	5,022

Project Status: Alternatives are being evaluated as part of the Canal Area study.

Benefits Analysis	Travel Miles	-0.4
	Travel Hours	-0.2
	Safety	3.0
	Air Quality	-0.1
	Goal Benefit	4
	Benefit Level	6.4

KEY:

Source of Origin	SBP = State Bike Plan
SRot, RPA	SPP = State Pedestrian Plan
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	CATS-Canal Area Transportation Study
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	SRot = Sagamore Rotary Study
	ITS = Intelligent Transportation Systems Study
	MCS = Monomoy Capacity Study
	OCS = Outer Cape Capacity Study
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	Safe = Cape Cod Accident Record Information System
	TDF = Travel Demand Forecast
	LCP = Local Comprehensive Plan
	Mar - Cape Cod Marine Transportation Studies

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved Implemented



2

RTP# 1009

Sagamore Rotary Reconfiguration

Score
n/a
State I.D.

Description Reconfiguration of Sagamore Rotary to allow traffic between Rt 3 and Sagamore Bridge to pass over or under the existing rotary

Annual Cost		RTP Projected Cost
Upfront Cost	\$30,000,000	\$30,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	<input type="checkbox"/>	goal 1	<input type="text"/>
	<input type="checkbox"/>	goal 2	<input type="text"/>
	<input type="checkbox"/>	goal 3	<input type="text"/>
	<input type="checkbox"/>	goal 4	<input type="text"/>
	<input type="checkbox"/>	goal 5	<input type="text"/>

Compatibility
Insufficient information - compatibility not determined at this time

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	7,453	10,274
	VHT Change	Emissions Change NOx
	796	12,069

Project Status:

Currently being studied by the CCC. A previous study was done by Rizzo and Assocites and the CCC study is expanding on their findings as well as providing lower cost alternatives. The study has identified some lower cost reconfigurations of the existing rotary that will improve flow and may be an interim solution to the flyover.

Benefits Analysis

Travel Miles	-0.7
Travel Hours	-0.8
Safety	1.0
Air Quality	-0.2
Goal Benefit	0
Benefit Level	-0.8

KEY:

Source of Origin

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- Mar - Cape Cod Marine Transportation Studies

- RPA = CCC Staff
- MHD = Mass Highway Dept
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- PUB = Public Input

Conformity Information

AQStatus Recommended for Study

Type

A - Capital Improvements

AQ Analysis Yr

N

Approved

Implemented



2

RTP# 1010

Bourne Rotary Reconfiguration

Score
n/a
State I.D.

Description Bourne - reconfigure Bourne rotary to allow traffic between Bourne Bridge to Route 28 (MacArthur Blvd)

Annual Cost		RTP Projected Cost	
Upfront Cost	\$30,000,000		\$30,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	<input type="checkbox"/>	goal 1	<input type="text"/>
	<input type="checkbox"/>	goal 2	<input type="text"/>
	<input type="checkbox"/>	goal 3	<input type="text"/>
	<input type="checkbox"/>	goal 4	<input type="text"/>
	<input type="checkbox"/>	goal 5	<input type="text"/>

Compatibility
Insufficient information - compatibility not determined at this time

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	1,098	2,280
	VHT Change	Emissions Change NOx
	146	2,998

Project Status: Options are currently being studied by the CCC. The study has identified some lower cost reconfiguration options for the existing rotary that will improve flow and may be an interim solution to higher cost alternatives such as a flyover.

Benefits Analysis	Travel Miles	-0.1
	Travel Hours	-0.1
	Safety	1.0
	Air Quality	-0.1
	Goal Benefit	0
	Benefit Level	0.7

KEY:

Source of Origin

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6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan
Mar - Cape Cod Marine Transportation Studies

Conformity Information

AQStatus
Recommended for Study

Type
A -

AQ Analysis Yr
N

Approved Implemented



2

RTP# 1012

Rt 132 Boulevard

Score
22
State I.D.

Description Barnstable - Construction of 2 new lanes from Rt 6 to Bearses Way (incl. landscaped median divider)

Annual Cost	RTP Projected Cost
Upfront Cost \$7,500,000	\$7,500,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	3	goal 1	Compatible
	0	goal 2	Compatible
	0	goal 3	Compatible
	0	goal 4	Compatible
	0	goal 5	Compatible

Compatibility Compatible

Technical Analysis	VMT Change	Emissions Change VOC
	-41,846	-50,933
	VHT Change	Emissions Change NOx
	-3,047	-63,603

SECTION 2 - QUANTITATIVE

Project Status: Under design by EarthTech for the Town of Barnstable

Benefits Analysis	Travel Miles	4.2
	Travel Hours	3.0
	Safety	5.0
	Air Quality	1.1
	Goal Benefit	3
	Benefit Level	16.4

KEY:

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MS, TDF	
RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input	

Conformity Information
<u>AQStatus</u>
Non-Exempt
<u>Type</u>
A - Capital Improvements
<u>AQ Analysis Yr</u>
Y-1999
Approved <input type="checkbox"/>
Implemented <input type="checkbox"/>



1

RTP# 1021

Additional CCRTA Service PROGRAM

Score
-
State I.D.

Description Public transit shuttle connecting villages along Route 6A from Sandwich to Orleans and other services

Annual Cost	\$1,940,000	RTP Projected Cost
Upfront Cost		\$41,346,250

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	7	goal 1	Compatible	Compatibility Compatible
	0	goal 2	Compatible	
	0	goal 3	Compatible	
	0	goal 4	Compatible	
	0	goal 5	Compatible	

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: The transit plan for the CCRTA is not expected to be complete until 2001/2002 and implementation of recommendations for additional service will not be possible before then.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	3.0
	Air Quality	
	Goal Benefit	7
<hr/>		
Benefit Level	10.0	

<p>KEY:</p> <p>Source of Origin</p> <p>6A</p> <p>RPA = CCC Staff MHD = Mass Highway Dept MS = Management Systems PUB = Public Input</p>	<p>SBP = State Bike Plan SPP = State Pedestrian Plan JTC = Cape Cod Joint Transportation Committee 28 = Route 28 Corridor Study CATS=Canal Area Transportation Study BYTS = Barnstable/Yarmouth Transportation Study SRot = Sagamore Rotary Study ITS = Intelligent Transportation Systems Study MCS = Monomoy Capacity Study OCS = Outer Cape Capacity Study 6A = Route 6A Corridor Management Plan Safe = Cape Cod Accident Record Information System TDF = Travel Demand Forecast LCP = Local Comprehensive Plan Mar - Cape Cod Marine Transportation Studies</p>
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Conformity Information
AQStatus
Exempt
Type
B - Operating and Maintenance
AQ Analysis Yr
N

Approved Implemented



2

RTP# 1022

Transportation Management Center

Score
43
State I.D.

Description Operations center to monitor traffic operations, issue real-time reports to traveling public, control variable message signs and coordinated traffic signals

Annual Cost		RTP Projected Cost
Upfront Cost	\$6,450,000	\$6,450,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	5	goal 1	Compatible
	6	goal 2	Compatible
	0	goal 3	Compatible
	9	goal 4	Compatible
	3	goal 5	Compatible

Compatibility
Compatible

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

SECTION 2 - QUANTITATIVE

Project Status: Ongoing discussions with CCRTA and other interested parties.

Benefits Analysis	Travel Miles	
	Travel Hours	
	Safety	5.0
	Air Quality	
	Goal Benefit	23
	Benefit Level	28.0

KEY:

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-------------------------	---

RPA = CCC Staff
MHD = Mass Highway Dept
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PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved Implemented



2

RTP# 1025

Expand/enhance Exit 6 Park & Ride

Score
70
State I.D.

Description Barnstable - Expansion of park&ride capacity at Interchange 6 Park & Ride. Add amenities such as bicycle lockers, indoor ticketing/waiting.

Annual Cost		RTP Projected Cost
Upfront Cost	\$2,000,000	\$2,000,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	6	goal 1	Compatible
	3	goal 2	Compatible
	0	goal 3	Compatible
	3	goal 4	Compatible
	0	goal 5	Compatible

Compatibility
Compatible

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

Project Status:

The current park and ride lot reaches capacity by 8:00 am. Park and Ride enhancements completed in 1997 have been very successful in maintaining level of demand. No design work has been done for this project.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
Goal Benefit	12
Benefit Level	14.0

KEY:

Source of Origin

MS

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Conformity Information

AQStatus

Recommended for Study

Type

A - Capital Improvements

AQ Analysis Yr

N

Approved

Implemented



2

RTP# 1027

Interchange Improvements Rt 6

Score
3
State I.D.

Description Mid-Cape Hwy - Implement improvements to Route 6 Interchanges

Annual Cost		RTP Projected Cost	
Upfront Cost	\$38,200,000		\$38,200,000

SECTION 1 - DESCRIPTIVE

Goal Scoring/Compatibility Analysis

goal scores	5	goal 1	Compatible
	0	goal 2	Compatible
	0	goal 3	Compatible
	0	goal 4	Compatible
	0	goal 5	Compatible

Compatibility
Compatible

SECTION 2 - QUANTITATIVE

Technical Analysis	VMT Change	Emissions Change VOC
	VHT Change	Emissions Change NOx

Benefits Analysis	Project Status:	Improvements to the portion of Route 6 between Dennis and Orleans have been contemplated for quite a while. Additional improvements are expected to be developed by the Route 6 Outer Cape study to be complete in late 2000. The RTP also recommends a study of the interchanges on Route 6 which will probably have additional safety recommendations.
	Travel Miles	
	Travel Hours	
	Safety	8.0
	Air Quality	
	Goal Benefit	5
Benefit Level	13.0	

Anticipated Projects:
 Route 6 Dennis to Orleans \$12,000,000
 Outer Cape \$5,000,000
 Exit 5 Improvements \$2,000,000

Source of Origin	MHD

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 MS = Management Systems
 PUB = Public Input

Conformity Information
<u>AQStatus</u>
Exempt
<u>Type</u>
B - Operating and Maintenance
<u>AQ Analysis Yr</u>
N
Approved <input type="checkbox"/>
Implemented <input type="checkbox"/>

7.3.2 - Projects Ranking

Based on the criteria laid out in the previous section, Table 7.3 presents a ranking of projects which are compatible with Regional Transportation Plan Goals. Essential programs are listed first, then ranked by score. The cumulative cost is compared to the total Regional Transportation Plan funding amount.

It is important to note that this analysis is based on the best available information. As new funding forecasts and sources become available (or disappear), it is expected that needed projects will move onto or off of the list of recommended projects. For an explanation of abbreviations please see the listing at the end of the main report.





Cape Cod Regional Transportation Plan
Fiscal Analysis of RTP Projects

Years of Operation 25
 RTP Funding - Millions \$689

RTP#	Title	RTP Projected Cost	Score	Cumulative Within Funding		FUNDED?
				Cost (Millions)	Target?	
1000	Cape Cod Rail Trail Bridges	\$3,081,000	65	\$3.1	Yes	<input checked="" type="checkbox"/>
1001	Hyannis Intermodal Center - ph. 1	\$5,500,000	49	\$8.6	Yes	<input checked="" type="checkbox"/>
1002	Hyannis Intermodal Center - ph. 2+	\$3,000,000	47	\$11.6	Yes	<input checked="" type="checkbox"/>
900	Resurfacing PROGRAM	\$255,750,000	-	\$267.3	Yes	<input type="checkbox"/>
901	Bridge PROGRAM	\$51,150,000	-	\$318.5	Yes	<input type="checkbox"/>
902	Transit Operating PROGRAM	\$142,047,813	-	\$460.5	Yes	<input type="checkbox"/>
903	Intersection PROGRAM	\$26,640,625	-	\$487.2	Yes	<input type="checkbox"/>
905	Access Management PROGRAM	\$2,131,250	-	\$489.3	Yes	<input type="checkbox"/>
904	Bicycle/Pedestrian Projects PROGRAM	\$6,393,750	-	\$495.7	Yes	<input type="checkbox"/>
1021	Additional CCRTA Service PROGRAM	\$41,346,250	-	\$537.0	Yes	<input type="checkbox"/>
908	New Ferry Service - PROGRAM	\$5,328,125	-	\$542.4	Yes	<input type="checkbox"/>
907	TDM/TSM PROGRAM	\$10,656,250	-	\$553.0	Yes	<input type="checkbox"/>
909	Regional Bike Network PROGRAM	\$4,262,500	-	\$557.3	Yes	<input type="checkbox"/>
906	Transit Capital PROGRAM	\$38,362,500	-	\$595.7	Yes	<input type="checkbox"/>
1031	Cape-wide Highway Advisory Radio	\$250,000	520	\$595.9	Yes	<input type="checkbox"/>
1024	Permanent Traffic Counting Stations	\$200,000	350	\$596.1	Yes	<input type="checkbox"/>
1036	Harwich/Chatham Rail Trail Extension	\$985,000	183	\$597.1	Yes	<input type="checkbox"/>
1023	Variable Message Signs	\$1,250,000	136	\$598.3	Yes	<input type="checkbox"/>
1037	Rt 6 Eastham - Safety Improvements	\$1,200,000	117	\$599.5	Yes	<input type="checkbox"/>
1025	Expand/enhance Exit 6 Park & Ride	\$2,000,000	70	\$601.5	Yes	<input type="checkbox"/>



Cape Cod Regional Transportation Plan
Fiscal Analysis of RTP Projects

Years of Operation 25
 RTP Funding - Millions \$689

RTP#	Title	RTP Projected Cost	Score	Cumulative Within Funding		FUNDED? ↓
				Cost (Millions)	Target?	
1008	Rt 6 Reconfigure Interchange One	\$1,250,000	51	\$602.8	Yes	<input type="checkbox"/>
1015	Cape Cod Rail Trail Extensions	\$4,000,000	45	\$606.8	Yes	<input type="checkbox"/>
1014	Cape Cod Rail Trail Resurface & Widen	\$3,000,000	45	\$609.8	Yes	<input type="checkbox"/>
1022	Transportation Management Center	\$6,450,000	43	\$616.2	Yes	<input type="checkbox"/>
1016	Rt 28 Bike Accomodation: Hyannis-Dennis	\$5,000,000	38	\$621.2	Yes	<input type="checkbox"/>
1012	Rt 132 Boulevard	\$7,500,000	22	\$628.7	Yes	<input type="checkbox"/>
1030	Land Conservation	\$12,500,000	19	\$641.2	Yes	<input type="checkbox"/>
1006	Rt 28 MacArthur Boulevard Improvements*	\$10,000,000	10	\$651.2	Yes	<input type="checkbox"/>
1027	Interchange Improvements Rt 6	\$38,200,000	3	\$689.4	Yes	<input type="checkbox"/>

Afterword

Planning, being a continuing process, requires monitoring and reevaluation of what's going on and deciding what to do about it. This chapter describes where the Regional Transportation Plan is headed.

Next Steps

The process of selecting projects for inclusion in the plan will continue to be improved. This means that criteria used to determine a project's benefits will become less subjective, with decisions supported by overall criteria which recognize the need for a balance of projects. Ongoing improvements to the Travel Demand Forecasting model will integrate analyses of the region's transportation resources (such as pavement condition, crash history, and road capacity) into the decision-making process.

Refinements to the Regional Transportation model will allow for more accurate analysis of key problem areas, public transit, and possibly other modes of travel such as ferries and bicycling.

Conclusion

What Cape Cod becomes will depend heavily on the transportation and land use decisions we make today. Planning the right transportation system relies on having effective land use planning. Decision makers are responsible for implementing the right transportation system as well as ensuring that the "right" Cape Cod - i.e., land use - occurs. While the functions of individual decision makers are often focused on one or the other, but not both (i.e., transportation planning vs. land use planning), only by working together can the success of both efforts be realized.

Projects recommended in the Regional Transportation Plan are listed in the executive summary. It is interesting to note that almost all of expenditures will continue toward maintaining and operating the existing transportation system, with a total of \$11.5 million (1.7% of the budget) available for new projects for the 25 year period.



