

Transportation Plan - Chapter 9

Executive Summary

I. INTRODUCTION

*** Purpose**

To provide a step in the completion of the work program of the Yarmouth Comprehensive Plan and to respond to requests and suggestions of the Barnstable County Regional Policy Plan. Also to provide a simple yet complete document that gives guidance to decision making regarding Transportation issues.

***Coordination With Yarmouth's Comprehensive Plan**

This document is designed for coverage of an important subject covered by the Yarmouth Local Comprehensive Plan, i.e.; the various transportation related issues that make up the skeleton of Yarmouth's current and future development. The document is designed to be easily amended, expanded, or deleted.

*** Organization of Chapter**

The Transportation Plan is prepared in three different types of formats to provide adequate information to the three definable groups that are requesting data about the Plan's various subjects. 1) For the general public and our open Town Meeting members, an "executive summary", such as this one 2) So-called "long summaries" with a substantial amount of technical information for those interested in looking closer at Yarmouth and 3) Consultant's and/or detailed reports for those researching details about the various subject matters. Those plans examine past trends, analyze needs, and propose actions and/or alternative approaches for the period from 2000 to the year 2015.

II. GOALS AND POLICIES

Goals, policies, and objectives were developed for transportation planning from the Barnstable/Yarmouth Transportation Study and the Regional Policy Plan, and are reported in more detail in the Long Summary. The major "goals" are as below:

- Goal #1** - Promote a transportation system that is multi-modal and encourages safe, effective, alternatives for travel, reduces the demand of single occupant vehicles, and maximizes the integration of all modes.
- Goal #2** - Develop a transportation plan that is in concert with local transportation plans and projects, as well as land use/growth management and economic development strategies, while being compatible with the overall Cape Cod Long Range Transportation Plan, the Commonwealth's transportation plan policies, the Commonwealth's implementation plan, and the transportation plans of abutting communities.
- Goal #3** - Create a transportation system that provides safe and efficient arterials to accommodate through movements, and movement to major commercial and business centers, while minimizing unnecessary traffic through neighborhoods..
- Goal #4** - Develop a transportation system that is cost effective and affordable, maximizing the use of federal and state transportation funds, equitably incorporating private financing and minimizing Town expenditures.
- Goal #5** - Implement actions that enhance historic, environmental, and natural resources, while minimizing the negative impact on these resources.

III. INVENTORIES OF EXISTING TRANSPORTATION FACILITIES

The initial task in developing the Yarmouth Transportation Plan was compiling the inventory of the existing transportation system. The Consultant's report describes the physical and operating characteristics of the various components. This "executive summary" describes the inventory in a very compact form for the general public. Again, for more detail see the Long Summary.

A. EXISTING ROADWAY NETWORK

* Roadways selected to be studied as part of the Yarmouth Comprehensive Plan are summarized as follows: In total there were 22 , and also 55 key intersections examined.

ROUTE 28

The segment of Route 28 within the study area is categorized as a "Principal Artery" by the Federal-Aide System and is a part of the National Highway System. It is under Massachusetts Highway Department jurisdiction, and is the main roadway link between Hyannis and South Yarmouth. The roadway consists of a 2-lane cross-section, following an east-west alignment, with exclusive left turn and right turn lanes provided at several intersections. On-street parking is not permitted along any section of Route 28. Most of its adjacent land uses are commercial in nature, and the Route 28 corridor is characterized by numerous curb cuts. The Right-of-way is very narrow along much of the corridor (40 ft.)

HIGGINS CROWELL ROAD

This road serves the Town as a "minor arterial" roadway providing a connection between Willow Street, from approximately 200 feet south of the Route 6 Interchange at Exit 7, and Route 28 to the south. Due to the lower traffic volumes and close proximity to Route 6 Higgins Crowell is used as an alternative to Willow Street to reach Route 28.

ROUTE 6A

Is described in some detail in the section on "Summary of Transportation Conditions", because of its unique historic character.

WILLOW STREET

Willow Street is a 2-lane, two-way, "major arterial" highway which follows a north-south alignment and provides a link between Route 6A in Yarmouthport and Route 28 in Hyannis. There is an interchange with Route 6, Exit 7, on the roadway. Utility poles, located close to the pavement have only limited effect on traffic flow.

STATION AVENUE

Station Avenue is another major gateway to Yarmouth and Dennis. It is a primary roadway for vehicles coming from Route 6A & 6 to South Yarmouth. Sidewalks exist along portions of the road. It is under Town jurisdiction.

INTERCHANGE 7

At this interchange both Willow Street approaches provide one through lane. The interchange ramps form a partial cloverleaf in the NE & SE quadrants. Ramps presently intersect Willow Street at channelized, unsignalized T-type junctions.

INTERCHANGE 8

At this interchange Union Street provides one through lane in each direction. Both ramp systems intersect with Union Street at channelized, unsignalized, T-type intersections. Ramps are situated in NE & SW quadrants.

OTHERS

Other roadways analyzed by the inventory include Buck Island Road, Camp Street, West Yarmouth Road, Forest Road, Winslow Gray Road, Long Pond Drive, Old Main Street, Union Street, North Main Street, Highbank Road, Great Western, Road, North Dennis Road, Setucket Road, Weir Road, and Seaview Avenue.

B. EXISTING TRAFFIC VOLUMES

* A comprehensive traffic count program was conducted in the Town between 1992 and 1994. This report's information was obtained through the BYTS Study and the Yarmouth Engineering Study.

* All of the data represents summer conditions. Additional count data was collected as part of other more recent studies, although much of the data was collected in the off-season.

* A variety of volume characteristics were reviewed as part of the volume studies. As a result a number of segments were reviewed for hourly variance over the 24-hour continued period.

*Peak hour factors (PHF) were also determined from the count data. The PHF is an indicator of the intensity of traffic flow during the entire peak period and is used in capacity analysis.

*There were two study area networks used. The Yarmouthport-North Yarmouth network was formed by Route 6A on the north, the border of Yarmouth and Dennis to the east, and the area north of Buck Island Road and Winslow Gray Road.

*The South Yarmouth Network is formed by Rte. 28/Main Street to the south, Willow Street to the west, the area west of Station Avenue, south of Buck Island Road and Winslow Gray Road.

*Route 6A, east of Willow Street, carries approximately 18,000 vehicles per day, while Route 6A west of Setucket Road carries approximately 14,000 vehicles per day. This pattern indicates a significant portion of the traffic is traveling to and from Union Street.

*Station Avenue, north of Old Town House Road, south of Whites' Path, carries approximately 21,200 vehicles per day. While Union Street, north of U.S. Rte 6. ramps carries approximately 13,500 vehicles per day.

* Old Town House Road, west of Station Avenue, east of Forest Road carries approximately 9,400 vehicles per day. Turning movement counts at the intersection of Old Town House Road/Station Avenue indicate a significant portion turn to/from Station Avenue, north of Old Town House.

* Both Higgins Crowell Road and West Yarmouth Road carry approximately 7,600 vehicles per day. North Main Street, east of Highbank Road, Weir Road, and Setucket Road carry less than 4000 vehicles per day.

* The pattern in the hourly volumes indicates that there are a relatively consistent number of vehicles on study roadways throughout the middle of the day in the Rte. 6A and Station Avenue corridors since these roads are near capacity.

* Route 28, west of Camp Street, and east of East Main Street (Hyannis) have ADT's (Average Daily Traffic) of approximately 37,500 vehicles per day, but this decreases significantly east of Yarmouth Road, indicating a significant portion of the Route 28 inventory is exiting to access downtown Hyannis via East Main Street (Hyannis).

* Daily volumes on Buck Island Road, east of Town Brook Road, are approximately 12,500 vehicles per day. In addition the Town Brook Road, Higgins Crowell Road, and West Yarmouth Road have ADT's between 7000 and 8000 vehicles per day.

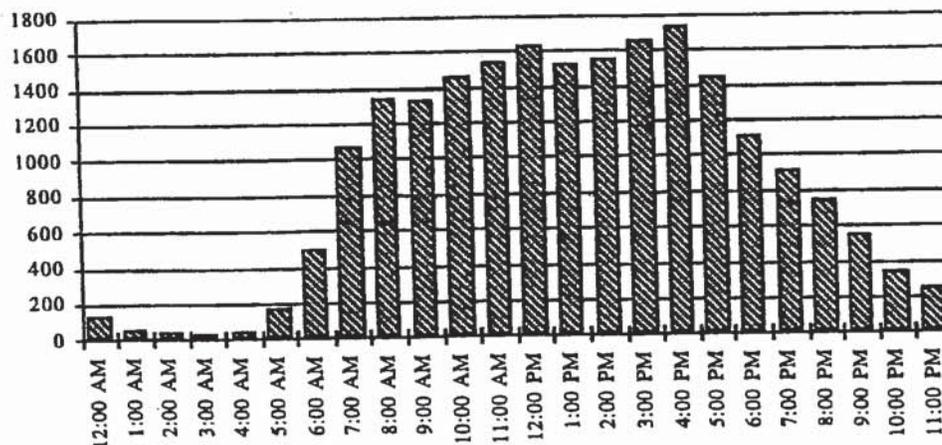


Figure 4
Hourly Traffic Flow Variation
Station Avenue North of Railroad Tracks

Source: Draft Text for Yarmouth Comprehensive Plan - Transportation Element - Submitted by MS Transportation Systems, Inc. December 1999.
 Figure No. 4 - Is from that report; vertical scale of chart is in vehicles per hour.

IV. ANALYSIS

A. FUTURE TRAVEL FORECASTS

*In developing this plan chapter, the Consultant estimated future travel demands and conditions. Future demands were estimated on historical growth, known projects, and potential build-out.

*Information was then put into the computer generated regional transportation model, and combined with the Barnstable build-out analysis, providing a more realistic model for projecting traffic in Yarmouth.

*Yarmouth's year-round residential population is approaching 24,000, but that is less than half the summer population. Workforce here is approximately 8,300, but doubles during the summer months.

*Yarmouth's commercial/industrial base is substantial compared to other Cape communities, with the exception of Barnstable.

* There will be an increased number of people having to commute into Yarmouth as its commercial base expands, while there will be only a small increase in residential population.

*It should be noted that the buildout projection does not include potential re-building of existing developed sites with greater amounts of space.

* However the analysis results indicate that over the next 15-20 years the general magnitude of volume increases on area roadways could be very substantial.

*As congestion intensifies over the years, drivers will tend to seek alternative routes, diverting onto the more local roadways, even though this may result in longer travel distance.

*For a much more detailed description of this computer analysis consult the Long Summary Report.

B. EXISTING/FUTURE LEVEL OF SERVICE CONDITIONS

* The Yarmouth roadway system was assessed in terms of the "Level of Service" (LOS) as part of the Plan's development. LOS is an indicator of the operating conditions that occur on a given roadway or intersection when accommodating various traffic volumes.

* This is a qualitative measure that accounts for a number of operational factors, including roadway geometrics, speed, travel delay, freedom to maneuver, and safety.

*In practice, any given roadway may operate at a wide range of LOS's depending on the time of day, day of week, or period of year.

*Level of Service "C", a condition of stable flow, is considered a desirable peak or for design flow in several areas while LOS "D" is considered acceptable in urban flow conditions, but indicates near or at maximum utilization of a roadway facility under less than ideal conditions.

*LOS "F" generally indicates a condition in which external factors result in forced flow illustrated by long delays and vehicle queues.

*Of the 18 existing unsignalized intersections in the North Yarmouth Network, 9 had a movement calculated to operate a LOS "E or F".

* Under future volume conditions these unsignalized intersections deteriorated to 14 of 18 at "E" or "F".

* Heavy traffic on Route 28 causes substantial delays to vehicles attempting to either cross or turn onto the major roadway. Some of the most significant problem locations are at the intersections of Route 28 and Town Brook Road and Route 28 and Seaview Avenue.

*Route 6 off-ramps left turn onto both Willow Street and Union Street operate at LOS "F" with long delays.

*For a much more detailed description of LOS conditions in Yarmouth consult the Long Summary Volume.

C. PUBLIC TRANSPORTATION

*In general, public transportation, or mass transit, is a common alternative to the single occupant vehicle. Like most suburban type areas, Yarmouth experiences low transit usage for both work and non-work trips. In this Mid-Cape sub-region, including Yarmouth, public transportation includes local fixed route service (year-round and seasonal) provided by the Cape Cod Regional Transit Authority. A demand-responsive service is also provided. Inter-city service is provided by both Plymouth and Brockton and Bonanza Bus Companies.

*Yarmouth Easy Shuttle (YES) was first introduced in the summer of 1994. When first undertaken a grant subsidized the cost. The service operates 7 days a week June 25 to Sept. 5. In 1999 a base fare of \$1.00 was introduced.

* Taxi service provides an additional transit option to commuters and residents. Three basic companies are serving Yarmouth.

D. PARKING SYSTEM

* Existing public parking facilities in Yarmouth were inventoried by the Consultant. There were 2776 total spaces available for public parking. It should be noted that although publicly all are owned, not all of them are open to the general public (such as the schools), and some facilities provide parking to the public for a fee (such as the beaches.)

* All the school parking lots and the Town Hall lot were underutilized on a summer weekday. Public beach and park lots, except for Dennis Pond, were also underutilized on a summer weekday. However on a summer weekend several beaches and one pond were at capacity.

*No overnight parking is allowed at the pay beach parking lots. Attendants are present during the day at parking lots where fees are collected or permits checked.

E. BICYCLE/PEDESTRIAN FACILITIES

*While traditionally not a major element in the transportation system, bicycle transportation does offer an alternative mode for local travel on Cape Cod; and could have a positive effect on reducing vehicle travel, particularly during the non-winter months on the Cape.

*A review of our local as well as regional transportation goals shows that bikeways should provide important transportation linkages to reduce peak traffic demands, instead of for recreation usage exclusively.

*Public support and enthusiasm for the development of a more friendly pedestrian environment and the improvement of existing facilities is widespread on Cape Cod.

*Existing bikepaths can be found in Yarmouth; there are two: Setucket Road, and Bayberry Hills Golf Course.

*Inventories have shown Yarmouth has an inadequate sidewalk system. We are in need of developing a continuation system for pedestrian travel. Curbing is non-existent in many areas.

* The town has proposed a sidewalk plan for future development, and the plan should be up-dated.

F. PLANNED/ON-GOING PROJECTS

*There are a number of improvements in process in the Town of Yarmouth. Most have been initiated by the Town, although several resulted from private development or private initiatives.

* Buck Island Road - Waiting for state funding

*Higgins Crowell Road - Final design stages

* Willow St. at Exit 7 - Reconstruction of interchange and road

*Station Ave.- Under study and design.

G. ACCIDENT EXPERIENCE

* Originally data on accident history for the study area roadways was reviewed as part of earlier studies through Mass. Highway Dept. records for the period 1 Jan 91 - 31 Dec 93. In addition MHD Statewide High Accident Listing was also reviewed - (1000 high accident locations).

* From this data 12 locations and the 2 Route 6 interchanges were identified; these experienced 5 or more reported accidents per year for the 3-year period. (See following map)

* In general, any intersection with 5 or more accidents per year has been categorized as a hazardous location and further investigation and analysis is warranted.

*Major findings from reviewing this accident data includes the following:

- the highest accident locations are related to the two interchanges with Route 6.

- there are a number of locations that experienced more than 5 reported accidents which are currently

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- Action Items With Areal or Project Applications -



4 - Address the 11 most critical safety-deficient locations, as indicated by the  symbol.

11 - New traffic signals at intersection of Willow St. & Route 6A and Sea View Ave. & Route 28.

9 - Improve interchanges to full clover leaves at Exits 7 and 8 on Mid-Cape Highway.

1 - Implement plans for improvements on Willow St., Higgins Crowell Rd., Station Ave., and Buck Island Rd.

21 - Extend the proposed work on Higgins Crowell Rd. to Barnstable town line.

13 - Ansel Hallet Rd. to be re-located at intersection of Higgins Crowell with Willow St.

12 - Higgins Crowell Rd. improvements to include widening, medians, bike paths to schools, and new Bus Station.

2 - Study feasibility of extending Buck Island Rd. to Yarmouth Rd. in Barnstable.

8 - Explore new YES route along Station Ave. corridor to connect with existing Route 28 route.

10 - Better traffic signals on Route 28 - particularly at Berry Ave., South Sea Ave., Forest Rd., and Old Main St.

14 - On Station Ave. - improve safety in front of A&P.

6 - Complete off-road east-west bicycle trail.

20 - Extend existing bicycle and pedestrian trail from former landfill east to Dennis along railroad.

22 - Improve access to White's Path.

19 - Complete and improve sidewalks on Route 28 and Station Ave.

18 - Provide additional public parking at Packet's Landing and at the old Drive-In property.

7 - Provide sidewalks or multi-use paths along Forest Road.

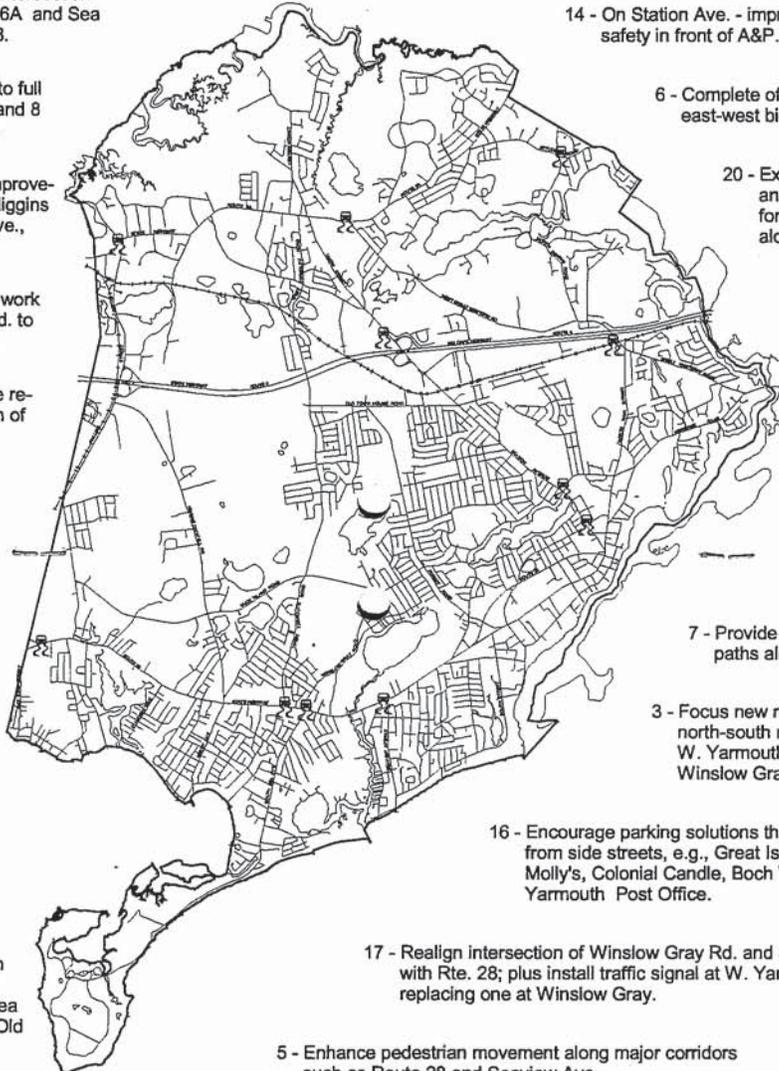
3 - Focus new re-hab. effort on key north-south roadways - Forest Rd., W. Yarmouth Rd., Seaview Ave., Winslow Gray Rd., South Sea Ave.

16 - Encourage parking solutions that focus access from side streets, e.g., Great Island Plaza, Molly's, Colonial Candle, Boch Village, South Yarmouth Post Office.

17 - Realign intersection of Winslow Gray Rd. and South Sea Ave. with Rte. 28; plus install traffic signal at W. Yarmouth Rd. replacing one at Winslow Gray.

5 - Enhance pedestrian movement along major corridors such as Route 28 and Seaview Ave.

15 - Extend summer bus service to Sea Gull Beach.



NOTES:

1 - Total Number of policy & action items in text = 104

2 - Number of those proposals shown above = 52

3 - For description of each action & policy item see Vols. I or II of the Long Summary Report on the Transportation Plan



programed for improvements.

- A number of locations experienced a high proportion of personal injury accidents.
- See the Long Summary Volumes for substantially more detail.

V. SUMMARY OF TRANSPORTATION CONDITIONS

In summary, the analysis of existing and future transportation system conditions has resulted in identification of a number of facilities, locations, or services which should be addressed in the long range transportation plan.

Major findings of the analysis can be summarized as follows:

1. There are several major congestion locations within the Town including Willow Street, Route 28 and Station Avenue, as well as a number of isolated problems. The Willow Street and Station Avenue corridors are currently undergoing planning and design studies.
2. A number of intersections have experienced more than five (5) accidents per year and pose potential hazardous locations. While most of them are being addressed through ongoing work, several of these locations exist along Route 28 and will need attention.
3. During the summer, there are four (4) to five (5) major beach parking areas that are generally used to capacity. Guiding visitors to other available space in an efficient manner is needed.
4. Actual "village" or business districts are not well defined and as such, business district public parking is not a major issue under current conditions. However, if "villages" or activity centers" are defined in the future, public parking could be vital to the redevelopment process.
5. The biking and walking facilities continue to be improved but there are gaps in the system or key streets without sidewalks. These areas should be addressed in the future.
6. The shuttle bus (YES) service is generally good, but it travels the congested Route 28 route which results in delays which may affect schedule reliability and ridership. Deficiencies that may need to be addressed involve schedules, publicity of routes/schedules, identification of stops, and the lack of "in town" connections (if not on Route 28).

Given the identified problems and the ongoing work, the focus of the 2000 Long Range Transportation Plan in Yarmouth should be as follows:

7. Route 28 - Decisions on what it should be, how to get there, and the specific actions needed, should be identified.
8. Improvements in east-west flow should continue to be explored since there will be a limit to the type of improvements possible to Route 28 and Route 6A. This includes a more detailed feasibility study of extending Buck Island Road to the Willow Street/Yarmouth Road corridor.
9. Ensure that appropriate infrastructure exists and is maintained in the "activity centers" and in any anticipated commercial growth areas.
10. Improve the safety at the isolated locations that experience five or more accidents per year.
11. Build upon the BYTS plan including the local Congestion Management System Plan which utilizes high technology to monitor, evaluate, and manage the area's roadway system.
12. Complete key links of sidewalks or consider multi-use pathways in important areas. Streets to consider improvements (beyond ongoing projects) include Seaview Avenue, South Shore Drive, South Sea Avenue, Forest Road and Route 28.
13. Residential areas should be connected with walkways and/or bike paths to major points of interest including parks, schools, government buildings and commercial districts.
14. Enhancements to the alternative and transportation modes, including transit improvements related to highly visible bus stops, greater publicizing of the service and potential service connections off Route 28 within the Town are worth exploring.
15. Yarmouth has 11 roadways designated as "scenic roads" under state enabling legislation. The Planning Board has to hold public hearings on any proposed tree trimming,, stone wall moving or removal. This hearing is held in conjunction with the Tree Warden. Other roads appear to be suitable for designation by Town Meeting as "scenic."

VI. ROUTE 6A CORRIDOR

* Route 6A, Old King's Highway, is a two-lane, east-west, state numbered route, that has "scenic road" status as designated by special state legislation. It serves six towns, including Yarmouth, along one of the oldest, largest, and longest historic districts in the country, the Old King's Highway Historic District.

* The Yarmouth section is often narrow and winding. It follows its 3.72 mile length in Yarmouth past ancient stone walls, historic trees, and the varied architectures of the past 400 years.

* Existing land use is mostly medium density residential, with a few small shopping areas. Overhead utility poles, street lighting, and narrow shoulders turn along much of the route. Sidewalks are evident from the Barnstable town line eastward to near Weir Road. Curbing is sporadic. There are flashing yellow caution signals at two intersections.

* Extremely heavy summer traffic volumes congest the road. There is occasional on-street parking in some commercial areas. Bicyclists also share the road in-season.

* Due to its unique character, alternative design standards need to be used to address solutions to increased speed limits, guardrails, fencing, signage, drainage and utility issues. Resolution of the conflicts over these standards with Mass. Highway Department should be a high priority of the Transportation Plan.

VII. ALTERNATIVE TYPES OF ACTION

In addressing transportation problems and meeting future needs, there are a variety of alternative approaches and techniques available.

A. Travel Demand Management (TDM)

* The growth that is highly possible in this Town over the next 15-20 years has the potential to cause severe congestion. While roadway and capacity improvements will be necessary, simply constructing more roadway capacity will not be sufficient to meet demands that could exist.

* An increasingly important part of dealing with transportation systems is the consideration of TDM and Transportation System Management (TSM) in addressing transportation problems and needs.

* TDM strategies have become critically important in areas of environmental and historical significance where construction presents a limit to adding roadway capacity.

* The research as it pertains to Yarmouth has indicated that:-

* TDM alone will not generally solve the congestion or safety problems.

* Employer commitment to the TDM concept are needed, or its success will be limited, particularly for the larger employers, and when programs are geared to work commute.

* There are many actions which can be considered to be in the realm of TDM, improved transit, enhanced ridesharing, enhanced bicycling and walking, parking management, and peak demand management.

* TDM programs for employers, developers, and the residential population are designed to shift employees out of single occupant vehicles and into its alternative modes, such as car pools, van pools, transit, bicycling and walking.

* Based on the "Transportation Goals and Objectives," the research findings, the condition of existing services and facilities, and the survey findings, a list of alternative TDM strategies for the region and for Yarmouth was developed:

* Improved traveler guidance

* Continued expansion of bicycle facilities

* Improved transit service

* Provision of sidewalks on major roads

* Transit friendly design

* Mixed use developments/densities to support alternative modes of transportation.

B. Transportation System Management (TSM)

* TSM has tended to be thought of as more straight forward traffic engineering. With "Intelligent Traffic System (ITS)" principles and concepts taking hold, TSM has grown into ideas related to area wide advanced traffic management systems (ATS), advanced traveler information systems, and priority systems, like high occupancy lanes and high occupancy lane by-pass control.

* TSM planning has been formalized longer than the TDM focus and importantly, can also be more readily evaluated in quantifiable terms. For example, improved signal timing can be measured through the reduction in travel time and delay data. Studies of efficient signal systems indicate that delays and stops can be reduced by 25%, travel time by 10%, and air pollution by 16-19%.

* TSM alternatives generally consist of traditional traffic engineering techniques, some of which are low cost actions such as pavement markings, or altering the lane use on an approach to an intersection

* Specific types of TSM action that need to be considered include the following:

- Improved signal timing

- Circulation patterns

- Provision of turn lanes

- Monitoring travel conditions

- Install traffic signals

- Improved guide signing

- Turn restrictions

- Access Management Practices

C. Major Capacity Enhancement Projects.

- * This category of project tends to involve roadway widening, significant intersection widening, and new roadways or segments, and traffic signalization projects.
- * Roadways within the town that experience substantially high volumes year round include Willow St., Station Ave., and Route 28. These roadways are vital-arterials of the Town providing regional connections to Route 6, and local access to governmental, educational, and employment land uses. While sections of Willow St. and Station Ave. may be able to be widened, limited right of way currently poses constraints to widening sufficiently to add substantial capacity to these three roadways.
- * Overall review of the existing and future roadway conditions in the Town show that:
 - Willow Street from Route 6 south to the Barnstable town line and Station Ave. from Route 6 to Old Town House Rd. need to provide more than one lane per direction to adequately carry the volumes in a safe and efficient manner.
- * While Rte. 28 experiences high year round volumes and some of the most service vehicle-oriented travel congestion in the entire region, its 40 ft. right of way and current development character limits any major improvements. Its current vehicle, pedestrian, and bike-way demands, plus the presence of transit service and the redevelopment potential along the entire corridor warrants that the Town examine its potential long range possibilities and the mechanisms to achieve the improvements.
- * In addition to the roadways listed in the table, major improvements at the two Route 6 interchanges are critically needed.

**TABLE 15
LIST OF ROADWAYS REQUIRING IMPROVEMENT**

Roadway	Access Mngmt	Major Widening	Type of Actions		Sidewalk/ Bike Lanes	Is It Currently Programmed
			Turn Lane Consideration	Resurfacing		
Willow St	Yes	Yes	Yes	Yes	No/Yes	Yes
Higgins						
Crowell Rd	No	No	No	Yes	Yes/Yes	Yes
Station Ave						Yes
Route 28	Yes	No	Yes	No	No/Yes	No
Buck Island	No	No	Yes	Yes	Yes/Yes	Yes
Winslow						
Grey Rd	No	No	No	Yes	Yes/Yes	No
South Sea Ave	No	No	No	Yes	Yes/Yes	No
Seaview Ave	No	No	No	Yes	Yes/Yes	No
Forest Rd	No	No	No	Yes	Yes/Yes	No
W. Yarm Rd						
White Path	Yes	No	Yes	No	Yes/Yes	No

Source: Draft Text for Yarmouth Comprehensive Plan - Transportation Element - Submitted by MS Transportation Systems, Inc. December 1999

VIII. RECOMMENDED PLAN

Based on the analysis of existing and future transportation conditions within the community and working closely with local officials, staff, and the Transportation Steering Subcommittee, a series of recommendations were developed that make up the 2000 Yarmouth Transportation plan. The recommended plan provides a direction for the Town to proceed in terms of providing transportation services and facilities for the next 15 years. The following describes the Plan elements:

A. Roadways

- Complete implementation of the major roadway improvement plans currently under design including Willow Street, Higgins Crowell Road, Station Avenue and Buck Island Road.
- A major focus of the long range plan is to develop management plans and capacity enhancement actions to improve the operations, safety, pedestrian/bicycle environment and aesthetics of Route 28.
- Study the feasibility of extending Buck Island Road to Yarmouth Road in Barnstable to enhance internal east-west travel.
- Focus new rehabilitation effort on key north-south roadways including Forest Road, West Yarmouth Road, Seaview Avenue, Winslow Grey Road and South Sea Avenue,
- Develop a set of guidelines and policies related to Access/Curb Cut Management for the major arterials serving the commercial areas.
- Address the eleven most critical safety deficient locations that include:

- | | |
|---|---------------------------------------|
| 1. Route 6 at Union Street interchange(s) | 6. Station Avenue at Regional Avenue |
| 2. Route 28 at East Main Street | 7. Route 28 at South Sea Avenue |
| 3. Route 28 at West Yarmouth Road | 8. North Dennis Road at Setucket Road |
| 4. Route 6A at Union Street | 9. Route 6A at Willow Street |
| 5. Station Avenue at Wood Road | 10. North Dennis Road at Whites Path |
| | 11. Route 28 at Seaview Avenue |

Continue emphasis on system management as developed in the BYTS Plan, particularly the Congestion Management System Plan and its use of technology to monitor and manage the roadway system.

B. Bicycle/Pedestrian

- Enhance pedestrian movement along major pedestrian corridors such as Route 28 and Seaview Avenue.
- Continue completion of the off-road east-west bicycle trail.
- Provide sidewalks or multi-use paths along Forest Road and other roadways.

C. Transit Service

- Provide shelters, recognizable signs, turnouts along the YES route.
- Explore new YES route along Station Avenue corridor; connect with existing Route 28 bus route.
- Work with the business community and the Transit Authority to effectively market and advertise the transit service.

D. TDM (Transportation System Management)

- Provide improved advanced travelers information, particularly with regards to summer public beach parking.
- Develop effective guide signing to major sections of Town and key facilities including recreation areas and bicycle routes.
- Develop economic and development incentives to encourage larger parcels which can then be developed as mixed use with amenities to further encourage alternative modes and a reduced number of vehicular trips.

Note: The first 11 pages of this Executive Summary represents inventory, analysis, and proposals, extracted from the report prepared by MS Transportation Systems, Inc. in December 1999 on the Yarmouth Comprehensive Plan - Transportation Element. In addition within those 11 pages additional material on the Goals and Objectives has been added by Sub-Committee and staff, as has been a paragraph on the unique character of the Route 6A Corridor. The final page, 12, represents a summary of action items that may be used to measure progress on the Transportation Plan.

YARMOUTH TRANSPORTATION PLAN
RECOMMENDED ACTION ITEMS

IX. Summary of Recommendations

Constraints on Yarmouth's transportation planning began more than 50 years ago when major roadways were built without an awareness of the traffic demands of the future. Yarmouth must adapt to growth and assure that transportation indicators are part of all its planning activities. These facts guide the six basic elements of the current planning strategy:

1. Make sure that the Massachusetts Department of Highway, is aware of the Town of Yarmouth's priorities:
 - *Improved interchanges (full clover leaves) at Exits 7 and Exit 8 on the Mid-Cape Highway;
 - *Better traffic signals on Route 28, particularly at Berry Avenue, South Sea Avenue, Forest Road and Old Main Street;
 - *New traffic signals at the intersection of Willow Street and Rte. 6A and at the intersection of Seaview Ave. and Rte 28.
 - *Consider solutions for roadways other than the usual "greenbook" responses.

2. Complete planned improvements to major town arteries, specifically:
 - *Higgins Crowell Road - includes widening, median, bike paths by the schools and new Police Station;
 - *Ansel Hallet Road - relocates the Higgins Crowell intersection with Willow Street;
 - *Station Avenue - improves safety in front of the A&P;
 - *Willow Street - featuring some widening and other improvements.

3. Recognize that any solution to Route 28 problems (where the right of way width varies from forty to 60 feet) requires innovative solutions, such as:
 - *Prohibit left turns except at intersections with traffic signals;
 - *Reduce the number of streets that intersect with Route 28;
 - *Furnish lodging places with bus and trolley schedules and encourage patrons to use public transportation;
 - *Provide attractive bus stop shelters with seating and schedule information;
 - *Extend the summer bus service to Sea Gull Beach;
 - *Encourage shared access points and prohibit multiple curb cuts at single sites;
 - *Minimize curb cuts through changes in the Zoning bylaw and other incentives;
 - *Encourage parking solutions that favor access from side streets (Examples include; Great Island Plaza, Molly's and Colonial Candle, Boch Village and South Yarmouth Post Office);
 - *Stripe key intersections (or, better still, provide landscaped medians) to provide stacking lanes;
 - *Realign the intersection of Winslow Gray Road and South Sea Avenue. Install a traffic signal at West Yarmouth Road, replacing the one currently at Winslow Gray Road;
 - *Provide additional public parking at Packet's Landing and the old drive-in property;
 - *Develop an alternate route to Hyannis; one possibility is extending Buck Island Road;
 - *Encourage economic redevelopment that positively impacts traffic flow such as upgrading motel sites and conference centers.

4. Support the development of sidewalks, bike paths and walking trails. Examples include:
 - *Complete and improve the sidewalks on Route 28 and Station Avenue;
 - *Extend the existing bicycle and pedestrian trail from the landfill east to Dennis along the railroad right of way;
 - *Extend the planned work on Higgins Crowell to the Hyannis town line;
 - *Link present and future bike paths and walking trails with destinations.

5. Work closely with the Cape Cod Commission and the Towns of Barnstable and Dennis on areas of regional concern.
 - *Access to the Barnstable Municipal Airport;
 - *Location of increased parking at the airport;
 - *Coordinated bus schedules;
 - *Access to White's Path, a regional traffic artery.

6. Develop an ongoing plan to improve accident prone intersections.

April 3, 2000

YARMOUTH COMPREHENSIVE PLAN

CHAPTER 9

TRANSPORTATION PLAN

- Long Summary Report -

Volume I - Inventory

Previously Prepared and Endorsed Plan Chapters

1. Introduction
2. Outreach Program
3. Population Study
4. Economic Development - Inventory
5. Intergovernmental Coordination
6. Recreation & Open Space
7. Coastal Resources
8. Land Use/Growth Management
10. Economic Development
11. Wetlands
12. Water Resources
13. Wildlife and Plant Habitat
14. Affordable Housing

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Planning Staff of the Planning Division
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of Natick, MA

TOWN OF YARMOUTH
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	2 OUTREACH PROGRAM	
	3 POPULATION STUDY	
	4 ECONOMIC DEVELOPMENT INVENTORY	
	5 INTER-GOVERNMENTAL COORDINATION	
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	7 COASTAL RESOURCES	April 1997
	8 LAND USE/GROWTH MANAGEMENT	December 1998
	10 ECONOMIC DEVELOPMENT - ANALYSIS & PLAN	January 2000
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			Phase II	Active
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SUMMARY DOCUMENT

Chapter 19 Composite Plan

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CREDIT PAGE FOR CONSULTANT

1. For this particular subject we have retained a traffic engineering consulting firm, **M.S. TRANSPORTATION SYSTEMS, INC. OF NATICK, MA.,** formerly McDonough & Scully, Inc., with Mr. William Scully as the Principal. He has proven very helpful in preparing the report on this highly technical subject.
2. Virtually all of the two "long summary" volumes for this chapter of the Comprehensive Plan on "transportation" were prepared by MS Transportation Systems. We are simply reproducing that report by the consultant in our standard long summary format. That is particularly true of this portion covering items.
3. Eleven of the 12 pages in the transportation Plan's Executive Summary document were also extracted from the Consultant's report, including inventory, analysis, and transportation plan proposals. Staff and Sub-Committee added additional material on goals and objectives, Route 6A Corridor, scenic roads and road classifications, and also action items, implementation schedule and responsibilities.

INTRODUCTION TO THE COMPREHENSIVE PLAN

ORGANIZATION OF THE COMPREHENSIVE PLAN

The Yarmouth Comprehensive Plan is organized so that it will be done by individual chapters about each pertinent subject. There are 18 of these in our work program, and 13 have been completed, with 8 endorsed by Town Meeting and the 5 others used as reference documents. We are the only Cape Town using this incremental approach. It is slower, but surer for us! This particular chapter, numbered 9 in the work program, contains the "Transportation" element, and this document is its "long summary" form. It is one of the basic skeleton chapters of the plan, along with Land Use/Growth Management, Economic Development, and Recreation and Open Space.

WHO IS PREPARING THE PLAN?

Primary guidance for the comprehensive planning program is being given by the "Local Planning Committee", which is made up of the Planning Board, with the assistance of the Growth Policy Advisory Council. Much of the technical work is being done by the planning staff, with assistance from interns and planning aides, and with advice, recommendations and analysis from various consultants. MS Transportation systems, Inc. of Natick, MA. has prepared much of the professional material for this element and assisted the staff and committees. For this subject, "transportation", we have also used a steering sub-committee with one representative from each of four committees, Planning Board, Growth Policy Advisory Council, Yarmouth Economic Revitalization Committee, and the Route 28 Task Force, to help gain consensus.

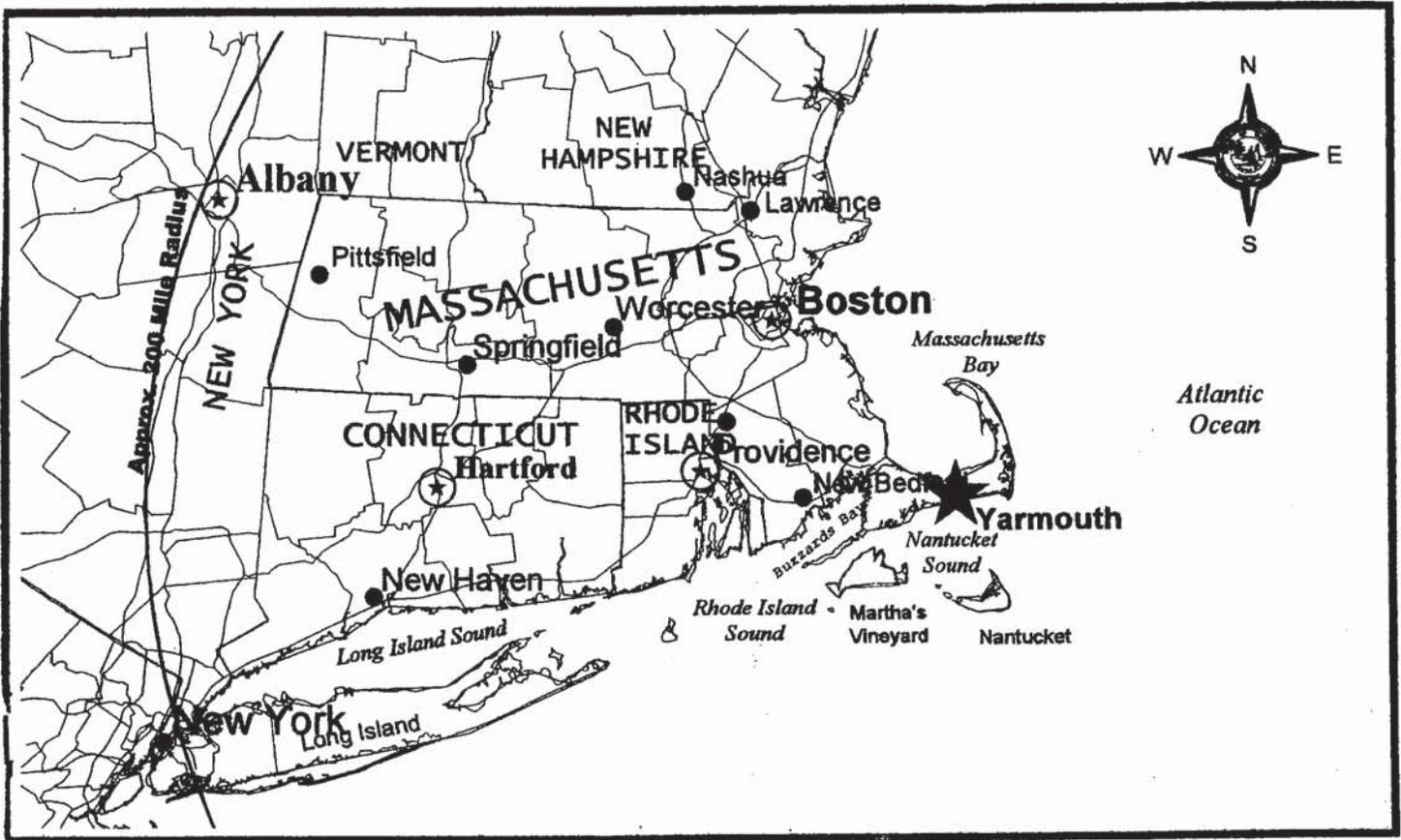
PRESENTING THE COMPREHENSIVE PLAN

In preparing such a far-reaching and complicated plan as this, we realize there must be an extensive and continuous outreach program. In addition to required hearings, we are continuing to use television and radio whenever possible, as well as specially prepared handouts for meetings and "executive summaries" for Town Meeting action. Each of the Comprehensive Plan's Chapters is also a "stand alone" document in itself, so that it can be used separately, or as part of the overall program.

PRESENTATION OF THE PLAN ELEMENTS

You may have noticed the terms "executive summary", and "long summary" in the title pages and in the text. One of the problems in presenting any town's comprehensive plan is that it is written usually for three different groupings of people. Most want only the basics and not a lot of detail, thus we prepare "executive summaries". A second level of interest includes those looking for more basic technical and planning information, such as in this document, the "long summary". Finally, a few want to see our detailed and research materials. Thus we have prepared all three levels of reports for the Plan Elements.

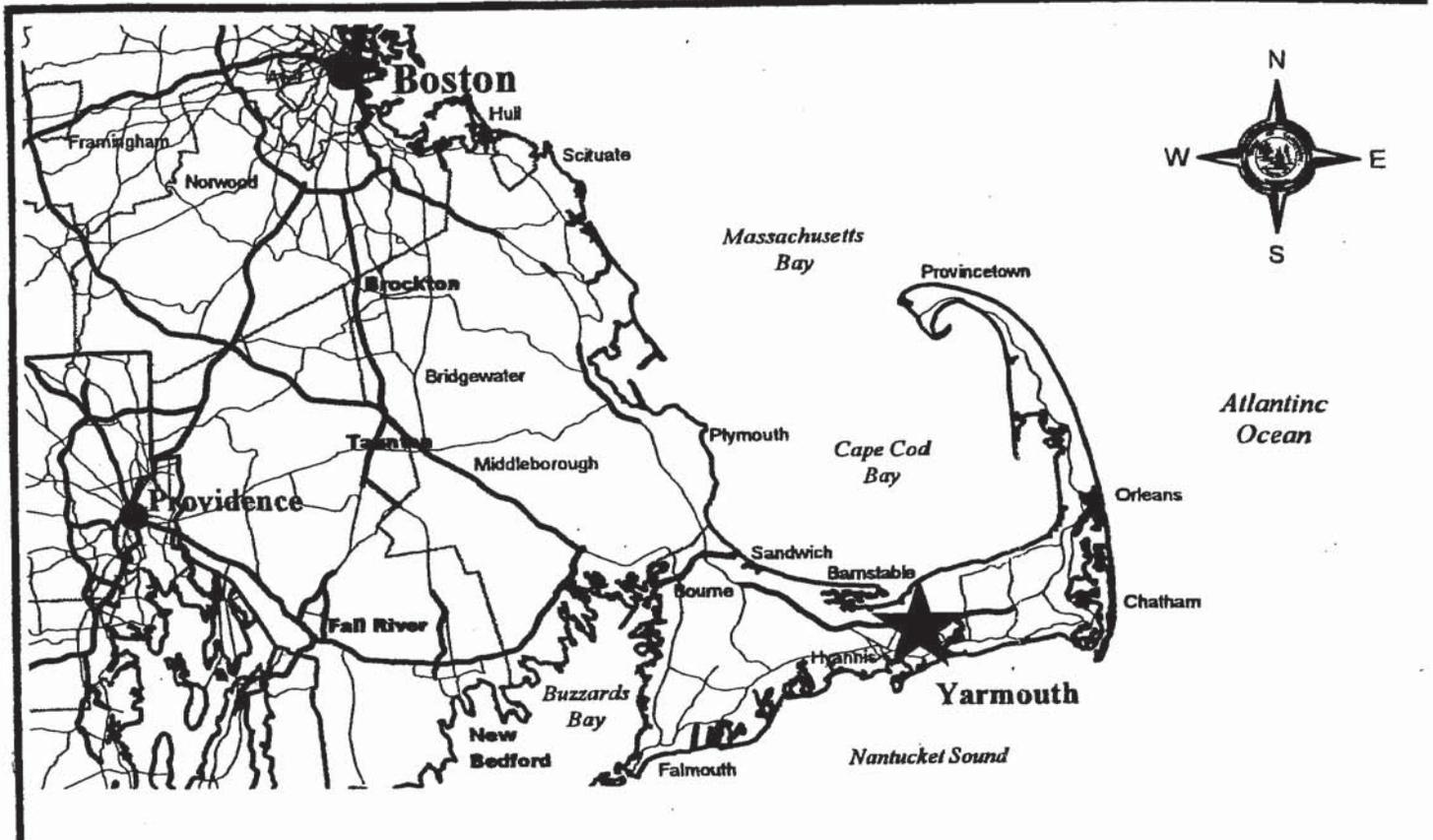
Regional location map



1-1 Map from Here to New York/Albany

The importance of the Cape Cod location cannot be over-emphasized. Yarmouth lies on the Cape Cod neck some 22 miles out into the Atlantic Ocean on a spit of sand pushed up by the last glaciation purportedly 50,000 years ago. It is both the best and worst of locations. On the one hand it is remote for some things and yet very accessible for others. Improved telecommunications have made it just that much more accessible.

Massachusetts Map



1-2 Map of Yarmouth - in a southeastern New England location.

While the Cape was indeed an off-beat site for years, first the construction of the two bridges over the Canal in the early 1930's, and then the construction of the inter-state highway system in the mid-1950's made it highly accessible for tourists and retirees.

The Cape has boomed as a result. But it is a boom that has been achieved at a price - traffic jams, pollution, over-crowding, noise, etc. But this is a location that attracts high-tech trained business persons, especially in telecommunications, related businesses. However, that kind of businesses or industry, although dependent on rapid communication, will cause further growth and stress.

One of the main purposes of the Comprehensive Plan is to try to help deal with the dislocations related to change.

USE OF THE "LONG SUMMARY" APPROACH

The middle level of detail described previously, or the so-called "long summary" is the support document we have used the most. These are sufficient in detail to satisfy most interested persons, are also incorporated by reference into the Town Meeting votes on each chapter. This document is a "long summary" covering the subject of "Transportation."

The "long summaries" are found in looseleaf notebook form so that they may be added to, or amended, or even deleted, fairly easily. They are intended to be used for interested and concerned citizens and committees, and updated on a regular basis. As far as we know we are the only Cape town using this approach.

"SETTING THE SCENE" (For the Transportation Plan) - extracts from the Regional Policy Plan -

- * "Transportation" continues to be one of the most challenging issues facing the Town of Yarmouth. Our present development patterns and the limited nature of the transportation alternatives result in a continued dependence on the automobile for mobility. Traffic congestion is an increasing problem. Our road system is generally adequate to serve Yarmouth's off-season needs, but becomes seriously overloaded during the summer months.
- * Traffic congestion causes driver frustration and air pollution, increases accidents and wastes valuable time and fuel. It is probably the most visible negative consequence of development without appropriate supporting infrastructure.
- * A comparison of 1972 and 1995 traffic volumes for the Bourne and Sagamore bridges, as counted by Mass. Highway Dept., reveals several disturbing trends:
 - A. Average annual traffic volumes in 1995 were higher than summer traffic volumes in '72.
 - B. 1972 summer traffic volumes were exceeded for 8 months by those of 1995.
 - C. Traffic volumes in the summer, are generally double traffic volumes in winter everywhere.
- * Should these trends continue, every month of the year will exceed summer '72 volumes by the year 2001, and these trends are not isolated just to the bridges.
- * Some progress has been made in developing alternatives to automobile transportation. In 1996, public subsidized summer trolley service operated in 7 Cape towns, including Yarmouth, compared to none 5 years previous: Plymouth & Brockton Bus Co. provides year-round bus service between Hyannis and Provincetown via Route 6A, through Yarmouthport.
- * And Cape Cod now has over 50 miles of bicycle paths, providing a viable alternative to auto travel and a desirable tourist attraction, particularly during the summer months.
- * Bus, rail, ferry, and air service is available to and from Cape Cod, generally. Year-round express buses from Hyannis to downtown Boston and Logan Airport via the park and ride lots on Route 6 are available.
- * Reduction of dependence on the automobile is a significant challenge, and our ambitious goal.
- * What is needed is a balanced approach to transportation that follows a sensible land use and growth management policy and includes the following actions and conditions: -
 1. Provides a source of funding for desirable transportation improvements.
 2. Requires new development to mitigate impacts in a manner consistent with Yarmouth's natural, scenic, and historic resources.
 3. Promotes safe access to roadways and property through controlled driveway and intersection spacing.
 4. Promotes land, air, and marine based alternatives to automobile travel.
 5. The need for a suitable land use and growth arrangement policy at the local level cannot be over-emphasized. Without such controls, travel demands will outpace transportation improvements, resulting in deterioration of many of the values that have made Yarmouth extremely desirable.

**INVENTORIES OF EXISTING TRANSPORTATION
FACILITIES**

The initial task in developing the Yarmouth Transportation Plan was compiling the inventory of the existing transportation system. The following pages describe the physical and operating characteristics of the various components of the transportation system including:

- roadway system
- public transportation modes
- parking system
- pedestrian/bicycle modes

A. Existing Roadway Network

Map 1-3 illustrates the roadways selected to be studied as part of the LCP. Each roadway along with key intersections are described below as well.

ROUTE 28

The segment of Route 28 within the study area is categorized as a Principal Arterial by Federal-Aid System and is a part of the National Highway System (NHS). It is under Massachusetts Highway Department (MHD) jurisdiction. It is the main roadway link between Hyannis and Yarmouth. This roadway consists of a two lane cross-section following an east-west alignment, with exclusive left turn and right turn lanes provided at several intersections. On-street parking is not permitted along any section of Route 28. The pavement consists of bituminous asphalt in fair to good condition. The pavement width varies between 26 and 40 feet but is primarily on the lower end. Lane markings typically show 12 foot vehicle lanes with 1 foot curb offsets. Most of the adjacent land uses are commercial. The corridor is characterized by numerous curb cuts. Previous studies have shown that this section averages 70 curb cuts per mile. Right-of-way is very narrow along the corridor. Key intersections along Route 28 in the study area are as follows:

Route 28/East Main Street

The "Y" type intersection of Route 28/East Main Street is a fully-actuated, signalized location. Two large channelization islands divide the minor East Main Street approach providing exclusive left and right turn lanes for Route 28 westbound and eastbound, respectively. Each approach of the intersection provides two lanes. Left turns are prohibited from East Main Street to Route 28 northbound. Pavement conditions at this location were noted to be in good to excellent condition overall.

Route 28/Camp Street

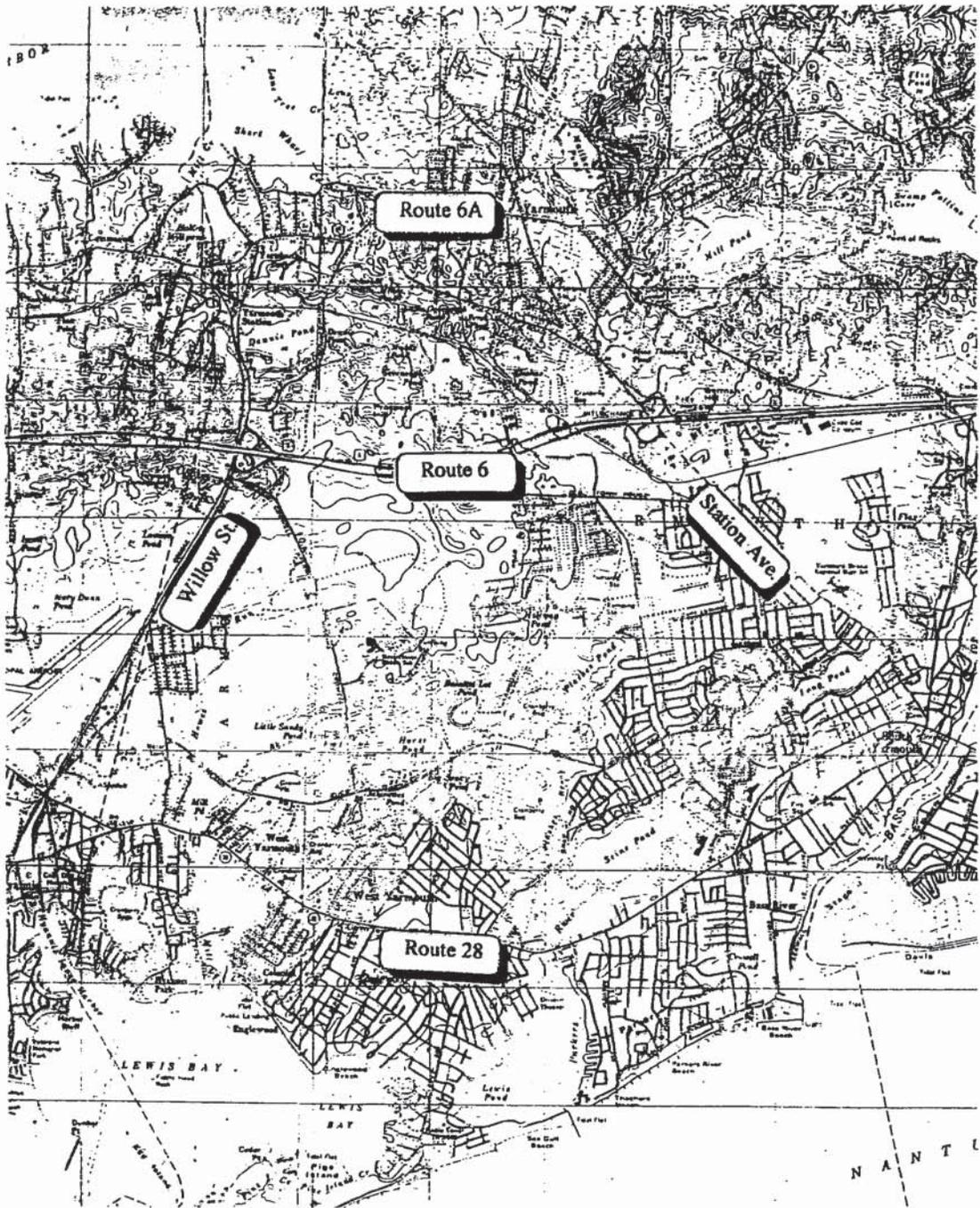
This is an unsignalized "T" type intersection. Camp Street is under STOP sign control. A channelized exclusive left turn lane is provided on the Route 28 eastbound approach.

Route 28/Town Brook Road

Town Brook Road intersects Route 28 to form an unsignalized "T" intersection. The intersection is currently under STOP control with a STOP sign controlling the southbound Town Brook Road approach. The current configuration provides an exclusive left turn lane for Route 28 eastbound traffic, as well as a painted right turn island along Route 28 westbound.

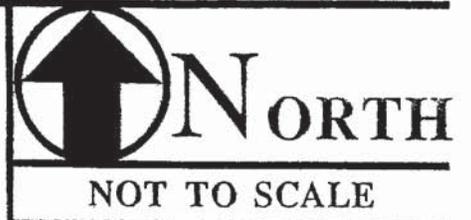
Route 28/Higgins Crowell Road/Berry Avenue

Is a fully-actuated signalized four-way intersection with channelized exclusive left turn lanes 10 feet in width provided on both approaches of Route 28. Higgins Crowell Road and Berry Avenue have two approach lanes to the intersection. "Right Turns on Red" (RTOR) are prohibited on all approaches. It is operating under four phases. There have been proposals to alter the phasing including providing Route 28 left turn protection but this has yet to be implemented by the State.



Major Study Roadways

*Transportation Element
Yarmouth Comprehensive Plan*



Route 28/West Yarmouth Road

This is an unsignalized “T” type intersection with West Yarmouth Road approaching Route 28 from the north. West Yarmouth Road has one approach lane 12 feet in width. Route 28 provides one lane of travel in each direction and has a pavement width of 34 feet. Pavement markings on Route 28 consist of broken yellow lines west of its intersection with West Yarmouth Road, and a double yellow center line east of the intersection. Bituminous asphalt sidewalks, granite curbing and single white edge lines are provided along both sides of Route 28.

Route 28/Winslow Grey Road

This intersection is a four-way semi-actuated traffic signal. The signal is coordinated with a traffic signal location at South Sea Avenue. These two signals operate under four phases; Phase I serves traffic movements from Route 28 between the intersections of Route 28 at Winslow Grey Road and Route 28 at South Sea Avenue; Phase II is a clearance phase; Phase III, if activated, serves pedestrians; and Phase IV serves traffic movement from Winslow Grey Road and South Sea Avenue.

Winslow Grey Road is 23 feet in width and was observed to be driven as two lanes. Channelized exclusive left turn lanes 10 feet in width are provided on both approaches of Route 28. Molly’s Restaurant provides an entrance and an exit drive, each 25 feet in width, separated by a 19 foot island. Pavement markings consist of double yellow center lines and stoplines on Route 28 and Winslow Grey Road, with single white edge lines provided on both approaches of Route 28. Granite curbing and a 5 foot concrete sidewalk is provided with crosswalks located on Winslow Grey Road and Route 28 immediately west of the intersection. “Right Turns on Red” (RTOR) are not permitted from Winslow Grey Road.

Route 28/South Sea Avenue

Previous concepts have been developed to align the South Sea Avenue with Winslow Grey Road. Route 28 intersects South Sea Avenue approximately 250 feet east of Winslow Grey Road to form a three-way signalized intersection. Traffic is controlled by a semi-actuated traffic signal and as previously mentioned, it is coordinated with the signal at Winslow Grey Road. South Sea Avenue is 24 feet in width and was observed to be driven as two lanes. The Route 28 eastbound approach provides one multi-purpose through/right turn lane 15 feet in width. The Route 28 westbound approach consists of a 10-foot wide exclusive left-turn lane and a 15 foot wide through lane. Double yellow center lines and stoplines are provided on all approaches of Route 28. Granite curbing and five foot cement sidewalks are provided with crosswalks located on South Sea Avenue and Route 28 immediately east of the intersection. “Right Turns on Red” (RTOR) are not permitted from South Sea Avenue.

Route 28/Seaview Avenue

This is an unsignalized “T” type intersection with Seaview Avenue approaching Route 28 from the south. Seaview Avenue has one exclusive left-turn lane and one right-turn lane 11-foot in width. A channelized exclusive left-turn lane is provided on the Route 28 westbound approach. Previous analysis has shown this location to warrant a signal. Seaview Avenue is a major local collector providing access to the waterfront’s public beaches.

Route 28/Willow Street

This intersection is an unsignalized “Y” type intersection with Willow Street approaching Route 28 from the southeast. Willow Street has one approach lane 11-foot in width. Route 28 provides one lane of travel in each direction. Land use in the vicinity of this intersection is a parking lot with approximately 35 spaces on the southwest side of Willow Street, a liquor store with approximately 10 parking spaces on the southern side of Route 28 and northeast of Willow Street, and several retail stores on the northern side of Route 28.

Route 28/Main Street

The "Y" type intersection of Route 28/Main Street is an unsignalized intersection with Main Street approaching Route 28 from the southeast. Two large channelization islands divide this intersection providing one exclusive channelized left-turn lane from Main street, one exclusive channelized right-turn lane for eastbound Route 28, and one channelized section containing one Main Street right-turn lane and one Route 28 westbound left-turn lane.

Route 28/Long Pond Drive

This intersection is a three-way fully-actuated signal controlled intersection with Long Pond Drive entering Route 28 from the north at the stem of the "T". The signal is operating under three phases. The Route 28 eastbound approach to the intersection consists of one left-turn lane and one through lane. The Route 28 westbound approach to the intersection consists of one through traffic lane and one through/right-turn lane.

Route 28/Forest Road

This intersection is a four-way fully-actuated traffic signal controlled intersection. It is operating under three phases. Improvements to the intersection are planned. Both Route 28 eastbound and westbound approach to the intersection consist of two lanes, one left-turn lane and one through/right-turn lane. Forest Road contains one travel lane in each direction.

Route 28/Wood Road

This intersection is an offset unsignalized intersection with Wood Road approaching Route 28 from the south via a jughandle and the north. STOP signs control traffic movements from Wood Road. Wood Road provides one travel lane in each direction. Route 28 eastbound consists of one exclusive left-turn lane and one shared through/right-turn lane. Route 28 westbound provides one shared lane which permits all movements. Land uses in the vicinity of this intersection are Yarmouth Town Hall and John Simpkins Elementary School

Route 28/North Main Street/Old Main Street

This intersection is located in the southeastern portion of the town. Route 28 forms the east and west legs of this four-legged fully-actuated signalized intersection. The Route 28 approaches each consist of a 10 to 11-foot wide exclusive left turn lane and a 11 to 12 feet wide shared through/right-turn lane. The Old Main Street approach to the intersection consists of one lane, approximately 12 feet wide, and permits all movements. The North Main Street approach to the intersection consists of an 11-foot wide exclusive left-turn lane and a 10 foot wide shared through/right-turn lane. The intersection is controlled by a four-phase fully-actuated traffic signal. The first phase permits all movements on the Route 28 approaches. The second phase is an advance phase for the movements from North Main Street. The third phase allows all movements from both North Main Street and Old Main Street and the fourth phase, if activated, serves pedestrians. Land use in the vicinity of the intersection consists of several motels, a service station and a convenience store.

Route 28/Pleasant Street

This intersection is an unsignalized "T" type intersection with Pleasant Street approaching Route 28 from the south. Pleasant Street is one-way with direction towards the south and is approximately 20 feet in width. Route 28 provides one lane of travel in each direction on a pavement width of 28 feet. Pavement markings on Route 28 consist of a double yellow center line. Bituminous asphalt sidewalks are 4-ft. in width, granite curbing and single white edge lines are provided along both sides of Route 28.

HIGGINS CROWELL ROAD

Higgins Crowell Road serves the Town of Yarmouth as a minor arterial roadway providing a connection between Willow Street, approximately 200 feet south of the Route 6 Interchange at Exit #7 and Route 28 to the south. The roadway, under local jurisdiction, serves a number of local streets and provides access to residential land uses along its length as well as two elementary schools. Higgins Crowell Road, which follows a north-south alignment, is a two-way roadway, approximately 24 feet wide providing two travel lanes and narrow, sand shoulders. Due to its lower traffic volumes and close proximity to Route 6, Higgins Crowell Road is used as an alternative to Willow Street to reach Route 28.

Higgins Crowell Road consists of bituminous concrete pavement which is in fair to good condition. Lateral obstructions in the form of utility poles and vegetation are set back a sufficient distance from the roadway and, consequently, do not impede traffic flow.

Key intersections along Higgins Crowell Road in addition to those previously discussed are as follows:

Higgins Crowell Road/Willow Street

This intersection is in close proximity of the Route 6 eastbound on ramp. Higgins Crowell Road intersects Willow Street to form an unsignalized "T" intersection. The intersection is currently controlled by a "STOP" sign on the Higgins Crowell westbound approach. Plans are to signalize this location in the future.

Higgins Crowell Road/Buck Island Road

This is a four-way fully-activated signalized intersection. The intersections presently is operating in two phases. The signal is scheduled for upgrading as part of the Buck Island Road reconstruction project. The Buck Island Road approach to the intersection consists of one lane, approximately 20 feet wide and permits all movements. The Higgins Crowell Road approach to the intersection consists of one 14-foot lane. On the Buck Island Road eastbound approach to the intersection, the vegetation should be out back..

WILLOW STREET

Willow Street, the continuation of which is known as Yarmouth Road in the Town of Barnstable, is a two-lane, two-way major arterial roadway which follows a north-south alignment and provides a link between Route 6A in Yarmouth Port and Route 28 in Hyannis. Approximately 24 feet in pavement width, a soft, sandy shoulder is provided along most of its length. There is also an interchange (No.7) with Route 6 on Willow Street. Except for the immediate interchange area, the roadway is under local jurisdiction.

Willow Street consists of bituminous concrete pavement which was observed to be in good condition, as were the pavement markings (solid yellow centerline) on this roadway. Lateral obstructions, mainly in the form of utility poles, although located relatively close to the edge of pavement, appear to have only a limited effect on traffic flow. The speed limit along Willow Street is posted 35 MPH and 40 MPH, depending upon location. Major improvements are currently planned for Willow Street from the interchange to the Barnstable townline. Key Willow Street intersections are as follows:

Interchange #7 on Route 6

At this interchange, both Willow Street approaches provide one through lane. The westbound ramps are situated on the northerly side of Route 6 and the eastbound ramps are located on the southerly side, forming a partial cloverleaf interchange. Both ramp systems presently intersect with Willow Street at channelized, unsignalized "T" type junctions. Plans are to modify the geometry and signalize the ramps.

Willow Street/Camp Street

This is an unsignalized "Y" type intersection with a curbed delta island dividing the Camp Street approach and allowing two way traffic on both sides of Camp Street. Camp Street, the minor leg of this intersection, is under STOP sign control. This type of geometry provides a number of turning options to the motorist resulting in an increased number of potential conflicts, when compared to a typical "T" type intersection. In addition, this geometry decreases the ability of drivers to predict the movements of other vehicles. The approach on the northerly side of the delta island on Camp Street also intersects Willow Street at an acute angle, making it difficult for motorists stopped on Camp Street to clearly view vehicles traveling northbound on Willow Street approaching the intersection.

The pavement at this intersection is in good condition. The STOP sign located at the northeast corner of the intersection facing the northern Camp Street approach is in need of repair and remounting. There is no STOP sign facing the southern approach of Camp Street. Overall, the pavement markings at this intersection are in good condition, however, both stop bars located on the dual Camp Street approach are in need of restriping

BUCK ISLAND ROAD.

Buck Island is a local, minor arterial street providing a connection between Camp Street and Winslow Grey Road. It intersects with a number of other minor arterials, such as Higgins Crowell Road and West Yarmouth Road, as well as providing access to other local streets. The land use along Buck Island Road is mostly residential along its length. The Sandy Pond Recreational Area is located off Buck Island Road.

Buck Island Road follows an east-west alignment, and is a two-way roadway approximately 24 feet wide, providing two travel lanes and sandy shoulders. A solid yellow center line and solid white edge lines, which were observed to be in good condition during the field inventory are provided. Buck Island Road consists of bituminous concrete pavement which is in good condition, although some cracking was noticed. Lateral obstructions in the form of utility poles and vegetation are set a sufficient distance back from the roadway and, therefore, have only a limited effect on traffic flow. Buck Island Road is planned for reconstruction in the near future which will add a sidewalk and some additional pavement to better accommodate bicycles. Key intersections along Buck Island Road are as follows:

Buck Island Road/Camp Street

This is an unsignalized "T" type intersection under STOP sign control with Buck Island Road serving as the minor approach. Channelization is provided on Buck Island Road at this location by a small raised median strip and two raised delta Islands delineated with granite curbing. It should be noted, however, that the mouth of the channelized right turn lane on the minor approach is somewhat narrow in width, and it appears that vehicles commonly drive over the curb.

Buck Island Road/Town Brook Road

This is a four-legged unsignalized intersection with "STOP" signs installed on the Town Brook Road approaches. One travel lane is provided in each direction. Lane use in the vicinity of this intersection is residential in nature.

Buck Island Road/West Yarmouth Road

This intersection is a four-way fully-actuated signalized intersection. The West Yarmouth Road northbound approach to the intersection consists of a 12-foot wide shared left-turn/through/right-turn lane, the southbound approach to the intersection consists of a 11-foot wide exclusive right-turn lane, and a 12-foot shared through/left turn lane. The Buck Island Road westbound approach to the intersection consists of one 15-foot wide shared through/left-turn lane, and a 24-foot wide exclusive right-turn lane. The Buck Island Road eastbound approach to the intersection consists of an 18-foot wide through/left-turn lane, and a

24 foot wide exclusive right-turn lane. The signal has been operating since spring of 1994, and operates in 3 phases. Two large channelization islands divide the intersection providing exclusive right turn lanes for Buck Island Road.

Buck Island Road/Winslow Grey Road/Lake Road

This intersection is an unsignalized intersection. Buck Island intersects Winslow Grey Road from the west and forms the stem of the "T". Two islands divide Buck Island Road providing one exclusive left-turn lane and one right-turn lane. Lane use in the vicinity of the intersection is residential in nature.

CAMP STREET

Camp Street serves the Town of Yarmouth as a minor roadway providing a connection between Willow Street and Route 28. It serves a number of local residential streets and provides access to the mainly residential land uses along its length. Camp Street, which generally follows a north-south alignment, is a two-way roadway, approximately 24 feet wide providing two travel lanes and narrow, sandy shoulders. The posted speed limit for Camp Street is 30 miles per hour (MPH) and includes posted "Slow Children" warning signs. A solid yellow center line and solid white edge lines, which were observed to be in good condition during the field inventory, are provided along the entire length of Camp Street. Camp Street consists of bituminous concrete pavement which is in fair to good condition. Lateral obstructions in the form of utility poles and vegetation are set a sufficient distance back from the roadway and, consequently, do not impede traffic flow.

WEST YARMOUTH ROAD

West Yarmouth Road is a local, minor arterial street providing a connection between Route 28 and Route 6A. It intersects with a number of other minor arterials, such as Buck Island Road and Old Town House Road, as well as providing access to other local residential streets along its length. Following a generally north-south alignment, West Yarmouth Road is a two-way roadway, approximately 22 to 24 feet wide, providing two travel lanes and sandy shoulders. A solid yellow center line, observed to be in fair to good condition during the field inventory, is provided on this road. West Yarmouth Road consists of bituminous concrete pavement which is fair to good condition. West Yarmouth Road is an important north-south arterial providing an alternative connection between Route 6A and Route 28. Key intersections along West Yarmouth road are as follows:

West Yarmouth Road/Old Town House Road/Bayberry Golf Course

This is a four-way unsignalized intersection with an All Way "STOP" control. Lateral obstructions in the form of utility poles and vegetation are set back a sufficient distance from the roadway and, consequently, do not impede traffic flow. The off road bicycle trail that now begins at the recently created Old Town House Road recreational area, crosses West Yarmouth Road at this location and continues on a westerly direction. The intersection was recently reconstructed to improve safety.

West Yarmouth Road/White Rock Road

This is a four-way "STOP" sign controlled intersection. West Yarmouth Road provides approximately one 10 ft. wide travel lane in each direction and White Rock Road provides one 9 ft. wide lane in each direction. Land use in the vicinity of this intersections is residential in nature.

In addition to these two intersections, West Yarmouth Road also intersects with Route 28, Buck Island Road and Route 6A.

FOREST ROAD

Forest Road serves the Town of Yarmouth as a minor arterial roadway providing connections between Old Town House Road and Route 28. It serves a number of local streets and provides access to the residential land use along its length. Forest Road consists of a two lane cross-section following a south-north alignment. Exclusive left turn lanes or right turn lanes are provided at several key intersections. The roadway consists of bituminous concrete pavement in fair to good condition. Lateral obstruction in the form of utility poles and vegetation are set back a sufficient distance from the roadway and consequently, do not impede traffic flow. At its northern end (Old Town House Road) the alignment of Forest Road was recently modified to improve safety. The reconstruction also included the start of an off road multi-use path. Key intersections along Forest Road are as follows:

Forest Road/Long Pond Drive

This intersection is a four-legged fully actuated signalized intersection. Long Pond Drive forms the east and west legs, and Forest Road forms the north and south legs of this intersection. The Forest Road approach to the intersection consists of one exclusive left-turn lane and one shared through/right-turn lane. The Long Pond Drive approach to the intersection consists of one shared through/left-turn lane and one channelized exclusive right-turn lane. The signal is currently operating in two phases.

Forest Road/Winslow Grey Road

This is also a four-legged fully actuated signalized intersection. The Forest Road northbound approach to the intersection consists of one exclusive left-turn lane and one shared through/right-turn lane. The Forest Road southbound approach to the intersection consists of one traffic lane serving all movements. The Winslow Grey Road westbound approach to the intersection consists of one shared lane, serving all movements, and the eastbound approach to the intersection consists of one exclusive right-turn lane and one shared through/left-turn lane. The signal operates in three phases. Lane markings are visible in the vicinity of the intersection. Vegetation cut back is needed on the Winslow Grey Road approaches.

Forest Road/Old Town House Road

As indicated above, the recently reconstructed intersection now forms an unsignalized intersection. The Forest Road northbound approach to the intersection consists of two 12-foot wide lanes allowing left and right turn lanes. Old Town House Road provides one 12-foot wide travel lane in the eastbound, and one 12-foot wide through and one left turn lane in the westbound direction.

WINSLOW GREY ROAD

Winslow Grey road is a two-lane, two-way minor arterial roadway which generally follows a north-south alignment from Long Pond Drive to Route 28. The roadway consists of approximately 24 feet in pavement width, with a soft, sandy shoulder provided along most of its length. Winslow Grey Road intersects with a number of other local roadways such as Buck Island Road and Forest Road, providing access to mostly residential land uses. Winslow Grey Road consists of bituminous concrete pavement with a solid yellow centerline which were both observed to be in fair to good condition. Key intersection along Winslow Grey Road is as follows:

Winslow Grey Road/Long Pond Drive

This is a "T" type unsignalized intersection with the Winslow Grey Road eastbound approach to the intersection controlled by a "STOP" sign. Long Pond Drive provides one travel lane in each direction and

the Winslow Grey Road eastbound approach to the intersection consists of one shared travel lane. Land use in the vicinity of the intersection is residential in nature.

LONG POND DRIVE

Long Pond Drive is a two-lane, two-way minor arterial roadway which generally follows an east-west alignment from Route 28 to Station Avenue. The roadway consists of approximately 22 feet in pavement width with a sidewalk approximately 4 feet in width provided along the northern side of the roadway. Long Pond Drive intersects with a number of other local roadways such as Winslow Grey Road and Forest Road, providing access to mostly residential land uses along its length.

MAIN STREET (OLD MAIN STREET)

Main Street, also called Old Main Street, use to be the only connection between the Four Corners (the intersection of North Main St./Station Avenue/Route 28/Main Street) and the intersection of Route 28 at Main Street. Route 28 was later relocated to its current location. Main Street provides access to schools and mostly residential land uses along its length. Following a generally east-west alignment, Main Street is a two-way roadway, approximately 20 to 24 feet wide, providing two travel lanes and sidewalks approximately 5 feet in width. Utility poles are located along both sides of the roadway. Roadway lighting is provided. Key intersections along Main Street are as follows:

Main Street/South Street

this is a "T: type unsignalized intersection with the South Street northbound approach to the intersection controlled by a "STOP" sign. Main Street provides one travel lane in each direction. The South Street approach to the intersection consists of one lane 12-foot in width.

Main Street/ Wood Road/River Street

This intersection is a four-way unsignalized intersection with "STOP" signs controlling traffic movements from Wood Road and River Street. The Main Street approach to the intersection consists of one shared lane 10 feet wide in each direction. The Wood Road approach to the intersection consists of one lane approximately 9 feet wide. The Yarmouth Fire Department is located in close proximity of this intersection.

ROUTE 6A

Route 6A serves as an important east-west roadway within the towns of Orleans, Brewster, Dennis, Yarmouth, Barnstable, Sandwich and Bourne. It functions as an important connection between the outer Cape Area and New England. The segment within the study area is categorized as a Regional Roadway with Scenic and Historic Values (Class B) under Barnstable County's Regional Policy Plan. It is classified as a Minor Arterial between Route 134 Dennis and Route 132 in Barnstable. It comes under the jurisdiction of the State Highway Department. Route 6A is a two-lane highway with 10 to 12 foot travel lanes and various shoulders such as curbs with sidewalks, stone walls, and historic trees. The existing right of way is approximately 33- 60 ft. in a few places. Land use is mostly medium residential, with small commercial establishments, and a few medium sized shopping centers. Utility poles are located along both sides of the roadway. Roadway lighting is provided along much of the route. Key intersections along Route 6A in the study area are as follows:

- * Route 6A/Willow Street
- * Route 6A/Summer Street
- * Route 6A/Strawberry Lane

- * Route 6A/ Union Street
- * Route 6A/Weir Street
- * Route 6A/Setucket Road

* Route 6A/West Yarmouth Road
* Route 6A/Center Street

* Route 6A/Bray Farm Road

Route 6A/Willow Street

This intersection is an unsignalized "T"-type intersection under STOP sign control with Willow Street serving as the minor approach. The Willow Street approach to the intersection consists of one lane, approximately 11 feet wide. The pavement surface of Willow Street was repaved in the summer of 1994, and is therefore the surface is in good condition, sight distance constraints exist from the Willow Street approach. Land use in the vicinity of the intersection consists of several residential homes/inns and the Christmas Tree Shops.

Route 6A/Summer Street

This is a "T" type intersection operating under "STOP" control with a flashing beacon. The Summer Street northbound approach to the intersection consists of one 12-foot lane. The flashing red beacon controls traffic on Summer Street and the flashing yellow beacon is visible to traffic on Route 6A. Three foot wide sidewalks exist on both sides of Route 6A and the west side of Summer Street. Pavement conditions in the vicinity of the intersection are in fair condition.

Route 6A/Strawberry Lane

This intersection is a "T" type unsignalized intersection. A large island divides the minor Strawberry Lane approach providing two separated travel lanes, one for inbound traffic and one for outbound traffic on Strawberry Lane. Land use in the vicinity of the intersection is residential in nature.

Route 6A/Center Street

This is an unsignalized "T" - type intersection. The intersection is currently under STOP control with a STOP sign installed on the southbound Center Street approach. Three foot wide sidewalks exist on the northern side of Route 6A

Route 6A/West Yarmouth Road

This is an unsignalized "T" type intersection with the West Yarmouth Road northbound approach to the intersection forming the stem of the "T". West Yarmouth Road approach consists of one lane, approximately 8.5-feet wide, and permits all movements. Field inventory shows that lateral obstructions in the form of shrubs are set back an insufficient distance from West Yarmouth Road and, consequently, have a potential impact on traffic flow.

Route 6A/Union Street

This is a "T" type intersection with "STOP" control on the minor street approach. A flashing beacon is located at the intersection. The Union Street northern approach to intersection consists of one 11-foot lane. Three foot wide sidewalks exist on the west side of Union Street. A double yellow solid line and single white edge lines exist on both Union Street and Route 6A. Land use in the vicinity of intersection consists of a service station, a real estate office building and several residential houses.

Route 6A/Weir Road

This intersection is a "T" type intersection with the Weir Road northbound approach to the intersection forming the stem of the "T". The Weir Road approach to the intersection consists of one lane, approximately 10 feet wide. No sidewalks exist along roadways in the vicinity of this intersection. A restaurant with driveways to Route 6A and Weir Road is located in the southeast corner.

Route 6A/Setucket Road

This intersection is an unsignalized modified "T" type intersection. Route 6A forms the east and west legs of this intersection. Setucket Road intersects Route 6A from the southeast and Eileen Street intersects

Setucket Road from the southwest at this location. One large channelization island divides the minor Setucket Road approach which separates opposing traffic flows at this location. One lane, approximately 12-feet wide, accommodates traffic from Route 6A to Setucket Road as well as Eileen Street. The Setucket Road approach to the intersection consists of one 15-foot wide lane, and it was observed to be used as two lanes. The Eileen Street approach to Setucket Road consists of one 9-foot wide lane. One 8-foot wide bikepath exists on the northern side of Setucket Road. Pavement surfaces in the vicinity of this intersection are in good condition.

Route 6A/Bray Farm Road

This is an unsignalized "T" type intersection with Bray Farm Road approaching Route 6A from the north. Bray Farm Road has one approach lane 12 feet in width. Route 6A provides one lane of travel in each direction on a pavement width of 23 feet.

UNION STREET

Union Street is categorized as a Secondary Arterial under Federal - Aid system. It is a two-lane, two-way arterial which generally follows a north-south alignment and provides a link between Route 6A in Yarmouth Port and Station Avenue. Union Street also intersects with Route 6, the Mid-Cape Highway, to form Interchange Exit 8. Union Street consists of bituminous concrete pavement which was observed to be in good to excellent condition. Lateral obstructions in the form of utility poles and vegetation are set back a sufficient distance from the road way and, consequently, do not impede traffic flow.

Key intersections along Union Street with the exception of the intersection of Route 6A at Union Street are as follows:

Interchange #8 on Route 6

At this interchange, Union Street provides one through lane in each direction. The westbound ramps are situated on the eastern side of Union Street and the eastbound ramps are located on the western side. Both ramp systems intersects with Union Street at channelized, unsignalized "T" type intersections.

Union Street/White Rock Road/Starbuck Lane

This is an unsignalized four-way intersection. This intersection is currently under STOP control with STOP signs installed on the White Rock Road eastbound approach to the intersection and the Starbuck Lane westbound approach to the intersection. One travel lane is provided in each direction.

STATION AVENUE

Station Avenue is another major gateway to the Towns of Yarmouth and Dennis. It connects with Union Street at Route 6. Station Avenue is a primary roadway for vehicles coming from Routes 6A and 6, and going to South Yarmouth, and on to Route 28 West Dennis. Land uses along Station Avenue are a mixture of commercial and residential. In addition, the Dennis-Yarmouth Regional High School is located on the eastern side of the roadway in close proximity to Old Town House Road. The segment of Station Ave. from North Main Street to Old Town House Road is a two lane, two-way roadway approximately 23 to 26 feet wide. From Old Town House Road to White's Path to the Route 6 ramps, Station Avenue becomes a four lane roadway. The majority of the commercial areas are located along this segment of road. In general, sidewalks exist along portions of the road. In certain locations, sidewalk definition is poorly defined by inadequate or non-existent curbing. Improvements are currently planned for the Station Avenue corridor. Key intersections along Station Avenue are as follows:

Station Avenue/White's Path Road

This is a four-way signalized intersection. The Station Avenue northbound approach to the intersection consists of one channelized exclusive right-turn lane and one shared 12-foot through/left-turn lane. The Station Avenue southbound approach to the intersection consists of one exclusive 12-foot left-turn lane and one shared 12-foot through/right-turn lane. The White's Path westbound approach consists of one channelized 10-foot wide right-turn lane, and one shared through/left-turn lane, approximately 10-feet in width. The Workshop Road northeast approach to the intersection consists of one 14-foot wide shared lane. The signal at this intersection operates in three phases. Land uses in the immediate vicinity of the intersections are A&P Shopping Center and several other retail stores on the western side of Station Avenue. Industrial and commercial uses exist off White's Path.

Station Avenue/Old Town House Road

This intersection is a four-legged fully actuated signalized location. The Old Town House Road eastbound approach to the intersection consists of one 12-foot exclusive left-turn lane and one 12-foot exclusive shared through/right-turn lane. The Old Town House Road westbound approach to the intersection consists of one 12-foot wide exclusive right-turn lane and one 12-foot shared through/right-turn lane. Station Avenue provides one through lane, one shared through/left-turn lane and one channelized right-turn lane in each direction. The signal at this intersection operates in four phases.

Station Avenue/Long Pond Drive

This is an unsignalized "T" type intersection with Long Pond Drive approaching Station Avenue from the west. The Long Pond Drive approach provides one lane, 10 feet in width. Station Avenue provides one lane of travel in each direction on a pavement width of 23 feet. Sidewalks, approximately 4 feet in width, exist on the northern side of Long Pond Drive and the eastern side of Station Avenue. Land use in the vicinity of the intersection is residential in nature.

Station Avenue/Regional Avenue/Cricket Drive

This is an unsignalized four-legged intersection. The Regional Avenue westbound approach to the intersection consists of one lane. Station Avenue provides one travel lane in each direction on a pavement width of approximately 25 feet. Cricket Drive provides one lane of travel on a pavement width of approximately 9 feet.

Station Avenue/Wood Road

This intersection is a four-way unsignalized intersection with Wood Road operating under "STOP" sign control. Wood Road provides one travel lane in each direction. The Station Avenue approach to the intersection consists of one lane in each direction. Sidewalks approximately 4.5 feet in width exist on the eastern side of Station Avenue. The pavement surface in the vicinity of the intersection is in poor to fair condition. Field inventory showed that lateral obstructions in the form of shrubs and vegetation are set back an insufficient distance from the roadway and, consequently, impede traffic flow. Most of the accidents occurring at this location are due to insufficient sight distance, and are discussed later in this report.

Station Avenue/North Main Street

This intersection is located approximately 20 feet north of the intersection of Route 28 at North Main Street. It is a "Y" type unsignalized intersection. The Station Avenue southeast approach to the intersection consists of one 11-foot wide lane, and permits all movements. The North Main Street southwest approach to the intersection consists of one 13-foot shared lane, and the northbound approach to the intersection consists of one 12-foot wide lane. The southwest approach is STOP controlled. Sidewalks, approximately 4.5 feet in width, exist on the eastern side of North Main Street. On-street parking is permitted on both sides of North Main Street south of the intersection. Land use in the vicinity

of the intersection consists of several retail stores and commercial businesses on both sides of North Main Street south of the intersection.

NORTH MAIN STREET

North Main Street runs from Route 28 to Great Western Road. It serves the Town as a minor roadway providing connections between Station Avenue and Great Western Road as well as North Dennis Road. It provides access to the residential land uses along its length. This roadway consists of a two lane cross-section generally following a south-north alignment. A sidewalk, approximately 4 feet in width, exists along the western side of North Main Street between Station Avenue and north of High Bank Road. On-street parking is not permitted with the exception of the section of roadway between Station Avenue and Route 28. The pavement consists of bituminous asphalt in fair to good condition. Key intersections along North Main Street are as follows:

North Main Street/Highbank Road

This is an unsignalized "Y" type intersection with Highbank Road intersecting North Main Street from the southeast. Traffic movements from Highbank Road are controlled by a "STOP" sign. The North Main Street northbound approach to the intersection consists of one channelized right-turn lane and one through lane. The North Main Street southbound approach to the intersection consists of one multi-purpose lane. The Highbank Road approach to the intersection consists of one shared lane. The pavement surface in the vicinity of intersections in fair to good condition and the land use is residential in nature.

North Main Street/Regional Avenue/Sheridan Road

This intersection is a four-legged intersection operating under flashing beacon control. The flashing red controls traffic movements from all four directions. The North Main Street north and southbound approach to the intersection consists of a 10 to 11-foot wide multipurpose lane. The Regional Avenue eastbound approach and Sheridan Road westbound approach to the intersection consist of one 10-foot wide shared lane. Sidewalks, approximately 4 feet in width, exist on the western side of North Main Street. Pavement markings are visible in the vicinity of the intersection, and pavement surfaces were observed to be in good condition. Land use in the vicinity of the intersection is residential in nature.

North Main Street/North Dennis/Great Western Road/Blue Rock Road

This intersection is a four way unsignalized intersection. North Dennis Road and Great Western Road form the north and south legs of the intersection, respectively. North Main Street and Blue Rock Road form the west and east legs of the intersection, respectively. "STOP" signs control all movements from North Main Street and Blue Rock Road. Great Western Road provides one 12 feet wide travel lane and North Main Street provides one 11 feet wide travel lane in each direction. Double yellow center lines and single white edge lines are visible throughout the intersection.

HIGHBANK ROAD

Highbank Road serves the Town of Yarmouth as well as the Town of Dennis as a minor arterial roadway providing connections between North Main Street in Yarmouth and Route 134 in Dennis. It provides access to the residential land use along its length. The roadway consists of a two lane cross-section generally following an east-west alignment. The pavement consists of bituminous asphalt and was observed to be in fair to good condition. Lateral obstructions in the form of utility poles and vegetation are set a sufficient distance back from the roadway and, consequently, do not impede traffic flow along most of its length. Key intersections along Highbank Road are as follows:

Highbank Road/Great Western Road

This intersection is “Y” type unsignalized intersection with Great Western Road forming the stem of “Y”. Two islands divide the intersection providing an exclusive left-turn lane and exclusive right-turn lane for Great Western Road.

GREAT WESTERN ROAD

Great Western Road serves the Town of Yarmouth as a minor roadway providing connections between North Main Street and Highbank Road. This roadway consists of a two lane cross-section generally following a south-north alignment. The pavement consists of bituminous asphalt in fair to good condition. Lateral obstructions in the form of utility poles and vegetation are set a sufficient distance back from the roadway and, consequently, do not impede traffic flow. The intersections of Great Western Road at North Main Street, and at Highbank Road are the two key intersections along its length.

NORTH DENNIS ROAD

The segment of North Dennis Road within the study area is categorized as a Secondary Arterial under the Federal-Aid System. North Dennis Road connects from North Main Street in Yarmouth to Route 6A in Dennis. This segment of North Dennis Road in Dennis (north of Setucket Road) is also called South Yarmouth Road. This roadway consists of a two lane cross-section 20 to 24 feet wide and generally follows a north-south alignment. The pavement consists of bituminous asphalt and was observed to be in fair to good condition. Key intersections along North Dennis Road are as follows:

North Dennis Road/West Great Western Road

This is a modified “T” type unsignalized intersection with a “STOP” sign controlling traffic from West Great Western Road. A minor road (Winsome Road) intersects North Dennis Road from the southwest in close proximity to the intersection. West Great Western approach to the intersection consists of four lanes. An island divides Weir Road providing two travel lanes for traffic to/from North Dennis Road from the south, and two travel lanes to/from North Dennis Road from the north. North Dennis Road contains a steep grade toward the north, estimated to be approximately 4%. A pond is located in close proximity to the intersection.

North Dennis Road/Setucket Road

This is a four-way unsignalized intersection with “STOP” signs installed on the North Dennis Road approach. Setucket Road forms the east and western legs of the intersection. One travel lane, approximately 12-foot in width, is provided in each direction. Land use in the vicinity of this intersection is residential.

SETUCKET ROAD

Setucket Road serves as an east-west roadway within the towns of Brewster, Dennis and Yarmouth. In the study area, Setucket Road is a two-way roadway, approximately 24 feet wide and 1 mile long, and provides two travel lanes and a bikepath running parallel to the roadway. The bikepath is approximately 8 ft wide with a 3 foot wide grass median separating it from the roadway. The vehicle speed limit posted along Setucket Road varies from 25 mph and 35 mph. Within the study area, Setucket Road consists of bituminous concrete pavement which is in good to excellent condition. Lateral obstructions in the form of utility poles and vegetation are set a sufficient distance back from the roadway and consequently, do not impede traffic flow.

Key intersections along Setucket Road are as follows:

Mayfair Road/Setucket Road

This is a "T" type unsignalized intersection with Mayfair Road intersecting Setucket Road from the southeast. One travel lane is provided in each direction. Land use in the vicinity of the intersection is residential in nature.

WEIR ROAD

Weir Road is a two-way roadway, approximately 22 feet wide, providing connections between Route 6A and North Dennis Road. It runs from Route 6A, generally following a north-south alignment. Approximately 1.6 miles south of Route 6A, Weir Road splits to form two roadways: one is Weir Road and another one is West Great Western Road. Both of them intersect North Dennis Road, however, at different locations. A "STOP" sign controls traffic on the Weir Road northbound approach to the intersection. At this location, a sign pole indicating the name of each road, is located in the middle of the intersection and could be confusing to motorists new to the area.

SEAVIEW AVENUE

Seaview Avenue is a two lane, town maintained roadway which travels in a general north/south direction from Route 28 in the Town of Yarmouth to Nantucket Sound. It has an existing pavement width of approximately 43 feet (13.1 meters). A faded double yellow centerline separates the directions of travel and divides the existing pavement width. Development along Seaview Avenue is primarily residential - both seasonal and year-round. Seaview Avenue is primarily residential - both seasonal and year-round. Seaview Avenue also leads to many public beaches and several hotels on the waterfront. Sidewalks do not exist along the roadway.

B. Existing Traffic Volumes

A comprehensive traffic count program was conducted in the Town between 1992 and 1994. This information was obtained through the BYTS Study and the Yarmouth Engineering Study. A total of 64 intersections were included in the study area. The manual traffic movement count (TMC) period ranged from 3:00 until 6:00 in the evening. The data was then reviewed in order to determine the afternoon peak hour (highest 60 minute period) as well as the peak hour factor (PHF) for each of the 64 intersections in the study area. More than thirty automatic traffic recorder (ATR) counts were also conducted as part of these two major studies.

All of the data represents summer conditions. Additional count data has also been collected as part of other more recent studies, although much of that data was collected in the off-season.

While analysis of roadway capacity focuses on peak hour conditions, a general sense of the demand and capacity relationship can be obtained from reviewing daily volume information. In general, a two-lane road can accommodate approximately 15,000 vehicles per day and operate in the range of Level of Service "C" to "D" during the peak periods. As volumes increase to approximately 20,000 vehicles per day, conditions worsen, with delays and congestion increasing. During peak periods Level of Service "E" may be experienced. As ADTs increase to 25,000 vehicles per day and higher, severe congestion tends to be experienced and Level of Service "F" may be experienced either along the corridor or at unsignalized intersections. A four lane section of roadway can generally accommodate much higher volume, however, the existence of curb cuts and signalized intersections will affect the ultimate level of service.

A variety of volume characteristics were reviewed as part of the volume studies. A number of segments were reviewed for hourly variance over the twenty-four hour count period. This information indicates if there are any significant peaks in the traffic volumes over the course of the day or if certain levels are maintained for many hours of the day. The hourly volumes were also used to determine the percentage of daily traffic occurring during the morning and afternoon peak periods. For the purpose of calculating the peak hour percentages "K factor", the morning peak period was assumed to occur between 7:00 and 9:00 in morning, while the afternoon peak period was a peak 60 minute flow occurring between noon and 6:00 in the evening.

Peak hour factors (PHF) were also determined from the count data. The PHF is an indicator of the intensity of traffic flow during the entire peak hour and is used in capacity analysis. It is calculated by dividing the peak hour traffic volume by four times the highest fifteen minute volume and ranges from 0.25 to 1.00, with a lower volume indicating greater peaking during a fifteen minute period within the hour.

The following sections present the existing traffic volumes for the two study area networks. Where possible a historical and/or seasonal perspective is also presented.

Yarmouthport-North Yarmouth Network

The Yarmouthport-North Yarmouth Network is formed by Route 6A on the north, Willow Street on the west, the border of Yarmouth and Dennis to the east, and the area north of Buck Island Road and Winslow Gray Road. Willow Street and the border of Yarmouth and Dennis form the western and eastern boundaries, and Route 6A forms the northern boundary.

Average Daily Traffic and Hourly Variance

In order to assess daily traffic volumes along the network and hourly traffic volume variance, twenty-four hour machine counts were conducted at 15 locations within the Yarmouthport - North Yarmouth network. Table 1 summarizes the data.

Diagram 1 presents the Average Daily Traffic (ADT) during 1994 summer conditions. From Diagram 2, it can be seen that Station Avenue carries the highest traffic volume per day among all the roads in the Yarmouth/Airport - North Yarmouth study network, and Route 6A carries the second highest traffic volume per day. Other highlights shown in Figure 2 include:

- Route 6A east of Willow Street carries approximately 18,000 vehicles per day, while Route 6A west of the Setucket Road carries approximately 13,900 vehicles per day. This pattern in conjunction with the intersection turning movement counts indicate that a significant portion of the traffic on Route 6A is traveling to/from Union Street.
- Station Avenue north of Old Town House Road, south of White's Path carries approximately 21,200 vehicles per day, while Union Street north of the Route 6 Ramp carries approximately 13,500 vehicles per day. This indicates that a significant portion of the traffic on Station Avenue is traveling to/from Route 6.

TABLE 1
SUMMARY OF EXISTING TRAFFIC VOLUMES¹
YARMOUTHPORT-NORTH YARMOUTH NETWORK

<u>Roadway</u>	<u>Average Daily Volume</u>	<u>Morning Peak Hour</u>	<u>Percent of Daily</u>	<u>Afternoon Peak Hour</u>	<u>Percent of Daily</u>
Route 6A					
East of Willow Street	18,000	1,099	6.1%	1,478	8.2%
West of Setucket Road	13,900	846	6.1%	1,139	8.2%
East of South Yarmouth Rd.	11,600	630	5.4%	966	8.3%
Setucket Rd.					
West of No. Dennis Rd.	3,400	249	7.3%	302	8.9%
Weir Road					
West of No. Dennis Rd.	1,300	81	6.2%	99	7.6%
Union St.					
North of Route 6 Ramp	13,500	871	6.5%	1,084	8.0%
Station Ave.					
No. of R.R. truck	21,200	1,348	6.4%	1,732	8.2%
Old Town House Rd.					
East of Forest Rd.	9,400	668	7.1%	740	7.9%
No. Main St.					
No. of Regional Ave.	3,700	256	6.9%	302	8.2%
Highbank Rd.					
East of No. Main St.	4,520	294	6.5%	360	8.0%
South of Great Western	7,010	454	6.4%	550	7.9%

¹ Based on Traffic Counts conducted during Summer of 1994

- Highbank Road west of Sheridan Road carries approximately 4,500 vehicles per day, while Highbank Road east of Sheridan Road, west of Great Western Road carries approximately 7,000 vehicles per day. This indicates that a significant portion of the traffic on Highbank Road, east of Sheridan Road is traveling to/from Sheridan Road and Regional Avenue.
- Old Town House Road west of Station Avenue, east of Forest Road carries approximately 9,400 vehicles per day. Field turning movement counts at the intersection of Old Town House Road/Station Avenue indicate that a significant portion of the traffic on Old Town House Road turns to/from Station Avenue north of Old Town House Road.
- Both Higgins Crowell Road and West Yarmouth Road carry approximately 7,600 vehicles per day. North Main Street east of Highbank Road, Weir Road and Setucket Road carry less than 4,000 vehicles per day.

Diagram 2 and Chart 2 display the variance in hourly volumes along Route 6A and Station Avenue, respectively. As illustrated in the figures there is a gradual increase in traffic during the morning hours from 6:00 until approximately 11:00. During the period of 11:00 in the morning to approximately 5:00 in the evening there is little variance in traffic volumes. Along Route 6A, the hourly volume is close to 1100 vehicles per hour during this six hour period, and along Station Avenue, the hourly volume varies from 1420 to 1750 vehicles per hour during this six hour period depending on the location.

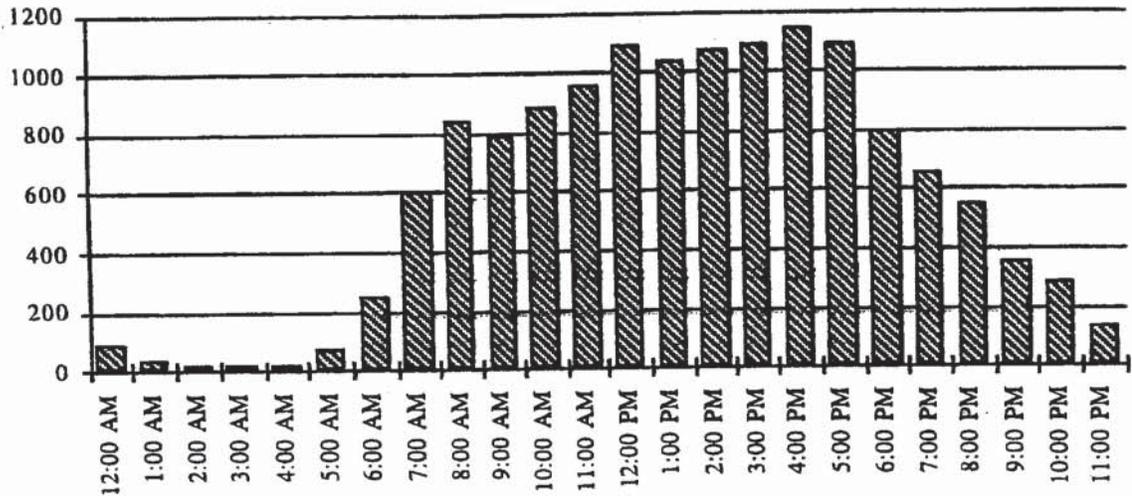


Chart 1
Hourly Traffic Flow Variation
Route 6A West of Setucket Road

This pattern in the hourly volumes indicates that there are a relatively constant number of vehicles on the study roadways throughout the middle of the day on these two corridors. Based on these data, minor peaking occurs between 4:00 p.m. and 5:00 p.m. Congestion problems may not simply be a peak hour problem but last for periods of up to 6 hours each day in the summer. Once the peak volume is reached midday, this level of demand is maintained until evening.

Peak Hour Volumes

In order to assess the operating characteristics in terms of capacity and level of service during peak periods, manual turning movement counts were conducted throughout the network at the study intersections. As indicated in the previous section, new turning movement counts at each location were conducted during the time period of 3:00 p.m. to 6:00 in the evening. From the data, the peak 60 minutes period was identified. The BYTS data was also used as appropriate. Figure 5 represents the afternoon peak hour turning movement counts in the Yarmouthport-North Yarmouth Network.

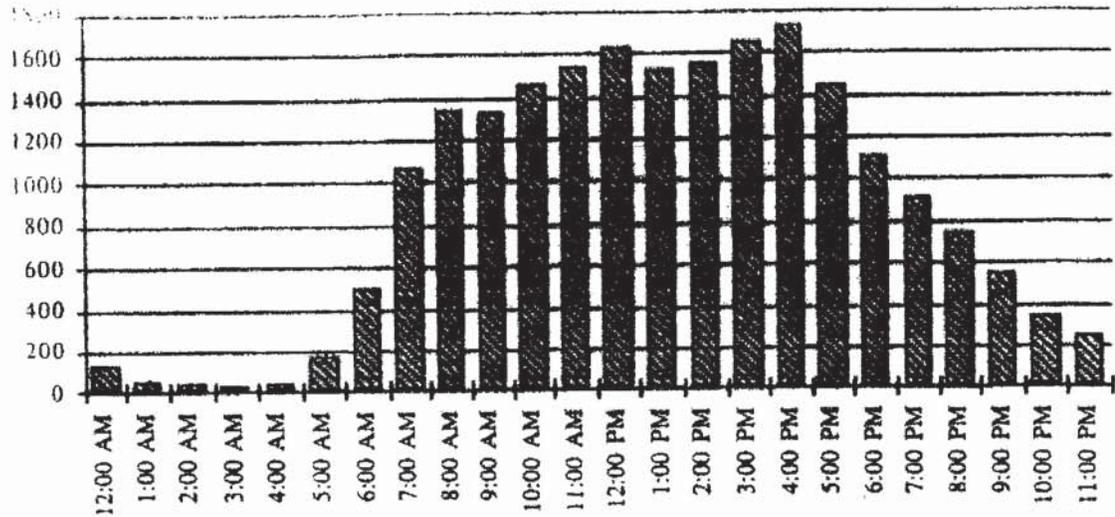


CHART 2
Hourly Traffic Flow Variation
Station Avenue North of Railroad Tracks
Hourly Traffic Flow Variation
Station Avenue North of Railroad Tracks

The percentage of daily traffic occurring during the peak morning and afternoon periods was also determined as part of this analysis based on available ATR counts. Table 1 previously presented a sample of selected roadways in the Yarmouthport-North Yarmouth network and their corresponding percentage of daily traffic occurring between 7:00 and 9:00 accounts for 5.4% to 7.3% of the daily volume, while the afternoon peak hour accounts for 7.6% to 8.9% of the daily traffic.

South Yarmouth Network

The South Yarmouth Network is formed by Route 28/Main Street to the south, Willow Street to the west, the area east of Station Avenue, south of Buck Island Road and Winslow Grey Road. Willow Street And Station Avenue form the western and eastern boundaries, and Route 28/Main Street forms the southern boundary.

Average Daily Traffic and Hourly Variance

In the south Yarmouth Network west of South Sea Avenue, Average Daily Traffic (ADT) and Hourly Variance information was obtained through research of the BYTS Study.

Additional twenty-four machine counts were conducted at eight (8) locations. Table 2 summarizes data from nine (9) locations.

TABLE 2
SUMMARY OF EXISTING TRAFFIC VOLUMES¹
IN SOUTH YARMOUTH NETWORK

Roadway	Average Daily Volume	Morning Peak Hour	Percent of Daily	Afternoon Peak Hour	Percent of Daily
Route 28					
West of East Main Street	20,200	1,180	5.8%	1,516	7.5%
West of Camp Street	37,500	1,970	5.3%	2,577	6.9%
East of Forest Rd.	19,400	1,581	8.2%	1,308	6.6%
West of Wood Road	24,900	1,575	6.3%	1,748	7.0%
East of North Main Street.	18,200	1,088	6.0%	1,319	7.2%
Forest Rd.					
North of Route 28.	9,210	586	6.4%	829	9.0%
Buck Island Rd.					
West of Higgins Crowell Rd.	12,530	670	5.3%	1,110	8.9%
Main St.					
East of Route 28	3,100	151	4.9%	264	8.5%
Willow St.					
North of Camp St.	29,869	1,565	5.2%	1,731	5.8%

1. Based primarily on ATRs conducted during Summer of 1994.

Diagram 3 presents the ADT during summer conditions in South Yarmouth. The major roadways of concern in the South Yarmouth Network are Route 28, Willow Street, Buck Island Road and Forest Road. The following presents a brief description on the traffic trends in the network:

*Route 28, west of Camp Street, and east of East Main Street have ADTs of approximately 37,500 vehicles per day, but decreases significantly east of Yarmouth Road, indicating that a significant portion of the Route 28 traffic is entering/exiting downtown Hyannis from the east via East Main Street.

*Daily volumes on Route 28, west of Wood Road, and east of Forest Road have ADTs of approximately 24,900 vehicles. Daily traffic volumes on Route 28 decrease slightly west of Forest Road, and Forest north of Route 28 have ADTs of approximately 9,300 vehicles, indicating that a significant portion of the Route 28 traffic is turning to/from Forest Road. In addition, daily traffic volumes on Forest Road decrease significantly north of Winslow Grey Road, indicating that traffic is using Forest Road, Winslow Grey Road and Buck Island Road as a bypass to Barnstable and West Yarmouth.

*Daily volumes on Route 28, east of North Main Street, and west of Pleasant Street have ADTs of approximately 18,200 vehicles this ADT volume is 6700 vehicles lower than that on Route 28 west of Wood Road, indicating that a significant portion of the route 28 traffic is turning to/from Station Avenue and North Main Street.

*Daily volumes on Buck Island Road, east of Town Brook Road are approximately 12,500 vehicles per day. In addition, Town Brook Road, Higgins Crowell Road and West Yarmouth Road, have ADTs between 7,000 to 8,000 vehicles per day. These volumes indicate that traffic is using Buck Island Road as a bypass or alternative to Route 28 and using the three north/south roadways as links between Route 28 and Route 6.

Transportation Element
Yarmouth Comprehensive Pla

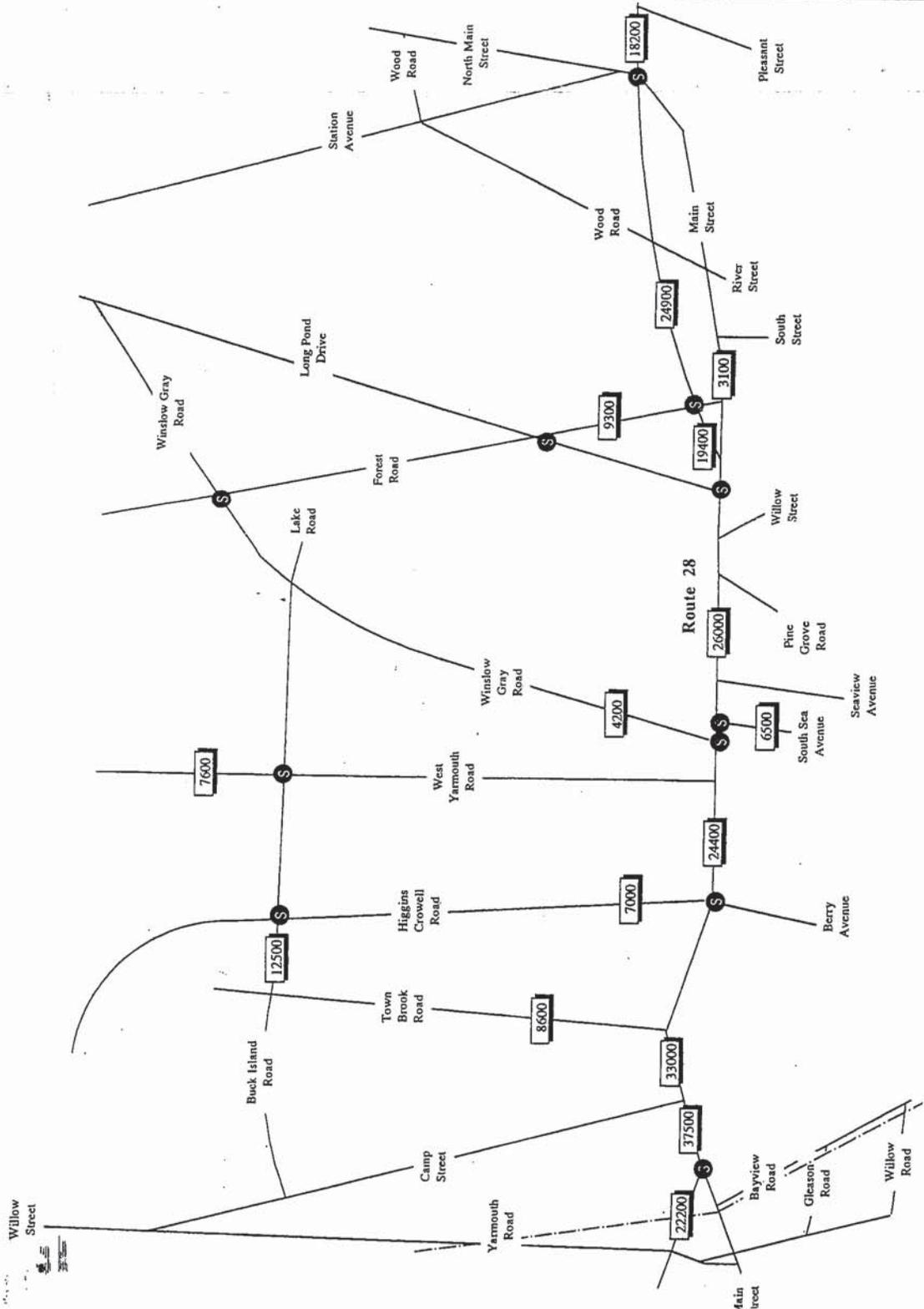
south yarmouth
network
average daily traffic
summer 1994

1993/1994 data
summer conditions

Not To Scale

DIAGRAM 3

MS Transportation Systems, Inc.
Natick, Massachusetts



Charts 3-6 graphically show the variance in hourly volumes along Willow Street, Forest Road, Route 28 and Buck Island Road, respectively. As indicated in Chart 3, significant traffic levels in excess of 1,400 vehicles per hour are reached as early as 8:00 a.m. in the morning along Willow Street, north of Camp Street, and maintained until 6:00 p.m. in the evening. There are more pronounced traffic peaks, particularly during the afternoon, on Willow Street as volumes increase to over 1,700 vehicles from 4:00 to 5:00 during the afternoon peak hour.

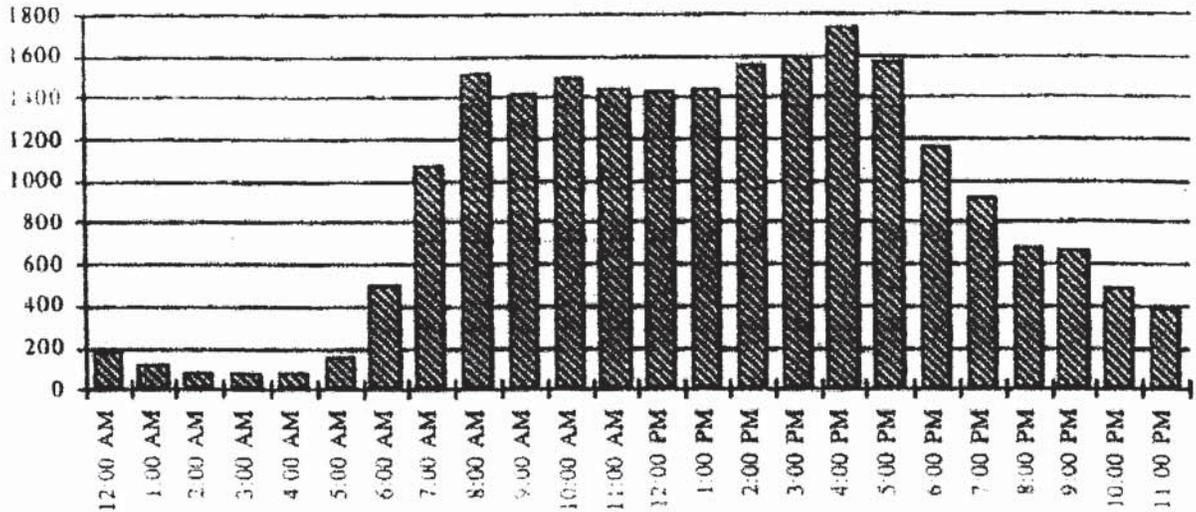


CHART 3
Hourly Traffic Flow Variation
Willow Street North of Camp Street

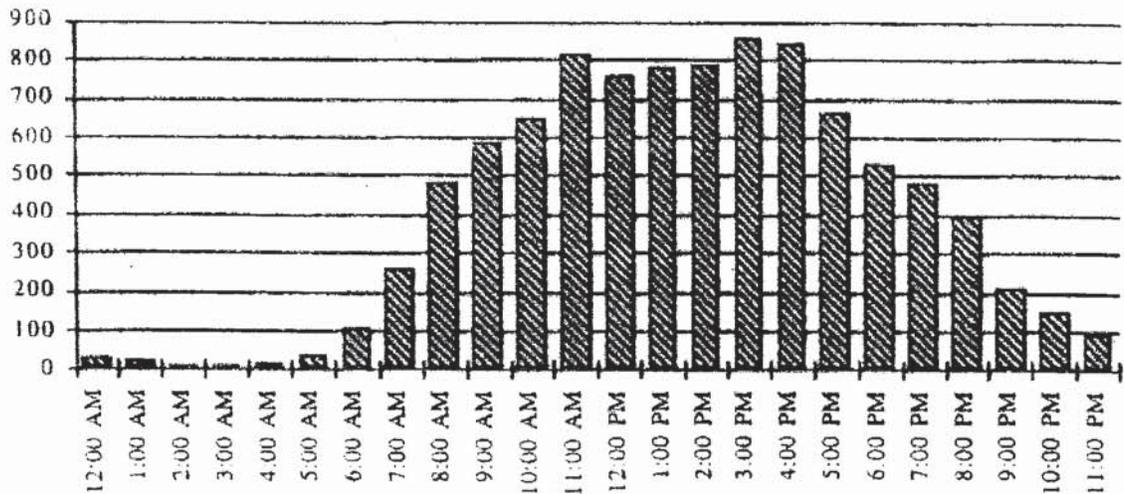


CHART 4
Hourly Traffic flow Variation
Forest Road North of Route 28

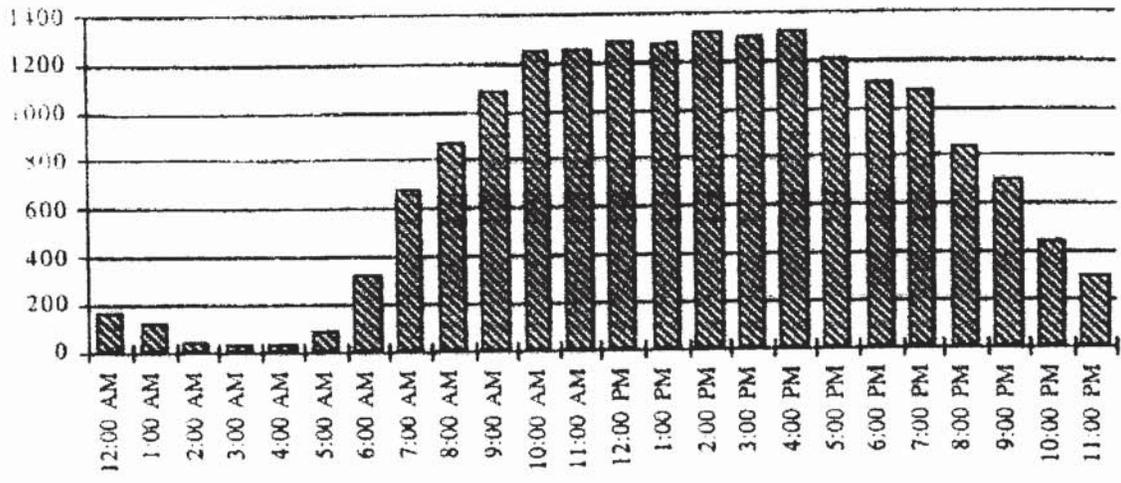


CHART 5
Hourly Traffic Flow Variation
Route 28 east of North Main Street

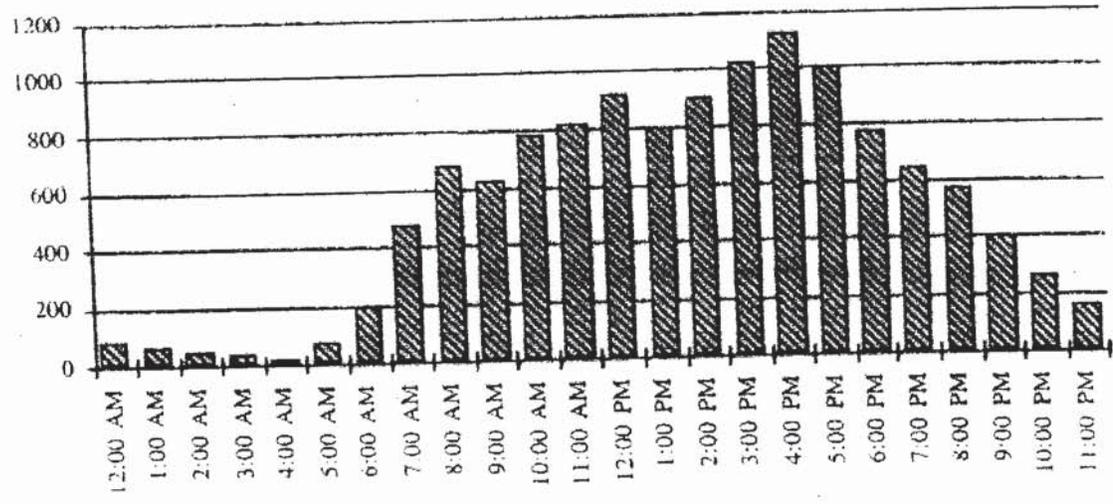


CHART 6
Hourly Traffic Flow Variation
Buck Island Road East of Town Brook Road

Peak Hour volumes

Chart 5 represents the afternoon peak hour turning movement counts in the South Yarmouth Network. In addition, the percentage of daily traffic occurring during the peak morning and afternoon periods was also determined as part of this analysis based on available ATR counts. Table 2 lists the percentages of daily traffic during the peak hours.

In general, 1994 summer data collected on roadways in the entire south Yarmouth network indicate that the morning peak hour between 7:00 and 9:00 a.m. accounts for 4.9% to 8.2% of the daily volume depending on the intersection location, while the afternoon peak hour accounts for 5.8% to 9.0% of the daily traffic.

Transportation Element
Yarmouth Comprehensive Plan

south yarmouth
traffic flow diagram
afternoon peak hour
existing summer volumes

1993/1994 data
summer conditions

Not To Scale

DIAGRAM 4

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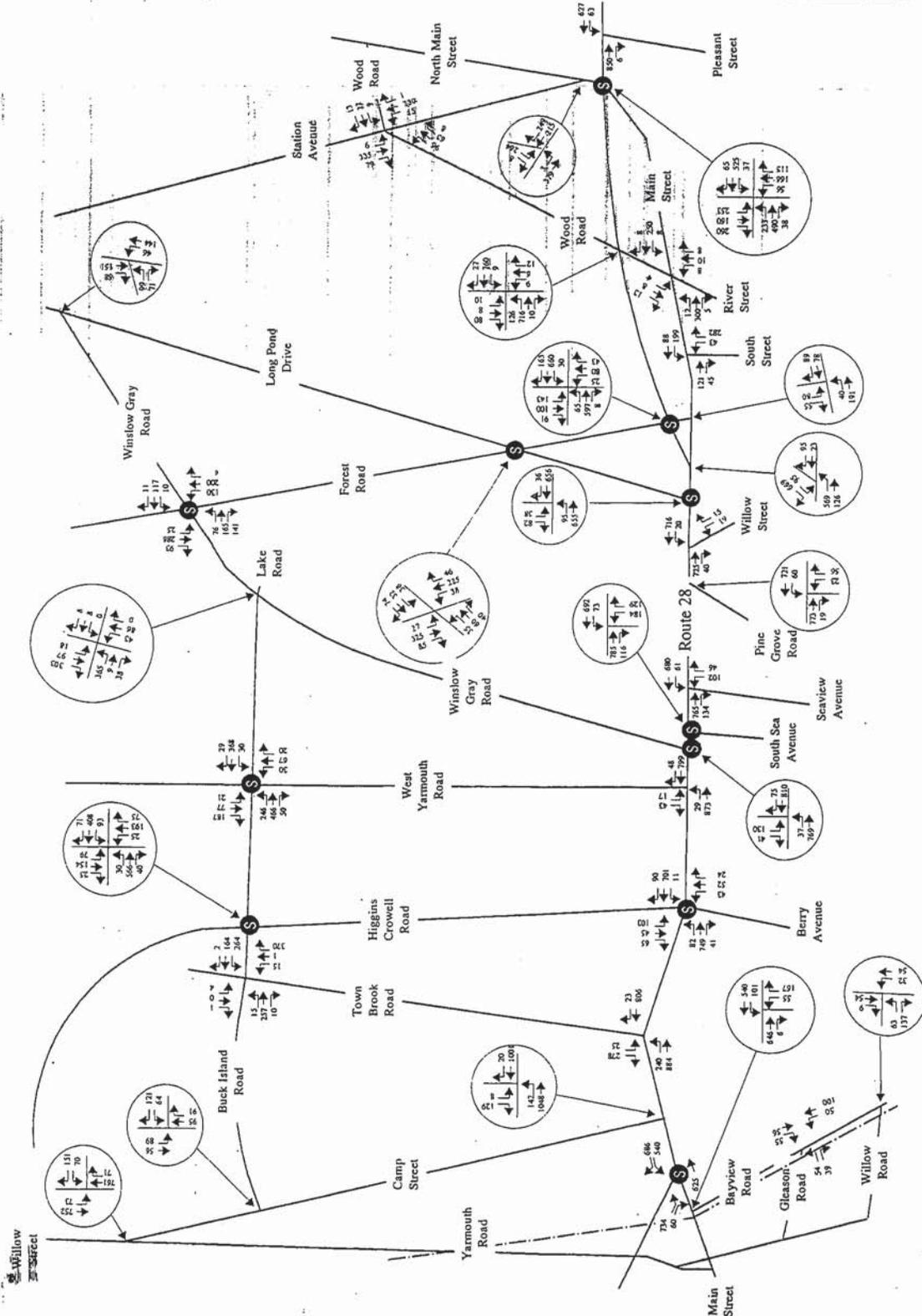


TABLE 3
INTERSECTION ACCIDENT SUMMARY
Intersections with five or more accidents annually
(1995-1997)

Intersection	Total	No. of Accident		No. of People					Type			Currently Planned Project
		Average Annual	Inj ^a	Prop ^b	Fat ^c	Inj ^d	Kill ^e	R ^f	A&H ^g	H ^h	O ⁱ	
Rte 6/Union St (EB&WB Ramp)	52	17	21	31	0	32	0	29	12	2	9	No
Rte 6/Willow St (EB&WB Ramp)	42	14	14	28	0	22	0	13	19	0	10	Yes
Station Ave/Old Town House Rd	33	11	9	24	0	123	0	11	17	2	3	Yes
Rte 28/East Main St	32	10.6	7	25	0	11	0	12	16	0	4	No
Station Ave/White Path	30	10	11	19	0	15	0	9	18	1	2	No
Higgins Crowell/Willow St	29	9.6	10	19	0	17	0	13	13	1	2	Yes
Rte 28/Forest Rd	27	9	7	20	0	10	0	12	14	0	1	Yes
Buck Island Rd/West Yarmouth Rd	23	7.6	12	11	0	19	0	10	9	2	2	No
Rte 28/North Main St	22	7.3	12	10	0	17	0	5	12	1	4	No
Rte 28/W. Yarmouth Rd	22	7.3	11	11	0	189	0	13	6	0	3	No
Higgins Crowell/Buck Island Rd	22	7.3	8	14	0	16	0	11	8	0	3	Yes
Station Ave/Wood Rd	19	6.3	6	13	0	6	0	3	11	1	4	Yes*
Rte 28/Town Brook	19	6.3	5	13	1	9	1	7	7	1	4	No
Rte 6A/Union St	19	6.3	4	15	0	6	0	4	9	1	5	No
Station Ave/Regional Ave	17	5.6	9	7	1	16	1	3	7	0	7	Yes*
Rte 28/Standish Way	17	5.6	7	10	0	12	0	15	2	0	0	No
Rte 28/Higgins Crowell Rd	15	5	7	8	0	9	0	8	5	0	2	No
Rte 28/South Sea Ave	15	5	2	13	0	2	0	6	8	0	1	No
Long Pond Dr/Forest Rd.	15	3	2	13	0	3	0	5	7	0	3	No
Station Ave/Long Pond	15	3.0	7	8	0	19	0	4	10	0	1	Yes*
Rte 28/Seaview	11	3.6	2	9	0	5	0	3	7	0	1	No

Source: Accident records from MHD - 1995 to 1997

- | | |
|---|------------------------------|
| a: number of injured accidents. | f: rear end type |
| b: number of property damaged accidents | g: angle/cross movement type |
| c: number of fatality accidents | h: head on type |
| d: number of people injured | i: other type |
| e: number of people killed | |

* Station Avenue itself is proposed to be improved, however, no specific major improvements are proposed at these locations.

C. ACCIDENT EXPERIENCE

Originally, data on accident history for the study area roadways was researched as part of earlier studies through MHD records for the period from January 1, 1991 through December 31, 1993. In addition, the Massachusetts Highway Department (MHD) statewide High Accident Listing (top 1,000 high accident intersections) was also reviewed. From this data, twelve locations and the two Route 6 interchanges were identified that experienced five or more reported accidents per year for the three year period. Locations included several along Station Avenue, Higgins Crowell Road and Route 28. As part of the 1999 plan development, an updated review of more recent accident history (1995-1997) was completed. Many of the locations identified in earlier data are currently planned for improvement as part of various projects.

In general, any intersection with five or more accidents per year has been categorized as a hazardous location and further investigation and analysis may be warranted.

Table 3 summarizes the number of type of accidents for each of the intersections with five or more accidents annually occurring over the three years (1995-1997) analyzed. Table 3 presents a summary of the accident trends, potential causes and possible counter measure to improve conditions, at each location.

Major findings from reviewing the accident data include the follow:

- The highest accident locations are related to the two interchanges with Route 6.
- There are a number of locations that experienced more than five (5) reported accidents which are currently programed for improvements.
- A number of locations experienced a high proportion of personal injury accidents.

D. PUBLIC TRANSPORTATION

In general, public transportation or mass transit is a common alternative to the single occupant vehicle in an urban area. However, like most of suburban type areas, Yarmouth experiences low transit usage for both work and non-work trips. In 1990, 5.3% of the nation's commuters used transit, compared to 73.2% who drove alone and 13.4% who carpooled/vanpooled. However, the 1990 census reported that only 0.08% of the residents in the Town of Yarmouth commuted by mass transit. At that time, only very limited transit service was available through a demand response service not geared to the work commute. In the summer of 1994 the Yarmouth Easy Shuttle (YES) service was introduced.

In general, mass transit consists of a variety of mode and operational types in a variety of geographic and organizational frameworks. The modes comprise various types of bus, rail, and ferry services. The operational types consist of fixed-route, route deviation, and demand response. Service can be express or have many stops and can take place on a local, regional, or intercity scale. Mass transit can also be organized in the public, not-for profit, or for -profit sectors. In this Mid-Cape region including Yarmouth, public transportation includes local fixed route service provided by both Plymouth and Brockton and Bonanza Bus lines. The YES Shuttle service in Yarmouth provides seasonal service as outlined below.

Yarmouth Easy Shuttle was first introduced in the summer of 1994. It is provided by Town of Yarmouth and the Cape Cod Regional Transit Authority to serve the Yarmouth area during the summer season. When first introduced, a grant subsidized the cost. The Yarmouth Easy Shuttle was a free trolley service operating 7 days a week from June 25 through September 5, including holidays. The trolley operates on a "flag stop" policy, simple "wave" to the driver as the vehicle approaches and he/she will pull over at a safe location.

Yarmouth Easy Shuttle provides services connecting with P&B bus, ferry and rail in downtown Hyannis. Two routes are served by the trolley, one is Route A (runs east), and the other one is Route B (runs west). When originally instituted, Route A started from the P&B Terminal in Hyannis to Route 28, to Four Corners, to Main Street, to South Street, to South Shore Drive, to Seaview Avenue, and then back to Route 28 reverse direction to the P&B Terminal in Hyannis. Route B starts from the P&B Terminal to Route 28, to Seaview Avenue, to South Shore Drive, to South Street, to Main Street and Four Corners, and then to Route 28 back to the P&B Terminal. Modifications have subsequently been made which extends the service to the Dennis town line to facilitate connections with the Dennis Trolley.

During the summer of 1994, Yarmouth Easy Shuttle experienced high usage. Data obtained from the RTA showed the ridership was 1768, 11445, 14544, and 2210 in June, July, August and September, respectively. The average daily ridership in August was as high as 505. Service was free to riders when it was introduced in 1994. Since then, service has been extended to Dennis and some additional stops are better defined. In addition, base fare of \$1.00 has been instituted.

B-bus is provided by the CCRTA to serve throughout the Cape including Yarmouth. It is a convenient and low-cost public transportation. It is a door-to-door, ride-by-appointments, visiting friends and Boston medical trips. There are 30 b-buses currently. Approximately 180,000 trips were served annually throughout the Cape.

Taxi service provides an additional transit option to commuters and residents as well as visitors in the Yarmouth area. Table 4 identifies the taxi companies identified in 1994 including the number of vehicles in service and the company location.

There are two basic companies servicing the Town:

**TABLE 4
TAXI COMPANIES**

Company	Number of Vehicle	Location
Access	3 vans	928 Route 28 Yarmouth
Bassett Minibus/Wheelchair		928 Route 28 Yarmouth
All Points Taxi	6 cars	928 Route 28 Yarmouth
Yarmouth Taxi		928 Route 28 Yarmouth
All Town Taxi	18 cars	741 Yarmouth Road Hyannis
Town Taxi of Cape Cod, Inc.		741 Yarmouth Road Hyannis
Yarmouth Taxi, Inc.		741 Yarmouth Road Hyannis

The taxi companies provide service anywhere on Cape Cod, as well as to Logan Airport. Only a few provide the majority of service in the Yarmouth and Barnstable areas. Although service is provided to the entire Cape Cod area by All Town Taxi, Town Taxi, and Yarmouth Taxi Inc., more than 90% of the trips are within the Barnstable area.

E. PARKING SYSTEM

The existing public parking facilities in Yarmouth were identified and inventoried. Table 5 summarizes the available parking spaces and observed parking demands during the summer of 1994 at each of public

beaches, schools and Town Hall. The location of each lot is indicated in Map 1-4. The capacity of those lots that have unmarked gravel surfaces has been approximated based on available lot area. Field observations were completed in July 1994, and the number of parked cars were counted on week days between 11:00 a.m. to 1:00 p.m. which was the peak parking demand period on the summer week day. Weekend demands at each beach were estimated through applying a weekend/weekday demand ratio which was developed for the Short Range Parking study. The information was reviewed by Town officials for general verification.

Table 5 shows that there are approximately 2,776 total spaces available for public parking within the study area. It should be noted that, although all of these facilities are owned publicly, not all of them are open to the general public (such as schools), and some facilities provide parking to the public for a fee (such as the beaches). In addition to the off-street lots, there are a few locations (commercial districts) where an overall

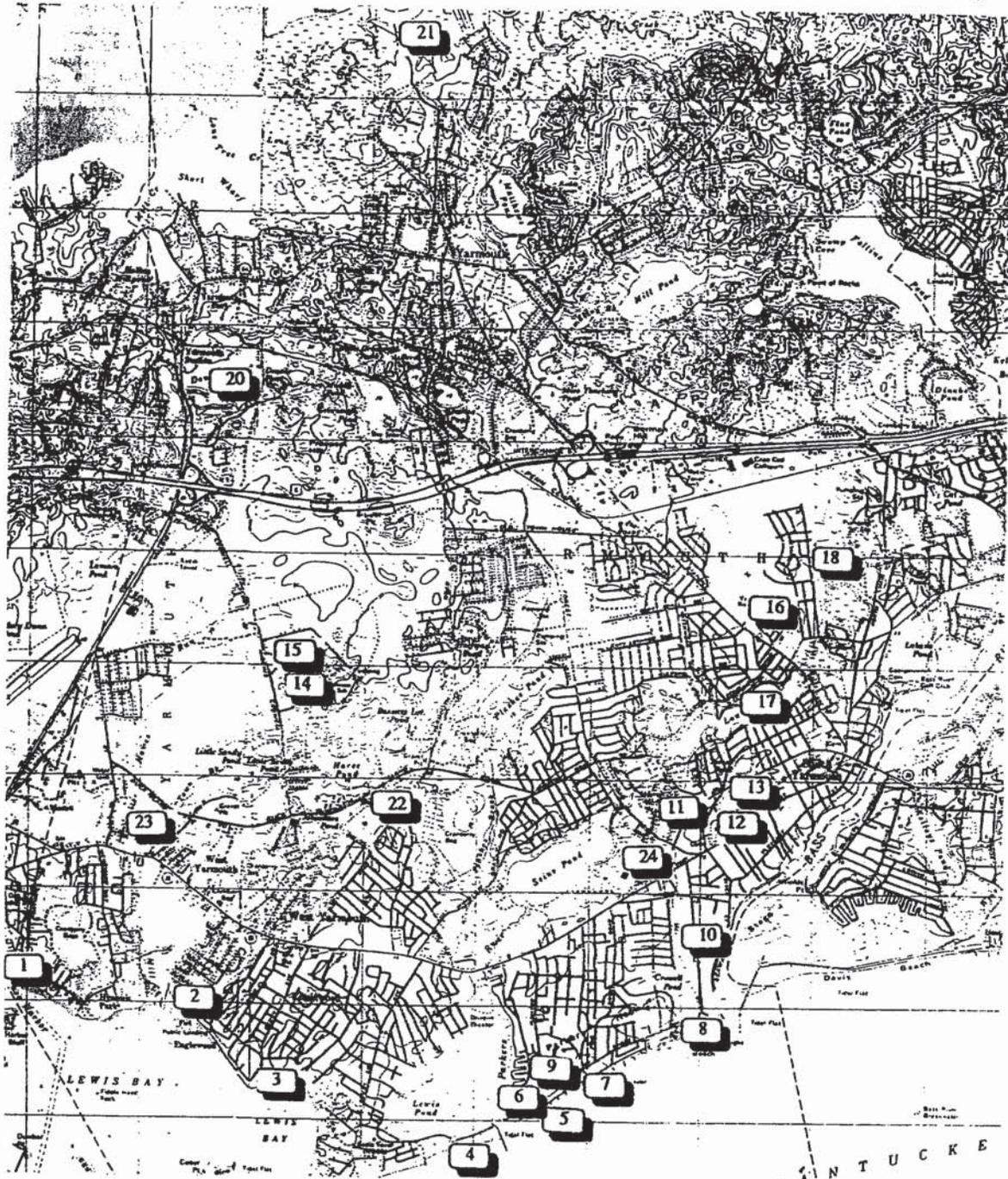
TABLE 5
AVAILABLE PARKING SPACES AND OBSERVED PARKING DEMANDS

ID	Facility Name	Location	Number of Available Spaces	Number of Cars Parked Weekday/ weekend	Fee
1	Bay View Beach	Off Main St.	31 (+3 B. T. ^a)	32/33	Free
2	Colonial Acres Beach	Off Rt 28	20	4/6	Free
3	Englewood Beach	Off Rt 28	30	15/20	Free
4	Seagull Beach	Off Rt 28	475 (+10 H. ^b)	198/376	\$7/day
5	Thatcher Beach	Off Rt 28	19	15/18	Free
6	Sea View Beach	Off South Shore Dr.	58	2/8	\$7/day
7	Parker's River Beach	Off South Shore Dr.	175 (+2 H. ^b)	44/84	\$7/day
8	Bass River Beach	Off South Shore Dr.	395 (+25 B. T. ^a)	179/340	\$7/day
9	South Middle Beach	Off South Shore Dr.	251 (+2 H. ^b)	37/70	Free
10	Windmill Beach	Off River St.	21	8/14	Free
11	Yarmouth Town Hall	Off Rt 28	99	45 ^c	Free
12	John Simhins Ele. Schl.	Off Rt 28	75	15 ^c	Free
13	South Yarmouth Ele. Schl.	Off Rt 28	22	2 ^c	Free
14	Mattacheese Middle Schl.	Off Higgins Crowell	100	15 ^c	Free
15	Margueriet Ele. Schl.	Off Higgins Crowell	102	1 ^c	Free
16	Y-D Regional High Schl.	Off Station Ave.	466	50 ^c	Free
17	Long Pond	Off Station Ave.	32	4/8	Free
18	Flax Pond	Off North Main St.	148 (+2 H. ^b)	33/40	Free
19	Wilbur Park	Off HighBank Rd.	7 (+7 B. T. ^a)	6/12	Free
20	Dennis Pond	Off Summer St.	11	18/20	Free
21	Grey's Beach	Off Center St.	120 (+1 B. T. ^a)	40/76	Free
22	Sandy Pond	Off Buck Island Rd.	125	-	-
23	Baxter Grist Mill	Off Rt 28	12	-	-
24	Packet's landing	Off Rt 28	10	-	-

a Boat trailers

b handicapped

c Weekend/weekday ratio was not applied.



Off-Street Public Parking Lots

*Transportation Element
Yarmouth Comprehensive Plan*


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Based on the field visit, the following parking restrictions were observed: no overnight parking is allowed at the pay beach parking lots; South Middle Beach is restricted to residents only; Dennis Pond is restricted to stickers.

All the school parking lots and Town Hall Lot were underutilized on a summer weekday. Due to the nature of parking patterns of the school parking lots the Town Hall Lot, the parking demands on weekends of these lots are expected to be lower than that of the weekday. Public beach and park lots except for the Dennis Pond Parking Lot were underutilized on a summer weekday. However, on a summer weekend, several beaches and one pond were near capacity: Seagull beach, Bayview Beach, Windmill Beach, Thatcher Beach, Bass River Beach, Windmill Beach and Dennis Pond. Discussions with the local staff indicated over capacity conditions exist at these si beaches on several occasions during the summer peak period.

The beach parking is managed by the Division of Parks and Cemeteries. Attendants are present at entry booths in parking lots where fees are collected or permits are required. Passes can be purchased from attendants as well as in the Division of parks and Cemeteries. Maintenance is conducted by the Public Works Department.

F. BICYCLE/PEDESTRIAN FACILITIES

During the last few years, the demand of the bicycle community for both recreation and commuter use has greatly increased. This increase is partly the result of an ever increasingly health conscience society, the increase in vehicle traffic, and the development of new, multi-speed, lightweight bicycles. While traditionally not a major element in the transportation system in the Northeast, bicycle transportation does offer an alternative mode for local travel, and would have a positive effect on reducing vehicle travel, particularly during the non-winter months on the Cape.

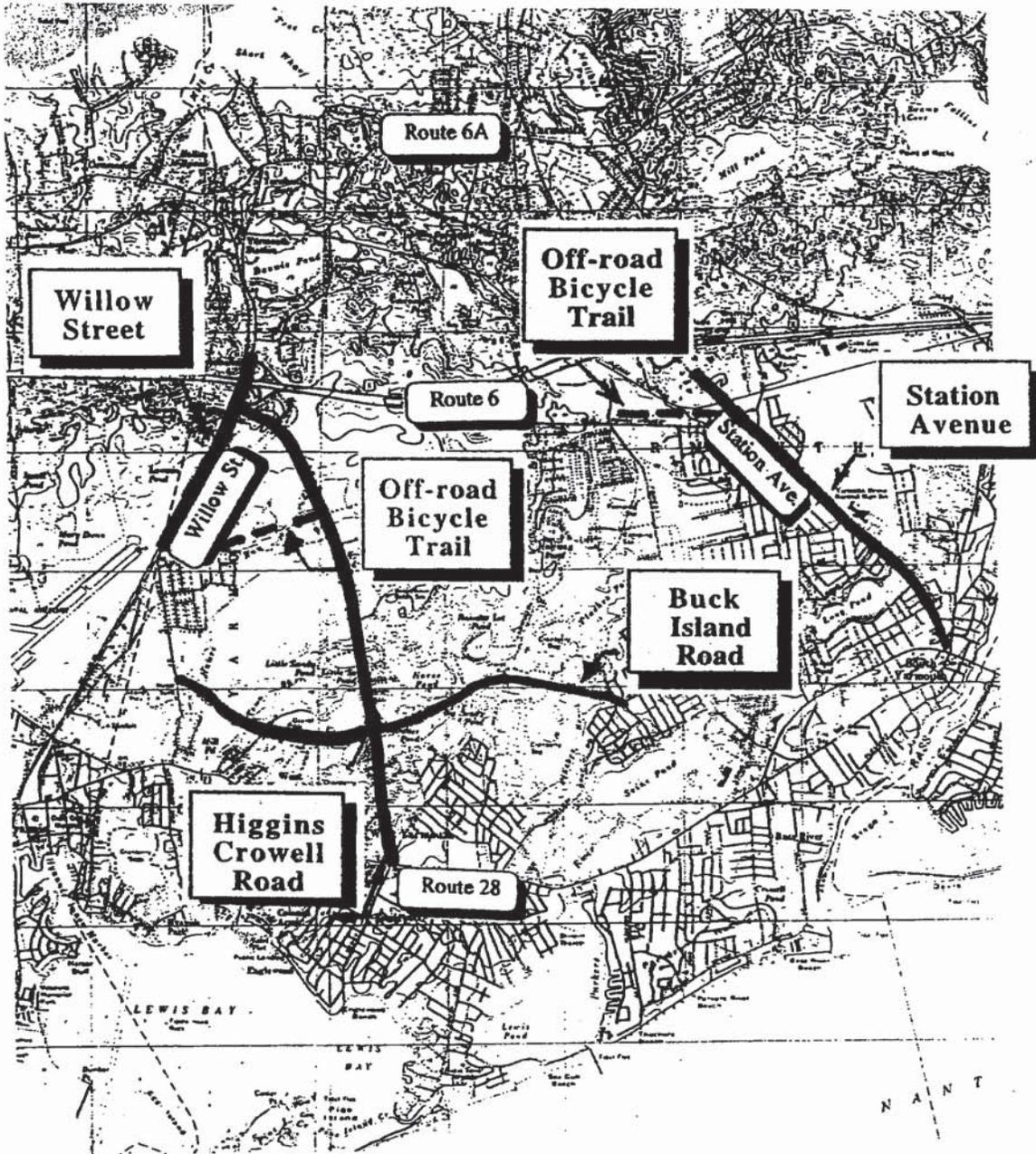
Cape Cod is a major recreation area, particularly during the summer. A significant portion of visitors bring their bicycles to Cape Cod as well. According to a survey conducted as part of the Transportation System Management and Transportation Demand Management (TSM/TDM) Study, approximately 20% of HyLine passengers who arrived by auto and 22% of the SSA terminal passenger who arrived by auto brought their bicycles to Cape Cod.

A review of the local as well as regional transportation goals, objectives and policies shows that bikeways should provide important transportation linkages to reduce peak traffic demands instead of exclusive recreation usage. However, according to the 1990 census data, the work trips in Yarmouth made by bikes and walking were only 0.36% and 1.57%, respectively.

1. Existing Bikepaths

Currently, two off-street bikepaths exist in Yarmouth. In evaluating the existing bikepaths as well as developing the future bikepath or route plans later, a series of evaluating criteria recommended by the bicycling Manual were considered. These included:

- *Accessibility:* This is measured by the distance a bicycle facility is from a specified trip origin or destination, the ease by which this distance can be traveled by bicycle, and the extent to which all origins and destinations are served. Some communities (e.g. Arlington, VA) have adopted a criterion of having a bicycle facility within 1 mile of residence. More importantly, no residential area or high priority destination (school, shopping center, business center, or park) should be denied reasonable access by bicycle.



Planned/Ongoing Projects

*Transportation Element
 Yarmouth Comprehensive Plan*


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- Directness*: Studies have shown that most bicyclists will not use even the best bicycle facility if it greatly increases the travel distance or trip time over that provided by less desirable alternative.
- Continuity*: The proposed network should have as few missing links as possible. If a gap exist, they should not include a traffic environment that is unpleasant or threatening to bicyclists, such as high-volume or high-speed motor vehicle traffic with narrow lanes.
- Route Attractiveness*: This can encompass such factors as separation from motor traffic, visual esthetics, and the real or perceived threat to personal safety along the facility.
- Low Conflict*: The route should present few conflicts between bicyclists and motor vehicle operators.
- Cost*: This would include the cost to both establish and maintain the system.
- Ease of Implementation*: The ease or difficulties in implementation proposed changes depends on available space and existing traffic operations and patterns.

The following is a brief description and evaluation of the two existing independent bike paths.

Setucket Road Bikepath (Multi-use Path): the Setucket Road Bikepath is located on the northern side of the roadway in Yarmouth. The bikepath is approximately one (1) mile long within Yarmouth and is eight (8) feet wide. It connects with the designated Route 6A bike route. The roadway is fairly straight and wide, and there is a 3-foot wide grass median separating the bikepath from the roadway. The roadway is fairly straight and wide. The vehicle speed limit posted along Setucket Road varies from 25 mph to 35mph. Setucket Road is fairly straight and the average weekday traffic volume along this road is approximate 3,500 vehicles. The bikepath signs are visible. It is an ideal bikepath in terms of low conflict with vehicles and route attractiveness. However, it is less than desirable in terms of accessibility, directness and continuity. No major residential area or high priority destinations are located in close proximity to the bikepath. Observations indicated that it may not be fully utilized. On a summer weekday, for example, only 2 bikers were observed during a three hour period from 3:00 to 6:00 in the afternoon.

Bayberry Hill Golf Course Bikepath: The Bayberry Hill bikepath goes through bayberry Hill Golf Course and over the past two years this bike path has been extended to the east parallel to Old Town House Road ending at the recreation complex parking area. It has also been extended to the west to Higgins Crowell Road ending just north of the two schools. Bayberry Hill Golf Course is located on the western side of West Yarmouth Road, near the intersection of West Yarmouth Road and Old Town House Road. The bikepath connects with the golf course driveway and goes through a wooded area within the golf course. In the golf course area, it is approximately three quarters (3/4) mile long and is eight (8) feet wide. The new sections are approximately 10 feet wide. No signage is located along the route and at key intersections. Only sign observed indicted "NO BICYCLE RIDE ON COURSE". The path overall is improved due to the extension, in terms of accessibility, directness and continuity. Plans are in place to continue the extension to the west towards Willow Street, as well as towards Dennis.

In addition to these two independent bikepaths, there is one signed remote bike route within the study area. This signed bike route is along the Route 6 service road, starting from Sandwich to exit 6 of Route 6 along Route 132 to Route 6A, along 6A starting from Phinneys Lane to Setucket Road. It then connects with the Setucket Road Bikepath.

There are several roads recommended as on-street bicycle routes on the "Cape & Islands Bicycle Map". Town Brook Road starting from Route 28 to Buck Island Road, Buck Island Road starting from Town Brook Road to Winslow Grey Road, Winslow Grey Road starting from Buck Island Road to Long Pond drive, Long Pond Drive starting from Winslow Grey Road to Station Avenue, Regional avenue, and High Bank Road. As indicated previously, Route 6A is marked as a remote bike route on the map.

This review of current bicycle transportation facilities has also identified that there are generally no bicycle storage facilities provided at key locations of major activity such as the Town Hall, schools, shopping areas, some beaches, etc. Without these types of facilities, it is difficult to encourage the use of bicycles as an alternative mode of transportation.

2 Pedestrian Facilities/sidewalks

The most noticeable need in terms of pedestrian travel is the need for developing a system of continuous facilities. Inventories of sidewalks along roadways in the study area conducted in 1994 indicated that, the Town of Yarmouth has an inadequate sidewalk system. Even along roadways in school zones, sidewalks are simply non-existent. No sidewalks presently exist along Higgins Crowell Road where Mattacheese Middle School and Marguerite Small elementary School are located. Sidewalks exist on Station Avenue opposite the Dennis-Yarmouth Regional High School, yet the curbing is non-existent in certain areas.

A listing of the detailed sidewalk inventory results are included in Appendix A of this report. The Town of Yarmouth has proposed a sidewalk plan for future development, and these plans will be taken into account during the sidewalk plan.

G. PLANNED/ONGOING PROJECTS

There are a number of improvements in process within the Town. Most of these have been initiated by the Town although several resulted from private development or private initiatives.

Buck Island Road - this project has completed its design process and is waiting for approved construction funds from Massachusetts Highway Department. The project extends from its intersection with Camp Street to Winslow Grey Road. The two lane road will be reconstructed to include a small shoulder and sidewalk along its length. The signal at Higgins Crowell Road will also be upgraded.

Higgins Crowell Road - This project is in the final design stages and extends from Route 28 in the south to Willow Street to the north. The project will include provision of a shoulder to accommodate bicyclists as well as a sidewalk along its length. In the vicinity of the two elementary schools, there is an off-road multi-use path proposed that will also connect with the east-west town wide bike trail to the north and a connection to the Sandy Pond Recreation area. Traffic calming features are included in the design in the vicinity of the schools.

Willow Street - This is the major Town access/egress way to and from the west as it connects with Route 6 via Interchange No. 7. Currently a two lane road carrying between 25,000 and 30,000 vehicles per day in the peak season, the project will include widening north of Higgins Crowell Road to enhance capacity and better facilitate the proposed signal operations at the interchange.

Traffic signals are also proposed for the Willow Street intersections with Higgins Crowell Road and with Camp Street. A major element of the Willow Street Project is the relocation of the northern section of Higgins Crowell Road to the south resulting in the roadway being more than 400 feet away from every well. Other access management modifications include left turn lanes and controlling access points.

Station Avenue - Another major corridor under study and design is Station Avenue. The project begins north of Old Town House Road and ends just north of Route 28. It includes upgrading the intersection with Old Town House Road and will also better define curbing and sidewalks along the corridor in the areas of the schools.

April 6, 2000

YARMOUTH COMPREHENSIVE PLAN

CHAPTER 9

TRANSPORTATION PLAN

- LONG SUMMARY REPORT -

VOLUME II

- ANALYSIS AND PLAN -

Previously Prepared and Endorsed Plan Chapters

1. Introduction
2. Outreach Program
3. Population Study
4. Economic development - Inventory
5. Intergovernmental Coordination
6. Recreation & Open Space
7. Coastal Resources
8. Land Use/Growth Management

10. Economic Development
11. Wetlands
12. Water Resources
13. Wildlife and Plan Habitat
14. Affordable Housing

Prepared by: -
Planning Staff of the Planning Division
of the Yarmouth
Department of Community Development and
MS Transportation Systems, Inc .
of Natick, MA

TOWN OF YARMOUTH
COMPREHENSIVE PLAN CHAPTERS

CHAPTERS	ENDORSED
<u>PREPARED/ENDORSED</u>	YEAR/MONTH
----- "VISION STATEMENT"	April 1994
Chapter 1 INTRODUCTION	
2 OUTREACH PROGRAM	
3 POPULATION STUDY	
4 ECONOMIC DEVELOPMENT INVENTORY	
5 INTER-GOVERNMENTAL COORDINATION (5 Research Chapters Not Subject to Town Meeting Action)	
6 RECREATION AND OPEN SPACE	April 1997
7 COASTAL RESOURCES	April 1997
8 LAND USE/GROWTH MANAGEMENT	December 1998
10 ECONOMIC DEVELOPMENT - ANALYSIS & PLAN	January 2000
11 WETLANDS	April 1998
12 WATER RESOURCES	February 1998
13 WILDLIFE AND PLANT HABITAT	April 1999
14 AFFORDABLE HOUSING	February 1998
 <u>CHAPTERS UNDER DEVELOPMENT</u>	
Chapter 9 Transportation	Active (April 2000)
20 Build Out Study,	Completed
	Phase I
	Phase II
Chapter 15 Community Tradition - Scenic Vistas - Historic Preservation	Active
16 Infrastructure	Active
17 Capital Facilities	-----
18 Inter-Governmental Coordination-Expanded Inter-Municipal Resources, Implementation	-----
 <u>SUMMARY DOCUMENT</u>	
Chapter 19 Composite Plan	
 <u>POSSIBLE ADDITIONAL CHAPTERS - NOT NOW IN PREPARATION</u>	
Waterways Management	Social Services
Energy Conservation	Library Facilities

YARMOUTH COMPREHENSIVE PLAN

PROGRESS ON PLAN ACCEPTANCE

CHAPTERS BY TITLE

DATE

ENDORSED

(Research Chapters - No Town Meeting Action Needed)

1. INTRODUCTION	(March 27, 1997)
2. OUTREACH PROGRAM	(March 17, 1997)
3. POPULATION STUDY AND FORECASTS, 1995-2015	(April 3, 1997)
4. ECONOMIC DEVELOPMENT - INVENTORY	(April 2, 1997)
5. INTERGOVERNMENTAL COORDINATION, ETC.	(March 18, 1997)
6. RECREATION AND OPEN SPACE	April 10, 1997
7. COASTAL RESOURCES	April 10, 1997
8. LAND USE/GROWTH MANAGEMENT	December 1, 1998
9. TRANSPORTATION PLAN	April 11, 2000
10. ECONOMIC DEVELOPMENT - ANALYSIS & PLAN	January 11, 2000
11. WETLANDS	April 14, 1998
12. WATER RESOURCES	July 29, 1997
13. WILDLIFE AND PLANT HABITAT	April 13, 1999
14. AFFORDABLE HOUSING	February 14, 1998
15. COMMUNITY CHARACTER/HERITAGE PRESERVATION	In Preparation
16. INFRASTRUCTURE	In Preparation
17. INTERGOVERNMENTAL COORDINATION/STRUCTURE	- Near Future-
18. CAPITAL FACILITIES - LONG RANGE	- Near Future -

FUTURE CHAPTERS

Composite Town Plan Document
Recreation and Open Space - Update
Energy
Telecommunication
Stormwater Plan
Waterways Management Plan
Air Quality

SUPPORTING DOCUMENTS

Vision Statement	April 27, 1994
Land Use/Growth Management Issues	(July 13, 1998)
Build-Out - Phase I	(October 28, 1999)
Build-Out - Phase II	- Near Future -

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3	Progress on Plan Acceptance
5	Lists of Tables, Maps, and Charts
6	Introduction To Comprehensive Plan
7	Setting the Scene
10	Goals and Objectives
13	Analysis and Plan - Segment A <ol style="list-style-type: none">1. Future Travel Forecasts2. Existing/Future Level of Service Conditions
30	Summary of Transportation Conditions - Segment B
32	Alternative Action - Segment C <ol style="list-style-type: none">1. Travel Demand Management (TDM)2. Transportation System Management (TSM)3. Major Capacity Enhancement Projects
40	Recommended Plan - Segment D
42	Appendix <ol style="list-style-type: none">1. Capacity and Level of Service Concept2. Functional Classification of Roads: Yarmouth3. Designated Scenic Roads and Legislation4. Consultant Credit Page

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19	2	PM Peak Hour Volume Comparison Existing vs. Buildout Conditions
20	3	Level of Service Criteria For Two Locations
21	4	Levels of Service Signalized Intersection Delay Criteria
22-24	5	Unsignalized Intersection Level of Service Summary Yarmouthport - North Yarmouth Network
25	6	Signalized Intersection Level of Service Summary Yarmouthport-North Yarmouth Network
26-27	7	Unsignalized Intersection Level of Service Summary South Yarmouth Network
28-29	8	Signalized Intersection Level of Service Summary South Yarmouth Network
35-36	9	Summary of TDM Alternatives Evaluation
37	10	List of Roadways Requiring Improvement

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<u>PAGE #</u>	<u>MAP #</u>	<u>DESCRIPTION</u>
8	1-1	From Here To NY/Albany
9	1-2	Yarmouth - in a Southeastern New England Location
15	1-3	TOY Traffic Analysis Zone and Census Tracts 1990
16	1-4	Yarmouth TAZ Map

LIST OF CHARTS

<u>PAGE #</u>	<u>CHART#</u>	<u>DESCRIPTION</u>
19	1	Yarmouth Roadway Volume Comparison

INTRODUCTION TO THE COMPREHENSIVE PLAN

ORGANIZATION OF THE COMPREHENSIVE PLAN

The Yarmouth Comprehensive Plan is organized so that it will be done by individual chapters about each pertinent subject. There are 18 of these in our work program, and 13 have been completed, with 8 endorsed by Town Meeting and the 5 others used as reference documents. We are the only Cape Town using this incremental approach. It is slower, but surer for us! This particular chapter, numbered 9 in the work program, contains the "Transportation" element, and this document is its "long summary" form. It is one of the basic skeleton chapters of the plan, along with Land Use/Growth Management, Economic Development, and Recreation and Open Space.

WHO IS PREPARING THE PLAN?

Primary guidance for the comprehensive planning program is being given by the "Local Planning Committee", which is made up of the Planning Board, with the assistance of the Growth Policy Advisory Council. Much of the technical work is being done by the planning staff, with assistance from interns and planning aides, and with advice, recommendations and analysis from various consultants. MS Transportation systems, Inc. of Natick, MA. has prepared much of the professional material for this element and assisted the staff and committees. For this subject, "transportation", we have also used a steering sub-committee with one representative from each of four committees, Planning Board, Growth Policy Advisory Council, Yarmouth Economic Revitalization Committee, and the Route 28 Task Force, to help gain consensus.

PRESENTING THE COMPREHENSIVE PLAN

In preparing such a far-reaching and complicated plan as this, we realize there must be an extensive and continuous outreach program. In addition to required hearings, we are continuing to use television and radio whenever possible, as well as specially prepared handouts for meetings and "executive summaries" for Town Meeting action. Each of the Comprehensive Plan's Chapters is also a "stand alone" document in itself, so that it can be used separately, or as part of the overall program.

PRESENTATION OF THE PLAN ELEMENTS

You may have noticed the terms "executive summary", and "long summary" in the title pages and in the text. One of the problems in presenting any town's comprehensive plan is that it is written usually for three different groupings of people. Most want only the basics and not a lot of detail, thus we prepare "executive summaries". A second level of interest includes those looking for more basic technical and planning information, such as in this document, the "long summary". Finally, a few want to see our detailed and research materials. Thus we have prepared all three levels of reports for the Plan Elements.

USE OF THE "LONG SUMMARY" APPROACH

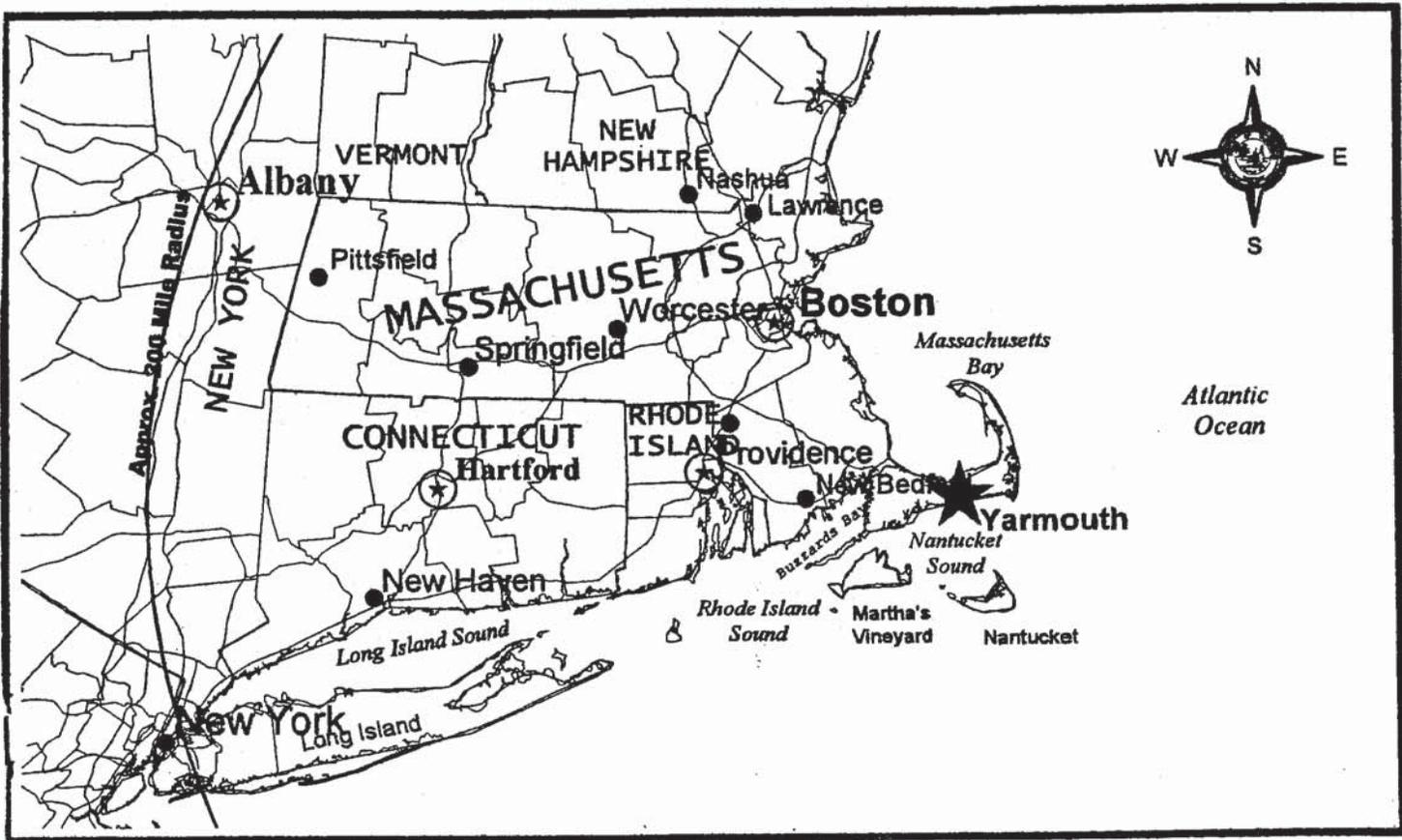
The middle level of detail described previously, or the so-called "long summary" is the support document we have used the most. These are sufficient in detail to satisfy most interested persons, are also incorporated by reference into the Town Meeting votes on each chapter. This document is a "long summary" covering the subject of "Transportation."

The "long summaries" are found in looseleaf notebook form so that they may be added to, or amended, or even deleted, fairly easily. They are intended to be used for interested and concerned citizens and committees, and updated on a regular basis. As far as we know we are the only Cape town using this approach.

"SETTING THE SCENE" (For the Transportation Plan) - extracts from the Regional Policy Plan -

- * "Transportation" continues to be one of the most challenging issues facing the Town of Yarmouth. Our present development patterns and the limited nature of the transportation alternatives result in a continued dependance on the automobile for mobility. Traffic congestion is an increasing problem. Our road system is generally adequate to serve Yarmouth's off-season needs, but becomes seriously overloaded during the summer months.
- * Traffic congestion causes driver frustration and air pollution, increases accidents and wastes valuable time and fuel. It is probably the most visible negative consequence of development without appropriate supporting infrastructure.
- * A comparison of 1972 and 1995 traffic volumes for the Bourne and Sagamore bridges, as counted by Mass. Highway Dept., reveals several disturbing trends:
 - A. Average annual traffic volumes in 1995 were higher than summer traffic volumes in '72.
 - B. 1972 summer traffic volumes were exceeded for 8 months by those of 1995.
 - C. Traffic volumes in the summer, are generally double traffic volumes in winter everywhere.
- * Should these trends continue, every month of the year will exceed summer '72 volumes by the year 2001, and these trends are not isolated just to the bridges.
- * Some progress has been made in developing alternatives to automobile transportation. In 1996, public subsidized summer trolley service operated in 7 Cape towns, including Yarmouth, compared to none 5 years previous: Plymouth & Brockton Bus Co. provides year-round bus service between Hyannis and Provincetown via Route 6A, through Yarmouthport.
- * And Cape Cod now has over 50 miles of bicycle paths, providing a viable alternative to auto travel and a desirable tourist attraction, particularly during the summer months.
- * Bus, rail, ferry, and air service is available to and from Cape Cod, generally. Year-round express buses from Hyannis to downtown Boston and Logan Airport via the park and ride lots on Route 6 are available.
- * Reduction of dependance on the automobile is a significant challenge, and our ambitious goal.
- * What is needed is a balanced approach to transportation that follows a sensible land use and growth management policy and includes the following actions and conditions: -
 1. Provides a source of funding for desirable transportation improvements.
 2. Requires new development to mitigate impacts in a manner consistent with Yarmouth's natural, scenic, and historic resources.
 3. Promotes, safe access to roadways and property through controlled driveway and intersection spacing.
 4. Promotes land, air, and marine based alternatives to automobile travel.
 5. The need for a suitable land use and growth arrangement policy at the local level cannot be over-emphasized. Without such controls, travel demands will outpace transportation improvements, resulting in deterioration of many of the values that have made Yarmouth extremely desirable.

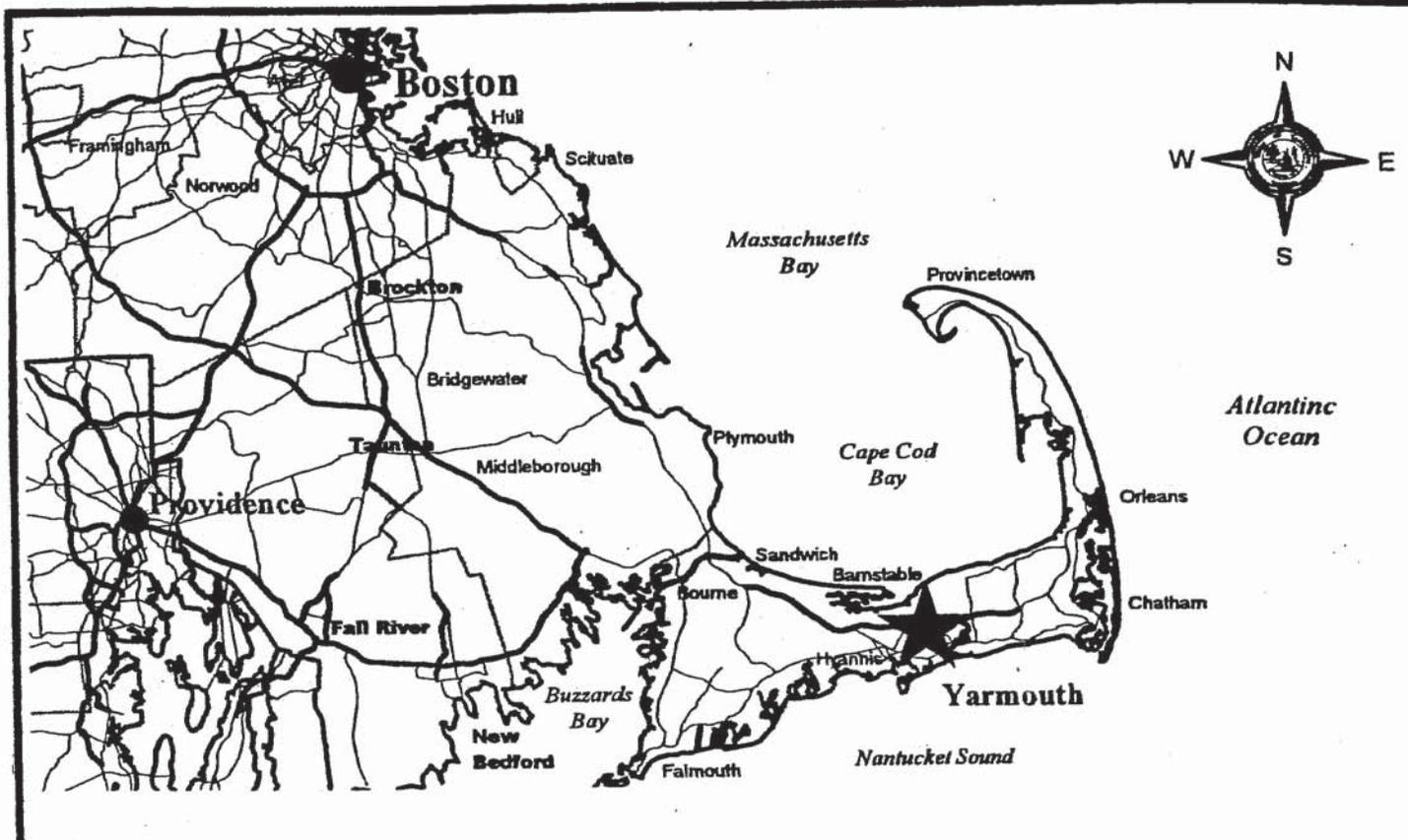
Regional location map



1-1 Map from Here to New York/Albany

The importance of the Cape Cod location cannot be over-emphasized. Yarmouth lies on the Cape Cod neck some 22 miles out into the Atlantic Ocean on a spit of sand pushed up by the last glaciation purportedly 50,000 years ago. It is both the best and worst of locations. On the one hand it is remote for some things and yet very accessible for others. Improved telecommunications have made it just that much more accessible.

Massachusetts Map



1-2 Map of Yarmouth - in a southeastern New England location.

While the Cape was indeed an off-beat site for years, first the construction of the two bridges over the Canal in the early 1930's, and then the construction of the inter-state highway system in the mid-1950's made it highly accessible for tourists and retirees.

The Cape has boomed as a result. But it is a boom that has been achieved at a price - traffic jams, pollution, over-crowding, noise, etc. But this is a location that attracts high-tech trained business persons, especially in telecommunications, related businesses. However, that kind of businesses or industry, although dependent on rapid communication, will cause further growth and stress.

One of the main purposes of the Comprehensive Plan is to try to help deal with the dislocations related to change.

GOALS AND OBJECTIVES
FOR TRANSPORTATION PLANNING

GOALS AND OBJECTIVES

With an understanding of the transportation deficiencies and needs for the Town's transportation system over the next 10 to 20 years, a series of goals and objectives were developed. In developing them, the Barnstable-Yarmouth Transportation Study goals and objectives were reviewed to ensure compatibility. The resulting Yarmouth goals and objectives were then used to evaluate alternative improvements and focus on priorities for the Town. They were developed in consultation with the town staff and Transportation Steering Subcommittee. They are:

Goal #1 - Promote a transportation systems that is multi-modal and encourages safe, effective alternatives for travel, reduces demand for single occupant vehicles, and maximizes ,the integration of all modes.

- Enhance the integration and coordination of various modes of travel including walking, bicycling, ridesharing and transit through providing adequate facilities that connect the modes.
- Improve the service of public transit through expanded coverage areas, service to key activity centers, adequate time of service and frequencies, and increased marketing/provision of information and amenities.
- Ensure that continuous, adequate sidewalks exist along all major arterials and collectors and that safe crossing areas and connections are appropriately provided at the major demand locations.
- Enhance pedestrian movements by providing clear, safe links between parking areas, activity centers (i.e. schools, parks, public buildings), and surrounding neighborhoods/residential areas.
- Provide physical and operational linkages between villages and activity centers within the study area.
- Provide an efficient multi-modal link between the Town and the major transportation terminals (i.e. airport, ferry, Hyannis Inter-modal Center), downtown Hyannis, the medical center, and major employment centers in the Hyannis region.
- Create a safe, visible bicycle network between neighborhoods, schools, parks, community centers and employment centers, and provide adequate storage facilities in key public areas and work locations.
- Incorporate bicycle and pedestrian design features in infrastructure projects in a way compatible with maintaining historic village centers and consistent with master bikeway plans.
- Develop a comprehensive parking system that provides adequate supply for the peak demand periods and attempts to reduce the vehicle demand in critical congested areas in Yarmouth
- Obtain, provide and coordinate information on the Yarmouth transportation system and coordinate it with regional and other local agencies.

Goal #2 - Develop a transportation plan in concert with the local comprehensive plan's elements such as the economic, land use, and open space plans, that is compatible with the Regional Policy Plan, the plans of neighboring communities, and the State's transportation plans and policies.

- Assure multi-modal access to the community's parks, open space, and recreation areas.

Goal #3 - Create a transportation system that provides safe and efficient arterials for through movement, and movement to major commercial and business centers, that minimizes unnecessary traffic through neighborhoods.

- Implement improvements along Route 28 to manage congestion and improve safety ; support alternative modes, and enhance the pedestrian climate.

- Develop access management plans and guidelines for the major corridors including Route 28, Willow Street, Station Avenue and White's Path
- Explore the feasibility of creating an improved east-west arterial connection between Hyannis and Dennis via extending Buck Island Road and improving Winslow Grey Road and Long Pond Drive.
- Improve locations identified as high accident locations.
- Consider the use of new technology for traffic control and including computerized, coordinated systems.
- Design and implement a traffic monitoring system incorporating both the regional and local transportation system.
- Develop appropriate traffic signal maintenance programs to assure that the equipment under local jurisdiction operates as efficiently as intended, and that the layouts are in conformance to design standards.
- Take into account the needs of the older drivers and pedestrians in all elements of design.

Goal #4 - Develop a transportation system that is cost effective and affordable, but maximizes the use of federal and state transportation funds, incorporates private financing, and minimizes Town expenditures.

Goal #5 - Implement actions that enhance the historic, environmental, and natural resources of the Town while minimizing the negative impact on these resources.

- Avoid or minimize net loss of public open space as a result of major transportation improvements with the exception of bicycle and pedestrian off-road paths that are intended to enhance recreation, environment, and improve access to open space and/or recreation areas.
- Enhance access to significant historic resources.
- Avoid significant negative impacts on the Town's water supply wells and resource areas.

RECOMMENDED TOWN ACTIONS

- A. The Town should establish a traffic impact assessment and mitigation program to identify and mitigate the impacts of new developments and redevelopment on the transportation system.
- B. The Town should adopt thresholds for review of traffic impacts of proposed projects within the zoning or site plan review by-law.
- C. The Town should adopt access management guidelines.
- D. The Town should evaluate parking requirements.
- E. The Town should consider developing impact fees for transportation improvements that are consistent with the Regional Policy Plan and the Local Comprehensive Plan.
- F. The Town should adopt zoning by-law amendments and land use plans to ensure that the future transportation needs of the Town are consistent with the future capacity of the transportation system.

Note: In addition, the Goals, Objectives, and Minimum Performance Standards contained in the 1996 version of the Barnstable County Regional Policy Plan regarding Transportation are hereby endorsed by reference for the purposes of local review and approval of projects which are Developments of Regional Impact (DRI) under the terms of the Cape Cod Commission Act and applicable County ordinances. Otherwise the Goals, Objectives and Policies and Minimum Performance Standards listed in this Chapter of the Plan concerning transportation shall apply.

TRANSPORTATION PLAN

CHAPTER 9 VOLUME II - LONG SUMMARY

SEGMENT A

ANALYSIS AND PLAN

CREDIT: - These pages of the "Analysis and Plan - Long Summary Document ,Volume II" have been extracted from the technical report prepared by MS Transportation Systems, Inc. of Natick, Mass, Consultants, in December of 1999. That report was designed for use with the Transportation Plan Chapter of the Yarmouth Comprehensive Plan. In addition to re-formatting the report and updating it, additional material has been added on "Goals and Objectives", the Route 6A Corridor, and "Recommended Action Items" to help implement the Plan, and to measure progress on the Town Plan. Also to the basic report has been added an appendix which deals with corollary items that have been brought up in discussion and public meetings; Classification of Roads, Scenic Roads, Bikepaths, Sidewalks, and the Impact of the Old Town House Road Recreation Area on Traffic.

ANALYSIS

1. Future Travel Forecasts

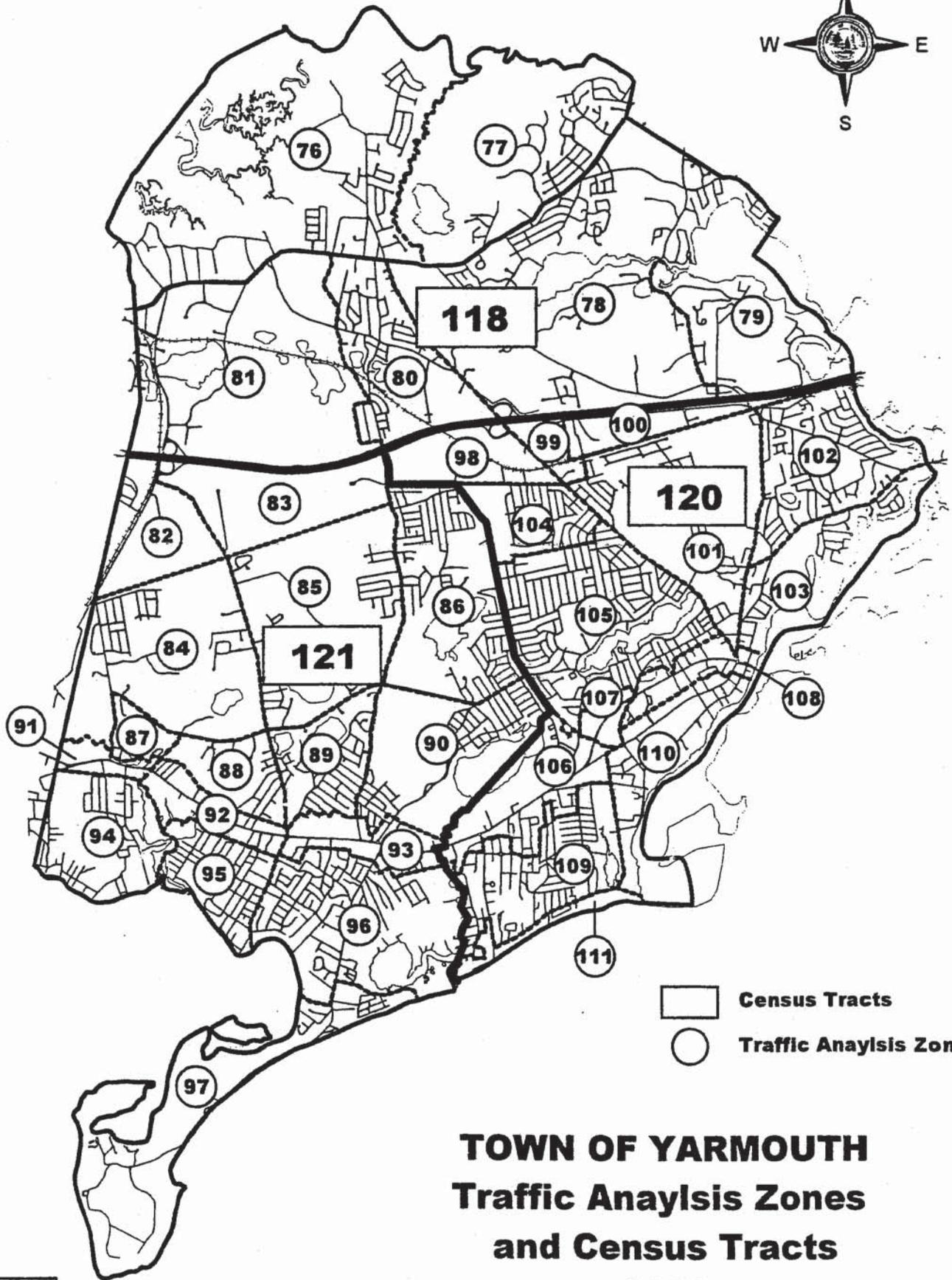
In developing this plan, future travel demands and conditions were estimated. Future demands were estimated based on historical growth, known development projects, and the anticipated buildout potential under the current land use plan and zoning regulations. The Town of Yarmouth Planning Division provided the future year build out analysis which included information about the present and future land use in the town. The land use was collected for the entire town and was broken into zones consistent with the BYTS traffic model.³ This information was then input into the regional transportation model and combined with the Barnstable build out analysis, providing a more realistic future model for projecting future traffic on Yarmouth roadways.

To better understand the areas with the largest build out potential and for modeling purposes, the Town of Yarmouth was broken into 36 areas, or TAZ's (Traffic Analysis Zones). Zones 76 through 81 are the areas north of Route 6. Zones 94 through 96 and 109 through 111 are the areas south of Route 28. All others are between Route 6 and Route 28. Map 1-16 reflects the areas as described above. Table 6 shows a summary of the future potential land use as it relates to all planning zone areas.

Yarmouth's year-round residential population at the time of modeling was approximately 22,200, less than half of the summer population in Yarmouth. The Yarmouth workforce is approximately 7,600 employees year-round and, like the population, doubles in the summer months. At the time of the modeling, Yarmouth had approximately 15,961 dwellings units, and had the potential for another 1,460 units in the future.

Yarmouth's commercial/industrial base is also substantial compared to other communities on Cape Cod, with the exception of Barnstable. At the time of the model development the existing commercial and industrial space in Yarmouth was approximately 3,081,400 square feet. Based on Census data, there are approximately 7,600 employees working in Yarmouth. Of this total, 3,500 or 46% also reside in Yarmouth. Under current zoning, Yarmouth has the potential to expand its commercial and industrial base by another 1.3± million square feet. The employment estimates for Yarmouth indicate an increase in the number of available jobs within Yarmouth to approximately 10,800 under full buildout. While the residential population in Town is to experience a small increase over time, employment is expected to increase by approximately 42% percent. Consequently, there will be an increased number of people having to commute into Yarmouth.

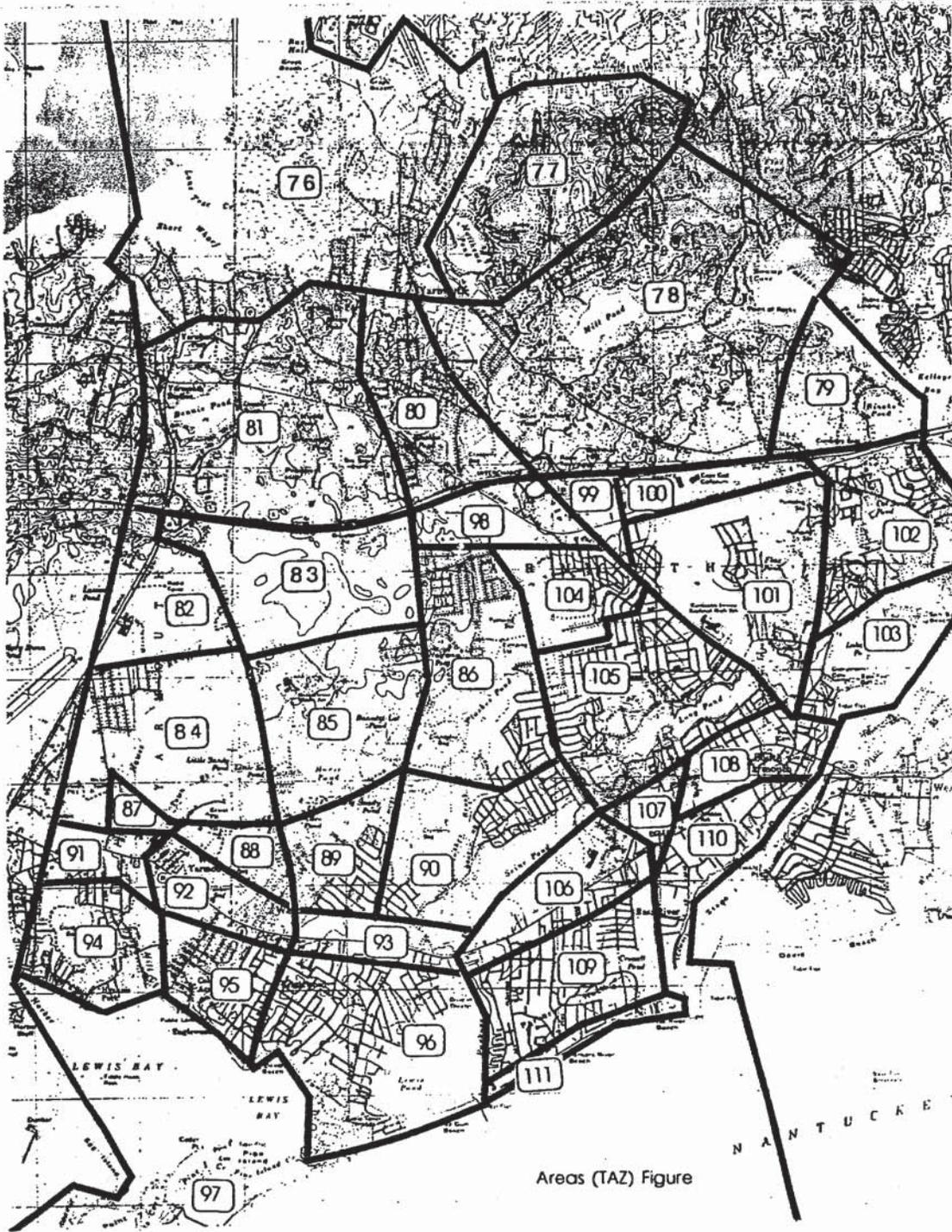
³ Transportation Research Board, Special Report 209, Highway Capacity Manual, Washington, D.C. 1985 with revisions 1994



TOWN OF YARMOUTH
Traffic Analysis Zones
and Census Tracts
1990

MAP 1-3





Yarmouth TAZ Map

*Transportation Element
Yarmouth Comprehensive Plan*



NOT TO SCALE

MAP 1-4

TABLE 6
SUMMARY OF EXISTING AND FUTURE
POTENTIAL LAND USE CHANGES

Area	Residential			Commercial/Industrial		
	Existing # Units	Future # Units	% Change	Existing (1,000 sf)	Future (1,000 sf)	% Change
76	565	615	8.8	46.7	46.7	0
77	541	615	13.3	58.3	58.3	0
78	1147	1220	6.4	65.7	75.5	14.9
79	205	230	12.2	0	0	0
80	504	545	8.1	13.1	13.1	0
81	160	380	137.5	199.3	616.5	209
82	70	80	14.3	97.8	160.3	64
83	4	5	25	177.0	177.0	0
84	453	480	6.0	13.8	13.8	0
85	409	420	2.7	1.8	1.8	0
86	855	865	1.2	0	0	0
87	78	80	2.5	0	0	0
88	334	340	1.8	0	0	0
89	426	435	2.1	10.0	10.0	0
90	654	660	0.92	0	0	0
91	45	45	0	85.2	85.2	0
92	288	295	2.4	164.9	191.2	16
93	218	220	0.92	242.9	466.0	92
94	635	645	1.6	5.9	5.9	0
95	683	695	1.8	0	0	0
96	1036	1050	1.4	2.6	2.6	0
97	162	185	14.2	1.6	1.6	0
98	0	0	0	265.7	372.6	40
99	0	0	0	362.4	453.0	25
100	4	4	0	391.0	620.0	58
101	861	880	2.2	48.2	48.2	0
102	732	750	2.5	0	0	0
103	268	280	4.5	17.4	17.4	0
104	436	440	0.92	0	0	0
105	1596	1600	0.25	24.4	24.4	0
106	708	715	0.99	334.8	430.0	28.4
107	41	41	0	197.7	224.0	13.3
108	79	85	7.6	221.7	221.7	0
109	1192	1210	1.5	15.0	15.0	0
110	402	410	2.0	16.5	16.5	0
111	170	175	2.9	0	0	0
Total	15,961	16,695	4.6	3,081.4	4,368.3	41.8

As shown in Table 1, the areas expected to have the largest amount of residential growth are the areas north of Route 6. The area with the largest percent growth expected is TAZ 81 (in the area north of Route 6, near Willow Street) which is expected to grow by another 220 housing units. Of the 36 zones in Yarmouth, only 6 zones are expected to experience residential growth greater than 10%. The commercial/industrial portions of Yarmouth are also expected to see an increase in square footage. Again, the largest increase is expected in TAZ81 where another 417,000 square feet is expected under full build-out. The area with the second largest commercial/industrial growth is TAZ 93 (in the Route 28 area) which is expected to increase by another 223,000 square feet. Overall, only 10 of the 36 zones will experience an increase in commercial/industrial space. It should be noted that the buildout projection by the Planning Division does not include potential rebuilding of existing developed sites with greater amounts of space.

With the understanding gained related to potential land use changes and anticipated growth in households, employment, and background traffic, future roadway traffic conditions were estimated using the regional transportation model which uses a program called Tmodel2. Tmodel2 takes the input data, which consists of an existing calibrated network model, future land use data by zone and roadway characteristics, and performs trip generation, trip distribution and trip assignment for all roadways contained in the model. As indicated, approximately 1.3 million square feet of new commercial/industrial development combined with another 1,460 dwelling units could be constructed in Yarmouth.

Resulting from this methodology was an estimate of future traffic volumes on the Yarmouth roadways included in the study area. These projections along with existing networks were analyzed in terms of level of service. The results of the analysis indicate that annual growth rates in peak hour summer volumes will be generally in the 1% to 2% range depending on the specific roadway. Table 7 summarizes estimated volumes for several roadways in the Town while Figure 17 illustrates the potential change in peak hour volumes for several roadways including Willow Street, Route 28, Station Avenue, Higgins Crowell Road and Route 6A.

After future base network assignments are complete, the initial steps of analyzing the impact of the long term growth is examined by studying the change in roadway volumes between the existing network and future base buildout network. Table 2 presents a summary of the expected increases in traffic volumes at key locations in Yarmouth for both existing conditions and future buildout conditions. As shown, there is a varying degree of increased traffic on various roadways. However, the analysis results indicate that the general magnitude of volume increases on area roadways over the next twenty (20) years, assumed as future buildout year, could be substantial. Chart 1 illustrates the estimated increases on many of the key town roadways.

As indicated in both Chart 1 and Table 2, several sections of two lane roadways located in the Town of Yarmouth are expected to experience volumes in excess of the desirable capacity, particularly of two lane roadways. These include Station Avenue south of Route 6, Willow Street north and south of Route 6, Route 28 along much of its length and sections of Route 6A.

As congestion intensifies over the years, drivers will tend to seek alternative routes, diverting onto the more local roadways, even though this may result in longer travel distances.

CHART 1

Yarmouth Roadway Volume Comparison

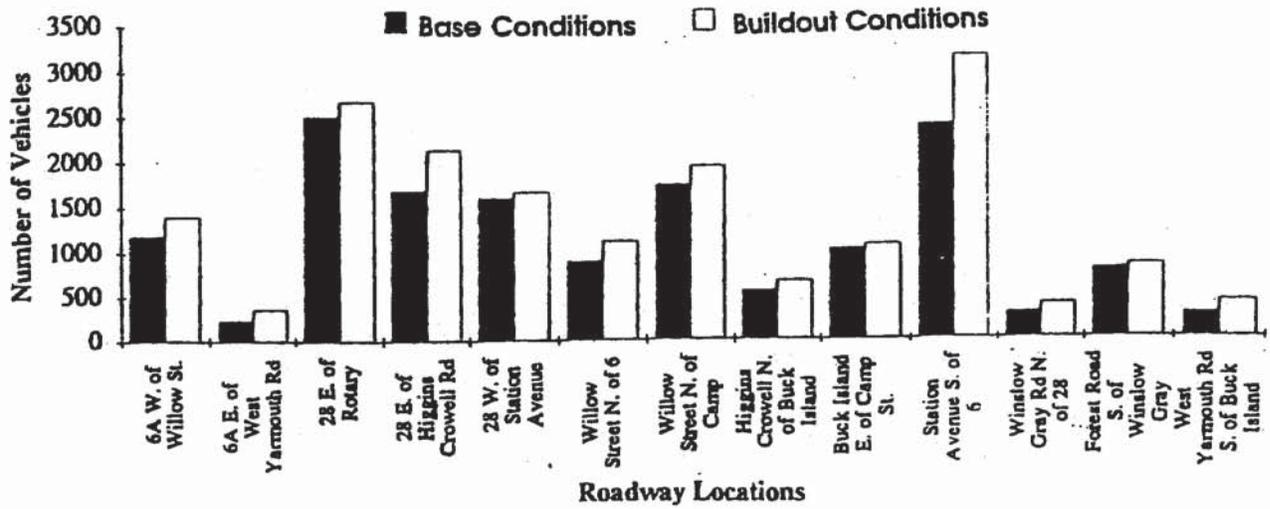


TABLE 2

**PM PEAK HOUR VOLUME COMPARISON
EXISTING VS. BUILDOUT CONDITIONS**

Location	Existing	Buildout	% Change
Route 6A			
East of Willow Street	1185	1395	17%
West of Willow Street	1435	1960	37%
East of West Yarmouth Road	235	360	53%
Route 28			
East of Rotary	2505	2670	7%
East of Higgins Crowell Road	1680	2130	27%
West of Station Avenue	1600	1660	4%
Willow Street			
North of Route 6	890	1110	25%
North of Camp Street	1735	1945	12%
Higgins Crowell Road			
North of Buck Island	550	655	19%
Buck Island			
East of Camp Street	1015	1070	5%
Station Avenue			
South of Route 6	2390	3140	31%
Winslow Gray Road			
North of Route 28	285	380	33%
Forest Road			
South of Winslow Gray Road	770	820	6%
West Yarmouth Road			
South of Buck Island	275	410	49%

2. EXISTING/FUTURE LEVEL OF SERVICE CONDITIONS

The roadway system was assessed in terms of the Level of Service (LOS) as part of the plan development. "Level of Service" is an indicator of the operating conditions that occur on a given roadway or intersection when accommodating various traffic volumes. It is a qualitative measure that accounts for a number of operational factors, including roadway geometrics, speed, travel delay, freedom to maneuver, and safety. When the criteria are assessed and a Level of Service is assigned to a roadway or intersection, it is equivalent to presenting an "index" to the operational qualities of the network component under study. Level of Service is defined in the Highway Capacity Manual⁴ by six levels, "A" thru "F".

Methodology

In practice, any given roadway may operate at a wide LOS range depending upon the time of day, day of week or period of year. Level of Service "C", a condition of stable flow, is considered desirable for peak or design flow in rural areas, while LOS "D" (more significant than LOS "C") is considered acceptable in urban flow conditions, but indicates near or at maximum utilization of a roadway facility under less than ideal conditions. Level of Service "F" generally indicates a condition in which external factors (i.e. breakdown) result in forced flow illustrated by long delays and vehicle queues. For the purpose of this analysis, it was assumed that a LOS "E: or worse LOS "F" would represent a problem location.

Unsignalized Intersection Analysis

The current method for determining the LOS of unsignalized locations uses a gap acceptance model which identifies the number and length of gaps available to traffic moving from a STOP or YIELD controlled minor street, or left turning traffic from the major street. The key element of the procedure is the critical gap (in seconds) which is by definition, the gap in traffic which 50 percent of all drivers will accept, to critical gap values which are generally accepted for various movements and under different arterial conditions at an unsignalized intersection. In general, in urban and suburban settings, gap times of 5.0 seconds for major street left turns, 5.5 seconds for minor street right turns and 6.0 seconds for minor street left turn and minor street through traffic, are considered appropriate for a two-lane major road. Based on the critical gap and conflicting volumes, the capacity for a movement is calculated.

The LOS criteria are based on the average total delay of each movement, combined as appropriate for individual lanes, expressed in seconds per vehicle. "Total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line."⁵ Table 3 presents the LOS criteria established in the Highway Capacity Manual for unsignalized locations.

TABLE 3
LEVEL OF SERVICE CRITERIA FOR TWO LOCATIONS

LEVEL OF SERVICE	AVERAGE TOTAL DELAY (SEC./VEH.)
A	<5
B	>5 and ≤10
C	>10 and ≤20
D	>20 and ≤30
E	>30 and ≤45
F	>45

⁴ Transportation Research Board, Special Report 209, Highway Capacity Manual, Washington, D.C. 1985 with revisions 1994

⁵ Transportation Research Board, Special Report 209, Highway Capacity Manual, Washington, D.C. 1985 with revisions 1994.

Signalized Intersection Analysis

Traffic signals provide a more complex type of control than STOP or YIELD signs. Signals assign the right of way to control and separate conflicting traffic flows. Signals can be effective in improving operations, reducing accidents, and improving access from more minor roadways, however, they also tend to increase delays for the major street through traffic.

The LOS analysis of a signalized location is a function of the intersection geometry, the signal timing, traffic volumes, the distribution of traffic by lane, and other adjustments made to account for the peaking characteristics within the analysis hour for turning vehicles and, if appropriate, to the saturation flow rate due to less than ideal conditions. The LOS is established based on the average stopped delay per vehicle. A summary of the delays associated with each LOS category as established in the Highway Capacity Manual, is provided in Table 4.

TABLE 4
LEVELS OF SERVICE SIGNALIZED INTERSECTION DELAY CRITERIA

LEVEL OF SERVICE STOPPED DELAY PER VEHICLE (Seconds)	
A	<5.0
B	>5.0 and <15.0
C	>15.0 and <25.0
D	>25.0 and <40.0
E	>40.0 and <60.0
F	>60.0

Source: Transportation Research Board, Special Report 209, Highway Capacity Manual, Washington, D.C., 1994

Delays in the range of 15 to 25 seconds (LOS "C" or better) are generally acceptable in rural areas, while up to 40 seconds may be acceptable in urbanized areas during peak hours. When stop delays exceed one minute, the intersection or approach is considered to be operating at LOS "F" which would generally indicate excessive delay or unacceptable conditions. Unlike the unsignalized analysis, the signalized LOS is based solely on the calculated delay.

The following discusses the results of the level of service analysis for each section of the Yarmouth network. Table 5 presents the estimated LOS at each intersection in the Yarmouth-North Yarmouth Network, while Table 6, under and future conditions. Table 7 provides a similar summary of the overall LOS conditions at the signalized locations for both existing and future volumes. Highlights of these two tables are summarized as follows:

- In total, nine (9) of the eighteen (18) existing unsignalized intersections in this subarea had a movement calculated to operate at LOS "E" or "F"
- Under future volume conditions, the unsignalized intersections deteriorate. Of the 18 total intersections, the number with a movement LOS of "E" or "F" is 14.

TABLE 5
UNSIGNALIZED INTERSECTIONS LEVEL OF SERVICE SUMMARY
YARMOUTHPORT-NORTH YARMOUTH NETWORK

Location	Existing		Future	
	DEL ^a	LOS ^b	DEL	LOS
<i>Willow Street/Route 6A</i>				
Willow Street NB	15.6	C	641.9	F
Route 6A WB LT	4.5	A	6.3	B
<i>Union Street/Route 6A</i>				
Union Street NB	*	F	*	F
Route 6A WB LT	6.2	B	8.4	B
<i>West Yarmouth Road/Route 6A</i>				
West Yarmouth Road NB	15.4	C	30.2	E
Route 6A WB LT	4.6	A	5.6	B
<i>Strawberry Lane/Route 6A</i>				
Strawberry Lane NB	19.9	C	123.7	F
Route 6A WB LT	4.5	A	5.5	B
<i>Route 6A/Bray Farm Road</i>				
Bray Farm Road SB	20.0	C	19.6	C
Route 6A EB LT	4.3	A	4.4	A
<i>Route 6A/Center Street</i>				
Center Street SB	10.6	C	11.3	C
Route 6A EB LT	3.7	A	4.1	A
<i>Setucket Road/Route 6A</i>				
Setucket Road NB	35.4	E	35.1	E
Route 6A WB LT	4.6	A	4.6	A
<i>Summer Street/Route 6A</i>				
Summer Street NB	10.8	C	27.2	D
Route 6A WB LT	4.5	A	5.3	B
<i>Weir Road/Route 6A</i>				
Weir Road NB	13.2	C	27.2	D
Route 6A WB LT	4.6	A	4.9	A
<i>Union Street/Route 6 EB</i>				
Route 6 EB LT	*	F	*	F
Route 6 EB RT	17.5	C	*	F
Union Street NB LT	6.2	B	23.3	D
<i>Union Street/Route 6 WB</i>				
Route 6 WB LT	474.1	F	*	F
Route 6 WB RT	4.7	A	5.4	B
Union Street SB LT	7.3	B	9.5	B
<i>Willow Street/Route 6 EB</i>				
Route 6 EB LT	*	F	*	F
Route 6 EB RT	*	F	*	F
Willow Street SB LT	*	F	*	F

TABLE 5 (Continued)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
YARMOUTHPORT-NORTH YARMOUTH NETWORK

Location	Existing		Future	
	DEL ^a	LOS ^b	DEL	LOS
<i>Willow Street/Route 6 WB</i>				
Route 6 WB LT	*	F	*	F
Route 6 WB RT	*	F	*	F
Willow Street SB LT	*	F	*	F
<i>Willow Street/Higgins Crowell Road</i>				
Higgins Crowell Rd. WB	*	F	*	F
Willow Street SB LT	11.3	C	15.7	C
<i>Long Pond Drive/Station Avenue</i>				
Station Avenue EB	14.6	C	33.4	E
Long Pond Drive NB LT	4.4	A	6.0	B
<i>Great Western Road/Highbank Road</i>				
Great Western Road SB LT	134.1	F	134.1	F
Great Western Road SB RT	4.7	A	4.7	A
Highbank Road EB LT	4.2	A	4.4	A
<i>Great Western Road/North Main Street</i>				
North Main Street EB	34.8	E	74.0	F
North Main Street WB	10.9	C	12.4	C
Great Western Road NB LT	3.9	A	3.9	A
Great Western Road SB LT	3.0	A	3.2	A
<i>Union Street/White Rock Road/Starbuck Lane</i>				
White Rock Road EB	6.7	B	7.6	B
Starbuck Lane WB 17.1	C	26.2	D	
Union Street NB LT	3.6	A	4.0	A
Union Street SB LT	3.2	A	3.4	A
<i>Highbank Road/Sheridan Road</i>				
Sheridan Road EB	8.6	B	8.4	B
Highbank Road NB LT	3.0	A	3.0	A
<i>North Dennis Road/West Great Western Road</i>				
W. Great Western Road WB	5.5	B	5.7	B
North Dennis Road SB LT	2.8	A	2.9	A
<i>North Main Street/Highbank Road</i>				
Highbank Road WB LT	8.2	B	8.4	B
Highbank Road WB RT	3.2	A	3.2	A
North Main Street SB LT	3.0	A	3.1	A
<i>North Main Street/Sheridan Road/Regional Avenue</i>				
North Main Street NB	2.5	A	4.4	A
North Main Street SB	3.6	A	15.2	C
Regional Avenue EB	2.7	A	7.6	B
Sheridan Avenue WB	3.2	A	8.6	B

TABLE 5 (Continued)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
YARMOUTHPORT-NORTH YARMOUTH NETWORK

Location	Existing		Future	
	DEL ^a	LOS ^b	DEL	LOS
<i>Forest Road/Old Town House Road</i>				
Forest Road NB	5.2	B	6.9	B
Forest Road SB	6.4	B	8.2	B
Old Town House Road EB LT	2.6	A	2.9	A
Old Town House Road WB LT	2.8	A	3.0	A
<i>West Yarmouth Road/Old Town House Road</i>				
Old Town House Road EB RT	2.8	A	3.0	A
Old Town House Road WB	6.3	B	9.6	B
West Yarmouth Road SB LT	2.8	A	3.2	A
<i>North Dennis Road/Setucket Road</i>				
North Dennis Road NB	7.5	B	7.5	B
North Dennis Road SB	8.2	B	8.1	B
Setucket Road EB LT	2.4	A	2.4	A
Setucket Road WB LT	3.0	A	3.0	A
<i>North Dennis Road/Weir Road</i>				
Weir Road EB	4.1	A	4.0	A
North Dennis Road NB LT	2.4	A	2.4	A
<i>Weir Road/West Great Western Road/Cheyenne Lane</i>				
Weir Road NB	3.7	A	3.7	A
Weir Road SB	3.0	A	3.1	A
Cheyenne Lane EB LT	2.2	A	2.2	A
West Great Western Road WB LT	2.1	A	2.1	A
<i>West Yarmouth Road/White Rock Road</i>				
West Yarmouth Road NB	2.1	A	3.4	A
West Yarmouth Road SB	2.2	A	3.0	A
White Rock Road EB	2.4	A	5.0	B
White Rock Road WB	1.9	A	2.6	B
<i>Setucket Road/Mayfair Road</i>				
Mayfair Road NB	6.7	B	7.3	B
Setucket Road WB LT	2.7	A	2.8	A
<i>Station Avenue/Regional Avenue/Cricket Drive</i>				
Cricket Drive EB RT	4.1	A	5.0	A
Regional Avenue WB	8.0	B	10.2	C
Station Avenue NB LT	3.2	A	3.9	A
Station Avenue SB LT	3.7	A	3.8	A

a average total delay per vehicle

b level of service

**TABLE 6
SIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
YARMOUTHPORT - NORTH YARMOUTH NETWORK**

LOCATION	EXISTING			FUTURE		
	V/C ^A	DEL ^B	LOS ^C	V/C	DEL	LOS
Whites Path/Station Avenue						
Whites Path EB	0.19	22.1	C	0.21	22.2	C
Whites Path WB	1.14	*	F	3.57	*	F
Station Avenue NB	0.79	18.3	C	1.19	*	F
Station Avenue SB LT	0.73	23.9	C	1.16	*	F
Station Avenue SB	0.53	4.3	A	0.71	6.3	B
Overall	0.77	*	*	1.78	*	*
Old Town House Road/Station Avenue						
Old Town House Road EB LT	0.68	23.5	C	1.06	*	F
Old Town House Road EB	0.15	17.2	C	0.15	17.2	C
Old Town House Road WB	0.11	16.9	C	0.11	16.9	C
Old Town House Road WB RT	0.13	17.1	C	0.13	17.1	C
Station Avenue NB DfL	-	-	-	0.80	51.6	E
Station Avenue NB	0.72	23.2	C	1.20	*	F
Station Avenue SB	0.49	6.6	B	0.66	8.2	B
Overall	0.42	14.3	B	0.82	*	*

a. volume to capacity ratio

b. average stopped delay per vehicle

c. level of service

- Both of the two existing signalized intersections in this network are experiencing capacity constraints during the summer conditions under both existing and future time periods.
- Route 6 off-ramps left turn onto both Willow Street and Union Street operate at LOS "F" with long delay and lengthy queues.
- At the intersection of Willow Street at Higgins Crowell Road, Higgins Crowell Road approach operates at LOS "F". Heavy traffic on Willow Street causes substantial delays to vehicles on Higgins Crowell Road attempting to turn onto Willow Street. Willow Street southbound left turn operates at LOS "C".
- At the intersection of Highbank Road at Great Western Road, Great Western road left turn approach is operating at LOS "F".

South Yarmouth Network

Table 7 presents the LOS for the critical movements at the unsignalized intersections in the South Yarmouth Network, while Table 8 provides a similar summary of the overall LOS conditions at the signalized locations. Highlights in Tables 12 and 13 are summarized as follows:

- In total, seven (7) of the thirteen (13) existing unsignalized intersections in this subarea were calculated to operate at LOS "E" or "F".
- In total, nine (9) of the thirteen (13) future unsignalized intersections in this subarea were calculated to operate at LOS "E" or "F".
- Heavy traffic on Route 28 causes substantial delays to vehicles attempting to either cross or turn onto the major roadway. Some of the most significant problem locations are the intersections of Route 28/Town Brook Road and Route 28 at Seaview Avenue.
- Many of the unsignalized intersections away from Route 28 are expected to operate at acceptable levels of service in the future.
- Of eleven (11) signalized intersections in the study network, one intersection, Route 28/Main Street, was calculated to operate at LOS "F" under both existing and future conditions. At this intersection, eastbound vehicles attempting to left turn onto Main Street experience long delays. At the intersection of Buck Island Road/Higgins Crowell Road, though the overall LOS is "D", Buck Island westbound approach operates at LOS "F".

TABLE 7
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
SOUTH YARMOUTH NETWORK

Location	Existing		Future	
	DEL ^a	LOS ^b	DEL	LOS
<i>Camp Street/Route 28</i>				
Camp Street SB	42.4	E	964.8	F
Route 28 EB LT	9.2	B	16.2	C
<i>Main Street/Route 28</i>				
Main Street NB	15.6	C	28.0	D
Route 28 WB LT	5.2	B	5.6	B
<i>Pine Grove Road/Route 28</i>				
Pine Grove Road NB	21.4	D	43.5	E
Route 28 WB LT	5.5	B	6.5	B
<i>Seaview Avenue/ Route 28</i>				
Seaview Avenue NB LT	234.3	F	*	F
Seaview Avenue NB RT	7.6	B	8.4	B
Route 28 WB LT	6.3	B	6.9	B
<i>Town Brook Road/Route 28</i>				
Town Brook Road SB LT	149.0	F	450.8	F
Town Brook Road SB RT	15.2	C	22.8	D
Route 28 EB LT	8.1	B	10.0	C
<i>Willow Street/Route 28</i>				
Willow Street NB	20.8	D	24.3	D
Route 28 WB LT	5.0	B	5.0	B
<i>Wood Road/Route 28</i>				
Wood Road NB	41.3	E	43.3	E
Wood Road SB	21.6	D	25.4	D
Route 28 EB LT	6.2	B	6.6	B
Route 28 WB LT	4.7	A	4.4	A
<i>West Yarmouth Road/Route 28</i>				
West Yarmouth Road SB	31.6	E	98.5	F
Route 28 EB LT	0.2	B	7.4	B
<i>Willow Street/Camp Street</i>				
Camp Street WB LT	173.9	F	730.0	F
Camp Street WB RT	9.1	B	13.3	C
Willow Street SB LT	6.0	B	6.8	B
<i>Station Avenue/Wood Road</i>				
Wood Road EB TH	13.7	C	23.9	D
Wood Road WB TH	7.4	B	7.9	B
Station Avenue NB LT	3.4	A	4.0	A
Station Avenue SB LT	2.7	A	2.8	A
<i>Town Brook Road/Buck Island Road</i>				
Town Brook Road NB	7.0	B	8.4	B
Town Brook Road SB	19.9	C	25.5	D
Buck Island Road EB LT	2.5	A	2.6	A
Buck Island Road WB LT	3.6	A	3.9	A
<i>Bay View Road/Main Street</i>				
Bay View Road NB	31.6	E	87.3	F
Main Street WB LT	5.0	A	5.5	B

TABLE 7 CONTINUED
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
SOUTH YARMOUTH NETWORK

Location	Existing		Future	
	DEL ^a	LOS ^b	DEL	LOS
<i>Winslow Gray Road/Buck Island Road</i>				
Buck Island Road EB	23.5	D	41.6	E
Buck Island Road WB	5.0	A	5.2	B
Winslow Gray Road NB LT	3.4	A	3.5	A
Winslow Gray Road SB LT	2.3	A	2.4	A
<i>Pleasant Street/Route 28</i>				
Pleasant Street NB	11.9	C	15.2	C
Route 28 WB LT	6.0	B	6.7	B
<i>Camp Street/Buck Island Road</i>				
Buck Island Road EB LT	5.8	B	7.1	B
Buck Island Road EB RT	3.1	A	3.1	A
Camp Street SB LT	2.8	A	3.1	A
<i>Bayview Road/Gleason Road</i>				
Gleason Road EB	4.5	A	4.9	A
Bayview Road NB LT	2.5	A	2.4	A
<i>Bayview Road/Willow Road</i>				
Willow Road EB	4.0	A	4.2	A
Bayview Road NB LT	2.3	A	2.3	A
<i>Forest Road/Main Street</i>				
Forest Road SB	5.6	B	6.1	B
Main Street EB LT	2.6	A	2.7	A
<i>Long Pond Drive/Winslow Gray Road</i>				
Winslow Gray Road EB	6.3	B	6.8	B
Long Pond Drive NB LT	2.8	A	2.9	A
<i>Station Avenue/North Main Street</i>				
Station Avenue SB	6.5	B	9.4	B
North Main Street EB LT	3.6	A	3.7	A
<i>South Street/Main Street</i>				
South Street NB	5.6	B	6.3	B
Main Street WB LT	3.0	A	3.1	A
<i>Wood Road/River Street/Main Street</i>				
River Street NB	6.5	B	6.9	B
Wood Road SB	5.4	B	6.2	B
Main Street EB LT	2.8	A	2.9	A
Main Street WB LT	3.0	A	3.0	A

a average total delay

b level of service

**TABLE 8
SIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
SOUTH YARMOUTH NETWORK**

Location	Existing			Future		
	V/C ^a	DEL ^b	LOS ^c	V/C	DEL	LOS
<i>Winslow Gray Road/Route 28</i>						
Route 28 EB LT	0.41	11.0	B	0.59	17.6	C
Route 28 EB	0.79	15.8	C	0.87	20.1	C
Route 28 WB	0.80	9.8	B	0.97	24.7	C
Winslow Gray Road SB	0.49	25.3	D	0.63	27.7	D
Overall		13.7	B		23.1	C
<i>Higgins Crowell Road/Route 28</i>						
Route 28 EB LT	0.55	5.8	B	0.96	49.2	E
Route 28 EB	0.63	3.7	A	0.79	6.1	B
Route 28 WB LT	0.08	1.9	A	0.43	3.7	A
Route 28 WB	0.64	3.9	A	0.95	15.4	C
Higgins Crowell Road NB	0.52	11.6	B	0.47	11.0	B
Higgins Crowell Road SB	0.80	21.2	C	0.84	24.5	C
Overall		6.3	B		14.2	B
<i>Main Street/Route 28</i>						
Route 28 EB LT	3.30	*	F	3.67	*	F
Route 28 EB	0.69	16.2	C	0.58	14.3	B
Route 28 WB LT	0.52	18.2	C	0.38	13.3	B
Route 28 WB	0.77	18.5	C	0.84	21.7	C
Main Street NB	0.95	43.8	E	0.91	37.1	D
Main Street SB LT	0.83	22.6	C	1.13	*	F
Main Street SB	0.52	11.4	B	0.60	12.3	B
Overall		*			*	
<i>Forest Road/Route 28</i>						
Route 28 EB LT	0.56	10.9	B	0.72	19.9	C
Route 28 EB	0.63	8.1	B	0.65	8.3	B
Route 28 WB LT	0.26	5.9	B	0.26	5.9	B
Route 28 WB	0.89	16.0	C	0.94	21.0	C
Forest Road NB	0.26	7.5	B	0.26	7.5	B
Forest Road SB LT	0.36	8.1	B	0.38	8.2	B
Forest Road SB	0.29	7.7	B	0.29	7.7	B
Overall		11.3	B		13.9	B
<i>Buck Island Road/Higgins Crowell Road</i>						
Buck Island Road EB	0.75	7.4	B	0.80	9.0	B
Buck Island Road WB	1.15	91.0	F	1.18	106.9	F
Higgins Crowell Road NB	0.76	15.9	C	0.89	24.1	C
Higgins Crowell Road SB	0.82	20.9	C	0.98	44.8	E
Overall		39.5	D		52.1	E

TABLE 8 (CONTINUED)
SIGNALIZED INTERSECTION LEVEL OF SERVICE SUMMARY
SOUTH YARMOUTH NETWORK

Location	Existing			Future		
	V/C ^a	DEL ^b	LOS ^c	V/C	DEL	LOS
<i>Long Pond Drive/Forest Road</i>						
Long Pond Drive EB	0.15	5.8	B	0.20	5.9	B
Long Pond Drive WB	0.10	5.6	B	0.13	5.7	B
Forest Road NB LT	0.23	7.6	B	0.30	8.1	B
Forest Road NB	0.39	8.3	B	0.44	8.6	B
Forest Road SB LT	0.09	7.0	B	0.10	7.1	B
Forest Road SB	0.60	10.0	B	0.67	11.2	B
Overall		8.5	B		9.0	B
<i>Winslow Gray Road/Forest Road</i>						
Winslow Gray Road EB	0.84	20.5	C	0.85	21.1	C
Winslow Gray Road WB	0.26	9.0	B	0.29	9.1	B
Forest Road NB	0.71	10.0	B	0.79	13.1	B
Forest Road SB	0.53	6.4	B	0.57	6.8	B
Overall		11.9	B		12.9	B
<i>East Main Street/Route 28</i>						
Route 28 EB	0.53	12.7	B	0.54	12.9	B
Route 28 WB LT	0.63	10.5	B	0.80	14.6	B
Route 28 WB	0.38	0.1	A	0.42	0.1	A
East Main Street NB RT	0.45	8.4	B	0.53	9.0	B
Overall		7.9	B		9.0	B
<i>Buck Island Road/West Yarmouth Road</i>						
Buck Island EB	0.61	7.5	B	0.60	7.4	B
Buck Island WB	0.59	11.0	B	0.58	10.8	B
West Yarmouth Road NB	0.24	12.1	B	0.42	13.3	B
West Yarmouth Road SB	0.18	11.8	B	0.33	12.6	B
West Yarmouth Road SB RT	0.38	12.9	B	0.43	13.3	B
Overall		9.7	B		10.2	B
<i>Route 28/Long Pond Drive</i>						
Route 28 EB LT	0.17	4.2	A	0.19	4.8	A
Route 28 EB TH	0.47	2.3	A	0.47	2.3	A
Route 28 WB	0.39	8.8	B	0.42	9.0	B
Long Pond Drive SB LT	0.16	24.2	C	0.18	24.2	C
Long Pond Drive SB RT	0.39	25.6	D	0.57	28.2	D
Overall		7.1	B		7.9	B
<i>Route 28/South Sea Avenue</i>						
Route 28 EB	0.77	8.0	B	0.84	10.4	B
Route 28 EB TH	0.23	6.9	B	0.25	7.0	B
Route 28 WB	0.66	10.6	B	0.79	13.7	B
South Sea Avenue NB LT	0.49	23.1	C	0.65	25.8	D
South Sea Avenue NB RT	0.38	22.1	C	0.35	21.8	C
Overall		11.2	B		13.7	B

a volume to capacity ratio

b delay

c level of service

SEGMENT B

SUMMARY OF TRANSPORTATION CONDITIONS

SUMMARY OF TRANSPORTATION CONDITIONS

In summary, the analysis of existing and future transportation system conditions has resulted in identification of a number of facilities, locations or services which should be addressed in the long range transportation plan. Major findings of the analysis can be summarized as follows:

- There are several major congestion locations within the Town including Willow Street, Route 28 and Station Avenue as well as a number of isolated problems. The Willow Street and Station Avenue corridors are currently undergoing planning and design studies.
- A number of intersections have experienced more than five (5) accidents per year and pose potential hazardous locations. While most of them are being addressed through ongoing work, several of the locations exist along Route 28 and will need attention.
- During the summer, there are four (4) to five (5) major beach parking areas that are generally used to capacity. Guiding visitors to other available space in an efficient manner is needed.
- Actual "village" or business districts are not well defined and as such, business District public parking is not a major issue under current conditions. However, if "activity centers" or business districts are defined in the future, public parking could be vital to the redevelopment process.
- The biking and walking facilities continue to be improved; there are gaps in the system or key streets without sidewalks. These areas should be addressed in the future.
- The shuttle bus (YES) service is generally good, but it travels the congested Route 28 route which results in delays which may affect schedule reliability and ridership. Deficiencies that may need to be addressed involve schedules, publicity of routes/schedules, identification of stops, and the lack of in-town connections (if not on Route 28).

Given the identified problems and the ongoing work, the focus of the 2000 Long Range Transportation Plan in Yarmouth should be as follows:

- Route 28 - Decisions on what it should be, how to get there, and the specific actions should be identified.
- Improvements in east-west flow should continue to be explored since there will be a limit to the type of improvement possible to Route 28 and Route 6A. This includes a more detailed feasibility study of extending Buck Island Road to the Willow Street/Yarmouth Road corridor.
- Ensure that the appropriate infrastructure exists and is maintained in the "activity centers" and in the anticipated commercial growth areas.
- Improve the safety at the isolated locations that experience five or more accidents per year.
- Build upon the BYTS plan, including the local Congestion Management System Plan, which utilizes high technology to monitor, evaluate and manage the area's roadway system.
- Complete key links of sidewalks or consider multi-use pathways in important areas. Streets to consider improvements (beyond ongoing projects) include Seaview Avenue, South Shore Drive, South Sea Avenue and Forest Road.
- Residential areas should be connected with walkways and/or bike paths to major points of interest including parks, schools, government buildings and commercial districts.
- Enhancements to the alternative modes, including transit improvements related to highly visible bus stops, greater publicizing of the service and potential service connections off Route 28 within the town, are all worth exploring.

SEGMENT C

ALTERNATIVE TYPES OF ACTIONS

- 1. Travel Demand Management**
- 2. Transportation System Management**
- 3. Major Capacity Enhancement Projects**

ALTERNATIVE TYPES OF ACTIONS

In addressing transportation problems and meeting the future needs, there are a variety of approaches and techniques available. The selection of a particular action will usually depend upon the degree and location of the problem, the type of problem or need, environmental and social issues and/or constraints, the effect on private property, and the cost. For the past decade on the Cape there has also been a major emphasis given to management of transportation demands rather than major roadway widening projects. Each of the major areas or types of improvements are summarized in the following subsections.

1. Travel Demand Management (TDM)

The growth that is highly possible in the Town and region over the next 20 or more years has the potential to cause severe congestion. Consequently, the pressure on the local road system will substantially increase as motorists utilize alternative routes. While roadway and capacity improvements will be necessary, simply constructing more roadway capacity is not sufficient to meet the demands that could exist. With the environmental and social-economic constraints that exist within the area, there is a physical limit as to the level of highway construction that can be implemented or is desirable for that matter.

An increasingly important part of dealing with transportation systems is the consideration of Transportation Demand Management (TDM) as well as Transportation System Management (TSM) in addressing transportation problems and needs. Both concepts have been with us since the 1970's when two energy crises occurred and the 1977 Clean Air Act Amendment was passed. Their particular importance is much more emphasized today with the passing of the 1990 Clean Air Act, the 1991 ISTEA bill and the continuation of TEA21.

TDM has become popular terminology to describe a system of actions whose purpose is to alleviate traffic problems through improved management of vehicle trip demand. These actions are structured to either reduce the dependence on and use of single-occupant vehicles (SOV's) or to alter the timing of travel to other less congested time periods. TDM planning involves exploring travel reduction strategies that improve the roadway operating conditions without necessarily causing the major capital investment of new roadways. TDM strategies have become critically important in areas of environmental or historical significance where constraints present a limit to adding roadway capacity. Simply stated, the purpose of TDM is to maximize the mobility of "people", not simply vehicles. In many cases, TDM and TSM strategies can compliment each other.

TDM is more complex to implement than TSM actions and requires substantial commitment on both the public and private sectors to have a lasting effect. Contributing causes for problems in implementing TDM include:

1. Political sensitivity
2. Non-visibility to the general public
3. Perceived costs
4. Public-private interface
5. Resistance to change
6. Agency biases
7. Uncertainty on project outcomes
8. Potential enforcement problems

TDM tends to relate to personal human behavior more than a physical change in the system, and consequently has been more difficult to model, quantify the effects, and successfully harness. However, the work over the past five years or so has begun to provide a much greater insight on TDM measures and their respective effectiveness. The research as it pertains to Yarmouth has indicated that:

- TDM alone will not generally solve the congestion or safety problems. Some of the more extensive TDM actions appear to reduce peak hour travel in a specific location (i.e. office park), but on an area wide basis will have a significantly lesser effect on reducing travel by 10% to 15%.
- Success in TDM will be significantly limited without an incentives program on a continuing basis.
- There is a question of sustainability with respect to TDM actions such as ridesharing.

- Employer commitments to the TDM concept is needed or its success will be limited, particularly for the large employers, and when programs are geared to the work commute. However, programs must also include the smaller employers, as together they may represent a large portion of the area wide employment. One successful method to obtain private sector active participation has been the creation of the transportation management association or TMA.

There are many actions which can be considered to be in the realm of TDM. These actions range from improved transportation alternatives to changing the development/redevelopment patterns. The following are the most common TDM strategies used nationwide.

1. Improve Transit
2. Enhance Ridesharing
3. Enhance Bicycling and Walking
4. Peak Demand Management
5. Parking Management
6. Other (such as mixed land use development)

Within each category, many actions can be taken to reach the TDM objectives. For examples, in the Parking Management category, actions include on/off street parking supply management, fringe and corridor parking, pricing, enforcement and marketing.

Some strategies would tend to have the public sector have the prime role while others need strong private sector involvement. Table 9 lists the particular actions within each TDM strategies and their general application setting.

TDM programs for employers, developers, and the residential population are designed to shift employees out of single occupant vehicles and into alternative modes, such as carpools, vanpools, transit, bicycling and walking. The application of TDM for the seasonal influx of people and daily visitors may require different approaches. In evaluating various alternatives, consideration was given to a number of criteria including:

1. General effectiveness in reducing SOVs
2. Ease of implementation
3. Costs
4. Year round potential
5. How one action affects other strategies

In general, the evaluation of TDM strategies for Yarmouth area indicated that there are a series of actions that can be taken, although their respective effects on reducing congestion may be quite limited. However, many of these strategies create alternative transportation opportunities for travel and potentially encourage a more efficient development pattern. The strategies and actions are consistent with meeting the objectives for improving air quality and reducing fuel consumption.

Based on the assessment of the existing roadway conditions in the study area, improvements to the system are warranted. While roadway capacity improvements will likely be necessary, simply constructing more roadways is capital intensive. In addition, with the environmental, historical and scenic constraints that exist within the area, there will be a physical limitation as to the level of highway construction that can be implemented. The Cape Cod Regional Policy Plan stresses the desire to consider non-construction actions to the greatest extent possible. Low cost actions to obtain the desired level of service through coordinated operation, improved TDM and TSM, will become critical in the movement of people between homes, workplace, recreational and shopping locations.

As part of the Metropolitan Planning Organizations Long Range Transportation Plan and the BYTS effort, a series of local and regional transportation goals, objectives and policies were developed. Available TDM/TSM effectiveness evaluation measures/methods were also reviewed.

Based on the BYTS transportation goals and objectives,⁶ the research findings, the conditions of existing services and facilities and the survey findings, a list of alternative TDM strategies for the region including the Town of Yarmouth was developed.

⁶Barnstable-Yarmouth Regional Transportation Study, BYTS Goals and Objectives, adopted by Committee in November, 1994.

TABLE 9
SUMMARY OF TDM ALTERNATIVES EVALUATION

action/strategy	criteria									
	effective in reducing SOVs	effective in reducing ADT	enhance other tdm measures	ease of implementation	capital costs	operating costs	year round application			
<i>transit</i>	intermodal transportation center	●	○	●	△	●	yes			
	coordination of schedules	○	○	○	△	○	yes			
	increase use of intercity transit	○	○	○	△	○	yes			
	express shuttle to/from Route 6	○	○	○	△	○	no			
	increase neighborhood service	○	○	○	△	○	yes			
	increase frequency of exist. service	○	○	○	△	○	no			
	neighborhood travel centers	○	○	○	△	○	no			
	provide midday shuttles/temp areas	○	○	○	△	○	yes			
	provide downtown Hyannis loop	○	○	○	△	○	yes			
	provide amenities along arterials	○	○	○	△	○	yes			
<i>parking</i>	increase marketing information kiosks	○	○	○	△	○	yes			
	parking system monitoring	○	○	○	△	○	yes			
	develop fringe parking facilities/shuttles	○	○	○	△	○	no			
	institute summer fee w/fringe system	○	○	○	△	○	no			
	signing	○	○	○	△	○	yes			
	develop regs for max. downtown parking	○	○	○	△	○	yes			
	facility design guidelines	○	○	○	△	○	yes			
	organization & coordination	○	○	○	△	○	yes			
	marketing/brochures	○	○	○	△	○	yes			
	<i>ridesharing</i>	matching	○	○	○	△	○	yes		
preferential parking marketing		○	○	○	△	○	yes			

Source: McDonough & Scully, Inc., CCC TDM/TSM Study, prepared for the Barnstable-Yarmouth Transportation Study, June, 1995.

LEGEND ● high ○ medium ○ low ▲ moderate △ difficult

Table 9 (Continued)
SUMMARY OF TDM ALTERNATIVES EVALUATION

action/strategy	criteria						
	effective in reducing SOVs	effective in reducing ADT	enhance other tdm measures	ease of implementation	capital costs	operating costs	year round application
Bicycling/pedestrian							
highlight midblock pedestrian crossings & water front & terminals	○	○	○	▲	○	○	yes
strengthen the lanes between main st.	○	○	●	▲	●	○	yes
improve pedestrian connections from parking	○	○	○	▲	○	○	yes
construct sidewalks along major arterials	○	○	○	▲	○	○	yes
provide internal pedestrian connections	○	○	○	▲	○	○	yes
connect regional bike path to activity centers	○	○	○	▲	○	○	no
provide minimum 2.4 feet of shoulder	○	○	○	▲	○	○	yes
install bike storage facilities at activity centers	○	○	○	▲	○	○	no
institute annual bike to work day	○	○	○	▲	○	○	yes
prepare town bike maps	○	○	○	▲	○	○	yes
install consistent signing	○	○	○	▲	○	○	yes
set minimum bicycle parking space requirements	○	○	○	▲	○	○	yes
educational program	○	○	○	▲	○	○	yes
land use							
support transit friendly design	●	●	●	▲	○	○	yes
support densities consistent with modes	●	●	●	▲	○	○	yes
strengthen trip reduction regulations	●	●	●	▲	○	○	yes
encourage mixed land use development	○	○	○	▲	○	○	yes
employer sponsored programs							
encourage idesharing	○	○	○	▲	○	○	yes
encourage off-peak commuting	○	○	○	▲	○	○	yes
support transp. management association	○	○	○	▲	○	○	yes
provide guaranteed ride home for rideshorer & transit rider	○	○	○	▲	○	○	yes
encourage employers to subsidize transit passes	○	○	○	▲	○	○	yes
provide bicycle lockers/tracks for bicycle commuters	○	○	○	▲	○	○	no

Source: McDonough & Scully, Inc., CCC TDM/TSM Study, prepared for the Barnstable-Yarmouth Transportation Study, June, 1995.

LEGEND ● high ○ low ▲ moderate ▲ difficult

Consequently, all of the actions would tend to have some applicability for the region, although some are more workable and effective than others. Taking into consideration other elements of the regional and Town transportation plan, priorities were identified. Priorities would also consider generally low cost, quick implementation and safety related factors. TDM plans relative to effectiveness in reducing core area SOVs and ADT growth, the following strategies should be given greater priority in the short range:

- improved traveler guidance,
- improved transit service,
- transit friendly design,
- continued expansion of bicycle facilities,
- provision of sidewalks on major roads, and
- mixed use developments/densities to support alternatives modes

2. Transportation System Management (tsm)

TSM has tended to be thought of as a more straight-forward traffic engineering approach, such as more efficient signal operations and coordination, providing turn lanes or modifying circulation patterns. With ITS (Intelligent Transportation System) principles and concepts taking hold, TSM has also grown into ideas related to advanced traffic management systems (ATMS), advanced traveler information systems (ATIS), and priority systems (i.e. high occupancy lanes, high occupancy lane bypass control). TSM actions are likely to be implemented on the public roadway system and though funding may be private or public, the action can be implemented with public officials and agency support.

TSM planning has been formalized longer than the TDM focus and importantly, can also be more readily evaluated in quantifiable terms. For example, improved signal timing can be measured through the reduction in travel time and delay data. Computer programs that utilize the delay models can be used to estimate the effect of intersection or traffic signal improvements prior to implementation, and the analyst can be reasonably assured that the actual effect will be close to the estimated. Years of study have resulted in this ability.

However, as critically reported in a recent government study⁷, the benefits of traffic signal systems are not being fully realized due to lack of operating expertise at State and local levels of government and inadequate maintenance. Studies of efficient signal systems indicate that delays and stops can be reduced by 25%, travel time by 10%, and air pollutants by 16-19%. Sustaining these results depends on commitments to manage and maintain the system. TSM today has moved towards or into the Intelligent Transportation System (ITS) framework. Ideally, the goals of a seamless transportation system with cooperation and coordination among the various governmental agencies gains the greatest benefits, although with the multi-jurisdictional responsibilities, cooperation has its share of problems including legal liability. Operating and maintenance issues will take on greater importance in the future.

Transportation System Management (TSM) alternatives generally consist of traditional traffic engineering techniques, some of which are low cost actions, such as pavement markings, or altering the lane use on an approach to an intersection. As the Intelligent Transportation System (ITS) concepts have emerged, the TSM activity also begins to expand into more extensive monitoring, incident management, and "real time" traffic management. Reflecting the objective of this particular study, actions were evaluated in terms of their impact on traffic flow and/or safety, costs, property requirements, and time frame for implementation. The specific types of TSM action that need to be considered include the following:

1. Improved signal timing
2. Provision of turn lanes
3. Install traffic signals
4. Turn restrictions
5. Circulation patterns
6. Monitoring travel conditions
7. Improved guide signing
8. Access management practices

⁷U.S. General Accounting Office, Report to Chairman, Committee on Energy and Commerce, House of Representatives, Transportation Infrastructure-Benefits of Traffic Signal Systems Are Not Being Fully Realized, Washington, D.C. March 1994.

3. Major Capacity Enhancement Projects

This category of project would tend to involve roadway widening, significant intersection widening, and new roadways or segments. Traffic signalization projects may also be considered in this category when part of the above type projects. In major urban centers, a major new transit line could also be considered a major capacity enhancement project.

While not encouraged in the Regional Policy Plan, it is recognized that these types of solutions may be necessary for locations within major activity centers, roadways with volumes generally exceeding two lane roadway service levels that are reaching or exceeding theoretical capacities and exhibiting safety problems, and considering the seasonal fluctuation of volumes on the roadway.

Roadways within the Town that experience substantially high volumes generally year round include Willow Street, Station Avenue and Route 28. These roadways are vital arterials of the Town providing regional connections to Route 6, and local access to governmental, educational and employment land uses. While sections of Willow Street and Station Avenue may be able to be widened, limited right-of-way currently poses constraints to widening sufficiently to add substantial capacity to these three roadways.

Overall review of the existing and future roadway conditions in the Town show that:

- Willow Street from Route 6 south to the Barnstable Tontine and Station Avenue from Route 6 to Old Town House Road need to provide more than one lane per direction to adequately carry the volumes in a safe, efficient manner.
- While Route 28 experiences high year round volumes and some of the most service vehicular travel congestion in the entire region, its 40 foot right-of-way and current development character limits, and prevents any major improvement in the short range time frame. However, its current vehicle, pedestrian and bike demands, the presence of transit service, and the redevelopment potential along the entire corridor warrants that the Town examine its potential long range possibilities and the mechanisms to achieve the improvements. Table 10 lists the Town's roadways that should be given attention in this plan.

In addition to the roadways listed in the table, major improvements at the two Route 6 interchanges are critically needed. These improvements may involve additional turn lanes, signalization, or ramp reconfiguration

**TABLE 10
LIST OF ROADWAYS REQUIRING IMPROVEMENT**

Roadways	Access Management	Major Widening	Type of Action		Sidewalk/ Bike Lanes	Is it Currently Programmed
			Turn Lane Consideration	Resurfacing		
Willow St.	Yes	Yes	Yes	Yes	No/Yes	Yes
Higgins Crowell Rd.	No	No	No	Yes	Yes/Yes	Yes
Station Ave.						Yes
Route 28	Yes	No	Yes	No	No/Yes	No
Buck Island	No	No	Yes	Yes	Yes/Yes	Yes
Winslow Grey Road	No	No	No	Yes	Yes/Yes	No
South Sea Ave.	No	No	No	Yes	Yes/Yes	No
Seaview Ave	No	No	No	Yes	Yes/Yes	No
Forest Rd.	No	No	No	Yes	Yes/Yes	No
W. Yarmouth Rd.	Yes	No	Yes	No	Yes/Yes	No
Whites Path	Yes	No	Yes	No	Yes/Yes	No

SEGMENT D

RECOMMENDED PLAN

RECOMMENDED TRANSPORTATION PLAN

Based on the analysis of existing and future transportation conditions within the community and working closely with local officials, staff and the Transportation Steering Subcommittee, a series of recommendations were developed that make up the 2000 Yarmouth Transportation plan. The recommended plan provides a direction for the Town to proceed in terms of providing transportation services and facilities for the next 10 to 20 years the target year is 2015. The target year is 2015. The following describes the Plan elements:

Roadway

- Complete implementation of the major roadway improvement plans currently under design including Willow Street, Higgins Crowell Road, Station Avenue and Buck Island Road.
- A major focus of the long range plan is to develop management plans and capacity enhancement actions to improve the operations, safety, pedestrian/bicycle environment, and aesthetics of Route 28.
- Study the feasibility of extending Buck Island Road to Yarmouth Road in Barnstable to enhance internal east-west travel.
- Focus new rehabilitation efforts on key north-south roadways including Forest Road, West Yarmouth Road, Seaview Avenue, Winslow Grey Road and South Sea Avenue,
- Develop a set of guidelines and policies related to Access/Curb Cut Management for the major arterials serving the commercial areas.
- Address eleven most critical safety deficient locations that include:
 1. Route 6 at Union Street interchange
 2. Route 28 at East Main Street
 3. Route 28 at West Yarmouth Road
 4. Route 6A at Union Street
 5. Station Avenue at Wood Road
 6. Station Avenue at Regional Avenue
 7. Route 28 at South Sea Avenue
 8. North Dennis Road at Setucket Road
 9. Route 6A at Willow Street
 10. North Dennis Road at White's Path
 11. Route 28 at Seaview Avenue
- Continue emphasis of system management as developed in the BYTS Plan, particularly the Congestion Management System Plan and its use of technology to monitor and manage the roadway system.

Bicycle/Pedestrian

- Enhance pedestrian movement along major pedestrian corridors such as Route 28 and Seaview Avenue.
- Continue completion of the off-road east-west bicycle trail.
- Provide sidewalks or multi-use paths along Forest Road.

Transit Service

- Provide shelters, recognizable signs, turnouts along YES route.
- Explore new YES route along Station Avenue corridor; connect with existing Route 28 bus route.
- Work with the business community and the transit authority to effectively market and advertise the transit service.

TDM

- Provide improved advanced travelers information, particularly with regards to summer public beach parking.
- Develop effective guide signing to major sections of Town and key facilities including recreation areas and bicycle routes.
- Develop economic and development incentives to encourage larger parcels, which can then be developed as mixed use with amenities, to further encourage alternative modes and a reduced number of vehicular trips.

YARMOUTH TRANSPORTATION PLAN

RECOMMENDED ACTION ITEMS

Summary of Recommendations - Which might be used to measure progress towards Plan Implementation.

Constraints on Yarmouth's transportation planning began more than 50 years ago when major roadways were built without an awareness of the traffic demands of the future. Yarmouth must adapt to growth and assure that transportation indicators are part of all its planning activities. These facts guide the six basic elements of the current planning strategy:

1. Make sure that the Massachusetts Department of Highways is aware of the Town of Yarmouth's Priorities:
 - Improved interchanges (full clover leaves) at Exits 7 and Exit 8 on the Mid-Cape Highway;
 - Better traffic signals on Route 28, particularly at Berry Avenue, South Sea Avenue, Forest Road and Old Main Street;
 - New traffic signals at the intersection of Willow Street and Rte 6A and at the intersection of Seaview Ave. and Rte 28.

2. Complete planned improvements to major town arteries, specifically:
 - Higgins Crowell Road - includes widening, median, bike paths by the schools and new Police Station;
 - Ansell Hallet Road - relocates the Higgins Crowell intersection with Willow Street;
 - Station Avenue - improves safety in front of the A&P;
 - Willow Street - featuring some widening and other improvements.

3. Recognize that any solution to Route 28 problems (where the right of way width varies from 40 to 60 feet) requires innovative solutions, such as:
 - Prohibit left turns except at intersections with traffic signals;
 - Reduce the number of streets that intersect with Route 28;
 - Furnish lodging places with bus and trolley schedules and encourage patrons to use public transportation;
 - Provide attractive bus stop shelters with seating and schedule information;
 - Extend the summer bus service to Sea Gull Beach;
 - Encourage shared access points and prohibit multiple curb cuts at single sites;
 - Minimize curb cuts through changes in the Zoning Bylaw and other incentives;
 - Encourage parking solutions that favor access from side streets (Examples include; Great Island Plaza, Molly's and Colonial Candle, Boch Village and South Yarmouth Post Office);
 - Stripe key intersections (or, better still, provide landscaped medians) to provide stacking lanes;
 - Realign the intersection of Winslow Gray Road and South Sea Avenue. Install a traffic signal at West Yarmouth Road, replacing the one currently at Winslow Gray Road;
 - Provide additional public parking at Packet's landing and the old drive-in property;
 - Develop an alternate route to Hyannis. One possibility is extending Buck Island Road;
 - Encourage economic redevelopment that positively impacts traffic flow such as upgrading motel sites and conference centers.

4. Support the development of sidewalks, bike paths and walking trails. Examples include:
 - Complete and improve the sidewalks on Route 28 and Station Avenue;
 - Extend the existing bicycle and pedestrian trail from the dump east to Dennis (along the railroad right of way)
 - Extend the planned work on Higgins Crowell to the Hyannis town line;
 - Link present and future bike paths and walking trails with destinations.

5. Work closely with the Cape Cod Commission and the Towns of Barnstable and Dennis on areas of regional concern.
 - Access to the Barnstable Municipal Airport;
 - Location of increased parking at the airport;
 - Coordinated bus schedules;
 - Access to White's Path, a regional traffic artery.

6. Develop an ongoing plan to improve accident prone intersections.

APPENDIX

CONTENTS:

- 1. Capacity and Level of Service Concepts**
- 2. Functional Classification of Roads: Yarmouth**
- 3. Designated Scenic Roads and Legislation**
- 4. Consultant Credit Page**

APPENDIX

1. CAPACITY AND LEVEL-OF SERVICE CONCEPTS

INTRODUCTION

A principal objective of capacity analysis is the estimation of the maximum amount of traffic that can be accommodated by a given facility. Capacity analysis would, however, be of limited utility if this were its only focus. Traffic facilities generally operate poorly at a near capacity, and facilities are rarely designed or planned to operate in this range. Capacity analysis is also intended to estimate the maximum amount of traffic that can be accommodated by a facility while maintaining prescribed operational qualities.

Capacity analysis is, therefore, a set of procedures used to estimate the traffic-carrying ability of facilities over a range of defined operational conditions. It provides tools for the analysis and improvement of existing facilities, and for the planning and design of future facilities.

The definition of operational criteria is accomplished using “*levels of service*.” Ranges of operating conditions are defined for each type of facility, and are related to amounts of traffic that can be accommodated at each level.

The following sections present and define the two principal concepts of this manual: “*capacity*” and “*level of service*.” (*LOS*)

CAPACITY

In general, the *capacity* of a facility is defined as the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions.

The *time period* used in most capacity analysis is 15-min, which is considered to be the shortest interval during which stable flow exists.

Capacity is defined for *prevailing roadway, traffic, and control conditions*, which should be reasonably uniform for any section of facility analyzed. Any change in the prevailing conditions will result in a change in the capacity of the facility. The definition of capacity assumes that good weather and pavement conditions exist.

1. *Roadway conditions* - Roadway conditions refer to the geometric characteristics of the street or highway, including: the type of facility and its development environment, the number of lanes (by direction), lane and shoulder widths, lateral clearances, design speed, and horizontal and vertical alignments.

2. *Traffic conditions* - Traffic conditions refer to the characteristics of the traffic stream using the facility. This is defined by the distribution of vehicle types in the traffic stream, the amount and distribution of traffic in available lanes of a facility, and the directional distribution of traffic.

3. *Control conditions* - Control conditions refer to the types and specific design of control devices and traffic regulations present on a given facility. The location, type, and timing of traffic signals are critical control conditions affecting capacity. Other important controls include STOP and YIELD signs, lane use restrictions, turn restrictions, and similar measures.

These and other factors affecting capacity are discussed in greater detail in a subsequent sections.

It is also important to note that capacity refers to a rate of vehicular or person flow during a specified period of interest, which is most often a peak 15-min. period. This recognizes the potential for substantial variations in flow during an hour, and focuses analysis on intervals of maximum flow.

LEVELS OF SERVICE (LOS)

The concept of *levels of service* is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level-of-service definition generally describes these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with level-of-service F the worst.

1. *Level-of-service definitions* - In general, the various levels of service are defined as follows for uninterrupted flow facilities:

- *Level-of-service A* represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.
- *Level-of-service B* is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.
- *Level-of-service C* is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.
- *Level-of-service D* represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
- *Level-of-service E* represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.
- *Level-of-service F* is to define forced or breakdown flow. This condition exists whenever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-service F is used to describe the operating conditions within the queue, as well as the point of the breakdown. It should be noted, however, that in many cases operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow which causes the queue to form, and Level-of-service F is an appropriate designation for such points.

These definitions are general and conceptual in nature, and they apply primarily to uninterrupted flow. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variable used to describe them. Each chapter of the traffic manual contains more detailed descriptions of the levels of service as defined for each facility type.

2. *Service flow rates*- The procedures of this traffic manual attempt to establish or predict the maximum rate of flow which can be accommodated by various facilities at each level of service, except level-of-service F, for which flows are unstable. Thus, each facility has five service flow rates, one for each level of service (A through E), defined as follows.

The service flow rate is the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions while maintaining a designated level of service. As to capacity, the service flow rate is generally taken for a 15-min time period.

Note that service flow rates are discrete values, while the levels of service represent a range of conditions. Because the service flow rates are defined as maximums for each level of service, they effectively define flow boundaries between the various levels of service.

3. *Measures of effectiveness* - For each type of facility, levels of service are defined based on one or more operational parameters which best describe operating quality for the subject facility type. While the concept of level of service attempts to address a wide range of operating conditions, limitations on data collection and availability make it impractical to treat the full range of operational parameters for every type of facility. The parameters selected to define levels of service for each facility type are called "measures of effectiveness," and represent those available measures that best describe the quality of operation on the subject facility type. The table below gives the measures of effectiveness used to define levels of service for each facility type.

Each level of service represents a range of conditions, as defined by a range in the parameter(s). Thus, a level of service is not a discrete condition, but rather a range of conditions for which boundaries are established.

Measures of Effectiveness for Level of Service Definition

Type of Facility	Measure of Effectiveness
Freeways	
Basic freeway segments.....	Density (pc/mi/ln)
Weaving areas.....	Average travel speed (mph)
Ramp junctions.....	Flow rates (pcph)
Multilane Highways.....	Density (pc/mi/ln)
Two-Lane Highways.....	Percent time delay (%)
	Average travel speed (mph)
Signalized Intersections.....	Average individual stopped delay (sec/veh)
Unsignalized Intersections.....	Reserve capacity (pcph)
Arterial.....	Average travel speed (mph)
Transit.....	Load factor (pers/seat)
Pedestrians.....	Space (sq ft/ped)

2. FUNCTIONAL CLASSIFICATION SYSTEM

A. INTRODUCTION

In this study two road classification systems have been used and referred to 1) the Federal-Aid System, the older and more traditional one, and 2) the Cape Cod Transportation Classification used in the Regional Policy Plan of the Cape Cod Commission.

B. BACKGROUND

McDonough, Scully, our Consultant, has extensively referred to the first in his analysis and plan studies. This classification has been used in Yarmouth primarily in highway analysis and plan work. A number of our provisional analytical studies and maps have used this more traditional system.

C. CAPE COD TRANSPORTATION CLASSIFICATION SYSTEM

The functional classification of highways, as adopted by the Cape Cod Metropolitan Planning Organization, is adopted as an official part of the Regional Policy Plan. The map entitled "Functional Classification of Cape Cod Highways" dated September 5, 1996, shows the classification of Cape Cod roads as of that date.

Roadway classifications are illustrated on the Regional Policy Plan Cape Cod Transportation Classification Map, June 20, 1991 as amended. (These can also be viewed on the "Functional Road Classification System Map, which follows.)

Class A. Major Regional Roadways - Major regional roadways consist of limited access roadways and other roadways that provide mobility to and within heavily developed commercial areas. Examples include Route 6, Route 132 from Route 6 to the Airport Rotary in Hyannis and sections of Route 28 from Harwich through Bourne.

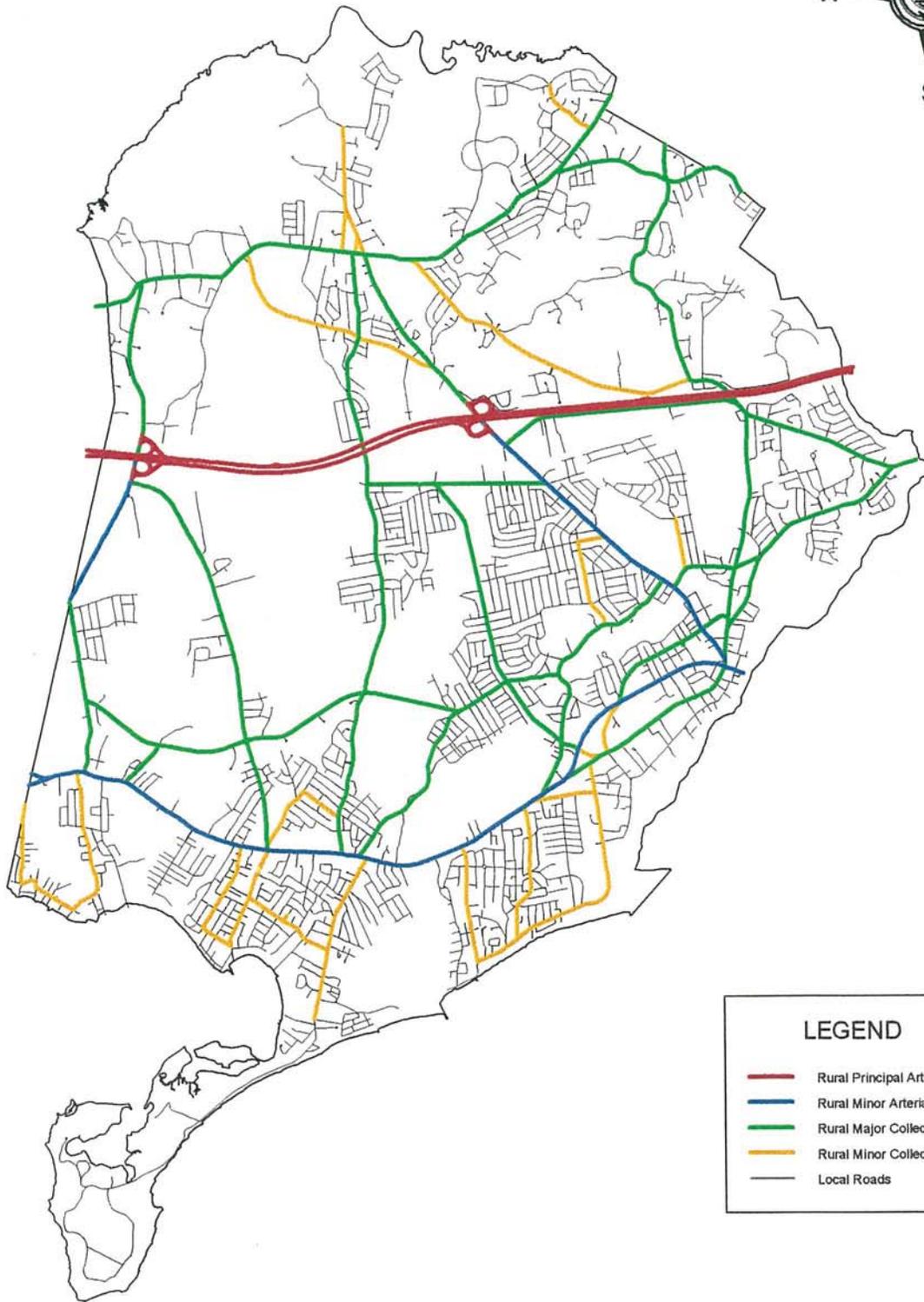
B. Regional Roadways with Scenic and Historic Values - This category of roadway consists of regional roads that have scenic and historic values inherent to Cape Cod that must be preserved. Such roadways often provide access to a mix of residential and small commercial areas. Examples of such roadways include Route 6A, Route 28A, and Route 28 from Harwich through Orleans.

Class C. Local Roadways of Regional Significance - These are roads that typically serve local traffic but provide mobility between towns. Area development is often characterized primarily by residential uses. Examples include Setucket Road (in Yarmouth, Dennis, and Brewster), great Western Road (Harwich and Dennis), Rock Harbor Road (Orleans and Eastham), parts of Route 130 (Sandwich and Mashpee), Route 151 (Falmouth and Mashpee).

Class D. Other Local Roadways - These are roads that typically serve local traffic. Examples include: shore Road (Bourne), Mill Way (Barnstable), Crowell Road (Chatham), and Crowell Road (Provincetown).

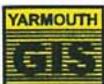
D. CONCERNS OF THE TRANSPARATION STEERING SUB-COMMITTEE

The Transportation Steering Sub-Committee has discussed these two classification and has misgivings about using the Cape Cod Commission classification. It is concerned that the Metropolitan Transportation Planning Organization does not truly represent the Towns' point of view, and does not concur in several classifications assigned to Yarmouth roads. Considerable study is felt to be needed before concurrence can be reached. The Sub-Committee is excluding the classification from the recommendation sent to Town Meeting at this time.



LEGEND	
	Rural Principal Arterial
	Rural Minor Arterial
	Rural Major Collector
	Rural Minor Collector
	Local Roads

Town of Yarmouth Functional Classification of Roads



3. OVERVIEW OF SCENIC ROADS IN YARMOUTH

* Currently eleven roads in Yarmouth have been designated as "scenic roads" by Town Meeting under the provisions of Sec. 15C of Chapter 40 of the General Laws. These 11 are listed on the following page. All are located in Yarmouthport or Bass River portions of Yarmouth.

* In addition they are also shown graphically on the Scenic Roads map that follows. No new Scenic Roads have been added since 1974, although there seems to be several other possibilities.

* By a Special Act of the General Court Route 6A was named a "Scenic Road" in June of 1992. But there are no hearing or enforcement provisions included in that act. An effort to clarify and strengthen the law was commenced in 1999.

* The Section 15C portion of Chapter 40 has requirements spelling out coverage and enforcement. It stipulates that "any repair, maintenance, reconstruction, or paving work" on a scenic road..... shall not involve the cutting or removal of trees, or the tearing down or destruction of stone walls, or portions thereof, except with the prior written consent of the Planning Board,, after a public hearing duly advertised twice in a newspaper of general circulation the area....."

* We have several instances in Yarmouth where public utilities and town agencies have ignored 15C's provisions and have cut or removed trees; and there have been residents who have undertaken moving or destroying stone walls.

* There needs to be accurate and extensive public relations to alert people and agencies to the provision, extent, and requirement of the Act. Specific questions such as, what is a tree, or trimming, and where limits are enforceable also needs to be clearly pointed out.

* The Town has authority to "make a by-law establishing that a violation shall be provided by a fine not to exceed \$300."

GENERAL LAWS OF MASSACHUSETTS

Chapter 40: Section 15C. Designation and improvement of scenic roads.

Section 15C. Upon recommendation or request of the planning board, conservation commission or historical commission of any city or town, such city or town may designate any road in said city or town, other than a numbered route or state highway as a scenic road if its entire length is contained within the boundaries of said city or town, and no part of said route is owned or maintained by the commonwealth.

After a road has been designated as a scenic road any repair, maintenance, reconstruction, or paving work done with respect thereto shall not involve or include the cutting or removal of trees, or the tearing down or destruction of stone walls, or portions thereof, except with the prior written consent of the planning board, or if there is no planning board, the selectmen of a town, or the city council of a city, after a public hearing duly advertised twice in a newspaper of general circulation in the area, as to time, date, place and purpose, the last publication to occur at least seven days prior to such hearing; provided, however, that when a public hearing must be held under the provisions of this section and under section three of chapter eighty-seven prior to the cutting or removal of a tree, such hearings shall be consolidated into a single public hearing before the tree warden and the planning board, or if there is no planning board, the selectmen of a town, or the city council of a city, and notice of such consolidated public hearing shall be given by the tree warden or his deputy as provided in said section three of chapter eighty-seven. Any city or town making said scenic road designation may make an ordinance or by-law establishing that a violation of this paragraph shall be punished by a fine not to exceed three hundred dollars. (Amended by 1989, 360 eff. 12-17-89.)

Designation of a road as a scenic road shall not affect the eligibility of a city or town to receive construction or reconstruction aid for such road pursuant to the provisions of chapter ninety.

TOWN OF YARMOUTH SCENIC ROADS

Chapter 40 Section 15C of the General Laws, as amended.

ARTICLE 8, SPECIAL TOWN MEETING, JULY 13, 1973:

- Strawberry Lane, from White Rock Road to Route 6A
- Thacher Shore Road, from Church Street to Wharf Lane
- Wharf Lane
- Water Street
- Mill Lane (Yarmouthport)
- Weir Road, from Route 6A to North Dennis Road
- Longs Road, from Dennis Road, westerly 2000 feet
- Summer Street (Yarmouthport).

Article 40, 1974 Annual Town Meeting:

- Main Street, from the traffic lights at South Yarmouth Center to River Street
- River Street, ending at South Street
- Pleasant Street

By an Act of the Mass. General Court, June 10, 1992

- Route 6A

4. CREDIT PAGE FOR CONSULTANT

- For this particular subject we have retained a traffic engineering consulting firm, **M.S. TRANSPORTATION SYSTEMS, INC. OF NATICK, MA.** formerly McDonough & Scully, Inc., with Mr. William Scully as the Principal. He has proven very helpful in preparing the report on this highly technical subject.
- B. Virtually all of the two “long summary” volumes for this chapter of the Comprehensive Plan on “transportation” were prepared by MS Transportation Systems. We are simply reproducing that report by the consultant in our standard long summary format. That is particularly true of this portion covering items relating to the analysis and transportation plan.
- C. Eleven of the 12 pages in the Transportation Plan’s “Executive Summary” document were also extracted from the Consultant’s report, including inventory, analysis, and transportation plan proposals. Staff and Sub-Committee added additional material on goals and objectives. The Route 6A Corridor, scenic roads and road classifications, and also action items, implementation schedule and responsibilities.

