CAPE COD
COMMISSION

2012 REGIONAL TRANSPORTATION PLAN

Chapter 7: Analysis of Alternatives

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7. Analysis of Alternatives

In the previous chapters of the Regional Transportation Plan (RTP), many existing and potential future problems have been identified, as well as potential solutions. Specifically, detailed information on many of the safety improvements is available in Chapter 3 (Safety). Detailed information on many of the bicycle/pedestrian alternatives is available in Chapter 5 (Cape Cod Bike Plan). This chapter includes information on the many potential solutions, analysis methods used, and descriptions of alternatives. Summaries of recent CCC transportation planning efforts and additional regional efforts are included in this chapter. The results of these analyses are used in the financially-constrained prioritization listing in the following chapter – Chapter 8 (Financial Plan and Recommended Projects).

7.1 TYPES OF TRANSPORTATION ALTERNATIVES

For purposes of organization, each alternative has been placed in one of four categories:

- Transportation Programs
- Transportation Projects
- Smart Solutions
- Transportation Studies

These categories are described in detail in the following sections. The final section on this chapter includes a detailed summary analysis of each alternative.

7.1.1 TRANSPORTATION PROGRAMS

The RTP, as a long-range transportation planning document, covers a time-span beyond our ability to define every specific project to be implemented up to the year 2035. It is therefore important to reserve resources (funds) over the life of the plan for specific transportation categories that support the RTP goals. The following "Programs" are examples proposed to meet the requirements of the RTP goals:

- Roadway resurfacing
- Bridge replacement/reconstruction
- Transit operating assistance & capital needs
- Intersection improvements
- Bicycle/pedestrian projects
- Regional bike network
- Intelligent Transportation Systems
- Land conservation

A full listing of all Programs is available in the section at the end of this chapter.

7.1.2 TRANSPORTATION PROJECTS

The second, and most specific category of transportation alternatives, is the listing of transportation "projects." Examples that fall into the "projects" category include:

- Signalization of a specific intersection
- Construction of additional travel lanes along a specific road segment
- Operation of new transit service in a specific area
- New bicycle path construction between specific end points

Specific projects are individually discussed in the listing at the end of this chapter.

7.1.3 "SMART" SOLUTIONS

This category of alternatives includes solutions that do not require major investments in capital or operations. These are called "Smart" Solutions because they do require thoughtful promotion and coordination of transportation services that for the most part already exist. The following are examples of Smart Solutions:

- Encourage people to take the ferry from New Bedford instead of Woods Hole to Martha's Vineyard to reduce vehicle congestion over the canal bridges.
- Coordinate Cape Cod RTA and Ferry Schedules with each other
- Develop, Sign, and Publish a Cape-wide Bicycle Route System

Smart Solutions are fully listed at the end of this chapter.

7.1.4 TRANSPORTATION STUDIES

This fourth and final category of alternatives encompasses ideas that have not been fully realized. From the public participation process, there have been many occasions on which a clear course of action is not revealed. In these cases, there may be many conflicting (and potentially infeasible) "solutions" proposed. Perhaps the only consensus is that there is in fact a problem worthy of further review. Therefore, this final category forms the basis for future planning efforts. These Transportation Studies provide the vehicle for generating programs, projects, and smart solutions. Examples of Transportation Studies may include the following types of activities:

- Analyze the need for improvements of highway crossings of the Cape Cod Canal.
- Analyze the safety impacts of changes to the Route 3 approach to the Sagamore Bridge.
- Analyze usage patterns and survey passengers for suggested improvements to the Outer Cape *Flex* service.

Transportation Studies are individually discussed in the section at the end of this chapter.

7.2 POPULATION AND EMPLOYMENT GROWTH

The Massachusetts Department of Transportation (MassDOT) has consulted with Cape Cod Commission staff on the potential growth of Barnstable County.

MASS DOT 2035 MUNICIPAL PROJECTION METHODS

MassDOT's projections pivot around trends established in the existing municipal demographic projections done by the RPA's in collaboration with MassDOT. Resulting from both RPA staff comments and newly available information, the following major changes have been made to MassDOT's original draft population and employment projections (February 2010):

Statewide and regional totals adjusted to latest available 2010 estimates.

2009 U.S. Census population estimates by municipality, as well as 2009 DET municipal employment figures (and 2010 state unemployment rates), were not yet available during development of the original forecasts. These new estimates have provided a better gauge of regional population growth, and a more accurate accounting of how the current recession has affected total employment. Many of these changes have been carried through to future forecast years (due to starting with a significantly larger or smaller base in 2010). 2010 Census results became available in time for inclusion in this RTP and are reflected in the tables listed in this section.

Improved relationships between labor force size, participation rates, jobs, and unemployment rates.

The revised 2020 estimates for total employment are now more consistent with the projected size of the available labor force. Although all regions are expected to add jobs this decade, 2020 unemployment rates will still be slightly higher than the pre-recession levels due to the growth of the labor force (many economists predict that unemployment rates will remain high for several years – or more). Massachusetts state unemployment rates assumed for these forecasts are as follows:

2010 (actual)	2017	2020	2025	2030	2035
9.2%	7.9%	6.7%	5.8%	5.3%	5.0%

By 2020, all regions are forecast to at least return to their 2000 employment level, with some experiencing further growth over and above those levels. While in general, a quicker recovery from the recession is now forecast, the job growth from 2020 to 2035 will be at a significantly slower pace.

Adjustments to regional shares and ratios.

Each region's shares of population and employment compared to statewide totals have been smoothed across forecast years to eliminate unlikely spikes or dips from (forecast) year to year. Similarly, the employment-to-population ratios are now slightly more consistent across historical and forecast years, with 2010 being treated as a dip (fewer jobs per person) due to the lingering recession

Based on the methods outlined above, the following table presents the estimated increases in population and employment in Barnstable County as well as the Commonwealth.

TABLE 1 - ESTIMATED EMPLOYMENT, POPULATION & HOUSEHOLDS

	2010	2017	2020	2025	2030	2035
Cape Cod						
Employment	88,900	94,000	98,000	100,000	102,000	104,000
Population	215,888	230,000	236,000	245,010	256,000	266,000
Households	95,755	103,000	106,000	112,000	117,000	122,000
Massachusetts						
Employment	3,111,600	3,258,900	3,331,500	3,362,400	3,395,400	3,418,800
Population	6,547,629	6,762,900	6,840,800	6,980,900	7,131,600	7,282,100
Households	2,547,075	2,704,000	2,751,100	2,832,600	2,912,700	2,980,500

Source: Massachusetts Department of Transportation

Distribution of Forecasts by Municipality

Using anticipated remaining growth in employment, population, and households from a 2000 EOEA build-out study as a guide for distribution, the MassDOT County totals were distributed on a town-by-town basis for the year 2035. Town numbers for intervening years were developed through interpolation and factoring to meet the MassDOT control totals for each year.

The following three tables include breakdowns for population and employment for each of the Cape's fifteen towns.

TABLE 2 - POPULATION FORECASTS BY TOWN

	POPULATION					
Town	**2010**	**2017**	**2020**	**2025**	**2030**	**2035**
Barnstable	45,193	47,840	48,970	50,640	52,720	54,600
Bourne	19,754	20,940	21,440	22,190	23,110	23,950
Brewster	9,820	10,820	11,240	11,900	12,660	13,370
Chatham	6,125	6,570	6,770	7,050	7,400	7,720
Dennis	14,207	14,720	14,930	15,230	15,650	16,010
Eastham	4,956	5,200	5,300	5,450	5,650	5,820
Falmouth	31,531	33,730	34,660	36,080	37,780	39,340
Harwich	12,243	13,270	13,700	14,370	15,150	15,880
Mashpee	14,006	15,560	16,220	17,250	18,420	19,520
Orleans	5,890	6,240	6,390	6,610	6,890	7,140
Provincetown	2,942	3,240	3,370	3,570	3,800	4,010
Sandwich	20,675	21,630	22,040	22,620	23,390	24,060
Truro	2,003	2,390	2,560	2,830	3,120	3,400
Wellfleet	2,750	3,230	3,430	3,760	4,110	4,450
Yarmouth	23,793	24,620	24,980	25,460	26,150	26,730
Grand Total	**215,888**	**230,000**	**236,000**	**245,010**	**256,000**	**266,000**

Source: Massachusetts Department of Transportation

TABLE 3 - EMPLOYMENT FORECASTS BY TOWN

	EMPLOYMENT					
Town	**2010**	**2017**	**2020**	**2025**	**2030**	**2035**
Barnstable	26,090	26,940	27,830	27,960	28,110	28,260
Bourne	7,300	8,800	9,620	10,550	11,460	12,360
Brewster	2,640	2,790	2,900	2,960	3,010	3,070
Chatham	2,920	3,000	3,080	3,090	3,090	3,090
Dennis	4,580	4,930	5,180	5,340	5,510	5,670
Eastham	1,160	1,220	1,270	1,290	1,320	1,340
Falmouth	14,250	14,690	15,160	15,220	15,280	15,350
Harwich	3,680	3,950	4,140	4,270	4,390	4,510
Mashpee	4,590	5,050	5,350	5,590	5,830	6,060
Orleans	4,070	4,250	4,410	4,470	4,520	4,580
Provincetown	2,420	2,440	2,500	2,470	2,440	2,420
Sandwich	5,090	5,280	5,460	5,500	5,540	5,580
Truro	540	600	630	660	690	720
Wellfleet	1,070	1,220	1,320	1,400	1,490	1,580
Yarmouth	8,500	8,840	9,150	9,230	9,320	9,410
Grand Total	**88,900**	**94,000**	**98,000**	**100,000**	**102,000**	**104,000**

Source: Massachusetts Department of Transportation

TABLE 4 - HOUSEHOLD FORECASTS BY TOWN

	Households					
Town	**2010**	**2017**	**2020**	**2025**	**2030**	**2035**
Barnstable	19,225	20,510	21,040	22,120	23,000	23,890
Bourne	7,866	8,470	8,720	9,220	9,630	10,050
Brewster	4,383	5,020	5,280	5,770	6,220	6,660
Chatham	3,085	3,320	3,420	3,610	3,770	3,930
Dennis	6,928	7,020	7,060	7,180	7,240	7,300
Eastham	2,388	2,480	2,510	2,600	2,660	2,720
Falmouth	14,069	15,240	15,730	16,690	17,500	18,310
Harwich	5,623	6,220	6,470	6,940	7,360	7,770
Mashpee	6,118	7,130	7,560	8,350	9,060	9,770
Orleans	2,950	3,110	3,170	3,310	3,420	3,530
Provincetown	1,765	1,940	2,010	2,160	2,280	2,400
Sandwich	7,776	8,180	8,350	8,700	8,970	9,250
Truro	984	1,270	1,390	1,610	1,810	2,010
Wellfleet	1,366	1,710	1,850	2,110	2,350	2,590
Yarmouth	11,229	11,380	11,440	11,630	11,730	11,820
Grand Total	**95,755**	**103,000**	**106,000**	**112,000**	**117,000**	**122,000**

Source: Massachusetts Department of Transportation

7.3 EVALUATION CRITERIA

The evaluation of transportation alternatives is ultimately based on the goals of the Regional Transportation Plan (RTP). For an alternative to be eligible for recommendation, it must be consistent with, or avoid inconsistencies with any of the goals of the RTP. These goals, discussed in the first chapter, are summarized as follows:

1. Safety and Security
2. Congestion Relief
3. Multimodal Accessibility
4. System Maintenance
5. Environmental Protection
6. Community Orientation
7. Equitability
8. Cooperation among Stakeholders

MassDOT's Project Design and Development Guide provides some guidance on performing evaluations.

For example, Highway System Preservation Projects may be evaluated according to:

- Condition
  - Pavement Condition (in consideration of pavement management principles)
  - Pavement structural adequacy (as available)
  - Bridge condition
  - Condition of other bridge infrastructure elements
  - Degree and severity of deterioration of other infrastructure
  - Compliance with minimum access standards
- Usage
  - Traffic volumes and truck usage
  - Pedestrian and bicycle usage and/or connectivity (as it is sometimes difficult to provide good pedestrian and bicycle data, connectivity to other trails, downtown areas, neighborhoods, schools, etc., should also be considered)
  - Effect on connectivity for the closure or restriction of bridges
  - Effect on safety and congestion
- Cost Effectiveness (as applicable)
  - Cost per daily traffic (average daily traffic or ADT) and/or pedestrian/bicycle user, as available
  - Cost per lane mile
  - Cost per ADT/lane mile

MassDOT's guide suggests that System Improvement/Expansion Projects should be evaluated according to:

- Condition and Service Quality
- Mobility
    - Magnitude and duration of congestion
    - Travel time and connectivity/access
    - Number of new pedestrians, bicycles, or transit riders that will use the facility (if available) or other measure of project's potential to encourage non-automobile oriented travel (influenced by the project's proximity to activity centers and destinations--downtowns, neighborhoods, schools, parks, etc., as well as by its connectivity to other existing or planned bicycle and pedestrian routes).
- Safety and Security
    - Crash rate compared to state average (if crash rate is not available, a general assessment of anticipated safety impacts can be substituted)
    - Transportation security and evacuation routes
    - Bicycle and pedestrian safety
    - Bicycle comfort index (as described in Chapter 3)
- Community Effects and Environmental Justice
    - Residential
    - Environmental justice for low income and minority neighborhoods, including residents that have English as a second language.
    - Public support
- Land Use and Economic Development
    - Business
    - Sustainable development (including compact & mixed-use development)
    - Consistency with local and regional plans (including Land Use Vision Maps)
- Environmental and Air Quality/Climate Effects
    - Air and water quality
    - Historical and cultural resources
    - Wildlife habitat and endangered species
- Cost Effectiveness
    - Cost per ADT and/or pedestrian/bicycle user, as available
    - Cost per lane mile
    - Cost per ADT/lane mile

Recent Cape Cod Regional Transportation Plans included other criteria for evaluation:

- Travel Miles (1 benefit = 10,000 VMT reduced)
- Travel Hours (1 benefit = 1,000 VHT reduced)
- Safety ("Equivalent Property Damage Only" Method)
- Air Quality (1 benefit = 100kg of VOC or 100 kg of NOx reduced)

The Cape Cod Commission maintains a database of implemented, currently approved, proposed, and potential projects. The database includes summary information such as a description of the project as well as estimates of the costs associated with it. A "Goal

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

Several specific criteria may used in the analysis of projects. Such criteria include:

Travel Miles:

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

Travel Hours:

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

Safety:

Solutions for areas with the largest safety problems are likely to have the greatest benefit. Safety evaluations may be based on the “EPDO” method where the EPDO, or “Equivalent Property Damage Only” is calculated by assigning a value of 5 to each injury crash and 10 to each fatality crash. For intersections EPDO is adjusted by Million Entering Vehicles (MEV) and for road segments is adjusted by Million Vehicle Miles Traveled (MVMT). These figures are expected to be used in future improvements to the projects database.

Air Quality:

Benefits are related to reductions in the precursors of ozone as determined from output of the regional transportation model air quality programs (when available). 1 Benefit = reduction of 100 kg of VOC or 100 kg of NOx.

Goal Benefit:

Based on scores developed under the compatibility analysis, the scores are multiplied by weighting factors (currently 1) and added together to equal the goal benefit.

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

The Benefit Level can then be divided into the RTP Projected Cost (in millions of dollars) to come up with a "Score." This method allows the relative benefits of large and small projects to be compared on a benefit/cost basis.

7.3.1.1 Cape Cod Regional Transit Authority Priorities

The Cape Cod Regional Transit Authority (CCRTA) is both an important member of the Cape's transportation planning organization and a provider of essential transportation services. In the development of priorities for the RTP, the CCRTA supports the following broad categories:

- Transit Enhancements
- Transit Service Expansion
- Transit Capital Improvements to all CCRTA parcels of land
- Transit Energy Efficient projects and programs
- Rail Operating Assistance
- Transit ITS Improvements
- Transit Operating Assistance
- Transit Capital Needs
- Rerouting/Redirecting Current Transit Routes

7.4 RECENT CCC TRANSPORTATION PLANNING EFFORTS

This section includes summaries of transportation recommendations from efforts undertaken since the 2007 RTP.

7.4.1 YARMOUTH ROAD CORRIDOR STUDY/HYANNIS ACCESS STUDY IMPLEMENTATION

Yarmouth Road in Barnstable experiences significant vehicle queues during peak hours of operation. The corridor is the primary access for some Cape towns to the Cape Cod Hospital. Seasonal and peak hour congestion often delay emergency vehicles access to the Hospital. The intersection of Yarmouth Road and Route 28 in Barnstable is a known high crash location and is identified in the Hyannis Access Study as an intersection in need of improvements. Yarmouth Road serves as an important access road into Hyannis Center, which accommodates both commercial and business development. Hyannis Center was recently approved as a Growth Incentive Zone. A viable Yarmouth Road corridor is significant for many modes of transportation, including walking, biking, automobile, transit and rail. The Hyannis Transportation Center is located off Route 28, a short distance from the Yarmouth Road/Route 28 intersection. The Yarmouth Road Corridor Study has examined each mode of transportation (walking, biking, automobile, transit and rail). After many months of review and public input, "Concept 1a" has been recommended (see figure below). Concept 1a and 1b are continuations of the four-lane divided Willow Street roadway that currently exists near Route 6 Interchange 7. Concepts 1a continues that four-lane divided roadway from the Higgins Crowell Street/Willow Street intersection in Yarmouth to the Route 28/Yarmouth Road intersection in Barnstable. Concept 1a uses a westerly alignment at the Route 28/Yarmouth Road intersection.

Concept 1a and all other considered concepts include a multi-use path. These concepts are available for viewing by at:

www.gocapecod.org/yarmouthroad

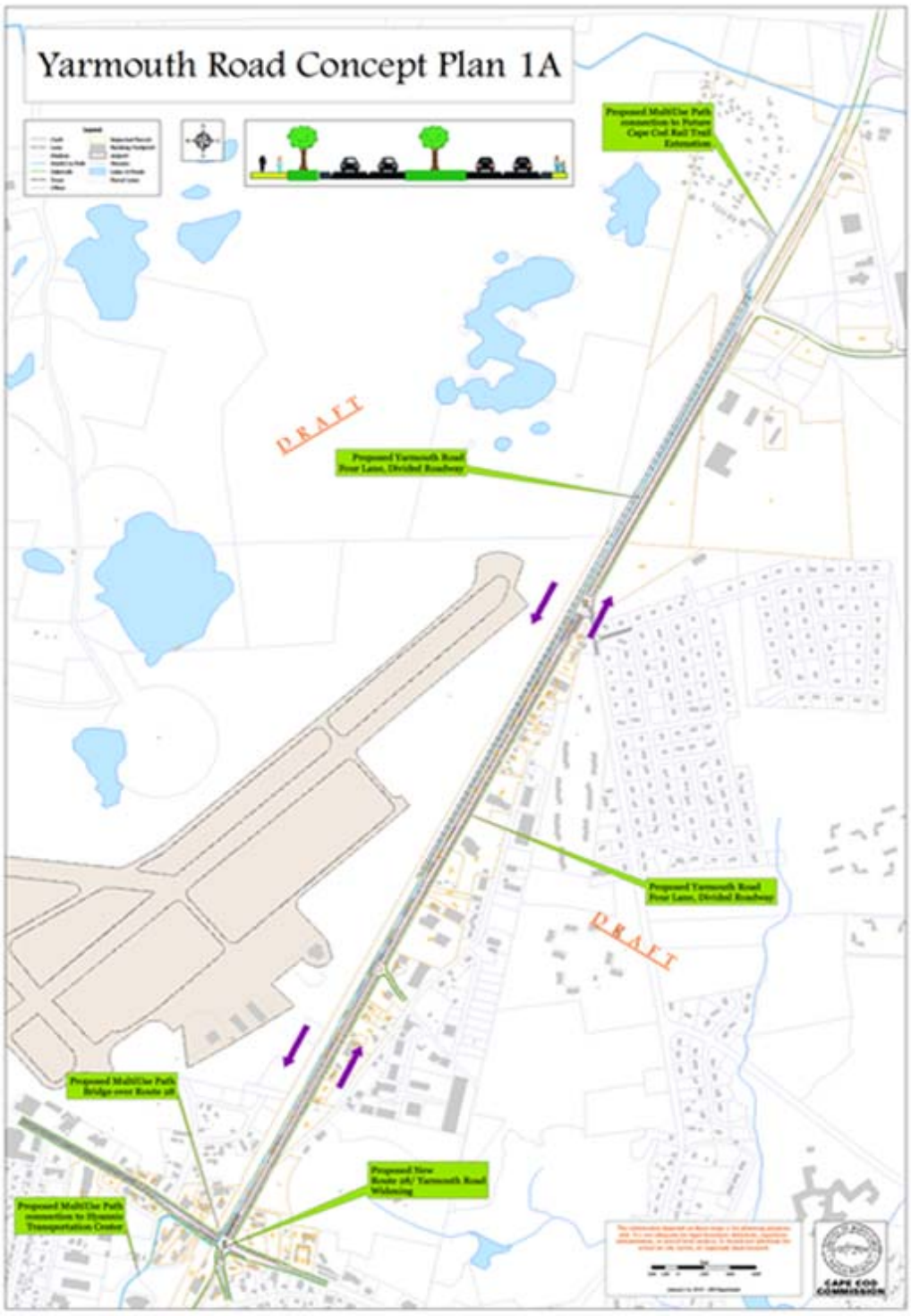

FIGURE 1 - YARMOUTH ROAD CONCEPT 1A

Planning for improvements recommended by MassDOT's Hyannis Access Study include a potential grade-separation of the Airport Rotary. The following figure shows a

redesign of the rotary as a modern roundabout with the two approaches of Route 28 connected via an underpass.

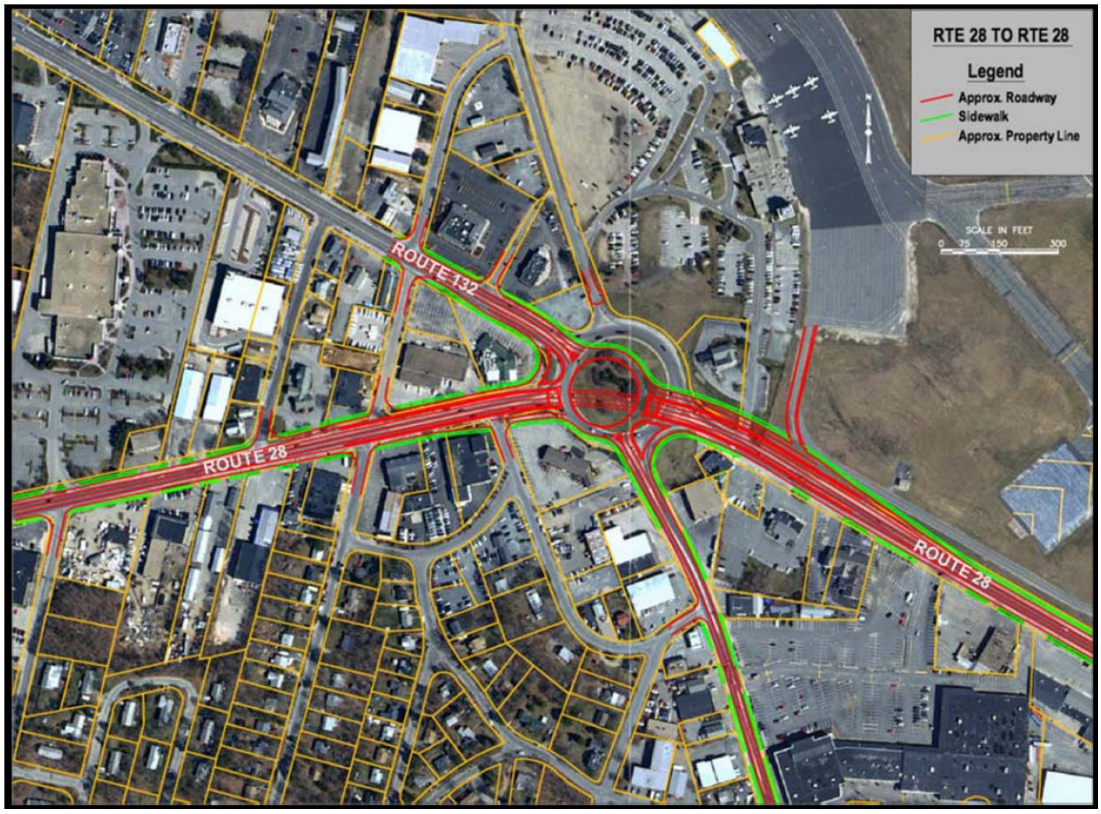

FIGURE 2 - HYANNIS ACCESS STUDY IMPLEMENTATION - AIRPORT ROTARY GRADE SEPARATION

7.4.2 ROUTE 6A CORRIDOR MANAGEMENT PLAN UPDATE

Route 6A consists of approximately 34 miles of state highway that extends along the Cape Cod Bay shoreline, traversing seven communities from the village of Sagamore in the town of Bourne to the U.S. Highway Route 6 Rotary at the Eastham/Orleans border. The Massachusetts state legislature designated the roadway as a "Scenic Byway" in 1992, in recognition of its distinctive scenic and historic character. In 1995, the Cape Cod Commission (CCC) issued the Route 6A Corridor Management Plan (CMP) through a grant provided by the state's Interim Scenic Byways program. The main purpose of the plan was to focus on resource protection along the corridor while addressing traffic and safety needs. A secondary purpose was to inform MassDOT policy on management of scenic roads and to assist in the development of the state's Scenic Byways program. The purpose of the Route 6A Corridor Management Plan Update is to continue the same

mission as the original plan, using current data. The full text of the CMP Update is available online:

www.gocapecod.org/6Away

Transportation Recommendations from the CMP update include:

General Transportation Improvement Strategies:

The following strategies advance the goals of the CMP and serve as the basis for the transportation implementation recommendations:

- **Improve access management.** By combining driveways, constructing inter-connections between adjacent parcels, or eliminating excess driveways and unnecessary "wide-open" pavement, traffic flow and safety is improved.
- **Encourage non-automobile travel of the corridor.** Alternate travel modes should be supported by development of non-automobile transportation facilities, education, and marketing. Using alternate transportation such as biking and walking reduces the impacts on air quality, safety, and energy use associated with automobile travel and enhances the Route 6A experience by reducing traffic.
- **Develop flexible roadway standards.** Allowing for narrower travel lanes can encourage lower travel speeds and enhance the safety of non-motorized travel such as walking or biking.

Transportation Implementation Recommendations

The following recommendations for implementation advance strategies to address traffic flow and safety along Route 6A, as well as support other CMP goals.

IMPLEMENTATION RECOMMENDATION:
Speed-management techniques

The 1995 CMP recommended exploring "speed zoning" to address safety concerns on Route 6A. Speed zoning is the process of (1) recording the speeds of vehicles on a segment of roadway and (2) setting the "appropriate" speed limits. Determination of the speed limit usually is based on the speed at which 85 percent or few motorists travel along that given segment of the road. The current speed zones on Route 6A vary, with changes occurring over relatively short distances. Drivers frequently exceed the speed limit; in many of the higher speed zones (speed limit 45 mph) this impacts the comfort and safety of pedestrians and bicyclists.

The traditional method of establishing speed limits would likely result in higher speed limits throughout the corridor, which would be inappropriate with the scenic byways program goals of accommodating a variety of roadway users (including pedestrians and

bicyclists). Establishing greater uniformity in the corridor's speed limits and lowering them in areas where speed limits are high to better serve the various types of users would improve safety along the corridor.

The greatest potential benefit of speed management for Route 6A is to bring uniformity and reduce the variability of average travel speeds. Higher travel speeds generally are not as great a concern for safety as differences in speeds and the resulting conflicts. It is important to keep in mind that compliance is necessary for speed limits to be effective. The Institute of Transportation Engineers has issued the following reasons for using caution when establishing speed limits:

What realistic speed limits do:

- Encourage compliance from the majority of drivers;
- Give a clear reminder of reasonable and prudent speeds;
- Provide an effective enforcement tool to the police;
- Minimize public antagonism toward police enforcement, which results from obviously unreasonable regulations; and
- Encourage drivers to travel at the speed where the risk of crash involvement is the lowest.

What unrealistic speed limits do:

- Discourage voluntary compliance;
- Create the perception of "speed traps;"
- Cause public antagonism toward the police;
- Create a bad image for a community in the eyes of tourists; and
- May increase the potential for crashes.

"Traffic calming" techniques such as geometric and visual cues can also be used to encourage motorists to travel at safer speeds. This approach involves reducing the perceived width or straightness of the travel lane through changes in pavement texture along the shoulders; pavement markings; strategic use of curbing; and other techniques to give motorists cues to drive slower. For information on traffic-calming techniques, see:

http://www.gocapecod.org/calming.htm

<u>Educational and enforcement programs:</u>

Lower speed limit signs alone generally are ineffective for reducing speed. New signage (e.g., "High Traffic Enforcement Area") may have an immediate effect on motorist behavior, but absent other factors (such as constant police attention), the signage over time may be ignored. Traditional speed enforcement has limited "educational" value

since it is usually intermittent or only in effect in a few ideal locations (due to visibility, officers' safety etc).

In some states, speed enforcement is accomplished via speed cameras coupled with traffic radar equipment. When a vehicle is measured to be traveling over the speed limit, digital cameras record images of the driver and the license plate, along with data such as travel speed, time and date, etc. The information is reviewed for accuracy and then a citation is mailed to the motorist. Massachusetts laws do not explicitly support enforcement through speed cameras. However, in recent years legislation has supported the Massachusetts Turnpike Authority's use of camera-based automated enforcement of electronic toll lanes. For a review of state laws that affect implementation of strategies such as "photo radar," see the Governors Highway Safety Association:

http://www.statehighwaysafety.org/html/stateinfo/laws/auto_enforce.html

In summary, speed management for the Route 6A corridor should include the following elements:

- Establish 35 miles per hour speed limits for the entire scenic byway;
- Establish 25 miles per hour speed limits within village centers along the scenic byway;
- Reduce travel lane width to 10 feet (remaining width for shoulder use by non-motorized travel); and
- Explore educational and enforcement programs.

IMPLEMENTATION RECOMMENDATION:
Connect sidewalks throughout the Scenic Byway (on both sides of the road in village centers)

Substantial areas along Route 6A have no pedestrian paths. Without accommodations for walking (for pleasure/recreation or for a short trip), travelers are forced to choose cars. Sidewalks serve a basic need for many of the shorter trips along the byway. When pedestrians are not present, sidewalks are also useful for beginning cyclists and low speed biking. MassDOT has indicated that 4-foot wide sidewalks are acceptable (narrowing intermittently to 3-feet at restrictions such as utility poles).

IMPLEMENTATION RECOMMENDATION:
Provide public transit service

Providing continuous, frequent, and coordinated public transit service can support other non-automobile uses (bikes are accommodated on racks of all Cape Cod Regional Transit Authority buses) throughout the corridor. Public transit uses relieve the stress of automobile demand and its associated congestion and safety problems. One of the most

viable options for improving public transit and access along the corridor would be to provide summer shuttle service. A Route 6A summer shuttle bus could serve as an alternative to automobile travel for visitors and residents during the peak seasons when car traffic is heaviest on the roadway.

IMPLEMENTATION RECOMMENDATION:
Roundabout

The intersection of Route 6A/Route 132 is a concern for drivers due to the wide expanse of pavement, high speed approaches, and complicated traffic channelization. In addition, non-motorized travel such as by bicycle is highly risky since some turning maneuvers require multiple points of exposure to potential side-on collisions. The current Cape Cod Regional Transportation Plan (RTP) has identified construction of a roundabout at this location as the 19th highest priority project on Cape Cod. According to the RTP, such a project would "improve traffic flow and safety of the Route 6A/Route 132 intersection through channelization of traffic movements (roundabout)."

The following figure illustrates a roundabout concept for the intersection of Route 6A/Route 132. Modern roundabouts have been shown to improve traffic safety and traffic flow as well as provide other community benefits. The geometry of a properly designed roundabout encourages low-speed entry, circulation, and exit that is consistent for each approaching roadway. In certain circumstances roundabouts can have significantly improved operations compared to signalized intersections and many unsignalized intersections. The main advantage of roundabouts is that they provide continuous traffic flow, as there is no "all-red" phase where all traffic must stop. A roundabout's continuous traffic flow generally results in less noise than the stop-idle-accelerate traffic movements of a signalized intersection.

A correctly designed roundabout encourages consistent lower speeds of all users—a safer option—versus the wide range of operating speeds at a signalized or unsignalized intersection (containing a mixture of stopped vehicles and high-speed through traffic). Additionally, the geometry of a modern roundabout is well-suited for creating a "gateway" to welcome visitors to a special area.

Due to the proximity of residences to the Route 6A/Route 132 intersection, it is important to use a low noise-emitting surface for the truck apron (the rumble strip inside the circulating roadway). A stamped-asphalt installation (as used at the Route 39/Queen Anne's Road roundabout in Harwich) is recommended.

FIGURE 3 - INTERSECTION OF ROUTE 6A, ROUTE 132, AND OAK STREET IN BARNSTABLE
(Photo taken from Route 132, facing north. Source: CCC)

FIGURE 4 - ROUNDABOUT CONCEPT: RT 6A, RT 132, OAK ST IN BARNSTABLE

IMPLEMENTATION RECOMMENDATION:
Shared-use pavement markings

Traffic lanes on roads such as Route 6A are often too narrow for sharing side-by-side by bicyclists and passing automobiles or trucks. Bicyclists riding too close to the roadway edge run the risks of being run off the road, being "clipped" by overtaking motorists who misjudge passing clearance, or encountering drainage structures, poor pavement, debris, and other hazards.

Riding farther to the left may help avoid these problems (and is legally permitted where needed for safety) but can run counter to motorist expectations and be hazardous. A pavement marking that indicates the legal and appropriate bicyclist line of travel, and cues motorists to pass with sufficient clearance, is recommended for certain locations on route 6A.

Guidance for proper installation indicates that a shared-lane marking should not be placed on roadways that have a speed limit above 35 miles per hour. Markings should be placed immediately after an intersection and spaced at intervals not greater than 250 feet thereafter. If used on a street without on-street parking (like most of Route 6A), the centers of the markings should be at least 4 feet from the face of the curb, or from the edge of pavement where there is no curb. The centers of the markings should be 11 feet from the edge where there is parking.

An example of a "sharrow" pavement marking on a narrow road is shown in the following photo:

FIGURE 5 - "SHARROW" PAVEMENT MARKING
(Source: National Committee on Uniform Traffic Control Devices 2007)

For Route 6A, the most effective use of the sharrow markings would be on road segments that are not served by alternate routes suitable for regional bike travel. Four segments of Route 6A do not have suitable alternate routes for bicycle use. These are identified by a western and an eastern roadway intersection as shown in the Table 4 (next page).

TABLE 5 - ROUTE 6A ENHANCED BICYCLE ACCOMMODATION SEGMENTS

Town	Western Transition	Eastern Transition	Length (miles)
Sandwich	Chipman Road	Spring Hill Road	0.5
Sandwich	Jacobs Meadow Road	Old County Road	0.4
Barnstable	Parker Road	Keveney Lane	5.0
Brewster	Stony Brook Rd (E)	Tubman Road	0.1

The longest segment is approximately five miles long from Parker Road to Keveney Lane in Barnstable.

IMPLEMENTATION RECOMMENDATION:
Collect vehicle classification data

The Cape Cod Commission traffic counting program should collect vehicle classification data at all Route 6A automated traffic count locations. (Twelve locations are scheduled for the 2010 traffic counts.) This will help determine the number of large trucks using Route 6A, which not only poses potential safety concerns but also could impact the condition of the roadway.

7.5 ADDITIONAL REGIONAL EFFORTS

This section provides summaries of regional efforts that are likely to benefit the Cape's transportation system.

7.5.1 *OPENCAPE*

The OpenCape initiative will provide a fiber-optic backbone for Cape Cod. This will provide capacity to support intelligent transportation systems in two ways: direct connections and 700 MHZ radio systems. This $40 million project is underway and is expected to be complete by 1/31/2013.

The Cape Cod ITS implementation planning has been oriented toward utilization of this system. There are 12 strands available to the Commonwealth for their use and it is expected these will be incorporated into the Cape's eventual ITS design.

7.5.2 LOCAL TRANSPORTATION CENTER STUDY

Sites for local transportation centers were recommended in short- and long-term public transportation plans. FTA funding to develop locations on the Lower and Outer Cape were provided and a site selection was done for Orleans and two concepts were explored in Provincetown. Currently, the town of Orleans is not interested in hosting a transportation center and funding for the Provincetown center has not been identified.

7.5.3 TRANSPORTATION PARTNER STUDY

The Transportation Partner Study included the development of inexpensive wireless automatic vehicle location technology and has been included on public and private transportation. The system will include local transit, intercity bus, and ferries. The real-

time vehicle locations will be used to allow "smart transfers" when congestion makes schedules difficult to maintain (see link below):

http://www.geolabvirtualmaps.com/CapeCodRegionalTransitAuthority_Legacy.aspx

7.5.4 RENEWABLE FUEL PARTNERSHIP

This initiative provided forums for biodiesel and ethanol education. Barnstable County made biodiesel available through their procurement process that many towns take advantage of. The next step for this group is development of a Renewable Fuels Strategic Implementation Plan which is currently unfunded.

7.5.5 CULTURAL COAST FERRY PLAN

Planning for a "Cultural Coast" ferry system was initiated by the Massachusetts Chambers of Commerce and Congressman Delahunt. The planning looked at a service network primarily to serve National Parks from the Boston Harbor Islands to the Cape Cod National Seashore with a hub located in Quincy at the Squantum Pier. Final recommendations for this system have not been made.

7.5.6 COORDINATED HUMAN SERVICE TRANSPORTATION PLAN

The Coordinated Human Service Transportation Plan development included a significant out reach to transportation providers within the Barnstable Urbanized Area (UZA) defined by the 2000 U.S. Census. The plan developed the following goals and objectives:

1. Plan Goals and Objectives
   1.1. Service Improvements
      1.1.1. Goal 1 – provide service to address barriers and unmet needs for; journey to work, weekends and available span of service.
      Objectives
         - Provide weekend and evening service
         - Improve journey to work options
            - Improve service opportunities for day care access
            - Improve outreach to employers
      1.1.2. Goal 2 – Encourage service opportunities in underserved areas.
      Objectives
         - Provide opportunities for:
            - Fixed route service in the Bourne/Falmouth area
            - Service between Barnstable and Sandwich especially to support elder day care programs
            - Service to the Cape Cod Career Centers

- Increased use of taxi services

1.1.3. Goal 3 – Improve accessible services

Objectives

- Provide additional accessible vehicles in:
  - Wareham
  - Carver
  - Marion
  - Rochester
  - Bourne
  - Plymouth
  - Sandwich
  - Other underserved areas
- Improve demand response scheduling
- Encourage medical escort services
- Expand the number of handicap accessible taxis

1.2. Service Coordination

1.2.1. Goal 4 - Reduce duplication of services.

Objectives

- Form a coordination body
- Development of a regional reservation and dispatch process
- Consolidation of trips for different funding agencies, where possible
  - Encourage inter agency cooperation where cost and ride sharing is possible.

1.2.2. Goal 5 – Improve service planning

Objectives

- Update the Cape Cod 5-Year Public Transportation Plan
- Support more inter regional RTA planning for services
- Develop more outreach programs to schools, employers, and human service organizations to determine barriers to transportation, unmet needs and opportunities.

7.5.7 OUTER CAPE MAINTENANCE FACILITY STUDY

The primary goal of this study is to assess the suitability of a satellite vehicle maintenance facility on the Outer Cape as a means of addressing some of the operational challenges and maintenance needs of Cape Cod National Seashore and its partners. The central finding of the study is that while such a satellite facility would indeed reduce deadheading time for transit vehicles serving the Outer Cape, and potentially yield other maintenance efficiencies, these savings would be greatly outweighed by the substantial upfront capital costs need for construction of the facility. Moreover, certain changes that have taken place since the project was originally proposed, such as reductions in the frequency of transit service on the Outer Cape, have reduced the prospects for cost-effectiveness.

The study report has presented an overview of three alternative approaches that would yield at least some of the advantages of a satellite facility at much lower cost: a simple overnight storage space for transit vehicles, a scaled-down satellite maintenance facility, and a mobile maintenance unit. Each of these approaches has its own set of tradeoffs and partnership considerations. Based on the information collected in the study and stakeholder feedback received, the mobile maintenance unit appears to warrant further examination as means of addressing many of the Outer Cape's maintenance needs in a cost-effective way. Key implementation issues such as forging an effective partnership for sharing the mobile resource and its costs, developing an acceptable service agreement, and addressing the potential impacts on existing in-house maintenance and staffing, are beyond the scope of the study but would need to be addressed by project partners before proceeding. Finally, it is also important to consider the virtues of a "no action" alternative. Current vehicle maintenance arrangements on the Outer Cape involve certain inefficiencies such as towing vehicles long distances for service, yet may represent the most cost-effective approach for a region with relatively low population density and modest maintenance needs.

A recommended next step would be to form a task force (perhaps under the auspices of the Outer Cape Inter-Municipal Coordination Committee) that would evaluate the viability of a shared mobile maintenance unit by gauging interest and studying institutional and financial options. The primary issues that the task force would need to examine are:

- Partners' preferences for in-house vs. contracted maintenance
- Inventory of partners' maintenance activities for which a mobile unit would be preferred over current practices and associated costs
- Operational changes from use of the mobile unit
- Ability to have a mobile unit dedicated to the Outer Cape, given projected maintenance needs
- Staffing and labor issues and (for Towns) any limitations due to the Pacheco Law
- Legal mechanisms (e.g. MOU) to govern cost-sharing among partners and the use of the mobile unit.

7.5.8 MONOMOY ACCESS STUDY

This study developed alternative transportation options to improve access between the Monomoy Wildlife Refuge and Chatham area, with potential connections to other Federal Lands. Alternatives included: satellite parking with a shuttle, relocation of the Monomoy Visitor Center, roadway improvements, and bicycling improvements. Currently the Refuge manager is exploring shuttle bus options.

7.5.9 PARKING AND TRANSIT STUDY

This study developed parking projections for Outer Cape beaches and projected erosion for a 20 year horizon. The study also developed information on beach capacity and constraints due to other issues such as area at high tide, lifeguards, and bathhouse septic capacity.

The study developed alternative parking sites and shuttles to meet expected parking needs and to centrally locate this parking rather than rebuild it in a fragile shoreline environment. A number of options were identified for contingencies in the event of a major loss in beach parking. The most likely catastrophic loss would be in the area near Nauset High School which was identified as a primary alternative for consideration.

7.5.10 ITS IMPLEMENTATION PLAN

ROADMAP STEP 1: COMPLETE SYSTEM EXPLORATION AND ASSESS FEASIBILITY

The first step of the roadmap comprises two elements that together produce an optimal concept for the system (or systems) to be formally designed and implemented. Stakeholders should be involved again as appropriate as problem definition and feasibility assessment proceed.

Complete System Exploration

The goal of this element is to achieve a confirmation that the conditions in need of ITS solutions have been correctly defined so that the solutions are on target. It will have the National Seashore, its planning partners, and stakeholders systematically arrive at a common definition of the condition to be remedied, define the evaluation criteria for assessment and comparison of alternative solution ideas, expand the array of system concepts, and align those concepts with real-world ITS solutions.

Assess Project Feasibility

The revised system concepts are assessed against the evaluation criteria to see if they are technically, economically, and operationally viable.

ROADMAP STEP 2: REVISE THE CONCEPTS OF OPERATIONS AND REQUIREMENTS

With the completion of this first reality check against market packages and actual ITS systems, the National Seashore and its collaborators will be in a position to re-cast their

description of the systems of interest. Any revision to the functional requirements for the new systems should also be worked through.

The Roadmap shows these revisions to be successive. While the ConOps drives the requirements, ITS planning is a heavily iterative exercise, and so these two steps will essentially happen in tandem.

ROADMAP STEP 3: OBTAIN A DETAILED ENGINEERING PLAN

In this step, the National Seashore will secure the services of an engineering consultant. The consultant will offer expert advice on technical matters and perform the necessary field work and measurements to translate the system's requirements into detailed technical specifications and a preliminary design.

ROADMAP STEP 4: CONSIDER DEPLOYMENT STRATEGIES

Some systems can be implemented all at once. Others for reasons of feasibility and/or external conditions are rolled out in stepwise fashion. A very important factor in this choice should be the National Seashore's level of experience with ITS deployment to date, and its comfort level with taking on the management and operations of new systems.

ROADMAP STEP 5: CHOOSE A PROCUREMENT MODEL AND PROCURE

The procurement process includes four dimensions: work distribution, method of award, contract form, and contract type. Once these key procurement decisions have been made then appropriate terms and conditions can be identified.

ITS system procurement decisions should be driven as much by how, and by whom, the project will be executed as by the intended system's purpose and functional and technical specifics. Any ITS project has a much greater chance of coming in on time and on budget if it performs thorough planning in advance of the project's administrative and technical management.

This aspect of project planning involves:

- assignment of project management responsibility and authority to individuals experienced in ITS deployment, and
- development of a detailed project plan and a systems engineering management plan.

The sponsoring agency has to factor into its planning how experienced it is with ITS deployment, and whether it has the appropriate personnel (that is, both experienced and sufficiently available) needed to manage the project so that it is executed on time and within budget. When necessary, the project management function can be procured; in that event the contractor develops the project and systems engineering plans as early deliverables. The sponsoring agency must still dedicate resources to assure active oversight of the project at all times.

The project plan documents how the project will be managed and controlled from a programmatic standpoint. It identifies the detailed work plans for both administrative and technical tasks. For each project task, the PP documents what is to be done, by whom, with what funds, when, how (processes to be used), and dependencies. The systems engineering management plan defines how the engineering portion of the project will be executed and controlled. It describes how the efforts of system designers, test engineers, and other engineering and technical disciplines will be integrated, monitored, and controlled during the complete life cycle.

ROADMAP STEP 6: EXECUTE AND OVERSEE PROJECT

Even when the administrative and technical planning and management of an ITS project are procured, the sponsoring agency has a significant role to play throughout project implementation. Each step in the systems engineering process has a gate at its termination that formally precludes going on to the next step until a series of documentation review and acceptance procedures are executed with the participation of agency personnel with assigned authority and responsibilities. At the completion of the project, after it has been installed and tested, the agency is responsible for the final acceptance testing. The system should not be accepted unless it passes this test. Additionally, the agency must validate the system once it is operating to confirm that the system has been built, is functioning as intended, and is having the desired impact in relation to the stakeholder needs it was originally conceptualized to address. In that way the benefits of the system are documented relative to its costs.

7.6 TRANSPORTATION ALTERNATIVES

The following pages contain a listing of alternatives considered for the 2012 RTP. It is expected that alternatives meeting MPO approval would undergo further analysis per the procedures outlined in the previous section. For this document, transportation alternatives were identified through an extensive public participation process and in consultation with local, state, and federal transportation officials. Commission transportation staff compiled a ranking of alternatives for each of the following four categories of alternatives:

- Transportation Programs;
- Transportation Projects;
- Smart Solutions; and
- Transportation Studies.

7.6.1 TRANSPORTATION PROGRAMS

Transportation Programs are intended to allow funding over the life of the plan (to 2035) for projects that are program-compatible but may not yet be specified. For example, the most important program, Roadway Maintenance, is expected to have numerous individual projects associated with it but these cannot be specifically identified at this time. The following table presents a priority listing of Transportation Programs. Priorities were developed through public input and consultation with Cape Cod Commission, Cape Cod Joint Transportation Committee members, and refinements requested by the Cape Cod Metropolitan Planning Organization. Some of the following headings are used in the table:

RTP#	**I**ndex number used for reference. Numbers followed by an "S" are funded through a program sponsored by the Cape Cod National Seashore.
Type Rank	For "Type," each alternative is listed as one of the following: Program, Project, Smart Solution, or Study. Ranking based on importance (#1 being most important). Unranked alternatives are also supported. Non-supported projects have been eliminated from the listing.
Town	Geographic area.
Title	Short listing.
Description	Longer description
Category	Some alternatives may also benefit other categories (e.g., many "Highway" alternatives also have benefits to "Safety" alternatives. "Highway" may also have congestion and mobility benefits as well).
Ann. Cost	estimated recurring operating cost or average funding allocation (may vary from year to year)
Start Cost	One time cost (e.g., construction cost or capital purchase)
Total Cost	Calculation of Start Cost + Ann. Cost x 23 Years

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3000	Program 1	Capewide	Roadway Rehabilitation & Reconstruction	Roadway resurfacing, rehabilitation, and reconstruction	Highway	360,000		8,280,000
3020	Program 2	Capewide	Bridge	Bridge Replacement/Reconstruction	Bridge	9,000		207,000
3001	Program 3	Capewide	Intersection Improvements	Intersection Improvements, including roundabouts, to address safety and congestion relief. Includes left-turn lanes & phases at signalized intersections	Highway	800		18,400
3009	Program 3	Capewide	Cape-wide Intelligent Transportation Systems (ITS)	Design and implement real-time transportation monitoring and notification technologies at facilities throughout Cape Cod. Includes highway and transit users traveling to and within Barnstable County.	ITS/ Management	2,500		57,500
3022	Program 5	Capewide	Bicycle/Pedestrian Projects	Bicycle and/or pedestrian facilities and programs. Includes development of a regional bike network, bike lane construction, bicycling accessibility improvements and amenities, pedestrian accessibility improvements and sidewalk network expansion.	Bicycle/ Pedestrian	2,000	3,125	49,125
3021	Program 6	Capewide	Transit Operating	Transit Operating Assistance	Transit	3,050		70,150
3023	Program 7	Capewide	Transit Capital	Transit Capital Needs	Transit	2,150		49,450
3018	Program 8	Capewide	Railway Infrastructure	Maintain & provide rail infrastructure	Rail	2,000		46,000
3015	Program 9	Capewide	Additional CCRTA Service	Public transit shuttles connecting villages along Route 6A from Sandwich to Orleans, Provincetown-Orleans Shuttle, etc.	Transit	750		17,250
3024	Program 10	Capewide	Travel Demand Management/Transportation Systems Management (TDM/TSM)	Travel Demand Management/Transportation Systems Management projects (TDM/TSM). Includes support of Transportation Management Associations (TMAs). Provide assistance to employers and institutions for the development and coordination of alternative transportation options for employees and patrons.	ITS/ Management	50		1,150
3320	Program 10	Capewide	Local Transportation Centers	Construct intermodal transportation centers in Buzzards Bay, Orleans, etc.	Transit	166		3,818
3034	Program 12	Capewide	Underground Utilities/Pole Relocation	Remove above ground utilities adjacent to roadways and install them underground or away from roadsides to improve safety where appropriate	Safety	3,000		69,000
3007	Program 14	Capewide	Traffic Calming	Promote the installation of Traffic Calming features at appropriate locations	Safety	100		2,300
4020	Program 16	Capewide	MBTA-Compatible Electronic Fare Systems on Transit and Inter-City Buses	Electronic fare system (EFS) on all CCRTA vehicles, interoperable with Massachusetts Bay Transit Authority.	Transit	200		4,600
3014	Program 17	Harwich to Truro	Flex Parking	Construct or designate parking areas for The Flex transit service	Multi-Modal	75		1,725
3028	Program 17	Capewide	Park-and-Ride Lot Management	Monitor parking usage of parking facilities at Barnstable (Exit 6), Sagamore, Harwich (Exit 10); identify & acquire new facilities, expansions as necessary	Multi-Modal	10		230
4021	Program 17	Capewide	Construction of Enhanced Bus Shelters	Build intelligent, accessible, and energy efficient Cape Cod style bus shelters that provide real-time customer information and amenities.	Transit	36		900
3011	Program 20	Capewide	Access Management	Eligible for all state and local numbered routes. Curb cut consolidation, medians, other access improvements	ITS/ Management	300		6,900

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3035	Program 21	Capewide	Congestion Management	Consider peak period pricing at strategic locations to provide funding for transportation needs	ITS/ Management	-47,000	5,000	-1,076,000
3012	Program 22	Capewide	Cape-wide Flex Service	Expand Flex bus service throughout Cape Cod	Transit	100		2,300
3027	Program 23	Sandwich, Barnstable, Yarmouth, Dennis, Brewster, Orleans	Route 6A/Scenic Byways	Corridor Management Plan update and implement recommended improvements. Includes connection of sidewalks (on both sides in villages), "Sharrow" pavement markings for bike accommodation. For report, see www.gocapecod.org/6Away	Highway	10	125	355
3002	Program	Capewide	Land Conservation	Strategic purchase of land to reduce sprawl and inefficient allocation of transportation resources. Also used to acquire land for improvement of intersections and protection of operations at new interchanges	ITS/ Management	1,000		23,000
3004	Program	Capewide	Transit Marketing & Education	Implement education programs and marketing activities to support public transit	Transit	50		1,150
3005	Program	Capewide	Safe Routes to Schools	Installation of sidewalks and provide other improvements and programs to promote safe routes to schools	Bicycle/ Pedestrian	30		690
3019	Program	Capewide	Red Light Running Cameras	Support legislation to allow installation of red-light running cameras at high-crash signalized intersections	Safety	200		4,600
3025	Program	Capewide	New Ferry Service	Passenger ferries connecting Cape Cod harbors	Ferry	250		5,750
3033	Program	Capewide	Vegetation Management	Implement a comprehensive program to trim/remove vegetation from encroaching areas	Safety	450		10,350
3036	Program	Capewide	Street Lighting	Install street lighting in woody areas where appropriate	Safety	10,000		230,000
3037	Program	Capewide	Bus Service Amenities	Provide bus schedule signage & related amenities	Transit	150		3,450
3040	Program	Capewide	Low-Floor Loading Buses	Purchase/acquire low-floor loading buses for Cape Cod services	Transit	1,125		25,875
4008	Program	Capewide	Signal Preemption	Install and maintain signal preemption hardware at traffic signals to improve public safety vehicle access	Safety	225		5,175
4076	Program	Capewide	Mashpee Wampanoag Roadway & Transit Projects	Implement roadway& transit improvements to improve accessibility & mobility to and within tribal lands in Mashpee	Multi-Modal	200		4,600

7.6.2 TRANSPORTATION PROJECTS

Transportation Projects are alternatives specific to location and effect. The following table presents a priority listing of Transportation Programs. Priorities were developed through public input and consultation with Cape Cod Commission, Cape Cod Joint Transportation Committee members, and refinements requested by the Cape Cod Metropolitan Planning Organization. Some of the following headings are used in the table:

RTP#	Index number used for reference. Numbers followed by an "S" are funded through a program sponsored by the Cape Cod National Seashore.
Type Rank	For "Type," each alternative is listed as one of the following: Program, Project, Smart Solution, or Study. Ranking based on importance (#1 being most important). Unranked alternatives are also supported. Non-supported projects have been eliminated from the listing.
Town	Geographic area.
Title	Short listing.
Description	Longer description
Category	Some alternatives may also benefit other categories (e.g., many "Highway" alternatives also have benefits to "Safety" alternatives. "Highway" may also have congestion and mobility benefits as well).
Ann. Cost	estimated recurring operating cost or average funding allocation (may vary from year to year)
Start Cost	One time cost (e.g., construction cost or capital purchase)
Total Cost	Calculation of Start Cost + Ann. Cost x 23 Years

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3802	Project 1	Barnstable	Hyannis Access Improvements	Improve access to downtown Hyannis per Hyannis Access Study. Construct 2 additional travel lanes w/landscaped median on Yarmouth Road to connect from existing 4-lanes in Yarmouth to Route 28 in Hyannis. Includes multi-use path and sidewalk.	Highway		50,000	50,000
3305	Project 2	Bourne	Rte 6 Reconfigure Interchange One	Improve westbound on-ramp near Sagamore Bridge during peak times for off-cape traffic flow: Route 6, Exit 1: Reconfigure WB on-ramp	Highway		11,500	11,500
3302	Project 3	Capewide	Cape Cod Rail Trail Extensions	Extend Cape Cod Rail Trail from Bourne to Provincetown via new bike path, including direct connection to Hyannis Transportation Center	Bicycle/ Pedestrian		74,000	74,000
4085	Project 4	Bourne	Route 25 Access Ramp Widening/Belmont Circle Modification	Widen Route 25 Ramps to 2 lanes in each direction. Modify Belmont Circle to 2-way travel. Construct pedestrian underpass at Route 25 Ramps. Per 2007 "Buzzards Bay Village Comprehensive Transportation Plan."	Highway		5110	5,110
4011	Project 5	Sandwich Barnstable Yarmouth	Route 6 Hydroplaning	Route 6 stormwater improvements to remove runoff from traveled way, including construction of shoulders as needed	Safety		10,000	10,000
3306	Project 6	Capewide	Year-Round Daily Rail Service	Implement year-round daily rail service from Hyannis to Buzzards Bay, Middleborough (connect to Boston), Providence, RI, (connect to T.F. Green Airport and N.Y. City)	Rail	1,000	3,000	26,000
3319	Project 6	Capewide	Transportation Management Center	Design & construct Operations Center to monitor traffic operations, issue real-time reports to traveling public, control variable message signs and coordinated traffic signals	ITS/ Management		6,450	6,450
3332	Project 8	Orleans, Eastham, Wellfleet, Truro, Provincetown	Rte 6 Improvements Orleans to Provincetown	Implement improvements in the corridor between Orleans and Provincetown per the *Rte 6 Safety and Traffic Flow Study*	Highway		5,000	5,000
3315	Project 9	Bourne	Otis Rotary Area Improvements	Construct safety improvements on Route 28/Connery Avenue/Route 28A at the Otis Rotary	Safety		5,000	5,000
3314	Project 10	Capewide	Permanent Traffic Counting Stations	Install permanent traffic counting stations at strategic locations Cape-wide, including remote-accessible detection at signalized intersections	ITS/ Management	5	175	290
4081	Project 10	Truro	Bus Stop Livability Enhancements	Livability enhancements / Improvements for bus stop area	Enhancements			1,000

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3300	Project 12	Bourne	Scenic Highway Median Barrier	Complete construction of median barrier along Route 6 Scenic Highway from Edge Hill Road to Belmont Circle in Bourne	Safety		12,000	12,000
3338	Project 12	Barnstable	Osterville-Cotuit Bike Connection	Construct off-road connection south of Route 28 for bicycle-pedestrian access between Osterville and Cotuit	Bicycle/ Pedestrian		2,000	2,000
3362	Project 12	Mashpee	Mashpee Rotary Ring Roads	Construct connector roads outside of the Mashpee Rotary: from Great Neck Road South to Route 28 East Leg; from Great Neck Road North to Route 151	Highway		20,000	20,000
4023	Project 12	Provincetown	Shank Painter Rd Corridor Improvements	Corridor improvements including new sidewalks, curb cut consolidation, landscaping, bicycle lanes, etc.	Bicycle/ Pedestrian		2000	2,000
3312	Project 16	Bourne	Sandwich Road Parkway	Develop Sandwich Road into a 4 lane parkway with a landscaped median.	Highway		35,000	35,000
3359	Project 16	Eastham	Route 6/Gov. Prence Road Intersection Improvements	Install improvements at Route 6/Governor Prence Road intersection in Eastham	Safety		1,000	1,000
4086	Project 18	Bourne	Memorial Circle Reconfiguration (Routes 6/28, Main Street Buzzards Bay)	Convert Memorial Circle to 4-way Intersection; includes slip lane connection for eastbound Routes 6/28 to Main Street. Per 2007 "Buzzards Bay Village Comprehensive Transportation Plan."	Highway		1802	1,802
3304	Project 19	Bourne	Bourne Rotary Improvements	Reconfigure Bourne rotary to allow direct connection between Bourne Bridge to Route 28 (MacArthur Blvd). Interim improvements to improve flows at rotary entrances and exits by widening and pavement markings/signage.	Highway		50,000	50,000
3317	Project 19	Barnstable	Independence Park Bikepath	Connect western extension of Cape Cod Rail Trail through Independence Park (Barnstable) to Service Rd at Exit 6	Bicycle/ Pedestrian		7,000	7,000
3322	Project 19	Bourne	Rte 28 MacArthur Boulevard Improvements	Bourne - Construction of 2 new northbound lanes on Rte 28, reverse existing northbound, existing southbound becomes frontage road	Highway		20,000	20,000
3325	Project 19	Capewide	Variable Message Signs	Remote operated variable message signs installed along all major routes - Rte 6, Rte 28 in Bourne & Falmouth, Rte 25 Extension, Rte 3	ITS/ Management	10	1,000	1,230
3367	Project 19	Barnstable Boston	Barnstable-Boston Ferry Service	Ferry service: Barnstable to Boston	Ferry		15,000	15,000
3337	Project 24	Falmouth	Cross-Falmouth Bikepath	Bike path connection from E. Falmouth to Gifford St. to Shining Sea Bike Path	Bicycle/ Pedestrian		3,000	3,000

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3356	Project 24	Chatham	Bridge St Bridge Replacement	Replace Bridge Street/Mitchell River Bridge (Chatham)	Bridge		12,000	12,000
3390 s	Project 26	Provincetown	Provincetown Intermodal Gateway Project - Construction	Construct the Gateway	Enhancements		8,000	8,000
3389 s	Project 27	Provincetown	Provincetown Bicycle Path Ext	Develop ped/bicycle facility using a portion of the Rte. 6 ROW	Bicycle/ Pedestrian		1,000	1,000
3301	Project 28	Sandwich	Interchange Improvements Rte 6	Mid-Cape Hwy - Implement improvements to Route 6 Interchanges	Highway		38,200	38,200
3324	Project 29	Yarmouth Dennis Harwich Chatham	Rte 28 Multimodal Improvements: Hyannis-Dennis	Construction, marking, and signage of Bicycle facility along Route 28 from Hyannis - Dennis using existing pavement with minor widening. Connect/construct Route 28 sidewalks from Yarmouth to Chatham in Dennis & Harwich. Implement improvements per the Rte 28 Safety and Traffic Flow Study; Includes turning lanes, signal optimization. See report: www.gocapecod.org/outreach	Multi-Modal		10,000	10,000
3331	Project 29	Bourne	Scenic Highway/Rte 25 Connector Ramp	Develop a direct connection from Scenic Highway to Rte. 25 to divert traffic from the Belmont Circle.	Highway		10,000	10,000
3330	Project 31	Sandwich, Bourne	Bus-Only Lanes for Rte 3 & Rte 6	Provide bus-only lanes between both Exits "2" and the Sagamore Bridge for both Rte. 3 and Rte. 6. This is expected to be achieved by widening and strengthening the shoulder section	Transit		5,000	5,000
4087	Project 32	Bourne	Reconfigure Route 6/28 Bypass (Buzzards Bay)	Reduce road width to 1 travel lane in each direction; provide local access to cross-streets; construct multi-use path from Memorial Circle to Belmont Circle. Per 2007 "Buzzards Bay Village Comprehensive Transportation Plan."	Highway		4455	4,455
3303	Project 33	Barnstable	Route 132 Access Management	Construct traffic channelization, land acquisition, combine/eliminate driveways to improve traffic flow and safety from CC Mall to Phinneys Lane	Safety		5,000	5,000
3308	Project 34	Barnstable	Airport Rotary Traffic Improvements	Reconfigure Airport Rotary to improve traffic flow and safety. May include realignment of approaches and reduction of diameter to conform to modern roundabout design	Safety		900	900
3310	Project 35	Capewide	Canal Area Intelligent Transportation System	Expand transportation monitoring system to improve congestion & safety while providing real-time information Capewide & beyond	ITS/ Management		3,000	3,000

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3316	Project 36	Orleans	Rt 6A/Rt 28 Intersection Improvements	Per recommendations of 2006 Safety Study, install traffic signal or roundabout at intersection of Route 6A/Route 28/Canal Street in Orleans	Highway		1,000	1,000
3318	Project 37	Barnstable	Barnstable Roundabout	Improve traffic flow and safety of the Route 6A/Route132 intersection through channelization of traffic movements (roundabout)	Safety		1,000	1,000
3006	Project	Bourne, Sandwich	Cape Cod Canal Park-and-Ride Lot(s) Improvements	Construct new and/or expand existing Park-and-Ride facilities on both sides of the Cape Cod Canal near highway bridges	Multi-Modal		1,150	1,150
3326	Project	Capewide	Cape-wide Highway Advisory Radio	Provide travel information cape-wide via AM radio	ITS/ Management		250	250
3336	Project	Bourne	Bourne Central Bikepath	Relocate rail line to the east of MacArthur Blvd (Bourne,) convert existing rail to bikepath	Bicycle/ Pedestrian		10,000	10,000
3340	Project	Barnstable	Truck Staging at Route 6 Interchange	Construct truck transfer staging area near a Route 6 (e.g., Exit 6 or Exit 7) interchange for transfer of freight from large trucks to smaller trucks for destinations in the Hyannis Area. Consider rail freight transfer.	ITS/ Management		3,000	3,000
3342	Project	Capewide	Emergency Routes & Shelters Signage	Install signage indicating emergency routes and shelter locations	Security		150	150
3343	Project	Barnstable	Villager Bus (Red Line) Phinneys Lane	Reroute CCRTA Villager service (Red Line) to include direct service to or from Barnstable Village directly to Route 132 via Phinneys Lane	Transit	40		920
3345	Project	Barnstable	Villager Bus Service (Red Line) Split	Add CCRTA Villager service into two separate, coordinated lines	Transit	5		115
3349	Project	Dennis	Rte 28 Main St Bridge Rehabilitation	Rehabilitate Route 28 Main Street/Swan Pond River Bridge (Dennis)	Bridge		6,000	6,000
3350	Project	Bourne	Bourne Rotary - Falmouth /Sandwich Bus Services	Introduce public transit bus service between the Bourne Bridge area and Sandwich/ Falmouth (CMAQ funding)	Transit	276		6,351
3352	Project	Dennis	Upper County Rd Bridge Rehabilitation	Rehabilitate Upper County Road/Swan Pond River Bridge (Dennis)	Bridge		3,000	3,000
3353	Project	Wellfleet	Marconi Beach Road/Route 6 Intersection Signage	Add correct signage indicating "disappearing lane" at Marconi Beach Road/Route 6 intersection in Wellfleet	Highway		5	5
3354	Project	Wellfleet	Cemetery Road & Old Wharf Road/Route 6 Improvements	Reconstruct intersections to consolidate Cemetery & Old Wharf Rd at Route 6 in Wellfleet	Highway		500	500
3355	Project	Bourne	Cohasset Narrows Bridge Improvements & Traffic Management. Includes multi-use path	Repair bridge abutments, prepare and implement traffic management plans as part of repairs to the Cohasset Narrows Bridge in Bourne [***review schedule]	Bridge		300	300
3357	Project	Falmouth	Dillingham Av/Davis Straights Signalization	Install traffic signal at Dillingham Avenue/Davis Straights intersection in Falmouth	Highway		1,000	1,000
3358	Project	Yarmouth	Route 6A/Union Street Intersection Improvements	Route 6A/Union Street intersection improvements in Yarmouth	Highway		1,000	1,000

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3361	Project	Mashpee Barnstable	Left-Turn Lanes - Route 28	Construct turning lanes on Rte 28 from Route 130 to Orchard Road in Mashpee (esp. at Bowdoin Road)	Highway		500	500
3363	Project	Yarmouth	West Yarmouth Rt 28 Intersection Improvements	Construct intersection improvements at Route 28 & East Main Street in West Yarmouth	Safety		1,000	1,000
3364	Project	Capewide	HOV Lanes	Construct High-Occupancy Lanes at key segments of freeways such as Route 6, 3, 25, and 28.	Highway		10,000	10,000
3365	Project	Eastham	Align Roadways: Aspinet /Nauset	Align Aspinet Rd with Nauset Rd at Route 6(Eastham)	Safety		1,000	1,000
3366	Project	Falmouth	Left Turn Phase - Gifford/Jones	Add left-turn phase Gifford St/Jones Rd (Falmouth)	Highway		50	50
3368	Project	Falmouth and Hyannis to New Bedford	2 New Ferry Services	Provide new ferry services: New Bedford-Woods hole, New Bedford-Hyannis	Ferry	2,000	100,000	146,000
3370 s	Project	Capewide	Coast Guard Beach Shuttle Replacement - Phase 2	Replace existing vehicles - National Park Service	Transit		500	500
3371 s	Project	Capewide	Outer Cape ITS Operations Control Center	Design and build an initial control center to accommodate ITS deployment for the Outer Cape	ITS/ Management		250	250
3372 s	Project	Capewide	Information Kiosks	Procure, install, and enable public transportation information kiosks	ITS/ Management		200	200
3373 s	Project	Capewide	Variable Message Signs - Phase 1	Permit, and install variable message signs for the Outer Cape.	ITS/ Management		500	500
3374 s	Project	Capewide	Surveillance Cameras	Permit, and install surveillance cameras for the Outer Cape to observe traffic conditions and monitor Nat'l Seashore parking facilities.	ITS/ Management		50	50
3375 s	Project	Capewide	Highway Advisory Radio System	Permit and install a highway advisory system for the lower/outer Cape area.	ITS/ Management		200	200
3379 s	Project	Capewide	Upgrade Radio System for CCRTA Service	Improve communications systems and provide capacity to accommodate ITS components /Narrowband Radio.	ITS/ Management		150	150
3381 s	Project	Capewide	Parking Improvement Implementation - Phase 1	Develop inland parking for the National Seashore	Park & Ride		150	150
3384 s	Project	Capewide	Variable Message Signs - Phase 2	Permit, and install variable message signs for the Outer Cape.	ITS/ Management		500	500

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3385 s	Project	Capewide	Beach Shuttle Expansion	Acquire additional buses to accommodate inland National Seashore parking needs - National Park Service.	Transit		400	400
3388 s	Project	Provincetown	Provincetown Bicycle Path Ext - Phase I	Develop an extension from Race Point to McMillan Pier.	Bicycle/ Pedestrian		1,000	1,000
3391 s	Project	Capewide	Renewable Fuels Pilot Stations	Develop pilot stations for renewable fuels such as biodiesel and ethanol. Proposal includes one station in the Mid-Cape area and one in the Outer Cape area	Enhancements		999	999
4000	Project	Barnstable	CCRTA Bike Rental	Provide bike rental service at Hyannis Transportation Center	Bicycle/ Pedestrian			0
4001	Project	Eastham Orleans	Eastham Rotary Bike/Ped Accommodation	Add bike/ped accommodation to connect Orleans to Rock Harbor Rd & Rt 6 in Eastham via periphery of rotary	Bicycle/ Pedestrian			0
4003	Project	Sandwich	Bike Information Kiosk	Construct informational kiosk by Canal bikeway near Sandwich Marina	Bicycle/ Pedestrian			0
4006	Project	Eastham	Route 6 Complete Street	Route 6 in Eastham: add bike accommodation, improve sidewalks, bus turnouts & stops to create "Complete Street"	Highway			5,000
4010	Project	Bourne	Rail Connection at "Y"	Construct direct connection from Canal-side rail to Falmouth rail (eliminating need to lower Canal rail bridge)	Rail			0
4012	Project	Barnstable	West Main St Transit	Provide transit service along West Main Street from SeaLine connection at Rt 28 to downtown Hyannis	Transit			0
4013	Project	Falmouth	Falmouth Transit Improvements	Add service/stops to Surf Drive, Maravista Ave, Brick Kiln Rd, Jones Rd.	Transit			0
4015	Project	Capewide	Mobility Management Call Center	One-stop traveler call center to coordinate all travel modes and to manage eligibility and special requirements for human services.	Transit			0
4017	Project	Capewide	Expansion of Next-Gen Mobile Data Terminals to Paratransit	State-of-the-art displays, global positioning systems (GPS), automatic vehicle location (AVL) systems, in-vehicle navigation systems, digital driver manifests and mobile data collection.	Transit			0
4018	Project	Capewide	Next Bus Stop Announcements and Automatic Passenger Counting	Add technology to Mobile Data Terminals (MDTs) to provide next bus stop announcements/displays onboard. Includes automatic passenger counters.	Transit			0
4019	Project	Capewide	Web 2.0 Integrated Intermodal Traveler Information over the Web	Internet-based intermodal trip planning, displays at malls and terminals to provide real-time mapping of transit vehicles, estimated time of arrival (ETA). Includes real-time displays for major destinations and terminals, ETA displays at bus shelters, and smartphone applications	Transit			0
4024	Project	Brewster	Rt 124/Tubman Safety Improvements	Context-sensitive improvements to improve intersection safety	Highway			0
4027	Project	Barnstable	Rt 6A W. Barnstable Sidewalk	Construct sidewalk along Route 6A in W. Barnstable	Bicycle/ Pedestrian			0

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
4028	Project	Barnstable	Route 28/Bearses Way Access Improvements	Intersection improvements including accommodation of bike/ped & public transportation amenities	Highway		2500	2,500
4029	Project	Barnstable	Rt 28/Yarmouth Rd Intersection Improvements	Construction of turning lanes and signal upgrades per Hyannis Access Study	Highway		2000	2,000
4030	Project	Bourne	Main Street (Buzzards Bay) Streetscaping Phase 3	Continue streetscaping improvements along Route 6/28 Main Street in Buzzards Bay	Enhancements			0
4032	Project	Bourne Sandwich	Rt 6 Resurfacing	Resurfacing and related work on Rt 6 from Sagamore Bridge to Sandwich/Barnstable TL	Highway		8000	8,000
4033	Project	Brewster	Rt 6A Resurfacing	Coldplaning/resurfacing of Rt 6A from Dennis T.L to Orleans T.L. in Brewster	Highway		6500	6,500
4034	Project	Dennis Harwich Brewster Orleans Eastham Wellfleet Truro Provincetown	Route 6 Stormwater Improvements	Route 6 stormwater improvements to remove runoff from traveled way, including construction of shoulders as needed from Dennis to Provincetown	Safety			0
4035	Project	Chatham	Rt 28/Crowell Rd/Depot Rd/Queen Anne Rd Intersection Improvements	Intersection improvements at Rt 28/Crowell Rd/Depot Rd/Queen Anne Rd in Chatham	Highway			0
4036	Project	Chatham	Rt 28 Corridor improvements	Access management improvements along Rt 28 from George Ryder Rd to Barnhill Rd	Highway			0
4037	Project	Falmouth	Rt 28/Old Meetinghouse Rd Intersection Improvements	Intersection improvements at Rt 28/Old Meetinghouse Rd in Falmouth	Highway		0	0
4038	Project	Falmouth	Rt 28/Jones Rd/Worcester Ct Intersection Improvements	Intersection improvements at Rt 28/Jones Rd/Worcester Ct in Falmouth	Highway		1500	1,500
4039	Project	Harwich	Rt 124 (Harwich) Reconstruction	Reconstruction of Rt 124 from Headwaters Dr to Brewster T.L. in Harwich	Highway		4000	4,000
4040	Project	Harwich	Rt 39 (Harwich) Reconstruction	Reconstruction of Rt 39 from Oak St to Brewster T.L. in Harwich	Highway			0
4041	Project	Orleans	Rt 6A/Main St Intersection Improvements	Intersection improvements at Rt 6A/Main St in Orleans	Highway			0
4042	Project	Orleans	Rt 28/Main St Intersection Improvements	Intersection improvements at Rt 28/Main St in Orleans	Highway			0
4044	Project	Sandwich	Rt 6A over Scorton River Bridge	Replace bridge: Rt 6A over Scorton River in Sandwich	Bridge		3000	3,000
4045	Project	Yarmouth	Old Townhouse Rd/Forest Rd Intersection Improvements	Intersection improvements at Old Townhouse Rd/Forest Rd in Yarmouth	Highway			0
4046	Project	Barnstable Bourne	Upper/Mid Cape Real Time Traffic Information System	Real Time Traffic Information System -- Design Build of year-round 24/7 Web based traffic information system based on cameras, sensors, with 511 to reduce road rage, congestion, and improve mobility and incident management through improved information	ITS/ Management		3000	3,000

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
4047	Project	Barnstable Yarmouth	Hyannis Access Bicycle/Pedestrian Improvements	Regional bicycle/pedestrian access in the Route 28/Yarmouth Road and Willow Street area between Hyannis Transportation Center and planned extension of the existing Cape Cod Rail Trail in Dennis-Yarmouth; Design build grade crossings of Willow Street and Railroad	Bicycle/ Pedestrian		13000	13,000
4048	Project	Brewster	Rt 124(Brewster) Reconstruction	Full depth reclamation Harwich Road / Rte 124	Highway		1500	1,500
4049	Project	Brewster	Rt 137(Brewster) Reconstruction	Full depth reclamation Long Pond Road / Rte 137	Highway		1900	1,900
4050	Project	Brewster	Stony Brook Rd, Rt 6A, Satucket Rd (Brewster) Reconstruction	Full depth reclamation Stony Brook Road, Rte 6A - Satucket Rd	Highway		600	600
4051	Project	Capewide	Rail Upgrade (Bourne +)	Buzzards Bay to Middleborough capital improvements for rail upgrade	Rail		6000	6,000
4052	Project	Capewide	Intercity Seasonal Connector-demonstration	Intercity Seasonal Rail Connector-demonstration	Transit		4000	4,000
4053	Project	Dennis	Rt 134/Airline Rd Roundabout	Route 134 at Airline Road, Intersection Improvements (roundabout)	Highway		600	600
4054	Project	Dennis	Old Wharf Rd (Dennis) reconstruction	Old Wharf Road, reconstruction, sidewalks, and drainage improvements	Highway		450	450
4056	Project	Dennis Harwich Brewster Orleans	Rt 6 Reconstruction	Route 6 National Highway System NHS, section with failing pavement	Highway		15000	15,000
4060	Project	Orleans	Rock Harbor Rd (Orleans) Reconstruction	Rock Harbor Road drainage improvements and roadway reconstruction	Highway		600	600
4061	Project	Orleans	Main Street (Orleans) Improvements	Main Street Sidewalk extension and reconstruction of Meeting House Road intersection	Bicycle/ Pedestrian		300	300
4062	Project	Provincetown	Commercial St (Provincetown) Reconstruction	Commercial Street Reconstruction	Highway		3500	3,500
4063	Project	Sandwich	Rt 130 Exit 2 Rt 6 Intersection Improvements phase 2	Route 130 Exit 2 Phase 2, WB exit ramp and Service Road intersection improvements	Safety		3000	3,000
4064	Project	Sandwich	Quaker Meetinghouse Rd Sidewalk	Quaker Meetinghouse Road Pedestrian Accessibility 3 miles of sidewalk	Bicycle/ Pedestrian		800	800
4065	Project	Sandwich	Quaker Meetinghouse Rd Resurfacing	Sandwich, Quaker Meetinghouse Road - 2 miles long, mill and pave	Highway		925	925
4066	Project	Capewide	MV Eagle Refurbishment	Woods Hole, Martha's Vineyard, and Nantucket Steamship Authority (SSA) MV Eagle Mid-Life Refurbishment	Ferry		5900	5,900
4067	Project	Capewide	Ferry Sewage Pump-out Systems	Vessel Sewage Pump-out Systems -- Installation of 3 land-side pump-out systems and vessel modifications in Woods Hole, Vineyard Haven, and Nantucket	Ferry		2700	2,700
4068	Project	Capewide	Passenger Loading Ramps	Passenger loading ramp modifications in Woods Hole, Vineyard Haven, Oak Bluffs, and Nantucket	Ferry		1600	1,600
4069	Project	Wellfleet	Chequessett Bridge	Chequessett Bridge Rehabilitation	Bridge		12000	12,000
4074	Project	Yarmouth	South Shore Dr (Yarmouth) Sidewalks	Yarmouth, Sidewalk improvements: South Shore Drive sidewalk- from Sea View Ave. to South Middle Beach	Bicycle/ Pedestrian		650	650
4075	Project	Yarmouth	Winslow Gray Rd (Yarmouth) Sidewalks	Yarmouth, Sidewalk improvements: Winslow Gray Rd. sidewalk 0.75 miles long from Buck Island Rd. to Long Pond Dr.	Bicycle/ Pedestrian		400	400

RTP#	Type Rank	TOWN	Title	Description	**Category**	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
4078	Project	Eastham	Governor Prence Road reconstruction and improvements	Reconstruction to improve sub-surface, pavement, and multimodal accommodation	Safety			0
4079	Project	Dennis	Rt 6A (Dennis) Sidewalks	Route 6A sidewalks Yarmouth TL to Sesuit Neck Road	Bicycle/ Pedestrian		2,000	2,000
4080	Project	Dennis	Rt 134 (Dennis) Bike/Ped Accommodation	Route 134 state section sidewalks / pedestrian bicycle accommodation, existing gap	Bicycle/ Pedestrian		300	300
4082	Project	Harwich	Bike Path Connector	Bike Path Connection from Old Colony Rail Trail to Rt 28 & Beaches (Harwich)	Bicycle/ Pedestrian		500	500
4083	Project	Sandwich	Canal Connector Bike Path	Bike Path Connection from Cape Cod Canal to Sandwich Center	Bicycle/ Pedestrian		500	500

7.6.3 SMART SOLUTIONS CONSIDERED

"Smart Solutions" are alternatives that do not require major investments in capital or operations. These are called "Smart" Solutions because they do require thoughtful promotion and coordination of transportation services that for the most part already exist. The following table presents a priority listing of Smart Solutions. Priorities were developed through public input and consultation with Cape Cod Commission, Cape Cod Joint Transportation Committee members, and refinements requested by the Cape Cod Metropolitan Planning Organization. Some of the following headings are used in the table:

RTP#	**I**ndex number used for reference. Numbers followed by an "S" are funded through a program sponsored by the Cape Cod National Seashore.
Type Rank	For "Type," each alternative is listed as one of the following: Program, Project, Smart Solution, or Study. Ranking based on importance (#1 being most important). Unranked alternatives are also supported. Non-supported projects have been eliminated from the listing.
Town	Geographic area.
Title	Short listing.
Description	Longer description
Category	Some alternatives may also benefit other categories (e.g., many "Highway" alternatives also have benefits to "Safety" alternatives. "Highway" may also have congestion and mobility benefits as well).
Ann. Cost	estimated recurring operating cost or average funding allocation (may vary from year to year)
Start Cost	One time cost (e.g., construction cost or capital purchase)
Total Cost	Calculation of Start Cost + Ann. Cost x 23 Years

Note that for Smart Solutions, costs have not been estimated for the draft RTP.

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3718	Smart Solution 1	Capewide	Zoning/Planning Support for Sidewalks	Improve zoning regulations & planning efforts to invest in sidewalks	Bicycle/ Pedestrian			0
3706	Smart Solution 2	Capewide	Remote Continuous Traffic Counting	Encourage installation of equipment at signalized intersections and other locations to conduct traffic counts throughout Cape Cod throughout the year using remotely-accessible detection equipment	ITS/ Management			0
3711	Smart Solution 3	Capewide	CCRTA/Steamship Authority Coordination	Coordinate schedules among the CCRTA SeaLine (Blue Line) and Steamship Authority Ferries	Transit			0
4014	Smart Solution 4	Bourne Wareham	CCRTA-GATRA Coordination	Coordinate schedules and service between GATRA and CCRTA	Transit			0
3708	Smart Solution 5	Capewide	Bicycling & Motorist Traffic Law Enforcement	Enforce traffic laws on bicyclists and motorists	Safety			0
4009	Smart Solution 6	Boston	Logan Intercity Bus Information	Provide real-time bus location information, schedules, fares etc. for service from Logan to Cape Cod	ITS/ Management			0
3705	Smart Solution 7	Capewide	Redesignate 195 & 495	Redesignate Route 25 Extension as Route 195 or Route 495 or Route 195/495	ITS/ Management			0
3704	Smart Solution 8	Capewide	Employer TDM Plans	Create incentives for employers to prepare and implement Travel Demand Management (TDM) plans (>25 Employees)	ITS/ Management			0
4005	Smart Solution 9	Falmouth	New Bedford-Martha's Vineyard Freight	To reduce traffic on Woods Hole Rd, operate barges between New Bedford and Martha's Vineyard to carry fuel trucks and garbage trucks.	Ferry			0
3700	Smart Solution 10	Capewide	Speed Management	Implement education, signage and enforcement to lower traffic speeds on roadways with speed-related safety problems	Safety			0
3715	Smart Solution 11	Capewide	Transit Education & Marketing on Local TV	Implement education programs and marketing activities on community-access television to support public transit	Transit			0
3702	Smart Solution 12	Capewide	Right-of-Way Preservation	Maintain rights-of-way for future transportation uses and to avoid future traffic generation	ITS/ Management			0
3713	Smart Solution 13	Capewide	Bus Users Incentives: Shopping Discounts	Provide shopping discounts to bus users	Transit			0
3717	Smart Solution 13	Capewide	Wi-Fi Hotspots	Install wireless internet services at strategic locations throughout Cape Cod	ITS/ Management			0
3701	Smart Solution	New Bedford	Promote Ferry Service from New Bedford		Ferry			0

RTP#	Type Rank	TOWN	Title	Description	**Category**	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3703	Smart Solution	Capewide	Vanpooling & Carpooling Incentives	Provide incentives to increase vanpooling and carpooling	ITS/ Management			0
3707	Smart Solution	Capewide	Carpooling "Stands/Stops"	Install signage and implement education & marketing program for the use of carpooling stands/stops" to promote higher occupancy vehicle use	ITS/ Management			0
3709	Smart Solution	Capewide	Rail Line Buffer Zone	Implement zoning protections to reduce future development for a distance of 100' along rail lines	Rail			0
3716	Smart Solution	Capewide	Vanpooling at Steamship Authority Lots	Permit use of Steamship Authority parking facilities for vanpooling	Multi-Modal			0

7.6.4 TRANSPORTATION STUDIES CONSIDERED

Transportation Studies are alternatives that have not been fully realized. From the public participation process, there have been many occasions on which a clear course of action is not revealed. In these cases, there may be many conflicting (and potentially infeasible) "solutions" proposed. Perhaps the only consensus is that there is in fact a problem worthy of further review. Therefore, this final category forms the basis for future planning efforts. These Transportation Studies provide the vehicle for generating Programs, Projects, and Smart Solutions.

The following table presents a priority listing of Transportation Studies. Priorities were developed through public input and consultation with Cape Cod Commission, Cape Cod Joint Transportation Committee members, and refinements requested by the Cape Cod Metropolitan Planning Organization. Some of the following headings are used in the table:

RTP#	**I**ndex number used for reference. Numbers followed by an "S" are funded through a program sponsored by the Cape Cod National Seashore.
Type Rank	For "Type," each alternative is listed as one of the following: Program, Project, Smart Solution, or Study. Ranking based on importance (#1 being most important). Unranked alternatives are also supported. Non-supported projects have been eliminated from the listing.
Town	Geographic area.
Title	Short listing.
Description	Longer description
Category	Some alternatives may also benefit other categories (e.g., many "Highway" alternatives also have benefits to "Safety" alternatives. "Highway" may also have congestion and mobility benefits as well).
Ann. Cost	estimated recurring operating cost or average funding allocation (may vary from year to year)
Start Cost	One time cost (e.g., construction cost or capital purchase)
Total Cost	Calculation of Start Cost + Ann. Cost x 23 Years

Note that costs for Studies are generally considered as one-time expenditures despite some studies which may be performed over two or more years.

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
3807	Study 1	Bourne, Army Corps	Cape Cod Canal Bridges Replacement/Expansion/Addition. Includes evaluation of Belmont Circle and Buzzards Bay Bypass and other roads.	Evaluation of future needs for highway crossings of Cape Cod Canal. Includes consideration of replacement or expansion of existing bridges; additional crossings	Highway		1,000	1,000
3803	Study 2	Falmouth, Mashpee, Barnstable, Yarmouth, Dennis, Harwich, Chatham	Southside Bike Route	Identify network (on- and off-road) for bike route from Woods Hole to Chatham	Bicycle/ Pedestrian		500	500
3809	Study 3	Capewide	Freight Study	Conduct a study of freight (quantities, origins, destinations, etc.)	ITS/ Management		250	250
3804	Study 4	Barnstable	Exit 6 Park-and-Ride Lot Expansion	Examine options at Exit 6 Park-and-Ride Lot such as parking structure or surface lot expansion to expand parking supply	Park & Ride		250	250
3811	Study 5	Capewide	Disaster/Emergencies/Security Plan	Develop plans to address disasters, emergencies, and security issues	Security		500	500
3816	Study 6	Barnstable, Mashpee, Falmouth	Hyannis-Falmouth Transportation Study	Identify needed roadway, public transit, and other modes' needed improvements for future travel demands between Hyannis and Falmouth	Highway		500	500
3832 s	Study 7	Capewide	Renewable Fuels Partnership Strategic Implementation Plan	Identify potential renewable fuel options, technologies, markets, and infrastructure needs to make use of biofuels both viable and sustainable	Enhancements		200	200
3829 s	Study 8	Capewide	Develop Origin/Destination Transit Mode Split Model	Create a transit model for Cape Cod	Transit		250	250
4026	Study 9	Sandwich Mashpee	Rt 130 Road Diet	Narrow travel lane width to reduce speeds and accommodate bicycles/ pedestrians	Safety			0
4007	Study 10	Eastham Orleans	Eastham Rotary Bypass	Relocate Rock Harbor Road access from Rotary to new Bridge Rd/Rt 6 signalized intersection. Convert rotary to roundabout	Highway			0
3805	Study 12	Bourne	Sagamore Bridge Speed Management	Identify measures to encourage safe speeds on Route 3 and Route 6 approaches to the Sagamore Bridge	Safety		350	350
4025	Study 12	Wellfleet	Rt 6 at Wellfleet/Eastham TL	Congestion mitigation where two NB lanes merge to one	Highway			0
4077	Study 14	Capewide	Mashpee Wampanoag Roadway & Transit Study	Identify roadway& transit improvements to improve accessibility & mobility to and within tribal lands in Mashpee	Multi-Modal			0
3822 s	Study 15	Capewide	Smart Card Study	Investigate current technologies, compatibilities with local planning, define potential partners, and make recommendations.	ITS/ Management		75	75
4004	Study 15	Bourne Falmouth	Falmouth-Wareham Bike Connection	Connect Falmouth bike paths to Bourne/Wareham town line at William Dalton Bridge including connection to Cod Canal bike paths	Bicycle/ Pedestrian			0

RTP#	Type Rank	TOWN	Title	Description	Category	Ann. Cost /yr ($K)	Start Cost ($K)	Total Cost ($K)
4084	Study 16	Barnstable	Rt 28 Corridor Study	Identify multimodal corridor improvements from Mashpee T.L. to Yarmouth T.L. along Route 28	Multi-Modal		750	750
3806	Study	Orleans	Rt 28/Rt 39 Intersection Improvements	Identify safety improvements at Route 28/Route 39/Quanset Road intersection in Orleans	Safety		100	100
3808 s	Study	Capewide	Flex Phase II Evaluation Study	Evaluate improvements and expansion of the Flex transit service.	Transit		30	30
3813	Study	Capewide	Railways for Transporting Emergency Supplies	Develop contingency plan to use railways for transporting supplies during emergencies	Security		75	75
3819 s	Study	Capewide	Evaluation of Existing Transit Info Software/Procurement	Evaluate customer information software to be used for a web-based system to support CCRTA operations	ITS/ Management		250	250
3820 s	Study	Capewide	Evaluation and refinement of Partner Program	Develop recommendations based on the public/private transportation provider coordination efforts.	ITS/ Management		100	100
3826 s	Study	Capewide	ITS Evaluation and Phase II Recommendation study	Evaluate ITS deployment and make recommendations.	ITS/ Management		150	150
3827 s	Study	Capewide	Evaluation of Customer Information Systems	Evaluate Customer Information Systems and make recommendations.	ITS/ Management		25	25
3828 s	Study	Capewide	Update 5-Year and Long Range Cape Cod Public Transportation Plans	Update the 2002 5-Year Plan and the 2003 Long Range Public Transportation Plan.	ITS/ Management		175	175
3830 s	Study	Capewide	Evaluation of Partner Program II	Continue the evaluation of the public/private carrier coordination program.	ITS/ Management		15	15

7.7 CONCLUSION

More than 200 Transportation Programs, Projects, Smart Solutions, and Studies were identified through a comprehensive public participation process. Many of these alternatives where refined, combined, and eliminated in the process of developing an MPO-supported priority ranking. Final MPO recommendations are based on fiscal constraint.

Funding issues are critical to the implementation of any of the above transportation alternatives. The following chapter includes a financial plan and listing of recommended alternatives constrained within estimated available funds.