



CAPE COD  
COMMISSION

# 2023 Pavement Management Systems

FINAL | FEBRUARY 2024



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Prepared by Cape Cod Commission Staff.

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Prepared by Cape Cod Commission Transportation staff, this report was funded by the Massachusetts Department of Transportation and Federal Highway Administration through the Cape Cod Metropolitan Planning Organizations Unified Planning Work Program.

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## Introduction

An essential task required by the Cape Cod Metropolitan Planning Organization (MPO) through its Unified Planning Work Program, this report provides the status of pavement condition assessment activities on Cape Cod. The objectives of this effort are to collect data and implement a regional pavement management system for Cape Cod to provide an objective rating of pavement conditions and needs. These efforts assist the local municipalities in their decision making as well as with the MassDOT Municipal Pavement Program. The MassDOT Municipal Pavement Program, created in 2021 as a part of the Transportation Bond Bill, seeks to improve the condition of municipally owned state numbered routes to support the long-term condition of the state network, contribute to National Highway System (NHS) pavement performance, and assist municipalities in the management of local infrastructure. The Municipal Pavement Program has been authorized by legislation for \$140M in future years and is funded in the FY23-27 Capital Investment Plan (CIP) for \$25M a year.

The pavement management process is conducted with the intent to keep the roadway system in the best possible condition with the most efficient use of available funds. There are distinct advantages to managing pavement condition and significant cost savings that can take place with preventative or rehabilitation measures rather than waiting until a road needs reconstruction. Of course, due to the reality of limited financial resources, it is necessary to prioritize pavement repair based on affordability. Deciding which roads to improve and by what technique in a fiscally responsible manner is the essence of Pavement Management. As such, this systems report seeks to present helpful information for municipalities on the most recent advancements and the latest industry standards in the pavement management process.

As stated, in the MPO-approved Cape Cod 2024 Regional Transportation Plan in the Performance Measures section, the goal of the pavement management process is to improve the overall pavement condition of all federal aid-eligible roads. Specifically, a four-year performance measure target has been set to have 30% of all non-interstate roads to be in “good” condition. Cape Cod Commission staff conduct regional pavement analysis on the federal-aid eligible municipal road network. Covering one-third of the road mileage each year, a three-year cycle provides an overall view of the pavement condition for federal-aid eligible municipal roadways on Cape Cod. This systems report includes the latest three-year cycle analysis conducted by the Cape Cod Commission as well as the current pavement management activities conducted by each municipality in Barnstable County.

## PAVEMENT MANAGEMENT - BACKGROUND

Pavement Management is the practice of planning for pavement repairs and maintenance with the goal of maximizing the value and life of a pavement network.

To accomplish this, a community needs to have several repair techniques in its arsenal and the knowledge of when to apply them. This is where pavement management comes into play. With a comprehensive database of road conditions, the pavement management software can model when to perform which repairs on a road network. Engineering judgment is required to finalize any list of street repairs, as no computer model can take every variable analyzed in making a repair decision into account. The computer system is a great springboard to help a community start its repair program for each year and is an excellent method of storing the repair data.

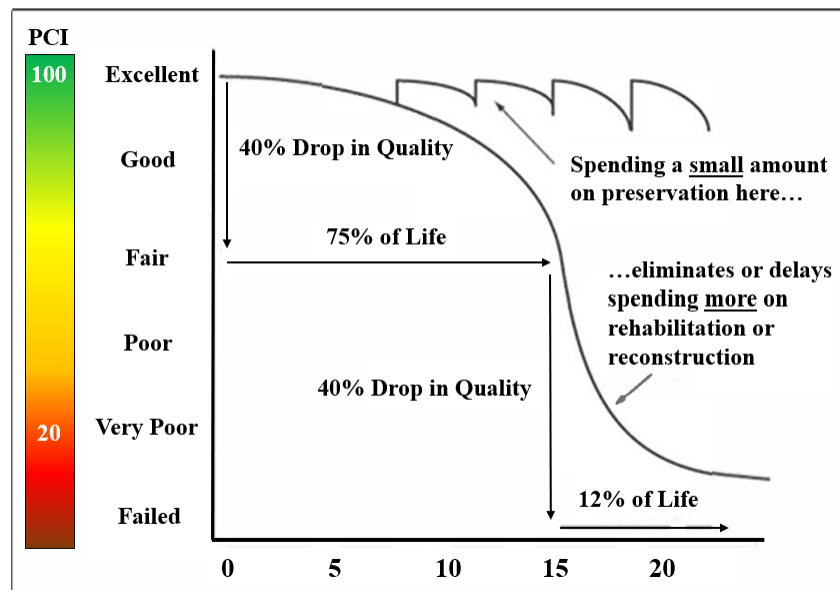


FIGURE 1: Pavement Deterioration Curve

Source: Federal Highway Administration

Figure 1 is a model of how a street's pavement deteriorates over time, a Pavement Deterioration Curve. Interpreting the curve, a street starts out in excellent condition when it is newly constructed. Midway through life, low-cost repairs such as crack seals and full depth patches can extend the quality of the road. It takes only a few years for the window of opportunity to perform this low-cost maintenance to pass after which the road would need a more costly repair such as a mill and overlay or full-depth reclamation. By performing timely maintenance using low-cost methods, road conditions can be improved thereby extending the life of the road and saving municipalities from spending more in the future.

## EVALUATION CRITERIA FOR CCC DATA COLLECTION

The Cape Cod Commission has continued to collect pavement condition data since 2011 through a series of “Windshield Surveys”. These “Windshield Surveys” involve driving the roadways in need of collection and filling out a brief survey with observations. Staff were given photographs and descriptions of example pavement distresses. Observers then used a 1 – 5 rating system and made notations of distresses observed in the field. Copies of the field observations for the most recent three-year period (2021-2023) are provided in the appendix of this report. The following table is a summary of the guidance given to observers:

Table 1: CCC Evaluation Criteria

Condition	Description	Criteria
1	Very Good to Excellent	New pavement with no cracking, rutting, raveling/ signs of wear
2	Good to Very Good	No cracking, rutting, showing a little wear
3	Fair to Good	Showing evidence or more wear and possibly repairs that are in good condition
4	Poor to Fair	Evidence of cracking, rutting, serious wear
5	Poor	Severe cracking, rutting, potholes

## SURVEY OF CAPE COD COMMUNITIES’ PAVEMENT MANAGEMENT ACTIVITIES

In the Winter of 2023, an email was sent to each of the 15 towns’ Department of Public Works directors asking for updates on pavement management activities within their towns. Several communities responded with updates to the summaries listed in the previous PMS report. The sections following are a summarization of those responses and the up-to-date pavement management efforts underway in each municipality.

### Barnstable Pavement Management Activities

The Town of Barnstable utilizes detailed field inspections and analysis performed by BETA Group, Inc. (BETA) as a consultant. Their work is entered into Barnstable’s database and periodic reports are provided and discussed. The DPW participates in the data and cost analysis used for reporting. DPW reviews project bids received by the Town and establishes base line costs for each pavement treatment band. These costs are discussed with the Town’s consultant and then utilized in the pavement conditions report. In addition to the BETA work, the DPW maintains a record of roadway repairs and relies upon experienced field personnel to assist in planning for individual maintenance tasks such as crack and chip seal. DPW also informally monitors the performance of all treatments.

Key to the pavement management program is coordination with other utilities. Proposed roadway rehabilitation information is passed to utility companies 6-12 months in advance of construction. Schedule adjustments can be made if planned utility work conflicts with DPW projects. This coordination is critical as a moratorium is in place for 5 years after application of a new surface.

Submitted materials include:

- BETA-prepared "Pavement Management Summary," dated September 2020. The report contains a summary of the Town's Pavement Management Program, approach, description of the roadway surface survey process, summary of findings, capital planning and typical costs for various items involved in pavement repair and related road work.

### **Bourne Pavement Management Activities**

The Town of Bourne maintains a Pavement Management Program (PMP) to adapt and update the Town's Capital Improvement Plan. The PMP incorporates an extensive database of roadway surface conditions to produce a prioritized list of improvements. The PMP is a planning tool intended to provide the foundation to manage the Town's roadway resources by combining professional engineering metrics with local institutional knowledge. Town Staff and consultants will work together to identify goals regarding roadway network conditions.

The updated roadway survey in Bourne, consisting of paved, town-accepted roadways, was most recently completed in the Fall of 2020 by BETA. A total of 97.63 miles of roadway were inspected. The collection effort focused on the primary categories of roadway data including roadway length, width, segment start/end points, surface type, and pavement condition.

Upon completion of the survey, the overall Road Surface Rating (RSR) value for Bourne's public roadway network was 77.92, an improvement over the 2017 RSR of 75.97. The overall RSR represents a benchmark for performance measuring of the Town's pavement management program moving forward. If the overall RSR were to drop in the years to come, this would be a sign that the program needs to be adjusted or funding for the program may need to be increased. Repair strategies and associated unit costs were defined to develop the Backlog Summary. The current backlog summary for the Town's roadway network is approximately \$9.05 million. This budgetary dollar figure represents the funding necessary if the Town were to perform all required maintenance for the Town's roadway network within the next year. Since 2021, Bourne has invested \$3.3 million into the repair and rehabilitation of 17.12 miles of roadway.

The Town will continue to monitor its progress and roadway rating by performing periodic network inspections and is committed to maintaining and improving its roadway network.

## Brewster Pavement Management Activities

Within the past few years, Brewster has retained BETA to provide a Pavement Management Program (PMP) to better maintain the Town's roadway network. BETA's pavement services include performing a detailed visual inspection, calculation of a Roadway Surface Rating (RSR), and recommendation of required maintenance for each roadway segment. BETA compiles the pavement data into a web-based application to allow the Town to actively manage their priorities.

The most recent report from BETA in 2022 shows a total of 48.3 centerline miles were inspected during the summer of 2020. The required field inspections were performed autonomously using a smartphone application utilizing machine-learning technology. Based on the inventory conducted in 2020, the overall Road Surface Rating (RSR) for Brewster's Town roadway network was 78.64. The PMP allows for the Town to develop a Capital Improvement Plan (CIP) for the existing roadway network. The Town has shown a commitment to maintaining the PMP and improving its roadway network.

## Chatham Pavement Management Activities

The Town of Chatham retained BETA to develop a Pavement Management Program (PMP) in 2018. BETA's pavement services include performing a detailed visual inspection, calculation of a Roadway Surface Rating (RSR), and recommendation of required maintenance for each roadway segment. A report from BETA was given to the Town in 2018, with recommendations on maintenance. As of 2023, the Town no longer retains BETA for PMP services.

## Dennis Pavement Management Activities

The Town of Dennis contracted StreetLogix to provide their Pavement Management System in 2020 at which time they performed an inventory of the Town roadways (approximately 142 miles) and sidewalks (approximately 29 miles). The StreetLogix platform is an interactive, web-based system that summarizes the current road condition on a user-friendly dashboard. The software allows the Town to update road conditions after work has been performed and updates the road PCI accordingly. Future recommendations for work and respective cost estimates are automatically generated by the software based on a decision tree that is input by the Town. The Town uses the recommendations from the system as a guide to determine the following years work. The Town reworks the recommendations to consider current funding, fairly spreading the improvements through the five villages in Dennis, and maximizing the bids received by contractors.

The Town's current overall PCI rating is 78 (Good Condition) but the latest deterioration has not been applied.



The Town's budget for road work has been consistently funded between \$400,000 to \$600,000 per year through Capital Requests for "secondary roads". This amount can vary depending on other competing capital requests. Chapter 90 apportionments have recently averaged around \$720,000/year and are also used to maintain the Town's roads. Chapter 90 funds are usually spent on larger resurfacing projects or on arterial and collector roads.

### Eastham Pavement Management Activities

The Town of Eastham is developing a pavement management system. Current efforts include detailed spreadsheets identifying treatment strategies.

Submitted materials include:

- Spreadsheet listing of Town roads with summary of face type.
- Spreadsheet listing of Town & Private Roads in Town of Eastham with summary of surface type.
- Spreadsheet listing of Town roads with itemized surface type.

These assessment surveys of all the Town's private ways and Town-maintained public roads, prompted mainly by the on-going construction of its Town-wide water distribution network, are to assist in the preparation of a Capital Improvements Plan (CIP). The Town of Eastham is also a Massachusetts Complete Streets Tier 3 community, and as such will be looking to include multimodal access options in all repairs related to its Roadway Capital Improvements Plan.

### Falmouth Pavement Management Activities

The Town of Falmouth has changed their approach to pavement management and has engaged BETA as a consultant to help with this effort. BETA has helped the Town to prepare a draft Pavement Management Program (PMP) report as of February 2023. In the draft report, based on the completion of the field inspections in 2022, the overall RSR for Falmouth's public-maintained roadway network was 74.38.

The draft PMP mentions that a 5-year forecast model was developed to demonstrate how the network-level RSR would potentially adjust based on different funding scenarios and repair strategies. Utilizing unit prices established in the program, the model suggests that the Town allocate approximately \$2.1M annually to maintain the current rating. However, if the Town were to allocate \$3.0M annually, the Network RSR is projected to reach 76.5 in 5 years. Conversely if the Town were to spend only its current Chapter 90 allotment on paving improvements, the network RSR would project to decrease 2.5 points over a 5-year span. The 5-year forecast model can be customized based on the repair treatments that the Town plans to implement. The current model also accounts for 3% annual inflation.

## Harwich Pavement Management Activities

The Harwich DPW does have a 5-year road maintenance plan that is updated every few years and is available on the Harwich town website. The Town's Highway Road Manager is a certified pavement inspector who develops a plan based on his experience, training, and knowledge of Harwich's 481 public roads (142 miles). The Town attempts to balance maintenance with repair to avoid costly reconstruction utilizing many different processes and procedures. For costs, the Town utilizes county bid pricing (pg. 2 of the Town's Five-Year Maintenance Plan).

The Town of Harwich typically spends \$1.4 million on their annual road maintenance program, which is comprised from approximately \$700,000 in Chapter 90 funds and \$700,000 in a local article. The current plan focuses on installing new drainage systems ahead of the sewer project to avoid paving over old infrastructure.

## Mashpee Pavement Management Activities

The Town of Mashpee hired Stantec in 2020 to complete a town-wide pavement assessment and included the Town's major collector roads. The report was issued in May 2020 and is being used to help prioritize projects and determine required funding levels. The report evaluated roads in two categories - local/neighborhood and collector. Historically, Chapter 90 funds have been used for all projects on collector roads, excluding routine maintenance such as drainage installation, crack sealing, and similar treatments. This funding is no longer enough to fund "Complete Street" type projects and resurfacing. The Town must compile several years of Chapter 90 apportionments for the larger projects so the latter will now require another funding source to maintain an acceptable PCI on the collector roads.

The Town will update the Town-wide pavement assessment in 2025. As of 2023, the Town has begun implementation of the Town's Wastewater Management Plan. This plan requires phased work which includes full width restoration of roads where collection system installed (mill/pave). The Town DPW is coordinating with other required road work with this resurfacing and adjusting priorities and schedules for work on other roads based on the implementation schedule for the Wastewater Plan.

## Orleans Pavement Management Activities

In Spring 2019, the Town of Orleans retained the firm of Vanasse Hangen Brustlin (VHB) to update the Town's pavement management system by performing pavement condition evaluations on all Town-maintained roadways and parking lots with the goal of prioritizing pavement maintenance and rehabilitation projects and analyzing budgetary needs. With this year's efforts, VHB conducted a street survey and compiled a report update. The Town generally performs a pavement management study update every five (5) years, with an expected update coming in 2024.

As of 2023, the current network PCI rating is 83. The Town appropriates about \$384,000 (increases by inflation each year) per year for pavement management above and beyond Chapter 90 funds. VHB estimates that a current budget of approximately \$660,000 per year is anticipated to maintain the average PCI over the five-year study period but will allow the backlog of work to increase due in part to inflation.

### Provincetown Pavement Management Activities

The Town of Provincetown is currently working with Environmental Design & Research (EDR) to provide an updated Pavement Management Plan. Provincetown has put its pavement plan on hold for the past few years because of the significant number of public works infrastructures in progress. In 2024, the Town plans on paving a few streets that desperately need to be paved but will likely be on hold until confirmation that any road to be paved will not have to be dug-up for at least 5 years.

Recent roadway improvement activities include:

- Redeveloped 920 linear feet of Conwell Street between Route 6 and Cemetery Road to include dedicated bike lanes, pedestrian sidewalks, stormwater drainage improvements.
- Road surface and storm drain repairs on Route 6 in October 2021.
- Stormwater improvements to West Vine Street. Work performed in Fall 2021.
- Currently planning road resurfacing and stormwater improvements to portions of Standish Street, Alden Street, Montello Street and Conant Street. Work started in Spring 2022.
- Currently designing stormwater improvements to Howland Street.

### Sandwich Pavement Management Activities

The Town of Sandwich retained the firm of Baden Consulting Services, LLC (BCS) to perform pavement management services. A comprehensive study was undertaken to re-evaluate pavement conditions in Sandwich and to allow for the analysis of various funding scenarios. BCS performed a detailed inspection of the condition of the pavement on all Town-maintained roads and updated a database of this information using VHB's Smart Asset Management and Inventory System (SAM IS) software.

To determine road repair strategies, the Town mainly uses PCI (Pavement Condition Index) and Benefit. For estimated costs for implementing various repair strategies, the Town uses the County's bid process and incorporates these into their own spreadsheets. The Town's 5-Year plan changes dramatically year-to-year but provides a guide to follow as funds become available.

A final Pavement Management 2021 Update includes the following information:

- Road Program Map – color coded map of Town roads showing 2021 Pavement Condition Index (PCI)
- Budget Scenarios for Town based on available funding
- Table itemizing construction costs for various repairs
- Table listing Town roads with PCI, Repair Alternative, Benefit, and Costs by street name and PCI

### Truro Pavement Management Activities

Truro uses local knowledge to determine pavement repair priorities.

### Wellfleet Pavement Management Activities

The Town of Wellfleet retained the firm of BETA to develop a Pavement Management Program (PMP) in 2015. The Town updated the PMP in the summer of 2022. Based on the inspections conducted in Spring of 2022, the overall Road Surface Rating (RSR) for Wellfleet's Town roadway network was 80.86.

In addition, the Town DPW actively keeps their own list and performs inspections on a regular basis. In Fall 2019, the following roads were planned to be resurfaced: sections of Long Pond Road, sections of Gull Pond Rd, Schoolhouse Hill Rd, Coles Neck Road, and sections of Brown's Neck Road. The Town also performed crack sealing during the Autumn of 2020 on various roads including: Chequessett Neck Road, Long Pond Road, Lecount Hollow Road, Nauset Road, Lawrence Road, Cottontail Road, Spring Valley Road, Paine Hollow Road, and Old Wharf Road.

### Yarmouth Pavement Management Activities

The Town of Yarmouth retained the firm of VHB to perform pavement management services. VHB services consist of performing a comprehensive study to evaluate pavement conditions in Yarmouth and to allow for the analysis of various funding scenarios; perform a detailed inspection of the condition of the pavement on all Town-maintained roads and update a database of this information using VHB's "SAMIS" software (Road Manager). One third of the roadways are inspected annually. The program is also maintained to provide detailed records for enforcing a five-year moratorium on roadways that have been improved.

To determine repair strategies, the Town reviews an initial list generated by the software and then decides whether to apply chip SEAL OR mill & overlay. In the Town's capital plan, annual spending ranges from \$1.3 million to \$1.5 million for roadway maintenance. As of September 2023, the Town's PCI rating was 81.8.

## SUMMARY OF TOWN PAVEMENT MANAGEMENT EFFORTS

Based on responses from the email survey and subsequent follow-up, the following table summarizes the techniques that responding towns use for pavement management.

Table 2: Summary of Responding Towns’ Pavement Management Activities

Town	Consultant/Technique
Barnstable	BETA
Bourne	BETA
Brewster	BETA
Chatham	BETA (no longer retained)
Dennis	StreetLogix
Eastham	Locally developed spreadsheets
Falmouth	BETA
Harwich	StreetLogix
Mashpee	Stantec
Orleans	VHB
Provincetown	EDR
Sandwich	BCS
Truro	Local knowledge
Wellfleet	BETA
Yarmouth	VHB

# Pavement Management Systems

Despite most towns using different management systems, the prevalent techniques are the same. The following sections contain excerpts describing the techniques involved in pavement management systems.

## **METHODOLOGY**

To start assessing the condition of a town's pavement, a detailed condition evaluation of each town's public roadways to build the pavement management system is a typical starting point. The first step is to identify the roadway network. The second step is to further break each street in the roadway network into pavement management sections. The third step is to carefully categorize, measure, and record the individual pavement distresses within each pavement management section and perform the inventory of sidewalks, curbs, and ramps. Finally, the fourth step is to customize the road repair treatment selection and unit costs within the pavement management software through discussions with town officials. All these steps are typically performed prior to the study of future funding scenarios.

## **NETWORK IDENTIFICATION**

Network Identification builds an inventory of streets that describe the municipality's complete roadway network. The direction of travel, street length, width, ownership, classification, zone, and pavement type are among the items identified at this initial phase in the pavement management process. This integral step ensures the streets surveyed are the definitive set to be analyzed.

## **PAVEMENT MANAGEMENT SECTION IDENTIFICATION**

Once the Network Identification is complete, the field work begins. Each street contains one or more pavement management sections. A pavement management section defines the limits of previous construction or maintenance activities within each street. Sections are defined by having the same width, typical distresses, functional class, etc. The goal is to set up homogenous areas of pavement to aid in assigning the appropriate repair. A "street" may be one section, or it may be comprised of several pavement management sections, depending on its construction history.

## **SURFACE DISTRESS ASSESSMENT**

For each pavement management section, the severity and extent of nine major pavement distresses are recorded and are then entered into a weighted formula to arrive at a Pavement Condition Index (PCI). The distresses are categorized as base related or surface related distresses. Base-related

distresses indicate that the pavement structure is inadequate for the existing traffic load and soil conditions. Streets that show significant base related distresses may need to have the pavement structure strengthened with either thicker or stronger base or pavement materials. Surface related distresses are caused by age and weathering of the pavement. Streets that have predominantly surface related distresses are excellent candidates for maintenance sealing to inhibit further pavement oxidization (the main effect of aging). Streets with more of the base related distresses will most likely need some full depth patching, structural overlays, or reclamation/reconstruction.

The four base related distresses are:

- Potholing or non-utility patching
- Alligator cracking
- Distortion
- Rutting

The five surface related distresses are:

- Block cracking
- Transverse or longitudinal cracking
- Bleeding or polished aggregate
- Surface wear or raveling
- Shoving, slippage, or corrugation

## PCI DEFINED

A PCI is generated for each inventoried pavement management section in a town using the surface distress data collected. PCI is measured on a scale of zero to one hundred, with one hundred representing a pavement in perfect condition and zero describing a road in impassable condition. Each type of observed pavement distress is assigned a deduct value based on the type, severity, and extent of the distress. A weighted sum of the deduct points is subtracted from the perfect "one hundred" road to generate a PCI for each pavement management section. In general, base related (pavement foundation) distresses are weighted more heavily than surface related distresses. For example, if 15% of a road section had medium severity "Alligator Cracking" it would receive a deduction of 40 points. Whereas the same area of "Block Cracking" would only receive a deduction of 15 points. The actual PCI calculation follows:

PCI = 100 - (Highest Deduct Value) - (25% of remaining base related deduct values) - (10% of remaining surface related deduct values)

## THE FIVE TREATMENT BANDS

The pavement management system uses broad ranges to group the individual repair types into five major treatment bands. Treatment bands are a useful tool to summarize data on a town-wide basis. An individual road segment will fall into a category based on the strategy table's output of repair types and will vary due to functional classification. The goal is to gain a broad understanding of the existing conditions in simple yet meaningful terms.

Table 3: Treatment Band Descriptions

Treatment Band	PCI*	Description
Do Nothing	93-100	Excellent condition - in need of no maintenance.
Routine Maintenance	86-92	Good condition – may need crack sealing or minor localized repair.
Preventive Maintenance	76-85	Fair condition – pavement surface may need surface sealing, full depth patch and/or crack sealing.
Structural Maintenance	56-75	Deficient condition – pavement surface structure in need of added strength for existing traffic. Typical repairs are overlay with or without milling.
Base Rehabilitation	0-55	Poor condition – in need of base improvement. Typical repairs are reclamation or full depth reconstruction.

*\*Note: Treatment bands are defined below. These are only general PCI ranges for reference purposes and represent only one pavement type. There are several fields considered by the strategy table when assigning repair types to each individual street. Source: VHB*

### Do Nothing

The Do Nothing category exhibits roads which need no maintenance. These roads are in excellent condition and existing distresses generally do not need to be addressed.

### Routine Maintenance

Routine maintenance activities are those which are taken to correct a specific pavement distress. Routine maintenance usually addresses localized pavement defects and includes activities such as:

- Full depth patching
- Skin patching
- Crack Sealing



## Preventive Maintenance

Preventive maintenance activities are those which are performed at planned intervals to protect and seal the pavement. Seals are designed to provide one or more of the following benefits:

- Prevent the intrusion of air and moisture.
- Fill small cracks and voids.
- Rejuvenate an oxidized binder.
- Provide a new wearing surface.

## Structural Improvement

Structural improvement includes the work necessary to restore the pavement to a condition that will allow it to perform satisfactorily for several years. Generally, a structural improvement would consist of milling the existing pavement down and applying a new Hot Mix Asphalt (HMA) Overlay allowing existing grades to be maintained. When the existing grade can be increased a new HMA course can simply be placed upon the existing surface. Structural improvements also include the work necessary to prepare the pavement for an overlay, either with or without milling. The major activities involved in the rehabilitation process are:

- Partial depth patching.
- Full depth patching.
- Joint and crack sealing.
- Grinding and milling.
- Hot Mix Asphalt leveling courses.

## Base Rehabilitation

Base rehabilitation utilizes one of two methods:

- Reclamation
- Reconstruction

Reclamation is the process of rehabilitating existing deteriorated pavements. The existing layers of the roadway are pulverized and then blended to create a homogenous pavement base. This reclaimed pavement base is then paved with a new HMA surface. Reconstruction is the complete removal and replacement of a failed pavement, and might also involve widening, realignment, traffic control devices, safety hardware, and major base and drainage work.

## CUSTOMIZING REPAIR STRATEGIES

Repairs strategies can also be made specific to fit the specific needs of the town. The overarching goal is to understand a town's decision-making process and simulate that process in the budget analysis software based on the pavement condition and other criteria of each pavement section. This allows for the section of which repair methods are the best to use and when.

## PREPARING BUDGET SCENARIOS

Once the roadway conditions are inventoried and analyzed, and the repair strategies are defined, the impact of various spending programs on the roadway network is assessed. These studies can range from 1 to 20 years; typically, 5-year studies are used. The purpose of the budget planning process is to determine the impact of various spending levels to find a funding level that will best meet the town's needs. Budget analysis software uses pavement deterioration curves, unit costs, and strategy tables developed in the repair strategy definition phase to assign each street a repair type and associated cost for each year of the study. Budget analysis software can also assign each street a benefit value that is used to prioritize which streets the software will select for repair each year. It is important to understand that a pavement management system is a network-wide planning tool and is not intended to give definitive street-by-street repair data. Field verification and testing are recommended to confirm any street repair list generated.

## DETERIORATION CURVES

To properly plan for future repairs, pavement management systems use deterioration curves. The deterioration curves estimate the rate at which the pavement condition decreases over time. These pavement deterioration curves depict two major categories of functional classification - arterials and collectors in one curve and local roads in the other. An example deterioration curve is presented in Figure 2.

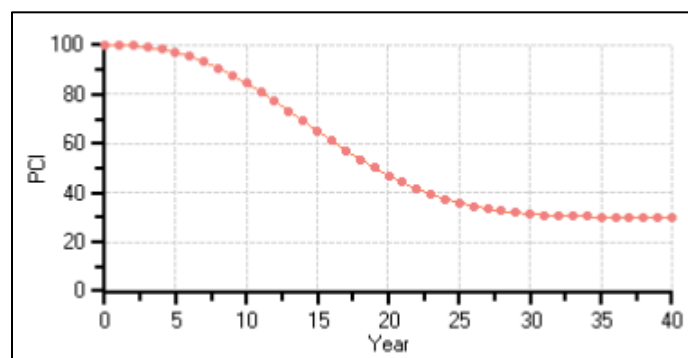


FIGURE 2: Sample Deterioration Curve

Source: VHB



## PROJECT PRIORITIZATION

Budget analysis software prioritizes needed system repairs based on the estimated “Benefit Value”. The Benefit Value formula is calculated using variables representing traffic volume, repair service life, PCI, and unit repair costs for each pavement management section. For each plan year, software can prepare a future roadway condition projection, exhaust the assigned budget, and then produce an annual list of roads included in the repair program. The system also allows the user to enter an inflation rate to account for estimated increases in future year construction costs. A 4% inflation rate is typically used.

The Benefit Value prioritization process generally favors cost effective maintenance alternatives. Repair actions are typically delayed on those sections that require reconstruction or major rehabilitation because the benefits for dollars spent are generally lower than maintenance candidates. After the relatively good roads are "saved," improvements are directed towards the poorer arterial and collector roads, and then to the local roads in need of major rehabilitation.

## Pavement Management Analyses

The data collected in the monitoring process will be continually analyzed to identify overall pavement conditions in the different Cape Cod towns to assist in programming maintenance and reconstruction activities.

According to information prepared for the Cape Cod Regional Transportation Plan, the Cape Cod Region possesses 739 miles of roadway eligible for federal funding. Of those miles, 565 are under the jurisdiction of the Cape's local communities.

MassDOT evaluates roads under their own jurisdiction and a selection of municipally owned roadways. Table 4 lists the corresponding rating from Excellent to Poor, based on a "PSI" (Pavement Serviceability Index) rating – roughly analogous to the "Pavement Condition Index" (PCI) commonly used.

Table 4: Pavement Serviceability Index

Pavement Condition	"PSI" Range
Excellent	PSI $\geq$ 3.5
Good	PSI 2.8-3.5
Fair	PSI 2.3-2.8
Poor	PSI $<$ 2.3

### CCC EVALUATIONS OF PAVEMENT CONDITIONS – "WINDSHIELD" SURVEYS

Beginning in 2011, Cape Cod Commission staff undertook a series of "windshield" surveys throughout Barnstable County. Starting in 2014, a new data collection strategy was deployed, based on Geographic Information Systems' needs and strengths. Data-collection regions of each town were identified which contained roughly one-third of the mileage of federal-aid eligible municipal roadways. The quality and accuracy of the data collection was greatly improved using GPS-capable tablet computers. The following figure shows the roadways that the CCC staff collected data on in 2023.

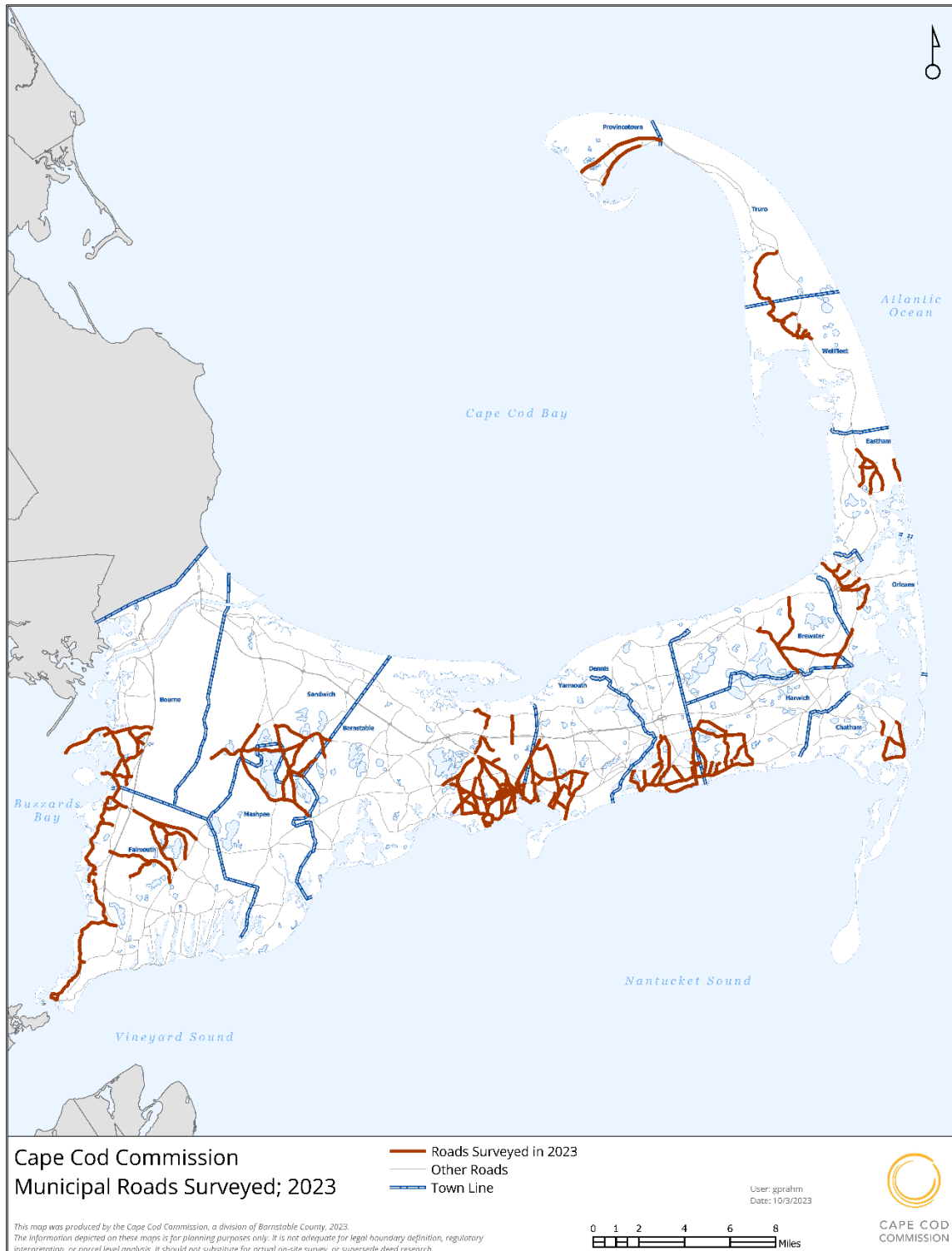


FIGURE 3: Municipal Roads Surveyed in 2023

The following table provides a summary of the miles of pavement condition observed by town, for the Cape Cod Commission’s most recent cycle of windshield surveys.

Table 5: Pavement Condition – Miles per Town

Town	Very Good to Excellent	Good to Very Good	Fair to Good	Poor to Fair	Poor	Totals
Barnstable	0.00	7.50	83.46	18.81	1.42	111.19
Bourne	0.00	1.02	29.14	11.46	0.22	41.84
Brewster	0.00	5.90	16.53	2.70	1.36	26.48
Chatham	0.00	1.26	10.45	1.05	0.00	12.76
Dennis	0.42	3.75	39.47	1.82	0.00	45.46
Eastham	0.00	0.00	15.19	1.73	0.00	16.92
Falmouth	0.00	10.12	65.12	10.07	0.00	85.31
Harwich	0.00	5.09	33.33	4.74	0.00	43.15
Mashpee	0.00	1.83	22.75	4.96	0.00	29.54
Orleans	0.00	1.37	15.59	0.00	0.00	16.95
Provincetown	0.00	0.00	12.79	0.54	0.00	13.33
Sandwich	0.00	4.05	27.53	5.55	0.89	38.02
Truro	0.00	2.06	6.97	3.37	0.00	12.41
Wellfleet	0.00	2.46	16.24	1.00	0.00	19.70
Yarmouth	0.00	5.39	43.77	2.87	0.00	52.03
<b>Total</b>	<b>0.42</b>	<b>51.80</b>	<b>438.34</b>	<b>70.66</b>	<b>3.88</b>	<b>565.11</b>

Source: latest data available from 2021-2023 collected by Cape Cod Commission

As shown in the table above, approximately 565 miles of roadway have been surveyed at least once as recently as 2023. The most common rating given by observers was “Fair to Good”, which yielded 438.34 miles. This is followed by 70.66 miles of “Poor to Fair”, 51.80 miles of “Good to Very Good,” 3.88 miles for “Poor” and 0.42 miles of “Very Good to Excellent.” The following figures provide a graphic of the CCC survey data in a series of four maps (Upper Cape, Mid-Cape, Lower Cape, and Outer Cape). The CCC evaluations are shown as colored parallel lines ranging from Blue (Very Good to Excellent) to Red (Poor).

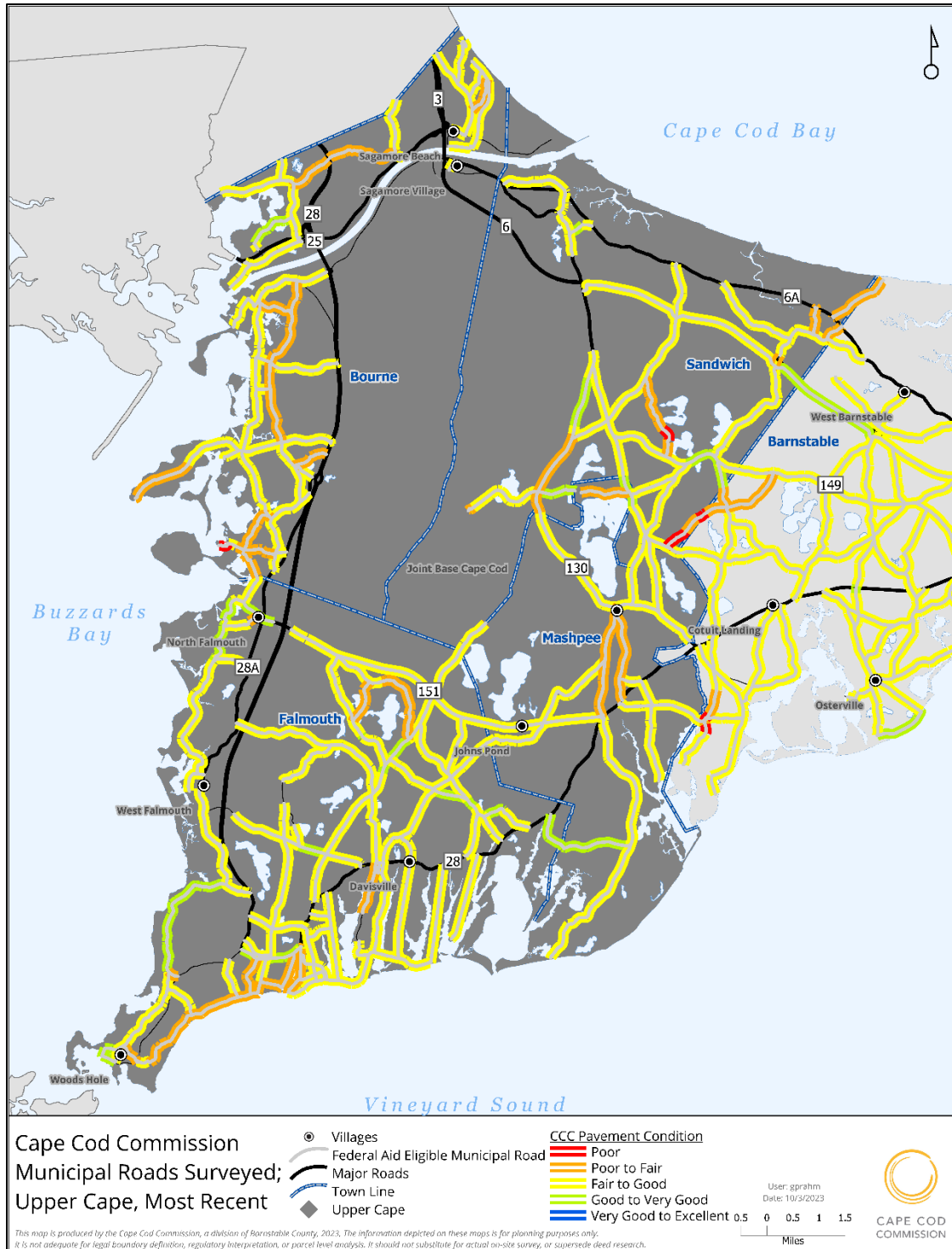


FIGURE 4: Pavement Condition Surveys: Upper Cape

Source: Latest available data from 2021-2023 collected by the Cape Cod Commission

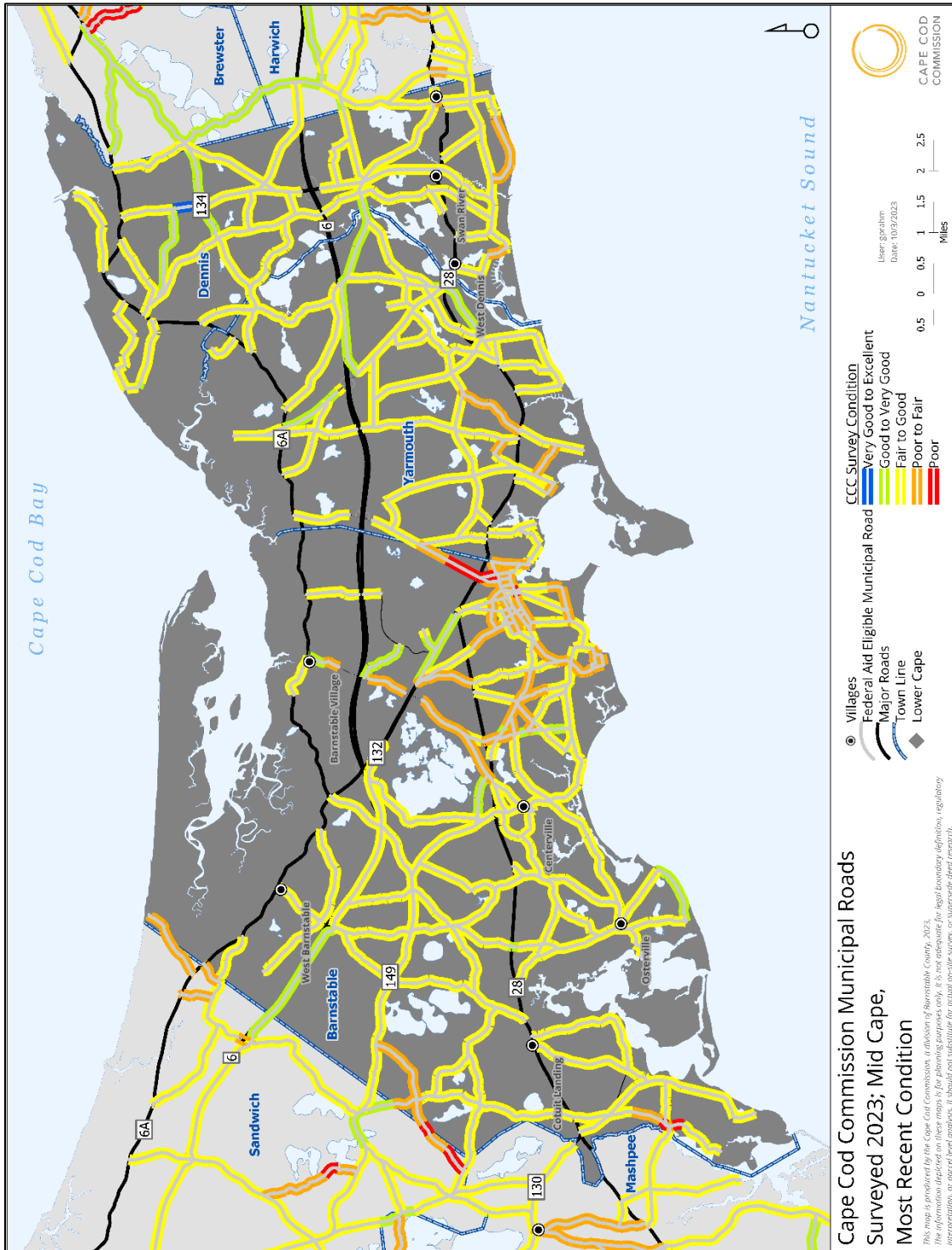


FIGURE 5: Pavement Condition Surveys: Mid Cape

Source: Latest available data from 2021-2023 collected by the Cape Cod Commission



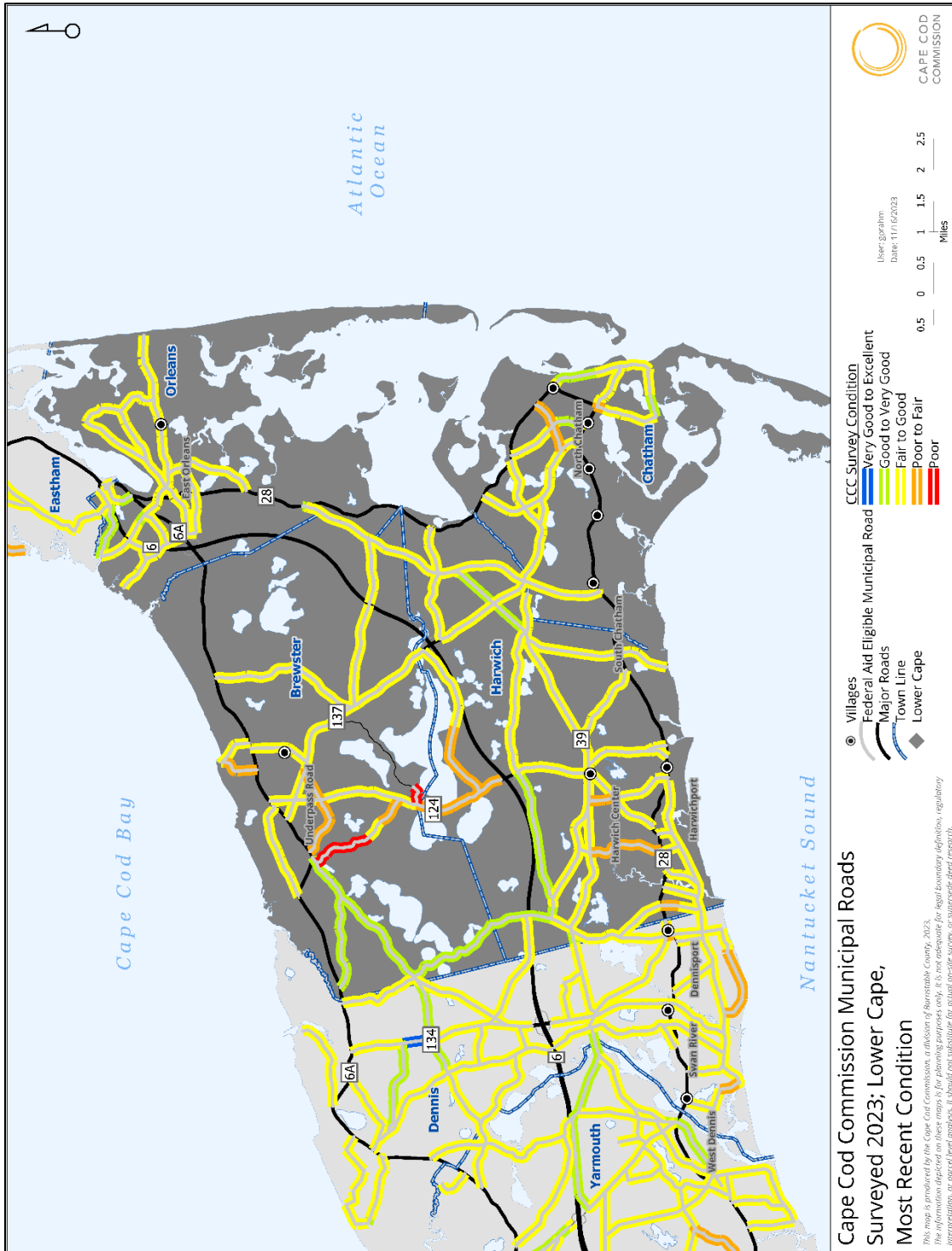


FIGURE 6: Pavement Condition Surveys: Lower Cape  
 Source: Latest available data from 2021-2023 collected by Cape Cod Commission

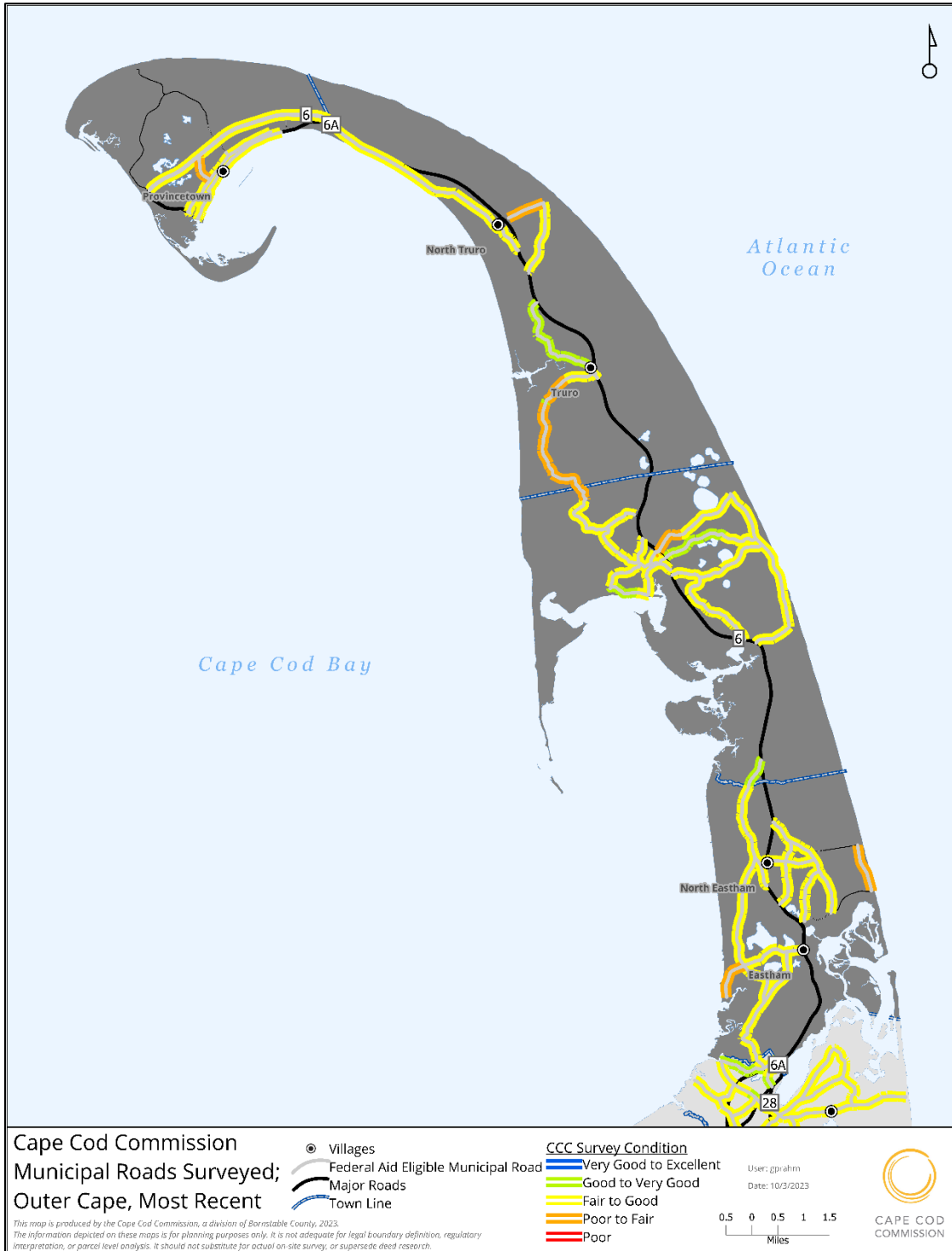


FIGURE 7: Pavement Condition Surveys: Outer Cape  
Source: Latest available data from 2021-2023 collected by Cape Cod Commission

## Recommendations for Achieving Improved Pavement Condition

The pavement deterioration curve shown in Figure 1 demonstrates the advantages of maintaining good roads to avoid expensive rehabilitation and reconstruction. The Cape Cod MPO is committed to exploring improved pavement management strategies and techniques to help optimize investments and achieve maximum improvement in overall PCIs.

The appropriate treatment for improving a particular roadway segment's PCI is unique and is decided based on what is right for the pavement at the time of improvement. There are a wide range of treatment options available to extend the life of roadway segments and improve PCI ratings including surface treatments, pre-treatment, recycling/rehabilitation and reclamation. MassDOT provides resources and recommendations for treatment options on their Municipal Pavement Program website page. MassDOT has also linked information from RoadResource.org provided by the Pavement Preservation & Recycling Alliance (PPRA). RoadResource.org is a free industry website built to equip road managers, consulting engineers, and city, county, and state agencies with tools and resources to improve their road networks. On RoadResource.org, PPRA has a Treatment Management Toolbox which has decision-making and pavement assessment tools useful for identifying treatment options for pavement based on multiple criteria or photos. The PPRA has also compiled a Pavement Management Treatment Resource Center which includes the most current guidelines, process information, research, case studies, and in-depth quality assurance recommendations on the current treatment options available for roadways. The Resource Center is an index of common treatments under various progressive pavement management disciplines. The treatment options presented in the index offer a variety of benefits toward improving the life expectancy and PCI of pavement surfaces. There are also calculators available for life cycle cost, equivalent annualized cost, remaining service life, and cost benefit value.

Information on MassDOT's Municipal Pavement Program can be found at their Municipal Pavement Program website at:

<https://www.mass.gov/info-details/program-overview-municipal-pavement-program>

The resources on RoadResource.org can be accessed at their website at:

[https://roadresource.org/treatment\\_resources](https://roadresource.org/treatment_resources)

## Recommendations for PMS Enhancement

Cape Cod Commission staff will continue help advance PMS activities throughout the fifteen towns of Barnstable County. Commission staff issue a status report on the pavement condition on Cape Cod each year. This status report includes pavement condition data collected during the Commission's summer data collection. The data is modeled and analyzed to provide an objective rating of pavement conditions and needs. The pavement condition data for the most recent three-year cycle of data is available in Appendix A: Cape Cod Commission Pavement Condition & Comments. The annual assessments contribute to the implementation of a regional pavement management system for Cape Cod that keeps the roadway system in the best possible condition with the most efficient use of available funds. The PMS reports can be viewed on the Cape Cod Commission's website under Our Work, then Transportation, and then Pavement Conditions.

<https://www.capecodcommission.org/our-work/pavement-conditions/>

The Commission also has a Pavement Condition Viewer which is viewable on the same website page as the PMS reports. The viewer displays the annual pavement survey results in a GIS web-based application to assist towns in their pavement management efforts. The GIS web application is available for public viewing on the Cape Cod Commission website on the same page as PMS Reports. The data collected by the Commission, in the monitoring process, will be continually analyzed to identify overall pavement conditions in the different Cape Cod towns to assist in programming maintenance and reconstruction activities.

Continued efforts included:

- Identify individual towns' methods for pavement condition evaluation and programming for improvements.
- Identify "gaps" in pavement condition information on Municipally-owned Federal Aid eligible roadways – and – prioritize and implement CCC data collection activities on these roadways.
- Improve CCC skills in performing pavement evaluations.
- Analyze local communities' bid prices to develop Cape-specific improvement costs.
- Generate listings of roadways with poor pavement conditions.
- Continue to provide yearly PMS Reports.
- Provide a web-viewer to display the most recent cycle of pavement condition data collected.
- Provide information on the most recent pavement management industry standards and developments.



# Appendix A: Cape Cod Commission Pavement Condition & Comments

Cape Cod Pavement Management Status Report 2023

Street_Name	Town	Crack_alligator	Crack_block	Crack_edge	Crack_linear	Crack_Transverse	Patched_pavement	Potholes	Sealed_cracks	Weathering	Rutting	Comments	Miles	Condition
AIRPORT ROAD	Barnstable						Yes						0.40	2.29
ASA MEIGS ROAD	Barnstable	Major		Minor	Minor		Yes	Yes	Yes	Major			0.47	4.00
BARNSTABLE ROAD	Barnstable	Minor	Minor		Minor		Yes	Yes	Yes	Minor	Minor		0.83	3.00
BASSETT LANE	Barnstable			Minor	Minor	Minor	Yes		Yes				0.19	3.62
BAY VIEW STREET	Barnstable		Minor	Minor	Major	Minor	Yes		Yes		Minor		0.09	4.00
BEARSES WAY	Barnstable	Minor		Minor	Minor	Minor	Yes			Minor			1.93	3.46
BRIDGE STREET	Barnstable	Minor					Yes	Yes		Minor			0.28	3.00
BUMPS RIVER ROAD	Barnstable	Minor	Minor	Minor	Major	Minor	Yes	Yes	Yes	Minor	Minor		2.74	3.00
CAMP STREET	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			0.28	5.00
CEDAR STREET WEST BARNSTABLE	Barnstable	Minor		Minor	Minor		Yes		Yes	Minor		Rough/bumpy	1.38	3.00
CENTER STREET	Barnstable				Minor	Minor	Yes		Yes				0.25	4.00
CENTERVILLE AVE	Barnstable	Minor	Minor		Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.23	3.00
CHARLES STREET	Barnstable	Minor			Minor		Yes	Yes	Yes	Minor			0.16	4.00
CHESTNUT STREET	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.33	4.00
CHURCH STREET	Barnstable	Minor		Minor			Yes		Yes	Minor			0.90	3.00
CRAIGVILLE BEACH ROAD	Barnstable						Yes		Yes				0.80	3.00
CRAIGVILLE BEACH ROAD	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			1.52	3.00
CROOKED CARTWAY	Barnstable	Major		Minor	Minor		Yes	Yes		Major			0.65	4.00
FIVE CORNERS ROAD	Barnstable	Minor		Minor	Major	Minor	Yes	Yes		Minor			0.52	3.00
FULLER ROAD	Barnstable	Minor	Minor	Minor	Major	Minor	Yes		Yes	Minor	Minor		0.61	3.00
GOSNOLD STREET	Barnstable			Minor			Yes	Yes	Yes			Bumpy	0.57	3.92
GREAT MARSH ROAD	Barnstable	Minor		Minor	Minor		Yes		Yes	Minor			0.14	3.00
GREENWOOD AVENUE	Barnstable												0.12	3.00
HIGH SCHOOL ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.32	3.33
HIGH STREET WEST BARNSTABLE	Barnstable				Minor								0.82	3.00
HOWLAND ROAD	Barnstable	Minor		Minor	Minor				Yes	Minor			0.11	4.00

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HYANNIS AVENUE	Barnstable												0.18	3.00
HYANNIS BARNSTABLE ROAD	Barnstable				Minor	Minor	Yes						0.55	2.96
IRVING AVENUE	Barnstable			Minor			Yes		Yes				0.17	4.00
IYANOUGH AVENUE	Barnstable			Minor			Yes		Yes				0.12	4.00
IYANOUGH ROAD	Barnstable				Minor								1.28	2.00
KIDD'S HILL ROAD	Barnstable			Minor	Minor	Minor	Yes						0.85	1.97
LAFAYETTE AVENUE	Barnstable			Minor			Yes		Yes				0.06	4.00
LEWIS BAY ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.28	3.74
LINCOLN ROAD	Barnstable			Minor	Minor	Minor			Yes				0.73	3.00
LINDEN AVENUE	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.13	3.00
LOVELLS LANE	Barnstable	Minor		Minor		Minor	Yes	Yes		Minor			0.33	3.00
LUMBERTS MILL ROAD	Barnstable			Minor	Minor								0.95	3.00
LUMBERTS MILL ROAD	Barnstable	Minor		Minor	Minor	Minor		Yes		Minor			0.61	3.00
MAIN STREET	Barnstable	Minor	Minor	Minor	Major	Minor	Yes	Yes	Yes	Minor	Minor		2.28	3.39
MAIN STREET	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			3.48	3.00
MAIN STREET COTUIT	Barnstable		Minor	Minor	Major	Minor	Yes	Yes	Yes		Minor		3.42	3.00
MARSTON AVENUE	Barnstable			Minor	Minor		Yes	Yes	Yes				0.26	3.00
MARY DUNN WAY	Barnstable	Minor					Yes			Minor			1.16	3.00
MEETING HOUSE WAY	Barnstable	Minor		Minor	Minor		Yes		Yes	Minor		Rough/bumpy	0.91	3.00
NORTH STREET	Barnstable	Minor	Minor	Major	Minor		Yes	Yes	Yes	Minor	Minor		0.89	3.69
NOTTINGHAM DRIVE	Barnstable	Minor		Minor			Yes			Minor			0.97	3.00
NYE ROAD	Barnstable	Minor		Minor			Yes			Minor			0.44	3.00
NYE ROAD	Barnstable	Minor		Minor	Minor					Minor			0.12	3.00
OAK STREET	Barnstable	Minor		Major	Minor		Yes	Yes	Yes	Minor			2.02	3.00
OCEAN AVENUE	Barnstable					Major	Yes						0.53	3.00
OCEAN STREET	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			0.93	3.43
OLD COLONY ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			1.21	3.22
OLD CRAIGVILLE ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			1.12	3.35
OLD FALMOUTH ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			2.10	3.00
OLD MILL ROAD	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.30	3.00
OLD OYSTER ROAD	Barnstable				Major		Yes	Yes					0.42	3.00
OLD POST ROAD	Barnstable			Minor	Major	Minor	Yes						2.49	3.00
OLD POST ROAD CENTERVILLE	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.50	3.00
OLD STAGE ROAD	Barnstable	Minor		Major	Minor		Yes	Yes	Yes	Minor			2.80	3.00

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OLD STAGE ROAD	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.32	3.00
OLD TOWN ROAD	Barnstable			Minor			Yes		Yes				0.97	3.19
OSTERVILLE WEST BARNSTABLE ROAD	Barnstable	Minor		Minor	Minor		Yes		Yes	Minor			1.91	3.00
OSTERVILLE WEST BARNSTABLE ROAD	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.78	2.91
PARK AVENUE	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.16	3.00
PARKER ROAD	Barnstable	Minor		Minor			Yes		Yes	Minor			0.69	3.00
PARKER ROAD	Barnstable	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		1.19	3.00
PHINNEYS LANE	Barnstable	Minor		Major	Major	Minor	Yes		Yes	Minor			2.32	4.00
PHINNEYS LANE	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.46	3.00
PINE AVENUE	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.10	4.00
PINE STREET CENTERVILLE	Barnstable			Minor	Minor			Yes	Yes				0.29	4.00
PINE STREET CENTERVILLE	Barnstable	Minor		Minor	Minor		Yes	Yes		Minor			0.59	3.00
PITCHERS WAY	Barnstable			Minor	Minor		Yes	Yes	Yes				2.35	3.35
PLEASANT STREET	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			0.19	4.00
POND STREET OSTERVILLE	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.97	3.00
PROSPECT STREET	Barnstable	Minor		Major	Minor	Minor	Yes	Yes	Yes	Minor			3.77	3.00
PUTNAM AVENUE	Barnstable		Minor	Minor	Major		Yes	Yes	Yes		Minor		2.02	3.00
RACE LANE	Barnstable				Minor								0.04	3.00
RACE LANE	Barnstable	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		3.41	3.00
RIVER ROAD	Barnstable	Minor		Minor		Minor	Yes			Minor			1.64	3.00
SANDY NECK ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.56	4.00
SANTUIT NEWTOWN ROAD	Barnstable			Minor	Minor		Yes		Yes				0.41	4.00
SANTUIT NEWTOWN ROAD	Barnstable	Minor		Minor			Yes		Yes	Minor			1.08	3.00
SANTUIT NEWTOWN ROAD	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			2.18	3.00
SANTUIT ROAD	Barnstable		Major	Minor	Major	Major	Yes	Yes	Yes		Major	Dirt Road	1.68	3.70
SCHOOL STREET	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			0.18	4.00
SCHOOL STREET	Barnstable	Major		Minor	Minor		Yes	Yes	Yes	Major			0.57	4.00
SCHOOL STREET	Barnstable		Minor	Minor	Minor	Minor	Yes	Yes	Yes		Minor		0.82	3.00
SCUDDER AVENUE	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			1.39	3.95
SEA STREET	Barnstable			Minor			Yes		Yes				0.67	3.06
SEA VIEW AVENUE	Barnstable	Minor			Minor		Yes			Minor			1.02	2.00
SERVICE ROAD	Barnstable	Minor		Major	Minor		Yes	Yes	Yes	Minor			4.47	2.60
SHOOT FLYING HILL ROAD	Barnstable	Minor		Major	Minor		Yes	Yes	Yes	Minor			2.91	3.00
SMITH STREET	Barnstable			Minor	Minor		Yes	Yes	Yes				0.30	3.00



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SOUTH COUNTY ROAD	Barnstable				Minor		Yes		Yes				0.97	3.00
SOUTH MAIN STREET	Barnstable	Minor		Minor	Minor		Yes	Yes	Yes	Minor			1.59	3.00
SOUTH STREET	Barnstable	Minor		Minor	Minor	Minor	Yes		Yes	Minor			1.04	3.98
STEVENS STREET	Barnstable				Minor		Yes						0.54	3.00
STRAWBERRY HILL ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			1.49	2.76
THE STRAIGHT WAY SOUTH SECTION	Barnstable	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.83	3.59
WAKEBY ROAD	Barnstable	Minor		Minor						Minor			0.87	3.00
WAKEBY ROAD	Barnstable	Minor		Minor	Major	Minor				Minor			0.92	3.00
WASHINGTON AVENUE HYANNISPORT	Barnstable			Minor			Yes		Yes				0.24	4.00
WEQUAQUET LANE	Barnstable			Minor		Minor							0.31	3.00
WEST BAY ROAD	Barnstable	Minor	Minor				Yes	Yes	Yes	Minor	Minor		0.28	3.00
WEST MAIN STREET	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			2.14	3.39
WEST MAIN STREET ROTARY CIRCLE	Barnstable	Minor					Yes		Yes	Minor			0.10	3.00
WIANNO AVENUE	Barnstable	Major	Minor	Minor	Minor		Yes	Yes	Yes	Major	Minor		1.10	3.00
WILLOW STREET HYANNIS	Barnstable			Minor			Yes		Yes				0.10	3.00
WINCHESTER AVENUE	Barnstable			Minor	Minor		Yes	Yes	Yes				0.08	4.00
WINTER STREET	Barnstable		Minor	Minor	Minor		Yes	Yes	Yes		Minor		0.73	3.12
YARMOUTH ROAD	Barnstable	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			1.49	4.43
ACADEMY DRIVE	Bourne				Minor		Yes	Yes	Yes				0.59	3.00
ADAMS STREET	Bourne												0.22	3.00
BARLOWS LANDING ROAD	Bourne			Minor			Yes	Yes	Yes				2.22	3.00
BEACH STREET	Bourne	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.27	3.00
BOURNEDALE ROAD	Bourne	Major	Minor	Major	Major	Minor	Yes	Yes	Yes	Major	Minor		2.30	4.00
CANAL STREET	Bourne								Yes				0.40	3.00
CLARK ROAD	Bourne	Minor			Minor				Yes	Minor			0.62	3.00
CLAY POND ROAD	Bourne	Minor	Minor		Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.44	3.00
COUNTY ROAD	Bourne						Yes		Yes				3.04	2.98
COUNTY ROAD	Bourne	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		3.37	4.00
GIBBS ROAD	Bourne								Yes				0.05	3.00
HEAD OF THE BAY ROAD	Bourne				Minor		Yes	Yes	Yes				2.58	2.97
HERRING POND ROAD	Bourne	Minor		Minor	Minor			Yes	Yes	Minor			1.29	3.00
HOMESTEAD AVENUE	Bourne	Minor		Minor					Yes	Minor			0.09	3.00
INDIAN TRAIL	Bourne	Minor		Minor					Yes	Minor			0.08	3.00
LAKE DRIVE	Bourne												0.14	3.00

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LAKE DRIVE EXTENSION	Bourne												0.12	3.00
LONG HILL ROAD	Bourne						Yes						0.26	3.00
MAIN STREET	Bourne				Minor		Yes	Yes	Yes				1.33	3.00
MASHNEE ROAD	Bourne			Major	Minor		Yes	Yes	Yes				0.39	3.00
MEETINGHOUSE LANE	Bourne				Minor		Yes						0.32	3.00
MEGANSETT ROAD	Bourne	Major		Major	Minor		Yes			Major			0.36	4.00
MIDWAY ROAD	Bourne				Minor		Yes		Yes				0.27	3.00
MONUMENT NECK ROAD	Bourne	Minor			Minor	Minor	Yes		Yes	Minor			0.16	3.00
NORRIS ROAD	Bourne	Minor		Minor					Yes	Minor			0.71	3.00
OLD COUNTY ROAD	Bourne			Minor			Yes						0.17	3.00
OLD DAM ROAD	Bourne	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.68	4.00
OLD PLYMOUTH ROAD	Bourne			Minor	Minor				Yes				1.89	3.00
PEAKED CLIFF ROAD	Bourne	Minor		Minor					Yes	Minor			0.07	3.00
PLYMOUTH LANE	Bourne	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.41	3.00
PRESIDENTS ROAD	Bourne	Minor		Major	Minor	Minor	Yes	Yes	Yes	Minor			0.45	3.00
PURITAN ROAD	Bourne								Yes				0.96	2.00
RED BROOK HARBOR ROAD	Bourne	Major		Major	Major		Yes	Yes	Yes	Major			0.88	4.00
RED BROOK ROAD	Bourne				Minor		Yes	Yes	Yes				0.03	3.00
SAINT MARGARETS STREET	Bourne								Yes				0.13	3.00
SCRAGGY NECK ROAD	Bourne	Major		Major	Major		Yes	Yes	Yes	Major			0.79	4.00
SCRAGGY NECK ROAD EXTENSION	Bourne						Yes		Yes				0.20	3.00
SHORE ROAD	Bourne	Major		Major	Major		Yes	Yes	Yes	Major			1.49	3.03
SHORE ROAD	Bourne	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		3.98	3.00
SQUETEAGUE HARBOR ROAD	Bourne	Major		Major	Major		Yes	Yes	Yes	Major			0.29	4.00
STANDISH ROAD	Bourne			Minor				Yes	Yes				0.72	4.00
TROWBRIDGE ROAD	Bourne	Minor			Minor	Minor	Yes		Yes	Minor			0.62	3.00
VICKERSON AVENUE	Bourne	Minor		Minor					Yes	Minor			0.06	3.00
WILLIAMS AVENUE	Bourne	Minor	Minor	Major	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.70	4.00
WILLISTON ROAD	Bourne	Minor		Minor	Minor			Yes	Yes	Minor			1.85	3.00
WINGS NECK ROAD	Bourne	Major		Major	Minor	Minor	Yes	Yes		Major			2.46	3.51
WINSOR ROAD	Bourne												0.40	4.11
AIRLINE ROAD	Brewster			Minor	Minor		Yes						0.41	3.00
AIRLINE ROAD	Brewster			Minor	Minor				Yes				0.07	3.00
CROWELLS BOG ROAD	Brewster	Major	Minor	Minor	Minor	Major	Yes	Yes		Major	Minor		0.33	5.00

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FOSTER ROAD	Brewster	Minor	Major	Minor	Minor		Yes	Yes	Yes	Minor	Major		0.60	3.00
FREEMANS WAY	Brewster			Minor	Minor		Yes		Yes				2.79	3.00
GREAT FIELDS ROAD	Brewster		Major	Major	Major		Yes	Yes			Major		1.84	4.39
HARWICH ROAD	Brewster	Major	Major	Minor	Minor	Major	Yes	Yes	Yes	Major	Major		2.47	3.02
LONG POND ROAD	Brewster			Minor									2.58	3.00
LONG POND ROAD	Brewster	Minor	Major	Minor	Minor		Yes	Yes	Yes	Minor	Major		0.95	3.00
LOWER ROAD	Brewster	Minor		Minor	Minor		Yes			Minor			1.62	3.00
MILLSTONE ROAD	Brewster	Minor		Minor			Yes		Yes	Minor			2.50	3.00
POINT OF ROCKS ROAD	Brewster	Major	Major	Major	Major		Yes	Yes	Yes	Major	Major		0.65	3.95
SATUCKET ROAD	Brewster			Minor	Minor		Yes						1.93	2.03
SLOUGH ROAD	Brewster												1.67	2.00
SOUTH ORLEANS ROAD	Brewster				Minor								1.19	3.00
STONY BROOK ROAD	Brewster		Major	Major	Major						Major		2.35	2.00
TUBMAN ROAD	Brewster	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		1.55	4.00
UNDERPASS ROAD	Brewster			Minor									0.20	3.00
UNDERPASS ROAD	Brewster				Minor								0.86	3.00
BRIDGE STREET	Chatham												0.78	2.53
CROWELL ROAD	Chatham		Minor				Yes		Yes		Minor		0.59	2.55
CROWELL ROAD	Chatham	Major		Minor	Minor	Minor	Yes	Yes	Yes	Major			0.84	3.00
MAIN STREET	Chatham	Major		Minor	Major	Minor	Yes		Yes	Major			1.28	3.01
MAIN STREET ROTARY	Chatham	Major			Major	Minor	Yes			Major			0.04	4.00
MEETING HOUSE ROAD	Chatham												1.33	3.00
OLD COMERS ROAD	Chatham												0.38	3.00
OLD COMERS ROAD	Chatham				Minor								0.83	3.00
OLD QUEEN ANNE ROAD	Chatham												1.34	3.00
OLD QUEEN ANNE ROAD	Chatham	Major		Minor	Minor	Minor	Yes		Yes	Major			1.18	3.00
QUEEN ANNE ROAD	Chatham												0.06	3.00
SHORE ROAD	Chatham			Major	Major	Minor	Yes		Yes				1.16	2.46
STAGE HARBOR ROAD	Chatham	Major	Minor		Major		Yes		Yes	Major	Minor		0.99	3.10
STEPPING STONE ROAD	Chatham	Major		Minor	Minor	Minor	Yes		Yes	Major			0.43	4.00
STONY HILL ROAD	Chatham	Major		Minor	Minor	Minor	Yes		Yes	Major			0.45	4.00
TRAINING FIELD ROAD	Chatham	Minor			Minor		Yes	Yes		Minor			1.07	3.00
AIRLINE ROAD	Dennis			Minor	Minor		Yes						0.98	3.00
AIRLINE ROAD	Dennis	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.57	3.00

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BAYVIEW ROAD	Dennis								Yes				0.20	3.00
BEACH STREET	Dennis												0.88	2.98
BOB CROWELL ROAD	Dennis	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			0.38	3.00
DEPOT ROAD	Dennis	Minor	Minor	Minor		Minor	Yes			Minor	Minor		0.19	3.00
DEPOT STREET	Dennis			Minor	Minor	Minor	Yes						2.14	3.06
EAST WEST DENNIS ROAD	Dennis					Minor			Yes				1.47	3.00
EAST WEST DENNIS ROAD	Dennis												1.32	2.32
EAST WEST DENNIS ROAD	Dennis	Minor	Minor	Minor	Major	Minor	Yes	Yes	Yes	Minor	Minor		3.00	3.00
ELM STREET	Dennis				Minor				Yes				0.24	3.00
FERRY STREET	Dennis			Minor	Minor		Yes		Yes				0.06	4.00
GREAT WESTERN ROAD	Dennis				Minor	Minor	Yes		Yes				1.19	3.00
HENRY DAVIS CIRCLE	Dennis												0.08	3.00
Highbank Road	Dennis												0.02	2.00
Highbank Road	Dennis												0.29	2.00
HOKUM ROCK ROAD	Dennis												1.57	2.02
HORSEFOOT PATH	Dennis												0.07	2.00
LIGHTHOUSE ROAD	Dennis						Yes						0.44	3.00
LORING AVENUE	Dennis		Minor				Yes	Yes	Yes		Minor		1.09	3.28
LOWER COUNTY ROAD	Dennis			Minor			Yes		Yes				2.59	3.00
MAIN STREET	Dennis			Minor	Minor		Yes		Yes				1.25	3.00
MAIN STREET	Dennis			Minor	Minor				Yes				0.43	3.00
MAYFAIR ROAD	Dennis	Minor		Minor	Minor		Yes		Yes	Minor			1.17	3.00
NEW BOSTON ROAD	Dennis												0.25	3.00
NOBSCUSSETT ROAD	Dennis								Yes				0.39	3.00
OLD BASS RIVER ROAD	Dennis												1.85	3.00
OLD BASS RIVER ROAD	Dennis			Minor	Minor	Minor			Yes				2.04	3.00
OLD CHATHAM ROAD	Dennis	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.96	3.00
OLD MAIN STREET	Dennis			Minor	Minor		Yes		Yes				0.42	3.00
OLD WHARF ROAD	Dennis	Minor		Minor		Minor	Yes		Yes	Minor			1.62	3.78
SCARGO HILL ROAD	Dennis												1.23	3.00
SCHOOL STREET	Dennis						Yes	Yes					0.51	3.00
SEA STREET	Dennis			Minor		Minor							0.43	3.00
SESUIT NECK ROAD	Dennis								Yes				1.47	3.00
SETUCKET ROAD	Dennis												2.57	2.39

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SHAD HOLE ROAD	Dennis								Yes				0.78	3.00
SHORE DRIVE	Dennis								Yes				0.65	3.00
SOUTH GAGES WAY	Dennis				Minor		Yes	Yes	Yes				0.34	3.00
SOUTH MAIN STREET	Dennis						Yes	Yes					0.06	3.00
SOUTH YARMOUTH ROAD	Dennis												0.71	3.00
SWAN RIVER ROAD	Dennis							Yes	Yes				0.99	3.00
TELEGRAPH ROAD	Dennis	Major					Yes			Major			0.06	4.00
THEOPHILUS F SMITH ROAD	Dennis	Minor			Major	Minor	Yes	Yes	Yes	Minor			0.63	3.00
TROTting PARK ROAD	Dennis						Yes		Yes				1.12	3.00
UPPER COUNTY ROAD	Dennis						Yes						0.34	3.00
UPPER COUNTY ROAD	Dennis			Minor	Minor	Minor	Yes		Yes				2.05	2.89
WHIG STREET	Dennis				Minor				Yes				0.45	3.00
BRACKETT ROAD	Eastham	Minor	Minor	Minor	Major	Minor	Yes		Yes	Minor	Minor		0.57	3.00
BRACKETT ROAD	Eastham								Yes				0.38	3.00
BRIDGE ROAD	Eastham	Minor	Minor	Minor	Major	Minor	Yes	Yes	Yes	Minor	Minor		2.54	3.00
CANAL ROAD	Eastham	Minor			Minor	Minor	Yes			Minor			0.02	3.00
HERRING BROOK ROAD	Eastham	Minor	Minor	Minor	Minor	Major	Yes	Yes	Yes	Minor	Minor		1.02	3.00
HERRING BROOK ROAD	Eastham		Minor	Minor	Minor	Minor	Yes		Yes		Minor		2.22	3.00
MASSASOIT ROAD	Eastham		Minor	Minor	Minor	Minor	Yes		Yes		Minor		2.07	3.00
NAUSET ROAD	Eastham	Minor	Minor	Minor	Minor		Yes			Minor	Minor		2.26	3.00
OCEAN VIEW DRIVE	Eastham	Minor		Major		Major				Minor			0.93	4.00
OLD COUNTY ROAD	Eastham			Minor	Minor	Minor	Yes		Yes				0.18	3.00
ORCHARD ROAD	Eastham	Minor	Minor	Minor	Major	Minor	Yes		Yes	Minor	Minor		1.31	3.00
ROUTE 6A	Eastham	Minor			Minor	Minor	Yes			Minor			0.19	3.00
SAMOSET ROAD	Eastham	Minor	Minor	Minor	Major	Major	Yes	Yes	Yes	Minor	Minor		2.07	3.38
SCHOOL HOUSE ROAD	Eastham	Minor	Minor		Minor	Minor	Yes			Minor	Minor		1.10	3.00
SMITH LANE	Eastham								Yes				0.02	3.00
ACAPESKET ROAD	Falmouth	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			1.80	3.00
ALBATROSS STREET	Falmouth				Minor	Minor							0.16	2.00
BARROWS ROAD	Falmouth			Minor	Minor		Yes	Yes					0.22	3.00
BLACKSMITH SHOP ROAD	Falmouth		Minor	Minor	Minor				Yes		Minor		1.27	3.00
BOXBERRY HILL ROAD	Falmouth	Major	Major	Minor	Major	Major	Yes	Yes	Yes	Major	Major		2.57	3.59
BRICK KILN ROAD	Falmouth	Minor	Minor	Minor	Major		Yes	Yes	Yes	Minor	Minor		2.66	2.79
CARRIAGE SHOP ROAD	Falmouth			Minor	Minor	Minor	Yes	Yes	Yes				3.26	2.61

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CENTRAL AVENUE	Falmouth								Yes				1.94	3.00
CHESTER STREET	Falmouth		Minor					Yes	Yes		Minor		0.83	2.28
CLINTON AVENUE	Falmouth	Major	Minor	Minor	Minor		Yes	Yes	Yes	Major	Minor		0.43	4.00
COUNTY ROAD	Falmouth	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.50	2.00
CROSS ROAD	Falmouth			Minor	Minor	Minor	Yes	Yes	Yes				0.39	3.00
CURLEY BOULEVARD	Falmouth		Minor				Yes		Yes		Minor		0.56	3.00
CURRIER ROAD	Falmouth			Minor	Minor		Yes	Yes	Yes				1.18	3.00
DAVISVILLE ROAD	Falmouth	Minor				Minor	Yes	Yes	Yes	Minor			1.87	3.00
ELYSIAN AVENUE	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		0.35	3.00
EMERSON ROAD	Falmouth	Minor			Major	Minor	Yes	Yes	Yes	Minor			0.21	3.00
FALMOUTH HEIGHTS ROAD	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		1.09	3.55
FALMOUTH-SANDWICH ROAD	Falmouth	Major		Minor	Major		Yes		Yes	Major			0.01	3.00
FRESH POND ROAD	Falmouth				Minor	Minor		Yes	Yes				0.92	3.00
GARNET AVENUE	Falmouth	Major	Minor	Major	Minor		Yes			Major	Minor		0.56	3.01
GIFFORD STREET	Falmouth	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		2.40	3.00
GIFFORD STREET EXTENSION	Falmouth	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		0.72	3.00
GRAND AVENUE	Falmouth	Minor	Minor		Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.21	3.34
HARBOR HILL ROAD	Falmouth	Major	Minor	Minor	Minor	Minor	Yes	Yes		Major	Minor		0.43	4.00
HATCHVILLE ROAD	Falmouth	Major	Minor	Minor	Minor	Major	Yes	Yes		Major	Minor		2.01	3.41
HAYWAY ROAD	Falmouth			Minor	Minor	Minor	Yes	Yes	Yes				1.86	3.00
JERICO PATH	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		0.62	3.00
JOHN PARKER ROAD	Falmouth						Yes		Yes				1.35	3.00
JONES ROAD	Falmouth	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		1.12	3.00
KATHERINE LEE BATES ROAD	Falmouth	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.63	3.00
LOCUSTFIELD ROAD	Falmouth	Minor		Minor	Minor		Yes	Yes	Yes	Minor			0.42	3.00
MAIN STREET	Falmouth	Minor	Minor		Minor	Minor	Yes		Yes	Minor	Minor		1.27	2.04
MARAVISTA AVENUE	Falmouth	Minor			Minor		Yes		Yes	Minor			1.26	3.00
MARAVISTA AVENUE	Falmouth			Minor	Minor	Minor	Yes						0.41	3.00
MARAVISTA AVENUE EXTENSION	Falmouth				Minor		Yes		Yes				0.45	3.00
MEETING HOUSE ROAD	Falmouth	Minor			Minor	Minor	Yes		Yes	Minor			0.57	3.00
MENAUHANT ROAD	Falmouth	Minor			Minor		Yes	Yes	Yes	Minor			2.49	3.00
MILL ROAD	Falmouth	Major	Minor	Major	Minor		Yes	Yes	Yes	Major	Minor		0.77	3.00
MILLFIELD STREET	Falmouth	Major			Minor		Yes			Major			0.26	2.00
NASHAWENA STREET	Falmouth	Minor	Minor		Minor		Yes	Yes	Yes	Minor	Minor		1.00	3.00

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NATHAN ELLIS HIGHWAY	Falmouth	Major	Major	Minor	Major	Minor	Yes	Yes	Yes	Major	Major		3.25	2.93
NATHAN ELLIS HIGHWAY	Falmouth				Minor				Yes				1.16	3.00
NOBSKA ROAD	Falmouth				Minor								0.25	3.00
OLD BARNSTABLE ROAD	Falmouth			Minor	Minor	Minor	Yes	Yes	Yes				3.24	3.00
OLD DOCK ROAD	Falmouth	Minor	Minor		Minor		Yes	Yes	Yes	Minor	Minor		0.14	3.00
OLD MAIN ROAD	Falmouth	Minor		Minor	Minor		Yes		Yes	Minor			0.04	3.00
OX BOW ROAD	Falmouth				Minor		Yes		Yes				0.06	3.00
OYSTER POND ROAD	Falmouth	Major	Minor	Major	Minor		Yes	Yes	Yes	Major	Minor		2.03	3.64
PALMER AVENUE	Falmouth		Minor			Minor	Yes				Minor		1.33	3.00
PINE STREET	Falmouth	Minor					Yes		Yes	Minor			0.23	4.00
QUAKER ROAD	Falmouth		Minor				Yes		Yes		Minor		2.87	2.72
QUISSETT AVENUE	Falmouth	Minor	Minor	Minor	Major	Minor	Yes	Yes		Minor	Minor		1.58	3.00
RANDOLPH STREET	Falmouth				Minor		Yes						0.20	3.00
RANSOM ROAD	Falmouth	Major	Major	Minor	Major	Minor	Yes	Yes	Yes	Major	Major		0.22	4.00
RED BROOK ROAD	Falmouth			Minor		Minor			Yes				0.71	2.00
SAM TURNER ROAD	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		1.41	3.00
SANDWICH ROAD	Falmouth	Major	Minor	Minor	Major		Yes	Yes	Yes	Major	Minor		5.76	2.85
SCHOOL STREET	Falmouth	Major		Minor	Minor	Minor	Yes			Major			0.24	3.00
SCRANTON AVENUE	Falmouth			Minor	Minor		Yes		Yes				0.71	4.00
SEACOAST SHORES BOULEVARD	Falmouth	Minor			Minor	Minor	Yes			Minor			1.70	3.00
SHORE STREET	Falmouth	Major	Minor	Major	Minor	Minor	Yes	Yes	Yes	Major	Minor		0.68	3.33
SHOREVIEW AVENUE	Falmouth				Major	Minor							0.29	3.00
SHOREWOOD DRIVE	Falmouth	Minor			Major	Minor	Yes	Yes		Minor			0.99	4.00
SIPPEWISSETT ROAD	Falmouth	Major	Major	Minor	Major	Minor	Yes	Yes	Yes	Major	Major		2.90	2.12
SPRING BARS ROAD	Falmouth	Minor			Minor		Yes	Yes	Yes	Minor			0.32	3.00
SURF DRIVE	Falmouth	Major	Minor	Major	Minor		Yes	Yes	Yes	Major	Minor		1.36	4.00
THATCHERS LANE	Falmouth							Yes					0.20	3.00
THOMAS B LANDERS ROAD	Falmouth	Minor	Minor	Major	Major		Yes	Yes	Yes	Minor	Minor		2.93	3.00
TURNER ROAD	Falmouth	Minor		Major	Major		Yes	Yes	Yes	Minor			0.51	3.00
WALKER STREET	Falmouth	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		0.76	4.00
WATER STREET	Falmouth	Major			Minor		Yes			Major			0.28	2.00
WEST FALMOUTH HIGHWAY	Falmouth			Minor	Minor		Yes						1.23	3.00
WILD HARBOR ROAD	Falmouth	Minor		Minor	Minor		Yes		Yes	Minor			0.49	3.00
WORCESTER AVENUE	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		0.13	3.00

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WORCESTER COURT	Falmouth	Major	Major	Minor	Minor	Minor	Yes	Yes	Yes	Major	Major		1.02	3.00
BANK STREET	Harwich	Major	Minor	Minor	Minor	Minor	Yes		Yes	Major	Minor		1.38	3.00
BELMONT ROAD	Harwich	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		0.64	3.46
BROOKS ROAD	Harwich	Minor	Minor	Minor	Minor	Minor	Yes		Yes	Minor	Minor		0.23	3.00
CHASE STREET	Harwich		Minor	Minor	Minor		Yes				Minor		0.62	3.00
CHATHAM ROAD	Harwich												1.48	3.00
CHURCH STREET	Harwich												1.27	3.00
DEPOT ROAD	Harwich	Minor	Minor	Minor		Minor				Minor	Minor		0.70	3.00
DEPOT ROAD	Harwich												1.50	3.00
DEPOT STREET	Harwich	Minor	Minor	Minor	Minor		Yes	Yes		Minor	Minor		0.71	3.00
DEPOT STREET	Harwich												0.03	2.00
DEPOT STREET	Harwich						Yes						0.96	2.00
EARLE ROAD	Harwich			Minor			Yes		Yes				0.29	3.00
FREEMAN STREET	Harwich	Minor	Minor		Minor		Yes	Yes	Yes	Minor	Minor		0.33	3.00
GREAT WESTERN ROAD	Harwich	Minor	Minor	Minor	Minor	Minor	Yes	Yes		Minor	Minor		2.24	2.91
LONG POND DRIVE	Harwich				Minor	Minor	Yes		Yes				2.70	3.47
LOTHROP AVENUE	Harwich	Minor	Minor	Minor	Minor	Minor	Yes	Yes		Minor	Minor		1.44	3.87
LOWER COUNTY ROAD	Harwich			Minor			Yes		Yes				2.24	3.00
MAIN STREET	Harwich	Minor	Minor	Minor	Minor	Minor	Yes	Yes		Minor	Minor		1.41	2.86
MAIN STREET	Harwich				Minor		Yes	Yes					0.06	3.00
MAIN STREET	Harwich	Major	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Major	Minor		1.60	3.00
OLD CHATHAM ROAD	Harwich					Minor	Yes		Yes				0.63	3.00
OLD QUEEN ANNE ROAD	Harwich												0.11	3.00
ORLEANS ROAD	Harwich				Minor								0.03	3.00
ORLEANS ROAD	Harwich				Minor		Yes	Yes					4.65	2.67
PLEASANT BAY ROAD	Harwich												1.94	3.00
PLEASANT LAKE AVENUE	Harwich	Major		Minor	Minor	Minor	Yes		Yes	Major			2.67	3.56
QUEEN ANNE ROAD	Harwich				Minor		Yes	Yes					3.02	2.99
QUEEN ANNE ROAD	Harwich				Minor								2.16	2.00
RIVERSIDE DRIVE	Harwich												0.57	3.00
ROUTE 137	Harwich												1.72	3.00
ROUTE 137	Harwich				Minor								0.18	3.00
SISSON ROAD	Harwich	Minor		Minor	Minor	Minor	Yes			Minor			0.86	3.00
SISSON ROAD	Harwich	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.59	3.00



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SOUTH STREET	Harwich	Minor	Minor	Major	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.40	3.31
UNCLE VENIES ROAD	Harwich												0.86	3.00
ASHERS PATH EAST	Mashpee				Minor	Minor							0.43	3.00
BOARDLEY ROAD	Mashpee												0.01	3.00
COTUIT ROAD	Mashpee			Major			Yes		Yes				1.72	2.76
FALMOUTH-SANDWICH ROAD	Mashpee	Major		Minor	Major		Yes		Yes	Major			0.72	3.00
GREAT NECK ROAD NORTH	Mashpee	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		2.28	4.00
GREAT NECK ROAD SOUTH	Mashpee			Minor	Minor	Minor	Yes		Yes				2.77	3.00
GREAT OAK ROAD	Mashpee			Minor	Minor	Minor	Yes		Yes				2.83	3.00
LOWELL ROAD	Mashpee	Minor	Minor	Minor	Minor	Minor	Yes		Yes	Minor	Minor		0.81	3.00
MAIN STREET	Mashpee			Major		Minor	Yes		Yes				4.13	3.00
MASHPEE NECK ROAD	Mashpee			Minor	Minor	Minor	Yes	Yes	Yes				1.50	3.00
MEETINGHOUSE ROAD	Mashpee	Minor	Minor	Minor	Minor	Minor	Yes	Yes	Yes	Minor	Minor		1.73	4.00
MONOMOSCOY ROAD	Mashpee			Minor		Minor			Yes				0.03	2.00
NATHAN ELLIS HIGHWAY	Mashpee			Minor	Minor	Minor	Yes	Yes	Yes				2.31	3.00
OLD BARNSTABLE ROAD	Mashpee			Minor	Minor	Minor	Yes	Yes	Yes				1.22	3.00
OLD BARNSTABLE ROAD	Mashpee	Minor	Minor	Minor	Minor	Minor	Yes		Yes	Minor	Minor		1.08	3.00
ORCHARD ROAD	Mashpee			Minor	Minor	Minor	Yes	Yes					0.51	3.00
PIMLICO POND ROAD	Mashpee	Minor		Minor			Yes	Yes		Minor			0.99	3.92
QUINAQUISSET AVENUE	Mashpee			Minor	Minor	Minor	Yes	Yes					1.72	3.00
RED BROOK ROAD	Mashpee			Minor	Minor	Minor	Yes		Yes				1.43	2.06
SOUTH SANDWICH ROAD	Mashpee	Minor		Minor			Yes		Yes	Minor			1.22	3.00
WAKEBY ROAD	Mashpee	Minor		Minor	Major	Minor				Minor			0.08	3.00
BEACH ROAD	Orleans				Minor		Yes		Yes				1.54	3.00
BRICK HILL ROAD	Orleans			Minor	Minor		Yes		Yes				1.34	3.00
BRIDGE ROAD	Orleans				Minor				Yes				0.19	3.00
CANAL ROAD	Orleans				Minor	Minor	Yes						0.57	2.62
ELDREDGE PARK WAY	Orleans			Minor			Yes		Yes				0.73	3.00
FINLAY ROAD	Orleans	Minor					Yes		Yes	Minor			0.67	3.00
HARWICH ROAD	Orleans				Minor								0.68	2.90
HOPKINS LANE	Orleans			Minor	Minor		Yes		Yes				0.99	3.00
LOTS HOLLOW ROAD	Orleans	Minor					Yes		Yes	Minor			0.17	3.00
MAIN STREET	Orleans	Minor			Minor	Major	Yes			Minor			0.77	2.76
MAIN STREET	Orleans				Minor		Yes	Yes	Yes				1.00	3.00

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MONUMENT ROAD	Orleans												1.22	3.00
MONUMENT ROAD	Orleans				Minor		Yes	Yes	Yes				0.28	3.00
OLD COLONY WAY	Orleans			Minor					Yes				0.61	3.00
POND ROAD	Orleans	Minor		Minor	Minor		Yes		Yes	Minor			0.46	3.00
ROCK HARBOR ROAD	Orleans	Minor			Minor	Major	Yes		Yes	Minor			1.99	2.55
ROUTE 6A	Orleans	Minor			Minor	Minor				Minor			0.02	3.00
SKAKET BEACH ROAD	Orleans			Minor	Minor		Yes		Yes				1.06	3.00
TONSET ROAD	Orleans												0.23	3.00
TONSET ROAD	Orleans			Minor	Minor		Yes		Yes				1.69	3.00
WEST ROAD	Orleans			Minor	Minor		Yes		Yes				0.75	3.00
BRADFORD STREET	Provincetown			Minor	Minor		Yes	Yes					1.52	3.00
BRADFORD STREET	Provincetown	Minor					Yes			Minor			0.85	3.00
COMMERCIAL STREET	Provincetown	Minor	Major		Minor		Yes			Minor	Major		2.51	3.00
CONWELL STREET	Provincetown			Minor	Minor		Yes	Yes					0.08	3.00
ROUTE 6	Provincetown	Minor		Minor	Minor	Minor	Yes	Yes	Yes	Minor			7.77	3.00
SHANK PAINTER ROAD	Provincetown	Minor			Minor		Yes		Yes	Minor			0.55	4.00
ASA MEIGGS ROAD	Sandwich			Minor					Yes				0.57	3.00
BEALE AVENUE	Sandwich												0.31	2.00
BOARDLEY ROAD	Sandwich			Minor			Yes		Yes				1.25	3.00
CHASE ROAD	Sandwich				Minor		Yes						0.46	3.00
CHASE ROAD	Sandwich				Minor								0.62	3.00
COTUIT ROAD	Sandwich	Minor		Minor	Minor		Yes		Yes	Minor			1.85	2.90
COTUIT ROAD	Sandwich	Major	Minor		Major	Minor	Yes		Yes	Major	Minor		1.39	3.00
FALMOUTH-SANDWICH ROAD	Sandwich	Major		Minor	Major		Yes		Yes	Major			0.01	3.00
FARMERSVILLE ROAD	Sandwich	Minor		Minor	Minor		Yes			Minor			2.29	2.68
FORESTDALE ROAD	Sandwich	Minor	Minor				Yes	Yes	Yes	Minor	Minor		1.73	3.99
FORESTDALE ROAD	Sandwich	Major			Major		Yes		Yes	Major			1.74	2.45
GREAT HILL ROAD	Sandwich												0.04	2.00
GREAT HILL ROAD	Sandwich				Minor								1.74	3.00
HARLOW ROAD	Sandwich			Minor					Yes				1.29	3.00
HOWLAND LANE	Sandwich	Minor		Minor	Minor				Yes	Minor			0.34	3.92
JONES LANE	Sandwich	Major		Major			Yes		Yes	Major			0.56	4.00
MAIN STREET	Sandwich						Yes		Yes				0.00	4.00
MAIN STREET	Sandwich	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		0.24	3.00

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MEIGGS BACKUS RD	Sandwich	Minor		Minor	Minor	Minor		Yes		Minor		Giant puddle/ditch at the end, unable to drive through	0.98	4.70
MEIGGS BACKUS ROAD	Sandwich	Major		Minor	Minor		Yes	Yes		Major			0.00	4.00
NEWTOWN ROAD	Sandwich			Minor	Minor		Yes		Yes				0.55	2.00
OLD COUNTY ROAD	Sandwich				Minor		Yes						2.70	3.00
PIMLICO POND ROAD	Sandwich						Yes						0.70	2.00
PINKHAM ROAD	Sandwich	Major	Minor	Major	Minor		Yes	Yes	Yes	Major	Minor		1.34	4.20
QUAKER MEETING HOUSE ROAD	Sandwich							Yes					0.08	4.00
QUAKER MEETING HOUSE ROAD	Sandwich				Minor				Yes				1.06	3.00
QUAKER MEETING HOUSE ROAD	Sandwich	Major	Minor		Minor	Minor	Yes		Yes	Major	Minor		3.24	3.00
RACE LANE	Sandwich				Minor								0.40	3.00
SANDY NECK ROAD	Sandwich	Minor		Minor	Minor	Minor	Yes		Yes	Minor			0.70	4.00
SERVICE ROAD	Sandwich	Minor		Minor	Minor	Major	Yes	Yes	Yes	Minor			4.84	2.88
SNAKE POND ROAD	Sandwich							Yes	Yes				1.73	3.08
SOUTH SANDWICH ROAD	Sandwich			Minor			Yes		Yes				0.21	3.00
STOWE ROAD	Sandwich			Minor	Minor	Minor		Yes	Yes				0.34	4.00
TUPPER ROAD	Sandwich	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		1.76	3.00
WATER STREET	Sandwich	Minor	Minor	Minor	Minor		Yes	Yes	Yes	Minor	Minor		0.83	3.00
CASTLE ROAD	Truro	Minor		Minor	Minor					Minor			1.99	2.00
DEPOT ROAD	Truro												0.52	3.00
HIGHLAND ROAD	Truro	Minor	Minor	Major	Minor	Major	Yes	Yes		Minor	Minor		0.74	4.00
OLD COUNTY ROAD	Truro	Minor		Minor	Minor	Minor	Yes			Minor			2.75	3.93
OLD ROUTE 6A	Truro	Minor		Minor	Minor					Minor			0.35	3.00
SHORE ROAD	Truro	Minor	Minor	Minor	Minor	Major	Yes		Yes	Minor	Minor		4.61	3.00
SOUTH HIGHLAND ROAD	Truro			Minor	Minor								1.45	3.00
BOUND BROOK ISLAND ROAD	Wellfleet	Minor		Major	Minor	Minor			Yes	Minor			0.84	3.00
BRIAR LANE	Wellfleet		Minor			Minor			Yes		Minor		0.53	3.00
CAHOONS HOLLOW ROAD	Wellfleet	Minor		Minor	Minor		Yes	Yes	Yes	Minor			2.03	3.00
CHEQUESSETT NECK ROAD	Wellfleet				Minor				Yes				0.77	3.00
COLE NECK ROAD	Wellfleet				Minor								0.69	3.00
COLES NECK ROAD	Wellfleet	Minor		Major	Minor	Minor			Yes	Minor			0.05	3.00
COMMERCIAL STREET	Wellfleet						Yes		Yes				0.51	3.00
EAST COMMERCIAL STREET	Wellfleet						Yes		Yes				0.22	3.00

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GROSS HILL ROAD	Wellfleet								Yes				1.92	3.32
HOLBROOK AVENUE	Wellfleet								Yes				0.08	3.00
KENDRICK AVENUE	Wellfleet				Minor	Minor	Yes		Yes				0.82	2.27
LECOUNT HOLLOW ROAD	Wellfleet			Minor		Minor			Yes				0.77	3.00
LONG POND ROAD	Wellfleet			Minor					Yes				2.14	2.33
LONG POND ROAD	Wellfleet			Minor		Minor			Yes				0.04	3.00
MAIN STREET	Wellfleet		Minor			Minor			Yes		Minor		0.74	3.00
OCEANVIEW DRIVE	Wellfleet			Minor					Yes				0.03	3.00
OCEANVIEW DRIVE	Wellfleet			Minor		Minor			Yes				2.92	3.00
OLD COUNTY ROAD	Wellfleet	Minor		Minor	Minor	Minor	Yes			Minor			0.33	4.00
OLD COUNTY ROAD SOUTH	Wellfleet	Minor		Minor	Minor		Yes	Yes	Yes	Minor			1.89	3.00
PAMET POINT ROAD	Wellfleet	Minor		Major	Minor	Minor			Yes	Minor			0.27	3.00
POLE DIKE ROAD	Wellfleet						Yes		Yes				0.67	3.00
SCHOOL STREET	Wellfleet		Minor			Minor			Yes		Minor		0.31	3.21
SCHOOL STREET	Wellfleet								Yes				0.02	4.00
WEST MAIN STREET	Wellfleet		Minor			Minor			Yes		Minor		0.52	3.00
WEST ROAD	Wellfleet												0.59	2.00
WHITS LANE	Wellfleet						Yes		Yes				0.08	3.00
ABELLS ROAD	Yarmouth			Minor					Yes				0.37	3.00
BAXTER AVENUE	Yarmouth			Minor				Yes					0.80	3.00
BAYVIEW STREET	Yarmouth		Minor	Minor	Major	Minor	Yes		Yes		Minor		0.54	4.00
BERRY AVENUE	Yarmouth			Minor			Yes		Yes				0.66	3.00
BRAY FARM ROAD NORTH	Yarmouth												0.14	3.00
BRAY FARM ROAD SOUTH	Yarmouth												0.40	3.00
BROADWAY	Yarmouth			Minor	Minor		Yes		Yes				0.24	3.58
BUCK ISLAND ROAD	Yarmouth		Minor	Minor		Minor	Yes	Yes	Yes		Minor		2.59	2.99
BUCK ISLAND ROAD	Yarmouth												0.11	2.00
CAMP STREET	Yarmouth		Minor	Minor		Minor	Yes	Yes	Yes		Minor		1.13	3.00
CAPTAIN SMALL ROAD	Yarmouth				Minor		Yes						0.18	3.00
CENTER STREET	Yarmouth				Minor				Yes				0.79	3.00
COTTAGE DRIVE	Yarmouth			Minor					Yes				0.06	3.00
FOREST ROAD	Yarmouth	Minor		Minor	Minor		Yes	Yes	Yes	Minor			2.16	3.00
GLENWOOD STREET	Yarmouth			Minor			Yes		Yes				0.20	3.00
GREAT WESTERN ROAD	Yarmouth				Minor								1.03	2.00

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HARBOR ROAD	Yarmouth			Minor			Yes	Yes	Yes				0.29	3.00
HIGGINS CROWELL ROAD	Yarmouth		Minor	Minor	Minor	Minor	Yes	Yes	Yes		Minor		2.82	3.00
HIGHBANK ROAD	Yarmouth				Minor		Yes	Yes					1.79	2.88
HIGHLAND STREET	Yarmouth								Yes				0.04	3.00
LEWIS ROAD	Yarmouth												0.59	3.00
LONG POND DRIVE	Yarmouth				Minor		Yes						0.95	3.00
LONG POND DRIVE	Yarmouth	Minor			Minor		Yes	Yes	Yes	Minor			0.92	3.00
MAYFAIR ROAD	Yarmouth	Minor		Minor	Minor		Yes		Yes	Minor			0.26	3.00
NORTH DENNIS ROAD	Yarmouth				Minor		Yes						2.03	2.97
NORTH MAIN STREET	Yarmouth				Minor		Yes	Yes	Yes				1.71	2.80
OLD CHURCH STREET	Yarmouth				Minor				Yes				0.32	3.00
OLD MAIN STREET	Yarmouth												0.98	2.00
OLD MAIN STREET	Yarmouth			Minor	Minor	Minor	Yes		Yes				0.28	3.00
OLD TOWN HOUSE ROAD	Yarmouth				Minor		Yes						0.03	3.00
OLD TOWN HOUSE ROAD	Yarmouth			Minor	Minor	Minor	Yes		Yes				1.15	3.00
PARK AVENUE	Yarmouth								Yes				0.28	3.00
PINE GROVE ROAD	Yarmouth			Minor	Minor	Minor	Yes	Yes	Yes				0.88	3.00
PLAYGROUND LANE	Yarmouth				Minor				Yes				0.11	3.00
RAYMOND AVENUE	Yarmouth				Minor		Yes	Yes					0.35	3.00
REGIONAL AVENUE	Yarmouth				Minor		Yes	Yes	Yes				0.46	3.00
SCHOLL AVENUE	Yarmouth			Minor					Yes				0.28	4.00
SEAVIEW AVENUE	Yarmouth			Minor	Minor		Yes		Yes				0.75	3.00
SETUCKET ROAD	Yarmouth												1.08	3.00
SHERIDAN ROAD	Yarmouth				Minor		Yes	Yes	Yes				0.17	3.00
SILVER LEAF LANE	Yarmouth			Minor			Yes						0.62	4.00
SOMERSET STREET	Yarmouth								Yes				0.10	3.00
SOUTH SEA AVENUE	Yarmouth												1.10	3.00
SOUTH SHORE DRIVE	Yarmouth			Minor	Minor	Minor	Yes	Yes	Yes				0.94	3.00
SOUTH STREET	Yarmouth			Minor	Minor	Minor	Yes		Yes				0.86	3.00
STATION AVENUE	Yarmouth				Minor		Yes						1.98	3.00
STRAWBERRY LANE	Yarmouth			Major		Minor	Yes		Yes				0.37	3.00
TOWN BROOK ROAD	Yarmouth		Minor				Yes		Yes		Minor		0.32	3.00
UNION STREET	Yarmouth												1.06	2.00
WEIR ROAD	Yarmouth				Minor		Yes						0.70	3.00

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WEST GREAT WESTERN ROAD	Yarmouth				Minor		Yes						1.40	3.00
WEST YARMOUTH ROAD	Yarmouth			Minor									1.06	3.00
WEST YARMOUTH ROAD	Yarmouth			Minor		Minor	Yes		Yes				2.80	3.00
WHITE ROCK ROAD	Yarmouth			Major		Minor	Yes		Yes				1.08	3.00
WHITES PATH	Yarmouth				Minor		Yes						1.74	2.02
WILLOW AVENUE	Yarmouth			Minor			Yes		Yes				0.07	3.00
WILLOW STREET	Yarmouth			Minor	Minor								0.83	3.00
WILLOW STREET	Yarmouth			Minor	Minor	Minor	Yes	Yes	Yes				1.33	3.00
WINSLOW GRAY ROAD	Yarmouth			Minor			Yes	Yes	Yes				1.16	4.00
WINSLOW GRAY ROAD	Yarmouth	Minor			Minor		Yes	Yes	Yes	Minor			0.73	3.00
WITCHWOOD ROAD	Yarmouth				Minor		Yes						0.57	3.00
WOOD ROAD	Yarmouth				Minor		Yes	Yes	Yes				1.29	3.00

## CAPE COD COMMISSION

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