

## **Road Plan Committee Meeting Notice**

**The Road Plan Committee will hold a Meeting on Tuesday, May 23<sup>rd</sup>, 2017  
At the Public Safety Building 7:00pm.**

**First Order of Business: Call meeting to order**

**Second Order of Business: Approval of minutes: 2/7/2017 ----- 5 minutes**

**Third Order of Business: Review Plan for updating RPC Reports ----- 10 minutes**

**Fourth Order of Business: Review/Edit Initial Draft Plan for 2017 ----- 10 minutes**

**Fifth Order of Business: Review/Edit the Road Plan Report 2017 ----- 10 minutes**

**Fifth Order of Business: Set next meeting date ----- 15 minutes**

**Sixth Order of Business: Other Business ----- 10 minutes**

**Adjourn Meeting-----**

DRAFT

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## Road Plan Committee Meeting Minutes February 2, 2017

The Road Plan Committee held a meeting on Tuesday, February 2, 2017 at the Public Safety Building at 7:03pm.

**Members present:** Herb Maine, Doug Damon, , Mark Dyer

**Guests Present:** Marjorie Stratton (Town Manager)

**First Order of Business:** Herb Maine called meeting to order at 7:03

**Second Order of Business:** No previous minutes presented.

**Third Order of Business: Cost Adjustment based on corrected costs from Allstate Paving**

Costs for this years recommended projects where updated based on selected work program and Allstate Paving estimates in the Report to be presented to the Selectmen.

**Fourth Order of Business. Engineers Gravel Assessment and the 2016 Road Plan Report**

Discussed the findings of the preliminary gravel report and will consider in more detail if selectmen decide to continue. Land settlement and zoning issues still lie ahead. The position of this committee is that this process should continue

**Fifth Order of Business: Selectmens Request to consider Drainage in Future Projects.**

Committee will look at drainage in more detail and will make recommendations or request engineering help for future projects.

**Sixth Order of Business:2017 Road Plan Approval for Submission to Selectmen.**

Edited section 6d par 9 and Gravel 6ii: and cost estimates

Moved: "To accept Road Plan as amended and submit to Selectmen" by Mark Dyer, 2<sup>nd</sup> Doug Damon: vote unanimous

**New Business:**

Discussed current conditions of road shoulder at stone pier and would like to see improvement. No recommendations made at this time.

Meeting Adjourned 8:30

Respectfully Submitted:

Doug Damon (Recording Secretary)

# **ROAD PLAN**

## **2016**

CHEBEAGUE ISLAND  
MAINE

**1. Introduction**

The road plan is updated annually by the town of Chebeague Island Road Committee (The Committee) with the aid of the Road Surface Management System (RSMS). RSMS is software created by the Maine Local Roads Center (MLRC) of the Maine Department of Transportation (MDOT). The goal of the plan is to methodically bring the quality of our road network up to a point where the entire network can be put into a regular, cost effective maintenance program. The Road Plan presents the findings of the Committee looking out 2 years and evaluating all island roads; approximately 10 miles of paved roads and 5 miles of gravel roads.

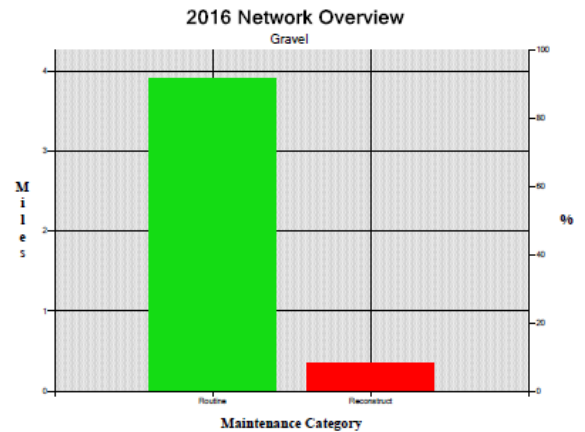
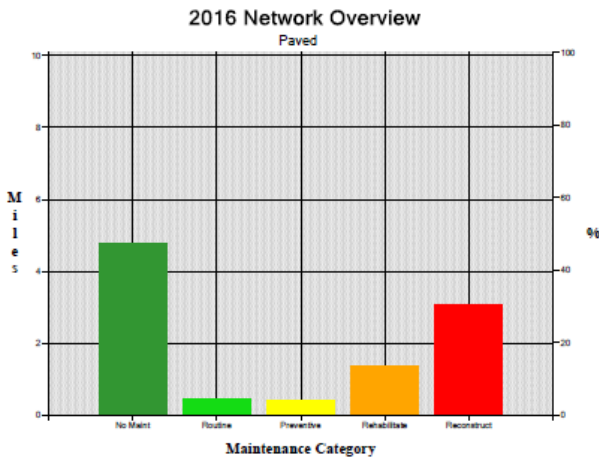
The Report of the Road Plan Committee is a more comprehensive document that describes the methodology in detail and presents other information used to support the annual plan.

**2. Road Network Status**

Once an annual survey is entered into the software, RSMS places each paved road segment in one of the following categories: Routine, Preventative, Rehabilitate, Reconstruct. Gravel roads only use Routine and Reconstruct.

The charts below show the results of the 2016 survey. They are very close to the 2015 survey because the chip sealing was done to protect the new cold mix. We gained longer life from the Cold Mix but no immediate improvement in the overall road network.

The goal of the plan for paved roads is to have all the roads categorized in the green and yellow categories. Roads maintained in these categories are easier and more cost effectively maintained.



**3. Maintenance Classifications of the Road Network for 2016**

The table on the next page lists the road segments grouped by the RSMS status and ordered by the Annual Surface Work Groups (ASW) identifier.

**Table 1 - Paved Road– Annual Surface Work Groups (ASW)**

No Maint	From Road/Section	To Road/Section	Length (miles)	Import	Traffic	Drainage
ASW01 North Road 01	South Road (East)	Public Safety Bld	0.87	high	med-high	Good
ASW02 North Road 02	Public Safety Bld	School House	0.99	high	med-high	Good
ASW02 Transfer Station Road	North Road	Transfer Sta.	0.06	high	high	Good
ASW03 South Road	Chandler's Cove	.2 mi p school hse	1.00	high	medium	Good
ASW04 Littlefield Road	South Road	Island Commons	0.06	low	low	Good
ASW04 Roy Hill Road	South Road	Summa	0.03	low	medium	Good
ASW04 South Road	.2 mi p school hse	Crossman	0.50	medium	medium	Good
ASW06 John Small 01	South Road (West)	Below Crossman	0.77	med-high	med-high	Good
ASW08 Soule Road	South Road	Johnson's	0.06	low	low	Good
ASW09 Parking Lot School	7000 square feet		0.02	high	low-med	Good
ASW09 School House Rd	North Road	South Road	0.42	high	med-high	Good
			<b>4.78</b>			
<b>Routine</b>						
ASW08 Bar Point Road	Division Point Rd	Cul du sac	0.16	low	low	Good
ASW08 Capps Road	South Road	Past C. Doughty	0.13	low	low	Good
ASW10 Stone Wharf Road	South Road	Stone Wharf	0.18	high	high	Good
			<b>0.47</b>			
<b>Preventive</b>						
ASW01 Parking Public Safety Bldg	North Road	Public Safety Bld	0.08	high	low	Good
ASW06 John Small 02	Below Crossman	South Road (East)	0.18	med-high	med-high	Good
ASW10 Stone Wharf	Stone Wharf Road	Easterly Extent	0.13	high	high	Poor
			<b>0.39</b>			
<b>Rehabilitate</b>						
ASW05 South Road	Roy Hill Rd	Inn	1.15	high	high	Good
ASW08 Old Cart Road	North Road	Cul du sac	0.20	low	low	Good
			<b>1.35</b>			
<b>Reconstruct</b>						
ASW04 South Road	Crossman Rd	Roy Hill Rd	0.42	med-high	med-high	Good
ASW05 South Road	Inn	East Shore Rd	0.35	medium	low	Good
ASW07 Cottage Road	North Road	South Road	0.60	medium	low-med	Good
ASW07 North Road 03	School House	Cottage Road	0.57	low-med	low-med	Good
ASW08 Division Point Road	North	Division Point	0.36	low	low	Good
ASW09 Fenderson Road	South Road	J. Dought'y drive	0.19	low	low	Poor
ASW09 Firehouse Road	North Road	South Road	0.37	medium	medium	Poor
ASW10 Caso Bay Landing	Chandler's Cove	State Wharf	0.05	med-high	medium	Good
ASW10 Chandler Cove Road	South Road	Caso Bay Lndg Rd.	0.18	med-high	medium	Good
			<b>3.09</b>			
			<b>10.08</b>			

The RSMS program uses two categories for road status: Routine and Reconstruct. The table below shows the gravel roads grouped by the status and by priority (based on public services report).

**Table 2 Gravel Roads - Annual Gravel Work Groups (AGW)**

<b>Routine</b>	<u>From Road/Section</u>	<u>To Road/Section</u>	<u>Length</u>	<u>Import</u>	<u>Traffic</u>	<u>Drainage</u>
AGW01 Bennets Cove Road-1	South Road	Shore	0.16	high	med-high	Good
AGW11 Roy Hill Road-1	North Road	South Road	0.65	low-med	medium	Good
AGW09 Littlefield Road-1	North Road	South Road	0.64	medium	medium	Good
AGW05 East Shore Drive-1	End of South Road	Cul du sac	0.26	low-med	low	Good
AGW08 Jenks Road-1	South Road	Shore	0.33	low-med	low	Good
AGW13 South Shore Drive-1	South Road	Cul du sac	0.23	low	low	Good
AGW06 Fenderson Road-1	End of paved secti	Cul du sac	0.20	low-med	low-med	Good
AGW12 Soule Road-1	End of paved secti	Shore	0.17	low-med	low	Good
AGW02 Capps Road-1	Capps end of pavin	Artist Point Road	0.14	low-med	low	Good
AGW10 Rose Point Road-1	John Small Road	Waldo Point Road	0.33	low-med	low	Good
AGW03 Charleston Road-1	John Small Road	Waldo Point Road	0.33	low	low	Good
AGW14 Waldo Point Road-1	Rose Point Road	Cul du sac	0.14	medium	low	Good
AGW04 Cordes Road-1	North Road	Cul du sac	0.33	low	low	Good

**3.91**

**Reconstruct**

AGW07 Indian Point Road-1	North Road	Cul du sac	0.27	medium	medium	Good
AGW15 Willow Street-1	South Road	Shore	0.08	low-med	low	Poor

**0.35**

Total Miles **4.26**

# Chebeague Island Road Network

2017 Road Plan Status



**Legend**

- ↑ Culverts
- Gravel Road Segments**
  - Unclassified
  - Reconstruct
  - Routine
- Paved Road Segments**
  - Unclassified
  - No Maintenance
  - Routine
  - Preventative
  - Rehabilitate
  - Reconstruct
  - 911 Roads

**4. Financial Status**

Part of the RPC’s duties are to recommend financing options for the plan. To that end each year the RPC requests the current estimated balance of the undesignated fund balance and the balance of the paving reserve account (9050) from the treasurer.

On 10/07/2016 the treasurer estimated the fund balance at approximately \$380,000 which is only slightly higher than the minimum 8% of operations allowed by Selectmen’s policy. The paving reserve (9050) has a balance of approximately \$54,570.

**5. Recommendations to the Board of Selectmen:**

**a. Capital Repair Projects for Calendar year 2017**

i. Paving Projects

Road Section	From Road/ Section	To Road/ Section	Length (mile)	Treatment	Est. Cost
<b>Preventive</b>					
ASW06 John Small 02	Below Crossman	South Road	0.18	Heavy Cold Mix Shim	\$39,240
<b>Rehabilitate</b>					
ASW05 South Road	Roy Hill Rd	Inn	1.15	Crack Seal	\$24,000
<b>Reconstruct</b>					
ASW04 South Road	Crossman Rd	Roy Hill Rd	0.42	Heavy Cold Mix Shim	\$84,000
			1.75		\$147,240

The Committee recommends preparing Firehouse Road in 2017 by addressing the many drainage issues.

ii. Gravel

The committee recommends that the Board continue to assess development options for the town-owned parcel (I07 Lot 37) and adjacent parcels.

**b. Capital Repair Projects for Calendar year 2018**

i. Paving Projects

Road Section	From Road/ Section	To Road/ Section	Length (mile)	Treatment	Est. Cost
<b>Reconstruct</b>					
ASW09 Firehouse Road	North Road	South Road	0.37	Heavy Cold Mix Shim	\$73,080

**c. Maintenance, Budget and Administrative Recommendations**

1. Request Town Meeting to raise \$175,000 in fiscal year 2017-2018 for the paving capital account (9050) and authorize spending up to \$162,000 for work on the following Work Groups: ASW04, ASW05 and ASW06 which includes about a % 10 contingency with the remainder to build the reserve,

2. Direct the Town Administrator to secure contracts and make any other preparations to accomplish the work described in this plan,
3. Maintain the RSMS software and purchase upgrades as needed,
4. Request Town Meeting transfer \$0 from the undesignated fund balance to the paving capital account (9050)
5. Consider shoulder and drainage issues on Stone Wharf Road to address safety concerns.

DRAFT 170523

**REPORT  
OF THE  
ROAD PLAN COMMITTEE  
2017**

CHEBEAGUE ISLAND  
MAINE

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## 1. Introduction

In 2009 a three person town appointed task force researched and developed a methodology to inventory, assess and create a cost-effective plan to maintain the roads in the Town of Chebeague. The resulting methodology is documented here and revised periodically as requirements change and new technology is developed. The maintenance strategy is implemented as a *road plan* developed annually with the assistance and approval of the Road Commissioner.

The Road Plan is presented to Board of Selectmen by the committee each year before the capital planning process. It's primary purpose is to offer the Board of Selectmen a specific recommendation for the capital plan regarding the town's road network.

## 2. Comprehensive Plan

While the committee is not charged with implementing the comprehensive plan recommendations, the 2011 plan discusses many aspects of the Town's Road System and sets out the following 'goals' relating to the road network:

Comprehensive Plan Goal	Relevance to the Road Plan
Improve Great Chebeague's roads in keeping with islanders' values and expectations	The Road Plan Committee was formed to support this goal.
Develop fair and cost-effective town policies for accepting and/or maintaining private roads	The Town received guidance from its insurance carrier in 2017 that maintaining private roads using Town staff and equipment is a high-risk activity and recommended against it.  Except in the case where the Board of Selectmen might ask the to help determine the impact of accepting a particular road on the road plan it doesn't appear that this goal is relevant to the committee's work.
Improve the accuracy of the town's information about roads	The Comprehensive Plan mentions 'descriptions' and 'documentation'. The Committee maintains an inventory that is used only to plan maintenance and estimate costs. It is limited to physical dimensions RSMS surveys.
Ensure the safety of drivers, bicyclists and pedestrians	The Committee has discussed safety issues from time-to-time and has made recommendations regarding safety not directly related to the RSMS methodology. But the survey and annual plan don't explicitly address safety issues related to design or use.
Balance the need for gravel for town infrastructure with the need for adequate groundwater	The 2017 study mentioned in Section 6a does not mention groundwater except to say that: " <i>The soil volume was calculated based on a 5-foot separation from the observed water table surface and 12 inches of soil removed during grubbing. ... Excavation to or below the water table could significantly increase the volume of gravelly soil available.</i> " The second sentence could be inconsistent with this goal.

### 3. Methodology

The town adopted the Maine Local Roads Center's (MLRC) methodology as described in the Road Surface Management System (RSMS). RSMS is a system developed for Maine roads by Maine Department of Transportation (MDOT) that guides municipalities in collecting qualitative assessments of the road surface and analyzing them to address maintenance and repair.

It is important to remember that RSMS is primarily a planning tool and not a tool that makes road engineers out of municipal officials. The implementation of the plans may well differ from the plan and the plan will likely be adjusted on an ongoing basis.

RSMS is developed and supported by MDOT's MLRC whose web page says: *"The Maine Local Roads Center provides training, technical assistance, and information to those municipal people who are responsible for constructing, maintaining, and managing local roads and bridges in Maine."*

The RSMS methodology includes the following tasks annually:

- Update an inventory of public roads (paved and unpaved)
- Perform a windshield survey of the entire network
- Update the RSMS software costs
- Input the survey results
- Generate costed treatment options for each segment
- Prioritize the road segments based on surface condition and use
- Review budget targets and treatment option
- Develop recommendations

#### a. Inventory

The methodology begins with a road inventory. In 1999 the Town of Cumberland had a pavement management study done by Casey & Godfrey Engineers of Gardiner, Maine. The 1999 study contained an inventory of mainland and island roads. This list forms the basis for the inventory that the Town has used to value its road network for the annual audit. Appendix A is the list of paved and unpaved town-owned roads from the 1999 study. It shows that Chebeague's existing network of town-owned roads includes about 10 miles of paved roads and about 5 miles of unpaved or gravel roads.

The inventory is updated on an annual basis.

#### b. Work Groups

The Committee has organized the road network into 'Work Groups' in an effort to divide the initial maintenance task into groups that can be addressed through the capital plan without borrowing funds. A Work Group can be a section of a long road, an entire road or a group for road section. The inventory of paved roads is in Appendix B.

i. Paved Road Annual Surface Work Groups (ASW)

The Committee continues to work on the belief that the Town can raise funds in a single year to maintain or repair about one mile of paved road surface. Given the inventory of about 10 miles of paved road surface the Committee has developed 10 segments of approximately 1 mile each and labeled them ASW01 – ASW10. The numeric portion does not reflect a priority or expected order it is simply a label. This labeling is reflected in the RSMS naming conventions.

ii. Gravel Road Inventory - Annual Gravel Work Groups (AGW)

Each gravel road was given a label “AGW01 – AGW15”. The island’s gravel roads tend to be shorter than the paved roads and the work performed on them is generally less complex. Public Services can provide nearly all of the basic maintenance.

**c. Road Use**

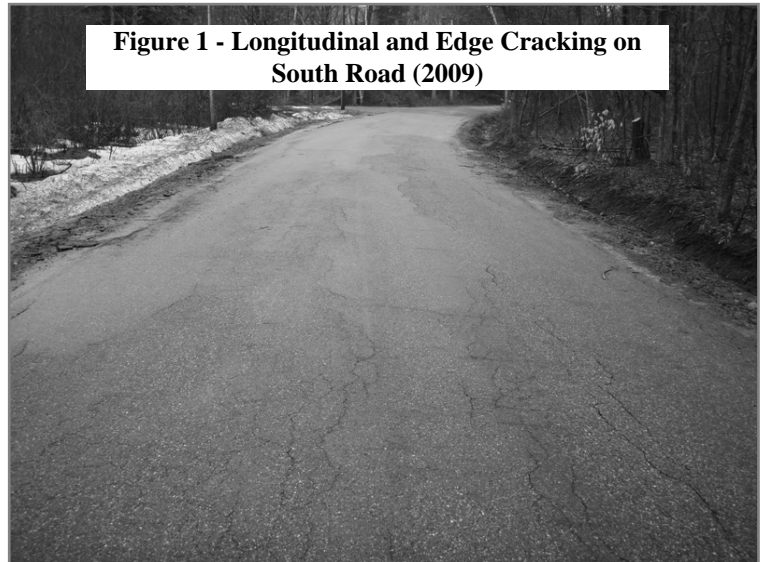
The RSMS method categorizes each road section based on the amount and kind of *traffic* and the *importance* of the section. In the RSMS methodology these are subjective assessments, arrived at by consensus of the surveyors. There are no traffic studies or hard numbers associated with this assessment.

RSMS uses a 5-level scale to rate the *traffic* load on each road section. The amount and quality of the traffic were taken into consideration. For example, each section on the entire route that the solid waste trucking company uses from Bennett’s cove to the transfer station was identified as either ‘high’ or ‘medium-high’. Even though the number of vehicles using this route is relatively small the consistent heavy-load traffic of the trucks moving our solid waste off the island represents a higher level of road use than other routes.

The *importance* of a road is also subjectively measured on a 5-level scale. The task force gave higher values to road sections that had public service centers on them such as North Road near the public safety building and transfer station, Stone Wharf road and the school. Cul de sacs serve a smaller segment of the public and so were given a lower importance rating.

**d. Road Condition**

The MLRC Field Manual used in association with the RSMS methodology gives the non-engineer a crash course in road defects or distress conditions. During the annual windshield survey each road section in the inventory is assessed based on the severity and extent of each type of distress. The distress conditions defined in RSMS are: 1) *alligator cracking*, 2) *longitudinal and transverse cracking*, 3) *edge cracking*, 4) *patch/pothole*, 5) *roughness*, 6) *rutting* and 7) *drainage*. Figure 1 and Figure 2 show some examples of the distress conditions found on the island.



**Figure 2 - Drainage, Roughness, Cracking and Potholes on North Road (2009)**

Figure 3 is an example of a field sheet completed by the task force. The members of the task force collaborate to fill this sheet out after driving each road section. The data from the sheets are then entered into the RSMS software.

**RSMS Inventory and Condition Identification**  
**Asphalt Surface Road Sections**

Inspected by: \_\_\_\_\_

Date: 3/21/2010 RIN: \_\_\_\_\_

Road Name: School House Road Road Section: SP-133

Seq. No.: \_\_\_\_\_ Maintenance Div.: \_\_\_\_\_

From St.: North Road Jurisdiction:  My Town  
 State Maintained  State, City Maintained  
 Private  \_\_\_\_\_

To St.: in front of school Class: \_\_\_\_\_

No. Lanes: 2 Width: 20 Traffic: 1  2  3  4  5

Shoulder Width: \_\_\_\_\_ Importance: 1  2  3  4  5

Surface:  Unpaved  Asphalt Class: \_\_\_\_\_

Shoulder:  Natural  Gravel  U.S. Units  Metric

Paved, Asphalt  Curbed, Granite  
 Curbed, Concrete  Curbed, Asphalt

Paved, Concrete  \_\_\_\_\_

Mile Post: \_\_\_\_\_ Inventory Year: 2009

End Post: \_\_\_\_\_ Current Year: \_\_\_\_\_

Comments: Segment Length (mi) = 0.19 Corner of road is per base  
road design

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**Condition**

			None	← Low	Extent Medium	→ High
			No Defects	<10%	10-30%	>30%
Alligator Cracking	Severity	Low	0	1	2	3
		Medium		4	5	6
		High		7	8	9
Long Trans Cracking	Severity	Low	0	1	2	3
		Medium		4	5	6
		High		7	8	9
Edge Cracking	Severity	Low	0	1	2	3
		Medium		4	5	6
		High		7	8	9
Patch/Pothole		No Defects	0	1	2	3
Roughness				Good	Fair	Poor
			1	2	3	
Rutting			None	0-1 inch	1 inch	
			1	2	3	
Drainage			Good	Fair	Poor	
			1	2	3	

Maine Local Roads Center  
1-800-498-9133

**Figure 3 - Example Field Sheet**

**4. RSMS Output**

The methodology described in section 2 above yields a *road network inventory* and a *condition survey*. RSMS assigns a *maintenance status* and *repair options* based on the inputted survey results. These are the primary tools used to develop the road plan.

**a. Road Section Maintenance Status**

The RSMS software assigns each road section a maintenance status. The status categories are: *No Maintenance, Routine, Preventative, Rehabilitation and Reconstruction*. The Road Network inventory report in Appendix B shows the status of each of the road sections in our inventory under the column labeled ‘surface status’.

Figure 4 shows how roads in each of these maintenance status categories tend to deteriorate with time. The steeper the curve, the faster the deterioration and the

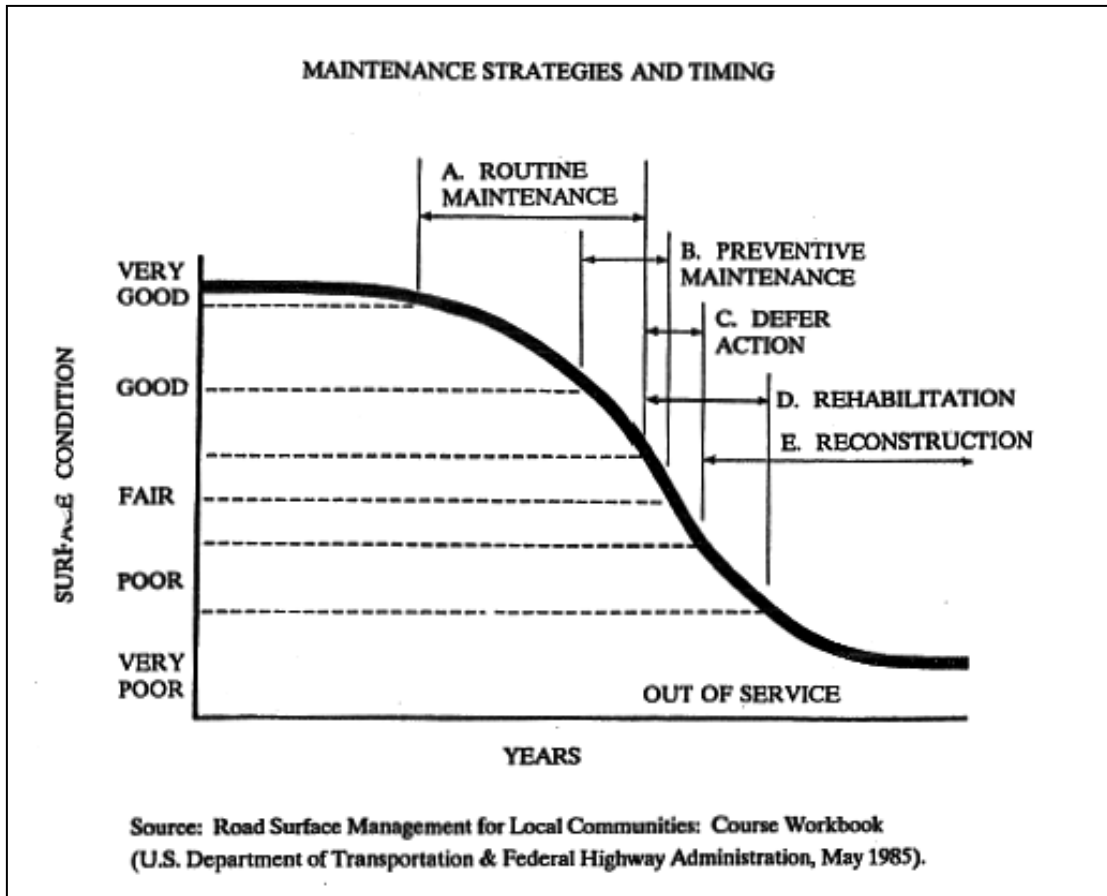


Figure 4 - Cost-Benefit Based on Road Condition

further down the curve you go the more costly it is to bring the road section back to a good condition or even maintain it properly.

The lesson learned is that it isn't necessarily the best policy to just start by fixing the worst roads first. After all they aren't going to get that much worse if you wait whereas roads in the Preventative category are going to get much more costly to repair if you wait.

### **b. Repair Options and Costs**

The RSMS goes further by assigning a set of repair options for each road and an estimated cost. The unit cost is assigned by the state. The RSMS software calculates a cost for each maintenance option based on the length, width and RSMS category. Special costs associated with the work such as what we might affectionately refer to as the "island factor" are accounted for when the budget is constructed in RSMS.

**Table 1 - RSMS Cost options, excerpt the 2016 Road Survey**

<b>ASW09 Firehouse Road-1 [Paved] From: North Road To: South Road (Length: 0.37mi., Width: 19.00ft.)</b>		
<b>Surface Status: Reconstruct-6</b>		<u>Estimated Cost</u>
	Reclaim pavement, revert to gravel (S)	\$ 7,030
	18" new 9.5mm gravel, 2" binder, 1" surface (S)	\$ 79,088
	24" new gravel, 2" binder, 2" surface (S)	\$ 105,450
<b>Drainage Status: Poor-6</b>		<u>Estimated Cost</u>
	Replace/New culverts (S)	\$ 0
	Grade shoulders (S)	\$ 370
	Ditching (S)	\$ 1,850

The Committee has historically applied an '*island factor*' of 30% to the RSMS cost where necessary.

The Committee often starts with a mid-level cost option for each segment and refines options based current the target budget. At this point in the process the Committee usually meets with the paving contractor and discusses its assessment and initial picks for maintenance.

### c. Gravel or Paved?

One of the repair options that could play an important role in Chebeague's current strategy is to revert a paved road to gravel. This could be a viable interim strategy especially on paved roads that are in very poor condition since a well constructed gravel road can be paved relatively efficiently. It could also be a permanent change reducing maintenance costs in the future.

Table 2 lists advantages that MDOT has defined for comparing paved and unpaved roads when they are properly constructed and maintained.

**Table 2 - Paved vs. Unpaved Advantages**

<b>Paved Roads</b>	<b>Unpaved Roads</b>
Carry all water off the surface and into ditches	Have low construction and maintenance costs for very low volume roads
Eliminate dust and Spring mud	Keep vehicles at lower speeds
Accommodate heavy trucks and many vehicles	Can usually be maintained and repaired within a municipal highway department's capabilities
Provide a smoother and safer ride	

<http://www.maine.gov/mdot/community-programs/csd/pavegravelroad.php>

The cost savings is significant. For example, RSMS lists repair options for the short section of pavement on the Landfill Road from the gate to North Road (see Appendix C). The least expensive of 4 paving options is 6.5 times more expensive than reclaiming the pavement and reverting to gravel.

## 5. Asphalt Products and techniques Used on Chebeague.

### a. Hot Mix Asphalt (HMA)

HMA is the product most often used on public roads on the mainland. The emulsion must be at a specific temperature for successful application. This can present logistical challenges on Chebeague. Generally speaking it is the strongest of the products discussed here and produces the smoothest road surface.

For the island its best use is for applications like parking lots and sections where parking along the roadside is common especially by heavy vehicles (like Stone Wharf Road). HMA is more resistant to damage from sharply turning traffic than CMA or chip seal.

### b. Cold Mix Asphalt (CMA)

CMA has been used in most road maintenance on the island since 2010. It produces a smooth road surface and can be shimed to make minor profile adjustments.

Cold mix has an advantage on the island in that it can be stockpiled in advance and doesn't require the emulsion to be at a high temperature. It can ease the logistic challenges that sometimes come with working on an island.

It has the disadvantage of being somewhat softer than HMA and provide less structural strength. The softer nature of the road can also be an advantage for some less stable road beds that may crack thinner applications of HMA.

It is about 10% less expensive than HMA.

### **c. Chip Seal**

Chip is applied as a liquid emulsion coat followed by dry aggregate. It goes down fast; five miles was applied in about 2+ days in 2016. A lot of loose aggregate and dust can be a nuisance to users for several weeks and it really takes a winter-over before the aggregate 'locks in'. The resulting road surface is rougher than CMS or HMA but seems generally acceptable to the community.

The best use of Chip Seal on Chebeague is to applied it within a few years of a new CMA or HMA project. It can be applied as a sealing coat of good quality roads (including gravel roads). The cost is about one-third of CMS.

### **d. In-Place Grinding**

The Town has ground the existing road surface before applying new asphalt in several cases. The Southerly end of School House Road was ground and HMA applied in 2010. The Eastery end of North Road (up to the public safety building) was ground and CMA applied in 2012. The next section of North was simply overlain with CMA in the same year. In both cases the grinding went to a depth of about 6 inches.

The Committee believes that the grinding is best used when the profile of a road needs to be changed. The grinding didn't make a significant difference in these projects because the profile of the road was already acceptable.

## **6. Gravel**

The MDOT Standard Specifications identifies types of gravel for road constructio. Section 706.3 classifies 5 types (A-E) based on grain size. Type A,B & C are for road **base**, particularly under pavement. Types D & E are for road **subbase**, building up a well drained road bed.

### **a. On-Island Gravel Sources**

In 2016 the Town contracted with Sevee & Maher Engineers, Inc (Cumberland, Maine) to evaluate potential gravels sources on the island and an approximate cost to develop them. The findings were presented in a letter report data 1/17/2017.

The report looked at all town properties but focuses on the town owned property Southeast of the corner of North Road and Division roads as the "... property best suited for further analysis."

The estimated amount of gravel on the property, assuming the zoning ordinance could be changed to allow smaller setbacks, was 59,000 cubic yards with an estimated cost of \$35,000 to \$50,000 to permit and develop.

The report included nine grain size analyses that put most of the deposit in the Type E classification. One analysis showed a lesser amount of material that was not suitable for road construction but could be used for winter sand.

In his presentation Mr. Maher indicated that material for the final surface of a gravel road almost always requires processing and is probably best purchased from a mainland provider.

The committee assisted in the logistics and oversight of the study but has made no recommendation regarding the development of an on-island gravel pit.

**b. Gravel Required to support the Road Plan**

Gravel is used to support this plan in re-surfacing and shaping gravel roads, dressing paved road shoulders, preparing roads for resurfacing and repair of damage to the road network.

Based on estimates and assumptions presented in Appendix B the 10-year road plan would require approximately 39,000 cubic yards of gravel. Add another 20% to handle unanticipated use such as storm damage and maintenance of related infrastructure such as access to dry-hydrants and Stone Wharf Parking repairs we arrive at approximately 46,000 cubic yards of gravel to support this 10-year plan.

**c. The Committee’s Strategy for Gravel Roads**

The committee can provide the cost options report from RSMS windshield survey to the Road Commissioner to assist in prioritizing maintenance. However, the committee believes that the evaluation, prioritization of the gravel roads are best addressed by the Road Commissioner and Road Crew and that no analysis or recommendation by the committee is necessary.

**7. Drainage**

Drainage is a common thread in MDOT guidance and portrayed as the most important factor in good road design. This is especially true on Chebeague where there is abundant surface water.

The purpose of ditches, culverts and even paving is to keep water out of the road bed.

The RSMS treats drainage in a general way. The survey classifies drainage on a

Road Name	Culverts on Section
Bar Point Road	3
Cottage Road	11
Division Point Road	1
East Shore Drive	1
Firehouse Road	6
John Small Road	12
North Road	10
Old Cart Road	1
School House Road	1
South Road	17

road section as “good, fair or poor”. The committee has developed a strategy that allows the town to address regular maintenance but recommends technical assistance if substantial changes are required.

#### **d. The Committee’s Strategy for Drainage**

The committee records drainage issues during its windshield survey and will report particular maintenance or repair issues to the Road Commissioner. For any road sections that are recommended for maintenance in an annual plan the committee will assess the drainage based on the following:

- If the drainage needs minor maintenance to support the planned road work then the road crew can address this prior to beginning the work using standard techniques. Minor maintenance include replacing culverts, cleaning and re-shaping ditches within the Town way.
- If the preparation for road work requires major maintenance, drainage re-direction or new drainage paths then the committee may recommend contracting with an engineering firm to resize culverts or ditches.

### **8. Analysis and Maintenance Strategy**

The comprehensive evaluation, assessment and strategic implementation of road maintenance projects can be a very technical process and may require professional engineering skills. The RSMS software along with training, assistance and other resources from MLRC allows non-engineers to make informed decisions and use professional services efficiently.

#### **a. Analysis**

The analysis of the RSMS output involves prioritizing road segments then choosing a repair option based on budget constraints. The guiding principles are:

1. Public Safety
2. Optimal return on dollar investment (timing and preparation)
3. Proximity to public services (importance and use)
4. Testing alternative road surfaces (reverting to gravel or other surfacing materials as interim or permanent steps)

#### Step 1: Using the RSMS OUTPUT

##### First Pass

The task force developed criteria for prioritizing road segment inventory. The criteria are based on the identified *importance* and *traffic* as well as the computed *surface status* based on the survey. The importance and traffic are fairly straightforward in that the emphasis should probably be given to the most important and highly used road sections.

The criteria for prioritizing road sections based on the surface status are a little more complex. Referring back to Figure 4 it is readily apparent that investing in

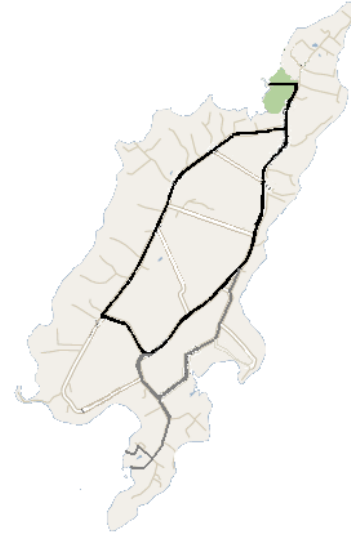
road sections that are in the “Preventative” and ‘Rehabilitate” status categories are probably the best use of limited funding in the long term. However, addressing routine maintenance should not be ignored.

### Second Pass

The first pass at prioritizing yielded a list of road sections that the task force reviewed. The major road sections were driven again and compared with each other to see if the survey yielded results that made sense. Some minor adjustments were made to surveys based on this.

### Third Pass

In the third pass a primary network of roads was divided into four groups roughly based on the idea of traffic and importance that included two ‘loops’. One loop starts at the Stone Wharf runs south on South Road then over School House Road and North on North Road all the way back to South Road. The second ‘loop’ runs from the State Pier at Chandlers over the Casco Bay Landing Road then North on South Road (past John Small, School House and Littlefield) then back on John Small Road all the back to South Road. These two loops can be considered the main roads of the island. The next set of roads are the crossroads between North and South Roads (including Cottage Road, Littlefield, Roy Hill and Firehouse) . The final group are the *cul de sacs* or *dead end* roads that often terminate at the Shore.



### Step 2: Interviewing the Road Crew

Once the road network was prioritized by these relatively academic means it was important to put those results to the “straight face test” by those who know our roads the best; the town road crew. The road crew review serves two important functions: 1) to test the results of the inventory, survey and initial analysis and 2) to identify public safety issues and other issues that might increase the cost of work on a particular section.

### Step 3: Review and site visit from MLRC

A review with the MLRC “Road Ranger” will be able to visit specific trouble spots and either provide engineering solutions or advise that the town should engage professional services to address the problem.

### Step 4: Task Force/Road Commissioner budget review

Steps 1-3 provided important input that enabled the task force and Road Commissioner to work together to develop a budget for each road section that could potentially be addressed in the next several years.

### **b. Maintenance Strategy**

For planning purposes, the Committee assumes all road work is done within the existing footprint of the road.

The strategy used in maintaining our roads has to take into account the current status of the entire road network. The goal is to bring the status of the entire network up to a sustainable level while protecting the best roads by maintaining them properly.

The strategy must also take into account the fiscal status of the town. Established towns often borrow the funds to accomplish large road projects but given our current secession related debt service (in the range of a half million dollars per year) we may want to consider some more creative approaches.

The strategy requires two phases:

Phase I – Slowly improve the paved roads in poor condition while maintaining the best roads.

Phase II – Once all roads are in good condition implement a plan to sustain the road network such that all roads are in Routine or Preventative RSMS maintenance category.

The task forces believes that by: 1) selecting moderate repair options (with respect to cost), 2) focusing on preserving the best roads and 3) lowering the maintenance costs on the worst roads the entire road network will slowly improve with time.

## **9. Schedule**

With nearly half our paved road network in the ‘rehabilitate’ and ‘reconstruct’ categories Chebeague will likely be in ‘Phase I’ for some time to come.

However, the short term schedule was relatively easy to determine for this initial review. It is based on the priority, cost and the type of road repair assigned to each road section. Once the repair strategy was selected the base budget is determined by RSMS. By grouping road sections with similar repair strategies and selecting road sections to meet the funds we have saved in our Capital Plan a proposed schedule quickly becomes evident.

The assumption was made that the town was willing to sustain a certain level of funding and the prioritized list played out in time accordingly.

When the road plan is reviewed next year it may be necessary or desirable to modify the schedule and associated funding. This discussion will likely be a core topic in the annual review of the capital improvement and maintenance plan and associated budget discussions.

The present schedule recommendation is provided in the Road Plan (Appendix D)

## **10. Budget**

The budget recommendation is developed by selecting a strategy from among several options presented by RSMS and examining what measures might need to

be taken to prepare for the work. These costs as well as the “island factor” are added to the budget within the RSMS program.

An important purpose of the annual report is to give the Selectmen a target funding level for the next annual Town Meeting.

The Committee uses both costs from the RSMS software and whenever possible contractor estimates to arrive at a budget recommendation.

The Public Services department performs culvert replacement, ditching, patching and grading as part of its operating budget and they are not included in the 2016 road plan recommendations. Public Services will also be involved in preparing roads for the work recommended in this document.

The Public Services department manages the regular maintenance of the gravel roads and informs the committee of its plans. Public Services has estimated gravel costs as delivered to the island for gravel roads. The materials will be included in capital recommendations but the labor and equipment to maintain the road has not been included or considered in this work.

## **11. Financing**

Funding sources for implementing the plan are limited to:

- Raise funds through tax at the annual town meeting to build the paving reserve account (9050).
- Requesting the annual town meeting to transfer funds from the Undesignated fund balance to the paving reserve account (9050).
- Borrowing money through a municipal bond or private lending institution.

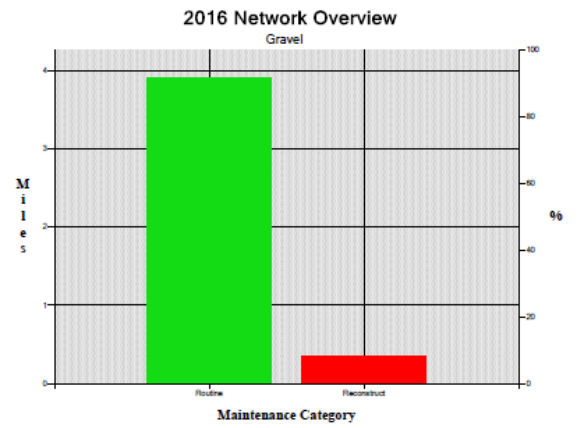
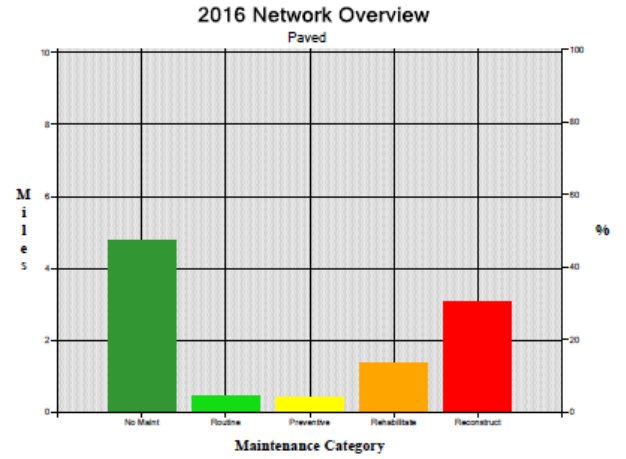
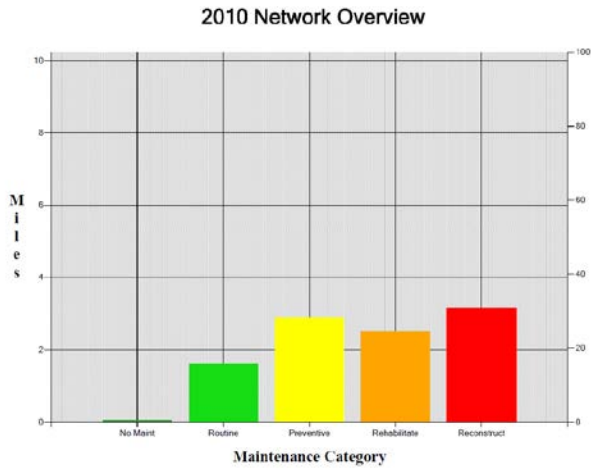
The Committee continues to recommend raising all funds required to implement this plan annually through taxes either directly or by transfer from other funds such as the undesignated fund.

1. Plan to allocate approximately \$175,000 each year for the paving capital account (9050) to implement this plan. Specific annual recommendations may vary.
2. Continue to raise funds in the operating budget to perform the pre-paving work of replacing culverts and the post-paving work of dressing the road shoulder of all newly paved roadways.
3. Supplement revenue raised through taxes each year with a transfer from the undesignated fund balance to the extent it can be done under the current fund balance policy.

## **12. Road Network Status**

RSMS places each paved road segment in one of the following categories: Routine, Preventative, Rehabilitate, Reconstruct. Gravel roads only use Routine and Reconstruct.

The charts below show the road network status from the first survey done in 2010 and a recent survey done in 2016. The charts demonstrate the strategy of the plan to address the roads



### 13. References

Maine Department of Transportation. Road Surface Management System for Maine Towns. Workshop Notebook, Local Technical Assistance Program, 2008.

Maine Department of Transportation. Field Manual, Identification of Road Surface Conditions. Maine Local Roads Center, 2002.

Town of Cumberland. Pavement Management Study for Town of Cumberland, Maine. Casey & Godfrey Engineers, 1999.

Sevee & Maher Engineers, Inc. Gravel Pit Evaluation. Letter Report, 2017

Maine Department of Transportation. Model Grading Specifications for Roads, website: <http://www.maine.gov/mdot/csd/mlrc/technical/gravelrdmaint/gravelrdspecs.htm>. 2017

Maine Department of Transportation, MaineDOT Standard Specifications, Section 703.06 Aggregate for Base and Subbase, website: <http://maine.gov/mdot/contractors/publications/standardspec/docs/2014/div700.pdf>, 2014

**Appendix A. Road Inventory**

A Road Study in 1999 undertaken by the Town of Cumberland identified 30 island roads for a total length of about 12 miles. Of those, 9.1 miles were paved and 2.9 miles were gravel.

The current RSMS database identifies 31 town roads. Actions at Town Meeting in June of 2017 are likely to refine this list slightly as a result of Selectmen's efforts to review the Town's interest in so called 'paper streets'. The refined list identifies about 15 miles of roads; about 10 miles paved and 5 miles gravel.

**Table 3 - Town Road Inventory 2017**

Road or Lot	Paved/Gravel	
Bar Point Road	P	
Bennets Cove Road	G	
Capps Road	G/P	
Caso Bay Landing	P	
Chandler Cove Road	P	
Charleston Road	G	
Cordes Road	G	*
Cottage Road	P	
Division Point Road	P	
East Shore Drive	G	
Fenderson Road	G/P	
Firehouse Road	P	
Indian Point Road	G	
Jenks Road	G	
John Small	P	
Littlefield Road	G/P	
North Road	P	
Old Cart Road	P	
Parking Lot School	P	
Parking Public Safety Bldg	P	
Rose Point Road	G	
Roy Hill Road	G/P	
School House Rd	P	
Soule Road	G/P	
South Road	P	
South Shore Drive	G	
Stone Wharf	P	*
Stone Wharf Road	P	
Transfer Station Road	P	
Waldo Point Road	G	
Willow Street	G	

Notes: (\*) these roads were not identified by Cumberland in 1999. In 1999 Cumberland also identified Sunset Road as a Town road but we believe that road was never accepted and recorded as a town road. Willow street actually appears to fall into this category as well but is left on here because the town has been maintaining it.

For planning purposes (as described in 2b) the committee has divided the paved roads into segments that are approximately one mile each.

**Table 4 - Paved Road Annual Workgroup Segments**

Segment/Name	Section	From	To	Length (miles)	Width (feet)	Import	Traffic
ASW01 North Road 01	1	South Road (East)	Public Safety Bld	0.87	21.00	high	med-high
ASW01 Parking Public Safety Bldg	1	North Road	Public Safety Bld	0.08	30.00	high	low
ASW02 North Road 02	2	Public Safety Bld	School House	0.99	21.00	high	med-high
ASW02 Transfer Station Road	1	North Road	Transfer Sta.	0.06	19.00	high	high
ASW03 South Road	1	Chandler's Cove Rd	.2 mi p school hse	1.00	20.00	high	medium
ASW04 Littlefield Road	1	South Road	Island Commons	0.06	19.00	low	low
ASW04 Roy Hill Road	1	South Road	Summa	0.03	17.00	low	medium
ASW04 South Road	2	.2 mi p school hse	Littlefield Rd	0.20	20.00	medium	medium
ASW04 South Road	3	Littlefield Rd	Roy Hill Rd	0.63	20.00	med-high	med-high
ASW05 South Road	4	Roy Hill Rd	Inn	1.15	20.00	high	high
ASW05 South Road	5	Inn	East Shore Rd	0.35	20.00	medium	low
ASW06 John Small 01	1	South Road (West)	Near Brother Ross'	0.41	19.00	med-high	med-high
ASW06 John Small 02	2	Near Brother Ross'	South Road (East)	0.54	19.00	med-high	med-high
ASW07 Cottage Road	1	North Road	South Road	0.60	18.00	medium	low-med
ASW07 North Road 03	3	School House	Cottage Road	0.57	21.00	low-med	low-med
ASW08 Bar Point Road	1	Division Point Rd	Cul du sac	0.16	20.00	low	low
ASW08 Capps Road	1	South Road	Past C. Doughty	0.13	17.50	low	low
ASW08 Division Point Road	1	North	Division Point	0.36	20.00	low	low
ASW08 Old Cart Road	1	North Road	Cul du sac	0.20	21.00	low	low
ASW08 Soule Road	1	South Road	Johnson's	0.06	14.00	low	low
ASW09 Fenderson Road	1	South Road	J. Dought'y drive	0.19	14.00	low	low
ASW09 Firehouse Road	1	North Road	South Road	0.37	19.00	medium	medium
ASW09 Parking Lot School		7000 square feet		0.02	70.00	high	low-med
ASW09 School House Rd	1	North Road	South Road	0.42	20.00	high	med-high
ASW10 Caso Bay Landing	1	Chandler's Cove Rd	State Wharf	0.05	19.00	med-high	medium
ASW10 Chandler Cove Road	1	South Road	Caso Bay Lndg Rd.	0.18	19.00	med-high	medium
ASW10 Stone Wharf	1	Stone Wharf Road	Easterly Extent	0.13	30.00	high	high
ASW10 Stone Wharf Road	1	South Road	Stone Wharf	0.18	22.00	high	high
TOTAL				9.99			

**Table 5 - Gravel Road Annual Workgroup Segments**

Segment/Name	Section	From	To	Length (miles)	Width (feet)	Import	Traffic
AGW01 Bennets Cove Road-1	1	South Road	Shore	1.00	20.00	high	med-high
AGW02 Capps Road-1	1	Capps end of pavin	Artist Point Road	0.14	14.00	low-med	low
AGW03 Charleston Road-1	1	John Small Road	Waldo Point Road	0.33	12.00	low	low
AGW04 Cordes Road-1	1	North Road	Cul du sac	0.33	10.00	low	low
AGW05 East Shore Drive-1	1	End of South Road	Cul du sac	0.26	20.00	low-med	low
AGW06 Fenderson Road-1	1	End of paved secti	Cul du sac	0.20	14.00	low-med	low-med
AGW07 Indian Point Road-1	1	North Road	Cul du sac	0.27	20.00	medium	medium
AGW08 Jenks Road-1	1	South Road	Shore	0.33	20.00	low-med	low
AGW09 Littlefield Road-1	1	North Road	South Road	0.64	15.00	medium	medium
AGW10 Rose Point Road-1	1	John Small Road	Waldo Point Road	0.33	18.00	low-med	low
AGW11 Roy Hill Road-1	1	North Road	South Road	0.65	20.00	low-med	medium
AGW12 Soule Road-1	1	End of paved secti	Shore	0.17	19.00	low-med	low
AGW13 South Shore Drive-1	1	South Road	Cul du sac	0.23	18.00	low	low
AGW14 Waldo Point Road-1	1	Rose Point Road	Cul du sac	0.14	18.00	medium	low
AGW15 Willow Street-1	1	South Road	Shore	0.08	18.00	low-med	low
TOTAL				5.10			

## **Appendix B. Estimates, Guidelines and Assumptions used in analysis**

### **1. Estimated factors**

#### **a. Yards Of Gravel To Backfill A Mile Of Paved Road Shoulder**

The Committee estimates that typical paving projects would require approximately 400 cubic yards of gravel to backfill a mile of road shoulder after paving (using approximately 2 inches x 24 inches on both sides).

#### **b. Amount of Gravel Required to Maintain a Gravel Road**

A gravel road loses about 1" per year through normal use and erosion. The Committee estimates that it takes approximately 1,000 cubic yards of gravel to add 1" of gravel to a 1 mile by 20' gravel road section.

### **1. Principals and Guidelines**

#### **a. Moving the footprint of a road**

For planning purposes, the Committee assumes all road work is done within the existing footprint of the road, paved or gravel.

**Appendix C.**