

## CHAPTER IX TRAFFIC AND TRANSPORTATION



### IX Section A - Introduction

The intent of Traffic and Transportation chapter is to provide information to assist the Town of Mason in assessing how growth and transportation patterns will impact travel demands, as well as the ability of the existing local system and infrastructure to accommodate those demands. This chapter includes an inventory of the existing highway network in the Town, including highway classification, traffic volumes, roadway conditions, crash statistics and travel patterns. Issues related to transportation and mobility are discussed, including highway policy, travel demand, and alternative modes of transportation. Recommendations to improve the highway network, and mobility in general, are also provided.

### Objectives and Planning Board Recommendations

The Planning Board recommends the following initiatives:

- The Town of Mason should work to maintain a “share the roadway” policy so that pedestrians and bicyclists are able to travel safely alongside vehicles on the roadways. This policy shall also apply to horseback riders. In addition, Mason should promote public education for drivers regarding ‘horse etiquette’ to ensure safe interactions between horses, riders, and vehicle operators on the road.
- The Town of Mason should consider designating space for a commuter parking area to serve people that would like to carpool.
- The Planning Board strongly encourages that the Town of Mason and all its departments work to revive the Capital Improvements Plan (CIP), making sure to allot necessary funds to support the Highway Department and Highway Department projects.

### What has been achieved?

Since the 2007 Master Plan was adopted, the Town has not experienced any drastic transportation-related changes but instead has sustained the existing road system and rural/agricultural character by continuing to enforce the Mason Land Use Regulations.

### What has changed?

The 2019 Master Plan Transportation Chapter update features the following updates since the 2007 chapter:

- Update of objectives and planning board recommendations
- Update of road classifications
- Update of data in all tables and figures
- Incorporation of the change of school districts from the Mascenic Regional School District in New Ipswich to the Milford School District
- Addition of gravel/dirt roads section

## IX Section B - Road Classifications

### State Classification

The State-aid classification system was developed by the state of New Hampshire, as defined by RSA 229 – 231, to determine responsibility for construction, reconstruction and maintenance as well as eligibility for use of state aid funds. The following is a description of the state-aid system:

- Class I, Primary State Highway System, consists of all existing or proposed highways on the primary state highway system, excepting all portions of such highways within the compact sections of towns and cities, provided that the portions of turnpikes and interstate highways within the compact sections of those cities are Class I highways.
- Class II, Secondary State-Highway System, consists of all existing or proposed highways on the secondary state highway system, excepting portions of such highways within the compact sections of towns and cities. All sections improved to the satisfaction of the Commissioner are maintained and reconstructed by the State. All unimproved sections, where no state and local funds have been expended, must be maintained by the Town or city in which they are located until improved to the satisfaction of the Highway Commissioner. All bridges improved to state standards with state-aid bridge funds are maintained by the State. All other bridges shall be maintained by the city or town until such improvement is made.
- Class III, Recreational Roads, consist of all such roads leading to, and within state reservations designated by the Legislature. The NH DOT assumes full control of reconstruction and maintenance of such roads.
- Class IV Highways, consist of all highways within the compact sections of cities and towns listed in RSA 229:5, V. The compact section of any such city or town shall be the territory within such

city or town where the frontage on any highway, in the opinion of the Highway Commissioner, is mainly occupied by dwellings or buildings in which people live or business is conducted, throughout the year. No highway reclassification from Class I or II to Class IV shall take effect until all rehabilitation needed to return the highway surface to reputable condition has been completed by the State.

- Class V, Rural Highways, consist of all other traveled highways, which the town or city has the duty to maintain regularly.
- Class VI, Un-maintained Highways, consist of all other existing public ways, including highways subject to gates and bars, and highways not maintained in suitable condition for travel for five years or more.

The state aid classification road mileage in Mason is summarized in Table 1 and Map 1. There are Class I, II, V and VI type roads in the Town. There are no roads in Mason classified by the state as Class I (primary state highway), Class III (recreational roads), or Class IV (compact section). Approximately, 16.871 of Class V roads are paved, and 22.771 of Class V roads are unpaved.

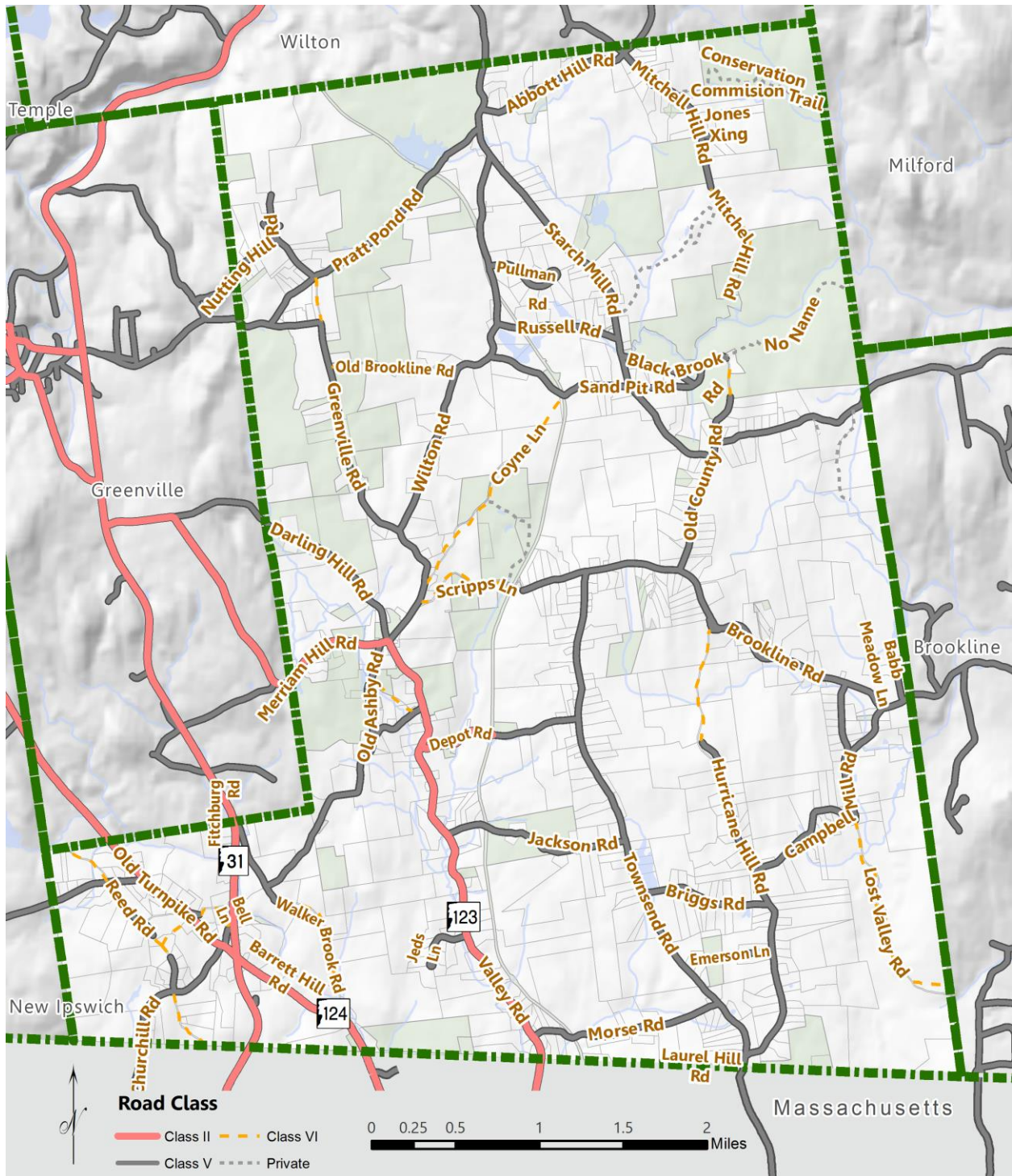
**Table IX-1. State Aid Classification Road Mileage**

State Class	Road Mileage	Percent of Total
Class 0 Private Roads	4.839	7.96%
Class I Primary State Highway	0	0%
Class II Secondary State Highway	7.407	12.19%
Class III Recreation Roads	0	0%
Class IV Compact Section	0	0%
Class V Rural Roads Local	39.642	65.25%
Class VI Un-maintained	8.87	14.60%
<b>Total</b>	<b>60.758</b>	<b>100%</b>

*Source: NH Department of Transportation, 2018*

As shown in Table 1, there is a total of 60.758 miles of roads in Mason. 39.642 miles are Town maintained and 7.407 miles are maintained by the State. Mason has 4.839 miles of private roads. As shown in Map 1, NH Routes 123, 124 and 31 pass through the southwest portion of Mason; these routes are classified as Secondary State Highway (Class II). Route 123 is comprised of Merriam Hill and Valley Roads (3.488 miles), Route 124 is comprised of Barrett Hill and Old Turnpike Roads (2.029 miles), and Route 31 is comprised of Fitchburg Road (1.385 miles). The western portion of Depot Road (0.462 miles; adjacent to Route 123) is also classified as Secondary State Highway (Class II).

Map IX-1. State Aid Classification



## Functional Classification

The New Hampshire Department of Transportation (NH DOT) has defined a second tier for classification of roads in New Hampshire in cooperation with the Federal Highway Administration (FHWA). This scheme classifies roads and highways into different categories according to their functions as well as their source of funding. The Functional Classification scheme was developed to define eligibility for funds under federal programs. The major source of funding for maintenance of minor collector roads and local roads comes from the Town of Mason and the New Hampshire State block grant for roads. The following provides a description of the functional classification system characteristics of a road and highway network:

<u>Functional System</u>	<u>General Characteristics</u>
Principal Arterial	<ol style="list-style-type: none"><li>1. Provides corridor movement suitable for substantial statewide or interstate travels and provides continuity for all rural arterials, which intercept the urban area.</li><li>2. Serves the major traffic movements within urbanized areas such as between central business districts and outlying residential areas, between major intercity communities, or between major suburban centers.</li><li>3. Serves a major portion of the trips entering and leaving the urban area, as well as the majority of the through traffic desiring to bypass the central city.</li></ol>
Minor arterial	<ol style="list-style-type: none"><li>1. Serves trips of moderate length at a somewhat lower level of travel mobility than principal arterials.</li><li>2. Provides access to geographic areas smaller than those served by the higher system.</li><li>3. Provides intracommunity continuity but does not penetrate identifiable neighborhoods.</li></ol>
Collector	<ol style="list-style-type: none"><li>1. Collects traffic from local roads and channel it into the arterial system.</li><li>2. Provides land access and traffic circulation within residential neighborhoods, commercial and industrial area.</li></ol>
Local	<ol style="list-style-type: none"><li>1. Comprises all facilities not on higher systems.</li><li>2. Provides access to land and higher systems.</li><li>3. Through traffic usage discouraged.</li></ol>

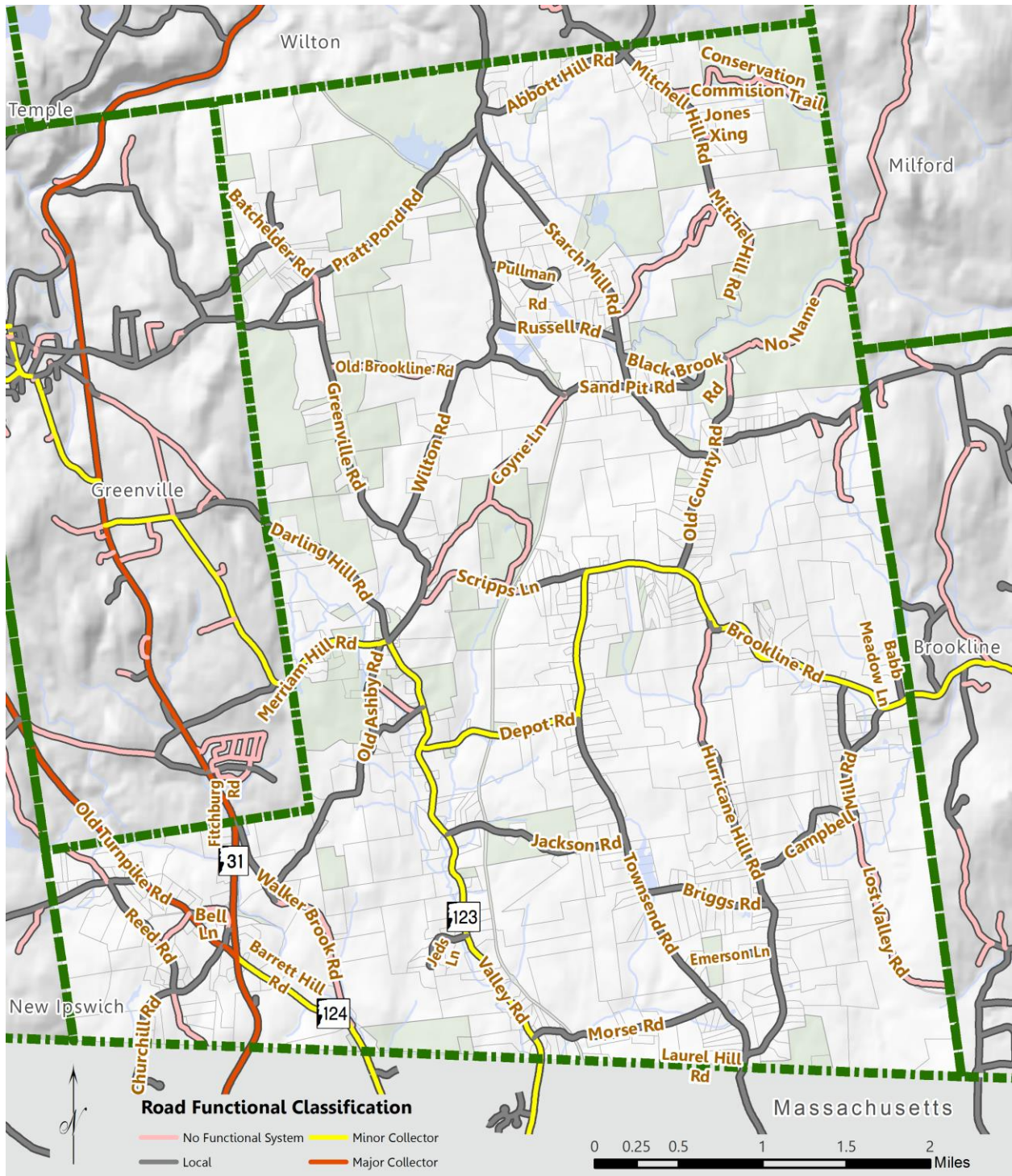
Table 2 provides a summary of the mileage for roads in the Town of Mason based on the NHDOT/FHWA assigned functional classifications, and Map 2 displays the functionally classed road network.

**Table IX-2. Functional Classification of Mason Roads**

State Functional Classification	State Aid Road Classification							
	Class 0 Mileage	Class I Mileage	Class II Mileage	Class III Mileage	Class IV Mileage	Class V Mileage	Class VI Mileage	Totals
No Functional Classification – Private	4.839	-	-	-	-	0.111	8.87	<b>13.82</b>
Principal Arterial - Other	-	-	-	-	-	-	-	<b>0</b>
Minor Arterial	-	-	-	-	-	-	-	<b>0</b>
Major Collector	-	-	2.474	-	-	-	-	<b>2.474</b>
Minor Collector	-	-	4.933	-	-	3.776	-	<b>8.709</b>
Local Roads	-	-	-	-	-	35.755	-	<b>35.755</b>
<b>Total</b>	<b>4.839</b>	<b>0</b>	<b>7.407</b>	<b>0</b>	<b>0</b>	<b>39.642</b>	<b>8.87</b>	<b>60.758</b>

*Source: NH Department of Transportation, 2018*

Map IX-2. Road Functional Classification



## Scenic Roads

Scenic Roads are special town designations of Class IV, V, and VI roads (per RSA 231:157 and RSA 231:158). The designation requires the municipality to obtain written permission of the planning board prior to any repair, maintenance, reconstruction or paving work on the road if such work requires damage or removal of trees, or the removal or destruction of stone walls. Likewise, any utility or other person who wishes to install or maintain poles, conduits, cables, wires, pipes or similar structures must obtain prior written consent of the planning board if the work involves tree cutting or removal of stone walls. Scenic road designation does not affect a municipality's eligibility to receive construction, maintenance or reconstruction aid.

**Table IX-3. Scenic Roads in Mason**

Name	Miles	Date of Designation
Coyne Lane	1.44	1972
Jackson Road	1.13	1992
Scripps Lane	0.40	1972

*Source: Mason Town Reports (Years 1972 and 1992)*

## IX Section C - Existing Transportation Network

### Traffic Volumes

Traffic data for the Town of Mason are compiled by both NH DOT and NRPC. NH DOT collects traffic counts in accordance with federal guidelines under the Federal Highway Performance Monitoring Program. The guidelines describe federal procedures for sampling highway and road volumes. These procedures provide FHWA with highway volumes for design standards and meet the Environmental Protection Agency's (EPA) requirements for estimating vehicular highway travel.

The Nashua Regional Planning Commission (NRPC) also maintains an ongoing traffic count program for validating the region's traffic model. NRPC provides these data to member communities upon request. The location of NRPC traffic counts in Mason are displayed in table 4 with their collection year and Average Annual Daily Traffic (AADT) Value or cars per day. These locations are displayed on Map 3.

Fitchburg Road (NH 31) is the most heavily traveled road in Mason. This road comprises 1.354 miles in the southwest portion of the town, between Greenville, NH and Townsend, MA. Barrett Hill Road and Old Turnpike Road also have significant traffic volumes; these roads comprise NH 124 (1.962 miles) as it passes through the southwest portion of Mason between Greenville, NH and Townsend, MA.

Per the Highway Performance Monitoring System Field Manual, traffic counts on local roads should be based on a six-year counting cycle. Table 4 summarizes both historical and current traffic counting data, and Map 3 illustrates the counting locations.



**Table IX-4. Average Annual Daily Traffic (AADT), 2008-2016**

Traffic Count Location	2006	2019
Brookline Rd at Brookline Town Line	1515	1363
Townsend Road North of Hurricane Hill Road	371	253
Greenville Rd at Greenville Town Line	256	171
Abbott Hill Rd at Wilton Town Line	474	398
Wilton Rd North of Pullman Rd	-	148
Starch Mill Rd North of Russell Rd	-	169
Hurricane Hill Rd North of Briggs Rd	-	190

*Source: Nashua Regional Planning Commission*

It should be noted that Mason changed from the Mascenic Regional School District (New Ipswich) to the Milford School District effective in 2009. This change impacted existing travel patterns, especially in the northern area of the Town on roads such as Abbott Hill Road, Starch Mill Road, and Wilton Road.

As depicted in Table IX-4, traffic volumes have decreased at all counting locations from 2006 to 2019. There are many transportation influencing factors that could cause a decrease in traffic volumes. One possible explanation is that Mason has an aging population, which could mean that there are less people commuting to work. Behavioral changes, such as increasing popularity in carpooling or telecommuting, could also impact average annual daily traffic. Fluctuations in school enrollment numbers year to year will also impact traffic volumes. It is also important to note that counts in 2006 were conducted by the Southwest Region Planning Commission and not by the Nashua Regional Planning Commission, so there could be some minor discrepancies caused using different equipment. NRPC will continue to conduct traffic counts in the locations depicted in Table IX-4 in the future upon request of the Town of Mason to establish better trend data.

### **Level of Service**

Using the observed traffic count data, it is possible to evaluate the performance of highway facilities using a highway capacity analysis. The purpose of this analysis is: to estimate maximum traffic volumes that can be accommodated by a given facility, to provide tools for improving of existing facilities, and for planning and designing future facilities.

“Level of Service” (LOS) denotes the type of operating conditions on a roadway or at an intersection for a given period, generally a one-hour peak period. LOS is a quantitative measure that incorporates several operational factors including road geometry, travel delay, freedom to maneuver, and safety. Level of service categories for roadway segments and descriptions are explained below.

Level of Service “A” represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

Level of Service “B” is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is still relatively unaffected.

Level of Service “C” is in the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. Occasional backups occur behind turning vehicles.

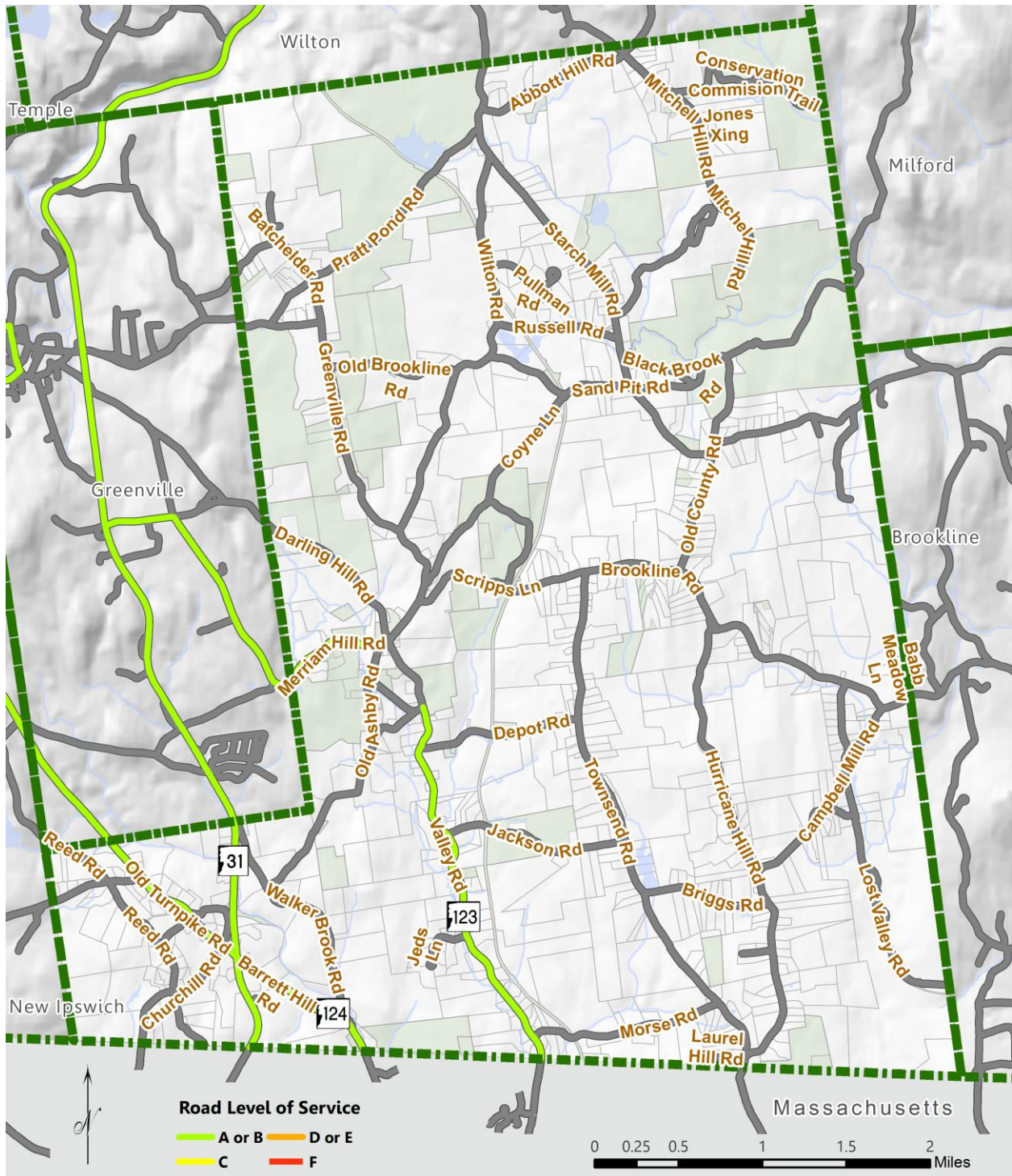
Level of Service “D” represents high-density, but stable, flow. Speed and freedom to maneuver are restricted, and the driver experiences a below average level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level of Service “E” represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform level. Freedom to maneuver within the traffic stream is extremely difficult and is generally accomplished by forcing other vehicles to give way. Congestion levels and delay are very high.

Level of Service “F” is representative of forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount, which can traverse the point, resulting in lengthy queues.

Map 3 shows the level of service on state-maintained roadways in Mason. NH Routes 31, 24, and 123 are all rate A or B.

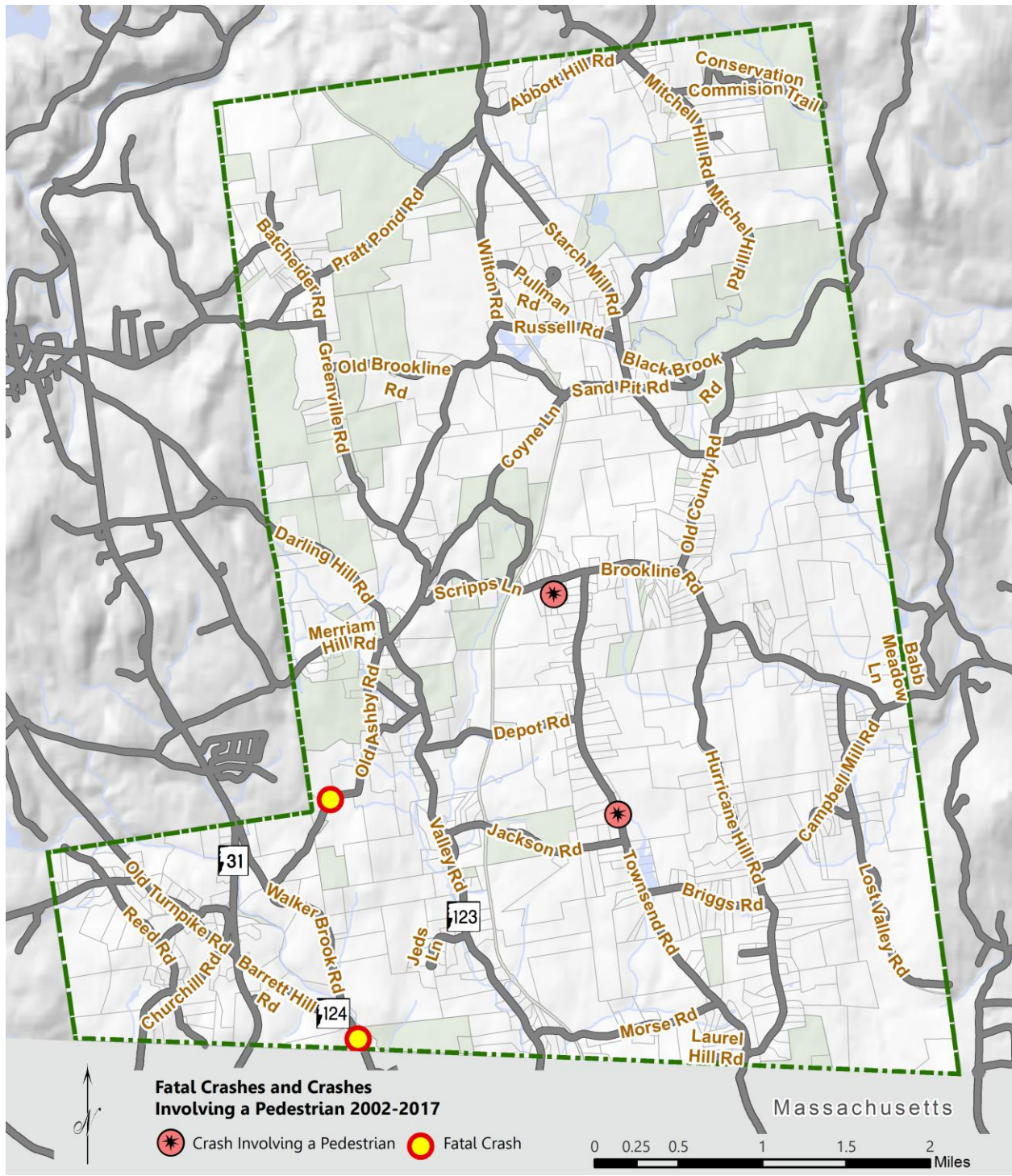
Map IX-3. Level of Service on State Maintained Roads



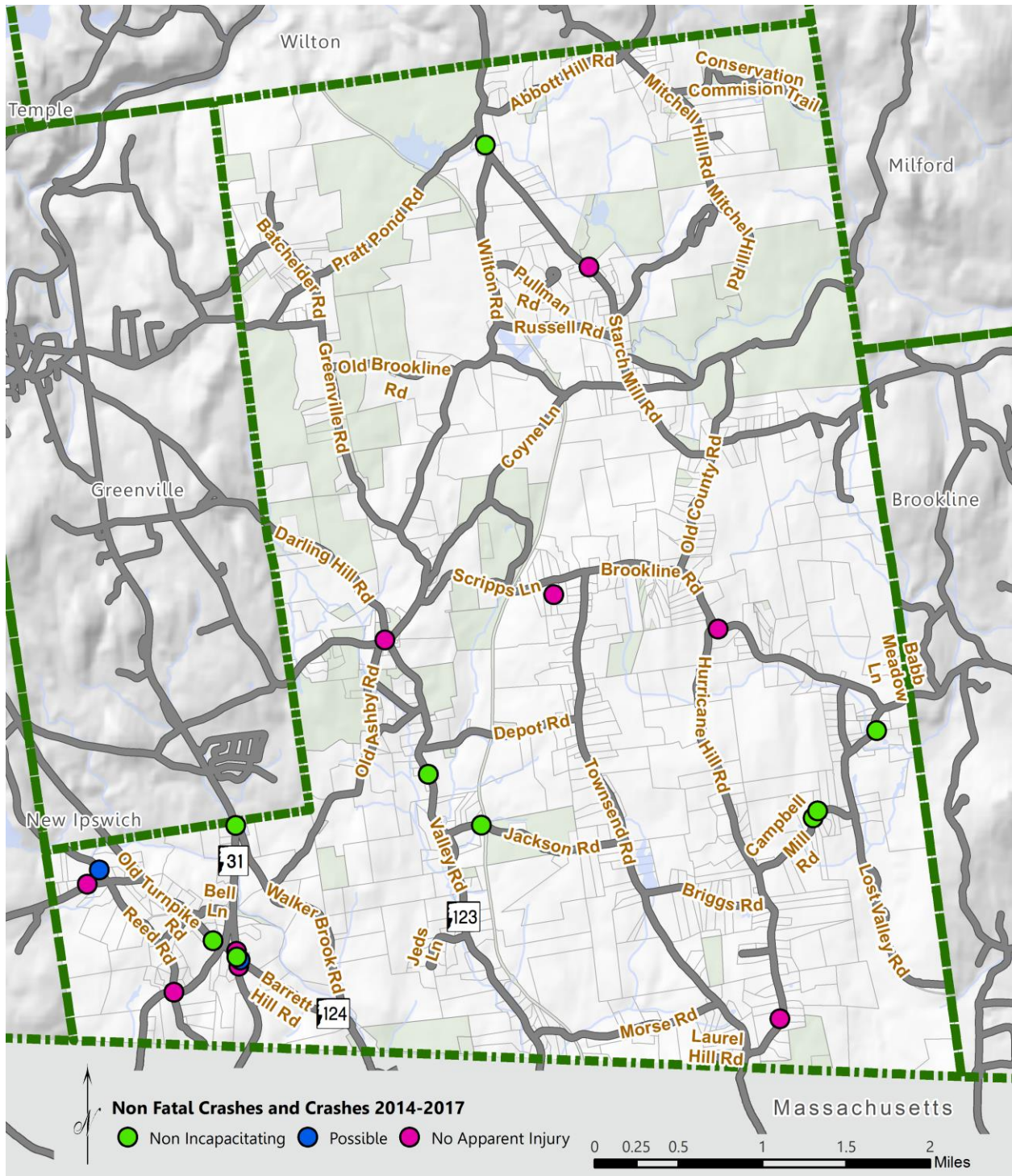
## **Crashes**

All locatable automobile crashes from 2002 to 2017 in the state of New Hampshire are compiled by the NH Division of Motor Vehicles based on local police reports. This database reveals that 167 occurred in Mason. Two crashes involved a fatality, six crashes resulted in an incapacitating injury, and two crashes involved a pedestrian. The primary cause of crashed in Mason was hitting a fixed object, followed by colliding with another vehicle. Map 4 shows the location of the two fatal crashes and the two crashes involving a pedestrian. Map 5 shows nonfatal crashes in Mason from 2014 to 2017 coded by their level of severity.

Map IX-4. Fatal Automobile Crashes and Crashes Involving a Pedestrian



Map IX-5. Non-Fatal Automobile Crashes 2014-2017



### Pavement Conditions

New Hampshire DOT collects information about paving condition using an advanced road condition survey vehicle. Some routes, like Interstates and those on the National Highway System are surveyed every year. Other routes are surveyed every other year with numbered routes collected during odd numbered calendar years and unnumbered collected during even numbered calendar years.

The condition of the road is determined by its roughness. The International Roughness Index measures the vertical movement, or bumpiness, that occurs along a route. It is an important value because it measures what the driver feels. As the road ages and distresses increase, the bumpiness and IRI increases.

Since roads are surveyed during the Spring/Summer/Fall months which coincides with the construction season, the data may not reflect all the paving that occurred each collection year thus the condition may not accurately reflect the current condition.

### Culvert Conditions

There are no bridges in Mason, however there are many culverts incorporated in the transportation network. In 2011 some local Eagle Scouts collaborated and surveyed all the culverts in the Town of Mason for a project. This ended up becoming a massive undertaking in which 283 separate culverts were located and identified. The scouts found that culverts overall were in good shape where only a few had significant structural damage. However, many were noted to be clogged with leaves and needed to be cleaned out.

In addition, the Mason road agent also stated that several culverts are prone to flooding. These include the Depot Road culvert at the fire station, the Wilton Road culvert at Sand Pit Road, the culvert at the Starch Mill Road and Abbott Hill Road intersection and the Townsend Road culvert near Jackson Road.

### Travel Patterns

In 2009, the Town of Mason formally changed school districts, from the Mascenic Regional School District based in New Ipswich, NH to the Milford School District based in Milford, NH. This change significantly impacted travel patterns. Prior to 2009, roads making a western connection to Greenville and beyond were heavily used by residents, especially State Route 123 (Merriam Hill Road), State Route 124 (Old Turnpike Road), State Route 31 (Fitchburg Road), and Greenville Road. After switching to the Milford School District, local roads in the northern part of Town began seeing heavier traffic, particularly Abbott Hill Road, Starch Mill Road, and Wilton Road.

### Aviation

The airspace in Mason is designated as a practice area for single engine planes by the Federal Aviation Administration (FAA). The Town is home to two privately owned airfields. The Mason Airfield (NH76) is located off Old Ashby Road and has one paved runway. The Zim Airport (NH17) is located on Campbell Mill Road and has



one turf runway. Both airfields are short takeoff and landing (STL) and are visual flight rules (VFR) only. The above image is of an aeronautical chart showing the Mason Airfield and Zim Airport.

## **IX Section D - Regional Transportation Issues**

Mason is not part of the Nashua, NH--MA Urbanized area or the Boston Urbanized Area, so regional transportation matters do not have much of an impact on the Town. However, the Town of Mason is a member of the Nashua Regional Planning Commission, which is also a Metropolitan Planning Organization (MPO). An MPO is a policy board designated by agreement between the governor and local governments for the purpose of executing the federal metropolitan transportation process. So, Mason is eligible for state funding from NRPC's Ten Year Plan (TYP) for any eligible transportation projects. Project application rounds occur in the fall of each year.

## **IX Section E - Alternate Modes of Transportation**

### **Public Transportation and Paratransit**

The Town of Mason has no public transportation network. However, Mason contracts with the Community Volunteer Transportation Company (CVTC) for \$500.00 a year. CVTC provides free transportation to residents who do not have access to a car due to age, ability, economics, or other circumstances. Residents can also contact CVTC and become a volunteer driver. To get a ride or become a volunteer driver, call 1-877-428-2882, ext. 5.



## **IX Section F - Other Transportation Issues**

### **Unpaved Roads**

The life of a road depends on the number of vehicles as well as the weight of the vehicles that use it. There is a direct correlation between road life and average daily traffic volumes (ADT), as a road will generally deteriorate faster as the ADT increases. Typically, once ADT reaches 400-500 vehicles per day, the road should be considered for paving. The two tables below show hypothetical costs for maintenance of gravel roads and hypothetical costs for three common pavement options, put together by the Kentucky Transportation Center.



**Table IX-5. Cost of Maintenance for Gravel Roads over a 6-Year Period (Hypothetical)**

YEAR	1	2	3	4	5	6	TOTALS
<b>GRADING</b>							
Equipment	270	280	290	300	310	320	1,770
Labor	90	100	110	120	130	140	690
<b>REGRAVEL</b>							
Materials	–	–	4,000	–	–	–	4,000
Equipment	–	–	2,500	–	–	–	2,500
Labor	–	–	2,300	–	–	–	2,300
<b>STABILIZATION/DUST CONTROL</b>							
Materials	800	900	1,200	920	950	975	5,745
Equipment	30	35	70	40	50	60	285
Labor	100	110	150	125	140	150	775
<b>Totals</b>	<b>1,290</b>	<b>1,425</b>	<b>10,620</b>	<b>1,505</b>	<b>1,580</b>	<b>1,645</b>	<b>\$18,065</b>

Source: Gravel Roads: Kentucky Transportation Center, University of Kentucky at Lexington, KY. "Maintenance and Design Manual, Appendix D: When to Pave a Gravel Road." [https://www.epa.gov/sites/production/files/2015-10/documents/2003\\_07\\_24\\_nps\\_gravelroads\\_appd\\_0.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/2003_07_24_nps_gravelroads_appd_0.pdf)

**Table IX: 6. Three Pavement Options: Estimated Costs and Lifespan (Hypothetical)**

Option	Life	Cost Per Mile	Cost/Mile Per Year	Calculations	Maintenance Per Mile/Year
Chip Seal-Double Surface Treatment	6 yrs.	\$20,533	\$3,422	Based on price of \$1.75 per sy; 20 ft. wide x 5,280 ft. = 105,600 sf 105,600 sf ÷ 9 = 11,733 sy \$1.75 = \$20,533	?
Bituminous Concrete-Hot Mix	12 yrs.	\$58,080	\$4,840	Based on estimated price of \$30 per ton; 1 sy of stone and hot mix/cold mix 1" thick weighs about 110 lbs. Therefore 3" = 330 lbs. per sy. 11,733 sy (1 mile of pavement) ÷ 330 lbs. = 3,871,890 lbs. 3,871,890 lbs. = 1936T × \$30 = \$58,080	?
Cold Mix	8 yrs.	\$48,390	\$6,048	At \$30 per ton, using same formula as hot mix, 2 1/2" of cold mix equals 1,613T × \$30 = \$48,390	?
*These costs must be determined before any conclusions can be reached regarding the most cost-effective pavement method. The thinner the pavement, the greater the maintenance cost. Traffic, weather conditions, proper preparation before paving and many other factors can affect maintenance costs. No Kentucky data exists upon which to base estimates of maintenance costs on low volume roads of these paving options; and, therefore, we offer no conclusion as to the "best" way to pave.					

Source: Gravel Roads: Kentucky Transportation Center, University of Kentucky at Lexington, KY. "Maintenance and Design Manual, Appendix D: When to Pave a Gravel Road." [https://www.epa.gov/sites/production/files/2015-10/documents/2003\\_07\\_24\\_nps\\_gravelroads\\_appd\\_0.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/2003_07_24_nps_gravelroads_appd_0.pdf)

Some additional maintenance costs per mile of paved road over a 6-year period could be<sup>1</sup>:

- Patching - \$1,800
- Striping - \$500
- Sealing - \$2,000

<sup>1</sup> Kentucky Transportation Center, "Gravel Roads: Maintenance and Design Manual, Appendix D: When to Pave a Gravel Road" (University of Kentucky at Lexington, KY, 2015), [https://www.epa.gov/sites/production/files/2015-10/documents/2003\\_07\\_24\\_nps\\_gravelroads\\_appd\\_0.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/2003_07_24_nps_gravelroads_appd_0.pdf).

Out of Mason's 60.76 miles of roads, 21.53 miles, (almost half) are unpaved. Historically, all dirt roads have been maintained as part of the Mason Town Budget. However, now that population has increased and local dirt roads are becoming more travelled, maintenance is becoming an issue. In addition, during the springtime the dirt roads become extremely muddy and soft with the snow thaw and spring rain. Some roads even become impassible.

In response to rising maintenance costs, the Mason Board of Selectmen are looking to create a Dirt Road Committee to investigate if the Town should simply allocate more funds for maintaining the existing dirt roads as is, use different materials for unpaved roads, or change tracts and work towards paving the dirt roads. Currently, the Board of Selectmen are seeking proposals regarding the Dirt Road Committee.

### **Areas of Concern**

The intersection of State Route 31 and State Route 124 statistically has the most accidents of all areas in the Mason road network. Town officials have been looking for funding to improve this intersection due to how dangerous it is with frequent recurring accidents.

### **IX Section G – Conclusion**

The transportation system has a significant impact on patterns of land development and the spatial layout of a community. The Town of Mason strongly identifies with its scenic and rural character, so it is crucial to balance any growth and improvement of transportation infrastructure with preservation moving forward.

