

## MEMORANDUM

**To:** Lance P. Larned, Superintendent  
Town of Rowe Highway Department  
8 Sibley Road  
Rowe, MA 01367 *SL*

**From:** Scott Carpenter, P.E. & Andrew Leenhouts

**Date:** August 15, 2019

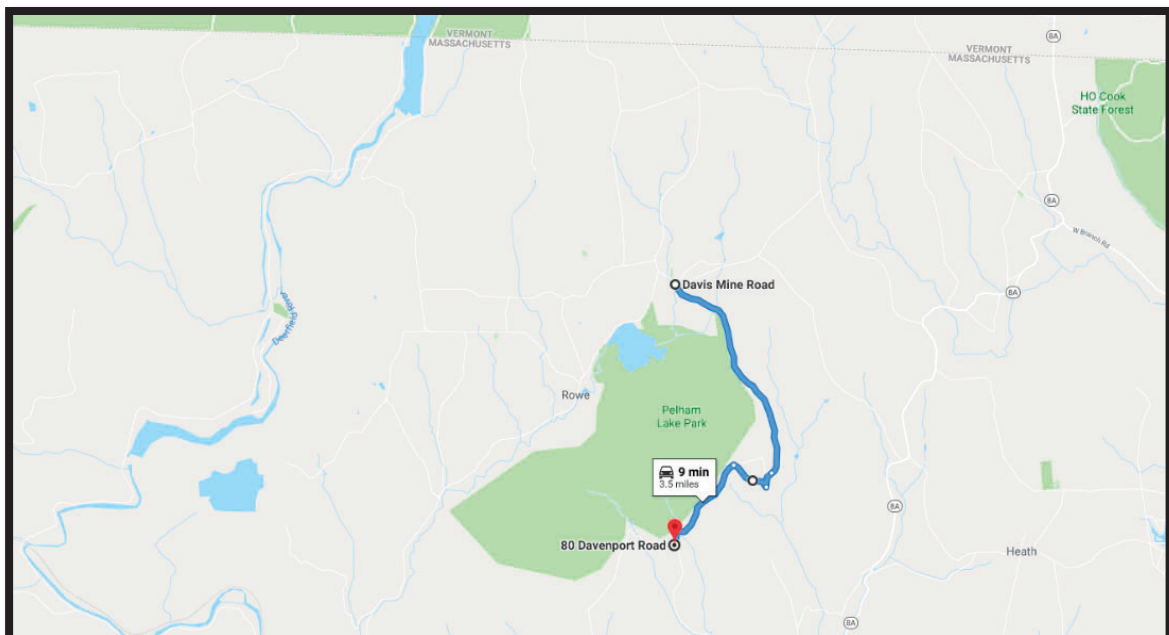
**Re:** Davis Mine/Davenport Road

### Introduction

Gill Engineering Associates, Inc. (Gill) was retained by the Town of Rowe (the "Town") to undertake a visual condition assessment of Davis Mine / Davenport Road and provide alternatives or recommendations for improvements.

### Background

Davis Mine / Davenport Road is a two-way town owned roadway that is located in the southeast section of Town. It is classified as a Rural Local roadway. The AADT is approximately 350 vehicles per day. It is a gravel road with no shoulders and the width is approximately 10 feet. Existing roadside ditches and cross pipes convey drainage. The terrain is generally level and rolling terrain. The length of the road is 3.5 miles from Cyprus Stage Road to the north and Tatro Road to the South.



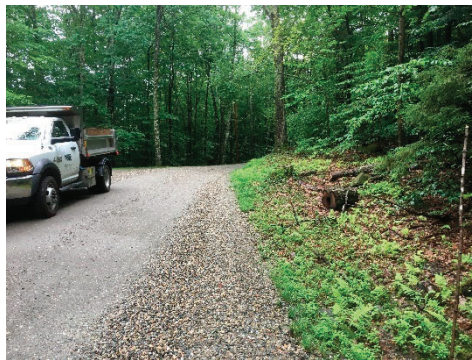
The roadway travels around the east side of Pelham Lake Park and provides direct access to residences along the route. It has been suggested that the traffic volumes have increased in recent years due to an increased number of visitors to the area and “mudding/joy-riding” during the mud season.

The Town operates and maintains the road. Regular maintenance includes:

- Spring & Fall – regrading and re-graveling
- Cleaning out ditches and drain pipes
- Removing the roadway crown prior winter plowing
- Spot repairs involving cutting into full depth of holes and adding gravel
- Placement of stone to address emergency surface issues
- Trimming Vegetation

### **Observations**

On July 23, 2019, a representative from Gill Engineering visited the 3.5-mile roadway with Lance P. Larned, Highway Department Superintendent to observe the condition of the road. While much of the problem locations have recovered from the mud season, the following were identified as areas of high concern:



- **Mud-season rutting:** *Rutting that developed during the mud season required emergency repairs. Stone used to help make the roadway passable has loosened from roadway and can be seen collected along the edge of the road. Rutting and other roadway deficiencies are largely due to poor drainage and the freeze thaw cycle occurring during the spring/mud season.*



- **Standing water:** *Standing water at the edge of roadway highlights the importance of proper ditch maintenance and design. This is especially important before the winter/spring months when the freezing and thawing of trapped water can cause roadway heaving. Some areas with slate have made the recommended 2'-3' depths difficult to achieve.*

Further investigation in these localized areas would be recommended to determine existing soil and road structure conditions to identifying cause of the road failure. This could be undertaken by test pitting with an excavator or drilling bore holes.

We understand that there is no weather protection for the stockpiles of gravel, which is used to repair rutting that can result from high drainage flows, such as occurred this past winter. Protecting the gravel from weather is important because it maintains the gravel in a dry condition that will not freeze during the winter, making the material fully available for repairs throughout the winter months.

### **Rehabilitation/Reconstruction Alternatives**

The following alternatives for improvements should be considered when the Town is forecasting future maintenance, upgrades, and reconstruction program(s):

#### **Do Nothing Alternative:**

This alternative would not make any specified improvements to the existing roadway. Regular maintenance by town forces would continue and consist of actions performed during prior years.

#### **Full Roadway Reconstruction Alternative:**

This alternative would completely reconstruct the existing roadway sub-base, base, and surface by removing and replacing or reclaiming the existing roadway. Proper drainage features would be included, and any other safety concerns could/would be addressed. Full depth pavement with an aggregate surface course or a hot mix asphalt top course could be constructed.

#### **Isolated improvements and added schedule maintenance activities:**

- Spot repairs at select locations. Locations identified during the site visit that are in need of special attention include:
  - Mud season rutting: Excavating to quality subgrade material and rebuilding the roadway using a grid and fabric will improve conditions. Fabric will keep silt and clay from being pumped from the subgrade into the gravel material. When several inches of gravel are required, a grid should be used at 6" or 12" intervals.
  - Standing water: 2'-3' ditches are recommended. Raising the roadway profile can be a method for creating ditches. Adding material to the roadway followed by proper compaction and grading will allow for deeper more defined ditches. Ditches should have a profile that provides positive drainage along the roadway until there is a proper outlet for water away from the roadway.
- Additional scheduled maintenance activities:
  - Calcium Chloride: Calcium Chloride applications will prevent particles from leaving the roadway structure and help solidify the unpaved roadways. Follow manufacturer directions for application.
  - Ditch Maintenance: This item is currently being performed but continuing to maintain ditches is important for draining surface water. This includes clearing the edge of roadway of any "dams" that may have developed over time. Ditches should be clear before the first snowfall every year.
  - Use Well-Graded Gravel for Emergency Repairs: Materials placed during emergency situations will become a part of the roadway structure during the regrading process. Well-graded gravel is the preferred repair material.
  - A storage facility or covered shed should be constructed to protect gravel stockpiles in a dry condition, making them fully accessible during the cold winter months.

## **Costs**

For planning purposes, budget level costs for the improvement alternatives are as follows. Please note that these are rough estimates that should be refined after a detailed improvement program is developed.

### **Do Nothing Alternative:**

No added cost beyond the current recurring costs for on-going routine maintenance activities such as grading, pothole repair, shoulder grading, ditching and drainage maintenance.

### **Full Roadway Reconstruction Alternative:**

An estimated cost for full roadway construction is in the range of \$2 million for an asphalt roadway and \$1 million for an aggregate surface roadway. For budgeting purposes, a design fee equal to 10%-15% of the construction cost should be added.

### **Isolated improvements and added schedule maintenance activities:**

Cost to repair select locations with full removal and replacement of existing roadway and sub-base can be estimated at \$5 to \$7 per square foot, or \$200k for roughly a half mile of reconstructed roadway.

The application of Calcium Chloride to the entire length of roadway can be estimated at \$5,000 per application.

Gravel for usage in emergency repairs can be estimated at \$10,000 to \$20,000 per year. The cost for providing weather protection should also be considered.

## **Closing**

We trust that this meets your needs at this time. If you have any further questions or concerns, please do not hesitate to contact us.