

Maintaining Unpaved Roads

A Case Study of Unpaved Roads in Barrington and Rochester NH

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Introduction

- Many roads in New England experience drainage issues that contribute to **road layer separation and loss of serviceability**.
- Swain Road in Barrington NH and Efab Lane in Rochester NH** are the focus of a case study on unpaved roads that face similar conditions in the mud season.
- The goal of this project is to **provide the most cost efficient repair and maintenance solutions for residents of unpaved roads experiencing serviceability issues**. Residents of class VI roads are faced with paying for repairs themselves.

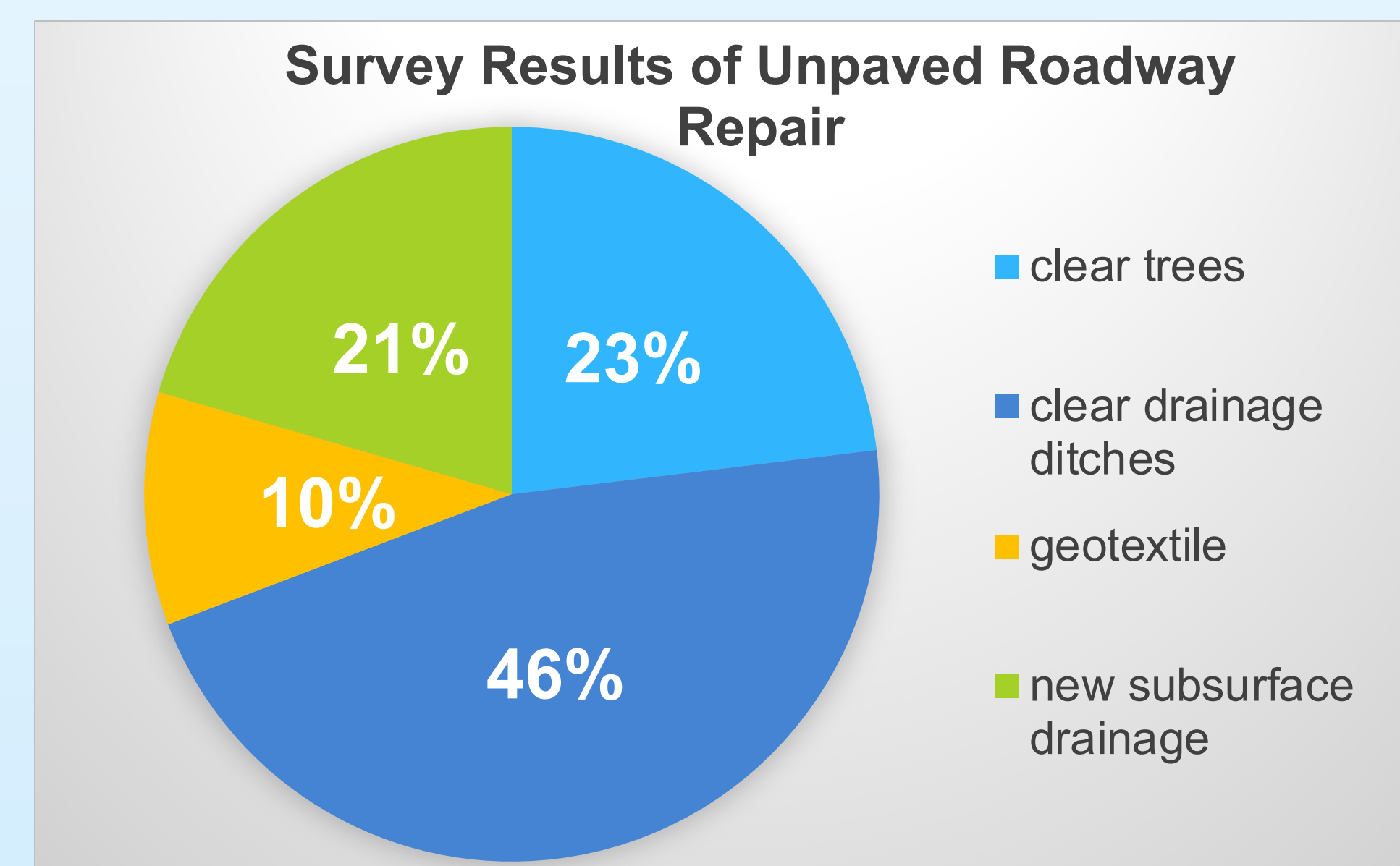


Methods

- The FHWA *Gravel Roads Construction and Maintenance Guide* was used to inform the construction and maintenance of unpaved roads. USDOA manual *Environmentally Sensitive Road Maintenance Practices for Dirt and Gravel Roads* provided drainage systems and alternative methods.
- In-person observations** of each road and consultation with Barrington Town Administrator Conner MacIver, and road agent Marc Moreau has provided the greatest insight for the project team's recommendation.
- The project team **surveyed twenty-one local transportation agents and town officials** to find which maintenance and repair practices are most common in New England towns and their approximate cost. These results will help the project team refine the recommendation for residents living on unpaved roads with similar issues in the mud season.

Discussion of Alternatives

- An **underdrain** is a network of pipes that collect water and transport it out of the system. Underdrains provide similar engineering functions to geotextiles, but are often more expensive and rigorous to install.
- Liquid calcium chloride** can be used with the new aggregate layer to bind the road together and help to resist deterioration from the freeze-thaw cycle.
- Calcium magnesium acetate** and **potassium acetate** are two chloride alternatives to salting roads as a method deicing. These two substances are more expensive but will have less of a negative impact on the road structure and the surrounding environment.
- Paving the road** is an option, but it would be very expensive for the residents. Both roads pass through wetland environments where impervious soil makes drainage difficult for paved roads.
- It should be noted that both graphs show the percentage of which measures are taken by **local towns under a strict budget**. The project team is providing a recommendation of the **ideal repair and maintenance** to prolong the lifespan of the roadway.

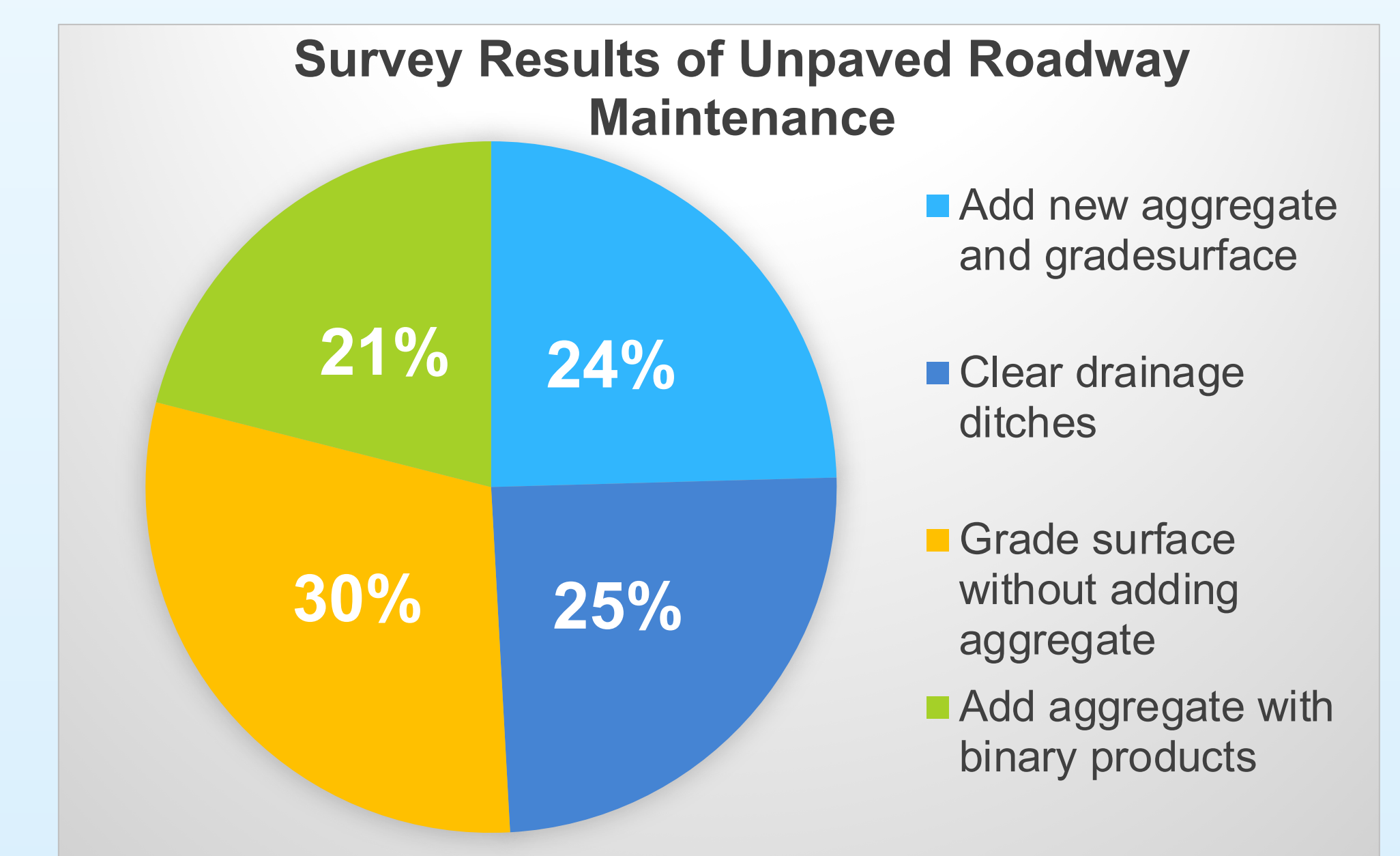


Acknowledgements

The project team would like to thank Jack Dibb, sponsor of Swain Road and Robert Henry, sponsor of Efab Lane.

Recommendation

- The project team finds a **geotextile** to be the most effective drainage structure for both roads, while also cost efficient and easy to install.
- A **US 250 geotextile** is a **woven slit-film** road fabric used for its drainage properties as well as structural capabilities and road layer separation.
- It is recommended that the road surface is excavated in order to install a **foot of well-graded aggregate** on top of this geotextile. Excavated aggregate can be reused.
- It is recommended to **clear the drainage ditches** and take down any trees that interfere with the drainage and drying of the road.
- Once the road is repaired it is recommended to **grade the surface without adding aggregate** and clear drainage ditches as standard maintenance. When aggregate is laid on a compacted road surface a majority of it ends up in drainage ditches and runoff.



References

“Environmentally Sensitive Maintenance for Dirt and Gravel Roads.” *EPA*, Environmental Protection Agency, 26 Oct. 2016, www.epa.gov/nps/environmentally-sensitive-maintenance-dirt-and-gravel-roads.

“Gravel Roads Construction and Maintenance Guide.” *U.S. Government Bookstore*, 3 Mar. 2020, bookstore.gpo.gov/products/gravel-roads-construction-and-maintenance-guide.