UNH T2 TECHNICAL ASSISTANCE BULLETIN

Frost Heaves, Gravel Roads & Seasonal Weight Limits

WHY THIS MATTERS

New Hampshire's freeze–thaw cycles reduce pavement and gravel road structural strength during spring thaw. Saturated base materials lose bearing capacity, making roads highly vulnerable to heavy vehicle damage.

Unmanaged spring loading can result in:

- Base pumping and rutting
- Frost "pockets" (also known as frost boils) on gravel roads
- Accelerated pavement failure
- Increased long-term capital costs

LEGAL AUTHORITY- SEASONAL WEIGHT LIMITS

Under **RSA 231:191–191-a**, municipalities may temporarily restrict vehicle weights on Class IV and V highways during thawing or special conditions to prevent road damage.

GOVERNANCE REQUIREMENTS

The **Board of Selectmen (or City Council)** must authorize seasonal weight postings. Authority may be formally delegated in writing to a designee, (i.e. Road Agent, DPW Director, etc.), and delegation should be recorded in meeting minutes. Posting and removal dates should be documented.

ADMINISTRATIVE BEST PRACTICES FOR POSTING ROAD WEIGHT LIMITS

Provide public notice via Town Clerk, municipal website, and available print or social media. Notify emergency services, fuel providers, and contractors, and coordinate with local law enforcement for enforcement. Maintain documentation for liability protection.

Monitoring and Removal of Postings

During spring thaw, gravel roads are especially vulnerable due to:

- Saturated subgrades
- Loss of shear strength
- Frost boils
- Rutting from heavy vehicles
- Reduced crown and drainage

Conduct daily review during thaw, including to inspect all culvert crossings as well as roadway and roadside. Monitor heavy truck corridors closely.

Remove restrictions when subgrade strength recovers.

BEST MANAGEMENT PRACTICES FOR MANAGING THAW

- Push snow embankments beyond the shoulders and to the ditch lines where able, so snow melts into ditches. Open blocked ditch outlets immediately.
- Post reduced load limits early and restrict heavy hauling where feasible.
- Maintain minimum 4% cross slope.
- Avoid grading when roads are fully saturated.
- For temporary frost pocket or soft spot response, assist the area in drying (through raking) and install course gravel or stone to bridge weak zones.
- Inspect known weak segments daily.

LONG TERM

Correction

- Excavate to firm subgrade.
- Install geotextile separator fabric.
- Replace with well-graded gravel.
- Improve undrain and drainage.

Prevention

- Improve ditch depth and outlet function.
- Install underdrains where necessary.
- Stabilize chronic frost heave segments.
- Incorporate weak sections into Capital Improvement Planning (CIP).

TEMPORARY HAZARD WARNING & MOTORIST NOTIFICATION

When significant frost heaves or sudden roadway irregularities develop, temporary warning measures may be appropriate to alert motorists.

Examples include:

- Temporary “BUMP,” “ROUGH ROAD,” or similar warning signs installed in accordance with MUTCD guidance and appropriate sign placement safety considerations
- Cones, delineators, or temporary markers
- Reduced speed advisories where conditions warrant

Providing advance warning helps reduce crash risk and allows motorists time to adjust speed and vehicle control when approaching sudden pavement changes.

New Hampshire law also recognizes a municipal responsibility to respond to roadway hazards once they are known. Under RSA 231:90–92 (sometimes referred to as the “highway insufficiency” statutes), municipalities are expected to address hazardous roadway conditions or provide appropriate warning to motorists once a condition has been identified. The New Hampshire Municipal Association (NHMA) may provide resources and guidance on municipal responsibilities under these statutes.

CITIZEN COMMUNICATION TOOLKIT

WHY ARE ROADS POSTED IN THE SPRING?

Each spring, as frost leaves the ground, road bases become saturated with water. When that happens, roads temporarily lose strength. A truck that causes little damage in July can cause significant structural damage in March or April. Seasonal weight limits protect the

road structure during this short but vulnerable period. Posting roads is a cost-control and infrastructure protection measure.

Without temporary restrictions, damage can occur that leads to:

- Deep ruts and potholes
- Frost “pockets” or soft, muddy areas (also known as “frost boils”)
- Premature pavement failure
- Higher long-term repair costs funded by taxpayers

WHAT IS A FROST “HEAVE” AND A FROST “BOIL”?

Pockets or layers of water embedded in the road can freeze and force the roadway “up”, causing a frost heave (a raised bump), possibly even causing cracking in pavement. After the road thaws, forst heaves on paved roads may result in a sunken area of pavement. Later, when the ground thaws, trapped water weakens the soil below the surface of the road. On gravel roads, this can cause soft, unstable areas known as “frost boils.” These sections may look muddy, uneven, or unstable. Heavy vehicles traveling over these areas can quickly create deep ruts that require excavation and rebuilding.

WHY CAN EMERGENCY VEHICLES STILL TRAVEL ON POSTED ROADS?

Emergency vehicles are exempt because public safety takes priority. However, regular heavy commercial or construction traffic may be restricted seasonally to prevent long-term road damage.

HOW LONG DO POSTINGS LAST?

There is no fixed calendar date. Restrictions remain in place until the road base regains strength. This depends on:

- Weather patterns
- Nighttime freezing
- Drainage conditions
- Groundwater levels

Highway crews monitor road conditions daily and remove postings as soon as conditions allow.

HOW RESIDENTS CAN HELP PROTECT LOCAL ROADS

Even small changes in driving behavior during thaw season make a measurable difference. Residents and contractors can reduce damage during spring thaw by:

- Avoiding heavy loads when possible
- Delaying non-essential deliveries
- Driving slowly on gravel roads
- Avoiding sudden braking or acceleration
- Keeping drainage ditches and culvert inlets clear near driveways

SAMPLE SOCIAL MEDIA POST

Spring thaw has begun, and some local roads are now posted with seasonal weight limits.
As frost leaves the ground, road bases temporarily lose strength. Heavy vehicles can cause significant damage during this short window, leading to potholes, rutting, and costly repairs.

These restrictions are temporary and will be lifted as soon as conditions allow. We appreciate your patience as we work to protect your local infrastructure and reduce longer-term costs.
For questions about posted roads, contact [Town/Department contact info].

This bulletin is provided for general informational purposes only and does not constitute legal advice, engineering design guidance, or an official interpretation of statute. While RSA 231:191–191-a is referenced, municipalities are responsible for ensuring compliance with all applicable laws and local governance requirements.

Roadway conditions and site factors vary. Decisions regarding postings, maintenance, and corrective actions should be based on site-specific evaluation and professional judgment, with consultation from legal counsel, engineers, NHDOT, or other appropriate authorities when necessary.

UNH T2 is pleased to provide free and customized Technical Assistance to local road agencies on a variety of road maintenance and transportation infrastructure-related topics, including bridge and pavement preservation, gravel roads, winter operations, worker safety, and maintenance activities. Please reach out to t2.center@unh.edu for additional resources, support, or technical assistance, or visit https://t2.unh.edu/.

University of New Hampshire
T2 Center

35 Colovos Rd., Durham, NH 03824
603.862.1362