

**NEW HAMPSHIRE  
DEPARTMENT OF TRANSPORTATION  
Bureau of Environment**

**2017 STONE WALL POLICY GUIDELINES**



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## ***PURPOSE***

The New Hampshire Department of Transportation (NHDOT) recognizes stone walls as an important resource contributing to the rural character of the New Hampshire countryside (NHDOT 2006). In addition, federal and state legislation require consideration of historic and archaeological resources. Stone walls constitute a cultural resource that needs to be evaluated during the environmental review process for NHDOT undertakings. The need for review of potential impacts to stone walls associated with proposed transportation projects, and the feasibility of preservation or reconstruction, is determined through evaluation requirements of Section 106 of the National Historic Preservation Act of 1966, under revised regulations for “Protection of Historic Properties” (36 CFR 800) effective 2004, as well as New Hampshire State Law RSA 227-C. Furthermore, Section 4(f) of the US Department of Transportation Act also requires the examination of project alternatives and selection of the feasible and prudent alternative to avoid, minimize or mitigate impacts to cultural resources found significant under the Section 106 process. NHDOT also uses the documentation completed for the Section 106 process to fulfill the cultural resources evaluation under the National Environmental Policy Act (NEPA).

This document updates the NHDOT stone wall policy guidelines, to reflect current practices for ensuring effective evaluation and management of stone walls that may be impacted within the NHDOT right-of-way and project boundaries. The guidelines also incorporate more recent information on the history and interpretation of stone walls.

The NHDOT 2017 Stone Wall Policy Guidelines retain components of the original 1990 stone wall policy and phased stone wall evaluations developed following a coordinated review by NHDOT, NHDHR, FHWA and ACOE.

## ***NHDOT STONE WALL POLICY PRIOR TO 2016***

In 1990, NHDOT highway engineer trainee Glenn Washer compiled information for implementation of the State of New Hampshire Roadside Stone Wall Reconstruction Policy, a multi-tiered screening system involving four phases. This policy was formulated by a multi-disciplined committee following “concern over the loss of the character associated with rural roads and in particular the resource represented by stone walls” (Stickney 1989). The policy provided guidance to ensure stone walls are considered as part of the environmental review process, with preferences for avoiding and preserving stone walls, minimizing impact, or relocating and reconstructing stone walls to their approximate original condition. Review may result in:

- protection of all stone walls within a project area,
- selective preservation, and/or
- selective sacrifice of stone walls.

As directed in the policy, following project specific coordinated review, NHDOT, New Hampshire Division of Historical Resources (NHDHR) and Federal Highway Administration (FHWA) considered the findings and subsequent actions for avoidance, preservation,

deconstruction and/or relocation during the monthly NHDOT Cultural Resource Agency Coordination meetings. In 2006, NH State Architectural Historian James Garvin did some editing and created a digital version of the policy (Garvin 2006, Garvin 2010).

Since 1990, as needed for NHDOT transportation projects, the NHDOT Bureau of Environment staff performed stone wall project assessments, in compliance with action steps of the 1990/2006 State of New Hampshire Roadside Stone Wall Reconstruction Policy (Washer 2006). In 2014, the NHDOT Bureau of Environment Cultural Resources Program staff found that the former NHDOT Historic Stone Wall Policy (Washer 2006) and multi-tiered screening system needed updating, in part due to:

- widespread views within the NHDOT Bureau of Environment and the NHDHR that the existing policy was outdated;
- the cumbersome multi-page phased stone wall screening and evaluation forms;
- undefined elements of the rating system leaving each researcher to determine definition, e.g., “Attractive Vegetation,” “characteristic roadside architecture,” and visual impression of stone walls assessed as minimal, moderate or superior;
- need for specific stone wall attribute detail for individual stone wall ratings;
- the many individuals involved in subjective components of the process;
- ineffective methodology, e.g., videotaping from moving cars during leaf-on seasons;
- questions pertaining to working with the abutting landowners and their requests;
- feasibility and safety issue considerations; and
- the NHDOT proactive actions for preserving stone walls within proposed project limits that are reviewed through the Request for Project Review process or internally through the NHDOT process (thus precluding the need for review by the FHWA and SHPO at Cultural Resources Agency Coordination meetings).

## ***2017 NHDOT STONE WALL POLICY GUIDELINES & THE BUREAU OF ENVIRONMENT***

The updated 2017 policy guidelines detail steps associated with the Project Stone Wall Rating, Individual Stone Wall Rating, and Reconstruction Feasibility for Individual Stone Walls. This document also includes stone wall policy guidelines definitions and photographic examples to facilitate evaluation of stone walls identified as superior, moderate, minimal or simple linear stone alignments. The policy guidelines and appendices also provide history, applicable legislation, and context for those interested in stone walls as a cultural resource worthy of preservation.

There is a broad spectrum of stone wall types under consideration within the stone wall policy. From the viewpoint of the Bureau of Environment and Right-of-Way, there are two kinds of stone walls – historic and non-historic (NHDOT Highway Design Manual 2014:10-12). Retaining walls are often extensions of these walls and, as such, require the same consideration.

## ***METHODOLOGY - PHASED SCREENINGS AND EVALUATIONS***

For each NHDOT transportation project, the evaluation involves four screening phases for stone walls that may be impacted within the project area of potential effect. The stone wall review is initiated by the Bureau of Environment, who shares their results, first with other NHDOT Bureaus involved in the project and then with SHPO and FHWA, as appropriate.

Documentation is associated with each of the phases. In order to follow the procedural sequence and improve clarification, the phased screenings include a Project Stone Wall Rating, Individual Stone Wall Ratings, a Reconstruction Feasibility Assessment, and the Stone Wall Evaluation.

The NHDOT Bureau of Environment compiles and retains field photographs of stone walls and all documentation pertaining to the phased screenings. Although the 2006 policy required the NHDOT Bureau of Environment videotape the stone wall corridors, videotaping is no longer undertaken due to media changes over time and that videos were “unwieldy and not always too sensitive to the actual visibility or character of the roadside walls” (Garvin 2015 personal communication). Instead, digital photo documentation of specific wall segments, as well as aerial photographs, on line street views (e.g., Bing or Google), and/or maps are compiled in the project file and, if needed, provided in a Request for Project Review form and/or shared at the Cultural Resource Agency Coordination meeting for the project.

The policy guidelines require gathering as much data as possible, prior to presenting the stone wall element of the project for discussion, if needed, during the monthly Cultural Resource Agency Coordination meeting with FHWA, NHDHR, and NHDOT. When a presentation and joint review are needed, the results of the screenings and evaluations, including details on the assignment of point values, are shared with the meeting participants.

To clarify the screening categories and facilitate scoring of stone walls, definitions have been compiled for use in conjunction with the multi-phased stone wall rating sheets (Appendix B). There is no associated rating form utilized for the evaluation phase. Meeting minutes and determinations of effects serve to document this step in the process.

### **PROJECT STONE WALL RATING**

The overall project appraisal of stone walls, using the Project Stone Wall Rating Sheet (Appendix A), is the first step in the environmental review process for all stone walls within a specific transportation project.

The numerical scoring takes into account:

- a. Functional classification of the highway
- b. Roadside development
- c. Current land use
- d. Zoned land use
- e. Highway characteristics, i.e., Annual Average Daily Traffic Count (AADT)
- f. Proposed posted speed limit
- g. Roadside Aesthetics

- h. Local or State Value
- i. Total Percentage of Stone Walls on Project
- j. Visual Impression of Stone Walls (Washer 2006; See definitions in Appendix A).

These attributes constitute elements considered when reviewing impacts and determining the visual recognition and local appreciation of these historic stone cultural resources.

A minimum score of 70 points qualifies all stone walls impacted in the project area as eligible for reconstruction.

### **INDIVIDUAL STONE WALL RATING**

When stone walls within the entire project score less than the established cut-off of 70 points, individual stone wall segments are rated using the Individual Stone Wall Rating Sheet (Appendix A). Individual stone wall segments may be associated with particular parcels, road segments, intersections, changes in stone wall fabrication, and/or relationship to historic complexes or landscapes (e.g., agricultural, industrial, institutional or residential).

This screening phase is based on observations and recognition of visible surface stone wall attributes. The investigation is non-invasive as no subsurface investigations are conducted. Detailed photo documentation of specific wall segments, as well as aerial photographs, on line street views (e.g., Bing or Google), and/or maps are compiled and shared in the Cultural Resource Agency Coordination meetings. Scoring for an impacted individual stone wall to be eligible for reconstruction is 26 points.

### **RECONSTRUCTION FEASIBILITY STONE WALL ASSESSMENT**

Individual stone walls that may be disturbed or removed by a project are reviewed and scored using the Reconstruction Feasibility Stone Wall Assessment form (Appendix A). Stone walls that meet the qualification criteria and score above the cut-off threshold of 26 for reconstruction feasibility are deemed eligible for reconstruction, if designs cannot be changed to provide for preservation in place.

If reconstruction is feasible and appropriate, the NHDOT's Bureau of Right-of-Way is notified and the review results are shared. If reconstruction is not feasible, discussion continues regarding steps to minimize and mitigate the loss of the resource.

Feasibility consideration takes into account whether the project effects a short segment of a stone wall that lies perpendicular to the road project or impacts a stone wall alignment that parallels the road project. More consideration is given to longer lengths of stone wall alignments that parallel the proposed road project.

## **STONE WALL EVALUATION & REVIEW COORDINATION**

Data is gathered on the results of the overall project rating, individual wall ratings, and reconstruction feasibility prior to any presentation at a Cultural Resource Agency Coordination meeting with FHWA, NHDHR, and NHDOT. This broad compiled data ensures efficient review and compliance with Section 106 of the National Historic Preservation Act, for the stone wall preservation, reconstruction, and/or the development of mitigation measures, if impacts are unavoidable.

Discussion of the pros and cons of alternatives to avoid, minimize and mitigate impacts are topics that are presented, as needed, during a Cultural Resources Agency Coordination meeting for the project with FHWA, NHDHR, Bureau of Highway Design, other NHDOT departments, consultants and/or City/Town representatives.

## ***STONE WALLS & THE BUREAU OF RIGHT-OF- WAY***

After the stone wall screening and reconstruction feasibility review (which may include one or more Cultural Resource Agency Coordination meetings with FHWA; NHDHR; NHDOT Bureau of Environment, Bureau of Highway Design, or other Bureaus; and project consulting teams and/or City representatives), a consensus for stone wall preservation, deconstruction, relocation, or reconstruction should have been reached.

The treatment of historic stone walls under the Section 106 process requires the NHDOT to consider the views of the private owner and the public. The NHDOT informs and actively seeks comments through the public participation process involving direct contact with landowners, adjacent landowners, and individuals/consulting parties through written notices, public meetings and/or private conversations.

Digital photo documentation of the stone walls and landscape become a pictorial part of the appraisal and are included in parcel file records maintained in the Bureau of Right-of-Way project files.

### **PRIVATE PROPERTY, EASEMENTS OR EMINENT DOMAIN**

Project designs may require that stone walls on private property be disturbed, removed, or as determined for environmental mitigation, relocated and reconstructed. The removal or relocation of non-historic stone walls do not require stone wall easements as long as this action is approved and a voluntary choice of the landowner.

Even if stone walls in the project area are not on private property, it may be necessary to acquire access and/or work outside of the state right-of-way for stone wall relocation and/or reconstruction purposes. When applicable, the land owner will be contacted by the NHDOT Project Manager prior to the public hearing and the potential need for access, impacts, relocation and/or reconstruction issues explained to them. Subsequently, the Bureau of Right-of-Way agent may follow up with the landowner.

In many instances, impacted stone walls on private property can be relocated and reconstructed at the NHDOT project expense. In exchange, the landowners must enter into a protective preservation easement for the stone wall and grant the NHDOT right-of-entry needed for construction/reconstruction activities (NHDOT Highway Design Manual 2014:10-12). The preservation easement requires the landowner's agreement to preserve the stone walls and/or landscaping. If the stone wall needs to be reset out of the state right-of-way, a permanent easement may need to be negotiated with the private land owner. The right-of-way record plans will reflect areas where easements are acquired.

In some instances, the private property owners may not want stone wall reconstruction on their property. Alternatively, the relocation of the stone wall may be established along the right-of-way.



## STONE WALL VALUE ASSESSMENTS

If alteration or impacts to stone walls are necessary, and the project design cannot be changed to preserve the walls in place, negotiation with the private property owner will be undertaken. NH RSA 231:17 states, “*No land or other property taken for a highway or alteration shall be appropriated or used for making the same until the damages assessed therefor are paid or tendered to the owner or his guardian or conservator.*”

If the wall cannot be rebuilt or if no amiable agreement is reached, the NHDOT will compensate the landowner for the impacted wall, and pay for its replacement value as determined by the right-of-way process. The replacement value of a stone wall is the estimated monetary value that the wall adds to the property as a whole (Washer 2006:5). Stone walls are considered an item of real estate value and effects to the landowner or abutting property owners must be considered. If the stone wall within the project lies on private property, NHDOT appraiser(s) in the Bureau of Right-of-Way will be given clear direction to identify in their report(s) the contributory value of parcel stone walls, so land owners can be compensated according to the contribution the stone walls make to the property’s market value (Stickney 1989).

Various elements are considered for establishing appropriate compensation. The Stone Wall Initiative (<http://stonewall.uconn.edu>) proposes that the financial value of a stone wall can be determined by assessing the stone wall’s material value, replacement value, intangible value and real estate value:

- **Material Value** - In determining material value alone, the stone wall is treated as a linear quarry (i.e., as a resource for the stone export business). “The material value is determined by many factors, including geographic location, access, and the quantity and “quality” of the stone.” Masonry-supply contractors can estimate the value of the stone.
- **Replacement Value** – Experienced stone masons can estimate the cost of building a length of wall similar to the one in place, calculating in obtaining a similar mix of stone matching the wall, the cost of the stone, and the length of the wall.
- **Intangible Value** – The intangible value is harder to calculate as it is subjective, based on issues as “family history tied up with the wall, known historical connections, sentimental value, educational and aesthetic opportunities, and the intrinsic value of authenticity.”
- **Real Estate Value** – As rural land in New England graced with stone walls has a higher intrinsic value than land without walls (or denuded of walls), the wall’s contributory value to the property can be determined by an experienced real estate assessor who can then determine market based assessments for both cases (<http://stonewall.uconn.edu/conservation/recommendations-2/assessment/>).

## **PRIVATE PROPERTY STONE WALL MAINTENANCE**

On private property, stone walls are not maintained by the Department of Transportation and the owner has the right to maintain the walls, if desired. The Bureau of Right-of-Way works with the Bureau of Highway Maintenance to ensure stone wall commitments are carried out.

It is illegal to remove a stone wall that is a boundary between two properties without the consent of both owners (New Hampshire Revised Statutes RSA 472:6; NHDHR 2001). In addition, reconstructed walls cannot be removed or relocated by the private property owner except where permitted by the NHDOT. The NHDOT District Engineer will forward these requests to the NHDOT Bureau of Right-of-Way for comment before issuing any driveway permit involving stone walls that have been reconstructed by highway projects. Information associated with private properties where easements apply will be provided by the Bureau of Right-of-Way to the appropriate Maintenance District office. The maintenance foreman will make periodic reviews to verify compliance. Violations are to be reported to the NHDOT Bureau of Environment in writing.

## ***STONE WALLS & THE BUREAU OF HIGHWAY DESIGN***

When impacts to stone walls cannot be avoided, stone wall removal, relocation and/or reconstruction is considered. Stone walls, to be disturbed or removed by a project, that meet the screening criteria are eligible for relocation and reconstruction if the project design cannot be changed to provide for preservation in place and the actions are feasible. Stone wall reconstruction “represents an investment of public funds which are made in recognition of the contribution these walls make to the roadside character” (Stickney 1989).

The NHDOT policy of reconstruction is derived from the 2010 NHDOT Bureau of Highway Design Standard Specifications. The goal of stone wall reconstruction is to rebuild sections of stone walls complimentary to the original alignment, fabric, and technology. Stone walls are to be rebuilt “in kind” as an item in the construction contract. Specifications for wall treatment will be included in bid documents along with proper notifications on the construction plans.

FWHA concluded that federal funds could be utilized for stone wall reconstruction if the following conditions were met:

- *The selection process must be comprehensive and have a rational basis, with objective eligibility criteria.*
- *Reconstruction costs must be in lieu of monetary payment for the contributory [replacement] value of stone walls that are reconstructed.*
- *Reconstructed walls must be protected by preservation covenants or permanent easements.*
- *The reconstruction must be physically feasible and cause no adverse environmental impact (Washer 2006:6).*

NHDOT Bureau of Highway Design guidance for stone wall reconstruction is provided in the 2016 NHDOT Standard Specifications for Road and Bridge Construction. Section 572 - Stone Wall (pages 5-174 to 5-176; Appendix F) presents standard specifications for reconstruction including details on materials, construction requirements, method of measurement, and basis of payment.

## ***STONE WALLS & THE BUREAU OF CONSTRUCTION***

NHDOT Bureau of Construction guidance for stone wall reconstruction is also provided in Section 572 of the 2016 NHDOT Standard Specifications for Road and Bridge Construction. It states that, prior to removal and reconstruction, contractor photographs and measurements are taken at intervals of not more than 500 feet and at locations of wall character changes. The NHDOT Bureau of Construction compiles and retains field photographs, maps and notes associated with stone wall presence, avoidance, deconstruction and/or reconstruction. This documentation is filed with the As Built Plans. Project files should also include post reconstruction photographs.

### **DECONSTRUCTION AND RELOCATION**

Although the preference is to avoid impacting historic stone walls, it may be necessary to deconstruct, realign, relocate and/or reconstruct stone walls to meet the project purpose and need. Adjacent stone wall segments may need to be flagged for special treatment and avoidance due to the potential for accidental inclusion or destruction during nearby construction activities.

Stone walls, listed as an item in the construction contract, are to be rebuilt “in kind,” with careful duplication of blending of existing stones and additional stones, and duplication of special features of the original wall, such as lintels, gate posts, openings, copings, markers, etc. Specifications reflecting the types of walls will be included in the bid documents along with proper notations on the construction plans. While the preference is to reconstruct the stone wall following local folk craft and dry stone traditions, the use of construction equipment is acceptable when determined necessary. In some cases, it may be necessary to use other stone from within the right-of-way or other local sources, especially if the original stone has been removed or lost. Extra care should be taken, “where walls are visible from public lands or right-of-ways, or where walls are contributing features to historic sites” (Garvin 1998).

There are two standards for relocation alignments of historic and non-historic stone walls. Stone walls with Limited Access/Controlled Access right-of-way (owned in fee) will be set behind the right-of-way line sufficiently (typically 3 feet) to allow maintenance of the wall by the property owner without encroaching onto the right-of-way (NHDOT Highway Design Manual 2014 10-13). The Construction Plan will clearly indicate the wall offset from the right-of-way line. Stone walls with common right-of-way will be set at the right-of-way line when possible, or beyond the right-of-way line when dictated by physical conditions (Highway Design Manual 2014:10-14). The newly reconstructed stone walls maybe set at or beyond a new right-of-way line, for example due to prohibitive physical conditions or safety concerns.

Prior to relocation, the ground surface needs to be prepared by removing brush, vegetation, topsoil and any unsuitable material accumulations. Then the area can be rough graded to create a reasonably firm and level surface.

## **BREACHING & STOCKPILING**

If it is necessary to cross or breach stone walls, use of existing openings (“barways”) is recommended. In general, limiting the number of breaches, removing only the minimum width needed, and establishing “clean cuts” is preferred.

Stone and chinking from the existing wall should be retained for reuse. Stock piling stone into a discrete pile at the edge of or behind the stone wall or in an out-of-the-way location will facilitate possible reuse later (Sanford et al. 1994:33).

Unused stockpiled stones can be repurposed for constructing other walls, retaining walls, steps, and/or delineating parking areas or walkways. In some instances, these recycled elements may be considered as mitigation actions, agreed upon by the various parties and/or during the Cultural Resources Agency Coordination meetings.

## **STONE WALLS & THE BUREAU OF HIGHWAY MAINTENANCE**

The Bureau of Highway Maintenance works in and around stone walls, situated both in the Right-of-way and associated with adjacent private or public properties. During construction and later road maintenance activities, work crews should avoid backfilling, impacting in situ, or realigning stone walls. In addition, along roadsides and driveways that have been cleared of forest canopy and exposed to sunlight, it is encouraged that the heavy overgrowth of plants and vines obscuring and accelerating the breakdown of the stone walls be cleared periodically (<http://stonewall.uconn.edu>). The NHDOT district personnel are key individuals in ensuring stone walls relocated and constructed under an NHDOT contract are not deconstructed. The Bureau of Highway Maintenance should take action if a stone wall within the Right-of-way is being disturbed or deconstructed

On private and inside non-fee owned Right-of-way, stone walls are the property and responsibility of the private property owner. Consequently, the Department of Transportation does not maintain the stone walls, unless the NHDOT desires it (particularly if they present a hazard to the traveling public) and/or the property owner is agreeable to NHDOT proposed activities.

It is illegal to remove a stone wall that is a boundary between two properties without the consent of both owners (New Hampshire Revised Statutes RSA 472:6). A private property owners' right to dismantle or modify a boundary stone wall is subject to RSA 472:6, which states removing of boundary markers as stone walls must be a mutual agreement between all landowners whose property lines are affected. Modifications or dismantling a stone wall boundary associated with the State must be authorized by government officials. In some instances, the authorizing officials would be NHDOT personnel within a district office. The Bureau of Highway Maintenance districts issue driveway and excavation permits that may impact stone walls. The permits are reviewed with the district offices and the applicant is responsible for considering impacts on cultural resources, such as stone walls. The NHDOT District Engineer will forward these requests to the NHDOT Bureau of Right-of-Way for comment before issuing any driveway permit involving stone walls that have been reconstructed by highway projects. Information associated with private properties where easements apply will be provided by the Bureau of Right-of-Way to the appropriate Maintenance District office. The maintenance foreman may make periodic reviews to verify compliance. Questions pertaining to violations can be reported to the Bureau of Environment in writing to review.

In addition, some communities have enacted local ordinances protecting walls bordering town-owned roads and in other locations.

## **NEW HAMPSHIRE STONE WALL LEGISLATION**

Although most stone walls have limited legal protection and enforcement is sporadic (<http://stonewall.uconn.edu>), Washer (2006:1) affirmed that the State of New Hampshire “has taken the lead in preserving” authentic roadside stone walls by enacting stone wall legislation. Legislation dealing with stone walls dates as early as the 18<sup>th</sup> century. In 1791, New Hampshire enacted legislation to protect New Hampshire’s resources against theft. The General Court decreed:

*... if any person shall dig up or carry away any stones, ore, gravel, clay or sand belonging to the proprietors of any common land, or to any particular person or persons, every such offender shall forfeit and pay treble damages to the party or parties injured thereby, and also a sum not exceeding five pounds.*

Former State Architectural Historian James Garvin noted, “This language has been retained in New Hampshire’s statutes almost unchanged (Garvin 2009), although over time amendments have increased the consequences of the theft. The law was amended in 1824 and the maximum penalty was changed to \$15, roughly equivalent to 15 days’ wages for an ordinary worker, a stringent penalty (Garvin 2009). While the law did not specifically mention stone walls, the statute served as “almost the only legal countermeasure against the theft of stone walls” (Garvin 2009). More recently, former Governor John Lynch signed an amended law on July 31, 2009.

Today, stone walls are cultural resources considered during the environmental review process, established under Section 106 of the National Historic Preservation Act of 1966 and under revised regulations for “Protection of Historic Properties” (36 CFR 800), effective 2004. In addition, in New Hampshire, there are widespread 20<sup>th</sup> century historic resource policies and several New Hampshire Revised Statutes Annotated (RSA) directed at the preservation of stone walls. New Hampshire Stone Wall Legislation were enacted or revised during various years, including 1791, 1842, 1854, 1935, 1955, 1959, 1967, 1983, 2009 (e.g., RSA 207:36; 472:6; 473L5; 539:3-4). These laws are summarized in the NHDHR fact sheet “New Hampshire Stone Wall Legislation.”

- **RSA 207:36**, first issued in 1935 and amended in 1959, dealt with “**Injuring Property**,” and stated “*No person shall tear down, damage or destroy any fence, wall ...*” “on common land and land of another person.

**RSA 472:6**, first issued in 1983, dealt with “**Removing or Altering Boundary Markers**” and stated that “*Any person who purposely commits or causes to be committed any of the following acts with regard to a boundary marker ...shall be guilty of a misdemeanor: defacement, alteration of a location, or removal of a stone wall or monument, ...*” unless it was a mutual agreement between all landowners whose property lines are affected by the moving of the boundary, authorized by government officials in order to more accurately place the boundary, a finally adjudicated court order or decree, or a law requiring or allowing the movement or alteration. This is a key issue for NHDOT that while New Hampshire law does not prevent a landowner from selling and removing stone walls that lie on private property, it is illegal to remove a wall that serves as a property boundary without the consent of both owners.

- **RSA 473:5**, last revised in 1967, stated, *“All fences of such height as to be reasonably adequate for their purpose and in good repair, consisting of rails, timber, boards or stone wall, barbed, electrified or woven wire, and all brooks, rivers, ponds, creeks, ditches, hedges and other things deemed by the fence-viewers to be equivalent thereto, shall be accounted legal and sufficient fences.*
- **RSA 539:3** (c.1854) pertaining to **“Fences”** stated that whoever *“willfully and unlawfully throw down or leave open any fence, gate or bar belonging to or enclosing land holden in common, or belonging to another person, or shall aid therein, shall forfeit to the person injured treble damages, and not more than fifteen dollars.”*
- **RSA 539:4**, pertaining to **“Stone, etc.”** issued in 1955 and last revised in 2009, updated the 1791 stone wall statute and 1842 revisions, retaining most of the original wording in honor of the original ‘78’ statute. Specific reference to stone walls was added and penalties and damages were updated to reflect inflation. This statute is “regarded as almost the only legal countermeasure against the theft of stone walls” (Garvin 2009). It states, *“Whoever shall willfully and unlawfully dig or carry away any stone, including stone from a stone wall, ore, gravel, clay, sand, turf, mold, or loam upon or from land holden in common or from the land of another person, or shall aid therein, shall forfeit to the person injured treble damages based on the cost of materials and restoration, and including attorney’s fees and costs.”*

In addition to New Hampshire state laws and regulations, some communities have enacted local ordinances protecting stone walls associated with town and private roads.

Studies of stone wall laws and preservation policies have also been undertaken in neighboring New England states, including Massachusetts (Commonwealth of Massachusetts, Stone walls or fences; unauthorized removal. Massachusetts General Law, Part IV, Title 1, Chapter 266, Section 105; [www.boxborough.ma.gov/town-planner/files/stone-walls-bylaw](http://www.boxborough.ma.gov/town-planner/files/stone-walls-bylaw)) and Connecticut (<http://stonewall.uconn.edu>). The Stone Wall Initiative (developed by staff of the Connecticut State Museum of Natural History and the University of Connecticut) as well as other grass roots organizations have formed “to promote the appreciation, investigation, and conservation of historic stone walls, and education about them” (<http://stonewall.uconn.edu>).

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## **REFERENCES**

Belman, Felice

1989 New Policy Intended to Protect 'Significant' Stone Walls.  
*Concord Monitor*, Pg. B3, November 2, 1989, Concord, NH.

Collins, Jim

2009 New England's Stone Wall Defender. *Yankee Magazine*, March/April 2009.

Crabtree, Peter

2013 Rocks of Ages: New England's stone walls stand the test of time.  
*Northern New England Journey*, AAA magazine, September/October 2013.

Feighner, Edna

2000 *Identification & Documentation of Stone Walls Encountered on the PNGTS/Maritimes & Northeast Pipeline Corridor, Maine & New Hampshire*. Prepared for Portland Natural Gas Transmission System, Maritimes & Northeast Joint Facilities Pipeline Project. Northern Ecological Associates, Portland, ME. NH Department of Transportation, Concord, NH.

Freeman, Castle

2006 Walls in the Woods. *Northern New England Journey*, September-October 2006.

Garvin, James L.

1998 Letter to Edna Feighner from NHDHR Architectural Historian James L. Garvin, May 6, 1998. Appendix in Edna Feighner's *Identification and Documentation of Stone Walls Encountered on the PNGTS/Maritimes & Northeast Pipeline Corridor in Maine and New Hampshire* (2000). New Hampshire Department of Transportation, Concord, NH.

2009 1791 Law Amended to Protect Stone Walls. Old Stone Wall Newsletter, Summer 2009.

2010 Email correspondence with Linda Wilson, Laura Black and Joyce McKay regarding the Stone Wall Policy.

Grace, William

1992 Inter-department Communication to NHDOT Bureau of ROW Carol Murray dated December 28, 1992 regarding Stone Wall Policy Committee Review. NHDOT Bureau of Environment files, Concord, NH.

1998 Memorandum of phone conversation with Jason Stone, NHDOT Environmental Manager. NHDOT Bureau of Environment files, Concord, NH.

MacQuarrie, Brian

2009 Stone wall plunderers leave a heritage in pieces. *The Boston Globe*, August 10, 2009.

Commonwealth of Massachusetts, 189<sup>th</sup> General Court

Stone walls or fences; unauthorized removal. Massachusetts General Law, Part IV, Title 1, Chapter 266, Section 105.

New Hampshire Department of Transportation

2014 Highway Design Manual, December 2014. New Hampshire Department of Transportation, Concord, NH.

2010 Standard Specifications for Road and Bridge Construction. New Hampshire Department of Transportation, Concord, NH.

2006 Stone Wall Preservation and Reconstruction Policy. New Hampshire Department of Transportation, Concord, NH.

New Hampshire Division of Historical Resources

2001 Stone walls. Old Stone wall Newsletter, Fall 2001. New Hampshire Division of Historical Resources, Concord, NH.

n.d. New Hampshire Stone Wall Legislation. New Hampshire Division of Historical Resources, Concord, NH.

n.d. Town Initiatives to Protect Stone Walls. New Hampshire Division of Historical Resources, Concord, NH.

New Hampshire Stone Wall Legislation

Various Years, including 1791, 1842, 1854, 1935, 1955, 1959, 1967, 1983, 2009, including RSA 207:36; 472:6; 473L5; 539:3-4.

Recht, Mike

1989 N.H. wants to preserve stone walls. *Keene Sentinel*, November 2, 1989.

Sanford, Rob, Don & Nina Huffer, Tom Neumann, Giovanna Peebles, Mary Butera, & David Lacy

1994 *Stone walls and Cellarholes: Guide for Landowners on Historic Features and Landscapes in Vermont's Forests*. Vermont Agency of Natural Resources, Waterbury, VT.

Stickney, Wallace

1989 Letter, October 26, 1989 to Governor Judd Gregg regarding Stone Wall Mitigation Policy.

Washer, Glenn A. NHDOT Bureau of Environment files, Concord, NH.

2006 Region 1. State of New Hampshire Roadside Stone Wall Reconstruction Policy. 1990, with 2006 edits by James Garvin. New Hampshire Department of Transportation, Concord, NH.

Wessels, Tom

1999 *Reading the Forested Landscape: A Natural History of New England*. The Countryman Press, Woodstock, VT.

Wilson, Linda Ray

1993 Letter to the New Hampshire Public Utilities Commission, June 16, 1993. New Hampshire Division of Cultural Resources, Concord, NH.

2005 Memorandum regarding local stone wall preservation initiatives, November 1, 2005. New Hampshire Division of Cultural Resources, Concord, NH.

## WEBSITES

<http://stonewall.uconn.edu>

<http://www.ideafinder.com/history/inventions/barbwire.htm>

[www.boxborough.ma.gov/town-planner/files/stone-walls-bylaw](http://www.boxborough.ma.gov/town-planner/files/stone-walls-bylaw)

## NHDOT 2017 Project Stone Wall Rating Sheet

Project Name: \_\_\_\_\_  
 Roads: \_\_\_\_\_  
 Station(s): \_\_\_\_\_

State No.: \_\_\_\_\_ Federal No.: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Reviewer(s): \_\_\_\_\_

		Points	Total	Comments
<b><u>Roadway Functional Classification</u></b>	Off System	10		
	Minor Collector	8		
	Major Collector	6		
	Principal Arterial	4		
	Interstate/ Turnpike	0		
<b><u>Roadside Development</u></b>	Sparse	10		
	Intermediate	5		
	Dense	0		
<b><u>Current Land Use</u></b>	Active Agricultural	10		
	Historically Agricultural	8		
	Residential	6		
	Mixed	4		
	Commercial	2		
	Industrial	0		
<b><u>Zoned Land Use</u></b>	Agricultural	10		
	Residential	8		
	Mixed	6		
	Commercial	2		
	Industrial	0		
<b><u>Highway Characteristics</u></b>	Existing ADT under 1,000	10		
	Existing ADT 1,000 to 5,000	6		
	Existing ADT 5,000 to 10,000	2		
	Existing ADT 10,000 and over	0		
<b><u>Proposed Posted Speed Limit</u></b>	Under 50 MPH	10		
	50 MPH and over	5		

<u>Roadside Aesthetics</u>		Points	Total	Comments
Vegetation – Purposeful Domestic/Agricultural	Yes	2		
	No	0		
Characteristic Roadside Architecture	Yes	2		
	No	0		
Visible from Roadway	Yes	2		
	No	0		
Existing Right-of-Way Delineated Stone Walls	Yes	2		
	No	0		
<u>Local or State Value</u>	Located Adjacent to Historic Resource	10		
	Identified as Important by Local Officials	10		
	Identified as Important by Property Owner	6		
	Identified as Important by Interested Citizen(s)	4		
	No Concern Expressed	0		
<u>Total Percentage of Stone Walls on Project</u>	Entire Project	10		
	Over 75%	8		
	50-75%	6		
	25-49%	2		
	Under 25%	0		
<u>Visual Appearance of Stone Walls</u>	Superior	10		
	Moderate	5		
	Minimal	2		
	Simple Linear Alignment	0		
<b>Grand Total</b>				

Cutoff for Total Project Stonewall reconstruction: **70**

Project Qualified:  Yes ----> Check Feasibility of Preservation or Reconstruction Worksheet  
 No ----> Proceed to Individual Wall Analysis Worksheet

## NHDOT 2017 Individual Stone Wall Rating Sheet

Project Name: \_\_\_\_\_  
 Roads: \_\_\_\_\_  
 Station(s): \_\_\_\_\_  
 Owner's Name: \_\_\_\_\_  
 Parcel Number: \_\_\_\_\_

State No.: \_\_\_\_\_ Federal No.: \_\_\_\_\_  
 Location: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Reviewer(s): \_\_\_\_\_

		Points	Total	
<b><u>Visual Appearance of Stone Walls</u></b>	Superior stone wall with Distinctive or Unique Workmanship	10		
	Moderate stone wall with Structurally Sound or Maintained Walls	8		
	Minimal stone wall including unmaintained common boundary walls	6		
	Simple Linear Alignment	2		

### **Roadside Aesthetics**

Tree-Lined	Yes	2		
	No	0		
Vegetation - Purposeful Domestic/Agricultural	Yes	2		
	No	0		
Characteristic Roadside Architecture	Yes	2		
	No	0		
Visible from Roadway	Yes	2		
	No	0		
<b><u>Local or State Value</u></b>	Located Adjacent to Historic Resource	10		
	Identified as Important by Local Officials	10		
	Identified as Important by Property Owner	6		
	Identified as Important by Interested Citizen(s)	4		
	No Concern Expressed	0		
<b><u>Function of Wall</u></b>	Identifiable Historic Purpose	10		
	Boundary Marker	6		
	Ornamental	4		
	Discarded Stone Alignment	2		

Percentage of Frontage (for Associated Parcel/Corridor Portion)	Entire Frontage	Points	Total	Comments
		Over 50%		
	25-50%	6		
	Under 25%	2		
	Under 25%	0		
Grand Total				

Cutoff for Individual Stone Wall Reconstruction: **26**

Project Qualified:

Yes  
 No

**26**

----> Check Feasibility of Reconstruction

**Stone Wall Types:**

**Natural (native) stone (glacially rounded or faceted):**

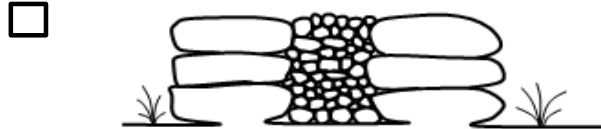
One Natural Stone Wide



Two or More Natural Stones Wide



Double-Faced with Loose Infill



Natural stone with split stone capstone



Approx. Height \_\_\_\_\_ ft

Approx. Width \_\_\_\_\_ ft

**Split Stone**

One stone wide, one split face



One stone wide, two split faces



Two stones wide, two split faces



**Squared Ashlar**



**Hammered Ashlar**



## NHDOT 2017 Reconstruction Feasibility for Individual Stone Walls

Project Name: \_\_\_\_\_

State No.: \_\_\_\_\_ Federal No.: \_\_\_\_\_

Roads: \_\_\_\_\_

Location: \_\_\_\_\_

Station(s): \_\_\_\_\_

Date: \_\_\_\_\_

				Comments
<b><u>Environmental Conditions</u></b>	Would there be adverse wetland effects due to reconstruction?	Y / N		
	Would there be negative consequences to natural vegetation due to relocation?	Y / N		
	Would there be negative consequences to cultural resources as a result of relocation?	Y / N		
<b><u>Physical Situation</u></b>	Do slope conditions allow construction of a stable wall?	Y / N		
	Is there an alternative location?	Y / N		
	Will the new wall location be visible from the roadway?	Y / N		
	Is the new wall location outside the clear zone?	Y / N		
<b><u>Owner Information</u></b>	Owner Name(s)			
	Contact Information			



**Other Considerations: (List and Describe)**


**NHDOT Reconstruction Determination**    Yes \_\_\_\_\_    No \_\_\_\_\_

Date of Joint Review: \_\_\_\_\_

Joint Review Comments:


Reviewers: \_\_\_\_\_  
                  \_\_\_\_\_  
                  \_\_\_\_\_

## **APPENDIX B**

PHOTOGRAPHS OF STONE WALLS  
IDENTIFIED AS SUPERIOR, MODERATE, MINIMAL  
AND SIMPLE LINEAR ALIGNMENTS

Visual Appearance of Stone Walls

**SUPERIOR STONE WALL EXAMPLES**

**With Distinctive or Unique Workmanship**

Superior stone walls are well built and possess integrity of location, design, setting, materials, workmanship, feeling and association. Walls may display capstones, end piers, formal breaks for entrances, steps, or aesthetic elements (e.g., carved elements).



Visual Appearance of Stone Walls  
**SUPERIOR STONE WALL EXAMPLES**  
With Distinctive or Unique Workmanship



Visual Appearance of Stone Walls  
**SUPERIOR STONE WALL EXAMPLES**  
With Distinctive or Unique Workmanship



Visual Appearance of Stone Walls  
**MODERATE STONE WALL EXAMPLES**

**With Structurally Sound or Maintained Walls**

Alignments show integrity associated with length, width and thickness of stone walls.  
Moderate stonewalls is the classification between minimal and superior stone walls.



Visual Appearance of Stone Walls  
**MODERATE STONE WALL EXAMPLES**  
With Structurally Sound or Maintained Walls



Visual Appearance of Stone Walls  
**MODERATE STONE WALL EXAMPLES**  
With Structurally Sound or Maintained Walls





Visual Appearance of Stone Walls

**MINIMAL STONE WALL EXAMPLES**

**Including unmaintained common boundary Walls**

Simple alignments; many discontinuous, disrupted elements and numerous dislodged stones; barely visible from within road fill, push piles or seasonal vegetation; short segments may suggest missing lengths; lack of substantive integrity



Visual Appearance of Stone Walls  
**MINIMAL STONE WALL EXAMPLES**  
Including unmaintained common boundary Walls



Visual Appearance of Stone Walls  
**SIMPLE LINEAR STONE ALIGNMENT EXAMPLES**

Short segment of discontinuous linear rock alignment, and/or disturbed remnant alignments



# **APPENDIX C**

2017 STONE WALL POLICY DEFINITIONS

## ***2017 STONE WALL POLICY DEFINITIONS***

The following discussions are intended to facilitate the phased screening and define criteria for evaluating and scoring stone walls within the project area as a whole and for individual stone wall segments. The evaluation of stone walls includes “assessing the character of the wall, the highway, the adjacent buildings and land uses, and the interest of owners or local citizens in preserving the walls,” as well as both aesthetic and technical criteria (NHDHR 2001).

**CURRENT LAND USE – Active Agricultural, Historically Agricultural, Residential, Mixed, Commercial, Industrial:** Classifications based on visual identification.

**ENVIRONMENTAL CONDITIONS:** Feasibility considerations including potential adverse effects of relocation and reconstruction due to impacts to presence of other cultural resources, slope, vegetation, wetlands, etc. Feasibility determinations may be a result of coordination with NHDOT staff, Natural Resource Agencies (DES, NHNH, F & G, etc.), NHDHR, engineers, city officials and/or the public.

### **FUNCTION OF WALL**

**Identifiable Historic Purpose:** Stone walls may have identifiable historic purposes, delineating the boundaries of the road or parcel; bordering cemeteries; defining parcel boundaries of industrial, residential, or agricultural areas; constraining livestock; stabilizing dugway roads or terrain gradients; defining the estate of a prominent proprietor’s estate; or erected to enhance the scenic transportation corridor.

**Boundary Marker:** Stone walls identifiable as elements delineating the boundaries of the road or parcel. Stone walls often follow survey lines (range and section lines) and road alignments. Many of these walls align with historic property lines described in deeds.

**Ornamental:** Stone walls serving as decorative elements to create a pleasing visual impression of the property, a garden, or to compliment the associated structural complex.

**Discarded Stones:** A stockpiled alignment or cluster of stones that may be discontinuous and not represent a uniform construction.

**HIGHWAY CHARACTERISTICS – Existing ADT under 1,000 through Existing ADT 10,000 and over:**

Classifications based on data from NHDOT Highway Design or lead design bureau.

### **LOCAL OR STATE VALUE –**

**Located Adjacent to Historic Resource:** Association with a historic resource is an aspect that contributes to the significance and consequently the scoring of the stone wall resource. Scoring is higher where walls are contributing features or lie adjacent to historic properties, districts, areas, scenic byways, historic roads and turnpikes, etc.

Information should be gathered to determine if the stone wall lies within or adjacent to a property listed on or eligible for the National or State Register of Historic Places, a Historic District, or locally recognized historic property/area. Identification of the local or state value of a stone wall may require input from the local community, or cultural resource program staff at NHDOT or NHDHR. Stone walls are sometimes referred to as “heritage walls” if they are associated with historic structures, estates or land tracts; properties listed or determined eligible for listing in the National Register of Historic Places; historic complexes and districts; cemeteries; town pounds; historic roads and turnpikes; and/or located in areas with moderate to high archaeological sensitivity. These stone walls may be contributing elements of a historic property or district. They are also more likely to be referenced in town and other archival records.

**Identified as Important by Local Officials:** Local officials of the town, commissions, or societies have expressed their concern regarding impacts to the stone walls in the project area.

**Identified as Important by the Property Owner:** The property owner has expressed concern regarding impacts to the stone wall on his property in the project area.

**Identified as Important by Interested Citizens:** An interested citizen(s) has expressed concern regarding impacts to the stone wall in the project area.

**No Concern Expressed:** No individuals have expressed their concern for stone walls in the project. This conclusion only follows conversations with the public, interested individuals, and affected or adjacent property owners.

**OTHER CONSIDERATIONS:** For example, other elements to consider include conservation easements; whether the stone walls represent character defining elements of historic properties or districts or areas; adjacent and property owners buy in to the deconstruction, relocation, and/or reconstruction.

**OWNER INFORMATION:** Information can be derived from Right of Way and Tax maps. It is recommended that property owners and adjacent landowners be contacted early in the project discussion.

**PERCENTAGE OF FRONTAGE (for Associated Parcel/Corridor Portion):** Entire or percentage classifications based on estimated extent of stone wall along road frontage associated with individual property.

**PHYSICAL SITUATION:** Feasibility considerations based on whether slope conditions allow construction of a stable stone wall, the potential and viability of an alternate location, consideration whether the reassigned wall location will be visible from the roadway, whether this location might affect proposed development of property and town planning initiatives, and whether the location is Outside the Clear Zone. Determination based on coordination with NHDOT staff including Bureau of Environment environmental managers, and NHDHR.

**PROPOSED POSTED SPEED LIMIT – Under 50 mph or over 50 mph:** Classifications based on data from NHDOT Highway Design or lead design bureau.

**ROADSIDE AESTHETICS** – Classification determinations based on attributes that constitute approximately 50% or more of project corridor.

**Tree-Lined:** Stone walls that are tree lined, due to purposeful landscape planting.

**Vegetation - Purposeful Domestic/Agricultural:** Vegetation adjacent to the stone walls that was purposely planted for domestic, agricultural or aesthetic purposes. For example, a cedar hedge, tree-lined boundary, or apple orchard.

Widespread secondary tree growth adjacent to stone walls may reflect a former cleared landscape for growing crops, grazing animals or mowing where trees did not grow in close proximity to others or extend skyward to the forest canopy to “garner their share of limited sunlight” (Wessels 1999:42-43).

**Characteristic Roadside Architecture:** Stone walls, whether freestanding or linked to structural features or archaeological sites, may be associated with characteristic roadside architecture. Associated structures may have been built to serve the traveling public. Notable roadside features include roadside boundary elements, highway or historical markers, monuments, statues, watering troughs and garden features. Depending on the setting, characteristic roadside architecture might be associated with historic farmsteads and barns, industrial or residential areas, bridges, etc. For example, when the stone wall associated with an agricultural setting represents boundaries of pastures, crop fields, animal pens, etc.

**Visible from Roadway:** Stone wall visibility is variable. Scoring is higher where walls are clearly visible from public lands or the right-of-way. Consideration should be given to a course of stone walls that would be more visible in a different season with less vegetative growth.

A single visible course of stone wall may actually be the top or bottom course of a formerly clearly defined stone wall alignment. Views of stone walls from the roadway may be compromised by uncut vegetation, seasonal growth, duff (decaying leaves, soil, and branches), sedimentation, landscaping, soil deposition associated with road construction and maintenance, erosion and frost heaving that dislodged stones, and stone wall vandalism, theft and “strip mining.” Alternatively, clearing the forest canopy and exposing the terrain to sunlight may have been the catalyst for heavy vegetation and invasive overgrowth that developed, obscuring the stone walls and encouraging their breakdown ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)).

**Existing Right-of-Way Delineated Stone Walls:** The stone wall may retain the alignment of a current or former road, survey line or parcel boundary. An obscured stone wall may continue to provide clues pertaining to historic or former road alignments and

grades. “In many places, the old town road is now 4 to 6 feet lower than the bottom of the stone wall which was once the grade line of the road surface” (Sanford et al. 1994:13).

**ROADSIDE DEVELOPMENT** – **Sparse, Intermediate, Dense:** Classifications based on visual identification.

**ROADWAY FUNCTIONAL CLASSIFICATION** – **Off system, Minor Collector, Major Collector, Principal Arterial, Interstate/Turnpike:** Classifications based on data from NHDOT Highway Design or lead design bureau.

**TOTAL PERCENTAGE OF STONE WALLS ON PROJECT** – Percentage classifications are based on measurable or estimated visible observation of stone walls along project’s entire road frontage.

**VISUAL APPEARANCE OF STONE WALLS** –

Each stone wall is unique, reflecting conscious patterning and style in the form of folk art (<http://stonewall.uconn.edu>). There are four stone wall classifications based on visual observations:

**Superior:** Superior stone walls reflect distinctive or unique workmanship. They are well built and possess integrity of location, design, setting, materials, workmanship, feeling and association. Walls may display capstones, end piers, formal breaks for entrances, steps, or aesthetic elements (e.g., carved elements).

These stone walls are examples of fine craftsmanship and may possess unique or distinctive design, materials, or technology. The walls may include hammered ashlar (rough cut blocks of hewn stone) or squared ashlar (squared and dressed blocks of hewn stone) instead of rounded and faceted native stones; shaped quarried stone blocks; copings or capstones (shaped quarried blocks set on top of the stone wall or structure); lintels; gate; posts; turrets; steps; “port” holes; carved elements, or other notable ornate sections. The unusual height, width or composition may also represent unique or distinctive workmanship.

**Moderate:** Moderate stone walls are structurally sound or maintained walls. Alignments show integrity associated with length, width, height, thickness and design. The result is a relatively uniform stone linear arrangement. Moderate stone walls represent the classification between superior and minimal stone walls.

**Minimal:** Minimal stone walls include unmaintained common boundary walls. These are simple alignments that have many discontinuous, missing or disrupted elements and numerous dislodged stones. They often lack substantive integrity. Often they may be barely visible as they are hidden within road fill or push piles.

The stone wall may follow the road or parcel boundaries, although disruptions in the alignment, form, and design are apparent as a result of construction, erosion, stone robbing, frost heaving, etc. Gaps along the top or course of the stone walls may be



evidence of modifications of the original condition and height of stone walls. If these gaps are a result of tree fall, the gaps are referred to as “tree bites” ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)).

If unmaintained, it is obvious that few actions have been taken to repair or maintain the stone wall configuration. Stone walls require maintenance. Over time without care, abandoned walls (aka wild walls) are deflated, “that is when single or double walls have fallen or slumped over time. These are often “deflated remnant walls containing disperse cobbles, with little integrity” (Feighner 2000:5).

Nevertheless, the “fact that they are tumbled doesn’t diminish their importance, because they have become part of local ecologic and watershed processes” ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)).

**Linear Stone Alignment:** The fourth classification concerns a simple linear arrangement of native or transported stones (one or more stones wide) that is visible along the road or parcel boundaries. Alignments may have discontinuation sections, disrupted or missing due to breaching for roads, paths, driveways, logging activities, etc. Some sections of aligned stones may represent the first stages of stone wall construction or agricultural field stone clustering. Some aligned stone section may be barely recognizable as stone walls.

**ZONED LAND USE – Agricultural, Residential, Mixed, Commercial, Industrial:**

Classifications based on Zoning Ordinances, or data from NHDOT Right-of-Way or Planning and Community Assistance.

# **APPENDIX D**

NHDOT STONE WALL POLICY HISTORY

## ***NHDOT STONE WALL POLICY HISTORY***

On May 8, 1989, former NH governor Judd Gregg tasked former NHDOT Commissioner Wallace Stickney to develop a stone wall policy, following the highly publicized destruction of a beautiful stone wall along NH Route 127 in Webster during highway widening. The Webster project “was the catalyst for the development of a policy that has preserved other stone walls and thus honored the historic and rural character that helps to define New Hampshire’s cultural landscape” (Washer 2006:3).

The NHDOT developed guidelines for stone wall review and consideration for preservation or reconstruction when walls may be impacted (Washer 2006). It has been acclaimed that New Hampshire was the first state in the Northeast to develop a stone wall preservation policy (Belman 1989). The policy, developed by a multi-agency committee, was agreed to by the Governor and Council, NHDOT, FHWA, and NHDHR.

The State of New Hampshire Roadside Stone Wall Reconstruction Policy was compiled in written form in 1990 and updated in 2006 (Washer 1990; Washer 2006). The policy provides guidance to ensure actions are in compliance with Federal-aid participation and other platforms such as the federal Scenic Byways Program and the New Hampshire Scenic and Cultural Byways System. The NHDOT stone wall policy (Washer 2006) established that during the environmental review process stone walls are considered, with preferences for avoiding and preserving stone walls or minimizing impact by considering relocating and reconstructing them to their approximate original condition. The environmental review may result in:

- protection of all walls in a project,
- selective preservation, and/or
- selective sacrifice of stone walls.

The Policy set fairly high standards and was developed with the intention of preserving the best examples of stone walls throughout New Hampshire since they represent important cultural and aesthetic features” (William Grace 1998 Memorandum of phone conversation with Jason Stone, NHDOT Senior Environmental Manager).

In 2010, Section 572 of the NHDOT Standard Specifications was developed in consultation with the NHDHR and the New Hampshire office of the Federal Highway Administration. Within the Standard Specifications, the Stone Wall Treatment Plan includes specific tasks directed towards evaluating and maintaining the integrity of our roadside views and vistas by preserving and protecting stone walls within or adjacent to the state highway right of ways.

In 2014, the NHDOT Bureau of Environment Cultural Resources Program staff however found that the former NHDOT Historic Stone Wall Policy (Washer 2006) and multi-tiered screening system needed updating and research was undertaken to improve the stone wall policy process of data collection and review. This report represents the results of research and policy updating.

# **APPENDIX E**

HISTORIC STONE WALL CONTEXT

## ***HISTORIC STONE WALL CONTEXT***

Many landscape elements in New Hampshire provide evidence of the former geologic and historic rural character of New England. Granite, gneiss, and schist field stones, boulders and slabs of various sizes are common elements of the rock-strewn, post-glacial New England landscape.

*The Southwest has its deserts; the Northwest, its rain forests; and the Plains states have their rolling grasslands. But to know New England, one must understand its stone walls* (Crabtree 2013:31).

### **TIMELINE**

While most stone walls are recognized as manifestations of Post- Contact Period European American activities, some stone features predate this era and are Native American in origin, including stacks of stone intended as defensive bulwarks, fish weir alignments, deer stands, mounds, monuments and/or ceremonial features (Personal email communication Mitch Mulholland 2.8.2013; [www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)). Archaeologically unproven associations also propose that some stone walls and features may have derived from the Vikings or Celts. Most stone walls however are historic period constructs built by European Americans during and following the settlement period. The earliest document citing a stone wall in New England is associated with a 1607 British permanent settlement north of Portland, Maine.

Stone wall historian Robert Thorson estimates that most of New England's stone walls were built between 1750 and 1850 and approximately half of the stone walls were built in the rapid construction period between 1775 and 1825 (<http://stonewall.uconn.edu>; MacQuarrie 2009).

Another predominant date range is suggested by Wessels (1999:48), who acclaims the majority of stone walls were constructed between 1810 and 1840. This era is associated with the loss of forests and expansion of agricultural landscapes where rocks were removed and recognized as a "new resource for fence construction" (Wessels 1999:58). Substantial corridors of stone walls may have been constructed and added to over a period of more than 50 years, the result of efforts of three or four generations (Sanford et al. 1994:15).

While some stone walls may have been rebuilt or are of more recent construction, by 1871, most historic stone wall construction ceased (NHDHR 2001). This end of the extensive stone wall construction in the latter 19<sup>th</sup> century is associated with the abandonment of marginal rural farms, introduction of cement, and the widespread use of barbed wire to replace the laborious construction of stone fences. Lucien Smith of Ohio was issued the first United States patent for barbed wire in 1867 and Joseph Glidden of Illinois received a patent in 1874 for his modifications (<http://www.ideafinder.com/history/inventions/barbwire.htm>). Barbed wire did not necessarily displace stone walls in all instances. In many cases, wire fencing was added, "usually attached to trees along the wall, adding to its height" (Sanford et al. 1994:11).

Although dating stone walls is often problematic, there are research avenues that may help in establishing or estimating the age of a stone wall. Archival research (e.g., deeds, diaries, invoices, or other personal documents) may contain references to stone walls, providing an

associated date of construction and the name of the property owner/builder; or the stone wall's alignment may reflect an association with a particular parcel segment or cemetery and its documented date of origin.

In addition to dating, identification of stone walls within project areas can be challenging as the walls may be hidden in road fill, accumulated duff, and leafy vegetation or only the top course of the stone wall may be visible. Several methods of mapping have been undertaken by local communities and historians. In addition to field surveys, primary resources are being utilized to identify stone wall locations and alignments, including white pine blister rust maps and aerial photographs. More recently, aerial laser scanning (LiDAR) imagery has been found to be another resource for determining anomalies in the natural landscape, including stone walls.

## **PURPOSE AND NEED**

Stone walls have been described as the “pioneer settler’s signature on the land, his indelible mark” (NHDHR 2001). The rudimentary purpose of early stone walls was “to hold stones that littered farm fields,” essentially they constituted what Robert Thorson calls “linear landfills” (Crabtree 2013:31). They replaced clustered forest detritus of fallen trees and brush, the earliest boundaries, and stump and zigzag, split-rail fencing, which predominated prior to the early 1800s and required less energy investment (Wessels 1999:48). In 1822, a writer for the journal of the state Board of Agriculture “admonished farmers to build for the ages” by replacing wooden fences with long lasting stone which “secures the fields from the ravages of stock, and improves them by removing rocks which are not only useless, but inconvenient and injurious in their natural situation” (NHDHR 2001). Overtime, as forest vegetation was removed and agricultural activities expanded, access to stony subsoil, field stones, stone outcrops and ledge was facilitated.

While stone walls may have been built for one purpose, over time the intended function of portions or the full length of a wall may have changed or been adapted for other or multiple purposes. Stone walls were constructed to:

- contain and cluster rocks, the “non-biogradable agricultural refuse” removed from the rocky soil when clearing and plowing fields;
- line road perimeters;
- designate pedestrian lanes and cow paths;
- buttress earthen cuts and terraces (i.e., retaining walls);
- delineate existing and/or old property lines (i.e., legal fences);
- enclose gardens;
- separate agricultural fields, pastures and residential yards;
- corral cows, sheep or other animals; and/or
- comprise walls, foundations or architectural elements of residential sites, industrial complexes, cemeteries, churches, etc.

Stone retaining walls often represent integral elements of stone wall alignments established along areas of the terrain with substantive slopes.

Approximate calculations for the combined linear extent of stone walls in New England vary. In 1872, a US Department of Agriculture report estimated approximately 240,000 miles of stone walls in New England (Collins 2009:24). In 1939, mining engineer Oliver Bowles estimated there were more than 250,000 miles of stone wall in the northeastern United States, mostly in New England and north of southern New Jersey (<http://stonewall.uconn.edu>). Substantive loss of stone walls has resulted from development and urbanization. More recently, Wessels (1999:41) estimates nearly 100,000 miles of stone walls currently crisscross the New England landscape.

## **CULTURAL AND ENVIRONMENTAL SIGNIFICANCE**

Stone walls have been described by Robert Thorson, Connecticut's foremost expert on stone walls, as "archaeological ruins" and "New England's signature landform" (Collins 2009:23). Tom Wessels, ecologist and environmentalist, colorfully describes central New England's stone fences as "the eighth wonder of the world" (Wessels 1999:59). Certainly, they represent important cultural and aesthetic features and play an important part of our state's attractiveness for residents and visitors (Wilson 1993). This lithic fabric of our cultural landscape is an "iconic emblem of New England's cultural heritage" (MacQuarrie 2009).

Although stone walls are evidence of human modifications of the landscape, they also benefit the environment by stabilizing surface soils, controlling the location and movement of water, and serving as animal habitat.

## **HISTORIC STONE WALL CONSTRUCTION STRATEGIES**

In the past, stone wall construction, an element of intensive property management, was hard labor. The task was undertaken by the landowner, farmer or hired hands, assisted by draft horses and oxen. Tools included a wench, rope, wooden sled and/or wheelbarrow to haul the glacially derived stones from cleared and tilled land to a designated location where the stones were clustered and stacked. Wessels (1999:41) suggests, "A strong stonemason can build ten to twenty feet of wall a day – if the stones are already at hand." Freeman (2006:26) indicated, "A good waller, with a good horse or team to move the largest, heaviest stones, could, it is said, put up 65 feet of finished wall in a day. Around 1850, the average charge to the landowner for a wall built by a pro was about a nickel a foot."

Stone walls are predominantly comprised of hard rock in the form of rounded cobbles, flat split stones, chinking (small rocks used to fill in voids), and/or cut and shaped quarried blocks or capstones (finishing stones that form the top of an exterior masonry wall). There are a number of reasons for variations in stone wall composition, including environmental setting; geology of the region; ease of acquisition, extraction and cutting of the stone; access to transportation for procurement of local and non-local stone; evidence of expansion or repair episodes; and purpose of the stone wall.

The types of bedrock and surficial material in the local or regional geographic area often determine the stone used in wall construction. A stone wall "province" represents a region where the stone walls are similar in material, as well as form ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)). New Hampshire's bedrock types most commonly are granite and gneiss ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)).

Regional resources, such as marble, may also be represented. Non-local material may also be used, depending on the ease of acquisition and transportation to the location. Variations may also derive from the stone wall expansion, repair or construction by different stone masons over time. Stone walls are either dry laid (lacking mortar) and held together with gravity and friction, or laid with mortar. The mortar or cement may have been added later as a repair. The stone wall composition may also include bricks, exotic stone from a distant source, asphalt, other road materials and/or added embellishments and ornamentations ([www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)).

The composition of the stone wall and variations along its course may reflect the intended primary purpose. Some researchers suggest that the size of stone used in the construction of walls may identify what the abutting lands were used for. Stone walls composed solely of large stones may have kept livestock in pastures or out of cultivated fields, while stone fences composed of large and smaller stones suggest that the adjacent fields were formerly cultivated or used as pastureland (Sanford et al. 1994:15-16; Wessels 1999:44). Function again may be a factor in the stone wall height determination. “To contain sheep, the walls had to be four and a half feet high,” although wooden rails or brush could be laid on the stones to add to the wall’s height (Wessels 1999:58). In some towns, fence wardens could issue fines to enforce height maintenance and ensure free-roaming sheep would not result in ruining crops (Wessels 1999:58).

To promote stone wall stability, maximize contact between stones and avoid vertical seams which create weakness, the waller may have constructed a tapered “A” shape (when viewed from the end), typically tapering in approximately 2 inches for every 12 inches of wall height” and set stones alternating end-in and end-out in a one-over-two and two-over-one pattern” (Crabtree 2013:32). To prevent wall shift and fill in gaps, hearting stones (angular wedge-shaped stones, at times measuring 3 to 5 inches in diameter) may have been inserted between stones as shims and spacers (Crabtree 2013:32). Alternatively some parallel walls were filled with pea gravel.

Throughout New England, stone walls lengths vary, some represent short segments while others extend hundreds or thousands of feet. Stone wall heights also vary, with well-built examples often reaching between 3 to 5 feet tall. Stone wall height may have been determined by the surrounding soils, which following clearing, plowing and planting may not have contained enough stones to build taller stone walls.

Stone wall widths range from less than one foot to several feet. While some stone walls are little more than a single fieldstone alignment, others are examples of fine craftsmanship (Washer 2006:1). The single thickness wall “is the most common wall found on woodland properties” (Sanford et al. 1994:10). This single wall “probably received all the stones from both of the fields it divided” (Sanford et al 1994:11). Double walled constructions may be comprised of two rows of medium to large stones stacked together. Some double walled constructions are filled in with a mixture of small and large stones. “These walls may have been built in particularly stony fields or in a field in which crops were cultivated (Sanford et al 1994:11).

The environmental setting of the stone wall may also contribute to variations. “Some walls that were built down steep inclines had long, flat stones placed diagonally in the wall to serve as a brace for the stones behind it” (Sanford et al. 1994:10). Along steep ground, the wall might have



been blended into the ledge or soil embankment creating a retaining wall, which then served the same purpose as the adjacent free standing stone walls at the base of the ledge or embankments.

Greater craftsmanship and aesthetics may be associated with stone walls in public places, such as churchyard cemeteries, or along the boundaries of wealthy private estate landowners.

## **IMPACTS AND LOSS OF HISTORIC STONE WALLS**

Stone walls are not permanent. They are vulnerable cultural resources, often “taken for granite” (Wilson 2005). Erosion, frost heaving and other forces of nature are hazardous to stone walls. In addition, over time many stretches and segments of stone walls have disappeared, quarried and robbed of stone for foundations, bridges, canals, piers, garden perimeters, landscape elements and road fill, while other neglected stone fences have been enveloped by sedimentation and forest regrowth following widespread abandonment of New England farms (<http://stonewall.uconn.edu>).

The threat of further losses to New Hampshire’s characteristic roadside walls also continues due to:

- expansion of transportation arteries, including road, railroad, bicycle and pedestrian trail corridor widening, straightening, leveling, safety and drainage improvements, etc.;
- impacts associated with residential, commercial and other construction projects;
- breaching for crossings, driveways, and other landscape modifications;
- introduction and expansion of utility corridors;
- logging;
- stone wall mining, harvesting, dismantling and theft, in some cases to sell and reuse the historic lithic resources for 21<sup>st</sup> century private property decorative stone walls, patios, recessed gardens, and swimming pool margins.

Former New Hampshire State Architectural Historian James Garvin declared that rampant thefts and “strip mining” of stone walls are often related to the inherent cash value of New Hampshire weathered stone. One large scale dismantling by rock thieves spanned a 500-foot wall section in Londonderry’s Leslie C. Bockes Memorial Forest (MacQuarrie 2009). In fact, “New England’s six-state landscape is believed to have lost more than half the stone walls that once crisscrossed its farmland and forest-cleared pasture, a web of piled rocks estimated to have totaled 250,000 miles, enough to reach the moon” (MacQuarrie 2009). More recently, Wessels (1999:41) estimates nearly 100,000 miles of stone walls currently crisscross the New England landscape.

To deter further loss, stone walls are considered during the environmental review process, established under Section 106 of the National Historic Preservation Act of 1966 and under revised 2004 regulations for “Protection of Historic Properties” (36 CFR 800) and New Hampshire “has taken the lead in preserving” authentic roadside stone walls by enacting state stone wall legislation as 227-C (Washer 2006:1).

# **APPENDIX F**

2016 NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION  
SECTION 572 – STONE WALL

# 2016 NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION

## SECTION 572 - STONE WALL

### Description

1.1 This work shall consist of reconstructing stone walls where shown on the plans or as ordered.

### Materials

2.1 Stone from the existing stone wall shall be utilized to reconstruct the wall at the specified location.

2.1.1 Any special stone features such as lintels, gate posts, copings, markers, etc. shall be retained for resetting.

2.2 Any added stone shall conform to the type used in the original wall.

2.3 Gravel for surface preparation shall meet the requirements of Section 209.

### Construction Requirements

3.1 The reconstructed stone wall shall match the existing wall as closely as possible.

3.1.1 The Contractor shall, by photographs and measurements acceptable to the Engineer, record the width, height and configuration of the existing wall prior to removal. These photographs and measurements along with the prevailing width, height and configuration shall be used to guide the reconstruction of the wall. These records shall be made at intervals of not more than 500 ft. and at locations where characteristics of the wall change. The photographs shall become the property of the Department at the end of the project.

3.1.2 When existing wall sections designated for reconstruction are in such disrepair that the original wall configuration cannot be determined, these sections shall be rebuilt to match abutting wall segments.

3.2 The stone wall reconstruction shall be supervised by a person with experience in dry masonry construction.

3.3 Care shall be taken to keep weathered faces exposed.

3.4 The Contractor shall retain all stone from existing wall for reuse. Additional stones that may be necessary shall be blended with the existing stones in order to reproduce the appearance of the existing wall.

3.5 The Contractor shall carefully replace chinking, blocking, bond stones and headers, as appropriate to the original style of wall, to ensure the maximum stability of the wall.

3.6 The Contractor shall carefully duplicate special features of the original wall, such as lintels, gate posts, openings, copings, markers, etc.

3.7 The ground surface shall be prepared by removing brush, vegetation, topsoil and unsuitable material. The area shall be rough graded to obtain a reasonably firm and level surface.

### Method of Measurement

4.1 Reconstructing stone walls will be measured by the linear foot, to the nearest 1 foot, along the center line of the reconstructed wall.

4.2 Clearing and grubbing will be measured as provided in Section 201.

4.3 Gravel required for surface preparation will be measured by the cubic yard, complete in place. Limits of gravel will be as shown on the plans, or as ordered.

### Basis of Payment

5.1 The accepted quantity of reconstructed wall will be paid for at the Contract unit price per linear foot complete in place.

5.1.1 Any additional stone required to complete the reconstruction will be subsidiary.

5.1.2 Reconstruction of special features as defined in 3.6 will be subsidiary.

5.1.3 Photographs and measurement records of the existing wall will be subsidiary.

5.2 Ground surface preparation will be subsidiary.

5.2.1 When special site preparation such as clearing and grubbing or gravel base courses are ordered, this work will be paid under appropriate items of the Contract. If appropriate items are not included in the Contract, this work will be paid as provided in 109.04.

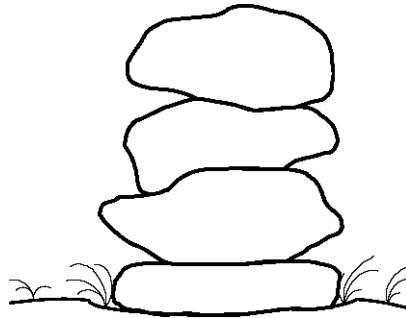
**Pay items and units:**

572.1	Reconstructing Stone Wall, One Stone Wide	Linear Foot
572.2	Reconstructing Stone Wall, Multiple Stones Wide	Linear Foot
572.3	Reconstructing Stone Wall, Double Faced with Loose Fill	Linear Foot

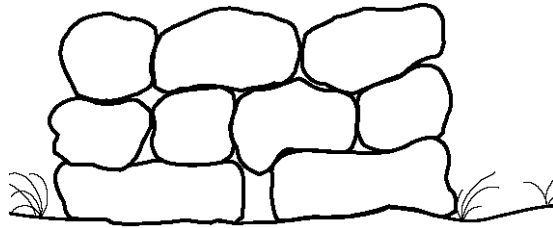
FOR INFORMATION  
GENERAL CONFIGURATION OF STONE WALLS

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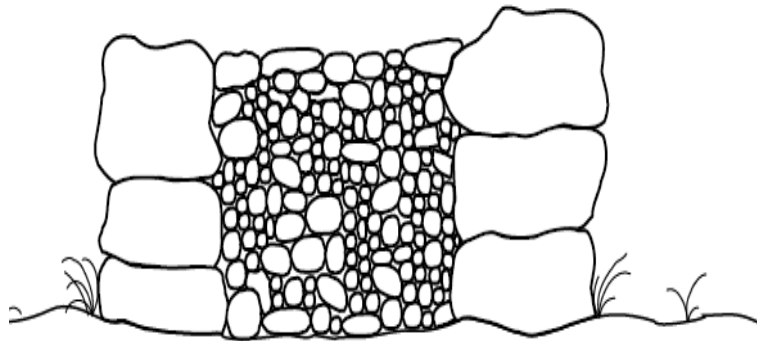
572.1



572.2



572.3



NOTE: DEPICTIONS ARE FOR  
DESCRIPTION OF THE ITEMS AND  
NOT INTENDED TO BE USED FOR  
CONSTRUCTION DETAIL.