NYNJTC Bridge Policy D R A F T

last update 11/16/2011

Overview

The Trail Conference maintains trails with varying formality (front or back country), user groups, and on land owned by a variety of partners. Many of these trails have bridges over streams. While we cannot dictate to our partners what kinds of bridges should be built and where they are necessary, we can suggest a number of parameters which need to be taken into account to use as a starting point for discussion with partners before building, replacing, or maintaining any bridges.

Definitions

A **bridge** is defined as a permanent, artificial structure not in continuous contact with the ground, regardless of length, width, or height above the surface, with a load bearing free span between abutments or sills, for passage over streams or wetlands. Helical piers and wooden piles higher than a foot above the ground are typically a series of small bridges linked together. Bog bridges or puncheon used for trail hardening are excluded from this policy. For the purposes of this policy, bridges are classified into three categories.

1. **Standard Bridges**: Bridges which the Trail Conference has standard plans for, and which can be built by someone with reasonable carpentry skills. Generally these are smaller bridges, including most bridges built with framing lumber.
2. **Custom Bridges**: Bridges which must be designed to fit a site or built with non standard or natural materials. Generally these are medium length bridges, for example bridges built with logs or telephone poles.
3. **Engineered Bridges**: More complicated bridges, for example fiberglass truss or cable suspension bridges. Generally these are long bridges.

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All bridges, regardless of their span, should be designed to bear a load that meets or exceeds current best management practice for architectural design and engineering of pedestrian structures for recreational trail environments. Bridges that must support vehicles are excluded from this discussion. Bridges that must support horse traffic are currently deferred from discussion.

A **built** or **frontcountry environment** needs to be distinguished below from a **primitive** or **backcountry environment**. For the NY/NJ area, the boundary between these two is somewhat different than most definitions which say “frontcountry is trails accessible from a car and used mostly for day hiking”. Except for a few locations in the Catskills, this definition would label essentially all our trails as frontcountry. Instead the distinction is based on user expectations and defined these loosely by the following examples. We will use the words built and primitive rather than frontcountry and backcounty.

Built:

- Meets handicapped accessible standards
- Less than a mile from trailhead, non-rocky footing, moderate elevation changes
- Bark chip, gravel, or paved (non-native soils) treadway
- Marked as a nature trail
- Trails in any park less than 100 acres

Primitive:

- Sections with more than 10% grades
- Beyond first non-bridged, non-puncheoned wet area
- Unmaintained

Legal issues

Some jurisdictions may place legal restrictions on bridge designs that limit architectural designs, materials used, required railings, permits required, and registered professional engineer approvals. The Trail Conference will comply with all such restrictions.

All bridges should be designed to meet or exceed current engineering design standards for pedestrian bridges in recreational trail environments.

All bridges must comply with the Accessibility Guidelines for Outdoor Developed Areas.

Do we really need a bridge?

There are alternatives to building a bridge in some cases, e.g. fords and rock steps. The necessity of a bridge is influenced by several environmental setting issues. We divide the settings into two categories: built and primitive, but the border cases will need individual assessment. In both cases it is recognized that a crossing may be hard or dangerous during high water and for a few days afterwards and that is not an argument for or against building a bridge.

Built: The default should be to build a bridge if sustainable, feasible, and affordable. It should also be recognized that closing the crossing seasonally or for short periods is an option to avoid building a bridge.

Primitive: A bridge should be constructed or replaced only if:

1. It is essential to hiker safety during the snow free hiking season, recognizing that a stream may be unfordable when seasonal or regular flooding occurs; or
2. It is absolutely necessary to protect sensitive resources, such as soils along a river's bank.

Yes a bridge is necessary

Sustainability/Location

Site selection is key to building a sustainable, feasible, cost effective bridge. The location should be such that the bridge is not destroyed by frequent flooding. This means either building the bridge high enough above flood levels or at places where the bridge spans only the normal channel and high waters can occupy flood plains at the ends of the bridge.

Feasibility

Trail Conference bridge designs are limited to what can be built without heavy construction equipment. There are also issues related to material transport to the construction site that may make a bridge not feasible. The cost of what can be accomplished with available grants may limit feasibility.

Design

In primitive settings, bridges should be designed to minimize their size and complexity and to utilize natural materials (stone and untreated wood). If the use of modern materials (steel, concrete, treated wood, etc.) is necessary, all reasonable measures should be considered to keep these modern materials hidden from view so the structure presents a rustic appearance.

In general, bridges should be designed to pass a 25-year flood. However, there are circumstances where, due to the nature of trail use in the area, a bridge that is passable during low-frequency flow events is necessary, resulting in larger and more elaborate structures. In most cases, such structures should be limited to sites where there is an overwhelming public-safety or resource-protection concern or where a cost-benefit analysis clearly demonstrates the benefit of the larger structure.

Liability

There are two aspects to liability: replacement cost and legal liability due to failures. Bridges built with non-native materials are usually built with land owner funds or funds from grants. Land owners must be either willing to supply replacement materials or be satisfied with closure until grant funding is found. The Trail Conference will not build bridges for which the land owner will not accept legal liability.

Approval Process

All bridges may require permits as they are constructed in a wetland. The project manager must insure that any appropriate permits are in place before construction begins.

Some custom and all engineered bridges require approval by Trails Council and the land owner. It addition, because of the likely high cost, most will need Board approval. The full design, both bridge and site, require plans approved by a registered professional engineer.

Standard bridges require whatever the land owner requires in terms of design and permissions. The Trail Conference requires that the design be selected from a set of approved designs which should have sufficient flexibility to adjust the size appropriate to a specific bridge or use a land owner approved design.

Note that Appalachian Trail bridges have similar but different processes and bridge requirements. See their policy dated May 2011, http://www.appalachiantrail.org/docs/trail-management-policies/stream-crossings-and-bridges-2011.pdf

Inspection/Maintenance

All bridges must be inventoried and they must be inspected at least every five years. Deficiencies must be recorded and maintenance scheduled promptly.

All maintainers should have training to recognize most bridge problems that can be detected by eye without instruments, e.g. wobbles, or has visibly broken parts. They are expected to report problems that might cause failures.

Engineered bridges must have an inspection/maintenance schedule and procedure prepared under the supervision of a registered professional engineer.

Standard and most custom bridges, especially those at the larger end or those with higher safety hazards, may need more trained personnel to do the inspections and should be marked in the inventory. For others, Supervisors, Chairs and Crew Chiefs should have additional training sufficient to inspect and plan for repairs or replacement.