



Final Project — Completed Timber Suspension Bridge

In the fall of 1994, the scope of the project was radically redefined because of the following:

- GPU Energy, a regional utility company, came “on-board” as a project volunteer, making people, material, heavy equipment, and expertise available to the project.
- Project partners made handicap accessibility from Route 517, across the quagmire, over the creek, and through the woods to Canal Road, a project goal. The bridge was no longer just for the agile, intrepid hiker, but for all segments of the population, including school children and senior citizens. The design standards were redefined with an enhanced emphasis on public safety.
- The NY-NJ Trail Conference applied for and received a \$10,000 grant from the USDA Forest Service Wood In Transportation Program. The State of New Jersey matched this grant 2:1 with \$22,323. Private donations added \$6,000. The project construction budget was set at \$36,000. The NJDEP Division of Parks and Forestry provided \$26,000 in funding for the project administration, survey, engineering, and environmental permits.

A unique public-private partnership consisting of a volunteer nonprofit group, State Park Service, a corporate volunteer, and even correctional facility workcrews was born.

During the planning phase, the primary project goal remained the same — eliminate the dangerous 2.1 mile roadwalk via placement of the Appalachian Trail within the designated and previously purchased trail corridor. This would require the construction of a safe, practical, cost-effective, and durable bridge over the Pochuck Creek.

Additional project goals established by the project partners were as follows:

- Preserve the primitive trail experience by constructing a bridge with a rustic appearance.
- Comply with the Appalachian Trail Conference policy on stream crossings.
- Utilize previously purchased material and/or donated material.
- Comply with the NJDEP wetlands and flood hazard area rules and regulations.
- Take advantage of GPU Energy expertise and standard practice, where practical, when developing the bridge design.
- Provide a handicap accessible section of the Appalachian Trail.
- Provide a site for environmental and floodplain education as well as wildlife and bird observation, while keeping visitors off the fragile flora.

Engineering Challenges to Overcome

Review of the pre-design study, various literature searches, numerous site inspections, and discussions with project partners defined the critical design problems. The problems were as follows:

- Low budget.
- Meandering 60-foot-wide stream channel.
- Steep, undercut, and unstable banks.
- Extremely poor soil conditions consisting of alluvial silt, clay, organic muck, and a high water table.



- Frequent overbank flooding; however, the Pochuck Creek is a non-delineated river, so the various frequency flood levels were not accurately identified.
- Serious logjam problems.
- Remote site with poor access.
- The entire area is a NJDEP designated Exceptional Resource Value Wetland, with extensive habitat for a variety of threatened and endangered species.
- No survey or elevation benchmark.
- Design and construction methods would have to be consistent with the ability level of a mainly volunteer, layperson work force. While some machinery would be available for construction, the premise of hand carrying all material to the site and utilization of hand tools was still valid.

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The answer to the referenced problems was to utilize a suspension bridge. Other bridge designs were investigated, but these alternatives failed to address some or all of the critical design criteria. The other designs considered before the suspension bridge were as follows:

- Center pier bridge
- Simple beam bridge of timber, steel, or concrete
- Arch bridge
- Truss bridge

Bridge Design Alternatives

Center Pier Bridge

A center pier bridge was totally unacceptable from both hydraulic and environmental perspectives. A mid-stream channel pier would be a major obstruction to normal and flood flows. It could easily turn into a dam by collecting debris or ice. The heavy construction methods required to build a durable mid-channel pier were beyond the resources of the project partners and would have had unacceptable environmental impacts. Finally, NJDEP regulations strongly discourage a center pier bridge.

Simple Beam Bridge

A simple, single-span beam of various material could span the Pochuck Creek from a structural perspective; however, practical limitations quickly arise. The steep, undercut, and unstable streambanks dictate that any abutments be set back from the banks. This requires that a beam be at least 82 feet long. The abutments would also have to be tall enough to provide proper clearance to floodwaters.

These requirements, in addition to the exceedingly poor soil conditions, quickly result in the bridge abutments needing pile driving and reinforced concrete. These methods are not allowed in an Exceptional Resource Value Wetland. Nor were they within the project budget, the ability of the project partners, or the philosophy of the Appalachian Trail.