
National Park Service
Cultural Landscapes Inventory

2016

Revised: 9/2025



Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

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Introduction

The Cultural Landscape Inventory (CLI)

The Cultural Landscape Inventory (CLI) is a comprehensive inventory of all cultural landscapes in the National Park System. Landscapes that are listed, or eligible for listing, on the National Register of Historic Places, or are otherwise managed as cultural resources and in which the National Park Service has, or plans to acquire, legal interest are included in the inventory. The CLI identifies and documents each landscape's location, size, physical development, landscape characteristics, character-defining features, and condition. Cultural landscapes have approved CLIs when concurrence with the findings is obtained from the park superintendent and all required data fields are entered into the Cultural Resources Information System (CRIS-CL) database. In addition, for landscapes not currently listed on the National Register and/or without adequate documentation, concurrence is required from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or the Keeper of the National Register.

Scope of the CLI

The information contained within the CLI is compiled from primary and secondary sources and through on-site surveys of the landscape. The level of investigation is dependent upon scoping the need for information.

The baseline information collected provides a comprehensive look at the historical development and significance of the landscape. Documentation and analysis of the existing landscape identifies character-defining characteristics and features and allows for an evaluation of the landscape's integrity and an assessment of the landscape's condition. The CLI also includes historic maps, drawings, and images; photographs of existing conditions; and a site plan that indicates major features. The CLI documents the existing condition of park landscape resources and identifies impacts, threats, and measures to stabilize condition. This information can be used to develop strategies for improved stewardship. Unlike a Cultural Landscape Report (CLR), the CLI does not provide management recommendations or treatment guidelines for the cultural landscape, but it may identify stabilization measures.

The Cultural Resources Information System (CRIS)

CRIS is the National Park Service's database of cultural resources on its lands, consisting of archeological sites, historic structures, ethnographic resources, and cultural landscapes. Cultural Resources Inventory System (CRIS) replaces three legacy inventory systems: ASMIS (archeology), CLI (cultural landscapes), and LCS (historic structures); and it reinstates the former ERI (ethnographic resources). This Cultural Landscape Inventory document reflects the information in a corresponding CRIS Cultural Landscape record.

Statutory and Regulatory Foundation

The legislative, regulatory, and policy directives for conducting and maintaining the CLI within CRIS are:

- National Historic Preservation Act (NHPA) of 1966 (16 USC 470h-2(a)(1)) Sec. 110
- Executive Order 13287: Preserve America, 2003. Sec. 3 (a and c)
- Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs
- Pursuant to the National Historic Preservation Act, 1998. Std. 2
- Cultural Resource Management Guideline, 1997, Release No. 5, page 22; issued pursuant to Director's Order #28 (DO-28)

The NHPA requires the identification, evaluation, and nomination of historic properties to the National Register of Historic Places and the maintenance and expansion of an inventory of cultural resources. DO-28 requires a cyclic assessment of the current condition of cultural landscapes based on an assessment interval, with a default of six years.

Use

Beyond fulfilling legal and policy requirements, park staff can use the Cultural Landscape Inventory in the following ways:

- To learn about park cultural landscapes (all staff)
- To inform management decisions (park managers)
- To inform project planning and development (park managers, facility managers, project managers, compliance specialists)
- To monitor the condition of the cultural landscape and take measures to protect its significance and integrity (cultural resource managers, facility managers)
- To recognize the stabilization and treatment needs of landscape features and plan work within cultural landscapes to address the needs (facility managers, cultural resource managers)
- To understand the cultural value of natural systems in a cultural landscape (natural resource managers)
- To create programming and educational materials based on site history (interpretation and education specialists)
- To recognize impacts within cultural landscapes and enforce protection measures (visitor and resources protection staff)

General Information

Property Level and CLI Numbers

Inventory Unit Name:	Roebling's Delaware Aqueduct Site
Resource Classification:	Cultural Landscape
CLI Identification Number:	300159
Parent Landscape:	300159
Inventory Status:	Complete

Park Information

Park Name:	Upper Delaware Scenic And Recreational River
Alpha Code:	UPDE
Park Organization Code:	4870
Park District:	UPDE
Region:	Northeast
Restricted:	Yes

Landscape Description:

Roebling's Delaware Aqueduct Site is part of the Upper Delaware Scenic and Recreational River, a unit of the National Park Service established in 1978 to conserve, protect, and interpret 73.4 miles of the river and its outstanding natural and cultural resources. The centerpiece of the property is Roebling's Delaware Aqueduct, known locally as the Roebling Bridge, a former aqueduct built in 1847-48 across the Delaware River just below its confluence with the Lackawaxen River. The rehabilitated structure now carries vehicular and pedestrian traffic between the hamlet of Lackawaxen in the Township of Lackawaxen in Pike County, Pennsylvania, and the hamlet of Minisink Ford in the Town of Highland, Sullivan County, New York.

The Delaware Aqueduct was built by John A. Roebling, the renowned nineteenth-century American civil engineer and later designer of the Brooklyn Bridge. The aqueduct was one of four suspension aqueducts on the Delaware & Hudson Canal, a 108-mile-long waterway opened in 1829 to supply the Atlantic seaboard's growing demand for anthracite coal in heating, smelting, and steam generation. The canal operated until 1898, after which it was dewatered and most of its infrastructure was redeveloped or left to ruin. In 1968, Roebling's Delaware Aqueduct was one of five intact locations associated with the canal to be designated as a National Historic Landmark. The American Society of Civil Engineers declared the aqueduct a National Civil Engineering Landmark in 1972.

Remnants of drained canal beds, earthen towpaths, and stone retaining walls survive on the Pennsylvania and New York sides of Roebling's Delaware Aqueduct, as does a toll house dating to 1908. Parking lots, sidewalks, and trails provide visitor access to these features, while waysides interpret the history of the former aqueduct and canal. Roebling's Delaware Aqueduct Site is a heavily visited facility in the park, with an annual visitation exceeding 60,000 visitors. The two parking lots are open for public use 365 days a year. During the busy summer season, the lots are used on a daily basis from mid-June thru mid-October and weekends throughout the winter months for eagle watching.

HISTORICAL OVERVIEW

The arrival of Europeans in the Upper Delaware River valley occurred in the 1600s when the area was occupied by the

Lenape people, also known as the "Delaware" or "Minsi." The landscape at that time would have looked similar in appearance as it does today, densely wooded and teeming with wildlife, though with a somewhat different composition of flora and fauna. Initial contact may have occurred with Dutch traders and Swedish immigrants, but throughout much of the seventeenth century Colonial occupation of the valley was limited to occasional hunters and trappers.

European Settlement, 1750-1782:

It was not until the 1750s that the Delaware Company from Connecticut established the first permanent settlement, named Cushetunk, along the Upper Delaware River between present day Narrowsburg and Callicoon. Its early residents built cabins and mills along a ten mile stretch of river, but expansion was hindered by disputes between and amongst European and Native groups over land rights, and conflicts related to the French and Indian War. The Lenape population dissipated because of exposure to European diseases and migrations west to flee constant conflict, and by the time of the American Revolution only a few hundred Lenape remained in the region, along with some Iroquois. Most settlers and Native people sided with the British during the Revolutionary War. In the summer of 1779 when tension was still rife, the Battle of Minisink took place on a hill above Minisink Ford and was a decisive loss for the Colonial militia.

Post-War Resettlement, 1782-1828:

Repopulation and rebuilding of valley settlements occurred slowly after the Revolution, mainly because of confusing and inactive land claims. Clarity was achieved in 1782 when Congress designated the Delaware River as the boundary between Pennsylvania and New York. By 1798 the hamlet of Lackawaxen and the town of Lumberland were established in the area of the future Delaware Aqueduct, and in c.1800 there were twenty-two small hamlets in the valley.

The timber industry had begun to flourish in the valley before the Revolution, and when peace returned timber rafting became central to the local economy. With a seemingly endless supply of hemlocks and pines, timber was lashed together and floated as rafts downstream, fueling construction of buildings in the fast-growing cities on the eastern seaboard and providing raw materials for the thriving shipbuilding industry.

The Delaware & Hudson Canal, 1828-1898:

In the 1820s, the extraction and shipment of anthracite coal began to dominate the Upper Delaware economy. Formed in the hills of northeastern Pennsylvania, this type of coal burned cleaner and more efficiently than the bituminous coal that was commonly used, and was already being shipped to markets in Philadelphia and Baltimore via canals. At this time, however, there was no reliable transportation system to deliver the coal to New York City, thus creating an opportunity for merchants Maurice and William Wurts of Philadelphia to establish the Delaware & Hudson Canal Company.

With the backing of the Pennsylvania and New York legislatures and other private investors, the company constructed a gravity railroad to transport their coal from their mines to the start of the canal in Honesdale, Pennsylvania. From there, the canal followed the Lackawaxen River to its confluence with the Delaware River at Lackawaxen, where it crossed the Delaware River by rope ferry. A slackwater dam was constructed just below the confluence to create a calm pool for the crossing. The canal then tracked along New York side of the Delaware River to Port Jervis, and followed the Neversink River and Rondout Creek from Port Jervis to Kingston, New York. Construction of the 108-mile canal began in 1825 and was completed in 1828, overcoming a grade of 1,075 feet through a system of locks and aqueducts. Canal infrastructure also included dwellings for the locktenders and barns for the mules that pulled the boats. Some locks also had stores for supplies and boat repair yards, and there were often gardens and orchards nearby for the locktender's family and canal boat crews.

During the 1840s and early 1850s, the canal and locks were enlarged in depth and width, and buttressed with stone retaining walls to prevent leakage. The new dimensions made possible the use of larger boats with greater capacity, greatly increasing tonnage from 20 to 140. The company also improved the crossing at the Delaware River crossing, which had become a major bottleneck in the journey and the frequent site of collisions between canal boats and timber raftsmen. The solution was to replace the rope ferry that guided canal boats from the north bank of the Lackawaxen River to the east bank of the Delaware River with two wood and masonry suspension aqueducts: one across the Lackawaxen River and one across the Delaware River. Designed by civil engineer John A. Roebling, the aqueducts were constructed in 1847-48 and opened to boat traffic in the spring of 1849. As part of the project, the company built a "new canal" segment on the Pennsylvania side to connect the two aqueducts, and three new locks on the New York side just south of the Delaware Aqueduct to lower boats 32 feet to the existing canal alignment paralleling the river. The bypassed portion of the "old canal" in this area was retained as a feeder canal.

The new aqueducts and new canal segments saved an entire day on the trip from Honesdale, Pennsylvania, to Kingston, New York, an immense cost savings. The sum of these improvements allowed the canal to transport one million tons of coal annually in the 1850s, making it the preeminent route for carrying northeastern Pennsylvania's coal to tidewater at the Hudson River. Although the New York & Erie Railroad entered the valley around this time, the canal remained profitable and in 1872 carried a peak of three million tons of coal. However, the railroad's powerful locomotives, higher-capacity cars, and longer train sets eventually rendered canal transport less and less competitive. Delays from ice, snow, droughts, and floods also made the canal less efficient than the railroad. The Canal Company itself had begun to enter the railroad business, and by the 1890s decided that the upkeep of the canal was not worth the cost. The final transport of coal through the canal occurred in 1898, after which it was dewatered. The canal prisms were filled in or left to ruin, while infrastructure was removed or repurposed. Of the four aqueducts built by Roebling for the Delaware & Hudson Canal, only the Delaware Aqueduct would survive.

Post-Canal Development, 1898-1980:

The New York & Erie Railroad was the first manmade north-south transportation route that extended the entire length of the Upper Delaware River valley. With 12 stations along the 73 miles of its Delaware division, the railroad connected the Hudson River to the Great Lakes and improved the movement of goods and services to and from the valley. It also introduced a tourism economy, promoting the valley's fresh mountain air, scenic beauty, and cooler climate as a respite for big city residents. However, the scenery that attracted tourists was undergoing change at the turn of the twentieth century. Many of the area's forests had been cleared of pine and hemlock trees, while new industries harvested the remaining hardwood trees, leaving behind a landscape that was much more open than wooded.

One such harvester was Charles Spruks, a Scranton lumber dealer who supplied heavy timbers for the area's coal mines. In May 1908, Spruks purchased Roebling's Delaware Aqueduct and its approaches as a means to transport logs from his timber lands in Sullivan County to the rail yard in Lackawaxen. As the abandoned structure was the only river crossing for miles, Spruks opened the former aqueduct to all traffic and constructed a toll house and gate on the New York side to collect payments. The two-story toll house featured a living room, kitchen, and two bedrooms. Spruks also removed the aqueduct's towpaths and regraded some of the "old canal" bed into approach roads that connected to the adjacent roads, which required the removal of several sections of the earthen towpaths. Other changes around the adjacent canal during this period included the removal of several canal buildings and the construction of two residences (Margold and Cortright houses) on the Pennsylvania side and a hotel on the New York side.

In November 1930 Roebling's Delaware Aqueduct and approaches were purchased by the Federal Bridge Company, which operated it under the name Lackawaxen Bridge Company. Aiming to modernize the former aqueduct to carry motorized vehicles, the company's president, Col. Peter K. Schuyler, removed the wooden aqueduct trunk and replaced it with a simpler deck floor and railing. These modifications coincided with the growing popularity of motor cars and a renewed interest in road construction that had waned since the arrival of the canal and railroad. Valley residents had lobbied for decades for a highway linking the riverside towns together, but it was not until 1934-39 that a highway was constructed on the New York side from Port Jervis to Hancock. Named New York State Route 97, the highway passed just east of Roebling's Delaware Aqueduct and connected to the structure's approach road.

Except in places where steep bluffs pushed its alignment inland, Route 97 generally paralleled the riverbank, thus destroying much of the abandoned Delaware & Hudson Canal between Lackawaxen and Port Jervis. The three locks built in 1847-48 just south of Roebling's Delaware Aqueduct were acquired by the state, as the highway's alignment filled and buried Lock 72 and most of Lock 70, but spared Lock 71 and some of the turning basin walls. To prevent potential floodwaters traveling through the "old canal" from undermining the highway embankment, the state constructed an earthen and stone diversion dam across it, between Locks 71 and 70, and breached a portion of the "old canal" towpath to allow flood water to drain back into the river.

In June 1942 the Lackawaxen Bridge Company was purchased by Edward H. Huber, a nephew of Charles Spruks. Huber continued charging tolls and eventually used the toll house as an office and for storage, but during his thirty-year ownership he rarely saw toll revenues exceed the costs of maintenance. Photographs taken during a survey by the Historic American Engineering Record in 1968 illustrated the poor condition of the former aqueduct's decking and railings, as well as the failing upstream sides of the masonry piers, from river ice. In 1973 Huber sold the Lackawaxen Bridge Company to Albert L. Kraft, who repaired the timber deck and converted the second floor of the toll house into a gift shop. Kraft also made plans to clean out trash and weeds that had accumulated in the "old canal" below the

former aqueduct and level out the nearby area for parking. Kraft raised the price of the tolls but it was not enough to realize a profit, and in 1979 he began negotiations to transfer ownership to the federal government.

National Park Service Management, 1980 to Present:

In 1978, Congress designated 73.4 miles of the Upper Delaware River as part of the National Wild and Scenic Rivers System, and as a unit of the national park system, named the Upper Delaware River Scenic and Recreational River. The designation covered the river segment beginning at the confluence of the east and west branches of the Delaware River at Hancock, New York, and extended downstream to Railroad Bridge No.2, in the vicinity of Mill Rift, Pennsylvania. The new park was based on the authority of the 1968 Wild and Scenic Rivers Act, which aimed to protect selected rivers from development that would substantially change their wild or scenic nature.

Soon after the park was created, the National Park Service indicated a desire to acquire Roebling's Delaware Aqueduct as a "cultural resource centerpiece" of the new park, and on March 27, 1980, officially purchased two parcels from the Lackawaxen Bridge Company. In addition to the former aqueduct, the acquisition included the towpath, two remnant retaining walls, the road leading to the structure on the Pennsylvania side, and the toll house and road leading to the structure on the New York side. After the Federal Highway Administration determined that the structure was in critical condition, the National Park Service closed it to vehicular traffic and initiated several studies to determine if it could be reopened to vehicular traffic without threatening its historic integrity. An engineering study in 1982 concluded that the former aqueduct could support limited highway traffic after certain structural upgrades were completed, and that such improvements could be economically accomplished without compromising the structure's historic elements. The study also recommended limiting traffic to one lane and restricting weight limits to 10 tons, with occasional emergency vehicle crossing up to 15 tons.

With the support of the Advisory Council on Historic Preservation, the State Historic Preservation Offices of Pennsylvania and New York, and the National Park Service's Mid-Atlantic Regional Office, restoration of Roebling's Delaware Aqueduct began in 1985 with rehabilitation of the original cable and masonry and reconstruction of icebreakers. Work in 1986-87 included replacement of the timber superstructure, construction of the approach roads and concrete bridge deck, and placement of the steel stiffening truss system, which enabled the structure to reopen to traffic on June 13, 1987, with no tolls. In 1994 the trunk walls, towpaths, and walkways for pedestrian circulation were constructed, and the ice breakers, which had undergone significant damage since 1985, were reconstructed. The National Park Service also stabilized the toll house in 1989-91.

In subsequent years, the National Park Service acquired portions of the "old canal" and towpath on the New York side for development of a trail, and a parcel with a non-historic residence (Margold house) adjoining the canal route on the Pennsylvania side, on the northwest corner of the Pennsylvania access road. The park also acquired properties on both sides of Roebling's Delaware Aqueduct for construction of parking lots, emergency access routes to the river, a restroom, and a maintenance area. The park has installed sidewalks, waysides, and other visitor amenities to the landscape, and currently uses the toll house as an exhibit space. The park remains interested in acquiring the remains of Lock 71 in the future.

SIGNIFICANCE SUMMARY

Roebling's Delaware Aqueduct Site is primarily significant for the restored and remnant features associated with the construction and operation of the Delaware & Hudson Canal, which transported coal from northeastern Pennsylvania to the Hudson River where it was loaded on barges and transported to New York City and the east coast from 1825-1898. The Delaware Aqueduct (Roebling Bridge), built by John A. Roebling, is itself a designated National Historic Landmark and nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as a key component in the financial success of the canal and as the nation's oldest wire cable suspension structure with its historic elements intact. The remnant canal prisms, towpaths, and stone walls of the canal are also nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as part of the canal's original 1825-28 route and the new 1847-48 alignment built in conjunction with the aqueduct. The toll house on the New York side of the former aqueduct is locally significant under Criterion A in the areas of commerce and transportation for its association with the aqueduct's conversion and use as a vehicular toll bridge in 1908. The toll house meets Criterion Consideration G (Properties that Have Achieved Significance Within the Past Fifty Years) because it continued to achieve its significance into a period less than fifty years ago.

For the purposes of this CLI, the historic resources at Roebling's Delaware Aqueduct Site span multiple periods of significance based on dates of construction and operation of the "old canal," "new canal," Roebling's Delaware

Aqueduct, and the toll house. The Delaware Aqueduct, located in New York and Pennsylvania, is significant for the period 1847-1898, representing the year construction began and the year its use as an aqueduct ended. For resources in Pennsylvania, there is one period of significance: 1847-1898 (includes construction and use of the "new canal" towpath and retaining walls, and Delaware Aqueduct). For resources in New York, there are two periods of significance: 1825-1898 (includes construction and use of the "old canal" prism, towpath, and retaining walls; "new canal" towpath and retaining walls; and Delaware Aqueduct), and 1908-1979 (construction and use of the Toll House).

ANALYSIS AND EVALUATION SUMMARY AND CONDITION

The physical integrity of Roebbling's Delaware Aqueduct Site is evaluated by comparing landscape characteristics and features present during the primary period of significance – 1825 to 1898 – with the existing conditions as assessed in 2013-14. Many of the site's historic characteristics and features remain today. The impact of the Upper Delaware River valley's natural features on the design and construction of the Delaware & Hudson Canal are still evident in the preserved canal remnants on both banks of the Delaware River and the rehabilitated Delaware Aqueduct. Although the structure no longer functions as an aqueduct transporting canal boats across the river, it now serves as an important vehicular and pedestrian crossing between Pennsylvania and New York. On the Pennsylvania side, remains of the "new canal" dating to 1847-48 can be seen from a section of towpath leading to the former aqueduct. Stone retaining walls that lined the turning basin leading to the former aqueduct are also intact, and the former canal prism nearby is filled in but remains undeveloped and is maintained as lawn. On the New York side, remnants of the "old canal" dating to 1825-28 can be viewed from the park's Towpath Trail. The U-shaped canal prism, towpath, and stone retaining walls continue to illustrate the canal's design. Some portions of the "old canal" prism have been filled in or taken over by successional vegetation, but others seasonally hold water and help visitors understand its former condition. A few remnants of the "new canal" dating to 1847-48 are also in this area, but only a portion of the towpath and stone walls reside on federally-owned property. Vehicular users of the former aqueduct can no longer see the river as they pass through the reconstructed aqueduct trunk, but pedestrians can enjoy the same river and valley views as the canal boats once did from the structure's reconstructed towpaths.

Since the closure and dewatering of the canal in 1898, significant changes have occurred at Roebbling's Delaware Aqueduct Site. The aqueduct trunk and towpaths were removed for the conversion to carriage and motor traffic and development of approach roads to the structure destroyed some of the towpaths and retaining walls. However, the park reconstructed the aqueduct towpaths in 1994. On the Pennsylvania side, portions of the "new canal" prism were filled in by a railroad embankment and realignment of Scenic Drive. Except for two Canal Company buildings (now the Roebbling Inn and the Brown Keller house), canal infrastructure was replaced by a domestic landscape of house lots, yards, and gardens, including a residence at the corner of the approach road and Scenic Drive (Margold house). On the New York side, a toll house was built at the east end of the former aqueduct for the toll collector, and just to the southeast the three-story Highland Bridge Hotel was constructed. A bigger change came with the construction of Route 97 in the 1930s, which destroyed most of the "new canal" and two of its three locks. In the 1990s, the National Park Service constructed parking lots and sidewalks on both sides of Roebbling's Delaware Aqueduct. The addition of a restroom, sidewalks, waysides, trash receptacles, and other small-scale features related to visitor use are generally inconspicuous in the overall landscape.

Overall, Roebbling's Delaware Aqueduct Site is in "fair" condition. The former aqueduct and toll house are in good condition. The canal prism, towpath, and stone retaining walls associated with the "old canal" (1825-28) are in poor to fair condition, while the same features associated with the "new canal" (1847-48) are in poor to good condition. Volunteer vegetation continues to dominate the remnant canal features on the New York side south of the former aqueduct. Many trees are growing adjacent to and within the canal's stone retaining walls, which are causing several wall sections to slump, bulge, and/or collapse. Other wall sections have been overtopped by soil and other material, rendering them partially or completely obscured. Woody vegetation is also taking hold within the canal itself and will eventually spread if unchecked. Surfaces of some parking lots and sidewalks have deteriorated or are uneven and are in need of repair. The park has planned several projects to address these issues, and when completed may improve the overall condition to "good."

Landscape Hierarchy Description:

The National Park Service owns three landscapes within the Upper Delaware Scenic and Recreational River: Zane Grey House, Roebling's Delaware Aqueduct Site, and Corwin Farm.

Landscape Type:

Historic Site

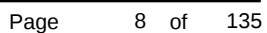
Other Names:

Other Name:	Roebling's Delaware Aqueduct (Roebling Bridge)	Other Name Type:	Current
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Other Name:	Delaware Aqueduct	Other Name Type:	Both Current And Historic
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Site Plan

Cultural Landscapes Inventory



Roebling's Delaware Aqueduct Site Upper Delaware Scenic And Recreational River



Roebeling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River



Site plans for Roebling's Delaware Aqueduct Site. (Olmsted Center for Landscape Preservation--hereafter OCLP--2016)

Concurrence Information

Concurrence Status:

Park Superintendent Concurrence:	Yes
Park Superintendent Date of Concurrence:	08/30/2016

Completion Status Explanatory Narrative:

A Level I Cultural Landscape Inventory was completed in 2003 by Nancy J. Brown and Cheryl Sams. A project aimed at finalizing the CLI was initiated in December 2013, with field work and archival research completed by Jeff Killion and Jaime Young of the Olmsted Center for Landscape Preservation (OCLP). An additional site visit was completed by Margie Coffin Brown and Ashley Braquet, OCLP, in June 2014. Narratives and site plans were finalized by Jeff Killion in March 2016.

Concurrence Graphic Information:

Attachment File Path

historic structures, archeological sites, ethnographic resources and museum objects. For example, the NPS List of Classified Structures (LCS) inventory includes structural features of cultural landscapes, but the CLI takes a more encompassing approach to the properties, inventorying all above-ground features in each park in which the NPS has a legal or mandated interest.

Straddling the states of Pennsylvania and New York, Roebbling's Delaware Aqueduct Site lies within the boundaries of the Upper Delaware Scenic and Recreational River, a national park unit authorized on November 10, 1978, as part of the National Wild and Scenic Rivers System and as a unit of the national park system. The Upper Delaware Scenic & Recreational River (SRR) includes resources associated with the Delaware & Hudson Canal, which have been documented in the National Historic Landmark Program and the National Register for Historic Places.

The Delaware Aqueduct itself was designated a National Historic Landmark (NHL) on November 24, 1968 (#68000051) under the name "Delaware & Hudson Canal." The 1968 documentation identified significance under NHL Criteria I and IV and Theme XVIII (Travel and Communication). The documentation was edited by the NHL Program in 2008, and identified Themes V (Developing the American Economy) and VI (Expanding Science and Technology). Commerce, transportation and engineering were listed as the areas of significance for the period beginning in 1825 when construction of the canal began until 1899 when the growth of the railroads led to the demise of the canal. The documentation noted there were many extant traces of the former 108-mile long canal, and described five well-preserved sections, including the aqueduct built by John Roebbling (located within portions of tracts 101-01 and 101-02). The designation did not describe other canal-era resources located on the Pennsylvania or New York sides of the aqueduct such as the toll house or any remnant canal engineering features. Research for this CLI discovered written notes from 1988 by Mary Curtis, Upper Delaware SRR, which stated that according to Neil Larson of your office, the State of New York considered the entirety of the canal in New York, not just the five specified sites, as eligible for the National Register. Additional written notes between Curtis and Maureen Danaher, NHL Program, reported that the original 1968 NHL nomination was likely intended to cover the entire canal, not just the five sites. However, the update by the NHL Program in 2008 continued to focus on the five sites and did not include the toll house or other remnant canal sections or features.

Evaluations of other historic canal resources on the New York side of the bridge were prepared in the 1980s. The significance of the toll house was described in a National Register Nomination Form prepared in 1983 by Harlan D. Unrau of the NPS. The form, under the name "Delaware Aqueduct," was not submitted to your office or the Keeper of the National Register for concurrence. From 1984-86, your office documented several Delaware & Hudson Canal sites on Building-Structure Inventory Forms. A form for the toll house was prepared by Mary Curtis in 1985, while forms for the original canal and towpath, Lock 70 and Lock 71 were prepared by Charles R. Thomas of the Neversink Valley Area Museum in 1986. The LCS indicates the toll house was determined eligible for listing in the National Register on January 31, 1990, but no supporting documentation has been located to confirm this date.

The NPS's plans to stabilize and restore Roebbling's Delaware Aqueduct to its historic appearance as an aqueduct began in 1980, soon after federal acquisition. A Memorandum of Agreement addressing its reconstruction was signed by representatives of the Advisory Council

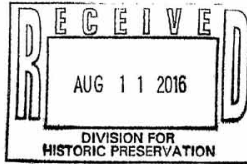
Roebbling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River



IN REPLY REFER TO:
A.1.2 (NER-RSS)

United States Department of the Interior

NATIONAL PARK SERVICE
Northeast Region
United States Custom House
200 Chestnut Street
Philadelphia, PA 19106



AUG 05 2016

Ruth L. Pierpont
Deputy Commissioner for Historic Preservation/ Deputy SHPO
New York State Division for Historic Preservation
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Dear Ms. Pierpont:

Enclosed you will find a copy of the Cultural Landscapes Inventory (CLI) for Roebbling's Delaware Aqueduct Site at Upper Delaware Scenic and Recreational River. We seek to reconfirm our agreement on previously evaluated resources and your concurrence on the status of previously unevaluated resources identified in this CLI for listing in the National Register of Historic Places. The report has been prepared by a team of historical landscape architects with the National Park Service (NPS) Olmsted Center for Landscape Preservation. The CLI program and the enclosed report continue the NPS efforts to update our cultural resource inventories.

Through the CLI program, the NPS is currently in the midst of a nationwide effort to inventory its cultural landscapes. The CLI is conducted in accordance with Section 110 of the National Historic Preservation Act of 1966 (as amended). It is an inventory of baseline information for all historically significant cultural landscapes within the national park system and it examines multiple landscape features that contribute to the significance of historic properties. The CLI process includes gathering information from existing secondary sources and conducting on-site reconnaissance of the existing landscape. The information collected provides a comprehensive look at the historical development and significance of the landscape, placing it in context of the property's overall significance. For landscapes found potentially eligible for the National Register of Historic Places, the evaluation describes their character-defining features and assesses the landscape's overall historical integrity. It also raises questions about the landscape that need further study.

It is important to note that the CLI reports are not intended as comprehensive inventory reports for any one property, although for some properties they provide fuller documentation than for others. For example, the reports do not include a full architectural description of structures, but document structures as elements of the overall landscape and similarly documents other characteristics such as vegetation, spatial organization, and views and vistas. The CLI is one component of the NPS inventory effort that also includes cultural resource inventories for

SHPO (New York) concurrence letter, August 24, 2016 (7 pages).

Roebbling's Delaware Aqueduct Site

Upper Delaware Scenic And Recreational River

on Historic Preservation (December 26, 1985), the SHPOs of Pennsylvania (December 30, 1985) and New York (January 6, 1986), and the NPS Mid-Atlantic Regional Office.

On March 15, 1995, your office concurred with a Determination of Eligibility (DOE) prepared by the NPS for canal features in the 2.95-acre Vollkommer property (tract 104-06), under the name "Delaware & Hudson Canal Remains." Located just south of Roebbling's Delaware Aqueduct, the tract included the old canal prism and associated walls, the old towpath and associated walls, and a portion of the new towpath and towpath retaining walls. The DOE identified national significance under Criterion A in the area of transportation for the canal remains and their retention of original materials and construction techniques, and their association with portions of the Delaware & Hudson Canal built in 1829-1848. The DOE also noted that the ruins contributed to a potential historic district of Roebbling's Delaware Aqueduct and the Delaware & Hudson Canal. The 2.95-acre tract was a portion of a larger 4-acre tract where the new canal prism, towpath, and locks 70, 71, and 72 were built after the completion of the aqueduct. The 4-acre tract was divided between the New York State Department of Transportation and the NPS. As such, the remains of Lock 71 and the former sites of Locks 70 and 72 remained on state-owned lands.

The enclosed CLI for Roebbling's Delaware Aqueduct Site fully evaluates the cultural landscape, particularly the associated landscape characteristics and features, and finds that the site's landscape retains integrity to the areas of conservation, transportation, and engineering. As noted previously, seven of the property's features compiled on the attached list have been listed in or determined eligible for listing in the National Register. The CLI identifies six additional features related to buildings and structures, and views and vistas that also contribute to the significance and historic character of the site's landscape.

We call your particular attention to the Landscape Description, National Register Information and the Statement of Significance, and Analysis and Evaluation Summary in the enclosed CLI.

Based on the CLI, we seek to reconfirm our agreement on previously evaluated resources and your concurrence on the status of resources and features identified in this CLI:

- Roebbling's Delaware Aqueduct Site is primarily significant for the restored and remnant features associated with the construction and operation of the Delaware & Hudson Canal, which transported coal from northeastern Pennsylvania to the Hudson River and New York City from 1825-1898.
- The Delaware Aqueduct itself is a designated National Historic Landmark, and is nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as a key component in the financial success of the Delaware & Hudson Canal and as the nation's oldest wire cable suspension structure, built by John A. Roebbling.
- The remnant canal prisms, towpaths, and stone walls of the canal are also nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as part of the canal's original 1825-1828 route and the new 1847-48 alignment built in conjunction with the aqueduct.

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

I concur with the National Park Service categorizations of the landscape resources and features at
Roebling's Delaware Aqueduct Site, as contributing and non-contributing.

Richard Purpout DSHPO
New York State Historic Preservation Officer

8/24/16
Date

NPS Cultural Landscapes Inventory – Roebling's Delaware Aqueduct Site (New York Side)

Upper Delaware Scenic and Recreational River
List of Contributing and Non-Contributing Landscape Features
July 2016

Contributing Landscape Characteristics & Associated Features

The following landscape characteristics and associated features contribute to the property's historic character, though not all are considered countable resources according to the National Register of Historic Places. Features marked with a (*) were described in the National Historic Landmark documentation on November 24, 1968. Features marked with a (#) were identified as contributing resources by the New York State Historic Preservation Office on March 15, 1995.

Constructed Water Features

- # Old Delaware & Hudson Canal Prism (Structure #7300)

Buildings and Structures

- * Delaware Aqueduct (Roebling Bridge) (7000)
- Wing Walls at New York Abutment
- Delaware Aqueduct Toll House (7250)
- # Old Delaware & Hudson Towpath Retaining Walls (7311)
- # Old Delaware & Hudson Towpath Retaining Walls (7321)
- Old Delaware & Hudson Towpath Retaining Walls (upstream from Aqueduct) (no #)
- # New Delaware & Hudson Towpath Retaining Walls (7211)

Circulation

- # Old Delaware & Hudson Canal Towpath (7310 and 7320)
- # New Delaware & Hudson Canal Towpath (7210)

Views and Vistas

- Views from Roebling's Delaware Aqueduct Towpaths
- Views of Roebling's Delaware Aqueduct from "Old Canal" Towpath (Towpath Trail)
- Views of "Old Canal" Prism from "Old Canal" Towpath (Towpath Trail)

Non-Contributing Landscape Characteristics & Associated Features

Vegetation

- "Old Canal" Prism Vegetation
- Plantings Around Parking Lots and Sidewalks

Buildings and Structures

- NYDOT Flow Diversion Structure (7323)
- Concrete Box Culvert (on "Old Canal" Towpath)
- Two-Pipe Culvert (on "Old Canal" Towpath)
- Non-Canal Stone Walls

Roebling's Delaware Aqueduct Site

Upper Delaware Scenic And Recreational River

Non-Canal Concrete Walls
Culverts, Headwalls, Drop Inlets

Circulation

Approach Road (New York side)
Visitor Parking Lot, Sidewalks, and Steps
Emergency River Access Road
Maintenance Access Road

Small-Scale Features

Lights on Roebling's Delaware Aqueduct
Park Entrance Sign
Waysides
Trash/Recycling Receptacles
Handrails
Wire Chain Gate
Boundary Markers

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

CULTURAL LANDSCAPES INVENTORY
CONCURRENCE FORM

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic and Recreational River

Upper Delaware Scenic and Recreational River concurs with the findings of the Cultural Landscape Inventory (CLI) for the Roebling's Delaware Aqueduct Site, including the following specific components:

MANAGEMENT CATEGORY: Must Be Preserved and Maintained

CONDITION ASSESSMENT: Fair

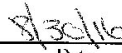
Good: indicates the inventory unit shows no clear evidence of major negative disturbance and deterioration by natural and/or human forces. The inventory unit's cultural and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

Fair: indicates the inventory unit shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within 3-5 years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the character defining elements will cause the inventory unit to degrade to a poor condition.

Poor: indicates the inventory unit shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural values.

The Cultural Landscape Inventory for the Roebling's Delaware Aqueduct Site is hereby approved and accepted.


Superintendent, Upper Delaware Scenic and Recreational River


Date

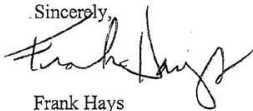
Park concurrence form, August 30, 2016.

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

- The toll house on the New York side of the bridge is locally significant under Criterion A in the areas of commerce and transportation for its association with the aqueduct's conversion and use as a vehicular toll bridge in 1908.
- The significance of the toll house meets Criterion Consideration G (Properties that Have Achieved Significance Within the Past Fifty Years) because it continued to achieve local significance into a period less than fifty years ago. The toll house was used to collect tolls across the former aqueduct from 1908 to 1979, a period of 69 years, and was an important source of revenue for owners of the structure during that time.
- The historic resources in Roebling's Delaware Aqueduct Site span multiple periods of significance based on dates of construction and operation of the old canal, new canal, Delaware Aqueduct, and the toll house. The Delaware Aqueduct, located in New York and Pennsylvania, is significant for the period 1847-1898, which begins with the year construction and ends when the structure was closed to boat traffic. The old canal prism, towpath, and retaining walls and the new canal towpath and retaining walls are significant for the period 1825-1898, which begins with the year of construction and ends when the canal was closed to boat traffic. The toll house is significant for the period 1908-1979, which begins with the year of construction and continues through its use as a toll facility.
- The categorization of contributing and non-contributing landscape characteristics and features (see attached list).

If you concur with these findings, we ask that you please sign on the space provided and return this letter to Jeff Killion, CLI Coordinator (Address: National Park Service, Olmsted Center for Landscape Preservation, 15 State Street, 6th Floor, Boston, MA 02109). We would appreciate your response at your earliest convenience. Thank you for your attention to this inventory. Should you have any questions, please feel free to contact Mr. Killion at 617-223-5053.

Sincerely,



Frank Hays
Associate Regional Director, Resource Stewardship

Enclosure

cc:

Superintendent, Upper Delaware Scenic and Recreational River

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River



Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

September 9, 2016

Mr. Jeff Killion
CLI Coordinator, National Park Service
Olmstead Center for Landscape Preservation
15 State Street, 6th Floor
Boston, MA 02109

RE: ER 2016-111-042-F; NPS: Roebling's Delaware Aqueduct Site, Cultural Landscapes
Inventory; Lackawaxen Township, Pike County

Dear Mr. Killion:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

We have reviewed the Roebling's Delaware Aqueduct Site Cultural Landscape Inventory (CLI; August 2016). The report provides a very concise and detailed history of the site and surrounding area associated with the aqueduct as well as the Delaware & Hudson Canal. We offer the following comments with regards to the findings of the landscape inventory report:

We have concerns regarding the separate periods of significance for the Pennsylvania and New York sides and suggest that the National Park Service consider extending the period of significance on both sides of the river from 1825 through to at least the early twentieth century to capture the importance of the aqueduct in transporting logs from Sullivan County to the rail yard in Lackawaxen. While we understand that the toll house was constructed during this time on the New York side, the aqueduct accommodated traffic between New York and Pennsylvania and therefore, the use and history is interconnected at this location. The aqueduct itself continued to be maintained and altered in the 20th century, as part of changes in use, as did the approaches on both sides. The actual end date of the period of significance would have to be tied to a specific context and theme that would require further documentation to our office in order to provide meaningful comment. In addition, we suggest inclusion of the dates of construction of features in the inventory table for ease of review and understanding of resources/features.

For questions concerning this review and/or for future consultation, please contact Emma Diehl at emdiehl@pa.gov or (717) 787-9121.

Sincerely,

Douglas C. McLearn, Chief
Division of Archaeology and Protection

Commonwealth Keystone Building | 400 North Street | 2nd Floor | Harrisburg, PA 17120 | 717.783.8947

SHPO (Pennsylvania) concurrence letter, September 9, 2016 (7 pages).



United States Department of the Interior

NATIONAL PARK SERVICE
Northeast Region
United States Custom House
200 Chestnut Street
Philadelphia, PA 19106

IN REPLY REFER TO:
A.1.2. (NER-RSS)

AUG 05 2016

Andrea MacDonald, Bureau Director
Deputy State Historic Preservation Officer
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Dear Ms. MacDonald:

Enclosed you will find a copy of the Cultural Landscapes Inventory (CLI) for Roebling's Delaware Aqueduct Site at Upper Delaware Scenic and Recreational River. We seek to reconfirm our agreement on previously evaluated resources and your concurrence on the status of previously unevaluated resources identified in this CLI for listing in the National Register of Historic Places. The report has been prepared by a team of historical landscape architects from the National Park Service (NPS) Olmsted Center for Landscape Preservation. The CLI program and the enclosed report continue the NPS efforts to update our cultural resource inventories.

Through the CLI program, the NPS is currently in the midst of a nationwide effort to inventory its cultural landscapes. The CLI is conducted in accordance with Section 110 of the National Historic Preservation Act of 1966 (as amended). It is an inventory of baseline information for all historically significant cultural landscapes within the national park system, and it examines multiple landscape features that contribute to the significance of historic properties. The CLI process includes gathering information from existing secondary sources and conducting on-site reconnaissance of the existing landscape. The information collected provides a comprehensive look at the historical development and significance of the landscape, placing it in context of the property's overall significance. For landscapes found potentially eligible for the National Register of Historic Places, the evaluation describes their character-defining features and assesses the landscape's overall historical integrity. It also raises questions about the landscape that need further study.

It is important to note that the CLI reports are not intended as comprehensive inventory reports for any one property, although for some properties they provide fuller documentation than for others. For example, the reports do not include a full architectural description of structures, but document structures as elements of the overall landscape, and similarly documents other

characteristics such as vegetation, spatial organization and views and vistas. The CLI is one component of the NPS inventory effort that also includes cultural resource inventories for historic structures, archeological sites, ethnographic resources and museum objects. For example, the NPS List of Classified Structures inventory includes structural features of cultural landscapes, but the CLI takes a more encompassing approach to the properties, inventorying all above-ground features in each park in which the NPS has a legal or mandated interest.

Straddling the states of Pennsylvania and New York, Roebling's Delaware Aqueduct Site lies within the boundaries of the Upper Delaware Scenic and Recreational River, a national park unit authorized on November 10, 1978, as part of the National Wild and Scenic Rivers System and as a unit of the national park system. The Upper Delaware Scenic & Recreational River (SRR) includes resources associated with the Delaware & Hudson Canal, which have been documented in the National Historic Landmark Program and the National Register for Historic Places.

The Delaware Aqueduct itself was designated a National Historic Landmark (NHL) on November 24, 1968 (#68000051) under the name "Delaware & Hudson Canal." The 1968 documentation identified significance under NHL Criteria I and IV and Theme XVIII (Travel and Communication). The documentation was edited by the NHL Program in 2008, and identified Themes V (Developing the American Economy) and VI (Expanding Science and Technology). Commerce, transportation and engineering were listed as the areas of significance for the period beginning in 1825 when construction of the canal began until 1899 when the growth of the railroads led to the demise of the canal. The documentation noted there were many extant traces of the former 108-mile long canal, and described five well-preserved sections, including the aqueduct built by John Roebling (located within portions of tracts 101-01 and 101-02). The designation did not describe other canal-era resources located on the Pennsylvania or New York sides of the aqueduct, such as the toll house or any remnant canal engineering features. The update by the NHL Program in 2008 continued to focus on the five sites and did not include the toll house or other remnant canal sections or features.

The National Park Service's plans to stabilize and restore Roebling's Delaware Aqueduct to its historic appearance as an aqueduct began in 1980, soon after federal acquisition. A Memorandum of Agreement addressing its reconstruction was signed by representatives of the Advisory Council on Historic Preservation (December 26, 1985), the State Historic Preservation Officer (SHPO) of Pennsylvania (December 30, 1985) and New York (January 6, 1986), and the National Park Service Mid-Atlantic Regional Office.

Except for the Delaware Aqueduct, evaluations of historic canal resources on the Pennsylvania side of the bridge are incomplete, as no National Register Nomination Forms or correspondences with the Pennsylvania SHPO have been found. Although the List of Classified Structures lists concurrence dates for three canal features as September 12, 1995 (the date of a Determination of Eligibility for the South District Ranger Station/Corwin Farm in New York), no supporting documentation has been located.

The enclosed CLI for Roebling's Delaware Aqueduct Site fully evaluates the cultural landscape, particularly the associated landscape characteristics and features, and finds that the site's landscape retains integrity to the areas of conservation, transportation and engineering. As noted

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

previously, one of the property's features compiled on the attached list has been listed in the National Register. The CLI identifies five additional features related to buildings and structures, circulation, views and vistas that also contribute to the significance and historic character of the site's landscape.

We call your particular attention to the Landscape Description, National Register Information and the Statement of Significance and Analysis and Evaluation Summary in the enclosed CLI.

Based on the CLI, we seek to reconfirm our agreement on previously evaluated resources and your concurrence on the status of resources and features identified in this CLI:

- Roebling's Delaware Aqueduct Site is primarily significant for the restored and remnant features associated with the construction and operation of the Delaware & Hudson Canal, which transported coal from northeastern Pennsylvania to the Hudson River and New York City from 1825-1898.
- The Delaware Aqueduct itself is a designated National Historic Landmark and is nationally significant under criteria A and C in the areas of commerce, transportation and engineering as a key component in the financial success of the Delaware & Hudson Canal and as the nation's oldest wire cable suspension structure, built by John A. Roebling.
- The remnant canal towpath and stone walls are also nationally significant under criteria A and C in the areas of commerce, transportation and engineering as part of the canal's 1847-48 alignment built in conjunction with the aqueduct.
- The historic resources in Roebling's Delaware Aqueduct Site span multiple periods of significance based on dates of construction and operation of the new canal and Delaware Aqueduct. The Delaware Aqueduct, located in New York and Pennsylvania, is significant for the period 1847-1898, which begins with the year construction and ends when the structure was closed to boat traffic. The new canal towpath and retaining walls are also significant for the period 1847-1898, which begins with the year of construction and ends when the canal was closed to boat traffic.
- The categorization of contributing and non-contributing landscape characteristics and features (see attached list).

If you concur with these findings, we ask that you please sign on the space provided and return this letter to Jeff Killion, CLI Coordinator (Address: National Park Service, Olmsted Center for Landscape Preservation, 15 State Street, 6th Floor, Boston, MA 02109). We would appreciate your response at your earliest convenience. Thank you for your attention to this inventory. Should you have any questions, please feel free to contact Mr. Killion at 617-223-5053.

Sincerely,



Frank R. Hays
Associate Regional Director
Resource Stewardship and Science

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

Enclosure

cc:
Superintendent, Upper Delaware Scenic and Recreational River

I concur with the National Park Service categorizations of the landscape resources and features at
Roebling's Delaware Aqueduct Site, as contributing, non-contributing and undetermined.

Pennsylvania State Historic Preservation Officer

Date

NPS Cultural Landscapes Inventory – Roebling's Delaware Aqueduct Site (Pennsylvania Side)

Upper Delaware Scenic and Recreational River

List of Contributing and Non-Contributing Landscape Features

July 2016

Contributing Landscape Characteristics & Associated Features

The following landscape characteristics and associated features contribute to the property's historic character, though not all are considered countable resources according to the National Register of Historic Places. Features marked with a (*) were described in the National Historic Landmark documentation on November 24, 1968.

Buildings and Structures

* Delaware Aqueduct (Structure #7000)

New Delaware & Hudson Canal Upstream Wall Ruin (7005)

New Delaware & Hudson Canal Downstream Wall Ruin (7006)

Circulation

New Delaware & Hudson Canal Towpath Ruin (7007)

Views and Vistas

Views from Roebling's Delaware Aqueduct Towpaths

View of Roebling's Delaware Aqueduct from Overlook at Visitor Parking Lot

Non-Contributing Landscape Characteristics & Associated Features

Vegetation

Plantings Around Parking Lots and Sidewalks

Margold Lot Trees, Shrubs, and Lawns

Buildings and Structures

Margold House

Margold Garage

Restroom

Boat Barn

Storage Shed

Maintenance Building

Non-Canal Stone Walls

Non-Canal Concrete Walls

Culverts, Headwalls, Drop Inlets

Circulation

Approach Road (Pennsylvania side)

Visitor Parking Lot, Sidewalks, Steps, and Overlook

Emergency River Access Road

Margold House Walks

Gravel Driveway to Boathouse and Storage Shed
Riverbank Steps
Maintenance Driveways

Small-Scale Features

Lights on Roebling's Delaware Aqueduct
Park Entrance Sign
Waysides/Information Signs
Trash/Recycling Receptacles
Pet Waste Station
Bicycle Rack
Metal Handrails
Split Rail Fence
Flag Pole
Bollards
Utility Poles
Septic Cleanouts
Well Covers
Bluestone/Masonry Slab on Concrete Box
Picnic Tables
Benches
Boundary Markers
Bridge Sculpture

Undetermined Landscape Characteristics & Associated Features

Constructed Water Features

New Delaware & Hudson Canal Prism

Cultural Landscapes Inventory
CLI Updates Certification Form
2025

Upper Delaware Scenic and Recreational River

Cowen Farm, Roebling’s Delaware Aqueduct Site, Zane Grey House

Upper Delaware Scenic and Recreational River concurs with the updates for the following CLIs, including:

CONDITION ASSESSMENT: Fair – Cowen Farm
 Fair – Roebling’s Delaware Aqueduct Site
 Fair – Zane Grey House

Good: indicates the inventory unit shows no clear evidence of major negative disturbance and deterioration by natural and/or human forces. The inventory unit’s cultural and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

Fair: indicates the inventory unit shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within 3-5 years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the character defining elements, will cause the inventory unit to degrade to a poor condition.

Poor: indicates the inventory unit shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural values.

The CLI Updates at Upper Delaware Scenic and Recreational River are hereby approved and accepted.

JESSICA WEINMAN	Digitally signed by JESSICA WEINMAN Date: 2025.09.29 07:52:46 -04'00'	9/29/2025
Acting Superintendent, Upper Delaware Scenic and Recreational River		Date

Park concurrence form, September 29, 2025.

Revision:

Revised By	Type of Revision	Revision Date	Revision Narrative
Jeff Killion	CLI Update	09/29/2025	Three levels of effort have been developed for CLI Updates: A, B, and C. Level C is limited to a condition reassessment of the landscape; Level B includes C and is a targeted update of select data fields; Level A includes C and is a comprehensive update of all data fields. This 2025 update to the Roebling's Delaware Aqueduct Site CLI has been conducted at a Level C effort. See Landscape Documents in CRIS-CL for correspondences with park.

Geographic Information

State and County:

State	County
Pennsylvania	Pike County
New York	Sullivan County
Pennsylvania	Potter County

Size (Acres): 9.99

Land Tract Number(s)

Pennsylvania: 101-02, 101-07, 101-10, 101-11, 101-13
New York: 101-01, 101-03, 101-05, 101-06, 104-06

Boundary Description:

Roebling's Delaware Aqueduct Site is comprised of eleven land tracts (six in Pennsylvania and five in New York) for a total of 9.99 acres. The northwestern corner of the boundary is located on the Pennsylvania side of the Delaware River along Scenic Drive at the point where it curves east heading toward the river. The following boundary measurements are approximate lengths.

From the starting point at the northwest corner, the boundary line heads east following Scenic Drive about 130 feet, turns south for 100 feet, turns east for 300 feet to the river's edge, turns south along the river for 85 feet, turns west for 330 feet, turns southeast for 285 feet, turns east for 115 feet back to the river's edge, turns south for 20 feet, turns west for 18 feet, and turns south for 35 feet. At this point, the boundary heads east for 415 feet, crossing the Delaware River to the New York side.

After crossing the river, the boundary then heads north for 52 feet, turns east for 90 feet, turns north for 490 feet, turns north-northeast for 250 feet, turns north-northeast again for 200 feet, turns east toward the highway for 90 feet, turns south-southwest along the highway for 370 feet, turns south for 450 feet, turns south-southeast for 100 feet, turns south across the former aqueduct's approach road for 125 feet, turns west for 30 feet, turns south for 20 feet, turns west for 30 feet, turns south for 125 feet, turns east to the highway for 50 feet, turns south-southeast paralleling the highway for 260 feet, turns south-southeast paralleling the highway again for 625 feet, turns southeast paralleling the highway for 370 feet, turns west for 125 feet, turns northwest for 425 feet, turns north-northwest for 900 feet, and turns north for 40 feet. At this point the boundary heads west for 415 feet, crossing the Delaware River to the Pennsylvania side.

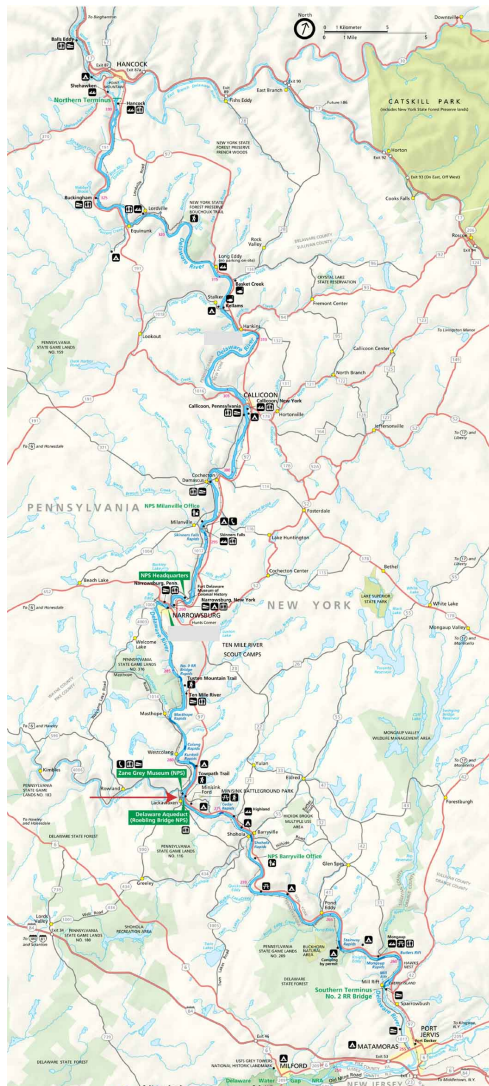
After crossing the river, the boundary then heads south for 30 feet, turns southeast toward the river for 60 feet, turns south along the river 190 feet, turns west for 60 feet, turns north for 90 feet, turns west for 90 feet, turns west-northwest for 60 feet, turns west for 60 feet, turns south along Scenic Drive for 110 feet, turns west for 20 feet, south-southeast along Scenic Drive for 90 feet, turns northwest for 180 feet, turns north-northwest for 140 feet, turns north for 60 feet, turns east-northeast for 60 feet, turns northeast toward Scenic Drive for 50 feet, and then along Scenic Drive for 575 feet back to start point.

Boundary Coordinates

Source	Type of Point	Latitude	Longitude	Narrative
	Point	41.482706	-74.984478	

Roebling's Delaware Aqueduct Site Upper Delaware Scenic And Recreational River

Location Map:



Map of the Upper Delaware Scenic and Recreational River. A red arrow indicates Roebling's Delaware Aqueduct Site. (NPS Park Map, annotated by OCLP)

Regional Landscape Contexts:

Type of Context: Cultural

Description:

Land areas in the Upper Delaware River corridor are rural in character, consisting of large expanses of forest broken by occasional farms, settlements, and low-lying marsh areas along the river. Over 90 percent of the land in the river corridor is in private ownership. Public land consists of state forests, local parks, and boating and fishing access sites, and as of this writing the National Park Service owns 30.4 acres. Most settlement is in the form of small unincorporated hamlets, although numerous dispersed home sites are also located throughout the valley. Commercial development is found primarily in the hamlets, but canoe liveries and campgrounds are located at several points along the river shoreline. Within the corridor, the largest settled areas are at Narrowsburg and Callicoon, New York, with numerous smaller towns, townships, and hamlets along both sides of the river. (EIS 1987: 55)

The Upper Delaware valley is rich in structures that reflect its history and cultural development. Prehistoric archeological sites, historic architecture, and historic engineering and industrial sites are all abundant in the valley. Since the late 1700s, the Upper Delaware region has exported stone and timber for commercial purposes. In the 1800s canals were built to transport coal to New York City, followed soon thereafter by the railroads which eventually replaced them. With the advent of the railroads, the area began to attract vacationing city-dwellers, including author Zane Grey who established a home on the river in Lackawaxen, Pennsylvania and penned his earliest articles and books there, including "Riders of the Purple Sage." After declines in tourism during the Depression and World War II, a major recreation and seasonal/retirement home economy began to develop by the 1970s. Today recreationists travel to the Upper Delaware region from the New York City metropolitan area, northeastern Pennsylvania and the Philadelphia area, Binghamton, New York, and western New England metropolitan areas. (EIS 1987: 55-56)

The Upper Delaware's accessibility to major metropolitan areas was established by the railroad in the 1870s and then with the construction of State Route 97 on the New York side of the river in the 1930s. Access has been improved since by the construction of Interstates 80, 81, 84 and New York's Highway 17 and Interstate 86. These highways bring the Upper Delaware within a two to four hour drive of the region's major population centers. The region is experiencing growth pressures from the expanding resort and tourism-based economies of the Catskills in New York and the Poconos in Pennsylvania, both of which border the river corridor. (EIS 1987: 56)

Type of Context: Physiographic

Description:

The Upper Delaware River is one of the few remaining examples of a free-flowing, relatively undeveloped river in the Appalachian Plateaus physiographic region. Originating in New York's Catskill Mountains, the river's eastern and western branches meet at Point Mountain near Hancock, New York. The Upper Delaware Scenic and Recreational River begins here and flows southeasterly for 73.4 river miles to Sparrowbush, just north of Port Jervis, New York (see Regional Landscape Context graphic). (EIS 1987: 54)

Rolling wooded hills ranging in elevation from 800 to 2,000 feet above sea level surround the river valley. The shape of the valley changes from narrow, steeply cut walls and high bluffs to broad U-shaped sections with low-lying lands along the river. Hardwoods such as oak, beech, birch, and maple are found in the northern portion of the corridor, while softwoods such as white pine and hemlock are more prominent in the southern portion. (EIS 1987: 54-55)

Type of Context: Political

Description:

The Upper Delaware River delineates the Commonwealth of Pennsylvania's northeastern boundary with a portion of the State of New York's southwestern boundary. The river is bordered in Pennsylvania by the seven townships of Buckingham, Manchester, Damascus, Berlin, Lackawaxen, Shohola, and Westfall (in Wayne and Pike Counties) and in New York by the eight towns of Hancock, Fremont, Delaware, Cohecton, Tusten, Highland, Lumberland, and Deerpark (in Delaware, Sullivan, and Orange Counties). Roebling's Delaware Aqueduct connects the township of Lackawaxen, Pennsylvania and town of Highland, New York. (EIS 1987: 54)

Management Information

General Management Information

Management Category: Must be Preserved and Maintained

Management Category Date: 08/30/2016

Management Category Explanatory Narrative:

Roebling's Delaware Aqueduct Site meets the criteria for the "Must be Preserved and Maintained" management category. The Delaware Aqueduct is nationally significant as defined by National Historic Landmark criteria, having been designated on November 24, 1968. The structure was built in 1847-48 as part of the Delaware & Hudson Canal. The adjacent remains of the canal, built in 1825-52, include the "old canal" prism and towpaths, "new canal" prism and towpaths, and numerous stone walls that serve as the setting for this nationally significant structure.

Management Agreements:

Legal Interests:

Type of Interest: Fee Simple

Narrative:

Type of Interest: Less Than Fee Simple

Narrative: All tracts are fee simple except tract 101-06 (0.28 acres), a less than fee simple easement with Sullivan County on the New York side, north of Roebling's Delaware Aqueduct.

Located in managed wilderness?: Unknown

Adjacent Lands Information

Do Adjacent Lands Contribute? Yes

Adjacent Lands Narrative:

Adjacent lands are those lands that contribute to the significance of the property but are situated outside the cultural landscape boundary, either inside or outside the park boundaries (see Adjacent Lands graphic).

Adjacent lands that contribute on the Pennsylvania side include a canal-era house between the bridge and Scenic Drive (owned by Alma Brown Keller) and a house and carriage house built in c.1870 by the Delaware & Hudson Canal Company along Scenic Drive (now the Roebling Inn). The railroad tracks immediately to the west of park-owned lands were built by the New York & Erie Railroad in the 1850s to compete with the Delaware & Hudson Canal Company, and originally crossed over the canal in this vicinity. Adjacent lands that contribute on the New York side include several features that help interpret the use of the bridge as an aqueduct. Remnant stone walls of the aqueduct's turning basin are located across State Route 97 from the bridge, and indicate where the canal boats turned from the aqueduct to line up with the series of three locks that would return the boats to the original canal prism. One of the remaining locks of this system, Lock 71, is located on the New York Department of Transportation's land but is in close proximity to the park's Towpath Trail. However, this resource is threatened because the lock's walls are beginning to fail.

Adjacent Lands Graphic:



Canal-era house between the former aqueduct and Scenic Drive (Brown Keller house).



Former Canal Company house (Roebling Inn).



Turning basin and towpath walls at the intersection of Route 79 and Old Minisink Road.



Collapsed wall at Lock 71 with Route 79 in background.



Interior view of Lock 71.

National Register Information

National Register of Historic Places

Documentation Status: Entered Inadequately Documented

Documentation Narrative Description:

Straddling the states of Pennsylvania and New York, Roebbling's Delaware Aqueduct Site lies within the boundaries of the Upper Delaware Scenic and Recreational River, a national park unit authorized on November 10, 1978, as part of the National Wild and Scenic Rivers System and as a unit of the national park system. The Upper Delaware Scenic & Recreational River includes resources associated with the Delaware & Hudson Canal, which have been documented in the National Historic Landmark Program and the National Register of Historic Places.

The Delaware Aqueduct itself was designated a National Historic Landmark (NHL) on November 24, 1968 (#68000051) under the name "Delaware & Hudson Canal." The 1968 documentation identified significance under NHL Criteria I and IV and Theme XVIII (Travel and Communication). The documentation was edited by the NHL Program in 2008, and identified Themes V (Developing the American Economy) and VI (Expanding Science and Technology). Commerce, transportation, and engineering were listed as the areas of significance for the period beginning in 1825 when construction of the canal began, to 1899 when the growth of the railroads led to the demise of the canal. The documentation noted there were many extant traces of the former 108-mile long canal, and described five well-preserved sections, including the aqueduct built by John Roebbling (located within portions of tracts 101-01 and 101-02). The designation did not describe other canal-era resources located on the Pennsylvania or New York sides of the aqueduct. Research for this CLI discovered written notes from 1988 by Mary Curtis, UPDE, which stated that according to Neil Larson of the New York State Historic Preservation Office (SHPO), the state considered the entirety of the canal in New York, not just the five specified sites, as eligible for the National Register. Additional written notes between Curtis and Maureen Danaher, NHL Program, reported that the original 1968 NHL nomination was likely intended to cover the entire canal, not just the five sites. However, the update by the NHL Program in 2008 continued to focus on the five sites and did not include the toll house or other remnant canal sections or features.

Evaluations of other historic canal resources on the New York side of Roebbling's Delaware Aqueduct were prepared in the 1980s. The significance of the toll house was described in a National Register Nomination Form prepared in 1983 by Harlan D. Unrau of the National Park Service. The form, under the name "Delaware Aqueduct," was not submitted to the New York SHPO or the Keeper of the National Register for concurrence. From 1984-86, the State of New York's Division of Historic Preservation documented several Delaware & Hudson Canal sites on Building-Structure Inventory Forms. A form for the toll house was prepared by Mary Curtis in 1985, while forms for the original canal and towpath, Lock 70, and Lock 71 were prepared by Charles R. Thomas of the Neversink Valley Area Museum in 1986. The List of Classified Structures (LCS) indicates the toll house was determined eligible for listing in the National Register on January 31, 1990, but no supporting documentation has been located to confirm this date.

The National Park Service's plans to stabilize and restore Roebbling's Delaware Aqueduct to its historic appearance as an aqueduct began in 1980, soon after federal acquisition. A Memorandum of Agreement addressing its reconstruction was signed by representatives of the Advisory Council on Historic Preservation (December 26, 1985), the SHPOs of Pennsylvania (December 30, 1985) and New York (January 6, 1986), and the National Park Service Mid-Atlantic Regional Office.

On March 15, 1995, the New York State SHPO concurred with a Determination of Eligibility (DOE) prepared by the National Park Service for canal features in the 2.95-acre Vollkommer property (tract 104-06), under the name "Delaware & Hudson Canal Remains." Located just south of Roebbling's Delaware Aqueduct, the tract included the "old canal" prism and associated walls, the old towpath and associated walls, and a portion of the new towpath and towpath retaining walls. The DOE identified national

significance under Criterion A in the area of transportation for the canal remains and their retention of original materials and construction techniques, and their association with portions of the Delaware & Hudson Canal built in 1829-1848. The DOE also noted that the ruins contributed to a potential historic district of Roebeling's Delaware Aqueduct and the Delaware & Hudson Canal. The 2.95-acre tract was a portion of a larger 4-acre tract where the "new canal" prism, towpath, and locks 70, 71, and 72 were built after the completion of the aqueduct. The 4-acre tract was divided between the New York State Department of Transportation and the National Park Service. As such, the remains of Lock 71 and the former sites of Locks 70 and 72 remained on state-owned lands.

Except for Roebeling's Delaware Aqueduct, evaluations of historic canal resources on the Pennsylvania side of the bridge are unknown, as no National Register Nomination Forms or correspondences with the Pennsylvania SHPO have been found. Although the LCS lists concurrence dates for three canal features as September 12, 1995 (the date of the DOE for South District Ranger Station/Corwin Farm), no supporting documentation has been located.

According to research conducted for this CLI and the categories of National Register documentation outlined in the "CLI Professional Procedures Guide," the areas and period of significance for Roebeling's Delaware Aqueduct Site are inadequately documented in the National Register and in subsequent consultations with the New York SHPO. The existing documentation does not adequately describe the site's historic resources that contribute to its significance. Therefore, for purposes of the CLI, Roebeling's Delaware Aqueduct Site is considered "Entered-Inadequately Documented."

Eligibility: Eligible - SHPO/THPO Consensus Determination

Concurrence Eligibility Date: 09/09/2016

Concurrence Narrative:

Concurrence on the findings of this report from the New York SHPO was received on August 24, 2016. The New York SHPO had no review comments.

Concurrence from the Pennsylvania SHPO was received on September 9, 2016. The Pennsylvania SHPO recommended changing the period of significance to "1825-early nineteenth century" for the Pennsylvania side of the aqueduct to acknowledge the early transportation of logs to the Lackawaxen railyard. However, the Delaware Aqueduct was not in operational until the spring of 1849. In addition, transport of logs did not occur until around 1908. Except for the toll house, there are no historic resources that contribute to this local area of significance. Therefore, the Pennsylvania SHPO's recommendations have not been made to the report.

Significance Level: National

Contributing: Individual

Classification: District

Statement of Significance for National Register of Historic Places:

Roebeling's Delaware Aqueduct Site is primarily significant for the restored and remnant features associated with the construction and operation of the Delaware & Hudson Canal, which transported coal from northeastern Pennsylvania to the Hudson River where it was loaded on barges and transported to New York City and the east coast from 1825-1898. The Delaware Aqueduct (Roebeling Bridge), built by John A. Roebeling, is itself a designated National Historic Landmark and nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as a key component in the financial

success of the canal and as the nation's oldest wire cable suspension structure with its historic elements intact. The remnant canal prisms, towpaths, and stone walls of the canal are also nationally significant under criteria A and C in the areas of commerce, transportation, and engineering as part of the canal's original 1825-28 route and the new 1847-48 alignment built in conjunction with the aqueduct. The toll house on the New York side of the former aqueduct is locally significant under Criterion A in the areas of commerce and transportation for its association with the aqueduct's conversion and use as a vehicular toll bridge in 1908. The toll house meets Criterion Consideration G (Properties that Have Achieved Significance Within the Past Fifty Years) because it continued to achieve its significance into a period less than fifty years ago.

For the purposes of this CLI, the historic resources at Roebbling's Delaware Aqueduct Site span multiple periods of significance based on dates of construction and operation of the "old canal," "new canal," Delaware Aqueduct, and the toll house. The Delaware Aqueduct, located in New York and Pennsylvania, is significant for the period 1847-1898, representing the year construction began and the year its use as an aqueduct ended. For resources in Pennsylvania, there is one period of significance: 1847-1898 (includes construction and use of the "new canal" towpath and retaining walls, and Delaware Aqueduct). For resources in New York, there are two periods of significance: 1825-1898 (includes construction and use of the "old canal" prism, towpath, and retaining walls; "new canal" towpath and retaining walls; and Delaware Aqueduct), and 1908-1979 (construction and use of the Toll House).

CRITERION A

Commerce and Transportation (Canal and Former Aqueduct):

The Delaware & Hudson Canal is nationally significant under Criterion A in the areas of commerce and transportation. Constructed in 1825-28 by Philadelphia merchants William and Maurice Wurts, the canal was the primary waterway linking the coal fields of northeastern Pennsylvania with the Hudson River and markets in New York City. The canal stretched 108 miles from Honesdale, Pennsylvania, to Kingston, New York, and soon became America's first privately owned million-dollar enterprise. As the demand for anthracite coal increased, the Delaware & Hudson Canal Company enlarged the canal and locks on three occasions in the 1840s and early 1850s, making possible the use of larger boats with greater capacity each time and thus improving efficiency. During the 1860s when anthracite coal was the chief fuel utilized by American industry and likewise a significant domestic need, northeastern Pennsylvania produced from 40 to 50 percent of the nation's entire supply, with the Delaware & Hudson Canal carrying the greater share of it to the tidewater. The canal remained an essential artery for the transportation of this material until its effectiveness was supplanted by railroad transportation, leading to its ultimate demise and closure in 1898. (NHL Documentation 1968: 7; Foundation Document 2014: 66)

Roebbling's Delaware Aqueduct is nationally significant under Criterion A in the areas of commerce and transportation. In 1847, the Delaware & Hudson Canal Company commissioned John A. Roebbling to build aqueducts that would carry the canal boats across the Delaware River, at its confluence with the Lackawaxen River. The two structures were intended to replace a rope ferry that pulled boats across the Delaware from the controlled confines of the canal. The ferry crossing had long been a bottleneck in the canal system, often delayed by high water and ice, and made perilous by timber raft traffic floating downstream. The construction of the Delaware Aqueduct, along with another aqueduct on the Lackawaxen River and a series of new locks on the New York side of the Delaware River, greatly improved efficiency in this portion of the canal. The Delaware Aqueduct survived the closing of the canal in 1898 because of its strategic location as a river crossing, and in 1908 was converted into a vehicular toll bridge. Following closure of the structure for restoration and rehabilitation from 1980-1987, Roebbling's Delaware Aqueduct has continued in that role (without tolls). It was the largest of four aqueducts built on the Delaware & Hudson Canal by John Roebbling, and the only one that remains within the former canal system. (HABS 1988: Sht. 2/4)

Commerce and Transportation (Toll House):

The toll house is locally significant under Criterion A in the areas of commerce and transportation for its association with the conversion of the Delaware Aqueduct to a privately-owned highway bridge. In 1908, Charles Spruks bought the abandoned aqueduct to transport timber from his lands in New York to coal mine customers in Pennsylvania. As a side business, he built the toll house on the New York end of the structure in 1908 to collect fees from local travelers. The two-story 26 by 17-foot frame building was set

into the massive stone retaining wall adjacent to the structure's northeast cable anchor. The first floor was at road level, where tolls were collected by Spruiks and subsequent owners until 1979. The building originally served as a residence for toll keepers and bridge workers, but later was converted into an office and storage area. The toll house was rehabilitated by the National Park Service in 1989-90 and is currently used for interpretive exhibits. (National Register draft 1983: Sec.7; LCS 2016; HAER 1988: Sht 1/3)

CRITERION C

Engineering (Canal and Former Aqueduct):

The Delaware & Hudson Canal and Roebbling's Delaware Aqueduct are nationally significant under Criterion C in the area of engineering. The 108-mile-long canal was constructed by the Delaware & Hudson Canal Company in 1825-28 to transport anthracite coal from northeastern Pennsylvania to the industrial and domestic furnaces of New York. At the confluence of the Delaware and Lackawaxen rivers, the canal originally tracked easterly along the north bank of the Lackawaxen, crossed the Delaware via a rope ferry to a guardlock at the east end of slackwater dam, and continued southerly along the east bank of the Delaware. Stone retaining walls supported the hand-dug canal prism and adjacent towpaths. (Dekin 1983: 3-84; NHL 1968: n.p.)

To eliminate the need for the chronically slow and dangerous rope ferry across the Delaware River, Chief Engineer Russell F. Lord of the Delaware & Hudson Canal Company proposed an alternative canal route on land south of the confluence. The new alignment required the construction of an aqueduct on the Lackawaxen and another aqueduct on the Delaware just below the slackwater dam. New sections of canal and towpaths lined with stone walls were constructed along the new route, as well as three new stone-lined locks (#s 70-72) on the east bank of the Delaware to handle the 32-foot grade change from the aqueduct to its junction with the original canal. Turning basins were built at each end of the aqueduct, but the basin on the New York side was larger to allow boats to make the sharp turn between the aqueduct and the new locks. The locks themselves were spaced close together, between 250-350 feet apart, and were served by a lock house adjacent to Lock 71 and other supporting structures. The abandoned portion of the original canal passing under the aqueduct was retained as a feeder canal, funneling water from the slackwater dam to its junction with the "new canal" just south of Lock 70. (HAER 1988: Sht 2/4)

Instead of conventional trussed structures, John A. Roebbling advocated for the construction of suspension aqueducts over the rivers, which needed only three piers for support, leaving more room for the flow of water, ice, and river traffic. In 1847-48, Lord built the anchorages, abutments, and piers to Roebbling's design, while Roebbling built the suspension system and aqueduct trough, or trunk, which held the water. Soon after he started work on the Delaware and Lackawaxen structures, Roebbling was asked to replace smaller aqueducts at Cuddebackville and High Falls with similar suspension designs. (HAER 1988: Sht 2/4)

The Delaware Aqueduct features four spans ranging between 131 and 141 feet in length, three masonry stone piers measuring around 42 by 13 feet, and two stone masonry abutments at either end. The New York side included additional wing walls to protect the abutment approaches from flood waters. The canal's water was contained in a long wooden trunk to a depth of approximately 6 to 6.5 feet and a width of around 19 feet. The trunk was suspended by two wire cables that rested in cast iron saddles atop the piers and alongside 8-foot wide wooden towpaths paralleling both sides of the trunk. The cables (each having a diameter of 8.5-inches and consisting of 2,150 bundled wires) were each made in one length across the river from abutment to abutment, connected at their ends with wrought iron anchor chains. The lower end of each chain was secured to heavy 6-foot-square cast iron plates on which rested a vast amount of masonry that resisted the strain of the chain and cable. The cables were protected from oxidation by paint and varnish and were closely encased by a tight wire wrapping. (National Register draft 1983: Sec.7; HAER 1969: 9-10)

By the late 1840s, the Delaware & Hudson Canal included 16 miles of gravity railway, four cable-suspension aqueducts, and 108 locks. The improvements to the canal coincided with the arrival of the New York & Erie Railroad, which built a truss bridge over the canal just northwest of the Delaware Aqueduct. The canal initially remained competitive with the railroad, but in time its physical limitations (such as seasonal operation and fluctuating water levels) could not match the reliability and efficiency of

the train.

After the canal was closed in 1898, much of the canal's infrastructure in the area of the Delaware Aqueduct was gradually lost to other development. The construction of State Route 97 in the early 1930s buried Locks 70 and 72 and destroyed the lock house (the stone walls of Lock 71 and the turning basin, and two canal-era buildings – known as Highland 173 and 175 – are still intact but are not currently on park-owned land). The Delaware Aqueduct was the only one of Roebling's four aqueducts to survive, as it was repurposed into a vehicular bridge in 1908 and its aqueduct trunk and towpaths were eventually removed. In the 1980s the National Park Service purchased the former aqueduct and reconstructed the trunk and towpaths to convey its original appearance. Today Roebling's Delaware Aqueduct carries vehicular traffic and not water traffic, and still retains its historic suspension design characteristics. The structure is the earliest of Roebling's works that survives, and illustrates the techniques that he later incorporated into his famous Brooklyn Bridge in 1883. Remnant features of the canal's 1825-28 and 1847-48 construction periods also remain on the New York and Pennsylvania sides of the structure, including the canal prism, towpaths, and stone retaining walls.

CRITERION CONSIDERATION G

The significance of the toll house meets Criterion Consideration G (Properties that Have Achieved Significance Within the Past Fifty Years) because it continued to achieve local significance into a period less than fifty years ago. The toll house was used to collect tolls across Roebling's Delaware Aqueduct from 1908 to 1979, a period of 69 years, and was an important source of revenue for owners of the structure during that time. Although the annual cost of maintenance usually exceeded the earnings from tolls, the former aqueduct would have nonetheless been in much worse condition without these proceeds when acquired by the National Park Service in 1980.

National Register Significance Criteria:

Significance Criteria A - Associated with events significant to broad patterns of our history

Significance Criteria C - Embodies distinctive construction, work of master, or high artistic values

National Register Criteria Consideration:

Consideration G -- A property less than 50 years of age

National Register Periods of Significance (with Historic Context Themes):

Time Period: CE 1825 - CE 1898

Historic Context Theme	Subtheme	Facet	Other Facet
Developing the American Economy	Shipping and Transportation by Water	Canals	
Developing the American Economy	The Mining Frontier	Mining (Coal, Salt Peter, Oil, etc)	
Expanding Science and Technology	Technology (Engineering and Invention)	Transportation	

Time Period: CE 1847 - CE 1898

Historic Context Theme	Subtheme	Facet	Other Facet
Developing the American Economy	Shipping and Transportation by Water	Canals	
Developing the American Economy	The Mining Frontier	Mining (Coal, Salt Peter, Oil, etc)	
Expanding Science and Technology	Technology (Engineering and Invention)	Transportation	

Time Period: CE 1908 - CE 1979

Historic Context Theme	Subtheme	Facet	Other Facet
Developing the American Economy	Transportation by Land and Air	Early Turnpikes, Roads, And Taverns East Of The Mississippi	

Area of Significance:

Area of Significance Category: Commerce

Area of Significance Subcategory:

Explanatory Narrative:

Area of Significance Category: Engineering

Area of Significance Subcategory:

Explanatory Narrative:

Area of Significance Category: Transportation

Area of Significance Subcategory:

Explanatory Narrative:

NRIS Information:

NRIS Name: Delaware Aqueduct
NRIS ID: 68000055
Other Name: See Also: Delaware and Hudson Canal
Primary Certification Date: 11/24/1968
Other Certifications and Date: MM/dd/yyyy

State Register Documentation:

Identification Number: 94NR00587
Name: Delaware and Hudson Canal, Roebling Aqueduct
Listed Date: 06/23/1980
Narrative: Roebling Aqueduct, USN #10508.000002
Delaware Aqueduct Toll House, USN #10508.000033

National Historic Landmarks:

National Historic Landmark? Yes

Theme:

Contributing:

NHL ID:

NHL URL:

Date:

Statement of Significance for National Historic Landmark:

World Heritage Site:

World Heritage Site? No

Category:

WHS ID:

WHS URL:

Date:

Is Resource within a designated National Natural Landscape: No

Chronology and Physical History

Chronology:

Year	Event	Major Event Narrative
CE 1600 - 1700	Settled	The Lenape Indians may have encountered Dutch traders as early as 1614 and Swedish settlers in the 1630s, but for much of the seventeenth century the valley's geographic isolation limits contact to the occasional hunter, trapper, and explorer.
CE 1750	Settled	The first substantial European settlement, named Cushetunk, is established along the Upper Delaware River between present day Narrowsburg and Callicoon.
CE 1782	Platted	After years of disputed boundaries between New York, New Jersey, Pennsylvania, and Connecticut, a Congressional settlement determines only New York and Pennsylvania can claim land north of Port Jervis. The Delaware River itself serves as the boundary between the two.
CE 1798	Established	In the future Roebbling's Delaware Aqueduct Site, the hamlet of Lackawaxen is established on the Pennsylvania side.
CE 1798	Established	In the future Roebbling's Delaware Aqueduct Site, the town of Lumberland is established on the New York side.
CE 1823	Planned	Surveys for a canal route through the Lackawaxen, Delaware, and Neversink river valleys begin.
CE 1825	Established	The Wurts brothers form the Delaware & Hudson Canal Company to transport anthracite coal from northeast Pennsylvania to New York City markets.
CE 1825 - 1828	Built	The Delaware & Hudson Canal is constructed. The start of the 108-mile long canal begins in Honesdale, Pennsylvania, at the terminus of a gravity railroad, and ends in Kingston, New York, near the Hudson River. Lock houses and other support structures are also built.
CE 1844 - 1852	Altered	A series of projects increases the dimensions of the canal prism and locks, allowing passage of larger boats with greater tonnage. Stone retaining walls are built to support the sides of the canals and towpaths.
CE 1847 - 1848	Built	The Delaware Aqueduct and Lackawaxen Aqueduct are built by John A. Roebbling and Russell Lord.
CE 1847 - 1848	Built	Locks 70, 71, and 72 are constructed at Minisink Ford, just south of the Delaware Aqueduct.
CE 1849	Built	The Delaware Aqueduct and Lackawaxen Aqueduct open to canal traffic. Pennsylvania Locks 1, 2, and 3 on the north side of the Lackawaxen River are abandoned, and the portion of the "old canal" on the New York side of the Delaware River passing under the Delaware Aqueduct is retained as a feeder canal.
CE 1853	Established	The Town of Highland is established when the Town of Lumberland is split into three towns.
CE 1898	Abandoned	The last canal boat passes through the system, after which the canal is closed and dewatered.

Year	Event	Major Event Narrative
CE 1899	Purchased/Sold	In June 1899, what is now called Roebling's Delaware Aqueduct is purchased by the Cornell Steamboat Company, which explored several railroad uses for the structure. Their ownership lasted only six months.
CE 1899	Purchased/Sold	In late 1899 the former aqueduct is conveyed to two different railroad companies, one company getting the Pennsylvania side and the other the New York side. However, no physical changes are made to the structure.
CE 1908	Purchased/Sold	Charles Spruks purchases Roebling's Delaware Aqueduct and converts it to accommodate vehicular traffic. Canal infrastructure leading to the former aqueduct is altered or removed to accommodate approach roads.
CE 1908	Built	Spruks constructs a two-story toll house on the New York side to collect payments. A separated pedestrian walk is built on the south side of the trough, and the towpaths are removed.
CE 1930	Purchased/Sold	Roebling's Delaware Aqueduct is purchased by Peter K. Schuyler and the Federal Bridge Company, which operates it under the name Lackawaxen Bridge Company.
CE 1931	Altered	Schuyler removes the wooden aqueduct trunk and installs a new wood deck floor.
CE 1933	Damaged	A fire destroys the woodwork of the western (Pennsylvania) span and part of the span adjacent to it. A gas pump is installed in the shed on the east end of the toll house.
CE 1933	Purchased/Sold	The State of New York acquires land in and around Locks 70-72 for construction of State Route 97. The right-of way extends to the riverbank, thus including much of the feeder canal and towpath.
CE 1934 - 1937	Destroyed	The State of New York constructs State Route 97 along the Delaware River, destroying much of the abandoned Delaware & Hudson Canal between Minisink Ford and Port Jervis. At Minisink Ford, the route passed directly over Lock 72 and part of Lock 70, but spares Lock 71.
CE 1934 - 1937	Built	The State of New York constructs an earthen and stone diversion dam in the feeder canal and breaches the "old canal" to prevent floodwaters from undermining the highway embankment.
CE 1940 - 1955	Altered	Lights are installed on Roebling's Delaware Aqueduct in the 1940s, and telephone lines in the late 1940s or early 1950s.
CE 1942 - 1979	Purchased/Sold	The Lackawaxen Bridge Company is purchased by E.H. Huber, who maintains toll operations.
CE 1960 - 1969	Planted	In the 1960s a row of evergreen trees is planted along Scenic Drive in Pennsylvania, at north end of former canal prism.
CE 1968	Established	Roebling's Delaware Aqueduct, and four other sites along the former canal, are designated a National Historic Landmark.

Roebeling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

Year	Event	Major Event Narrative
CE 1972	Established	The American Society of Civil Engineers designates Roebeling's Delaware Aqueduct a National Historic Civil Engineering Landmark.
CE 1973	Purchased/Sold	The Lackawaxen Bridge Company is purchased by Albert L. Kraft.
CE 1977	Damaged	Roebeling's Delaware Aqueduct is closed for four months after a truck falls through the deck and lands in the feeder canal.
CE 1978	Established	Congress designates 73.4 miles of the Upper Delaware River as part of the National Wild and Scenic Rivers System and as a unit of the national park system, named Upper Delaware Scenic and Recreational River.
CE 1979	Altered	Roebeling's Delaware Aqueduct is closed to vehicular traffic.
CE 1980	Purchased/Sold	The National Park Service officially purchases the Lackawaxen Bridge Company on March 27, 1980. The purchase includes both approach roads and the toll house. After emergency repairs are made, vehicular traffic is still banned, but pedestrian use is allowed.
CE 1983	Damaged	Portion of the Lock 71 stone wall collapses.
CE 1985	Restored	Phase I restoration of Roebeling's Delaware Aqueduct begins with rehabilitation of the original cable and masonry, and reconstruction of the former aqueduct's ice breakers.
CE 1986	Established	The Town of Highland designates the toll house as a town historic site.
CE 1986 - 1987	Restored	In Phase 2, the National Park Service replaces the timber superstructure, reconstructs the approach roads, constructs the concrete bridge deck, and installs a steel stiffening truss system. This phase enables the structure to reopen to vehicular traffic on June 13, 1987.
CE 1988 - 1992	Purchased/Sold	On the New York side north of the former aqueduct, the park assembles 1.77 acres of land (tracts 101-03, 101-06, 101-05) for a parking lot and emergency access road to the river.
CE 1989 - 1990	Stabilized	The National Park Service and the Williamsport Preservation Training Center repair and stabilize the toll house.
CE 1993 - 1999	Purchased/Sold	On the Pennsylvania side south of the former aqueduct, the park acquires 1.38-acres of land (tract 101-07) for a parking lot and emergency access road to the river.
CE 1994	Restored	During Phase 3 the historic trunk walls and towpaths are reconstructed, and walkways for pedestrian circulation are constructed. The ice breakers, which had undergone significant damage since 1985, are also reconstructed.
CE 1994 - 1996	Built	On the New York side north of the former aqueduct, a parking lot for 10 cars and an emergency river access road from the north end of the lot to the river are completed in the mid-1990s.

Year	Event	Major Event Narrative
CE 1995	Purchased/Sold	On the New York side south of the former aqueduct, the National Park Service purchases the 2.95-acre Vollkommer property (tract 104-06) that includes the "old canal" prism and associated walls, the old towpath and associated walls, and a portion of the new towpath and towpath retaining walls. However, the remains of Lock 71, former sites of Locks 70 and 72, and the state's diversion dam remain within the State Route 97 right-of-way. Portions of this area were also abandoned by the State of New York Department of Transportation.
CE 1995 - 1999	Built	On the New York side, the park proposes an accessible loop trail (Towpath Trail) utilizing the old and "new canal" towpaths. By 1999 only the connecting trail section from the New York parking lot to the old towpath under the Roebling's Delaware Aqueduct is constructed.
CE 1997 - 1999	Built	On the Pennsylvania side south of the former aqueduct in the late 1990s, the park builds a parking lot for 18 cars, which includes a restroom, an overlook at the east end of the parking lot, and an emergency river access road from the east end of the lot.
CE 1997 - 2000	Purchased/Sold	The park acquires 0.29 acres of land (tract 101-10) on the west side of Scenic Drive for development of a maintenance facility. The property includes a one-story frame building that formerly housed the Lackawaxen Volunteer Fire Department. The park occupies the building beginning in 2000.
CE 1998	Purchased/Sold	On the Pennsylvania side north of the former aqueduct, the National Park Service purchases the 2.90-acre Margold property (tract 101-11), which includes the grass-covered canal bed, land access to the river, and the Margold house and barn.
CE 2004	Removed	The National Park Service's Northeast Region Exotic Plant Management Team assists with removal and treatment of Japanese knotweed, multiflora rose, purple loosestrife, autumn olive, and bush honeysuckle along the Towpath Trail.
CE 2004	Damaged	On September 18, 2004 Hurricane Ivan floods the valley, causing major damage to the former aqueduct's curved stone wing wall extending upstream from the abutment on the New York side.
CE 2005	Damaged	Flood in April 2005 causes additional damage to the former aqueduct and "old canal" remnants.
CE 2005	Stabilized	In September 2005 an emergency stabilization treatment of temporary rip rap is installed at the New York abutment.
CE 2006	Removed	The park removes evergreen trees along Scenic Drive, at north end of former canal prism.
CE 2006	Damaged	Flooding on June 28, 2006 raises river water to within feet of the bridge deck. The stabilization treatment installed in 2005 holds, but the flood causes additional damage to one of the former aqueduct's roadside trunk walls and all three ice breakers.

Year	Event	Major Event Narrative
CE 2007	Reconstructed	The curved stone wing wall around the New York abutment damaged in 2004-06 is rebuilt from the summer of 2007 to December. A maintenance access road is completed from the New York parking lot to the Towpath Trail, and under the former aqueduct a culvert is installed between the "old canal" prism and the river, replacing an earlier footbridge.
CE 2008	Removed	In June 2008 the Olmsted Center for Landscape Preservation removes around 70 trees along the Towpath Trail downstream from Roebling's Delaware Aqueduct.
CE 2009	Reconstructed	Repairs to the ice breakers damaged in 2006 begins in the summer of 2009 and is completed in September.
CE 2009	Built	A concrete box culvert is built along the Towpath Trail to meet handicap accessibility requirements. A retaining wall is built along the maintenance access road to the Towpath Trail.
CE 2010 - 2011	Damaged	Flooding and storms damage the maintenance access road to the Towpath Trail.
CE 2011	Removed	The NPS Northeast Region Exotic Plant Management Team treats and assists with removal of non-native invasive plant species along the Towpath Trail, including Japanese knotweed, Japanese barberry, multiflora rose, and mugwort.

Physical History:

The following section documents the physical development and evolution of Roebling's Delaware Aqueduct Site. The information is extracted from several secondary sources, including: "Cultural Resource Survey, Volumes 1-6," by Albert Dekin and others (1983); "Final River Management Plan," by the Conference of Upper Delaware Townships (1986); "Final Environmental Impact Statement" by the National Park Service (1987); "Roebling's Delaware & Hudson Canal Aqueducts" by Robert M. Vogel (1971, reprint 1998); documentation from the Historic American Engineering Record (1968,1988); "Archeological Overview and Assessment," by Stuart Fiedel and Charles Lee Decker (2008); the park's website; and a review of historic photographs, maps, and plans.

Note: In this chapter, the structure now called the Delaware Aqueduct/Roebling Bridge is referenced as the "aqueduct" or "Delaware Aqueduct" before 1898, and as "former aqueduct" and "Roebling's Delaware Aqueduct" after 1898.

PRE-HISTORY TO 1750

The Upper Delaware River valley was a glaciated landscape in the last ice age, and today exhibits physical features that are a result of these glacial events. As the ice retreated, the thawed land was able to support life and human habitation. Long before European contact in the seventeenth century, the Lenape Indians and their predecessors lived off the area's abundant plant and animal life.

Paleo-Indian Period:

Archeologists have evidence that the Lenape Indians were preceded by a nomadic people called Paleo-Indians (12,000-10,000 years ago) who migrated to the North American continent via the Bering land bridge that connected Alaska and Russia. The Paleo-Indians encountered an environment very different than it is today; winters were much colder and longer, and the land was covered with tundra grass, marshlands, and scattered forests of spruce and fir. To survive they lived a hunter-gatherer lifestyle, following game animals, fishing in rivers and lakes, and gathering wild plants. The Paleo-Indian's best known artifact is the fluted point, such as the Clovis point. Artifacts from this period are very rare but have been located in the Upper Delaware River valley. (UPDE website, accessed 14 March 2015)

Archaic Period:

During the Archaic period (10,000-4,000 years ago), the climate began to resemble that of today. The Archaic Indians were still mobile, like their Paleo ancestors, but they did not travel as far because the rivers and forest provided what they needed. Wild plants, acorns, and other nuts were abundant, as were animals such as fish, shellfish, deer, elk, raccoon, and turkey. They hunted with spears, which could be thrown by hand or used with an atlatl, or spear thrower, that enabled the hunter to throw spears much harder and faster. Archaic Indians lived in caves, rock shelters, and wooden longhouses. Artifacts from the Archaic period found in the Upper Delaware River valley include grooved axe heads, bannerstones, net-sinkers (small stones that were sewn into fishing nets), and several types of projectile points. (UPDE website, accessed 14 March 2015)

Woodland Period:

Hunting, fishing, trapping, and gathering wild foods continued to occupy men and women in the early and middle Woodland period (4,000-400 years ago). Bow and arrows allowed hunters to kill even more effectively and from a greater distance. Deer, elk, bear, turkey, and waterfowl were hunted, while smaller game animals such as squirrels and rabbits were trapped or snared. Fish were an important food source, especially shad that were caught in huge fishnets upwards of 300 to 400 feet long. Fish were also speared or harpooned, or caught with fishhooks made of bone or dried bird claws. Many artifacts from the Woodland period have been found in the Upper Delaware River valley, including large quantities of net-sinkers. (UPDE website, accessed 14 March 2015)

With the abundance of resources close at hand, Woodland Indians stayed within their lands and built sturdier homes with saplings and bark. They also engaged in agriculture, planting corn, beans, and squash that were eaten fresh or dried for storage. Pottery vessels were made of clay from the riverbanks and used for cooking and storage. (UPDE website, accessed 14 March 2015)

The Lenape and European Exploration:

The Lenape people, also called "Delaware" and "Minsi," lived in the Upper Delaware region beginning around 400 BCE. Historians differ in defining the territory of the Lenape, but it is generally thought they controlled the lands downstream from the mouth of the Lackawaxen River while the Iroquois people lived upstream. The Lenape may have encountered Dutch traders as early as 1614 and Swedish settlers in the 1630s, but for much of the seventeenth century the valley's geographic isolation limited contact to the occasional hunter, trapper, and explorer. (Dekin 1983: 3-45; EIS 1987: 98)

European colonization of North America intensified with the turn of the eighteenth century, but exploration into the remote Upper Delaware River valley remained limited. Border disputes also hindered settlement, with the colonies of Pennsylvania, Connecticut, New York, and New Jersey each claiming portions of the valley, leaving boundary lines ill-defined and a source of long-standing

dispute. Vast land patents were awarded to speculators, but land sales were contingent on obtaining deeds from the Indians already in possession of the land, which created conflicts between the Indians who believed the land was for all people and animals and the settlers who favored private ownership. With such geographic and political uncertainties, the upstream sections of the Upper Delaware River north of present-day Port Jervis were not actively settled until the 1750s and 1760s, almost fifty years later than downstream sections of the river. (Dekin 1983: 3-44; Route 97 Report 2001: n.p.)

The arrival of the colonists brought drastic changes to the Indian lifestyle. The Indians traded with the colonists, exchanging animal pelts for brass kettles, iron axe heads, and cloth, but in time contact with Europeans proved so devastating to the Indians that their numbers rapidly dwindled. Many were killed by diseases, such as measles and smallpox, for which they had no immunity. In time, the Lenape and the neighboring Iroquois became enemies, with the Iroquois Confederacy becoming the stronger of the two groups. (UPDE website, accessed 14 March 2015)

Evidence of Native American occupation has been discovered at Roebbling's Delaware Aqueduct Site. According to the 2008 "Archeological Overview and Assessment for Upper Delaware Scenic and Recreational River" by Stuart Fiedel and Charles Decker, Indian skeletons were encountered in the excavations for the Delaware & Hudson Canal in 1825-28. A century later, archeologist Max Schrabisch investigated locations both north and south of the Delaware and Lackawaxen confluence in the 1930s, and noted that an "aboriginal cemetery" had been located on "the high banks of sandy loam bordering the Lackawaxen at the very point where it empties into the Delaware." This location generally coincides with a 1776 map by Claude Joseph Sauthier that notes "Indian Graves" just north of the Lackawaxen River. Schrabisch also wrote that, "another grave was disclosed in the spring of 1926 by the caving in of the steep river bank a little to the north of this place. Buried with the remains ... were a tomahawk, several arrow points, a quantity of fresh water mussels and fire-cracked stones." (AOA 2008: 52, citing Schrabisch 1930: 74; Library of Congress, Map, www.loc.gov/resource/eg3800.ar10470)

The valley landscape of the eighteenth century was predominantly wooded with dense forests of oak, hickory, maple, ash, and hemlock. Early European survey records from the period also reported beech, sugar maple, pine, and buttonwood. Large wildlife species such as cougar, bear, wolf, and moose roamed the wooded wilderness and provided ample food supply for the Lenape. Smaller mammals, birds, waterfowl, fish, mollusks and crustaceans were also abundant in the river valley. By the river's edge, the vegetation was described as "low and scrubby" with mostly oak, maple, and pine. (Dekin 1983: 2-46-48,59)

EUROPEAN SETTLEMENT, 1750-1782

The first substantial European settlement in the Upper Delaware River valley began when frontiersmen from Connecticut arrived in the 1750s. Organized as the Delaware Company, they based their land claim on the contention that Connecticut had been granted lands west of the Delaware River in the seventeenth century. These lands were also claimed by William Penn, as well as the Indian nations. Boundary problems also existed on the east side of the river, where New York and New Jersey claimed overlapping segments. The disputes were only resolved by litigation after the American Revolution. (EIS 1987: 98-99)

The Colonial settlement, called Cushetunk, was located north of the Delaware and Lackawaxen confluence, along the river flood plains between present day Narrowsburg and Callicoon. Small communities of log cabins grew up on both sides of the river, often near the mouths of tributaries suitable for saw and gristmill sites, including Cochection, Damascus, and Milanville. By 1760, the Cushetunk settlement stretched almost ten miles in length along the river and eight miles in width, and included 30 cabins, 17 farms, and 2 mills. It was around this time that the lumber rafting industry began, as the area's tall and straight trees were found to be ideal for ship masts. Raftsmen floated the white pines and later hemlock trees to shipyards in Philadelphia. (Curtis 1992, Sec.E: 2-3; Dekin 1983:3-46,49,67-68,71,74)

In response to the French and Indian War of 1754-1763, Colonial settlers built a stockade for protection from Indian raids. The worst violence came in the final year of the war, following the assassination of Teedyuscung, King of the Lenape, by a party of Iroquois warriors. His murder was blamed on the Colonial settlers, precipitating a raiding party of Lenape Indians headed for Cushetunk that destroyed the settlement at Ten Mile Creek. The same raiding party attacked the blockhouse, but the settlers there survived. (Dekin 1983: 3-50; Curtis 1992, Sec.E: 3)

The outbreak of the Revolutionary War in 1775 brought a number of significant changes to Colonial settlements in the valley. The early years of the war saw little activity in the valley, but by 1777 many of the Iroquois nations had broken neutrality to side with the British (Tories). Thereafter, the Upper Delaware River valley became an avenue of invasion for Indian and Tory units, prompting many settlers to leave the valley. One of the bloodiest battles of the Revolution took place on a hill just east of Minisink Ford in 1779, pitting militiamen and local volunteers against a party of Tory and Indian raiders, who won a decisive victory. Indian raids continued sporadically until the end of the Revolution in 1783, after which the Indian population quickly declined and Colonial settlers returned to the valley. (Dekin 1983: 3-51-52; EIS 1987: 99; Curtis 1992, Sec.E: 4)

POST-WAR RESETTLEMENT, 1782-1825

Settlement after the Revolutionary War occurred slowly, in part because of ongoing boundary disputes and confusing land claims between New York and New Jersey, and Pennsylvania and Connecticut. After 1782, the only states with claims to land north of Port Jervis were New York and Pennsylvania, with the Delaware River itself serving as the boundary between the two. At the future site of Roebeling's Delaware Aqueduct, the hamlet of Lackawaxen was established on the Pennsylvania side in 1798, and by 1800 contained twenty-three taxable families. On the New York side, the Town of Lumberland was also formed in 1798 and had a population of 733 in 1800. At this time the valley included twenty-two hamlets, although many contained only a handful of structures. (Dekin 1983: 3-53-57,64,111; Review comments from Carla Hauser Hahn, 18 August 2016)

Another reason for the slow rate of growth was the valley's continued isolation and inaccessibility. The Delaware River was for the most part considered unnavigable to all but low draft vessels. Conditions improved in 1792 when Pennsylvania improved the river channel by removing large boulders, which helped eliminate some of the worst dangers for small craft. However, the river's rough and shallow waters discouraged large scale attempts to transport possessions or supplies by water. Throughout much of the year, navigation was mostly by rafts, canoes, and other low draft crafts, all of which were extremely limited in the amount and the nature of supplies they could carry into the valley. In winter months, goods were hauled from New Jersey to as far north as Narrowsburg using the iced-over river as a road. (Dekin 1983: 3-65-66)

Various logging roads were in existence on both sides of the river by the turn of the nineteenth century, and while they were often in better condition than the old Indian trails, they were difficult to maintain and often impassable due to the damp climate. More significant changes came when New York began building roads to connect remote areas like the Upper Delaware River valley and the tidewater on the Hudson River. One of the first road projects was the Sackett Road, constructed in 1795 between Cocheton and what would later become Wurtsboro, followed by a turnpike from Cocheton to Newburgh in 1804-10. The turnpike then crossed the river into Pennsylvania, reaching the Susquehanna River at Great Bend in 1811 and evolving into a principal route for travelers and freight. The turnpike was also an important conduit for westward migration prior to the development of canals and railroads. (Dekin 1983: 3-73-74,78-80; EIS 1987: 100; Review comments from Carla Hauser Hahn, 24 May 2016)

According to Albert Dekin, communication between the New York and Pennsylvania sides of the Upper Delaware River valley was not imperative to the local economy at this time. Connections that did exist were often at points in the valley where hamlets developed across from one another, such as at Pond Eddy. Aside from natural fords such as the Minisink Ford at the mouth of the Lackawaxen River, the first step in the development of cross-river communication was the rope ferry, which existed at various times in a number of locations, including one at Lackawaxen. The rope ferries were considered dangerous and were eventually replaced by bridges, the earliest of which were built at Narrowsburg and Cocheton in the 1810s. (Dekin 1983: 3-82-83)

THE DELAWARE & HUDSON CANAL, 1825-1898

The interest in roads and bridges in the Upper Delaware River valley ran high during the early years of the nineteenth century, as recent construction offered some improvement over the uncertainties of navigation on the river itself. In the 1820s, however, development of reliable transportation shifted to the Delaware & Hudson Canal Company, signifying a new attempt to solve the valley's accessibility problem. (Dekin 1983: 3-83)

The Delaware & Hudson Canal was the consequence of a plan envisioned by Maurice and William Wurts, Philadelphia merchants who owned considerable land holdings in the coal-rich fields of northeastern Pennsylvania. In their mines was anthracite coal, a harder type of coal found to burn cleaner and more efficiently than the bituminous coal that was commonly used at this time. The Philadelphia area was already receiving adequate coal supplies from other sources, but the Wurts saw potential in supplying their coal to businesses and homes in the New York City area. The distance and terrain between the coal fields and the seaboard was formidable, but as the recently completed Erie Canal was proving, water was the most feasible way to bulk transport the coal. An initial survey of a canal route to the Hudson River was completed by John B. Mills, while a more intensive survey was undertaken by John L. Sullivan in 1823. Acting on these surveys, and with the support of private investors and enabling acts by both the Pennsylvania and New York legislatures, the Wurts brothers formed the Delaware & Hudson Canal Company in 1825. (Dekin 1983: 3-83-84)

Construction of the Delaware & Hudson Canal began in 1825 and finished in 1828 (Figure 1). The start of the canal began in Honesdale, Pennsylvania, at the terminus of a gravity railroad constructed by the Canal Company to transport coal down from the mines. From Honesdale, the canal followed the Lackawaxen River to the township of Lackawaxen, paralleled the Delaware River from Lackawaxen to Port Jervis, New York, and followed the Neversink River and Rondout Creek from Port Jervis to Kingston, New York. Upon reaching the Hudson River, the coal could easily be transported to New York City. Originally, engineers had envisioned using the Delaware River itself between Lackawaxen and Port Jervis for the canal, but it was determined to be more feasible to build the canal along the New York (eastern) riverbank, parallel to but separate from the river. Upon completion, the canal overcame an elevation change of 1,075 feet through 108 locks and aqueducts, and covered a distance of 108 miles. (Dekin 1983: 3-84)

One of the most challenging sections of the canal route occurred at the confluence of the Lackawaxen and Delaware rivers, where canal boats had to cross the Delaware. Lacking adequate capital to build an aqueduct across the Delaware, the Canal Company instead constructed a slackwater dam just below the confluence to create a still upstream pool for the crossing canal boats (Figure 2). The boats navigated from the north bank of the Lackawaxen to the continuation of the canal on the east bank of the Delaware, either by momentum or hand haulage along a ferry rope strung between the banks. However, river raftsmen floating down the Delaware River viewed the rope ferry and slackwater dam as navigational impediments to their downstream journeys. (HAER 1969: 3; DeNio 1955-60: 108)

Water for the canal was supplied by the rivers, tributaries, creeks, and natural drainage, and supplemented by feeder canals. The canal itself was simply an engineered ditch with a flat bottom and sloping sides, typically lined with clay "puddling" to prevent the loss of water. In its original configuration the canal prism was 4 feet deep, with an average water line width of 28 feet and a bottom width of 20 feet, with some variations based on local topographic conditions. The locks measured 9.5 feet in width and 75 feet in length, and were designed to accommodate boats carrying up to 40 tons of coal, although the first boats could hold only around 20 tons. Boats were pulled by ropes through the canal with mules that traveled on earthen towpaths located on one or both sides of the canal. Stone retaining walls were constructed to support the sides of the canal and towpaths as needed. (AOA 2008: 86; Dekin 1983: 3-84-85, citing Wakefield 1965: 93-122; HAER 1969: 2)

In addition to the canal itself, there was a great deal of ancillary infrastructure that contributed to its operation. Each of the locks along the way was manually operated by a locktender, who would have lived in close proximity to the lock. The locktender's job was to operate the lock mechanism, ensure

the correct working of the locks, maintain proper water level, and manage the clear passage of the canal boats. The locktender's day was typically long, as the changing of the water level could be a slow transition. Boatmen typically began grooming and harnessing their mule team around 4am, and were in motion until the locktender closed for the night, usually around 10pm. Boats would only stop their travel because they could not proceed when the locks were closed. In a typical day, a canal boat and its mule team could travel about 30 miles.

The locktender and his family had to be self-sufficient, as locks were placed where the grade change necessitated them, not necessarily near a village where it was convenient to purchase goods at will. Orchards, vegetable gardens, flowers, herbs, and field crops were usually important aspects of the adjacent landscape. Products grown and produced at the home could be sold and bartered with passing boats on their journey of ten or more days. In addition to a residence, a locktender's complex usually included a barn to provide shelter and hay for the mules. Some locks included a general store and a warehouse to supply boat operators with provisions for their journey.

Canal Improvements:

With a reliable supply of anthracite assured, and the demand for heating, iron smelting, and steam generation increasing, business and profits improved for the Delaware & Hudson Canal Company. Even with the introduction of 30-ton boats, by 1841 the rising demand for coal was stretching the canal's physical capacity. The Canal Company had anticipated the need for periodic enlargements of the canal almost from the day the canal opened, as there had been expediciencies and compromises in initial construction and design due to limited capital. The Canal Company also aimed to increase both the canal's carrying capacity and the speed of passage to better compete with the New York & Erie Railroad, which was expanding into the Lower Delaware River valley and ever closer towards the coal regions. (HAER 1969: 2-3)

To improve efficiency, the canal was enlarged in depth and width in the 1840s and early 1850s, allowing for larger boats with greater capacity each time. Boats with 140 ton-capacity ultimately replaced the 20-ton boats that initially plied the waters. The canal prism was deepened from 4 to 6 feet, and widened from 28 to 48 feet at water level and 20 to 30 feet at the bottom. As the canal sides were cut back, dry-laid stone walls were built to decrease leakage from the clay beds and prevent failure of the banks and towpaths. Locks were also increased in length, from 75 to 90 feet, and in width, from 9.5 to 15 feet. Most locks had a 10-foot lift, and all were constructed with stone and lined with wood. (Scott and Hauptman 1981: 3; Dekin 1983: 3-86)

Construction of the Delaware Aqueduct:

The most significant improvement to the canal's operation, however, was the elimination of the canal system's worst bottleneck: the Delaware River crossing at the mouth of the Lackawaxen River. Under best conditions the passage was slow and cumbersome, and at worst was often impossible, especially during high water events in the spring and fall that could halt canal operations for days at a time. A further hazard was persistent conflict with timber raft traffic. Raftsmen had to dodge the passing canal boats and then traverse the slackwater dam either by riding the flowage over the crest or passing through a sluiceway. Consequently, raftsmen were generally hostile to the canal interests and engaged the company in constant physical and legal harassment. With a solution now needed and the capital available, an aqueduct that had been proposed from the canal's beginning was included in the Canal Company's improvement plans. (HAER 1969: 3; Vogel 1998: 3)

Canal improvements were under the supervision of Russell F. Lord, chief engineer, who proposed a relocation of the canal route at Lackawaxen. Instead of locating the new aqueduct across the Delaware River above the mouth of the Lackawaxen River at the rope ferry site, Lord sited it a quarter-mile downstream, just below the slackwater dam (Figure 3). Several factors may have been behind this decision, such as the high cost of purchasing land at the upstream site and unfavorable riverbed and riverbank conditions. The proposed route also necessitated the construction of a smaller aqueduct on the Lackawaxen River, about one mile above its confluence with the Delaware, and a new five-eighths-mile segment of canal to connect the two aqueducts. Another quarter-mile segment of "new canal"—and three new locks—were also needed at the east end of the Delaware Aqueduct, at Minisink Ford, New York. The "old canal" and guardlock on the east bank of the Delaware would be saved for use as a feeder channel, while the three locks on the north bank of the

Lackawaxen were to be abandoned. (Vogel 1998: 6-7; Wakefield 1965: 84)

In February 1846, the Canal Company directors authorized the two aqueducts, locks, and canal sections, and through Lord purchased 126 acres of land south of the confluence of the Delaware and Lackawaxen Rivers from Charles Lacoste. By late December two aqueduct proposals had been received for the Delaware crossing: one for a six-span trussed timber structure and the other for a four-span wire-cable suspension structure. Management preferred the latter scheme, submitted by civil engineer John A. Roebling of Saxonburg, Pennsylvania, because it was less expensive and had fewer river piers, which meant fewer impedances to flood water, ice, and river traffic. Another major advantage was that suspension spans, unlike either truss or masonry-arch spans, could be built without falsework in the river, a matter of some significance at a site frequently subjected to flooding and ice jams. An additional factor likely influencing the company's selection of John Roebling was their successful use of Roebling's wire ropes on the inclined planes of the gravity railroad in Honesdale. (Vogel 1998: 9; HAER 1988, PA-1, Sheet 3 of 4)

Roebling's plan was tentatively accepted in early January 1847. Later that month, Lord traveled to Pittsburgh, Pennsylvania to inspect a similar aqueduct built by Roebling to carry the Pennsylvania Canal over the Allegheny River. Lord was impressed with his aqueduct and his Smithfield Street suspension bridge over the Monongahela River in Pittsburgh, and concluded that Roebling's abilities were far ahead of their time. The contract for both final design and construction of the Delaware and Lackawaxen aqueducts was given to Roebling, for a combined price of \$6,400, and work began almost immediately. (Vogel 1998: 10)

Roebling's construction contract covered only the suspended spans, "including all iron, timber, and wire work, the company to do all masonry and cement." As Roebling's presentation and estimating drawings were based on only general site information, Lord sent him detailed data on the bank and riverbed conditions for preparation of the working drawings. With these in hand by March 1847, Lord's crews began foundation work and the laying of the pier and abutment masonry, despite the cold weather and impending river ice. Continual coordination with Roebling was necessary to set the massive iron anchor plates in the aqueduct abutments. These huge castings resisted the pull of the chains of eyebar links that rose up through the masonry mass ultimately to restrain the main cables. (Vogel 1998: 10)

Roebling visited the site periodically, but much of the consultation was conducted through correspondence. In late March, Lord advised him that:
"We are proposing to get the abutments for Delaware Aqueduct in a state of forwardness so that the anchors may be put down soon after 1st of July; and have the piers all done so that you can have a chance to commence the superstructure in the fall and pursue it during the winter." (Vogel 1998: 11, citing Lord to Roebling, 22 March 1847)

Roebling took up his work at Lackawaxen in the summer or fall of 1847, working on both aqueducts simultaneously throughout 1848. The aqueducts were designed like the locks, to pass only a single boat at a time (Figure 4). The aqueduct's trough, or trunk, through which boats floated was 19 feet wide at the waterline, 6 feet deep, and featured wood towpaths 8 feet in width on each side. Three of the structure's spans measured 131 feet, while the fourth (on the Pennsylvania side) measured 142 feet. The Lackawaxen Aqueduct, about half a mile west of the Delaware, was almost identical but had only two spans, each of slightly less than 115 feet, with a single river pier. (Vogel 1998: 11; Wakefield 1965: 84)

By the end of 1848, the aqueducts were complete and ready for the opening of the 1849 canal season in April (Figure 5). Great cheers went up when the first boat passed safely across the Delaware Aqueduct and through newly created Locks 72, 71, and 70, respectively, at Minisink Ford (on the New York side), which replaced Locks 1, 2, and 3 on north side of the Lackawaxen River (on the Pennsylvania side). At both approaches to the Delaware Aqueduct, the canal was widened to include turning basins for boats to queue up to the structure or wait their turn (Figures 6 and 7). The turning basin on the New York side was considerably larger because boats had to negotiate a 90-degree turn toward the three new locks, which were grouped closely together (about 900 feet). The locks were needed to bring boats from the level of the aqueduct to the level of the original canal, an

elevation change of approximately 32 feet (Figures 8 and 9). The original section of canal converted into a feeder canal intersected with the "new canal" just south of Lock 70 (Figures 10 and 11). The slackwater dam on the Delaware River was also retained, and in fact heightened to 16 feet to increase the pool area for the feeder canal (Figure 12). (HAER 1969: 5; Wakefield 1965: 86)

The enlargement of the canal was a success, as reported in the company's Annual Report for 1849: "the two wire-suspension aqueducts over the Delaware and Lackawaxen Rivers, are a part of the new work brought into use last year, and proved to be all that was expected or can be desired of such structures, and a great facility to the navigation."

With a slight additional deepening and widening, the canal was able to pass 130-ton capacity boats by 1852, which were large enough to handle the waters of the Hudson River. They could thus make the down-Hudson trip to New York directly, eliminating the expensive trans-shipment of the coal to schooners at Rondout, and hauling the schooners up and down river by tugs. Chief Engineer Lord estimated that the project, particularly the construction of the Delaware and Lackawaxen aqueducts, had avoided nine days-stoppage of boating due to high water in the first year of operation, and eliminated a full day from the passage time. (Vogel 1998: 25, citing Annual Report 1850: 3)

Canal maps prepared by John Torrey in 1856-65 and other historic maps and photographs from 1849-1898 indicate various structures, roads, and vegetation in the vicinity of the Delaware Aqueduct (Figure 13). On the Pennsylvania side, a primitive road passed under the aqueduct, along the shoreline. To the north of the aqueduct, this road connected with another road (now Scenic Drive) passing along the south side of a two-story Canal Company house (now the Roebeling Inn) and carriage house built in c.1870. The triangular-shaped space formed by the two roads and the towpath was owned by the Canal Company, and included a two-story home (now Brown Keller house) surrounded by fenced pastures and cultivated fields. Two tall trees adjacent to the canal appear in several historic photographs (see Figures 5 and 7). To the south of the aqueduct, the primitive road passed near two one-story structures standing adjacent to the towpath, at the edge of a rocky open field also owned by the Canal Company. Another collection of structures was located to the northwest, which one map labels as a store (see Figures 5 and 7). (Dekin 1983: 5-131)

On the New York side, a road (now Old Minisink Ford Road) running parallel to the river was located to the east and uphill from the canal. To the north of the aqueduct, a shed was situated adjacent to the guardlock, while to the northeast was a barn owned by N.B. Johnson. Johnson's house and an adjacent barn and outbuilding were located to the south-southeast at a bend in the road, while a house owned by P. Neville was located to the north along the west side of the road. Photographs show open conditions along the canal, but scattered trees and fenced pastures up the hill (see Figures 2, 4, 5, and 6). To the south of the aqueduct, the Canal Company constructed small wood frame lock houses above the south ends of Locks 70-72. A lockkeeper's house stood just east of Lock 71, and later maps and photographs indicate several sheds were added nearby to serve the canal. Maps also indicate the Canal Company constructed a two-story frame building on the east side of the road as an office. Scattered trees were present on the slopes between the "new canal" and "old canal" (see Figures 8, 9, and 11).

New Industries and the Railroad:

Enlargements to the Delaware & Hudson Canal coincided with the growth of other industries in the last half of the nineteenth century that made use of the Upper Delaware River valley's natural resources. Advances in technology and the proliferation of saw mills spawned new and diverse types of river rafts. Tanneries tanned animal hides with bark from the abundant hemlock groves until the 1880s when the tree supply was depleted. Acid factories harvested the trees left behind by the tanneries – mostly hardwoods such as cherry, ash, maple, beech, birch – to produce charcoal, wood, alcohol, and acetate of lime until hardwood stands were depleted and petroleum-based synthetics were developed. Quarrying of bluestone and other building materials also emerged as an important industry, and some of this product may have been shipped on the canal to New York City and elsewhere as paving blocks, curbs, and decorative stonework. (Dekin 1983: 3-70,5-108; EIS 1987: 100-101; Carrol et al. 1987: 10)

During the 1850s, the canal transported as much as a million tons of cargo a year, but the

construction of the New York & Erie Railway introduced a new means of transportation and a source of competition for the Delaware & Hudson Canal Company. The railroad had reached Port Jervis, New York, in 1847 and headed north into the Upper Delaware River valley on the New York side. Upstream from Port Jervis, the railroad was forced to cross over to the Pennsylvania side because the Canal Company obtained a permanent injunction that preempted all rights to the east riverbank upon which the canal was built. The railroad entered Lackawaxen in 1848, crossed over the canal and Lackawaxen River via truss bridges, and then crossed back to the New York side north of the Lackawaxen River. (Route 97 Report, 2001)

The New York & Erie Railway was the first manmade north-south transportation route that extended the entire length of the Upper Delaware River valley. The railroad connected the Hudson River to the Great Lakes, and with 12 stations along the 73 miles of its Delaware division it very quickly became an integral part of the valley's economy. Lumber, stone, and various agricultural products were shipped to markets, and previously scarce commodities such as rope became more generally available. Raftsmen also made use of passenger train service in making their return trips from the Lower Delaware River valley. (EIS 1987: 100; Dekin 1983: 3-95)

The railroad also introduced tourism into the area's economy. Encouraged by the 1851 "Harpers Guide to the New York & Erie Railway," residents of New York City, Philadelphia, and elsewhere began boarding passenger trains to enjoy the valley's scenery, recreation, and cooler climate. Places such as Shohola, Pond Eddy, Parker's Glen, Narrowsburg, and Lackawaxen became the primary recipients of the tourist boom, as entrepreneurs began renting rooms and building boarding houses and hotels. One such development was the three-story Delaware House, a 200-bed boarding hotel built by William Holbert on the north bank of the Lackawaxen River in 1852, just uphill from the abandoned route of the canal built in 1825-28 (see Figure 12). It was also around this time that the Town of Lumberland was subdivided into the present day towns of Lumberland, Tusten, and Highland. Within Highland was the hamlet of Minisink Ford. (EIS 1987: 101; Dekin 1983: 3-54,100-101,108; Carrol et.al.1982: 11; Town of Highland website, accessed 8 March 2016)

Decline of the Canal:

The Delaware & Hudson Canal Company's infrastructure improvements in the 1840s and early 1850s allowed it to maintain competitive coal transportation rates with the railroads well into the 1870s. In 1872 the canal carried its peak load of three million tons, but by this time what was now called the Erie Railway had become more efficient, in part by adding a second line of track along the entire length of the Upper Delaware River valley. In three decades that followed, locomotive weights doubled, with corresponding increases in car capacity and train lengths and decreases in shipping rates. (Vogel 1998: 25)

After this point, the canal system lost its competitive ground to the railroad, as its inherent disadvantages could not be overcome: movement along the route was slow, its operation was seasonal, and it was directed to a single market in New York. The Canal Company itself had already diversified into the railroad business, and ultimately decided that the canal's expensive upkeep was unworthy of the cost. In 1898, the canal was used for the transport of coal for the last time and in February 1899 officially abandoned. In the following years the canal was dewatered and the company lands were sold off (see Figure 13). (Dekin 1983: 3-86,88,95; Whitford 1906: 751)

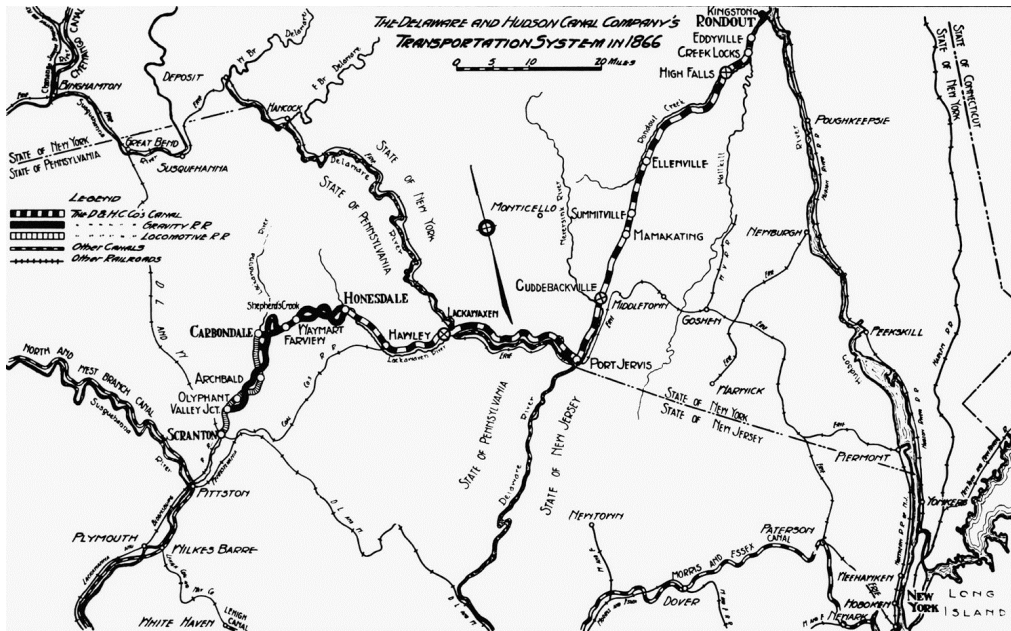


Figure 1. Map of the Delaware & Hudson Canal route from Honesdale to Eddyville, 1866. Roebling's Delaware Aqueduct is located at the confluence of the Lackawaxen and Delaware Rivers. (From A Century of Progress: History of the Delaware & Hudson Company)

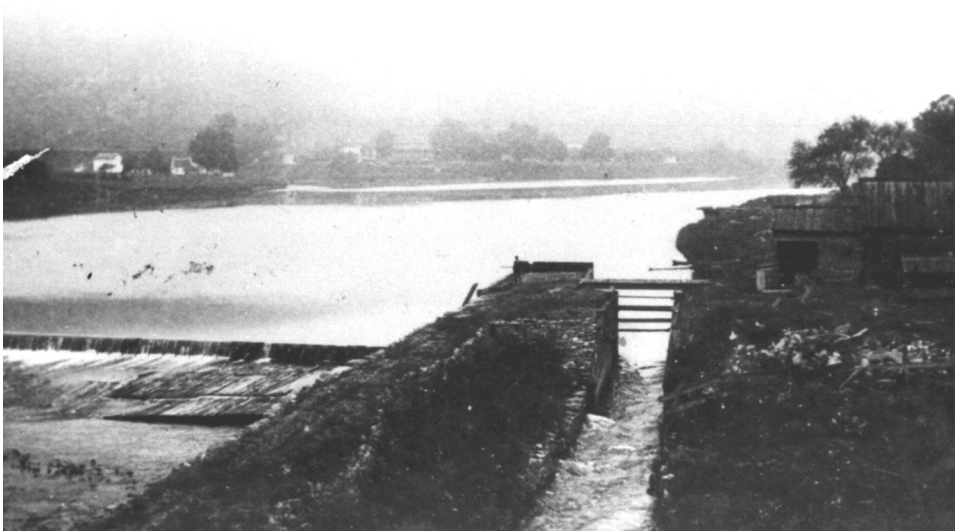


Figure 2. View looking north, 1852-98, at the upstream pool formed by the slackwater dam on the Delaware River. The old canal route (image right) is used as a feeder canal. (UPDE website, "Delaware and Hudson Canal" Photo Gallery, Image #22 - Guard Lock)

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

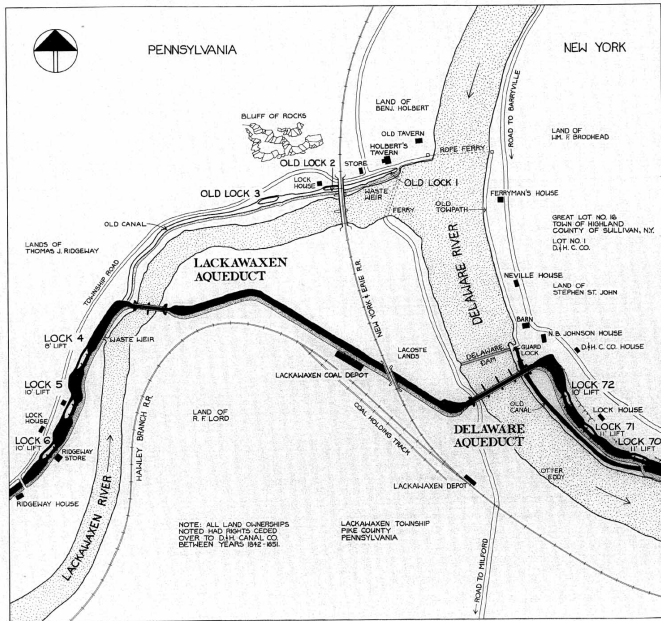


Figure 3. Map of the new canal sections at Lackawaxen, in 1849. (UPDE Archives, UPDE-00071, I RBR-1.2, "DELAWARE AQUEDUCT 1989 HABS/HAER MYLARS"(from Wakefield's Coat Boats to Tidewater, pg. 83)/NAP_RL02_054)

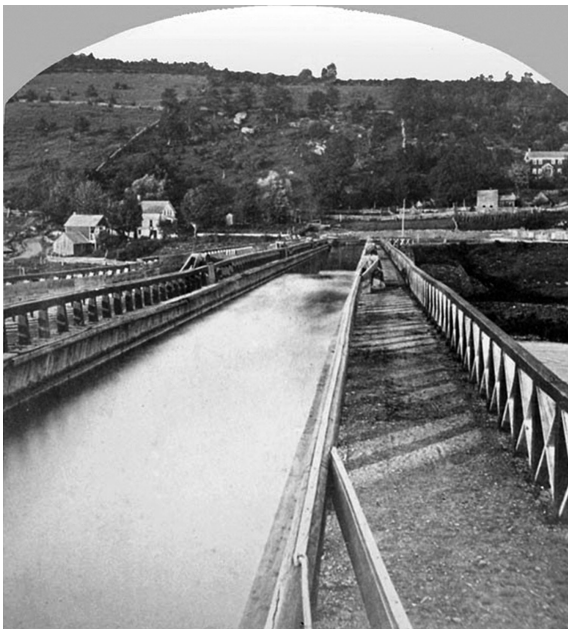


Figure 4. Delaware Aqueduct, looking east from Pennsylvania side, 1849-98. In the distance, image left, is the two-story N.B. Johnson house and adjacent outbuilding. (UPDE website, "Delaware and Hudson Canal" Photo Gallery, Image #28 - Delaware Aqueduct)



Figure 5. View looking southwest, 1849-98. On the New York side, a shed is under construction at the guardlock. On the Pennsylvania side, a Canal Company house is surrounded by a fenced field. (Minisink Valley Historical Society, P-98-8-17)

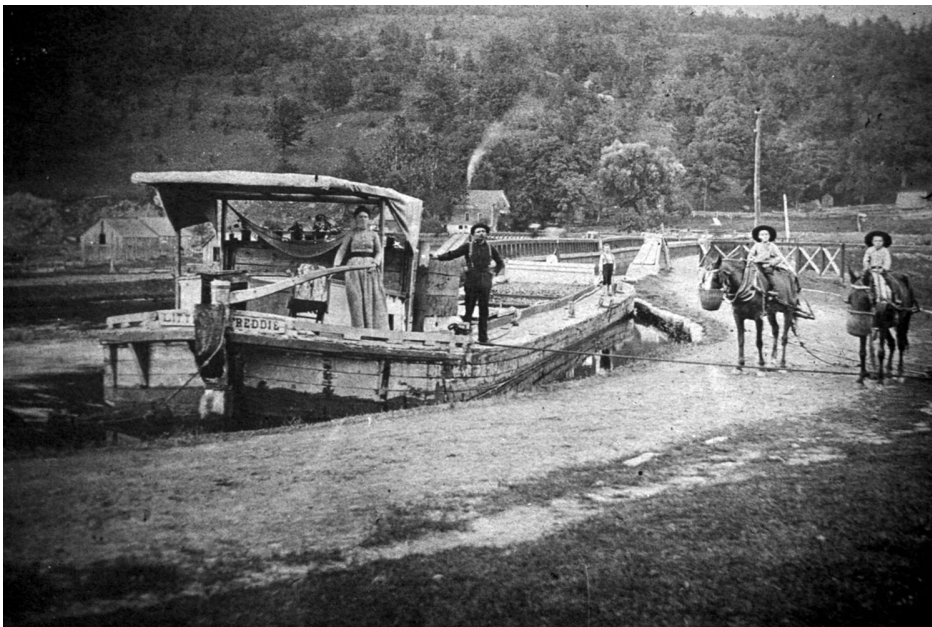


Figure 6. View looking east at the turning basin and towpath on the Pennsylvania side of the aqueduct, 1849-98. Note N.B Johnson's house and barn, and a shed next to the guardlock, at image left. (Wayne County Historical Society, #6974)

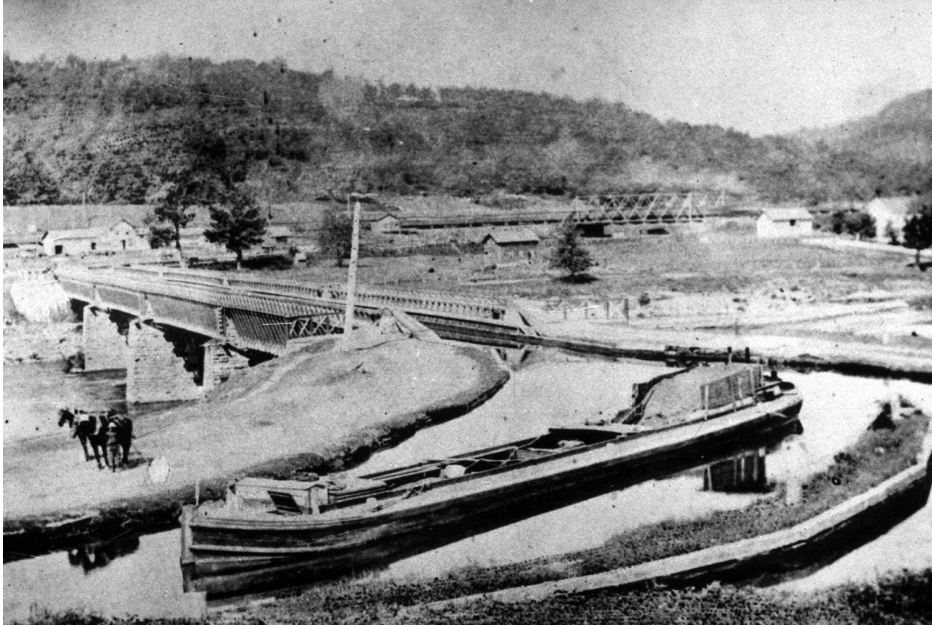


Figure 7. View looking northwest at turning basin and towpaths on the New York side, 1870s-98. On the Pennsylvania side, two trees mark the canal's turn northwest. (UPDE website, "Delaware and Hudson Canal" Photo Gallery, Image #30 - Typical Waste Weir)

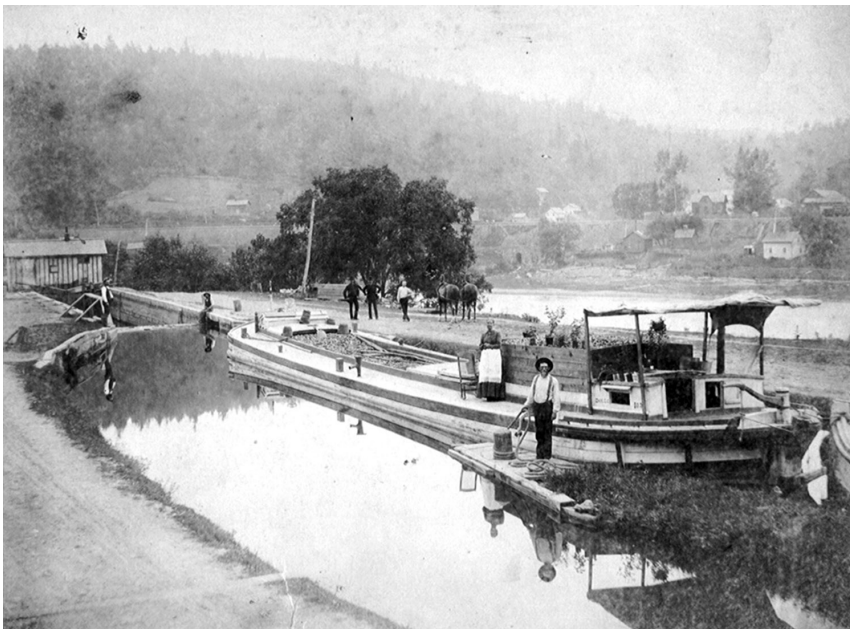


Figure 8. View looking southwest at the south end of the turning basin, with Lock 72 visible in the distance, 1849-1898. Note the lockhouse above the south end of the lock. (Minisink Valley Historical Society, P-98-8-19)



Figure 9. View looking north at the new canal, just south of Lock 71. The lockhouse for Lock 71 is in the distance. (Minisink Valley Historical Society, P-82-11-5)

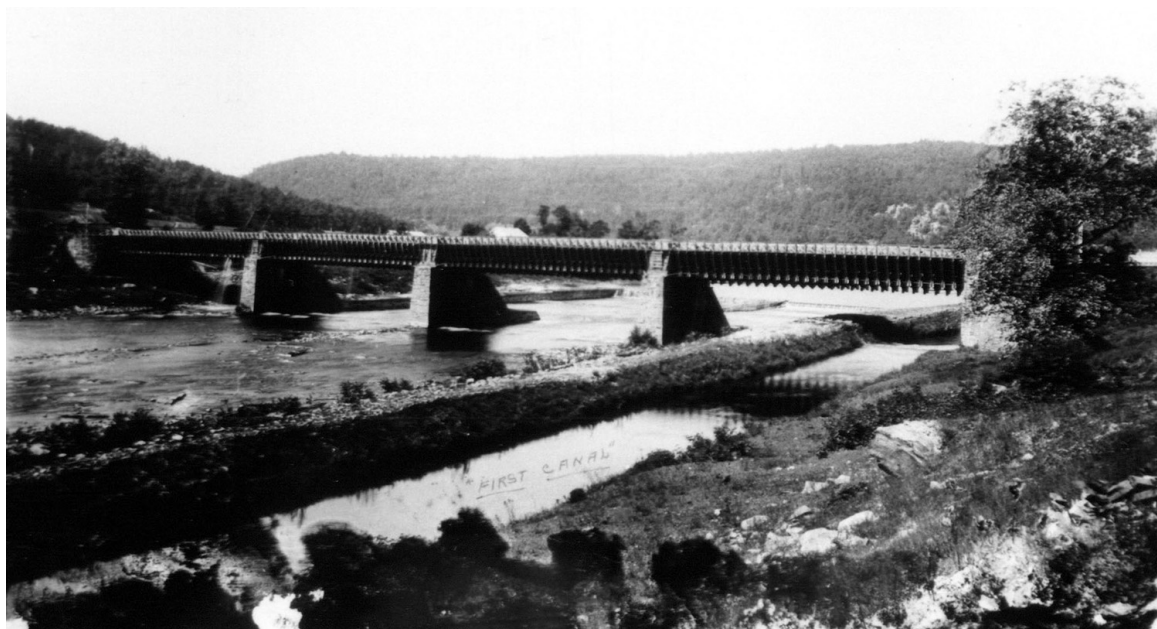


Figure 10. View looking northwest at the Delaware Aqueduct and the original canal, by this time used as a feeder canal, in the 1890s. (Delaware and Hudson Canal Historical Society, Ghear Collection)

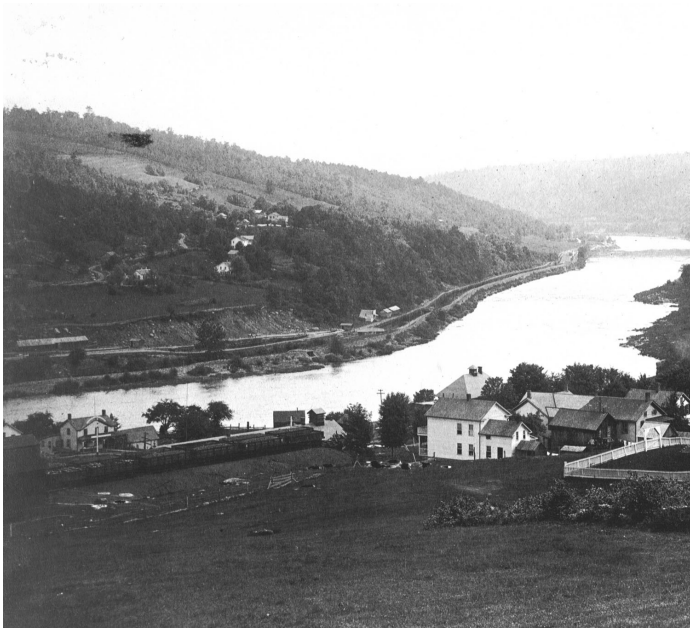


Figure 11. View looking southeast from Pennsylvania side, 1849-98. Lockhouses mark Locks 71 and 70 and a long shed sits north of Lock 71. A railed bridge spans the junction of the new canal and old canal. (Minisink Valley Historical Society, P-98-8-20)



Figure 12. View looking north at slackwater dam and icebreaker at the western-most aqueduct pier, 1852-98. Note the two people next to the dam at image center and the Delaware House Hotel in background. (Minisink Valley Historical Society, P-98-8-18)

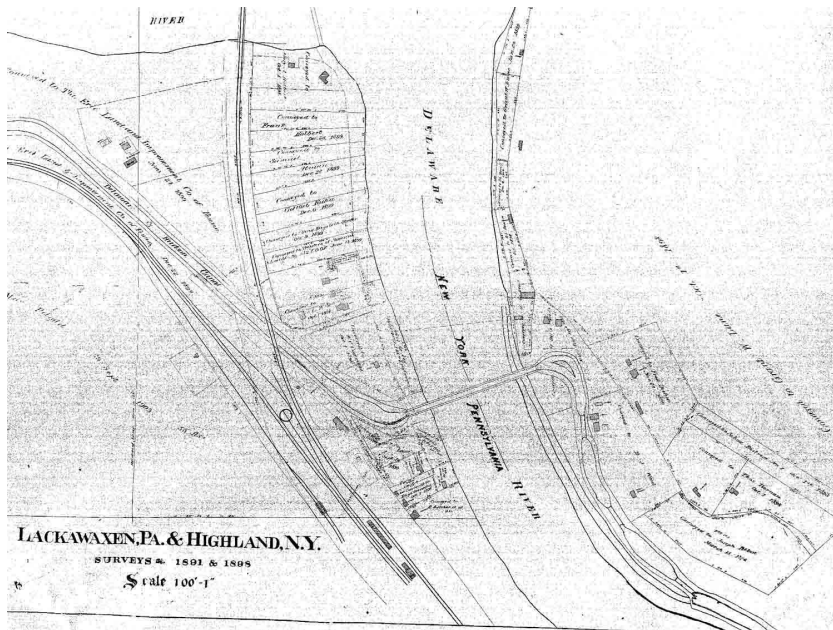


Figure 13. Map of the Delaware Aqueduct area in 1898. (UPDE Archives, UPDE-00071, GLK 7 and IV RBR 42, "CANAL COMPANY OWNERSHIP"/NAP_RL02_005)

POST-CANAL DEVELOPMENT, 1898-1980

In the wake of the Delaware & Hudson Canal's closure, some of the hamlets and villages that had grown up along the canal declined, and most waterways and locks fell into ruin or were lost to redevelopment. Roebling's suspension aqueducts over the Lackawaxen, Neversink, and Rondout rivers were eventually demolished, but his Delaware Aqueduct was purchased privately and eventually converted into a vehicular bridge.

In June 1899, Roebling's Delaware Aqueduct was purchased by the Cornell Steamboat Company, which explored several railroad uses for the structure. Their ownership lasted only six months, and in late 1899 the former aqueduct was conveyed to two different railroad companies, one company getting the Pennsylvania side and the other the New York side. For the next eight years the structure was embroiled in inter-railroad rivalries and no physical changes were made to it, although it likely served as an informal river crossing for the local population. One of the area's most famous residents, Zane Grey, often used the former aqueduct to travel between his house on the Pennsylvania side to other lands he owned on the New York side. (HSR 1983: 96-97,102,108)

Charles Spruks Ownership:

In May 1908, Roebling's Delaware Aqueduct and its immediate approaches were purchased by Charles Spruks, a Scranton lumber dealer who supplied heavy timbers for use as supports in the area's coal mines. Spruks initially purchased the former aqueduct as a means to transport logs from his timber lands in Sullivan County to the railhead in Lackawaxen (Figure 14). However, because the structure was at a strategic location far from any other road crossing over the Delaware River, Spruks opened it to all traffic and constructed a two-story toll house on the New York side around 1908 to collect payments (Figure 15). The toll house featured a bedroom and kitchen on the first floor, and a bedroom and living room on the second floor, while later accounts place a privy across from the toll house on top of the abutment. A wooden lattice gate that could be raised and lowered was installed at the former aqueduct's entrance next to the toll house. Spruks eventually removed the structure's towpaths and reused part of the towpath fence as a railing along the downstream side of the trunk floor to separate pedestrians from horse-drawn wagon traffic. In the 1920s a shed was built on the east end of the toll house, and electric lines were run across the former aqueduct. (HSR 1983: 103,105,108,121,128; Vogel 1998: 25; HAER 1988, Sht 2 of 4; LCS 2016)

Former canal features leading to Roebeling's Delaware Aqueduct were altered or removed to accommodate short approach roads that connected it to nearby existing roads. This required the removal of several sections of the earthen towpaths and retaining walls. On the Pennsylvania side, the Erie Railroad replaced their truss bridge that crossed over the canal with an embankment, while Scenic Drive was rerouted from under the westernmost aqueduct span to a crossing through the empty canal. On the New York side, Minisink Ford Road passed across the former turning basin (Figure 16). A United States Geological Survey (USGS) map from 1913 confirms the layout of roads, with the former aqueduct and approach roads connecting to roads on the Pennsylvania side (Scenic Drive) and the New York side (Minisink Ford Road). (USGS, Map, Milford_130569_1913_62500_geo)

The 1913 USGS map and historic photographs confirm new buildings around the abandoned canal. On the Pennsylvania side to the north of the former aqueduct's approach road, a two-story wood frame house (Margold house) and a detached garage and shed were built by 1913 upon the south towpath, at the intersection of the approach road and Scenic Drive (Figure 17). The house lot was fenced, and included walks, retaining walls, and several trees. By the same time, an addition was added to the west side of the former Canal Company house (Brown Keller house) located just north of the canal, as well as a detached garage. A larger two-story frame house (Cortright house) was also built between this house and the former Canal Company house (now Roebeling Inn) to the north. To the south side of the former aqueduct's approach road, all buildings were removed. On the New York side to the north of the former aqueduct's approach road, the Johnson house and outbuildings were extant, but the Johnson barn and the shed at the guardlock were gone (see Figure 14). To the south side of the former aqueduct's approach road, the three-story Highland Bridge Hotel was built next to the toll house by 1908. A two-story garage and a substantially larger two-story building stood to the south of the hotel in the vicinity of former Lock 72. The purpose of the larger building is not known but it likely covered the lock until it was removed by 1930 (see Figures 14 and 15). Despite the amount of new construction in this area, the stone and timber remains of Lock 71 were still intact (Figure 18).

Lackawaxen Bridge Company Ownership, Peter K. Schuyler:

In November 1930 Roebeling's Delaware Aqueduct and its approaches were purchased by the Federal Bridge Company of Washington, D.C., a toll bridge holding company that operated it under the name Lackawaxen Bridge Company. The company's president, Col. Peter K. Schuyler, immediately announced plans to rebuild the structure to make it "suitable for highway traffic of the heaviest class," and in 1931 replaced the old wooden aqueduct trunk with a new bridge deck (Figure 19). A gas pump was installed in the shed on the east end of the toll house to sell to customers. In May 1933 a fire destroyed the woodwork of the western (Pennsylvania) span and part of the span adjacent to it, but within two weeks repairs were made. (Vogel 1998: 26; HSR 1983: 112,117,121,269)

Construction of New York State Route 97:

The appearance of automobiles at the turn of the twentieth century had marked the next evolution in the country's transportation system. In the Upper Delaware River valley, cars renewed an interest in road construction that had waned since the introduction of the canal and railroad. Road improvements on the Pennsylvania side largely amounted to resurfacing the narrow winding roads already in existence. On the New York side, road projects mainly focused on routes heading inland from the river. Although some towns had short road segments along the Delaware River, many were not connected to each other. Rail remained the typical means of through-travel through the valley because there was no through-road that ran parallel to the river for its entire length. (Dekin 1983: 3-118,119; Route 97 Report, 2001)

As the number of paved roads and the use of automobiles increased in the 1920s, valley residents began to lobby for a new highway that would link the valley's riverside towns. Although a road along the New York side of the Delaware River had been proposed as early as 1914, it was not until the early 1930s that plans came to fruition for a new through-road, named State Route 97, stretching from Port Jervis to Hancock. The planned route paralleled the Delaware River and tracked along the river's edge, and consequently filled and overlaid much of the abandoned Delaware & Hudson Canal between Lackawaxen and Port Jervis. Construction of the 70.53-mile highway in 1934-39, aided by

President Roosevelt's New Deal funding, overcame several engineering challenges including deep ravines at Narrowsburg, Cochecton, Callicoon, and Basket Creek, and a sheer drop to the river at the Hawks Nest, just north of Port Jervis. (Route 97 Report, 2001; Dekin 1983: 3-119)

At Minisink Ford, the State of New York acquired land in and around Locks 70-72 and portions of the "old canal" and old towpath for the highway in 1933. Much like the route of the "new canal" segment in 1847-48, the highway route veered inland at this location. As such, the highway alignment passed directly over Lock 72 and part of Lock 70, but spared Lock 71. To prevent floodwaters from traveling through the "old canal" and undermining the new highway embankment at Lock 70, the state constructed a stone and earthen diversion dam in the "old canal" prism between Locks 71 and 70. The state also created a breach in the "old canal" towpath upstream from the diversion dam so floodwater could drain into the river once river water levels dropped. The highway alignment required reconfiguration of the intersection with Roebeling's Delaware Aqueduct and Minisink Ford Road, renamed Old Minisink Ford Road, and demolition of the Johnson house north of the former aqueduct. A new stone retaining wall and culvert inlet were installed just northeast of the Highland Bridge Hotel, with the culvert outlet located northeast of the former aqueduct. The stone walls that defined the outer curved portions of the canal's turning basin and towpath were not impacted by the road construction and thus retained. (UPDE Archives, UPDE-00071, GLK 6.6/NAP_RL02_04)

State Route 97 was envisioned not only as a means of local transportation but more importantly as a scenic route that would enhance the Upper Delaware River valley's tourist industry. While some towns offered recreation pursuits into the 1900s, the majority of the valley had remained largely rural and oriented toward agriculture and natural resource extraction. Hotels and boardinghouses throughout the region lost much of their popularity during the Depression of the 1930s, although some tourists continued to visit the area to hunt, fish, canoe, and enjoy the scenery. Completion of Route 97 also coincided with the decline in passenger railroad service, as visitors increasingly favored the automobile as their means of travel. (De Vries 2007: II-4; EIS 1987: 101)

Lackawaxen Bridge Company Ownership, Edward H. Huber:

The Lackawaxen Bridge Company was purchased in June 1942 by Edward H. Huber of Scranton, a nephew of Charles Spruks. Huber maintained the toll operations on Roebeling's Delaware Aqueduct, and by 1970 charged 25 cents for cars and 5 cents for pedestrians (passage was free when the toll house was closed). In later years of his ownership, Huber converted the first floor of the toll house into an office and tool room after the shed (for the gas tank) on the east side was removed, and the second floor into two storage rooms. He also painted the toll house, changing its color from a gray or beige with green trim to red. Huber installed lights on the former aqueduct in the 1940s, telephone lines in the late 1940s or early 1950s, and a wooden gate to replace the lattice gate in the 1950s. (HSR 1983: 126-128)

According to Huber, the cost of maintaining the former aqueduct was usually higher than the revenue from tolls, as the valley's damp conditions continuously deteriorated the structure's timber components. Historic photographs taken during a survey by the Historic American Engineering Record (HAER) in 1968-69 show the poor condition of the structure's decking and railings, as well as the upstream sides of the masonry piers from river ice (Figures 20 and 21). The photographs also show that except for a towpath at the turning basin, the other towpaths on the Pennsylvania side were gone. A row of evergreen trees was planted along the Scenic Drive by this time, at the north end of the former canal. (Vogel 1998: 26; HSR 1983: 126-127)

In 1968, Roebeling's Delaware Aqueduct was one of five locations associated with the Delaware & Hudson Canal to be designated as a National Historic Landmark. It was around this time that Huber announced his intentions to sell the former aqueduct, but it was not until November 1972 that he formally placed it on the market. Several potential buyers made offers, but at the same time various professional, historical, and political interest groups became alarmed at what could happen to the historic structure if it was sold. Additional recognition of the former aqueduct came in 1972 when it was designated a National Historic Civil Engineering Landmark by the American Society of Civil Engineers. (HSR 1983: 130-132,138)

Lackawaxen Bridge Company Ownership, Albert L. Kraft:

In January 1973, Albert L. Kraft, purchased the Lackawaxen Bridge Company from Edward Huber. By July Kraft had repaired much of the timber deck and was converting the second floor of the toll house into a gift shop. He also made plans to clean out trash and weeds that had accumulated in the feeder canal below the former aqueduct, and level out the nearby area to the north of the approach road for a parking area. The structure was closed for four months in 1977 following an accident where a truck fell through the deck and landed in the "old canal." (HSR 1983: 139-140)

Kraft raised the tolls to 50 cents for cars in 1976, but it was not enough to realize a profit. In February 1979 he reported that approximately 40,000 cars and trucks crossed the former aqueduct per year, from which he raised \$20,000 in tolls. Costs related to maintenance, insurance, and salaries were \$20,650. In the months that followed, Kraft began negotiations in transferring ownership to the federal government. "I love the bridge. If I were a millionaire, I wouldn't be selling it. I'd be at the bridge for the rest of my days." (HSR 1983: 143-145, citing New York Times, 16 April 1979)

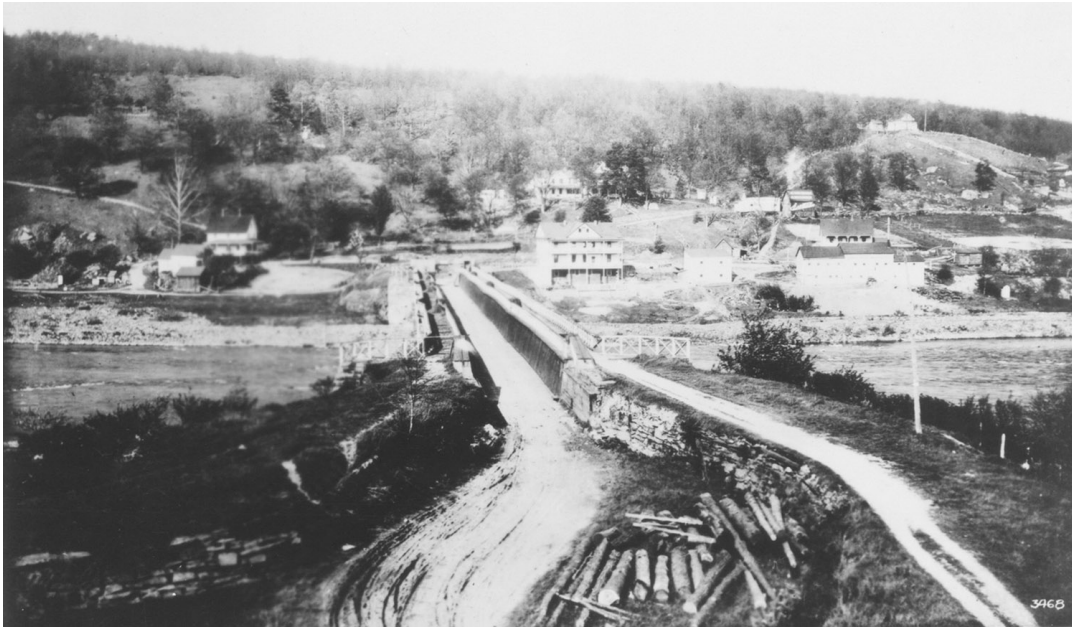


Figure 14. View looking east at Delaware Aqueduct after conversion to vehicular bridge, after 1908. (Minisink Valley Historical Society, P-82-8-28/Delaware and Hudson Railway Company, New York State Library/Canal Society of New York State negative 10339C)



Figure 15. View of the tollhouse on the New York side of the former aqueduct, December 1923. Note the reuse of the towpath fences at image right. (Delaware and Hudson Railway Company, New York State Library)



Figure 16. View looking south, 1923, at Minisink Ford Road passing through the former turning basin on the New York side. Walls associated with the turning basin and towpath are at image left. (Minisink Valley Historical Society, P-82-8-5)

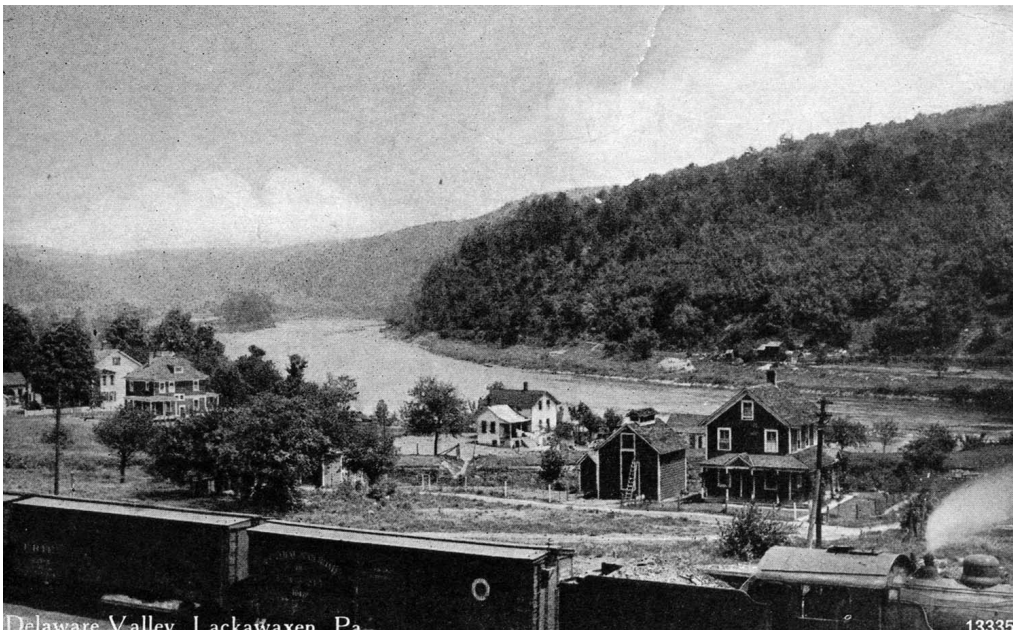


Figure 17. View looking northeast at the Pennsylvania side north of the former aqueduct, after 1913. The Margold House at image right is likely on top of the south towpath. The north towpath is intact. (Park Image File, Historic Lackawaxen, Scan 435)



Figure 18. View looking northwest at Lock 71, 1923. (Minisink Valley Historical Society, P-82-8-6)



Figure 19. View looking east-southeast at the redesigned deck, c.1932. (Park Image File, Delaware & Hudson Canal, Historic Roebling Bridge, Scan 140)



Figure 20. View looking southeast at Roebling's Delaware Aqueduct Site, c.1968. Note the poor condition of the upstream side of the aqueduct piers. On the Pennsylvania side, only a small section of towpath survives. (HAER PA-1, 1968, 140671pv)



Figure 21. View looking west at tollhouse and former aqueduct, c.1968. The structure's decking and railings are in poor condition. The toll gate is a simple hinged horizontal crossbar (shown here in a raised position). (HAER PA-1, 1968, 140680pv)

NATIONAL PARK SERVICE MANAGEMENT, 1980 TO 2016

Acknowledgement of the historical significance of the Delaware & Hudson Canal and Roebling's Delaware Aqueduct coincided with efforts to protect the setting of the Delaware River. In 1968,

President Lyndon Johnson signed into law the Wild and Scenic Rivers Act, which aimed to protect selected wild rivers and scenic rivers from development that would substantially change their wild or scenic nature. The declaration identified eight rivers that:

"with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations." (Final River Management Plan 1986: 177, citing Wild and Scenic Rivers Act, Section 1271)

The Act named 27 other rivers, including the Upper Delaware River, for further study to determine if they qualified for inclusion in the system.

The river study was timely, as canoeing and camping were developing into sizeable commercial operations in the Upper Delaware River valley. The appearance of canoe liveries and campgrounds along the river, and the increasingly heavy river use in the spring and summer, had caused concern among some local officials and citizens that the river's clean water and the valley's pristine scenery could be permanently damaged. Others, however, worried about government intrusion and regulation in the valley, and the effects on property rights. (EIS 1987: 101)

In 1978, after ten years of study and multiple attempts at legislation, Congress designated 73.4 miles of the Upper Delaware River as part of the National Wild and Scenic Rivers System and as a unit of the national park system. The designation covered the river segment beginning at the confluence of the east and west branches of the Delaware River at Hancock, New York, and extended downstream to Railroad Bridge No.2, in the vicinity of Mill Rift, Pennsylvania. It also established an interim ridge to ridge landward boundary of around 68,000 acres, with a stipulation that the boundary could be modified as part of an interagency planning effort. The new park was based on the authority of the 1968 Act, which stated that the river must be protected in its free-flowing condition and that it must be managed for the benefit and enjoyment of present and future generations. Consistent with the Act, the river was classified as part "scenic" (areas with minimal development or other intrusions) and part "recreational" (areas having more concentrated development and/or roadways). Roebbling's Delaware Aqueduct fell within the "Recreation" area. (Scott and Hauptman 1981: n.p.; Foundation Document 2014: 3; Resource Management Plan 1994, draft: 1)

Acquisition and Restoration of Roebbling's Delaware Aqueduct and the Toll House:

Soon after the park was created, the National Park Service indicated a desire to acquire Roebbling's Delaware Aqueduct as a "cultural resource centerpiece" of the new park. In May 1979, after months of negotiations with Albert Kraft and undertaking numerous inspections and appraisals of the structure, a public notice was sent to Upper Delaware River valley residents that the National Park Service had agreed to "purchase and preserve" the former aqueduct. As stated by Richard L. Stanton, Mid-Atlantic Regional Director, this action would "preserve for future visitors perhaps the most important historical feature that remains in the area that Congress designated as the Upper Delaware Scenic and Recreational River." (HSR 1983: 147, citing New York Times, 26 April 1979)

On March 27, 1980, the National Park Service officially purchased the Lackawaxen Bridge Company. In addition to the former aqueduct, the acquisition included the towpath, two remnant retaining walls, and the approach road leading to the structure on the Pennsylvania side (0.42 acres) and the toll house and approach road leading to the structure on the New York side (0.58 acres). Based on the Federal Highway Administration's assessment that the former aqueduct was in critical condition, the National Park Service closed the structure to all traffic. Critical repairs were made to the deck, railings, and lights, but because of the discovery of additional major structural problems, the structure was only reopened to pedestrians in October 1980. Local opposition to the closure of the former aqueduct to vehicles was considerable, prompting the National Park Service to reiterate their commitment to preserving the structure's historic elements and opening it to light vehicular traffic. Over the next two years, research projects were undertaken to evaluate the structure's preservation needs and the long-term effects of continued use of it by vehicles. (HSR 1983: 163,165-167; Speers 1987: 32; Drawing 647-80006, 1980)

In the October 1982 "Draft Environmental Impact Statement for the River Management Plan," the

National Park Service stated that a detailed engineering study was underway to determine if Roebbling's Delaware Aqueduct could be reopened to traffic without threatening its historic integrity. It also stated that the former aqueduct would be interpreted with signs, exhibits, and programs, and the toll house could be adaptively reused for such purposes. The engineering study referenced in the "Draft Environmental Statement" was completed in late 1982, and concluded that the structure could support limited highway traffic after certain structural upgrades were completed, and that such improvements could be economically accomplished without compromising its historic elements. The study also recommended limiting traffic to one lane and restricting weight limits to 15 tons. (HSR 1983: 165-167)

The National Park Service considered three alternatives for interpreting Roebbling's Delaware Aqueduct: 1) leaving the former aqueduct to look much as it had since the 1930s; 2) rebuilding short sections of the towpaths and trunk walls at both ends to demonstrate the original design; or 3) reconstructing the trunk walls and towpaths so that visitors could see a structure closely resembling the one that opened to canal traffic in 1849. The third interpretive alternative was selected, and in 1986 a Memorandum of Agreement addressing the reconstruction of Roebbling's Delaware Aqueduct was signed by representatives of the Advisory Council on Historic Preservation, the State Historic Preservation Offices of New York and Pennsylvania, and the National Park Service's Mid-Atlantic Regional Office. The multi-year project began in 1985 and included the rehabilitation of the original cables and masonry, reconstruction of the icebreakers, replacement of the timber superstructure, construction of the approach roads and concrete bridge deck, placement of a steel stiffening truss system, and reconstruction of the trunk walls, towpaths, and walkways (Figure 22). The project was completed in 1994 when the ice breakers, which had undergone significant damage since 1985, were reconstructed. (Shultz 1998: n.p.)

Historic recognition of the toll house and improvements to it were also completed in the late 1980s and early 1990s. In 1984, the Town of Highland designated the toll house as a local historic site. In August 1989 and May 1990, the National Park Service and the Williamsport Preservation Training Center completed structural repairs and stabilization at the toll house, which included the replacement of siding. Materials for this work were purchased by the Friends of the Roebbling Bridge group. (Sasser 1990: 1-2)

Final River Management Plan:

The park's "Final River Management Plan" was completed in 1986 and established a final boundary encompassing 55,574 acres. The plan described ways that existing local and state laws and authorities would be used to safeguard the river's resources. It also identified key cultural resource features in the designated river corridor for protection and enhancement, but acknowledged that most would not be acquired by the federal government. Instead, voluntary agreements would be used by the National Park Service, local governments, private groups, and private property owners to protect resources. (Resource Management Plan 1994 draft: 1; Foundation Document 2014: 3)

Specifically, the plan proposed exploring the use of voluntary agreements with property owners who had intact features of the Delaware & Hudson Canal. Deteriorated sites would receive management limited to stabilization, clearing of vegetation, and debris removal. The remains of Lock 71 (misidentified as #72 in the report) were singled out as a unique example of canal construction that should be interpreted and preserved if a suitable purchase, lease, or cooperative agreement could be arranged. (Final River Management Plan 1986: 77,81,83,88)

Acquisition of Canal Remnants:

In 1981 the National Park Service conducted a broad survey of canal remnants within the park's boundaries. In the vicinity of Roebbling's Delaware Aqueduct, the survey's report noted intact remains of "old canal," old towpath, guardlock wall, Lock 71, new towpath, turning basin, and two canal-era houses on the New York side. The survey team mistakenly identified the earthen and stone dam between Locks 70 and 71 as the site of the towpath crossing over the feeder canal (it was just south of Lock 70). The report noted the canal prism, towpath, and an abutment of the Lackawaxen Aqueduct on the Pennsylvania side, but did not remark on the remnant walls or filled in canal bed and turning basin adjacent to Roebbling's Delaware Aqueduct. The report's authors recommended acquisition of canal remains upstream and downstream from Roebbling's Delaware Aqueduct on the

New York side. (Scott and Hauptman 1981: n.p.)

A more comprehensive survey of park cultural resources was completed by the State University of New York at Binghamton in 1983. The survey described a potential Delaware & Hudson Canal historic district in the vicinity of Roebbling's Delaware Aqueduct, which in addition to the former aqueduct could include the toll house and three Delaware & Hudson Company houses. It was around this time that a portion of the east stone wall of Lock 71 collapsed. (Dekin 1983: 80,83)

The National Park Service acquired additional canal remnants adjacent to Roebbling's Delaware Aqueduct in the 1990s. On the Pennsylvania side north of the former aqueduct, the park purchased the 2.90-acre Margold property (tract 101-11) in 1998, which included the grass-covered canal bed, land access to the river, and the Margold house and garage. On the New York side south of the former aqueduct, the park purchased the 2.95-acre Vollkommer property (tract 104-06) by 1995 that included the "old canal" prism and associated walls, the old towpath and associated walls, towpath breach, and a portion of the new towpath and towpath retaining walls. The stone wall remains of Lock 71, the former sites of Locks 70 and 72, and the state's diversion dam, however, remained within the State Route 97 right-of-way.

Development of Visitor Facilities:

The 1986 "Final River Management Plan" identified the need to provide facilities for management and use of the park. At Roebbling's Delaware Aqueduct, the plan proposed the acquisition of land on both sides of the structure for parking areas and emergency river access points. That same year, a consultant prepared a drawing showing preliminary plans for visitor parking facilities on either side of the former aqueduct: a lot for ten cars and one bus on the Pennsylvania side south of the former aqueduct's approach road and a lot for fifteen cars and a bus on the New York side north of the former aqueduct's approach road. The plan also indicated the relocation of the Margold house in order to straighten the approach road, and the removal or relocation of the toll house (Final River Management Plan 1986: 87-88; Drawing 647-80015, 1986)

A "Schematic Design/Environmental Impact" report was prepared in 1994-95 and refined earlier facility plans on both sides of the river. The site was divided into three landscape character zones—manicured setting, transition zone, natural zone—that would heighten visitor awareness and appreciation of the aqueduct and canal system when either viewing these areas or passing through them. Each zone was achieved by management and maintenance practices that varied in intensity. (SD/EI 1995: 5)

On the Pennsylvania side south of the former aqueduct, the park had acquired 1.38-acres of land (tract 101-07) for the parking lot in 1993. Plans in 1994 showed a parking lot for 17 cars, an emergency river access road from the east end of the lot to the river, a restroom building with a composting toilet, an accessible walk from the parking lot to the north side of the former aqueduct's abutment, a boardwalk leading to an overlook southeast of the parking lot, waysides and information kiosks, and a wood model of a bridge truss. Unlike the 1986 drawing, the skewed alignment of the approach road was left intact, thus preserving the Margold house. When built in the late 1990s, the parking lot accommodated 18 cars and the overlook was moved to the east end of the parking lot. (Drawing 647-20022, 1994; Drawing 647-41003A, 1998)

On the New York side north of the former aqueduct, the park had assembled 1.77 acres of land (tracts 101-03, 101-06, 101-05) for the parking lot from 1988-1992. Plans in 1994 showed a parking lot for 10 cars, an emergency river access road from the north end of the lot to the river, an accessible walk from the parking lot to the toll house and north side of the former aqueduct's abutment, and waysides and information kiosks. Unlike the 1986 drawing, the toll house was not moved or razed. These facilities were completed in the mid-1990s. Archeological investigations in the area of the parking lot discovered nineteenth-century metal fragments, ceramic sherds, and some bone fragments, but no intact structural remains or features. (Drawing 647-20023B, 1994; Fiedel and Decker 2008: 52,57,60)

The "Schematic Design/Environmental Impact" report included the development of an accessible loop trail atop the old and "new canal" towpaths on the New York side. The proposed route began with an

access segment from the north end of the new parking lot heading southwest down the hillside to under Roebbling's Delaware Aqueduct where it met the "old canal" towpath. The route continued south along the old towpath to the state's diversion dam, turned north to the "new canal" towpath and passed Lock 71, and then descended northwest down the hill to meet the old towpath. A 6-foot hard surface was proposed, along with a rustic footbridge with railings over the towpath breach and a footbridge over the "old canal" prism. The park also planned to remove hazardous trees within the canal trace and install several waysides. Unfortunately, recurring flood and storm damage in this area delayed and altered plans until the late 2000s when the access segment and bridge spanning the breach were built as part of the Towpath Trail rehabilitation project. The section of trail on the new towpath was not built. (SD/EI 1995: 5-6,15; Review comments from Carla Hauser Hahn, 24 May 2016 and 22 August 2016)

Development of maintenance facilities was also addressed in the "Schematic Design/Environmental Impact" report, and in 1997 the park acquired 0.29 acres of land (tract 101-10) on the west side of Scenic Drive to house a maintenance facility in a one-story frame building formerly used by the Lackawaxen Volunteer Fire Department. The park moved into the facility in 2000. (SD/EI 1995: 5; Drawing 647-41002, 1993; Drawing 647-41003A, 1988)

Recent Maintenance and Repair Projects:

Frequent storm events and floods have periodically damaged Roebbling's Delaware Aqueduct, canal remnants, and other facilities. The most significant storm damage occurred from 2004 to 2006. During September 2004 and again in April 2005, two hurricane strength storms produced near-record high water events and caused a partial collapse of the former aqueduct's stone wing wall extending upstream (north) from the New York side abutment. The storms also damaged the maintenance access road from the parking lot to the Towpath Trail and portions of the trail itself. In September 2005 an emergency stabilization treatment of rip rap and a temporary culvert were installed to prevent subsequent failure of the exposed slope. In the meantime, a design was completed for a new dry laid stone wing wall that would maintain the character and appearance of the historic wing wall and be engineered to meet current structural and safety requirements. (Ballos and Hahn 2009)

To accomplish the repair work, the National Park Service collaborated with the Dry Stone Conservancy, Inc., a group dedicated to teaching and perpetuating the craft and art of dry stone masonry. However, in June 2006 the third flood of record in 18 months struck the Upper Delaware River valley, raising the river level to within feet of the former aqueduct's road deck. The stabilization treatment installed on the hillside the previous fall held, but the storm washed away about 30% of the new temporary rip rap and drainage culvert and most of the maintenance access road material, as well as causing damage to a section of one of the roadside trunk walls and all three of its ice breakers. (Ballos and Hahn 2009)

In the fall of 2006 the cooperative agreement with Dry Stone Conservancy was finalized, and the contract was revised to address the additional repairs. Implementation of the wing wall, road, and culvert repairs began in the summer of 2007 and was complete in December. Stone and gravel used to build a ramp for the excavator to install the stone in the wing wall was reused to repair and rebuild the maintenance access road and towpath. The large volume of riprap and gravel that was scoured from the access road and hillside stabilization in the 2005 and 2006 floods and deposited in the "old canal" bed canal was also removed. A culvert was installed at the location of a former footbridge to channel water under the access road/towpath, from the "old canal" bed to the river. Repairs of the ice breakers were completed in 2009. (Ballos and Hahn 2009)

The floods of 2004-06 resulted in other improvement and stabilization projects. In June 2008 the Olmsted Center for Landscape Preservation and park staff removed around 70 hazardous and dead trees along the Towpath Trail and adjacent stone walls, south of Roebbling's Delaware Aqueduct. In 2008-09, the surface of the Towpath Trail was improved to meet accessibility standards. A new covered concrete culvert was installed in the towpath breach to allow continuation of the trail and to improve resistance to future high water events in the "old canal." A dry laid stone wall was built at each culvert abutment and along the maintenance access road near the New York parking lot. Flooding and storms in 2010 and 2011 also caused damage to the maintenance access road. (Memorandum, Hahn to Martinez, et.al. 30 June 2008; Pritchett 2010; Review comments from Carla

Hauser Hahn, 24 May 2016)

The damp climate of the Upper Delaware River valley requires constant maintenance of Roebling's Delaware Aqueduct, especially its wood components. Work has included milling and overlaying the road deck with structural concrete, replacing the approaches to the structure, cleaning and repointing masonry, replacement of ice breakers, general maintenance on the cables, and repair of signs, striping, and other miscellaneous work.



Figure 22. View looking west at the tollhouse and former aqueduct after it reopened to vehicular traffic, c.1988, before the towpaths were reconstructed (1994). (HAER PA-1, 1988, 123818pv)

Uses

Functions and Uses:

Major Category	Category	Use/Function	Historic	Current	Primary
Transportation	Water-Related	Aqueduct	Yes	No	Yes
Transportation	Water-Related	Canal	Yes	No	No
Transportation	Water-Related	Canal Lock	Yes	No	No
Transportation	Water-Related	Culvert (Waste Weir)	No	Yes	No
Transportation	Road-Related	NPS Class I Principal Road	No	Yes	No
Recreation/Culture	Outdoor Recreation	Outdoor Recreation	No	Yes	Yes
Landscape	Scenic Landscape	Overlook	No	Yes	No
Transportation	Road-Related	Parking Area	No	Yes	No
Transportation	Road-Related	Road Bridge	No	Yes	No
Vacant (Not In Use)	Ruin	Ruin	No	Yes	No
Recreation/Culture	Museum (Exhibition Hall)	Wayside Exhibit	No	Yes	No

Public Access:

Public Access: Other Restrictions

Public Access Narrative:

Upper Delaware Scenic and Recreational River has no park entrance, amenity, or interpretive program fees. Roebeling's Delaware Aqueduct is open 24 hours a day and no tolls are collected. The Towpath Trail is open all year, and the toll house is open daily 10:00 am - 4:00 pm.

The Margold house on the Pennsylvania side of the bridge houses the Delaware Highlands Conservancy, a non-profit organization dedicated to protecting the healthy lands and waters, eagles and other wildlife, and locally sustainable economies of the Upper Delaware River region. It is staffed on weekends in January and February.

Associated Ethnographic Group

Ethnographic Study Status: No Survey Conducted

Ethnographic Narrative:

Analysis & Evaluation of Integrity

Analysis and Evaluation of Integrity Narrative Summary:

Landscape characteristics identified for Roebbling's Delaware Aqueduct Site include natural systems and features, spatial organization, topography, land use, vegetation, constructed water features, circulation, buildings and structures, views and vistas, and small-scale features. Many of these characteristics have associated features that contribute to the site's overall historic significance and character. The features that contribute were either present during the period of significance or are in-kind replacements of historic features.

INTEGRITY

According to the National Register of Historic Places, integrity is the ability of a property to convey its significance through physical resources. The National Register program identifies seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Retention of these qualities is necessary for a property to convey its significance; however, not all seven aspects must be present for a property to retain integrity. A basic test of integrity is to judge whether a participant in the historic period would recognize the property and its features as they exist today. That is to say, if John Roebbling was to return today, would he easily recognize the Delaware Aqueduct and the adjacent canal?

Location:

Location is defined by the National Register as the place where the historic property was constructed or the place where the historic event occurred. Roebbling's Delaware Aqueduct and remnant canal features on both sides of the Delaware River are in their original locations.

Design:

Design is the combination of elements that create the form, plan, space, structure, and style of a property. Roebbling's Delaware Aqueduct Site retains characteristics and features associated with the Delaware & Hudson Canal. Although Roebbling's Delaware Aqueduct no longer carries canal boats across the Delaware River, it does provide passage for vehicles and pedestrians. Vehicles cross the structure in the reconstructed aqueduct trunk, while pedestrian use the reconstructed towpaths on the structure's upstream and downstream sides. Remains of the canal prism, towpaths, and stone retaining walls evoke the canal's design and use, although some features are missing or filled in, or are obscured by successional vegetation. Ancillary structures and features located along the canal route that were vital to its operation are gone, and one of the most intact ruins, Lock 71, currently lies just beyond park property. Tolls are no longer collected at the toll house, but it retains its original design features and relationship to the former aqueduct during its life as a vehicular traffic crossing.

Setting:

Setting is the physical environment of a property and the general character of the place. The setting of Roebbling's Delaware Aqueduct Site has undergone changes, beginning with the canal's abandonment and the aqueduct's transition from carrying canal boats to transporting carriages and motor vehicles. The former aqueduct still serves as a primary vehicular crossing over the Delaware River. The addition of residences, lodgings, yards, and parking lots in areas just beyond the structure have also changed the setting, as has the presence of Route 97 on the New York side. However, the site's place in the scenic Upper Delaware River valley is still intact, with forests covering the valley and the Delaware and Lackawaxen rivers flowing unimpeded. Historic views up and down the river and towards Roebbling's Delaware Aqueduct also remain. Although the adjacent township of Lackawaxen has grown since the historic period, Roebbling's Delaware Aqueduct Site remains mostly quiet and tranquil. Visitor facilities added by the National Park Service overall do not compromise the historic setting.

Materials:

Materials are the physical features that were combined or deposited during the period of significance in a particular pattern or configuration to give form to the property. The masonry, iron, and suspension wire components of Roebbling's Delaware Aqueduct have been restored and are intact, but the wood elements on the structure's aqueduct trunk, towpath, fences, and superstructure are reconstructions. Remnant stone walls associated with the canal prisms and towpaths feature locally-quarried stone. Post canal-era stone walls generally employ local stone that is compatible in appearance with the historic walls, although the parking lot

walls feature poured concrete construction. Concrete and asphalt comprise the surfaces of the structure's road deck, the Pennsylvania and New York approach roads, parking lots, and sidewalks.

Workmanship:

Workmanship is the physical evidence of the crafts and methods of construction used during the specified historic period of significance. The rehabilitation of Roebbling's Delaware Aqueduct in the 1980s and 1990s successfully reconstructed features from the original design while making necessary structural improvements to accommodate vehicles and pedestrians safely. Today, the former aqueduct appears very much as it did during the historic period, without the water. The remnant canal prisms, towpaths, and stone walls still reflect nineteenth-century canal technology and craftsmanship. The batter of the stone walls is still evident, although some have collapsed or are severely compromised.

Feeling:

Feeling is the expression of the aesthetic or historic sense of a particular time resulting from the presence of physical features that, taken together, convey a property's historic character. During the historic period, Roebbling's Delaware Aqueduct Site was a working landscape, animated by mules and people pulling boats, and lockkeepers carefully raising and lowering boats from one level to another. Today the canal sections that remain are empty and silent, and are surrounded by a landscape of homes, lawns, and roads. The historic feeling of the former aqueduct has also changed, as motorized traffic now crosses the structure instead of canal boats. However, the park has reconstructed the aqueduct trunk and towpaths. Vehicles pass through the trunk that appears, which has the appearance of having been drained of water. Pedestrians on the towpaths can still experience the crossing like those who travelled across it in the 1800s, and witness the dramatic upstream and downstream views of the river and the valley.

Association:

Association is the direct link between an important event or person and the property. Roebbling's Delaware Aqueduct Site retains its association with the Delaware & Hudson Canal. Although the former aqueduct no longer carries boats, it does retain the important characteristics and features designed by John A. Roebbling, and stands as the oldest suspension structure in the United States. The site retains visual associations with canal remnants on adjacent lands, including Lock 71, the turning basin, and portions of the "new canal" prism, towpath, and stone walls.

Landscape Characteristic:

This section presents an analysis of landscape characteristics and their associated features and corresponding List of Classified Structures (LCS) and Facility Maintenance Software System (FMSS) names and numbers, if applicable. It also includes an evaluation of whether the feature contributes to the property's National Register eligibility for the primary historic period (1825-1898) or secondary historic period (1908-1966); is noncontributing "compatible" (visually congruent with the historic character of the landscape) or "incompatible" (visually incongruent with the historic character of the landscape); is undetermined; or is managed as a cultural resource.

Landscape Characteristic: Natural Systems and Features

Historic and Existing Conditions:

Natural systems are the natural aspects that influence the development and physical form of the landscape including physiography, geology, and hydrology. These processes were vital to the construction and operation of the Delaware & Hudson Canal and the Delaware Aqueduct (Roebbling Bridge).

The portion of the Delaware River within the boundaries of the Upper Delaware Scenic and Recreational River is an exceptional example of a deep, narrow river valley cutting across the Small Lakes section of the glaciated portion of the Appalachian Plateau. The overall landscape is a stream-cut landscape modified by stream derangements from glacial deposits burying portions of pre-glacial valleys. Examples of significant geologic features in the park include sandstone cliffs, barbed tributaries, glacial deposits, glacial outwash terraces, diverse channel morphologies, exposed ancient bedrock, bedrock knobs, cutoff incised meanders, island complexes, gorges, and fossils. (UPDE website, accessed 11 March 2015; FD 2014: 9)

The Delaware River, a free-flowing river from Hancock, New York to the Atlantic Ocean, consists of a series of riffles, rapids, runs, and pools with varying water widths, depths, and speeds. The river is 535 feet wide and 2 to 4 feet deep at Roebbling's Delaware Aqueduct, and has moderate to fast currents during normal waterflows. To the north and one-third mile upstream from the former aqueduct is the Lackawaxen River, a tributary that joins the Delaware. At their confluence, a rope ferry guided canal boats from the Lackawaxen River across the Delaware River until it was replaced by the Lackawaxen and Delaware aqueducts in 1849. Together, the Delaware River and Lackawaxen River watered approximately one-third of the Delaware & Hudson Canal. (SD/EA 1995: 20)

Landforms had a great influence on the canal's course through the Upper Delaware River valley, especially the river floodplains (Figures 23 and 24). At Roebbling's Delaware Aqueduct Site on the Pennsylvania side, the relief of Pike County is mild except for the steep escarpments cut by the Delaware and Lackawaxen Rivers. Elevations range from 595 feet at the river's edge, to 640 feet along Scenic Drive, to 1,050 feet along the ridgeline immediately west of the site. Slopes are generally gradual and increase to the west, while riverbank slopes exceed 15 percent in some areas. On the New York side, the relief of Sullivan County is that of a deeply dissected plateau that slopes to the southwest. Elevations range from 595 feet at the river's edge, to 622 feet along State Route 97, to around 1,180 feet along the ridgeline just to the northeast. Slopes are moderate to steep as they increase to the east, exceeding 15 percent in most areas. (SD/EA 1995: 17)

The wet and poorly drained soils of the river floodplains were ideal for development of the canal. At Roebbling's Delaware Aqueduct Site, soils vary according to their position within or above the river's floodplain. Soils within the floodplain originate from materials deposited from flood events while higher elevation soils derive from shale, sandstone, and/or limestone. The Pennsylvania side is underlain by stony and cobble alluvial soils, and by Tunkhannock gravelly sandy loams above the floodplain. The New York side is underlain by Fluvauquent-Udifluent complex soils, and by Valois

gravelly sand loams above the floodplain. (SD/EA 1995: 17-18)

Portions of Roebling's Delaware Aqueduct Site are located within the river's 100-year floodplain. Most floods occur in the spring as a result of the seasonal rains and snowmelt, but tropical storms traveling up the eastern seaboard in summer and early fall have occasionally flooded the valley. On the Pennsylvania side, the top of the former aqueduct's abutment, parking lot, restroom, maintenance building, and Margold house are above the floodplain, while the emergency river access road and areas below the parking lot are within the floodplain. On the New York side, the top of the former aqueduct's abutment, toll house, and parking lot are above the floodplain, but the remnants of the "old canal" and "new canal" below Route 97 are within the floodplain. (SD/EA 1995: 21)

The U.S. Army Corps of Engineers has identified several small areas of wetlands occurring in Roebling's Delaware Aqueduct Site. On the Pennsylvania side, wetlands can be found between the river and the toe of the adjacent slope. On the New York side, wetlands correspond to standing water and depressions in the "old canal" prism and between the river and the towpath. (SD/EA 1995: 21-22)

Landscape Characteristic Graphics:



Figure 23. View of the Upper Delaware River valley, looking southeast from the west end of Roebling's Delaware Aqueduct. (OCLP 2015, DSC_0348 and DSC_0349)



Figure 24. View of the Upper Delaware River valley, looking north from the middle of Roebling's Delaware Aqueduct. The ripples in the water are caused by the remnants of a slackwater dam. The Lackawaxen River is visible upstream. (OCLP 2015, DSC_0418)

Landscape Characteristic: Spatial Organization

Historic Condition:

Spatial organization refers to the three-dimensional organization of physical forms and visual associations in a landscape, including the articulation of ground, vertical, and overhead planes that define and create spaces. During the primary historic period, the Delaware and Lackawaxen rivers and the Delaware & Hudson Canal served as the primary organizing elements of Roebling's Delaware Aqueduct Site landscape. Various ancillary buildings, structures, corrals, and gardens occupied the intervening spaces between the rivers and canal, especially alongside the towpaths, locks, and aqueducts. Beginning in 1849, the Delaware Aqueduct served as the main crossing over the Delaware River for boats and pedestrians, while local roads on either side of the river provided access to nearby buildings owned by the Canal Company and the surrounding privately-owned lands.

Post-Historic and Existing Conditions:

Roebling's Delaware Aqueduct was converted into a vehicular bridge in 1908, thus preserving its use as the area's primary river crossing between Pennsylvania and New York. The remainder of the canal was abandoned and sold, and local roads and new property lines gradually replaced the canal as an organizing landscape element. Several towpaths were removed to construct approach roads to the former aqueduct, and in time leftover canal sections were filled or leveled by new buildings, roads, and yard spaces. Perhaps the biggest change came in the 1930s when Route 97 was built atop much of the canal on the New York side.

Today, Roebling's Delaware Aqueduct continues to serve as a vehicular and pedestrian crossing over the Delaware River and a connection to State Route 590 via Scenic Drive on the Pennsylvania side and Route 97 on the New York side. These roads provide access to the parking lots adjacent to the former aqueduct on both sides of the river, while sidewalks lead from the parking lots to the structure's reconstructed towpaths. The Delaware River and Roebling's Delaware Aqueduct effectively divide the site into four spaces. On the Pennsylvania side of the river, spaces to the north and south of the Pennsylvania approach road are bordered by Scenic Drive; on the New York side of the river, spaces to the north and south of the New York approach road are bordered by Route 97.

Landscape Characteristic: Topography

Historic Condition:

Topography is the three-dimensional configuration of the landscape surface characterized by slope and orientation. At the confluence of the Delaware and Lackawaxen rivers, the riverbanks had to be modified to build the canal. Through a combination of cutting, filling, and construction of stone walls, workers employed by the Delaware & Hudson Canal Company removed and piled material to create the canal prism and the adjacent towpaths. On the north bank of the Lackawaxen, extensive cut and fill was needed to construct three locks to lower boats down to the rope ferry that crossed the Delaware. Downstream from the rope ferry on the east bank of the Delaware River, the canal was built in the floodplain, which did not require any locks or as much change to the original grade. In 1849 canal traffic was diverted from these riverside sections to new inland sections of canal and two aqueducts across the Lackawaxen and Delaware rivers. The "new canal" sections and aqueducts required additional cut, fill, and walls to create the canal prisms, towpaths, and aqueduct embankments and abutments. Three locks were constructed on the New York side to overcome the 32-foot elevation change from the east end of the Delaware Aqueduct to the original canal to the south. Around this same time, New York & Erie Railroad was making similar topographic changes on the Pennsylvania side to build a rail corridor alongside and over the canal and Lackawaxen River.

Post-Historic and Existing Conditions:

In the years after the Delaware & Hudson Canal was abandoned and its properties were sold, some of the landform changes that had been made for the canal were reversed. To accommodate the conversion of the Delaware Aqueduct into a vehicular bridge, several sections of towpath were removed on both sides of the former aqueduct to build approach roads. On the Pennsylvania side, the New York & Erie Railroad replaced their bridge over the canal with an embankment, leaving a stranded section of canal between the railroad and Roebeling's Delaware Aqueduct that was eventually leveled for the construction of several homes and additional roads. On the New York side, the road prism and embankments of State Route 97 were built atop much of the canal. The National Park Service has also made changes to the topography in the construction of parking lots and drainage features on the Pennsylvania and New York sides of the former aqueduct, and accessible walkways from the parking lots to the structure. Perhaps the least changed area is the "old canal" (feeder canal) on the New York side, which although partially filled and vegetated retains many of its original topographic characteristics.

Landscape Characteristic: Land Use

Historic Conditions:

Land use describes the principal activities in a landscape that form, shape, and organize the landscape as a result of human interaction. During the primary historic period, the Delaware & Hudson Canal Company built and operated the canal in this area to transport anthracite coal to markets in New York City. Canal boats loaded with coal plied the waterways with the help of mules, locktenders, and other canal workers. Historic photographs show a variety of houses, offices, barns, corrals, and gardens that supported canal operations and canal operators. By the early 1850s, other land uses near the canal included the New York & Erie Railroad mainline and railyard just to the west of the Delaware Aqueduct, the Delaware House hotel on the north bank of the Lackawaxen River, and the township of Lackawaxen just to the southwest. On the river itself, timber barges continued to transport logs to downstream markets. When first built, the canal was the only feasible way to deliver coal to the seaboard, but by the 1870s the railroad became the most efficient means of transport. Canal-related land uses at the Delaware Aqueduct continued until the canal was closed in 1898 and its lands were sold.

Post-Historic and Existing Conditions:

In 1908, Roebbling's Delaware Aqueduct was sold to a private landowner who repurposed it as a river crossing for wagon and later automobile traffic. That same year, the structure's owner, Charles Spruks, constructed a toll house on the New York side to collect payments and house the tollkeeper and bridge workers. In the following years, some of the buildings owned by the Canal Company in the vicinity of the former aqueduct became private residences or lodgings, while other structures were removed. By c.1913, two new homes (Margold house and Cortright houses) were built on former canal lands on the Pennsylvania side near the former aqueduct, and a tavern/lodge called the Highland Bridge Hotel was constructed on the New York side next to the toll house.

The 1930s brought major land use changes to Roebbling's Delaware Aqueduct Site. Charles Spruks sold Roebbling's Delaware Aqueduct to the Lackawaxen Bridge Company, who replaced the aging aqueduct trunk with an open bridge deck. These improvements coincided with the State of New York's plans for Route 97 along the east bank of the Delaware River, which also prompted the Bridge Company to begin selling gasoline at the toll house. The completion of the highway increased traffic and toll profits, but it destroyed and filled most of the "new canal" prism, turning basin, and locks just south of the former aqueduct. Use of the toll house as a dwelling was eventually replaced by office and storage space, but tolls were still charged until 1980 when the National Park Service acquired Roebbling's Delaware Aqueduct and toll house as a centerpiece of the Upper Delaware Scenic and Recreational River.

Today, the restored and rehabilitated former aqueduct still serves as an important vehicular and pedestrian crossing between Lackawaxen and Minisink Ford. The park has added visitor parking and restroom facilities at the site and waysides throughout the landscape. At the toll house, the second floor features exhibits about canal life, but exhibits about the canal system, Roebbling's wire rope, and the rehabilitation project on the lower level are closed to the public because of moisture problems. The park's Towpath Trail guides visitors along the "old canal" towpath where they can appreciate the engineering marvel of the former aqueduct and canal and enjoy the river. Although timber traffic no longer flows down the river, visitors will often see recreational rafts and kayaks floating downstream as part of organized float trips. Another land use at Roebbling's Delaware Aqueduct Site is the Delaware Highlands Conservancy, an accredited land trust organization that currently operates a winter-time visitor center in the Margold house. (Review comments from Carla Hauser Hahn, 24 May 2016)

Landscape Characteristic: Vegetation

Historic Conditions:

Vegetation includes managed individual specimens and masses of deciduous and evergreen trees, shrubs, vines, groundcovers, and herbaceous material, both indigenous and introduced. When Europeans began settling in the Upper Delaware River valley in the eighteenth century, they encountered a densely forested landscape of oak, hickory, maple, ash, and hemlock, as well as beech, sugar maple, pine, and buttonwood. Harvesting woodlands for log cabins and mills began in the 1750s with the establishment of the Cushetunk settlement, and then expanded soon after as part of a thriving lumber rafting industry.

At the confluence of the Delaware and Lackawaxen rivers, the construction of the Delaware & Hudson Canal in 1825-28 required the removal of trees and other vegetation to accommodate the canal prisms, towpaths, engineered embankments, and support buildings. It is not known if the Delaware & Hudson Canal Company attempted to replant any of the resulting bare slopes, but in a short time they were presumably revegetated with small trees, shrubs, and grasses, which would have helped slow soil erosion into the canal prisms.

Historic photographs of Roebeling's Delaware Aqueduct from the mid- to late 1800s show scattered vegetation and open areas along the canal route and dense forest cover in the steeper slopes above the canal. Areas beyond the canal supported trees and shrubs, or were cleared for gardens and orchards. Several photographs show two distinct trees near the Pennsylvania end of the Delaware Aqueduct, next to the northern towpath. However, any woody vegetation located between the towpath and canal would certainly have been removed or suppressed to prevent the tangling of towlines.

Post-Historic and Existing Conditions:

At the turn of the twentieth century, many of the forests in the Upper Delaware River valley had been cleared of pine and hemlock trees, and new industries were harvesting the hardwood trees, leaving behind a much more open landscape. One such harvester was Charles Spruks, who initially bought the abandoned Delaware Aqueduct as a means of transporting logs from his lands in Sullivan County to the Lackawaxen railyard. In the years that followed, the land around the remnant canal segment leading to Roebeling's Delaware Aqueduct on the Pennsylvania side was subdivided and redeveloped for residential uses and a reconfiguration of Scenic Drive. The existing houses and new homes in this area featured lawns, ornamental plantings, and gardens, as well as vegetative screens along some of the property lines. In the 1960s a row of evergreen trees were planted along Scenic Drive, at north end of the former "new canal" prism, but were removed in the 2000s. On the New York side, a few plants were installed at the Highland Bridge Hotel, but most of the "new canal" route was redeveloped as State Route 97. Canal features not destroyed by the highway, such as the "old canal" route and Lock 71, gradually became overgrown with successional vegetation.

Today, the majority of the Upper Delaware River valley has reforested with a mixture of deciduous and evergreen trees and shrubs in several vegetative communities. At Roebeling's Delaware Aqueduct Site, steeper slopes above the floodplain are characterized by an oak and hickory forest that also includes maple, hemlock, and yellow poplar. The floodplains are characterized by riparian trees such as maple, birch, ash, sycamore, cottonwood, basswood, and willow, and shrubs like sumac, spicebush, and elderberry. Several areas that were previously part of the oak-hickory and floodplain forest types are now disturbed areas associated with houses, businesses, and other built features. Vegetation in these areas include remnants of the oak-hickory and floodplain types, tall grasses comprised of goldenrod, ragweed, and other forbs; and woody species such as eastern red cedar, gray birch, aspen, and sassafras. There is also a plant community of river vegetation comprised of pond-weed, water-weed, and river-weed, which can be found on the Pennsylvania side upstream from the former aqueduct and on both sides of the river downstream from the structure. (SD/EA 1995: 18-19)

The remnants of the "old canal" on the New York side are within the floodplain and disturbed area plant communities. Much of the "old canal" towpath has been developed as the Towpath Trail, which features generally open conditions in the vicinity of the former aqueduct but transitions to a canopy of second growth maple, birch, sycamore, and oak canopy heading south. Portions of the "old canal" prism are filled with trees as well as plants listed on the National Park Service invasive

plant list: Japanese knotweed (*Polygonum cuspidatum*), barberry (*Berberis thunbergii*), multiflora rose (*Rosa multiflora*), and poison ivy (*Rhus radicans*).

The National Park Service has installed plantings at Roebeling's Delaware Aqueduct Site. Plantings observed on the Pennsylvania side south of the former aqueduct include hackberry (*Celtis occidentalis*), flowering dogwood (*Cornus florida*), Eastern white pine (*Pinus strobus*), willow oak (*Quercus phellos*), lowbush blueberry (*Vaccinium angustifolium*), and blackhaw viburnum (*Viburnum prunifolium*). There is a small grove of aspen trees (*Populus tremuloides*) adjacent to the bridge sculpture and a Colorado blue spruce (*Picea pungens*) in the planting bed on the western corner of the parking lot. The groundcover immediately surrounding the parking lot consists of turf grass. North of the former aqueduct, plantings around the Margold house consist of several maple (*Acer* sp.), Norway spruce (*Picea abies*), rhododendron (*Rhododendron* sp.), lilac (*Syringa vulgaris*), and a Japanese maple (*Acer palmatum*). The remainder of the parcel to the north and east is maintained as lawn, including the former "new canal" prism, but also includes scattered maple, apple (*Malus* sp.), spruce, and pine trees. A row of spruce and lilac marks a diagonal property line in this area and the approximate northern extent of the "new canal" towpath. Plantings observed on the New York side north of the former aqueduct include a large maple near the approach road, several swamp white oaks and red maples around the parking lot, and a few scattered chokeberry and winterberry shrubs, but most of the area is maintained as turf grass. The area south of the former aqueduct around the toll house is mostly turf grass and a hemlock.

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176540						No
Plantings Around Parking Lots and Sidewalks	176542	Noncontributing – Compatible					No
Margold Lot Trees, Shrubs, and Lawns	176544	Noncontributing – Compatible			Location	81074	Yes
NEW YORK SIDE	176546						No
"Old Canal" Prism Vegetation	176548	Noncontributing – Incompatible					No
Plantings Around Parking Lots and Sidewalks	176550	Noncontributing – Compatible					No

Landscape Characteristic: Constructed Water Features

Historic Condition:

Constructed water features are built features and elements that utilize water for aesthetic or utilitarian functions. The Delaware & Hudson Canal was constructed from 1825 to 1828 to transport coal from deposits in Pennsylvania to the New York City area. The 108-mile long canal included 108 locks and 22 aqueducts, and on the Delaware section (between Lackawaxen and Port Jervis) there were thirteen locks that raised or lowered boats a total of 130 feet in a distance of 24 miles. Boats were pulled by mules on earthen towpaths located on one or both sides of the canal. Rivers, streams, and natural drainage supplied the necessary water for the canal.

The canal itself was designed with a flat bottom and sloping sides, typically lined with clay or stone retaining walls to prevent the loss of water and control erosion into the canal prism. The prism was

4 feet deep, with an average water line of 28 feet and a bottom width of 20 feet. At the confluence of the Delaware and Lackawaxen rivers, the canal prism and three locks were built along the north bank of the Lackawaxen River. At the Delaware River, a rope ferry guided boats across the river from the north bank of the Lackawaxen to the east bank of the Delaware. Canal boats reentered the canal prism through a guardlock at the slackwater dam and continued south along the east bank of the Delaware.

The rope ferry crossing became a major bottleneck in the canal system because it was time-consuming and slow, and vulnerable to collisions with timber raft traffic heading downstream. In 1847-48 the crossing was replaced by the Lackawaxen Aqueduct over the Lackawaxen River, a "new canal" section running east and southeast, the Delaware Aqueduct over the Delaware River, and three new locks heading south on the east bank of the Delaware River, after which it connected with the original canal. The "old canal" prism on the north bank of the Lackawaxen was abandoned, but the guardlock and "old canal" prism on the east side of the Delaware were retained for use as a feeder canal. The "new canal" construction was part of a major program of improvements completed in the 1840s and early 1850s that enlarged the canal and locks to accommodate boats with up to a 140-ton capacity. During this period, the canal prism was deepened from 4 to 6 feet, and widened from 28 to 48 feet at the waterline and from 20 to 30 feet at the bottom. As the canal sides were cut back, dry-laid stone walls were built to decrease leakage from the clay beds and prevent failure of the banks (see Buildings and Structures below).

The two aqueducts greatly improved efficiency along this section of the canal, and the system-wide improvements allowed the Delaware & Hudson Canal Company to remain competitive with the New York & Erie Railroad, which had expanded into the Upper Delaware River valley around this time. However, advancements and efficiencies in railroad technology eventually outpaced the limitations and capacity of the canal, and by 1898 it was closed.

Post-Historic and Existing Conditions:

With the closure of the canal, the waterways and locks eventually became overgrown or fell into ruin, while other sections were filled in by road construction or other development or all but destroyed by years of high water events. At Roebeling's Delaware Aqueduct Site, all such instances occurred. After Roebeling's Delaware Aqueduct was drained and repurposed as a vehicular crossing, the former canal prisms leading to it were regraded into approach roads.

On the Pennsylvania side, portions of the "new canal" prism heading southeast toward the former aqueduct were filled in, first when the railroad replaced their bridge over the canal with a massive earthen embankment and then by Lackawaxen when they built an embankment for the reconfiguration of Scenic Drive. The northern towpath was later flattened out, but no construction occurred on the prism itself. Today, this section of canal prism is around 320 feet long and is maintained as a lawn, but its former use as a canal bed is difficult to discern without the towpaths and stone walls (Figure 25). Additional research on the exact location of the canal prism, walls, and towpaths is recommended for this area.

On the New York side, construction of Route 97 in the 1930s utilized most of the "new canal" prism, including the turning basin and two of the three locks, but left the remains of Lock 71 and its immediate approaches untouched. The "old canal" prism along the riverbank was generally left intact, although a segment from the guardlock to just under the former aqueduct and a small segment between Locks 70 and 71 (for a diversion dam) were filled in. Today, the "old canal" prism (Structure #7300) is approximately 2,000 feet long and 10 feet high. It still holds water after storm and flood events, but a breach in the towpath prevents the water from getting too high. Other areas of the "old canal" prism have been overtaken by successional woodlands (Figure 26). Sections of "new canal" prism on either end of Lock 71 that were not buried by the highway are located on state-owned land and therefore not evaluated for this CLI.

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176552						No
New Delaware & Hudson Canal Prism	176554	Undetermined			Location	81074	No
NEW YORK SIDE	176556						No
Old Delaware & Hudson Canal Prism (7300)	176558	Contributing	081476		Location	60704	Yes

Landscape Characteristic Graphics:



Figure 25. View looking northwest at the remains of the new canal prism. (OCLP 2014, DSC_0404)



Figure 26. View looking south-southwest from Roebling's Delaware Aqueduct to the old canal prism and old canal towpath (Towpath Trail). (OCLP 2013, DSC_0036)

Landscape Characteristic: Buildings and Structures

Historic Condition:

Buildings are elements constructed primarily for sheltering any form of human activity in the landscape, while structures are elements constructed for functional purposes other than sheltering human activity. The operation of the Delaware & Hudson Canal required a great amount of infrastructure, from dwellings housing the lockkeepers and their families to stone walls supporting the canal prisms and towpaths. One of the first structures built by the Delaware & Hudson Canal Company in 1825-28 was a slackwater dam in the Delaware River, just downstream from the confluence of the Delaware and Lackawaxen rivers. The dam created a calm pool upstream at the rope ferry crossing, which guided canal boats from the north bank of the Lackawaxen to the east bank of the Delaware.

On the Lackawaxen riverbank, stone walls and compacted clay likely supported the sides of the canal prism, towpaths, and the three locks (Locks 1-3) that lowered canal boats to the ferry. The rope ferry system was anchored into both riverbanks with stone piers. On the Delaware riverbank, a towpath ran along the riverbank from the ferry to the guardlock at the resumption of the canal prism. The towpath was protected by stone walls due to its vulnerable location at the confluence of two rivers with a history of flooding. The guardlock structure controlled the amount of water entering the canal, and historic photographs show the canal prism and towpath were lined with stone walls, in part because of their location in the floodplain. Historic maps show several other built features associated with the original canal route, including a lockhouse on the north side of Lock 2, a waste weir at Lock 1, and a ferryman's house south of the ferry on the New York side.

The rope ferry's slow crossing times and frequent conflicts with river raftsmen prompted the Delaware & Hudson Canal Company to build a new route that included two aqueducts, three locks (Locks 70-72), and new sections of canal. Designed by John A. Roebling, Civil Engineer, the wire suspension aqueducts were supported by masonry piers and abutments, and bound wire cables anchored deep in the ground with iron chains and plates. A heavy wood trough, or trunk, ran the length of the structures and held 6 feet of water at a width of 19 feet at the waterline, while 8-foot wide towpaths were bracketed out from the sides, level with the top of the trunks. The Delaware Aqueduct spanned 393 feet and had three river piers, while the Lackawaxen Aqueduct spanned 230 feet and had one river pier. Both structures were built in 1847-48 and opened to canal traffic in the spring of 1849. At some point during the historic period, wing walls were constructed on the New York side abutment of the Delaware Aqueduct. These tapered dry-laid stone walls extended outward from the upstream and downstream ends of the masonry abutment and curved inland, presumably to protect the aqueduct's cable anchorage and earthen approach from potential flood waters.

The three new locks built on the New York side in 1847-48 carried canal boats from the Delaware Aqueduct to the junction with the "old canal," an elevation change of 32 feet. Historic photographs show the stone walls in the lock and at the entrances were faced with horizontal heavy timber planks attached to vertical boards and anchored to the walls with iron tie bars. Some of the lock walls were recessed for the gates when they were open. Sheds were built above the south ends of each lock to house machinery, which probably used the newer technology of drop gates that could be operated by one person rather than the older balance beam gates that required two people.

Historic photographs show the sides of the canal prism were supported by tapered stone retaining walls to decrease leakage from the clay beds and prevent failure of the sides from erosion. Some towpath segments were also supported with stone walls if warranted by the surrounding grade. The stone was predominately bluestone, a hard type of sandstone locally available in great quantities. Photographs from 1849-98 also reveal a lockhouse on the east side of Lock 71, several sheds and barns along the canal route, and other dwellings, barns, and corrals nearby owned by the Canal Company and private landowners.

Post-Historic and Existing Conditions:

The abandonment of the canal in 1898 and subsequent disposition of property resulted in the reuse and removal of much of its infrastructure. In 1908 Charles Spruks purchased Roebeling's abandoned Delaware Aqueduct and converted it into a vehicular bridge. He removed the former aqueduct's towpaths and added a low railing along the downstream side of the trunk floor to separate pedestrian from horse-drawn wagon traffic. Spruks also constructed a toll house on the New York side around 1908. The two-story frame building included a first floor bedroom and kitchen and a second floor bedroom and living room, as well as a covered porch on the west elevation. In the 1920s a shed was added on the east end of the toll house.

Just beyond the ends of the former aqueduct, Spruks removed portions of the canal and towpath stone walls to accommodate approach roads that connected Roebeling's Delaware Aqueduct to adjacent roads, but retained some of the walls presumably because they were still functional and useful. However, new property owners adjacent to the former aqueduct eventually removed or buried their remnant canal walls for new development. Some of the new buildings near the former aqueduct included the Highland Bridge Hotel and outbuildings just south of the toll house, a collection of sheds and outbuildings on the northeast portion of the turning basin floor, and what is now called the Margold house and garage west of the former aqueduct.

More changes came in the 1930s when the new owner of Roebeling's Delaware Aqueduct, the Lackawaxen Bridge Company, removed the aging aqueduct trunk and replaced it with a simpler deck and railing system. At the same time, the State of New York constructed Route 97 across the turning basin, Lock 72, and Lock 70, destroying or burying whatever structures were left, including the lockhouse. However, the highway's alignment just missed Lock 71, thus preserving its stone walls as well as some of the walls associated with the "new canal" prism and towpath. The highway project also left the stone walls associated with the "old canal" prism and towpath intact, except for a small area between Locks 71 and 70. Here, the state constructed an earthen and stone diversion dam in the "old canal" prism and removed a portion of the "old canal" towpath for floodwater to drain back into the river. These alterations were designed to prevent floodwater from reaching and potentially undermining the highway embankment.

The National Park Service purchased Roebeling's Delaware Aqueduct, its approaches, and the toll house in 1980. From 1985-94 the park completed a series of reconstruction and rehabilitation projects to structurally upgrade the former aqueduct for limited highway traffic and restore the structure's historic elements, including the aqueduct trunk, towpaths, and projecting wooden icebreakers on the piers. In 1990 the National Park Service and the Williamsport Preservation Training Center completed structural repairs and stabilization at the toll house. In 1995 the park acquired the "old canal" prism and associated walls, the "old canal" towpath and associated walls, and a portion of the "new canal" towpath and towpath retaining walls. However, the remains of Lock 71, former sites of Locks 70 and 72, "new canal" prism, and other portions of the "new canal" towpath, and turning basin remained within the Route 97 right-of-way. In 1997, the park acquired land and an existing building between Scenic Drive and the railroad tracks for use as a maintenance facility. The property included a one-story frame building that formerly housed the Lackawaxen Volunteer Fire Department. In 2007 the park reconstructed the upstream wing wall at the former aqueduct's New York abutment after it was severely damaged in the flood events of 2004-06 (Figure 27).

Roebeling's Delaware Aqueduct currently accommodates one lane of traffic and pedestrians, and is in good condition (see Cover). The former aqueduct is nationally significant in the areas of commerce, transportation, and engineering for its association with the Delaware & Hudson Canal and its wire suspension design. The toll house offers self-guiding exhibits and displays on its upper level, but exhibits on the lower level are currently closed because of moisture inundation, a byproduct of the structure's construction into the towpath berm. The toll house has wood siding painted slate grey with white trim, and is in good condition (Figure 28). The toll house is locally significant in the areas of commerce and transportation for its association with the use of Roebeling's Delaware Aqueduct as a toll bridge.

The park also manages several remnant canal structural features. On the Pennsylvania side, two dry-laid, random-coursed stone walls (#s 7005,7006) associated with the "new canal" prism line the

sides of the approach road (Figures 29 and 30). The north wall is 67 feet long and tapers from 4 to 1 feet high where it meets a non-historic section of stone wall. The south wall is 80 feet long and 5.5 feet high at its highest point, and retains its curved shape indicative of the small turning basin that was once here. On the New York side, numerous sections of dry-laid, random-coursed stone walls still define the "old canal" prism and towpath (#s 7311, 7321) and the "new canal" towpath (#7211) (Figures 31, 32, and 33). Downstream from the former aqueduct, the old towpath walls parallel the river and measure 6 to 10 feet in height. The walls may run the length of the structure, but because of successional vegetation and overtopping from the path only portions of walls are visible. The "old canal" prism walls ranging in height from 3 to 6 feet are also visible, but many are overgrown. The "new canal" towpath walls are located uphill from the "old canal" prism walls and range in height from 10 feet at the north end to meet grade at the diversion dam (around the area where the new towpath historically met the old towpath). The park only owns approximately 400 feet of the new towpath walls. Upstream from the former aqueduct, there are remnant stone walls associated with the old canal towpath (Figure 34). Visible portions of the walls still parallel the riverbank and range from 3 to 5 feet in height. Like locations downstream, other historic wall segments may still be present but are obscured by vegetation. The canal features are nationally significant in the areas of commerce, transportation, and engineering for their association with the Delaware & Hudson Canal. (LCS 2016)

There are other extant stone walls associated with the "new canal" towpath, "new canal" prism, Lock 71, and the turning basin, but they are on state-owned land and therefore not evaluated for this CLI (see Adjacent Land Information). The State of New York's earthen and stone diversion dam (#7323) is 40 feet long, 10 to 12 feet high, 10 feet wide at the base, and 4 feet wide at the top (Figure 35). The boundary line between state and federal land crosses this structure.

The park maintains several other buildings that are unrelated to the history and significance of the canal. On the Pennsylvania side north of the former aqueduct is the Margold house, a 2.5-story building clad with asbestos shingles painted slate blue with white trim (Figure 36). The gable-roofed building includes a covered porch on the west and south elevations. Just to the north of the house is a single car, 1.5-story garage covered in wood siding painted to match the house. Both buildings are similar to other domestic house lots in this area, but in the future they could be evaluated as incompatible to the historic scene if new research confirms they are located within the "new canal" prism or on top of the "new canal" towpath. Farther to the northeast are two single-story, gable-roofed structures used for storage and to house a boat (Figure 37). The dark color of the boathouse helps it blend in with the surroundings, but the light color of the shed draws attention. South of the former aqueduct, a pre-fabricated 1-story restroom is located at the southwest corner of the parking lot (see Figure 30). The gable-roof structure is covered with unpainted wood siding and has an entry screen on the north façade. The restroom blends in with the surroundings. The maintenance building is a split-level, 3-story structure with gray siding and white trim (Figure 38). Due to its location well west of the primary historic features, it is not obtrusive in the landscape. The south end of the building is the high side with a driveway and garage door at grade, while the north end is the low side with the driveway and garage door below grade.

Non-historic retaining walls can be found throughout Roebbling's Delaware Aqueduct Site, most of which are built with native bluestone that blends in with the surroundings. On the Pennsylvania side north of the former aqueduct, a low stone wall wraps around the south and east sides of the yard at the Margold house, measuring around 140 feet in total length (see Figure 36). East of the two sheds, a low stone wall runs east-west for 50 feet to support a lawn area (see Figure 37). Low stone walls around 60 feet in length line both sides of the Scenic Drive driveway extension adjacent to the river. The west wall is mostly flush with the ground while the east wall is around 3 feet high and connects with an overgrown set of bluestone steps descending to the riverbank. Other bluestone walls are present on adjacent properties, including an extensive set of walls along the river just north of the former aqueduct that may have been associated with the early road that passed under the structure during the canal era. South of the former aqueduct, a precast concrete wall supports the overlook at the east end of the parking lot. Although its contemporary appearance is consistent with the adjacent visitor facilities, it is somewhat conspicuous. To the west at the maintenance facility, the driveway leading down to the north end of the garage is bordered by concrete retaining walls. On the New York side north of the former aqueduct, the west and north

sides of the parking lot are supported by a concrete retaining wall. This contemporary wall is clearly visible from the former aqueduct and Towpath Trail. By 2009 the park also built a stone retaining wall on the hill northwest of the parking lot as part of a maintenance access road (which leads to the Towpath Trail). The wall is located just uphill from an older stone wall associated with the "old canal" towpath shown in this area on historic maps. The outlet pipes for the parking lot drop inlet emerge from under the upper wall and lay on top of the older wall, further evidence that the lower wall is older (see Figure 34). South of the former aqueduct, a low curved stone retaining wall measuring around 60 feet extends from the east side of the toll house to Route 97.

Several culverts and waterways aid drainage at Roebeling's Delaware Aqueduct Site. In both visitor parking lots, drop inlets collect stormwater. On the Pennsylvania side, a culvert begins north of the maintenance building, channels water under Scenic Drive, and ends as a single pipe set in stone headwall northwest of the restroom. From this outlet stormwater travels along the south side of the parking lot toward the river via a cobblestone waterway. On the New York side, a culvert collects water from both sides of Route 97, runs under the New York approach road, and ends as twin pipes set in a stone headwall south of the parking lot. From this outlet stormwater travels west down the hill into the "old canal" prism, via a riprap channel (see Figure 27). On the Towpath Trail directly under the former aqueduct, twin PVC pipes installed in 2007 now direct water from the "old canal" prism to the river. This structure replaced an earlier opening spanned by a footbridge. Farther along the trail to the south, the park reconstructed the deteriorated stone walls that the state had built to support the towpath breach abutments with a concrete box culvert in 2009 (Figure 39). This substantial structure measures 30 feet long, 10 feet wide, and 6 feet high, but does not appreciably detract from the historic scene because the earthen stone surface of the adjacent trail continues across the top of the culvert.

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176560						No
Delaware Aqueduct (7000)	176562	Contributing	080000		Location	45563	Yes
New Delaware & Hudson Canal Upstream Wall Ruin (7005)	176564	Contributing	082170		Location	60700	Yes
New Delaware & Hudson Canal Downstream Wall Ruin (7006)	176566	Contributing	081479		Location	60701	Yes
Margold House	176568	Noncontributing – Compatible			Location	45568	Yes
Margold Garage	176570	Noncontributing – Compatible			Location	67999	Yes
Restroom	176572	Noncontributing – Compatible			Location	68052	Yes
Boat Barn	176574	Noncontributing – Compatible			Location	68000	Yes
Storage Shed	176576	Noncontributing – Incompatible			Location		No
Maintenance Building	176578	Noncontributing – Compatible				45569	Yes
Non-Canal Stone Walls	176580	Noncontributing – Compatible					No

Roebeling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

Non-Canal Concrete Walls	176582	Noncontributing – Incompatible					No
Culverts, Headwalls, Drop Inlets	176584	Noncontributing – Compatible					No
NEW YORK SIDE	176586						No
Delaware Aqueduct (7000)	176588	Contributing	080000		Location	45563	Yes
Wing Walls at New York Abutment	176590	Contributing					No
Delaware Aqueduct Toll House (7250)	176592	Contributing	080001		Location	45564	Yes
Old Delaware & Hudson Towpath Retaining Walls (7311)	176594	Contributing	083041		Location	60706	Yes
Old Delaware & Hudson Towpath Retaining Walls (7321)	176596	Contributing	081477		Location	60708	Yes
Old Delaware & Hudson Towpath Retaining Walls (upstream from Aqueduct)	176598	Contributing					No
New Delaware & Hudson Towpath Retaining Walls (7211)	176600	Contributing	081484		Location	94487	No
NYDOT Flow Diversion Structure (7323)	176602	Noncontributing – Compatible			Location	60709	Yes
Concrete Box Culvert (on “Old Canal” Towpath)	176604	Noncontributing – Compatible					No
Two-Pipe Culvert (on “Old Canal” Towpath)	176606	Noncontributing – Compatible					No
Non-Canal Stone Walls	176608	Noncontributing – Compatible					No
Non-Canal Concrete Walls	176610	Noncontributing – Incompatible					No
Culverts, Headwalls, Drop Inlets	176612	Noncontributing – Compatible					No

Landscape Characteristic Graphics:



Figure 27. View looking southwest at the New York side of the former aqueduct and the rebuilt curved wing wall on the north side of the abutment. At image left is the culvert outlet that originates on Route 97. (OCLP 2014, DSC_0660)



Figure 28. View looking southwest at the toll house and Roebling's Delaware Aqueduct. (OCLP 2013, DSC_0038)



Figure 29. View looking west-northwest at two remnant stone walls associated with the new canal prism, on the Pennsylvania side of Roebling's Delaware Aqueduct. (OCLP 2013, DSC_0298)



Figure 30. View looking west-southwest at the new canal prism wall and towpath on the south side of Delaware Drive. The Pennsylvania side parking lot, restroom, and bridge sculpture are visible in the background at image left. (OCLP 2014, DSC_0421)



Figure 31. View looking southeast from the old canal towpath at remnant stone walls in the old canal prism. (OCLP 2013, DSC_0515)



Figure 32. View looking south-southeast from the old canal towpath at the old canal prism and some of the new canal towpath stone wall. (OCLP 2013, DSC_0528)



Figure 33. Close up view of a canal wall. Located just south of the current diversion dam, it likely served both the old and new canal. Note the recessed portions of the wall. (OCLP 2013, DSC_0572)



Figure 34. View looking northwest at an extant stone wall associated with the old towpath, upstream from Roebling's Delaware Aqueduct. The wall behind it (background) is contemporary and supports a maintenance access road. (UPDE 2016)



Figure 35. View looking northeast at the State of New York's diversion dam. Portions of the new canal towpath and stone walls are visible just beyond (north) the dam. A guardrail along Route 97 can be seen at top image right. (OCLP 2013, DSC_0556)



Figure 36. View looking northeast at the Margold house and garage, from Scenic Drive. The stone wall on the south edge of the yard wraps around to the east side of the yard. (OCLP 2014, DSC_0431)



Figure 37. View looking west-northwest at the two park sheds and a low retaining wall. The building at far image right is not owned by the park. (OCLP 2013, DSC_0369)



Figure 38. View looking southwest at the maintenance building. (OCLP 2013, DSC_0447)



Figure 39. View looking east at the concrete box culvert at the breach in the old canal towpath. (OCLP 2013, DSC_0534)

Landscape Characteristic: Circulation

Historic Condition:

Circulation is comprised of the spaces, features, and materials that make up the network of pedestrian and vehicular movement. Before the historic period, the primary means of transport through the Upper Delaware River valley was on rough roads forged from old Native American trails or on Durham boats and canoes plying the Delaware River. In 1825-28, the Delaware & Hudson Canal Company constructed a canal to transport boats loaded with coal from northeastern Pennsylvania to the Hudson River and New York City. Paralleling the canal were towpaths from which mules and workers pulled the boats through the canal and locks. At the confluence of the Delaware and Lackawaxen rivers, the original canal route on the north bank of the Lackawaxen included a towpath on the north side of the canal leading to the rope ferry. At the ferry, mules and their handlers were transported across the Delaware River to a towpath on the east bank of the river, which extended south to the guardlock at the slackwater dam. A small bridge at the guardlock provided passage to a towpath on the west side of the canal. At this time, primitive roads and paths provided connections from the towpaths to adjacent barns, corrals, and lockhouses.

In 1847-48, the Canal Company relocated the canal route to new sections of canal, locks, and aqueducts a quarter-mile to the south of the river confluence. Historic photographs show towpaths along both sides of the “new canal,” locks, and turning basin, varying in width from 8-12 feet. Towpaths measuring 8 feet wide were bracketed out from the sides of the aqueducts, and level with the top of the trunk. On the New York side, the new towpath along the west side of the “new canal” crossed the “old canal” via a wood bridge just south of Lock 70, where it connected with the original towpath and continued south. The old towpath and bridge at the guardlock fell out of regular use.

By this time, local roads had improved and appeared on maps from the period. Like earlier roads, they provided access to the towpaths as well as properties owned by the Canal Company and private landowners. On the Pennsylvania side, historic maps indicate a north-south road (now Scenic Drive) on the west bank of the Delaware, passing under the Delaware Aqueduct’s western

span and connecting to a ferry crossing at the Lackawaxen River. The New York & Erie Railroad's tracks were located just to the west of the Delaware Aqueduct, crossing the canal via a truss bridge. On the New York side, a north-south road (now Old Minisink Ford Road) travelled along the hillside just east of the canal, turning basin, and locks.

Post-Historic and Existing Conditions:

With the closure of the canal in 1898, towpaths were repurposed as local roads or left abandoned. At Roebbling's Delaware Aqueduct Site, the dewatered aqueduct likely served as an informal pedestrian crossing until 1908 when Charles Spruks purchased the structure and built a toll house to collect fees from carriages and pedestrians. The floor of the drained aqueduct trunk was wide enough to accommodate one lane of traffic and a pedestrian path, which was separated by a railing. Spruks removed the former aqueduct's towpaths as well as portions of the towpaths leading to the structure to build approach roads that connected to the local roads.

As canal properties were sold off, most remaining sections of towpaths at Roebbling's Delaware Aqueduct Site were lost to new development. On the Pennsylvania side, the portion of the north-south road (now Scenic Drive) under the former aqueduct was abandoned and rerouted across the remains of the "new canal" prism. Part of the towpath on the south side of the prism became the location of the Margold house and garage by 1913, while the towpath on the north side of the prism was removed sometime after 1913. On the New York side, Minisink Ford Road was rerouted directly into the empty turning basin to connect to the former aqueduct sometime before 1923. In the 1930s Route 97 was built on much of the "new canal" prism, locks, and turning basin, leaving behind only isolated fragments of the "new canal" towpath on the east side of the turning basin and the west side of Lock 71. The highway project also breached a small section of the "old canal" towpath between Locks 70 and 71 as part of a flood water diversion system.

Roebbling's Delaware Aqueduct was sold to the Lackawaxen Bridge Company in the 1930s, which removed the aqueduct trunk and replaced it with a simplified bridge deck and railings. Photographs from this time indicate there was no physical separation between vehicles and pedestrians on the structure, and photographs from the late 1960s show the deterioration of the bridge deck and railings. In 1980 the National Park Service purchased Roebbling's Delaware Aqueduct and approaches, and initiated a series of projects that improved the former aqueduct's structural elements for vehicular traffic and reconstructed the historic aqueduct trunk with raised sidewalks on the trunk floor. The National Park Service completed these projects in 1985-94. In 1994, the park reconstructed the historic aqueduct towpaths on both the upstream and downstream sides of the structure.

The 1980 acquisition of Roebbling's Delaware Aqueduct included a small section of the "new canal" towpath on the Pennsylvania side of the former aqueduct, but the remnant towpaths associated with the old and "new canal" on the New York side were not acquired until 1995. This purchase, from Estelle Vollkommer, and through an associated abandonment of portions of the area by the State of New York, included the "old canal" towpath and a portion of the new towpath in the vicinity of Lock 71. The park had long been interested in these lands for development of a loop trail as a way to interpret the history of the canal and former aqueduct, but recurring storm and flood damage delayed implementation. By 2007 the park built a maintenance access road stretching from the New York parking lot to the "old canal" towpath under the structure, and in 2009 constructed a culvert in the towpath breach as part of an effort to make the trail accessible. However, the planned loop portion of the trail utilizing the "new canal" towpath has not been completed because the state still owns part of it. (Review comments from Carla Hauser Hahn, 24 May 2016)

The National Park Service acquired additional lands on the both sides of Roebbling's Delaware Aqueduct for development of visitor parking lots in the late 1980s and 1990s. The New York side parking lot was constructed in 1994-97 for 10 vehicles and the Pennsylvania side parking lot was completed in 1997-99 for 18 vehicles. Both paved parking lots included emergency access roads that lead directly to the riverbanks, and concrete sidewalks that connected to the former aqueduct's towpaths. The Pennsylvania parking lot also featured a paved semicircular-shaped overlook projecting from the east end.

Today, Roebbling's Delaware Aqueduct Site contains both vehicular and pedestrian circulation features. Vehicular circulation consists of through roads, emergency river access roads, parking lots, and driveways, while pedestrian circulation consists of the reconstructed towpaths on both sides of the former aqueduct, a trail through the canal remnants on the New York side, and sidewalks that provide access to the former aqueduct, toll house, parking lots, and Margold house. The public roads used to access Roebbling's Delaware Aqueduct Site are Lackawaxen Scenic Drive in Pennsylvania and New York State Route 97 in New York, both of which connect to the Pennsylvania and New York approach roads that lead to Roebbling's Delaware Aqueduct. Vehicles now travel through the reconstructed aqueduct trunk, which features angled wood plank walls and a concrete and imbedded aggregate road surface (Figure 40). The reconstructed wood towpaths are level with the top of the trunk and offer pedestrian access across both sides of the structure. They are 6-feet wide and have wooden railings on both sides, and connect to small stone paved areas at each abutment that in turn connect to concrete sidewalks.

The Pennsylvania approach road jogs westerly to meet Scenic Drive on the Pennsylvania side. Access to the parking lot and the emergency river access road south of the former aqueduct is from the approach road. The 20-foot wide earthen and gravel emergency road is on the east end of the double-loaded asphalt parking lot, which accommodates 17 cars and one accessible space adjacent to the restroom. Six-foot wide concrete sidewalks on the south, east, and north sides of the parking lot provide access to the restroom, bike rack, and overlook, and connect to a sidewalk leading to the downstream towpath and a sidewalk leading to the crosswalk at the approach road. Part of the sidewalk leading to the former aqueduct is situated on top of the "new canal" towpath (#7007), an earthen and sand trailbed around 162 feet long, 15 feet wide, and in good condition (see Figure 30). North of the former aqueduct, a 6-foot wide sidewalk leads from the crosswalk to the upstream towpath (see Figure 29). At the Margold house, 2-to-3-foot wide bluestone walks lead from Scenic Drive to the front door and around the south side of the house to the side entrance of the porch (see Figure 36). To the north off Scenic Drive, a short gravel driveway provides access to the park's boathouse and storage shed. At the maintenance building, asphalt roads off Scenic Drive connect to concrete driveways at the north and south ends of the building. (LCS 2016)

The New York approach road heads east to meet State Route 97 on the New York side. Access to the parking lot and the emergency river access road north of the former aqueduct is from State Route 97. The 20-foot wide earthen and gravel emergency road is on the north end of the single-loaded asphalt parking lot, which accommodates 9 cars and one accessible space at the south end. A 6-foot wide concrete sidewalk runs along the east side of the lot and connects to a sidewalk leading to the upstream towpath and a sidewalk leading to the crosswalk at the approach road. South of the former aqueduct, a sidewalk runs from the crosswalk and first floor of the toll house to a set of concrete stairs that lead to a sidewalk on the south side of the toll house and its second floor porch. This sidewalk connects to the downstream towpath.

Access to the Towpath Trail on the New York side is from the a short segment of the emergency river access road at the north end of the parking lot, which continues northward and becomes overgrown. Visitors then turn to the south-southwest and descend the hillside on a maintenance access road, which features a 6-foot wide earthen and gravel surface. The trail crosses a filled in portion of the "old canal" prism and meets the "old canal" towpath under the former aqueduct at a culvert that was formerly a small wood footbridge. Here begins the Towpath Trail. The "old canal" towpath (#s 7310,7320) is an earthen and sand road-bed around 2,700 feet long, 15 feet wide, and in poor condition due to its deteriorated surface and areas of overgrown vegetation (see Figures 26, 32, and 39). The "old canal" towpath crosses the concrete culvert and ends near Route 97 where three boulders prevent vehicles from entering the trail from the highway. The state has made the shoulder wider here to accommodate parking for about a half dozen vehicles. At the State of New York's diversion dam, the "new canal" towpath (#7210) heads uphill and northeast toward the remains of Lock 71 (see Figure 35). The portion of the trail within park boundaries measures 50 feet long and 8 feet wide. (LCS 2016)

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176614						No
New Delaware & Hudson Canal Towpath Ruin (7007)	176616	Contributing	081482		Location	60702	Yes
Approach Road (Pennsylvania side)	176618	Noncontributing – Compatible			Location	45567	Yes
Visitor Parking Lot, Sidewalks, Steps, and Overlook	176620	Noncontributing – Compatible			Location	68038	No
Emergency River Access Road	176622	Noncontributing – Compatible			Location	109450	Yes
Margold House Walks	176624	Noncontributing – Compatible					No
Gravel Driveway to Boathouse and Storage Shed	176626	Noncontributing – Compatible			Location	81075	Yes
Riverbank Steps	176628	Noncontributing – Compatible					No
Maintenance Driveways	176630	Noncontributing – Compatible			Location	102623	Yes
NEW YORK SIDE	176632	Noncontributing – Compatible					No
Old Delaware & Hudson Canal Towpath (7310)	176634	Contributing	081475		Location	60705	Yes
Old Delaware & Hudson Canal Towpath (7320)	176636	Contributing	081478		Location	60707	Yes
New Delaware & Hudson Canal Towpath (7210)	176638	Contributing	081471		Location	60703	Yes
Approach Road (New York side)	176640	Noncontributing – Compatible			Location	45566	Yes
Visitor Parking Lot, Sidewalks, and Steps	176642	Noncontributing – Compatible			Location	68563	No
Emergency River Access Road	176644	Noncontributing – Compatible			Location	109362	Yes
Maintenance Access Road	176646	Noncontributing – Compatible			Location	45565	Yes

Landscape Characteristic Graphics:



Figure 40. View looking east, from the towpath on the downstream side of Roebling's Delaware Aqueduct. (OCLP 2013, DSC_0288)

Landscape Characteristic: Views and Vistas

Historic Condition:

Views are the panoramic or expansive prospect of a broad range of vision, which may be naturally occurring or deliberately contrived. Vistas are controlled aspects of a discrete, linear range of vision, which is deliberately contrived. The Delaware & Hudson Canal was a business venture built around the efficient and profitable transportation of coal, so views and vistas were not a consideration in its design. However, as the alignment of the canal was in response to the course of the rivers and local topographic conditions, scenic views were nonetheless a byproduct of its construction. During the canal's operation, there was always an open and unobstructed view between the waterway and the towpaths because this area would have been clear to prevent tangling of ropes between the boats and the mules. The canal corridor itself provided open upstream and downstream views framed by the vegetation and terrain of the surrounding valley, which in the early years of the canal was still scarred from construction but then became a mix of dense vegetation and open fields.

There were also frequent views from the canal to the rivers. Some of the most dramatic views were from the Delaware Aqueduct, which at around 40 feet above the river's water level gave boat operators and mule handlers broad upstream and downstream views of the Delaware River and valley. The Delaware Aqueduct was itself a subject of views, as evidenced by the many historic photographs, postcards, and sketches of it within the Upper Delaware River scenic landscape.

Post-Historic and Existing Conditions:

During its first twenty-five years as a toll bridge, horse-drawn carriages, motorized vehicles, and pedestrians traveling through the dewatered trunk of Roebbling's Delaware Aqueduct did not have views of the river. In the early 1930s, the trunk was replaced with a new deck and open railings, allowing users to see the river. In 1987, the National Park Service reconstructed the aqueduct trunk, closing the views from the structure for vehicles and pedestrians. However, the park's reconstruction of the aqueduct towpaths in 1994 restored views for pedestrians. Today, pedestrians on the former aqueduct's towpaths can look down at vehicles passing through the reconstructed trunk or take in the upstream and downstream views, as the boat operators once did (see Figures 23, 24, and 40). The towpath on the upstream side of the former aqueduct also includes projecting lookouts over each of the piers, and there are also lookouts at each abutment.

The location of Roebbling's Delaware Aqueduct Site within the Upper Delaware River valley offers scenic views from nearly every location. On the Pennsylvania side, the white church steeple in Lackawaxen stands out on the hillside, while the steep forested hillsides dominate the New York side. The overlook in the visitor parking lot on the Pennsylvania side offers a framed vista to Roebbling's Delaware Aqueduct, while the Towpath Trail on the New York side provides upstream and downstream riverbank views as well as a unique view of the former aqueduct's structural framing and support piers. Views of the "old canal" prism from the trail are obscured in places because of successional tree growth.

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176648						No
Views from Roebbling's Delaware Aqueduct Towpaths	176650	Contributing					No
View of Roebbling's Delaware Aqueduct from Overlook at Visitor Parking Lot	176652	Contributing					No
NEW YORK SIDE	176654						No
Views from Roebbling's Delaware Aqueduct Towpaths	176656	Contributing					No
Views of Roebbling's Delaware Aqueduct from "Old Canal" Towpath (Towpath Trail)	176658	Contributing					No
Views of "Old Canal" Prism from "Old Canal" Towpath (Towpath Trail)	176660	Contributing					No

Landscape Characteristic: Small Scale Features

Historic Condition:

Small-scale features include minor built elements that provide aesthetic detail and function, such as signs benches, and other outdoor furnishings. Historic photographs of Roebbling's Delaware Aqueduct reveal some of the small-scale features that supported operation of the Delaware & Hudson Canal. One of the most important features at the locks and along the towpaths were the snubbing posts. "Snubbing" involved throwing a rope around this short post to stop the motion of a vessel. Other important features were iron tie bars that secured wood planks to the stone lock walls and lock entrances. At both the Delaware and Lackawaxen aqueducts, two-rail post-and-wood fences with unique wood crossbar insets lined the outboard sides of the towpaths. The fences also extended outward from the aqueducts to guide mules and their handlers safely on and off the structure's towpaths. The fence alignments were curved because they were secured to the top of the structure's abutment walls that also curved inland. Just beyond the canal corridor, historic photographs show post-and-board fences enclosing a large pasture on the Pennsylvania side north of the Delaware Aqueduct and a barn area on the New York side north of the aqueduct. Photographs also show tall poles positioned at the downstream side of each abutment and in the vicinity of Lock 71; they likely supported telegraph lines. (Le Roy 1978: n.p.)

Post-Historic and Existing Conditions:

Most of the canal-related features described above were removed or lost after the canal was closed and sold. Soon after Roebbling's Delaware Aqueduct opened to vehicular traffic, Charles Spruks installed a gate with a vertical board inset at the east end of the former aqueduct, next to the toll house. The inset gate could be raised and lowered to allow passage to and from the structure. Spruks also removed the structure's towpaths, and photographs reveal that some of the towpath fences were used to separate vehicles and pedestrians in the converted aqueduct trunk. They were

also used beyond the former aqueduct, such as along the side of Minisink Ford Road as it passed through the “new canal” turning basin. However, Spruks and subsequent owners of Roebling's Delaware Aqueduct retained the curved fence sections atop the abutments, presumably for safety reasons. In the 1930s the Lackawaxen Bridge Company removed the aqueduct trunk and fence and installed a new bridge deck lined with post-and-board fences. The Bridge Company installed light poles in the 1940s and telephone lines in the late 1940s or early 1950s, and replaced the inset gate with a simpler hinged horizontal crossbar. When Roebling's Delaware Aqueduct was purchased by the National Park Service in 1980, the structure's fences and other structural components were in poor condition, prompting its immediate closure for safety reasons. In 1987 the park reconstructed the aqueduct trunk and in 1994 rebuilt the structure's towpaths and fences using the historic design.

As canal lands adjacent to Roebling's Delaware Aqueduct were sold and redeveloped, several new homes were constructed near the former aqueduct. On the Pennsylvania side, historic photographs show the Margold house lot was enclosed by post-and-wire fencing, and it appears post-and-wire fencing was present near the Canal Company house (Brown Keller house) just north of the former aqueduct. By 1968 the fences in this area were removed and utility poles crisscrossed the area. On the New York side, corral fences were eventually removed north of the former aqueduct. South of the former aqueduct, a historic postcard from the early 1920s shows a vertical board fence on the west side of the Highland Bridge Hotel, and a flagpole on the north side near the toll house. The fence and flag pole were removed at unknown dates.

Today, small-scale features at Roebling's Delaware Aqueduct Site consist of the following: lighting; National Park Service signage; wayside exhibits; trash/recycling receptacles and a pet waste station; a bicycle rack; handrails, fences, and barriers; a flagpole; wells and utility poles; picnic tables and benches; boundary monuments; and an interpretive sculpture. The only lighting at the site is on the upstream side of the former aqueduct, which features cobra-style lamps mounted on square wooden posts at the three piers.

On the Pennsylvania side, the park entrance sign identifying “Roebling's Delaware Aqueduct” is located in the lawn between Pennsylvania approach road and the parking lot, facing northwest. Waysides are located on the north abutment, “new canal” towpath, and parking lot overlook, while a wayside/information sign is situated on the north side of the parking lot. Trash/recycling receptacles and a pet waste station are located next to the wayside/information sign, and a trash/recycling receptacle is situated on the east side of the restroom. A bicycle rack can be found just to the east of the restroom. Black metal handrails line portions of the sidewalks leading to the former aqueduct's towpaths and the steps north of the parking lot, while a decorative black metal railing defines the edges of the semicircular overlook. A run of split rail fence extends along Scenic Drive from a flagpole at the northeast corner of the maintenance building to the north entrance of the driveway. Three removable black bollards secure the entrance to the emergency river access road.

A power pole, telephone pole, and septic cleanouts are located in the “new canal” prism near the Margold house, and there are three wooden well covers near the boathouse and shed. There is also a stacked set of bluestone and masonry slabs set on a concrete box just north of the Pennsylvania approach road, which may have been associated with a well or mobile trailer in this area. Two movable picnic tables are situated in the lawn northeast of the Margold house, and two benches with backs are located at the parking lot overlook. Several types of boundary markers were observed at the site, including concrete squares flush with the ground, iron pipes and metal posts, and DOI-NPS disks. Lastly, a replica of the former aqueduct's wooden framing is used as an interpretive element in the lawn between the parking lot and the Pennsylvania approach road. The timber frame is a cross-section of the structure for understanding how it is put together, and is described in the wayside/informational sign (see Figure 30). (Review comments from Lauren Hauptman, 23 June 2016)

On the New York side, the park entrance sign identifying “Roebling's Delaware Aqueduct” is located in the lawn between the New York approach road and the parking lot, facing southeast. Waysides are located on the north bridge abutment, south bridge abutment, south end of the parking lot, north end of the parking lot at the emergency river access road, and on the sidewalk on the south side of the toll house. A trash/recycling receptacle is situated at the south end of the parking lot. Black

metal handrails line portions of the sidewalks leading from the parking lot to the former aqueduct's towpath, the retaining wall on the west edge of the parking lot, the steps east of the toll house, and the sidewalk on the south side of the toll house. A decorative black metal railing extends from the northeast corner of the toll house to protect visitors from stepping into the roadway from the toll house. Another decorative black metal railing extends from the toll house porch to the former aqueduct. Two posts and a removable wire chain secure the entrance to the emergency river access road. DOI-NPS boundary markers mark the property line in the lawn area south of the toll house.

Landscape Features:

Feature Name	CLI Feature ID	Feature Contribution	CRIS-HS Resource ID	Associated CRIS-AR ID	FMSS Record Type	FMSS Record Number	FMSS Exact Match
PENNSYLVANIA SIDE	176662						No
Lights on Roebeling's Delaware Aqueduct	176664	Noncontributing – Compatible					No
Park Entrance Sign	176666	Noncontributing – Compatible					No
Waysides/Information Signs	176668	Noncontributing – Compatible			Location	238544	Yes
Trash/Recycling Receptacles	176670	Noncontributing – Compatible					No
Pet Waste Station	176672	Noncontributing – Compatible					No
Bicycle Rack	176674	Noncontributing – Compatible					No
Metal Handrails	176676	Noncontributing – Compatible					No
Split Rail Fence	176678	Noncontributing – Compatible					No
Flag Pole	176680	Noncontributing – Compatible					No
Bollards	176682	Noncontributing – Compatible					No
Utility Poles	176684	Noncontributing – Compatible					No
Septic Cleanouts	176686	Noncontributing – Compatible					No
Well Covers	176688	Noncontributing – Compatible					No
Bluestone/Masonry Slab on Concrete Box	176690	Undetermined					No
Picnic Tables	176692	Noncontributing – Compatible					No
Benches	176694	Noncontributing – Compatible					No
Boundary Markers	176696	Noncontributing – Compatible					No

Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

Bridge Sculpture	176698	Noncontributing – Compatible					No
NEW YORK SIDE	176700						No
Lights on Roebling's Delaware Aqueduct	176702	Noncontributing – Compatible					No
Park Entrance Sign	176704	Noncontributing – Compatible					No
Waysides	176706	Noncontributing – Compatible			Location	238544	Yes
Trash/Recycling Receptacles	176708	Noncontributing – Compatible					No
Handrails	176710	Noncontributing – Compatible					No
Wire Chain Gate	176712	Noncontributing – Compatible					No
Boundary Markers	176714	Noncontributing – Compatible					No

Landscape Characteristic: Archeological Sites

Archeological research has been conducted at Roebling's Delaware Aqueduct Site, and there are opportunities for further research, especially in the vicinity of the "new canal" prism on the Pennsylvania side and the guardlock at the "old canal" prism on the New York side. For the purpose of this CLI, evaluations of archeological sites are limited to sites identified in National Register documentation. To date, no such sites have been identified in National Register documentation for Roebling's Delaware Aqueduct Site.

Condition

Assessment Interval (Years): 1
Next Assessment Due Date: 09/29/2026

Condition Assessment and Impacts

Condition Assessment: Fair
Assessment Date: 09/29/2025

Condition Assessment Explanatory Narrative:

Noncontributing vegetation continues to dominate the remnant canal features on the New York side south of the former aqueduct.

Condition Assessment: Fair
Assessment Date: 08/30/2016

Condition Assessment Explanatory Narrative:

Overall, Roebling’s Delaware Aqueduct Site is in “fair” condition. Roebling’s Delaware Aqueduct and toll house are in good condition. The canal prism, towpath, and stone retaining walls associated with the “old canal” (1825-28) are in poor to fair condition, while the same features associated with the “new canal” (1847-48) are in poor to good condition. Volunteer vegetation continues to dominate the remnant canal features on the New York side south of the former aqueduct. Many trees are growing adjacent to and within the canal’s stone retaining walls, which are causing several wall sections to slump, bulge, and/or collapse. Other wall sections have been overtopped by soil and other material, rendering them partially or completely obscured. Woody vegetation is also taking hold within the canal itself and will eventually spread if unchecked. Surfaces of some parking lots and sidewalks have deteriorated or are uneven and are in need of repair. The park has planned several projects to address these issues, and when completed may improve the overall condition to “good.”

A “fair” condition assessment indicates the property shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within three to five years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the character defining elements will cause the property to degrade to a poor condition.

Impacts

Type of Impact: Adjacent Lands

Other Impact:

External or Internal: External

Impact Narrative: If incompatible development occurs on non-NPS lands in the area around Roebling's Delaware Aqueduct, the historic scene could be lost.

Date Identified: 09/08/2016

Type of Impact: Inundation/Flooding

Other Impact:

External or Internal: Internal

Impact Narrative: Flooding and ice flows have in the past damaged components of Roebling's Delaware Aqueduct and canal remnants, as well as post-canal era features.

Date Identified: 09/08/2016

Type of Impact: Structural Deterioration

Other Impact:

External or Internal: Internal

Impact Narrative: Roebling's Delaware Aqueduct is in good condition but requires constant maintenance. The canal ruins on both sides of the river are subject to deterioration due to freeze/thaw cycles, and erosion, high water, and storm damage, which may cause them to become unstable.

Date Identified: 09/08/2016

Type of Impact: Vegetation/Invasive Plants

Other Impact:

External or Internal: Internal

Impact Narrative: Volunteer vegetation thrives on the New York side south of the former aqueduct, throughout the canal prism, towpaths, and stone retaining walls. If left unchecked these features may be lost.

Date Identified: 09/08/2016

Treatment

Stabilization Measures

Treatment Documents

Treatment Type: Rehabilitation

Treatment Completed: No

Document Type: Other Document

Document Date: 1986-11-01

Title:

IRMA Link:

Narrative:

The "Final River Management Plan" was completed in 1986 and serves as the park's official planning document. The plan noted that Roebbling's Delaware Aqueduct was stabilized, restored, and rehabilitated beginning in 1985-86. It also proposed exploring the use of voluntary agreements with property owners who had intact features of the Delaware & Hudson Canal. Deteriorated sites would receive management limited to stabilization, clearing of vegetation, and debris removal. Lock 71 (misidentified as #72 in the report) was specifically noted as a unique example of canal construction that should be interpreted and preserved if a suitable purchase, lease, or cooperative agreement could be arranged. (Final River Management Plan 1986: 81-83,88)

The following projects in the Project Management Information System (PMIS) will address future landscape treatment issues and recommendations:

"Prepare Cultural Landscape Report for Historic Roebbling Bridge" (PMIS 210464). Funding of \$65,017.14 requested for FY 2019. The study will address the 12+ acre National Historic Landmark Roebbling Bridge (Delaware Aqueduct, Circa 1848) site. It will: a) address preservation of the overall cultural landscape; b) include treatment recommendations; c) inventory and assess vegetation, structures, archaeological features, and other landscape elements on new properties; d) direct use of the site including access, parking circulation, and integrate this information with previous plans and existing site development.

"Prepare Historic Structures Report for Delaware and Hudson Canal Features" (PMIS 210643). Funding of \$63,933.49 requested for FY 2020. The report will focus on park-owned remnants of the National Historic Landmark Delaware and Hudson Canal (1828-1898). The project includes identification and survey of surviving features, and condition assessment. This information will help partners in doing determinations of eligibility for either the National Register or expansion of the National Historic Landmark boundaries and provide information needed for completion of nomination forms. Several different types of canal features are present including: 1) inner and outer towpath walls; 2) berm walls; 3) canal prism; 4) turning basins; and 5) the remains of locks; 6) waste weirs and other drainage structures. Park owned canal remnants are included in the List of Classified Structures and are located in the vicinity of the Roebbling Bridge, the Barryville Office, and the Mongaup Visitor Center site.

Approved Treatment Costs

Cost Narrative:

Bibliography and Supplemental Information

Bibliography:

Citation Author	Citation Title	Year of Publication	Citation Publisher	Citation Type	Citation Location	Citation Number
Whitford, Noble E.	History of the Canal System of the State of New York	1906	Albany, NY: Brandon Printing Company			
Wakefield, Manville B.	Coal Boats to Tidewater. The Story of the Delaware & Hudson Canal	1965	Fleischmanns, New York: Purple Mountain Press, Ltd.			
Unrau, Harlan D.	Historic Structure Report, Historic Data Section, The Delaware Aqueduct, Upper Delaware Scenic and Recreational River, New York-Pennsylvania	1983	U.S. Department of the Interior, National Park Service, Denver Service Center			
Vogel, Robert M.	Roebbling's Delaware & Hudson Canal Aqueducts	1998	Eastern National, reprint			
Speers, Sandra R.	Historic Structure Report, Physical History and Analysis, The Delaware Aqueduct, Upper Delaware Scenic and Recreational River, New York-Pennsylvania	1987	U.S. Department of the Interior, National Park Service, Mid-Atlantic Regional Of			
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Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

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Roebling's Delaware Aqueduct Site
Upper Delaware Scenic And Recreational River

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Upper Delaware Scenic And Recreational River

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Upper Delaware Scenic And Recreational River

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Landscape Documents:

File Name	Date	Attachment Type
UPDE_Cowen Farm-Roeblings Bridge-Zane Grey_CLI Updates Notes_2025.pdf		

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