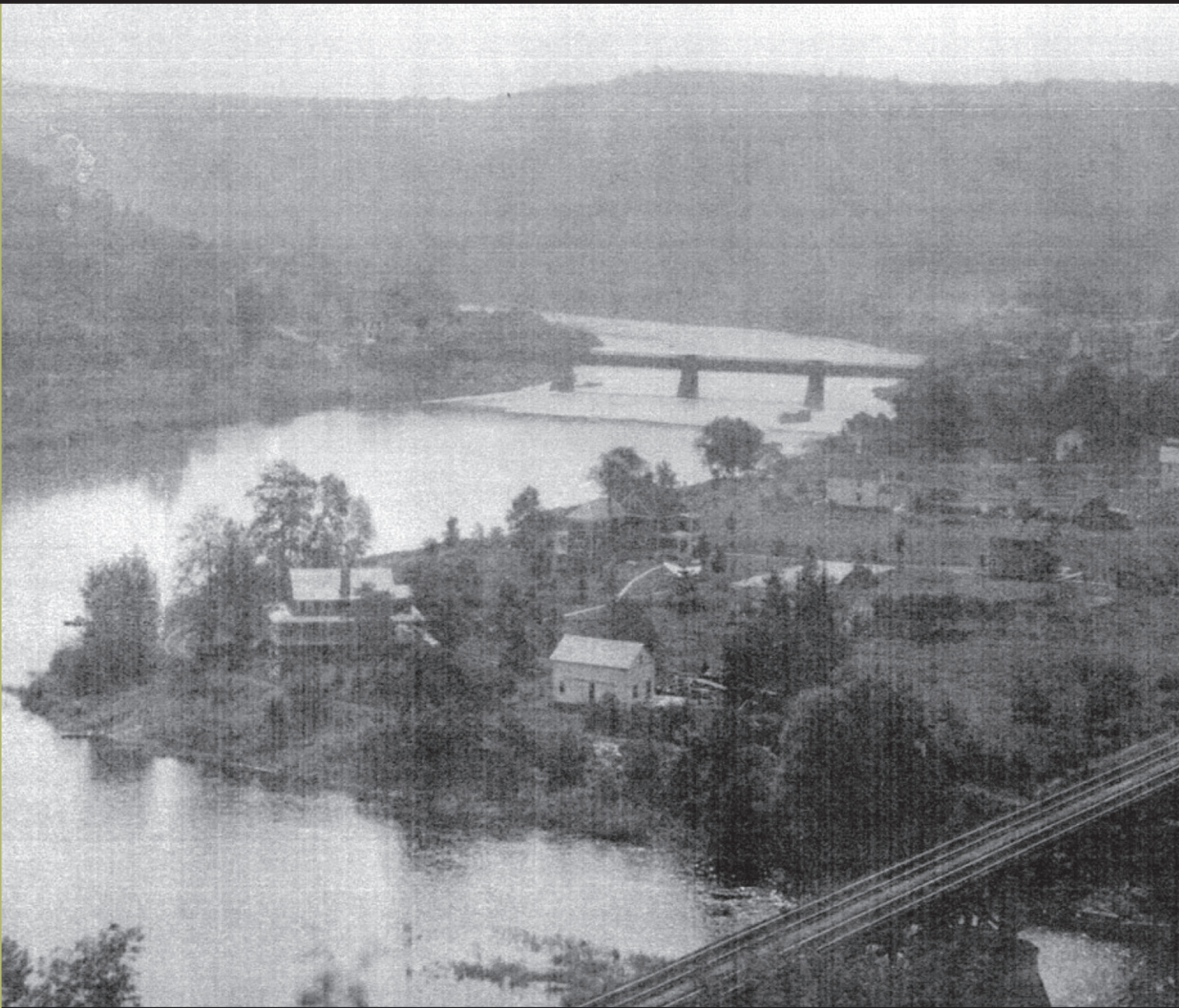




OLMSTED
CENTER
for LANDSCAPE PRESERVATION



CULTURAL LANDSCAPE REPORT FOR ROEBLING'S DELAWARE AQUEDUCT SITE AND THE ZANE GREY PROPERTY

UPPER DELAWARE SCENIC AND RECREATIONAL RIVER



“The place has grown up most wonderfully. It is a forest. It is a jungle. The trees are splendid. Oh, that is the way I wanted it then...”

Zane Grey, 1928

CULTURAL LANDSCAPE REPORT FOR ROEBLING’S DELAWARE AQUEDUCT SITE AND THE ZANE GREY PROPERTY

UPPER DELAWARE SCENIC AND RECREATIONAL RIVER

NEW YORK AND PENNSYLVANIA

SITE HISTORY

ANALYSIS & EVALUATION

TREATMENT RECOMMENDATIONS

Prepared by

Jeffrey Killion, Historical Landscape Architect

Maryrose Kulick, Cartographer

Eliot Foulds, Senior Project Manager

Olmsted Center for Landscape Preservation

National Park Service, Boston, Massachusetts, 2023

The Olmsted Center for Landscape Preservation promotes the stewardship of significant landscapes through research, planning, and sustainable preservation maintenance. The Center accomplishes its mission in collaboration with a network of partners including national parks, universities, government agencies, and private nonprofit organizations. Techniques and principles of preservation practice are made available through training and publications.

Olmsted Center for Landscape Preservation
National Park Service
15 State Street, 6th Floor
Boston, MA 02109
www.nps.gov/oclp/

Publication Credits: Graphics from sources other than federal repositories may not be reproduced without the permission of the owners noted in the captions. Other information in this publication may be copied and used with the condition that full credit be given to the authors and publisher. Appropriate citations and bibliographic credits should be made for each use.

National Park Service, Technical Information Center (eTIC2): # 191471

Library of Congress Cataloging-in-Publication Data:
TBD

Cover Photo: View from Prospect Rock, c.1918, showing the Zane Grey property with Roebling's Delaware Aqueduct in the background. (Historic Structures Report, Alice Josephine Grey House, Barn & Accessory Buildings, Zane Grey Family Compound, 2012: 8)

Title Page: View looking west at woody vegetation on the original towpath and abutting the towpath wall. (Olmsted Center for Landscape Preservation, 2022, IMG-1867)

TABLE OF CONTENTS

LISTS OF FIGURES, TABLES & DRAWINGS	VII
ACKNOWLEDGMENTS	XVII
INTRODUCTION	1
Project Purpose	3
Project Scope and Background	3
Project Methodology	3
Summary of Findings	5
Historical Overview	
Existing Conditions and Analysis	
Treatment Recommendations	
SITE HISTORY	9
Early Land Use and European Contact, to 1750	9
The Lenape and European Exploration	
European Settlement, 1750-1782	11
Post-War Resettlement, 1783-1825	12
The Delaware & Hudson Canal and Roebling's Delaware Aqueduct, 1825-1898	13
Construction of the Canal	
Canal Improvements	
Construction of the Delaware Aqueduct	
Construction of the New York & Erie Railroad	
Establishment of Union Church and Union Cemetery	
New Development Along the Canal and Railroad	
Decline of the Canal	
Landscape Summary, 1898	
Period Plans, 1898	
Redevelopment of Canal Company Lands and the Zane Grey Property, 1898-1929	37
Repurposing Roebling's Delaware Aqueduct	
New Developments on the New York Side of the Aqueduct/Bridge	
New Developments on the Pennsylvania Side, South of Aqueduct/Bridge	
New Developments on the Pennsylvania Side, North of Aqueduct/Bridge	
Grey Family Lands	
Landscape Summary, 1929	
Period Plans, 1929	

Use of Former Canal Company and Zane Grey Properties, 1929-1978	61
Changes to Roebling's Delaware Aqueduct and New Roads	
New Developments on the New York Side, North of Aqueduct/Bridge	
New Developments on the New York Side, South of Aqueduct/Bridge	
New Developments on the Pennsylvania Side, South of Aqueduct/Bridge	
New Developments on the Pennsylvania Side, North of Aqueduct	
Zane Grey Property	
Landscape Summary, 1978	
Period Plans, 1978	
National Park Service Stewardship in the Upper Delaware River Valley, 1978-2023	81
Acquisition of Roebling's Delaware Aqueduct	
Acquisition of the Zane Grey Property	
Acquisition of Canal Remnants	
Development of Visitor Facilities	
Existing Condition Plans, 2021	
 ANALYSIS & EVALUATION	 99
Existing National Historic Landmark and National Register Listings	99
National Historic Landmark Status	
National Register of Historic Places Status	
Evaluation of Landscape Characteristics and Features	104
River Corridor	
Roebling's Delaware Aqueduct Site – New York Side	
Roebling's Delaware Aqueduct Site – Pennsylvania Side	
Connection Area	
Zane Grey Property	
 TREATMENT RECOMMENDATIONS	 155
Framework for Treatment	155
National Wild and Scenic Rivers Act	
Enabling Legislation and Park Boundaries	
Relationship to Existing Park Planning Documents	156
River Management Plan	
Foundation Document	
Cultural Landscape Inventories	
Cultural Landscape Report for the Zane Grey Property	
Treatment Approach	158
Treatment Issues and Treatment Projects	159
Roebling's Delaware Aqueduct Site – New York Side	159
Project #1. Stabilize Towpath Trail and Original Canal Prism	
Project #2. Improve Accessibility to Towpath Trail	
Project #3. Preserve Lock 71	

Roebbling's Delaware Aqueduct Site – Pennsylvania Side	165
Project #4. Interpretation of Canal and Towpaths on Pennsylvania Side and Improve Pedestrian Connections	
Project #5. Repair Overlook at Parking Lot	
Connection Area	169
Project #6. Develop Pedestrian Connection between Zane Grey Property and Roebbling's Delaware Aqueduct	
Zane Grey Property	174
Project #7. Construct Accessible Entrance at the Zane Grey House	
Project #8. Develop Accessible Parking and Walkways to the Zane Grey House	
Project #9. Remove Existing Front Walk and Parking Lot, Restore Original Driveway and Front Walk	
Project #10. Infill Existing Orchard with New Apple Trees	
Project #11. Interpret the Garden Area south of Zane Grey House	
Project #12. Interpret the Tennis Court	
 REFERENCES	 183

LISTS OF FIGURES, TABLES & DRAWINGS

FIGURES

Introduction

0.1. Regional map showing location of Upper Delaware National Scenic and Recreational River.	2
0.2. Park map of Upper Delaware National Scenic and Recreational River. The CLR project location is marked with a red dot.	2
0.3. View looking southwest at Roebling's Delaware Aqueduct.	2
0.4. View looking west at the Zane Grey House.	2
0.5. Maps showing federally owned parcels in the CLR project area.	4
0.6. Overview of CLR site maps.	4

1. Site History

1.1. Map showing the confluence of the Delaware and Lackawaken Rivers by Sauthier, Claude Joseph, Bernard Ratzer, and William Faden, 1776.	11
1.2. A rope ferry along the Delaware River, at Masthope, 1825-1849.	13
1.3. 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.	14
1.4. View looking north, 1894-1902, at the upstream pool formed by the slackwater dam on the Delaware River and the original entrance to the Delaware & Hudson Canal on the New York side of the Delaware River. By this time, this portion of the original canal is used as a feeder canal.	15
1.5. View looking south at stone walls associated with the original canal on the north side of the Lackawaxen River, 1933.	16
1.6. John Roebling, 1866.	17
1.7. Isometric view of the Delaware Aqueduct as it appeared in 1849.	17
1.8. View looking southwest at the Delaware Aqueduct, 1849-1898. The west wall of the original canal on the New York side is in the foreground.	18
1.9. Map of the new canal sections at Lackawaxen, in 1849. The Delaware & Erie Rail Line was built in 1848.	18
1.10. View looking east at the turning basin on the west end of the Delaware Aqueduct, 1849-1898.	19
1.11. View looking southwest at the approach to Lock 72 on the New York side, 1849-1898.	19
1.12. View looking northwest at the original section of the D&H Canal passing under the Delaware Aqueduct on the New York side, 1849-1898, which was repurposed for use as a feeder canal.	19
1.13. View looking southeast from Pennsylvania side, 1880-1898. Lockhouses mark Locks 71 and 70 and a long shed sits north of Lock 71. A railed towpath bridge spans the junction of the new canal and original canal.	19

1.14. View looking north at slackwater dam and icebreaker at the western-most pier of the Delaware Aqueduct, 1852-1892.	20
1.15. View looking northeast from the turning basin on the Pennsylvania side, 1870-1890.	21
1.16. View looking northeast from the Pennsylvania side of the Delaware Aqueduct, 1890-1898.	21
1.17. View looking southwest from the New York side, 1890-1898.	22
1.18. Portion of a view looking southeast at the Delaware Aqueduct, 1894-1898.	22
1.19. View looking southwest from the New York side, c.1890.	23
1.20. View looking northwest from the turning basin on the New York side, 1855-1898.	23
1.21. View looking north at the two trees adjacent to the Pennsylvania side turning basin and towpaths, 1855-1898.	24
1.22. View looking north at lands on the Pennsylvania side, north of the church, 1894-1898.	24
1.23. View looking southeast from Pulpit Rock at lands north of the Delaware Aqueduct, 1894-1898.	25
1.24. Map of the Delaware Aqueduct area in 1898.	25
1.25. View looking east from inside the dewatered Delaware Aqueduct, c.1910. The toll house and gate were built in 1908.	37
1.26. View looking southwest at the turning basin (far image left) and toll house on the New York side, 1923. The toll house was built in 1908 and a shed was added to it in the early 1920s.	38
1.27. View looking south at Minisink Ford Road passing through the former turning basin on the New York side, 1923.	38
1.28. View looking east at the former turning basin on the Pennsylvania side, after 1908.	39
1.29. USGS map from 1913.	39
1.30. View looking southwest at lands on the New York side, north of the aqueduct/bridge, 1898-1923.	40
1.31. View looking southeast at lands on the New York side, south of the aqueduct, 1921. The hotel, barn/garage, and likely an industrial building crowd the hill above the old feeder canal and towpath.	40
1.32. View looking northwest from the New York side, 1898-1913.	41
1.33. View looking northwest at Lock 71 in 1923.	41
1.34. View looking east at the Cortright store and road leading down to the barn/shed and a small house, 1908-1921.	41
1.35. View looking northeast at lands on the Pennsylvania side north of the former aqueduct, after 1915. The Margold house is likely next to or on top of the south towpath. The north towpath is intact except for a v-shaped breach.	42
1.36. View looking southeast from Pulpit Rock, 1898-c.1902.	43
1.37. View looking southeast from Pulpit Rock, c.1906. This photograph shows the enlarged D&H house, now owned by Zane Grey and called "The Cottage," and construction beginning on the Romer Grey house to the south.	43
1.38. View looking southeast from Pulpit Rock, 1914. The completed Romer Grey house, later the Zane Grey house, and the Ida and Josephine Grey house to the west.	43

1.39. View looking southeast at the Cottage, 1906. Construction of a second floor addition is underway on the former Holbert farmhouse, but the porch has not yet been built (see Figure 1.18).	45
1.40. Zane Grey Cottage, outhouse, and Lodge.	45
1.41. View looking northwest at the “Big House,” c.1916-18, after north additions were built.	46
1.42. View from Prospect Rock, c.1918, showing the rebuilt Cottage.	46
1.43. View looking south at Charles Smith canoeing during a flood, between 1906-1915. The “Big House” is at right, prior to its expansion.	47
1.44. Period plan for the Zane Grey site, c.1916-1918.	48
1.45. View looking northwest at the Big House and its well vegetated surroundings, c.1920s.	49
1.46. View looking east at the beginning of the project to replace the bridge deck and remove the aqueduct/bridge trunk walls, c.1931.	61
1.47. View looking west at the removal of the aqueduct/bridge trunk walls, c.1931.	61
1.48. View looking east-southeast at the finished aqueduct/bridge deck, after 1932.	61
1.49. Plan of the proposed alignment of New York State Route 97.	62
1.50. USGS map showing the completed route of State Route 97 on the New York side, 1944.	62
1.51. View looking southwest adjacent to the newly built Route 97 on the New York side, with the aqueduct/bridge in the background.	62
1.52. View looking west at the toll house and the aqueduct/bridge, c.1968. The toll gate is a simple hinged horizontal crossbar (shown here in a raised position).	63
1.53. View looking east at the aqueduct/bridge, c.1969. The structure’s decking and railings are in poor condition.	63
1.54. View looking southwest, c.1969. By this time the area north of the aqueduct/bridge on the New York side was filled with successional vegetation.	64
1.55. View looking southeast, c.1968.	64
1.56. View looking northwest, c.1969.	64
1.57. USGS map showing the extension of State Route 590 on the Pennsylvania side, 1965.	65
1.58 a-d. Aerials from 1939, 1952, 1959, 1969	66
1.59. The Big House as the Zane Grey Inn, c.1950s-60s. The location of the front steps has shifted north and there is a walk leading down to the parking area. The original front walk has been removed.	68
1.60. Map of conditions around the Zane Grey house, prior to development of the state’s parking lot.	69
1.61. Map showing property acquisitions of and around Roebling’s Delaware Aqueduct, 1980.	82
1.62. View looking southeast at the deteriorated aqueduct/bridge, 1980.	83
1.63. View looking east at the toll house, 1980s, when the aqueduct bridge was pedestrian-only.	83
1.64. Cross-section view of reconstructed aqueduct trunk with towpaths, 1997.	83
1.65. View looking west at the tollhouse and former aqueduct after it reopened to vehicular traffic, c.1988, before the towpaths were reconstructed in 1994.	83
1.66. Plan showing the 0.93-acre Zane Grey house property at the time of its transfer to the federal government.	84
1.67. Zane Grey House and Museum and its sign, 1999.	85
1.68. Map of parcels acquired in 1998 and 2000.	85

1.69. View facing west of Nelson house framed by tall Norway spruce and adjacent buildings on Moran-Hurley property, 1999.	85
1.70. View looking southwest from the Pennsylvania Fish and Boat Commission parking lot, 1998.	85
1.71. Landscape treatment plan for the Zane Grey site, 1999.	86
1.72. Landscape treatment plan update for the Zane Grey site, 2008.	87
1.73. Map showing the Vollkommer property, 1994.	88
1.74. Facility development plan for Roebling's Delaware Aqueduct, 1985.	88
1.75. Site plan for Roebling's Delaware Aqueduct, 1994.	89
1.76. Site plan for New York side of Roebling's Delaware Aqueduct, 1994.	90
1.77. Site plan for New York side, 1994.	90
1.78. Site plan for Pennsylvania side of Roebling's Delaware Aqueduct, 1994.	91
1.79. Site plan for the Pennsylvania side, 1998.	91
1.80. Site plan details for canal trails on New York side of Roebling's Delaware Aqueduct, 1994.	92
1.81. View of the northeast wing wall of Roebling's Delaware Aqueduct after a storm in 2005.	93
1.82. View looking northeast during severe flooding in July 2006.	93
1.83. Drawing of the rehabilitation plan for the Towpath Trail, 2008.	93
1.84. View looking south from the access road/trail on the New York side, 2018. Vegetation removals proposed in 2018 were outlined in red.	94
1.85. View looking south from the Towpath Trail on the New York side, 2018.	94

2. Existing Conditions and Analysis

2.1. View looking south from the New York side parking lot to the upstream side of Roebling's Delaware Aqueduct.	106
2.2. Panoramic view from the aqueduct/bridge's upstream towpath, traces of the slackwater dam are still visible in normal river level conditions.	107
2.2a. View of parallel lengths of submerged timbers associated with a guardlock at the former entrance of the original canal.	110
2.3. View looking southeast at the original canal prism and towpath.	110
2.4. View looking northwest at the south end of Lock 71 and new canal prism and walls.	110
2.5. View looking west at the original towpath stone wall and a curved contemporary stone wall above it, which supports the Maintenance Access Road.	110
2.6. The top of a partially hidden section of stone wall associated with the original canal prism or towpath.	111
2.7. View northwest at a stone wall supporting the original canal towpath.	111
2.8. View looking southeast at stone walls lining along the new canal towpath, likely built atop walls associated with the original canal prism.	111
2.9. View looking west at the two-story toll house, constructed in 1908 next to the aqueduct/bridge's east abutment.	111
2.10. View looking northwest at the original canal prism and towpath, and the stone diversion dam.	112
2.11. A section of Lock 71 has collapsed due to stormwater associated with a culvert on State Highway 97.	112
2.12. A two-pipe culvert is located under the aqueduct/bridge and empties stormwater from the original canal.	112

2.13. A concrete box culvert on the Towpath Trail spans the breach in the original canal and also serves as a footbridge.	112
2.14. View looking west at the former turning basin site and remnant canal and towpath stone walls.	113
2.15. View looking south at the new canal towpath, located north of Lock 71.	113
2.16. View looking southeast at the parking lot and sidewalks on the New York side of the bridge/aqueduct.	113
2.17. View looking northwest at the trace of the emergency river access road.	113
2.18. View looking south at the Maintenance Access Road that connects the parking lot to the Towpath Trail.	114
2.18a. View looking northwest from the original canal towpath to Roebling's Delaware Aqueduct.	115
2.19. View looking east at the former location of the canal, from Scenic Drive.	117
2.20. View looking east at two stone walls alongside the roadway that once lined the canal's turning basin. The sidewalk traces the location of the south towpath.	118
2.21. View looking north at the Margold house and garage, just south of the former canal.	118
2.22. View looking west at the boathouse, shed, and stone wall just north of the former location of the canal.	118
2.23. View looking east at the restroom and parking lot.	118
2.24. View looking south at the park's maintenance facility.	118
2.25. View looking south at a stone retaining wall at the Margold house.	118
2.26. View looking south at a stone wall and steps east of the Brown Kelley garage.	119
2.27. View looking southwest at the stone gutter on the east side of the parking lot..	
2.28. View looking south at the Brown Keller house and garage, located just north of the former canal (which was just beyond the spruce trees).	119
2.29. View looking southwest at the Cortright house.	119
2.30. View looking north at the paved overlook on the Pennsylvania side of the bridge/aqueduct.	120
2.31. View looking southeast at road providing access to the Brown Keller house.	120
2.32. View looking southwest at remnant stone steps leading to the riverbank.	120
2.33. View looking west at the location of the new canal, shown here as an open, snow-covered lawn.	121
2.34. View looking north at Roebling's Delaware Aqueduct from the overlook.	121
2.35. View looking north at the former D&H Canal Company House, now the Roebling Inn.	123
2.36. View looking west at the former former St. Mark's Church and social hall.	124
2.37. View looking west at the buildings on the George property.	124
2.38. View looking southwest at the Kuhn property.	124
2.39. View north at Scenic Drive, with the Zane Grey House in the distance.	124
2.40. View looking northeast at the two cemetery lanes.	125
2.41. View looking west at the Roebling Inn parking lot.	125
2.42. View looking southeast at the historic trail route paralleling the railroad embankment.	125
2.43. View looking northwest at the historic trail route paralleling the railroad embankment.	125
2.44. View looking south at the former canal location from the D&H office/house (Roebling Inn).	126
2.45. View looking southwest at the Zane and Lina (Dolly) Grey headstone.	126

2.46. View looking south at the memorial for the Unknown Soldier. In the background five stone piers are visible.	127
2.47. View looking south at one of the fenced cemetery plots.	127
2.48. View looking southwest at the Zane Grey house.	128
2.49. View looking northwest at the barn.	129
2.50. View looking southwest at the coal shed.	129
2.51. View looking southwest at the former Ida and Josephine Grey house, Moran house, and guest house.	129
2.52. View looking west at the historic driveway.	130
2.53. View looking east at the historic driveway and part of the non-historic loop.	130
2.54. View looking northeast at some of the bluestone walkways around the Zane Grey house.	130
2.55. View looking southwest at the current visitor/staff parking lot.	130
2.56. View looking northeast at the PFBC parking lot.	131
2.57. Panoramic view looking east, upstream and downstream at the Delaware River, from the front porch of the Zane Grey house.	132
2.58. View looking northwest at the generator.	133
2.59. View looking west at the granite some of the bluestone walkways around the Zane Grey house.	133

3. Treatment Recommendations

3.1a. View looking northwest at the original section of the D&H Canal passing under the Delaware Aqueduct on the New York side, 1849-1898, repurposed for use as a feeder canal.	159
3.1b. View looking southeast at north end of the original towpath (Towpath Trail).	160
3.1c. View looking northwest at woody vegetation separating the towpath and canal prism.	160
3.1d. View looking east at canal prism wall damage from a fallen tree.	160
3.1e. View looking west at woody vegetation in the canal prism and on the new canal towpath.	160
3.1f. View looking northwest at woody vegetation between the canal prism and the original towpath, from the diversion dam.	160
3.1g. View looking west at woody vegetation on the original towpath and abutting the towpath wall.	160
3.1h. View looking north at the lower portion of the Maintenance Access Road, where it meets the Towpath Trail.	161
3.2a. View looking northwest at upper end of the Maintenance Access Road, where it meets the parking lot on New York side of Roebling's Delaware Aqueduct.	161
3.2b. View looking northwest at the former Emergency Access Road that extends north from the Maintenance Access Road.	161
3.2c. View looking southeast at the sharp turn of Maintenance Access Road, from the former Emergency Access Road.	162
3.2d. View looking southeast at the contemporary retaining wall that supports the Maintenance Access Road.	162
3.2e. View looking south at the Maintenance Access Road as it descends to the Towpath Trail under the aqueduct/bridge.	162
3.2f. View looking north at the steep upper part of the Maintenance Access Road.	162
3.2g. View looking north at the lower portion of the Maintenance Access Road, where it meets the Towpath Trail.	162

3.2h. View looking southwest at the gravel parking pullout along State Route 97, at the south end of the Towpath Trail. This area is not on NPS property.	162
3.3a. View looking southwest at the approach to Lock 72 on the New York side, 1849-1898.	163
3.3b. View looking northwest at Lock 71 in 1923.	163
3.3c. View looking west at the new canal prism and south end of Lock 71.	164
3.3d. View looking southeast from the interior of Lock 71.	164
3.3e. View of a mature tree anchored in the canal wall.	164
3.3f. View looking east at the new canal prism and north end of Lock 71.	164
3.4a. View looking north at the Pennsylvania side turning basin and towpaths, 1855-1898.	165
3.4b. View looking east at the turning basin on the Pennsylvania side, 1849-1898.	165
3.4c. View looking east at the former turning basin on the Pennsylvania side, after 1908.	165
3.4d. View looking east at the snow-covered lawn.	166
3.4e. View looking east at the snow-covered lawn.	166
3.4f. Geophysical survey grid and project area on aerial imagery, from the western end of Roebling's Delaware Aqueduct northwestward to bend in Scenic Drive.	166
3.4g. Processed plan-view results map for the GPR survey near Roebling's Aqueduct, Time-Slice #1.	167
3.4h. Processed plan-view results map for the GPR survey near Roebling's Aqueduct, Time-Slice #7.	167
3.4i. GPR Slice #7 showing the locations of select profiles. Purple lines mark the edges/sides of the canal.	167
3.5a. View looking north at Roebling's Delaware Aqueduct from the overlook.	168
3.5b. View looking northwest at the overlook. Note the tilt of the overlook.	168
3.6a. Annotated aerial photograph showing three options for a pedestrian connection between Roebling's Delaware Aqueduct site and the Zane Grey Property.	169
3.6b. View looking northwest at Option A, near where it meets Scenic Drive.	170
3.6c. View looking north at Option A, west of the Roebling Inn.	170
3.6d. View looking north at Option A, west of the cemetery.	170
3.6e. View looking south at Option A, from the southwest corner of the Zane Grey property.	170
3.6f. View looking south at Option A, west of the Roebling Inn.	170
3.6g. View looking northeast at Option B and the north side of Scenic Drive, and the Roebling Inn.	171
3.6h. View looking north at Option B and the west side of Scenic Drive, at the cemetery lot.	171
3.6i. View looking north at Option B and the west side of Scenic Drive, at the George property.	171
3.6j. View looking north at Option B and the west side of Scenic Drive, at the Zane Grey property.	171
3.6k. View looking south at Option B and the west side of Scenic Drive, at the cemetery lot.	172
3.6l. View looking south at Option B and the west side of Scenic Drive, at the cemetery lot.	172
3.6m. View looking west at Option B and the north side of Scenic Drive, at the Roebling Inn.	172

3.6n. View looking west at Option B and the north side of Scenic Drive, at Roebling Inn parking lot.	172
3.6o. View looking southwest at Option C, at the steps on park property that access the riverbank.	173
3.6p. View looking north at Option C and the private driveway, across from the Cortright house.	173
3.6q. View looking north at Option C and the east side of Scenic Drive, across from cemetery.	173
3.6r. View looking north at Option C and the east side of Scenic Drive, next to the George property.	173
3.6s. View looking south at Option C at the east side of Scenic Drive, opposite the Kuhn house.	173
3.6t. View looking south at Option C and the east side of Scenic Drive, across from the cemetery.	173
3.6u. View looking south at Option C and the east side of Scenic Drive, across from the cemetery.	174
3.6v. View looking south at Option C and the east side of Scenic Drive, across from the Roebling Inn.	174
3.7a. Portion of the 1999 Cultural Landscape Treatment Plan and proposed accessible routes. Hatched areas indicate accessible walks.	174
3.7b. Treatment Plan for the Zane Grey House, 2008.	175
3.7c. Drawing of the proposed ramp and walk at the Zane Grey House, 2022.	175
3.8a. Schematic design for an accessible parking area and walkway.	176
3.8b. View looking east at the proposed site of a parking lot, behind the barn. An accessible path will be built to connect the lot to other paths barn.	177
3.8c. View looking west at the barn. The historic driveway will be extended along the north side of the barn (image right) to access the new parking lot.	177
3.9a. View looking northwest, c.1916-18.	177
3.9b. View looking southwest at the existing parking lot. When its is relocated it can be removed so that only the original driveway portion will remain.	177
3.9c. View looking northeast from the front porch and the current pedestrian and vehicular layout.	177
3.10. Aerial view of the orchard located between the Norfolk Southern track and the Moran House and Cottage Kitchen.	178
3.11a. View looking northwest at the Big House and part of the garden, c.1920s.	179
3.11b. View looking northwest at the former garden plot area.	179
3.12a. Portion of photograph looking from Prospect Rock, c.1918.	179
3.12b. View looking southeast at the former location of a clay tennis court.	179

TABLES

2. Existing Conditions and Analysis

2.1. Summary of Property Listings.	100
2.2. Summary of Landscape Characteristics and Features.	134

DRAWINGS

Introduction

1	Overview (Figure 0.6)	4
---	-----------------------	---

1. Site History

2	Roebling's Delaware Aqueduct, New York (North), Period Plan 1898	27
3	Roebling's Delaware Aqueduct, New York (South), Period Plan 1898	29
4	Roebling's Delaware Aqueduct, Pennsylvania, Period Plan 1898	31
5	Connection Area, Period Plan 1898	33
6	Zane Grey Property, Period Plan 1898	35
7	Roebling's Delaware Aqueduct, New York (North), Period Plan 1929	51
8	Roebling's Delaware Aqueduct, New York (South), Period Plan 1929	53
9	Roebling's Delaware Aqueduct, Pennsylvania, Period Plan 1929	55
10	Connection Area, Period Plan 1929	57
11	Zane Grey Property, Period Plan 1929	59
12	Roebling's Delaware Aqueduct, New York (North), Period Plan 1978	71
13	Roebling's Delaware Aqueduct, New York (South), Period Plan 1978	73
14	Roebling's Delaware Aqueduct, Pennsylvania, Period Plan 1978	75
15	Connection Area, Period Plan 1978	77
16	Zane Grey Property, Period Plan 1978	79

2. Existing Conditions and Analysis

17	Roebling's Delaware Aqueduct, New York (North), Existing Conditions 2021	145
18	Roebling's Delaware Aqueduct, New York (South), Existing Conditions 2021	147
19	Roebling's Delaware Aqueduct, Pennsylvania, Existing Conditions 2021	149
20	Connection Area, Existing Conditions 2021	151
21	Zane Grey Property, Existing Conditions 2021	153

ACKNOWLEDGMENTS

The Cultural Landscape Report for Roebling's Delaware Aqueduct Site and the Zane Grey Property was a collaborative effort by the Olmsted Center for Landscape Preservation and Upper Delaware Scenic & Recreational River. At the Olmsted Center, the report was prepared by Jeff Killion, Historical Landscape Architect. Maryrose Kulick and Kelsey Little created the period plans and existing conditions plans. Eliot Foulds, Senior Project Manager contributed to the report and served as the project manager. Robert Page, Director, provided project oversight.

The Olmsted Center would like to thank Superintendent Lindsey Kurnath, and dedicated park staff for their invaluable assistance in the review and completion of this report, including Jennifer Claster, Community and Land Use Planner and Accessibility Coordinator; Don Hamilton, Natural Resource Program Manager; Susan Kasper, Interpretive Ranger; Ingrid Peterec, Chief of Interpretation; and Jessica Weinman, Facility Program Manager, who also served as Acting Superintendent. We would also like to acknowledge former park staff, including Loren K. Goering, Chief of Facility Maintenance, and Joe Salvatore, Superintendent.

Allied Region 1 Cultural Resources Programs also participated in the project. Michelle Surber, Landscape Architect, Historic Architecture Conservation & Engineering Center, lead efforts in accessibility design at Zane Grey Property. James A. Nyman, Regional Archeologist and Program Manager, and Meg Wilkes, Archeologist, coordinated geophysical field investigation at the canal basin.

We are particularly grateful to Alejandro (Alex) Garcia-Maldonado and Lauren Hauptman, current and former Cultural Resource Manager and Curator, respectively, for their dedication and enthusiasm in preserving and interpreting the park's historic resources. As this project was interrupted by the Covid-19 pandemic, they were the driving forces who steered it through completion.

INTRODUCTION

The Upper Delaware Scenic and Recreational River is 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 (Figures 0.1, 0.2). Straddling New York and Pennsylvania, 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. 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. 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. The National Park Service owns 30.4 acres, a small fraction of the just over 55,575 acres of land within the river corridor.

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. The National Park Service preserves and maintains two such sites –Roebing’s Delaware Aqueduct Site and the Zane Grey House – at the confluence of the Upper Delaware River and Lackawaxen River, in the Township of Lackawaxen in Pike County, Pennsylvania, and the Town of Highland, Sullivan County, New York (Figures 0.3, 0.4).

Roebing’s Delaware Aqueduct is the oldest existing wire cable suspension bridge in the United States. John A. Roebing, who later designed the Brooklyn Bridge, built the 1848 aqueduct that once carried the Delaware and Hudson Canal over the Delaware River. In the 1980s the aqueduct underwent adaptive reuse restoration as a one-lane bridge. The aqueduct, listed as both a national historic landmark and a national historic civil engineering landmark, was honored by the American Institute of Architects in 1989 for its rehabilitation design. Portions of the Delaware and Hudson Canal, a national historic landmark, are located in the river corridor. The Zane Grey Site preserves the home and grounds of American writer Zane Grey (1872-1939), author of *Riders of the Purple Sage* (1912) and other popular adventure novels and stories that were a basis for the Western genre in literature and the arts. The home is now a museum filled with memorabilia from Grey’s successful career as an American novelist, as well as from his other endeavors in dentistry, baseball, world traveling, and fishing.

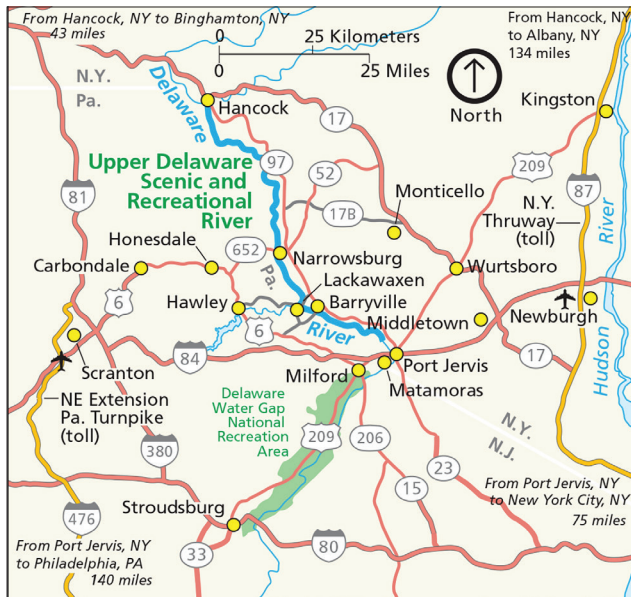


Figure 0.1. Regional map showing location of Upper Delaware National Scenic and Recreational River. (NPS, *Foundation Document Overview*, 2014: 2)



Figure 0.3. View looking southwest at Roebling's Delaware Aqueduct. (OCLP 2016, DSC_0392)



Figure 0.4. View looking west at the Zane Grey House. (OCLP 2014: DSC_0621)

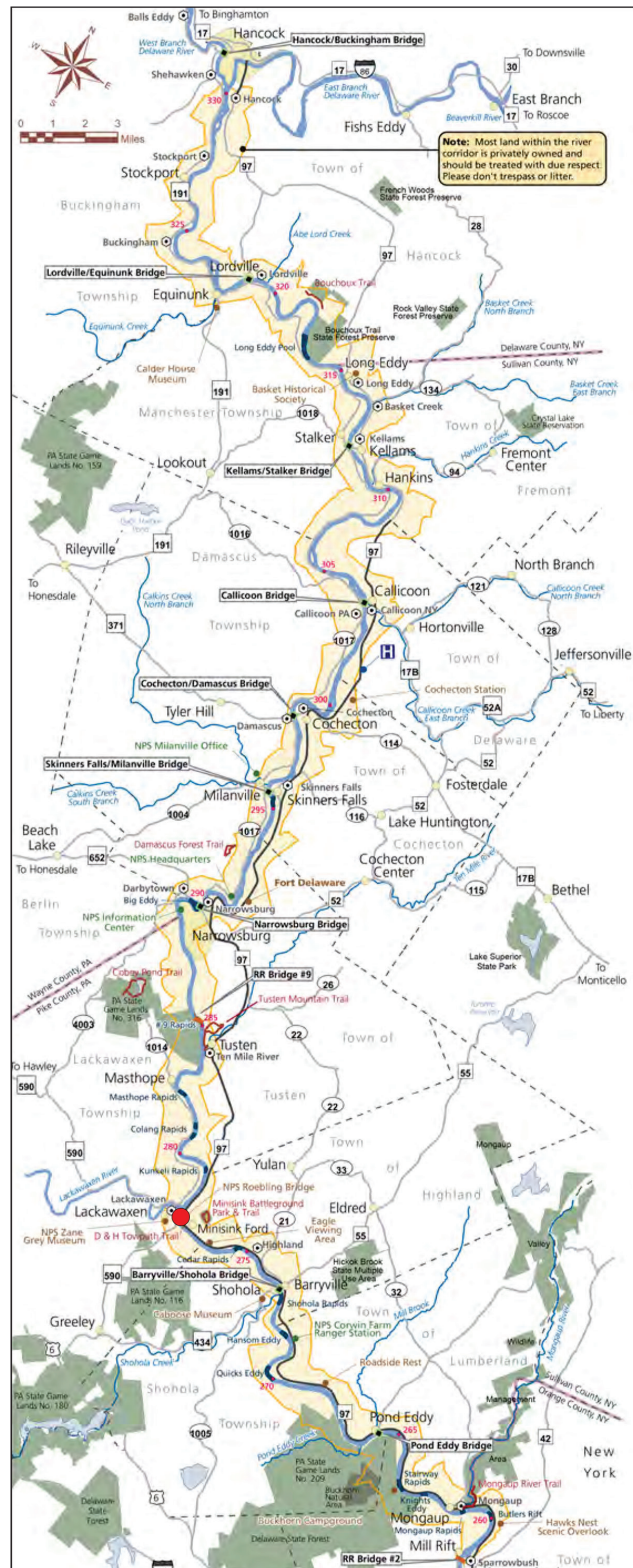


Figure 0.2. Park map of Upper Delaware National Scenic and Recreational River. The CLR project location is marked with a red dot. (NPS, *Foundation Document Overview*, 2014: 2)

PROJECT PURPOSE

Cultural landscapes are settings that human beings have created in the natural world. They reveal fundamental ties between people and the land – ties based on our need to grow food, give form to our settlements, meet requirements for recreation, appreciate scenic beauty, and find suitable burial places. Cultural landscapes are intertwined patterns of both natural and constructed features – plants and fences, watercourses, and buildings. They range from formal gardens to cattle ranches, from cemeteries and pilgrimage routes to village squares. They are special places – expressions of human manipulation of and adaptation to the land and the environment.

The National Park Service (NPS) uses the cultural landscape report as the primary tool to inform long-term management decisions regarding a cultural landscape. The report follows the general format outlined in *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques* (NPS 1998).

The purpose of this CLR is to provide valuable information about the histories of the properties, document defining landscape characteristics and features, identify existing resource issues and threats, and provide treatment guidance needed for the short and long-term preservation of significant resources. The focus of the CLR is to present alternatives for enhanced pedestrian connectivity within and between the park unit's fee-owned parcels, and improve interpretation of surviving canal remnants.

PROJECT SCOPE AND BACKGROUND

The geographic scope of the project is focused on the federally owned parcels of the park that comprise Roebling's Delaware Aqueduct, Delaware and Hudson Canal, and the Zane Grey Property, as well as privately owned properties between the two sites on the Pennsylvania side of the Delaware River (Figures 0.5, 0.6). The overall goal of the CLR project is to identify treatment projects related to park plans for the Roebling's Delaware Aqueduct and Zane Grey properties. The CLR proposes landscape treatment

actions related to visitor access, circulation, and interpretation in concert with preservation of these cultural landscapes. The project presents alternatives for display and interpretation of physical remnants of the canal basin, and also for making practical pedestrian connections between the Aqueduct Site and the Zane Grey Site. The report also provides additional research for the Delaware & Hudson Canal and Zane Grey properties to strengthen the existing Cultural Landscape Inventories (CLI).

Roebling's Delaware Aqueduct Site is highlighted in the park's 2014 *Foundation Document* as needing an update to a Schematic Plan prepared in 1995. Significant portions of that plan have been implemented, but since that time the park has acquired additional lands at the site (Margold tract was added to the park in 1998), which requires a reassessment of the overall property. The Zane Grey Property is also identified in the *Foundation Document* as needing an update to a *Cultural Landscape Treatment Report* completed in 1999 and revised in 2008. In addition to its current use as a museum, planning efforts are underway to rehabilitate the site into a park visitor center. CLIs were completed for the Zane Grey Site in 1999 (updated in 2014) and Roebling's Delaware Aqueduct Site in 2016.

This CLR project builds upon these prior projects and incorporates findings of other cultural resource assessments being pursued concurrently, including updates to National Historic Landmark and National Register of Historic Places documentation, an archeological survey of the Zane Grey site, and a geophysical survey of the canal bed on the Pennsylvania side.

PROJECT METHODOLOGY

The first chapter of the CLR, Site History, documents the physical history of the landscape with narratives, historic photographs, maps, and period plans for 1898, 1929, and 1978. The second chapter, Analysis and Evaluation, reviews the site's historical significance according to National Historic Landmark and National Register criteria, evaluates the historic significance of the landscape, and identifies landscape characteristics and associated features that con-

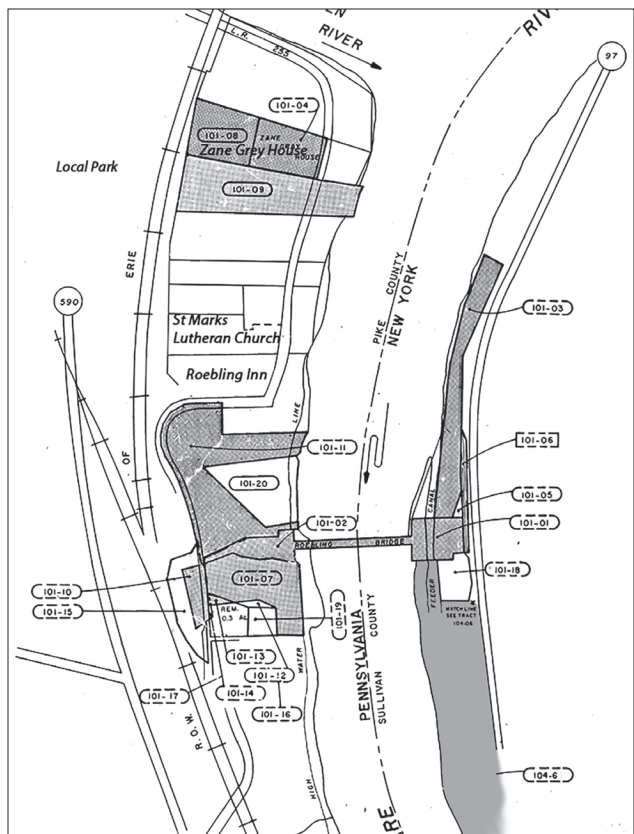


Figure 0.5. Maps showing federally owned parcels in the CLR project area. (NPS, Drawing #101-10, 1979)

tribute to the property's significance and historic character. It also includes existing condition maps. The third chapter, Treatment Recommendations, proposes enhancements to existing historic and non-historic landscape features to improve the visitor experience. Treatment recommendations will be supplemented with graphics to convey the intent of each project. Overall, the report will provide information needed to inform park compliance and support planning, treatment, protection, and management of the cultural landscape.

This CLR was prepared in conformance with guidelines established by the National Park Service *Management Policies* (2006), *Director's Order 28: Cultural Resource Management* (1998), *NPS 28: Cultural Resource Management Guidelines* (1997), *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (1996), and *A Guide to Cultural Landscape Reports: Contents, Process and Techniques* (1998). Research was conducted at Upper Delaware Scenic & Recreational River and the Olmsted Center for Landscape Preservation.



Figure 0.6. Overview of CLR site maps. (OCLP, Drawing 1, 2023)

SUMMARY OF FINDINGS

HISTORICAL OVERVIEW

Native American Land Uses, European Settlement (to 1778):

Long before European contact in the 17th century, Lenape Indians and their predecessors lived off the area's rich plant and animal life. The first substantial European settlement in the Upper Delaware River valley began when frontiersmen arrived in the 1750s. Named Cushetunk, it was located north of the confluence of the Delaware and Lackawaxen Rivers. During Revolutionary War, the valley becomes an avenue of invasion for Indian and Tory units, prompting many settlers to leave. One of the bloodiest battles occurred just east of the Delaware and Lackawaxen confluence in 1779. Occasional Indian raids continued until the end of the war, after which the Indian population quickly declined and Colonial settlers returned.

Post-War Settlement (1782-1825):

Settlement after the Revolutionary War occurred slowly, in part due to ongoing boundary disputes between the states. In 1798, at future site of Roebling's Delaware Aqueduct, Lackawaxen and Lumberland were founded on the Pennsylvania and New York sides, respectively. The area's isolation and inaccessibility also slowed settlement. Rough and shallow river waters discouraged large-scale attempts of water transportation. Navigation was mostly by rafts, canoes, and other low draft crafts that were limited in the amount and the nature of supplies they could carry into the valley. There were roads, but the damp climate made upkeep difficult.

D&H Canal and Aqueducts (1825-1898):

Development of reliable transportation shifted to the Delaware & Hudson Canal Company and their construction of a canal, signifying a new attempt to solve the valley's accessibility problem. The D&H Canal was built in 1825-1828 to ship anthracite coal from northeastern Pennsylvania to

New York City via the Hudson River. Lacking funds to build an aqueduct to carry canal boats across the Delaware, a slackwater dam was built just below the confluence to create a still upstream pool for vessels to cross from the canal on 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 rope ferry. Conflicts arose, however, as other river raftsmen viewed the dam and ferry as navigational impediments.

High demand for coal and the emergence of railroads prompted canal improvements in 1849, which included using larger boats, deepening and widening canal, and building new stone walls to stop leaks and towpath failures. Roebling's Delaware Aqueduct was built in 1849 to eliminate what had become the canal's worst bottleneck: the ferry crossing at the mouth of the Lackawaxen River and frequent conflicts with other river traffic. Three new canal locks (#s 72, 71, 70) on the Delaware (New York side) replaced original locks (1, 2, 3) on the Lackawaxen River (Pennsylvania side). Turning basins were built at each end of aqueduct for boats to cue into the structure. The original canal section on the New York side became a feeder canal for the new canal. Around this time, the railroad also arrived to the area, its rails spanning the canal and Lackawaxen River via wood truss bridges.

Canal infrastructure included lock houses, barns, and gardens. New homes, stores, and roads were also built, as well as a church and Union Cemetery. The canal was a success, with peak use occurring in 1870s, but railroad efficiencies begin to outpace that of the canal's. In 1898 the D&H Canal was closed to boat traffic and dewatered.

Reusing Canal Lands, Zane Grey Property (1898-1929)

By 1906 the Erie Railway replaced the wood truss bridge spanning the abandoned D&H Canal on the Pennsylvania side with an earthen embankment. The adjacent canal bed and towpath remnants remained for many more years. In 1908 the dewatered Delaware Aqueduct was converted to a one-lane vehicular bridge. A toll booth was built at east end. The old turning basins served as vehicular approaches and connected to the bridge to local roads. The Delaware

& Hudson Canal Company lands were sold off during this period, and new homes were built, especially in the 1910s. Lackawaxen Cemetery was established in c.1915 adjacent to the Union Cemetery.

In 1904 at the river confluence, author and outdoorsman Zane Grey purchased the northern three acres of a farm (parcel A). The lot included a two-story D&H house, called the "Cottage," a D&H barn, and a shed. In 1905 Zane's brother Romer bought the the farm's southern two acres (parcel B). The brothers created a cluster of three separate houses for themselves and their mother and sister, Josephine and Ida, respectively. Romer sold the house to Zane in 1914, who expanded the "Big House" twice. Gardens, corrals, tennis courts, and new plantings were added. The Cottage was razed and rebuilt to house Zane's secretaries. Around this time Zane purchased additional acreage to the south of the Big House (parcel C). In 1918 the Grey family moved to Los Angeles to focus on his writing and film career. In 1928 in one of his last visits, Zane wrote, "The place has grown up most wonderfully. It is a forest. It is a jungle. The trees are splendid. Oh, that is the way I wanted it then..."

Use of Former Canal Company Properties (1929-1978)

In early 1930s the Delaware Aqueduct/Bridge was improved to accommodate heavier traffic. Concurrently, the State of New York built Route 97 across former canal route, its roadbed destroying many segments of the D&H Canal as well as Locks 72 and 70 associated with Roebling's Delaware Aqueduct (Lock 71 was spared). By late 1960s, the aqueduct/bridge was in poor condition, but was nonetheless designated a National Historic Landmark (NHL) in 1968.

Neither Zane Grey or his wife Dolly visited Lackawaxen after 1929. Zane Grey died in 1939 and was buried in Lackawaxen Cemetery. Beginning in the 1930s, landscape features like the clay tennis courts and gardens declined due to lack of use and care. A 1942 flood destroyed several buildings and landscape features, including the Cottage. Around this time the Moran House was built on Parcel C.

Dolly Grey sold the last of the property in 1945. The Big House became the Zane Grey Inn until 1973 when it is converted into the Zane Grey Museum. Parcel A was sold to Pennsylvania Fish and Boat Commission in 1971, which built a parking lot to serve a popular boat ramp nearby.

National Park Service Stewardship (1978-2023)

The designation of Roebling's Delaware Aqueduct as a NHL coincided with efforts to preserve the setting of the Delaware River. 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 new unit of the national park system. Roebling's Delaware Aqueduct area and the Zane Grey property fell within the park's "Recreation" area.

The National Park Service acquired the Roebling's Delaware Aqueduct in 1980 and restricted it to pedestrian use due to its poor condition. Rehabilitation of the structure was completed in 1987 and the towpaths were rebuilt in 1994. In the 1990s the park acquired canal remnants on both sides of the aqueduct/bridge.

The 1986 *Final River Management Plan*, the park's first planning document, identified facility needs for management and use of the park. At Roebling's Delaware Aqueduct, the plan proposed acquisition of additional lands on both sides of the structure for parking areas, walkways, and emergency river access points. This occurred in the late 1980s and early 1990s, with improvements completed in the late 1990s. In 2000 a maintenance facility was built on the Pennsylvania side.

A 1994 *Schematic Design/Environmental Impact* report included plans for a loop trail atop the "old canal" (feeder canal) and "new canal" towpaths on the New York side. The route began with a new access road/trail from the north end of the new parking lot, headed southwest down the hillside to under Roebling's Delaware Aqueduct, continued south along the towpath to the state's diversion dam, turned north to the "new canal" towpath and passed alongside Lock 71, and then descended northwest down the hill to cross the feeder canal and meet the feeder canal towpath. A 6-foot hard surface was proposed, along with a

rustic footbridge with railings over the breach in the feeder canal towpath and a footbridge over the feeder canal prism.

Completion of the eastern part of the loop was contingent on acquiring the portions of Lock 71 still in the Route 97 right-of-way. The access road/trail and portions of towpath trail were constructed in early 2000s, but recurring flood and storm damage in 2004-2006 delayed and altered plans for the remainder of the trail loop. In 2007 wing wall, road, and culvert repairs are completed. In 2008-2009, the Towpath Trail surface was rehabilitated to improve resistance to flood damage and meet outdoor developed area accessibility standards. Flooding and storms in 2010 and 2011 damaged the access road/trail. To date the section of proposed trail on the new canal towpath has not been built.

In 1989 the National Park Service acquired the Zane Grey property, and additional lands in 1998 and 2000. In 1999 landscape treatment recommendations were developed for the entirety of the original Zane Grey property. A “Cultural Landscape Treatment Plan” in 2008 recommended accessibility improvements. Plans are underway to convert part of the Big House into a park visitor center, and restore portions of the grounds as part of accessibility improvements.

ANALYSIS AND EVALUATION

The landscape in the project area has undergone dramatic changes, especially in land uses and transportation -- the canal and neighboring farms gave way to single family homes, railroads, and highways. Much of the historic fabric that documents this timeline remains today, most notably Roebling’s Delaware Aqueduct and the Zane Grey House. Numerous canal remnants and associated buildings, structures, and landscape features are maintained by the park, while others remain obscured and forgotten.

Several features in the project area are designated National Historic Landmarks (NHL) and are listed in the National Register of Historic Places. Other features have been determined eligible for listing in the National Register (NR) through consensus determinations between the National Park Service and State Historic Preservation Offices in

Pennsylvania and New York. The overall period of significance for the project area is 1825-1979, which begins when the original canal sections were construction and ends when the toll house at the east end of Roebling’s Delaware Aqueduct closed.

Three listings are owned by the federal government. The Delaware & Hudson Canal and Roebling’s Delaware Aqueduct is significant for the period 1825-1898 (New York) and 1847-1898 (Pennsylvania) in the areas of commerce, transportation, and engineering (NHL criteria 1 and 3/ NR criteria A and C). The Toll House is significant for the period c.1908-1979 in the areas of commerce and transportation (NR criterion A). The Zane Grey House Property is significant for the period 1906-1929 in the area of literature (NR criteria A and B). Lastly, the privately owned D&H Canal Office (Roebling Inn) is significant for the period c.1855-1898 in the areas of architecture and transportation (NR criteria A and C).

TREATMENT RECOMMENDATIONS

This report identifies twelve projects to improve interpretation of and access to extant and missing historic features at the park-owned Roebling’s Delaware Aqueduct and Zane Grey properties, and that will create a pedestrian connection between the two properties.

Roebling’s Delaware Aqueduct Site – New York Side:

Project #1. Stabilize the Towpath Trail and Original Canal Prism

Project #2. Improve Accessibility to Towpath Trail

Project #3. Preserve Lock 71

Roebling’s Delaware Aqueduct Site – Pennsylvania Side:

Project #4. Interpret of Canal and Towpaths on PA side and Improve Pedestrian Connections

Project #5. Repair Overlook at Parking Lot

Connection Area:

Project #6. Develop Pedestrian Connection between Zane Grey Property and Roebling’s Delaware Aqueduct

Zane Grey Property:

Project #7. Construct Accessible Entrance at the Zane Grey House

Project #8. Develop Accessible Parking and Walkways to the Zane Grey House

Project #9. Remove Existing Front Walk and Parking Lot, Restore Original Driveway and Front Walk

Project #10. Infill Existing Orchard with New Apple Trees

Project #11. Interpret the Garden Area south of Zane Grey House

Project #12. Interpret the Tennis Court

SITE HISTORY

This chapter presents the development and use of the landscapes that comprise Roebling's Delaware Aqueduct Site and the Zane Grey Property, as well as the area of privately-owned land situated between these two federally-owned properties. The narrative begins with Native American land uses and European contact (to 1750), European settlement (1750-1782), post-war resettlement (1782-1825), construction and use of the Delaware & Hudson Canal and Roebling's Delaware Aqueduct (1825-1898), redevelopment of Canal Company lands and the Zane Grey property (1898-1929), use of former Canal Company properties (1929-1978), and National Park Service stewardship in the Upper Delaware River valley (1978-2021).

EARLY LAND USE AND EUROPEAN CONTACT, 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. The confluence of the Lackawaxen and Delaware Rivers is notable for a high concentration of prehistoric objects, which suggests that this area was intensely occupied. Physical evidence confirms occupation during the Late Archaic through Late Woodland Age, about 450 to 10,000 years before present.¹

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.²

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, white-tailed 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.³

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 American 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.⁴

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.⁵

Evidence of Native American occupation has been discovered in the vicinity of the Zane Grey House and Roebling's Delaware Aqueduct Site. According to the 2008 *Archeologi-*

cal 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 (Figure 1.1). 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." The 2008 report noted other archeological research projects that yielded numerous artifacts (see 2008 report for more information).⁶

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. One such person was Captain Arent Schuyler who visited what is present-day Pike County in 1694, where he encountered the Lenape. Schuyler was sent by the governor of the colony of New York, Benjamin Fletcher, to determine whether the French were allied with the Lenape to rebel against the English. Schuyler found no evidence of a rebellion, but observed the wide variety of crops the Lenape were growing on the fertile river side soils.⁷

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 European 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 by the colonies 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 colonists who favored private ownership. Among the first Europeans to settle Pike County were Nicholas Depui in 1725, Thomas Quick in 1733, and Andrew Dingman in 1735. As more colonists came to the area, land disputes arose with the Lenape and the relationship between the two groups deteriorated. Perhaps the most notable of these disputes was the Walking Purchase of 1737, a treaty for 1,200,000 acres of Lenape land, which included more than half of the present-day Pike County, and which displaced many of the Lenapes. 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.⁸

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,

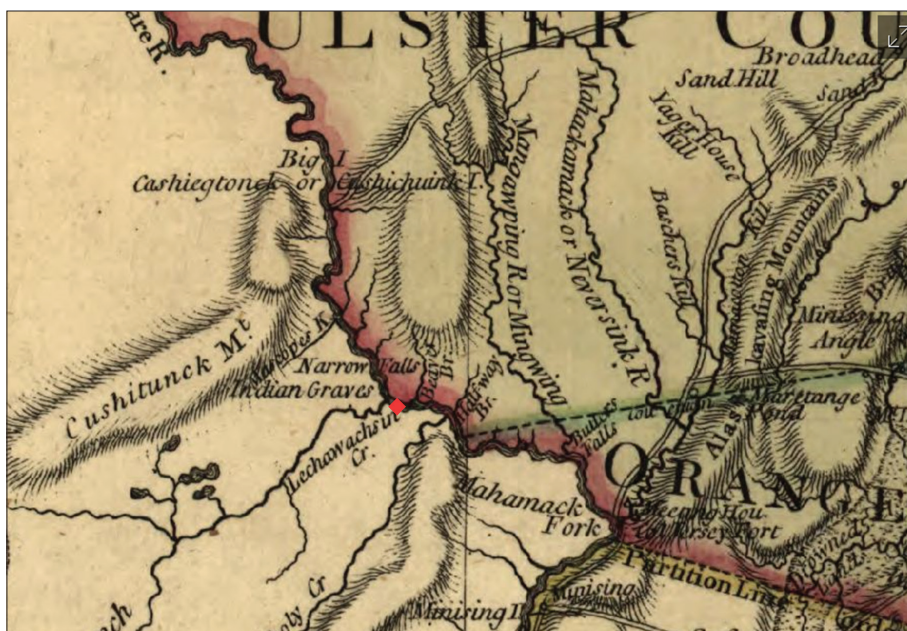


Figure 1.1. Map showing the confluence of the Delaware and Lackawaken Rivers by Sauthier, Claude Joseph, Bernard Ratzer, and William Faden, 1776. ("A map of the Province of New-York, reduc'd from the large drawing of that Province, compiled from actual surveys by order of His Excellency William Tryon, Esqr., Captain General & Governor of the same, by Claude Joseph Sauthier; to which is added New-Jersey." London, Wm. Faden, 1776. Map. <https://www.loc.gov/item/74692643/>)

the Lenape and the neighboring Iroquois became enemies, with the Iroquois Confederacy becoming the stronger of the two groups.⁹

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.¹⁰

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.¹¹

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. Within this stretch, 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.¹²

In response to the French and Indian War of 1754-1763, Colonial settlers built a stockade named Fort Delaware for protection from Indian raids. The worst violence came in the final year of the war, following the assassination of Teedyuscung, leader 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 colonists there survived.¹³

The outbreak of the Revolutionary War in 1775 brought several 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 colonists to leave. One of the bloodiest battles of the Revolution, the Battle of Minisink, took place on a hill just east of the Delaware and Lackawaxen confluence in 1779. The conflict

pitted 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.¹⁴

POST-WAR RESETTLEMENT, 1783-1825

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 1783, 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 Roebling'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.¹⁵

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.¹⁶

Various logging roads were located 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 Cochection and what would later become Wurtsboro, followed by a turnpike from Cochection 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.¹⁷

According to the 1983 *Cultural Resource Survey, Upper Delaware National Scenic and Recreational River, Pennsylvania and New York, Volumes 1-6* by 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 (Figure 1.2). The rope ferries were considered dangerous and were eventually replaced by bridges, the earliest of which were built at Narrowsburg and Cochection in the 1810s.¹⁸

THE DELAWARE & HUDSON CANAL AND ROEBLING'S DELAWARE AQUEDUCT, 1825-1898

CONSTRUCTION OF THE CANAL

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 construction of the Delaware & Hudson (D&H) Canal, signifying a new attempt to solve



Figure 1.2. A rope ferry along the Delaware River, at Masthope, 1825-1849. (UPDE Archives, Scan423; Hawley Public Library, #1484)

the valley's accessibility problem. Like those already in existence in Europe, canals were used for multiple purposes such as transportation, water supply, irrigation, power, flood control, and drainage. Between 1820 and 1830, over 800 miles of canals were opened for navigation in New York, Pennsylvania, Delaware, and Maryland, and by 1830, 1,300 more miles of canal were nearly completed.¹⁹

The D&H 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 Wurt brothers 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. 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. The Canal Company hired Benjamin Wright, who had served as chief engineer of the Erie Canal, and John B. Jervis, to finalize the route.²⁰

Construction of the D&H Canal began in 1825 and finished in 1828 (Figure 1.3). 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 Delaware River and the hamlet of Lackawaxen. The canal 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, seventy miles to the south. 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 four aqueducts, and covered a distance of 108 miles.²¹

One of the most challenging sections of the canal route occurred at the confluence of the Lackawaxen and Delaware rivers. Lacking adequate capital to build an aqueduct to carry canal boats across the Delaware, the Canal Company instead constructed a slackwater dam just below the confluence to create a still upstream pool for the crossing vessels (Figure 1.4). The boats navigated from the canal on 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 from upstream locations viewed the rope ferry and slackwater dam as navigational impediments to their downstream journeys.²²

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

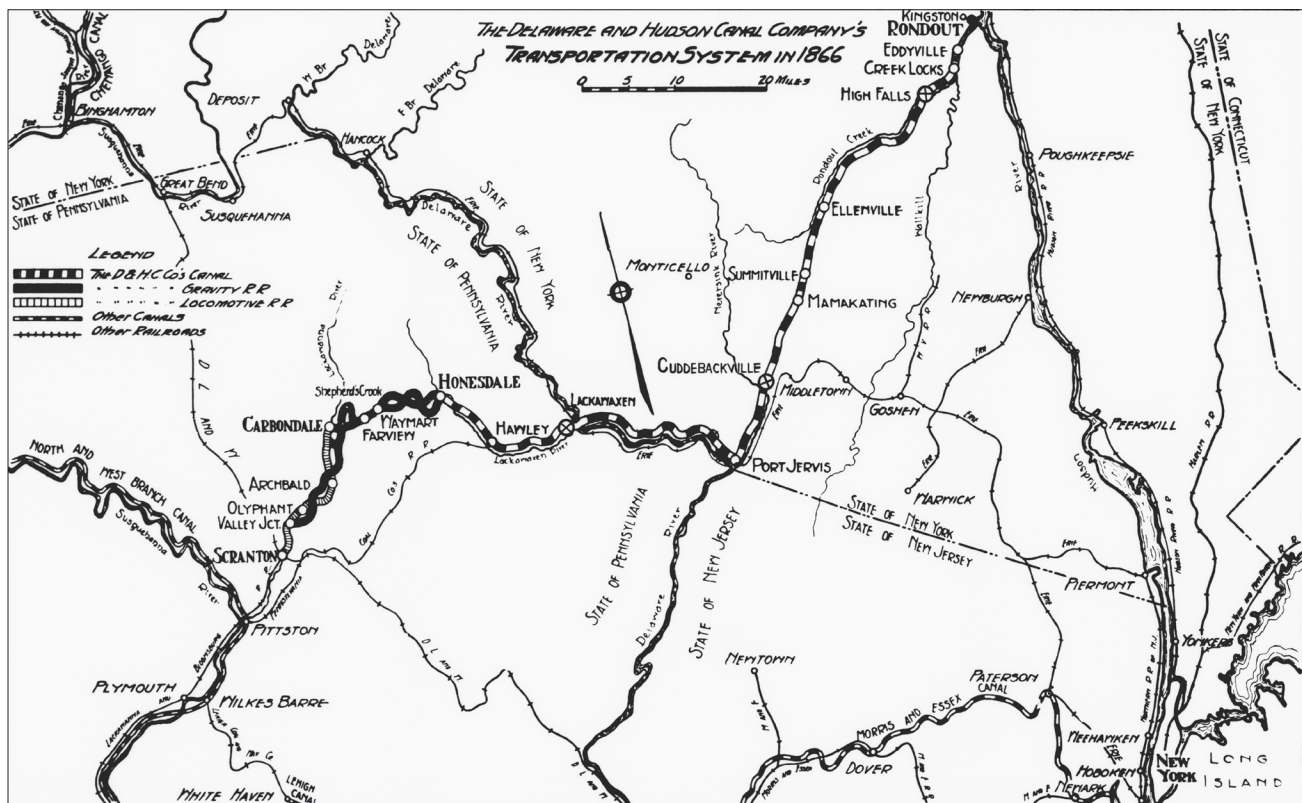


Figure 1.3. Map of the Delaware & Hudson Canal route from Honesdale to Eddyville, 1866. Roebling's Delaware Aqueduct is located at the confluence of the Lackawaxen and Delaware Rivers. (A Century of Progress: History of The Delaware and Hudson Company, 1823-1923: 195, Image #227/792, <https://catalog.hathitrust.org/Record/001108907>)

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 through the canal by ropes harnessed to 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.²³

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.²⁴

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

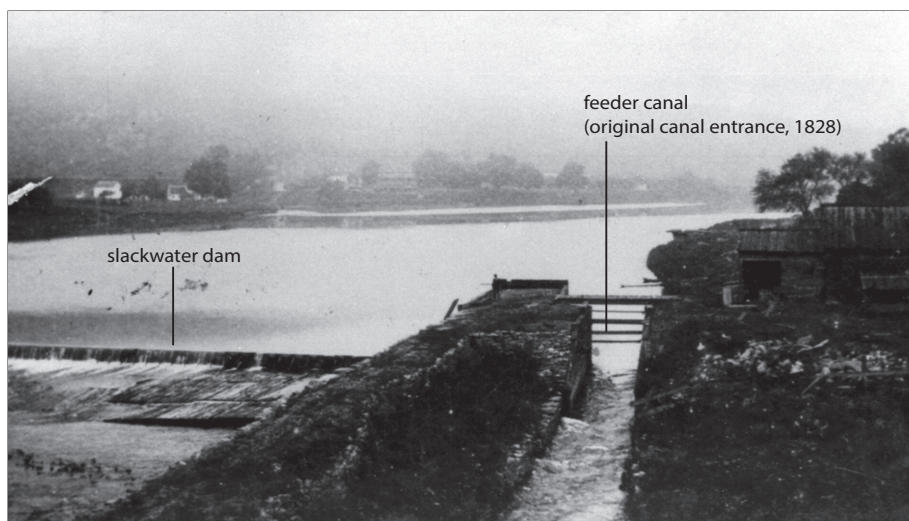


Figure 1.4. View looking north, 1894-1902, at the upstream pool formed by the slackwater dam on the Delaware River and the original entrance to the Delaware & Hudson Canal on the New York side of the Delaware River. By this time, this portion of the original canal is used as a feeder canal. (UPDE website, "Delaware and Hudson Canal," Photo Gallery, Image #22 - Guard Lock)

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.²⁵

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 higher capacity 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 expediencies 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.²⁶

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. Larger boats with 140 ton-capacity ultimately replaced the 20- and 30-ton boats that initially plied the waters. The canal prism was



Figure 1.5. View looking south at stone walls associated with the original canal on the north side of the Lackawaxen River, 1933. (Historic American Engineering Record, HAER PA-24, 2001, #140643pv)

deepened from 4 to 6 feet, and widened from 28 to 48 feet at water level 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 and towpaths (Figure 1.5). 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.²⁷

CONSTRUCTION OF THE DELAWARE AQUEDUCT

The most significant improvement to the D&H Canal's operation, however, was the elimination of its 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 times 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 navigating through a sluiceway at the west end of the dam. Consequently, raftsmen were generally hostile to the canal interests and engaged the Canal Company in constant physical and legal harassment. With a solution now needed and the capital available, aqueducts that had been proposed from the canal's original design were included in the company's improvement plans.²⁸

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. 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. This aqueduct came to be known as the Delaware Aqueduct. The relocated route also necessitated the construction of the Lackawaxen Aqueduct, a smaller structure on the Lackawaxen River, about one mile above its confluence with the Delaware River. To connect the two aqueducts, a new five-eighths-mile segment of "new canal" was constructed on the Pennsylvania side. Another quarter-mile segment of "new canal"—and three new locks—were also needed at the east end of the Delaware Aqueduct, on the New York side. The three locks on the north bank of the Lackawaxen were to be abandoned, but the original canal and guardlock on the east bank of the Delaware would be retained for use as a feeder channel.²⁹

In February 1846, the Delaware & Hudson Canal Company directors authorized the two aqueducts, locks, and new canal beds, and through Russell 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.³⁰

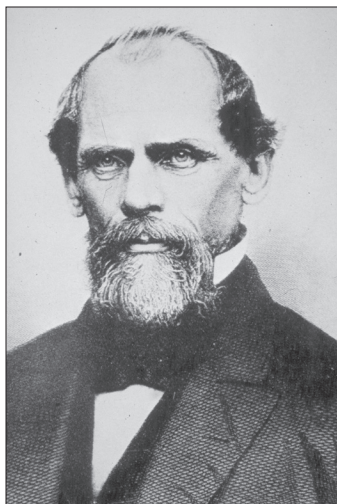


Figure 1.6. John Roebling, 1866.
(Photo Gallery, The Delaware and Hudson Canal, Upper Delaware Scenic and Recreational River, <https://www.nps.gov/media/photo/gallery.htm>)

Roebling's plan was tentatively accepted in early January 1847. In February, 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 Roebling's aqueduct as well as his Smithfield Street suspension bridge over the Monongahela River in Pittsburg, 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 (Figure 1.6).³¹

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, Chief Engineer 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

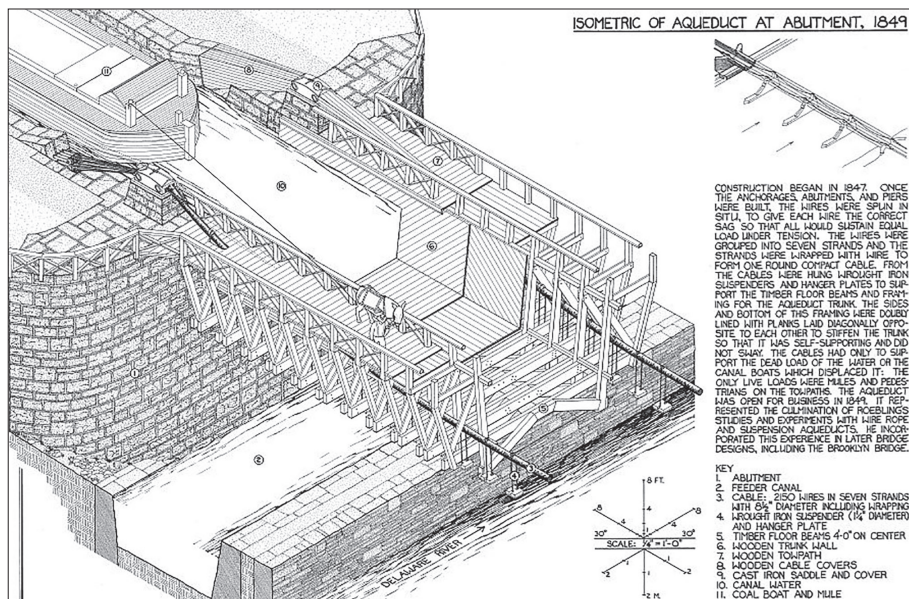


Figure 1.7. Isometric view of the Delaware Aqueduct as it appeared in 1849. (Historic American Engineering Record, HAER PA-1, 1988, #00007v)

rose up through the masonry mass ultimately to restrain the main cables.³²

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."³³

Roebling took up his work at Lackawaxen in the summer or fall of 1847, working on both the Delaware and Lackawaxen aqueducts simultaneously throughout 1848. The aqueducts were designed like the locks, to pass only a single boat at a time. 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 bound by wood fencing with crossbars. Three of the Delaware Aqueduct's spans measured 131 feet, while the fourth (on the Pennsylvania side) measured 142 feet (Figure 1.7). 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.³⁴



Figure 1.8. View looking southwest at the Delaware Aqueduct, 1849-1898. The west wall of the original canal on the New York side is in the foreground. (UPDE Archives, NY_Image 4-11B)

By the end of 1848, the two aqueducts were complete and ready for the opening of the 1849 canal season in April (Figure 1.8). 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 the north side of the Lackawaxen River (on the Pennsylvania side) (Figure 1.9). 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 (Figure 1.10). The turning basin on the New York side was considerably larger because boats had to negotiate a 90-degree turn toward

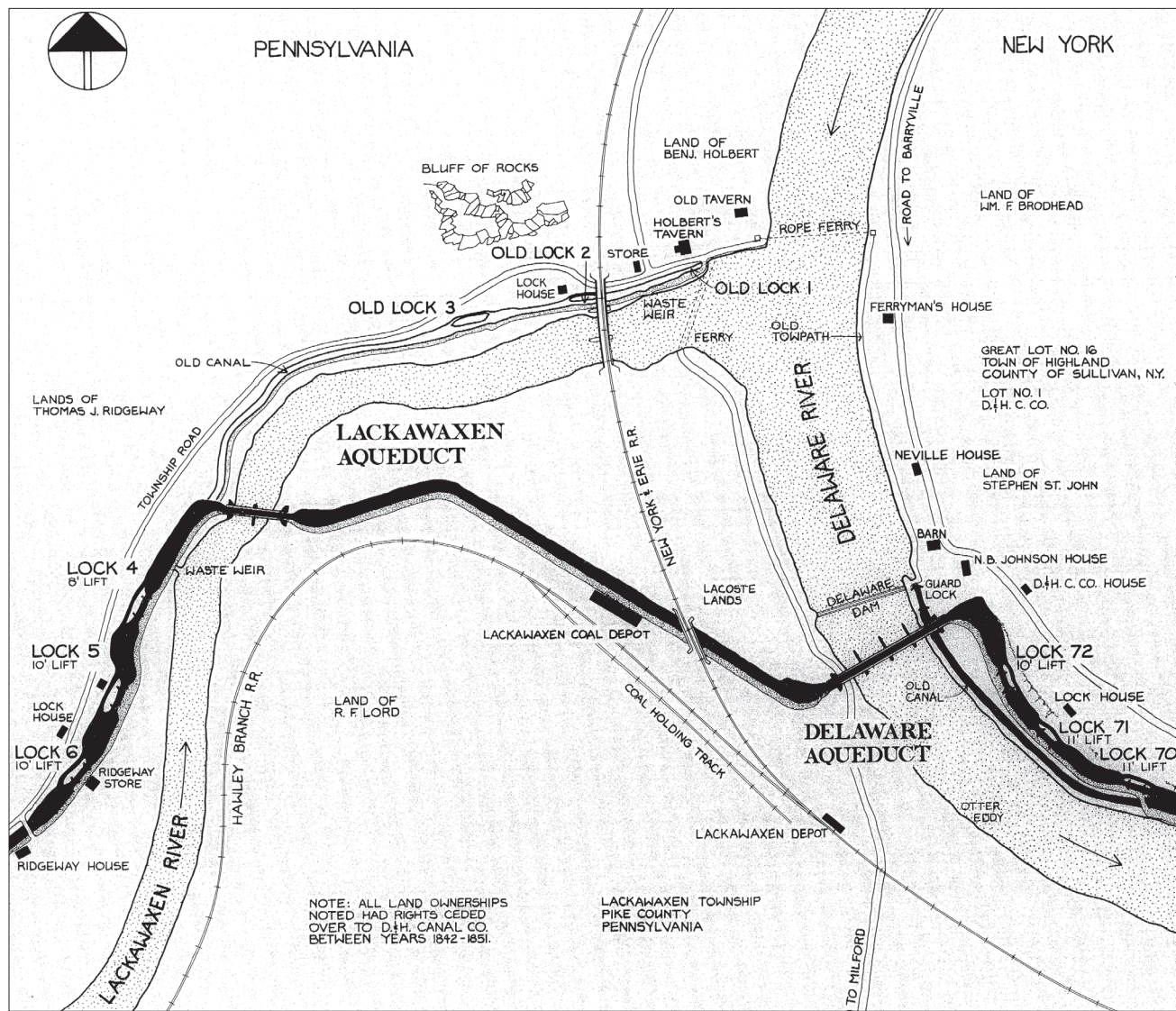


Figure 1.9. Map of the new canal sections at Lackawaxen, in 1849. The Delaware & Erie Rail Line was built in 1848. (UPDE Archives, UPDE-00071, I RBR-1.2, "Delaware Aqueduct 1989 HABS/HAER Mylars," from Wakefield's *Coal Boats to Tidewater*, pg.83/NAP_RL02_054)

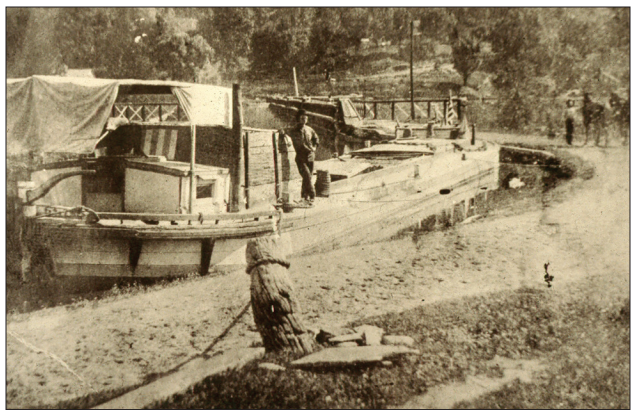


Figure 1.10. View looking east at the turning basin on the west end of the Delaware Aqueduct, 1849-1898. Note the earthen tow path and the wood bollard to tie up boats. (UPDE Archives, PA_Scan4)

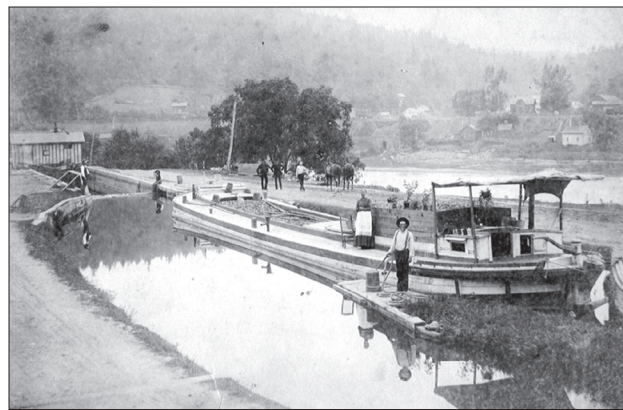


Figure 1.11. View looking southwest at the approach to Lock 72 on the New York side, 1849-1898. Note the wood timbers on the sides of the lock and the wood locktenders shed. (Minisink Valley Historical Society, #P-98-8-19)

the three new locks, which were grouped closely together (about 900 feet). The new 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 (Figure 1.11). The old section of canal on the New York side, now in use as a feeder canal, intersected with the “new canal” just south of Lock 70 (Figures 1.12, 1.13). The slackwater dam on the Delaware River was also retained, and in fact heightened to increase the pool area for the feeder canal (Figure 1.14).³⁵

The improvements to the D&H Canal were 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.”

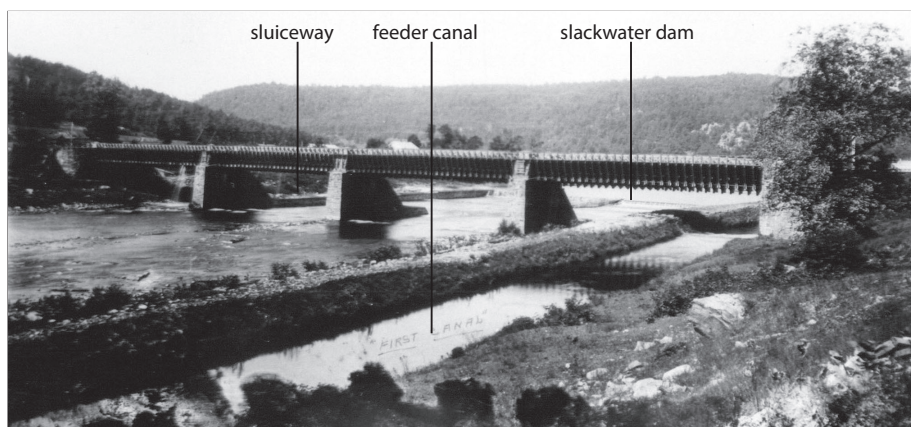


Figure 1.12. View looking northwest at the original section of the D&H Canal passing under the Delaware Aqueduct on the New York side, 1849-1898, which was repurposed for use as a feeder canal. (D&H Canal Historical Society, Ghearr Collection)

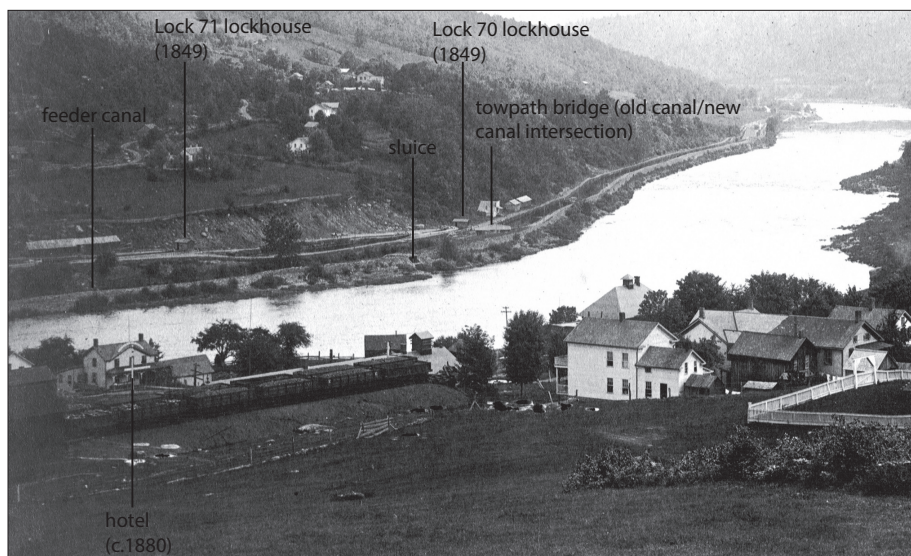


Figure 1.13. View looking southeast from Pennsylvania side, 1880-1898. Lockhouses mark Locks 71 and 70 and a long shed sits north of Lock 71. A railed towpath bridge spans the junction of the new canal and original canal. (Minisink Valley Historical Society, #P-98-8-20)

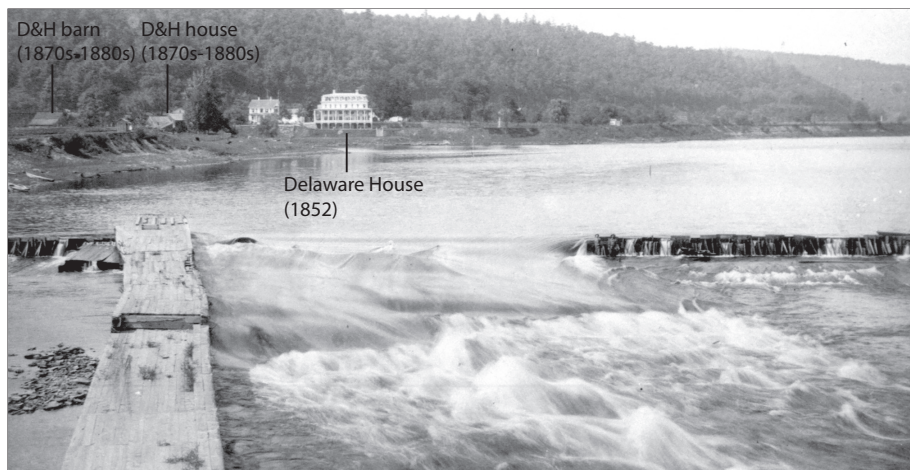


Figure 1.14. View looking north at slackwater dam and icebreaker at the western-most pier of the Delaware Aqueduct, 1852-1892. Note the two people next to the dam at image center and the Delaware House Hotel in the background. (Minisink Valley Historical Society, #P-98-8-18)

With a slight additional deepening and widening in 1852, the canal was able to pass 140-ton capacity boats, which were large enough to handle the waters of the Hudson River. These bigger boats were able to 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.³⁶

CONSTRUCTION OF THE NEW YORK & ERIE RAILROAD

During the 1850s, the D&H Canal transported as much as a million tons of cargo a year, but the expansion of the New York & Erie Railroad 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. Upstream from Port Jervis, the railroad was forced to cross over from the New York side to the Pennsylvania side because the Canal Company obtained a permanent injunction that preempted all rights to the east riverbank upon which the D&H canal was built. The railroad entered Lackawaxen in 1848, crossed over the

canal and Lackawaxen River via two wood truss bridges, and then crossed back to the New York side north of the Lackawaxen River. A depot was constructed southwest of the Delaware Aqueduct, at the junction with the Hawley Branch rail line that headed northwest and tracked along the Lackawaxen River (see Figure 1.9).³⁷

The New York & Erie Railroad 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.³⁸

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 on the Pennsylvania side 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 original route of the canal built in 1825-28 (see Figure 1.14).³⁹

On the New York side, several houses and barns straddled a road that paralleled the river and canal, including a D&H Canal Company owned home east of the turning basin (see

Figure 1.9). 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, in the vicinity of the Delaware Aqueduct, was the hamlet of Minisink Ford.⁴⁰

ESTABLISHMENT OF UNION CHURCH AND UNION CEMETERY

Concurrent with construction of the new canal and aqueducts, and the arrival of the railroad, a church and cemetery were established on the Pennsylvania side, in the riverfront area owned by the D&H Canal Company. Now bound by the two rivers, the canal, and the railroad, the land had long been farmed and was possibly the site of Native American activity. In the middle of this area in 1848, local Baptists and Methodists built the Union Church, one of the first churches in the valley. The small one-story frame structure was topped with a modest steeple, and in 1856 became St. Mark's Church with the establishment of the local Lutheran Society. A separate parish hall/social hall, which later maps indicate was occupied by the Odd Fellows, was built just north of the church around the same time. In c.1848 the Union Cemetery was established just north of the church and west of the hall, also one of the first in the valley. Later photographs indicate some graves were enclosed by fences. The church, hall, and cemetery area essentially divided this broad riverfront space into two equal-sized halves.⁴¹

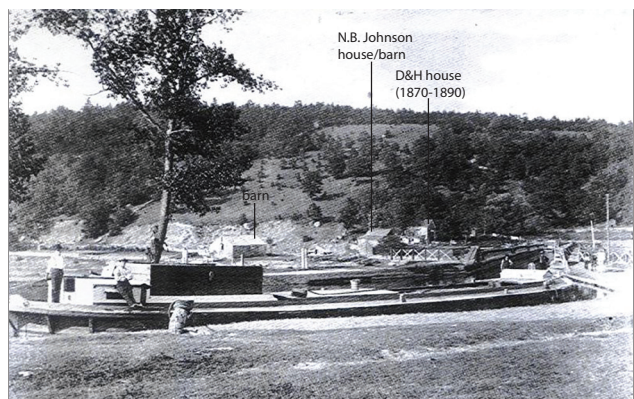


Figure 1.15. View looking northeast from the turning basin on the Pennsylvania side, 1870-1890. On the New York side north of the aqueduct is a D&H canal house built in 1870-1890 and another house and two barns. (UPDE Archives, PA_Delaware Aqueduct - PA side)

NEW DEVELOPMENT ALONG THE CANAL AND RAILROAD

While the canal and aqueducts provided direct passage through the valley, a collection of local roads traced the hills and plains of the Upper Delaware River valley (see Figure 1.9). According to canal maps prepared by John Torrey in 1856-1865, on the New York side a road paralleled the river north of the Delaware Aqueduct to just before the turning basin, where it then turned southeast and tracked across the hillside parallel to the river. Named Minisink Ford Road, a portion of it would later become State Route 97. On the Pennsylvania side, the Torrey maps showed a road passing by the Lackawaxen depot, tracking under the west end of the Delaware Aqueduct between its west abutment and the river bank, and continuing north parallel to the river to a ferry that crossed the Lackawaxen River, which provided access to the Delaware House and other roads to the north. Part of this road would later become Scenic Drive.

The Torrey maps, and other historic maps and photographs from 1849-1898, document new development along the river in Lackawaxen and Minisink Ford, both on and adjacent to D&H Canal Company lands. On lands on the New York side north of the aqueduct, the Canal Company built a 2-story house in 1870-1890 at the jog in the road, joining other houses, barns, and fenced pastures on the steep lower slopes (Figures 1.15, 1.16). In c.1890 another barn was erected next to the inlet of the feeder canal (Figure 1.17).

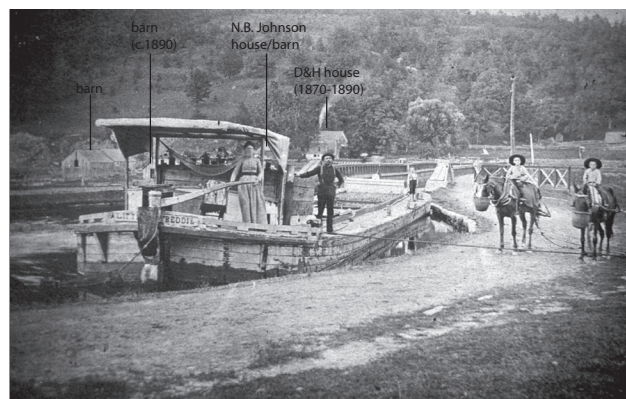


Figure 1.16. View looking northeast from the Pennsylvania side of the Delaware Aqueduct, 1890-1898. On the New York side north of the aqueduct, a barn has been built at the inlet to the original canal. (Wayne County Historical Society, #6974)

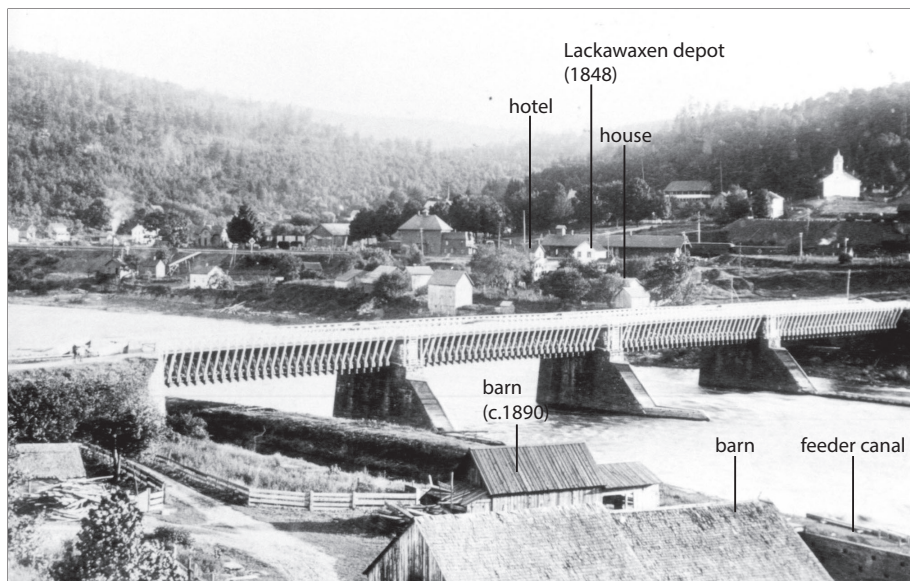


Figure 1.17. View looking southwest from the New York side, 1890-1898. On the New York side, note the barn next to the original canal inlet, fences, and roads. Note: St. Mary's Church on the Pennsylvania side. (Minisink Valley Historical Society, #P-98-8-17; BYU_M556081_F16_I575)

Post and board fences defined pastures and workyards in this area. On lands the south of the aqueduct, the company erected another house opposite Lock 72 in c.1885 (Figure 1.18). Although there are few photographs of this area, several additional buildings and structures lined the canal, while other homes and barns were built on the adjacent hillside alongside Minisink Ford Road (see Figure 1.13).⁴²

On lands on the Pennsylvania side south of the aqueduct, a Canal Company barn was located next to the turning basin,

(now Roebling Inn), located between the river road and the wood truss railroad bridge spanning the canal (Figure 1.20). Surrounded by several large trees, it was one of several such combination office/residences built for local canal administrators, and was enlarged with a kitchen addition in c.1880. Closer to aqueduct, a smaller Canal Company two-story house (now Brown Keller house) was erected within an open field with a few singular trees, including two tall trees near the turning basin (Figure 1.21). By 1875

a new east-west road or path ran along the south side of the office/house, connecting the road/path paralleling the river (now Scenic Drive) to the towpath under the wood truss railroad bridge before turning northwest to parallel the canal. Historic photographs show post and board fencing was erected in front of the office/house, as well as near the smaller house to demarcate a vegetable garden and the edges of a pasture. On non-Canal Company lands between the canal and railroad embankment, there was a c.1850s

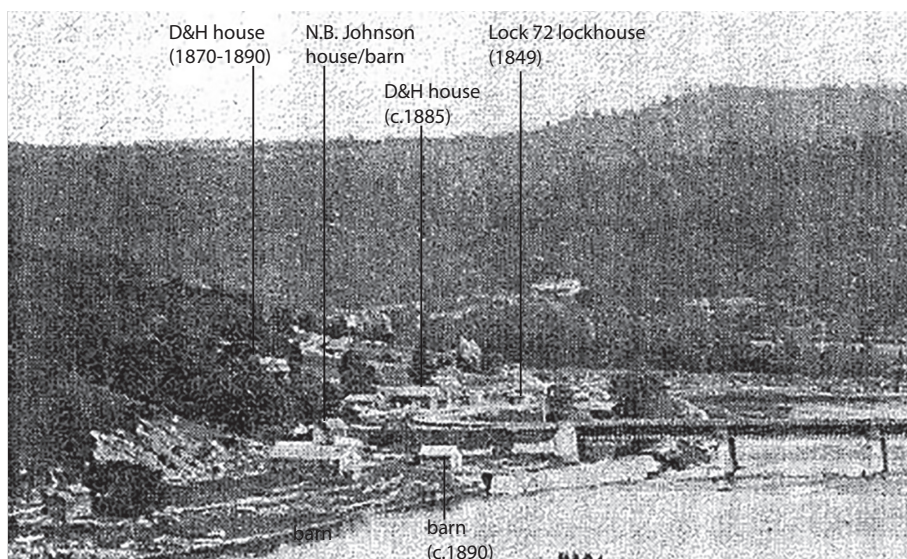


Figure 1.18. Portion of a view looking southeast at the Delaware Aqueduct, 1894-1898. Visible on the New York side are two D&H houses, barns, and other structures. (UPDE Archives)

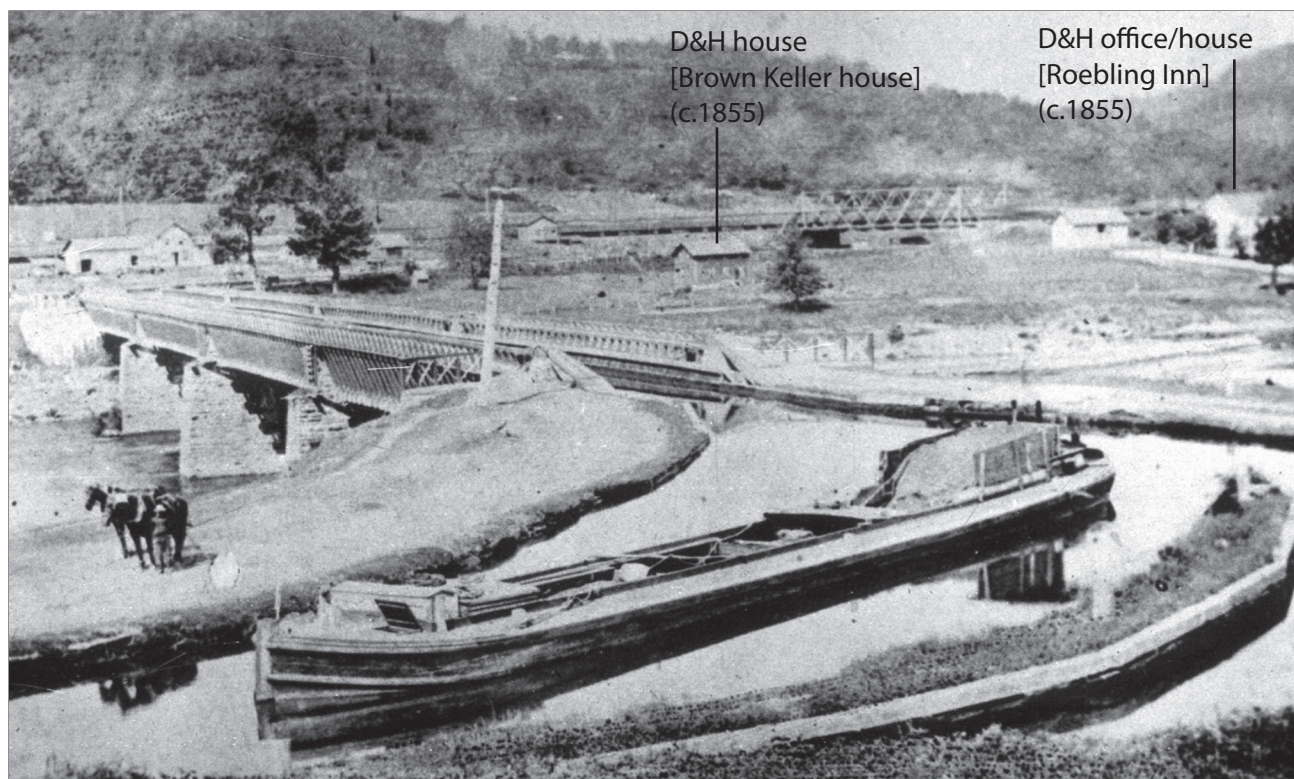


Figure 1.19. View looking southwest from the New York side, c.1890. On the Pennsylvania side north of the aqueduct is the Shannon-Cortright house, while to the south of the aqueduct is a D&H barn next to the turning basin, and Shannon's store. Nearby are other houses, stores, barns, and a hotel. (Minisink Valley Historical Society, #P-98-8-17)

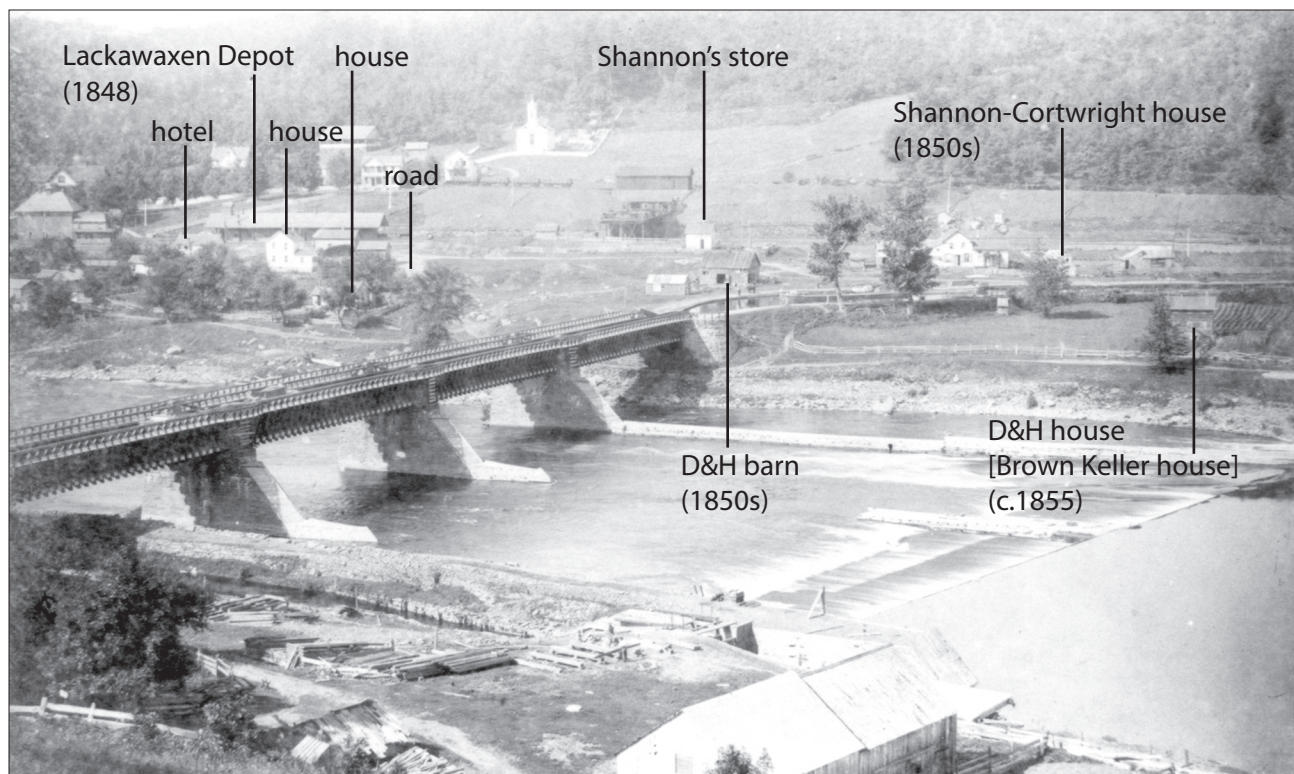


Figure 1.20. View looking northwest from the turning basin on the New York side, 1855-1898. On the Pennsylvania side, north of the aqueduct, fences can be seen around the two D&H houses built in c.1855, and two tall trees mark the canal's turn northwest. In the background at image right is the wood truss railroad bridge spanning the canal. (UPDE website, "Delaware and Hudson Canal" Photo Gallery, Image #30 - Typical Waste Weir)

house owned by Charlie Shannon, who operated a store located to the southwest near the tracks (see Figure 1.19). On Canal Company lands north of the church/cemetery lot, the company built a two-story house and a barn along the Lackawaxen River in the 1870s or 1880s, and beginning in 1892 leased them to Frederick and Mary Holbert (Figures 1.22, 1.23). Post and board fencing marked field edges along the river road (now Scenic Drive) paralleling the Delaware River. By 1894 this road was extended west



Figure 1.21. View looking north at the two trees adjacent to the Pennsylvania side turning basin and towpaths, 1855-1898. To the north is one of the c.1855 canal houses and sections of post and board fencing. (UPDE Archives, PA_dhCanalLackWest)

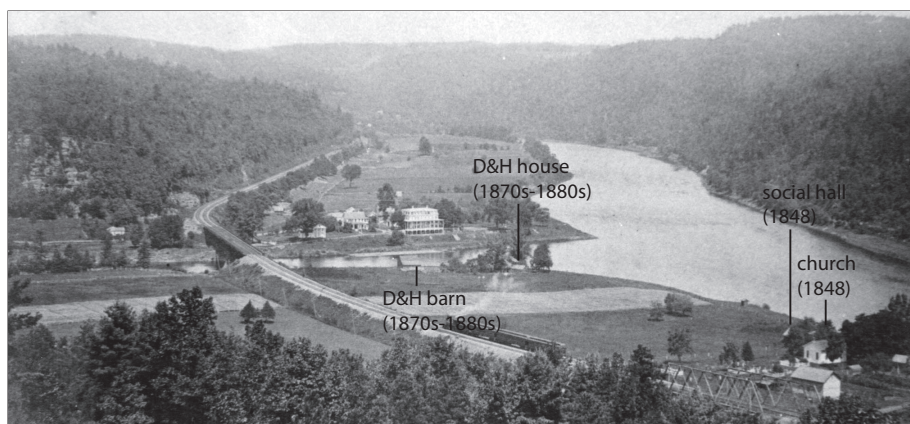


Figure 1.22. View looking north at lands on the Pennsylvania side, north of the church, 1894-1898. A D&H Canal Company house and barn stand along the south bank of the Lackawaxen River, while to the south are the church and social hall. In the foreground at image right, note the wood truss railroad bridge spanning the canal. To the north is an iron truss bridge spanning the Lackawaxen River that replaced the earlier wood truss bridge in 1894. (UPDE Archives, Scan224-MVHS-P98-8-17)

along the Lackawaxen River and under a new iron truss railroad bridge that spanned the river, replacing an earlier wood truss bridge. By now the ferry crossing at the Lackawaxen River was replaced by a seasonal pontoon bridge.⁴³

DECLINE OF THE CANAL

The improvements to the D&H Canal and the arrival of the New York & Erie Railroad spawned 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 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.⁴⁴

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 1875. In the three decades that followed, locomotive weights doubled, with corresponding increases in car capacity and train lengths and decreases in shipping rates.⁴⁵

After this point, the canal system lost its competitive ground to the railroad, as its inherent disadvantages could not be overcome: movement along the canal 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 subdivided and sold off (Figure 1.24).⁴⁶

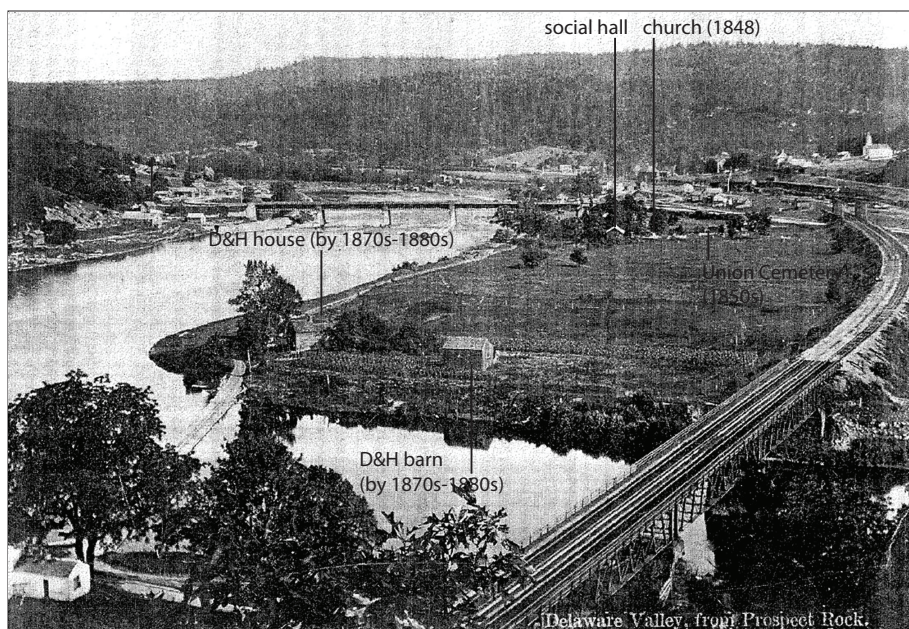


Figure 1.23. View looking southeast from Pulpit Rock at lands north of the Delaware Aqueduct, 1894-1898. On the Pennsylvania side north of the church, social hall, and cemetery are the D&H Canal Company house and barn, fencing, the pontoon ferry, and the road that would become Scenic Drive. (UPDE Archives)

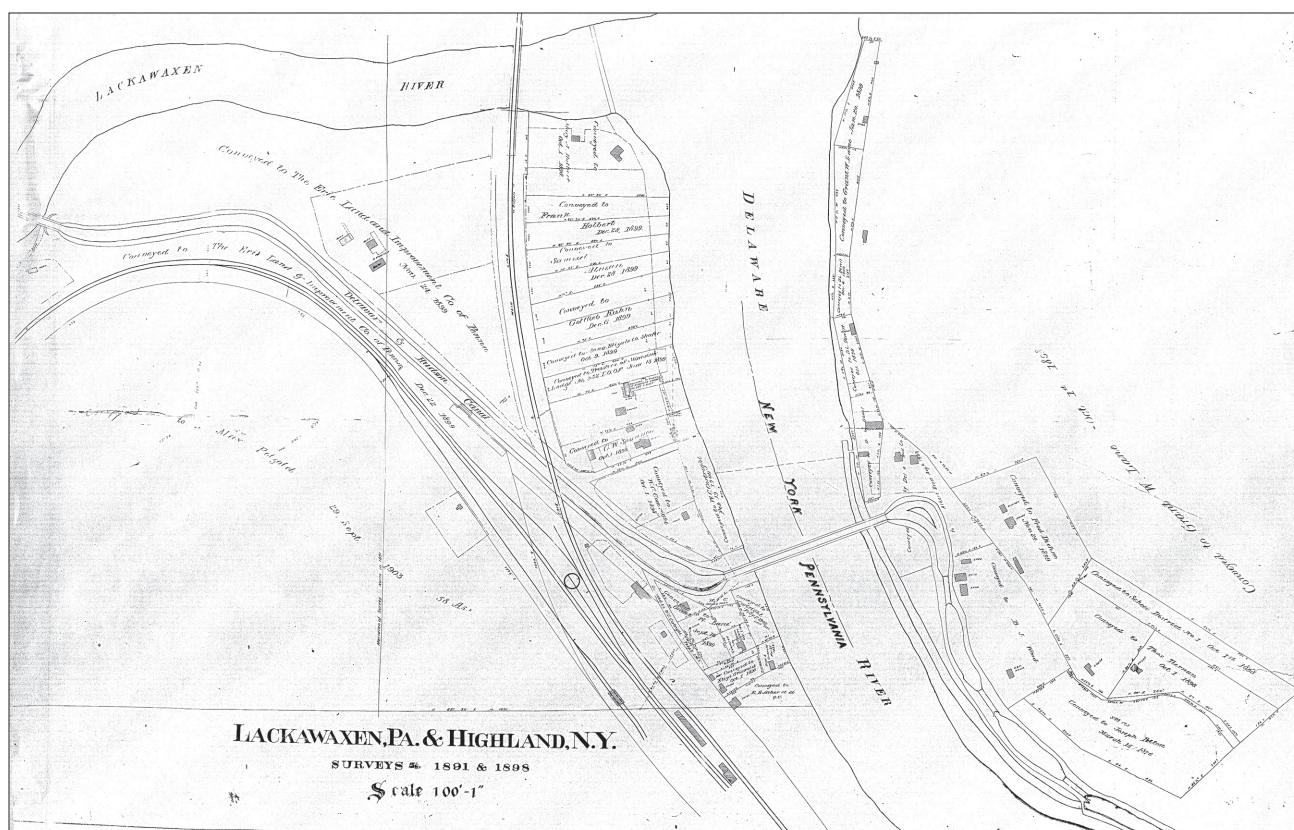


Figure 1.24. Map of the Delaware Aqueduct area in 1898. (UPDE Archives, UPDE-00071, GLK 7 and IV RBR 42, "CANAL COMPANY OWNERSHIP"/NAP_RL02_005)

LANDSCAPE SUMMARY, 1898

Aqueduct

The last year of operation for the Delaware & Hudson Canal Company was 1898. At this time the aqueduct was still watered and featured towpaths on each side that continued around the turning basins on either end of the structure.

Aqueduct Area, New York-North (Drawing 2)

Structures in this steeply sloped area included a D&H house (Rollins-Davis), the N.B. Johnson house/barn just downhill from it, a long barn perpendicular to the river, and a smaller barn at the feeder canal inlet. Fenced pastures and scattered trees surrounded the barns. Four structures stood to the north along the river, one of which was possibly the old rope ferryman's house. Tree density increased up the hill except for clearings around structures. Circulation was on Minisink Ford Road that paralleled the river (now SR 97) and then tracked up the hillside (now Old Minisink Ford Road) to avoid the turning basin.

Aqueduct Area, New York-South (Drawing 3)

This area was active due to the turning basin and three locks. Structures included the D&H house (Nieke), various sized barns and sheds near the canal, and structures controlling the locks themselves. Random trees stood between the new and original canals, but were more prevalent on the hillside to the east except for clearings around buildings. Minisink Ford Road (now Old Minisink Ford Road) tracked on the hill, while towpaths provided access to the riverfront. A towpath bridge south of Lock 70 spanned the outlet of the feeder canal.

Aqueduct Area, Pennsylvania (Drawing 4)

By 1898 development was more prevalent to the south of the aqueduct. A D&H barn stood alongside the turning basin, and next to a rocky vacant lot that was likely used for a pasture or garden. To the south of the lot were several homes, barns, and workshops, as well as the train station, a hotel, and the Cortwright (Sullivan) store. The Canal Company lots were generally treeless, but other lots had

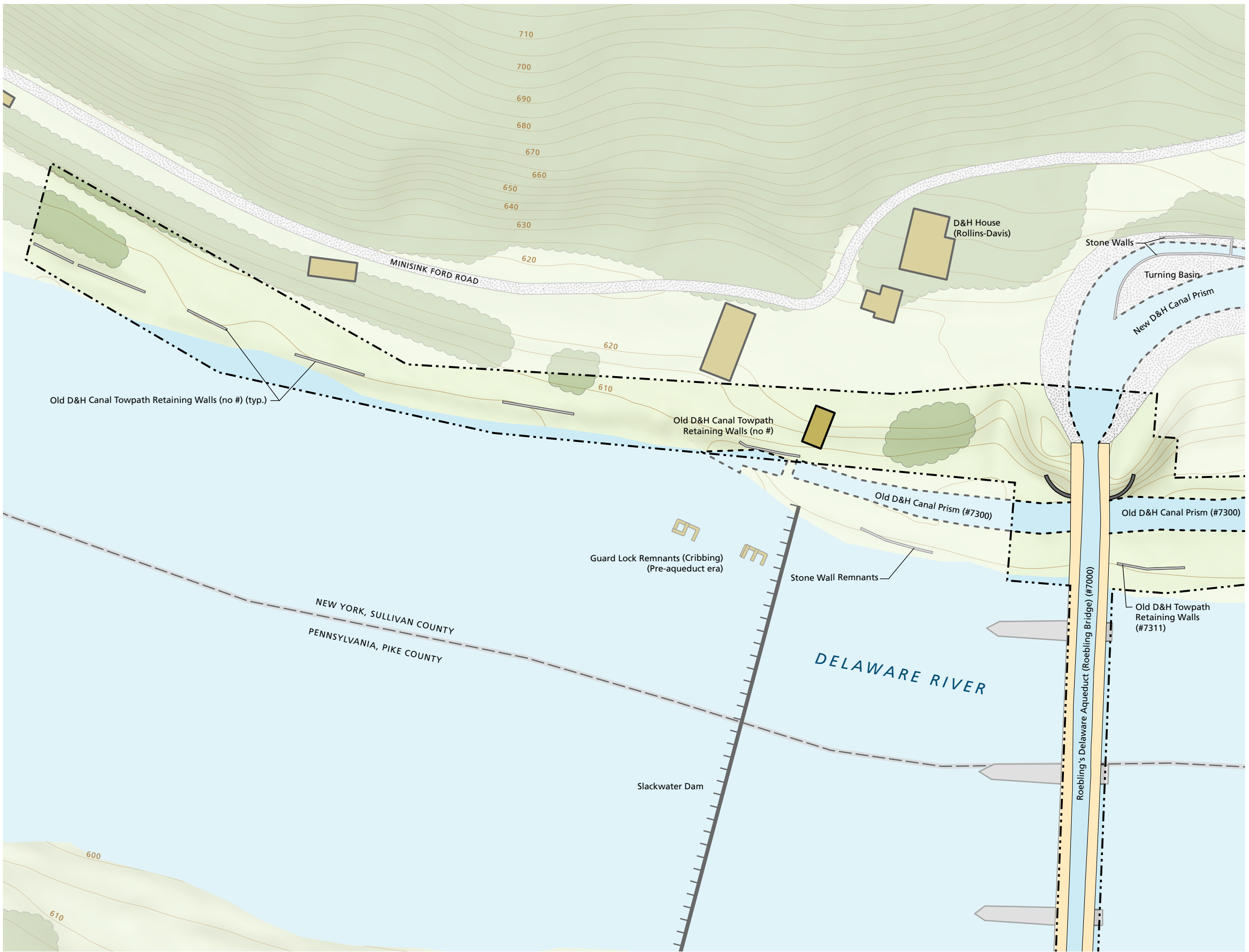
scattered trees. To the north of the aqueduct, the Shannon-Cortwright (Sullivan) house stood on the northwest side of the canal, and a D&H house (Brown Keller) stood northeast of the canal, the latter set within a fenced field with post and board or wire fencing. A garden grew west of the D&H house and trees dotted the field, including two near the turning basin visible in historic photographs. Other circulation features included a north-south road paralleling the river and under the west end of the Delaware Aqueduct, a short road to the buildings south of the aqueduct, and a road connecting the river road to the towpath.

Connection Lots (Drawing 5)

By 1898 this area's most prominent structure was the D&H office/house (Roebbling Inn), built in c.1855 and enlarged in c.1880, along with carriage house just to the north and a barn/shed and fence enclosure to the west. Post and board fencing marked the side (south) lawn and there were scattered shade trees throughout. North of this lot was St. Mark's Church, a social hall, and the Union Cemetery, all set within lawns and scattered mature trees. Fences surrounded some of graves, and post and wire fence ran along its north side. Heading north, the remainder of the area was used for farming and was treeless except for two lone trees in the middle and a small unknown structure along the riverbank. The north-south road alongside the river (Scenic Drive) served as the primary circulation feature.

Zane Grey Area (Drawing 6)

A D&H canal house and barn (both 1870s-1880s), and a shed (1894-1898), were in the northern third of this area, alongside the Lackawaxen River. Post and wire fencing wrapped around the barn and shed and a garden to the west. Trees stood around the house and between the house and barn. The middle and southern thirds of this area were used for agriculture. Circulation was by way of the north-south road (now Scenic Drive) that tracked alongside the Delaware River to the ferry crossing, and then turned east-west along Lackawaxen River (also Scenic Drive). An 1875 map shows this road passing under the railroad's wood trestle bridge and heading northwest and paralleling the canal. Post and board fencing lined portions of this road.



Cultural Landscape Report

Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct New York (North) Detail 1898 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1939
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

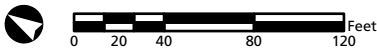
Maryrose Kulick, ArcGIS Pro 2.6, 2021

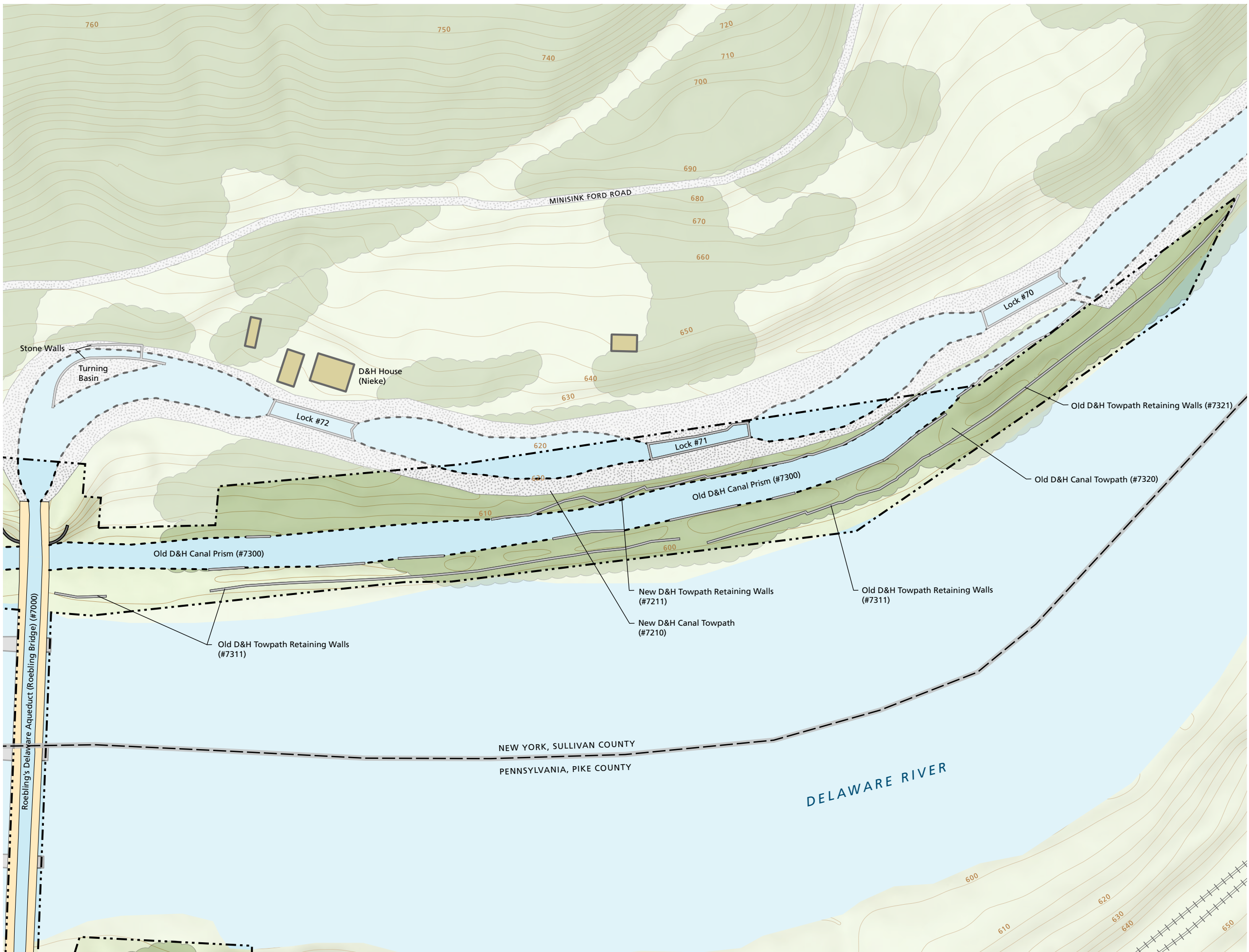
LEGEND

- Canopy
- Earthen/Gravel Surface
- Wood Surface
- Building
- Typ. Stone Wall (unverified)
- Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report

Roebing's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebing's Delaware Aqueduct New York (South) Detail 1898 Period Plan



National Park Service

Olmsted Center for Landscape Preservation

www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1939
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

Maryrose Kulick, ArcGIS Pro 2.6, 2021

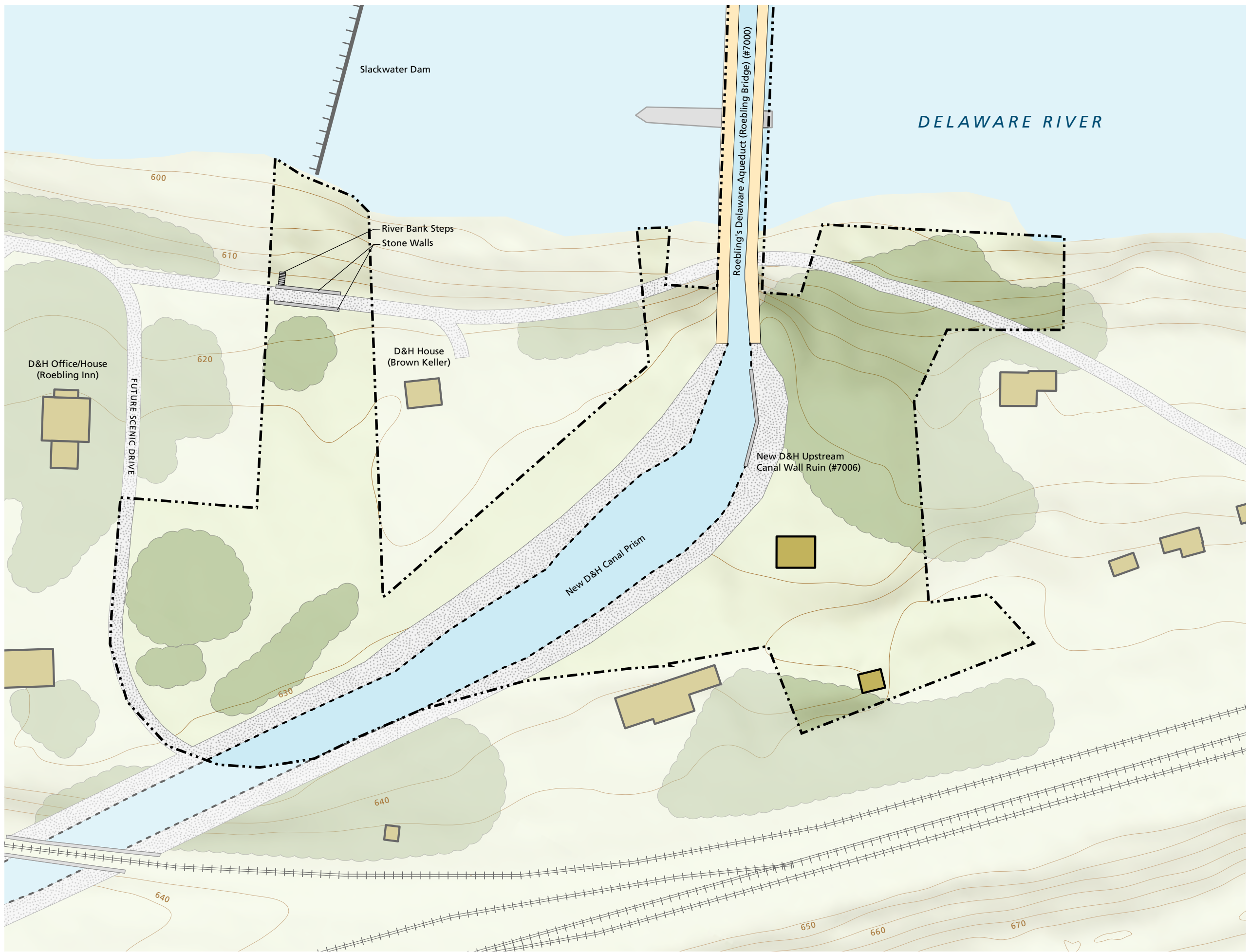
LEGEND

- Canopy
- Earthen/Gravel Surface
- Wood Surface
- Building
- Typ. Stone Wall (unverified)
- Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct
Pennsylvania Detail
1898 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 1939
 3. Site visits, December 2013 and June 2014
 4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

	Canopy		Railroad
	Earthen/Gravel Surface		Future NPS Boundary
	Wood Surface		
	Building		
	Typ. Stone Wall (unverified)		

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



0 20 40 80 120 Feet

Drawing 4



Cultural Landscape Report
Roebeling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Connection Area
1898 Period Plan



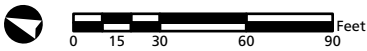
National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES
1. Orthophotography, 1939
2. UPDE GIS Data
3. CLI Data
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

- LEGEND**
- | | | | |
|--|------------------------------|--|---------------------|
| | Canopy | | Parcel Boundary |
| | Earthen/Gravel Surface | | Future NPS Boundary |
| | Building | | |
| | Railroad | | |
| | Typ. Stone Wall (unverified) | | |

NOTES
1. Projection: NAD 83 UTM Zone 18N, US Survey Feet
2. Contour Interval = 10'
3. All features shown in approximate scale and location





Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Zane Grey Property
1898 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 1939
 3. Site visits, December 2013 and June 2014
 4. 1999 Cultural Landscape Treatment Plan

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

- LEGEND**
- Canopy
 - Earthen/Gravel Surface
 - Building
 - Railroad
 - Future NPS Boundary

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



REDEVELOPMENT OF CANAL COMPANY LANDS AND THE ZANE GREY PROPERTY, 1898-1929

REPURPOSING ROEBLING'S DELAWARE AQUEDUCT

In June 1899 the Delaware Aqueduct was purchased by the Cornell Steamboat Company, which explored several railroad uses for the abandoned 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 dewatered 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. By 1906 the Erie Railway's replaced the wood truss bridge spanning the canal on the Pennsylvania side with an earthen embankment, which physically blocked the canal route and effectively ended plans to convert it into a rail line. However, remnants of the canal bed and towpaths remained on either side of the embankment for many years.⁴⁷

Charles Spruks Ownership.

In May 1908, the 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 old aqueduct to transport logs from his timber lands in Sullivan County, New York to the rail junction in Lackawaxen. 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 1.25). 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 across the roadway was installed next to the toll house. Spruks eventually removed the aqueduct's towpaths and reused part of the towpath fence as a railing along the

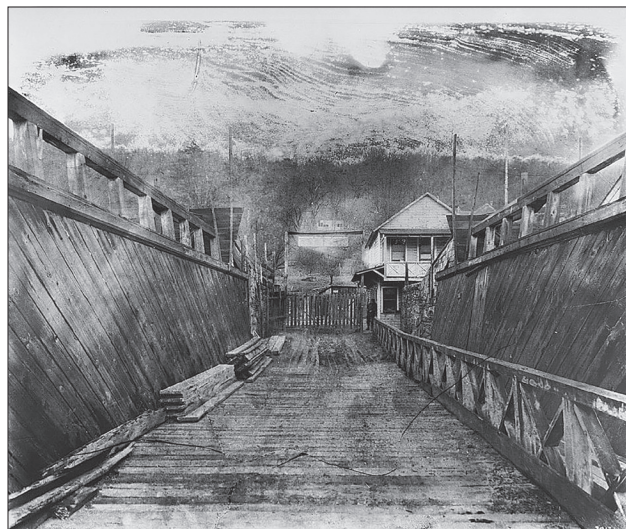


Figure 1.25. View looking east from inside the dewatered Delaware Aqueduct, c.1910. The toll house and gate were built in 1908. The fence at image right separated pedestrian traffic from vehicular traffic. (Historic American Engineering Record, HAER NY-203, 2001, #140696pv)

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 aqueduct/bridge.⁴⁸

New Roads

The canal turning basins that connected to each end of the Delaware Aqueduct/Bridge were repurposed to serve as vehicular approaches. However, some of their towpaths and stone retaining walls were removed to connect the approaches to the adjacent existing roads. On the New York side, the approach connected to Minisink Ford Road, a portion of which was rerouted westward to track directly across the former turning basin (Figures 1.26, 1.27). On the Pennsylvania side, the approach connected to a new road that linked to the existing road in front of the D&H office/house (Figure 1.28). The new road crossed the empty canal and utilized a portion of the towpath, further filling in the original canal bed. This route hereafter became part of Scenic Drive, and replaced the section of the north-south road that passed under the west abutment of the aqueduct/bridge. A US Geological Survey (USGS) map from 1913 confirms the layout of the New York and Pennsylvania roads, with the former aqueduct and approach roads connecting Minisink Ford Road and Scenic

Drive, respectively (Figure 1.29). By 1913 there was also a new vehicular bridge across the Lackawaxen River, located just west of the Erie Railway's iron trestle. This bridge would become the eastern terminus of State Route PA 590, ending as a T-intersection with Scenic Drive on the south side of the Lackawaxen River. The 1913 map and historic photographs also confirm several new buildings near the dewatered canal, as well as the absence of others.⁴⁹



Figure 1.26. View looking southwest at the turning basin (far image left) and toll house on the New York side, 1923. The toll house was built in 1908 and a shed was added to it in the early 1920s. Note the reuse of the towpath fences at image right and left. (Delaware and Hudson Railway Company, New York State Library)

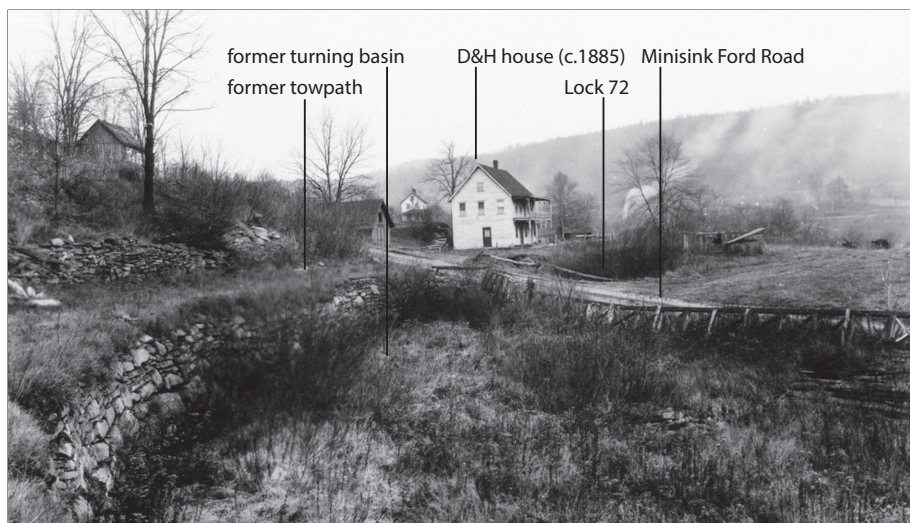


Figure 1.27. View looking south at Minisink Ford Road passing through the former turning basin on the New York side, 1923. Walls associated with the turning basin and towpath are at image left. (Minisink Valley Historical Society, #P-82-8-5)

NEW DEVELOPMENTS ON THE NEW YORK SIDE OF THE AQUEDUCT/BRIDGE

On the New York side, the former D&H Canal Company lands just north of the old aqueduct were sold to D.L. De-wit and Albert Ernst between 1898 and 1903. The entrance of the old feeder canal north of the aqueduct/bridge was filled in and the barn and fencing next to the gate were removed (Figure 1.30). This was likely done to prevent water from entering the abandoned channel. The re-

routed Minisink Ford Road now passed through this area. More significant changes occurred on the lands to the south of the aqueduct/bridge, which were sold to Albert Ernst and B.J. Wood around 1903. By 1908 the three-story Highland Bridge Hotel and a detached garage/barn were built next to the toll house (see Figure 1.28). The building featured covered porches overlooking the river, and by 1921 there was a path or patio leading to the still intact feeder canal and a flagpole between it and the toll house (Figure 1.31). Just to the south in the vicinity of former Lock 72 and opposite the D&H house was a substantially larger two- to three-story building. Presumably built for industrial purposes, this building covered the lock until it was removed by 1930 (Figure 1.32). Despite the amount of new construction in this area, the stone and timber remains of the canal and Locks 71 and 70 to the south were still intact (Figure 1.33).⁵⁰

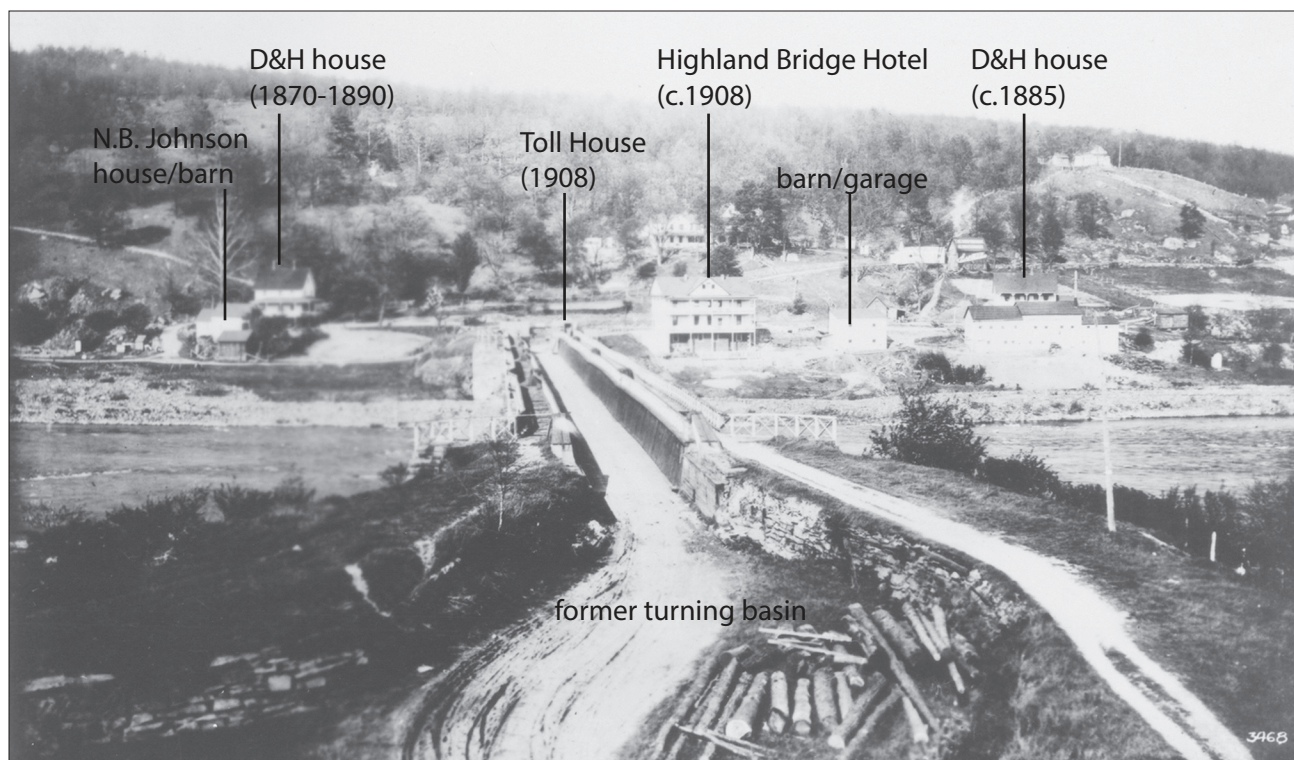


Figure 1.28. View looking east at the former turning basin on the Pennsylvania side, after 1908. (Minisink Valley Historical Society, P-82-8-28/Delaware and Hudson Railway Company, New York State Library/Canal Society of New York State negative 10339C)

NEW DEVELOPMENTS ON THE PENNSYLVANIA SIDE, SOUTH OF AQUEDUCT/BRIDGE

On the Pennsylvania side of the Delaware River, the D&H Canal Company lands just south of the old aqueduct were divided into multiple irregular-shaped lots and sold to William Cortright, Eliza Griswold, Grant W. Lane, and Theresa Gillette between 1898 and 1903 (see Figure 1.24). In c.1898 Charles Cortright built a two-story, hipped roof store on his narrow lot that abutted Scenic Drive (see Figure 1.32). Between this building and an existing small house down the hill (east) on the Gillette lot was a one-story barn/shed. A rough road extended down the hill from Scenic Drive to access the house and barn/shed (Figure 1.34). A photograph shows a large addition was built on the north end of the store by 1923 and that the D&H barn adjacent to the towpath and the Sullivan store was gone (see Figure 1.26). The area between the Cortright store and small house, and the old towpath, was fenced and was likely still used as a pasture.⁵¹

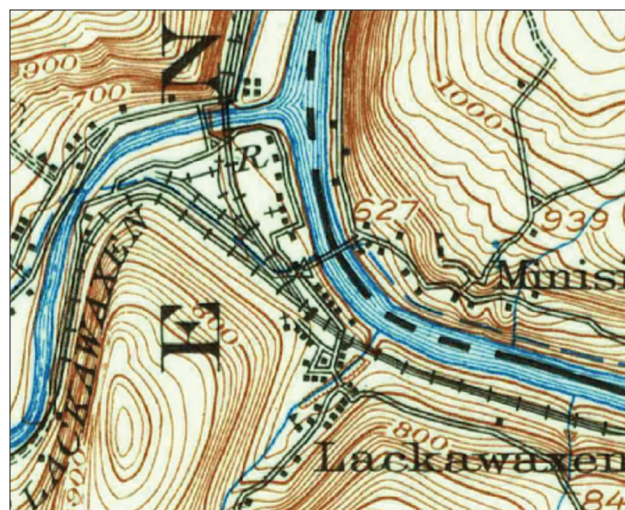


Figure 1.29. USGS map from 1913. (UPDE Archives, PA, Miford_130569_1913_62500_geo)

NEW DEVELOPMENTS ON THE PENNSYLVANIA SIDE, NORTH OF AQUEDUCT/BRIDGE

Margold House, Brown Keller House, Cortright House

On the Pennsylvania side of the Delaware River, the triangular-shaped area just north of the old aqueduct was divided into three lots and sold to Charles W. Cortright

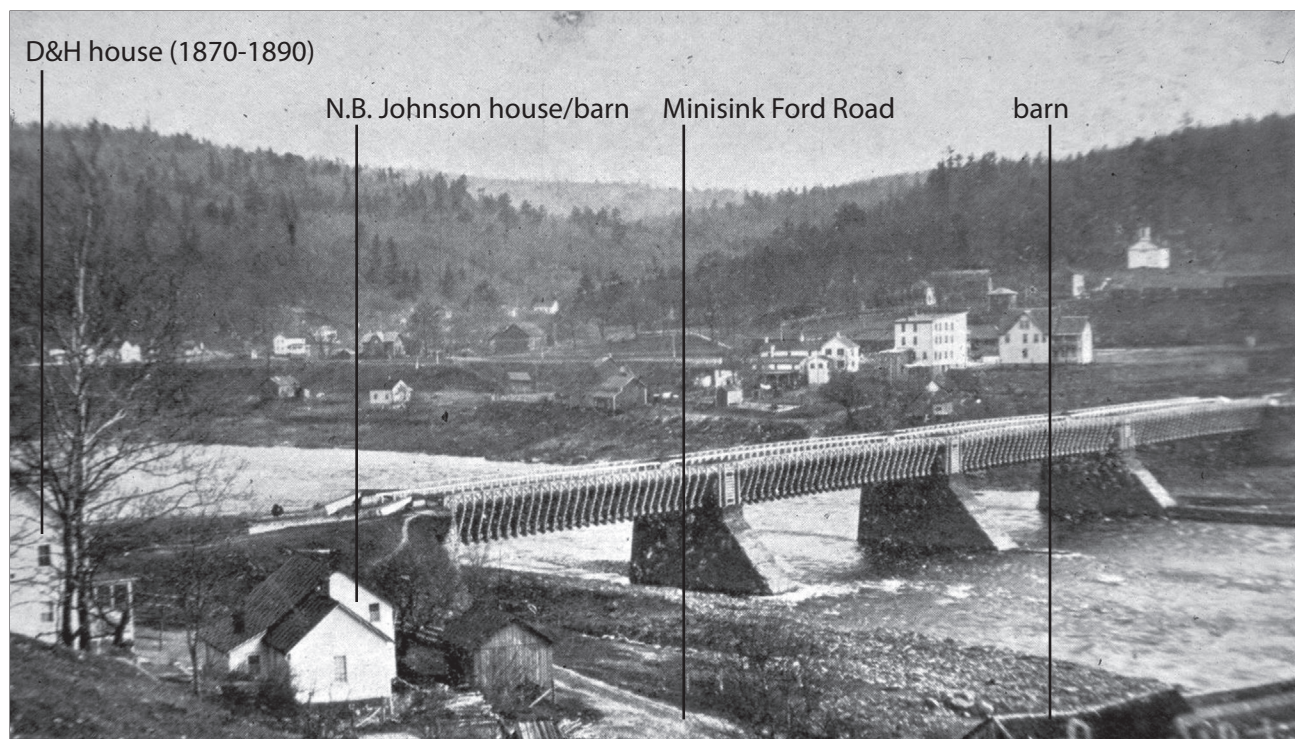


Figure 1.30. View looking southwest at lands on the New York side, north of the aqueduct/bridge, 1898-1923. Note the feeder canal has been filled in and the barn and fencing that stood next to its gate are gone. (UPDE Archives, NY_Roebling Aqueduct - aerial)



Figure 1.31. View looking southeast at lands on the New York side, south of the aqueduct, 1921. The hotel, barn/garage, and likely an industrial building crowd the hill above the old feeder canal and towpath. (UPDE Archives, 1921_minisinkford-300x184)

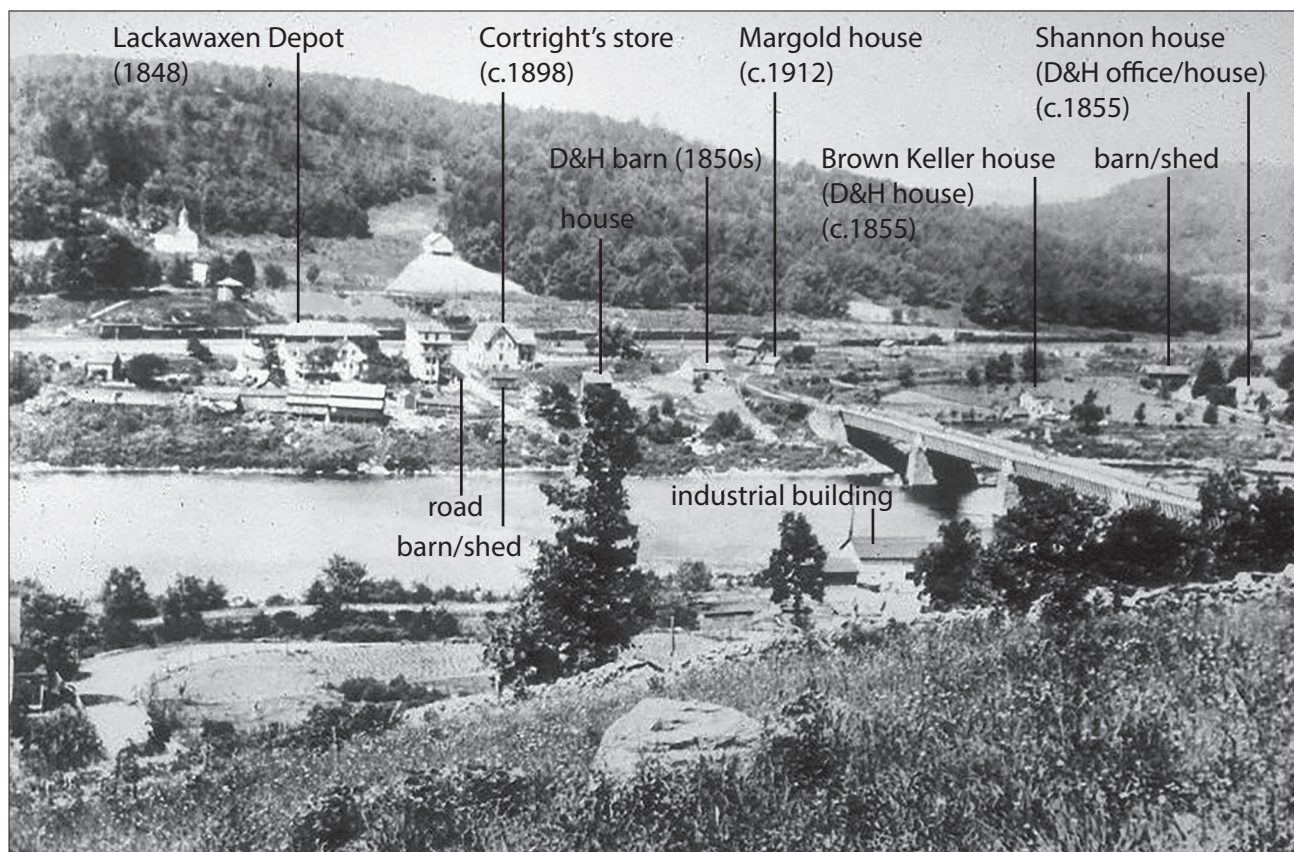


Figure 1.32. View looking northwest from the New York side, 1898-1913. On the Pennsylvania side south of the aqueduct/bridge. (UPDE Archives, NY_Historic Pic of Aqueduct)



Figure 1.33. View looking northwest at Lock 71 in 1923. (Minisink Valley Historical Society, #P-82-8-6)

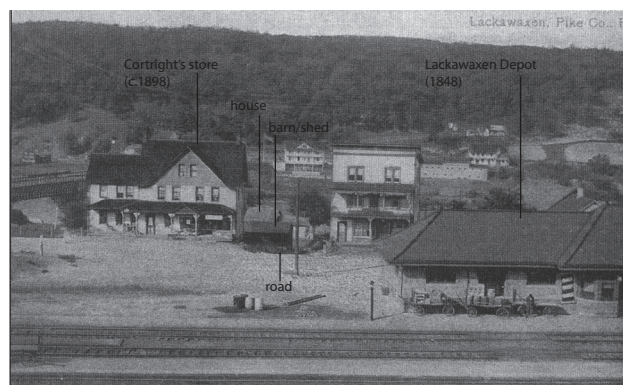


Figure 1.34. View looking east at the Cortright store and road leading down to the barn/shed and a small house, 1908-1921. (UPDE Archives, PA_Erie Train Station - Lackawaxen, PA)

in 1898 and 1899 (see Figure 1.24). Significant changes in this area began in c.1912 when Charles W. Shannon built a two-story wood frame house (Margold house) at the intersection of the approach road and the rerouted Scenic Drive (Figure 1.35). The house was built on or adjacent to the former canal towpath and just south of the site of the smaller 1850s era Shannon house. Sometime after c.1915 a detached garage and shed were built just to the north of the house. The house lot was fenced and included walks and several young trees, as well as a stone retaining wall on the south side of the house that separated the property from the adjacent approach road. Around the same time, a one-story addition was added to the west side of the former D&H house (Brown Keller house) located just north of the canal, as well as a detached garage to the southeast. Lastly, a larger two-story frame house (Cortright house) was built in c.1915 between the D&H house and the former D&H office/house (now Roebling Inn). A c.1915 photograph shows an earthen path within a V-shaped breach in the north towpath, possibly to allow access into the empty canal bed (see Figure 1.35).⁵²

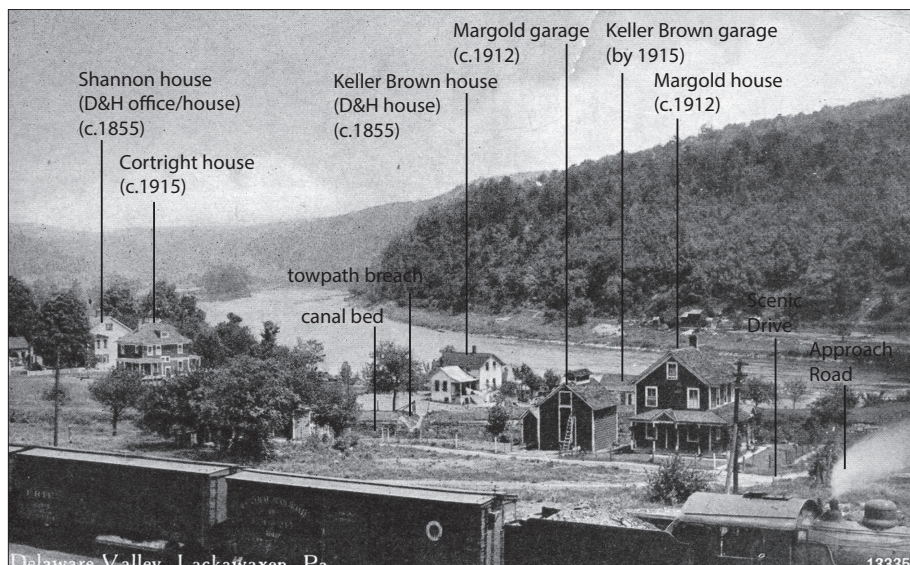


Figure 1.35. View looking northeast at lands on the Pennsylvania side north of the former aqueduct, after 1915. The Margold house is likely next to or on top of the south towpath. The north towpath is intact except for a v-shaped breach. Visible in the background is the addition of the Brown Keller house, a detached garage, and the Cortright house. (UPDE Archives, Historic Lackawaxen, Scan 435)

Roebling Inn, Church/Cemeteries, Social Hall, Shaffer Lot, Kuhn Lot

Just north of the rerouted Scenic Drive, Charles W. Shannon purchased the former D&H office/house in 1898. Shannon used it as a residence as well as a boarding house, which according to a 1905 Erie Railway guide could accommodate 20 guests. The property also included the carriage house along the north property line and a barn/shed to the west near the tracks (see Figures 1.32 and 1.35). Shannon's son Walter practiced medicine in Lackawaxen in c.1915-1925 and lived in the house, and during that period built a small one-story building immediately to the rear of the house for use as an office. Historic photographs show gardens west of the house, bluestone walks along Scenic Drive, and numerous shade trees. Shannon's lot was one of several long and narrow one to three acre lots that D&H Canal Company laid out in the former Lacoste lands.⁵³

North of the Shannon lot was the existing Union Cemetery and St. Mark's Church lot, and to the north of that was an irregular-shaped lot acquired by the Odd Fellows in 1899.

In 1915 the Lackawaxen Cemetery was established in the Odd Fellows lot. The Lackawaxen Cemetery was purchased by local residents, and unlike the earlier Union Cemetery, was not associated with the church. Over time the cemetery would extend the length of the lot from the railroad embankment to Scenic Drive. No detailed photographs have been found of the church, cemeteries, and social hall area, but it does appear in the background of several historic photographs, which indicate numerous shade trees, especially on the east half of these parcels (Figures 1.36, 1.37).⁵⁴

On three one-acre lots north of the social hall – one conveyed to Anna Shaffer and two to Gottlieb

Kuhn in 1899 – two structures were built. A 1.5-2-story building, either a house or barn, was located in the middle of the Shaffer lot by c.1906 (see Figure 1.37). By 1914, a two-story house (Kuhn house) was situated on the north half of the Kuhn lot, close to the river (Figure 1.38). A historic postcard from 1914 suggests orchards may have been laid out west of the Shaffer building and east of the Kuhn house.⁵⁵

Alman/Kuhn/Shannon Lots and Holbert Farm

Continuing north, a two-acre double lot north of the Kuhn property was acquired by Samuel Alman in 1899, but between from that time to 1916 the lot was apparently owned by Gottlieb Kuhn and then Charles Shannon. Historic photographs show it as a field with no buildings or structures (see Figures 1.36, 1.37, 1.38).

At the confluence of the Delaware and Lackawaxen rivers, the D&H Canal Company sold a three-acre parcel to Mary Holbert in 1898, which included the former D&H house and barn the Holberts had been leasing since 1892. In 1899 Frank Holbert acquired an adjacent two-acre double lot to the south (see Figure 1.24). Mary and Frank's parcels came to be known as Parcels A and B, respectively. From this time until around 1902, the Holberts renovated and painted the existing house and

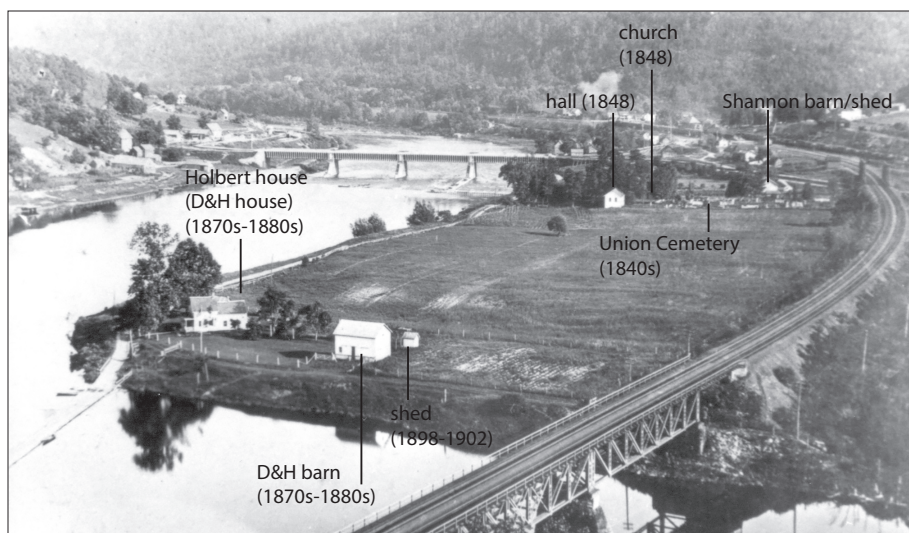


Figure 1.36. View looking southeast from Pulpit Rock, 1898-c.1902. North of the church, hall, and cemetery are the former Canal Company house and barn, owned and improved by the Holberts. Note the new shed and the vegetable garden west of the barn. (UPDE Archives, Scan230)

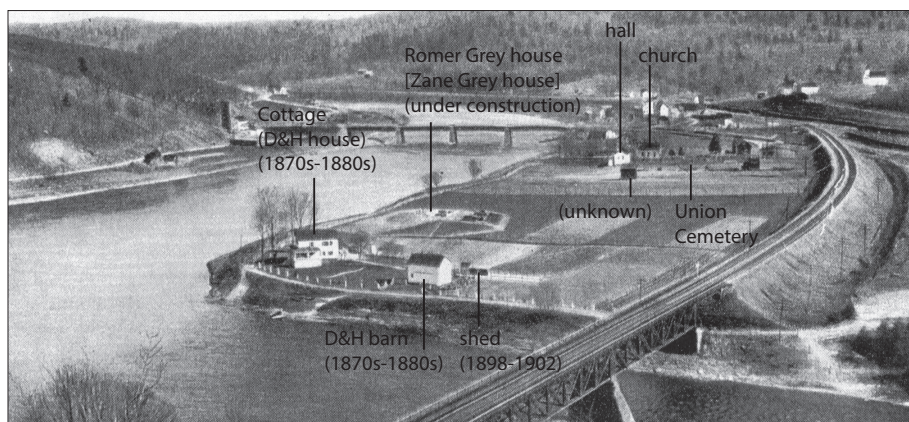


Figure 1.37. View looking southeast from Pulpit Rock, c.1906. This photograph shows the enlarged D&H house, now owned by Zane Grey and called "The Cottage," and construction beginning on the Romer Grey house to the south.

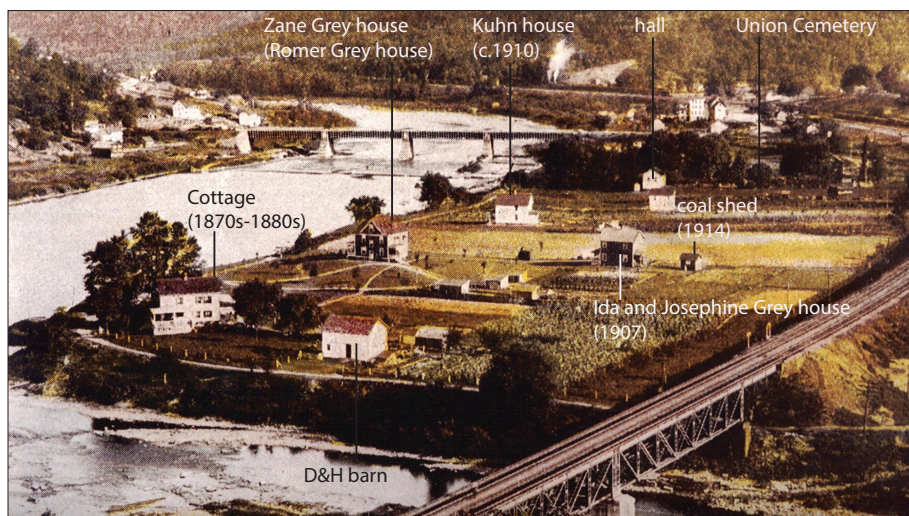


Figure 1.38. View looking southeast from Pulpit Rock, 1914. The completed Romer Grey house, later the Zane Grey house, and the Ida and Josephine Grey house to the west.

barn and added a shed southwest of the barn (see Figure 1.36). Fence locations were also changed under the Holberts tenure. A north-south post and rail fence ran along the west side of Scenic Drive and continued towards properties further south. A post and wire fence extended along the south boundary of Parcel B, and another post and wire fence ran along the west side, which separated the agricultural fields and pastures from a path that ran between the fields and railroad embankment. The open character of the landscape and the fence posts indicate the continued agricultural use of the land. Research has revealed that locals remembered this area as Holbert's Flats, and recalled the Holberts' various agricultural activities. The Holbert farm and Alman/Kuhn lot would soon become the home of the valley's most famous resident, Zane Grey.⁵⁶

GREY FAMILY LANDS

Pearl Zane Grey was born in Zanesville, Ohio on January 31, 1872, and from an early age was interested in fishing, baseball, and writing. These pursuits all played a role in his career and life interests, first landing him a baseball scholarship from the University of Pennsylvania's Dental Department. Zane graduated in 1896 with a degree in dentistry and established his own dental practice in New York City, but chose to play amateur baseball for several seasons, practicing dentistry intermittently. Grey also spent time fishing and hunting with his brother Romer, particularly in the hills of northeastern Pennsylvania, exploring what they considered at the time "really wild country." Grey first visited the Lackawaxen area in 1899, and later in his memoirs, idealized its rugged landscape as "the picturesque mountainous region where the forests abounded with game and the stream with fish."⁵⁷

On one of the trips to Lackawaxen in 1900, Zane met Lina Elise Roth ("Dolly") while canoeing near the Delaware House. Dolly would later become his wife and support him in his attempts to become a successful writer. Grey first published an article in *Recreation* magazine in May 1902 called, "A Day on the Delaware," and in 1903 published his first novel, *Betty Zane*. In November 1905, Dolly and Zane married and he left his dentistry practice to settle

in Lackawaxen in the spring of 1906 to pursue writing full-time.⁵⁸

In the year before his marriage, in September 1904, Zane Grey had purchased the northern three acres of the Holbert farm for \$1,425 (Parcel A). The lot included the two-story D&H house, which was called the "Cottage," the old D&H barn, and the shed. The area's scenic qualities, undeveloped wilderness, and numerous recreational opportunities also attracted Romer and his wife Reba Smith to this riverside site, and in 1905 they acquired the southern two acres of the Holbert farm adjacent to Zane's property (Parcel B) for \$325.39. Together, the brothers aimed to develop a "family retreat from urban life," and made plans to settle three generations of their close-knit family together on the land. They planned to build a cluster of separate houses for Zane and Dolly, Romer and Reba, and Josephine and Ida Grey (Zane Grey's mother and sister).⁵⁹

Zane Grey and the Cottage

In the spring 1906, Zane and Dolly began living in the Cottage, and as shown in several historic photographs expanded the second floor of the house (Figure 1.39). The Greys also built several other structures on their property, including a small unheated cabin variously called the "Lodge" or "Bungalow" southeast of the Cottage where Zane wrote during the summer months (Figure 1.40). In February 1908 Zane described a winter flood in his diary, telling of "huge cakes of ice floating, bumping into the bungalow." An ice house was built southwest of the Cottage along the property line, and a cat house for the family's many Persians was erected somewhere near the old canal barn.⁶⁰

Romer and Reba began construction of their house on Parcel B in 1906, which would later be known as the Zane Grey house (see Figure 1.38). Featuring a four-square plan with a hipped pyramid roof, its style was referred to as "American Foursquare," an American vernacular style of architecture common in the first quarter of the twentieth century. The two-and-one-half-story building faced the Delaware River and was sited on the edge of a slight knoll. Its elevated position dominated the Grey family lands, earning its nickname, "Big House." In 1907 Zane and

Romer built a 2-story house west of the Big House for their mother Josephine and sister Ida (see Figure 1.38).⁶¹

Profits from his books enabled Zane to improve and expand his Lackawaxen residency to accommodate his growing family. In 1911, following the positive commercial response to *The Heritage of the Desert*, Zane and Dolly purchased 446 acres of land on the New York side of the Delaware River, opposite the family compound, that included open land for fishing and hunting and a one-half interest in a bluestone quarry. Around this time Romer began spending less time in Lackawaxen, as he and Reba owned a second house in Middletown, New York, near the eldest Grey brother, Ellsworth. In 1913 they sold the Ida and Josephine Grey house and the western third of Parcel B to friends Charles and Mary Smith and their two daughters. Smith served as a caretaker for the property, particularly when the Greys were away in New York, and his improvements included the construction of a coal house just to the west of his home in 1914 (see Figure 1.38). Zane and Dolly also purchased a house in Middletown in early 1913 where they wintered, but they remained at Lackawaxen for the majority of the year. In June 1914, shortly before the birth of Zane's third child, Romer deeded the Big House and the middle and eastern thirds of Parcel B to Zane for \$1.00.⁶²



Figure 1.39. View looking southeast at the Cottage, 1906. Construction of a second floor addition is underway on the former Holbert farmhouse, but the porch has not yet been built (see Figure 1.18). Pictured are Zane Grey, his wife Lina (Dolly,) mother Alice Josephine (in the back), and sister Ida. (Courtesy Ohio Historical Society, P49-5-2-1)

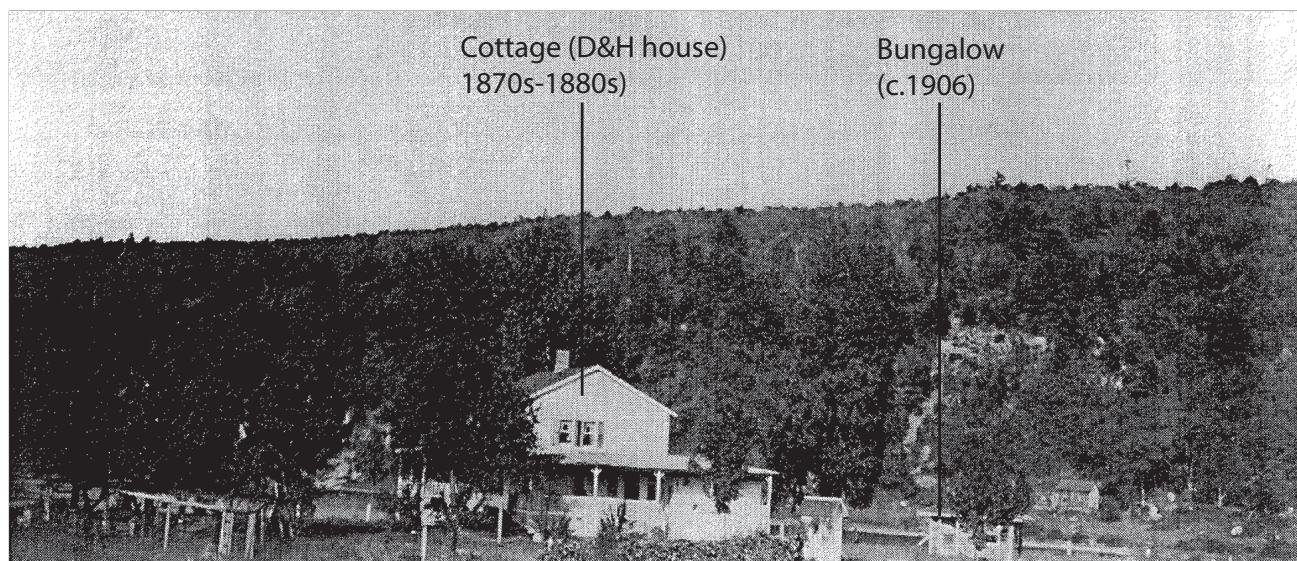


Figure 1.40. Zane Grey Cottage, outhouse, and Lodge. Note grapevine support fence in front of house, medium-sized deciduous trees, and fence posts, circa 1907-1914. (Courtesy Ohio Historical Society, from CLPT 1999: 14)



Figure 1.41. View looking northwest at the “Big House,” c.1916-18, after north additions were built. Note the vegetable garden plot in foreground, front walk shrubs, and vines on the porch. (Courtesy Ohio Historical Society, from CLPT 1999: 21; Hawley Public Library, #1604)

Views of the Grey family compound dating to 1914 show the three main residences and some of the new features added in the landscape (see Figure 1.38). By this time there was a large garden and small garden shed on the west side of Parcel A, a tennis court and coal shed on the west side of Parcel B, a smaller garden north of the Ida and Josephine Grey (Smith) house, a collection of small outbuildings and the ice house northeast of the Smith house and northwest of the Big House, and an outhouse between the Smith house and the Big House. Photographs indicate several paths surrounded the Big House, including a bluestone

walk from the front door eastward to Scenic Drive and from the rear of the house northward to the Cottage. Another bluestone walk ran from the south side of the Big House to the outhouse and the Smith house, roughly following the property line between Parcels B and C. This walk continued west to a footpath paralleling the railroad embankment, which led south to the railroad depot and north to the floating bridge and Delaware House. The bluestone paths were likely built between 1906 and 1914, and some may have been constructed with bluestone from the quarry.⁶³

Zane Grey and the Big House

With acquisition of the Big House in 1914, Zane and Dolly enlarged the home to the northeast, completing a first-floor study and second-floor bedroom and sleeping porch in 1915, by which time Zane and Dolly’s family had grown to three children (Romer b. 1909, Betty b. 1912, and Loren b. 1915). In 1916 the Greys again expanded the Big House, this time to the northwest, transforming what had become an ell-shaped house plan into a single large rectangular plan. The northwest addition contained a filing room and pantry on the first floor and a new bedroom, bath, and sleeping porch on the second floor (Dolly occupied the

1914 bedroom, which connected to the children’s rooms) (Figure 1.41). Gottlieb Kuhn, Grey’s neighbor to the south, was a contractor for the Greys and helped with the construction of the Big House additions. The Greys also demolished their old home, the Cottage, replacing it with another building with a kitchen ell on the same foundation (also called the Cottage) in 1914 to serve as a summer residence for Zane’s many secretaries who typed his draft manuscripts (Figure 1.42).⁶⁴

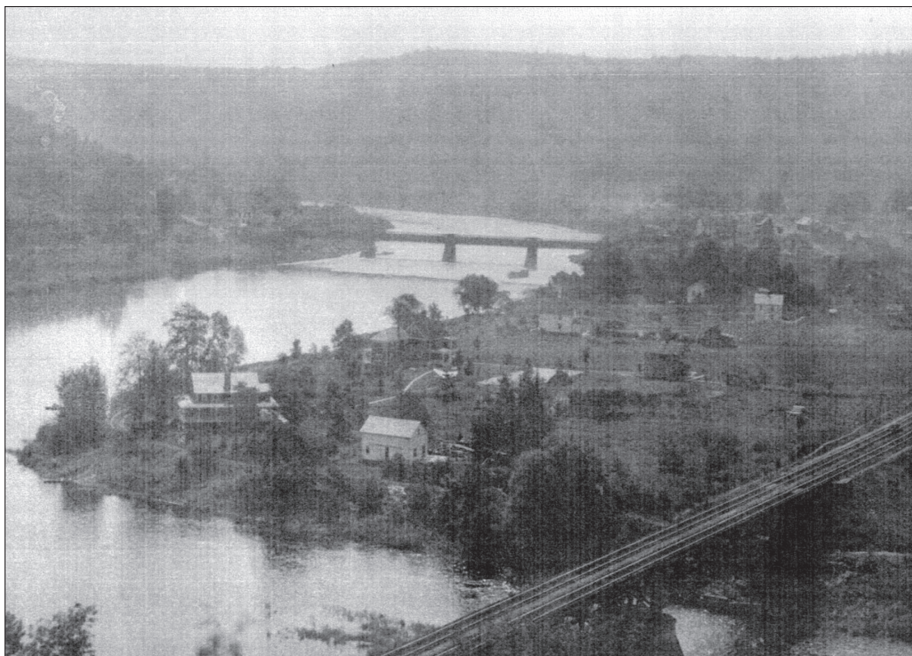


Figure 1.42. View from Prospect Rock, c.1918, showing the rebuilt Cottage (image left). (Historic Structures Report [HSR], Alice Josephine Grey House, Barn & Accessory Buildings, Zane Grey Family Compound, 2012: 8)

The additions to the Big House undertaken by Zane Grey provided him with a spacious heated

study for his writing. Although he kept a small office on the first floor of the rebuilt Cottage, he primarily wrote in his new office/study located conveniently in the main house. Grey's influence on the design of the space in the house is evident in the built-in bookshelves and floor-to-ceiling cabinets and drawers in the adjacent filing room. He also incorporated decorative elements inspired by his success as an author of Westerns. Dolly's cousin Lillian Wilhelm created friezes for the walls of his study that reference his primary subject matter, the American West. Zane's former writing studio, The Lodge, was apparently abandoned in favor of these improvements.⁶⁵

The Greys built a barn to the north of the Ida and Josephine Grey (Smith) house in 1915, which was accessed from Scenic Drive by a driveway, an early form of which may have existed earlier. The following year, a corral was set out southwest of barn, around the site of the tennis court. A new red clay tennis court and two small equipment sheds were then built between the Big House and the Smith house (see Figure 1.42). To the south of the Big House a children's playhouse was installed in the lawn, which likely coincided with the Grey's purchase of a two-acre double lot of open land (Parcel C) from Charles Shannon in September 1916. The Greys planted the parcel with apple and pear trees at the west end and a vegetable garden with corn, asparagus, and other vegetables at the east end, separated by a pasture in the middle that was set aside for the cow that lived on the property (see Figure 1.41). The land purchase increased the size of the Grey family compound to around 6.5-7 acres.⁶⁶

The orchard and vegetable garden on Parcel C were one of several such features located on the grounds of the compound. Apple and pear trees also grew in the northwest portion of Parcel A, and there were two older cultivated gardens: a plot north of the Ida and Josephine Grey (Smith) house that grew cabbage and other vegetables, and an even larger plot on the west side of Parcel A that contained grape arbors, vegetables, and a berry patch.⁶⁷

Ever since he purchased the property, Zane also made efforts to transform the open character of the former Holbert farm into a landscape filled with trees and gardens. In a



Figure 1.43. View looking south at Charles Smith canoeing during a flood, between 1906-1915. The "Big House" is at right, prior to its expansion. Note the two white pine trees and the fence. The Delaware Aqueduct/Bridge is in the background (image left). (UPDE Archives, Zane Grey-house in flood with Charles Smith)

circa 1905 letter to Dolly, Grey described planting four young pine trees and trimming the lower branches off one of the ash trees on the property (Figure 1.43). According to Mary Smith Nelson, her father Charles Smith planted trees for Grey in the 1910s, including white pines along Scenic Drive and perhaps the sugar maples lined up along both sides of the second tennis court, to which Grey's secretaries complained were planted in a linear fashion rather than laid out more naturally (see Figure 1.42). Besides shade trees, the Greys' property also supported several kinds of decorative flowers. Hydrangea and spiraea were planted around the front of the Big House and walk, climbing vines were growing on front and back porches, and Nelson remembered daffodils and narcissus around the tennis court (see Figure 1.41). Grey noted some of the plantings around the house in the fall of 1917, "Increase of foliage, a cornfield with huge tall shocks, great nodding sunflowers and brilliant cosmos, those lent some change to the grounds around my home. And it was a favorable change..." Other areas around the compound may have served as pasture or were mown for hay, while lawns were limited to areas near the dwellings or under trees for relaxation. A period plan from the 1999 *Cultural Landscape Treatment Plan for the Zane Grey Property*, illustrates the landscape conditions in c.1916-1918 (Figure 1.44).⁶⁸

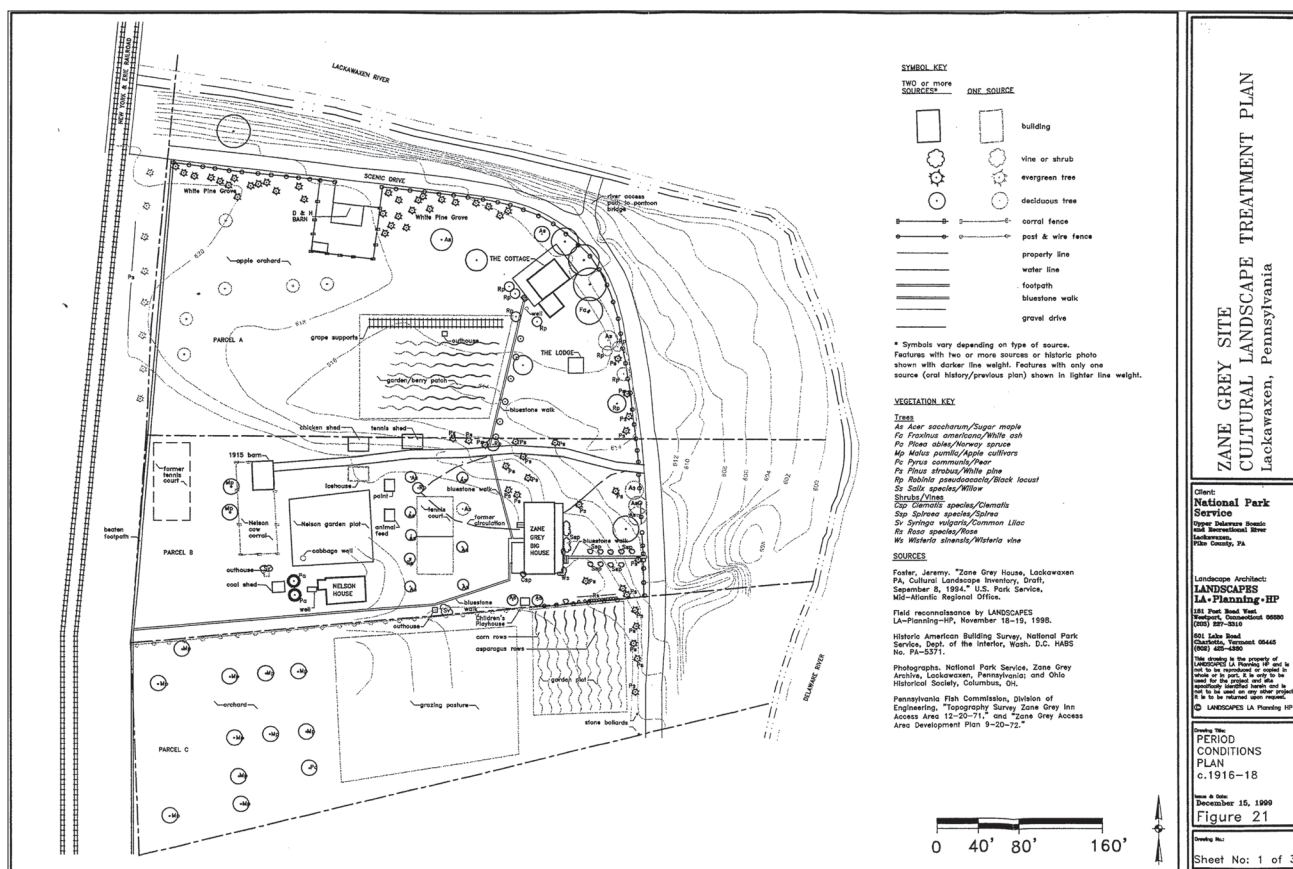


Figure 1.44. Period plan for the Zane Grey site, c.1916-1918. ("Period Conditions Plan, c.1916-18," Zane Grey Site, Cultural Landscape Treatment Plan, Lackawaxen, Pennsylvania, Figure 1.#21, December 1999. From LANDSCAPES, *Cultural Landscape Treatment Plan for the Zane Grey Property Lackawaxen, Pennsylvania*, 1999: 31)

Zane Grey Family Summer Retreat

The burgeoning American entertainment industry of the early twentieth century quickly discovered the value of best-sellers like Zane Grey and the potential for the translation of Grey's success to the nascent motion picture industry. By October 1916, Grey had already sold film rights to all his previous novels, except *The Border Legion*. In 1918 movie versions of *The Border Legion*, *Riders of the Purple Sage*, and *The Rainbow Trail* appeared in theaters. By this time, Zane Grey found himself traveling West more frequently for expeditions or for movie productions. Eventually, it became clear that if he was to spend any time with his family, they would have to move near him, and in 1918 the Grey family moved to Altadena, California, just outside Los Angeles.⁶⁹

For the next decade, the Greys used their Lackawaxen property periodically for extended visits, typically in the summer months and occasionally residing there for longer

periods. Relatives also enjoyed summer vacations on the property, and the Smith family continued to live in the Ida and Josephine Grey house and serve as caretakers. Electricity and water mains were supplied to the Big House in 1926, and the roof was resingled with fireproof asbestos shingles. While few additions were made to the landscape during this period, it had nonetheless changed in appearance from its earlier 1910s aspect, causing Zane to remark to Dolly on a visit in 1928, “The place has grown up most wonderfully. It is a forest. It is a jungle. The trees are splendid. Oh, that is the way I wanted it then...” (Figure 1.45).⁷⁰

In May 1929, in what would be his last visit to the Big House, Zane traveled by train from New York City to Lackawaxen and recorded his observations in a letter to Dolly: “I was overcome with the beauty, the sadness, the loneliness, the desertedness of it. . . They are a first and great part of our lives. Love, struggle, work, children – all came to us

there....Going back after all these years...drew me in a circle back to the days of struggle, of agony, of Growth.”⁷¹

LANDSCAPE SUMMARY, 1929

Aqueduct/Bridge

By this time the Delaware Aqueduct/Bridge had been operating as a vehicular and pedestrian crossing for 21 years. Owner Charles Spruks had removed the aqueduct'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 aqueduct/bridge. The approach roads connected to Minisink Ford Road on the New York side and Scenic Drive on the Pennsylvania side.

Aqueduct/Bridge Area, New York-North (Drawing 7)

Several structures still filled this steeply sloped area in 1929, including the D&H house on the hillside, the N.B. Johnson house/barn just downhill from it, and the long barn perpendicular to the river. However, the smaller barn at the inlet to the feeder canal was gone. Fenced pastures and scattered trees surrounded the various barns. Two structures still stood to the north alongside the river, but their uses are unknown. The density of trees increased further up the hill except for cleared areas around structures. Primary circulation was still Minisink Ford Road, except around the aqueduct/bridge where its alignment was shifted down the hill to connect to the east approach road and then track across the former turning basin. The abandoned portion up the hill became Old Minisink Ford Road.



Figure 1.45. View looking northwest at the Big House and its well vegetated surroundings, c.1920s. (UPDE Archives, Scan531)

Aqueduct/Bridge Area, New York-South (Drawing 8)

By this time the “new” canal and “old” (feeder) canal had been dewatered for almost thirty years, although portions of the latter still held water when the river level was high. Nonetheless, the canal's stone walls still remained, and possibly some of the locktender structures. The D&H house and several outbuildings stood next to Lock 72 but the other barns and sheds proximate to the canal were gone. Patches of scattered trees grew between the new and original canals, and covered much of the hillside to the east except for cleared spaces around buildings. The primary vehicular road tracked across the turning basin (now Minisink Battlefield Road) and joined Minisink Ford Road (now Old Minisink Ford Road) on the hill above the canal, but the old towpaths still provided local access to the riverfront areas. The towpath bridge south of Lock 70 still spanned the outlet of the feeder canal at this time.

Aqueduct/Bridge Area, Pennsylvania (Drawing 9)

Like 1898, development by 1929 had been more prevalent to the south of the aqueduct/bridge than to the north. To the south, the D&H barn on the south side of the turning basin had been removed, but the lot just to the south of it was still vacant and characterized by scattered trees that had established over the past thirty years. South of

the vacant lot were several homes and barns, the train station, stores, and a hotel. These lots featured scattered trees. To the north, the old Shannon-Cortwright (Sullivan) house was gone and replaced by a new house (Margold house) and outbuildings alongside the dewatered canal. The D&H house (Brown Keller house) was enlarged and a detached garage was added to the southeast, while the Cortright house was built to the north. Between these various buildings were gardens, orchards, and open fields. A path connected the (Margold) house and D&H house, passing across the empty canal and through a breach in the towpath. The two trees near the turning basin that were visible in several photographs were removed by c.1915. Circulation had changed considerably by 1929, with the construction of the approach road to the aqueduct/bridge and replacement of the river road with a new road now called Scenic Drive that formalized the road south of the D&H office/canal and tracked across part of the canal. The canal route was also severed by the railroad embankment.

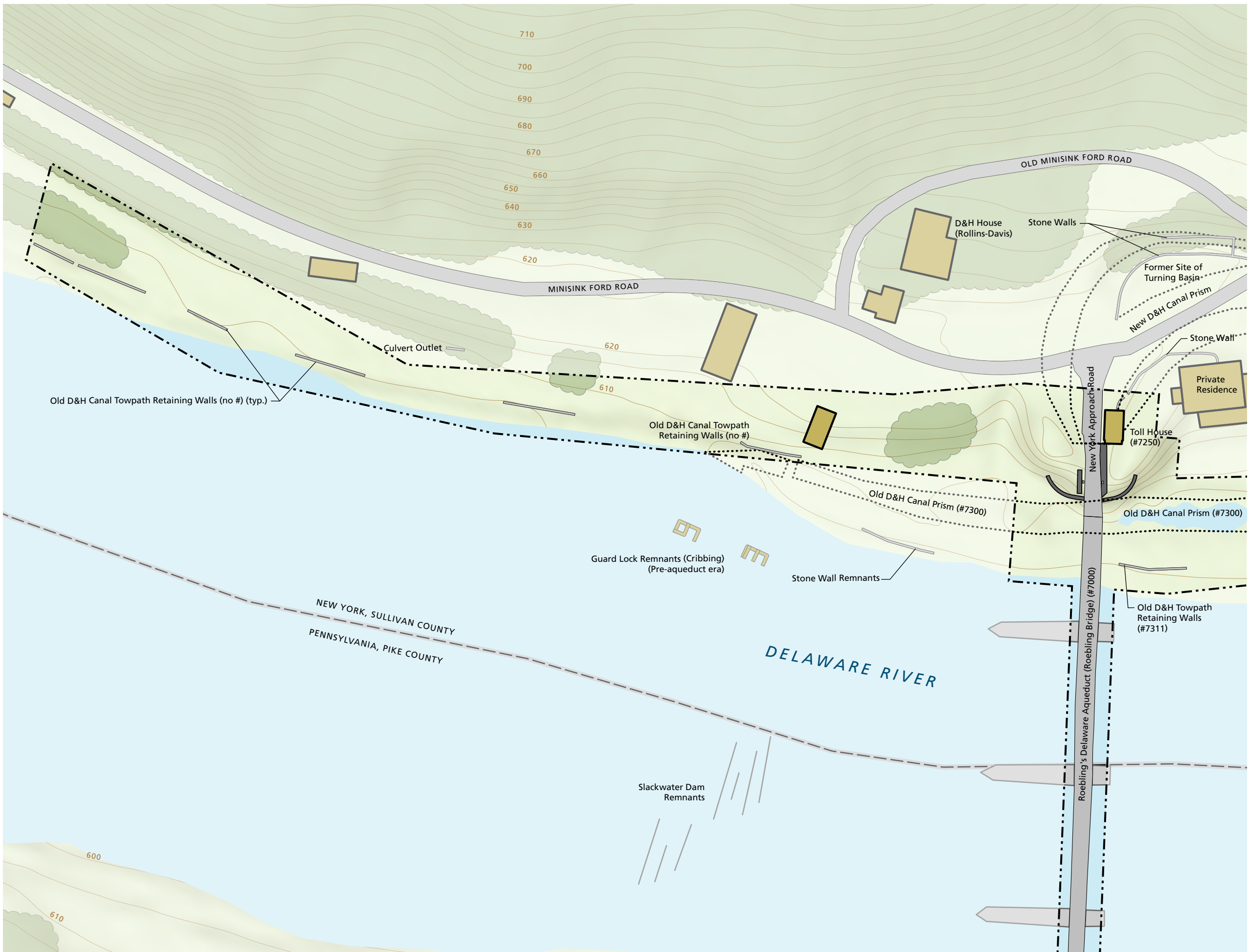
Connection Lots (Drawing 10)

By 1929 new buildings and structures had begun to fill in this area. The D&H office/house (Roebbling Inn) was owned by the Shannon family, who had added a small doctor's office between the house and barn/shed. Scattered trees shaded areas around the house but the western part of the lot was comparatively open. Fences present in 1898 likely remained, but there are no known historic photographs from this period to confirm. To the north was St. Mark's Church, the social hall, and the Union Cemetery, all set within lawns and scattered mature trees, as well as the Lackawaxen Cemetery established in c.1915 that features fewer trees as it was formerly a field. Earthen lanes tracked through the cemeteries, and fences surrounded some of the graves. Heading north, on the three one-acre lots north of the social hall, two structures were built: a house or barn in the middle of the Shaffer lot by c.1906 and another house (Kuhn house) on the north half of the Kuhn double lot, along with several outbuildings to the west. Driveways connected both houses to Scenic Drive. Scattered vegetation and fields surrounded both buildings. A historic postcard

from 1914 suggests orchards may have been laid out west of the Shaffer building and east of the Kuhn house.

Zane Grey Area (Drawing 11)

This property witnessed dramatic changes undertaken by author Zane Grey and his extended family. The area was dominated by the Big House, built in 1906 and expanded in 1914 and 1916. To the west the Greys built the Ida and Josephine Grey house in 1907. The Cottage, the former D&H house at the confluence of the two rivers was razed in 1914 and replaced with a similar sized structure, also called the Cottage. Other features included the Bungalow where Zane Grey initially spent time writing, the old D&H barn, and various sheds, barns, driveways, and fences. There were also two tennis courts, a vegetable garden, orchard, and pasture, and numerous trees and shrubs. Scenic Drive continued to define the northern and eastern sides of the family compound. By this time, some of these features were in disrepair as the Greys were no longer living at the property full time.



Cultural Landscape Report

Roebling's Delaware Aqueduct Site and Zane Grey Property, Upper Delaware Scenic & Recreational River

Roebling's Delaware Aqueduct New York (North) Detail 1929 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1939
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

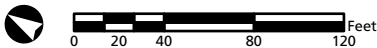
Maryrose Kulick, ArcGIS Pro 2.6, 2021

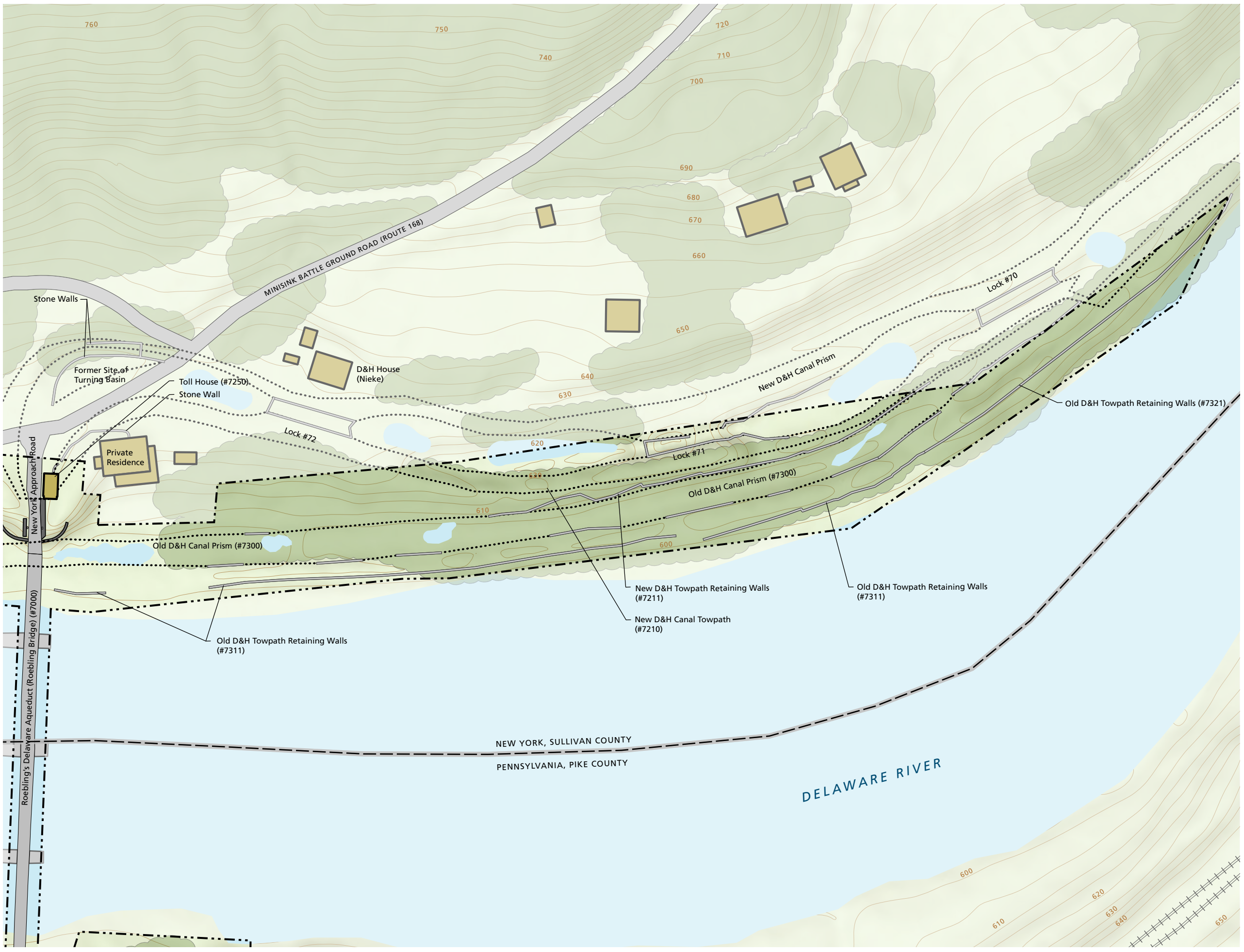
LEGEND

- Canopy
- Paved Surface
- Building
- Former D&H Canal Prism
- Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report

Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct
New York (South) Detail
1929 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1939
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

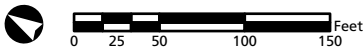
Maryrose Kulick, ArcGIS Pro 2.6, 2021

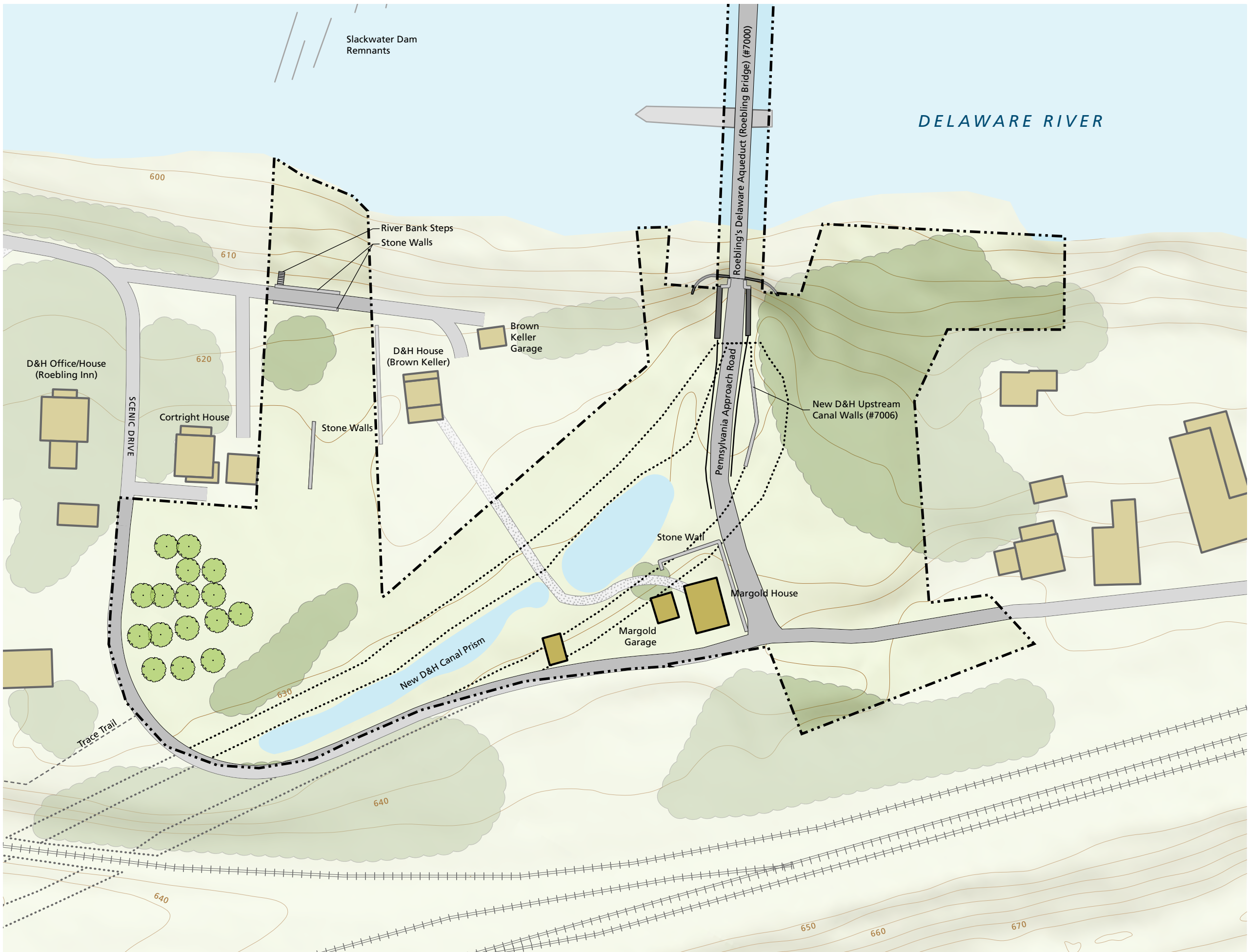
LEGEND

- Canopy
- Paved Surface
- Building
- Former D&H Canal Prism
- Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct
Pennsylvania Detail
1929 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

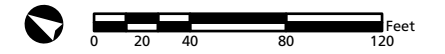
- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 1939
 3. Site visits, December 2013 and June 2014
 4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

 Canopy	 Railroad
 Paved Surface	 Former D&H Canal Prism
 Earthen/Gravel Surface	 Future NPS Boundary
 Building	
 Deciduous Tree	

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location





Cultural Landscape Report
Roebing's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Connection Area
1929 Period Plan



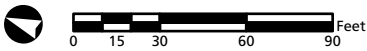
National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

- SOURCES**
1. Orthophotography, 1939
 2. UPDE GIS Data
 3. CLI Data
 4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

	Canopy		Former D&H Canal Prism
	Paved Surface		Parcel Boundary
	Earthen/Gravel Surface		Future NPS Boundary
	Building		
	Railroad		

- NOTES**
1. Projection: NAD 83 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 10'
 3. All features shown in approximate scale and location





Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Zane Grey Property
1929 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 1939
 3. Site visits, December 2013 and June 2014
 4. 1999 Cultural Landscape Treatment Plan

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND	
	Canopy
	Evergreen Shrub
	Paved Surface
	Railroad
	Earthen/Gravel Surface
	Future NPS Boundary
	Building
	Deciduous Tree
	Evergreen Tree
	Shrub

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



USE OF FORMER CANAL COMPANY AND ZANE GREY PROPERTIES 1929-1978

CHANGES TO ROEBLING'S DELAWARE AQUEDUCT AND NEW ROADS

Lackawaxen Bridge Company Ownership, Peter K. Schuyler

In November 1930 the Delaware Aqueduct/Bridge 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 (Figures 1.46, 1.47, 1.48). 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.⁷²

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. On the New York side, road projects mainly focused on routes heading inland from the river. Road improvements on the Pennsylvania side largely amounted to resurfacing the narrow winding roads already in existence. 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.⁷³

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 such 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 D&H



Figure 1.46. View looking east at the beginning of the project to replace the bridge deck and remove the aqueduct/bridge trunk walls, c.1931. (UPDE Archives, Scan 165)



Figure 1.47. View looking west at the removal of the aqueduct/bridge trunk walls, c.1931. (UPDE Archives, Scan168)

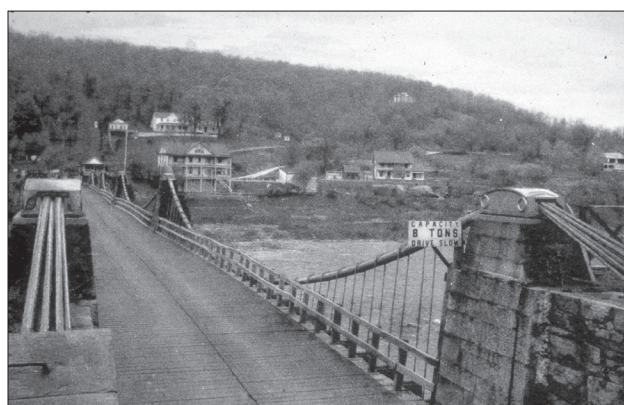


Figure 1.48. View looking east-southeast at the completed aqueduct/bridge deck, after 1932. (UPDE Archives, Delaware & Hudson Canal, Historic Roebling Bridge, Scan 140)

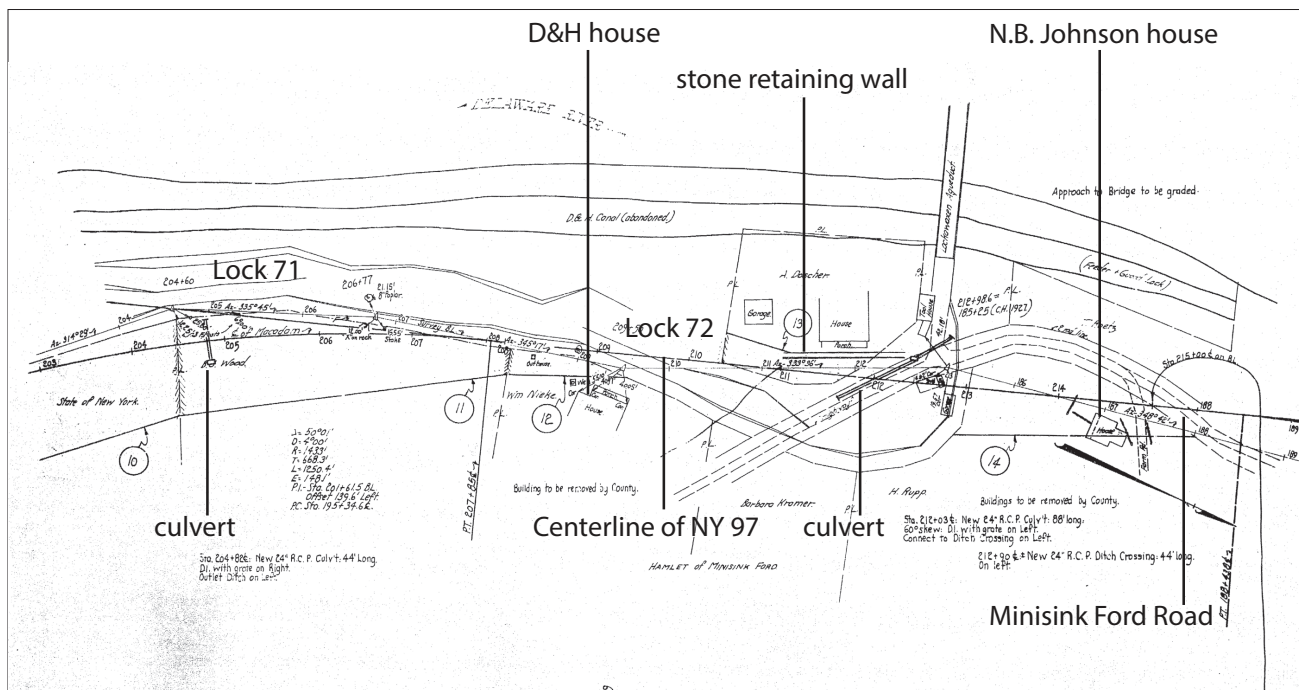


Figure 1.49. Plan of the proposed alignment of New York State Route 97. (UPDE Archives, NAP_RL02_014)

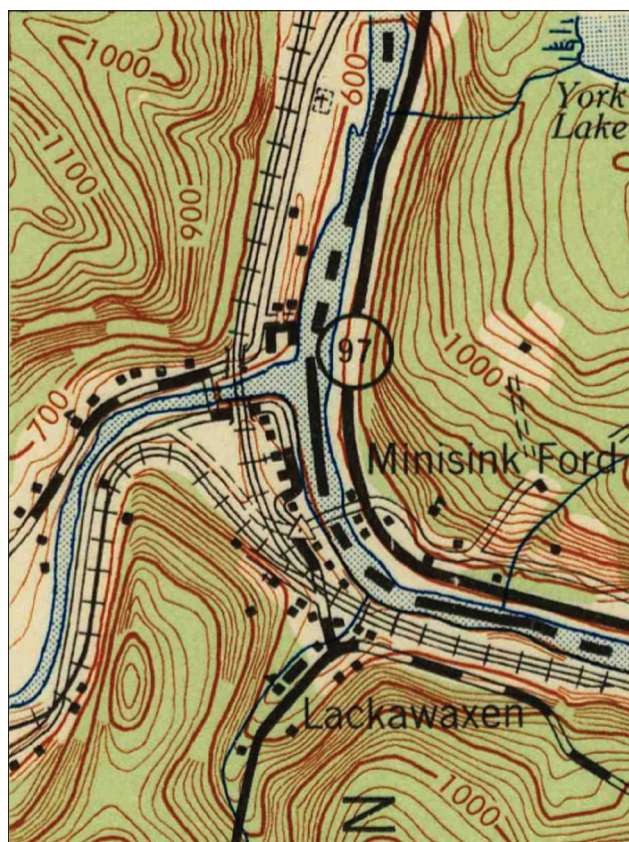


Figure 1.50. USGS map showing the completed route of State Route 97 on the New York side, 1944. (UPDE Archives, S3_PA_Milford_171248_1944_62500_geo)

Canal between Lackawaxen and Port Jervis. Construction of the 70.53-mile highway in 1934-39, aided by President Franklin D. Roosevelt's New Deal funding, overcame several engineering challenges including deep ravines at Narrowsburg, Cocheton, Callicoon, and Basket Creek, and a sheer drop to the river at the Hawks Nest, just north of Port Jervis.⁷⁴

In advance of construction in 1933, the State of New York acquired land in and around the "new canal" and Locks 70-72 and portions of the original canal (feeder canal) and

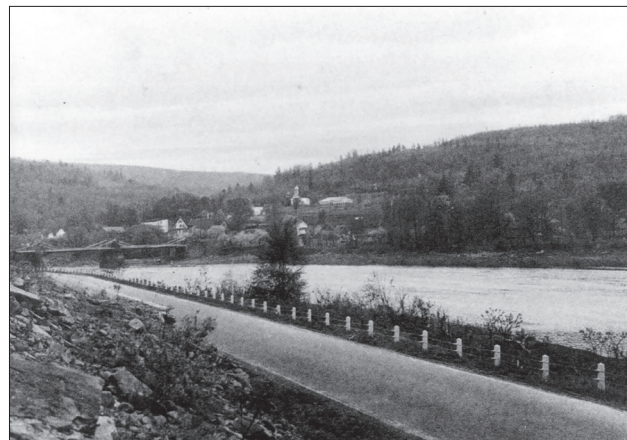


Figure 1.51. View looking southwest adjacent to the newly built Route 97 on the New York side, with the aqueduct/bridge in the background. (UPDE Archives, NY_Scan386)

old towpath for the highway (Figure 1.49). Much like the route of the “new canal” segment in 1847-48, the highway route veered slightly inland at this location, this time to avoid the former Highland Bridge Hotel, which by this time was a private home (rebuilt in c.2000). As such, the highway alignment passed directly over Lock 72 and part of Lock 70, but spared Lock 71. The highway alignment required reconfiguration of the intersection with the Delaware Aqueduct/Bridge and Minisink Ford Road (renamed Old Minisink Ford Road), as well as demolition of the two sheds in the old turning basin and the N.B. Johnson house just northeast of the former aqueduct. A new stone retaining wall and culvert inlet were installed for the new road just east of the former hotel, with the culvert outlet located to the north (see Figure 1.49). The stone walls that defined the outer curve of the canal’s turning basin and towpath were not impacted by the road construction and thus retained. Another road culvert to the south had its outlet at the south end of Lock 71.⁷⁵

The state’s property line extended to the feeder canal north of the aqueduct, and to the river’s edge south of the aqueduct. The latter boundary allowed the state to construct a stone and earthen diversion dam in the feeder canal prism opposite Locks 71 and 70 in order to prevent floodwaters from traveling through the feeder canal and undermining the new highway embankment at Lock 70. The state also created a breach in the feeder canal towpath upstream from the diversion dam so floodwater could drain into the



Figure 1.52. View looking west at the toll house and the aqueduct/bridge, c.1968. The toll gate is a simple hinged horizontal crossbar (shown here in a raised position). (Historic American Engineering Record, HAER PA-1, 1968, #140680pv)

river once river water levels dropped.

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 (Figure 1.50). 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 coincided with a decline in passenger railroad service, as visitors increasingly favored automobiles as their means of travel (Figure 1.51).⁷⁶

Lackawaxen Bridge Company Ownership, Edward H. Huber: 1942-1973

The Lackawaxen Bridge Company was purchased in June 1942 by Edward H. Huber of Scranton, Pennsylvania, a nephew of Charles Spruiks. Huber maintained the toll operations on Roebling’s Delaware Aqueduct for almost thirty years, 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



Figure 1.53. View looking east at the aqueduct/bridge, c.1969. The structure’s decking and railings are in poor condition. (Historic American Engineering Record, HAER PA-1, 1969, #140679pv)

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 aqueduct/bridge in the 1940s, telephone lines in the



Figure 1.54. View looking southwest, c.1969. By this time the area north of the aqueduct/bridge on the New York side was filled with successional vegetation. On the Pennsylvania side, the partially wooded and partially graded vacant lot still stood between the aqueduct/bridge and development to the south. (Historic American Engineering Record, HAER PA-1, 1969, #140673pv)



Figure 1.55. View looking southeast, c.1968. Note the dense vegetation on the New York side south of the aqueduct/bridge. On the Pennsylvania side north of the aqueduct/bridge, the former canal bed and towpaths (image lower right) have been leveled to the surrounding grades. A row of young trees marks the property line, which generally coincides with the outer edge of the former towpath. (Historic American Engineering Record, HAER PA-1, 1969, #140671pv)

late 1940s or early 1950s, and a wooden gate to replace the lattice gate in the 1950s.⁷⁷

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 (Figures 1.52, 1.53). A series of oblique aerials shows these conditions as well as the deterioration of the masonry piers (Figures 1.54, 1.55, 1.56). Despite its poor condition, the Delaware Aqueduct itself was designated a National Historic Landmark (NHL) on November 24, 1968 (#68000051) under the name "Delaware & Hudson Canal."⁷⁸

Extension of Pennsylvania State Route 590

By 1965, the Commonwealth of Pennsylvania extended State Route 590 southward from its T-intersection with Scenic Drive on the south side of the Lackawaxen River. The highway crossed over the remnants of the original canal bed west of the railroad embankment, and intersected with the south end of Scenic Drive (Figure 1.57). The new road, now also known as the Hamlin Highway, diverted through-traffic to and from Lackawaxen off of Scenic Drive.



Figure 1.56. View looking northwest, c.1969. North of the aqueduct/bridge, a line of young pine trees lines Scenic Drive (image upper left). (Historic American Engineering Record, HAER PA-1, 1969, #140672pv)

Lackawaxen Bridge Company Ownership, Albert L. Kraft: 1973-1978

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 feeder canal.⁷⁹

Kraft increased 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."⁸⁰

NEW DEVELOPMENTS ON THE NEW YORK SIDE, NORTH OF AQUEDUCT/BRIDGE

The construction of Route 97 spared the D&H canal house on the hillside but destroyed the N.B. Johnson house and barn. The area between the highway and feeder canal remained undeveloped for the next fifty years, during which time scattered trees and shrubs became established (see Figure 1.54). The previously filled in feeder canal, became indistinguishable. A comparison of aerial photographs from 1939, 1952, 1959, and 1969 indicate the vegetation was sparse in the years after the highway's construction, but at some point trees were planted alongside the road and matured over time (Figures 1.58a, b, c, d). Previous structures present along the narrow strip of land between the new highway and the river bank were removed, except for remnant sections of stone retaining walls associated with the ferry towpath, which were likely retained to hold the steep slope.

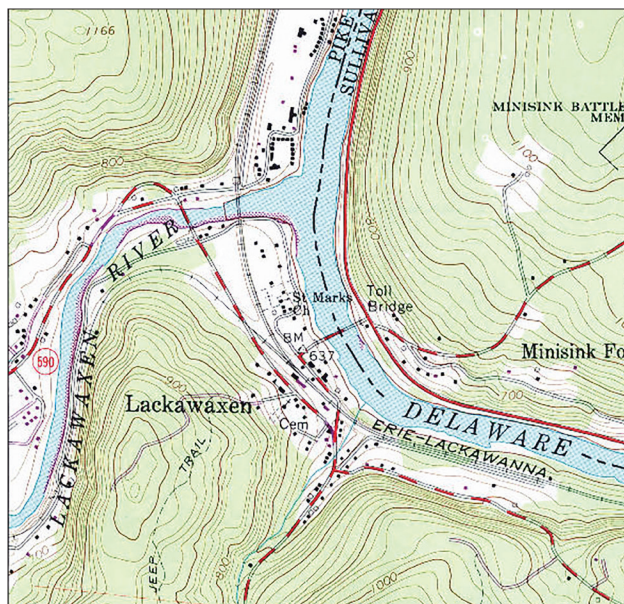


Figure 1.57. USGS map showing the extension of State Route 590 on the Pennsylvania side, 1965. (UPDE Archives, 44_PA_Sholola_221952_1965_24000)

NEW DEVELOPMENTS ON THE NEW YORK SIDE, SOUTH OF AQUEDUCT/BRIDGE

Although Locks 72 and 70 were lost to the Route 97 project, the alignment of the new highway tracked just east of the abandoned Lock 71, leaving its stone retaining walls intact. The D&H house opposite Lock 72, and an adjacent garage, were also retained. The large industrial building south of the former hotel and garage were removed by 1931, while the garage itself was removed sometime in the 1930s and later replaced by a small shed. Much of the area between the highway and the feeder canal and river was already covered in trees at the time the highway was built. By the late 1960s the area was still cloaked in vegetation (see Figures 1.58d, 1.55, 1.56).

NEW DEVELOPMENTS ON THE PENNSYLVANIA SIDE, SOUTH OF AQUEDUCT/BRIDGE

South of the aqueduct/bridge on the Pennsylvania side, the 1939 aerial reveals a rectangular-plan addition on the north end of the former Cortright store (see Figures 1.58a, 1.54). By this time the building was used as a movie house that reportedly showed Zane Grey films. The outbuilding down the hill (east) adjacent to the short lane extending from

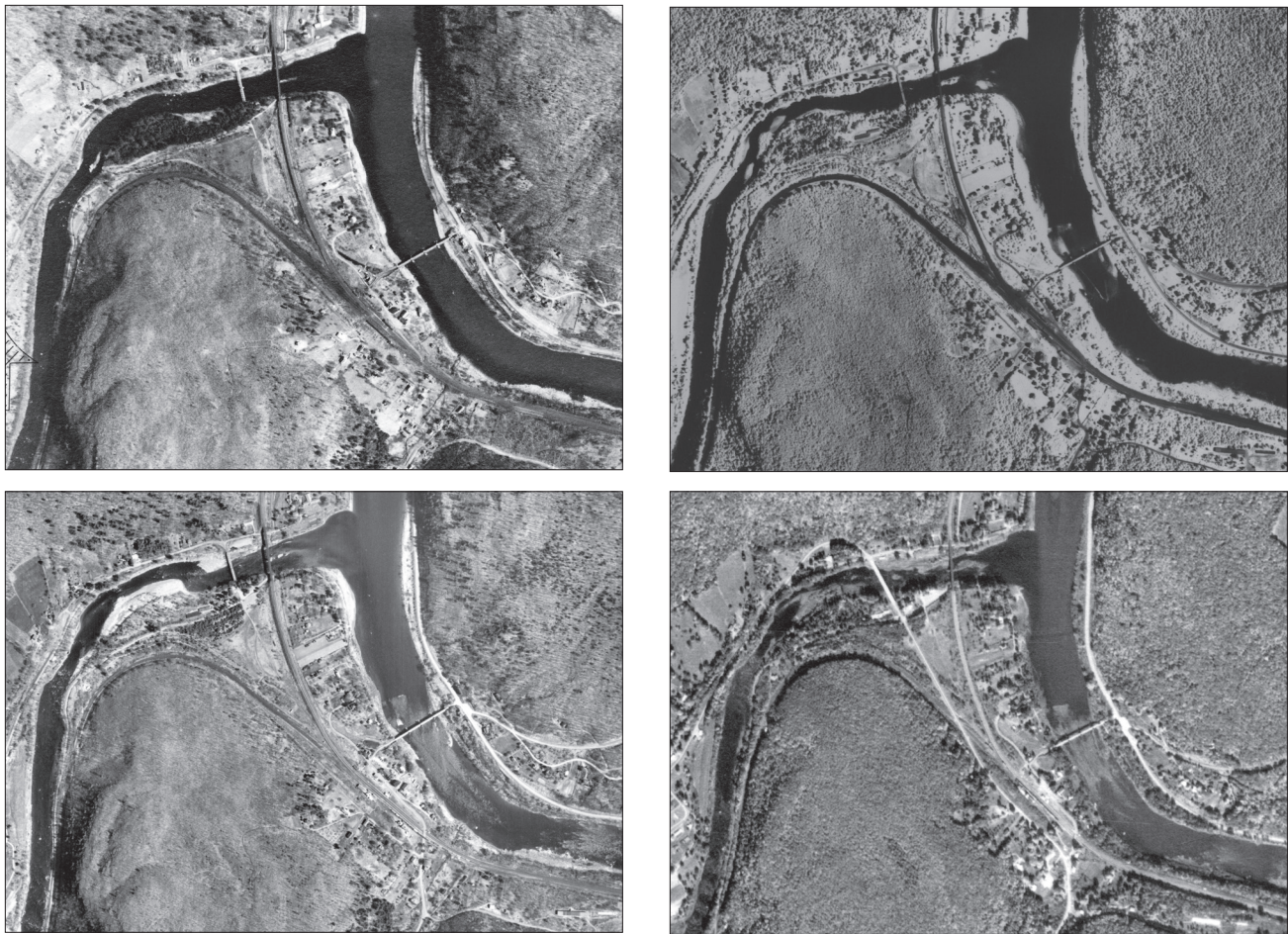


Figure 1.58 a-d. Aerials from 1939 (a, top left); 1952 (b, top right); 1959 (c, bottom left), 1969 (d, bottom right). (Historical Aerial Viewer, Historical Aerial Photographs of Pennsylvania. From <https://datacommons.maps.arcgis.com/apps/>)

Scenic Drive was gone by 1959, but the adjacent house and garage remained and were surrounded by several shade trees and accessed by driveways at the end of the lane. The 1959 aerial indicates an informal road and parking area in the west half of the rocky vacant land just to the south of the aqueduct and scattered vegetation in the east half, but by 1969 the west half had been graded (see Figures 1.54, 1.55, 1.58c). Buildings across Scenic Drive from the movie house included the depot (razed c.1950) and the building that housed Shannon's store.⁸¹

NEW DEVELOPMENTS ON THE PENNSYLVANIA SIDE, NORTH OF AQUEDUCT

Margold House, Brown Keller House, Cortright House

The 1939 aerial shows the canal bed partially filled with water and patches of vegetation, especially at the aqueduct/bridge end (see Figure 1.58a). A footbridge spanned the canal bed, connecting the Shannon house (Margold house) to the former D&H house (Brown Keller house), via a breach in the remains of the river-side towpath. Young orchards trees filled much of the open spaces north of the Brown Keller house and around the Cortright house. These conditions persisted through 1959, with the fruit trees maturing, but by 1969 most of the orchard trees were gone (see Figures 1.58c, 1.58d). The canal bed appears to have been filled in and the towpath that had been breached for a path was removed, creating a level lawn area (see Fig-

ure 1.55). A row of evergreen trees was planted along the Scenic Drive by this time, at the north end of the former canal (see Figure 1.56) (removed 2011-2015). A small shed and a driveway were present in the former orchard area by 1969 (see Figure 1.58d).

Roebling Inn, Church/Cemetery, Social Hall/Cemetery, Shaffer, Kuhn Lots

The four historic aerials show that the scattered trees throughout the Roebling Inn and Church/Cemetery/Social Hall lots continued to mature. The aerials also reveal the presence of two or three parallel roads or paths extending the length of the two cemeteries, which connected to a curved road or path from Scenic Drive. Additionally, all four aerials suggest a path still ran along west edges of each property, paralleling the railroad embankment and ending at Scenic Drive next to the Shannon barn, which was removed in the 1960s (see Figures 1.58a, b, c, d). On the Shaffer lot, the four aerials show a curved driveway from Scenic Drive to the dwelling in the center north side of the lot. At the Kuhn double lot, a driveway from Scenic Drive ran to the north side of house, and continuing to the west side of the house and several outbuildings along the north property line. The aerials indicate the remainder of the Kuhn property was farmed (see Figures 1.58a, b, c, d).

ZANE GREY PROPERTY

Zane Grey suffered a stroke in August 1937 while on a fishing trip in Oregon that left him paralyzed. He regained his ability to walk and write by the end of the summer of 1939, but died on October 23 of a heart attack at his estate in Altadena, California. He was interred at the Lackawaxen Cemetery.⁸²

James Family and Dolly Grey Stewardship, 1933–1945

From 1929 until his death ten years later, Zane Grey and his wife continued to own the Lackawaxen property and allowed friends to stay there, but Zane himself did not visit it. Beginning in 1933, longtime friends of the Greys, Alvah and Allie (possibly Alice) James and their family, lived in the

Big House and served as caretakers. Very little documentation remains from this period, during which the property as a whole gradually declined in condition from lack of use. Landscape features such as the clay tennis court and garden plots deteriorated, as they were no longer used. Trees planted as seedlings and saplings during the Grey residency also continued to grow and fill the former open spaces of the property, especially north of the Big House, and throughout Parcel A.⁸³

Dolly proceeded to sell portions of the Lackawaxen property, and gradually ended her ownership of the lands and association with the Upper Delaware River valley. The southernmost two-acre parcel of the family estate (Parcel C) was sold to the Moran family, cousins of Charles and Mary Smith, in 1939. The Morans built a house just south of the Ida and Josephine Grey (Smith) house in c.1942 (see Figure 1.58b). A flood that same year caused extensive damage to the entire site, including the Cottage, and resulted in the loss of the Lodge and many landscape elements. The Morans salvaged the Cottage kitchen and moved it adjacent to their house as a free-standing structure (see Figure 1.58b). They also incorporated interior elements salvaged from the Cottage into their new house. In 1945, Dolly sold the remainder of the property (Parcels A and the middle and eastern thirds of Parcel B), including the Big House, Cottage, and surrounding land to Helen James Davis, the daughter of Alvah and Allie James.⁸⁴

Davis, Smith, Moran, and Pennsylvania Fish and Boat Commission Ownership, 1945–1989:

In 1945 Helen James Davis operated the Big House as an inn, while her parents Alvah and Allie lived there until their deaths in 1958. To accommodate its new hospitality use, a wall was removed to enlarge the kitchen; electrical, plumbing, and heating systems were repaired; bathrooms were added; and the exterior was repainted from dark green and white trim to all white. In 1948, Davis asked Dolly Grey if she could name the inn after Zane Grey, and Dolly agreed (she would visit the inn occasionally until her death in 1957). It is likely that the parking area off of the driveway northeast of the Big House was built around this time for guest parking.⁸⁵

The inn could accommodate ten to twelve people comfortably and twenty at capacity. Influxes of boarders came as the result of a large train wreck in 1948, which brought numerous railroad officials to the area, and again in 1964 when the shad resumed “running” in the area. Historic photographs of the front of the inn show lawns and shade trees, and a line of spiraea along the front porch (Figure 1.59). The playhouse and the ice house were removed in the 1940s, and the post and wire fence along Scenic Drive and between Parcels B and C may have been removed around the same time. The barn built by the D&H Canal Company (on Parcel A) burned in the late 1950s.⁸⁶

In 1971 Davis sold Parcel A and the far eastern third of Parcel B to the Pennsylvania Fish and Boat Commission, which constructed two parking lots and a boat ramp on it in 1972. Prior to this construction, these areas featured two rough driveways from Scenic Drive to a primitive boat ramp (Figure 1.60). Portions of the lots featured numerous scattered trees, many of which were likely planted during Zane Grey’s residency. Davis operated the Zane Grey Inn until 1973 when, amidst growing financial concerns she converted the house into the Zane Grey Museum.⁸⁷

Ida and Josephine Grey House

In the early 1950s, Mary Smith Nelson constructed an addition on the south side of the Ida and Josephine Grey (Smith) house. The addition severed the bluestone path that lead west to the railroad embankment. Around the



Figure 1.59. The Big House as the Zane Grey Inn, c.1950s-60s. The location of the front steps has shifted north and there is a walk leading down to the parking area. The original front walk has been removed. (Courtesy C. Chernick. From CLPT 1999: 26)

same time, Nelson planted trees along her property’s boundaries and in a garden plot north of her house.⁸⁸

LANDSCAPE SUMMARY, 1978

Aqueduct/Bridge

The Delaware Aqueduct/Bridge provided one lane of vehicular traffic across the Delaware River as well as pedestrian travel, although there was no dedicated pedestrian walkway. The toll house on the New York side collected fees for vehicular traffic. The bridge/aqueduct connected to State Route 97 on the New York side and Scenic Drive on the Pennsylvania side. By this time the bridge/aqueduct and approach roads were in poor condition.

Aqueduct/Bridge Area, New York-North (Drawing 12)

In 1978 the former D&H Canal Company house (now Rollins-Davis house) was the only structure that remained in this area. The house was fronted by State Route 97, which occupied a wider cross-section than the earlier road (Minisink Ford Road) it replaced in the 1930s. Behind the house was Old Minisink Ford Road. Successional vegetation was well-established between the highway and river’s edge, growing amongst remnant sections of stone wall associated with the original canal towpaths that were presumably retained to hold the steep banks. There were also several new walls built in conjunction with the highway’s culverts. Two structures that once stood to the north alongside the river were also gone. The hillsides to the east remained mostly wooded.

Aqueduct/Bridge Area, New York-South (Drawing 13)

Like the area north of the aqueduct/bridge, this area was also dominated by State Route 97, which supplanted Minisink Ford Road as the primary circulation feature. The highway’s alignment spared part of the turning basin and Lock 71, but obliterated Lock 72 and most of Lock 70. Much of the feeder canal in this area had not been filled in, and portions still occasionally held water, in part due to a diversion dam built by the state opposite Locks 71 and

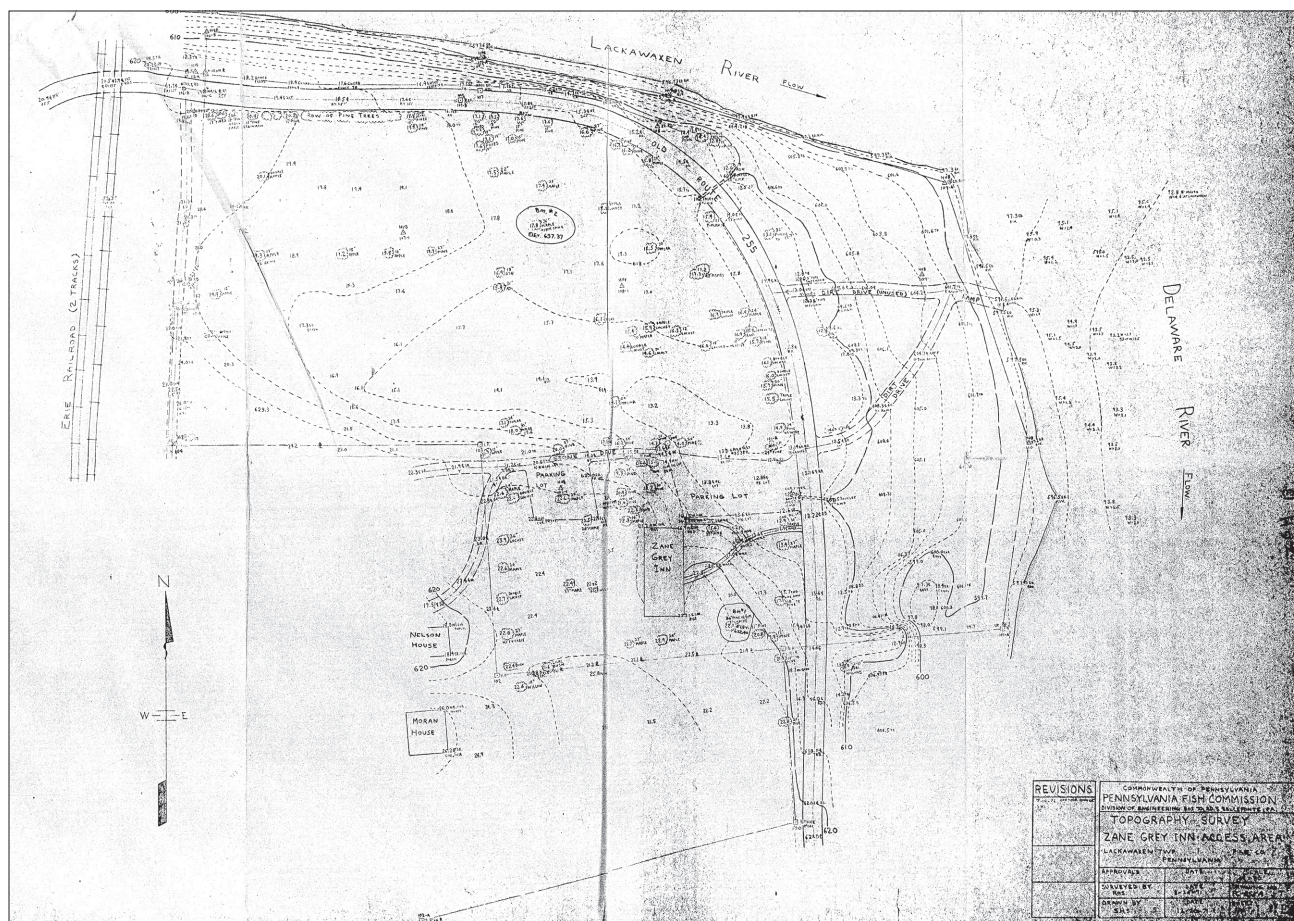


Figure 1.60. Map of conditions around the Zane Grey house, prior to development of the state's parking lot. ("Topographic Survey, Zane Grey Inn, Access Area," Commonwealth of Pennsylvania, Pennsylvania Game Commission, Drawing # [illegible], December 1971. From UPDE Archives, NAP_RL01_451)

70 to prevent floodwater from undermining the highway embankment. The state also breached the riverside tow-path of the feeder canal to allow water to drain back into the river. The former hotel and a nearby garage were the only buildings present between the road and river, while a former D&H Canal Company house (now Nieke house) and outbuildings still stood east of the road and opposite to buried Lock 72. With the exception of spaces around building, successional vegetation dominated this area, cloaking the remaining locks, canal beds, towpaths, and stone walls.

Aqueduct/Bridge Area, Pennsylvania (Drawing 14)

The density of development on the Pennsylvania side of the aqueduct/bridge did not change considerably in the fifty years between 1929 and 1978. Portions of the turning basin south wall still lined the approach road. South of the

aqueduct/bridge, the west half of the vacant lot was used as an informal parking area while the east half was filled with successional vegetation. South of the vacant lot stood several homes and barns, the train station, stores, and a hotel. These lots featured scattered trees. North of the aqueduct/bridge, the canal bed was filled in and the towpaths were removed, replaced by an evenly graded area of lawn that left little indication of this former water feature. The lawn was separated from Scenic Drive by a line of white pines. The Margold house and outbuildings stood at the corner of Scenic Drive and the approach road, while the D&H house (Brown Keller house) and garage, and Cortright house still stood to the northeast. Most of the gardens and orchards that occupied these areas in 1929 were gone, replaced by lawns and a few small sheds. However, scattered trees still grew the area, especially around the Cortright house and south of the Brown Keller garage.

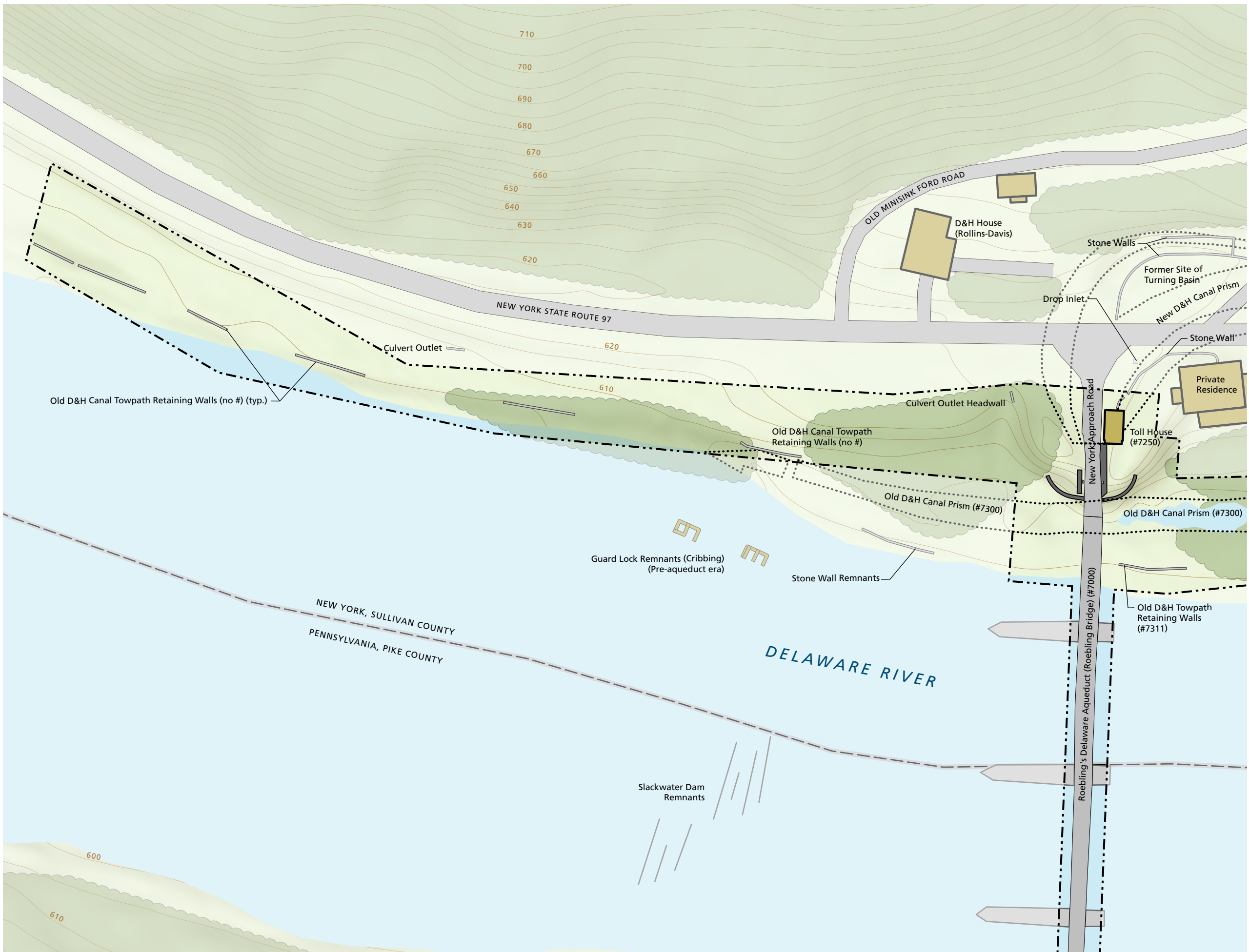
Connection Lots (Drawing 15)

Few changes occurred in this area between 1929 and 1978. The D&H office/house (Roebbling Inn) owned by the Shannon family still featured the carriage house and doctor's office, but the barn/shed was removed. Scattered trees shaded areas around the house but the western part of the lot remained mostly open. To the north was St. Mark's Church, the social hall, and the Union Cemetery, all set within lawns and scattered mature trees, as well as the Lackawaxen Cemetery that still featured fewer trees than its neighbor. The exception was a small grove of evergreen trees around the graves of Zane and Lina Grey, interred in 1939 and 1957, respectively. Earthen lanes tracked through the cemeteries, and fences surrounded some of the graves. Heading north, on the three one-acre lots north of the social hall, a house/barn still stood on the former Shaffer lot, the boundaries of which were lined with trees. The double Kuhn lot to the north was comparatively treeless, with much of it still used for farming. Trees still surrounded the Kuhn house and outbuildings to the west. Driveways connected to both of these homes to Scenic Drive.

Parcel C was the c.1942 Moran house as well as a separate kitchen that was salvaged from the Cottage after a damaging flood around the same time. The Morans planted orchards and other trees on their property, alongside existing vegetation.

Zane Grey Area (Drawing 16)

Changes during this period were directly linked to the selling of former Zane Grey lands to various parties beginning in 1939. Floods damaged/destroyed the Cottage, Lodge, and D&H barn on Parcel A. By 1978 Parcel A and the eastern third of Parcel B has been transformed into parking areas and a boat launch by the Pennsylvania Fish & Boat Commission as part of improving public water access to the adjacent rivers. The Big House was the site of the Zane Grey Museum, operated by Helen James Davis who originally operated the house as an inn. The setting of the Big House now encompassed the middle part of Parcel B and included a parking area north of the house. The western third of Parcel B was owned by Mary Smith Nelson, who added an addition on the south side of the Ida and Josephine Grey house and planted trees along her property's boundaries and in a garden plot north of her house. On



Cultural Landscape Report

Roebling's Delaware Aqueduct Site and Zane Grey Property, Upper Delaware Scenic & Recreational River

Roebling's Delaware Aqueduct New York (North) Detail 1978 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1986
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

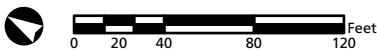
Maryrose Kulick, ArcGIS Pro 2.6, 2021

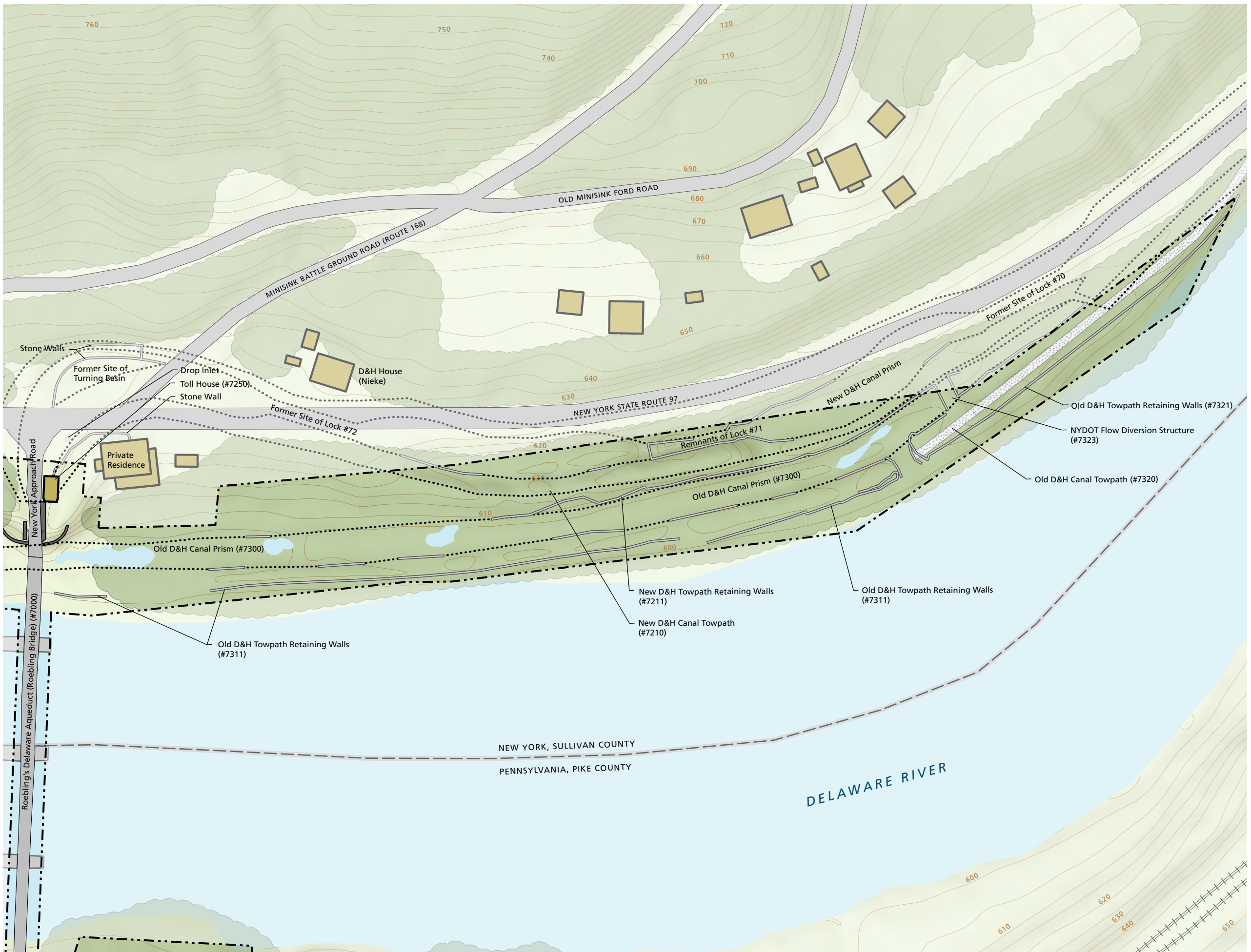
LEGEND

- Canopy
- Paved Surface
- Building
- Former D&H Canal Prism
- Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report

Roebing's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebing's Delaware Aqueduct New York (South) Detail 1978 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 1986
3. Site visits, December 2013 and June 2014
4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

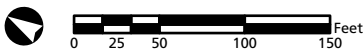
Maryrose Kulick, ArcGIS Pro 2.6, 2021

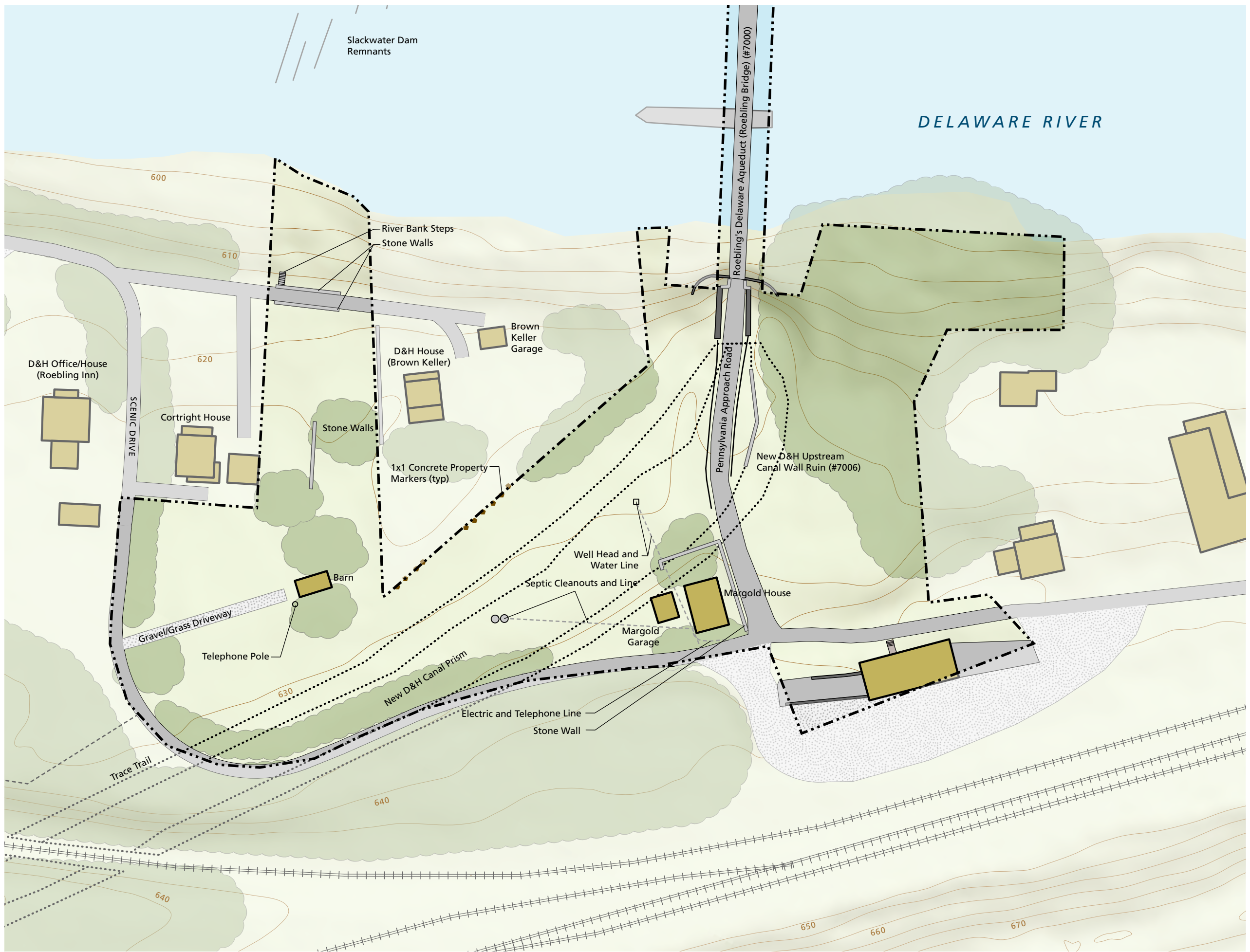
LEGEND

	Canopy		Former D&H Canal Prism
	Paved Surface		Future NPS Boundary
	Earthen/Gravel Surface		
	Building		

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct
Pennsylvania Detail
1978 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 1986 & 1969
 3. Site visits, December 2013 and June 2014
 4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

 Canopy	 Railroad
 Paved Surface	 Former D&H Canal Prism
 Earthen/Gravel Surface	 Future NPS Boundary
 Building	

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



0 20 40 80 120 Feet

Drawing 14



Cultural Landscape Report
Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Connection Area
1978 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

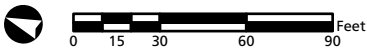
- SOURCES**
1. Orthoimagery, 1986 & 1969
 2. UPDE GIS Data
 3. CLI Data
 4. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

	Canopy		Former D&H Canal Prism
	Paved Surface		Parcel Boundary
	Earthen/Gravel Surface		Future NPS Boundary
	Building		
	Railroad		

- NOTES**
1. Projection: NAD 83 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 10'
 3. All features shown in approximate scale and location





Cultural Landscape Report
Roebbling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Zane Grey Property
1978 Period Plan



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 2008
3. NAIP 2019
4. Site visits, December 2013 and June 2014

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND	
	Canopy
	Paved Surface
	Earthen/Gravel Surface
	Building
	Deciduous Tree
	Evergreen Tree
	Shrub
	Evergreen Shrub
	Railroad
	Future NPS Boundary

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location



NATIONAL PARK SERVICE STEWARDSHIP IN THE UPPER DELAWARE RIVER VALLEY, 1978-2023

Acknowledgement in the late 1960s of the historical significance of the Delaware & Hudson Canal, and what is now referred to as Roebling's Delaware Aqueduct or Roebling's Bridge, coincided with efforts to preserve 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 modern 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." The Act named 27 other rivers, including the Upper Delaware River, for further study to determine if they qualified for inclusion in the system.⁸⁹

The study of the Upper Delaware River was timely, as canoeing and camping were developing into sizeable commercial operations in the 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.⁹⁰

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 new 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 a federal 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 designations outlined in the Act, the river was classified as two parts: "scenic" areas with minimal development or other intrusions, and "recreational" areas having more concentrated development and/or roadways. The two classifications were thus reflected in the new park's name. Roebling's Delaware Aqueduct area and the Zane Grey property fell within the park's "Recreation" area.⁹¹

Final River Management Plan

In 1986 a "Final River Management Plan" was completed and established a final park 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 guide the National Park Service, local governments, private groups, and private property owners to protect resources.⁹²

The 1986 plan served as the park's official planning document. The plan recognized the park's cultural resources, noting that the National Scenic Wild and Scenic Rivers Act specifically required that cultural resource features identified in designated river corridors be protected and enhanced. In the Upper Delaware River corridor, such aspects included human history archeological sites, industrial remnants, and architectural features, as well as the people who live in the corridor and their settlements, commerce, and agriculture. The plan noted that Roebling's Delaware Aqueduct was stabilized, restored, and rehabilitated beginning in 1985-86, and proposed exploring the use of voluntary agreements with property owners who had intact features of the D&H Canal. The plan also identified the Zane Grey house as a cultural resource, and the park's interest in acquiring and preserving it.⁹³

ACQUISITION OF ROEBLING'S DELAWARE AQUEDUCT

Soon after the park's establishment in 1978, the National Park Service indicated a desire to acquire Roebling'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 NPS 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."⁹⁴

On March 27, 1980, the National Park Service officially purchased the Lackawaxen Bridge Company. In addition to the aqueduct/bridge, the acquisition included the toll house and approach road leading to the structure on the New York side (0.58 acres) and the towpath, two remnant retaining walls, and the approach road leading to the structure on the Pennsylvania side (0.42 acres) (Figure 1.61). Based on the Federal Highway Administration's assessment that the former aqueduct was in critical condition due to years of deferred maintenance, the National Park Service

closed the structure to all traffic (Figure 1.62). Repairs were made to the deck, railings, and lights, but because of the discovery of additional major structural problems, the structure was reopened only to pedestrians in October 1980 (Figure 1.63). 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.⁹⁵

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 Roebling'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.⁹⁶

The National Park Service considered three alternatives for interpreting Roebling'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 all of the trunk walls and towpaths so that visitors could see a structure closely resembling the one that

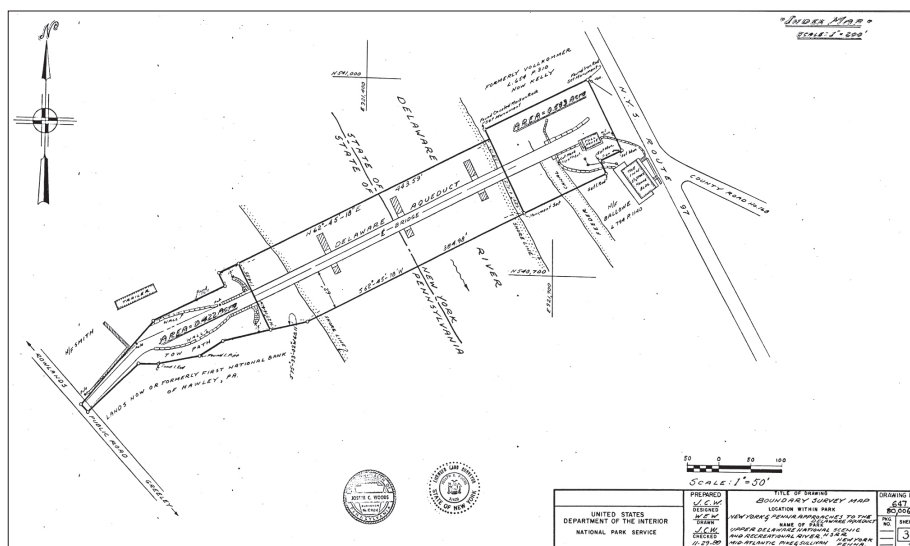


Figure 1.61. Map showing property acquisitions of and around Roebling's Delaware Aqueduct, 1980. ("Boundary Survey Map, New York and Pennsylvania Approaches to the Delaware Aqueduct," Upper Delaware Scenic and Recreational River, Drawing #647-80006, November 1980. From UPDE Archives, RL02-060)



Figure 1.62. View looking southeast at the deteriorated aqueduct/bridge, 1980. (National Park Service, Photo Gallery, "48 Roebling Aqueduct in 1980." From <https://www.nps.gov/media/photo/gallery-item>)



Figure 1.63. View looking east at the toll house, 1980s, when the aqueduct bridge was pedestrian-only. (Mary Curtis, "Toll House," Building-Structure Inventory Form, NYS Office of Parks, Recreation, and Historic Preservation, Division for Historic Preservation, 1985)

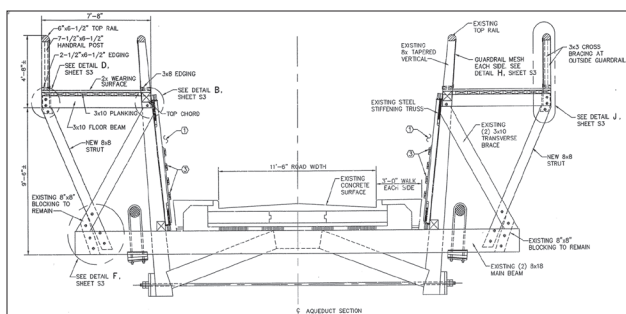


Figure 1.64. Cross-section view of reconstructed aqueduct trunk with towpaths, 1997. ("Tow Path Cross-Sections," Upper Delaware Scenic and Recreational River, Drawing #647-25001, May 1994. From Denver Service Center, eTIC)



Figure 1.65. View looking west at the tollhouse and former aqueduct after it reopened to vehicular traffic, c.1988, before the towpaths were reconstructed in 1994. (Historic American Engineering Record, HAER Addendum PA-1, 1988, #123818pv)

opened to canal traffic in 1849. The third interpretive alternative was selected, and in 1986 a Memorandum of Agreement addressing the reconstruction 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 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 (Figures 1.64, 1.65). Roebling's Delaware Aqueduct reopened to traffic in 1987.⁹⁷

In the late 1980s and early 1990s, the historical significance of the toll house was recognized, and efforts were made for

rehabilitation. 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 (now Historic 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 Roebling Bridge group.⁹⁸

ACQUISITION OF THE ZANE GREY PROPERTY

By 1983, Helen James Davis began to seek a buyer that would purchase and care for the Zane Grey house and its

museum contents together. She initially contacted Whitney Seymour North, Jr., a New York attorney with an interest in American authors. North in turn contacted the National Park Service, who sent a representative to visit the site in 1983. That same year, the Zane Grey house was recognized for its national significance and listed in the National Register of Historic Places. After numerous studies, Davis sold the house and 0.93 acres (middle third of Parcel B, tract 101-04) to the federal government in 1989 for incorporation into the Upper Delaware Scenic and Recreational River (Figure 1.66).⁹⁹

In March 1989, the National Park Service assumed operation of the Zane Grey museum and grounds. Three rooms on the first floor of the house were opened as a museum depicting Zane Grey's life at Lackawaxen, the second floor was given over to offices and storage for park purposes, and Helen James Davis retained a life tenant's apartment at the rear of the main house until her death in 1995. In October of that year, the State of Pennsylvania erected a historical marker in front of the house.¹⁰⁰

At the Big House, the park undertook several repair and restoration projects, including reconstruction of the front porch, upgrades to the electrical and plumbing systems, replacement of a third floor window, and the reintroduction

of wooden shake shingles that were original to the house. The building's original dark green with white trim exterior color scheme was also reintroduced. The projects were based on a *Historic Structures Report* completed in 1989-1990 by Short and Ford Architects.¹⁰¹

Another challenge for park staff was maintenance of the grounds, especially the many large, aged, and unhealthy trees that were a hazard to visitors. The park removed the first tree in 1989, followed by two large white pines in 1991, another nine trees in 1992, and a dead sugar maple in 1995. In October 1995, a violent wind storm blew through Lackawaxen, and a large sugar maple fell onto the southwest corner of the house, but the staff was able to make repairs before the winter (Figure 1.67).¹⁰²

In 1998 and 2000 the National Park Service expanded the setting around the Zane Grey house with the purchase of former Grey family lands to the west and south (Figure 1.68). The first acquisition was the 1.00-acre western third of Parcel B (tract 101-08) that included the Ida and Josephine Grey house, a shed, and garage, followed by the 2.21-acre Parcel C to the south (tract 101-09) that included the Moran house and Cottage kitchen (Figure 1.69). Parcel A remained in possession of the Pennsylvania Fish and Boat Commission (Figure 1.70).¹⁰³

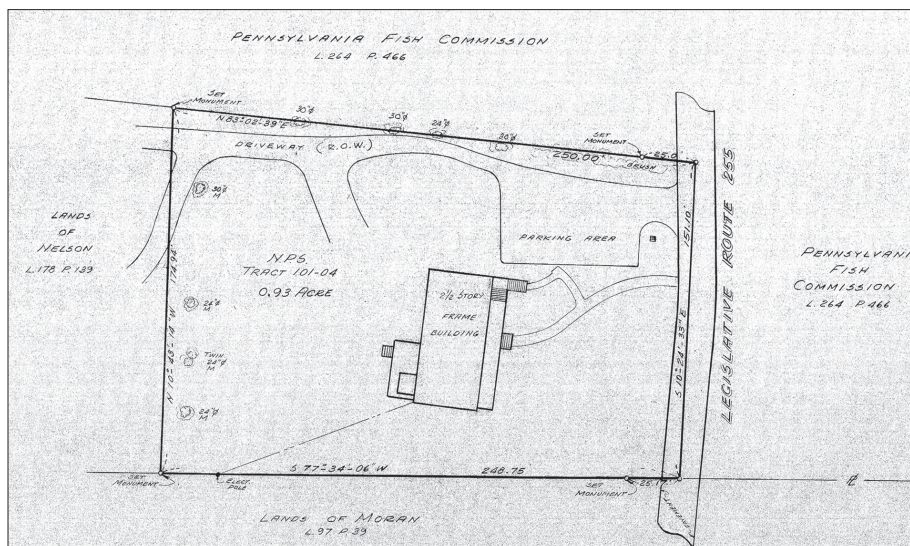


Figure 1.66. Plan showing the 0.93-acre Zane Grey house property at the time of its transfer to the federal government. Former Grey family lands to the west and south were under Nelson and Moran ownership. ("Survey of Land in the Township of Lackawaxen, Pike County, PA," National Park Service, Tract 101-04, July 1989. From O'Donnell et al., *Zane Grey Family Property, Lackawaxen, PA, Preliminary Cultural Landscape Assessment 1991*: 17)

The 1989-1990 Short and Ford report included a "Preliminary Cultural Landscape Assessment" by Landscapes, a historic preservation and documentation firm based in Connecticut. The assessment articulated the need for a comprehensive landscape treatment plan. In 1999 this firm completed a report that documented the site's history and developed landscape treatment recommendations for the entirety of the original Zane Grey property (Figure 1.71). The plan recommended a preservation treatment for Parcel B, the only



Figure 1.67. Zane Grey House and Museum and its sign, 1999. Note also the bluestone walkway and brick and bluestone steps. (O'Donnell et.al., *Cultural Landscape Treatment Plan [CLPT] for the Zane Grey Property, Lackawaxen, Pennsylvania. Prepared for the National Park Service, Upper Delaware Scenic and Recreational River, Lackawaxen, Pennsylvania, 1999: 47)*

parcel owned by the park at that time. Specific recommendations included removing non-historic trees, replanting missing trees, and replacing over-mature trees in-kind. The plan proposed replacing the apple trees in the orchard with crabapples, a proposal ultimately rejected by the park as it would diminish the historical integrity of the property. The park instead opted to propagate the existing aged trees and replant the grafted genetically identical species. The plan

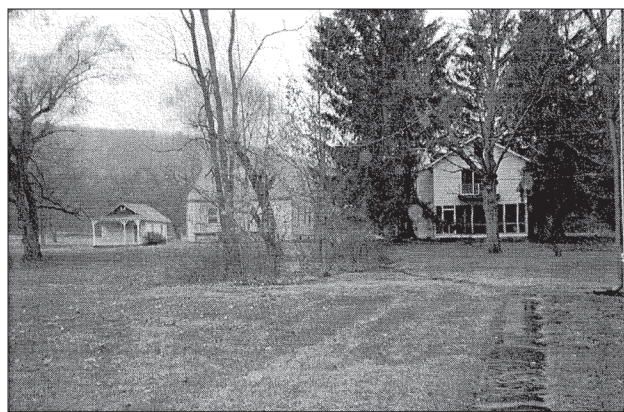


Figure 1.69. View facing west of Nelson house framed by tall Norway spruce and adjacent buildings on Moran-Hurley property, 1999. Note also bluestone walkway, shrub and tree area in the center, willow to the left and extant maple tree near main axis of Nelson house. (LANDSCAPES, *Cultural Landscape Treatment Plan [CLPT] for the Zane Grey Property, 1999: 51)*



Figure 1.70. View looking southwest from the Pennsylvania Fish and Boat Commission parking lot, 1998. Mature pines, locust, ash and blue spruce mark the boundary between the parking lot and the Zane Grey Museum and Nelson properties. (LANDSCAPES, *Cultural Landscape Treatment Plan [CLPT] for the Zane Grey Property, 1999: 48)*

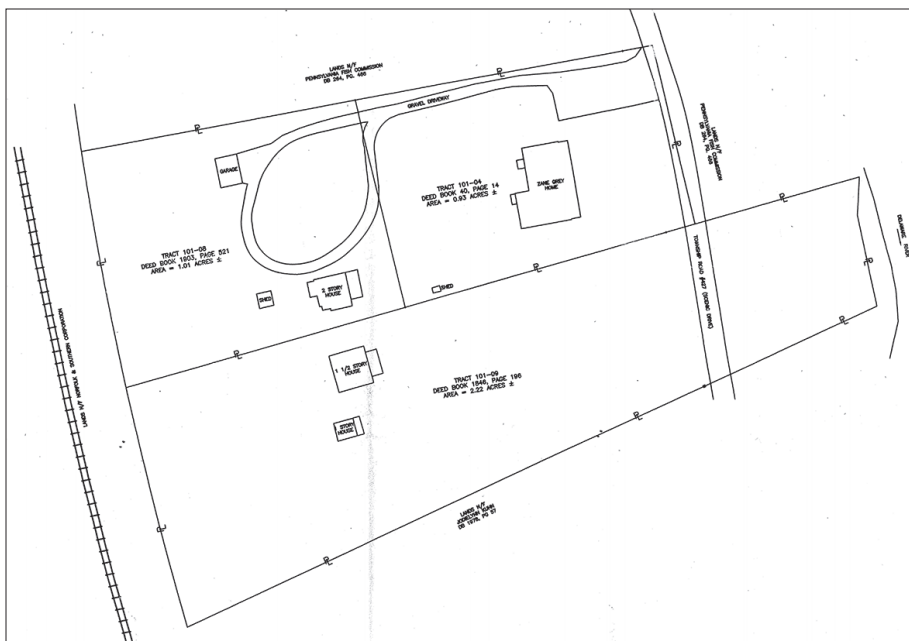


Figure 1.68. Map of parcels acquired in 1998 and 2000. ("Boundary & Topographic Survey, Zane Grey Home," Upper Delaware Scenic and Recreational River, Drawing #467-80033, February 2009. From Denver Service Center, eTIC)

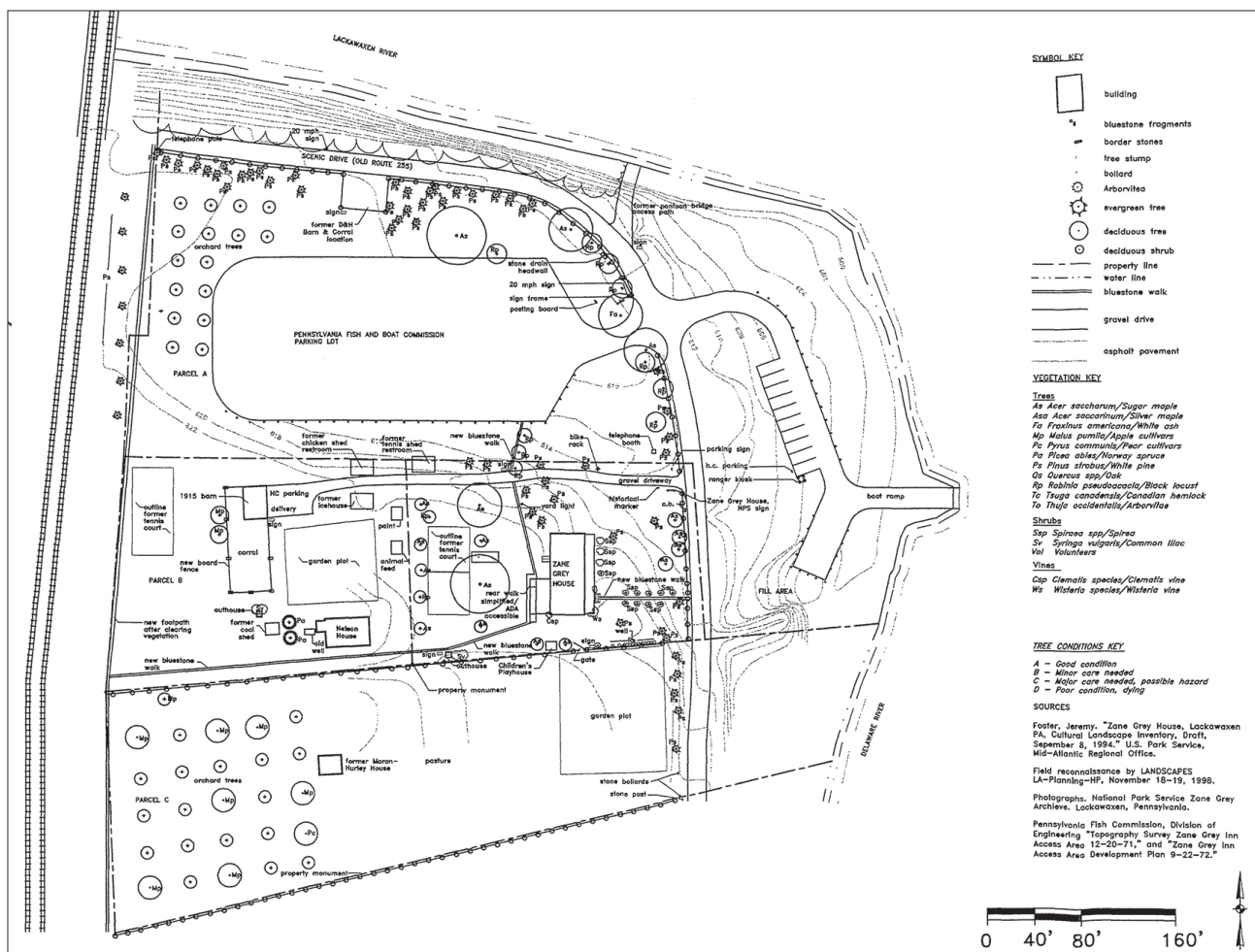


Figure 1.71. Landscape treatment plan for the Zane Grey site, 1999. ("Preservation Treatment Plan, Zane Grey Site," Cultural Landscape Treatment Plan, Lackawaxen, Pennsylvania, Figure 1.#48, December 1999. From LANDSCAPES, *Cultural Landscape Treatment Plan for the Zane Grey Property Lackawaxen, Pennsylvania*, 1999: 73)

also proposed the reconstruction of six missing structures including two outhouses, the children's playhouse, icehouse, tennis shed, and a chicken shed. In 2007 the park reconstructed the outhouse between the Zane Grey house and the Ida and Josephine Grey house, approximately halfway between the two buildings, to store the propane tanks that fuel the property's electric generator.¹⁰⁴

As accessibility to the Zane Grey property was not fully addressed in the 1999 report, the Olmsted Center for Landscape Preservation prepared a subsequent "Cultural Landscape Treatment Plan" in 2008 (Figure 1.72). The report's annotated map included recommendations for installing an accessible path from the Pennsylvania Fish and Boat Commission lot to the west side of the Zane Grey house, constructing an accessible ramp at the Zane Grey house back (west) entrance, and relocating the visitor park-

ing from the lot north of the house to the state lot. In 2014 an agreement was finalized with the state regarding visitor parking in the Pennsylvania Fish and Boat Commission lot. The accessibility project was initiated in 2020.¹⁰⁵

The 2008 plan also reiterated some of the recommendations from the 1999 report, such as outlining the former garden plots and tennis courts, reconstructing historic fences, removing non-historic vegetation, installing new evergreen plantings between Parcels A and B, and removing the Moran house. In 2011 the park's National Register of Historic Places documentation of the Zane Grey property determined that the Moran house, Moran kitchen, and Ida and Josephine Grey house were non-contributing features.¹⁰⁶

Recent Planning and Projects

only 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). On the Pennsylvania side at the aqueduct, the survey did not remark on the remnant walls or filled in canal bed and turning basin, but did note the canal prism, towpath, and an abutment of the Lackawaxen Aqueduct to the west. The report's authors recommended acquisition of canal remains upstream and downstream from Roebling's Delaware Aqueduct on the New York side.¹⁰⁸

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 D&H Canal historic district in the vicinity of Roebling's Delaware Aqueduct, which in addition to the former aqueduct could include the toll house and three D&H Company houses. It was around this time that a portion of the east stone wall of Lock 71 collapsed.¹⁰⁹

87

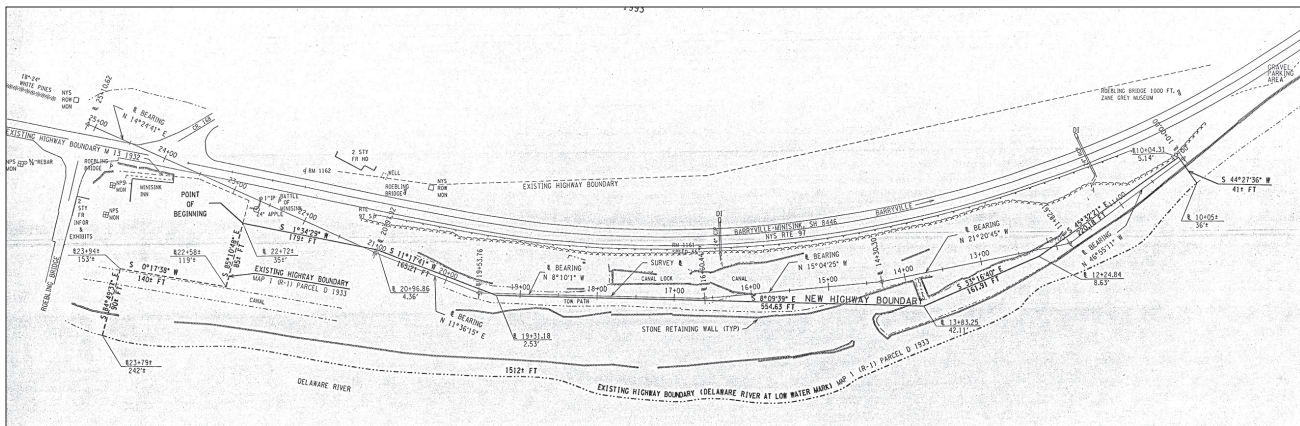


Figure 1.73. Map showing the Vollkommer property, 1994. ("Preliminary Plan, Abandonment Map," State of New York, Department of Transportation, Drawing AB-1, February 1994. From UPDE Archives, RL02-050)

As noted earlier, the 1986 "Final River Management Plan" proposed exploring the use of voluntary agreements with property owners who had intact features of the D&H Canal. Deteriorated sites would receive management limited to stabilization, clearing of vegetation, and debris removal. In the plan 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.¹¹⁰

In the 1990s the federal government began purchasing canal remnants on both sides of Roebling's Delaware Aqueduct. On the New York side south of the aqueduct/bridge, the park acquired a 2.95-acre Vollkommer property, (tract 104-06) by 1995 that included the original canal prism and associated walls, the old towpath and associated walls, towpath breach, and a portion of the new towpath and towpath retaining walls (Figure 1.73). However, part of the remains of Lock 71, the former sites of Locks 70 and 72, and the state's diversion dam remained within the

state's Route 97 right-of-way. On the Pennsylvania side north of the aqueduct/bridge, 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.¹¹¹

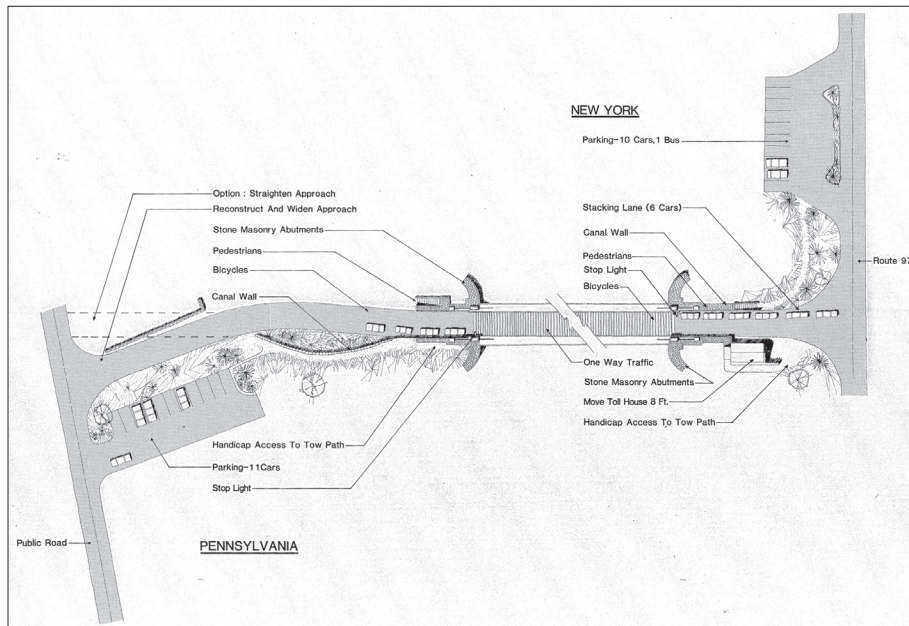


Figure 1.74. Facility development plan for Roebling's Delaware Aqueduct, 1985. ("Approach Road Plan," Delaware Aqueduct, Roebling Bridge Reconstruction, Located within Park, Minisink NY, Lackawaxen PA, Upper Delaware Scenic and Recreational River, Drawing #647-80015, January 1986. From UPDE Archives, RL02-050)

DEVELOPMENT OF VISITOR FACILITIES

The 1986 "Final River Management Plan" identified the need to provide facilities for management and use of the park. At Roebling's Delaware Aqueduct, the plan proposed the acquisition of additional 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 aqueduct/bridge: a lot for ten cars and a bus on the New York side north of the approach road, and a lot for eleven cars on the Pennsylvania side south of the approach road (Figure 1.74). The drawing also proposed accessible access to the aqueduct towpaths, a shift in the location of the toll house, and relocation of the Margold house in order to straighten the approach road on the Pennsylvania side.¹¹²

Federal acquisition of lands for the two parking areas occurred in the late 1980s and early 1990s. On the New York side north of the aqueduct/bridge, the park assembled 1.77 acres of land from John Kelly, the Trust for Public Lands, and an easement from Sullivan County (tracts 101-03, 101-05, 101-06) in 1988-1992. On the Pennsylvania side south of the aqueduct/bridge, the park acquired 1.38-acres of land (tract 101-07) in 1993.¹¹³

With lands in hand, a “Schematic Design/Environmental Impact” report was prepared in 1994, which refined earlier facility plans on both sides of the river (Figure 1.75). 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 would be achieved by management and maintenance practices that varied in intensity.¹¹⁴

On the New York side, the 1994 schematic plan showed a parking lot for ten 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 aqueduct/bridge abutment, and waysides and information kiosks (Figure 1.76). Unlike the 1986 proposal, the toll house was not moved. The park revised and finalized the design, and constructed the facilities in the mid-1990s (Figure 1.77). New plantings included groupings of swamp

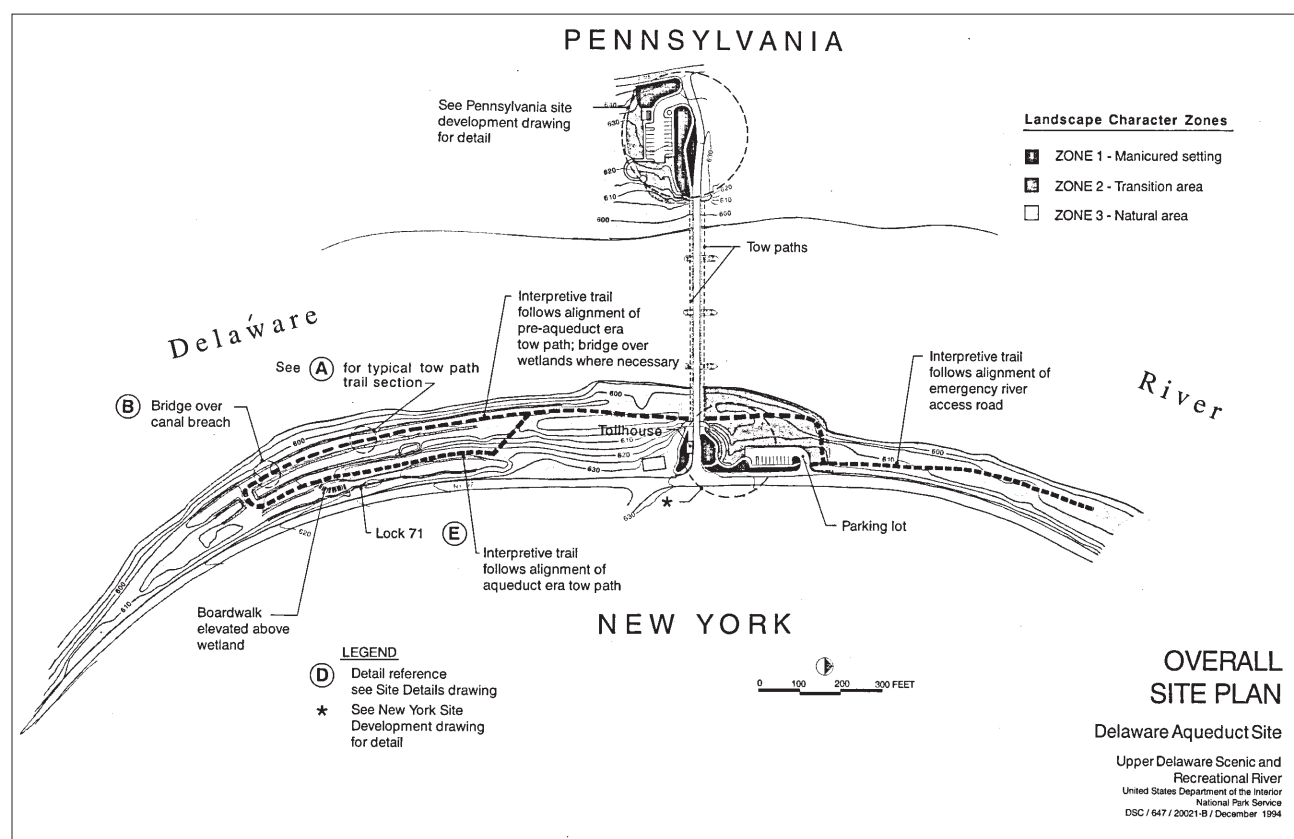


Figure 1.75. Site plan for Roebling's Delaware Aqueduct, 1994. ("Overall Site Plan, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20021-B, December 1994. From National Park Service, *Delaware Aqueduct Site, Schematic Design/Environmental Assessment*, 1994: 15)

white oak, black chokeberry, and lowbush blueberry at the south end of the lot and red maple, hawthorn, winterberry, and blueberry at the north end. 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.¹¹⁵

On the Pennsylvania side, the 1994 schematic plan showed a parking lot for seventeen cars, an emergency river access

road from the east end of the lot to the river, a restroom building with composting toilet, an accessible walk from the parking lot to the south side of the former aqueduct's abutment, a boardwalk to an overlook southeast of the parking lot, waysides and information kiosks, and a wood model of a bridge truss (Figure 1.78). Unlike the 1986 proposal, the skewed alignment of the approach road was left intact, thus preserving the Margold house. The overlook

was moved to the east end of the parking lot in the final design, which was completed in the late 1990s (Figure 1.79). Plantings installed on the west, east, and especially south sides of the lot included hackberry, dogwood, white pine, willow oak, lowbush blueberry and blackhaw viburnum.¹¹⁶

Development of park 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 (see Figure 1.79). The park moved into the facility in 2000.¹¹⁷

Towpath Trail

The 1994 "Schematic Design/Environmental Impact" report included plans for a loop trail atop the original canal (feeder canal) and new canal towpaths on the New York side (Figure 1.80, see also Figure 1.75). The proposed route would begin with a new access road/trail from the north end

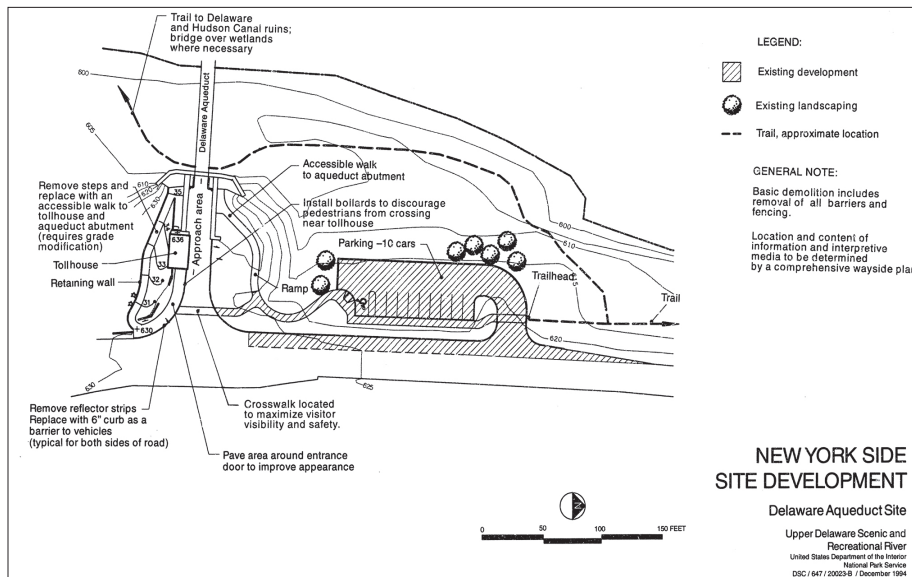


Figure 1.76. Site plan for New York side of Roebling's Delaware Aqueduct, 1994. ("New York Side, Site Development, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20023-B, December 1994. From National Park Service, *Delaware Aqueduct Site, Schematic Design/Environmental Assessment*, 1994: 43)

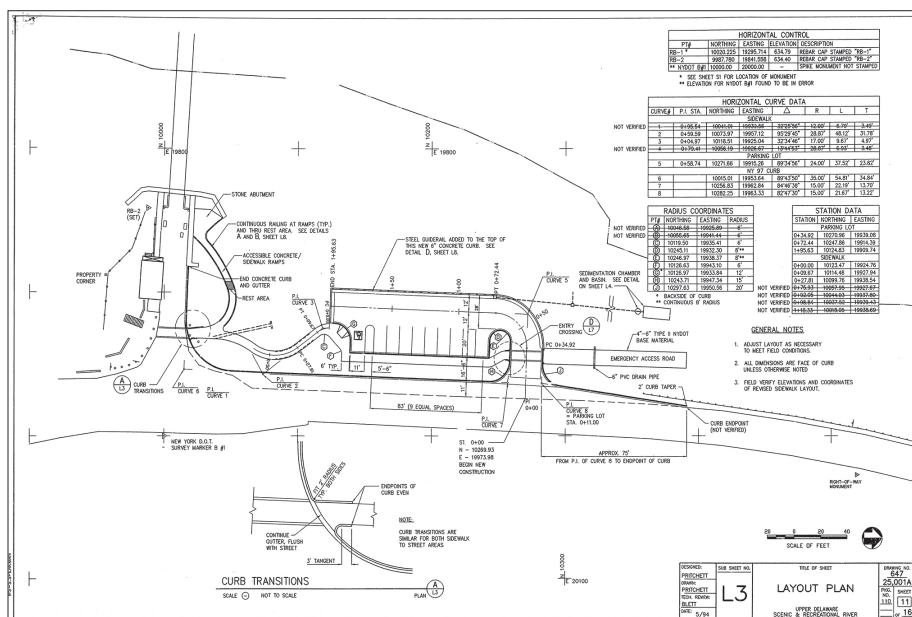


Figure 1.77. Site plan for New York side, 1994. ("Layout Plan," Upper Delaware Scenic and Recreational River, Drawing #647-25001, May 1994. From Denver Service Center, eTIC)

of the new parking lot heading southwest down the hillside to under Roebling's Delaware Aqueduct, then continue south along the towpath to the state's diversion dam, turn north to the "new canal" towpath and pass alongside Lock 71, and then descend northwest down the hill to cross the feeder canal and meet the feeder canal towpath. A 6-foot hard surface was proposed, along with a rustic footbridge with railings over the breach in the feeder canal towpath and a footbridge over the feeder canal prism. The park also planned to remove hazardous trees within the canal trace and install several waysides. Completion of the eastern part of the loop was contingent on acquiring the portions of Lock 71 still in the Route 97 right-of-way.¹¹⁸

The access road/trail and portions of the towpath trail were constructed, but recurring flood and storm damage delayed and altered plans for the remainder of the trail loop. Hurricane Ivan in September 2004 and above-normal rainfall in April 2005 produced near-record high water events and caused a partial collapse of part of the aqueduct/bridge's stone wing wall extending upstream (north) from the New York side abutment (Figure 1.81). The storms also damaged the access road/trail from the parking lot to the towpath and portions of the trail itself. In September 2005 the park installed an emergency stabilization treatment of rip rap and a temporary culvert 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 existing historic wing wall and be engineered to meet current structural and safety requirements.¹¹⁹

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

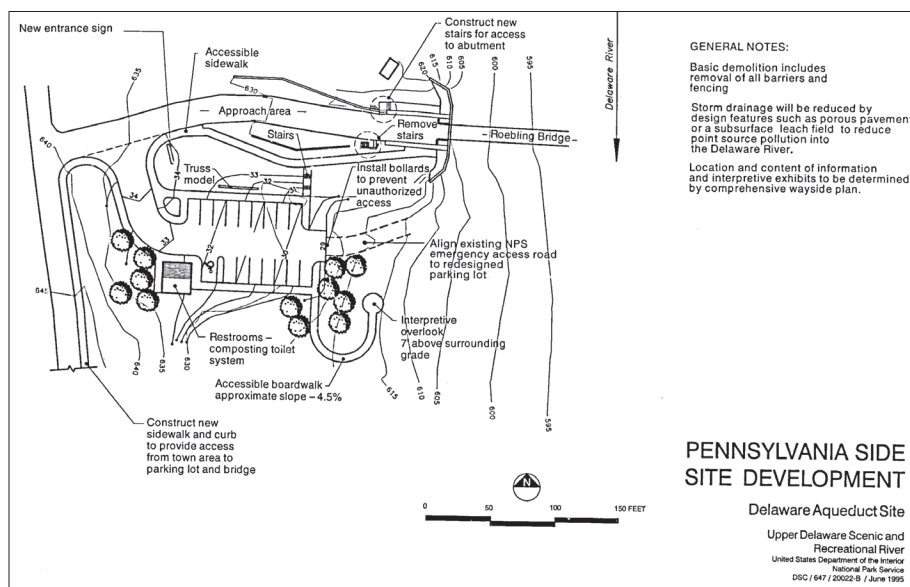


Figure 1.78. Site plan for Pennsylvania side of Roebling's Delaware Aqueduct, 1994. ("Pennsylvania Side, Site Development," Upper Delaware Scenic and Recreational River, Drawing #647-20022-B, June 1995. From National Park Service, *Delaware Aqueduct Site, Schematic Design/Environmental Assessment*, 1994: 44)

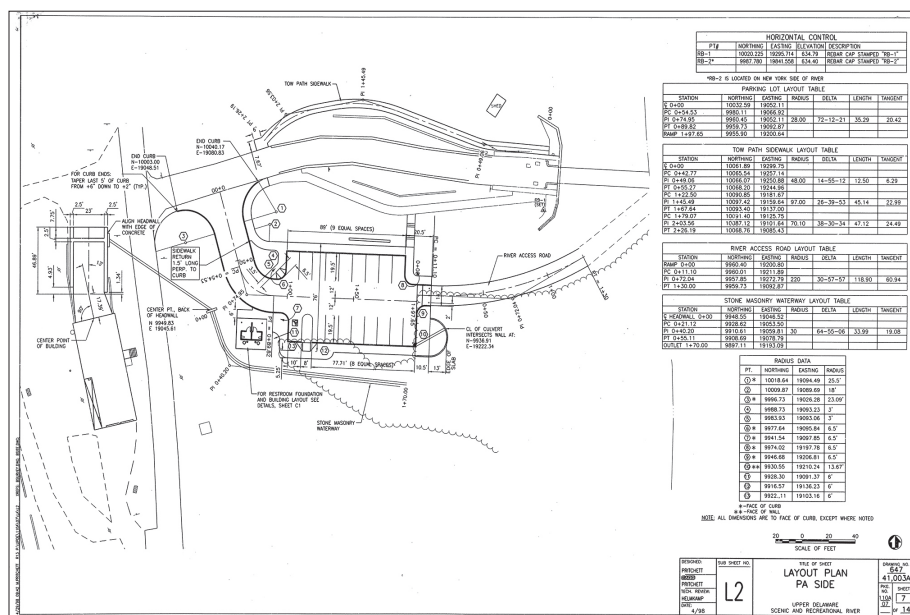


Figure 1.79. Site plan for the Pennsylvania side, 1998. ("Layout Plan, PA Side," Upper Delaware Scenic and Recreational River, Drawing #647-41003-A, April 1998. From Denver Servie Center, eTIC)

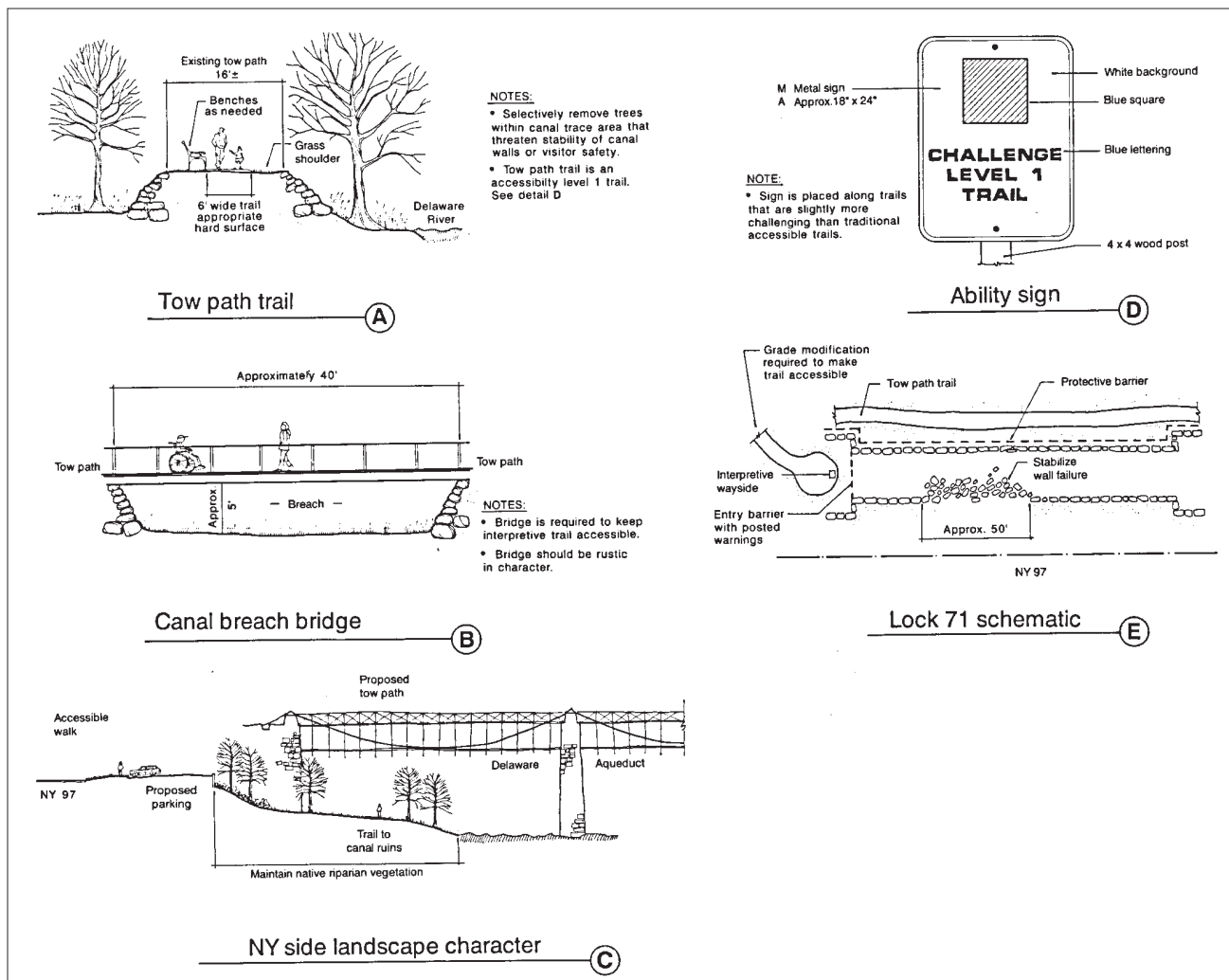


Figure 1.80. Site plan details for canal trails on New York side of Roebling's Delaware Aqueduct, 1994. ("New York Side, Site Details, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20024-A, December 1994. From National Park Service, *Delaware Aqueduct Site, Schematic Design/Environmental Assessment*, 1994: 45)

of dry stone masonry. However, in June 2006 a third flood of record in 18 months struck the Upper Delaware River valley, raising the river level to within feet of the aqueduct/bridge's road deck (Figure 1.82). 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 access road/trail material, as well as causing damage to a section of one of the aqueduct/bridge's trunk walls and all three of its ice breakers.¹²⁰

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 access road/trail and towpath. The large volume of riprap and gravel that was scoured from the access road/trail and hillside stabilization in the 2005 and 2006 floods and deposited in the feeder canal was also removed. A culvert was installed at the location of a former footbridge to channel water under the access road/trail, from feeder canal to the river. Repairs of the ice breakers were completed in 2009.¹²¹

The floods of 2004-2006 resulted in other improvement and stabilization projects. In June 2008 the Olmsted Center for Landscape Preservation and park staff removed around

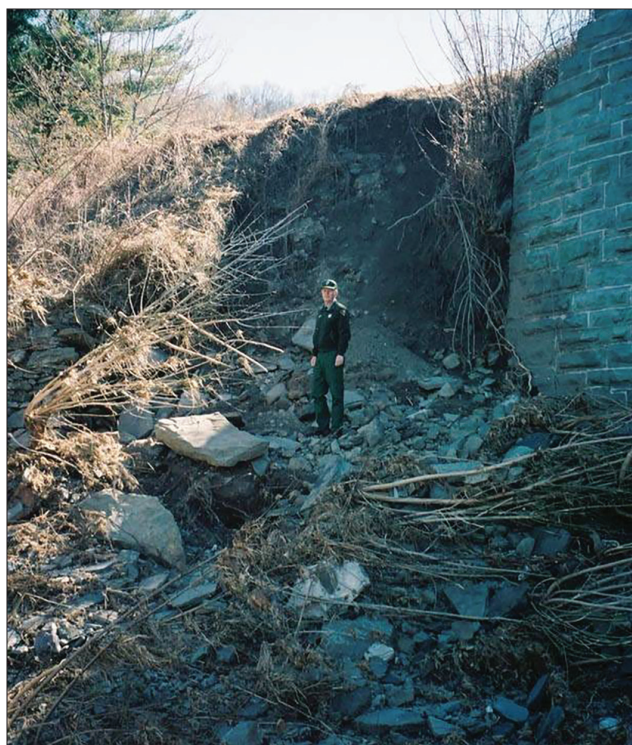


Figure 1.81. View of the northeast wing wall of Roebling's Delaware Aqueduct after a storm in 2005. ("Flood Damage-NY Upstream retaining wall 2.2." UPDE Archives)



Figure 1.82. View looking northeast during severe flooding in July 2006. (*Family Stories New York: Eldred, Barryville, the Delaware River*. From <http://weezy.info/category/eldred/page/2>)

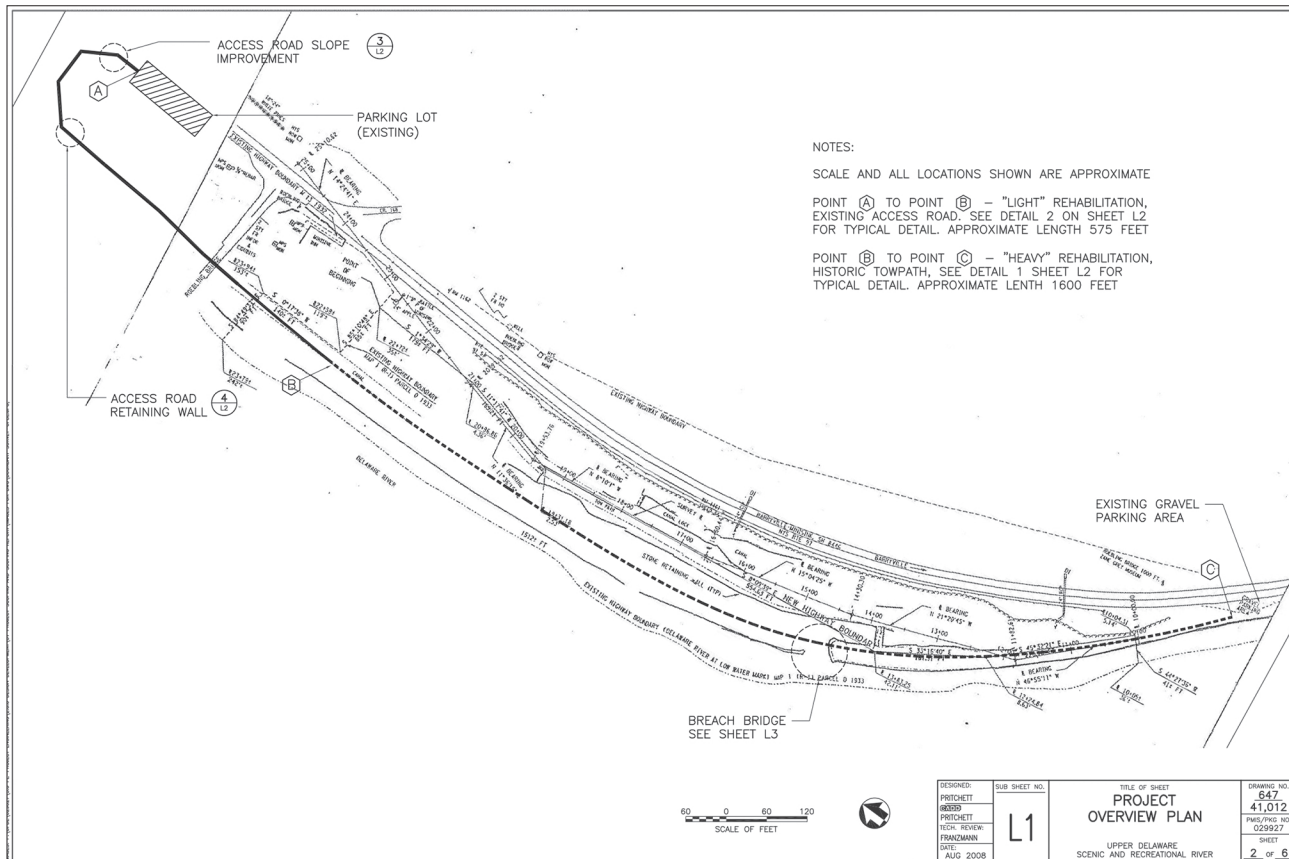


Figure 1.83. Drawing of the rehabilitation plan for the Towpath Trail, 2008. ("Project Overview Plan," Upper Delaware Scenic and Recreational River," Drawing #647-41012, August 2008. From PEPC #79690)



Figure 1.84. View looking south from the access road/trail on the New York side, 2018. Vegetation removals proposed in 2018 were outlined in red. (PEPC #79690)



Figure 1.85. View looking south from the Towpath Trail on the New York side, 2018. (PEPC #79690)

70 hazardous and dead trees along the Towpath Trail and adjacent stone walls, south of Roebling's Delaware Aqueduct. In 2008-2009, the surface of the Towpath Trail was rehabilitated to improve resistance to flood damage and meet outdoor developed area accessibility standards (Figure 1.83). A new covered concrete culvert was installed in the towpath breach to allow continuation of the trail to a small parking lot to the south and to improve resistance to future high water events in the feeder canal. A dry laid stone wall was built at each culvert abutment and along the access road/trail near the New York parking lot. Flooding and storms in 2010 and 2011 again also caused damage to the access road/trail. To date the section of proposed trail on the new canal towpath has not been built.¹²²

Recent Planning and Projects

The damp climate of the Upper Delaware River valley requires constant maintenance of Roebling's Delaware Aqueduct, especially its wood components. Completed or proposed work includes 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. Several projects have been recently completed or are planned along the Towpath Trail, including removal of invasive, volunteer, and hazardous vegetation, and the installation of temporary benches (Figures 1.84, 1.85).¹²³

ENDNOTES

- 1 RB CLI 2016: 60; ZG CLI 2014: 31; UPDE website, accessed 17 June 2014 and 14 March 2015; Hunter Research 1990: 3-2
- 2 RB CLI 2016: 60; UPDE website, accessed 14 March 2015
- 3 RB CLI 2016: 60; UPDE website, accessed 14 March 2015
- 4 RB CLI 2016: 60; UPDE website, accessed 14 March 2015
- 5 RB CLI 2016: 60; UPDE website, accessed 14 March 2015
- 6 RB CLI 2016: 62; AOA 2008: 52-60, citing Schrabisch 1930: 74
- 7 RB CLI 2016: 61; (ZG CLI 2014: 31-32; Dekin 1983: 3-45; EIS 1987: 98; Discover Pike website: 7 July 2014
- 8 ZG CLI 2014: 31-32; RB CLI 2016: 61; Discover Pike website: 7 July 2014; Dekin 1983: 3-44; Route 97 Report 2001: n.p.
- 9 RB CLI 2016: 61; UPDE website, accessed 14 March 2015
- 10 RB CLI 2016: 62; Dekin 1983: 2-46-48,59
- 11 RB CLI 2016: 62, from EIS 1987: 98-99
- 12 RB CLI 2016: 62, from Curtis 1992, Sec.E: 2-3; Dekin 1983:3-46,49,67-68,71,74
- 13 RB CLI 2016: 62-63, from Dekin 1983: 3-50; Curtis 1992, Sec.E: 3
- 14 RB CLI 2016: 63, from Dekin 1983: 3-51-52; EIS 1987: 99; Curtis 1992, Sec.E: 4
- 15 RB CLI 2016: 63, from Dekin 1983: 3-53-57,64,111; Review comments from Carla Hauser Hahn, 18 August 2016
- 16 RB CLI 2016: 63, from Dekin 1983: 3-65-66
- 17 RB CLI 2016: 63-64, from Dekin 1983: 3-73-74,78-80; EIS 1987: 100; Review comments from Carla Hauser Hahn, 24 May 2016
- 18 RB CLI 2016: 64, from Dekin 1983: 3-82-83
- 19 RB CLI 2016: 64; Dekin 1983: 3-83; ZG CLI 2014: 32; Bracken 1997: 7-9,16; Review comments, Paul King, 21 October 2021
- 20 RB CLI 2016: 64; Dekin 1983: 3-83-84
- 21 RB CLI 2016: 64-65; Dekin 1983: 3-84
- 22 RB CLI 2016: 65; HAER PA-1, 1969: 3; DeNio 1988: 108
- 23 RB CLI 2016: 65; AOA 2008: 86; Dekin 1983: 3-84-85, citing Wakefield 1965: 93-122; HAER PA-1, 1969: 2
- 24 RB CLI 2016: 65
- 25 RB CLI 2016: 65-66
- 26 RB CLI 2016: 66; HAER PA-1, 1969: 2-3
- 27 RB CLI 2016: 66; Scott and Hauptman 1981: 3; Dekin 1983: 3-86
- 28 RB CLI 2016: 66; HAER PA-1, 1969: 3; Vogel 1998: 3
- 29 RB CLI 2016: 66-67; Vogel 1998: 6-7; Wakefield 1965: 84
- 30 RB CLI 2016: 67; Vogel 1998: 9; HAER PA-1 Addendum, 1988: Sht 3
- 31 RB CLI 2016: 67; Vogel 1998: 10

- 32 RB CLI 2016: 67; Vogel 1998: 10
- 33 RB CLI 2016: 67-68; Vogel 1998: 11, citing Lord to Roebling, 22 March 1847
- 34 RB CLI 2016: 68; Vogel 1998: 11; Wakefield 1965: 84
- 35 RB CLI 2016: 68; HAER PA-1 1969: 5; Wakefield 1965: 86
- 36 RB CLI 2016: 68; Vogel 1998: 25, citing Annual Report, 1849: 3
- 37 RB CLI 2016: 69; Route 97 Report 2001: np
- 38 RB CLI 2016: 70; EIS 1987: 100; Dekin 1983: 3-95
- 39 RB CLI 2016: 70; EIS 1987: 101; Dekin 1983: 3-54,100-101,108; Carrol et.al. 1982: 11; Town of Highland website, accessed 8 March 2016
- 40 RB CLI 2016: 70, from EIS 1987: 101; Dekin 1983: 3-54,100-101,108; Carrol et.al. 1982: 11; Town of Highland website, accessed 8 March 2016
- 41 Dekin 1983: 6-90; “Pennsylvania Historic Resources Survey Form, L-L16”; “Pennsylvania Historic Resources Survey Form, L-L17”; email, L. Hauptman, 26 October 2020
- 42 Dekin 1983: 6-189-191
- 43 Dekin 1983: 6-92-93; HAER PA-24, 2001; Curtis 1987: np; CLTP 1999: 6; NR 1993 Sec.8: 1
- 44 RB CLI 2016: 69; Dekin 1983: 3-70,5-108; EIS 1987: 100-101; Carrol et.al. 1987: 10
- 45 RB CLI 2016: 70; Vogel 1998: 25
- 46 RB CLI 2016: 70; Dekin 1983: 3-86,88,95; Whitford 1906: 751
- 47 RB 2016: 80; HSR 1983: 96-97,102,108)
- 48 RB 2016: 80-81; HSR 1983: 103,105,108,121,128; Vogel 1998: 25; HAER PA-1 Addendum, 1988: Sht 2; LCS 2016)
- 49 RB 2016: 81; Wikipedia, Pennsylvania Route 590)
- 50 RB 2016: 81)
- 51 “Pennsylvania Historic Resources Survey Form, L-L22”; Curtis 1987: np)
- 52 “Pennsylvania Historic Resources Survey Form, L-L19, L-L20, L-L21)
- 53 NR 1993, Sec.8: 2
- 54 Email, L. Hauptman, 26 October 2020
- 55 “Pennsylvania Historic Resources Survey Form, L-L15”
- 56 ZG 2014: 36; CLTP 1999: 6-8; HABS No. PA-5371: 2
- 57 HABS PA-5371, 1989: 2
- 58 ZG 2014: 38; UPDE website, 17 June 2014; NR 2011, Sec.8: 16
- 59 ZG 2014: 38; HFR 2003: 27; NR 2011, Sec.8: 17, citing Landscapes 1999: 10; HSR 1990: B3; HABS PA-5371, 1989: 3
- 60 ZG 2014: 38; NR 2011, Sec.8: 17; HFR 2003: 47; HABS PA-5371, 1989: 3)
- 61 ZG 2014: 38, from National Register 2011, Sec.8: 17; HFC 2003: 47; Review comments, Lauren Laham, 3 March 2021
- 62 ZG 2014: 38-39; NR 2011, Sec.8: 17
- 63 ZG 2014: 39; NR 2011, Sec.8: 17; HFR 2003: 110; CLTP 1999: 39

- 64 ZG 2014: 39; NR2011, Sec.8: 17; HSR 1990: np; HFR 2003: np; “Pennsylvania Historic Resources Survey Form, L-L15.”
- 65 ZG 2014: 39; NR 2011, Sec.8: 17-18
- 66 ZG 2014: 40; NR 2011, Sec.8: 17; HFR 2003: 29
- 67 ZG 2014: 40; HFR 2003: 29
- 68 ZG 2014: 40; HFR 2003: 29, citing Zane Grey Diary, 5 October 1917: 151
- 69 ZG 2024: 40-41, citing NR 2011, Sec.8: 18; CLTP 1999: 20
- 70 ZG 2014: 40, NR 2011, Sec.8: 18; HABS PA-5371, 1989: 8; HFR 2003: 28-29, citing Zane Grey to Dolly Grey, 1928, Farley Collection: 343
- 71 ZG 2014: 41, from NR 2011, Sec.8: 18, citing Pauly 2005: 276
- 72 RB 2016: 82; Vogel 1998: 26; HSR 1983: 112,117,121,269
- 73 ZG 2016: 82; Dekin 1983: 3-118,119; Route 97 Report, 2001: np
- 74 RB 2016: 82-83; Route 97 Report, 2001: np; Dekin 1983: 3-119
- 75 RB 2016: 83
- 76 RB 2016: 83; De Vries 2007: II-4; EIS 1987: 101
- 77 RB 2016: 83; HSR 1983: 126-128
- 78 RB 2016: 44,83; Vogel 1998: 26; HSR 1983: 126-127
- 79 RB 2016: 83-84; HSR 1983: 139-140
- 80 RB 2016: 84; HSR 1983: 143-145, citing New York Times, 16 April 1979
- 81 Curtis 1987: np
- 82 ZG 2014: 41-42; NR 2011, Sec.8: 18-19; HFR 2003: 38
- 83 ZG 2014: 41; CLTP 1999: 25
- 84 ZG 2014: 41-42; NR 2011, Sec.8: 18-19; HFR 2003: 38
- 85 ZG 2014: 46; HFR 2003: 113
- 86 ZG 2014: 46; HFR 2003: 88,114; CLTP 1999: 27
- 87 ZG 2014: 46; CLTP 1999: 27; HFR 2003: 115
- 88 ZG 2014: 46-47
- 89 RB 2016: 90; Final River Management Plan 1986: 177, citing Wild and Scenic Rivers Act, Section 1271
- 90 RB 2016: 90-91; EIS 1987: 101
- 91 RB 2016: 91; Scott and Hauptman 1981: n.p.; FD 2014: 3; RMP 1994 draft: 1
- 92 RB 2016: 92; RMP 1994 draft: 1; FD 2014: 3
- 93 RB 2016: 148; ZG 2012: 83; Final River Management Plan 1986: 77,81-83,88
- 94 RB 2016: 91; HSR 1983: 147, citing New York Times, 26 April 1979
- 95 RB 2016: 91; HSR 1983: 163,165-167; HSR 1987: 32
- 96 RB 2016: 92; HSR 1983: 165-167

- 97 RB 2016: 92; Shultz 1998: n.p.; NR 1992, Sec.F: 7
- 98 RB 2016: 92; Sasser 1990: 1-2
- 99 ZG 2014: 46; CLTP 1999: 27; HFR 2003: 115
- 100 ZG 2014: 47
- 101 ZG 2014: 47-48,83; Administrative History 2002 draft: 76
- 102 ZG 2014: 48; NR 2011, Sec.8: 8,19; Administrative History 2002 draft: 76
- 103 ZG 2014: 48; NR 2011, Sec.8: 8,19; Administrative History 2002 draft: 76
- 104 ZG 2012: 83; CLPT 1999: 69-70
- 105 ZG 2014: 48,83
- 106 ZG 2012: 48,83; Review comments, Carla Hauser Hahn, 24 May 2016
- 107 PEPC 72534, 65084; 52457, 52504, 70089
- 108 RB 2016: 93; Scott and Hauptman 1981: n.p.
- 109 RB 2016: 93; Dekin 1983: 80,83
- 110 RB 2016: 93; Final River Management Plan 1986: 77,81,83,88
- 111 RB 2016: 93
- 112 RB 2016: 93-94; Final River Management Plan 1986: 87-88
- 113 LandsNet, Upper Delaware Scenic and Recreational River, Sullivan County New York, Pike County Pennsylvania, Segment 101, November 2015
- 114 RB 2016: 94, SD/EA 1994: 5
- 115 RB 2016: 94; Fiedel and Decker 2008: 52,57,60
- 116 RB 2016: 94, from Drawing 647-20022, 1994; Drawing 647-41003A, 1998
- 117 SD/EA 1995: 5; Drawing 647-41002, 1993
- 118 RB 2016: 94-95; SD/EA 1994: 5-6,15
- 119 RB 2016: 94-95; Review comments, Carla Hauser Hahn, 24 May 2016 and 22 August 2016
- 120 RB 2016: 95, from Ballos and Hahn 2009
- 121 RB 2016: 95, from Ballos and Hahn 2009
- 122 RB 2016: 95-96; Memorandum, Hahn to Martinez, et.al. 30 June 2008; Pritchett 2010: np; Review comments, Carla Hauser Hahn, 24 May 2016; PEPC 19005
- 123 RB 2016: 96; PEPC 81315, 97162, 79690; Review comments, Lauren Hauptman, 26 March 2021

ANALYSIS & EVALUATION

This chapter assesses landscape characteristics and features associated with Roebling's Delaware Aqueduct Site and the Zane Grey Property, as well as those in the area of privately-owned land located between these two federally-owned properties. The chapter summarizes the current status of National Historic Landmark Program and National Register of Historic Places documentation, and provides an evaluation of landscape characteristics and features within the CLR project area.

EXISTING NATIONAL HISTORIC LANDMARK AND NATIONAL REGISTER LISTINGS

The preservation of historic properties and resources that reflect our American heritage became a national policy through the passage of the Antiquities Act of 1906, the Historic Sites Act of 1935, and the National Historic Preservation Act of 1966, as amended. The Historic Sites Act authorized the Secretary of the Interior to identify properties of national significance (National Historic Landmarks) in United States history and archeology. The National Historic Preservation Act authorized the Secretary to expand this recognition to properties of local and state significance in American history, architecture, archeology, engineering, and culture. The National Register of Historic Places is the official federal list of these recognized properties.

According to the National Register, some part of a property's districts, sites, buildings, structures, or objects must meet at least one of the four criteria defined by the National Register of Historic Places Program. The properties must also have sufficient integrity of location, design, setting, materials, workmanship, feeling, or association.

- Criterion A: Associated with events that have made a significant contribution to the broad patterns of history; or
- Criterion B: Associated with the lives of persons significant in our past; or
- Criterion C: Embody the distinctive characteristics of a type, period, method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D: Yield or be likely to yield information on prehistory or history.

A National Historic Landmark (NHL) is typically identified through "theme studies" that consider related properties within a specific historic context, or through special studies of individual properties. The aspects of a NHL nomination that differ from a

Table 2.1: Summary of Property Listings

Site	Period of Significance	Area of Significance
Delaware & Hudson Canal and Roebling's Delaware Aqueduct	1825-1898 (New York) 1847-1898 (Pennsylvania)	Commerce (NHL Criteria I/NR Criterion A) Transportation (NHL Criteria I/NR Criterion A) Engineering (NHL Criterion IV/NR Criterion C)
Toll House	c.1908-1979	Commerce (NR Criterion A) Transportation (NR Criterion A)
D&H Canal Office (Roebling Inn)	c.1855-1898	Transportation (NR Criterion A) Architecture (NR Criterion C)
Zane Grey House Property	1906-1929	Literature (NR Criterion A and B)

National Register nomination are possessing “exceptional” national significance, national context, and high degree of integrity, and meeting a different set of criteria, described below.

- Criterion 1: Associated with events that have made a significant contribution to, and are identified with, or that outstandingly represent, the broad national patterns of United States history and from which an understanding and appreciation of those patterns may be gained; or
- Criterion 2: That are associated importantly with the lives of persons nationally significant in the history of the United States; or
- Criterion 3: Represent some great idea or ideal of the American people; or
- Criterion 4: Embody the distinguishing characteristics or an architectural type specimen exceptionally valuable for the study of a period, style, or method of construction, or that represent a significant, distinctive, and exceptional entity whose components may lack individual distinction; or
- Criterion 5: That are composed of integral parts of the environment not sufficiently significant by reason of historical association or artistic merit to warrant individual recognition but collectively compose an entity or exceptional historical or artistic significance, or outstandingly commemorate or illustrate a way of life or culture; or
- Criterion 6: That have yielded or may be likely to yield information of major scientific importance by revealing new cultures, or by shedding light upon periods of occupation of large areas of the United States. Such sites are those which have yielded, or which may reasonably be expected to yield, data affecting theories, concepts, and ideas to a major degree.

The park lands that comprise the study area of this Cultural Landscape Report include sites and historic resources that have been designated as National Historic Landmarks or are listed in the National Register of Historic Places: Roebling's Delaware Aqueduct, portions of the Delaware & Hudson Canal, the toll house, and the Zane Grey property (Table 2.1). In addition, a privately owned resource within the project area, the Roebling Inn, is also individually listed in the National Register. Other sites have been considered for inclusion in the National Register but have not yet been listed.

NATIONAL HISTORIC LANDMARK STATUS

Delaware & Hudson Canal and Roebling's Delaware Aqueduct

On November 24, 1968, the “Delaware and Hudson Canal” was designated with documentation as a National Historic Landmark (NHL). The designation was based on the findings of the *National Survey of Historic Sites and Buildings, Special Report, Delaware & Hudson Canal*, which identified significance under NHL Criteria I and IV and Theme XVIII (Travel and Communication). 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, among them Roebling's Delaware Aqueduct. The NHL designation did not describe any canal-era resources located on the Pennsylvania or New York sides of the aqueduct. Research for the 2016 Cultural Landscape Inventory (CLI) discovered written notes from 1988 by Mary Curtis, Upper Delaware SRR, 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 listing in 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.

The original NHL documentation was edited by the NHL Program in 2008, which identified additional themes: Theme V (Developing the American Economy) and Theme VI (Expanding Science and Technology). However, the update continued to focus on the five sites and did not include other remnant canal sections or features. Planning for a second NHL update is underway as of December 2022.¹

NATIONAL REGISTER OF HISTORIC PLACES STATUS

On November 27, 1992, the Multiple Property Documentation Form (MPDF) for "Historic and Architectural Resources of the Upper Delaware Valley, New York and Pennsylvania," was accepted by the Keeper of the National Register. The MPDF identified eight property types and three historic contexts with which to inventory and nominate resources to the National Register. The property types were historic districts, residences, religious properties, transportation resources, industrial properties, commercial properties, schools, and military sites. The historic contexts were Upper Delaware Exploration, Trade and Early Settlement, 1614-1810; Upper Delaware Transportation, 1614-1942; and Upper Delaware Industry, 1614-1942. The MPDF did not address features for the D&H

Canal itself since "it is the basis of a 1968 National Historic Landmark designation," but did include associated buildings associated with the canal, such as stores, locktenders' houses, and residences. The MPDF references several resources within the project area, as described below.²

Delaware & Hudson Canal and Roebling's Delaware Aqueduct

With passage of the National Historic Preservation Act in 1966, the D&H Canal was automatically listed on the National Register, but without documentation. In June 1983, the significance of Roebling's Delaware Aqueduct was described in a National Register Nomination Form, "Delaware Aqueduct," prepared by Harlan D. Unrau. Significance was identified under criteria A and C in the areas of Transportation, Engineering, and Architecture, for the nineteenth century (no specific period listed). However, the form was not submitted to the New York SHPO or the Keeper of the National Register for concurrence, and thus was not officially listed on the National Register.³

The 1992 MPDF identified Roebling's Delaware Aqueduct (1848) and the D&H Canal (1828, 1848) under the Transportation Resources property type and the "Upper Delaware Transportation, 1614-1942" historic context. The form described the aqueduct and canal's development and associations with the local communities. Significance was identified under Criterion A for its direct association with the historic development of Lackawaxen, Criterion B for its association with John Roebling, and Criterion C for its unique construction values. To date, Roebling's Delaware Aqueduct and the D&H Canal are listed without documentation in the National Register.⁴

On March 15, 1995, the New York 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 Roebling's Delaware Aqueduct, the tract included the "original canal" prism and associated walls, the old towpath and associated walls, and a portion of the new canal towpath and towpath retaining walls. The DOE identi-

fied 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 Roebling'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 immediately after 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.⁵

On August 24, 2016 and September 9, 2016, the New York and Pennsylvania SHPOs, respectively, concurred with the National Park Service that Roebling's Delaware Aqueduct and the D&H Canal were eligible for listing in the National Register, as part of their review of the Cultural Landscape Inventory for Roebling's Delaware Aqueduct Site. The CLI identified national-level significance under Criterion A in the areas of Commerce and Transportation, and Criterion C in the area of Engineering, for the aqueduct's role in the financial success of the canal and as the nation's oldest wire cable suspension structure with its historic elements intact, and for the remnant canal prisms, towpaths, and stone walls associated with the original 1825-28 route and the new 1847-48 alignment built in conjunction with the aqueduct. The period of significance was identified as 1825-1898, beginning with the year of construction and ending when the canal was closed to boat traffic.⁶

Toll House

In 1985 the toll house was documented on the State of New York's Division of Historic Preservation, Building-Structure Inventory Form by Mary Curtis. The National Park Service Historic Structures Inventory (formerly LCS, List of Classified Structures) indicates the toll house was determined eligible for listing in the National Register on January 31, 1990, but no supporting correspondences have been located to confirm the evaluation or date.

The 1992 MPDF identified the toll house (c.1908) under the "Upper Delaware Transportation, 1614-1942" historic context, but did not specifically assign it a property type. The form described the building as the last intact example of toll houses in the valley and association with the vehicular era of the Delaware Aqueduct. Under the Transportation Resources property type, the building may be locally significant for its association with the historic development of the surrounding communities and for its architectural design.⁷

On August 24, 2016, the New York SHPO concurred with the NPS that the toll house was eligible for listing in the National Register, as part of its review of the Cultural Landscape Inventory for Roebling's Delaware Aqueduct Site. The CLI identified local level significance under Criterion A in the areas of Commerce and Transportation for the building's association with the aqueduct's conversion and use as a vehicular toll bridge. The period of significance was identified as 1908-1979, which begins with the year of construction and continues through its use as a toll facility. 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.⁸

D&H Canal Co. Office (Roebling Inn) Property

On August 9, 1993, the "D&H Canal Co. Office (Roebling Inn)" was listed and documented in the National Register. The Registration Form noted that the property met the requirements for the 1992 MPDF's Transportation Resources property type and the "Upper Delaware Transportation, 1614-1942" historic context. The form identified local level significance under criteria A and C in the areas of Transportation and Architecture for the property's association with the D&H Canal and local transportation history, and the building's 19th century Greek Revival style architecture, and its overall high integrity. The period of significance was listed as c.1855-1898, beginning with the year the building was constructed and ending the year the canal closed and the property was sold. The National Register boundary was listed as under one-acre, and noted the small non-historic building west of the office/house and the non-

historic carriage house to the north, but no other landscape features were described. This property is privately owned.⁹

Church and Cemeteries

The 1992 MPDF identified St. Mark's Church (1848) under the "Upper Delaware Transportation, 1614-1942" historic context, but did not specifically assign it a property type. The form described the building's association with the growth years of the railroad, its establishment by the Methodists and Lutherans, and its Greek Revival decorative elements. Under the Religious Properties property type, the church may be locally significant as a cultural institution associated with the nineteenth and early twentieth century development of the valley and for its architectural design. To date, the church has not been listed or documented in the National Register.¹⁰

The MFDF also identified the Union Cemetery (1848) and Lackawaxen Cemeteries (1915) under the Military Site property type, but did not discuss them under any of the historic contexts. The form referenced the two cemeteries as St. Mark's Cemetery, and noted it as the site of the grave of an unknown soldier from the 1779 Battle of Minisink. The cemetery may also be significant under the Religious Properties property type for association with the area's social and cultural development, and with those buried there who were historically important to their communities. Zane and Dolly Grey, who are buried in Lackawaxen Cemetery, are not specifically mentioned.¹¹

Zane Grey Property

On May 6, 1983, the "Zane Grey House" was listed with documentation in the National Register. The Inventory-Nomination Form identified national level significance under Criterion A in the area of Literature, for the property's association with Zane Grey, America's most popular novelist of the Old West. The period of significance was listed as the twentieth century, with a specific date of 1905, the year Zane's brother Romer constructed the house (the actual date is 1906). The National Register boundary encompassed 0.9 acres, consisting of the house and its immediate surroundings. The form described Grey's writing

career during the years he lived at the house, and additions he made to the home. Except for the presence of a large wood museum sign and a small unpaved parking lot, no other landscape features were described for the property. However, the documentation included a general description of the area by Zane Grey, from later in his life when he was living in California:

"Just to get your letter made me see the old familiar places as vividly as if I had been there. I could see the October colors of the hills and the old Delaware winding down from the mountains, and the purple asters blooming along the trails, the smoky Indian colors, and the smell of the pine. . ."¹²

On April 28, 2011, the "Zane Grey House Boundary Increase" was listed with documentation in the National Register. The Registration Form identified national level significance under Criterion B in the area of Literature for the property's association with the early career of Zane Grey. The period of significance was listed as 1906-1929, beginning with the year the Zane Grey house was constructed and ending with the year Zane Grey last visited the property. The National Register boundary of the property was increased to 3.7 acres to include extant historic resources and landscape features that contribute to the setting and associative significance of the Zane Grey house (the acreage indicated on the documentation form is incorrectly noted as 3.2 acres). Specific contributing resources listed in the documentation included the Zane Grey House, Zane Grey Barn, Grey Coal Shed, and the Zane Grey Grounds (including the driveway, bluestone paths, orchard, pasture, and garden). Non-contributing resource included the Ida and Josephine Grey House, Moran House, Cottage Kitchen, and Reconstructed Outhouse. The documentation noted that the Grey family owned the property until 1945 but Zane Grey had no further direct association with it after 1929.¹³

EVALUATION OF LANDSCAPE CHARACTERISTICS AND FEATURES

This section presents an analysis of landscape characteristics and their associated features within the CLR project area. It includes previous resource evaluations from the 2014 and 2016 CLIs for the Zane Grey House and Roebling's Delaware Aqueduct Site, respectively, which themselves are consistent with evaluations in National Register documentations and Determinations of Eligibility consultations.

The following landscape characteristics and features are examined in the CLR project area:

- **Natural Systems and Features:** The natural aspects that influence the development and physical form of the landscape including physiography, geology, and hydrology.
- **Topography:** The three-dimensional configuration of the landscape surface characterized by slope and orientation.
- **Land Use:** The principal activities in a landscape that form, shape, and organize the landscape as a result of human interaction.
- **Spatial Organization:** 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.
- **Constructed Water Features:** Built features and elements that utilize water for aesthetic or utilitarian functions.
- **Buildings and Structures:** Buildings are elements constructed primarily for sheltering any form of human activity in a landscape, while structures are elements constructed for functional purposes other than sheltering human activity.
- **Circulation:** The spaces, features, and materials that make up the network of pedestrian and vehicular movement.
- **Vegetation:** Managed individual specimens and masses of deciduous and evergreen trees, shrubs, vines, groundcovers, and herbaceous material, both indigenous and introduced.
- **Views and Vistas:** 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.
- **Small-scale Features:** Include minor built elements that provide aesthetic detail and function, such as signs, benches, and other outdoor furnishings.

The analysis evaluates individual features as follows:

- **Contributing:** The feature contributes to the project area's National Register eligibility and historic character.
- **Non Contributing-Compatible:** The feature is visually congruent with the historic character of the landscape.
- **Non Contributing-Incompatible:** The feature is visually incongruent with the historic character of the landscape
- **Undetermined:** Evaluation of the feature requires future research.

The analysis of characteristics and features that follows is organized into five character areas that respond to the geography of the project area and the boundaries of the 2014 and 2016 CLIs. The first area presented is the River Corridor, which includes Roebling's Delaware Aqueduct. The next two areas are the New York and Pennsylvania sides of Roebling's Delaware Aqueduct Site. This is followed by the Connection Area that links Roebling's Delaware Aqueduct Site and the fifth character area, the Zane Grey Property. Features in the specific areas are shown in Drawings 17-21 at the end of this chapter. Table 2.2 at the end of the chapter summarizes the feature evaluations.

RIVER CORRIDOR/AQUEDUCT

Natural Systems and Features

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.¹⁴

The Delaware River is a free-flowing river from Hancock, New York to the Atlantic Ocean, and 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 Roebling's Delaware Aqueduct, and has moderate to fast currents during normal waterflows. To the north and one-third mile upstream from the aqueduct/bridge 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 in 1849 when it was replaced by the Lackawaxen and Delaware aqueducts. Together, the Delaware River and Lackawaxen River watered approximately one-third of the Delaware & Hudson Canal from 1825-1898. The confluence also offered scenic views up and down the river, and is one of the reasons Zane Grey and his family chose it as their family retreat.¹⁵

The climate of the area has remained similar to conditions during the historic periods. The average annual precipitation is about thirty-six inches. Moderated by the river valley, the project area is in USDA plant hardiness zone 6a, in which the temperature lows can reach negative five to ten degrees in the winter.¹⁶

Buildings and Structures

Within the river courses that flow through the project area are extant historic features associated with the Delaware & Hudson Canal. One of the first structures built by the 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 upstream pool for the rope ferry crossing, which guided canal boats from the north bank of the Lackawaxen to the east bank of the Delaware. The dam extended from the canal guardlock on the east bank of the Delaware to the Pennsylvania side. Timber rafters traveling down the Delaware could either ride the flowage over the dam's crest or pass through a sluiceway at the west end.¹⁷

One of the central features within the project area, and the entire park, is the historic Delaware Aqueduct, built in 1848-1849. By this time, rope ferry crossing had become a major bottleneck in the canal system because it was time-consuming and slow, and vulnerable to collisions with the timber raft traffic. The Delaware Aqueduct was located just downstream from the slackwater dam, and together with the nearby Lackawaxen Aqueduct and new sections of canal and locks, increased the canal's capacity and efficiency, and reduced travel time and conflicts with the rafters. It also allowed the canal to remain competitive with the New York & Erie Railroad. At this time the slackwater dam was heightened to increase the pool area for the original canal that was converted into a feeder canal.¹⁸

Designed by Civil Engineer John A. Roebling, the two wire suspension aqueducts were supported by masonry river piers and shoreline 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. Bracketed out from the sides and level with the top of the trunks were 8-foot wide towpaths, lined on the outboard sides with two-rail post-and-wood fences with unique wood crossbar insets. The fences continued beyond the aqueduct trunks for a short distance atop the curved abutments to safely guide mules and their handlers on and off the towpaths. The Delaware Aqueduct spanned



Figure 2.1. View looking south from the New York side parking lot to the upstream side of Roebling's Delaware Aqueduct. (OCLP 2022, DSC_7492)

393 feet and was supported by three river piers. At some point during the historic period, additional wing walls were constructed on the New York side abutment. These tapered dry-laid stone walls extended outward from the upstream and downstream ends of the masonry abutment and curved inland to provide additional protection from potential flood waters.¹⁹

The abandonment of the canal in 1898 and subsequent disposition of property resulted in the reuse and removal of much of its infrastructure. Both aqueducts were drained; the Lackawaxen Aqueduct was removed except for its abutments and pier (later destroyed in a flood), while the Delaware Aqueduct was saved and converted into a vehicular bridge by Charles Spruks in 1908. Spruks removed the structure'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. More changes came in the 1930s when the new owner of aqueduct/bridge, the Lackawaxen Bridge Company, removed

the aging aqueduct trunk and replaced it with a simpler deck and railing system. The National Park Service purchased Roebling's Delaware Aqueduct in 1980, and from 1985-1994 completed a series of reconstruction and rehabilitation projects to structurally upgrade the aqueduct/bridge for limited highway traffic and restore the structure's historic elements, including the aqueduct trunk, towpaths, and projecting wooden icebreakers on the piers. In 2007 the park reconstructed the upstream wing wall on the New York abutment after it was severely damaged in the flood events of 2004-2006.²⁰

Roebling's Delaware Aqueduct currently accommodates one lane of traffic and pedestrians, and is in good condition (Figure 2.1). Vehicles now travel through the reconstructed aqueduct trunk, which features angled wood plank walls and a concrete and imbedded aggregate road surface. 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



Figure 2.2. Panoramic view from the aqueduct/bridge's upstream towpath, traces of the slackwater dam are still visible in normal river level conditions (ripples, image left). (OCLP 2022, IMG_0740)

each abutment that in turn connect to concrete sidewalks. From the aqueduct/bridge's upstream towpath, traces of the slackwater dam are still visible in normal river level conditions (Figure 2.2).²¹

Views and Vistas

Historic views of the river and surrounding landforms from Roebling's Delaware Aqueduct remain present today. Rising around 40 feet above the river's water level, the Delaware Aqueduct 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.²²

During its first twenty-five years as a toll bridge, horse-drawn carriages, motorized vehicles, and pedestrians traveling through the dewatered trunk of Roebling'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, again blocking views from the structure for vehicles and pedestrians, but in 1994 reconstructed the towpaths, restoring views for pedestrians. Today, pedestrians on the aqueduct/bridge'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 Figure 2.2). 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.²³

Small-Scale Features

There are no historic small-scale features on Roebling's Delaware Aqueduct. Soon after the structure opened to vehicular traffic, Charles Spruiks installed a gate with a vertical board inset at the east end, next to the toll house. The gate could be raised and lowered to allow passage to and from the structure. The Lackawaxen Bridge Company installed light poles on the aqueduct/bridge in the 1940s and telephone lines in the late 1940s or early 1950s, and also replaced the inset gate with a simpler hinged horizontal crossbar. When the structure was purchased by the National Park Service in 1980, the gate was removed as tolls were no longer collected. Today, the structure is lit by three cobra-style lamps mounted on square wooden posts anchored into the upstream side of the three piers.²⁴

ROEBLING'S DELAWARE AQUEDUCT SITE - NEW YORK SIDE

Historic Periods: 1825-1898, 1908-1979 (Toll House only)

Natural Systems and Features, and Topography

Landforms and topography had great influences on the Delaware & Hudson Canal's course through the Upper Delaware River valley, especially the river floodplains. On the New York side of Roebling's Delaware Aqueduct Site, 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.²⁵

The wet and poorly drained floodplain soils were ideal for development of the original canal route. These soils originate from materials deposited from flood events, while higher elevation soils derive from shale, sandstone, and/or limestone. The New York side is underlain by Fluvaquent-Udifluent complex soils, and by Valois gravelly sand loams above the floodplain. The route of the new canal tracked through both soil profiles because its location was dictated by the location and design of the Delaware Aqueduct.²⁶

Portions of Roebling's Delaware Aqueduct Site in New York are located within the river's 100-year floodplain. Most floods occur in the spring as a result of seasonal rains and snowmelt, but tropical storms traveling up the eastern seaboard have occasionally flooded the valley. Specifically, the top of the aqueduct/bridge's east abutment, toll house, parking lot, and portions of the new canal are above the floodplain, but the remnants of the original canal and portions of the new canal are within the floodplain.²⁷

The U.S. Army Corps of Engineers has identified several small areas of wetlands occurring in Roebling's Delaware Aqueduct Site. On the New York side, wetlands correspond to standing water and depressions in the "original canal" prism and between the river and the towpath.²⁸

Modifications made to the local topography during the historic period are still evident. At the confluence of the Delaware and Lackawaxen rivers in 1825-1828, the riverbanks

had to be modified to build the Delaware & Hudson 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 east bank of the Delaware River, extensive cut and fill was needed to build a towpath from the terminus of the rope ferry that crossed the Delaware River from the Lackawaxen River in Pennsylvania. This grading continued downstream to a guardlock at the canal entrance. From here, the canal was built in the floodplain, which did not require any locks or as much change to the original grade. In 1847-1848 a "new canal" with three locks was constructed uphill from the original canal site to overcome the 32-foot elevation change from the east end of the new Delaware Aqueduct to the original canal a quarter mile to the south. New cuts, fills, and stone walls created the new canal prisms, towpaths, turning basin, and aqueduct embankments.²⁹

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 the towpath embankments were removed and regraded to build an approach road to the structure. The road prism and embankments of Minisink Ford Road and later State Route 97 were built atop much of the empty canal. The National Park Service has altered topography north of the aqueduct/bridge to build a parking lot, emergency access road, maintenance access road, accessible sidewalks, and drainage features. Perhaps the least changed topographic feature is the "original canal" (feeder canal); it is partially filled and vegetated but retains original topographic characteristics.³⁰

Land Use

None of the historic activities associated with the Delaware & Hudson Canal on the New York side survive today, but some of the infrastructure where these uses occurred are extant. The Canal Company built and operated the canal in this area from 1825-1898 to transport anthracite coal to markets in New York City. Historic photographs show a variety of houses, offices, barns, corrals, and gardens that

supported canal operations and canal personnel, as well as the local population. 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 lasted until 1898 when the canal closed and Canal Company lands were sold.³¹

An increase in residential and commercial land uses on the New York side coincided with the conversion of Roebling's Delaware Aqueduct into a wagon and later automobile crossing, and the construction of connecting roads. Some of the buildings owned by the Canal Company in the vicinity of aqueduct/bridge became private residences or lodgings, while other structures were removed. New development included a toll house next to the aqueduct/bridge, a tavern/lodge called the Highland Bridge Hotel next to the toll house, and an industrial factory building near the ruins of Lock 71. The construction of State Route 97 in the 1930s atop Minisink Ford Road, and along and adjacent to the remains of the new canal, essentially limited further development of the space between the highway and river, thus preserving some of the old and new sections of the canal. At this time the industrial building was removed for the highway and the hotel became a private residence. The toll house collected tolls until 1979, during which time it was also used as housing, storage, and office space, even selling gasoline for a period.³²

With establishment of Upper Delaware Scenic and Recreational River, the toll house and the canal ruins are among the resources that provide recreational opportunities to park visitors and the local population. They are within the six tracts of land assembled by the National Park Service on the New York side of the river in 1988-1995: Tract 101-01 (0.58 acres), 101-03 (1.45 acres), 101-05 (0.04 acres), 101-06 (0.28 acres, less than fee simple easement), and 104-06 (2.95 acres).³³

Spatial Organization

The Delaware River and the Delaware & Hudson Canal historically served as the primary organizing elements of the landscape on the New York side, and their influence is still evident despite road construction that oc-

curred after the canal was abandoned in 1898. Starting in 1825, various ancillary buildings, structures, corrals, and gardens bordered the river and canal, especially alongside the towpaths and locks. Beginning in 1849, the Delaware Aqueduct served as the main crossing over the Delaware River for boats and pedestrians, while Minisink Ford Road provided access to nearby buildings owned by the Canal Company and the surrounding privately-owned lands. The Delaware Aqueduct was converted into a vehicular bridge in 1908, thus preserving its use as the area's primary river crossing between New York and Pennsylvania. At this time Minisink Ford Road was rebuilt to connect to a new approach road to the aqueduct/bridge. In the 1930s State Route 97 was built, straightening the rerouted Minisink Ford Road and adding new construction atop the remnants of the abandoned canal.³⁴

Today, Roebling's Delaware Aqueduct, the highway, and the river spatially divide the New York side into two north and south spaces. The aqueduct/bridge continues to serve as a vehicular and pedestrian crossing over the Delaware River and a connection to State Route 97. The highway provides access to the parking lot, from which sidewalks and trails lead to the toll house, reconstructed aqueduct/bridge towpaths, and Towpath Trail.³⁵

Constructed Water Features

Much of the project area on the New York side of Roebling's Delaware Aqueduct preserves remnants of the Delaware & Hudson Canal. At the confluence of the Delaware and Lackawaxen rivers, the canal ran along the north bank of the Lackawaxen, to a rope ferry that carried mules and their handlers across the Delaware to its east bank, and then to a guardlock that marked the entrance to another segment of the canal (Figure 2.2a). Located at the east end of a slackwater dam, this segment was constructed in 1828. The canal prism was 4 feet deep, with an average water line of 28 feet and a bottom width of 20 feet. To improve operational efficiency, the Delaware Aqueduct was built across the river just below the slackwater dam in 1847-1848, as well as an approximately 500-yard section of "new canal" from the east end of the aqueduct southward to where it intersected with the "original canal." The new canal



Figure 2.2a. View of parallel lengths of submerged timbers associated with a guardlock at the former entrance of the original canal. (OCLP 2022, IMG_1877)



Figure 2.3. View looking southeast at the original canal prism and towpath. The river is at image right. (OCLP 2022, IMG_1848)



Figure 2.4. View looking northwest at the south end of Lock 71 and new canal prism and walls. (OCLP 2022, IMG_1872)



Figure 2.5. View looking west at the original towpath stone wall and a curved contemporary stone wall above it, which supports the Maintenance Access Road. (OCLP 2022, IMG_1839)

included a turning basin and three locks, and featured a larger prism to accommodate bigger canal boats, increasing to a depth of 6 feet, width of 48 feet at the waterline, and 30 feet at the bottom. The section of original canal bypassed by the new canal was repurposed as a “feeder canal” to send water to the downstream canal segments. After canal operations ended in 1898, the turning basin became part of an approach to the aqueduct/bridge. Construction of State Route 97 in the 1930s destroyed most of the new canal prism, including the turning basin and two of the three locks, but left the ruins of Lock 71 and its immediate approaches and towpaths untouched. The original canal prism along the riverbank was generally left intact, except a small section between Locks 70 and 71 that were filled in for a diversion dam aimed to prevent floodwater away from the highway embankments.³⁶

Today, the original canal prism (UPDE Str #7300) is approximately 2,000 feet long and 10 feet high (Figure 2.3). 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 original canal prism have been overtaken by successional woodlands. Sections of new canal prism on either end of Lock 71 that were not buried by the highway are located on state-owned land (Figure 2.4).³⁷

Buildings and Structures

There are numerous extant park-owned historic structures on the New York side associated with the Delaware & Hudson Canal. Upstream from the slackwater dam, stone walls



Figure 2.6. The top of a partially hidden section of stone wall associated with the original canal prism or towpath. (OCLP 2022, IMG 1841)

(no#) that supported the towpath paralleling the riverbank from the rope ferry to the to the original canal remain (no Str #) (Figures 2.5, 2.6). A guardlock structure guided canal boats into the original canal and controlled the amount of water entering the canal until at least 1848, after which it was removed. Remnants of stone walls still line the original canal towpath (#7311, #7321) (Figure 2.7). By 1848 three new locks, turning basin, and towpaths were built as part of the Delaware Aqueduct. This section of new canal also featured stone wall construction, with the locks themselves armored with horizontal heavy timber planks attached to vertical boards and anchored to the walls with iron tie bars. Most of the new canal was filled in by the construction of State Route 97 in the 1930s, except for Lock 71 and its approaches, which today still features intact stone walls (#7211) (Figure 2.8, see also Figure 2.4). The park periodically removes woody vegetation from the canal walls, but soil and successional vegetation still obscure some wall segments. Various sheds, barns, and lockhouses that served as canal support structures are gone, although several canal-era houses, as well as some of the turning basin stone walls, are extant beyond the CLR project boundaries.³⁸

The two-story toll house (#7250) constructed in 1908 stands next to the aqueduct/bridge's east abutment, as part of that structure's conversion to a vehicular crossing (Figure 2.9). The toll house was stabilized in 1990 and houses exhibits and displays. Adjacent to the toll house is a three-story private residence built c.2000 on the site of the former Highland Bridge Hotel. The Route 97 highway project also constructed a stone diversion dam (#7323) in the original



Figure 2.7. View northwest at a stone wall supporting the original canal towpath. (OCLP 2022, IMG_1867)



Figure 2.8. View looking southeast at stone walls lining along the new canal towpath, likely built atop walls associated with the original canal prism. (OCLP 2022, IMG_1854)



Figure 2.9. View looking west at the two-story toll house, constructed in 1908 next to the aqueduct/bridge's east abutment. (OCLP 2022, IMG_1885)



Figure 2.10. View looking northwest at the original canal prism and towpath, and the stone diversion dam. (OCLP 2022, IMG_1860)



Figure 2.11. A section of Lock 71 has collapsed due to stormwater associated with a culvert on State Highway 97. (OCLP 2022, IMG_1877)



Figure 2.12. A two-pipe culvert is located under the aqueduct/bridge and empties stormwater from the original canal. (OCLP 2022, IMG_1847)



Figure 2.13. A concrete box culvert on the Towpath Trail spans the breach in the original canal and also serves as a footbridge. (OCLP 2022, IMG_1858)

canal prism to prevent flood water from undermining the road's embankments (Figure 2.10). Several culvert outlets associated with the highway drain onto park-owned lands. The most prominent are double pipe and single pipe outlets north of the aqueduct, and a single pipe outlet south of the aqueduct, the outfall of which has severely damaged the stone walls in Lock 71 (Figure 2.11). More recent walls and culverts include: concrete walls and culverts at the parking lot north of the aqueduct/bridge and stone walls along sidewalk east of the tollhouse (mid-1990s), a stone wall along the Maintenance Access Road (2007), two-pipe culvert at the beginning of the Towpath Trail (2007), and a concrete box culvert/footbridge on the old towpath that spans the breach (2009) (Figures 2.12, 2.13).³⁹

Circulation

The New York side of the aqueduct/bridge preserves several towpaths on which mules and workers pulled the boats through the canal. A few remnant retaining walls reveal the route of the 1828 towpath that lead from the rope ferry to the guardlock at the original canal entrance, but there is no trace of the small bridge at the guardlock that provided passage to the west side of the canal. However, a long section of original canal towpath heading downstream along the west side of the remnant original canal prism is extant and open to the public as the Towpath Trail (#7310) (see Figures 2.7, 2.8, 2.10, 2.13). Use of the original canal towpath had diminished after 1848 when new towpaths between 8-12 feet wide were built on both sides of the new



Figure 2.14. View looking west at the former turning basin site and remnant canal and towpath stone walls. (OCLP 2022, IMG_1813)



Figure 2.15. View looking south at the new canal towpath, located north of Lock 71. The new canal is at image left and the original canal and towpath are down the hill at image right. (OCLP 2022, IMG_1881)

canal, in conjunction with the construction of Roebling's Delaware Aqueduct. In time a north-south road (now Old Minisink Ford Road) travelled along the hillside just east of the canal, turning basin, and locks, but after the canal was closed this road was rerouted directly into the empty turning basin to connect to the aqueduct/bridge via a short approach road (Figure 2.14). In the 1930s most of the new canal towpaths were destroyed for construction of State Route 97, except for a small towpath section (#7210) on the west side of Lock 71 and on the east side of the turning basin Figure 2.15, see also Figure 2.14). The highway project also breached a small section of the original canal towpath between Locks 70 and 71 as part of a flood water diversion system. The small bridge crossing where the new canal towpath joined the original canal towpath just south of Lock 70 was also lost to the highway. Near this spot are boulders that mark the south end of the Towpath Trail. The state has made the highway shoulder wider here to accommodate parking for about a half dozen vehicles.⁴⁰

Several non-historic circulation features were constructed by the park beginning in the 1990s (Figures 2.16, 2.17, 2.18). In 1994-1997 a paved parking lot was built for 10 vehicles and included an earthen/gravel emergency access road to the riverbank. Concrete sidewalks provided visitor access to the toll house and the reconstructed aqueduct/bridge towpaths. In 2007 the park built a maintenance access road stretching from the parking lot to the north end of the Towpath Trail under the aqueduct/bridge. A planned



Figure 2.16. View looking southeast at the parking lot and sidewalks on the New York side of the bridge/aqueduct. (OCLP 2022, DSC_7500)



Figure 2.17. View looking northwest at the trace of the emergency river access road. (OCLP 2022, DSC_7493)



Figure 2.18. View looking south at the Maintenance Access Road that connects the parking lot to the Towpath Trail. (OCLP 2022, DSC_7498)

loop portion of the trail utilizing the new canal towpath remains unbuilt because the state owns part of the property.⁴¹

Vegetation

The historic overall pattern of dense trees and small and scattered open areas is still present just north and south of the aqueduct/bridge, but is considerably less discernable farther north and south. Like the clearings that were created for buildings, pastures, gardens, and roads during the historic period, clearings today also coincide with houses and roads, as well as parking areas. The construction of the original canal in 1825-28, and the “new canal” and Roebling’s Delaware Aqueduct in 1847-1848, also required the removal of vegetation to accommodate the canal prisms, towpaths, engineered embankments, and support buildings. Historic photographs from the mid- to late-1800s show these areas were likely planted or allowed to revegetate with small trees, shrubs, and grasses that would slow soil erosion into the canal prisms. However, after 1898 woody vegetation took over the old and new canal prisms, and grew between the canal and towpaths, which would not have been allowed during the canal’s operation. Some of this successional vegetation was removed to build State Route 97 in the 1930s.⁴²

Today, the floodplains are characterized by riparian trees such as maple, birch, ash, sycamore, cottonwood, basswood, and willow, and shrubs like sumac, spicebush, and elderberry. Steeper slopes above the floodplain are char-

acterized by an oak and hickory forest that also includes maple, hemlock, and yellow poplar. Several areas that were previously part of the floodplain and oak-hickory forest types are now disturbed areas and also include 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 comprised of pond-weed, water-weed, and river-weed located south of the aqueduct/bridge. Portions of the original canal also include invasive Japanese knotweed (*Polygonum cuspidatum*), barberry (*Berberis thunbergii*), multiflora rose (*Rosa multiflora*), and poison ivy (*Rhus radicans*). The park has made considerable progress in removing non-historic vegetation along the original prism alongside the aqueduct/bridge, but heading south the vegetation transitions to a canopy of volunteer maple, birch, sycamore, and oak.⁴³

Non-historic vegetation comprised of trees, shrubs, and lawns is concentrated along State Route 97 and around the parking lot. Installed by the park beginning in the mid 1990s, species include a large maple (*Acer sp.*) near the aqueduct/bridge approach road, several swamp white oaks (*Quercus bicolor*) and red maples (*Acer rubrum*) at the parking lot, a few scattered chokeberry (*Aronia sp.*) and winterberry (*Ilex verticillate*), and turf grass. The toll house features turf grass and a hemlock (*Tsuga canadensis*).⁴⁴

Views and Vistas

Although views and vistas were not a design consideration for the Delaware & Hudson Canal Company, the canal’s alignment alongside the Delaware River provided scenic views that persist today. 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 the 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. Both the old and new canals also provided views to Roebling’s Delaware Aqueduct (Figure 2.18a).⁴⁵



Figure 2.18a. View looking northwest from the original canal towpath to Roebling's Delaware Aqueduct. (OCLP 2022, IMG_1851)

Today, the Towpath Trail on the original canal towpath, as well as the new canal towpath, still offer views of the canal, aqueduct/bridge, river, and surrounding terrain, but the views become more limited heading south as the density of successional vegetation increases. The parking lot and Maintenance Access Road offer partial views of the aqueduct/bridge (see Figure 2.1).⁴⁶

Small-Scale Features

There are no longer any historic small-scale features associated with the canal or surrounding homesteads. Historic photographs show “snubbing posts,” which were short wood posts along the towpaths used to stop and secure the canal boats. Photographs also show a tall pole in the vicinity of Lock 71 and next to the Delaware Aqueduct, which likely supported telegraph lines and connected to similar poles along the canal (see Figure 1.19). Just beyond the canal corridor, post-and-board fences enclosed a pasture north of the aqueduct, but they were eventually removed when Minisink Ford Road was rerouted. After the Delaware Aqueduct was opened to vehicular traffic and the

structure's towpaths were removed, some of the towpath fencing was installed along the sides of Minisink Ford Road as it passed through the new canal turning basin. A historic postcard from the early 1920s shows a vertical board fence on the west side of the Highland Bridge Hotel and flagpole on the north side near the toll house, but both were removed at unknown dates.⁴⁷

The current roster of non-historic small-scale features includes: a park entrance sign identifying “Roebling's Delaware Aqueduct;” waysides on the north and south aqueduct/bridge abutments, 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; trash/recycling receptacle at the south end of the parking lot; black metal handrails along some of the sidewalks and steps; two posts and a removable wire chains at the emergency river access road; and DOI-NPS boundary markers in the lawn area south of the toll house.⁴⁸

ROEBLING'S DELAWARE AQUEDUCT SITE – PENNSYLVANIA

Historic Period: 1847-1898

Natural Systems and Features, and Topography

On the Pennsylvania side of Roebling Delaware Aqueduct Site, the relief of Pike County is rolling 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. Like the New York side, landforms on the Pennsylvania side influenced the route of the original canal through the Upper Delaware River valley, especially the river floodplains.⁴⁹

The floodplain features stony and cobble alluvial soils, while Tunkhannock gravelly sandy loams reside above the floodplain. Wet and poorly drained soils in the floodplain proved ideal for development of the original canal on the north bank of the Lackawaxen River. The route of the new canal to the south traversed both soil profiles, as its location and design was determined by the locations and grades of both Roebling aqueducts (Delaware and Lackawaxen).⁵⁰

Portions of the site are located within the river's 100-year floodplain. The emergency river access road and areas below the parking lot are within the floodplain, and the top of the former aqueduct/bridge's abutment, parking lot, restroom, maintenance building, and Margold house are above it. The privately-owned Cortright house and D&H house (Brown Keller) are above the floodplain too.⁵¹

Modifications to the local topography made during the historic period are only partially evident today. In 1847-1848 the Delaware & Hudson Canal Company diverted canal traffic from the original riverside sections to new inland sections that included aqueducts across the Lackawaxen and Delaware rivers. Like the original canal sections, the new canal sections required cut, fill, and stone walls to create the canal prisms, towpaths, and turning basin to meet the new Lackawaxen and Delaware aqueducts. Around the same time, the New York & Erie Railroad was making

even more substantial topographic changes in the form of earthen embankments to carry trains over the new canal and the Lackawaxen River.⁵²

In the years after the Delaware & Hudson Canal was abandoned and its properties were sold, some of the landform changes made for the canal were removed. To accommodate the conversion of the Delaware Aqueduct into a vehicular bridge, several sections of the towpath embankments were removed and regraded to build an approach road to the structure. In 1906 the New York & Erie Railroad replaced their bridge over the canal with an earthen embankment, stranding a section of dewatered canal between the railroad and Roebling's Delaware Aqueduct. Soon after, this isolated section was partially regraded for the construction of Scenic Drive and the Margold house, and in the 1960s the last canal embankments here were graded away and replaced with lawn. The National Park Service made additional modifications to the topography with the construction of a parking lot, emergency access road, and drainage features south of the aqueduct/bridge, as well as accessible walkways from the parking lot to the structure.⁵³

Land Use

Like the New York side, no historic activities associated with the Delaware & Hudson Canal on the Pennsylvania survive today, although some of the infrastructure where these uses occurred survives. The Canal Company operated the "new canal" in this area from 1847-1898 to improve the efficiency in transporting anthracite coal to markets in New York City. Historic photographs reveal houses, offices, barns, corrals, and gardens that supported canal operations and canal operators, as well as the local population. 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 continued until the Canal Company ceased operations in 1898 and began selling their lands.⁵⁴

The shift to residential and commercial land uses on the Pennsylvania side coincided with the conversion of Roebling's Delaware Aqueduct into a wagon and later automobile crossing, and the construction of connecting roads.

Some of the buildings owned by the Canal Company in the vicinity of aqueduct/bridge became private residences or lodgings, while other structures were removed. New development included the Margold house and Cortright house north of the aqueduct/bridge, and numerous homes, stores, workshops, and a hotel south of the aqueduct/bridge. Portions of the empty canal survived the construction of a new railroad embankment and Scenic Drive, but by the 1960s most vestiges of the canal were removed and replaced with grass.⁵⁵

With establishment of Upper Delaware Scenic and Recreational River, the canal ruins are among park resources that provide recreational opportunities for park visitors and the local population. They are within the five tracts of land assembled by the National Park Service on the Pennsylvania side of the river in 1993-1998: Tract 101-02 (0.42 acres), 101-07 (1.38 acres), 101-10 (0.29 acres), 101-11 (2.90 acres), and 101-13 (0.03 acres).⁵⁶

Spatial Organization

The Delaware River, canal, and the New York & Erie Railroad mainline served as the primary organizing elements of the Pennsylvania side of Roebling's Delaware Aqueduct site, but new developments that occurred after the canal was abandoned in 1898 also contributed to the imprint visible today. Beginning in 1848 various ancillary buildings, structures, corrals, and gardens occupied the spaces between the river and canal, and especially alongside the towpaths. Roebling's Delaware Aqueduct served as the main crossing over the Delaware River for boats and pedestrians, while local roads provided access to nearby buildings owned by the Canal Company and the surrounding privately-owned lands. The conversion of the Delaware Aqueduct into a vehicular bridge in 1908 preserved its use as the area's primary river crossing from Pennsylvania to New York. The local road that ran under the aqueduct/bridge was abandoned and rebuilt to the west as Scenic Drive, which connected to an approach road leading to the aqueduct/bridge. These two roads became the new organizing elements in the landscape, as did new property lines carved out of the former Canal Company lands, and the new homes and businesses built within them. The last

traces of the empty canal remained until the 1960s, but its general location is still revealed by a broad swath of lawn.⁵⁷

Today, Roebling's Delaware Aqueduct, Scenic Drive, and the river spatially divide this area into two north and south spaces. The aqueduct/bridge serves as a vehicular and pedestrian crossing over the Delaware River and a connection to State Route 590 via Scenic Drive. The approach road provides access to the parking lot, from which sidewalks lead to the reconstructed towpaths.⁵⁸

Constructed Water Features

National Park Service-owned land on the Pennsylvania side of Roebling's Delaware Aqueduct preserves the location of the Delaware & Hudson Canal. This "new canal" section was built in 1847-1848 to connect the Delaware Aqueduct and the Lackawaxen Aqueduct, as part of a larger project to speed transportation along the canal route. The dimensions of this approximately 1,000-yard long prism featured a depth of around 6 feet, and a width of 48 feet at the waterline and 30 feet at the bottom. After the canal was dewatered in 1898, the turning basin was regraded to serve as approach road to the aqueduct/bridge while other portions of the canal prism were filled in, first when the railroad replaced their bridge over the canal with a massive earthen embankment, and then by the Town of Lackawaxen's reconfiguration of Scenic Drive. The northern towpath was later flattened out to meet the grade of the existing landform, but no construction occurred on the prism itself.⁵⁹ Stormwater occasionally filled some of the low parts of the canal prism for years afterwards.



Figure 2.19. View looking east at the former location of the canal, from Scenic Drive. (OCLP 2022, DSC_7439)

Today, this section of canal prism is around 320 feet long and is maintained as a lawn, but its former use as a canal is difficult to discern without the towpaths and stone walls (Figure 2.19). Recent geophysical research has discovered the approximate location of the canal prism and walls.⁶⁰



Figure 2.20. View looking east at two stone walls alongside the roadway that once lined the canal's turning basin. The sidewalk traces the location of the south towpath. (OCLP 2022, DSC_7439)



Figure 2.21. View looking north at the Margold house and garage, just south of the former canal. (OCLP 2022, DSC_7477)



Figure 2.22. View looking west at the boathouse, shed, and stone wall just north of the former location of the canal. (OCLP 2022, DSC_7447)

Buildings and Structures

There are only two extant park-owned historic structures associated with the Delaware & Hudson Canal on the Pennsylvania side, and both are stone walls associated with the “new canal” built in 1848 to link the Delaware and Lackawaxen aqueducts. The stone walls (Str #7005,



Figure 2.23. View looking east at the restroom and parking lot. (OCLP 2022, DSC_7475)



Figure 2.24. View looking south at the park's maintenance facility. (OCLP 2022, IMG_1911)



Figure 2.25. View looking south at a stone retaining wall at the Margold house. (OCLP 2022, DSC_7447)



Figure 2.26. View looking south at a stone wall and steps east of the Brown Kelley garage. (OCLP 2022, IMG_1911)

#7006) alongside the approach road once lined the turning basin (Figure 2.20). A canal barn that once stood alongside the turning basin is no longer present. On land just east of the project boundary is a c.1855 two-story D&H canal house (Brown Keller house) that was enlarged with an addition on its west side in c.1915.⁶¹

The park maintains several other non-historic buildings that are unrelated to the history and significance of the canal. The oldest are the c.1912 two-story Margold house and adjacent 1915 one-story garage that stand at the approach road and Scenic Drive intersection (Figure 2.21). The 2016 CLI evaluated both buildings as “Non-contributing-Compatible.” To the north are two single-story, gable-roofed structures used for storage and to house boats (Figure 2.22). Installed after the park acquired the Margold property in 1998, the dark color of the boathouse helps it



Figure 2.27. View looking southwest at the stone gutter on the east side of the parking lot.. (OCLP 2022, IMG_1901)

blend in with the surroundings, but the light color of the shed draws attention. The boathouse is built upon a stone foundation, likely dating to after 1915. A pre-fabricated 1-story restroom is located at the southwest corner of the parking lot. Built in the late 1990s, it blends in with the surroundings, with unpainted wood siding and has an entry screen on the north façade (Figure 2.23). The park plans to replace this building in the near future. On the west side of Scenic Drive is a 3-story, split level maintenance building that formerly housed the volunteer fire department (Figure 2.24). Due to its location well west of the primary historic features, it is not obtrusive in the landscape. Several non-canal related stone walls are located on the south and east sides of the Margold House, east of the boat barn and storage shed, and along the Scenic Drive extension that parallels the river (Figures 2.25, 2.26). Drainage in the parking lot is handled by a drop inlet, while a culvert, stone gutter,



Figure 2.28. View looking south at the Brown Keller house and garage, located just north of the former canal (which was just beyond the spruce trees). (OCLP 2022, DSC_7450)



Figure 2.29. View looking southwest at the Cortright house. (OCLP 2022, DSC_7443)

and earthen swale convey stormwater from the maintenance building area and grades around the parking lot to the river (Figures 2.27). Lastly, two other buildings stand just beyond the park boundary: the two-story Cortright House and the one-story Brown Keller garage (Figures 2.28, 2.29). Both date to c.1915 but are not considered historically significant.⁶²



Figure 2.30. View looking north at the paved overlook on the Pennsylvania side of the bridge/aqueduct. (OCLP 2022, IMG_1900)



Figure 2.31. View looking southeast at the road providing access to the Brown Keller house. (OCLP 2022, DSC_7427)



Figure 2.32. View looking southwest at remnant stone steps leading to the riverbank. (OCLP 2022, IMG_0742)

Circulation

The only extant historic canal feature on the Pennsylvania side of Roebling's Delaware Aqueduct Site is a short section of the towpath (#7007) on the south side of the former turning basin. Built in 1848 as part of the new canal and the Delaware Aqueduct, it is currently paved and connects to other contemporary sidewalks in this area (see Figure 2.20). After the canal closed portions of other towpaths were destroyed by the construction of a railroad embankment, the approach road to the aqueduct/bridge, and relocation of Scenic Drive. Other towpath sections were eventually leveled to make the lawn area that exists today.⁶³

Some of the current non-historic circulation features in this area date to the conversion of the Delaware Aqueduct into a vehicular bridge. The approach road to the aqueduct/bridge consumed much of the former turning basin (see Figure 2.20). The primitive road that ran under the structure's west span was abandoned and replaced with Scenic Drive, which utilized an old road on the south side the D&H office/house (Roebling Inn) and part of the towpath to connect to the approach road (see Figure 2.19). In 1997-1999 south of the approach road, the park constructed the paved parking lot for 18 vehicles and an earthen/gravel emergency access road (see Figure 2.23). The project included concrete sidewalks that connected to the new canal towpath as well as a concrete sidewalk on the north side of the approach road. The sidewalks connected to the reconstructed aqueduct/bridge towpaths. The parking lot also featured a paved semicircular-shaped overlook projecting from its east end (Figure 2.30). Other non-historic features include bluestone walks at the Margold house that lead from Scenic Drive to the front door and around the south side of the house to the side entrance of the porch, and a short gravel driveway north off Scenic Drive that provides access to the park's boathouse and storage shed. An extension of Scenic Drive serves as access to the Brown Keller house, and on the park-owned land there is an overgrown set of bluestone steps that descends to the riverbank (Figures 2.31, 2.32). At the maintenance building, asphalt roads off Scenic Drive connect to concrete driveways at the north and south ends of the building.⁶⁴

Vegetation

The historic patterns of vegetation dominated by open areas with small and scattered groupings of trees is intact on the Pennsylvania side. The construction of the new canal and Roebling's Delaware Aqueduct in 1847-1848 replaced former agricultural fields and other vegetation to accommodate the canal prisms, towpaths, engineered embankments, and support buildings. Small trees, shrubs, and grasses were planted or allowed to grow as volunteers on the canal's bare slopes to stop soil erosion into the canal prism. In particular there were two distinct tall trees near the Delaware Aqueduct, next to the turning basin (see Figure 1.21). However, to prevent towlines from becoming tangled, no tall vegetation grew between the towpaths and waterway. Scattered trees grew in areas beyond the canal, but most of the land was open for gardens, orchards, and pastures. After the canal's closure the land 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. Eventually the ruins of the canal bed were filled in and the towpaths were leveled, and this area was planted with grass. Some property owners planted vegetative screens along their property lines. One such feature was a row of white pines planted in the 1960s along Scenic Drive, at north end of the former new canal prism, but they were removed in 2011-2015.⁶⁵

Woodland areas are generally limited to riparian trees like maple, birch, ash, sycamore, cottonwood, basswood, and willow, and shrubs like sumac, spicebush, and elderberry. Disturbed areas that were previously part of the floodplain forest include goldenrod, ragweed, and other forbs, and woody species such as eastern red cedar, gray birch, aspen, and sassafras. There is also a community of river vegetation comprised of pond-weed, water-weed, and river-weed upstream and downstream from the aqueduct/bridge.⁶⁶

Non-historic plantings installed by the park in 1997-1999 are concentrated around the parking lot and 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 (*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 aqueduct/bridge, 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 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 that parallels the northern extent of the new canal.⁶⁷

Views and Vistas

As noted earlier, historic views to and from the Delaware & Hudson Canal, and Roebling's Delaware Aqueduct, were an unplanned result of their construction. Views of the river, aqueduct/bridge, and surrounding terrain are extant



Figure 2.33. View looking west at the location of the new canal, shown here as an open, snow-covered lawn. (OCLP 2022, IMG_1892)



Figure 2.34. View looking north at Roebling's Delaware Aqueduct from the overlook. (OCLP 2022, IMG_1899)

from the former location of the 1847-1848 new canal that is now a lawn (see Figure 2.19). However, the park's ability to interpret this characteristic is made difficult due to the loss of the canal prism, walls, and towpaths, and the elevated position the towpaths and waterline would have provided (Figure 2.33). The overlook in the parking lot also offers a framed vista of the aqueduct/bridge (Figure 2.34).⁶⁸

Small-Scale Features

No historic small-scale features from the canal period remain today. Small wood posts, or "snubbing posts," were once positional along the towpaths to secure ropes that slowed down or stopped canal boats, but they were removed after the canal closed. Historic photographs show a tall wood pole positioned at the downstream side of the Delaware Aqueduct abutment, likely one of many in the area supporting telegraph lines. Just beyond the canal corridor, historic photographs also show post-and-board fences enclosed a large pasture north of the canal, but many were replaced or removed after the Canal Company sold their lands and new residential properties were developed. The Margold house lot was one such property, which featured a post-and-wire fence enclosure, while post and wire fencing was present near the D&H house (Brown Keller house). By 1968 the fences in this area were removed and utility poles crisscrossed the area.⁶⁹

Current non-historic features include: a park entrance sign identifying "Roebling's Delaware Aqueduct;" waysides on the north abutment and parking lot overlook; a way-side/information sign on the north side of the parking lot; trash/recycling receptacles and a pet waste station next to the wayside/information sign and on the east side of the restroom; a bicycle rack east of the restroom; black metal handrails along portions of the sidewalks to the former aqueduct, steps north of the parking lot, and edges of the semicircular overlook; a split rail fence at the maintenance building; three removable black bollards at the emergency river access road; a power pole, telephone pole, and septic cleanouts in the new canal prism near the Margold house; three wooden well covers near the boathouse and shed; stacked set of bluestone and masonry slabs set on a concrete box just north of the approach road; two movable

picnic tables in the lawn northeast of the Margold house; two benches at the parking lot overlook; and boundary markers comprised of concrete square posts, iron pipes, 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 approach road (Figure 2.59). The display is a cross-section of the structure for understanding how it is put together, and is described in the wayside/informational sign.⁷⁰

CONNECTION AREA

Historic Period: c.1855-1898 (D&H Office/House only)

Potential Historic Period: 1848-present

Natural Systems and Features, and Topography.

Natural features and systems, and topographic characteristics, in the Connection Area are the product of glacial activity in the Delaware River valley and the alluvial deposits that were left behind. The landform in this area rises moderately from the Delaware River to Scenic Drive, and then rises gradually westward. The first building constructed in this area, Union Church (later St. Mark's), was constructed in c.1848 on a slightly elevated rise above the surrounding terrain that was predominantly devoted to agriculture because of its fertile floodplain soils. At the same time, workers were raising the topography just to the west to build a rail line embankment, while slightly farther west and south other workers were digging into the land to build new sections of the Delaware & Hudson canal. The two transportation corridors intersected at the southwest corner of the Connection Lot. Less dramatic cutting and filling also occurred to build an early version of what would later be named Scenic Drive. After this time, the only changes to topography were those specific to construction of residences, outbuildings, and a social hall, as well as grading associated with driveways and walkways. The rich soils in the Connection Area yielded productive gardens that supplied canal workers and local residents, and they continue to thrive today, although at a much smaller scale.

Land Use and Spatial Organization

Land uses and spatial relationships in the Connection Area have associations to both the canal era and the Zane Grey era, and resources and characteristics from both remain today. The area was small part of a larger 126-acre purchase by Engineer Russell Lord in 1846 on behalf of the D&H Canal Company directors to build new sections of canal, as well as aqueducts and locks, to improve the transport of coal to the Hudson River. Soon after, local Baptists and Methodists built the Union Church, one of the first in the valley, in the middle of the area, as well as the adjoining Union Cemetery and a parish/social hall.⁷¹ The church was set back from the rough road that would become Scenic Drive, and behind the church (west) was the Union Cemetery. In 1856 the church was renamed St. Mark's with the establishment of the local Lutheran Society. South of the church, hall, and cemetery, the D&H constructed an office/house and a barn/shed in c.1855 for one of the canal administrators, while to the north the land was farmed. Just to the west of the Connection Area was the New York & Erie Railroad line.

The closure of the canal in 1898 led to the sale of former canal lands, and in the Connection Area the creation of one and two acre lots. Charles Shannon purchased the former D&H office/house as a private residence and boarding house. Soon after he built a detached carriage house and in c.1915 a detached office for his son's medical practice. By this time the current configuration of Scenic Drive was established, defining the south and east sides of the property that featured a broad front lawn with shade trees, bluestone walks, and small pasture and garden. Fences and trees marked Shannon's north property line that abutted St. Mark's. Around 1900 the Odd Fellows occupied the parish/social hall, and in c.1915 local residents established the Lackawaxen Cemetery just north of the Union Cemetery. The cemetery was larger than the older cemetery, stretching from the railroad embankment to Scenic Drive, with several earthen lanes running its length and providing a rough layout for future grave plots. A few trees marked the north edge of the cemetery, separating it from the Shaffer and Kuhn lots to the north. The Shaffer lot included a house or barn at its center, while the Kuhn house was sited

closer to the river. Both properties had a few outbuildings and combinations of fields, gardens, and pastures.

Spatial configurations in the Connection Area have changed slightly over time, especially in regard to the amount of land devoted to crops and gardens. Residential and cemetery land uses remain today, but religious and service activities are no longer present. St. Mark's Church recently closed and the Odd Fellows stopped using the social hall in the 1950s. The Lackawaxen Cemetery Association serves as caretakers of the two cemeteries. In the 1980s the D&H office/house was converted into lodgings by owners D.J. and Joanne Jahn. The Jahns converted the former doctor's office into a cottage, and removed the barn/shed and fenced pasture to build a guest parking lot.

Other changes in the Connection Area include the loss of fences that delineated the various property lines, but many of them can be identified by lines of trees and shrubs that took hold. Perimeter fences no longer enclose any of the cemetery, but several grave lots feature decorative wrought iron fences. The earthen lanes still track through the spaces. Zane and Lina Grey were buried in Lackawaxen Cemetery in 1939 and 1957, respectively. The grave of an unknown Revolutionary War soldier is interred next to Scenic Drive and marked with a plaque.

Buildings and Structures

There are ten buildings and structures in the Connection Area, including the former D&H Canal Office/House (Roebing Inn, 155-157 Scenic Drive) at the south end of



Figure 2.35. View looking north at the former D&H Canal Company House, now the Roebing Inn. (OCLP 2022, DSC_7433)



Figure 2.36. View looking west at the former St. Mark's Church (left) and social hall (right). (OCLP 2022, DSC_7423)



Figure 2.39. View north at Scenic Drive, with the Zane Grey House in the distance. (OCLP 2022, DSC_7401)



Figure 2.37. View looking west at the buildings on the George property. (OCLP 2022, DSC_7402)



Figure 2.38. View looking southwest at the Kuhn property. (OCLP 2022, DSC_7396)

this area, which is listed on the National Register. The two-story frame building was built in the Greek Revival style in c.1855 and enlarged with a kitchen addition in c.1880 on its west elevation. Around the time it became a private residence in 1898, Charles Shannon built a small one-story carriage house along the north property line, and in c.1915 a one-story office to the west of the building for his son's medical office. The office is now used as a guest cottage. All three buildings are extant today, but a historic barn/shed that stood to the west near the tracks is gone (Figure 2.35). Just to the northwest of the office is a small one-story storage shed.

This area's oldest building is the one-story frame St. Mark's Church (147-149 Scenic Drive), built in c.1848 in the Greek Revival style and topped with a small belfry and pointed spire (Figure 2.36). Just to the north is a one-story building constructed around the same time and used as a social hall, itself displaying a simplified Greek Revival style. A small one-story shed stands along the south property line next to the Roebling Inn carriage house. The church and social hall were sold in 2019 to a private fishing and hunting club and are temporarily occupied throughout the year.⁷²

On the single lot north of the church/cemeteries that was conveyed to Anna Shaffer in 1899 are two residences (143 Scenic Drive), but little is known about these buildings. Now owned by David and Diana George, both are contemporary in design (Figure 2.37). The location of the eastern building corresponds to a house or barn visible in historic photographs, but additional research is needed to confirm



Figure 2.40. View looking northeast at the two cemetery lanes. (OCLP 2022, DSC_7413)

this. There is also a garage/shed just north of the western building. On the double lot that was sold to Gottlieb Kuhn in 1899 is the c.1914 Kuhn house (141 Scenic Drive), now owned by Adam Kuhn. West of this 2.5-story home were several barns/sheds near the Zane Grey property line, and there are two in the same location today (Figure 2.38).

Circulation

Scenic Drive is the primary circulation route through the Connection Area. An early form of the north-south portion of the road that parallels the Delaware River was present as early as 1848 to provide access to the church, parish hall/social hall, and Union Cemetery. By 1875 the east-west segment paralleling the south side of the D&H office/house was established. Both segments became Scenic Drive by 1913, and served as the primary route to and from Lackawaxen until around 1965 when the Hamlin Highway (Route 590) was built on the other side of the railroad tracks. Today the paved road primarily handles local traffic (Figure 2.39). The Union and Lackwaxen Cemeteries were established in c.1848 and c.1915, respectively, and likely featured informal circulation features in the form of lanes or paths. Over time these evolved into distinct two-track earthen lanes oriented east-west that exist today (Figure 2.40). They connect to an informal earthen/gravel parking area east of the church and social hall, that itself connects to Scenic Drive. The gravel driveways currently accessing the George and Kuhn properties from Scenic Drive likely have similar developmental histories, and today



Figure 2.41. View looking west at the Roebling Inn parking lot. (OCLP 2022, DSC_7435)



Figure 2.42. View looking southeast at the historic trail route paralleling the railroad embankment. (OCLP 2022, DSC_7411)



Figure 2.43. View looking northwest at the historic trail route paralleling the railroad embankment. (OCLP 2022, DSC_7412)

feature gravel surfaces. In the 1980s the Jahns constructed a parking lot for guests at the Roebling Inn. The paved lot is located west of the office/cottage, at the approximate location of the former barn/shed and adjoining pasture (Figure 2.41).

From around 1904 into the 1920s a trail tracked between the base of the railroad embankment and the west property lines of the lots in the Connection Area. The trail was often a shortcut for Zane Grey and his family from their property to the train station and other points south. The route was used until the twentieth century but only portions of its route are discernable (Figures 2.42, 2.43). Other pedestrian circulation features include bluestone walks at the Roebling Inn, from the front porch and side porch to Scenic Drive, and to the office/cottage and parking lot. Some of these walks may date to the house's historic period. There is also a concrete sidewalk at the front of the Kuhn house.⁷³



Figure 2.44. View looking south at the former canal location from the D&H office/house (Roebling Inn). (OCLP 2022, DSC_7454)



Figure 2.45. View looking southwest at the Zane and Lina (Dolly) Grey headstone. (OCLP 2022, DSC_7407)

Vegetation

The vegetation pattern characterized by scattered groups of trees amongst open areas that is depicted in historic photographs persists today in the Connection Area. Only a few trees grew in this area when it was primarily farmland, but with the establishment of the Lackawaxen Cemetery and St. Marks Church in c.1848, new trees were planted around the church and some of the graves, and grass and other groundcovers were introduced. Trees were also planted in the lawn fronting the east side of the D&H office/house after c.1855. When the land was subdivided at the turn of the twentieth century, new and volunteer vegetation took hold along the new property lines, and trees and grass were planted at the Kuhn house and Lackawaxen Cemetery in the 1910s. A historic postcard from 1914 suggests orchards were laid out on the Shaffer and Kuhn lots, and were bordered by small cultivated fields, gardens, or pastures (see Figure 1.38). There was also a garden west of the D&H office/house. By the mid-1970s, there were mature evergreen trees around the graves of Zane and Lina Grey, interred in 1939 and 1957, respectively. The Connection Area today features scattered mature deciduous trees and a few mature evergreen trees. A few scattered shrubs can be found throughout the area, but most are located on the Roebling Inn property. Open spaces are primarily turf with a few small garden areas.

Views and Vistas

A framed view still exists from the D&H office/house (Roebling Inn) toward the former location of the D&H canal to the southwest (Figure 2.44). This view would likely have been more open when the canal was operating because vegetation was generally comprised of orchard trees and gardens, and not taller trees that grow there today. There were likely similar open views from the house toward the canal to the south but this view is now partially blocked by the Cortright House and vegetation. All of the lots in the Connection Area offer framed views looking east to the Delaware River, although some are more limited than others depending on the density of trees that fill the riverbank on the east side of Scenic Drive (see Figure 2.39).

Small-Scale Features

The roster of small-scale features in the Connection Area is dominated by the gravestones associated with the Union Cemetery established in c.1848 and the adjacent Lackawaxen Cemetery established c.1915. They include a headstone for Zane Grey and his wife Lina, and a modern plaque for an unknown soldier from the nearby Revolutionary Battle of Minisink (Figures 2.45, 2.46). Historic photographs show fence enclosures surrounded some of the cemetery plots (Figure 2.47).

Fencing in the rest of the Connection Area is limited to garden fences associated with the Kuhn and George properties. Fencelines that once marked the property lines are gone, as is the post and board fencing that ran along the south side of the D&H office/house and enclosed the small pasture at the barn/shed to the west. There may have been other fences, but the absence of historic documentation leaves this story unclear. Interestingly, there are five mortared stone piers measuring approximately two feet square and three feet high, each topped with boulder, that stand along Scenic Drive (see Figure 2.46). Several piers mark the entrance to the church and cemetery areas. Some may correspond to the property lines shown in the 1898 plat map.

There are three signs in the Connection Area. The wood sign, “Roebing Inn on the Delaware” is attached to a wood framed lattice and supported by two posts. It stands on the south side of the Roebing Inn. The metal sign, “Lutheran Church, St. Mark’s, Service,” is attached to a single metal pole and stands near the entrance to the church/social hall parking lot. Nearby is the wood sign, “Lackawaxen and Union Cemetery, Entrance,” which is supported by two decorative wood posts. The sign indicates establishment in 1800, but records indicate the Union Cemetery was established in c.1848.



Figure 2.46. View looking south at the memorial for the Unknown Soldier. In the background five stone piers are visible. (OCLP 2022, DSC_7404)



Figure 2.47. View looking south at one of the fenced cemetery plots. (OCLP 2022, DSC_7408)

ZANE GREY PROPERTY

Historic Period: 1904-1929

Natural Systems and Features, and Topography

The natural features and systems, and topography, that historically characterized the Zane Grey Property persist today. The site is situated on glacial and alluvial deposits within the Delaware River valley, at a bend overlooking the confluence of the Lackawaxen and Delaware rivers. The Greys set out buildings, gardens, and corrals along alluvial terraces overlooking the rivers, while the drainage features, roads, paths, and steps traversed the sloped riverbank terrain. The first and lowest terrace along the river contains much of Parcel A – the former Holbert property and Cottage site and now owned by Pennsylvania Fish and Boat Commission (PFBC) – and the eastern third of Parcel B.

The second terrace gradually rises fifteen to twenty feet and encompasses the middle third of Parcel B – including what was called the “Big House” – and much of Parcel C. The third and least discernable terrace generally occupies the western third of Parcel B – including the Ida and Josephine Grey house – and extends to the railroad embankment that was built in the 1840s and rises around twenty-five feet above the site. The Greys referred to the low area between the Cottage and Big House as “the Drop,” which they used as a garden area.⁷⁴

The construction of a parking area just northeast of the Big House for guest parking in the late 1940s altered part of the second terrace landform, while construction of the PFBC parking area and boat ramp in the 1970s altered the first terrace landform, “the Drop,” and extensively regraded the Delaware River bank. The Big House also reflects the original relationship with the Delaware, even though the water’s edge has receded by about 120 feet due to the gradual decay of the downstream slackwater dam.⁷⁵

Land Use and Spatial Organization

Historic land uses have obviously changed since Zane Grey and his brother Romer were drawn to the Lackawaxen and Delaware riverfronts, but the overall organization of their “family retreat from urban life” is still evident in the landscape. During the historic period, the Greys modified existing buildings and constructed new buildings to create a complex of residences, barns, sheds, outhouses, and associated domestic areas on the riverside terraces, bounded by



Figure 2.48. View looking southwest at the Zane Grey house. (OCLP 2022, DSC_7360)

Scenic Drive and the flowing rivers to the north and east, and the railroad embankment to the west. The landscape was characterized as a rural place for writing, a recreational retreat, a small farm, and a family gathering place. New construction was ad hoc to meet the needs of Zane Grey and his extended family as his writing career flourished. By the end of the historic period, the six-acre property featured numerous spaces connected by a system of paths and a driveway. Uses included corrals and pasture, a clay tennis court, orchards, garden plots, and berry patches.⁷⁶

Zane Grey purchased a three-acre parcel (Parcel A) from the Holbert family in 1904, which included a farmhouse and a D&H barn. Zane and his wife Dolly lived in the former Holbert farmhouse until 1914, which they called “the Cottage.” Zane’s brother Romer and his wife Reba acquired two acres (Parcel B) adjacent to Zane’s property in 1906. That same year, Romer and Reba constructed the home referred to by the Greys as the “Big House” on Parcel B, on the edge of a terrace overlooking the Delaware. Zane also built a one-room cabin, variously called the “Lodge” or “Bungalow” on Parcel A to the southeast of the Cottage where he wrote during summer months. In 1907 the brothers built the Ida and Josephine Grey house behind the Big House for their mother Josephine and sister Ida. Beginning in 1914, the Big House became the centerpiece of the family compound when Zane and his family moved in and enlarged it several times. Although the Ida and Josephine Grey house had been sold to family friends by this time, it was developed as part of the Grey family compound. Amongst the primary buildings were various outbuildings that were added over the years, including a barn, cat house, coal shed, ice house, playhouse, and outhouses. There was also a tennis court, garden, pasture, and orchard. Driveways, walkways, fences, and tree lines both connected and separated these features and spaces.⁷⁷

The overall spatial organization remained unchanged for several years after the historic period, but the use of many features in the landscape declined or changed. After Zane’s death in 1939, Dolly Grey began selling various parcels, and subsequent landowners altered, moved, or removed some of the buildings and landscape features. Notable changes included floods in 1942 and 1943 that



Figure 2.49. View looking northwest at the barn. (OCLP 2022, DSC_7368)

damaged the Cottage and destroyed the Bungalow; Helen James Davis's conversion of the Big House into the Zane Grey Inn and then the Zane Grey Museum; and construction of a large parking lot in Parcel A by the PFBC.⁷⁸

With establishment of Upper Delaware Scenic and Recreational River, the key features of the Zane Grey Property are among park resources that provide recreational opportunities for park visitors and the local population. They are within the three tracts of land assembled by the National Park Service between 1989-2000: Tract 101-04 (0.93 acres), 101-08 (1.00 acres), and 101-09 (2.21 acres).⁷⁹

Buildings and Structures

Three historic buildings and structures associated with Zane Grey are extant. The Zane Grey house (Str #6250) was built by Romer Grey in 1906 and purchased by Zane Grey in 1914. Nicknamed the "Big House" for its location on a knoll overlooking the Delaware River, the original two-story foursquare plan featured Queen Anne and Neoclassical influences. Zane added two, two-story additions in 1915 and 1916, which resulted in the overall 30 by 65-foot footprint that exists today (Figure 2.48). The house was operated as an inn in 1948-1973 by Helen Davis, at which time the first floor was converted into a museum. The park acquired the house in 1989 and has made numerous repairs while maintaining the exhibits and using it as office space. The two-story Zane Grey barn (Str #6256) was constructed in 1915 and converted into a garage in the 1920s (Figure 2.49). It was acquired in 1998. The Grey



Figure 2.50. View looking southwest at the coal shed. (OCLP 2022, DSC_7367)



Figure 2.51. View looking southwest at the former Ida and Josephine Grey house (right), Moran house (center), and guest house (left). In the foreground is the reconstructed outhouse. (OCLP 2022, DSC_7378)

coal shed (Str #6257) was built in c.1913 just west of the Ida and Josephine Grey house, and was acquired by the park in 2003 (Figure 2.50). Zane and Romer Grey also constructed the two-story Ida and Josephine Grey House (Smith-Nelson House) for their mother and sister, in 1907 (Figure 2.51). In 1913 the house was sold to friends, but additions and alterations by later owners in the late 1950s and early 1960s diminished the building's integrity. The park gained full ownership of the house in 2003 and plans to raze this non-historic building. Historic buildings and structures that have been lost include the Cottage, a D&H barn, Bungalow/Lodge, ice house, pet shelter, playhouse, and one of the outhouses.⁸⁰

The property's other non-historic buildings and structures post-date the historic period. The two-story Moran House was built in c.1942, using salvaged portions of the Cot-



Figure 2.52. View looking west at the historic driveway. (OCLP 2022, DSC_7360)



Figure 2.55. View looking southwest at the current visitor/staff parking lot. (OCLP 2022, DSC_7356)



Figure 2.53. View looking east at the historic driveway and a portion of the non-historic loop. (OCLP 2022, DSC_7370)



Figure 2.54. View looking northeast at some of the bluestone walkways around the Zane Grey house. (OCLP 2022, DSC_7380)

tage, which was severely damaged during the major flood that year. The Morans also saved the Cottage's one-story kitchen ell and porch for use as a guest house, which they placed just to the south of their house. The park is planning to remove both structures (see Figure 2.51). The park reconstructed the outhouse that was located southwest of the Zane Grey house in 2007 to conceal propane tanks that fuel the property's generator (Figure 2.51).⁸¹

Circulation

The Zane Grey Property has preserved several historic circulation features. The east-west driveway was constructed in c.1915 to access the new barn that was built at that time, although it may have existed informally in 1906-1907 to access Romer Grey's new residence (Big House) and the Ida and Josephine Grey house. A southern loop extension at the west end was likely added after 1918 to improve access to the Ida and Josephine Grey house. The driveway and loop are extant (Figures 2.52, 2.53). The Grays also constructed walkways with local bluestone throughout the family compound in 1906-1916 (Figure 2.54, see also Figure 2.51). Some routes included a north-south path between the Cottage and the Big House, east-west path from the Big House to the earthen trail at the railroad embankment, and an east-west path from the front porch steps of the Big House to Scenic Drive. Portions of these walks exist today, although some segments have been lost or buried, and others have been reconstructed or extended. Another missing circulation feature is a distinct earthen path that paralleled

the foot of the railroad embankment and reached the Lackawaxen train station a quarter-mile to the south. During the historic period, the Greys relied on the train line for travel to and from New York City. Although passenger service has ended, the rail line is actively used by Norfolk Southern for freight shipping. The park is developing plans to restore the trail.⁸²

Non-historic features at the Zane Grey property include a gravel parking area northeast of the Big House, on the south side of the historic driveway, which was built in the 1940s to accommodate guests at the inn. The park expanded this parking area in the 1990s to accommodate eight vehicles (Figure 2.55). The trace of a smaller gravel parking area for one to two vehicles is situated near the northwest corner of the Zane Grey house, but is being allowed to grow over with grass. The former Grey property to the north, which was the location of the Cottage and other buildings and gardens, is now a paved parking lot owned by the Pennsylvania Fish and Boat Commission (PFBC). Built in the early 1970s, the facility continues across Scenic Drive to a smaller parking lot and boat ramp along the Delaware River. The parking areas accommodate large numbers of recreational boaters in the summer (Figure 2.56). The National Park Service has an agreement with the PFBC to use the parking lot, as well as a co-use/co-management agreement for river access. The other non-NPS circulation feature is Scenic Drive, an early form of which was constructed in the late 1800s and improved in the early 1900s. The two-lane drive continues to serve as the primary access route to the Zane Grey Property as well as the state parking lots.⁸³

Vegetation

Vegetation at the Zane Grey Property includes a mix of historic and non-historic trees and shrubs, as well as historic orchard, pasture, and garden areas. Beginning in 1904, the Greys planted numerous shade trees in what was mostly a treeless landscape. Species included white pine, sugar maple, black locust, Norway spruce, white ash, and willow, as well as ornamental shrubs and fruit trees. After the Greys departed in 1918, the trees they planted continued to mature, providing screenings, windbreaks,



Figure 2.56. View looking northeast at the PFBC parking lot. (OCLP 2022, DSC_7391)

and shade. In the 1950s new property owners planted additional trees at the Ida and Josephine Grey house, which included Japanese maples, arborvitae, hemlocks, Norway spruces, and Colorado blue spruces, and near the Moran house, which included willows. Since taking ownership, the park has removed several trees, and has replaced-in-kind some of them. Trees that contribute to the historic character of the Zane Grey landscape include the sugar maples and black locust surrounding the former clay tennis court; sugar maples east and south of the Big House; a row of white pines along the Scenic Drive and along the Parcel A and B property line; two Norway spruce between the Ida and Josephine Grey house and the coal shed; and a willow tree on the east side of Scenic Drive on Parcel C. The park has so far retained the non-historic 1950s plantings, but when they die or become damaged they are removed and not replaced. Existing vegetation along the perimeter of the PFBC parking lot (Parcel A) may include historic plant material, but additional research is needed.⁸⁴

The Greys planted small orchards on the western end of each of the three parcels, and after they left Lackawaxen, the orchard on Parcel C continued to mature. Fruit trees on Parcel B died, and those on Parcel A were removed for the state parking lot. Several original trees in Parcel C remain, and the park has replaced some trees using cuttings from the original apple and pear trees grafted onto rootstock. The Greys created a fenced pasture in the middle portion of Parcel C for their three horses and a cow. Today, the park mows the pasture area infrequently, allowing the

area to retain the character of a pasture, but the fences are gone. The Grey's also maintained extensive garden plots of fruits and vegetables on Parcel A between the Cottage and Big House, Parcel B between the Ida and Josephine Grey house and the driveway, and Parcel C south of the Big House. After the historic period, the gardens fell into disuse, and today only the Parcel C retains open conditions. This garden is no longer tended but can still be interpreted as a garden area when the asparagus plants are visible.⁸⁵

Little is known about shrubs at the Zane Grey Property except for plantings around the house, along the front walk, and by the outhouse that included spiraea, rose, lilac, clematis, and wisteria, and perennials around the tennis court like daffodil and narcissus. After the historic period, some ornamental shrubs persisted on the property and others disappeared. Clematis and wisteria vines are no longer present, and no plants grow along the original front walk since it was removed. Spiraea still grows at the Big House and near the former playhouse. Lilacs still grow at the reconstructed outhouse, coal shed, and along the driveway at the northeast corner of parcel B. Flowering quince grows west of the reconstructed outhouse and along the driveway.⁸⁶

Views and Vistas

The historic upstream view of the river valley that was present during the Zane Grey period of residence is extant, but the downstream view is partially blocked by vegetation (Figures 2.57). Zane Grey and his brother Romer pur-

chased this property in 1904, at the bend in the Delaware River and its confluence with the Lackawaxen River, in part because of the scenic views of the river valleys. At this time it was almost entirely devoid of tall vegetation except for a cluster of trees around the D&H house (original Cottage). The orientation of the Cottage, and especially the Big House from its position on a knoll, provided clear views up and down the Delaware River, and in particular Roebbling's Delaware Aqueduct. The Greys subsequently planted pines and locusts along Scenic Drive that narrowed the range of vision of the Delaware River from the two primary buildings. Views of the Delaware River also included the forested bluff on the New York side, which was owned by Zane and Dolly.⁸⁷

After 1929 the upstream and downstream views persisted but continued to slowly narrow as vegetation matured. However, the emergence of successional riverfront vegetation to the south of the Big House (Parcel C) after the historic period has further diminished downstream views toward the Delaware Aqueduct. The bluff across the Delaware River is still mostly wooded and contributes to the background of the river views, but recent vista cutting associated with residences along Zane Grey Way threaten this condition (see Figure 2.57).⁸⁸

Small-Scale Features

There are no longer any small-scale features from the Zane Grey period. Fences and gates associated with property lines, gardens, and corrals during the historic period are



Figure 2.57. Panoramic view looking east, upstream (left side) and downstream (right side) at the Delaware River, from the front porch of the Zane Grey house. (OCLP 2022, DSC_7361-7362)



Figure 2.58. View looking northwest at the generator. (OCLP 2022, DSC_7381)

no longer present. Play areas for the children, a slide, and a family croquet area are gone, as are the family's iron couches, hammocks, and lawn swing. After the Greys moved to California in 1918, and especially after Zane's last visit in 1929, these features were gradually removed.⁸⁹

The property contains several non-historic small-scale features that include: a historical marker erected in 1995 by the state; two wood museum signs along Scenic Drive and at the parking area; informational and directional signs installed by the National Park Service; picnic tables in the open area south of the Zane Grey house, which historically was a vegetable garden; two benches on the front porch of the Big House; several concrete boundary markers along the property lines; and a generator south of the Big House, near the location of the former playhouse. Except for the generator, all of these features generally blend in with the surroundings (Figure 2.58). There are also five features that require future research: two concrete pillars that mark the entrance to a road trace at the southeast corner of Parcel C (Figure 2.59); a metal well cap at the southeast corner of the Zane Grey house; a bluestone slab covering a dry well at the rear of the Ida and Josephine Grey house; a buried septic tank with two protruding vents; and a six-foot by six-foot square piece of bluestone set in the ground, near the (second) tennis court. On occasion, temporary features associated with special events are brought to the site, such as tents, trash receptacles, and portable outhouses. Two



Figure 2.59. View looking west at the granite some of the bluestone walkways around the Zane Grey house. (OCLP 2022, DSC_7382)

small-scale features located on state owned property are non-contributing but compatible features: a portable and seasonal kiosk at the boat ramp and a concrete telephone booth pad at the southeast corner of the main parking lot.⁹⁰

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
River Corridor / Aqueduct							
NATURAL SYSTEMS AND FEATURES							
Delaware River / Lackawaxen River	✓	✓	✓	✓	C	CLI 2026: 99-100	--
BUILDINGS AND STRUCTURES							
Slackwater Dam	✓	✓	✓	✓	C	CLI 2016: 110-113	built 1825-1828; altered 1848; abandoned after 1898
Roebling's Delaware Aqueduct (#7000) CL-176560, HS-80000	✓	✓	✓	✓	C	CLI 2016: 110-113	built 1847-1848
Wing Walls at New York Abutment CL-176590	✓	✓	✓	✓	C	CLI 2016: 110-113	built 1848-1898; rebuilt 2007
VIEWS AND VISTAS							
Views from Roebling's Delaware Aqueduct Towpaths CL-176650	✓	--	✓	✓	C	CLI 2016: 135-136	established 1848; altered 1908; restored 1930s and 1994
SMALL-SCALE FEATURES							
Lights on Roebling's Delaware Aqueduct CL-176702/176664	--	--	✓	✓	NC-c	CLI 2016: 137-138	installed 1940s
Roebling's Delaware Aqueduct Site, New York Side							
CONSTRUCTED WATER FEATURES							
Old Delaware & Hudson Canal Prism (#7300) CL-176558, HS-81476	✓	✓	✓	✓	C	CLI 2016: 107-110	built 1828; altered 1848; aban- doned 1898; altered 1930s
<i>New Delaware & Hudson Canal Prism</i>	✓	✓	✓	✓	C	--	<i>no NPS ownership; built 1848; abandoned 1898; altered 1930s</i>
BUILDINGS AND STRUCTURES							
Old Delaware & Hudson Towpath Retaining Walls (no#, upstream from Aqueduct) CL-176598	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1828
Old Delaware & Hudson Towpath Retaining Walls (#7311) CL-176594, HS-83041	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1828
Old Delaware & Hudson Towpath Retaining Walls (#7321) CL-176596, HS-81477	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1828
New Delaware & Hudson Towpath Retaining Walls (#7211) CL-176600, HS-81484	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1848
Delaware Aqueduct Toll House (#7250) CL-176592, HS-80001	--	✓	✓	✓	C	CLI 2016: 110-127	built 1908
NYDOT Flow Diversion Structure (#7323) CL-176602	--	--	✓	✓	NC-c	CLI 2016: 110-127	built 1930s

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
Culverts, Headwalls, Drop Inlets (Rte 97) CL-176612	--	--	✓	✓	NC-c	CLI 2016: 110-127	built 1930s
Non-Canal Stone Walls (Toll House and Maintenance Access Road) CL-176608	--	--	--	✓	NC-c	CLI 2016: 110-127	built mid-1990s, 2007
Non-Canal Concrete Walls (Parking Lot) CL-176610	--	--	--	✓	NC-i	CLI 2016: 110-127	built mid-1990s
Two-Pipe Culvert (Towpath Trail) CL-176606	--	--	--	✓	NC-c	CLI 2016: 110-127	built 2007
Concrete Box Culvert (Towpath Trail) CL-176604	--	--	--	✓	NC-c	CLI 2016: 110-127	built 2009
CIRCULATION							
Old Delaware & Hudson Canal Towpath (Towpath Trail) (#7310/7320) CL-176634/176636 HS-81475/81478	✓	✓	✓	✓	C	CLI 2016: 127-135	built 1828; abandoned 1848-1898; altered 2007
New Delaware & Hudson Canal Towpath (#7210) CL-176638, HS-81471	✓	✓	✓	✓	C	CLI 2016: 127-135	built 1848; abandoned 1898; most destroyed 1930s
Approach Road (New York side) CL-176640	--	✓	✓	✓	NC-c	CLI 2016: 127-135	built 1908
Visitor Parking Lot, Sidewalks, and Steps CL-176642	--	--	--	✓	NC-c	CLI 2016: 127-135	built 1994-1997
Emergency River Access Road CL-176644	--	--	--	✓	NC-c	CLI 2016: 127-135	built 1994-1997
Maintenance Access Road CL-176646	--	--	--	✓	NC-c	CLI 2016: 127-135	built 2007
VEGETATION							
“Old Canal” Prism Vegetation CL-176548	--	✓	✓	✓	NC-i	CLI 2016: 104-107	established after 1898
Plantings Around Parking Lots and Sidewalks CL-176550	--	--	--	✓	NC-c	CLI 2016: 104-107	planted 1994-1997
VIEWS AND VISTAS							
Views of “Old Canal” Prism from “Old Canal” Towpath (Towpath Trail) CL-176660	✓	✓	✓	✓	C	CLI 2016: 135-137	established 1828
Views of Roebling’s Delaware Aqueduct from “Old Canal” Towpath (Towpath Trail) CL-176658	✓	✓	✓	✓	C	CLI 2016: 135-137	established 1848

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
SMALL-SCALE FEATURES							
Park Entrance Sign: "Roebbling's Delaware Aqueduct" CL-176704	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Waysides CL-176706	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Trash/Recycling Receptacles CL-176708	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Handrails CL-176710	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Wire Chain Gate CL-176712	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Boundary Markers CL-176714	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1995
Roebbling's Delaware Aqueduct Site, Pennsylvania Side							
CONSTRUCTED WATER FEATURES							
New Delaware & Hudson Canal Prism CL-176554	✓	✓	✓	✓	U	CLI 2016: 107-110	built 1848; altered 1898; filled in 1930s
BUILDINGS AND STRUCTURES							
New Delaware & Hudson Canal Upstream Wall Ruin (7005) CL-176564, HS-82170	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1848; altered after 1898
New Delaware & Hudson Canal Downstream Wall Ruin (7006) CL-176566, HS-81479	✓	✓	✓	✓	C	CLI 2016: 110-127	built 1848; altered after 1898
<i>D&H House (Brown Keller)</i>	✓	✓	✓	✓	C	--	<i>no NPS ownership; built c.1855; altered c.1915</i>
<i>Brown Keller House Garage</i>	--	✓	✓	✓	NC-c	--	<i>no NPS ownership; built c.1915</i>
Margold House CL-176568	--	✓	✓	✓	NC-c	CLI 2016: 110-127	built c.1912
Margold Garage CL-176570	--	✓	✓	✓	NC-c	CLI 2016: 110-127	built 1915
Non-Canal Stone Walls (Margold House, CL-176580	--	✓	✓	✓	NC-c	CLI 2016: 110-127	built c.1912
Boat Barn CL-176574	--	--	--	✓	NC-c	CLI 2016: 110-127	built after 1998
Storage Shed CL-176576	--	--	--	✓	NC-i	CLI 2016: 110-127	built after 1998
Restroom CL-176572	--	--	--	✓	NC-c	CLI 2016: 110-127	built late 1990s
Maintenance Building CL-176578	--	--	--	✓	NC-c	CLI 2016: 110-127	altered 1997-2000

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
Non-Canal Stone Walls (Margold House, east of Boat House, along riverbank) CL-176580	--	✓	✓	✓	NC-c	CLI 2016: 110-127	built c.1912
Non-Canal Concrete Walls (Maintenance Building) CL-176582	--	--	--	✓	NC-i	CLI 2016: 110-127	built 1997-2000
Culverts, Headwalls, Drop Inlets CL-176584	--	--	--	✓	NC-c	CLI 2016: 110-127	built late 1990s
<i>Cortright House</i>	--	✓	✓	✓	NC-c	--	<i>no NPS ownership; built c.1915</i>
CIRCULATION							
New Delaware & Hudson Canal Towpath Ruin (#7007) CL-176616, HS-81482	✓	✓	✓	✓	C	CLI 2016: 127-135	built 1848; abandoned 1898
Approach Road (Pennsylvania side) CL-176618	--	✓	✓	✓	NC-c	CLI 2016: 127-135	built 1908
Visitor Parking Lot, Sidewalks, Steps, and Overlook CL-176620	--	--	--	✓	NC-c	CLI 2016: 127-135	built 1997-1999
Emergency River Access Road CL-176622	--	--	--	✓	NC-c	CLI 2016: 127-135	built 1997-1999
Margold House Walks CL-176624	--		✓	✓	NC-c	CLI 2016: 127-135	
Gravel Driveway to Boathouse and Storage Shed CL-176626	--	--	--	✓	NC-c	CLI 2016: 127-135	built c.1998
Riverbank Steps CL-176628	--	✓	✓	✓	NC-c	CLI 2016: 127-135	built after 1898
Maintenance Driveways CL-176630	--	--	--	✓	NC-c	CLI 2016: 127-135	built 1997-1999
VEGETATION							
Plantings Around Parking Lots and Sidewalks CL-176542	--	--	--	✓	NC-c	CLI 2016: 104-107	planted 1997-1999
Margold Lot Trees, Shrubs, and Lawns CL-176544	--	✓	✓	✓	NC-c	CLI 2016: 104-107	planted after 1915
VIEWS AND VISTAS							
View of Roebling's Delaware Aqueduct from Overlook at Visitor Parking Lot CL-176652	✓	✓	✓	✓	C	CLI 2016: 137-144	established 1848, built 1997-1999
SMALL-SCALE FEATURES							
Park Entrance Sign: "Roebling's Delaware Aqueduct" CL-176666	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
Waysides/Information Signs CL-176668	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Trash/Recycling Receptacles CL-176670	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Pet Waste Station CL-176672	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Bicycle Rack CL-176674	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Metal Handrails CL-176676	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Split Rail Fence CL-176678	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Flag Pole CL-176680	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Bollards CL-176682	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Utility Poles CL-176684	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Septic Cleanouts CL-176686	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Well Covers CL-176688	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Bluestone/Masonry Slab on Concrete Box CL-176690	--	--	--	✓	U	CLI 2016: 137-144	installed after 1997
Picnic Tables CL-176692	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Benches CL-176694	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Boundary Markers CL-176696	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Bridge Sculpture CL-176698	--	--	--	✓	NC-c	CLI 2016: 137-144	installed after 1997
Connection Area							
BUILDINGS AND STRUCTURES							
D&H Canal Co. Office (Roebling Inn)	✓	✓	✓	✓	C	NR 1993	<i>no NPS ownership; built c.1855; altered 1880 and 1980s</i>
Carriage House	--	--	✓	✓	NC-c	NR 1993	<i>no NPS ownership; built c.1898</i>
Office /Cottage	--	--	✓	✓	NC-c	NR 1993	<i>no NPS ownership; built c.1915; altered 1980s</i>
Storage Shed, Roebling Inn	--	--	--	✓	U	--	<i>no NPS ownership; built after 1980</i>
St. Mark's Church	✓	✓	✓	✓	U	--	<i>no NPS ownership; built c.1848</i>

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
<i>Social Hall</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; built c.1848
<i>Shed at Church</i>	--	?	?	✓	U	--	<u>no NPS ownership</u> ; construction date unknown
<i>Houses at George Property (2)</i>	--	--	?	✓	U	--	<u>no NPS ownership</u> ; construction dates unknown
<i>George Garage/Shed</i>	--	?	?	✓	U	--	<u>no NPS ownership</u> ; construction date unknown
<i>Kuhn House</i>	--	✓	✓	✓	U	--	<u>no NPS ownership</u> ; built c.1914
<i>Kuhn Barns/Sheds (2)</i>	--	?	?	✓	U	--	<u>no NPS ownership</u> ; construction dates unknown
CIRCULATION							
<i>Scenic Drive (portion)</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; route present by 1848; realigned c.1915
<i>Earthen Lanes in Cemeteries</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; likely created in c.1848 (Union Cemetery) and c.1915 (Lackawaxen Cemetery)
<i>Parking Area at Church</i>	--	?	✓	✓	U	--	<u>no NPS ownership</u> ; likely developed late nineteenth or early twentieth century
<i>Parking Lot at Roebling Inn</i>	--	--	--	✓	U	--	<u>no NPS ownership</u> ; built 1980s
<i>Driveway, George Property</i>	--	?	✓	✓	U	--	<u>no NPS ownership</u> ; likely developed c.1915
<i>Driveway, Kuhn Property</i>	--	?	✓	✓	U	--	<u>no NPS ownership</u> ; likely developed c.1915
VEGETATION							
<i>Mature Shade Trees</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u>
<i>Lawns and Grass Areas</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u>
<i>Shrubs</i>	?	?	✓	✓	U	--	<u>no NPS ownership</u>
VIEWS AND VISTAS							
Views from D&H Canal Co. Office (Roebling Inn) to Roebling's Delaware Aqueduct and location of former canal	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; established c.1855
Views from the Connection Area Lots to the Delaware River	✓	✓	✓	✓	U	--	<u>no NPS ownership</u>
SMALL-SCALE FEATURES							
<i>Headstone, Zane and Lina Grey</i>	--	--	✓	✓	U	--	<u>no NPS ownership</u> ; interred 1939 and 1957
<i>Plaque, Unknown Soldier</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; interred c.1848
<i>Other Gravestones</i>	✓	✓	✓	✓	U	--	<u>no NPS ownership</u> ; installed c.1848-present
<i>Garden Fences</i>	--	?	?	✓	U	--	<u>no NPS ownership</u> ; construction dates unknown

Table 2.2: Summary of Landscape Characteristics and Features

Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
Stone Piers (5)	?	?	?	✓	U	--	<i>no NPS ownership; construction date unknown</i>
Sign, "Roebbling Inn on the Delaware"	--	--	--	✓	U	--	<i>no NPS ownership; erected after 1980</i>
Sign, "Lutheran Church, St. Mark's, Service"	?	?	?	✓	U	--	<i>no NPS ownership; date erected unknown</i>
Sign, "Lackawaxen and Union Cemetery, Entrance"	?	?	?	✓	U	--	<i>no NPS ownership; date erected unknown</i>
Zane Grey Property							
BUILDINGS AND STRUCTURES							
Zane Grey House (#6250) CL-99605, HS-80018	--	✓	✓	✓	C	CLI 2014: 66-72	built 1906; altered 1915-1916
Zane Grey Barn (#6256) CL-99606, HS-83046	--	✓	✓	✓	C	CLI 2014: 66-72	built 1915
Grey Coal Shed (#6257) CL-99607, HS-83043	--	✓	✓	✓	C	CLI 2014: 66-72	built c.1913
Ida and Josephine Grey House CL-170318	--	✓	✓	✓	NC-i	CLI 2014: 66-72	built 1907; altered 1950s-1960s
Moran House CL-170320	--	--	✓	✓	NC-i	CLI 2014: 66-72	built c.1942
Cottage Kitchen CL-170322	--	--	✓	✓	NC-i	CLI 2014: 66-72	built 1945
Reconstructed Outhouse CL-170324	--	--	--	✓	NC-c	CLI 2014: 66-72	built 2007
CIRCULATION							
Driveway CL-99608	--	✓	✓	✓	C	CLI 2014: 62-66	built c.1915; altered after 1918
Bluestone Pathways CL-99609	--	✓	✓	✓	C	CLI 2014: 62-66	built 1906-1916
Gravel Parking Areas CL-99610	--	--	✓	✓	NC-i	CLI 2014: 62-66	built 1940s-1989; altered 1990s
<i>Penn Fish and Boating Commission Parking Lots and Boat Ramp</i>	--	--	✓	✓	NC-i	--	<i>no NPS ownership; built early 1970s</i>
VEGETATION							
Deciduous and Coniferous Trees CL-100053	--	✓	✓	✓	C NC-c	CLI 2014: 57-62	planted 1905-1918 and 1950s; altered 1990s
Orchard (Parcel C) CL-100054	--	✓	✓	✓	C	CLI 2014: 57-62	planted 1916-1918; replanted 2000
Pasture CL-100055	--	✓	✓	✓	C	CLI 2014: 57-62	planted 1915-1918; altered 1940s
Garden (Parcel C) CL-100056	--	✓	✓	✓	C	CLI 2014: 57-62	planted 1916-1918; altered after 1929
Ornamental Shrubs CL-100058	--	✓	✓	✓	C NC-c	CLI 2014: 57-62	planted 1905-1918, altered after 1929

Table 2.2: Summary of Landscape Characteristics and Features

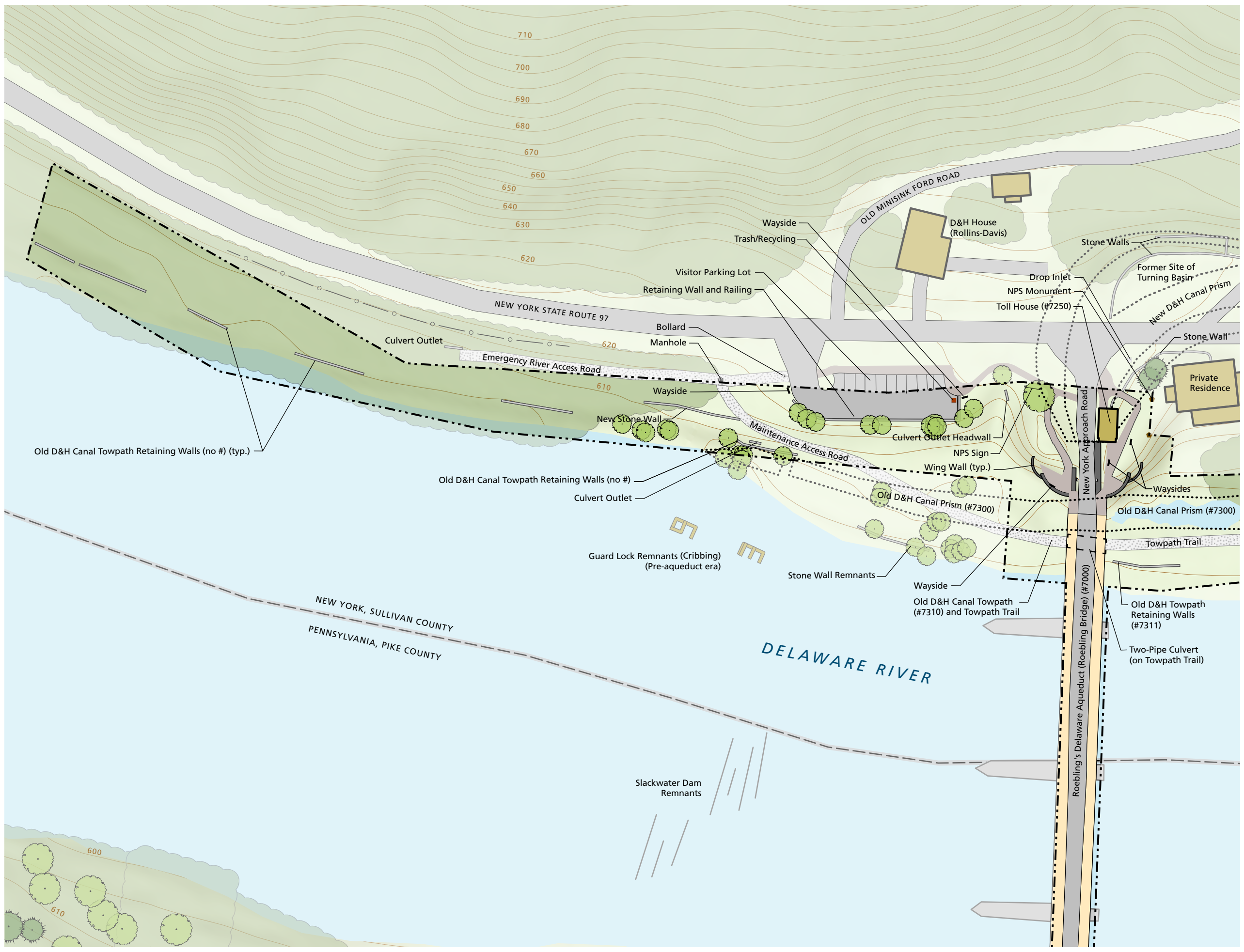
Characteristic or Feature CRIS-CL# / CRIS-HS#	Extant 1898	Extant 1929	Extant 1978	Extant 2022	Evaluation	Evaluation Source	Notes C (contributing), NC-c (noncontributing-compatible), NC-i (noncontributing- incompatible), U (undetermined)
<i>Vegetation in Penn Fish and Boating Commission West Parking Lot (Parcel A)</i>	--	✓	✓	✓	U	--	<i>no NPS ownership; planted 1905-1918; altered after 1929 and in 1970s</i>
VIEWS AND VISTAS							
Upstream and Downstream River Views CL-170326	✓	✓	✓	✓	C	CLI 2014: 73-74	established by 1904; altered after 1929
SMALL-SCALE FEATURES							
Zane Grey Historical Marker CL-170330	--	--	--	✓	NC-c	CLI 2014: 74-78	erected 1995
NPS Signs CL-170332	--	--	--	✓	NC-c	CLI 2014: 74-78	erected after 1989
Picnic Tables and Benches CL-170334	---	--	--	✓	NC-c	CLI 2014: 74-78	placed after 1989
South Boundary Fence CL-170336	--	--	--	✓	NC-c	CLI 2014: 74-78	erected after 1989
Utility Poles CL-170340	--	--	✓	✓	NC-c	CLI 2014: 74-78	erected after 1940s
NPS Boundary Markers CL-170340	--	--	--	✓	NC-c	CLI 2014: 74-78	erected after 1989
Generator CL-170346	--	--	--	✓	NC-i	CLI 2014: 74-78	erected after 1989, at site of former playhouse
Concrete Pillars and Road Trace CL-170328	--	✓	✓	✓	U	CLI 2014: 74-78	possibly former property markers and farm lane
Wells CL-170342	--	✓	✓	✓	U	CLI 2014: 74-78	may date to historic period
Septic Tank CL-170344	--	✓	✓	✓	U	CLI 2014: 74-78	may date to historic period
<i>Penn Fish and Boating Commission Portable Kiosk</i>	--	--	--	✓	NC-c	--	<i>no NPS ownership; seasonal feature</i>
<i>Penn Fish and Boating Commission Telephone Booth Pad</i>	--	--	--	✓	NC-c	--	<i>no NPS ownership; remnant of phone booth</i>

ENDNOTES

- 1 RB CLI 2016: 44; Review comments, Lauren Hauptman, 26 March 2021
- 2 MPDF 1992, Sec.E: 1 and Sec.F: 1-12
- 3 NR 1983 draft, Sec.8: 1
- 4 MPDF 1992, Sec.E: 14-16 and Sec.F: 7-9
- 5 RB CLI 2016: 44-45
- 6 RB CLI 2016: 48-49. The Margold House and Garage were evaluated as non-contributing features.
- 7 MPDF 1992, Sec.E: 22-23 and Sec.F: 7-9
- 8 RB CLI 2016: 48-49)
- 9 NR 1993, Sec.7: 1; MPDF 1992, Sec.E: 15 and Sec.F: 7-9
- 10 MPDF 1992, Sec.E: 17-19 and Sec.F: 5-6
- 11 MPDF 1992, Sec.F: 5-7,14-15
- 12 NR 1983, Sec.8: 1
- 13 NR 2011, Sec.8: 1
- 14 RB CLI 2016: 99-100; UPDE website, accessed 11 March 2015; FD 2014: 9
- 15 RB CLI 2016: 99-100; ZG CLI 2016: 52; SD/EA 1995: 20
- 16 ZG CLI 2016: 52
- 17 RB CLI 2016: 110-113
- 18 RB CLI 2016: 110-113
- 19 RB CLI 2016: 110-113,137-138
- 20 RB CLI 2016: 110-113; Review comments, Lauren Hauptman, 26 March 2021
- 21 RB CLI 2016: 130
- 22 RB CLI 2016: 135
- 23 RB CLI 2016: 136
- 24 RB CLI 2016: 137-138
- 25 RB CLI 2016: 99-100; SD/EA 1995: 17
- 26 RB CLI 2016: 99-100; SD/EA 1995: 17-18
- 27 RB CLI 2016: 99-100; SD/EA 1995: 21
- 28 RB CLI 2016: 99-100; SD/EA 1995: 21-22
- 29 RB CLI 2016: 102-103
- 30 RB CLI 2016: 102-103
- 31 RB CLI 2016: 103-104
- 32 RB CLI 2016: 103-104
- 33 RB CLI 2016: 37; LandsNet, accessed 12 December 2020
- 34 RB CLI 2016: 101-102

35	RB CLI 2016: 101-102
36	RB CLI 2016: 107-110
37	RB CLI 2016: 107-110
38	RB CLI 2016: 110-127
39	RB CLI 2016: 110-127
40	RB CLI 2016: 127-135
41	RB CLI 2016: 127-135
42	RB CLI 2016: 104-107
43	RB CLI 2016: 104-107
44	RB CLI 2016: 104-107
45	RB CLI 2016: 135-137
46	RB CLI 2016: 135-137
47	RB CLI 2016: 137-144
48	RB CLI 2016: 137-144
49	RB CLI 2016: 99-100; SD/EA 1995: 17
50	RB CLI 2016: 99-100; SD/EA 1995: 17-18
51	RB CLI 2016: 99-100; SD/EA 1995: 21
52	RB CLI 2016: 102-103
53	RB CLI 2016: 102-103
54	RB CLI 2016: 103-104
55	RB CLI 2016: 103-104
56	RB CLI 2016: 37; LandsNet, accessed 12 December 2020
57	RB CLI 2016: 101-102
58	RB CLI 2016: 101-102
59	RB CLI 2016: 107-110
60	RB CLI 2016: 107-110
61	RB CLI 2016: 110-127
62	RB CLI 2016: 110-127
63	RB CLI 2016: 127-135
64	RB CLI 2016: 127-135
65	RB CLI 2016: 104-107; Review comments, Lauren Hauptman, 26 March 2021
66	RB CLI 2016: 104-107
67	RB CLI 2016: 104-107
68	RB CLI 2016: 135-137

- 69 RB CLI 2016: 137-144
- 70 RB CLI 2016: 137-144
- 71 There are some graves that are earlier than 1848; at least one from 1826 and one from 1832, located just behind the tree at the back of the tomb of the unknown soldier. Review comments, Lauren Hauptman, 26 March 2021
- 72 Review comments, Lauren Hauptman, 26 March 2021
- 73 Review comments, Lauren Hauptman, 26 March 2021
- 74 ZG CLI 2014: 52-53
- 75 ZG CLI 2014: 52-53
- 76 ZG CLI 2014: 53-57
- 77 ZG CLI 2014: 53-57
- 78 ZG CLI 2016: 53-57
- 79 ZG CLI 2016: 18); LandsNet, accessed 12 December 2020
- 80 ZG CLI 2016: 66-72
- 81 ZG CLI 2016: 66-72
- 82 ZG CLI 2016: 62-66
- 83 ZG CLI 2016: 62-66; Review comments, Lauren Hauptman, 26 March 2021
- 84 ZG CLI 2016: 57-62; Review comments, Lauren Hauptman, 26 March 2021
- 85 ZG CLI 2016: 57-62
- 86 ZG CLI 2016: 57-62; Review comments, Lauren Hauptman, 26 March 2021
- 87 ZG CLI 2016: 73-74
- 88 ZG CLI 2016: 73-74
- 89 ZG CLI 2016: 74-78
- 90 ZG CLI 2016: 74-78



Cultural Landscape Report

Roebling's Delaware Aqueduct Site and Zane Grey Property, Upper Delaware Scenic & Recreational River

Roebling's Delaware Aqueduct New York (North) Detail Existing Conditions 2021



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

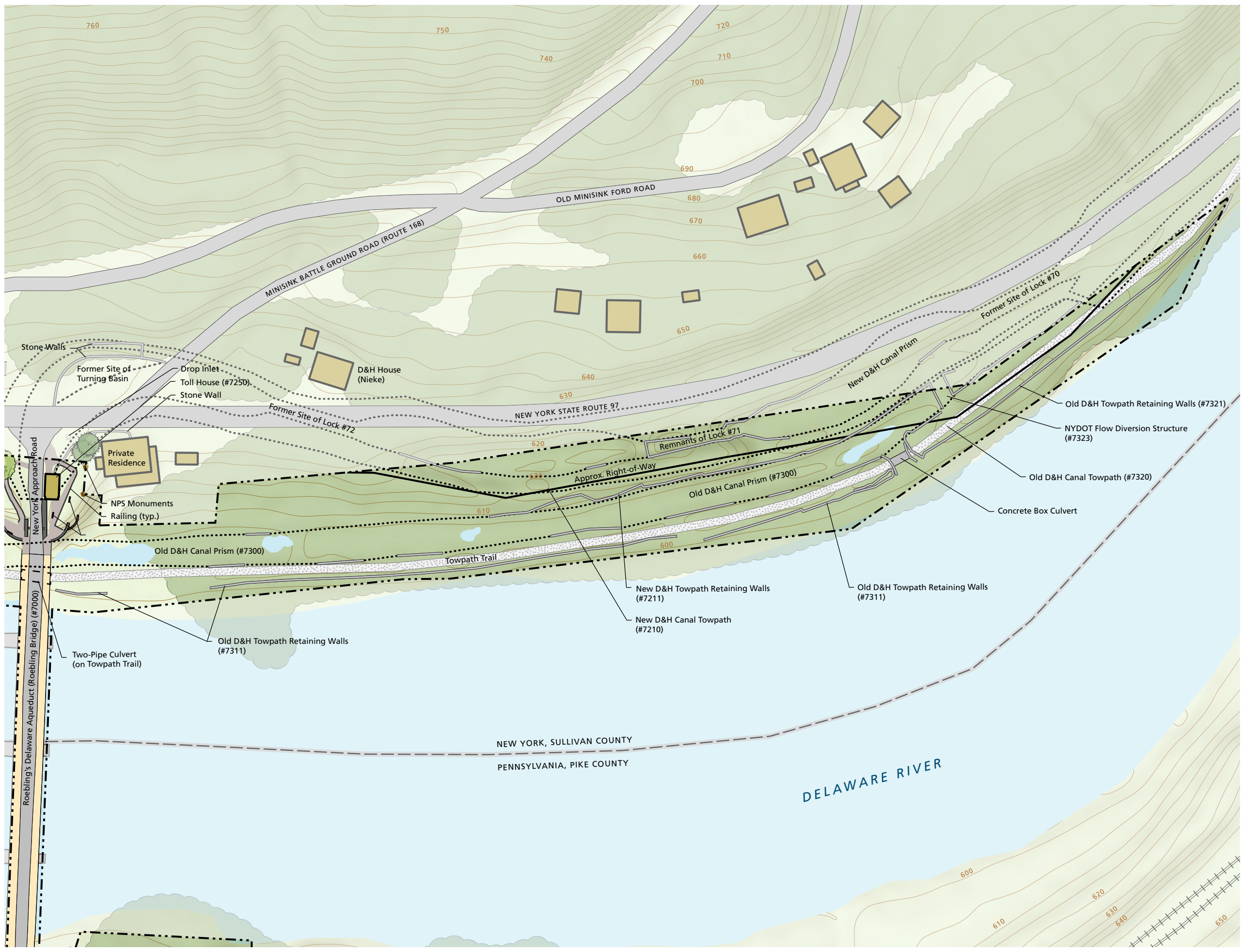
- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 2008
 3. NAIP 2019
 4. Site visits, December 2013 and June 2014
 5. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



Cultural Landscape Report

Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct New York (South) Detail Existing Conditions 2021



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES

1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 2008
3. NAIP 2019
4. Site visits, December 2013 and June 2014
5. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY

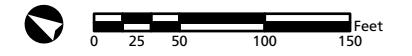
Maryrose Kulick, ArcGIS Pro 2.6, 2021

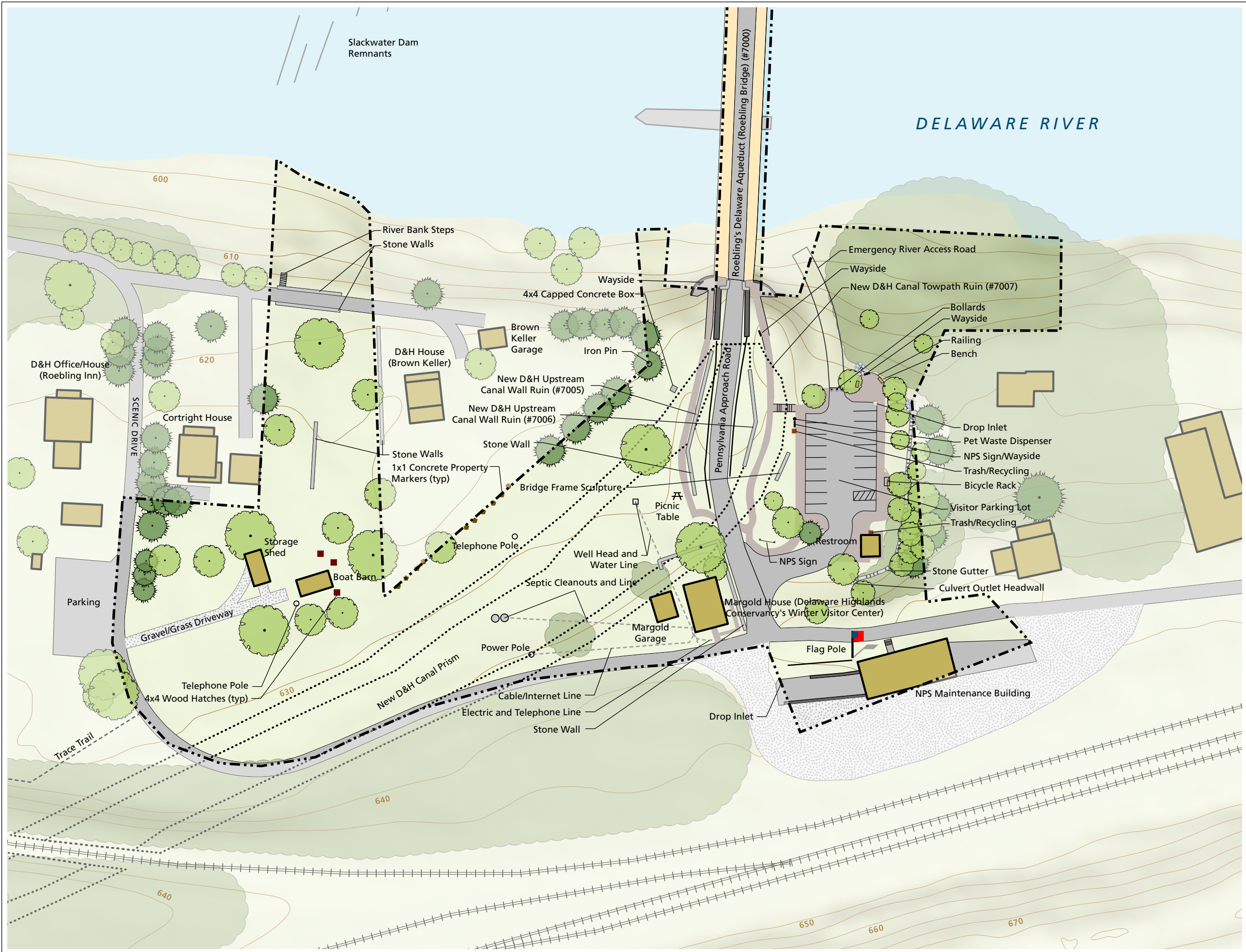
LEGEND

- | | | | |
|--|------------------------|--|------------------------|
| | Canopy | | Former D&H Canal Prism |
| | Paved Surface | | NPS Boundary 2020 |
| | Earthen/Gravel Surface | | |
| | Wood Surface | | |
| | Walkway | | |
| | Building | | |
| | Deciduous Tree | | |
| | Evergreen Tree | | |

NOTES

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location





Cultural Landscape Report

Roebling's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Roebling's Delaware Aqueduct Pennsylvania Detail Existing Conditions 2021



National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

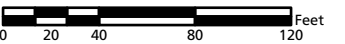
- SOURCES**
1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
 2. Orthophotography, 2008
 3. NAIP 2019
 4. Site visits, December 2013 and June 2014
 5. Lackawaxen & Highland 1891-1898 Survey

DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

LEGEND

- NOTES**
1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
 2. Contour Interval = 5'
 3. All features shown in approximate scale and location



0 20 40 80 120 Feet

Drawing 19



Cultural Landscape Report
Roebing's Delaware Aqueduct Site
and Zane Grey Property,
Upper Delaware Scenic &
Recreational River

Connection Area
Existing Conditions 2021



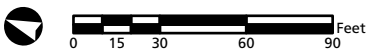
National Park Service
Olmsted Center for Landscape Preservation
www.nps.gov/oclp

SOURCES
1. Orthoimagery, 2008
2. NAIP 2019
3. UPDE GIS Data
4. CLI Data
5. Lackawaxen & Highland 1891-1898 Survey

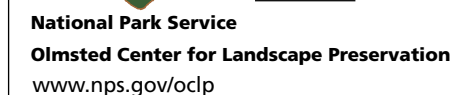
DRAWN BY
Maryrose Kulick, ArcGIS Pro 2.6, 2021

	Canopy		Possible Utility Pole
	Paved Surface		Railroad
	Earthen/Gravel Surface		Parcel Boundary
	Building		Former D&H Canal Prism
	Deciduous Tree		NPS Boundary 2020
	Evergreen Tree		

NOTES
1. Projection: NAD 83 UTM Zone 18N, US Survey Feet
2. Contour Interval = 10'
3. All features shown in approximate scale and location



Zane Grey Property
Existing Conditions 2021



1. Olmsted Center for Landscape Preservation, Cultural Landscape Inventories, 2001
2. Orthophotography, 2008
3. NAIP 2019
4. Site visits, December 2013 and June 2014

Maryrose Kulick, ArcGIS Pro 2.6, 2021

	Canopy		Evergreen Shrub
	Paved Surface		Possible Utility Pole
	Earthen/Gravel Surface		Railroad
	Building		NPS Boundary 2020
	Deciduous Tree		
	Evergreen Tree		
	Shrub		

1. Projection: NAD 1983 UTM Zone 18N, US Survey Feet
2. Contour Interval = 5'
3. All features shown in approximate scale and location



TREATMENT RECOMMENDATIONS

According to National Park Service policy, the cultural landscape report serves as the primary supporting document guiding the treatment of a cultural landscape, and is required before major intervention. This chapter articulates a management strategy for the CLR project area based on its significance, existing conditions, and use. The overall goal is to reinforce the National Park Service's traditions, policies, and philosophical basis for sound stewardship of cultural landscapes as outlined in *The Secretary of Interior's Standards for Treatment of Historic Properties* (1996), *Director's Order 28*, and the *Cultural Resources Management Guidelines* (1997).

This chapter begins with a review of the park's enabling legislation and planning documents as they pertain to this project, a description of an overall treatment philosophy and current treatment issues, and a presentation of treatment projects that aim to address the park's accessibility and interpretive goals while preserving the historic character of the sites.

FRAMEWORK FOR TREATMENT

In the 1960s Congress established legislation aimed at treating and preserving the country's environment, including the Wilderness, Clean Air, Clean Water, and National Environmental Policy Acts. This effort also included the Wild and Scenic Rivers Act in 1968, which created the National Wild and Scenic Rivers System (PL 90-542). 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 (PL 95-625).

NATIONAL WILD AND SCENIC RIVERS ACT

The National Wild and Scenic Rivers System was created to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The Act is notable for safeguarding the special character of these rivers, while also recognizing the potential for their appropriate use and development.¹ Rivers are classified as wild, scenic, or recreational:

- **Wild River Areas** – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

- Scenic River Areas – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational River Areas – Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

The Act specifically requires that cultural resource features identified in designated river corridors be protected and enhanced. In the Upper Delaware corridor, such aspects include human history archeological sites, industrial remnants, and architectural features. It also includes the people who live in the corridor, their settlements, their commerce, and their agriculture.²

ENABLING LEGISLATION AND PARK BOUNDARIES

Upper Delaware Scenic and Recreational River was established as a working partnership dedicated to preserving the “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural . . . and other similar resource values that qualified Upper Delaware for inclusion in the National Wild and Scenic Rivers System.” The boundaries encompassed 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 river area or corridor includes the surrounding lands designated by the park’s landward boundaries.³

Of the just over 55,575 acres of land within the river corridor, the National Park Service owns only 30.4 acres for which the agency has management responsibility under the enabling legislation. Federally owned lands include the historic Roebling’s Delaware Aqueduct and portions of the Delaware & Hudson Canal, a toll house, the Zane Grey Museum, Cowen Farm, and other administrative structures. The remaining land is predominantly privately-owned and managed in accordance with the Land and

Water Use Guidelines set forth in the 1986 Final River Management Plan for the Upper Delaware Scenic and Recreational River. The River Management Plan, which was required by the enabling legislation, described the ways that existing local and state laws and authorities will be used to safeguard the Upper Delaware’s resources.⁴

The Upper Delaware Council, a nonprofit organization whose membership consists of the 15 municipalities, 2 states, the Delaware River Basin Commission, and the National Park Service (as a nonvoting member), is charged with responsibility for implementing the River Management Plan and assuring substantial conformance with the plan’s Land and Water Use Guidelines. The National Park Service partners with the Council, as well as local, county, state, and federal partners, and other community organizations with an interest in the river corridor, through technical assistance and collaboration.⁵

RELATIONSHIP TO EXISTING PARK PLANNING DOCUMENTS

RIVER MANAGEMENT PLAN

The park’s enabling legislation called for the creation of a management plan for the Upper Delaware River, which was ultimately issued in 1986 after extensive public involvement. The River Management Plan is written to ensure that the Upper Delaware’s fifteen Towns and Townships will use their laws, plans and ordinances, including their zoning powers, to manage land use within the river corridor to be protective of river resources. In this way, land use decisions remain in the hands of local government, while the National Park Service manages commercial and recreational use of the river, provides technical and financial assistance to the Upper Delaware Council and its members, and works to protect and enhance the values that prompted the Upper Delaware’s designation in the National Wild and Scenic Rivers System.⁶

Management of Cultural Resources

Two specific aspects of the Final River Management Plan addressed cultural resources. The plan proposed that the National Park Service continue its role of recreation management by submitting an annual plan to the Council for review and recommendations. Additional National Park Service roles include membership and participation in the Council, the protection and interpretation of historical sites (contingent on consent of affected private property owners), the provision of technical assistance to members of the Council, and provision of funds, contingent upon appropriations, to assist in operation of the plan.⁷

The plan also proposed that an active program to conserve and interpret the corridor's historical, archeological, and architectural resources be carried out primarily by the National Park Service with the guidance and recommendations of the Council, and consistent with the River Management Plan. The orientation of the plan is toward private action, volunteerism, and coordination of existing organizations concerned about the protection cultural resources. The plan also proposes specific management strategies for thirteen sites, and advocates for establishment of a valley heritage system. Three of the thirteen sites are within the CLR project area: Roebling's Delaware Aqueduct, Delaware & Hudson Canal, and the Zane Grey House.⁸

FOUNDATION DOCUMENT

Every unit of the national park system is to have a foundation document that will provide basic guidance for planning and management decisions. In 2014 the National Park Service completed a Foundation Document for Upper Delaware National Scenic and Recreational River.

Purpose Statement

The Foundation Document drafted the following purpose statement after careful analysis of the enabling legislation and legislative history that influenced the park's development. The statement lays the basis for understanding what is most important about this National Park Service unit:

"The Upper Delaware Scenic and Recreational River protects, conserves, and enhances the free-flowing character, exceptionally high water quality, and the scenic, recreational, ecological, cultural, and geological values of the Upper Delaware River valley through collaborative partnerships and cooperation with state and local government entities."⁹

Significance Statements

Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. The Foundation Document identified ten significance statements, five of which address cultural resources:

"The main stem of the Delaware River, which includes the 73.4-mile-long Upper Delaware Scenic and Recreational River (as well as two other units of the National Wild and Scenic Rivers System), is the only major river in the eastern United States that remains undammed, providing unimpeded flows and ecologic connectivity that support scenic, recreational, ecological, cultural, and geological values.

"Picturesque gorges, rock outcroppings, steep forested slopes, gently rolling hills, and pastoral cultural landscapes, farms, and communities contribute to the regionally significant scenic quality of the Upper Delaware River.

"North America's oldest existing wire cable suspension structure, Roebling's Delaware Aqueduct carried the Delaware and Hudson Canal over the Delaware River, carrying anthracite coal to the Hudson River. From there the coal was transported to New York City and throughout the East Coast, providing fuel for the American Industrial Revolution.

"The Upper Delaware River Valley preserves a rich cultural heritage including outstanding examples of mid-Atlantic riverside communities that have retained qualities and values of earlier times.

"Zane Grey, 'Father of the Western Novel,' made his home on the banks of the Upper Delaware River, where he wrote many of his most successful books, including *Riders of the Purple Sage*.¹⁰

Fundamental Resources and Values

Fundamental resources and values are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary

consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. The Foundation Document identified seven fundamental resources and values for the park: water quality, free-flowing river conditions, cultural, ecological, geological, recreational, and scenic. Three fundamental resources and values are present in the CLR project area:

- Cultural: precontact archeological sites, early settlements, early transportation corridors, Delaware & Hudson Canal, Roebling's Delaware Aqueduct, Zane Grey House, rural villages, and buildings listed on the National Register of Historic Places.
- Recreational: photography, wildlife viewing, bird-watching, picnicking, bicycle touring, hiking, sight-seeing opportunities, ranger-led activities are also popular.
- Scenic: the river's picturesque gorge, riparian vegetation, steep forested slopes, and gently rolling hills. Charming rural communities' architecture also contributes to the stimulating visual variety of the Upper Delaware.

CULTURAL LANDSCAPE INVENTORIES

One of the key components of the National Park Service's Cultural Landscapes Inventory Program (CLI) is to determine the category of management, based on its significance, use, condition, and location. Each category is representative of a compilation of legislative mandates, policy considerations, and planning. The four categories are: Must be Preserved and Maintained; Should be Preserved and Maintained; May be Preserved and Maintained; and May Be Released, Altered, or Destroyed.

Except for the Connection Area, the remainder of the CLR project area has CLIs that are certified as "complete, accurate, and reliable." On September 29, 2014, the park superintendent approved the Zane Grey House CLI, which meets the "Must Be Preserved and Maintained" category because it is related to the park's legislated significance. On

August 30, 2016, the superintendent approved the Roebling's Delaware Aqueduct Site CLI, which also meets the "Must be Preserved and Maintained" category because it is nationally significant as defined by National Historic Landmark criteria.

CULTURAL LANDSCAPE REPORT FOR THE ZANE GREY PROPERTY

Upon acquiring the property in 1989, the National Park Service funded a Historic Structures Report for the house, which included a Preliminary Cultural Landscape Assessment by Landscapes, a historic preservation and documentation firm based in Connecticut and Vermont. The assessment articulated the need for a more comprehensive landscape treatment plan, which the same firm completed in 1999. Their Cultural Landscape Treatment Plan documented the site's history and developed treatment recommendations for the original six-acre Zane Grey House property. The plan recommended a preservation treatment for Parcel B, the only parcel owned by the park at that time. Specific recommendations included removing non-historic trees, replanting missing trees, and replacing over-mature trees in-kind and in location. The plan proposed replacing the apple trees in the orchard with crabapples, a proposal rejected by the park as it would diminish the historical integrity of the property. The park instead opted to propagate the existing aged trees and replant the grafted genetically identical species. The plan also proposed the reconstruction of six missing structures including two outhouses, the children's playhouse, the icehouse, the tennis shed, and the chicken shed. To date, one of the outhouses has been reconstructed and is used for propane tank storage.¹¹ (CLPT 1999: 69-70)

TREATMENT APPROACH

The Secretary of Interior has approved standards, policies, and guidelines for four distinct, but interrelated, approaches to the treatment of historic properties: preservation, rehabilitation, restoration, and reconstruction. Collectively, these standards serve as the philosophical

basis for achieving long-term landscape preservation. In general, the amount of physical intervention in a landscape increases from preservation to reconstruction.¹²

Based on the park's 1978 enabling legislation, 1986 Final River Management Plan and associated Land and Water Use Guidelines, and 2014 Foundation Document, "Rehabilitation" is the recommended treatment for resources in the CLR project area. Of the four treatment philosophies, rehabilitation will allow for sound stewardship of historic resources through appropriate repairs, alterations, and additions while preserving those existing historic features that convey the historical, cultural, and architectural values.

TREATMENT ISSUES AND TREATMENT PROJECTS

Staff from the Olmsted Center for Landscape Preservation (OCLP) and Upper Delaware Scenic and Recreational River (UPDE) participated in an on-site treatment workshop in December 2022. The group included: Eliot Foulds, Project Manager, OCLP; Alex Garcia, Cultural Resource Manager and Curator, Upper Delaware River; Don Hamilton, Natural Resource Program Manager, UPDE; Jeff Killion, Project Lead, OCLP; Ingrid Peterec, Chief of Interpretation, UPDE; Michelle Surber, Landscape Architect, HACE; and Jessica Weinman, Facility Program Manager, UPDE.

The project team discussed landscape treatment issues, which focused on three topics: the display and interpretation of physical remnants of the canal basin on the Pennsylvania side, improving access within Roebling's Aqueduct Site and the Zane Grey Site, and developing pedestrian connections between the two sites. These issues serve as the foundations for twelve projects, organized by the character areas introduced in Chapter 2.

1. Stabilize the Towpath Trail and Original Canal Prism
2. Improve Accessibility to Towpath Trail
3. Preserve Lock 71
4. Interpretation of Canal and Towpaths on PA side and Improve Pedestrian Connections

5. Repair Overlook at Parking Lot
6. Develop Pedestrian Connection between Zane Grey Property and Roebling's Delaware Aqueduct
7. Construct Accessible Entrance at the Zane Grey House
8. Develop Accessible Parking and Walkways to the Zane Grey House
9. Remove Existing Front Walk and Parking Lot, Restore Original Driveway and Front Walk
10. Infill Existing Orchard with New Apple Trees
11. Interpret the Garden Area south of Zane Grey House
12. Interpret the Tennis Court

ROEBLING'S DELAWARE AQUEDUCT SITE – NEW YORK SIDE

PROJECT #1. STABILIZE TOWPATH TRAIL AND ORIGINAL CANAL PRISM

The Towpath Trail follows the route of the original section of the D&H Canal towpath on the New York side that became a feeder canal after Roebling's Delaware Aqueduct was opened (Figure 3.1a). The trail features an earthen/gravel/grass surface. Due to its location in the floodplain, floods periodically damage or destroy the trail surface. The park maintains the trail from spring to fall, but it is not maintained in the winter (Figures 3.1b-3.1h).

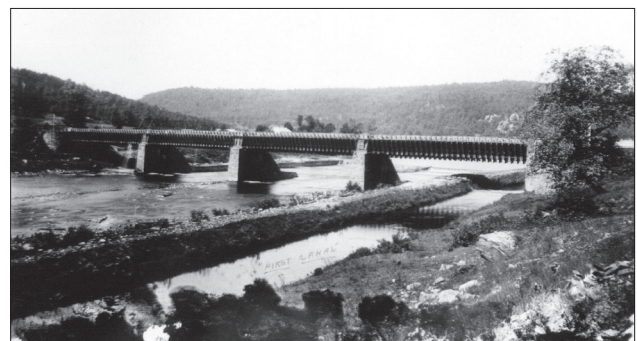


Figure 3.1a. View looking northwest at the original section of the D&H Canal passing under the Delaware Aqueduct on the New York side, 1849-1898, which was repurposed for use as a feeder canal. Note the absence of trees between the canal prism and towpaths. (D&H Canal Historical Society, Ghear Collection)



Figure 3.1b. View looking southeast at the north end of the original towpath (Towpath Trail). (OCLP 2022, IMG_1845)



Figure 3.1e. View looking west at woody vegetation in the canal prism and on the new canal towpath (image right). (OCLP 2022, IMG_1868)



Figure 3.1c. View looking northwest at woody vegetation separating the towpath and canal prism (image right). (OCLP 2022, IMG_1851)



Figure 3.1f. View looking northwest at woody vegetation between the canal prism and the original towpath, from the diversion dam. (OCLP 2022, IMG_1859)



Figure 3.1d. View looking east at canal prism wall damage from a fallen tree. (OCLP 2022, IMG_1856)



Figure 3.1g. View looking west at woody vegetation on the original towpath and abutting the towpath wall. (OCLP 2022, IMG_1867)



Figure 3.1h. View looking north at the lower portion of the Maintenance Access Road, where it meets the Towpath Trail. (OCLP 2022, IMG_1849)

Recommendations:

- Retain the current earthen/gravel/grass surface on the Towpath Trail, and conduct inspections and repairs as needed. Installation of asphalt surfacing is not recommended, as such a surface is incompatible with the historic character and will likely be damaged or destroyed in major flood events.
- Continue the program of removing all woody vegetation in the canal bed and within three feet of the prism and towpath walls. During the canal's operation, vegetation was not allowed to grow between the canal prism and towpaths because it would impede on the ropes pulling the boats. Storm and flood damage to the trail surface and the towpath and canal prism walls, is often caused by downed trees that can act as dams in these areas. Mature trees in or adjacent to the walls may damage the walls of the fall.

PROJECT #2. IMPROVE ACCESSIBILITY TO TOWPATH TRAIL

The park is considering ways to provide accessible access to the Towpath Trail, which follows the towpath on a segment of the original D&H Canal on the New York side. There are currently no park programs conducted on the Towpath Trail. The trail is not maintained in the winter.

Option A: Regrade Maintenance Access Road at North End of Towpath Trail

Create an accessible route from the north end of the north parking lot to the north end of the Towpath Trail, via the existing gravel Maintenance Access Road (Figures 3.2a-3.2g). This option would require extending the length and lowering the grade of the upper portion of Maintenance Access Road. The unused Emergency Access Road that extends north and parallel to State Route 97 can be utilized to add the horizontal distance need achieve the correct grades. A survey will be needed to determine existing grades and the property boundary between state and federal lands.



Figure 3.2a. View looking northwest at the upper end of the Maintenance Access Road, where it meets the parking lot on the New York side of Roebling's Delaware Aqueduct. (OCLP 2022, IMG_1824)



Figure 3.2b. View looking northwest at the former Emergency Access Road that extends north from the Maintenance Access Road. (OCLP 2022, DSC_7493)



Figure 3.2c. View looking southeast at the sharp turn of Maintenance Access Road, from the former Emergency Access Road. (OCLP 2022, IMG_1826)



Figure 3.2f. View looking north at the steep upper portion of the Maintenance Access Road. (OCLP 2022, IMG_1834)



Figure 3.2d. View looking southeast at the contemporary retaining wall that supports the Maintenance Access Road. (OCLP 2022, DSC_7495)



Figure 3.2g. View looking north at the lower portion of the Maintenance Access Road, where it meets the Towpath Trail. (OCLP 2022, IMG_1849)



Figure 3.2e. View looking south at the Maintenance Access Road as it descends to the Towpath Trail under the aqueduct/bridge. (OCLP 2022, DSC_7498)



Figure 3.2h. View looking southwest at the gravel parking pull-out along State Route 97, at the south end of the Towpath Trail. This area is not on NPS property. The boulders are positioned to prevent vehicles from entering the canal prism and towpath. (OCLP 2018, DSC_2434)

Considerations:

- This option will be entirely on federally owned property.
- Extending and lowering the Maintenance Access Road will likely result in the need for additional retaining walls on the cut slopes and possibly fill slopes.
- Retain the sharp turn in the Maintenance Access Road as a short cut for visitors.

Option B: Improve Existing Pullout at South End of Towpath Trail

Improve the layout of an informal gravel parking pullout along State Route 97, at the south end of the Towpath Trail (Figure 3.2h). The safest layout will be parallel parking alongside the river-side edge of the pullout. Installation of a log or steel barrier along this edge, and regulatory signage, can reinforce the desired layout. An accessible parking space can be designated close to the trailhead. Head on or angle parking should be avoided in the pullout because it would require exiting drivers to back out towards or into the highway's narrow shoulder and southbound travel lane. A "no parking" sign should be placed at the boulders to prohibit parking, and warning signs should be placed along the highway to warn drivers of entering and exiting vehicles.

Considerations:

- This option is not on park property and will require coordination with the State of New York Department of Transportation and Town of Highland.
- Parking capacity will be limited at this pullout due to its relatively small space and the institution of parallel parking. The park should work with the Eagle Conservancy, Town of Highland, and New York Department of Transportation to develop this facility as part of the proposed trail connection from this area to an existing Eagle Observation shelter one-half mile to the southeast (off site), which has a much larger parking capacity.

PROJECT #3. PRESERVE LOCK 71

Three new locks were constructed on the New York side as part of Roebling's Delaware Aqueduct. They remained after the canal closed in 1898, but in the 1930s Locks 70 and 72 were filled in or destroyed for construction of State Route 97 (Figure 3.3a, 3.3b). Lock 71 was spared and is one of only a few of the D&H Canal's locks that remain (Figures 3.3c-3.3f). Dry laid stone walls and remnants of lock doors, wood plank walls, and iron hardware tower over the leaf littered floor. Several mature trees are established within and atop the walls. Part of the east wall has collapsed into the lock due to stormwater runoff from an adjacent culvert outlet associated with State Route 97. The location of property lines and rights-of-way are not clearly marked in the field; various park drawings and descriptions

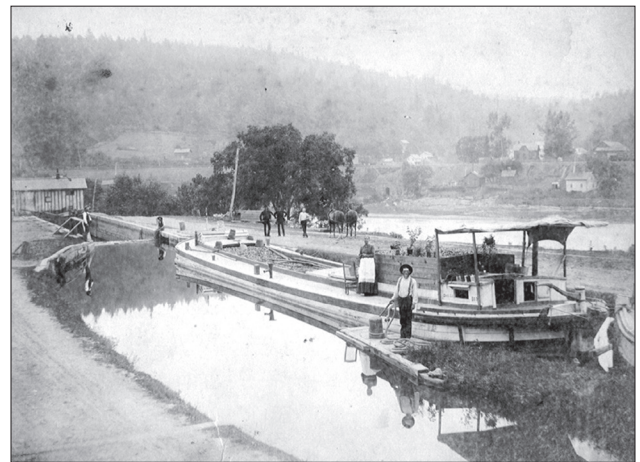


Figure 3.3a. View looking southwest at the approach to Lock 72 on the New York side, 1849-1898. Note the wood timbers lining the lock. (Minisink Valley Historical Society, #P-98-8-19)



Figure 3.3b. View looking northwest at Lock 71 in 1923. (Minisink Valley Historical Society, #P-82-8-6)



Figure 3.3c. View looking west at the new canal prism and south end of Lock 71. (OCLP 2022, IMG_1874)



Figure 3.3f. View looking east at the new canal prism and north end of Lock 71. (OCLP 2022, IMG_1880)



Figure 3.3d. View looking southeast from the interior of Lock 71. Note the collapsed section of the lock wall (image left). (OCLP 2022, IMG_1877)



Figure 3.3e. View of a mature tree anchored in the canal wall. (OCLP 2022, IMG_1878)

indicate the lock is either on park-owned land, state-owned land, or both.

Recommendations:

- There is an urgent need for stabilization of the canal wall and mitigation of highway drainage. The park should contact Christine Colly at the New York Department of Transportation (colly@dot.ny.gov, 518-485-9313)
- Mature trees abutting and within the lock's stone walls should be removed to prevent damage to the walls during a storm event.
- The park should pursue ownership of Lock 71. This issue is preventing the park from preserving and interpreting the lock and the still visible new canal prism and towpath. If federally owned, it may be possible to create a loop trail from the original canal towpath (Towpath Trail) to the east end of the aqueduct bridge and tollhouse, via Lock 71 and the new canal towpath.

ROEBLING'S DELAWARE AQUEDUCT SITE - PENNSYLVANIA SIDE

PROJECT #4. INTERPRETATION OF CANAL AND TOWPATHS ON PA SIDE AND IMPROVE PEDESTRIAN CONNECTIONS

The goal of this project is to visually represent the canal's horizontal and/or vertical presence of the 1848 Delaware & Hudson Canal in the landscape between the west end of Roebling's Delaware Aqueduct to the south and Scenic Drive to the north (Figure 3.4a, 3.4b, 3.4c). Another goal is to provide pedestrian access through this area, which also links with the existing paved towpath sidewalks at the aqueduct/bridge and the proposed pedestrian route through the connector area to the north. The area is currently maintained as lawn, and except for a wayside near the approach road, provides no physical interpretation of the historic canal alignment, walls, or towpaths (Figures 3.4d, 3.4e).

In November 2020, geophysical specialist Jeremy W. Pye conducted a ground-penetrating radar (GPR) survey in this approximately 2-acre area to identify and map the signatures of any sub-surface archaeological features, namely evidence of the canal (Figure 3.4f). The radar profiles collected at various depths yielded ten radar profiles, which made possible the creation of plan-view maps of the survey data, called "time-slices" (Figures 3.4g, 3.4h). Dr. Pye's interpretation of GPR data on Time Slice 7 indicates the location of the canal and turning basin boundaries (Figure 3.4i).

Although the GPR data succeeded in identifying the location of the canal and was able to provide a basic assessment of the nature and condition of the canal, Dr. Pye wrote that, "In order to know for certain what is present under the ground surface within the project area, one would need to conduct excavations, be that either hand excavations or mechanical trenching."¹³

The options presented below were discussed at the December treatment workshop. All of the options can be implemented using either the canal's historic alignment as



Figure 3.4a. View looking north at the Pennsylvania side turning basin and towpaths, 1855-1898. (UPDE Archives, PA_dhCanalLack-West)



Figure 3.4b. View looking east at the turning basin on the Pennsylvania side, 1849-1898. Note the earthen tow path and the wood bollard to tie up boats. (UPDE Archives, PA_Scan4)



Figure 3.4c. View looking east at the former turning basin on the Pennsylvania side, 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 3.4d. View looking east at the snow-covered lawn. (OCLP 2022, DSC_7439)



Figure 3.4e. View looking east at the snow-covered lawn. (OCLP 2022, DSC_7439)

shown on the GPR survey (see Figure 3.4i) or as a non-his-
toric representation of the canal's alignment. An additional
alternative would be to solicit ideas and proposals through
an artistic competition, which could include the installation
of a canal boat in the space.

Option A: Manage Vegetation

Represent the purported interior extents of the canal with
tall grasses and wildflowers. This space could be mowed
less frequently so that the grass is allowed to grow taller
than the surrounding maintained lawns. Alternatively,
the space can be planted with native warm season grasses,
wildflowers, etc. Two earthen/gravel paths would be built
to define both long edges of the tall grass area. The height
and swaying movement of the grasses would represent

water, while the paths would represent the towpaths.

Considerations:

- Maintenance will be minimal.
- The grasses will not convey the height of the canal pool.
- No archeological impact.

Option B: Install Rows of Boulders

Place boulders atop or alongside the purported canal wall
lines. The stones can be placed apart (5, 10, 15 feet) to con-
vey a “dashed outline” of the former canal. The boulders
will also represent the canal walls. The stones should be
large enough to ensure they remain stationary. The interior
space can be mowed lawn or taller grasses. Earthen/gravel

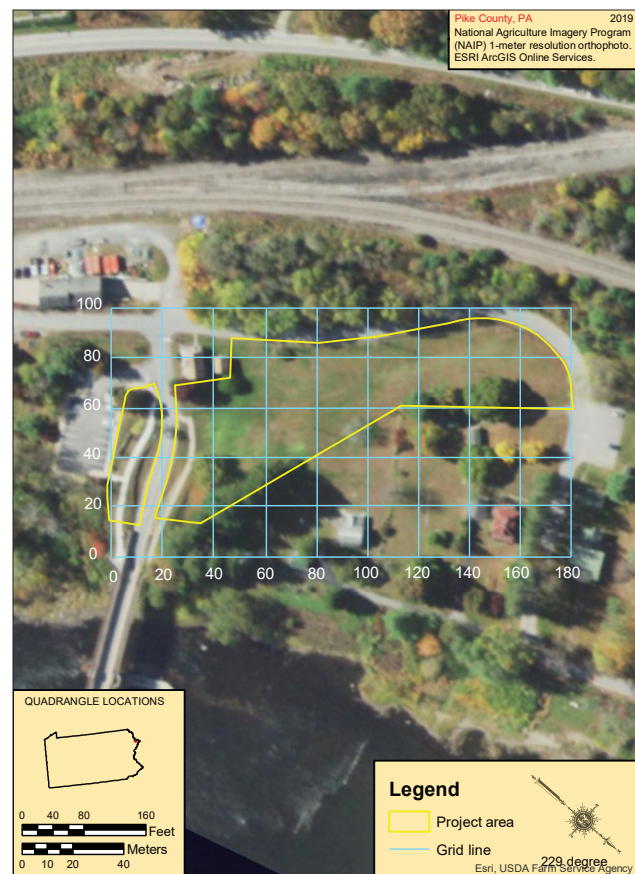


Figure 3.4f. Geophysical survey grid and project area on aerial imagery, from the western end of Roebling's Delaware Aqueduct northwestward to the bend in Scenic Drive. (Pye 2021: 13)

paths would be built on each outboard side of the boulders to represent the towpaths.

Considerations:

- The boulders and grasses will not convey the height of the canal pool.
- Minimal archeological impact.
- Minimal maintenance.

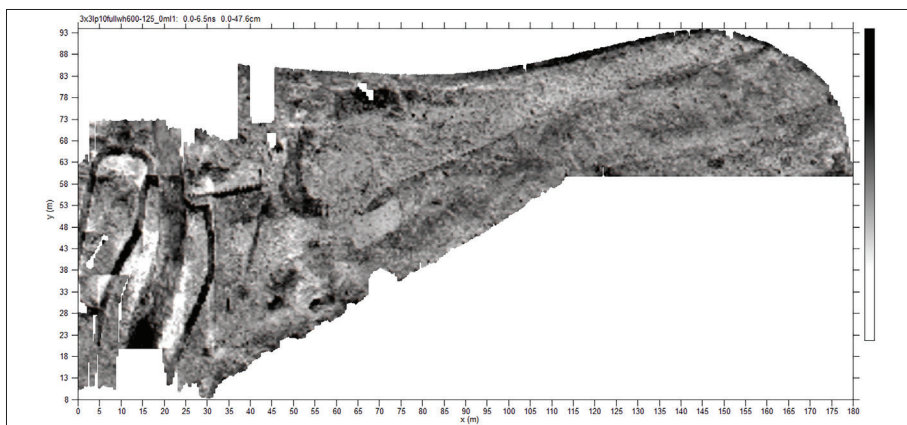


Figure 3.4g. Processed plan-view results map for the GPR survey near Roebling's Aqueduct, Time-Slice #1. (Pye 2021: 17)

Option C: Erect Rows of Wood Posts

Erect wood posts atop or alongside the purported canal wall lines. The posts can be placed apart (5, 10, 15 feet) to convey a “dashed outline” of the former canal. The wood posts will also represent the canal walls. The height of the posts can represent the height of the canal pool; de-

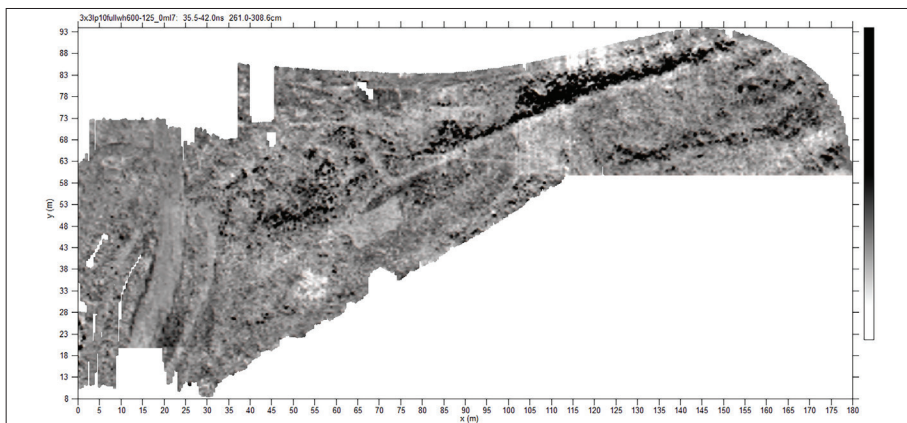


Figure 3.4h. Processed plan-view results map for the GPR survey near Roebling's Aqueduct, Time-Slice #7. (Pye 2021: 23)

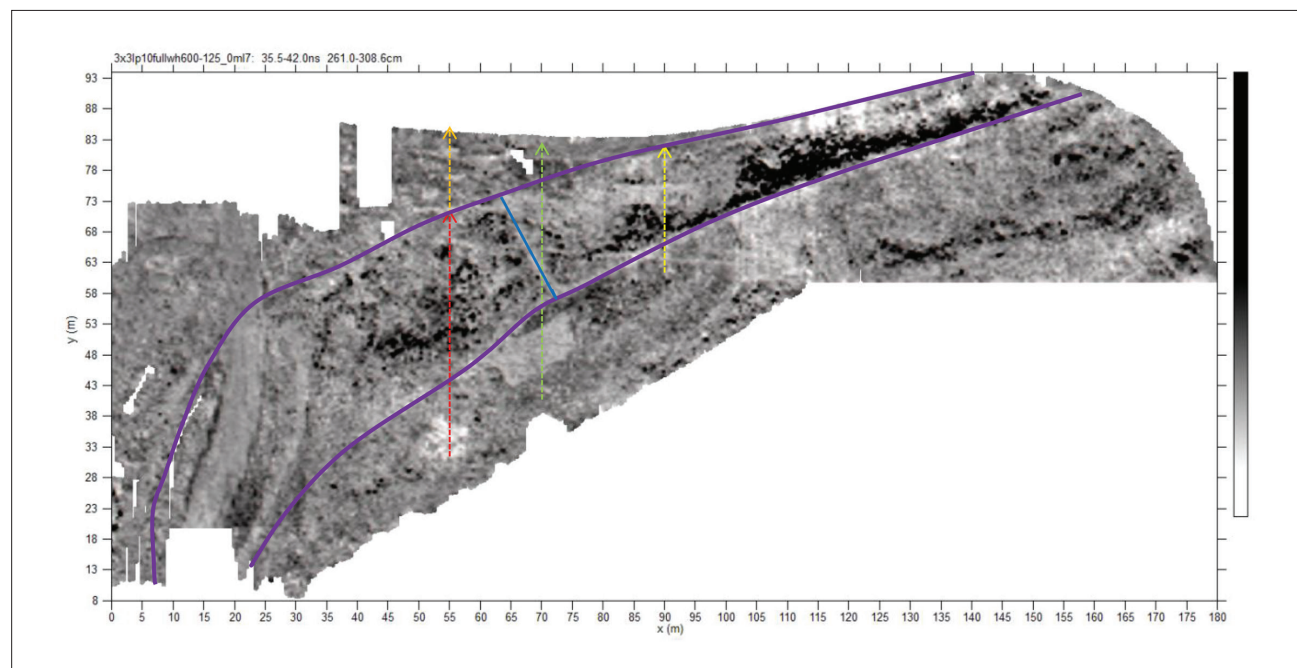


Figure 3.4i. GPR Slice #7 showing the locations of select profiles. Purple lines mark the edges/sides of the canal. (Pye 2021: 27)

pending on the local topography, some posts will be taller than others. The interior space can be mowed lawn or taller grasses. Earthen/gravel paths would be built on each outboard side of the posts to represent the towpaths.

Considerations:

- Use single posts or bundles of three lashed with rope or steel bands.
- Archeological impact due to the need for footings.
- Minimal maintenance.

Option D: Erect Rows of Stone Piers

Erect bluestone piers atop or alongside the purported canal wall lines. The piers can be placed apart (5, 10, 15 feet) to convey a “dashed outline” of the former canal. The wood posts will represent the canal walls. The height of the piers can represent the height of the canal pool. Depending on the local topography, some piers will be taller than others. The interior space can be mowed lawn or taller grasses. Earthen/gravel paths would be built on each outboard side of the piers to represent the towpaths.

Considerations:

- This option would be costly to install and require substantial footings. Existing grades would suggest piers on downhill (east side) would be taller than those on the west side. Mortar would be required.
- Makes use of a locally sourced material.
- Archeological impact due to the need for footings.
- Opportunities for foolishness: if the piers are not of robust design or construction they could be toppled.

Option E: Reconstruct Stone Walls and Earthen Berms

Reconstruction of the canal and towpath walls and berms to fully convey the horizontal and vertical presence of the canal and turning basin. The bottom of the canal would be mowed lawned or tall grasses. Earthen/gravel paths would be built atop each berm to represent the towpaths.

Considerations:

- Best option to convey the historic period.
- Construction of stone walls will be costly and earthen berms will require substantial earthmoving.
- Archeological research, field work, and monitoring will be required.
- Substantial effort to meet Secretary of Interior's Standards for reconstruction (walls), and requirements of Americans with Disabilities Act (earth/gravel paths atop berms)

PROJECT #5. REPAIR OVERLOOK AT PARKING LOT

The National Park Service constructed the pedestrian overlook at the east end of the parking lot in the late 1990s. The semi-circular concrete patio offers a framed view of Roebling's Delaware Aqueduct (Figures 3.5a, 3.5b). However, the overlook has settled and now tilts slightly toward



Figure 3.5a. View looking north at Roebling's Delaware Aqueduct from the overlook. (OCLP 2022, IMG_1899)



Figure 3.5b. View looking northwest at the overlook. Note the tilt of the overlook. (OCLP 2022, IMG_1900)



Figure 3.6a. Annotated aerial photograph showing three options for a pedestrian connection between Roebling's Delaware Aqueduct site and the Zane Grey Property. (OCLP 2023)

the river, thereby creating drainage issues and cracked pavement surfaces on and around the overlook.

Recommendation:

- Investigate causes of the overlook's poor condition to determine an appropriate treatment.

CONNECTION AREA

PROJECT #6. DEVELOP PEDESTRIAN CONNECTION BETWEEN ZANE GREY PROPERTY AND ROEBLING'S DELAWARE AQUEDUCT

The goal of this project is to develop a maintained pedestrian connection between the Roebling's Delaware Aqueduct area and the Zane Grey property. Pedestrians currently must use Scenic Drive and its narrow and sometimes steep shoulders to travel between the two sites. There are no pedestrian pavement markings or caution signs.

Option A: New Trail Paralleling Railroad Embankment

A new trail would be developed along a route once used by Zane Grey, between the rear southwest corner of the Zane Grey Property and Scenic Drive (west of Roebling Inn). This option will require high-level coordination between NPS, railroad, and private property owners. Detailed surveys are recommended to determine the exact location of property lines, easements, and grades.

Considerations:

- The route would parallel the railroad embankment and the row of utility poles (Figures 3.6a-3.6f). A detailed survey is recommended for the entire route to determine the exact location of property lines, easements, and grades. The area between the toe of the railroad embankment and the utility poles averages approximately twelve feet in width, enough space for a 6-8-foot path and side ditches. Southern portions of the route currently function as a level, informal path and would require minimal grading. Northern por-



Figure 3.6b. View looking northwest at Option A, near where it meets Scenic Drive. (OCLP 2022, DSC_7438)



Figure 3.6e. View looking south at Option A, from the southwest corner of the Zane Grey property. (OCLP 2022, IMG_1914)



Figure 3.6c. View looking north at Option A, west of the Roebling Inn. (OCLP 2022, IMG_1913)



Figure 3.6f. View looking south at Option A, west of the Roebling Inn. (OCLP 2022, DSC_7411)



Figure 3.6d. View looking north at Option A, west of the cemetery. (OCLP 2022, DSC_7412)

tions are inaccessible due to overgrown vegetation and wet conditions and would require ditches.

- Fencing would likely be required on both sides of the trail to prevent public access to railroad property and private property. Fence types and heights could vary, depending on property owners wishes (e.g., cemetery may prefer ornamental fencing and/or a gate).
- Removal of vegetation will be more substantial in northern portions of the route. The addition of vegetative screens on the private property side of the trail may enhance privacy.
- The trail will not be visible from Scenic Drive, possibly warranting installation of motion-detecting lights for safety and security. Use of the trail will likely increase visitation to the cemetery and Zane Grey's headstone.

- No views of the river and aqueduct/bridge, open views of cemetery and the rear portions of private residences.

Option B: New Walkway on West and North Sides of Scenic Drive

A walkway would be built from the front southeast corner of the Zane Grey Property to the south side of the Roebling Inn. This option will require consultations between NPS and private property owners.

Considerations:

- The route would parallel the north and west sides of Scenic Drive (Figures 3.6a, 3.6g-3.6n). The alignment would be sited 5-20 feet west of the pavement edge to avoid mature trees and the need for extensive retaining walls along steep road shoulders at the Zane Grey
- Property and the cemetery lot. At the cemetery, the route may need to track farther west to avoid grave-stones abutting Scenic Drive, including the grave of an unknown Revolutionary War soldier. It is likely other graves will be encountered, which would require extensive archeological consultations. The bluestone walkway on the north side of Scenic Drive, at the Roebling Inn, can be preserved.
- Several mature trees would need to be removed along this route, diminishing the area's rural character and be a concern to of property owners. Locally sourced bluestone materials should be considered to lessen the presence of a contemporary suburban feature upon the area's decidedly rural character.
- Visitor safety and visibility would be high for the entire walkway. Use of this walkway will likely increase visitation to the cemetery and Zane Grey's headstone.



Figure 3.6g. View looking northeast at Option B and the north side of Scenic Drive, and the Roebling Inn. (OCLP 2022, DSC_7433)



Figure 3.6i. View looking north at Option B and the west side of Scenic Drive, at the George property. (OCLP 2022, DSC_7401)



Figure 3.6h. View looking north at Option B and the west side of Scenic Drive, at the cemetery lot. (OCLP 2022, DSC_7418)



Figure 3.6j. View looking north at Option B and the west side of Scenic Drive, at the Zane Grey property. (OCLP 2022, DSC_7455)



Figure 3.6k. View looking south at Option B and the west side of Scenic Drive, at the cemetery lot. (OCLP 2022, DSC_7400)



Figure 3.6m. View looking west at Option B and the north side of Scenic Drive, at the Roebling Inn. (OCLP 2022, DSC_7432)



Figure 3.6l. View looking south at Option B and the west side of Scenic Drive, at the cemetery lot. (OCLP 2022, DSC_7417)



Figure 3.6n. View looking west at Option B and the north side of Scenic Drive, at Roebling Inn parking lot. (OCLP 2022, DSC_7435)

- Filtered views of the river and aqueduct/bridge, open views of cemetery and front portions of private residences. Visitors experience the area's rural character.

Option C: New Trail on East Side of Scenic Drive

A trail would be constructed from the boat ramp to the existing steps on NPS property (between Margold and Cortwright properties). This option will require consultation between NPS, private property owners, and other interested parties associated with the river.

Considerations:

- The route would abut the east side of Scenic Drive and the private driveway (Figures 3.6a, 3.6o-3.6v). This alignment would sit at the grade of the road and likely avoid minor flood events but would be highly susceptible to major flood events due to its location in the

floodplain. As such, a sturdy boardwalk design with railings would be needed, substantially adding to the cost. Cantilevering the trail from the edge of the road toward the river would be needed in some sections due to limited shoulder space and the presence of the existing guardrail.

- A substantial removal of mature trees would be needed along the alignment, diminishing the area's rural character and be a concern to property owners.
- Visitor safety and visibility would be high for trail sections along Scenic Drive but lower for sections along the private driveway.
- Open/framed views of the river, aqueduct/bridge, cemetery, and front portions of private property. Visitors experience the area's rural character.



Figure 3.6o. View looking southwest at Option C, at the steps on park property that access the riverbank. (OCLP 2022, IMG_0472)



Figure 3.6p. View looking north at Option C and the private driveway, across from the Cortright house. (OCLP 2022, DSC_7445)



Figure 3.6q. View looking north at Option C and the east side of Scenic Drive, across from cemetery. (OCLP 2022, DSC_7420)



Figure 3.6r. View looking north at Option C and the east side of Scenic Drive, next to the George property. (OCLP 2022, DSC_7401)



Figure 3.6s. View looking south at Option C at the east side of Scenic Drive, opposite the Kuhn house. (OCLP 2022, DSC_7456)



Figure 3.6t. View looking south at Option C and the east side of Scenic Drive, across from the cemetery. (OCLP 2022, DSC_7403)



Figure 3.6u. View looking south at Option C and the east side of Scenic Drive, across from the cemetery. (OCLP 2022, DSC_7419)



Figure 3.6v. View looking south at Option C and the east side of Scenic Drive, across from the Roebling Inn. (OCLP 2022, DSC_7428)

ZANE GREY PROPERTY

PROJECT #7. CONSTRUCT ACCESSIBLE ENTRANCE AT THE ZANE GREY HOUSE

It has long been a park goal to improve accessibility at the Zane Grey Property, beginning with the Zane Grey House itself. In 1999 and 2008 two *Cultural Landscape Treatment*

Plans recommended making the house accessible from its rear walk/back porch (Figures 3.7a-3.7b). A 2022 “Value Analysis Report” evaluated several alternatives for this area: a lift, a ramp and sloped walk, a ramp and stair at north, a ramp and stair at south, and an interior ramp and exterior sloped walk. The report concluded that the interior ramp and exterior sloped walk at the back porch (Alternative 5) was the best option (Figure 3.7c).¹⁴ As of March 2022, design work was underway.¹⁵

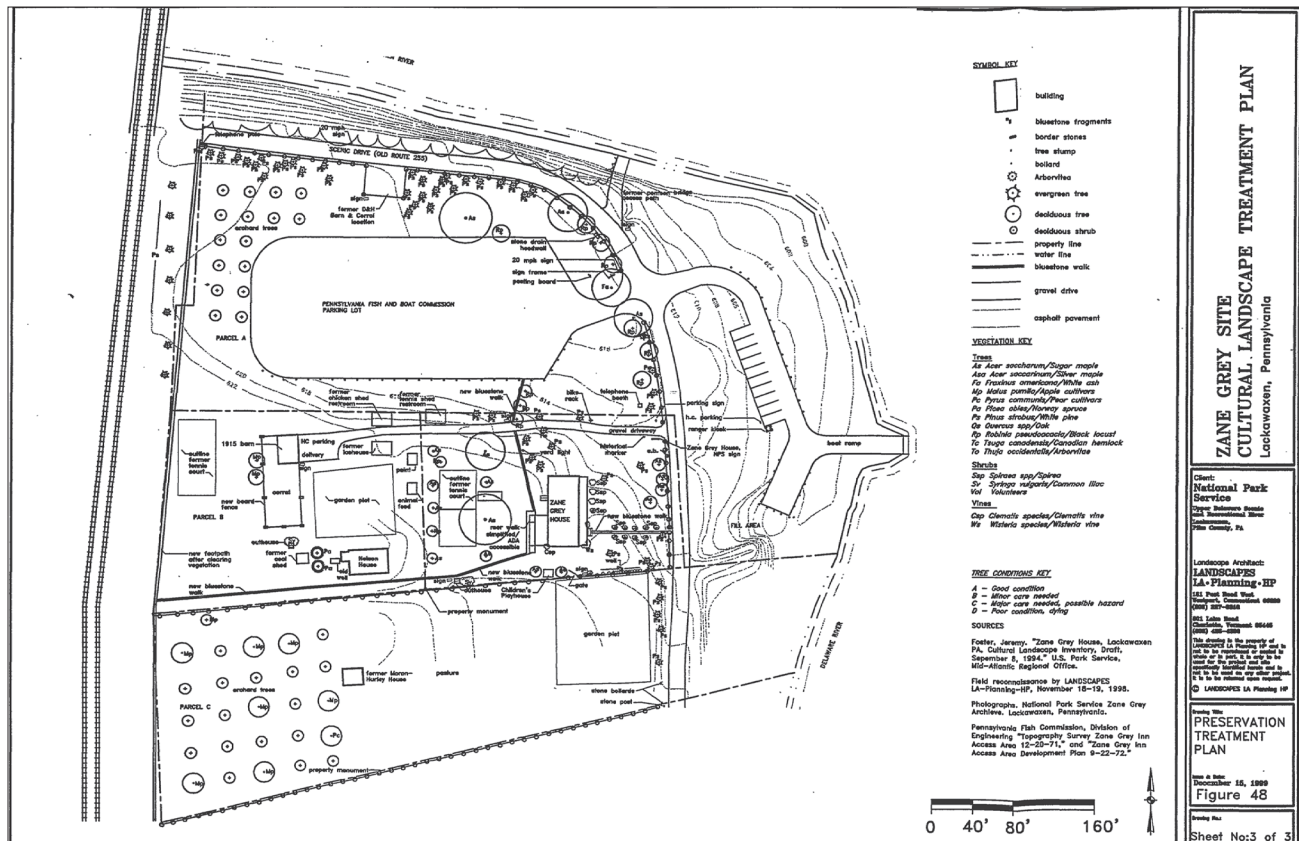


Figure 3.7a. Portion of the 1999 Cultural Landscape Treatment Plan and proposed accessible routes. Hatched areas indicate accessible walks. (Landscapes LA, Planning, HP, 1999: 83)

The image displays architectural drawings and a photograph of a porch enclosure project. The top left drawing is an interior perspective view of the enclosure, showing a ramp with handrails and a sloped walkway. The top right photograph shows the completed enclosure on a green house, featuring a screened porch and a landing area. The bottom left drawing is an exterior perspective view of the enclosure, showing the ramp with handrails and the sloped walkway. The bottom right drawing is a cross-section diagram of the enclosure, showing the porch, landing, and steps, with dimensions and labels.

Architectural Drawings:

- Interior View:** A perspective drawing showing the interior of the porch enclosure. It features a ramp with handrails and a sloped walkway. The enclosure is built with a wooden frame and has a screen door.
- Exterior View:** A perspective drawing showing the exterior of the porch enclosure. It features a ramp with handrails and a sloped walkway. The enclosure is built with a wooden frame and has a screen door.
- Section View:** A cross-section diagram of the porch enclosure. It shows the porch, landing, and steps. The dimensions are as follows:
 - PORCH: +3.3 FEET
 - LANDING: +1'-2"
 - Steps: +1'-2"
 - RAISED GRADE: +6"
 - 24'-0" @ 1:20 (Ramp slope)
 - 19'-0" @ 1:12 (Ramp slope)
 - 7'-2" (Total height)
 - 3'-6" (Height of porch)
 - 8'-5'-0" (Height of landing)

Photograph:

- A photograph of the completed porch enclosure on a green house. The enclosure is built with a wooden frame and has a screen door. It is situated on a raised grade and has a ramp with handrails and a sloped walkway.

175

PROJECT #8. DEVELOP ACCESSIBLE PARKING AND WALKWAYS TO THE ZANE GREY HOUSE

Accessibility improvements for the grounds were also proposed in the 1999 and 2008 plans, in conjunction with landscape rehabilitation goals and objectives. The two plans proposed removing the non-historic front parking lot and rebuilding it at the rear of the property, in front of the historic barn (see Figures 3.7a-3.7b). Later proposals also placed the accessible parking area at this location, as well as adapting the barn into an accessible restroom. However, with construction of the new walk and ramp at the back porch, the park can locate an accessible restroom in the house and use the barn interpretive programming. This change at the barn makes the level space behind the barn usable, as it will no longer be needed for the restroom's septic field. A November 2022 plan proposes building an accessible parking lot to the rear of the barn, which will be a less visually intrusive location than the front of the barn (Figure 3.8a). This level area was the once the site of the Grey's second tennis court, and is currently grass and used for storage of mobile fee trailers, seasonal signs, etc. (Figure 3.8b). However, the park will instead focus on interpretation of the first tennis court, located closer to the house.

In the plan, the west end of the driveway will be extended along the north side of the barn to access the new parking lot (Figure 3.8c). A new accessible walk will be built from the new lot to connect to other paths. Consistent with the 1999 and 2008 treatment drawings, the remainder of the historic driveway will be restored to its historic condition.

PROJECT #9. REMOVE EXISTING FRONT WALK AND PARKING LOT, RESTORE ORIGINAL DRIVEWAY AND FRONT WALK

During the historic period a bluestone walk extended from the front of the original portion of the Zane Grey House to Scenic Drive (Figure 3.9a). Its removal and enlargement of the driveway for parking coincides with the conversion of the Zane Grey House into a guest inn. With the proposed relocation of the visitor/staff parking lot to the rear of the property, the existing parking lot, front walk, and steps can be removed, and the original topography and lawn restored (Figures 3.9b-3.9c). The 1999 and 2008 treatment plans show the historic alignment of the front bluestone walk, from the front porch steps to Scenic Drive, and the driveway heading west to the barn (see Figures 3.7a-3.7b).

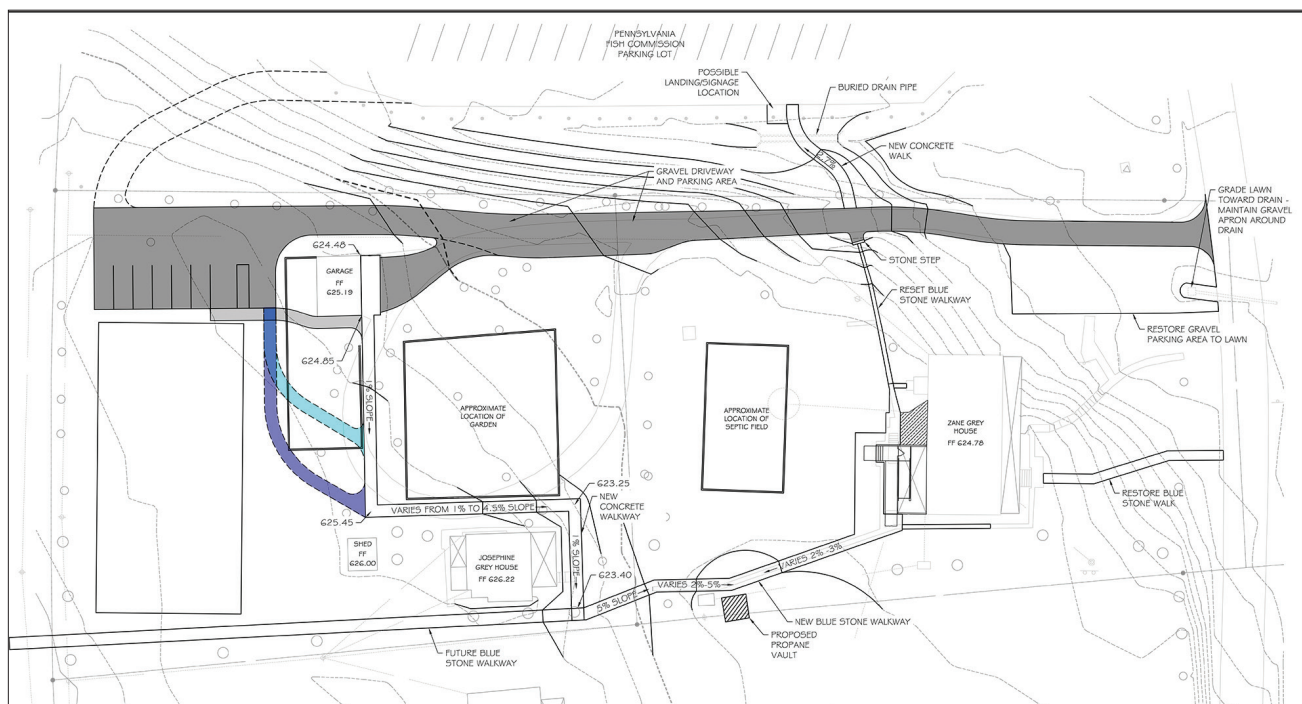


Figure 3.8a. Schematic design for an accessible parking area and walkway. ("Parking, Path, and Pathway Site Plan," Upper Delaware Scenic and Recreational River, Schematic Design Submission, Sheet L1.01, 23 November 2022)



Figure 3.8b. View looking east at the proposed site of a parking lot, behind the barn (image left). An accessible path will be built (image right) to connect the lot to other paths barn. (OCLP 2022, DSC_7389-7390)



Figure 3.8c. View looking west at the barn. The historic driveway will be extended along the north side of the barn (image right) to access the new parking lot. (OCLP 2022, DSC_7461)



Figure 3.9a. View looking northwest, c.1916-18. In the foreground is the garden plot. In the background (image right) is a glimpse of the front bluestone walk and possible the tennis court (image left). (Courtesy Ohio Historical Society, from CLPT 1999: 21; Hawley Public Library, #1604)



Figure 3.9b. View looking southwest at the existing parking lot. When its is relocated it can be removed so that only the original driveway portion (image right) will remain. (OCLP 2022, DSC_7356)



Figure 3.9c. View looking northeast from the front porch and the current pedestrian and vehicular layout. (OCLP 2022, DSC_7361-7362)

Recommendations:

- Some of the bluestone slabs in the existing front walk may be salvaged to reconstruct the original front walk.
- Take stock of the salvaged material; if there is not enough to complete the entire project, obtain in-kind bluestone from a local source. Unused salvageable material can be stockpiled for use in other walkways as needed.
- The wood “Little Free Library” display and signage will have to be relocated.

PROJECT #10. INFILL EXISTING ORCHARD WITH NEW APPLE TREES

Three original apple trees remain in this orchard, located in the western part of Parcel C (Figure 3.10a). The area is predominantly maintained lawn. Past park efforts to install

new plantings of apple trees have been unsuccessful. The 1999 and 2008 treatment plans show the proposed grid of the orchard (see Figures 3.7a-3.7b).

Recommendation:

- Orchard replanting should be considered only if maintenance and care can be ensured.

PROJECT #11. INTERPRET THE GARDEN AREA SOUTH OF ZANE GREY HOUSE

The Greys planted vegetables and flowers in the open, level space just south of the Big House (Figure 3.11a). This area is currently maintained as lawn and is often the site of outdoor events, include Zane Grey Day in July (Figure 3.11b). The 1999 and 2008 treatment plans show the approximate outline of the historic garden plot (see Figures 3.7a-3.7b).



Figure 3.10. Aerial view of the orchard located between the Norfolk Southern track (image left) and the Moran House and Cottage Kitchen (image right).



Figure 3.11a. View looking northwest at the Big House and a portion of the garden, c.1920s. (UPDE Archives, Scan531)



Figure 3.11b. View looking northwest at the former garden plot area. (OCLP 2022, DSC_7457)

Recommendations:

- The sides and/or corners of the garden plot can be marked with stones set flush with the ground, and/or with small groupings of peony and yucca). A wayside that describes the intent of the stones or plantings is recommended.
- A complete restoration of the garden plot is practical only if supported by historic research and maintained by volunteers, or as part of a garden club, community garden project, etc.

PROJECT #12. INTERPRET THE TENNIS COURT

During the historic period the Greys constructed two clay tennis courts: in the back yard between the Zane Grey House and the Nelson House, and behind the barn next to the railroad embankment (Figure 3.12a, see also Figure 3.9a). Both areas are now maintained as lawns but do not reveal the extents of the playing surface (Figure 3.12b). The park will focus interpretive efforts on the tennis court closest to the Big House, as the other tennis court is the proposed site for visitor/staff parking lot (see Project #9). The 1999 and 2008 treatment plans show the approximate outlines of the tennis courts (see Figures 3.7a-3.7b).

Recommendations:

- Outline with firehoses: The hoses can be easily moved and can be cleared by a mower but will nonetheless look like firehoses.



Figure 3.12a. Portion of photograph looking from Prospect Rock, c.1918. The light colored rectangular area (image center) west of the Zane Grey house may be the tennis court. (*Historic Structures Report, Alice Josephine Grey House, Barn & Accessory Buildings, Zane Grey Family Compound*, 2012: 8)



Figure 3.12b. View looking southeast at the former location of a clay tennis court. (OCLP 2022, DSC_7462)

- Mark the court lines with spray paint: The lines will need to be repainted every two-or three mows.
- Use grass to delineate the court. This grass area can be mowed shorter and more frequently than the surrounding lawns.

ENDNOTES

- 1 National Wild and Scenic Rivers System: <https://rivers.gov/wsr-act.php>.
- 2 Conference of Upper Delaware Townships, *Final River Management Plan, Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 1986: 77.
- 3 National Park Service, *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014: 3, citing Upper Delaware Act, P.L. 95-625 November 10, 1978.
- 4 National Park Service, *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014: 3.
- 5 National Park Service, *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014: 4.
- 6 UPDE website: <https://www.nps.gov/upde/getinvolved/planning.htm>.
- 7 Conference of Upper Delaware Townships, *Final River Management Plan, Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 1986: vi.
- 8 Conference of Upper Delaware Townships, *Final River Management Plan, Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 1986: vii, 82-83.
- 9 National Park Service, *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014: 6.
- 10 National Park Service, *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014: 7.
- 11 Patricia O'Donnell, et.al., *Cultural Landscape Treatment Plan [CLPT] for the Zane Grey Property, Lackawaxen, Pennsylvania. Prepared for the National Park Service, Upper Delaware Scenic and Recreational River, Lackawaxen, Pennsylvania*. Landscapes: Landscape Architecture-Planning-Historic Preservation, Charlotte, Vermont and Westport Connecticut, 1999: 69-70.
- 12 Robert Page, Cathy Gilbert, and Susan Dolan, *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*, Washington D.C: U.S. Department of the Interior, National Park Service, *Cultural Resource and Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program*, 1998: 82
- 13 Jeremy W. Pye, "A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebling's Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania," 30 April 2021: 1, 5.
- 14 National Park Service, "Value Analysis Study for Upper Delaware Scenic and Recreational River," PMIS 223493: Zane Grey Porch Accessibility," January 22, 2022: 11-12, 17.
- 15 Email, "Update on UPDE-ZAGR Value Analysis," David Bitterman to Jessica Weinman, et.al., 4 March 2022.

REFERENCES

REPORTS AND BOOKS

“Administrative History.” Park files, Draft 2002.

Bracken, Jeanne M., ed. *American Waterways: Canal Days*. History Compass LLC, 1997.

Carrol, Matthew S., Ben W. Twight, and Marsha McCabe. *Appropriate River Recreation Use Study: An Analysis of Community Response to Federal Presence in the Upper Delaware River Valley*. Penn State University, School of Forest Resources, 1987.

Conference of Upper Delaware Townships. *Final River Management Plan, Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 1986.

Curtis, Mary. “Lackawaxen Walking Tour.” Park files, 1987.

Curtis, Mary. *National Register of Historic Places, Multiple Property Documentation Form [MPDF]*, “Historic and Architectural Resources of the Upper Delaware Valley, New York and Pennsylvania.” US Department of the Interior, National Park Service, 1992.

Curtis, Mary. *National Register of Historic Places, Registration Form [NR]: D & H Canal Co. Office (Roebeling Inn)*. US Department of the Interior, National Park Service, 1993.

Curtis, Mary. “Toll House,” Building-Structure Inventory Form. NYS Office of Parks, Recreation, and Historic Preservation, Division for Historic Preservation, 1985.

Dekin, Albert, et al. *Cultural Resource Survey, Upper Delaware National Scenic and Recreational River, Pennsylvania and New York, Volumes 1-6*. Binghamton, NY: State University of New York, Public Archaeology Facility, 1993.

Delaware & Hudson Canal Company. *Annual Report, 1849*, cited in Vogel 1998.

Delaware & Hudson Canal Company. *A Century of Progress: History of the Delaware and Hudson Company, 1823-1923*. Albany, NY: J.B. Lyon, 1925.

DeNio, Pierre. *The Winding Delaware, Written Between the Years 1955-1960*. Equinunk, PA: Equinunk Historical Society, 1988.

De Vries, Gregory. *Mongaup Interpretive Center Cultural Landscape Assessment, Upper Delaware Scenic and Recreational River*. Heritage Landscapes Preservation Landscape Architects & Planners, 2007.

Fiedel, Stuart and Charles Lee Decker. *Archeological Overview and Assessment [AOA], Upper Delaware Scenic and Recreational River*. The Louis Berger Group, Inc., 2008.

Historic American Building Survey [HABS], Zane Grey House, Lackawaxen, Pike County, Pennsylvania, PA-5371. U.S. Department of the Interior, National Park Service, Office of Archeology and Historic Preservation, 1989.

Historic American Engineering Record [HAER Addendum], Addendum to Delaware & Hudson Canal, Delaware Aqueduct, PA-1. U.S. Department of the Interior, National Park Service, Office of Archeology and Historic Preservation, 1988.

Historic American Engineering Record [HAER], Delaware & Hudson Canal, Delaware Aqueduct, PA-1. U.S. Department of the Interior, National Park Service, Office of Archeology and Historic Preservation, 1969.

Historic American Engineering Record [HAER], Delaware and Hudson Canal: Delaware Aqueduct Toll House, NY-205. U.S. Department of the Interior, National Park Service, Office of Archeology and Historic Preservation, 2001.

Historic American Engineering Record [HAER], Erie Railway: Delaware Division, Bridge 110.54, Delaware Aqueduct, PA-24. U.S. Department of the Interior, National Park Service, Office of Archeology and Historic Preservation, 2001.

Hunter Research, Inc. *A Preliminary Archaeological Assessment of the Zane Grey Property, Lackawaxen Township, Pike County, Pennsylvania*. Hunter Research, Inc., 1990.

John Milner Architects, Inc. *Historic Structures Report [HSR], Alice Josephine Grey House, Barn & Accessory Buildings, Zane Grey Family Compound*. Chadds Ford, PA: John Milner Architects, Inc., 2012.

Kline, Laura J. and Stephen A. Olausen. *National Register of Historic Places, Registration Form [NR]: Zane Grey House (Boundary Increase)*. Pawtucket, RI: Public Archeology Lab, 2011.

McDermott, John D. *The National Survey of Historic Sites and Buildings, Special Report, Delaware and Hudson Canal, New York and Pennsylvania*. US Department of the Interior, National Park Service, 1968.

National Park Service. *Delaware Aqueduct Site, Schematic Design/Environmental Assessment [SD/EA]*. U.S. Department of the Interior, National Park Service, Denver Service Center, 1994.

National Park Service. *Final Environmental Impact Statement [EIS], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 1987.

National Park Service. *Foundation Document [FD], Upper Delaware Scenic and Recreational River, New York and Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014.

National Park Service. *Foundation Document Overview [FDO], Upper Delaware Scenic and Recreational River, New York, Pennsylvania*. U.S. Department of the Interior, National Park Service, 2014.

National Park Service. *Resource Management Plan [RMP], Upper Delaware Scenic and Recreational River*. U.S. Department of the Interior, National Park Service, Draft 1994.

National Park Service. *Roebbling's Delaware Aqueduct Site: Cultural Landscape Inventory [RB CLI], Upper Delaware Scenic and Recreational River*. Boston, MA: National Park Service, Northeast Regional Office, 2016.

National Park Service. "Value Analysis Study for Upper Delaware Scenic and Recreational River," PMIS 223493: Zane Grey Porch Accessibility," January 22, 2022.

National Park Service. *Zane Grey House: Cultural Landscape Inventory [ZG CLI], Upper Delaware Scenic and Recreational River*. Boston, MA: National Park Service, Northeast Regional Office, 2014.

New York Times, 16 April 1979 and 26 April 1979.

O'Donnell, Patricia, et.al. *Cultural Landscape Treatment Plan [CLPT] for the Zane Grey Property, Lackawaxen, Pennsylvania. Prepared for the National Park Service, Upper Delaware Scenic and Recreational River, Lackawaxen, Pennsylvania*. Landscapes: Landscape Architecture-Planning-Historic Preservation. Charlotte, Vermont and Westport, Connecticut, 1999.

O'Donnell, Patricia, et.al. *Zane Grey Family Property, Lackawaxen, PA, Preliminary Cultural Landscape Treatment*. Prepared for the National Park Service, Upper Delaware Scenic and Recreational River, Lackawaxen, Pennsylvania. Landscapes: Landscape Architecture-Planning-Historic Preservation. Charlotte, Vermont and Westport, Connecticut, 1991.

Page, Robert, Cathy Gilbert, and Susan Dolan. *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*. Washington D.C: U.S. Department of the Interior, National Park Service, Cultural Resource and Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program, 1998.

Pauly, Thomas H. *Zane Grey: His Life, His Adventures, His Women*. Urbana and Chicago: University of Illinois Press, 2005.

"Pennsylvania Historic Resources Survey Form: Brown's Canal House, L-L21." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1991.

"Pennsylvania Historic Resources Survey Form: Cortright House, L-L19." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1991.

"Pennsylvania Historic Resources Survey Form: Kuhn, Gottlieb, House, L-L15." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1991.

"Pennsylvania Historic Resources Survey Form: Lackawaxen Cemetery, L-L16." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1999.

"Pennsylvania Historic Resources Survey Form: Merchant's Bank Building, L-L22." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1999.

"Pennsylvania Historic Resources Survey Form: Shannon, Charles, House, L-L21." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1991.

"Pennsylvania Historic Resources Survey Form: St. Marks' Church, L-L17." Pennsylvania Historical and Museum Commission, Bureau of Historic Preservation, 1991.

Pritchett, Mark. "Completion Report, National Park Service, Upper Delaware Scenic and Recreational River, Rehabilitate the Towpath Trail. Park files, 2010.

Pye, Jeremy W. "A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebbling's Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania," Contract Publication Series No.: 20-414. Cultural Resource Analysts – Louisiana Office, April 30, 2021.

Racine, Laurel L. *Historic Furnishings Report* [HFR], *Zane Grey House, Upper Delaware Scenic and Recreational River, Lackawaxen, Pennsylvania, Historical Data with Implementation Options*. Boston, MA: National Park Service, Northeast Museum Services Center, May 2003.

Roach, Nancy Carrs. *National Register of Historic Places, Inventory-Nomination Form* [NR]: *Zane Grey House*. US Department of the Interior, National Park Service, 1983.

“Route 97 Intrinsic Quality Report,” 2001. Park files.

Sasser, Elizabeth S. “Fiscal Year 1990 Preservation Project, Project Record, Delaware Aqueduct Tollhouse Stabilization, Phase II, Upper Delaware Scenic and Recreation River, Mid-Atlantic Region.” U.S. Department of the Interior, National Park Service, Harpers Ferry Center, 1990.

Schrabisch, Max. *Archaeology of the Delaware River Valley. No. 1*. Harrisburg: Publications of the Pennsylvania Historical Commission, 1930.

Schultz, Sandra Speers. *Roebling's Suspension Aqueduct over the Delaware River – A Short History*. Park files, 1998.

Scott, Jane and Sandra Hauptman. “Remains of Delaware and Hudson Canal Within the Boundaries of the Upper Delaware National Scenic and Recreational River, New York and Pennsylvania, Report of a Survey Conducted April-May.” Park files, 1981.

Short and Ford Architects. *The Zane Grey House, Lackawaxen, Pennsylvania. Historic Structures Report* [HSR]. Princeton, NJ: Short and Ford Architects, 1990.

Speers, Sandra R. *Historic Structure Report* [HSR], *Physical History and Analysis, The Delaware Aqueduct, Upper Delaware Scenic and Recreational River, New York-Pennsylvania*. U.S. Department of the Interior, National Park Service, Mid-Atlantic Regional Office, 1987.

Unrau, Harlan D. *Historic Structure Report* [HSR], *Historic Data Section, The Delaware Aqueduct, Upper Delaware Scenic and Recreational River, New York-Pennsylvania*. U.S. Department of the Interior, National Park Service, Denver Service Center, 1983.

Unrau, Harlan D. *National Register of Historic Places, Inventory-Nomination Form* [NR draft]: *Delaware Aqueduct*. US Department of the Interior, National Park Service, 1983 draft.

Vogel, Robert M. *Roebling's Delaware & Hudson Canal Aqueducts*. Eastern National, reprint 1998.

Wakefield, Manville B. *Coal Boats to Tidewater: The Story of the Delaware & Hudson Canal*. Fleischmanns, New York: Purple Mountain Press, Ltd., 1965.

Whitford, Noble E. *History of the Canal System of the State of New York*. Albany, NY: Brandon Printing Company, 1906.

Zane Grey Diary, 5 October 1917. Farley Collection, UPDE Archives.

WEBSITES

Discover Pike, accessed 7 July 2014: https://web.archive.org/web/20080531014946/http://www.discoverpikepa.com/mre/mre_dtl.aspx?id=1

Family Stories New York: Eldred, Barryville, the Delaware River, accessed 12 November 2020: <http://weezy.info/category/eldred/page/2>

Historical Aerial Viewer, Historical Aerial Photographs of Pennsylvania, accessed 23 August 2020: <https://datacommons.maps.arcgis.com/apps/>

National Park Service, LandsNet - Land Resources Division, accessed 12 December 2020: <http://landsnet.nps.gov/>

National Park Service, Photo Gallery, “48 Roebling Aqueduct in 1980,” accessed 17 August 2020: <https://www.nps.gov/media/photo/gallery-item>

National Park Service, Planning, Environment & Public Comment (PEPC), accessed 18 November 2020: <https://pepc.nps.gov/>

National Park Service, Upper Delaware Scenic and Recreational River [UPDE], accessed 17 June 2014, 14 March 2015, 14 August 2020, 10 March 2023: <https://www.nps.gov/upde/index.htm>

National Park Service, Upper Delaware Scenic and Recreational River [UPDE], accessed 17 June 2014 and 14 March 2015: <https://www.nps.gov/upde/learn/photosmultimedia/index.htm>

National Wild and Scenic Rivers System, accessed 10 March 2023: <https://rivers.gov/wsr-act.php>

Sullivan County Property Information, accessed 16 September 2020: http://webapps.co.sullivan.ny.us/IMO/report.aspx?file=&swiscode=483400&printkey=025_0001036000&sitetype=res&siteNum=1

Town of Highland, accessed 8 March 2016: <https://townofhighlandny.com/>

Wikipedia, “Pennsylvania Route 590,” accessed 3 September 2020: https://en.wikipedia.org/wiki/Pennsylvania_Route_590

OTHER

Hahn, Carla Hauser. Email, Review comments, Roebling’s Delaware Aqueduct Site, Cultural Landscape Inventory, 24 May 2016, 18 August 2016, 22 August 2016.

Hahn, Carla. Memorandum, Hahn to Martinez, et.al., 30 June 2008.

Hauptman, Lauren. Email, 26 October 2020.

DRAWINGS

"A map of the Province of New-York, reduc'd from the large drawing of that Province, compiled from actual surveys by order of His Excellency William Tryon, Esqr., Captain General & Governor of the same, by Claude Joseph Sauthier; to which is added New-Jersey." London, Wm. Faden, 1776. Map. <https://www.loc.gov/item/74692643/>

"Accessibility Study, Alternative 5 - Interior Ramp and Sloped Walk, Value Analysis Exercise, Zane Grey House, Upper Delaware Scenic and Recreational River," January 21, 2022.

"Approach Road Plan," Delaware Aqueduct, Roebling Bridge Reconstruction, Located within Park, Minisink NY, Lackawaxen PA, Upper Delaware Scenic and Recreational River, Drawing #647-80015, January 1986.

"Boundary Survey Map, New York and Pennsylvania Approaches to the Delaware Aqueduct," Upper Delaware Scenic and Recreational River, Drawing #647-80006, November 1980.

"Boundary & Topographic Survey, Zane Grey Home," Upper Delaware River Scenic and Recreational River, Drawing #467-80033, February 2009.

"Cultural Landscape Treatment Plan, Upper Delaware Scenic and Recreational River, The Zane Grey Home, Lackawaxen, Pennsylvania, Drawing #1, 2008."

"Geophysical survey grid and project area on aerial imagery," "A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebling's Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania," 2021: Figure 11.

"GPR Slice 7 showing the locations of select profiles included in this report," "A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebling's Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania," 2021: Figure 27.

"Layout Plan," Upper Delaware Scenic and Recreational River, Drawing #647-25001, May 1994.

"Layout Plan, PA Side," Upper Delaware Scenic and Recreational River, Drawing #647-41003-A, April 1998.

"New York Side, Site Details, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20024-A, December 1994.

"New York Side, Site Development, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20023-B, December 1994.

"Overall Site Plan, Delaware Aqueduct Site," Upper Delaware Scenic and Recreational River, Drawing #647-20021-B, December 1994.

"Parking, Path, and Pathway Site Plan," Upper Delaware Scenic and Recreational River, Schematic Design Submission, Sheet L1.01, 23 November 2022.

"Pennsylvania Side, Site Development," Upper Delaware Scenic and Recreational River, Drawing #647-20022-B, June 1995.

"Period Conditions Plan, c.1916-18," Zane Grey Site, Cultural Landscape Treatment Plan, Lackawaxen, Pennsylvania, Figure #21, December 1999.

- “Preliminary Plan, Abandonment Map,” State of New York, Department of Transportation, Drawing AB-1, February 1994.
- “Preservation Treatment Plan, Zane Grey Site,” Cultural Landscape Treatment Plan, Lackawaxen, Pennsylvania, Figure #48, December 1999.
- “Processed plan-view results map for the GPR survey near Roebling’s Aqueduct, Time-Slice #1, “A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebling’s Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania,” 2021: Figure 17.
- “Processed plan-view results map for the GPR survey near Roebling’s Aqueduct, Time-Slice #7,” “A Ground-Penetrating Radar Survey of Approximately 2 acres in the Vicinity of Roebling’s Delaware Aqueduct, Upper Delaware Scenic and Recreational River, Lackawaxen, Pike County, Pennsylvania,” 2021: Figure 23.
- “Project Overview Plan, Upper Delaware Scenic and Recreational River,” Drawing #647-41012, August 2008.
- “Survey of Land in the Township of Lackawaxen, Pike County, PA,” National Park Service, Tract 101-04, July 1989.
- “The Delaware and Hudson Canal Company’s Transportation System in 1866.”
- “The Zane Grey Home, Lackawaxen, Pennsylvania,” Cultural Landscape Treatment Plan, Upper Delaware Scenic and Recreational River, Drawing #1, 2008.
- “Topographic Survey, Zane Grey Inn, Access Area,” Commonwealth of Pennsylvania, Pennsylvania Game Commission, Drawing # [illegible], December 1971.
- “Tow Path Cross-Sections,” Upper Delaware Scenic and Recreational River, Drawing #647-25001, May 1994.

OLMSTED CENTER FOR LANDSCAPE PRESERVATION
NATIONAL PARK SERVICE
15 State Street, 6th Floor
Boston, MA 02109
www.nps.gov/oclp/