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WINDHAM ROAD BRIDGE  
(Bridge No. 1850)  
Windham Road, spanning Willimantic River  
Windham  
Windham County  
Connecticut

HAER No. CT-166

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING SURVEY  
National Park Service  
Philadelphia Support Office  
U.S. Custom House  
200 Chestnut Street  
Philadelphia, PA 19106

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HISTORIC AMERICAN ENGINEERING RECORD  
WINDHAM ROAD BRIDGE

(Bridge No. 1850)

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**Location:** Windham Road, spanning Willimantic River  
Windham  
Windham County, Connecticut  
  
USGS Willimantic Quadrangle  
UTM Coordinates: 18.732400.4621060

**Date of Construction:** 1857

**Engineer:** Whiting Hayden  
**Contractors:** Lyman Jordan and Nathaniel Olin

**Present Owner:** State of Connecticut  
Department of Transportation  
2800 Berlin Turnpike  
Newington, Connecticut 06131-7546

**Present Use:** Vehicular bridge

**Significance:** Windham Road Bridge is significant as a large and well-preserved example of stone-arch construction, a vernacular technique that was commonly used for important crossings, particularly ones below mill dams that might present a hazard during floods. The bridge was built in 1857 in connection with the mill and dam of the Willimantic Linen Company, an enterprise that eventually became the town's largest employer.

**Project Information:** This documentation was undertaken in accordance with a Memorandum of Agreement between the Federal Highway Administration and the Connecticut State Historic Preservation Office. The bridge is scheduled for conversion to pedestrian use.

Bruce Clouette  
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55 Van Dyke Avenue  
Hartford, CT 06106

Description

The stone-arch bridge that carries Windham Road across the Willimantic River in the Willimantic section of Windham, Connecticut, includes two spans: a large arch 76 feet in span across the main river channel and a smaller arch across the tailrace of an adjacent former textile mill. The bridge connects the historic Willimantic Linen Company mill complex (HAER No. CT-44) on the north side of the river with the residential neighborhoods on the south side. At the north end of the bridge, Windham Road (designated Route 601 in the State Highway system) is crossed by three connectors running between Mill No. 1 (1857) and Mills No. 5 and 6 (1899, 1907): a concrete-faced overhead bridge, a brick-arched underground passage, and a stone-arched tunnel that originally accommodated a millyard railroad. The dam for Mill No. 1 lies just upstream from the Windham Road Bridge and continues to provide power for a modern hydroelectric installation in the east end of the mill; the turbine discharges into the mill's original tailrace, which is separated from the river channel by a reinforced-concrete wall superimposed over an earlier stone-rubble wall. Immediately south of the bridge, two plate-girder overpasses carry the tracks of the Providence and Worcester and New England Central railroads over Windham Road.

The bridge is built of locally quarried granitic gneiss; the same stone, quarried along the river banks and elsewhere in Willimantic, was used for the linen company mills. Generally medium-gray in color, with bands of white and brown, the stone blocks used in the bridge typically exhibit shallow drill marks about 8 inches apart on one or more edges.

The main span springs directly from the ledge along the river banks, with the arch rising 20 feet at its crown. The carefully shaped ring stones vary in length but are typically about 16 inches wide and 36 inches in height, with the apex or keystone about 6 inches higher than the others. The spandrels are built of large flat stones; although the edges are fairly well squared-off, the resulting stonework has more the character of rubble masonry than ashlar. Much of the stonework has been repointed with modern gray mortar, though traces remain of an earlier sandy brown mortar as well.

The tailrace span is similar to the main arch in its construction but it is smaller, measuring 26 feet in span with

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a rise of 8 feet. The ring stones average about 10 inches in width and 24 inches in height, and there are no keystones. The overall length of the bridge is 130 feet.

The spandrels of both arches continue about 3 feet above the roadway to form continuous parapets. Measuring about 22 inches wide, the parapets are finished with large capstones 6 inches thick and up to 8 feet in length. The parapets restrict the roadway to a width of 21 feet. The west parapet formerly had an iron pipe rail, added in 1890, along its top; it has been replaced by chain-link fencing.

Extending along the east or downstream face of the bridge is a wooden sidewalk, 6 feet in width, first installed in 1875. The five stringers and planking were recently replaced in pressure-treated wood, but the original sidewalk supports and railing remain, supplemented by additional welded T-section supports and chain-link fencing. The original supports consist of light T-rail beams let into the masonry, with heavy iron rods serving as diagonal struts bearing against the masonry. The railing features four horizontals of light bar stock with uprights and diagonals formed of rods; additional lengths of rod provide outside sway bracing. The various parts of the railing are bolted together.

The bridge's historic appearance remains substantially intact. In addition to the changes already noted, the roadway elevation appears to have been changed at both ends. The south end has been cut down about two feet from the original grade in order to provide more clearance under the railroad overpass; other than increasing the apparent height of the railing, this change has not directly affected the stonework of the bridge. The north end shows evidence of having been raised about two feet, necessitating additional height for the parapets. Showing in even the earliest photographs as a disjuncture in the masonry, with generally smaller stones than the rest of the bridge, this change may have occurred either in 1863, when Main Street was realigned in connection with the construction of Mill No. 2, or in 1882, when Main Street was re-graded in the vicinity of the mills. Both sides of the bridge carry large water or sewer pipes.

At one time, a set of tracks for a streetcar route ran down the middle of the bridge's roadway, and there were two supports on the bridge for the overhead trolley wire. No visible evidence remains of these features.

Ironically for such a prominent structure, the bridge does not now have a commonly recognized name, nor has it had a consistent name throughout its history. The primary name of the bridge used in this documentation, Windham Road Bridge, was in common use from about 1907, when the designation of the road formerly known as South Main Street was changed to the name currently in use, Windham Road. Earlier (and even afterwards for some years) the bridge was referred to as the South Main Street Bridge, the Lower Bridge (as opposed to the stone arch on Bridge Street further upriver), or simply as the bridge near the thread mill. The name Jillson Hill Bridge was also used in the early 20th century and still has some currency.

#### Historical Background

The road carried by the bridge has been an important one since the early 18th century. Main Street was first laid out as a public highway in 1707 for the convenience of Windham farmers gathering hay from meadows along the river, and in 1727 a bridge was built at this location to connect that highway with places to the south. The bridge, known as Ironworks Bridge because of its proximity to an early 18th-century refining forge, was carried off in a flood in 1771 and subsequently rebuilt, perhaps more than once. The bridge became part of the route improved by the Windham County Turnpike, incorporated in 1799, a well-traveled road that ran from the Rhode Island border to the Boston Post Road east of Hartford. The turnpike company was dissolved in 1852, leaving the maintenance of the road to the town of Windham.

By this time, the Willimantic section of Windham had become a thriving industrial and commercial center, with several large cotton mill complexes along its swiftly flowing river, two intersecting railroad lines (a third was completed in the 1870s), and stores, banks, and places of entertainment that served the surrounding countryside as well. Willimantic became an organized borough in 1836; although still part of the town of Windham, which was responsible for highways and other local-government functions, the borough provided sidewalks, street lighting, and other amenities appropriate to a growing small city.

Apparently the turnpikes and other roads through Windham had deteriorated to a sorry state, since the town meeting minutes

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of the 1850s record at least seven lawsuits against the town by people trying to force the town to upgrade the roads. In 1856 the town meeting warrant included the following item: "to see if said Town will direct to rebuild or thoroughly repair the Iron Works Bridge at Willimantic." The citizens directed the selectmen to make some repairs to the wooden bridge, but took up the issue of replacement again the following year. On April 25, 1857, the town approved a resolution authorizing the replacement of the old wooden bridge with a stone arch:

Voted: to rebuild the Iron Works Bridge in Willimantic upon the plan or similar to the one proposed by W. Hayden Esq. which bridge is to be a stone arch, 80 feet span, and that the selectmen forthwith contract with the Linen Company upon the best terms.

The company referred to in the resolution was the Willimantic Linen Company, a venture so called because linen was anticipated to be one of its major products. Formed in 1854 by an alliance of local cotton manufacturers and Hartford capitalists, the linen company soon turned to the manufacture of cotton sewing thread, a product which became their specialty. Propelled by the growth of the garment industry and sales of home sewing machines, the market for Willimantic thread expanded constantly throughout the 19th century, and the linen company (which retained its original name until 1898, when it became known as the American Thread Company) kept pace by building an ever-larger plant. Starting with Mill No. 1 in 1857 (during the first few years the company leased space in an old cotton mill), the company built a series of large stone and brick mills, scores of worker tenements, and a library that was open to the public. Although no account of the Windham Road Bridge's costs has been located, it is likely that the company bore some of the expense itself, particularly for the tailrace portion; in any event, coordinating the bridge's construction with the erection of the mill and dam probably produced substantial savings for the town. At its height in the 1920s, the thread mill employed some 3,000 people, making it by far the town's largest employer. Production ceased in 1985.

Although they were more expensive, stone arches were valued because they were more durable than wooden bridges. They usually were reserved for the most important roads, especially

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ones such as Windham Road, where the impoundment of water by mill dams upstream threatened the bridge in times of flood. A few years after its completion, the editor of the local newspaper praised the Windham Road Bridge as "a fine, substantial structure, as enduring as time."<sup>1</sup> His opinion was well-founded: the bridge survived both the disastrous flood of October, 1869, which destroyed dozens of bridges throughout eastern Connecticut, and the complete wash-out in 1888 of Mill No. 1's dam just upstream.

The addition of the sidewalk in 1875 grew out of a concern for pedestrian safety and convenience. As Willimantic developed as a commercial and industrial center, the two bridges over the river became perceived as inadequate, and as early as the 1860s some citizens began petitioning for a footbridge midway between the two that would link the downtown business district with the rapidly growing residential neighborhoods on the south side. In 1872 the selectmen reported that the construction of a pedestrian bridge was not within the town's powers. The town was then petitioned by Henry Brainard and others in 1874 to "instruct the selectmen to construct side walks on the easterly walls of the two stone arch bridges across the river." At a town meeting on October 5, 1874, the citizens approved the sidewalk on the "east or lower stone arch bridge" but put off the Bridge Street walkway until much later. Town records show that the Windham Road Bridge's sidewalk planking was renewed several times over the years, including 1888, 1903, and 1914. In 1890, the town installed an iron railing on the bridge, presumably the pipe rail shown in early photographs on the upstream or west parapet.

Starting in 1903 the bridge began carrying a streetcar line for the Willimantic Traction Company's Willimantic to Baltic route, which connected just beyond the bridge's north end with the company's Main Street trolley service. As a result of the increased congestion caused by the electric cars, some local citizens began a movement to substantially widen the South Main Street bridge, as it was known at that time. However, the construction of two long-deferred projects, the footbridge from the downtown to Pleasant Street, begun in 1906, and the sidewalk on the Bridge Street arch, started in 1907, may have

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<sup>1</sup>William L. Weaver, "Willimantic and Vicinity,"  
Willimantic Journal, June 5, 1863.

made the widening seem less urgent. It was defeated in a town meeting on October 24, 1907.

### Engineering Significance

The Windham Road Bridge typifies in all its aspects the vernacular art of stone-arch bridge construction. As was characteristic of the type, it was designed and built using locally available skills and materials. Although larger in scale, the bridge made use of the same traditional practices developed in the community for the construction of foundations, chimney stacks (some of the larger of which were supported on arches), dams, and mill races. By the time the Windham Road bridge was built, Willimantic had several large textile mills built of stone, as well as a number of stone houses for well-to-do residents.

The method of construction as traditionally undertaken required some sort of coffer dam to direct the flow of the river around the immediate site of the work. Since the bridge was built at the same time as the adjacent dam and mill, it is likely that this step was coordinated with the overall construction at the site. Next, a large wooden form or centering would be constructed, mimicking the shape of the finished arch. Ring stones would be set onto the planks of the centering using horse-powered derricks to lift the blocks. The spandrels would then be built up to contain the fill for the roadway laid across the top of the arch.

The stone, a hard granitic gneiss, was available at several locations in the vicinity, where it forms much of the local bedrock, most notably along the banks and the bed of the Willimantic River itself. Since the associated textile mill also under construction in 1857 is said to have made use of stone taken from the vicinity of the river, it is likely the bridge's stone came from there as well.

The person responsible for the general design of the Windham Road bridge was Whiting Hayden, a prominent local manufacturer. Although it is not possible at this time to know how detailed his plans were or how closely he supervised the stone masons, it is likely that Hayden provided the overall dimensions, general specifications, and a cost estimate in the document referred to in the town minutes as "the Plan . . . proposed by W. Hayden, Esq." The resolution

approving the bridge described it reasonably accurately as a "stone arch, 80 feet span," and the town was able to estimate the amount of money needed as an 8-cent tax on the grand list, or approximately \$3,200.

Whiting Hayden (1808-1886) was an influential Willimantic citizen with a background in textile manufacturing. Although not formally trained as an engineer, his experience building mills, dams, and raceways amply qualified him to lay out a stone arches such as those of the Windham Road Bridge. Born in Massachusetts, he moved with his family to Smithfield, Rhode Island, where his father was employed in the building the Blackstone Canal. Whiting Hayden participated in the construction and set-up of the Albion Mill in Smithfield, an enterprise in which, in 1834, he became partners with textile magnate George Morse. After a brief sojourn in Illinois, Hayden returned to New England and became superintendent of a textile mill in East Greenwich, Rhode Island. In 1843 he came to Willimantic to work for A. D. and J. D. Smith supervising their large cotton mill; Hayden became a partner in the Smiths' mill in 1846. He also supervised the construction of some of the early mills for the Willimantic Linen Company, as well as building a large commercial block in Willimantic's business district. He was an officer of the local savings bank. Active in the Republican Party (he served for a time as the region's State Senator), he was generally regarded as one of the wealthiest men in town.

The contractor for the bridge was Lyman Jordan (1817-1882), a local stone mason. Jordan was born in Coventry, Rhode Island and came to Willimantic with his parents in 1833. He first found work in a machine shop but then turned his hand to stone masonry. His obituary described his subsequent career:

Having a talent for the business, he became a proficient stone mason, and from this a large contractor and builder of stone work. . . . He has been an industrious worker, and probably no man in this section of the state has done so much masonry work for the manufacturers.

In addition to his work for the textile mills, Jordan went on to build at least two more stone-arch bridges for the town of Windham, including the 1868 span, 80 feet in length, that carries Bridge Street over the Willimantic River about three-quarters of a mile upstream from the Windham Road Bridge.

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In his reminiscences of 1893, local historian (and building contractor) Lloyd E. Baldwin gave Jordan sole credit for building the bridge; however, Jordan's obituary noted that he built it in company with Nathaniel Olin. Olin (1819-1893) was a stone mason from Plainfield, another Windham County town with a number of mill villages. Sometimes referred to as Nason Olin or Captain Olin, he was the chief masonry contractor for the Willimantic Linen Company's Mill No. 1, so it is hardly surprising that he played a role in the construction of the adjacent bridge. Olin and Jordan apparently continued their association, since the following year they purchased some property together.<sup>2</sup> Olin also did the stone work for the linen company's Mill No. 2 (1864), and he constructed at least one other stone bridge, an 1886 granite arch in Packerville, a small mill village on the Canterbury-Plainfield town line.

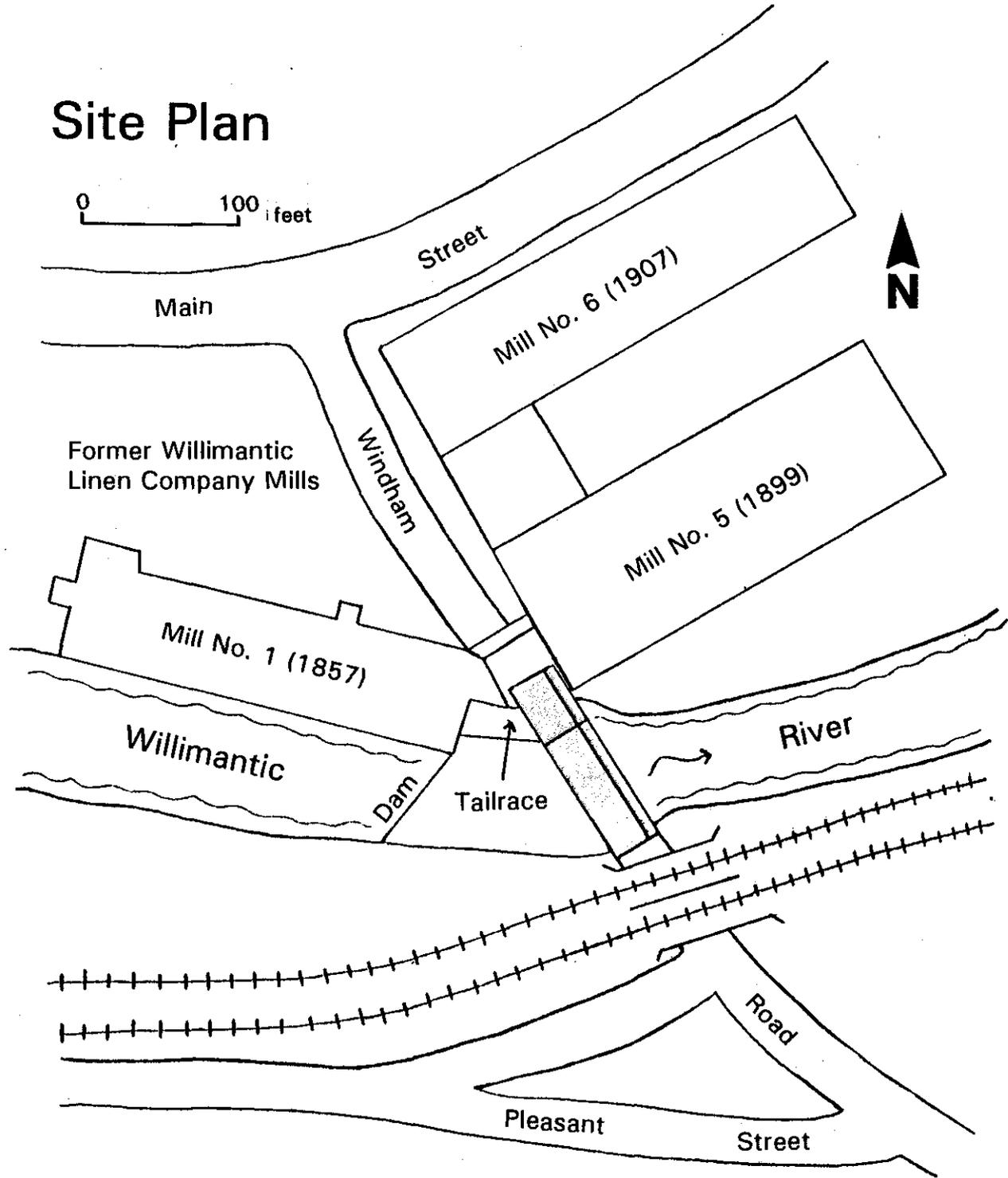
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<sup>2</sup>Windham Land Records, Vol. 41, page 412.

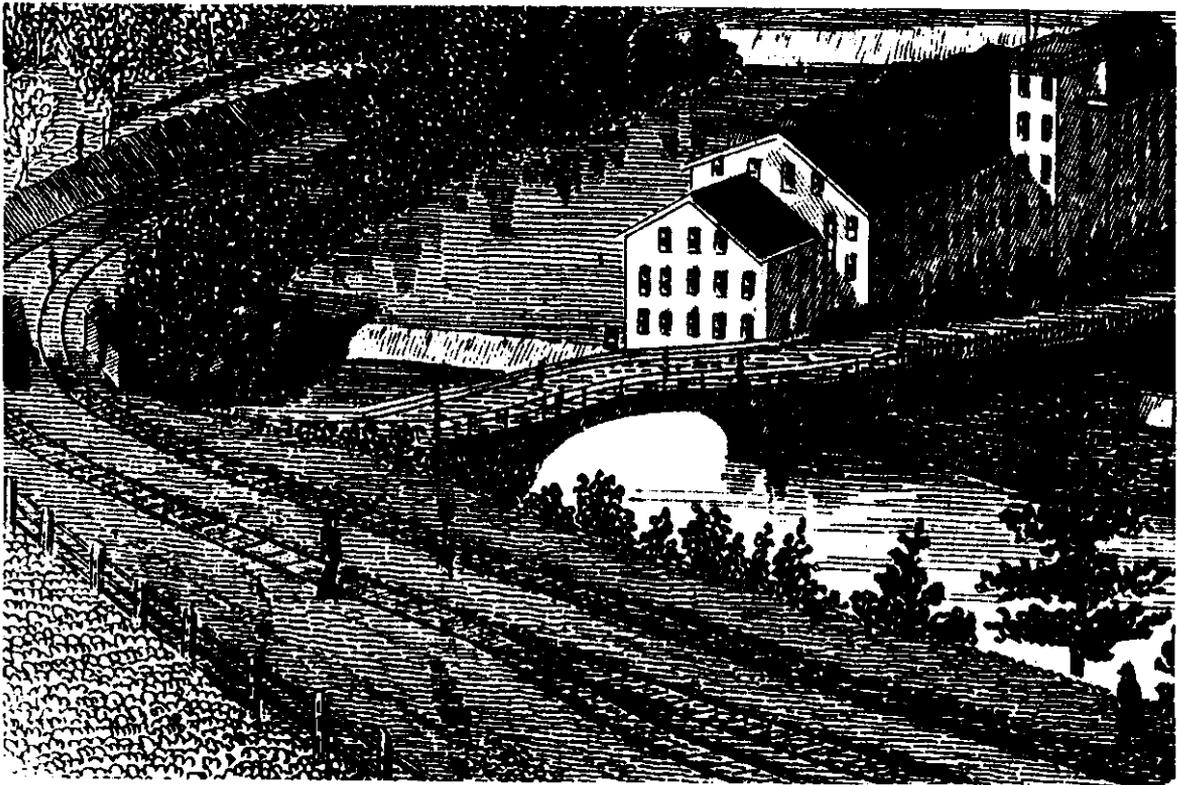
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# Site Plan



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Steel engraving of bridge, 1879, from Van Slyck,  
Representatives of New England: Manufacturers, Vol. 2,  
p. 553.