COCHITUATE AQUEDUCT, LAKE COCHITUATE GATEHOUSE
(Inlet Gatehouse on Lake Cochituate)
Water Supply System of Metropolitan Boston
Lake Cochituate State Park
Natick
Middlesex County
Massachusetts

HAER MA-174
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

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(Inlet Gatehouse on Lake Cochituate)

HAER No. MA-174

Location: Lake Cochituate State Park, Natick, Middlesex County, Massachusetts.

The coordinates for the Cochituate Aqueduct, Inlet Gatehouse are -71.372015 W and 42.314820 N, and they were obtained through Google Maps in August 2013 with, it is assumed, NAD 1983. There is no restriction on the release of the locational data to the public.

Significance: The Inlet Gatehouse of the Cochituate Aqueduct is one of three major above-ground components of the aqueduct, features that also include the Lower or Principal Gatehouse in Brookline and the bridge over the Charles River. As part of the Boston's first public waterworks and only the second municipal system constructed in the United States, the Inlet Gatehouse is an important part of an engineering feat that married grandeur and public good to create a "visual utility" or "urban democracy" in the words of historian Carl Smith.[1] Both gatehouses embraced classical architectural tenets and quality materials that lent the buildings solidarity in form and bespoke of civic solidarity or commitment to the people of Boston. The Inlet Gatehouse has wrought iron trusses and originally was covered in a tin roof. With the Lower or Principal Gatehouse in Brookline, the Inlet Gatehouse on Lake Cochituate attests to the early use of wrought iron in a structural capacity and the survival of the trusses provides vital evidence in the trajectory of architectural and engineering history.

The Brookline Reservoir Gatehouse has twenty-one wrought iron trusses, likely prefabricated and most certainly produced in an industrialized or standardized fashion given their uniformity and the absence of connection details. The upper and lower chords of each truss are riveted, and the ends rest on the granite walls, instead of an intermediary plate. Tie beams hold the trusses in place in relation to each other and together the truss system supports the wrought iron plate roof. Clips to fasten the top chord to the plate roof are present, but not systematically placed which suggests they may not be original. In contrast, the wrought iron trusses of the Lake Cochiutate Gatehouse support a hip roof that was covered with a wood roof deck covered in turn by tin surface. The hip roof structure dictated three Howe truss forms be used, with two hip trusses to either end. The wrought iron trusses and rafters joined a wall plate. These trusses have "blacksmithed" connection details, such as mortise and tenons and hooks, and each varies in cross section. Because there are fewer trusses upholding the roof, the cross sections are greater than those seen in Brookline and the framing members are more

[1] Carl Smith, *City Water, City Life: Water and the Infrastructure of Ideas Urbanizing Philadelphia, Boston and Chicago* (Chicago: University of Chicago Press, 2013).

substantial. The wrought iron trusses of the gatehouses, therefore, represent a transition in the engineering that shifted from a more craftsman or carpentry assembly to a prefabricated and self-contained truss form secured by rivets. Specifications for wrought iron trusses were fulfilled through evolving construction and manufacturing techniques and this shift punctuated the Cochituate Aqueduct.

Both gatehouses were constructed in the 1847 to 1848 period, under the direction of the engineer Ellis Sylvester Chesbrough. John Bloomfield Jervis oversaw the plan for the Cochituate Aqueduct, consulting on the Boston project and drawing on his experience building New York's Croton Aqueduct and his work with the Erie Canal, but Chesbrough engineered and built the western portions of the aqueduct. Chesbrough's counterpart for the eastern section was William Whitwell.

Date: 1847-48.

Description: The one-story, hip roofed Inlet Gatehouse measures approximately 30' x 40'. It has three bays in the north and south side elevations, with the entrance into the building from the center bay of the south wall. The inner lining of bricks was partially removed from the north wall, and evidence of fire is present at the east end. The west elevation faces the lake and water entered the aqueduct system through two gates; these gates and stop planks controlled water levels in the chambers that fed the aqueduct. It is probable that hoists attached to the trusses lifted and lowered the stop planks as needed. The aqueduct tunnel is about 5' in diameter. The exterior walls are made of granite, like that seen on the Lower or Principal Gatehouse in Brookline, and the fenestration marked by subtly drawn voussoirs. The interior is primarily an open space dominated by the railing along the perimeter of the stairway of stone steps leading to the lower or water intake level of the building. The railing likely matched that in the Brookline Gatehouse, although Brookline's railing is no longer extant, and it is similar to the balustrade of the cast-iron stairs in Brookline as well. The dedication plaques are affixed to the east wall, to either side of the open well.

In 1859 the depth of Lake Cochituate was increased and the Inlet Gatehouse was rebuilt about four to eight feet higher. The dismantling and reconstruction of the gatehouse cost around $19,000, and accounts leave no record regarding the wrought iron trusses. It is likely the trusses were removed and reinstalled rather than replaced at this time. No physical evidence suggests otherwise. In 1903 improvements were made to the Cochituate Aqueduct, including some work on the Inlet Gatehouse. Drawings made at the time reference the presence of sistered

wood beams that carried the compression loads. It is possible the tie beams seen today were added at this time.

The tin roof blew off in a storm and was replaced in 1915. Likely this was the roof installed in 1859.

History: The Cochituate Aqueduct stretches for fifteen miles from Lake Cochituate in Natick to the reservoir in Brookline, and three above-ground features define its path: the Inlet Gatehouse on the lake, the bridge across the Charles River, and the Lower or Principal Gatehouse on the Brookline Reservoir. A gravity-fed system, the aqueduct relied on the difference in grade from the originating lake and the various distribution reservoirs in the city of Boston. Inverted siphons and pressure-containing iron pipes carried the water over the Charles River. The gradual change was about three and one-half inches per mile and the water primarily flowed through various tunnels and under-ground conduits. The scale of the tunnels allowed for maintenance inspections by boat and permitted the flow of ten million gallons of water a day. The Brookline Reservoir was also planned as a settling basin and held a two-week reserve of water in the event the aqueduct had to be closed. Engineers broke ground for the aqueduct in October 1846 and two years later the city of Boston held its "grand water celebration" on the Common.

Despite the monumental accomplishment of the Cochituate Aqueduct as a public work and the commitment to public good it signified, the needs of the city soon demanded further improvements and so the waterworks system was expanded. The dam at Lake Cochituate was raised in 1859, and this prompted the disassembly and rebuilding of the Inlet Gatehouse some four to eight feet higher. In 1870 a larger reservoir on Chestnut Hill came on-line, and its basins flanked the Cochituate Aqueduct. Water from the Cochituate flowed into the Chestnut Hill reservoir, as well as waters from other sources, and soon a line was added to connect Chestnut Hill directly to the three pipes fed by the Brookline Reservoir (and seen in the Lower or Principal Gatehouse bulkhead chamber). Once this water main was complete, the Brookline Reservoir was bypassed. It remains as a back-up water source. By the century's end the Metropolitan Water Works and Sewerage Board acquired elements of the Boston water system outside the city limits and in 1903 the city of Boston sold the Brookline section of the Cochituate Aqueduct and the Brookline Reservoir to the town of Brookline for $150,000. The entire Cochituate Aqueduct cost $1,720,000 to build in 1848, and in 1903, the Brookline component became a park. The fence erected around the reservoir initially was removed.

In 1947 Cochituate State Park was established and the park's boundaries included the lake and Inlet Gatehouse. Today the Lake Cochituate Gatehouse is part of the

state park system and is under the purview of the Massachusetts Department of Conservation and Recreation. It is not open to the public.

Historian: Lori Ferriss, 2009, with Virginia B. Price, 2013.

Project Information: This short-form historical report was adapted from a larger study undertaken by Lori Ferriss for her thesis, "Preservation of Early Wrought Iron Trusses: The 1848 Roof of the Cochituate Gatehouse," B.S. in Art and Design, Massachusetts Institute of Technology, 2009, and is intended to offer a summary of the structure and underscore its significance to the Cochituate Aqueduct and the Metropolitan Waterworks System overall. In time, a complete study of the waterworks system should be mapped and recorded for the HABS/HAER/HALS collection.
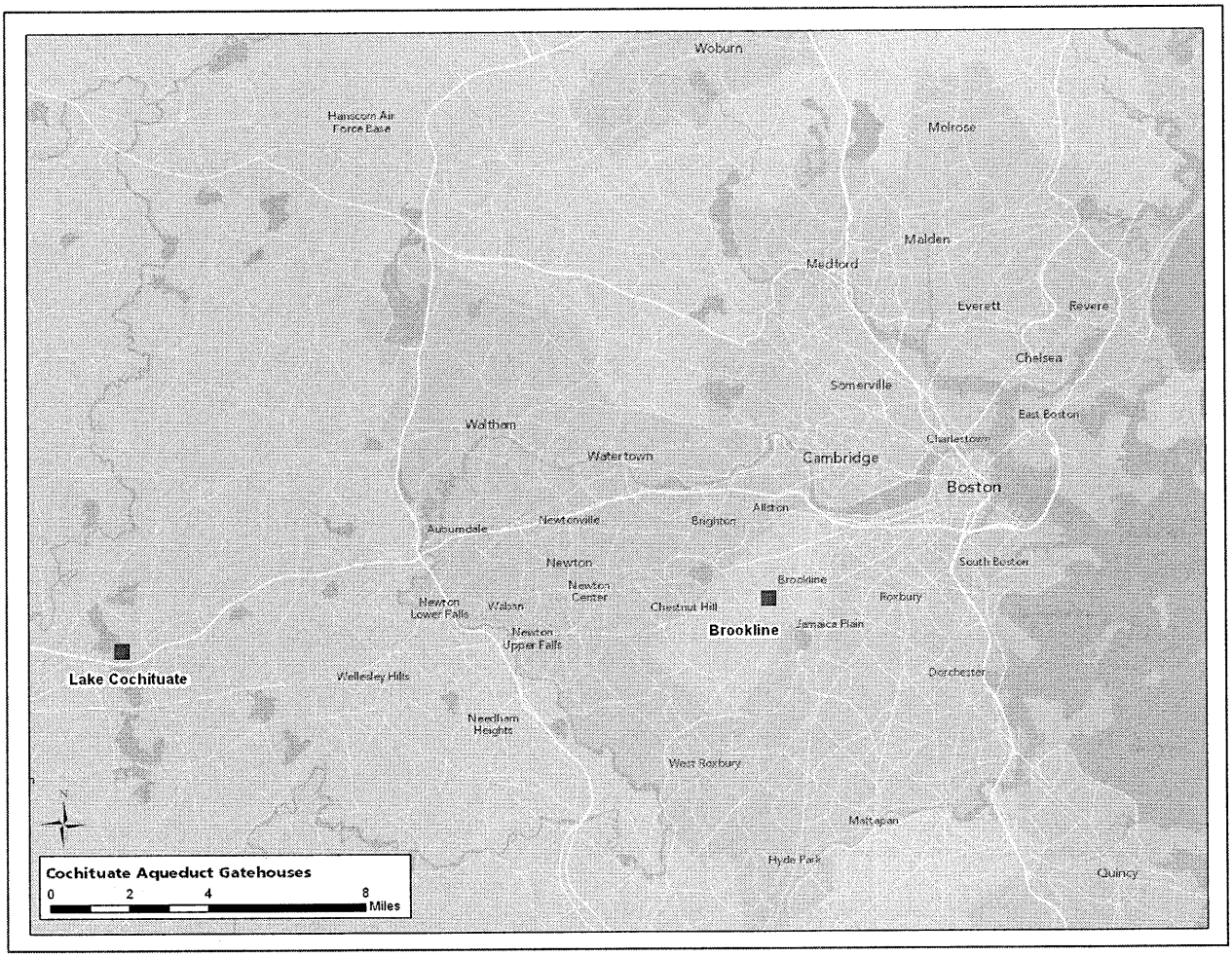
Figure 1. Area map to show the Cochituate Aqueduct and the upper and lower (principal) gatehouses. Map courtesy of Matthew Stutts, CRGIS, 2013.