HISTORIC AMERICAN ENGINEERING RECORD

LAKE ROLAND DAM HAER No. MD-81

Location: Spanning the outlet of Lake Roland adjacent to Woodbridge Road, located 0.48 mile north of the northern Baltimore City boundary, Towson Vicinity, Baltimore County, Maryland

UTM: 18.0358420.4359820
Quad: Cockeysville, Maryland

Date of Construction: 1858-1861. Abandoned 1915.

Architect: James Slade
Engineer: Charles P. Manning
Builder: Crowley Hoblitzell and Co.

Present Owner: Baltimore City
Department of Recreation and Parks
2600 Madison Avenue
Baltimore, MD 21217

Present Use: Vacant

Significance: The Lake Roland Water Supply Project was the first attempt by the City of Baltimore to establish a city-wide water supply system. The dam, spillway and gatehouse are the surviving elements of the system which provided a supply of water to the city from 1861 to 1915. The Lake Roland Water Supply Project is significant as one of the first municipal waterworks in the State of Maryland and as one of the first sites in the United States used for testing hypochlorite water treatment processes.

Project Information: This documentation was undertaken in August, 1991 in accordance with a scope of work by MAAR Associates, Inc. of Newark, Delaware, for Allied Contractors, Inc. of Baltimore, Maryland as a mitigation measure prior to the initiation of the Lake Roland Dam and Gatehouse Renovation Project.

Ronald A. Thomas
Principal Investigator
MAAR Associates, Inc.
P. O. Box 655
Newark, Delaware 19715-0655

The Lake Roland Water Supply System was built in response to Baltimore's need for increased water supply during the city's population expansion of the 1850s. The water supply system utilized watercourses along Jones Falls purchased from the privately-owned Baltimore Water Co., which supplied water to city residents from 1804 to 1854. The Baltimore City political leaders chose James Slade of Hartford, Connecticut to design the water supply system. In 1857, the city purchased the right-of-ways for $289,000 and abandoned any alternative proposals (McGrain 1979:253-256).

In the summer and autumn of 1857, a comprehensive survey of the water system corridor was conducted by Mr. Wampler, a surveyor contracted by James Slade. Actual construction began in 1858 under the supervision of Charles P. Manning. The project consisted of seven primary components: Lake Roland, Lake Roland Dam, the conduit from Lake Roland to Hampden Reservoir, Hampden Reservoir, the pipeline from Hampden to Mount Royal Reservoir, Mount Royal Reservoir, and the network of distribution mains from each reservoir (McGrain 1979:253-254). The dam and the lake were available for use in 1860, although they were not finally completed until 1861; the conduit from the dam to Hampden Reservoir was finished by January 1, 1860. The cost of the excavation of the lake was $112,752.55, and the cost of the dam construction was $152,190.65 (McGrain 1979:256).

The core of the dam was built of heavy rubble stone taken from "the rough gigantic stone of the neighboring hillsides." Its outer facing was of regularly coursed, rough-cut stone blocks. A one hundred twenty-five foot waterway provided the overflow at the top of the dam, which was forty feet high from base to crest. Wing walls, enclosed in earth embankments, rose six feet above the top of the dam. The dam's spillway surfaces were inclined, and its rear wall was perpendicular. The stone mass of the dam was 60 feet thick from the back of the dam to the front of its base. The waste flume and the gate chambers, which were lined with Texas (MD) limestone, were below the crest of the dam. At overflow conditions, the water surface stood 225 feet above mean tide at Baltimore. The dam was completed by August 1861 (McGrain 1979:254-255).

The gatehouse controlled the seven gates built into the dam. Engineer Charles P. Manning described this flow control system in 1862:

> The gate chambers consist of two distinct apartments, the floors of which are at the respective heights of 201 and 210 feet above tide - or respectively 24 and 15 feet below the crest of the dam, and the usual surface of the lake. The lower chamber is provided with gates which regulate the discharge of water through the waste flume, and by means of which the lake can be drained to the bottom. The higher chamber is provided with gates by which the flow of water into the conduit is regulated; and another gate for occasional use, when a connection between the waste and conduit chambers may be needed. The gate chambers are

> enclosed by a substantial stone house, upon the floor of which are placed screw stands of the several gates. All the masonry of the dam was carefully laid in full beds of fresh hydraulic cement mortar, and where necessary, thoroughly grouted with the same material (McGrain 1979:255).

Further details regarding the Lake Roland gatehouse can be found in documentation entitled HAER No. MD-81-A.

Another component of the construction of the water supply system was the purchase and excavation of the fifty acres of land that would become Lake Roland. The area had little agricultural value, and excavation of the Jones Falls ravine provided a basin able to contain 500 million gallons of water. However, the engineer, James Slade, never considered the potential problems of siltation and soil erosion, which eventually caused the system to fail (McGrain 1979:256).

The Lake Roland Water Supply System was supplying the City of Baltimore with water by 1862; but within two years, it was recognized as insufficient to fulfill the city's needs. Siltation and the inflow of waste led to pollution of the water, causing city-wide outbreaks of typhoid fever in the 1860s. The city implemented a series of stopgap measures, including the construction of the Rogers Reservoir at Druid Hill Park, of an earth-fill dam across Druid Lake, and of a temporary pumping station at Meredith's Ford (McGrain 1979:257).

The problem of pollution flowing into Lake Roland continued into the 1870s and included the waste water and products from a slaughter-house built near the lake. During the remaining years of the operation of the water supply system, the city was forced to expend funds annually to clean the silt and refuse from the lake and the conduits (McGrain 1979:259).

Physical improvements to the Lake Roland Reservoir made between 1861 and 1915 included the construction of a wood panel fence around Lake Roland (1861), the addition or replacement of rip-rap around the lake (1862, 1879, and 1902), the construction of a tree-lined road to allow visitor access to the lake (1862), and the additions of a boat house, ornate cast-iron bridge, and hay barracks around the lake for use by these visitors (McGrain 1979:259).

A new and larger dam was constructed at Lock Raven in 1914, and use of the Lake Roland Water Supply System was discontinued on November 19, 1915. The Lake Roland system was briefly brought back into use on December 2 as the result of a leak in the new system, but ceased to function after that date. Beginning in 1916, some parcels of land around Lake Roland were sold to the L'Hirondelle Club, the rest eventually

coming under the domain of the City Department of Recreation and Parks. Lake Roland continued to experience siltation, so that by 1952, ten feet of silt were recorded. Other problems included the formation of large shallow flats where mosquitos bred, and erosion from the adjacent Baltimore Beltway (I-695) and the Jones Falls Expressway. By 1978, the city of Baltimore decided to abandon any future attempts at dredging the lake, and to allow it to continue to fill with silt (McGrain 1979:271).

The Lake Roland Water Supply System was the first municipal water supply system to be built in the City of Baltimore, as well as one of the first municipal waterworks constructed in the State of Maryland. Incorporating the watercourses owned and operated from 1804 to 1854 by the privately-owned Baltimore Water Company, the Lake Roland Water Supply System was neither the city's first public water supply system nor one of the nation's earliest municipal waterworks. A municipal water system consisting of a well from which water was pumped to fill a reservoir and then distributed through wooden pipes was constructed in New York City as early as 1774. Known as the New York Water Works, the system was utilized until the British occupation of the city in 1776 (Draffin 1939:154-155). In 1799, Philadelphia's city fathers participated in the decision-making process surrounding the construction of the Fairmont Waterworks; and in 1839, the City of Cincinnati purchased the Cincinnati Water Company and assumed responsibility for that city's water supply system (Draffin 1939:151-152). The first municipal waterworks in the State of Maryland was built by the City of Frederick in 1845 (Wasch 1990:220-222).

While the construction of the Lake Roland system does not represent a milestone in terms of technological innovation or municipal provision of a public water supply, it is significant as one of the first sites in the United States at which the large-scale purification of water with liquid chlorine was tested. During the nineteenth century, concern about the purity of city water led to the use and development first of filters, which removed particles and sediment, and then of chlorine (Draffin 1939:72-74). The first documented use of filters to improve water quality and remove particles and sediment from public water supply systems occurred in Britain and dates to the 1820s (Draffin 1939:72). Large-scale use of chlorine first occurred in England in 1904-1905 when Sir Alexander Houston utilized hypochlorite (bleaching powder) to purify London's water supply (Draffin 1939:74-75). Large-scale hypochlorite testing using powdered chlorine bleach was conducted in the United States by Col. George A. Johnson and Dr. J. L. Leal for the Jersey City Water Company between 1908 and 1910. The first use of liquid chlorine in the United States occurred in 1910 at the Jersey City Water Company's Boonton plant. In 1911, a chlorinating system consisting of a mixing machine, which utilized countershafts to connect belts to an engine, was installed in the Lake Roland gatehouse. Known thereafter as a hypochlorite plant, the Lake Roland waterworks was

one of two sites (the Western New York Water Company's Niagra Falls plant was the other) used for large-scale testing of the application of liquid chlorine to a public water supply system. Experiments conducted at the plant documented the merit of utilizing liquid chlorine and led to its widespread use in public water supply systems in the United States both before and after filtration (Draffin 1939:74-75).

Bibliography

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