

NEW YORK, WEST SHORE & BUFFALO RAILROAD, WEEHAWKEN TUNNEL
(West Shore Railroad, Weehawken Tunnel)
Weehawken
Hudson County
New Jersey

HAER No. NJ-109-A

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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

HISTORIC AMERICAN ENGINEERING RECORD

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Location: Weehawken, Hudson County, New Jersey.

UTM: West Portal 18.582030.4515151
East Portal 18.583273.4514333
Quad: Weehawken, New Jersey 1:24000

Date of Construction: 1881-1883

Engineer: Walter Katte, Chief Engineer, New York, West Shore & Buffalo Railroad

Present Owner: Consolidated Rail Corporation (Conrail)
2 Commerce Square, P.O. Box 41411
2001 Market Street
Philadelphia, PA 19101

Present Use: Railroad tunnel

Significance: The New York, West Shore & Buffalo Railroad Weehawken Tunnel is significant in the development of freight and passenger rail service in New York Harbor in the late nineteenth and early twentieth centuries by allowing rail access through the Palisades Sill to the Hudson River. Construction of the tunnel afforded direct access to New York Harbor during a period of intense expansion and competition among regional railroads.

Project Information: This documentation has been submitted as per the Memorandum of Agreement among the Federal Transit Administration, New Jersey State Historic Preservation Office, the Advisory Council on Historic Preservation and New Jersey Transit (NJ TRANSIT) for the Hudson-Bergen Light Rail Transit System (HBLRTS). The HBLRTS will alter the tunnel, its portals and the ventilation tower.

On February 28, 1991, the New Jersey State Historic Preservation Office issued the opinion that the West Shore Railroad Tunnel was eligible for inclusion in the National Register of Historic Places.

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DESCRIPTION

The Weehawken Tunnel was built by the New York West Shore and Buffalo Railroad (NYWS&B) from 1881-1883 to provide a rail connection from west of the Palisades to the Hudson River waterfront where the NYWS&B had constructed Weehawken Terminal, a freight and passenger terminal. The tunnel passes through the Palisades Sill, a steep prominent east-facing ridge along the west shore of the Hudson River extending from Haverstraw, New York, to Jersey City, New Jersey.

The Weehawken Tunnel extends 4,014 feet from its western portal in North Bergen Township, Hudson County, New Jersey, to its eastern portal near the Hudson River in the Township of Weehawken, Hudson County, New Jersey. The western approach and portal are adjacent to the northern boundary of Grove Church Cemetery, approximately 600 feet west of the North Bergen Township-Union City boundary. The tunnel extends beneath 48th Street in Union City. The eastern portal is located at the base of the Weehawken cliffs adjacent to the Hudson River.

Constructed to accommodate two tracks, the tunnel has a semi-elliptical arched roof with nearly vertical walls; it is 27 feet wide and 21 feet high, or 19 feet from the top of the rail to the center of the roof arch. The distance between the centerlines of the two tracks was 13 feet; a single Conrail track now occupies the tunnel.

The western approach to the tunnel, 2,700 feet in length, makes a broad sweep east before leading to a false portal structure constructed of steel plates and reinforced concrete. The 50-foot-long false portal, built in 1911-1912 to house ventilation fans and motor houses on north and south sides of the approach, obscures the original western tunnel portal. The original portal, approximately 45 feet high, is constructed of ashlar masonry with a projecting course at the spring line of the tunnel arch, a keystone and stone coping.

The eastern portal, trumpet-shaped to accommodate curved tracks that diverge along the waterfront, is a false portal; the tunnel widens approximately 100 feet from its mouth. The eastern false portal, approximately 163 feet long, is a reinforced concrete structure with open triple arches along the northern sidewall. The southern sidewall abuts the rockface of the cliff that was cut for the southern approach to the eastern tunnel portal. The eastern false portal was extended and strengthened between late 1907 and early 1908; the date "1908" is cast in the concrete surface above the arched portal opening.

The majority of the Weehawken Tunnel is constructed in the rock of the Palisades Diabase. For approximately three-quarters of its length, the tunnel is unlined and the natural rock is exposed. Eight sections of the tunnel are lined with brick masonry. The sections, varying in length from 18 feet to 357 feet, total approximately one-quarter of the tunnel length. The lining, two-foot-thick masonry set in Portland cement, is constructed in brick arches with ashlar stone masonry sidewalls; excavated stone from the tunnel is used for the sidewalls. One area of the tunnel, approximately 1,000 feet from the western portal, is supported by nine timber sets. These consist

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of supporting arches constructed of heavy timber beams that rest on pockets drilled in the tunnel walls or on timber posts; brick-work is constructed over the arches. Additional timbers running perpendicular to the arches provide added support for the tunnel roof. This area of brick and timber lining supports sandstone rock formations near the western portal.

Deterioration of the tunnel required supplemental bracing of the tunnel ceiling in 1952. Alterations consisted of the installation of arched ribs that followed the curved profile of the tunnel ceiling; three-foot-long steel liner plates were bolted to the ribs. Holes provided in the steel plates were used for forced grouting of the void between the tunnel walls and the liner plates.

Brick-lined zones are present at four of the five locations where construction shafts were sunk during tunnel construction. The shafts, spaced at approximately 845 feet along the axis of the tunnel, were used to remove excavated rock and debris and transport workers and machinery to and from the tunnel during construction. The brick zones are positioned to conceal all but one of the original five shafts; the shaft not concealed is surmounted by a brick ventilation tower. There is currently no evidence of the four abandoned shafts at ground level.

The Ventilation Tower for the Weehawken Tunnel is located approximately 600 feet east of Bergenline Avenue, between 316 and 318 48th Street, Union City, Hudson County, New Jersey. The tower is located at the northern terminus of New York Avenue near the western end of an urban residential block characterized by closely-spaced single-family townhouses. The tower straddles the rear yards of two three-story houses. The dwellings almost entirely block views of the tower from the street; a shared driveway between 316 and 318 48th Street provides the only full view of the tower.

The Ventilation Tower was built above construction Shaft #3, the central shaft of the five construction shafts, and the only shaft that remains open. The ventilation shaft is capped by a 55-foot-high octagonal red brick tower; each face of the tower is approximately nine feet six inches wide. The brick is laid in American common bond with two rectangular recessed blind brick panels arranged vertically on each face of the tower; the lower panels reach the ground. A flush plywood door with a padlock is located on the northeast face. The tower has a cornice of projecting brick courses and cast stone coping above a simple entablature composed of three courses of projecting brick.

SIGNIFICANCE OF THE WEEHAWKEN TUNNEL

The New York, West Shore & Buffalo Railroad (NYWS&B) was built from 1880-1883 from New York to Buffalo. The Railroad's New York Harbor terminal, one of the busiest and largest rail terminals in the region, was in Weehawken. The major engineering feat of the short-lived NYWS&B was the construction of the 4,014-foot long tunnel through the Palisades to afford direct rail access to their new waterfront terminal at Weehawken. The Weehawken Tunnel was

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constructed in 1881-1883 as a joint venture of the New York, West Shore and Buffalo Railroad (NYWS&B) and the New York Ontario and Western Railway (NYO&W). The tunnel provided a vital link for freight and passenger traffic bound to and from New York Harbor.

In early 1880, the NYWS&B was formed to provide direct competition with the New York Central Railroad (NYC). The NYWS&B route paralleled the NYC from New York Harbor to Buffalo, New York, traveling along the Hudson and Mohawk Rivers in New York State, through Utica and Syracuse to Buffalo.

The NYWS&B received financial backing from General Horace Porter, Vice-President of the Pullman Sleeping Car Company, and several individuals associated with the Pennsylvania Railroad, the chief competitor of the NYC. William H. Vanderbilt, owner of the NYC, believed that the NYWS&B was organized to cripple the NYC either by cutting into the NYC business or forcing it to buy out the NYWS&B. Vanderbilt had prohibited Pullman Sleeping Cars from NYC tracks, replacing them with Wagner Sleeping Cars; the NYC held an interest in a company that built Wagner cars. Therefore, Vanderbilt suspected revenge was the motive behind the formation of a rival railroad that virtually duplicated the NYC route.

Porter also served as director of the North River Railroad Company, a railroad organized simultaneously with the NYWS&B. In late 1880, the NYWS&B conveyed its right-of-way between Weehawken, New Jersey, and Cornwall, New York, to the North River Railroad. The NYO&W, with whom the NYWS&B had formed a joint venture, was to meet the NYWS&B at Cornwall. The North River Railroad agreed to build and equip the line and give the NYWS&B trackage rights. North of Cornwall, the line was to be built by the North River Construction Company, another new company organized under the same financial control. In mid-1881, the NYWS&B absorbed the North River Railroad and the NYWS&B was re-organized with General Porter as president.

Construction of the NYWS&B began in 1881. The Railroad, which had acquired an established ferry route between Weehawken, New Jersey, and 42nd Street in Manhattan, located its yards and passenger and freight terminals on the Hudson River at the foot of the Weehawken cliffs. From the riverfront terminal, the NYWS&B needed to build a tunnel through Bergen Hill, as the Palisades Ridge is called at that point, to reach the their right-of-way west of the hill.

The Weehawken Tunnel was designed and constructed under the supervision of NYWS&B Chief Engineer Walter Katte (1830-1917). Born in England and trained in civil engineering, Katte emigrated to the United States in 1849. His career included service as Resident Engineer for the Pennsylvania state canals and as engineer and general Western agent for the Keystone Bridge Company, located in Pittsburgh, Pennsylvania; Katte superintended the erection of the St. Louis Steel Arch Bridge for Keystone. Later, Katte served as chief engineer for the New York Elevated Railway Company (1877-1880), the New York, West Shore & Buffalo Railroad (1880-1886), and the New York Central's New York & Harlem, and West Shore Railroads (1886-1899) until

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his retirement in 1899. In addition to the St. Louis Steel Arch Bridge and Weehawken Tunnel, Katte was responsible for the construction of the New York Central & Hudson River Railroad Park Avenue Viaduct in New York City.

Construction of the Weehawken Tunnel began in early 1881; excavations were conducted simultaneously from the east and west ends and in both directions from five construction shafts. The shafts, eight feet by sixteen feet in cross-section, were sunk at roughly equal intervals along the tunnel route from the top of the hill to the grade line of the tunnel. At a depth of 160 feet, Shaft #3 was the deepest. Excavation was performed by placing charges of high explosive with electric fuses in depressions formed with Rand drills; the tunnel was evacuated when the charges were exploded. Material loosened by the explosions were placed on rail cars that ran on two tracks in excavated sections of the tunnel; loaded cars were pushed to the bottom of the shaft. The car was raised to the surface on paired counterbalancing platforms by hoisting machinery and removed by locomotive on a temporary rail line built for the duration of tunnel construction. The temporary line was built parallel to the tunnel route on the summit of the hill with side tracks at each shaft. The work force for the tunnel consisted of an average of 450 men working in two shifts of twelve hours; an additional 200 worked on the western approach.

Excavated material from the tunnel was used both for the railroad's purposes and for souvenir hunters. As described in an article in the June 17, 1882, issue of *Engineering News*, three Blake crushers were located at the western end of the hill; crushed rock was sometimes used as fill during construction or stock-piled for later use as ballast. Excavated material from the section of the Tunnel surrounding Shafts #1 and #2 contained a proliferation of mineral treasures that caught the attention of collectors of zeolites. Most of the usual minerals of this class were obtainable from this area. Between Shafts #1 and #2, large portions of rock were coated with Natrolite, a highly prized mineral that appeared in great abundance in Weehawken. Weehawken also claims the distinction of the first pink apophyllite that was discovered in the United States.

When completed in 1883, the NYWS&B extended from New York Harbor to Buffalo. The rail line extended from the dock facilities and passenger terminal at Weehawken, New Jersey, through the Weehawken Tunnel to the Ridgefield right-of-way in North Bergen. From there, the NYWS&B ran north through a long valley until just south of Haverstraw, New York, where it tunneled through the Palisades ridge again to emerge on the west shore of the Hudson River. The railroad continued to travel north along the edge of the river until it reached a point between Newburgh and Kingston, New York, where it turned slightly west and continued north on an alignment one to two miles west of the river; it veered northwest just south of Albany, New York, to by-pass the state capital. The line turned toward Schenectady, then followed a Mohawk Valley right-of-way on the south bank of the Mohawk River, passing through Utica and Syracuse and south of Rochester on its way to Buffalo and the shore of Lake Erie.

The NYWS&B began passenger service between Jersey City, New Jersey, and Newburgh, New York, in June 1883, rapidly expanding service to Kingston and via an associated line to Albany.

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The NYWS&B used the Jersey City rail station and ferry terminal owned by the Pennsylvania Railroad on a temporary basis while the Weehawken passenger terminal was under construction.

The first freight to travel on NYWS&B track consisted of dairy products and hops shipped from the NYO&W at their connection with the NYWS&B at Cornwall, New York. Although the NYWS&B's primary function was the transport of freight to and from Weehawken Terminal, it also served as a commuter railroad for some of the towns along the west shore of the Hudson River in New Jersey and New York. Under the NYSW&B, Weehawken Terminal began to develop into a major waterfront terminal; the NYWS&B, largely superfluous as other railroads followed much of its route, was the only road to the Weehawken waterfront due to its construction of the Weehawken Tunnel.

The NYWS&B had grand designs for Weehawken Terminal; extensive dock facilities, designed to accommodate both passenger and freight traffic, was to have included twelve piers separated by deep water slips. Tracks from the tunnel were to have led to each pier. South of the piers was the passenger station and ferry terminal; a round-house was to be located south of station. The Weehawken passenger terminal was completed, but only one or two of the many large piers originally planned were actually built by the NYWS&B. Foundations were laid for a grain elevator, fill was brought in for the yard and some yard tracks were completed, but the NYWS&B never realized their full plans for Weehawken Terminal.

In 1884, the NYWS&B experienced serious financial difficulties and fell into receivership. The NYO&W, partner of the NYWS&B, had declared bankruptcy in January, burdening the NYWS&B's already strained finances, and an ensuing rate war among the railroads completely crippled the NYWS&B. In 1885, following the intervention of J. Pierpont Morgan, the failing NYWS&B was sold at foreclosure. The railroad was immediately re-organized as the West Shore Railroad Company, wholly owned by the NYC, and thereafter generally known as the West Shore, or River Division of the New York Central.

In the first few years after the West Shore was taken over by the New York Central, only light freight service ran on the line; passenger service continued, including some long-distance trains to Albany and commuter service as far as Haverstraw. The NYC completed and used the grain elevator the NYWS&B had started at Weehawken.

At the turn of the century, freight traffic east of the Hudson River had increased to such an extent that the NYC's freight line and yards in Manhattan were very congested. Freight yards could not be expanded due to the high cost of waterfront land. Therefore, the Central devised an alternative strategy: in 1900, a direct connection between the NYC original main line, east of the Hudson and the West Shore on the west side of the Hudson, was built at Hoffman's Bridge, 26 miles west of Albany. Large quantities of New York-bound freight were then diverted at Hoffman's Bridge to the West Shore and thence to Weehawken Terminal, where it was transferred to lighters or carfloats for delivery around New York Harbor.

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Due to the increase in freight traffic, the NYC completed the Weehawken Freight Terminal complex according to the original plans of the NYWS&B. Within a few years, a dozen piers were completed, a second grain elevator constructed and the freight yard expanded. After 1900, Weehawken Terminal developed into NYC's major New York outlet for export freight, with facilities that included passenger, ferry and freight terminals, a locomotive roundhouse and turntable, railroad and marine repair shops, and an icehouse - all serving twelve freight piers that occupied over a mile of Hudson River waterfront. The eastern false portal was extended and strengthened between late 1907 and early 1908; steel fabrication was provided by Belmont Iron Works, Philadelphia, Pennsylvania.

Most of the suburban trains terminated at West Haverstraw, New York with several trains each day that continued to Newburgh and Cornwall on the Hudson River. This area, from Stony Point to Highland, including Bear Mountain, was popular for weekend rail excursions. The core of the suburban service for the West Shore Railroad was for New Jersey towns in Bergen County such as Little Ferry, Ridgefield Park and Teaneck, and the New York towns of Rockland County such as Orangeburgh, Blauvelt, West Nyack, Valley Cottage, Congers and Haverstraw. The West Shore Railroad promoted suburban development along its route, changing the farmland into middle-class housing developments. In 1925, the West Shore Line carried 25,000 commuters daily. The Depression had little effect on the operation of the West Shore Railroad; in 1930 there were eight morning and seven evening rush hour trains serving the suburbs.

In 1931, the George Washington Bridge opened establishing the first highway link from Bergen County to Manhattan. Almost immediately, the annual ridership of the West Shore declined to 15,000 commuters. In 1937, the Lincoln Tunnel provided a second automobile route almost parallel to the West Shore's Weehawken ferry's 42nd Street crossing. In the 1950s, the Tappan Zee Bridge and the New York State Thruway were constructed. By 1959, following a long period of decline, all passenger service on the West Shore Railroad was abandoned.

In its passenger heyday, the West Shore boasted four main tracks from Ridgefield Park, New Jersey, northward to the state line; double-track continued from that point north to Albany. Even before commuter service ceased in 1959, the four tracks from Weehawken to Dumont, New Jersey, were reduced to double-track; through-service to Albany ended several years earlier. Between 1959 and 1965, the line north of Dumont was reduced to a single-track with sidings. Most of the rest of the line north to Selkirk Yard, just south of Albany, is now single-tracked.

Since 1984, the Hudson River waterfront at the location of the former Weehawken Terminal has been completely redeveloped. All the structures of the former Weehawken Terminal, once one of the largest rail terminals in New York Harbor and the proud centerpiece of the NYC's West Shore Railroad, have been demolished. The area is now used by passenger ferries to Manhattan, and associated parking areas, Arcorps Corporation and a waterfront restaurant.

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The West Shore Railroad is currently (1996) Conrail's River Line and is used for freight purposes only, carrying most of the rail freight to and from New York Harbor through New England, Upstate New York and Canada. The NYWS&B Weehawken Tunnel remains intact and is currently used by Conrail.

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SOURCES OF INFORMATION AND BIBLIOGRAPHY

Engineering Drawings:

Construction and Alteration Plans: 1883-1911. Microfilm Center, Engineering/Construction Division, Consolidated Rail Corporation, Two Commerce Square, Philadelphia, PA.

Historic Views:

Postcard. West Shore Railroad Tunnel, Clifton Park, Weehawken, N.J., ca. 1900. No. 431 of the John C. Voight Post Card Co., Jersey City, New Jersey. Printed in Germany. From the Collection of Tom Flagg, New York, New York

Historic Photograph ca. 1883. *OW Observer*. Vol. XXVII, Nos. 1 to 9 January-September 1992 p.48. Published by the Ontario & Western Railway Historical Society, Inc. From the collection of the Ontario & Western Railway Historical Society, Inc., Middletown, New York.

Annual Reports of the New York Central System.

Best, Gerald M. *The Ulster & Delaware: Railroad Through the Catskills*. San Marino, CA: Golden West. 1972.

Grow, Lawrence. *On the 8:02: An Informal History of Commuting By Rail in America*. New York, NY: Mayflower Books. 1979.

Harlow, Alvin. *The Road of the Century*. New York, NY: Creative Age Press. 1947.

Katte, Walter (entry). *Who was Who in America 1897-1942*. Volume 1. Chicago, IL: A.N. Marquis Company. 1942. p. 657.

Parsons Brinckerhoff Quade & Douglas, Inc. *Existing Conditions and Demolition Plan, Station 975+00 to 1020+00, HUDSON-BERGEN LIGHT RAIL TRANSIT SYSTEM*. Prepared for NJ TRANSIT, October 1996.

Raber, M., Thomas Flagg, Charles Parrott and Jed Levin. *Final Report, Cultural Resources Investigations in Hoboken-North Bergen Reach: New York Harbor Collection and Removal of Drift Project*. New York Harbor Collection and Removal of Drift Project. Report on file, New York District: Army Corps of Engineers. 1984.

"Reviving Passenger Service on the West Shore". Tom Gallo and Joel Rosenblum. *Railpace Newsmagazine*. April 1985

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(Page 10)

"The Minerals of the Weehawken Tunnel". *Transactions of the New York Academy of Sciences*.
Volume II. New York, NY: Published for the Academy. 1882-1883. pp. 88-90.

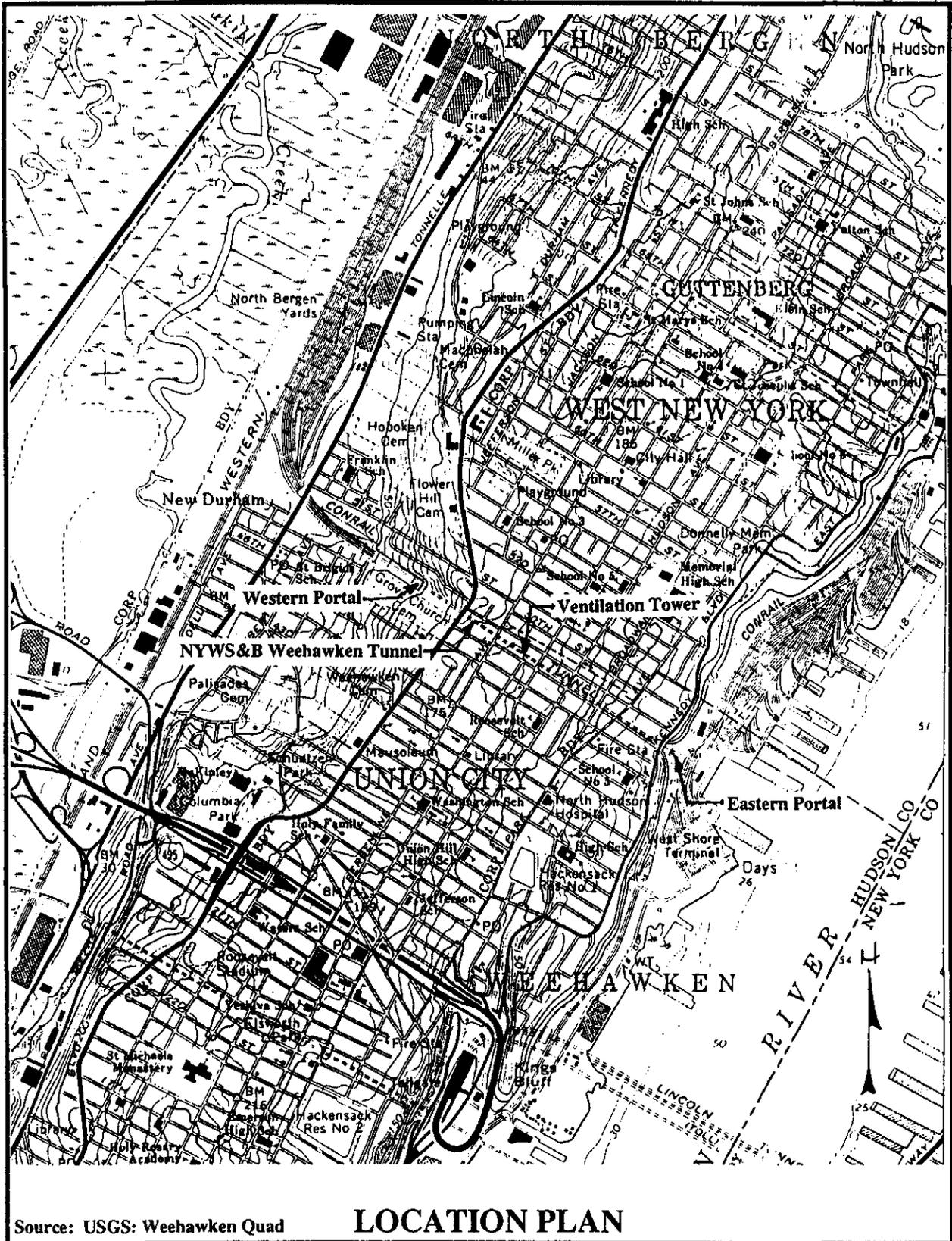
"The Weehawken Tunnel." *Engineering News and American Contract Journal*. June 17, 1882.
pp. 197-198.

"The Weehawken Tunnel." *The Railroad Gazette*. Volume 15. March 2, 1883.

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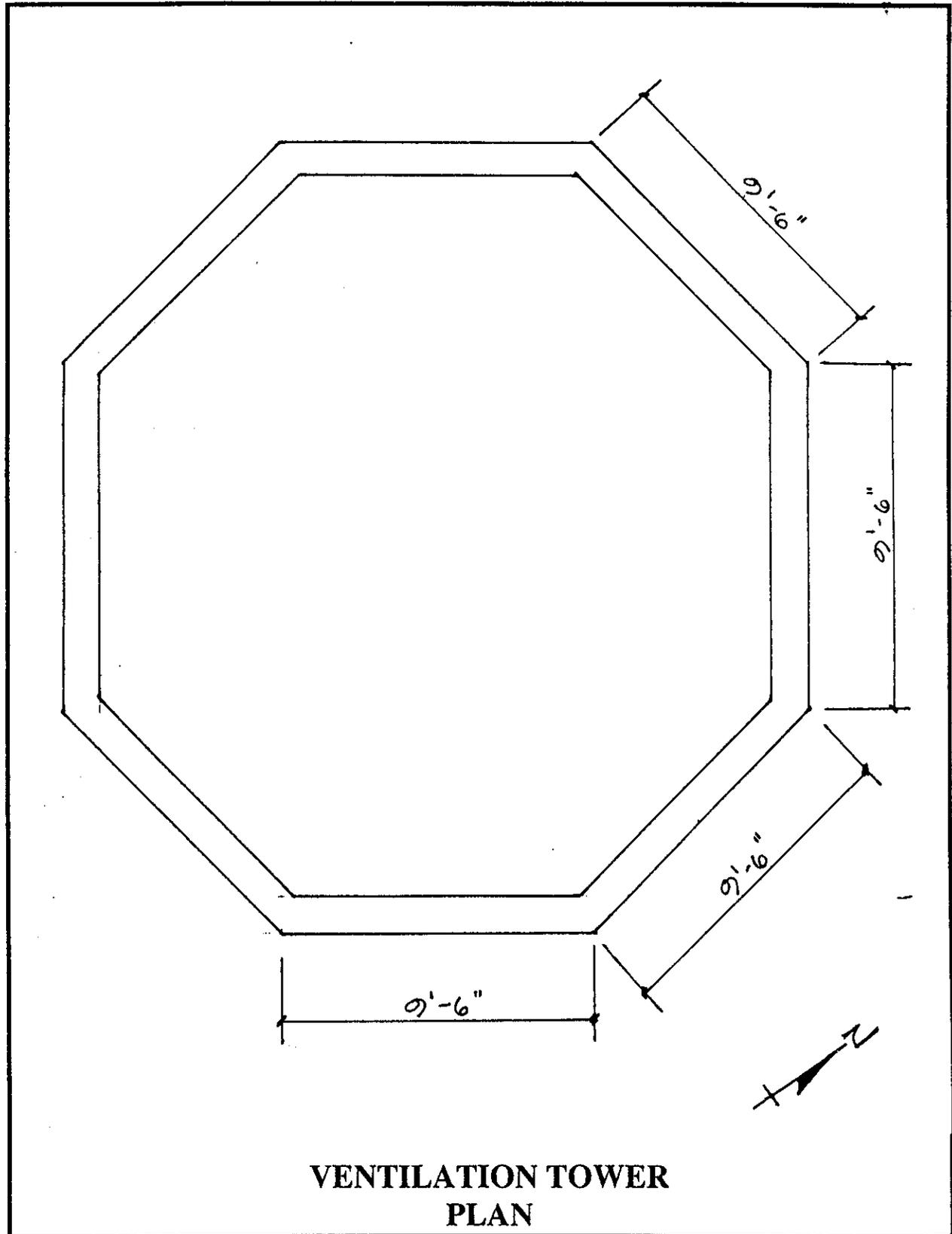
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Source: USGS: Weehawken Quad

LOCATION PLAN



VENTILATION TOWER
PLAN