HISTORIC STREETCAR TRACKS
O and P Streets between Wisconsin Avenue and 36th Street, NW
Washington
District of Columbia

HAER DC-67
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PHOTOGRAPHS

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

HISTORIC AMERICAN ENGINEERING RECORD

HISTORIC STREETCAR TRACKS

HAER No. DC-67

Location: O and P streets between Wisconsin Avenue and 36th Street, N.W., Washington, D.C.

Date of Construction: 1895

Engineer/ Builder: A.N. Connett, Chief Engineer; E. Saxton, Constructing Engineer

Original Owner/ Use: Metropolitan Railroad Company; transportation

Present Owner/ Use: District of Columbia; not in use, undergoing restoration and rehabilitation

Significance: The historic streetcar tracks on O and P streets in the Georgetown neighborhood of Washington, D.C., are significant as some of the last visible examples in the world of a unique, late-nineteenth century underground conduit system that was also installed in New York City and London. The system was developed to provide electric motive power to streetcars via an underground conduit rather than overhead wires, since Congress had prohibited their use. With the end of streetcar transportation in Washington, D.C., the infrastructure was either removed or paved over during the 1960s and 1970s, except for this section, which has been preserved as an artifact of the city's transportation history.

Description: As evidenced by the remnants on O and P streets and described in contemporary publications, the underground conduit system consisted of 350-pound, cast-iron yokes set in concrete and located at regular intervals (from 4' to 6') under the street's surface. The running (or wheel) and slot rails are attached to the yokes. The running rails, on which the streetcar ran, are 7" girder rails weighing 83 pounds. The slot rail is centered between the running rails with the Portland cement conduit underneath. The conduit, reportedly measuring 25" deep and 18" wide, encloses the T-shaped conductor rails, to which the porcelain insulators are attached at regular intervals. Steel-plate hatches provide access to the insulators. Feed wires to the conductors were housed in terra cotta pipes, and drains connected to sewers to help keep water and debris from accumulating. The pavement between the rails is granite block pavers with areas of asphalt.[1]

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[1] Description based on a site visit in June 2011, as well as "Conduit of the Metropolitan Railroad Company at Washington," *The Street Railway Review* 5, no. 1 (January 15, 1895): 7; "Metropolitan Railroad Conduit, Washington, D.C.," *The Street Railway Review* 5, no. 8 (August 15, 1895): 465; and A.N. Connett, "The Electric

Leroy King describes the operation of the underground conduit system in his comprehensive history of Washington, D.C. streetcars.

> A 'plow' suspended from the truck of the car had two sliding shoes which collected positive and returned negative current from and to the two conductor rails. At switches there was a necessary break in the conductor rails—so that positive and negative conductors would not meet on crossing. This break, though short, required coasting and current cut off. The switch mechanism, in addition to directing the car wheels, had to direct the plow in the proper direction. This was accomplished with an underground movable plate which moved with the switch points.[2]

History:

Streetcar Companies in Washington, DC

While other metropolitan areas like Boston, Philadelphia, Pittsburgh, Chicago, and Baltimore, had established horse-drawn street railways in the first half of the nineteenth century, such service was not available in Washington, D.C. until the second half of the century. Prior to that, an omnibus line, established in 1830 and operating between Georgetown (initially founded as a port on the Potomac River in 1751) and the Navy Yard, served as the city's first form of public transportation. A 1918 description captures the crudeness of this method of transport.

> To those who remember the omnibus as it thumped and creaked and surged over the rough cobble-covered roadways in the days before the establishment of street railroad transportation, the allusion of the poet Byron to 'the car rattling o'er the stony street' as a fitting similitude for the distant boom of the cannon of Waterloo, does not seem an unwarrantable stretch of the imagination.[3]

A proposal was made to Congress for construction of a street railway in Washington, D.C., in 1854, but it was not until May 17, 1862, that Congress passed an act incorporating The Washington and Georgetown Railroad Company, thereby establishing the first street railway in the city. Two years later, on July 1, 1864, the Metropolitan Railroad Company was authorized as the second. Thus, the city's predominant form of public transportation shifted from omnibus to horse-drawn streetcars.[4]

Conduit of the Metropolitan Railroad and the Reasons for its Adoption," *The Street Railway Journal* 11, no. 8 (August 1895): 530-531.

[2] Leroy O. King, *100 Years of Capital Traction: The Story of Streetcars in the Nation's Capital* (Taylor Publishing Co., 1972), 303. Appendix J of King's book (pages 303-308) contains a description of this system, along with drawings and historic photographs.

[3] Dr. William Tindall, "Beginnings of Street Railways in the National Capital," *Records of the Columbia Historical Society* (Charlottesville, VA: Columbia Historical Society, 1918), 24.

[4] King, Chapter 1; Tindall, 25-26; District Department of Transportation, "A Sesquicentennial Overview of Streetcars in the Nation's Capital, 1862-2012," presented at Preserving the Historic Road, September 9-12, 2012, Washington, D.C.

In 1888, the first electric street railway was built in Richmond, Virginia, and shortly afterward, the District of Columbia Appropriation Act of March 2, 1889, mandated that Washington, D.C., street railway companies convert from horse to electrical power. Congress later outlawed the use of overhead lines within the city on July 1, 1893. These mandates resulted in a period of experimentation to find the most efficient forms of electric propulsion, such as storage batteries, surface contact systems, and, finally, underground conduits. The Eckington and Soldiers' Home Railway Company exemplifies the early efforts of the city's street railways to comply with legislation while providing efficient service. The company began operations in 1890, experimenting with the Wheless surface contact system first. This was comprised of an insulated cable near the rails. When the system proved inadequate, the company installed EDCO storage batteries in its streetcars. Since the battery was installed directly in the streetcar, the cars operated independently, preventing systemic failure. In addition, service could be increased, if necessary. Ultimately, though, the batteries proved inefficient and expensive, and the company reverted to using horse power until Congress directed them to convert to compressed-air streetcars on June 10, 1896. These were soon abandoned, however, because they required charging after every trip, and there were customer complaints about the smell and smoke generated by the motors. Eventually, the company would install the underground conduit system.[5]

The Eckington and Soldier's Home Railway Company was only one of a multitude of small streetcar companies operating in Washington, D.C. in the second half of the nineteenth century. Eventually, these companies were consolidated into two major ones by the turn of the twentieth century: the Washington Railway and Electric Company and The Capitol Traction Company.[6] The section of streetcar tracks on O and P streets in Georgetown was originally owned by the Metropolitan Railroad Company, which had been chartered on July 1, 1864. Not long after its establishment, the company absorbed a number of smaller lines, including the Union Railroad Company in November 1872, the Boundary and Silver Spring Railroad Company in December 1872, and the Connecticut Avenue and Park Railway Company in June 1874. The company's route consisted of the 9th Street and F Street lines and Columbia Avenue extension, and encompassed the tracks on O and P streets. On February 4, 1902, the Washington and Great Falls Electric Company, a subsidiary of the Washington Railway and Electric Company, acquired the Metropolitan Railroad Company but continued operations.[7]

The first half of the twentieth century saw increased use of the streetcar system—the result of a buildup of the federal government and workforce in response to World War I. A 1918 Congressional report stated, "a vast army of employees is necessary to carry on the functions of

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[5] Tindall, 52-53; King, Chapter 2.

[6] A thorough discussion of the numerous Washington, D.C. metropolitan area streetcar companies is beyond the scope of this report, but interested readers can find a comprehensive list and descriptions of all the companies in King's *100 Years of Capital Traction*.

[7] King, 7-9; Tindall, 35-39; "Metropolitan Railroad Conduit, Washington, D.C.," 465; "The Street Railways of Washington, D.C.: Which Will Be Operated by the Washington Traction & Electric. Co.," *The Street Railway Review* 9, no. 6 (June 15, 1899): 365. The Washington and Great Falls Electric Railway Company, which had been incorporated in July 1892, featured a scenic route along the Potomac River bluffs to Glen Echo, Maryland.

the Federal Government in all its departments."[8] Known as the "crush hour," peak travel times developed at 9:00 a.m. and from 4:00 to 5:00 p.m., coinciding with the start and end of the federal government's workday. By 1917, there were 171.3 miles of streetcar tracks in the city with thirty-three routes and 575 cars in daily operation. Congestion and inefficient operation by the streetcar companies led to attempts by the Public Utilities Commission and Congress to consolidate the Washington Railway and Electric Company and Capitol Traction Company. Congress initially attempted to authorize the merger in 1925. After many delays, the U.S. Senate finally passed a resolution approving the merger on December 22, 1932, followed by the U.S. House of Representatives on January 5, 1933. The new company, known as Capital Transit Company, became the city's sole streetcar operator.[9]

In summer 1956, after an employee strike, Congress passed Public Law 389, authorizing city officials to revoke the Capital Transit Company's franchise. New York financier O. Ray Chalk purchased the company, renamed it D.C. Transit Systems, and oversaw the closure of the streetcar lines and transition to bus lines. Under Chalk's leadership, lines were abandoned in 1958, 1960 (which included the line servicing O and P streets in Georgetown), 1961, and 1962. With the closure, the problem of what to do with the track system had to be solved, and, even more importantly, who would pay for the massive undertaking: the city or D.C. Transit. From 1956 to 1977, the metal tracks, massive yokes, and concrete settings were either removed entirely or simply covered with pavement, except for those on O and P streets.[10]

The Citizens Association of Georgetown spoke out against paving over the tracks on O and P streets in 1976, and a federal court ruled the following year that the tracks were to be maintained. In 2003, the District Department of Transportation developed a rehabilitation project to preserve the O Street tracks while still rehabilitating the roadway, necessary because of the deteriorating pavement, uneven surfaces, and loose granite paving blocks. In consultation with the D.C. Historic Preservation Office, Advisory Council on Historic Preservation, and the Georgetown community, additional track was preserved. As undertaken in 2011-2012, the project involved removing the streetcar system remnants, including the tracks, yokes, manholes, and junction boxes on O and P streets. The system components were refurbished and then reinstalled, except

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[8] John Beeler, Consulting Engineer, "Report on the Washington Traffic Situation," Appendix J, in 65th Congress, 2d sess., Senate Document No. 197, *Street Railways in the District of Columbia*, March 8, 1918 (Washington, D.C.: Government Printing Office, 1918), 32.

[9] "Study of the Merger Plan," *The Washington Post*, April 30, 1928, 6; "Street Railway Merger," *The Washington Post*, November 6, 1926, 6; John A. Beeler, Consulting Engineer, "Report on the Washington Traffic Situation to the Public Utilities Commission," Appendix F, in 65th Congress, 2d sess., Senate, Document No. 197, *Street Railways in the District of Columbia*, March 8, 1918 (Washington, D.C.: Government Printing Office, 1918), 32; King, 130.
For information on the attempted merger, see 70th Congress, 1st sess., House of Representatives, Report No. 1720, "Merger of Street Railway Corporations Operating in the District of Columbia," May 17, 1928; 70th Congress, 2d sess., Senate Report No. 1652, Calendar No. 1680, "Street Railway and Bus Merger in the District of Columbia," February 4, 1929; 70th Congress, 2d sess., House of Representatives, Report No. 2540, "Merger of Street Railway Corporations Operating in the District of Columbia, February 15, 1929.

[10] King, 171, 181; Eve Edstrom, "New Transit Era Opens as CTC Passes from Scene," *The Washington Post and Times*, August 15, 1956, 25; Jack Eisen, "Transit C. to Pay $3 Million to City in Track Removal," *The Washington Post, Times Herald*, December 10, 1972, B2; Susan Crowley, "Georgetown Streetcar Tracks Paved; Some Are Happy and Some Are Not," *The Washington Post*, July 28, 1977, DC4.

for that section of the system on P Street between 35th and 36th streets and 36th Street between O and P streets. In addition, the roadway and streetscape were rehabilitated, and the water mains were replaced as part of the 18-month, $11.8 million project.[11]

Development of Underground Conduit System

The late-nineteenth century saw experimentation with developing closed and open conduits to deliver electricity to streetcars. In Washington, D.C., this experimentation was particularly important as Congress had prohibited the use of overhead wires in Georgetown and within the city limits in 1888. While overhead wires had been proven successful and more flexible than underground conduit, they were also decried in national publications for the "inconveniences and the unsightliness of a bare overhead conductor," particularly in heavily-developed areas.[12] Contemporary journals examined the efforts of engineers to develop the most effective conduit systems. Initial experiments with open conduits were described as "flat and miserable failures, electrically and mechanically, the trouble being that the conduits were much too shallow and would easily fill up with water, snow, mud and all sorts of street materials, so as to short circuit the conductors or cause excessive leakage of current." They were also negatively affected by temperature changes and cold weather, which was of great concern in the North. Finally, the cost of construction was deemed prohibitive except by "heavily patronized metropolitan roads." Closed conduit systems, made up of tubes with feed wires and conductors enclosed in insulating material that connected to junction boxes at regular intervals, were also developed. The closed conduit systems had the advantages of being more economical and eliminating the problems with debris collection and precipitation that plagued the open conduit types.[13]

The form of conduit system that would be built by the Metropolitan Railway Company and others in Washington, D.C., was reportedly influenced by a system built in Budapest by Siemens & Halske, a German electrical engineering firm. It also served as the model for the system installed by the Metropolitan Traction Company of New York City in 1897. A.N. Connett, the Metropolitan Railway's chief engineer who had formerly been with the Baltimore City Passenger Railway Company, provided design expertise and oversaw the installation.[14] E. Saxton, described as "among the best constructing engineers in the country," completed all the conduit and track work.[15] The Metropolitan went into service on July 29, 1895, making it the first line in the city to use the underground open conduit system. By the turn of the twentieth century, the city's street railways had been converted to the open conduit system, deemed the "best modern

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[11] District Department of Transportation, "A Sesquicentennial Overview of Streetcars"; Fixing O and P Streets, website, fixingoandpstreets.com/, accessed 2011.

[12] "The Wheless Electric Railway Co.'s Conduit and Aerial Trolley System," *Electrical Age* 11, no. 23 (June 10, 1893): 361.

[13] "Electric Railway Practice in the United States," *Street Railway* Journal 12, no. 1 (January 1896): 27; "Underground Conduit System," *Street Railway Journal* 12, no. 1 (January 1896): 39-40, quote from 39.

[14] Connett's career began in Kansas City in 1888 where he worked on cable lines before joining Bentley-Knight Company and installed the company's electric conduits in Allegheny, Boston, and New York. After leaving the company, he took the position of chief engineer with the Baltimore City Passenger Railway in July 1891 and then became its general manager. "Conduit of the Metropolitan Railroad Company at Washington," 7. See also, "Underground Conduit Electric Railroads in America," *The Street Railway Review* 8, no. 1 (January 15, 1898): 3.

[15] "The Street Railways of Washington, DC," 365.

system of street railway operation in existence."[16] The streetcar tracks and system on O and P streets survive as the last visible remnants of the underground conduit system.

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Historian: Justine Christianson, HAER, 2011

Project Information: The Historic American Engineering Record (HAER) is a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Heritage Documentation Programs division (Richard O'Connor, Chief), a division of the National Park Service, U.S. Department of the Interior. The streetcar tracks were unearthed during a rehabilitation and preservation project of O and P streets. The District of Columbia Department of Transportation provided access to the site during the removal of the tracks in summer 2011, which was photographed by Renee Bieretz with assistance from Jet Lowe. Thanks also go to Dara Ward who facilitated access.

Appendix: Images

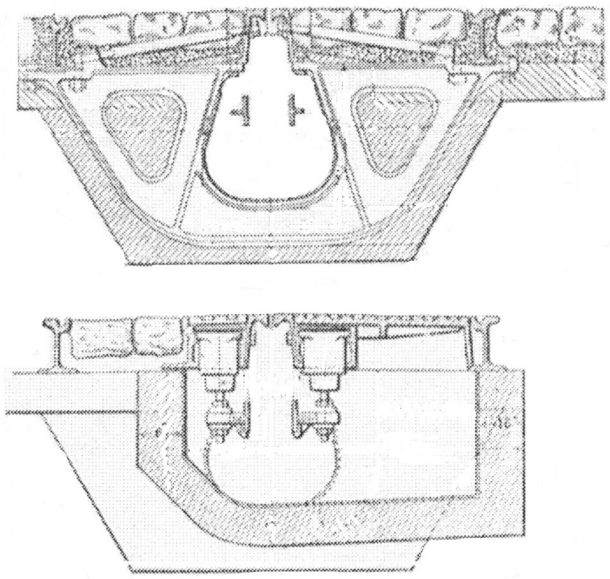

Figure 1: Sections at yoke (top) and manhole with insulator (bottom). Drawing from "Conduit of the Metropolitan Railroad Company at Washington," *The Street Railway Review* 5, no. 1 (January 15, 1895): 7.

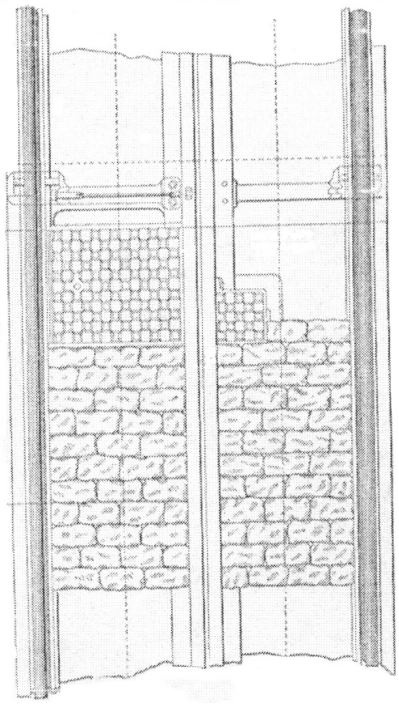

Figure 2: Plan showing wheel tracks with slot rail and manholes. Drawing from "Conduit of the Metropolitan Railroad Company at Washington," *The Street Railway Review* 5, no. 1 (January 15, 1895): 7.

Figure 3: "City of Washington," Statistical Map, No. 10, compiled by Lt. E.V. Greene, June 30, 1880, and reproduced in Leroy O. King, *100 Years of Capital Traction*.