NAER INVENTORY

U.S. Department of the Interior
Heritage Conservation and Recreation Service

1. SITE I.D. NO

2. INDUSTRIAL CLASSIFICATION: Bridges, Trestles, and Aqueducts

MOVE: bascule

513/12

3. PRIORITY: 1

5. DATE: 1924

4. DANGER OF DEMOLITION? (SPECIFY THREAT) ☐ YES ☐ NO ☒ UNKNOWN

6. GOVT SOURCE OF THREAT: OWNER ADMIN

7. OWNER/ADMIN: City of Seattle

8. NAME(S) OF STRUCTURE: Montlake Bridge

9. OWNER'S ADDRESS:
Engineering Department
Seattle Municipal Building, Room 704
Seattle, Washington 98104

10. STATE: WA | COUNTY: 033 | COUNTY NAME: King | CITY/VICINITY: Seattle | CONG. DIST.: 03

STATE | COUNTY | COUNTY NAME | CITY/VICINITY | CONG. DIST.

11. SITE ADDRESS (STREET & NO)
Crossing: Lake Union Ship Canal
.2 N. Jct. SR 520

12. EXISTING SURVEYS ☐ NR ☐ NHL ☐ HABS ☐ HAER—I ☐ HAER ☐ NPS ☐ CL6
☐ CONF ☐ STATE ☐ COUNTY ☐ LOCAL ☐ OTHER

13. SPECIAL FEATURES (DESCRIBE BELOW)
☐ INTERIOR INTACT ☐ EXTERIOR INTACT ☐ ENVIRONS INTACT

14.

UTM ZONE	EASTING	NORTHING	SIGN
10	552310	5277140	

SCALE ☒ 1:24 ☐ 1:62.5 ☐ OTHER _____ QUAD NAME: Seattle North, Washington

SCALE ☐ 1:24 ☐ 1:62.5 ☐ OTHER _____ QUAD NAME _____

15. CONDITION. 70 ☐ EXCELLENT 71 ☐ GOOD 72 ☐ FAIR 73 ☐ DETERIORATED 74 ☐ RUINS 75 ☐ UNEXPOSED 76 ☐ ALTERED ☐ DESTROYED 85 ☐ DEMOLISHED

16. INVENTORIED BY: Lisa Soderberg | AFFILIATION: HAER/Washington State Bridge Inventory | DATE: September 1980

17. DESCRIPTION AND BACKGROUND HISTORY, INCLUDING CONSTRUCTION DATE(S). HISTORICAL DATE(S). PHYSICAL DIMENSIONS, MATERIALS, EXTANT EQUIPMENT, AND IMPORTANT BUILDERS, ENGINEERS, ETC.

The Montlake Avenue Bridge was the fourth double-leaf trunnion bascule bridge to be constructed across Seattle's ship canal. Although the bridge was not completed until 1924, five years after the completion of the Eastlake Avenue, Fremont Avenue, and 15th Avenue Northwest Bridges, its construction was planned when the ship canal was built. In order to conserve costs, foundations for the Montlake Bridge were constructed in 1913 at the time that the canal was excavated, long before detailed plans of the bridge were prepared.

The design of the bridge had to be adapted to the existing foundations. The pier foundations had been built so close to the edge of the canal that it was necessary to alter the design of the moving mechanism so that the width of the canal would not be reduced by the bridge.

(CONT OVER)

18. ORIGINAL USE: vehicular | PRESENT USE: vehicular | ADAPTIVE USE:

19. REFERENCES—HISTORICAL REFERENCES, PERSONAL CONTACTS, AND/OR OTHER

City Engineering Department files.
"Double-leaf Bascule bridge over Canal at Seattle," Engineering News-Record, Vol. 95, 19 November 1925, pp. 826-827.

(CONT OVER)

20. URBAN AREA 50,000 POP. OR MORE? ☒ YES ☐ NO

21. NW

22. PUBLIC ACCESSIBILITY ☐ YES, LIMITED ☐ YES, UNLIMITED ☐ NO ☐ UNKNOWN

23. EDITOR INDEXER

24. LOCATED IN AN HISTORIC DISTRICT? ☐ YES ☒ NO NAME DISTRICT I.D. NO

FHR-8-310 1/78 HCRS REGION GPO 871 981

Description (continued)

A unique feature in the Montlake Avenue Bridge was the use of trunnions that are supported on a cantilever projectio extending from the pier. This design eliminated the need for the transverse cross girder that was used in the earlier bascule bridges that were across the canal. Because there was no need to place framing around the cross-girder, the space between the trunnion brackets could be used for the moving mechanism of the bridge. However, this design causes an eccentric trunnion load on the pier as the bascule span is raised or lowered. In order to support this load, deep, narrow transverse girders connecting the two piers at a level below that required for clearance of moving parts were built to carry the forward bearing of the moving leaf. The problem of supporting this eccentric load was further complicated by the fact that the main piers did not rest on stable ground. Although the material in the cut was stable, there was a layer of fine sand below the water level of the canal. Therefore, it was necessary to design a bridge that carried the load of the structure independently of the surface of the slope. "This was accomplished by driving seventy 14-inch and 16-inch steel pipes down to the desired elevation, excavating the material inside them, driving wooden piles by means of followers through the pipes to the depth necessary to develop the required bearing capacity, and filling the pipes with concrete." In order to prevent the slipping of the embankment, and to avoid any change in span length between trunnions, the piers were braced at the point where they intersect the slope of the cut. A reinforced concrete strut designed for either tension or compression was built to connect the pier to a concrete anchor that was embedded in the slope, 134 feet from the edge of the canal. The anchor also helped to maintain an even pressure on the foundation when the structure was under live load and during the operation of the bascule leaves.

The foundations support a 345 foot structure which consists of a 182 foot bascule span and concrete T-beam approach spans. The bascule bridge which originally carried two street car tracks provides a 40-foot wide roadway. Although the tracks have long since disappeared, vestiges of the electric railway system are visible in the steel superstructure above the roadway that once carried the cables. The original floor system consisted of creosoted timbers and planking with wood-block pavement.

The bridge is framed by two towers that rise more than 100 feet above the water providing a monumental east entrance to the University of Washington grounds. These ornate towers which conspicuously set the Montlake Bridge apart from the other bascule bridges spanning the ship canal, were designed by Howells and Albertson.

The Montlake Bridge was constructed by the city of Seattle at a cost of $670,000. The steel was fabricated and erected by the Wallace Equipment Company. A. Munster, acting bridge engineer of the City of Seattle supervised the construction. J.D. Blackwell was city engineer and D.W. McMorris was assistant engineer.

REFERENCES (CONTINUED)

ABSTRACT

HAER NO | LC | TECH REPORT | HIST REPORT | CONTEMP PHOTO | HIST PHOTO | CONTEMP DRWG | HIST DRWG | COLOR PLATE | PHOTOGRAM | SW | FILM

25. Photos and Sketch Map of Location