Guide to the Records of the

Washington Toll Bridge Authority

Office of the Secretary of State
Division of Archives and Records Management
Olympia, Washington
April 2004

Guide to the Records of the

Washington State Toll Bridge Authority 1937 - 1977

Compiled by
Kathleen Waugh

Office of the Secretary of State
Division of Archives and Records Management
Olympia, Washington

April 2004

INDEX

TOLL BRIDGE AUTHORITY

The Toll Bridge Authority was created by the Legislature in 1937. The state wanted to improve transportation routes by building bridges but had been hampered by restrictions regarding bonding in Article VIII of the state constitution. Therefore the Toll Bridge Authority was given the power to issue revenue bonds which were not limited by Article VIII. It was to select, fund, build and operate bridges which would probably not win approval in a statewide levy. The revenues from the operation of the bridges would pay off the bonds.

The membership of the Authority originally consisted of the Governor, the State Auditor, the Director of the Public Service Commission, the Director of Highways, and the Director of the Department of Finance, Budget and Business. By the time the Authority was dissolved in 1977, the membership consisted of the Governor, two members of the State Highway Commission appointed by the Commission, and two other members appointed by the Governor. The Director of the Highways Department was an ex officio, nonvoting member.

The first two major projects were the Lake Washington Bridge and the Tacoma Narrows Bridge. A bridge across Lake Washington Bridge, from the eastern shore to Mercer Island and beyond to Seattle, had been proposed and debated for at least twenty years. Various citizens' groups, private companies, and King County had all planned bridges but been unable to obtain financing. The newly-created Washington State Toll Bridge Authority was able to get federal Public Works Administration funds to begin the bridge. Both a suspension bridge and a girder bridge were dismissed as too expensive, so the bridge consisted of twenty-five concrete pontoons, 350 feet long, 60 feet wide, and 14.5 feet deep. Each was divided into many watertight cells. They were bolted together end-to-end and attached to anchors on the lakebed with steel cables. The Lake Washington Bridge was the longest floating span in the world at 6,620 feet, and the first ever floating drawspan. More than 3,000 workers had been employed on the bridge by the time it was opened on July 2, 1940, by Governor Martin. Tolls paid were sufficient to retire the $5,500,000 bonds, and render the bridge toll-free, exactly nine years later.

The Lake Washington Bridge was renamed the Lacey V. Murrow Bridge in 1967 in honor of the former Director of the Department of Highways. In 1981, the "bulge" of the drawspan, which opened to allow ships to pass but which had proved a traffic hazard, was removed and replaced by fixed pontoon sections. On November 25, 1990, the bridge broke apart in a storm and eight of the pontoons sank. Work on a new Lacey V. Murrow Bridge began almost immediately, incorporating lessons learned from the previous fifty years.

The Tacoma Narrows Bridge was built simultaneously with the Lake Washington Bridge, financed by bonds totaling $3,520,000, and opened to the public on July 1, 1940. It was the third-longest suspension bridge ever built, and the slimmest ever in relation to its length. Partly because of the latter characteristic, the bridge ripped apart in a high wind and crashed into Puget Sound after only four months of service. More than ten years passed before the new Tacoma Narrows Bridge rose on the same site. For more detailed information on this bridge, see pages 36-58.

In 1947, the state bought and rehabilitated the seventeen-year-old toll bridge crossing the Columbia River at Longview, having sold bonds for the purpose totaling $3,650,000. The bonds were retired in 1965 and tolls removed from the bridge as Washington Governor Dan Evans and Oregon Governor Mark Hatfield held a brief bond-burning ceremony.

The Agate Pass Bridge connecting the north end of Bainbridge Island to the Kitsap Peninsula was built with a $1,650,000 bond issue in 1950. This bridge became toll-free only a year later when highway bonds were sold and the revenues applied to retiring the bridge bonds.

In 1951, Washington State bought the Puget Sound Transportation Company's fleet of "Black Ball Line" ferries, and the Toll Bridge Authority took on the responsibility of running and funding the ferry system. Many considered ferries to be only a stopgap measure to transport people until bridges were built across Puget Sound, which would replace all ferries. Much work went into planning as many as five cross-sound bridges, as well as bridges between the various San Juan Islands, before the idea was finally dropped. The only one of the cross-Sound bridges to be built was the Hood Canal Bridge (see page 7).

In August 1954 the Fox Island Bridge, connecting Fox Island with western Pierce County not far from Gig Harbor, was opened at a cost of $1,500,000 and operated as a toll bridge until 1965.

In Spokane, the Maple Street Bridge over the Spokane River was opened on August 8, 1958 at a cost of $6,000,000, and operated at a deficit for years, probably because of competition from two free bridges nearby.

In Bremerton, the state built a new bridge over Port Washington Narrows at Warren Avenue in 1958 and took over the twenty-eight-year-old Manette Bridge, for a combined cost of $5,375,000, which was paid off by 1973.

In 1929 the states of Washington and Oregon bought the bridge which crossed the Columbia River between Vancouver and Portland. The bridge had been built in 1917 by Clark County, Washington, and Multnomah County, Oregon. It was 23,000 feet long, including the approaches, and stood 150 feet above high water. In 1956 the states began building a new bridge over the Columbia River between Vancouver and Portland, and rebuilding and modernizing the existing older bridge on the site. The new bridge was opened in January 1960. The work was financed with a $14,500,000 bond which was retired in 1965, in a ceremony attended by two women who had cut the ribbon to open the bridge in 1917.

In eastern Washington, the Biggs Rapids Bridge (Sam Hill Memorial Bridge) between Maryhill, Washington, and Biggs, Oregon, opened on November 1, 1962, replacing a ferry that had operated in the area for many years. The bridge cost $3,500,000 and was paid off in June 1975.

In 1961, the Highways Department's newly-established Toll Facilities Division took over building, maintaining and operating toll bridges and ferries, but the TBA continued to handle financing, bonds, leases and toll rates.

1961 saw the opening of the Hood Canal Bridge, stretching from the northern Kitsap Peninsula near Port Gamble to Shine on the Olympic Peninsula, about twenty-five miles from Port Townsend. This bridge replaced the Lofall-Southpoint ferry, three miles to the south, and was originally conceived as one of five cross-Sound bridges which would render the state ferry system obsolete. It was the first pontoon bridge anywhere to be built over an arm of the sea, subjecting it to waves, wind, and eighteen-foot fluctuations in the water level, and was 6,520 feet long. Two pontoons sank during construction; then joints between pontoons were damaged in storms. The design was altered and a new contractor hired.

The Hood Canal Bridge was opened fifteen months behind schedule and immediately began to suffer minor damage from waves and storms. In February, 1979, the entire western part of the bridge sank during a severe storm which had apparently shifted three of the bridge's anchors. The drawspan floated 3,000 feet north before sinking. Ferry service was reinstituted until the western end of the bridge was rebuilt at great expense. The new bridge was designed to be much stronger. The anchors weighed three times as much as their predecessors and were filled with slag from the ASARCO copper smelter in Tacoma.

In 1963, the Second Lake Washington Bridge, or Evergreen Point Bridge, was opened, after fifteen years of pressure and debate over its exact location. The area east of Lake Washington had experienced tremendous population growth and needed more access to Seattle. Like the first Lake Washington Bridge, the second bridge was built of concrete pontoons, but was even longer, at 7,578 feet. It was later renamed after former Governor Albert D. Rosellini. It cost $35,000,000 and was paid off in June 1979, many years ahead of schedule.

The Vernita Bridge, 45 miles east of Yakima near the boundary of the United States Atomic Energy Reservation, was opened in October 1956, replacing a free ferry run by the Department of Highways. It cost $3,050,000 and was paid off by June 1977.

The 4-mile-long Astoria Bridge across the mouth of the Columbia River was opened in August 1966, replacing ferry service, and cost about $24,000,000. It is part of U. S. Highway 101 and was built by the Oregon Highway Department after being designed by Washington and Oregon engineers. It is the longest continuous three-span through-truss bridge in the world. It has successfully withstood floods and impressive Pacific storms. Tolls were removed in 1993.

The Department of Transportation was created September 21, 1977, and the Toll Bridge Authority held its last meeting two days earlier. The members reminisced about the many projects the Authority had overseen over the decades and Governor Dixy Lee Ray "then brought the meeting to an end by commenting that she felt the TBA has had a remarkable 40-year history . . . and it was with a sense of sadness that this was to be the last meeting."

SCOPE AND CONTENT

The records in this collection document the operations of the Washington State Toll Bridge Authority. The Authority's subject files include meeting minutes, correspondence, resolutions, and much information on bonds issued. There are files on each individual bridge which include agreements, audits, bonds, correspondence, engineering records, financial records, insurance information, investigations, maintenance records, plans, progress reports, publicity, studies, and traffic and revenue reports. Files on proposed tunnels include maps, plans and proposals. Files on the proposed Tacoma-Seattle-Everett Toll Road include correspondence, engineers' reports, and right-of-way records.

NOTE ON THE ARRANGEMENT

These records were transferred to the State Archives from the Toll Bridge Authority, the Department of Highways, and the Department of Transportation, on many occasions over the past thirty-five years. They were in no particular order.

The records have been separated into four sections: subject files, files on individual bridges, files on tunnels, and files on the proposed Tacoma-Seattle-Everett Toll Road. They have been put into alphabetical order and placed in acid-free folders and acid-free boxes.

SUBJECT FILES

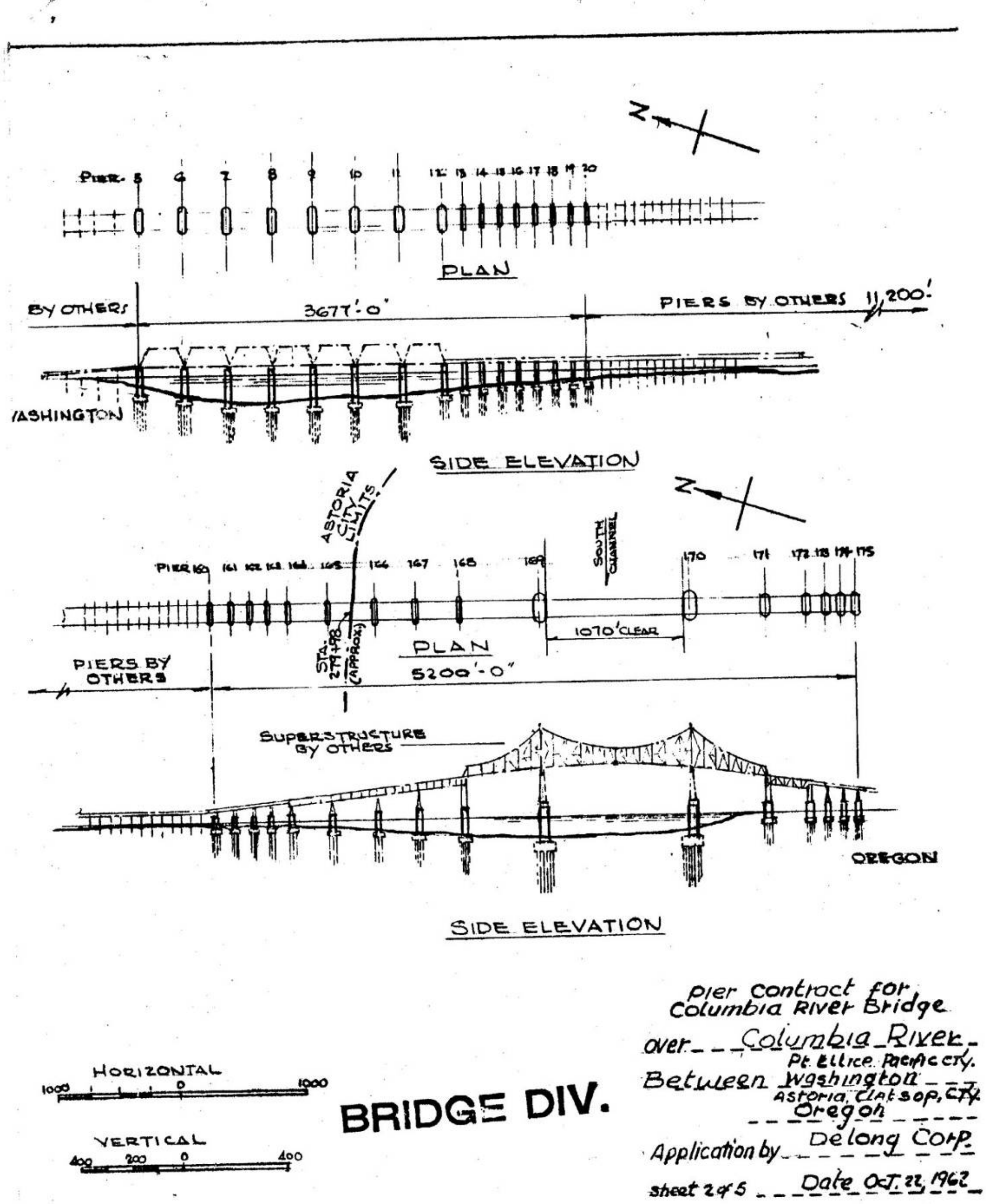
Box 1	Andrew, Charles E., Consulting Engineer	1941-57
	Attorney General Opinions	1941
	Batcheller, Willis T., Consulting Engineer	1960-70
	Bids	1938
	Bond Resolutions	1948-56
	Bonds	1966-76
	Bonds, A. C. Allen and Company	1948-49
	Bonds, Fees	1939-41
	Budgets	1948-62
	Correspondence	1940
	Correspondence	1951-52
	Correspondence	1953-54
	Correspondence	1955-56
	Correspondence	1955-56
	Correspondence	1955-59
	Correspondence	1957-58
	Correspondence	1959-60
	Correspondence	1961-62
	Correspondence	1963-64
	Correspondence	1967-69
	Equipment Inventories	1941
	Ferry and Hood Canal Bridge Revenue Bonds	1956
	Ferry and Hood Canal Bridge Revenue Bonds	1956-58
Box 2	Ferry and Hood Canal Bridge Revenue Bonds	1956-58
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1957
	Ferry and Hood Canal Bridge Revenue Bonds	1958-60
	Ferry and Hood Canal Bridge Revenue Bonds	1958-63
	Ferry and Hood Canal Bridge Revenue Bonds	1961
	Ferry and Hood Canal Bridge Revenue Bonds	1961-62
	Ferry and Hood Canal Bridge Revenue Bonds	1963
	Ferry and Hood Canal Bridge Revenue Bonds	1970-74
	Highway Commission, Activities	1955
	Highways Department, Auditor’s Examinations	1967-75
	Informational Releases	1954-55
	Informational Releases	1955-56
	Informational Releases	1957

SUBJECT FILES

Box 3	Informational Releases	1958-59
	Informational Releases	1960
	Informational Releases	1961-62
	Informational Releases	1963-64
	Informational Releases	1965
	Informational Releases	1967
	Informational Releases	1968-70
	Informational Releases	1971
	Informational Releases	1972-74
	Legislation	1969-73
	Legislation	1973-75
	Legislature, Joint Fact-finding Committee on Highways . . .	1951-64
	Meeting Minutes, Toll Bridge Authority	1937-40
	Meeting Minutes, Toll Bridge Authority	1940
	Meeting Minutes, Toll Bridge Authority	1941-44
Box 4	Meeting Minutes, Toll Bridge Authority	1945-49
	Meeting Minutes, Toll Bridge Authority	1949-52
	Meeting Minutes, Toll Bridge Authority	1953-55
	Meeting Minutes, Toll Bridge Authority	1955-56
Box 5	Meeting Minutes, Toll Bridge Authority	1956-57
	Meeting Minutes, Toll Bridge Authority	1958-59
	Meeting Minutes, Toll Bridge Authority	1959-61
	Meeting Minutes, Toll Bridge Authority	1961-63
Box 6	Meeting Minutes, Toll Bridge Authority	1963-67
	Meeting Minutes, Toll Bridge Authority	1968
	Meeting Minutes, Toll Bridge Authority	1968-70
	Meeting Minutes, Toll Bridge Authority	1971-74
	Meeting Minutes, Toll Bridge Authority	1975
	Meeting Minutes, Toll Bridge Authority	1975-77
	Meeting Minutes, Toll Bridge Authority	1976
	Meeting Minutes, Toll Bridge Authority	1977
	Meeting Minutes, Toll Bridge Authority	1977
	Miscellaneous	1956-59
	Newspaper Clippings	1956-58
	Newspaper Clippings	1956-58
Box 7	Puget Sound Governmental Conference, Transportation	1970-74
	Puget Sound Regional Transportation Study	1965-69
	Puget Sound Regional Transportation Study	1967-69
	Puget Sound Toll Bridge and Ferry Revenue Bonds	1948
	Puget Sound Toll Bridge and Ferry Revenue Bonds	1948

SUBJECT FILES

Box 7	Puget Sound Toll Bridge and Ferry Revenue Bonds	1948
	Receipts and Expenditures	1942-52
	Receipts and Expenditures	1953
	Report of Current Program	1956
	Resolutions	1949-64
	Resolutions	1953-54
	Resolutions, Index	
	Results International	1957-58
	Shearer, George H., Farewell Dinner	1939
	Ticket and Revenue Control	1976
	Toll Bridge Authority v. Yelle	
	Toll Bridge Authority v. Yelle	
	Toll Bridge Authority v. Yelle	1938
	Toll Bridge Authority v. Yelle	1938
	Toll Bridge Authority v. Yelle	1938
	Toll Bridge Authority v. Yelle	1940
	Toll Collection	1977-80
	Toll Collector’s Handbook	1940
	Transportation Commission, Meetings	1973-81



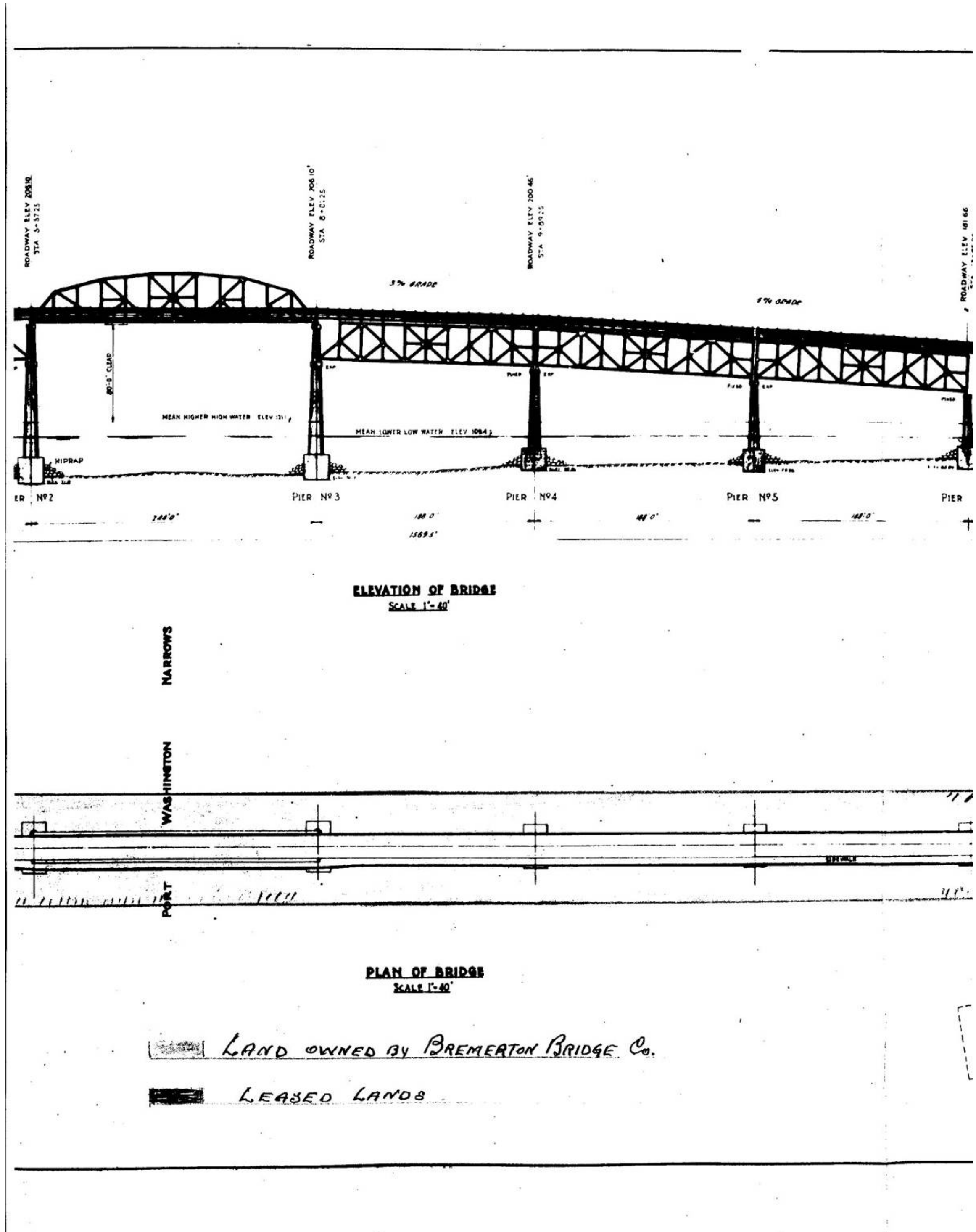
Astoria Bridge
Box 1

BRIDGE FILES

Box 1	Agate Pass Bridge	1947
	Agate Pass Bridge	1947-52
	Agate Pass Bridge, Bond Issue	1949-51
	Agate Pass Bridge, Monthly Statements	1949-52
	Agate Pass Bridge, Plans and Bids	1948-50
	Agate Pass Bridge, Puget Sound Ferry Operations	1948-49
	Agate Pass Bridge, Puget Sound Ferry Operations	ca. 1948
	Agate Pass Bridge, Revenue Fund	1950-51
	Agate Pass Bridge, Tolls	1950-51
	Agate Pass Bridge, Traffic Survey	1949
	Astoria Bridge, Construction	1961-63
	Astoria Bridge, Construction	1963
	Astoria Bridge, Construction	1963
	Astoria Bridge, Construction	1963
	Astoria Bridge, Construction	1963
	Astoria Bridge, Construction	1964
	Astoria Bridge, Construction	1964
	Astoria Bridge, Construction	1964-67
	Astoria Bridge, Ferry System	1948-54
	Astoria Bridge, Ferry System	1957-66
Box 2	Astoria Bridge, Newspaper Clippings	1958-61
	Astoria Bridge, Proposed	1953-54
	Astoria Bridge, Proposed	1954-58
	Biggs Rapids Bridge, Agreements and Contracts	1955-74
	Biggs Rapids Bridge, Auditor’s Examinations	1960-74
	Biggs Rapids Bridge, Bonds	1960
	Biggs Rapids Bridge, Bonds	1960-61
	Biggs Rapids Bridge, Consulting Engineers	1955-64
	Biggs Rapids Bridge, Correspondence	1958-78
	Biggs Rapids Bridge, Engineering Report	1959
	Biggs Rapids Bridge, Engineers’ Estimates	1959-61
	Biggs Rapids Bridge, Ferry	1960-62
	Biggs Rapids Bridge, Financial Consultant	1955-59
	Biggs Rapids Bridge, Financial Consultant	1959-60
	Biggs Rapids Bridge, Financial Consultants	1960-65
	Biggs Rapids Bridge, Financial Feasibility Study	1955
	Biggs Rapids Bridge, Foundation Drilling	1955-59
	Biggs Rapids Bridge, Klickitat County	1955-64
	Biggs Rapids Bridge, Legal Issues	1955-69
	Biggs Rapids Bridge, Newspaper Clippings	1957-58
	Biggs Rapids Bridge, Oregon Highway Department	1955-72

BRIDGE FILES

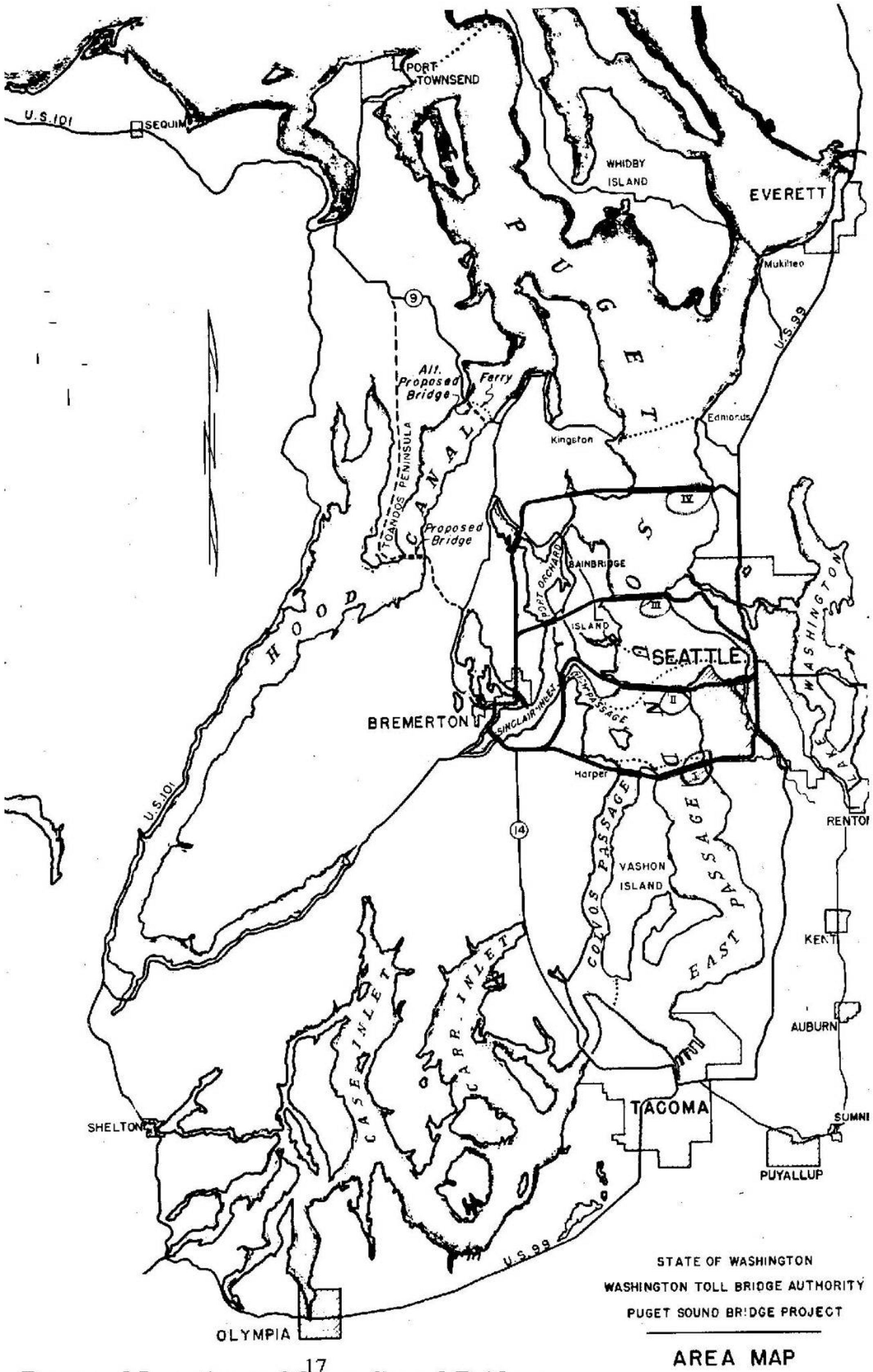
Box 3	Biggs Rapids Bridge, Permits	1958-68
	Biggs Rapids Bridge, Proposed	1955-58
	Biggs Rapids Bridge, Removal of Tolls	1974-75
	Biggs Rapids Bridge, Right of Way	1959
	Biggs Rapids Bridge, Sherman County	1955-56
	Biggs Rapids Bridge, Toll Collection	1963-75
	Biggs Rapids Bridge, Toll Plaza and Equipment	1961-63
	Biggs Rapids Bridge, Traffic	1970-74
	Biggs Rapids Bridge, Traffic and Financial Studies	1955-56
	Biggs Rapids Bridge, Traffic and Financial Studies	1957-60
	Biggs Rapids Bridge, Wasco County	1960
	Bremerton Toll Bridge	1930-36
	Bremerton Toll Bridge	1932-38
	Bremerton Toll Bridge	1934-37
	Bremerton Toll Bridge	1937-38
	Bremerton Toll Bridge	1937-38
	Bremerton Toll Bridge	1938
	Bremerton Toll Bridge	1938
	Bremerton Toll Bridge	1938
	Bremerton Toll Bridge	1938
	Bremerton Toll Bridge	1938-39
	Bremerton Toll Bridge	1938-40
	Bremerton Toll Bridge	1938-52
	Bremerton Toll Bridge	1939-40
	Bremerton Toll Bridge	1939-41
	Bridge of the Gods	1952-58
Box 4	Columbia River Interstate Bridge Studies	1944
	Colvos Passage, Design Calculations	1950-51
	Colvos Passage, Design Calculations	1951-54
	Cross-Sound Bridge, Aerial Survey	1957-58
	Cross-Sound Bridge, Analyses of Alternates	1965
	Cross-Sound Bridge, Army Corps of Engineers	1953-58
	Cross-Sound Bridge, Blyth & Co., Inc.	1955
	Cross-Sound Bridge, Consulting Engineers	1951-55
	Cross-Sound Bridge, Correspondence	1965-67
	Cross-Sound Bridge, Coverdale and Colpitts	1954-57
	Cross-Sound Bridge, Coverdale and Colpitts Report	1955
	Cross-Sound Bridge, Design Calculations	
	Cross-Sound Bridge, Design Calculations	1952
	Cross-Sound Bridge, Design Calculations, Book 2	1952



Bremerton Bridge
Box 3

BRIDGE FILES

Box 5	Cross-Sound Bridge, Design Calculations, Book 3	1953-54
	Cross-Sound Bridge, Design Calculations, Book 4	1952-53
	Cross-Sound Bridge, Design Calculations, Book 7	1950-51
	Cross-Sound Bridge, Engineers	1951-55
	Cross-Sound Bridge, Engineers	1953-65
	Cross-Sound Bridge, Engineers	1957-58
	Cross-Sound Bridge, Engineers	1962-67
	Cross-Sound Bridge, Engineers	1966-69
	Cross-Sound Bridge, Financial Feasibility Report	1958
	Cross-Sound Bridge, Financial Feasibility Report	1966
	Cross-Sound Bridge, Financing	1950-68
	Cross-Sound Bridge, Fletcher Bay	1958-69
	Cross-Sound Bridge, Hearings	1957-58
	Cross-Sound Bridge, Hearings	1958
	Cross-Sound Bridge, Illahee	1960-68
	Cross-Sound Bridge, Informational Releases	1951-64
	Cross-Sound Bridge, Informational Releases	1957-61
	Cross-Sound Bridge, Informational Releases	1957-66
Box 6	Cross-Sound Bridge, Informational Releases	1965-70
	Cross-Sound Bridge, Letters from Citizens	1952-53
	Cross-Sound Bridge, Location for	1951-54
	Cross-Sound Bridge, Location for	1957
	Cross-Sound Bridge, McLean & Company, Inc.	1958-69
	Cross-Sound Bridge, Meyer, Job L. G.	1956-61
	Cross-Sound Bridge, Newspaper Clippings	1956-58
	Cross-Sound Bridge, Newspaper Clippings	1958-59
	Cross-Sound Bridge, Origin and Destination Traffic Survey	1952
	Cross-Sound Bridge, Plans and Estimates	1957-68
	Cross-Sound Bridge, Preliminary Study	1947-49
	Cross-Sound Bridge, Preliminary Study, Second	1951
	Cross-Sound Bridge, Proposed	1948-50
	Cross-Sound Bridge, Report to Governor and Legislature	1952
	Cross-Sound Bridge, Reports	1955-59
	Cross-Sound Bridge, Resolution and Agreements	1957-66
	Cross-Sound Bridge, Resolutions and Petitions	1957-63
	Cross-Sound Bridge, Slides – see Lake Washington Bridge, Slides	
	Cross-Sound Bridge, Studies	1952-54
	Cross-Sound Bridge, Studies	1973-75
	Cross-Sound Bridge, Studies	1957-68
	Cross-Sound Bridge, Studies	1968-72
	Cross-Sound Bridge, Task Committee	1968
	Cross-Sound Bridge, United States Army	1950-57



17

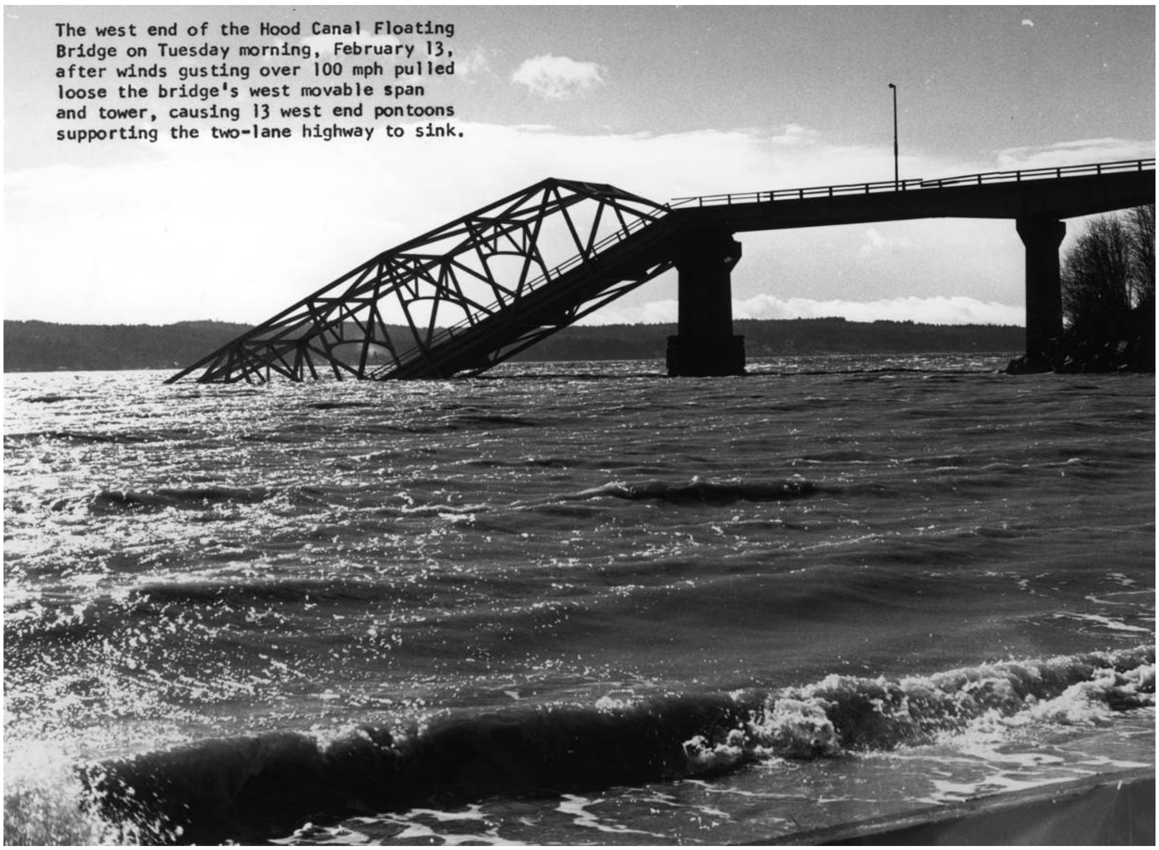
Proposed Locations of Cross-Sound Bridges

BRIDGE FILES

Box 7	Cross-Sound Bridge, United States Army	1957-58
	Cross-Sound Bridge, United States Navy	1950-58
	Cross-Sound Bridge, Vashon Island Approach to Colvos	1965
	Cross-Sound Bridge, Whidbey Island-Mainland Crossing	1968
	Cross-Sound Bridge, Whidbey Island-Mainland Crossing	1968
	Cross-Sound Bridge, Wilbur Smith and Associates	1968
	Cross-Sound Transportation Study	1961
	Cross-Sound Transportation Study	1965
	Cross-Sound Transportation Study	1965
	Cross-Sound Transportation Study	1966
	Cross-Sound Transportation Study	1971-74
	Cross-Sound Transportation Study	1972
	Cross-Sound Transportation Study	1972
	Cross-Sound Transportation Study, United States Navy	1962
	Fox Island Bridge	1954-58
	Fox Island Bridge and Tacoma Narrows Bridge, Report	1956
	Fox Island Bridge, Agreements	1951-62
Box 8	Fox Island Bridge, Auditor’s Examinations	1953-65
	Fox Island Bridge, Bond Calls	1953-56
	Fox Island Bridge, Bond Resolutions	1953
	Fox Island Bridge, Bond Retirement and Interest Payments	1954-58
	Fox Island Bridge, Bonds	1951-52
	Fox Island Bridge, Bonds	1953
	Fox Island Bridge, Bonds	1953
	Fox Island Bridge, Bonds	1953-57
	Fox Island Bridge, Bonds	1953-59
	Fox Island Bridge, Construction Fund	1953-57
	Fox Island Bridge, Contracts and Agreements	1954
	Fox Island Bridge, Correspondence	1951-70
	Fox Island Bridge, Final Design Report	1952
	Fox Island Bridge, Financial Issues	1953-57
	Fox Island Bridge, Informational Releases	1954-65
	Fox Island Bridge, Insurance	1953-57
	Fox Island Bridge, Insurance	1954-57
	Fox Island Bridge, Investments	1953-55
	Fox Island Bridge, Investments	1955-57
	Fox Island Bridge, Permits	1945-52
	Fox Island Bridge, Proposed	1941
	Fox Island Bridge, Right of Way	1953
	Fox Island Bridge, Tolls	1954-59
	Fox Island Bridge, Tolls	1954-65

BRIDGE FILES

Box 9	Fox Island Bridge, Traffic Analysis and Reports	1954-56
	Fox Island Bridge, Traffic and Revenue Estimates	1951-53
	Golden Gate Bridge	1952-53
	Government Island Bridge	1960-61
	Hood Canal Bridge, Anchor Cables	1972
	Hood Canal Bridge, Army Corps of Engineers	1953-61
	Hood Canal Bridge, Bids	1957
	Hood Canal Bridge, Construction	1957-58
	Hood Canal Bridge, Construction	1958
	Hood Canal Bridge, Construction	1958
	Hood Canal Bridge, Construction	1959
	Hood Canal Bridge, Construction	1959-60
	Hood Canal Bridge, Construction	1960
	Hood Canal Bridge, Construction	1960
	Hood Canal Bridge, Construction	1961-62
	Hood Canal Bridge, Consulting Engineers	1956-60
	Hood Canal Bridge, Consulting Engineers	1960-63
	Hood Canal Bridge, Contractor’s Claims	1960
	Hood Canal Bridge, Correspondence	1953-57
	Hood Canal Bridge, Correspondence	1956-61
Box 10	Hood Canal Bridge, Correspondence	1956-76
	Hood Canal Bridge, Correspondence	1962-79
	Hood Canal Bridge, Correspondence	1979
	Hood Canal Bridge, Correspondence	1980
	Hood Canal Bridge, Correspondence	1980
	Hood Canal Bridge, Correspondence	1980
	Hood Canal Bridge, Correspondence	1980
	Hood Canal Bridge, Correspondence	1980-82
	Hood Canal Bridge, Design Calculations	1952-53
	Hood Canal Bridge, Draw Section	1961
	Hood Canal Bridge, East Approach	1959-60
	Hood Canal Bridge, Emergency Relief Request	1979
	Hood Canal Bridge, Engineering Investigations	1959
	Hood Canal Bridge, Ferry Service	1979
	Hood Canal Bridge, Financing	1955-61
	Hood Canal Bridge, History	1960-62
	Hood Canal Bridge, Informational Releases	1954-63
Box 11	Hood Canal Bridge, Informational Releases	1954-64
	Hood Canal Bridge, Informational Releases	1957-77
	Hood Canal Bridge, Informational Releases	1961-62
	Hood Canal Bridge, Informational Releases	1964-65
	Hood Canal Bridge, Inspection Report	1962



Hood Canal Bridge
Box 10

BRIDGE FILES

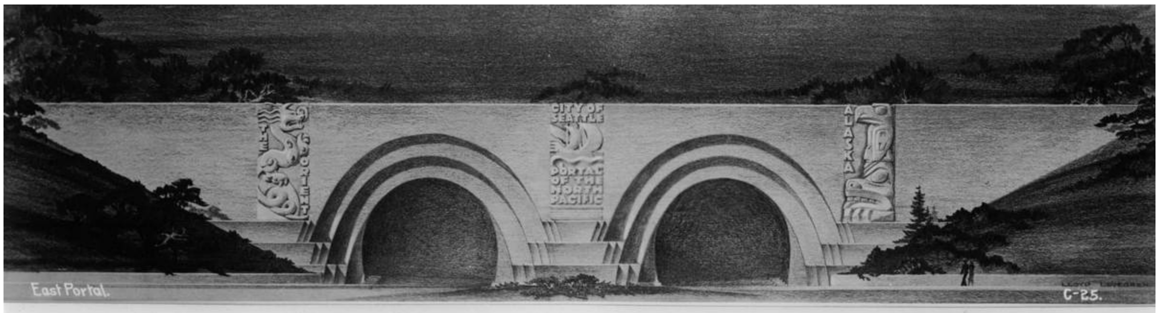
Box 11	Hood Canal Bridge, Insurance	1958-63
	Hood Canal Bridge, Insurance	1960-61
	Hood Canal Bridge, Insurance	1961-67
	Hood Canal Bridge, Insurance	1961-68
	Hood Canal Bridge, Insurance	1967-71
	Hood Canal Bridge, Insurance Policies	1961-62
	Hood Canal Bridge, Insurance Policies	1961
	Hood Canal Bridge, Maintenance	1961-64
	Hood Canal Bridge, Maintenance	1965-71
Box 12	Hood Canal Bridge, Maintenance	1972-74
	Hood Canal Bridge, Modification	1962-64
	Hood Canal Bridge, Modification	1964-65
	Hood Canal Bridge, Newspaper Clippings	1956-62
	Hood Canal Bridge, Permits	1953-74
	Hood Canal Bridge, Plans	1956-67
	Hood Canal Bridge, Pontoons	1959-66
	Hood Canal Bridge, Pontoons, Sinking	1959-60
	Hood Canal Bridge, Progress Reports	1958-60
	Hood Canal Bridge, Progress Reports	1958-60
	Hood Canal Bridge, Progress Reports	1961
	Hood Canal Bridge, Proposed	1955
	Hood Canal Bridge, Proposed	1957
	Hood Canal Bridge, Provisions	1957-60
Box 13	Hood Canal Bridge, Puget Sound Power and Light	1956-62
	Hood Canal Bridge, Replacement Recommendations	1979
	Hood Canal Bridge, Replacement Recommendations	1979
	Hood Canal Bridge, Right of Way	1954-56
	Hood Canal Bridge, Right of Way	1957-62
	Hood Canal Bridge, Storm Damage	1960
	Hood Canal Bridge, Strengthening	1961
	Hood Canal Bridge, Strengthening	1961
	Hood Canal Bridge, Strengthening	1961
	Hood Canal Bridge, Strengthening	1961
	Hood Canal Bridge, Strengthening	1961
	Hood Canal Bridge, Strengthening	1961-62
	Hood Canal Bridge, Structural Behavior, Floating Bridges	1964-72
	Hood Canal Bridge, Task Force Summary Report	1979
	Hood Canal Bridge, Toll Reductions	1978
	Hood Canal Bridge, Toll Revenue Loss Analysis	1985
	Hood Canal Bridge, Tolls	1972
	Hood Canal Bridge, West Approach	1958-61
	Hood Canal Bridge, West Approach	1958-62

BRIDGE FILES

Box 13	Hood Canal Bridge, Workboat Driftwood	1961-64
Box 14	Hood Canal Handbook, Research, Activities	1977
	Hood River Bridge	1955-74
	I-205 Bridge, Hearing	1965
	Lady Island Bridge	1958-64
	Lake Washington Bridge, Agreements	1939-41
	Lake Washington Bridge, Application to Public Works Ad.	1935
	Lake Washington Bridge, Application to Public Works Ad.	1935
	Lake Washington Bridge, Application to Public Works Ad.	1937-38
	Lake Washington Bridge, Application to Public Works Ad.	1938
	Lake Washington Bridge, Application to Public Works Ad.	1939-40
	Lake Washington Bridge, Application to Public Works Ad.	1940
	Lake Washington Bridge, Audits	1940-44
	Lake Washington Bridge, Audits	1941-49
	Lake Washington Bridge, Audits	1944-49
	Lake Washington Bridge, Automobile Markings	1939
	Lake Washington Bridge, Bellevue Overcrossing	1940
	Lake Washington Bridge, Bid Tabulations	1938
	Lake Washington Bridge, Bids	1938
	Lake Washington Bridge, Boat Service	1939-40
	Lake Washington Bridge, Boat Service	1939-40
Box 15	Lake Washington Bridge, Bond Calls	1941
	Lake Washington Bridge, Bond Calls	1942
	Lake Washington Bridge, Bond Calls	1943
	Lake Washington Bridge, Bond Calls	1944
	Lake Washington Bridge, Bond Calls	1946
	Lake Washington Bridge, Bond Calls	1947
	Lake Washington Bridge, Bond Calls	1947
	Lake Washington Bridge, Bond Calls	1948
	Lake Washington Bridge, Bond Calls	1948
	Lake Washington Bridge, Bond Calls	1949
	Lake Washington Bridge, Bond Calls	1949
	Lake Washington Bridge, Bond Calls	1950
	Lake Washington Bridge, Bond Calls	1951
	Lake Washington Bridge, Bond Issues	1939-41
	Lake Washington Bridge, Bond Issues	1940
	Lake Washington Bridge, Bond Issues	1940-41
	Lake Washington Bridge, Bond Issues	1944
	Lake Washington Bridge, Bond Issues	1944
	Lake Washington Bridge, Bond Issues	1944
	Lake Washington Bridge, Bond Issues	1944
	Lake Washington Bridge, Bond Issues	1944

BRIDGE FILES

Box 16	Lake Washington Bridge, Bond Issues	1944
	Lake Washington Bridge, Bond Issues	1945
	Lake Washington Bridge, Bond Issues, Certificates	1938-39
	Lake Washington Bridge, Bond Issues, Trust Agreement	1938-52
	Lake Washington Bridge, Bond Redemption	1945-46
	Lake Washington Bridge, Bond Trustee	1939-44
	Lake Washington Bridge, Bond Trustee	1940-41
	Lake Washington Bridge, Bond Trustee	1945-46
	Lake Washington Bridge, Bond Trustee	1945-51
	Lake Washington Bridge, Bonds	1938-40
	Lake Washington Bridge, Bonds	1938-40
	Lake Washington Bridge, Change Orders	1939-40
	Lake Washington Bridge, Change Orders, General	1939
	Lake Washington Bridge, Change Orders, Unit 1	1939
	Lake Washington Bridge, Change Orders, Unit 3	1939
	Lake Washington Bridge, Change Orders, Unit 4	1939
	Lake Washington Bridge, Change Orders, Unit 4	1939
	Lake Washington Bridge, Change Orders, Unit 4	1939-40
	Lake Washington Bridge, Change Orders, Unit 4	1939-40
	Lake Washington Bridge, Change Orders, Unit 4	1940
Box 17	Lake Washington Bridge, Change Orders, Unit 4	1940
	Lake Washington Bridge, Change Orders, Unit 4	1940
	Lake Washington Bridge, Change Orders, Unit 4	1940
	Lake Washington Bridge, Change Orders, Unit 5	1939-40
	Lake Washington Bridge, Change Orders, Unit 6	1939-40
	Lake Washington Bridge, Change Orders, Unit 6	1940
	Lake Washington Bridge, Change Orders, Unit 7	1939-40
	Lake Washington Bridge, Change Orders, Unit 7	1939-40
	Lake Washington Bridge, Change Orders, Unit 8	1939-41
	Lake Washington Bridge, Change Orders, Unit 9	1939-40
	Lake Washington Bridge, Change Orders, Unit 10	1939-41
	Lake Washington Bridge, Construction	1938
	Lake Washington Bridge, Construction	1939
	Lake Washington Bridge, Construction	1940
	Lake Washington Bridge, Construction	1940-41
Box 18	Lake Washington Bridge, Contracts and Agreements	1939
	Lake Washington Bridge, Correspondence	1937-38
	Lake Washington Bridge, Correspondence	1938
	Lake Washington Bridge, Correspondence	1938-39
	Lake Washington Bridge, Correspondence	1941
	Lake Washington Bridge, Correspondence	1941-48
	Lake Washington Bridge, Correspondence	1942-52



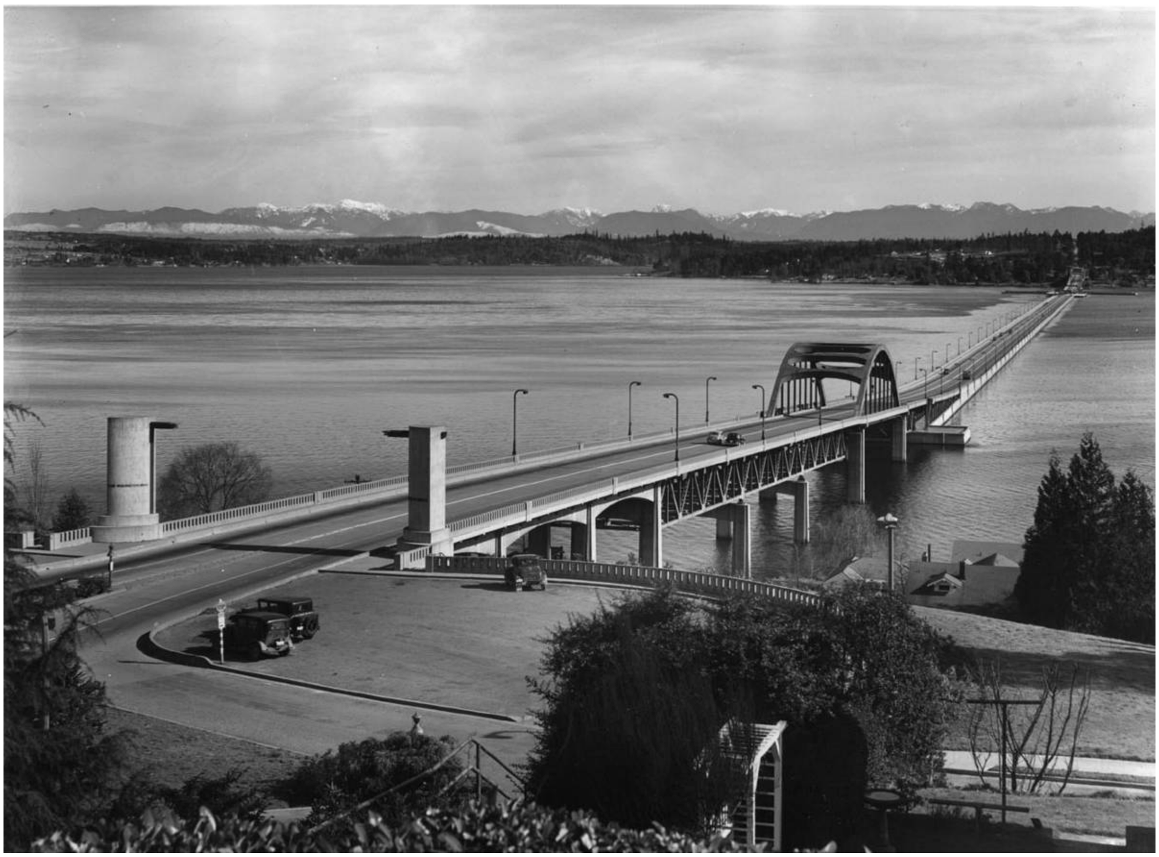
Lake Washington Bridge
Box 18

BRIDGE FILES

Box 18	Lake Washington Bridge, Correspondence	1949-54
	Lake Washington Bridge, Cost Estimates	1938
	Lake Washington Bridge, Cost Estimates	1938
	Lake Washington Bridge, Cost Estimates	1938
	Lake Washington Bridge, Design Calculations	1937
	Lake Washington Bridge, Drawings	1939
	Lake Washington Bridge, Engineer	1939-40
	Lake Washington Bridge, Engineer, Correspondence	1941
	Lake Washington Bridge, Engineers' Boats	1939-40
	Lake Washington Bridge, Final Construction Report	1940
	Lake Washington Bridge, Final Report	1940
Box 19	Lake Washington Bridge, Funds, Audits, Reports	1941-43
	Lake Washington Bridge, Funds, Audits, Reports	1944-49
	Lake Washington Bridge, General Plan and Profile	1940
	Lake Washington Bridge, Hearings	1938
	Lake Washington Bridge, Inspection and Testing Corresp.	1939-41
	Lake Washington Bridge, Insurance	1938
	Lake Washington Bridge, Insurance	1939
	Lake Washington Bridge, Insurance	1939-40
	Lake Washington Bridge, Insurance	1939-40
	Lake Washington Bridge, Insurance	1940-42
	Lake Washington Bridge, Insurance	1940-46
	Lake Washington Bridge, Insurance	1945-51
	Lake Washington Bridge, Insurance, All-risk	1939
	Lake Washington Bridge, Insurance, Burglary and Robbery	1942-49
	Lake Washington Bridge, Insurance, Multiple-risk	
	Lake Washington Bridge, Insurance, Multiple-risk	
	Lake Washington Bridge, Insurance, Multiple-risk	1941-43
	Lake Washington Bridge, Insurance, Multiple-risk	1943-46
	Lake Washington Bridge, Insurance, Multiple-risk	1945
	Lake Washington Bridge, Insurance, Multiple-risk	1946-49
	Lake Washington Bridge, Insurance, Policies	1920-41
	Lake Washington Bridge, Insurance, Public Liability	1939
Box 20	Lake Washington Bridge, Insurance, Public Liability	1942-49
	Lake Washington Bridge, Insurance, Use and Occupancy	1941-45
	Lake Washington Bridge, Insurance, Use and Occupancy	1945-49
	Lake Washington Bridge, Insurance, War, Bombardment	1942-43
	Lake Washington Bridge, Investigation of Funds	1947-48
	Lake Washington Bridge, King County Agreements	1928-39
	Lake Washington Bridge, King County Agreements	1937-38
	Lake Washington Bridge, Land Acquisition	1940-41
	Lake Washington Bridge, Legal and Financial Issues	1945

BRIDGE FILES

Box 20	Lake Washington Bridge, Legal Issues	1939
	Lake Washington Bridge, Legal Issues	1940-41
	Lake Washington Bridge, Loomis Armored Car Service	1941-49
	Lake Washington Bridge, Materials Reports	1938-39
	Lake Washington Bridge, Mercer Island, 72nd Avenue	1940
	Lake Washington Bridge, Mercer Island, East Street Overc.	1939-40
	Lake Washington Bridge, Mercer Island, Water Association	1939-41
	Lake Washington Bridge, Miscellaneous	1938
	Lake Washington Bridge, Miscellaneous	1939-40
	Lake Washington Bridge, Monthly Revenue and Traffic	1940-44
	Lake Washington Bridge, Monthly Revenue and Traffic	1945-46
	Lake Washington Bridge, Monthly Revenue and Traffic	1947-48
	Lake Washington Bridge, Monthly Revenue and Traffic	1949-51
	Lake Washington Bridge, Navigation Fender	1942
	Lake Washington Bridge, Photographs	1939-41
	Lake Washington Bridge, Photographs and Maps	
	Lake Washington Bridge, Photographs, Unit 2	1939-40
	Lake Washington Bridge, Photographs, Unit 3	1939
	Lake Washington Bridge, Photographs, Unit 4	1939-40
	Lake Washington Bridge, Photographs, Unit 5	1940
	Lake Washington Bridge, Photographs, Unit 7	1939-40
	Lake Washington Bridge, Photographs, Unit 9	1940
	Lake Washington Bridge, Photographs, Unit 10	1940
	Lake Washington Bridge, Pier Fenders	1941-42
	Lake Washington Bridge, Planning	1938
Box 21	Lake Washington Bridge, Planning	1938
	Lake Washington Bridge, Planning	1938
	Lake Washington Bridge, Planning	1938
	Lake Washington Bridge, Planning	1938
	Lake Washington Bridge, Planning	1938
	Lake Washington Bridge, Plans, List	1944
	Lake Washington Bridge, Progress Reports	1938
	Lake Washington Bridge, Progress Reports	1938
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1939
	Lake Washington Bridge, Progress Reports, Monthly	1940
	Lake Washington Bridge, Progress Reports, Monthly	1940
	Lake Washington Bridge, Progress Reports, Monthly	1940



Lake Washington Bridge
Box 20

BRIDGE FILES

Box 22	Lake Washington Bridge, Progress Reports, Monthly	1940
	Lake Washington Bridge, Progress Reports, Monthly	1940
	Lake Washington Bridge, Progress Reports, Monthly	1940
	Lake Washington Bridge, Progress Reports, Weekly	1939
	Lake Washington Bridge, Progress Reports, Weekly	1939
	Lake Washington Bridge, Progress Reports, Weekly	1939
	Lake Washington Bridge, Progress Reports, Weekly	1939-40
	Lake Washington Bridge, Progress Reports, Weekly	1940
	Lake Washington Bridge, Progress Reports, Weekly	1940
	Lake Washington Bridge, Proposed	1937
	Lake Washington Bridge, Public Works Administration Grant	
	Lake Washington Bridge, Public Works Administration	1938-39
	Lake Washington Bridge, Public Works Administration	1939-40
	Lake Washington Bridge, Public Works Administration	1939-41
	Lake Washington Bridge, Public Works Administration	1940
	Lake Washington Bridge, Publicity	1939-40
	Lake Washington Bridge, Publicity	1939-40
	Lake Washington Bridge, Publicity	1940
	Lake Washington Bridge, Publicity, Pamphlet	1940
	Lake Washington Bridge, Publicity, Pamphlet	1940-41
	Lake Washington Bridge, Publicity, Requests	1939-40
	Lake Washington Bridge, Repairs and Additions	1940-41
	Lake Washington Bridge, Reports and Pamphlets	1939-40
	Lake Washington Bridge, Right of Way	1939-41
Box 23	Lake Washington Bridge, Seattle, City of, Water Dept.	1939-41
	Lake Washington Bridge, Slides	
	Lake Washington Bridge, Station 363+32 Overcrossing	1940
	Lake Washington Bridge, Steel Flooring	1939
	Lake Washington Bridge, Steel Test Reports	1939
	Lake Washington Bridge, Temperature Studies	1943
	Lake Washington Bridge, Tensometer	1941
	Lake Washington Bridge, Time Extension and Completion	1939-40
	Lake Washington Bridge, Toll Registers	1940
	Lake Washington Bridge, Toll Registers, Burroughs	
	Lake Washington Bridge, Toll Registers, National	
	Lake Washington Bridge, Toll Registers, Ohmer	
	Lake Washington Bridge, Tolls	1940-41
	Lake Washington Bridge, Tolls	1940-41
	Lake Washington Bridge, Traffic	1941
	Lake Washington Bridge, Traffic and Revenues	1938
	Lake Washington Bridge, Traffic and Toll Rates	1940
	Lake Washington Bridge, Trust Indenture	
	Lake Washington Bridge, Unit 1	1939-40

Box 23	Lake Washington Bridge, Unit 1, Change Orders	1939-40
Box 24	Lake Washington Bridge, Unit 1, Seattle Approach	1938
	Lake Washington Bridge, Unit 1, Seattle Approach, Design	1938
	Lake Washington Bridge, Unit 2	1938-39
	Lake Washington Bridge, Unit 2	1939
	Lake Washington Bridge, Unit 2	1939-40
	Lake Washington Bridge, Unit 2	1940
	Lake Washington Bridge, Unit 2	1940
	Lake Washington Bridge, Unit 2	1940-41
	Lake Washington Bridge, Unit 2, Change Orders	1939
	Lake Washington Bridge, Unit 2, Change Orders	1939-40
	Lake Washington Bridge, Unit 2, Change Orders	1939-40
	Lake Washington Bridge, Unit 2, Change Orders	1940
Box 25	Lake Washington Bridge, Unit 2, Change Orders	1940
	Lake Washington Bridge, Unit 2, Change Orders	1940
	Lake Washington Bridge, Unit 2, Tunnel, Design Drawings	1938
	Lake Washington Bridge, Unit 3	1939-40
	Lake Washington Bridge, Unit 3	1939-41
	Lake Washington Bridge, Unit 3, Change Orders	1939-40
	Lake Washington Bridge, Unit 3, West Approach, Design	1938
	Lake Washington Bridge, Unit 4	1938
	Lake Washington Bridge, Unit 4	1938-40
	Lake Washington Bridge, Unit 4	1939
	Lake Washington Bridge, Unit 4	1939
	Lake Washington Bridge, Unit 4	1940
Box 26	Lake Washington Bridge, Unit 4	1940
	Lake Washington Bridge, Unit 4	1940-41
	Lake Washington Bridge, Unit 4, Change Orders	1940
	Lake Washington Bridge, Unit 5	1939-40
	Lake Washington Bridge, Unit 5	1939-41
	Lake Washington Bridge, Unit 5, Change Orders	1940
	Lake Washington Bridge, Unit 5, East Approach	1938
	Lake Washington Bridge, Unit 5, East Approach, Design	1938
	Lake Washington Bridge, Unit 6	1939-40
	Lake Washington Bridge, Unit 6	1939-40
	Lake Washington Bridge, Unit 6, Change Orders	1938-40
	Lake Washington Bridge, Unit 6, Grading and Paving	1938
	Lake Washington Bridge, Unit 7	1939-41
	Lake Washington Bridge, Unit 7	1939-41
	Lake Washington Bridge, Unit 7, Change Orders	1939-40
	Lake Washington Bridge, Unit 7, Mercer Island Bridges	1938
	Lake Washington Bridge, Unit 8	1939-41

BRIDGE FILES

Box 27	Lake Washington Bridge, Unit 8	1939-41
	Lake Washington Bridge, Unit 8, Change Orders	1939-41
	Lake Washington Bridge, Unit 8, Mud-jacking	1940
	Lake Washington Bridge, Unit 9	1939-40
	Lake Washington Bridge, Unit 9	1939-40
	Lake Washington Bridge, Unit 9, Change Orders	1939-40
	Lake Washington Bridge, Unit 9, East Channel Bridge	1938
	Lake Washington Bridge, Unit 9, East Channel Bridge	1938-40
	Lake Washington Bridge, Unit 10	1939-41
	Lake Washington Bridge, Unit 10	1939-41
	Lake Washington Bridge, Unit 10, Change Orders	1939-40
	Lake Washington Bridge, Unit 10, Grading and Paving	1938
	Lake Washington Bridge, Unit 11	1939-40
	Lake Washington Bridge, Unit 11	1939-40
	Lake Washington Bridge, Unit 11, Change Orders	1939
	Lake Washington Bridge, Unit 11, Change Orders	1939
	Lake Washington Bridge, Unit 11, Change Orders	1939
	Lake Washington Bridge, Unit 11, Mercer Slough Bridge	1938
	Lake Washington Bridge, United States War Department	1937-40
Box 28	Lake Washington, Area East of, Economic Survey	1951
	Lake Washington, Ferries	1938-41
	Lake Washington, Reflected Waves	1965
	Lake Washington, Shoreline, Wave Action	1968
	Longview Toll Bridge, Accounting	1947-54
	Longview Toll Bridge, Agreements and Contracts	1955-62
	Longview Toll Bridge, Auditor’s Examinations	1947-58
	Longview Toll Bridge, Auditor’s Examinations	1947-59
	Longview Toll Bridge, Auditor’s Examinations	1959-65
	Longview Toll Bridge, Bond Resolution	1947
	Longview Toll Bridge, Correspondence, History, Newsp.	1947-53
	Longview Toll Bridge, Correspondence	1949
	Longview Toll Bridge, Correspondence	1953-57
	Longview Toll Bridge, Correspondence	1954-58
	Longview Toll Bridge, Correspondence	1958-74
	Longview Toll Bridge, Easements and Franchises	1956
	Longview Toll Bridge, Informational Releases	1947-50
	Longview Toll Bridge, Informational Releases	1948-56
	Longview Toll Bridge, Informational Releases	1950-58
	Longview Toll Bridge, Informational Releases	1955-72
	Longview Toll Bridge, Investigations	1949-52
	Longview Toll Bridge, Legal Issues	1959-67
	Longview Toll Bridge, Maintenance	1955-62

BRIDGE FILES

Box 29	Longview Toll Bridge, Port of Longview	1960-64
	Longview Toll Bridge, Port of Longview	1961
	Longview Toll Bridge, Purchase	1946
	Longview Toll Bridge, Rainier Drainage District	1961
	Longview Toll Bridge, Removal of Tolls	1965
	Longview Toll Bridge, Tolls	1948-57
	Longview Toll Bridge, Tolls	1948-65
	Longview Toll Bridge, United States Army, Debris	1959-61
	Longview Toll Bridge, Washington Approach	1949-51
	North Richland Bridge, H. B. 1511	1976
	North Richland Bridge, Interim Report	1980
	North Richland Bridge, Legislative Studies	1970-76
	Pasco-Kennewick Bridge, Financing	1969
	Pontoon, Concrete Floating Bridge, Model and Study	1967
	Port Orchard Passage Bridges (Fletcher Bay), Proposed	1960-62
	Port Washington Narrows Bridge, Army Corps of Engineers	1955
	Port Washington Narrows Bridge, Audits	1956-60
	Port Washington Narrows Bridge, Audits	1956-73
	Port Washington Narrows Bridge, Audits	1970-73
	Port Washington Narrows Bridge, Bond Calls	1972-73
	Port Washington Narrows Bridge, Bonds	1954-58
	Port Washington Narrows Bridge, Bonds	1956
	Port Washington Narrows Bridge, Bonds	1956
	Port Washington Narrows Bridge, Bonds	1956
	Port Washington Narrows Bridge, Bonds	1956-58
	Port Washington Narrows Bridge, Budgets	1961-72
	Port Washington Narrows Bridge, City of Bremerton	1953-57
	Port Washington Narrows Bridge, City of Bremerton	1957-60
Box 30	Port Washington Narrows Bridge, Consulting Engineers	1956-58
	Port Washington Narrows Bridge, Correspondence	1953-58
	Port Washington Narrows Bridge, Correspondence	1958-61
	Port Washington Narrows Bridge, Correspondence	1963-73
	Port Washington Narrows Bridge, Cost Estimate and Plans	1956
	Port Washington Narrows Bridge, Illumination and Signs	1958-59
	Port Washington Narrows Bridge, Informational Releases	1955-62
	Port Washington Narrows Bridge, Informational Releases	1963-74
	Port Washington Narrows Bridge, Legal Issues	1954-65
	Port Washington Narrows Bridge, Newspaper Clippings	1956-58
	Port Washington Narrows Bridge, Painting and Lighting	1958-59
	Port Washington Narrows Bridge, Permits	1955
	Port Washington Narrows Bridge, Plans	1958
	Port Washington Narrows Bridge, Proposed	1954
	Port Washington Narrows Bridge, Proposed	1954

BRIDGE FILES

Box 30	Port Washington Narrows Bridge, Railing	1960
	Port Washington Narrows Bridge, Resolutions	1956
	Port Washington Narrows Bridge, Superstructure and Sub.	1957-62
	Port Washington Narrows Bridge, Toll Collection	1958-71
	Port Washington Narrows Bridge, Tudor Engineering Co.	1953-57
	Port Washington Narrows Bridge, Tudor Engineering Co.	1957-59
Box 31	Prism, Semi-immersed, Dynamic Response under Motion	1967
	Rich Passage Bridge	1966-67
	Rich Passage Suspension Bridge, Design Calculations	1950-54
	Rich Passage Suspension Bridge, Design Calculations	1952
	San Francisco-Oakland Bay Bridge	1945
	Satsop River Bridges	1965
	Second Lake Washington Bridge, Access, Resolutions	1955-62
	Second Lake Washington Bridge, Agreements, Contracts	1955-59
	Second Lake Washington Bridge, Agreements, Contracts	1961-80
	Second Lake Washington Bridge, Agreements, Contracts	1973-79
	Second Lake Washington Bridge, Army Corps of Engineers	1954-61
	Second Lake Washington Bridge, Auditor’s Examinations	1963-78
	Second Lake Washington Bridge, Audits	1974-80
	Second Lake Washington Bridge, Bonds	1952-53
	Second Lake Washington Bridge, Bonds	1952-63
	Second Lake Washington Bridge, Bonds	1960
	Second Lake Washington Bridge, Bonds	1960-73
Box 32	Second Lake Washington Bridge, Bureau of Public Roads	1958-61
	Second Lake Washington Bridge, Carbon Monoxide	1968-75
	Second Lake Washington Bridge, Carbon Monoxide	1974-77
	Second Lake Washington Bridge, City of Seattle	1954-62
	Second Lake Washington Bridge, Consulting Engineer	1952-60
	Second Lake Washington Bridge, Consulting Engineer	1953-59
	Second Lake Washington Bridge, Consulting Engineer	1954-58
	Second Lake Washington Bridge, Consulting Engineer	1955-57
	Second Lake Washington Bridge, Consulting Engineer	1960
	Second Lake Washington Bridge, Correspondence	1951-54
	Second Lake Washington Bridge, Correspondence	1954-55
	Second Lake Washington Bridge, Correspondence	1954-57
	Second Lake Washington Bridge, Correspondence	1955-66
	Second Lake Washington Bridge, Correspondence	1962-68
	Second Lake Washington Bridge, Correspondence	1970-79
	Second Lake Washington Bridge, Draw Span Contract	1955
	Second Lake Washington Bridge, Drawings, Negatives	1958
	Second Lake Washington Bridge, East Approach	1958-63
	Second Lake Washington Bridge, East West Approaches	1955-63

BRIDGE FILES

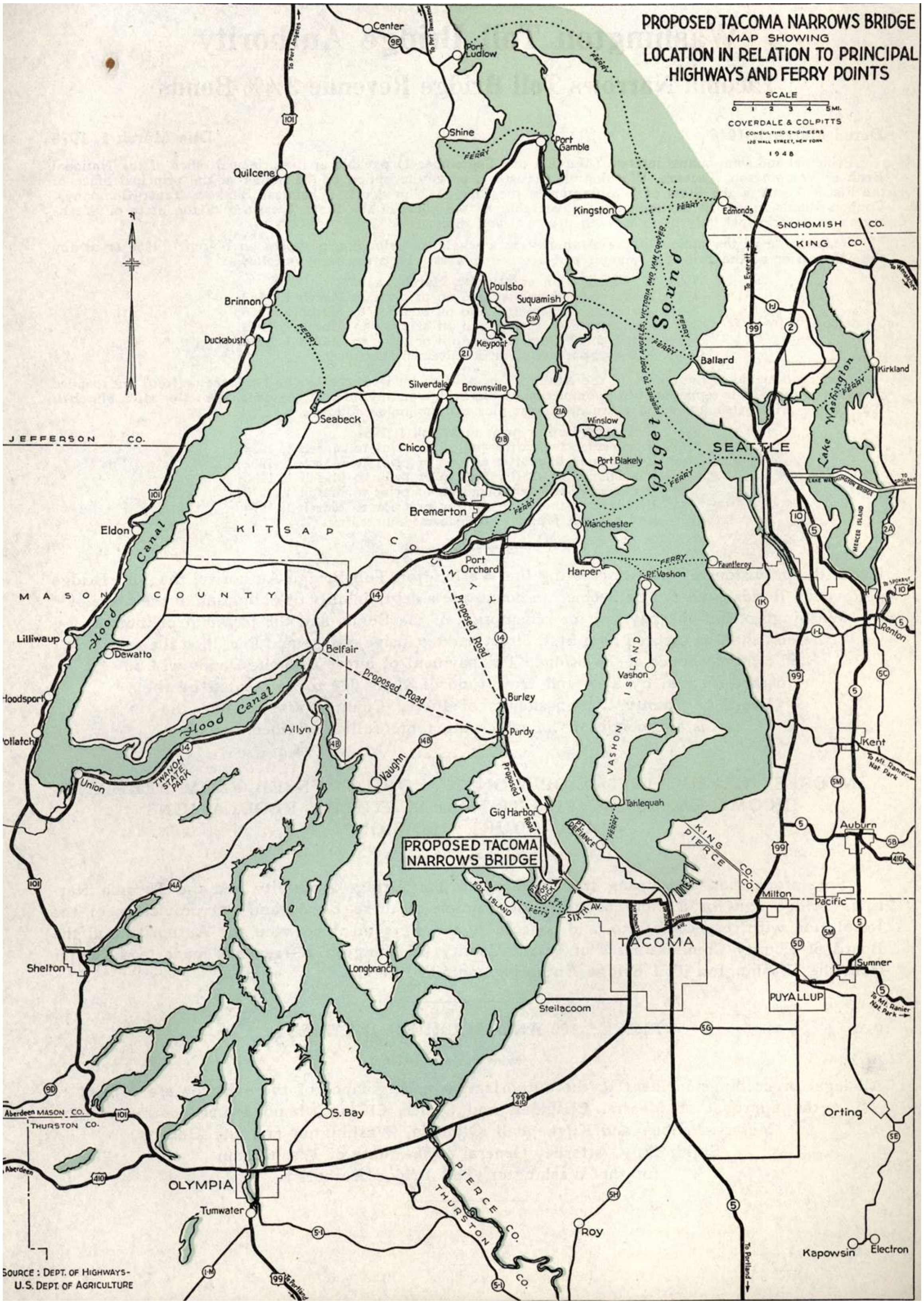
Box 32	Second Lake Washington Bridge, Edgewater Property	1960-62
	Second Lake Washington Bridge, Emergency Water Safety	1973
	Second Lake Washington Bridge, Engineer's Estimates	1957-62
Box 33	Second Lake Washington Bridge, Estimated Traffic	1957-59
	Second Lake Washington Bridge, Fifth Lane	1977
	Second Lake Washington Bridge, Financial Data	1978
	Second Lake Washington Bridge, Financing	1953-59
	Second Lake Washington Bridge, Financing, Rejected	1952-63
	Second Lake Washington Bridge, Foundation Investigation	1959
	Second Lake Washington Bridge, Hearings	1955-53
	Second Lake Washington Bridge, Informational Releases	1953-59
	Second Lake Washington Bridge, Informational Releases	1960-63
	Second Lake Washington Bridge, Informational Releases	1963-66
	Second Lake Washington Bridge, Informational Releases	1967-79
	Second Lake Washington Bridge, Informational Releases	1971-79
	Second Lake Washington Bridge, Informational Releases	1973-77
	Second Lake Washington Bridge, Insurance	1959-66
	Second Lake Washington Bridge, Insurance	1966-73
	Second Lake Washington Bridge, King County Contrib.	1962-79
	Second Lake Washington Bridge, Legal Issues	1959
	Second Lake Washington Bridge, Legal Issues	1955-70
	Second Lake Washington Bridge, Legal Issues	1955-79
Box 34	Second Lake Washington Bridge, Legal Issues	1959-60
	Second Lake Washington Bridge, Limited Access	1955-58
	Second Lake Washington Bridge, Location	1956-57
	Second Lake Washington Bridge, Maintenance	1962-69
	Second Lake Washington Bridge, Materials Lab, Testing	1955-61
	Second Lake Washington Bridge, Net Toll Revenues, Debt	1965
	Second Lake Washington Bridge, Newspaper Clippings	1962-63
	Second Lake Washington Bridge, Noise	1965-68
	Second Lake Washington Bridge, One-way Toll Study	1975
	Second Lake Washington Bridge, Opening Ceremonies	1963
	Second Lake Washington Bridge, Parallel, Proposed	1968
	Second Lake Washington Bridge, Passenger Occupancy	1971-77
	Second Lake Washington Bridge, Permits	1954-64
	Second Lake Washington Bridge, Petitions	1953
	Second Lake Washington Bridge, Petitions	1953
	Second Lake Washington Bridge, Petitions	1953
Box 35	Second Lake Washington Bridge, Petitions	1953
	Second Lake Washington Bridge, Petitions	1953
	Second Lake Washington Bridge, Petitions	1956

BRIDGE FILES

Box 35	Second Lake Washington Bridge, Petitions	1956-57
	Second Lake Washington Bridge, Preliminary Report	1952
	Second Lake Washington Bridge, Preliminary Report	1953
	Second Lake Washington Bridge, Preliminary Report, 2nd	1954
	Second Lake Washington Bridge, Proposals	1957
	Second Lake Washington Bridge, Proposed	1956-57
	Second Lake Washington Bridge, Proposed	1956-57
	Second Lake Washington Bridge, Proposed	1957
	Second Lake Washington Bridge, Proposed	1958-59
	Second Lake Washington Bridge, Resolution	1959
	Second Lake Washington Bridge, Right of Way	1956-61
	Second Lake Washington Bridge, Roanoke Expressway	1961-66
Box 36	Second Lake Washington Bridge, Safety	1968-73
	Second Lake Washington Bridge, Seattle Chamber of Com.	1955-59
	Second Lake Washington Bridge, Seattle Transit System	1957
	Second Lake Washington Bridge, State Route 520	1972
	Second Lake Washington Bridge, Storm Damage	1971-73
	Second Lake Washington Bridge, Structural Engineer	1955-56
	Second Lake Washington Bridge, Tariff and Traffic Rev.	1968
	Second Lake Washington Bridge, Tariffs	1975-76
	Second Lake Washington Bridge, Tariffs	1975-79
	Second Lake Washington Bridge, Telephones	1965-73
	Second Lake Washington Bridge, Toll Booths, Number of	1961
	Second Lake Washington Bridge, Toll Booths, Ventilation	1972
	Second Lake Washington Bridge, Toll Collection	1961-63
	Second Lake Washington Bridge, Toll Collection, One-way	1975
	Second Lake Washington Bridge, Toll Plaza and Admin.	1954-62
	Second Lake Washington Bridge, Toll Plaza and Admin.	1954-78
	Second Lake Washington Bridge, Toll Plaza and Admin.	1957-62
	Second Lake Washington Bridge, Toll Removal	1977
	Second Lake Washington Bridge, Toll Study	1965-75
	Second Lake Washington Bridge, Traffic and Revenues	1953-60
	Second Lake Washington Bridge, Traffic and Revenues	1960-65
	Second Lake Washington Bridge, Traffic Survey for	1949
	Second Lake Washington Bridge, U-Bolt Modification	1967
	Second Lake Washington Bridge, Unit 1	1959-61
	Second Lake Washington Bridge, Unit 1	1960-61
	Second Lake Washington Bridge, Unit 1	1961-62
Box 37	Second Lake Washington Bridge, Unit 1	1961-63
	Second Lake Washington Bridge, Unit 1	1961-69
	Second Lake Washington Bridge, Unit 1	1963-65
	Second Lake Washington Bridge, Wave Action Study	1964-74

BRIDGE FILES

Box 37	Second Lake Washington Bridge, Wave Damage Claims	1964-72
	Second Lake Washington Bridge, West Approach Fountains	1955-64
	Second Lake Washington Bridge, West Approaches	1969-72
	Spokane River Bridge, Maple Street, Auditor Examinations	1956-59
	Spokane River Bridge, Maple Street, Bonds	1956
	Spokane River Bridge, Maple Street, Correspondence	1969-70
	Spokane River Bridge, Maple Street, Financial Stability	1968
	Spokane River Bridge, Maple Street, Illumination & Signs	1957
	Spokane River Bridge, Maple Street, Informational Releases	1954-78
	Spokane River Bridge, Maple Street, Legal Issues	1957-78
	Spokane River Bridge, Maple Street, Newspaper Clippings	1956-58
	Spokane River Bridge, Maple Street, Proposed	1951-56
	Spokane River Bridge, Maple Street, Proposed	1954
	Spokane River Bridge, Maple Street, Railroads	1956
	Spokane Traffic Survey	1946


PROPOSED TACOMA NARROWS BRIDGE
MAP SHOWING
LOCATION IN RELATION TO PRINCIPAL
HIGHWAYS AND FERRY POINTS
SCALE
COVERDALE & COLPITTS
CONSULTING ENGINEERS
120 WALL STREET, NEW YORK
1948
PROPOSED TACOMA
NARROWS BRIDGE
SOURCE: DEPT. OF HIGHWAYS-
U.S. DEPT. OF AGRICULTURE
Center
Port Ludlow
Shine
Port Gamble
Quilcene
Kingston
Edmonds
SNOHOMISH CO.
KING CO.
Poulsbo
Suquamish
Brinnon
Duckabush
Keyport
Ballard
Kirkland
Silverdale
Brownsville
Seabeck
Winslow
JEFFERSON CO.
Chico
Port Blakely
SEATTLE
Puget Sound
Lake Washington
Bremerton
Manchester
Eldon
KITSAP COUNTY
Hood Canal
Port Orchard
Harper
Fauntleroy
Pt. Vashon
MASON COUNTY
Proposed Road
Lilliwaup
Dewatto
Belfair
Renton
VASHON ISLAND
Vashon
Hoodsport
Burley
Allyn
Purdy
Kent
Vaughn
Union
TWANOH STATE PARK
Tahlequah
Gig Harbor
Auburn
KING CO.
PIERCE CO.
Milton
Pacific
SIXTH AV.
TACOMA
Shelton
Longbranch
Sumner
PUYALLUP
Steilacoom
Orting
S. Bay
Aberdeen
THURSTON CO.
OLYMPIA
Tumwater
PIERCE CO.
THURSTON CO.
Roy
Kapowsin
Electron
FERRY

History of the Tacoma Narrows Bridge

The city of Tacoma in Pierce County, Washington, is bordered on the west by Puget Sound, almost a mile wide even in the "Narrows" and characterized in this region by formidably deep swift currents. Across the water lies the Kitsap Peninsula, containing the city of Bremerton, the Puget Sound Naval Shipyard, towns, farms, hundreds of miles of beautiful coast line, and access to the Olympic Peninsula. For decades, it was easy for people to look at a map of southern Puget Sound, or to look out across the waters of the Sound itself, and envision the advantages of a bridge connecting the two areas. As early as 1889, a railroad bridge was proposed, but fifty years later there were still only two ways to get from the Tacoma area to the Kitsap and Olympic Peninsulas, or vice versa: driving south through Olympia and Shelton and then north again, or taking a ferry. The Skansonia, the Crosline and the City of Tacoma carried cars and passengers across the Tacoma Narrows for more than twenty years, but were a slow method of travel involving frequent delays.

The proposed bridge would provide many benefits. It would be in the interests of national defense to link the Shipyard with Fort Lewis, McChord Air Force Base, on which construction began in 1938, and Camp Murray. More tourists would visit the Olympic Mountains, Forest and Park if it were easier to get to them. "Development"-minded businesspeople wanted to sell shorefront and other property on the Peninsulas to homebuyers. Farm products and other raw materials could be transported more easily, and all sort of businesses wanted to attract more shoppers. During the Great Depression, construction projects such as a Tacoma Narrows bridge (and a floating bridge across Lake Washington) were ways to alleviate unemployment.

For years, private interests such as businessmen's clubs and Chambers of Commerce tried to promote the idea of building a bridge to replace the ferry system. In 1932, Elbert Chandler, a civil engineer, envisioned a bridge somewhat south of the present site, organized a Tacoma Narrows Bridge Company and asked the federal Reconstruction Finance Commission for funds, which were denied. Two years later, the Legislature passed a bill permitting counties to build and operate toll bridges. Pierce County asked the federal Public Works Administration for funds, which were also denied, even though Governor Clarence Martin had set aside $700,000 of state money to meet federal requirements. Legislators continued to lobby the PWA.

As the urging of Governor Martin, the 1937 Legislature created the Washington State Toll Bridge Authority, which had the power to finance, construct and operate toll bridges. Immediately, the Pierce County Commissioners requested the Authority to study the feasibility of a bridge across the Narrows. The Legislature appropriated $25,000 for the study, which was completed in May 1938 with a request from the state to the Public Works Administration for money to design and build the Bridge. Plans and designs were drawn up by the Washington State Department of Highways, which also selected the site.

The PWA approved a grant of 45% of the costs with the Reconstruction Finance Commission loaning the rest, provided that independent consultants checked the plans.

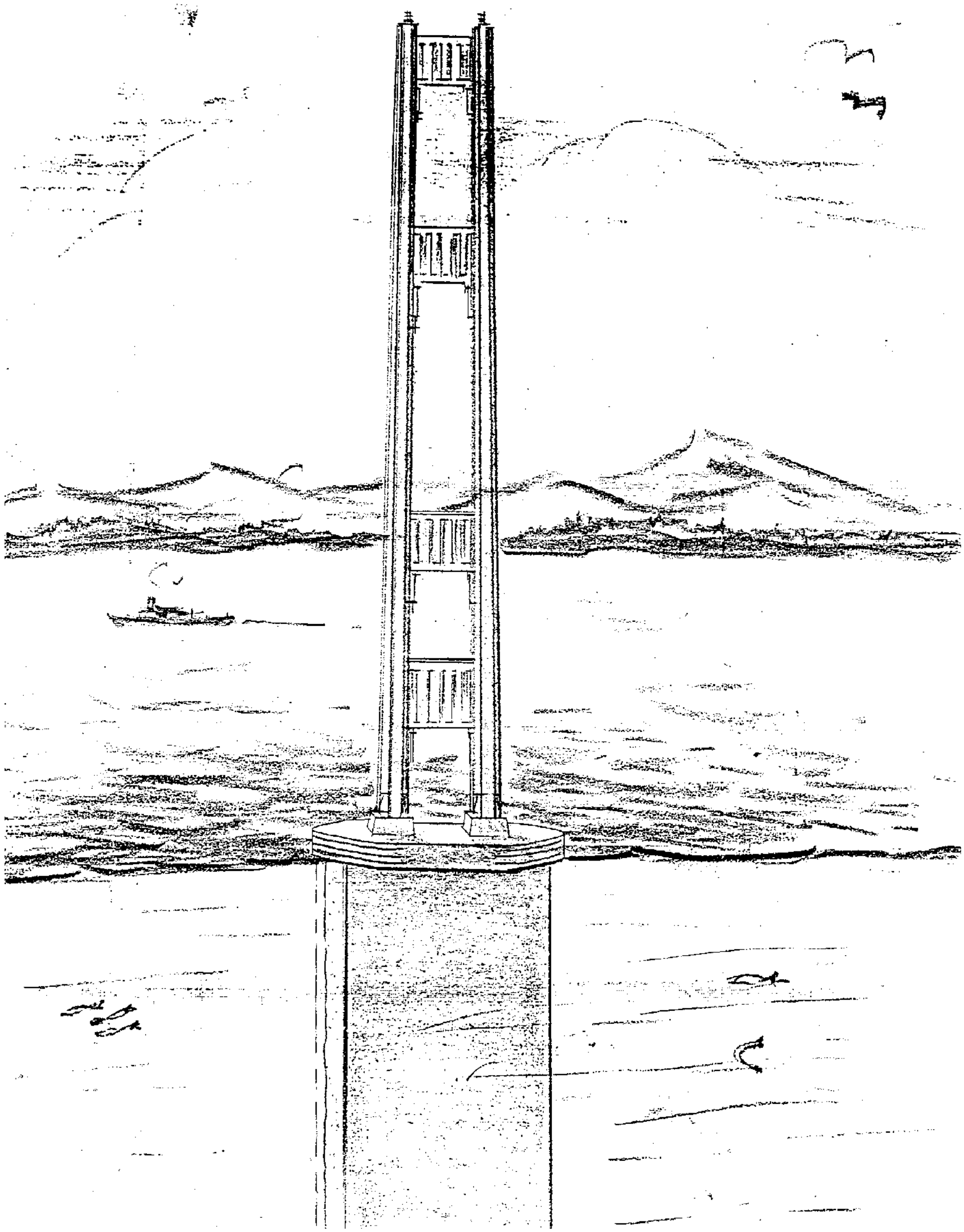
Engineer Leon Moisseiff and the New York firm of Moran and Proctor made substantial changes in the design of the superstructure and the foundation, respectively, and the amended plans were approved by the PWA. When bidding was opened on the construction of the bridge on 2 September 1938, only one bid was received and it subsequently proved to be about $700,000 higher than the available funds. The consulting board for the Lake Washington Bridge (Charles E. Andrew, Chairman) was asked to modify the plans in order to reduce the costs. The new plans restored the original foundation, changed the floor system and deck, and lowered the costs to an acceptable figure. There was no time left to redesign the superstructure before bidding was reopened on 27 September, since the PWA required that the bid be let by 31 December.

The Pacific Bridge Company, as the lowest bidder, won the contract with a bid of almost $6,000,000. The Company was a combination of the Pacific Bridge Company of San Francisco, the General Construction Company of Seattle, and the Columbia Construction Company of Bonneville, Oregon. The Bethlehem Steel Company was to provide and erect the steel and wire. Subcontractors handled concrete, lighting, elevators, painting, and the construction of the administration buildings and toll booths. Pierce County provided some funds for exploratory drilling and for the east approach which would link the bridge with the city streets, and also bought the ferry system across the Narrows for $300,000. Regular highway funds were to provide for the west approach, which would link the bridge with the highways of the Peninsulas. Construction began on 25 November 1938.

The Tacoma Narrows Bridge was the third-longest suspension bridge in the world. The central span was 2800 feet long, each side span was 1100 feet long, and the shore approaches totaled 939 feet. The two towers rose up out of piers sunk deeply into the compacted sand and gravel under the waters of Puget Sound. The piers were 66 feet wide and 120 feet long and were made of reinforced concrete with steel frames. They were each supported by more than 14,000 tons of caisson anchors, concrete blocks which were towed into place by barges and dumped. Working on the piers involved much hazardous work by “hard hat” divers wearing heavy awkward equipment, weighed down by extra lead weights, and working in murky water 120 feet deep with currents of over eight miles per hour. Work went on around the clock, seven days a week.

The two steel towers stood 425 feet above the water and had saddles at the tops to hold the huge suspension cables, which were more than 17 inches in diameter and held up a total weight of more than 11,250 tons. The cables contained more than 19,000 miles of wire. Each of the shore anchorages, to which the cables were connected by eye bars, were made of more than 40,000 tons of concrete.

The roadway was about 200 feet above the water, to allow ships to pass underneath. To save money and because traffic was expected to be light, the roadway was only two lanes wide. Its length and slimness made the bridge the narrowest ever constructed in terms of width to span ratio.



Box 44

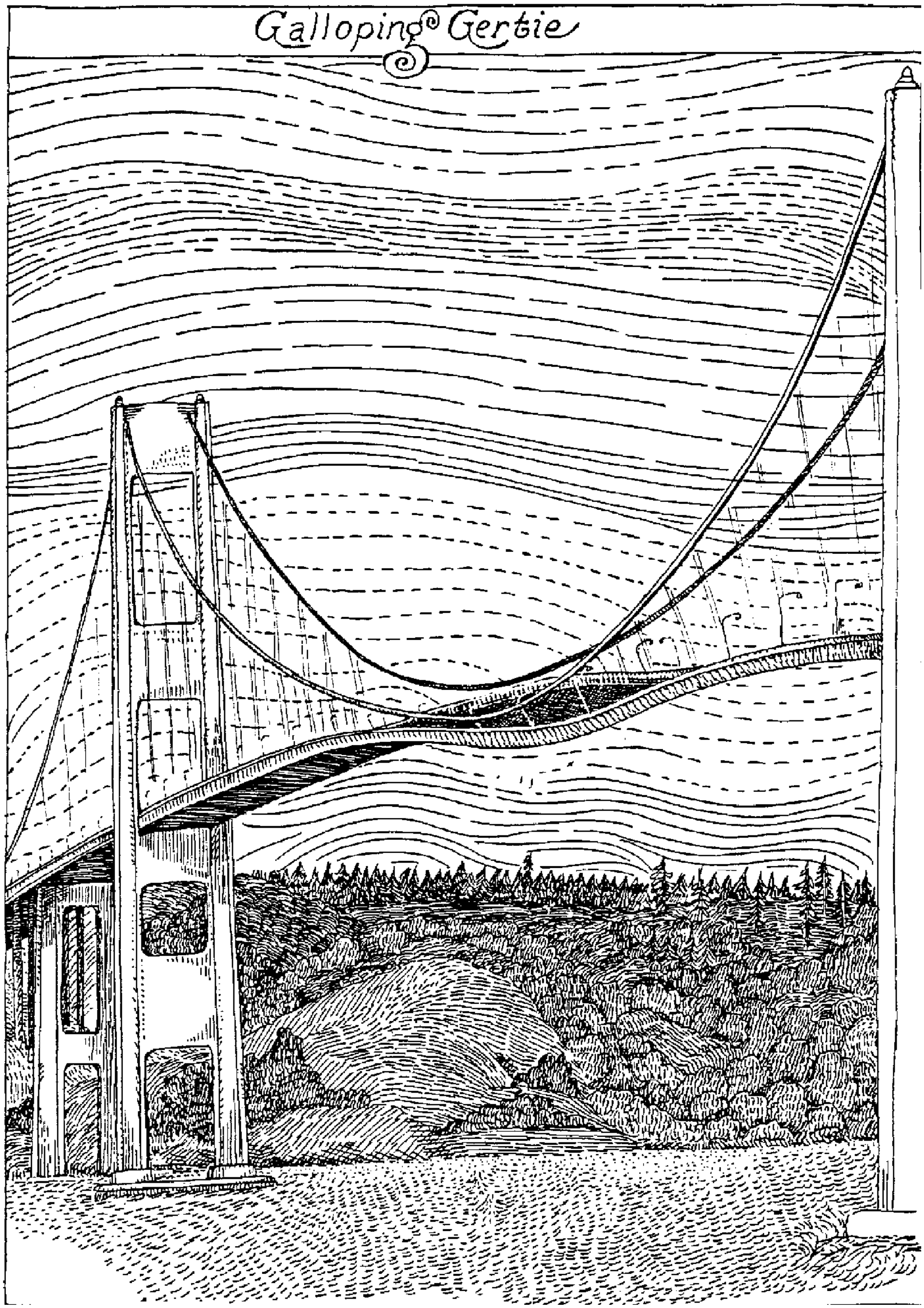
All in all, the Tacoma Narrows Bridge was considered to be an engineering marvel and was written up in many engineering journals including Pacific Builder and Engineer, Western Construction News, Roads and Streets, and Compressed Air Magazine, as well as in the popular press.

The bridge was officially opened on 1 July 1940, with great pride and fanfare. It had been built in only nineteen months and with no fatalities. The floating bridge across Lake Washington, the world's first concrete pontoon bridge, was opened the next day, and it seemed that there was little that modern technology could not accomplish.

However, doubts had already begun to arise. The lightness and slimness that made the Tacoma Narrows Bridge so attractive also made it extremely vulnerable to the gusty winds in the Narrows. Even before the bridge was finished, it began to vibrate vertically in even light winds. After the roadway was finished and open to traffic, it would ripple up and down as much as forty or fifty inches, so that motorists could see the cars in front of them disappearing and reappearing. The bridge quickly acquired the nickname "Galloping Gertie" and people who were not thrill-seekers began to avoid it on windy days.

Professor F. B. Fraquharson of the University of Washington, who had been commissioned to study the bridge's behavior, built a model of the bridge and tested it in a wind tunnel. New diagonal stays were installed at the middle of the bridge's center span, but before many modifications could be accomplished, there was no Galloping Gertie left to modify.

On the morning of 7 November 1940, the wind was blowing through the Narrows at 42 miles an hour, and one of the bridge's new diagonal stays broke. The bridge began not only to ripple up and down, but also to twist from side to side in a torsional or corkscrew motion so violent that the bridge was closed. Leonard Coatsworth, a copy editor for the Tacoma News Tribune who was on his way to his summer place southwest of Gig Harbor, was the last motorist permitted on the bridge; in the car with him was his daughter's black spaniel. When Coatsworth was about halfway across, the roadway tilted sideways so violently that he lost control of the car, which slammed sideways into a guardrail and seemed about to topple off the bridge. Coatsworth decided to abandon the car. The terrified dog bit Coatsworth and refused to leave the car, so Coatsworth ran off the bucking bridge alone and arrived shaking and bleeding on the eastern shore, where Professor Farquharson was filming the bridge's gyrations. Farquharson crawled out on the tossing, pitching bridge to attempt to save the dog, but was no more successful than Coatsworth had been. Coatsworth called the News Tribune, which sent out reporters Bert Brintnall and Howard Clifford. They also ventured out on the bridge to try to save the dog, but before they reached the car, the bridge began to whip up and down so violently that they gave up and began to retreat, Clifford taking photographs as he went. The roadway was now rising and falling as much as 28 feet, and was tilting up to 45 degrees sideways. Suddenly the vertical cables that held up the roadway began to snap, their ends whipping through the air, and the roadway along the 2800-foot-long center span began to break up. Huge chunks of concrete broke off and crashed into the water 200 feet below,



from Bridges by Scott Corbett

taking along Coatsworth's car and dog. Workmen under the bridge's west end, who had been attempting to stabilize the bridge by driving anchors for storm lines, had to avoid the falling pieces of roadway. The remainder of the bridge deck, relieved of the weight of the center span, was then free to bounce crazily, and Clifford fell repeatedly as he ran to shore along a roadway which one minutes would drop out from under him and the next minute would rise up to meet him.

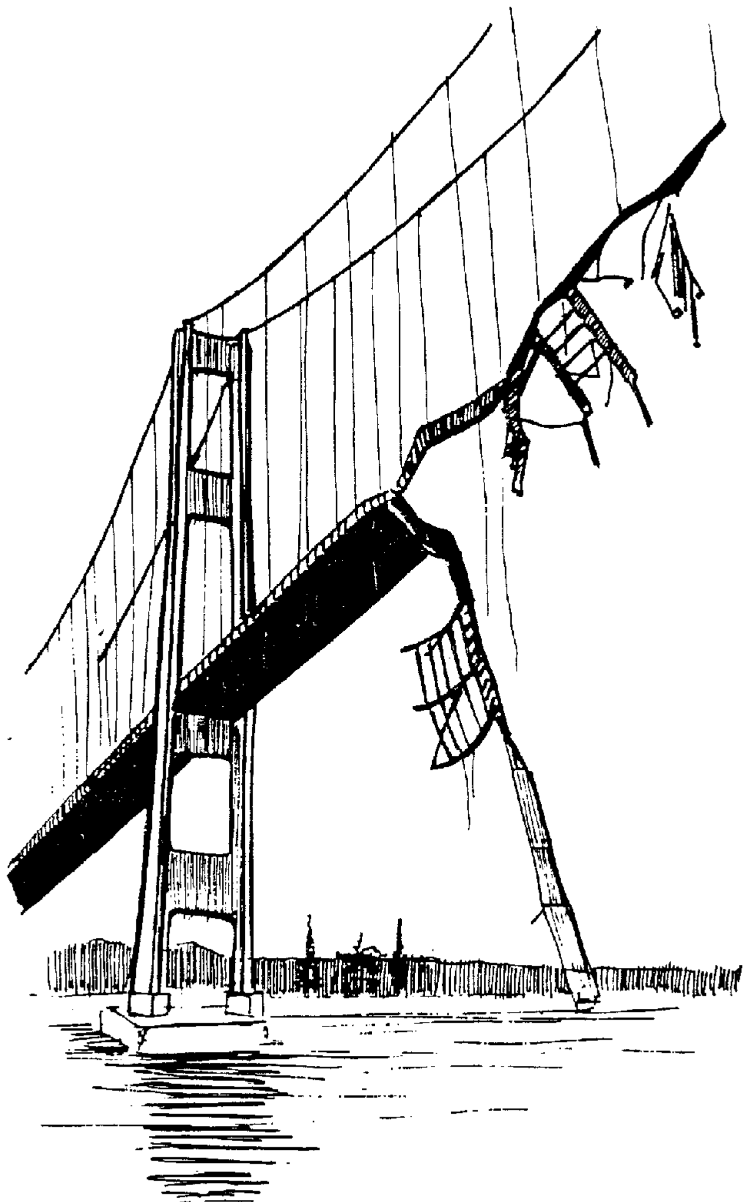
The bridge continued to writhe and shatter and by the time the wind had subsided, about 90% of the center span was lying in pieces on the bottom of Puget Sound, the rest was hanging down limply in the air, and the side spans had sagged 60 to 70 feet. The steel towers, though still standing and still holding up the huge cables, were bent back towards the shores and were damaged beyond repair. The Tacoma Narrows Bridge had indeed, in the dry words of Principle Engineer Charles E. Andrew, "been rendered useless as a traffic carrying unit."

The demise of the Tacoma Narrows Bridge only four months after its opening was a sad blow to the area's citizens who had had such high hopes. Immediate clamor arose for a new bridge, but plans for reconstruction were shelved as money, materials and manpower were redirected to the fighting of World War II. Ferry service was reinstituted the day after the bridge's collapse. At least, the bridge had been well-insured. Twenty-two different insurance companies were involved, to spread out the risk, for a total of more than $5 million. (One of the insurance agents had simply kept the premium for his own use. His company paid off anyway, and the agent was sentenced to fifteen years in prison.) After the bridge's collapse, the insurance agencies appointed a board of engineers to study the damage. Another board of engineers was appointed by the state for the same reason. The first board proposed a payment of $1.8 million, the second, $4 million. After much negotiation, it was finally agreed that the state would receive $4 million plus whatever it could salvage from the wreckage.

Salvage began immediately, as the ruins of the bridge were a hazard to navigation and the railroad on the eastern shore. The towers and cables were carefully removed and sold for scrap for almost $300,000, the price of steel being favorable due to the war. The dismantling of the cables was extremely hazardous work but was nevertheless accomplished without fatalities. The midchannel piers and the shore anchorages were carefully studied and found to have sustained no damage. Since the piers were worth $3 million dollars, they were left in place to be used for the next bridge.

There was no doubt that there would be a new bridge once the war was over. In the four months of the bridge's existence, traffic over it had been 145% more than the previous use of the ferry system and had brought in $222,705 in tolls, more than twice what had been estimated. The population of Tacoma rose by a third during the war, and Bremerton more than tripled in size. Tourism, housing starts, and industry were all expected to increase as soon as the war was over.

Therefore, a prompt start was made on investigations into causes of the collapse and ways to prevent a recurrence.



from <u>Wind in Architectural and Environmental Design</u> by Michele Melaragno

Why did Galloping Gertie collapse? The Tacoma Narrows Bridge has become a sort of classic engineering failure and its causes have been intently studied and discussed ever since.

The superstructure which broke so spectacularly was designed by Leon Moisseiff, the world's leading authority on suspension bridges, and met all conventional requirements. However, the factors of wind and narrow proportions had not been taken sufficiently into consideration, even though suspension ridges had undulated and broken up due to wind in Britain and in Ohio in the nineteenth century, and as the Tacoma Narrows bridge was being built there were reports of oscillations of the Bronx-Whitestone Bridge in New York and several other recently-completed bridges (these bridges were hastily reinforced after Galloping Gertie collapsed).

The slimness that made Galloping Gertie such a graceful sight was her fatal flaw. Because the bridge was only two lanes wide and almost a mile long, it was 72 times longer than it was wide; its nearest competitor for narrowness, the Golden Gate Bridge, had a ratio of only 45. The design of the bridge's superstructure was not calculated to compensate for this fraility.

The Washington State Department of Highways' original plans had called for open, 25-feet-deep stiffening trusses. Moisseiff's revamping of the design substituted a plate girder stiffening system only 8 feet deep. This made the ratio of depth to span length only 1:350, as compared to the 1:40 which had been conventional earlier in the century. Combined with the roadway's narrowness and light weight, this made the bridge exceptionally flexible.

All suspension bridges are subject to flexural and torsional oscillation due to variation in air flow, but the Tacoma Narrows Bridge's thin solid girders both created pulsating wind eddies and were not braced sufficiently to dampen the resulting flexing. The particular wind velocity of November 7, and the breaking of the stabilizing cable, allowed the torsional or side-to-side rippling to become greater and greater in a process called "self-excited oscillation" until the bridge broke.

To conduct investigations into suspension bridge behavior and to design a new bridge, a Board of Consulting Engineers and a Design Department had been appointed by mid-1941 with Charles E. Andrew as Chairman. The members of the Board quickly found that little original research had been done on the aerodynamics of suspension bridges, so they would have to do the research themselves. Under the guidance of Professor Farquharson a new wind tunnel was built at the University of Washington, large enough to hold a 1:50 scale model 100 feet long and simulate winds of over 100 miles per hour. New designs were tested in the wind tunnel, altered, and tested again, and a large amount of data compiled. Wind-tunnel testing subsequently became routine in the development of new bridges.

The findings of the Board were incorporated into the new bridge designs which were completed in 1947. Bidding was opened in October and contracts were awarded in

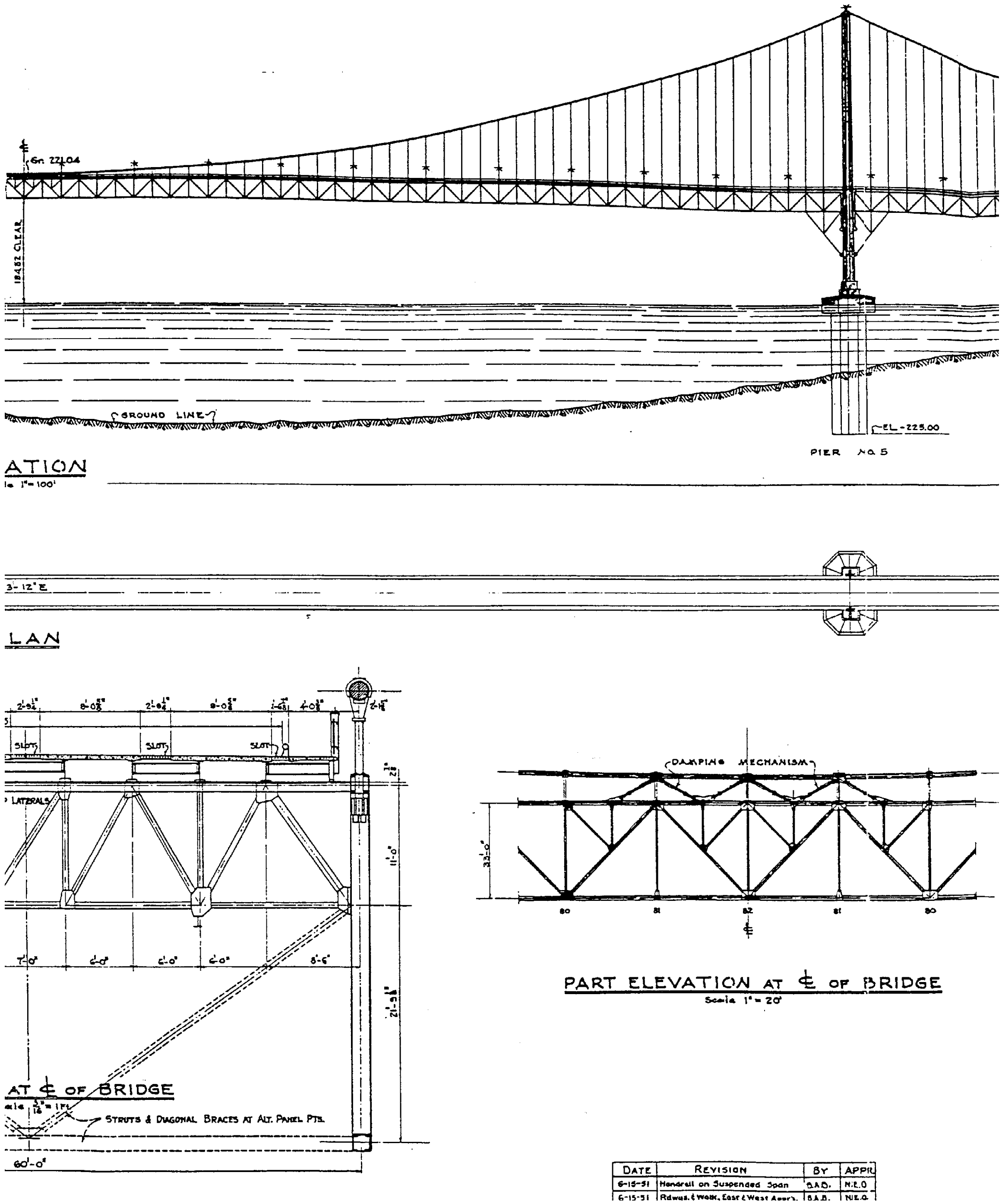
March and April, 1948, to Woodward and Company of Tacoma for work on piers, anchorages, towers, trusses and decks; and to John A. Roebling's Sons Company of California for cables and hangers.

Work began at once. The shore anchorages, though undamaged by the old bridge's fall, had to be greatly modified and enlarged to support the new bridge's greater weight and width. The old piers were provided with new pedestals to hold up the new towers, which were made wider at the bottom than the old towers to allow for a four-lane roadway rather than the previous two lanes. The pedestals were also made higher than the old ones to that saltwater spray would not corrode the bases of the new towers as it had the old ones. The erection of the towers was made more dramatic by the 7.1-magnitude earthquake of 13 April 1949. A 21-ton cable saddle had just been lifted to the top of the eastern tower when the earthquake struck. The tower vibrated sufficiently to dislodge the saddle, which fell 500 feet into the water below, crashing into and sinking a contractor's barge. The saddle was recovered and put back in place.

The superstructure was of course redesigned with great care to avoid the mistakes of the past. The stiffening trusses were made 33 feet deep, were open to allow the wind to pass through, and were very strongly braced horizontally. The new trusses were 58 times stiffer than in the old system. All parts of the superstructure including the floor beams were designed to catch the wind as little as possible. The designers felt that it was necessary to reduce noticeable motion to zero as nearly as possible in order to give the public faith in the new bridge and in bridge-building in general.

The new suspension cables were even larger than the old ones, being more than twenty inches in diameter. Weeks of rain and snow delayed work on the cables during the winter of 1949-50.

The new Tacoma Narrows Bridge was built in about thirty months and cost about $14 million, plus the lives of four workmen who were killed during its construction. It was opened officially on 14 October 1950 and was found to be very stable even in winds of over 70 miles per hour. The volume of traffic that crossed the new bridge was much greater than had been anticipated, and in May 1965, thirteen years ahead of schedule, the tolls collected had paid off the $14 million cost of the bridge. The last half-dollar was collected on May 14 and about 2,000 watched as Governor Dan Evans signed into law a bill which removed the tolls. All the arguments for the necessity of a bridge across the Tacoma Narrows had been vindicated. The second Tacoma Narrows Bridge is a lovely sight and an engineering triumph, although never destined, it is hoped, to be as exciting as her predecessor.



GROUND LINE
PIER NO. 5
ATION
LAN
DAMPING MECHANISM
PART ELEVATION AT ℄ OF BRIDGE
AT ℄ OF BRIDGE
STRUTS & DIAGONAL BRACES AT ALT. PANEL PTS.
DATE
REVISION
BY
6-15-51
Handrail on Suspended Span

Box 52

BRIDGE FILES

Box 38	Tacoma Narrows Bridge and Fox Island Bridge, Report	1956
	Tacoma Narrows Bridge, Aerodynamic Investigation	1942
	Tacoma Narrows Bridge, Aerodynamic Stability	1950-52
	Tacoma Narrows Bridge, Agreements	1938
	Tacoma Narrows Bridge, Agreements	1939
	Tacoma Narrows Bridge, Agreements	1941
	Tacoma Narrows Bridge, Agreements	1941-50
	Tacoma Narrows Bridge, Agreements	1957-57
	Tacoma Narrows Bridge, Agreements, Consultants	1941-47
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1941-43
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1944-45
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1946
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1947-48
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1948-49
	Tacoma Narrows Bridge, Andrew, Charles E., Engineer	1950-56
	Tacoma Narrows Bridge, Approaches and Buildings	1958-64
	Tacoma Narrows Bridge, Auditor’s Examinations	1940-54
	Tacoma Narrows Bridge, Auditor’s Examinations	1940-65
	Tacoma Narrows Bridge, Barrett and Hilp, Contractors	1942
	Tacoma Narrows Bridge, Barrett and Hilp, Contractors	1943-45
	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1948
	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1948
	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1948-50
Box 39	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1948-51
	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1949-52
	Tacoma Narrows Bridge, Bethlehem Pacific Coast Steel	1950-52
	Tacoma Narrows Bridge, Bethlehem Steel Company	1945
	Tacoma Narrows Bridge, Bethlehem Steel Company	1948
	Tacoma Narrows Bridge, Bethlehem Steel Company	1948-49
	Tacoma Narrows Bridge, Bethlehem Steel Company	1948-50
	Tacoma Narrows Bridge, Bethlehem Steel Company	1949
	Tacoma Narrows Bridge, Bethlehem Steel Company	1949-51
	Tacoma Narrows Bridge, Bids	1938
	Tacoma Narrows Bridge, Bids	1947
	Tacoma Narrows Bridge, Biennial Report	
	Tacoma Narrows Bridge, Boats	1939-41
	Tacoma Narrows Bridge, Boats, Dolphin	1942-44
	Tacoma Narrows Bridge, Bonds	1939
	Tacoma Narrows Bridge, Bonds	1939-41
	Tacoma Narrows Bridge, Bonds, Attorneys	1938
	Tacoma Narrows Bridge, Bonds, Attorneys	1939
	Tacoma Narrows Bridge, Bonds, Calls	1941-42
	Tacoma Narrows Bridge, Bonds, Calls	1952

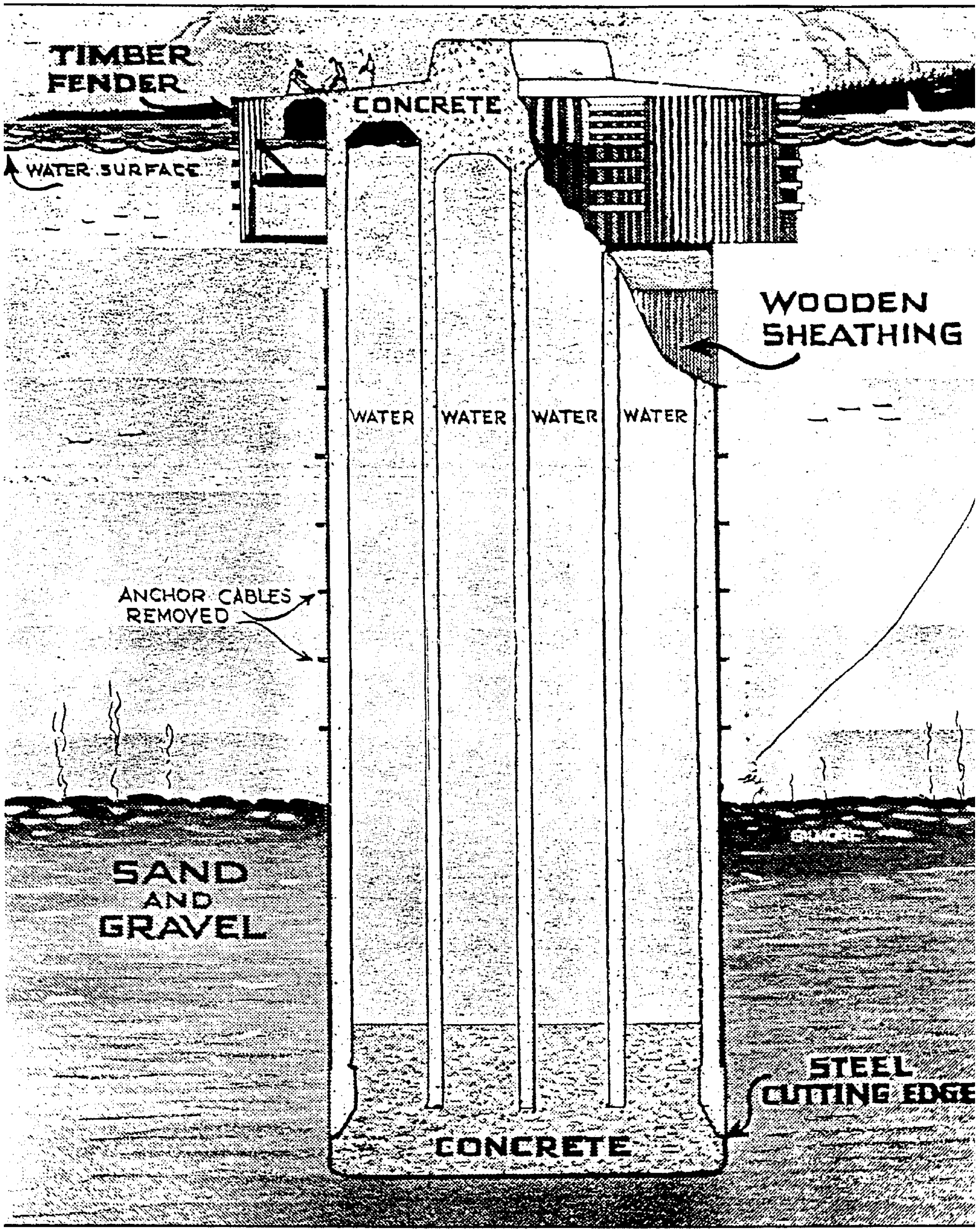
BRIDGE FILES

Box 39	Tacoma Narrows Bridge, Bonds, Correspondence	1939
	Tacoma Narrows Bridge, Bonds, Miscellaneous	1940-41
Box 40	Tacoma Narrows Bridge, Bonds, Printing	1939
	Tacoma Narrows Bridge, Bonds, Resolutions	1939
	Tacoma Narrows Bridge, Bonds, Resolutions	1939
	Tacoma Narrows Bridge, Bonds, Resolutions	1940
	Tacoma Narrows Bridge, Bonds, Resolutions	1948
	Tacoma Narrows Bridge, Bonds, Resolutions	1939
	Tacoma Narrows Bridge, Bridge Building in the Laboratory	1943
	Tacoma Narrows Bridge, California Institute of Technology	1942-43
	Tacoma Narrows Bridge, Causes of Failure	1940
	Tacoma Narrows Bridge, Causes of Failure	1942
	Tacoma Narrows Bridge, Chandler, Elbert M.	1934
	Tacoma Narrows Bridge, Change Orders	1939-41
	Tacoma Narrows Bridge, Change Orders, 1 – 2	1939
	Tacoma Narrows Bridge, Change Orders, 1 – 5	1939
	Tacoma Narrows Bridge, Change Orders, 1 – 7	1948-49
	Tacoma Narrows Bridge, Change Orders, 3 – 5	1939
	Tacoma Narrows Bridge, Change Orders, 6 – 10	1939
	Tacoma Narrows Bridge, Change Orders, 7 – 10	1939
	Tacoma Narrows Bridge, Change Orders, 8 – 27	1950-51
	Tacoma Narrows Bridge, Change Orders, 11 – 16	1939
	Tacoma Narrows Bridge, Change Orders, 11 – 21	1939
Box 41	Tacoma Narrows Bridge, Change Orders, 17 – 19	1939
	Tacoma Narrows Bridge, Change Orders, 22 – 25	1939
	Tacoma Narrows Bridge, Change Orders, 22 – 25	1939-40
	Tacoma Narrows Bridge, Change Orders, 27 – 29	1939
	Tacoma Narrows Bridge, Change Orders, 30 – 34	1939
	Tacoma Narrows Bridge, Change Orders, 32 – 49	1941
	Tacoma Narrows Bridge, Change Orders, 35	1940
	Tacoma Narrows Bridge, Change Orders, 36	1940
	Tacoma Narrows Bridge, Change Orders, 37 – 43	1940
	Tacoma Narrows Bridge, Change Orders, 38 – 39	1939-40
	Tacoma Narrows Bridge, Change Orders, 41 – 43	1940
	Tacoma Narrows Bridge, Change Orders, 44 – 49	1940
	Tacoma Narrows Bridge, Change Orders, Extra Work Items	1948-49
	Tacoma Narrows Bridge, Change Orders, Extra Work Items	1950-52
	Tacoma Narrows Bridge, Civil Aeronautics Administration	1941
	Tacoma Narrows Bridge, Clearance	1941
Box 42	Tacoma Narrows Bridge, Coast Guard, War Dept., Navy	1938-50
	Tacoma Narrows Bridge, Coatsworth, Leonard	1941-42

BRIDGE FILES

Box 42	Tacoma Narrows Bridge, Completion	1940
	Tacoma Narrows Bridge, Completion	1940
	Tacoma Narrows Bridge, Construction	1939-41
	Tacoma Narrows Bridge, Construction	1940
	Tacoma Narrows Bridge, Construction	1950-52
	Tacoma Narrows Bridge, Construction Contracts	1942-52
	Tacoma Narrows Bridge, Construction Plans, 1938-40 – in 10-drawer map case	
	Tacoma Narrows Bridge, Consulting Board	1954
	Tacoma Narrows Bridge, Consulting Board, Meeting	1941
	Tacoma Narrows Bridge, Consulting Board, Meeting	1942
	Tacoma Narrows Bridge, Consulting Board, Meeting	1942
	Tacoma Narrows Bridge, Consulting Board, Meeting	1942
	Tacoma Narrows Bridge, Consulting Board, Meeting	1942
	Tacoma Narrows Bridge, Consulting Board, Meeting	1943
	Tacoma Narrows Bridge, Consulting Engineers, Corresp.	1939-41
	Tacoma Narrows Bridge, Consulting Engineers, Corresp.	1938
	Tacoma Narrows Bridge, Consulting Engineers, Corresp.	1939-41
	Tacoma Narrows Bridge, Consulting Engineers, Corresp.	1940-41
	Tacoma Narrows Bridge, Consulting Engineers, Reports	1938-41
	Tacoma Narrows Bridge, Contracts and Agreements	1940-47
	Tacoma Narrows Bridge, Contracts and Agreements	1942-47
	Tacoma Narrows Bridge, Correspondence	1939-52
	Tacoma Narrows Bridge, Correspondence	1940-45
	Tacoma Narrows Bridge, Correspondence	1940-50
	Tacoma Narrows Bridge, Correspondence	1946-51
	Tacoma Narrows Bridge, Correspondence	1951-70
	Tacoma Narrows Bridge, Correspondence	1952-59
	Tacoma Narrows Bridge, Correspondence	1976-79

Box 43	Tacoma Narrows Bridge, Correspondence	1980-82
	Tacoma Narrows Bridge, Cranes and Travelers	1946-48
	Tacoma Narrows Bridge, Cranes and Travelers	1948-51
	Tacoma Narrows Bridge, Current Velocity Report	1939
	Tacoma Narrows Bridge, Damage	1941
	Tacoma Narrows Bridge, Dead Load Test, Model of Deck	
	Tacoma Narrows Bridge, Deck Materials	1942-51
	Tacoma Narrows Bridge, Deck Materials	1943-50
	Tacoma Narrows Bridge, Design and Construction Report	1939
	Tacoma Narrows Bridge, Design and Construction Report	1940
	Tacoma Narrows Bridge, Design and Construction Report	1941
	Tacoma Narrows Bridge, Design Data	1942-50
	Tacoma Narrows Bridge, Design General Report	1942
	Tacoma Narrows Bridge, Design Report with Recommend.	ca.1945
	Tacoma Narrows Bridge, Dill, Clarence C.	1940



ᵓiers were constructed of steel and concrete, with heavy timber fenders at water level. This drawing by Gilmor shows the 20-foot concrete seal, top and bottom, and the pedestal atop to receive the tower. From: Chas. E. Andrew repo

Box 52

BRIDGE FILES

Box 43	Tacoma Narrows Bridge, Discharge of Oil, Small Orifices	1949
	Tacoma Narrows Bridge, Dismantling	1940
	Tacoma Narrows Bridge, Dismantling	1940-45
	Tacoma Narrows Bridge, Dismantling	1942
	Tacoma Narrows Bridge, Dismantling	1942-43
	Tacoma Narrows Bridge, Dismantling	1942-43
	Tacoma Narrows Bridge, Dismantling	1943
Box 44	Tacoma Narrows Bridge, Drawings	
	Tacoma Narrows Bridge, Dunn, Louis G.	1942-43
	Tacoma Narrows Bridge, Dynamic Model for	1940
	Tacoma Narrows Bridge, Earl, Austin W.	1943-44
	Tacoma Narrows Bridge, Electrical	1949-51
	Tacoma Narrows Bridge, Engineering	1939-40
	Tacoma Narrows Bridge, Engineering and Design	1939-41
	Tacoma Narrows Bridge, Engineering and Design	1941-42
	Tacoma Narrows Bridge, Engineering and Design	1942
	Tacoma Narrows Bridge, Erection Model	1949-50
	Tacoma Narrows Bridge, Erection Procedures	1948
	Tacoma Narrows Bridge, Ferry, Accounting	1940-44
	Tacoma Narrows Bridge, Ferry, Accounts Receivable	1948-51
	Tacoma Narrows Bridge, Ferry, Boats and Service	1940
	Tacoma Narrows Bridge, Ferry, City of Tacoma	1949-50
	Tacoma Narrows Bridge, Ferry, Coast Guard	1946-47
	Tacoma Narrows Bridge, Ferry, Construction Contracts	1940-42
	Tacoma Narrows Bridge, Ferry, Contracts and Agreements	1940-47
	Tacoma Narrows Bridge, Ferry, Correspondence	1941-42
	Tacoma Narrows Bridge, Ferry, Correspondence	1941-42
	Tacoma Narrows Bridge, Ferry, Correspondence	1941-45
	Tacoma Narrows Bridge, Ferry, Correspondence	1941-48
	Tacoma Narrows Bridge, Ferry, Correspondence	1943
Box 45	Tacoma Narrows Bridge, Ferry, Correspondence	1944
	Tacoma Narrows Bridge, Ferry, Correspondence	1946
	Tacoma Narrows Bridge, Ferry, Correspondence	1947
	Tacoma Narrows Bridge, Ferry, Correspondence	1948
	Tacoma Narrows Bridge, Ferry, Correspondence	1949-51
	Tacoma Narrows Bridge, Ferry, Costs and Traffic	1945
	Tacoma Narrows Bridge, Ferry, Crosline	1946
	Tacoma Narrows Bridge, Ferry, Crosline	1946-47
	Tacoma Narrows Bridge, Ferry, Crosline	1946-47
	Tacoma Narrows Bridge, Ferry, Crosline	1947
	Tacoma Narrows Bridge, Ferry, Crosline	1947
	Tacoma Narrows Bridge, Ferry, Crosline	1947-48

BRIDGE FILES

Box 45	Tacoma Narrows Bridge, Ferry, Crosline	1947-51
	Tacoma Narrows Bridge, Ferry, Crosline	1960's
	Tacoma Narrows Bridge, Ferry, Defiance	1940-51
	Tacoma Narrows Bridge, Ferry, Defiance	1941-45
	Tacoma Narrows Bridge, Ferry, Defiance and Skansonia	1940
	Tacoma Narrows Bridge, Ferry, Defiance, Skansonia, etc.	1950-52
	Tacoma Narrows Bridge, Ferry, Equipment	1941-50
	Tacoma Narrows Bridge, Ferry, Fire Protection	1941
	Tacoma Narrows Bridge, Ferry, Funds	1940-48
	Tacoma Narrows Bridge, Ferry, Goshen	1941-50
	Tacoma Narrows Bridge, Ferry, Inspector's Files	1946
	Tacoma Narrows Bridge, Ferry, Insurance	1940-41
	Tacoma Narrows Bridge, Ferry, Insurance	1941-43
Box 46	Tacoma Narrows Bridge, Ferry, Insurance	1941-47
	Tacoma Narrows Bridge, Ferry, Insurance	1941-50
	Tacoma Narrows Bridge, Ferry, Insurance	1942-50
	Tacoma Narrows Bridge, Ferry, Insurance	1943-47
	Tacoma Narrows Bridge, Ferry, Insurance Claims	1944-47
	Tacoma Narrows Bridge, Ferry, Insurance Claims, 6th Ave.	1946-47
	Tacoma Narrows Bridge, Ferry, Insurance Claims, Fosdick	1945-47
	Tacoma Narrows Bridge, Ferry, Labor Issues	1945-47
	Tacoma Narrows Bridge, Ferry, Landings, Docks	1940-49
	Tacoma Narrows Bridge, Ferry, Landings, Repairs	1944-45
	Tacoma Narrows Bridge, Ferry, Landings, Repairs	1946-47
	Tacoma Narrows Bridge, Ferry, Landings, Repairs	1949-50
	Tacoma Narrows Bridge, Ferry, Lincoln	1946
	Tacoma Narrows Bridge, Ferry, Operations Contract	1945-47
	Tacoma Narrows Bridge, Ferry, Pierce County Agreements	1938
	Tacoma Narrows Bridge, Ferry, Repairs	1945
	Tacoma Narrows Bridge, Ferry, Repairs	1946-47
	Tacoma Narrows Bridge, Ferry, Repairs	1946-47
	Tacoma Narrows Bridge, Ferry, Salvaged Materials	1945-54
	Tacoma Narrows Bridge, Ferry, Salvaged Materials	1946-50
	Tacoma Narrows Bridge, Ferry, Salvaged Materials	1950-51
	Tacoma Narrows Bridge, Ferry, Santa Clara	1946
	Tacoma Narrows Bridge, Ferry, Skansie, William J.	1942-47
	Tacoma Narrows Bridge, Ferry, Skansie, William J.	1944-46
	Tacoma Narrows Bridge, Ferry, Skansie, William J.	1947-50
	Tacoma Narrows Bridge, Ferry, Skansonia	1941-47
	Tacoma Narrows Bridge, Ferry, Skansonia	1942-51
	Tacoma Narrows Bridge, Ferry, Skansonia	1944
	Tacoma Narrows Bridge, Ferry, Skansonia	1970

BRIDGE FILES

Box 47	Tacoma Narrows Bridge, Ferry, Spare Parts	1946-52
	Tacoma Narrows Bridge, Ferry, Trucks, Weights	1946-47
	Tacoma Narrows Bridge, Ferry, Washington Navigation Co.	1938
	Tacoma Narrows Bridge, Ferry, Washington Navigation Co.	1943
	Tacoma Narrows Bridge, Field Books	1937-41
	Tacoma Narrows Bridge, Field Books	1948-49
Box 48	Tacoma Narrows Bridge, Field Books	1948-50
Box 49	Tacoma Narrows Bridge, Field Books	1937-41
	Tacoma Narrows Bridge, Field Books	1948-50
Box 50	Tacoma Narrows Bridge, Field Books	1939-40
	Tacoma Narrows Bridge, Field Books	1946-50
Box 51	Tacoma Narrows Bridge, Field Books	1937-41
	Tacoma Narrows Bridge, Field Books	1948-50
Box 52	Tacoma Narrows Bridge, Final Report	1952
	Tacoma Narrows Bridge, Financial Report	1941
	Tacoma Narrows Bridge, Fog Signal	1940
	Tacoma Narrows Bridge, Informational Releases	1940-49
	Tacoma Narrows Bridge, Informational Releases	1950-71
	Tacoma Narrows Bridge, Informational Releases	1962-76
	Tacoma Narrows Bridge, Insurance	1938-39
	Tacoma Narrows Bridge, Insurance	1938-40
	Tacoma Narrows Bridge, Insurance	1939-40
	Tacoma Narrows Bridge, Insurance	1939-48
	Tacoma Narrows Bridge, Insurance	1940
	Tacoma Narrows Bridge, Insurance	1940
	Tacoma Narrows Bridge, Insurance	1940
	Tacoma Narrows Bridge, Insurance	1941
	Tacoma Narrows Bridge, Insurance	1941
	Tacoma Narrows Bridge, Insurance	1942-43
	Tacoma Narrows Bridge, Insurance and Financing	1944-48
	Tacoma Narrows Bridge, Insurance and Financing	1946
	Tacoma Narrows Bridge, Insurance	1947
	Tacoma Narrows Bridge, Insurance and Financing	1947
	Tacoma Narrows Bridge, Insurance	1948-49
	Tacoma Narrows Bridge, Insurance and Financing	1949-50
Box 53	Tacoma Narrows Bridge, Insurance	1950-58
	Tacoma Narrows Bridge, Insurance	1957-65
	Tacoma Narrows Bridge, Insurance, Builder’s Risk	1947-49

BRIDGE FILES

Box 53	Tacoma Narrows Bridge, Insurance, Builder's Risk	1948
	Tacoma Narrows Bridge, Insurance, Builder's Risk	1948-51
	Tacoma Narrows Bridge, Insurance, Builder's Risk	1949-50
	Tacoma Narrows Bridge, Insurance, Builder's Risk	1950-51
	Tacoma Narrows Bridge, Insurance, Claims	1945-54
	Tacoma Narrows Bridge, Insurance, Property Damage	1962
	Tacoma Narrows Bridge, Insurance, Public Liability and	1943-48
	Tacoma Narrows Bridge, Insurance, Recoverage	1948-53
	Tacoma Narrows Bridge, Insurance, Salvage, Reconstruction	1941-43
	Tacoma Narrows Bridge, Insurance, United Firemen's	1941
	Tacoma Narrows Bridge, Insurance, United Firemen's	1941
	Tacoma Narrows Bridge, Insurance, United Firemen's	1941-43
	Tacoma Narrows Bridge, Insurance, Use and Occupancy	1939-41
	Tacoma Narrows Bridge, Insurance, Use and Occupancy	1940-56
	Tacoma Narrows Bridge, Investigation Board	1941-43
	Tacoma Narrows Bridge, Investigation Board Report	1941
	Tacoma Narrows Bridge, Investigations	1940
Box 54	Tacoma Narrows Bridge, Laboratory Studies	1941
	Tacoma Narrows Bridge, Legal Issues	1939
	Tacoma Narrows Bridge, Legal Issues	1940-41
	Tacoma Narrows Bridge, Legal Issues	1940-41
	Tacoma Narrows Bridge, Lights	1937-51
	Tacoma Narrows Bridge, Long-span Suspension Bridge	1943-50
	Tacoma Narrows Bridge, Long-span Suspension Bridge	1943-50
	Tacoma Narrows Bridge, Long-span Suspension Bridge	1941-51
	Tacoma Narrows Bridge, Loss Committee	1940
	Tacoma Narrows Bridge, Maintenance	1942-48
	Tacoma Narrows Bridge, Maps	1938
	Tacoma Narrows Bridge, Materials and Priorities	1941
	Tacoma Narrows Bridge, Miscellaneous	1939-40
	Tacoma Narrows Bridge, Moissieff, Leon S.	1941
	Tacoma Narrows Bridge, Motion	1940
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
Box 55	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Natural Gas Pipeline	1965
	Tacoma Narrows Bridge, Northern Pacific Railway	1941-51
	Tacoma Narrows Bridge, Office Building	1938-40

BRIDGE FILES

Box 55	Tacoma Narrows Bridge, Opening Ceremony	1950
	Tacoma Narrows Bridge, Parcel, John I., Engineer	1941-42
	Tacoma Narrows Bridge, Parcel, John I., Engineer	1941-50
	Tacoma Narrows Bridge, Parcel, John I., Engineer	1942-45
	Tacoma Narrows Bridge, Parcel, John I., Engineer	1946-47
	Tacoma Narrows Bridge, Patents	1938
	Tacoma Narrows Bridge, Photographs and Drawings	
	Tacoma Narrows Bridge, Photographs	1939
	Tacoma Narrows Bridge, Photographs	1939
Box 56	Tacoma Narrows Bridge, Photographs	1939-40
	Tacoma Narrows Bridge, Photographs	1939-43
	Tacoma Narrows Bridge, Photographs, Damage	1940
	Tacoma Narrows Bridge, Photographs	1942-48
	Tacoma Narrows Bridge, Physical Condition, Behavior	1956
	Tacoma Narrows Bridge, Pier Fenders	1949-52
	Tacoma Narrows Bridge, Pier Investigation	1946-47
	Tacoma Narrows Bridge, Pierce County Bond Issue	1935-65
	Tacoma Narrows Bridge, Pierce County Bond Issue	1948-54
	Tacoma Narrows Bridge, Pierce County Government	1934-40
	Tacoma Narrows Bridge, Professional Publications	1941-51
	Tacoma Narrows Bridge, Progress Reports	1939-40
	Tacoma Narrows Bridge, Progress Reports	1941-48
	Tacoma Narrows Bridge, Progress Reports	1948
	Tacoma Narrows Bridge, Progress Reports	1948-49
	Tacoma Narrows Bridge, Progress Reports	1948-49
	Tacoma Narrows Bridge, Progress Reports	1949
	Tacoma Narrows Bridge, Progress Reports	1949-50
	Tacoma Narrows Bridge, Progress Reports	1949-50
	Tacoma Narrows Bridge, Progress Reports	1950
	Tacoma Narrows Bridge, Public Works Administration	1938
	Tacoma Narrows Bridge, Public Works Administration	1938
	Tacoma Narrows Bridge, Public Works Administration	1939
	Tacoma Narrows Bridge, Public Works Administration	1939-41
Box 57	Tacoma Narrows Bridge, Public Works Administration	1940
	Tacoma Narrows Bridge, Public Works Administration	1940
	Tacoma Narrows Bridge, Public Works Administration	1940
	Tacoma Narrows Bridge, Public Works Administration	1940
	Tacoma Narrows Bridge, Publicity	1939-40
	Tacoma Narrows Bridge, Publicity, Pamphlet	
	Tacoma Narrows Bridge, Reconstruction	1940
	Tacoma Narrows Bridge, Reconstruction Bids	1947-48
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1938-39

BRIDGE FILES

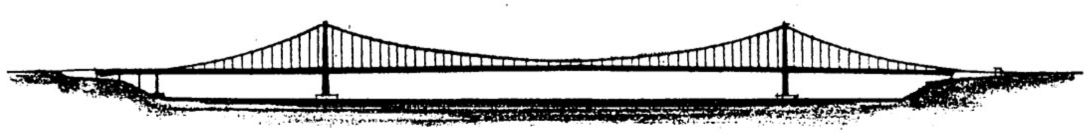
Box 57	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1938-40
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1939
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1939
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1939-40
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1939-40
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1940
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1940
	Tacoma Narrows Bridge, Reconstruction Finance Corp.	1940
	Tacoma Narrows Bridge, Recordkeeping Supplies	1939-41
	Tacoma Narrows Bridge, Redesign and Reconstruction	1940-45
	Tacoma Narrows Bridge, Redesign	
	Tacoma Narrows Bridge, Redesign	1941
	Tacoma Narrows Bridge, Redesign	1945
	Tacoma Narrows Bridge, Refinancing	1955-57
	Tacoma Narrows Bridge, Refunding	1955
	Tacoma Narrows Bridge, Removal of Tolls	1965
	Tacoma Narrows Bridge, Removal Work	1941
Box 58	Tacoma Narrows Bridge, Report, Final	1952
	Tacoma Narrows Bridge, Report, Final	1952
	Tacoma Narrows Bridge, Resolutions	1938-40
	Tacoma Narrows Bridge, Right of Way	1939-41
	Tacoma Narrows Bridge, Right of Way	1938-40
	Tacoma Narrows Bridge, Right of Way	1939
	Tacoma Narrows Bridge, Right of Way	1939-41
	Tacoma Narrows Bridge, Roebling’s Sons Company	1942-51
	Tacoma Narrows Bridge, Roebling’s Sons Company	1948
	Tacoma Narrows Bridge, Roebling’s Sons Company	1949
	Tacoma Narrows Bridge, Roebling’s Sons Company	1949
	Tacoma Narrows Bridge, Roebling’s Sons Company	1949
	Tacoma Narrows Bridge, Roebling’s Sons Company	1950
	Tacoma Narrows Bridge, Salvage Inventory	1943
	Tacoma Narrows Bridge, Schedule	1939
	Tacoma Narrows Bridge, Slides	
Box 59	Tacoma Narrows Bridge, Specifications	1938
	Tacoma Narrows Bridge, Specifications	1939-45
	Tacoma Narrows Bridge, Specifications	1945-48
	Tacoma Narrows Bridge, Specifications	1947
	Tacoma Narrows Bridge, Specifications	1947-51
	Tacoma Narrows Bridge, Specifications, Steel	1940-48
	Tacoma Narrows Bridge, State v. Yelle, Janssen, Stevens	1938
	Tacoma Narrows Bridge, Suggestions	1941-45
	Tacoma Narrows Bridge, Suggestions	1946-50

BRIDGE FILES

Box 59	Tacoma Narrows Bridge, Superstructure, Report on Construction	
	Tacoma Narrows Bridge, Superstructure, Report Photos	1940
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1941-42
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1942
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1943
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1943-44
Box 60	Tacoma Narrows Bridge, Suspension Bridge Investigation	1944
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1944-45
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1945-46
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1947-50
	Tacoma Narrows Bridge, Suspension Bridge Investigation	1950-54
	Tacoma Narrows Bridge, Suspension Bridge Model Studies	1942-43
	Tacoma Narrows Bridge, Suspension Bridge Model Studies	1944
	Tacoma Narrows Bridge, Suspension Bridge Model Studies	1945
	Tacoma Narrows Bridge, Suspension Bridge Model Studies	1946-50
	Tacoma Narrows Bridge, Switchgear Proposal	1949
	Tacoma Narrows Bridge, Tacoma, City of	1937-40
	Tacoma Narrows Bridge, Telephone Cable	1940
	Tacoma Narrows Bridge, Testing, University of Wash.	1940
	Tacoma Narrows Bridge, Testing, University of Wash.	1941
	Tacoma Narrows Bridge, Testing, University of Wash.	1941-42
	Tacoma Narrows Bridge, Testing, University of Wash.	1941-43
	Tacoma Narrows Bridge, Testing, University of Wash.	1941-44
	Tacoma Narrows Bridge, Testing, University of Wash.	1941-50
	Tacoma Narrows Bridge, Testing, University of Wash.	1941-51
	Tacoma Narrows Bridge, Testing, University of Wash.	1943-44
Box 61	Tacoma Narrows Bridge, Testing, University of Wash.	1944-45
	Tacoma Narrows Bridge, Testing, University of Wash.	1944-50
	Tacoma Narrows Bridge, Testing, University of Wash.	1945-51
	Tacoma Narrows Bridge, Theodolite Rental	1942-43
	Tacoma Narrows Bridge, Time Schedules	1945-50
	Tacoma Narrows Bridge, Toll Rates	1938-40
	Tacoma Narrows Bridge, Toll Rates	1949-61
	Tacoma Narrows Bridge, Tower Elevators	1949-51
	Tacoma Narrows Bridge, Tower Repairs	1949
	Tacoma Narrows Bridge, Traffic and Revenue Estimates	1933-40
	Tacoma Narrows Bridge, Traffic and Revenue Estimates	1940
	Tacoma Narrows Bridge, Traffic and Revenue	1941-58
	Tacoma Narrows Bridge, Traffic and Revenue Estimates	1947
	Tacoma Narrows Bridge, Traffic and Revenue Estimates	1947-48
	Tacoma Narrows Bridge, Traffic and Revenue Reports	1940
	Tacoma Narrows bridge, Traffic and Revenue Reports	1940-41

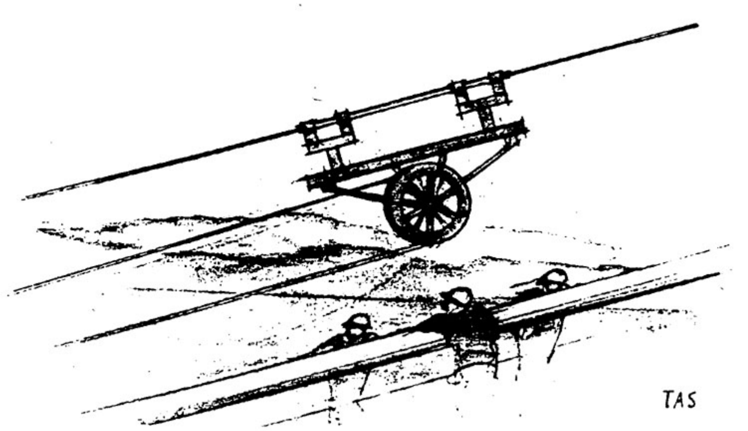
BRIDGE FILES

Box 61	Tacoma Narrows Bridge, Traffic and Revenue Reports	1950-52
	Tacoma Narrows Bridge, Traffic Statistics	1959-60
	Tacoma Narrows Bridge, Traffic Statistics	1961-64
	Tacoma Narrows Bridge, Traffic Statistics, Profit and Loss	1951-54
	Tacoma Narrows Bridge, Traffic Statistics, Profit and Loss	1955-57
Box 62	Tacoma Narrows Bridge, Traffic Statistics, Profit and Loss	1958
	Tacoma Narrows Bridge, von Karman, Theodore, Engineer	1941
	Tacoma Narrows Bridge, Wind Direction Instruments	1941-51
	Tacoma Narrows Bridge, Woodruff, Glenn B., Engineer	1941-42
	Tacoma Narrows Bridge, Woodruff, Glenn B., Engineer	1941-43
	Tacoma Narrows Bridge, Woodruff, Glenn B., Engineer	1941-51
	Tacoma Narrows Bridge, Woodruff, Glenn B., Engineer	1942-44
	Tacoma Narrows Bridge, Woodruff, Glenn B., Engineer	1945-46
	Tacoma Narrows Bridge, Woodworth & Co., Contractors	1948-51



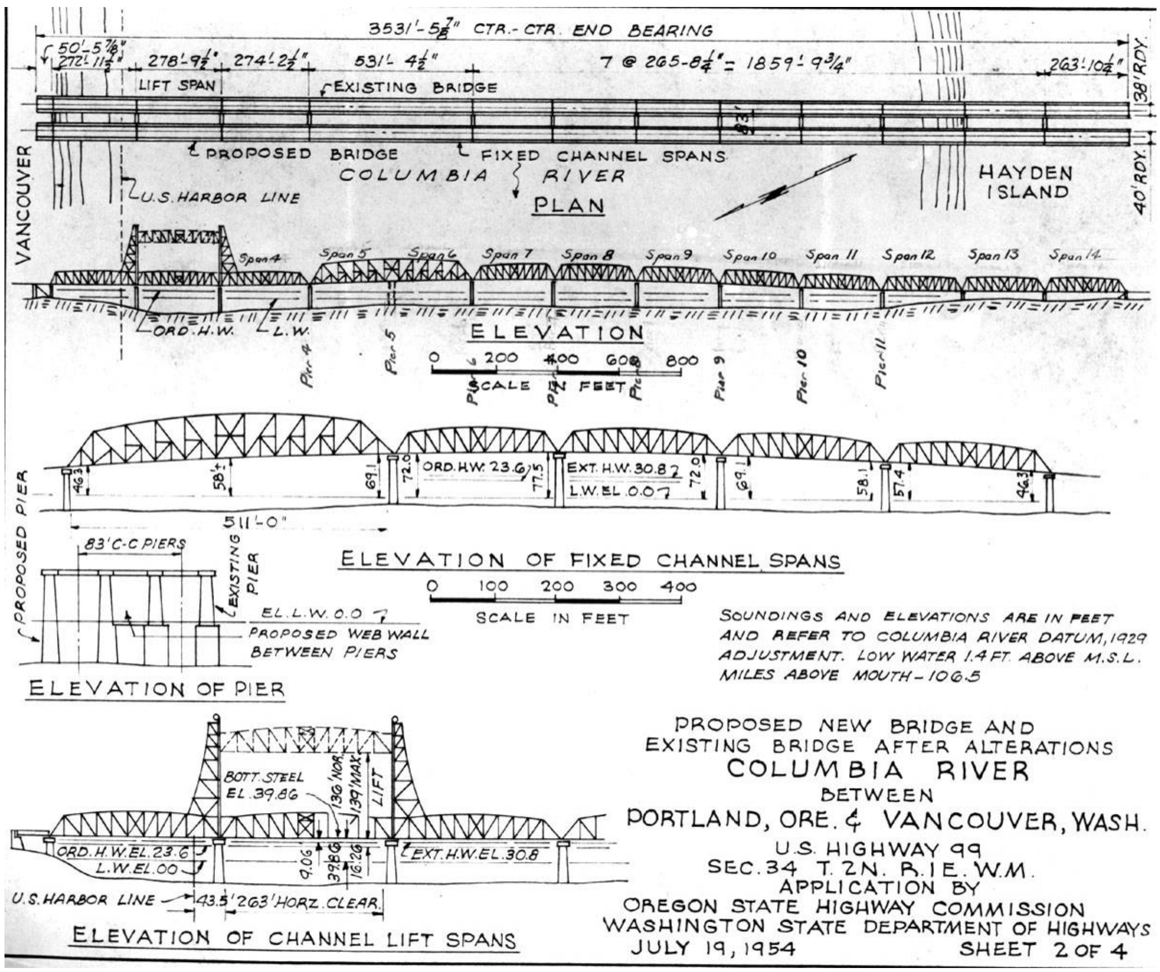
· TACOMA · NARROWS · BRIDGE ·

· TACOMA · WASHINGTON ·



BRIDGE FILES

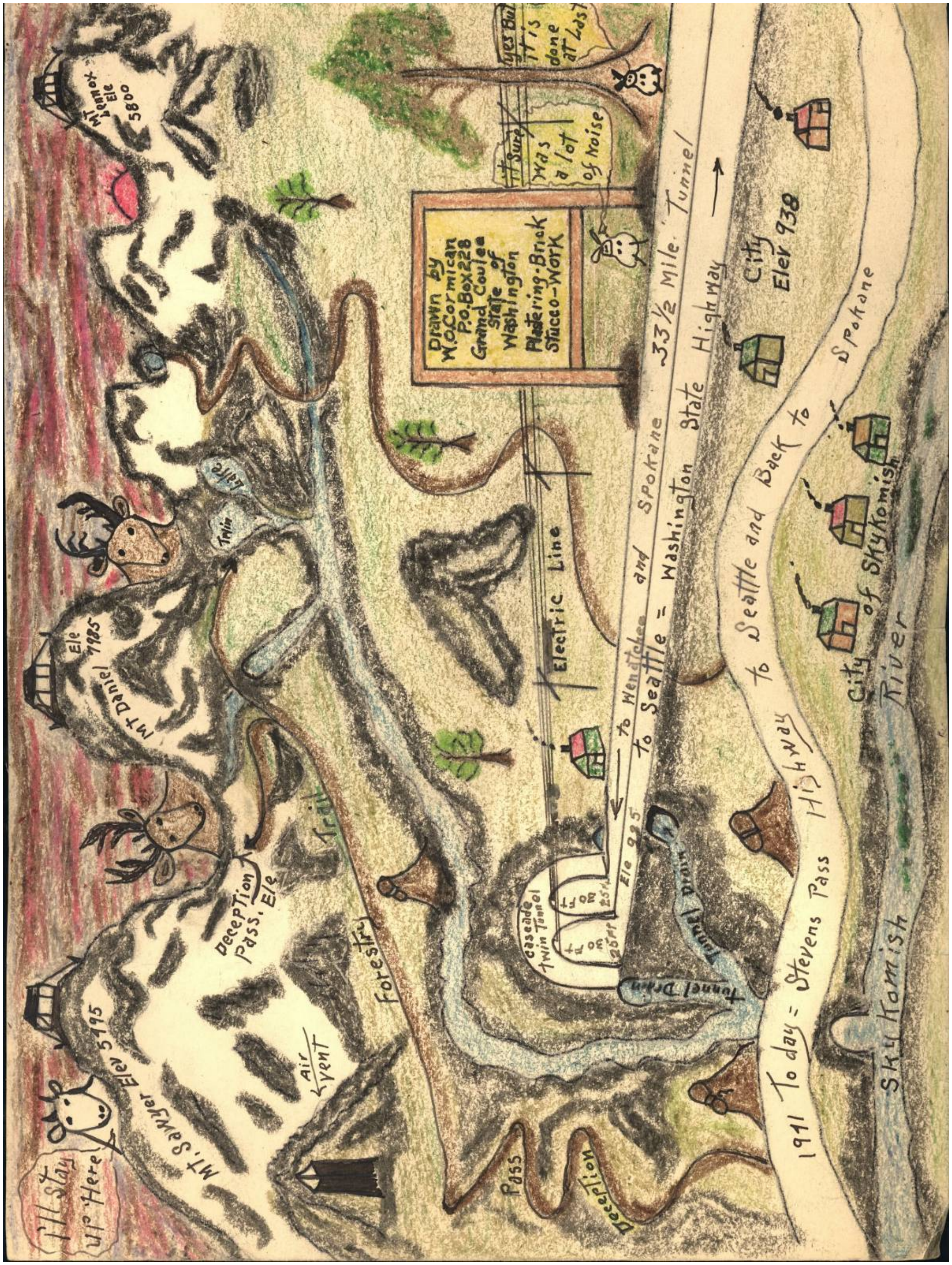
Box 62	The Dalles Bridge	1949-52
(cont.)	The Dalles Bridge, Wasco County	1947-68
	Third Lake Washington Bridge	1963-66
	Third Lake Washington Bridge, Transit Facilities Required	1965
	Umatilla Bridge	1950-74
	Vancouver-Portland Bridge, Accounting	1956-62
	Vancouver-Portland Bridge, Administration Building	1958-60
	Vancouver-Portland Bridge, Bond Calls	1953-67
	Vancouver-Portland Bridge, Bond Calls	1961-62
	Vancouver-Portland Bridge, Bond Calls	1961-62
	Vancouver-Portland Bridge, Bond Calls	1963-65
Box 63	Vancouver-Portland Bridge, Bond Resolution	1956
	Vancouver-Portland Bridge, Bond Resolution	1956
	Vancouver-Portland Bridge, Bonds	1956
	Vancouver-Portland Bridge, Bonds	1956-58
	Vancouver-Portland Bridge, Bonds	1958
	Vancouver-Portland Bridge, Claims	1958-61
	Vancouver-Portland Bridge, Correspondence	1955-62
	Vancouver-Portland Bridge, Correspondence	1963-66
	Vancouver-Portland Bridge, Design Correspondence	1953-55
	Vancouver-Portland Bridge, Examinations	1960-66
	Vancouver-Portland Bridge, Federal Participation	1954-58
	Vancouver-Portland Bridge, Federal Participation	1955-58
	Vancouver-Portland Bridge, Federal Participation	1958-61
	Vancouver-Portland Bridge, Financial Advisory Committee	1955-56
	Vancouver-Portland Bridge, Financial Status	1952-59
	Vancouver-Portland Bridge, First Washington Corporation	1957-58
	Vancouver-Portland Bridge, Informational Releases	1953-58
Box 63	Vancouver-Portland Bridge, Informational Releases	1959-60
	Vancouver-Portland Bridge, Informational Releases	1961-77
	Vancouver-Portland Bridge, Insurance	1956-61
	Vancouver-Portland Bridge, Insurance	1962-66
	Vancouver-Portland Bridge, Joint Investigation	1951
	Vancouver-Portland Bridge, Legal Issues	1953-58
Box 64	Vancouver-Portland Bridge, Legal Issues	1953-70
	Vancouver-Portland Bridge, Miscellaneous	1959-60
	Vancouver-Portland Bridge, Monthly Construction Reports	1956-57
	Vancouver-Portland Bridge, Newspaper Clippings	1956-58
	Vancouver-Portland Bridge, Oregon State Highway Comm.	1929-66
	Vancouver-Portland Bridge, Oregon State Highway Comm.	1953-69
	Vancouver-Portland Bridge, Oregon State Tax Commission	1962-65


3531'-5 7/8" CTR.-CTR. END BEARING
LIFT SPAN
EXISTING BRIDGE
7 @ 265-8 1/4" = 1859'-9 3/4"
PROPOSED BRIDGE
FIXED CHANNEL SPANS
COLUMBIA RIVER
PLAN
VANCOUVER
U.S. HARBOR LINE
HAYDEN ISLAND
ELEVATION
SCALE IN FEET
ELEVATION OF FIXED CHANNEL SPANS
PROPOSED PIER
EXISTING PIER
83' C-C PIERS
PROPOSED WEB WALL BETWEEN PIERS
ELEVATION OF PIER
SOUNDINGS AND ELEVATIONS ARE IN FEET
AND REFER TO COLUMBIA RIVER DATUM, 1929
ADJUSTMENT. LOW WATER 1.4 FT. ABOVE M.S.L.
MILES ABOVE MOUTH - 106.5
PROPOSED NEW BRIDGE AND
EXISTING BRIDGE AFTER ALTERATIONS
COLUMBIA RIVER
BETWEEN
PORTLAND, ORE. & VANCOUVER, WASH.
U.S. HIGHWAY 99
SEC. 34 T. 2N. R. 1 E. W.M.
APPLICATION BY
OREGON STATE HIGHWAY COMMISSION
WASHINGTON STATE DEPARTMENT OF HIGHWAYS
JULY 19, 1954
SHEET 2 OF 4
ELEVATION OF CHANNEL LIFT SPANS
U.S. HARBOR LINE
263' HORZ. CLEAR.

Box 64

BRIDGE FILES

Box 64	Vancouver-Portland Bridge, Plans	1955-58
	Vancouver-Portland Bridge, Plans	1956-59
	Vancouver-Portland Bridge, Plans	1959
	Vancouver-Portland Bridge, Plans and Specifications	1946-47
	Vancouver-Portland Bridge, Port of Vancouver	1956-57
	Vancouver-Portland Bridge, Reconstruction	1958-60
	Vancouver-Portland Bridge, Removal of Tolls	1967-69
	Vancouver-Portland Bridge, Resolutions	1956
	Vancouver-Portland Bridge, Revenue Bond Financing	1955
	Vancouver-Portland Bridge, Right of Way	1928-56
Box 65	Vancouver-Portland Bridge, Roadside Improvement	1957-59
	Vancouver-Portland Bridge, State Highway Departments	1955-56
	Vancouver-Portland Bridge, State Highway Departments	1956-57
	Vancouver-Portland Bridge, State Highway Departments	1956-57
	Vancouver-Portland Bridge, Toll Collection	1954-62
	Vancouver-Portland Bridge, Toll Collection	1963-67
	Vancouver-Portland Bridge, Traffic Engineers	1954-61
	Vancouver-Portland Bridge, Union Securities Corporation	1956
	Vantage Bridge	1962
	Vernita Bridge, Agreements and Contracts	1963-75
	Vernita Bridge, Auditor's Examinations	1964-76
	Vernita Bridge, Bond Resolutions	1960-64
	Vernita Bridge, Bonds	1964
	Vernita Bridge, Bonds	1963-64
	Vernita Bridge, Bonds	1963-64
	Vernita Bridge, Consulting Engineer	1963-64
	Vernita Bridge, Correspondence	1963-73
	Vernita Bridge, Correspondence	1963-79
	Vernita Bridge, Permits, Proceedings, Findings of Fact	1963-64
	Vernita Bridge, Public Hearing	1963



I'll stay up Here
Mt Sawyer Elev 5195
Air vent
Deception Pass, Ele
Mt Daniel
Mt Lennox Ele 5800
Deception Pass
Forestry
Trail
Cascade Twin Tunnel
Tunnel Drain
Lake
Twin
Drawn by W.O.Cormican P.O.Box228 Grand Coulee State of Washington
Plastering-Brick Stucco-Work
It Sure was a lot of noise
It is done at Last
Electric Line
to Wenatchee and Spokane 33½ Mile Tunnel
to Seattle = Washington State Highway
City Elev 938
1911 Today = Stevens Pass Highway to Seattle and Back to Spokane
City of Skykomish
Skykomish River

TUNNEL FILES

Box 1	Blewett Pass Tunnel	1946
	Cascade Tunnel	1936-37
	Cascade Tunnel	1937-46
	Cascade Tunnel	1945-46
	Cascade Tunnel	1946
	Cascade Tunnel	1946
	Cascade Tunnel, Cost and Unit Price Data	1946
	Cascade Tunnel, Naches Pass	1946
	Cascade Tunnel, Newspaper Clippings	1909-46
	Cascade Tunnel, Survey	1946
	Cascade Tunnel, Survey	1947
	Cascade Tunnel, Weekly Reports	1946
	Climatic Summary of the United States	ca. 1946
	Columbia Basin Snow Surveys and Irrigation Forecasts	1940-41
	Columbia Basin Snow Surveys and Irrigation Forecasts	1942-44
	Columbia Basin Snow Surveys and Irrigation Forecasts	1946-47
	Leavenworth-Skykomish Tunnel, Proposed	
	Naches Pass Tunnel, Amendatory Report	1952
	Naches Pass Tunnel, Consulting Engineers	1962
	Naches Pass Tunnel, Feasibility	1958
Box 2	Naches Pass Tunnel, Feasibility Report	1960
	Naches Pass Tunnel, Informational Releases	1957-63
	Naches Pass Tunnel, Interim Report	1960
	Naches Pass Tunnel, Maps and Profiles	1946
	Naches Pass Tunnel, Proposal for Study	1959
	Naches Pass Tunnel, Reports and Newsletters	1962-63
	Naches Pass Tunnel, Traffic, Revenues and Expenses	1962
	Naches Pass Tunnel, Vouchers and Warrants	1946-61
	Snoqualmie Pass Highway Tunnel	1946
	Snoqualmie Pass Railroad Tunnel	1946
	Snow Data	1946
	Stampede Pass Tunnel	1946
	Stampede Pass Tunnel	1946
	Stevens Pass Highway Tunnel	1946
	Stevens Pass, Railway Tunnel	1946
	Tunnels and Passes	1946

TACOMA-SEATTLE-EVERETT TOLL ROAD FILES

Box 1	Toll Highways and Super Highways	1938
	Toll Road, Angle Lake Area Alternate	1956
	Toll Road, Appraisals	1954-56
	Toll Road, Bond Trustee	1955
	Toll Road, Bonds	1955
	Toll Road, Bonds	1955-56
	Toll Road, Caldwell, Marshall, Trimble & Mitchell	1954-57
	Toll Road, Civil Engineering Report	1955
	Toll Road, Concessions	1955-56
	Toll Road, Correspondence	1953-55
	Toll Road, Correspondence	1954-56
	Toll Road, Coverdale and Colpitts Report	1953-55
	Toll Road, Coverdale and Colpitts Report	1953-55
	Toll Road, Coverdale and Colpitts Report	1955
	Toll Road, Damman, H. H.	1955-57
	Toll Road, Design Criteria	1954
	Toll Road, Duwamish-Green River Joint Survey Board	1955-56
	Toll Road, Economic Feasibility	1954
Box 2	Toll Road, Engineering Fees	1955
	Toll Road, Engineers	1954
	Toll Road, Engineers	1955
	Toll Road, Engineers	1956
	Toll Road, Estimated Traffic and Revenue	1955
	Toll Road, Estimated Traffic and Revenue	1955
	Toll Road, Financial Advisory Committee	1954-56
	Toll Road, Financial Consultants	1954-57
	Toll Road, Financing	1953-55
	Toll Road, Financing	1955
	Toll Road, Greiner-Tudor Associates	1954-55
	Toll Road, Greiner-Tudor Associates	1956
	Toll Road, Highway Commission	1955-56
	Toll Road, Informational Releases	1954-55
	Toll Road, Informational Releases	1955
	Toll Road, Informational Releases	1955-58
	Toll Road, Legal Issues	1954-56
	Toll Road, Legal Issues	1954-57
Box 3	Toll Road, Locations	1955-56
	Toll Road, Locations and Financing	1955-59
	Toll Road, Pavement Study	1955
	Toll Road, Paying Agents	1954-55
	Toll Road, Permits	1953-56
	Toll Road, Ponders-Everett	1953

TACOMA-SEATTLE-EVERETT TOLL ROAD FILES

Box 3	Toll Road, Progress Schedule	1954-55
	Toll Road, Proposed	1954
	Toll Road, Puget Sound Engineering Council	1955
	Toll Road, Resolutions	1954-55
	Toll Road, Right of Way	1954-55
	Toll Road, Right of Way	1955
	Toll Road, Right of Way	1955-56
	Toll Road, Road Relocations, Grade Separations	1954-55
	Toll Road, Seattle, City of	1954-56
	Toll Road, Soils Investigations	1956
	Toll Road, Tacoma, City of	1955-56
	Toll Road, Technical Advisory Committee	1954
	Toll Road, Technical Advisory Committee	1954-55
	Toll Road, Traffic	1953-56