Landmark Preservation Board Report on Designation: Seattle Japanese Garden

The City of Seattle

Landmarks Preservation Board

Mailing Address: PO Box 94649 Seattle WA 98124-4649
Street Address: 700 5th Ave Suite 1700

REPORT ON DESIGNATION LPB 298/08

Name and Address of Property: **Seattle Japanese Garden**
1075 Lake Washington Boulevard E.

Legal Description:

Washington Park Arboretum Legal Description:
Lots 1 thru 7, Block 1, Madison Park Addition together with Lots 6-7, Block 4, Bard-Foster Washington Park Addition together with portion of vacated Bard-Foster Washington Park Addition together with portion Washington Park in E 1/2 Section 21-25-4 & NE 1/4 Section 28-25-4 together with Blocks 13-14, Lake Washington Shore Lands Addition less State Highway.

Japanese Garden Boundary Description:
A parcel of land, lying within the boundaries of Washington Park, in the N.E. ¼ of Section 28, Township 25 North, Range 4 East, Willamette Meridian in the City of Seattle, County of King, State of Washington described as follows:
Beginning at the intersection of 26th Avenue East and East Highland Drive;
thence along the centerline of 26th Avenue East N 1˜50'20" E, 65.00 feet;
thence S 88˜23'25" E, 289.27 feet;
thence S 21˜13'25" E, 7.70 feet to the True Point Of Beginning;

Thence N 00˜35'23" W, 68.55 feet;
thence N 71˜07'10" E, 159.97 feet;
thence S 16˜20'18" E, 74.57 feet;
thence S 22˜48'37" E, 83.06 feet;
thence S 29˜29'27" E, 99.36 feet;
thence S 33˜07'15" E, 94.70 feet;
thence S 28˜23'23" E, 98.30 feet;
thence S 22˜33'30" E, 86.82 feet;
thence S 19˜04'38" E, 81.24 feet;
thence S 20˜05'38" E, 84.41 feet;
thence S 23˜52'39" E, 49.65 feet;
thence S 24˜57'47" W, 150.55 feet;
thence N 61˜56'17" W, 148.82 feet;

thence N 42˜19'08" W, 100.44 feet;
thence N 44˜36'03" E, 48.20 feet;
thence N 43˜27'58" W, 116.39 feet;
thence N 32˜32'24" W, 305.54 feet;
thence N 18˜51'46" W, 181.83 feet;
thence N 85˜36'34" E, 71.86 feet to the True Point of Beginning. Said parcel containing 4.37 acres. Bearings are based on Lambert Projection for the State of Washington, North Zone.

At the public meeting held on May 21, 2008, the City of Seattle's Landmarks Preservation Board voted to approve designation of the Seattle Japanese Garden at 1075 Lake Washington Boulevard East as a Seattle Landmark based upon satisfaction of the following standards for designation of SMC 25.12.350:

(C.) *It is associated in a significant way with a significant aspect of the cultural, political, or economic heritage of the community, city, state or nation.*

(D.) *It embodies the distinctive visible characteristics of an architectural style, or period, or of a method of construction.*

(E.) *It is an outstanding work of a designer or builder*

(F.) *Because of its prominence of spatial location, contrasts of siting, age, or scale, it is an easily identifiable visual feature of its neighborhood or the city and contributes to the distinctive quality or identity of such neighborhood or city.*

DESCRIPTION

Current Appearance

The Seattle Japanese Garden is a 3½ acre enclosed site located in the extreme southwest corner of the Washington Park Arboretum. This 230-acre park occupies a long, narrow valley extending south from Lake Washington's Union Bay to East Madison Street. Lake Washington Boulevard winds through the length of the Arboretum west of center and serves as the primary access to the park. South of Madison Street, the Boulevard continues southeast towards the shores of Lake Washington. Arboretum Drive East is a secondary road through the Arboretum that roughly parallels the park's eastern boundary. The Montlake neighborhood borders the Arboretum to the west while the private, gated residential community of Broadmoor lies to the east. Broadmoor's 18-hole golf course wraps around the single family residences clustered at the center of the development and provides a green buffer for the park. East Madison Street, the major arterial along the southern end of the Arboretum, connects downtown Seattle to the southwest with the Madison Park neighborhood to the northeast. Named for the adjoining park, the Washington Park neighborhood lies south of Madison Street to the north of Lake Washington Boulevard.

Nestled at the base of a steep slope on the west, the Japanese Garden has a long, narrow and roughly rectangular outline bordered by Lake Washington Boulevard along its entire eastern margin. The garden's northern end terminates just south of the intersection of East Interlaken Boulevard and Lake Washington Boulevard. Beyond the southern end of the garden is the northern entrance of a large parking lot shared by the Washington Park Playfield situated further to the south. A small wooden sign positioned near the lot's entrance directs visitors to Japanese Garden parking. A second entrance off Lake Washington Boulevard provides access to the lot's southern end.

A short service road extends from the northwest corner of the parking lot to a pair of gates leading into the service area within the southwest corner of the Japanese Garden. The gates are set within a chain link fence topped with barbed wire that encloses the western end of the garden's southern boundary and continues along the entire western and northern boundaries. Just beyond the fence is a rough dirt trail that follows the fence line from the parking lot on the south to Interlaken Boulevard on the north. On the hillsides to the west and north of the garden, the vegetation of native trees, bushes and groundcover is largely untended in contrast to the landscaped areas found on the more public south and east sides and within the garden itself.

The chain link fence terminates at the northeast corner of the garden where a high cedar fence begins and continues the length of the eastern boundary and around the southeast corner of the garden. Following the contour of Lake Washington Boulevard, a paved sidewalk runs along much of the eastern side to a point just beyond the garden's original entrance gate where it transitions to a wide gravel path. North of this gate, a low hedge grows along the fence, while the beds south of the gate are planted with a greater variety of trees, bushes and shrubs. Known as the Emperor's Gate, this wood frame structure features a pair of paneled doors that open inward below a shingled side gable roof supported by carved brackets and simple side posts. Each door contains a narrow bamboo screen in the upper half. When open, the doors rest against wing posts set at angles from the gate posts and connected by short horizontal beams. The gate is recessed inward from the main fence, allowing rolling metal gates to secure the entrance.

At the southern end of the garden, the sidewalk continues to the parking lot, providing pedestrian access for the garden's visitors. A wide paved path leads from the sidewalk to the current entrance, known as the south gate, set within the cedar fence near the southeast corner of the garden. Dense plantings obscure much of the fence from view in this area. Shaped pine trees dot the lawn on either side of the entrance path, framing the view towards the gate. In contrast to the open view of the southeast corner of the garden, a small grove of evergreens screens the southwest corner and service road beyond. Along the sidewalk from the parking area, a small landscaped area features a wood sign mounted on a post indicating the direction to the Japanese Garden adjacent to a large granite boulder set with a small memorial plaque. The plaque honors the efforts of James K. Fukuda, who was with the Consulate-General of Japan in Seattle and was instrumental in the creation of the garden. Sheltering the stone is a *Paulownia tomentosa* or Empress Tree.

At the end of the paved entrance path, a small enclosed plaza is recessed from the main fence so as to allow rolling metals gates to secure the area containing the ticket booth and south gate. Built into the fence along the east side of the plaza, the small wood frame booth has a hexagonal plan with ticket windows set in the two exposed sides. The entrance is located at the rear within one of the four sides facing into the garden. The flat roof structure has small shingled shed roofs over the ticket windows. The wood frame garden gate consists of a pair of doors that open inward below a shingled side gable roof supported by carved brackets and simple side posts. Each paneled door contains a bamboo screen in the upper half. When open, the doors rest against wing posts set at angles from the gate posts and connected by short horizontal beams. On the east side of the plaza, two shallow display cases are mounted on the fence under a side gable roof of similar design to the garden gate. A low wooden bench on a concrete base provides the only seating in this area.

At the threshold of the gate, a large flat shedding stone is set into the pavement. Visitors are meant to pause on the stone and shed the outside world before entering the more contemplative realm of the garden. Beyond the gate, the paved path transitions to gravel as it continues into the garden. Along many of the garden paths, fencing in the form of low wood posts connected by ropes serves to prevent visitors from walking on the delicate mosses and other groundcover in the adjoining beds. Immediately after entering the garden, a large and very old Japanese lace leaf maple grows to the left of the path. To the east, a dry stream bed constructed of rocks, stones and pebbles meanders through banks covered with moss and Mondo grass and planted with trees, bushes and low shrubs. A *yukimi* or snow-viewing lantern, so named because its broad flat roof is designed to catch the falling snow, rests above the eastern bank near another large Japanese maple.

As the wide path proceeds north, a side path leads southwest to the service area, containing a pair of portable toilets, the garden's only restroom facilities, a small wood frame shed, and the ladders, wheelbarrows, hoses, tools and equipment used to maintain the garden. A stand of bamboo partially screens this otherwise open area from view. From the service area, a wide path continues north and parallels the fence along the western boundary of the garden before curving northeast to join the path along the pond's western shore. Just beyond the intersection with this side path, the main path splits into one leading northwest over a stone arch bridge to paths on the western side of the garden and one continuing north to paths along the eastern side.

Designed in 1959 and completed in 1960, the Seattle Japanese Garden contains the features of a stroll garden of the formal (*shin*) type built during the late 16th century Momoyama Period and early 17th century Edo Period. Using the techniques of *miegakure* or "hide and reveal," the stroll garden's design is intended to present a series of scenes as visitors walk through a series of sub-gardens centered on a pond or lake. In addition to the pond, popular garden elements include hills, streams and waterfalls, islands, rocks, groves of plum or cherry trees, paths and bridges, and tea gardens. All of these elements have been included within the design of the Seattle Japanese Garden with the intent of recreating natural and man-made landscapes within a compressed area. One of the garden's initial designers, Kiyoshi Inoshita, described his design intent in a 1959 report:

> The flow of water, which originated at the high mountain ranges, transforms itself as it continues its way through the landscape; first it turns into a waterfall, then into a stream, washing the bank by a tea hut, and finally becomes a lake. At the lakeshore are a variety of features such as a rock promontory, an inlet, and steep slopes, through which water continues its way, until it reaches a village (an image of the village symbolically represented by a cherry grove, iris paddies, and a moon viewing hill). At the village, there appears an island connected to the shore by two different bridges. At the end of the lake is a stone paved boat launch, which symbolically represents a fishing village. There, the water disappears from one's sight, leaving the expectation that it will be joining the greater ocean.

In executing this design intent for the Seattle Japanese Garden, principal designer Juki Iida incorporated an existing pond and existing plant material, primarily maples, and created several distinct landscapes or sub-gardens anchored by the pond at the center and connected by paths that provide various scenes to strolling visitors. Iida also used a compositional technique called *shakkei* or "borrowed scenery" to draw outside elements of the existing Arboretum into the views he created within the garden. This technique serves to extend the scale of the garden beyond its own boundaries.

Covered with a forest of conifers, maples and rhododendrons at the higher southern end, the mountain and hillside area contains two streams, one natural and one man-made, but both appearing to flow from the background hill to the west of the garden. Originating near the southwest corner of the garden, the natural stream follows a man-made rocky bed and flows downhill through a steep moss-covered slope and under the stone arch bridge before joining the second stream to form the lake. A large *Kasuga*-style lantern stands near the southern end of the stone bridge, which was constructed ca. 1936 as part of the original improvements to the Arboretum funded by the Depression-era Works Progress Administration. The man-made stream originates from a point northwest of the 11-tiered Korean-style stone pagoda, representative of a ruined mountain monastery, and flows east before cascading over a four-foot waterfall below the stone pagoda. Constructed of weathered granite boulders buried two-thirds underground, the waterfall is the focal point of the mountain area anchored by the largest stone in the garden, weighing some 8½ tons.

Below the waterfall, the water continues to flow through a rocky course, shifting direction and crossing a path of stepping stones before joining the first stream near the tea house, representative of a mountain villa. A small box-like stone lantern rests directly on the ground along the rocky course, seeming to shed light on the water as it passes. Below the junction of the two streams, water flows around a bridge of stepping stones and then into a wider bed, representative of a valley, and eventually becomes the lake. Just before the outlet to the lake, a second bridge of large, flat rectangular stones, representative of a dam, crosses the wider stream. Another *yukimi* or snow-viewing lantern rests on a nearby rock outcrop.

With its strong rock outcrops, projecting pebble beached cape and inlet, the southern end represents the pond in plateau while the marshy landscape of the more open northern end represents the pond in plain. At the middle of the pond, a rocky island covered with low

pines and bushes and connected to the east and west banks by two bridges separates the two halves. North of this is a second rocky island, known as Turtle Island, that is also covered with low pines and located near the eastern shore. The island's pines are said to symbolize Japanese cranes. Individual rocks dot the water near the pond's shoreline, including one off the southern end of Turtle Island that the pond's turtles often use to sun themselves. Lined with cut stone paths set at right angles, the rectilinear northern shore of the pond represents a fishing village and boat landing or harbor. At the northeast corner of the pond, the water passes under a wisteria arbor before disappearing from view in a culvert, metaphorically flowing out to sea. Due to the use of *miegakure* techniques, a full circuit of the paths around the pond is required in order to view all of its design elements as no one place within the garden offers a full view of everything.

From the southeastern corner of the pond, the gentle grassy bank projects north into a low, narrow rocky cape or peninsula, creating an inlet between the eastern shore. A small stone *misaki-toro* or "cape lantern" at the tip of the peninsula serves as a beacon. The cape is a popular spot for the great blue herons that visit the garden to rest and sun themselves. Along the eastern shore planted with maples, shaped pine trees and low sculpted bushes, the grassy bank slopes gently towards the water's rock lined edge. At the midpoint of the pond, a path leads from the Emperor's Gate, the garden's original entrance, and through a stand of five vertical pines to the eastern bridge. Set amongst the pine trees is a large *Kasuga*-style lantern dedicated to the memory of Carl McNeilan Ballard, who was president of the Arboretum Foundation from 1955 to 1957 when planning for the Japanese Garden initiated.

The eastern bridge is a *dobashi* or earthen bridge constructed of small logs set over a timber frame supported over the water on a pair of posts at the center. A layer of earth or concrete covers the logs before being topped by gravel. A path set with wide flat stepping stones winds across the small island to the western bridge. This *yatsuhashi* or "eight-plank" zigzag bridge has two changes of direction before reaching the western shore. Square posts set in the water support the plank deck and continue above it to support the low railings. It is said that the zigzag form enables one to avoid the evil spirits that flow in straight lines.

Nearby on the western shore is the pond's moon-viewing stand or platform of similar construction. This wood-frame structure has a square plan and extends over the water, facing southeast towards the apparent path of the rising moon. However, the hills beyond the garden obscure the moon rising above the eastern horizon and only allow it to be visible when well up in the sky. Like the *yatsuhashi* bridge, the square posts set in the water at the outer corners support the plank deck and continue above it to support the railing that encloses three sides of the platform. Additional shorter posts set in the water provide structural support around the perimeter and at the center. The focus of late summer ceremonies that celebrate the rising of the moon, the platform is also a good place to view the large colorful koi that inhabit the pond. Along the western shore planted with trees and low shrubs, the grassy bank slopes gently towards the water lined with beds of Japanese iris, reeds, and other aquatic plants. Near the northern end of the shore, a stone reflecting lantern set on a shaft rises above the water adjacent to a large stone. This is another snow-viewing lantern of the *tachi-yukimi* type.

The more natural state of the eastern and western shores contrasts with the more formal appearance of the northern shore, representing the fishing village and boat landing. Beyond the waterline edged with rocks, a nearly flat grassy bank extends upward to a wide path set with narrow bands of cut stone. This path follows a zigzag route near the base of a seven foot stone wall that extends across the full length of the northern shore. Near the western end of the path, a set of wide shallow stone stairs leads down to the water's edge. At the corner of the area representing the boat dock, a stone *omokage* or "face-shape" lantern illuminates the harbor area. Several low benches provide seating within the grassy margin between the path and the wall.

A set of wide stone steps leads up to a path that skirts the top of the wall covered with low sculpted shrubs below a hillside planted with azaleas. Near the top of the slope and the garden's northern boundary, the Kobe Friendship Lantern is reached by a series of irregular stone steps. This *Kasuga*-style stone lantern was a gift from Seattle's sister city and carries a small plaque that reads "May the Light shine Everlastingly upon the Friendship between Kobe and Seattle." The City of Kobe donated a second lantern in the *okazaki* style with a turtle carved at the base that occupies a site near a bench within the grassy area beyond the southeast corner of the pond.

The eastern end of the path along the top of the wall follows a steep slope down to the northeast corner of the garden. Another *Kasuga*-style lantern stands at the base of the path aligned with the end of the cut-stone path of the fishing village area. The path continues south to the wisteria arbor where it splits to cross a low, arched wood plank bridge on the east and a bridge of irregular stepping stones to the immediate west. Cedar corner posts and diagonal braces support a square frame of cedar and bamboo tied together with bark rope imported from Japan. The wisteria's gnarled main trunk grows at the northeast corner with interweaving branches trained upward, over and through the bamboo framework. Dense green foliage covers the top of the arbor and typically fills with blossoms in mid-May. The wisteria arbor covers the outlet to the lake and serves as an entrance to the fishing village.

Above the path along the western shore of the pond, an orchard planted primarily of flowering cherry trees covers the grassy slope. Japan is deservedly famous for its cultivation of cherry trees over the centuries, and its festivals held in conjunction with the tree's spring flowering. Considered the national flower, the cherry blossom (*sakura*) is celebrated in the country's arts, crafts and literature. At the northwest corner of the orchard, an *azumaya* or viewing arbor occupies the high ground near the chain link outer fence screened with bamboo matting in this area. The earthen steps leading up to the open east side of the *azumaya* are constructed of rows of short concrete posts that simulate sections of wood logs set vertically. The wood frame structure is a marvel of Japanese joinery, especially the interior framing of the low-pitch, pyramidal roof. Covered with wood shingles, the roof rests on four tapered corner posts mounted on a concrete pad. A low bench is built into the north and west sides between the posts, providing a restful place to view the cherry orchard and the garden beyond. Attractive plantings of ornamental grasses, low bushes and flowering shrubs grow on the banks beyond the south and east sides.

Further south along the western path on the bank beyond the moon viewing stand is a *Betula pendula* or European white birch tree. Crown Princess (now Empress) Michiko of Japan planted the tree, a symbol of her family, in a formal ceremony during her visit to the garden on October 5, 1960, shortly after it was completed. The Crown Princess had accompanied her husband, Crown Prince (now Emperor) Akihito, on a tour of the United States to commemorate the centennial of the first trade and friendship treaty between the two countries. On the same visit to the garden, the Crown Prince planted a cherry tree to symbolize Japan and his family.

Occupying a knoll above the southwest corner of the pond, the Japanese Tea Garden or *roji* (literally "dewy ground") is an enclosed garden, containing the six-mat *chashitsu* or teahouse, Shoseian (Arbor of the Murmuring Pines), and a *machiai* or waiting arbor. Surrounded by a hedge of boxwood, cedar and osmanthus, the *roji*, a term that originally referred to the path leading to the teahouse, is designed to prepare guests for *chanoyu* or tea ceremony by recreating a tranquil forest glen in a mountain landscape. As in the larger Japanese Garden, the hide and reveal techniques of *miegakure* are employed so as not to allow for an open view of the *roji* in its entirety. This is true both within the *roji* and outside, where the hedge enclosing the garden screens most views. Even with this screening, the teahouse at the center of the *roji* is still a major focal point for the larger garden. The original 1959 teahouse donated by the City of Tokyo burned in a 1973 arson fire. Following the plans for the original structure, the current teahouse was completed in 1981 with major funding provided by Urasenke Foundation of Kyoto to serve as a classroom for the study of Chado at the University of Washington. Shoseian is maintained by the Seattle Branch for University of Washington Chado classes, community classes, seasonal tea gatherings, special events and tea presentations.

While paths surround the *roji* on all sides, there are only two entrances, one on the rear west side and one on the east side facing the pond. The rear service entrance is meant to be used by those performing the tea ceremony to give them access to the back entrance of the teahouse while the front main entrance is meant to be used by the guests who will be participating in the tea ceremony. For each entrance, a *shiorido* or wood and bamboo lattice gate held shut by a strand of woven rope stands within a break in the hedge. The service entrance is level with the adjacent path, but the main entrance is reached by a flight of irregular stone steps. These gates provide access to the outer (*soto*) *roji*, the brighter northern half of the tea garden where guests wait to be called to the tea ceremony on the covered bench in the *machiai*. A wood and bamboo lattice fence separates this area from the inner (*uchi*) *roji*, the shadier, darker southern half where guests pause to purify hands and mouth in a ritual at a *tsukubai* or stone basin before entering the teahouse.

Upon entering the *mon* or main gate, guests follow a meandering path of irregular stepping stones (*tobiishi*) to reach the *machiai* just beyond the gate to the northwest. Although there is a paved path from the service entrance to the rear of the teahouse, irregular stepping stones are used for all paths within the *roji*. The meandering nature of the natural stone paths is designed to slow the guest down and reveal the landscape gradually, thus increasing the sense of space and passage. The smaller stepping stones are intended to make one look down and pay careful attention to one's steps while the larger stones allow one to pause and look

up, all in preparation for the tea ceremony as part of the transition from the mundane world to the realm of tea. The stones also protect the delicate mosses that cover the ground of the *roji* in imitation of a forest glen.

The *machiai* is a wood frame structure comprised of an open seating area with a rectangular plan facing east and an enclosed area that wraps the north and west elevations. Traditionally, this enclosed area would have contained lavatories and changing rooms for the convenience of guests. Access to the enclosed area is provided by *shoji* screen doors located on the east and south ends. A shed roof covers the enclosed area on the rear west elevation and continues as a gable roof over the east half of the north end of the structure. A low-pitch gable roof covers the open seating area but extends only a few feet beyond the ridge over the enclosed area at the rear. Wood shingles cover both roofs, which also feature carved caps at the ends of the ridges. Around the exterior, the structure's vertical peeled cedar posts are exposed between panels plastered with stucco in the upper half and vertical wood paneling in the lower. Stucco covers all of the panels within the open seating area set with a low wood bench along the west and north sides. There is no floor within this area covered with small rocks and set with a continuation of the irregular stepping stones that lead from the gate. The largest stone below the southern end of the bench is meant to indicate the position of the most important guest. A small window screened with bamboo in the southern end of the building allows the guest in this position to view the gate leading to the inner *roji*.

Once guests are summoned, they follow a second path of stepping stones to the *chumon* or middle gate within the fence that extends from the rear east elevation of the teahouse. Once inside the inner *roji*, the guests proceed to the southeast corner where the *tsukubai* is located, enabling them to rinse their hands and mouth before the tea ceremony. Adjacent to the *tsukubai* is a stone *oribe* lantern, both of which were donated by the City of Tokyo in 1959 along with the original teahouse. The original teahouse was built by craftsman in Tokyo and then disassembled and shipped to Seattle where it appeared on display at a Washington State trade fair before being reassembled on this site prior to the creation of the Japanese Garden. Post and lintel construction with Japanese joinery, which requires little or no use of nails, screws or other fasteners, enabled this assembling and disassembling to occur relatively easily. As near as possible, the same construction techniques and the original plans were used when the current teahouse was rebuilt of cryptomeria and western red cedar, creating a near duplicate of the original destroyed by arson fire.

Known as a six-mat teahouse, this size refers to the fact that six *tatami* mats cover the floor of the *chaseki* or tearoom, with each *tatami* mat measuring 90cm by 180cm or roughly 3 feet by 6 feet. The functions of the teahouse dictate its form with its interior arrangement of rooms expressed on the exterior of the building. The *chaseki* is the main room within the teahouse and features a *tokonoma* or alcove along a portion of the rear north wall. The two rooms of equal size immediately adjacent to the *chaseki* are an entry foyer at the northwest corner and a *kyujima* or service and preparation room at the southwest corner. A *mizuya* or small kitchen or pantry with storage shelves and a sink area extends off the service room, enclosing the western side of the *doma* or covered terrace at the front of the teahouse. A shallow storage closet extends along the west side of the *mizuya* and *kyujima*. This storage space was not part of the original teahouse's design but added when the teahouse was rebuilt.

A low square, wooden platform or stool occupies the center of the *doma* in front of the main entrance to the *chaseki* screened with sliding *shoji* doors and accessed by a large rectangular stone known as a shoe stone. This platform can be used for outdoor tea ceremonies. Two low wooden benches provide seating within the *doma* along the south and east sides.

A low pitch gable on hip roof clad with copper sheeting covers the teahouse and extends over the *doma* where it is supported on peeled log posts. The wood frame structure of the teahouse is exposed between panels plastered with stucco in the upper half and vertical wood paneling in the lower half, similar to that of the *machiai*. Sliding wood screens line the east elevation of the *chaseki* and adjacent *tokonoma*. Two sliding wood *shoji* doors are set within the north wall of the entry room at the rear of the teahouse. Windows screened with bamboo grills line the upper west wall of this room. The only other window is on the south wall of the *mizuya*. A narrow door within the east wall of the *mizuya* allows direct access to the *doma*. A concrete pad serves as the foundation for the entire structure, including the *doma*. A narrow channel of gravel lines the outer edge of the concrete pad and serves to catch the rain falling from the gutterless eaves of the roof. Another path of stepping stones leads from the south end of the *doma* and around the west side of the building to a gate within a fence that extends from the northwest corner of the teahouse. This fence also serves the function of separating the inner and outer *roji*. The path continues to the paved path off the rear service gate.

Original Design

An examination of the original drawings for the Japanese Garden shows that much of the original design was executed as intended when the garden was created in 1960 or shortly thereafter. However, a major departure was the omission of a large club house or pavilion that occupied a terrace above the fishing village at the northern end of the garden. The drawings also show a spacious "front yard" north of this structure. It appears that this would have pushed the boundary of the garden further to the north. The drawings also show that the *azumaya* or viewing arbor was not constructed in the plan's original location within the center of the cherry orchard and but at its northwestern edge. One major landscape element, a *zoukirin* or mixed forest, was not realized as planned within the northwest area of the garden between the cherry orchard and club house. A camellia glen on the east side of the pond was also omitted. Due to security concerns, the plan to enclose the garden with a 4½-foot evergreen hedge was abandoned in favor of a chain link fence topped with barbed wire.

Subsequent Alterations

With the exception of the replacement of the original teahouse due to arson fire, the greatest change since the creation of the Japanese Garden has been the growth of the plant material over the years. Early photographs show more open views before the garden matured to its present state. Major and minor maintenance and rehabilitation projects, including several focusing on the pond and its circulation system, have been carried out over the years, but all have been executed with the intent of maintaining the original design. Other projects have served to improve the ADA accessibility of the garden's paths and bridges. While the design has remained intact, the majority of alterations have occurred around the perimeter with changes in fencing and in the entrances. As funds have allowed, the inappropriate chain link

fencing on the more public south and east sides has been replaced with cedar fencing. Shortly after the garden was completed, the main gate on the east side was supplemented by the construction of a second gate at the south end. This was initiated primarily because little parking was available near the main gate while a large parking area was already located south of the garden. Eventually, the main gate was closed only for special occasions, leaving the south gate as the primary entrance into the garden. The current entry plaza was completed in a 1987 project that added the ticket booth, relocated from the Seattle Center, and the rolling security gates. At the same time, rolling gates were installed at the original gate for security purposes. Portable toilets have also been installed in the service area so as to provide restrooms within the garden, the nearest permanent facilities being those located at the Washington Park Playfield or the Arboretum's Graham Visitors Center.

STATEMENT OF SIGNIFICANCE

Washington Park Arboretum Historical Context

The long, narrow valley now encompassing the 230 acres of the Washington Park Arboretum extends north from East Madison Street to the southern shore of Lake Washington's Union Bay. Historic maps show a stream meandering north through this valley before discharging into the southwest corner of Union Bay to the west of Foster Island. Until the 1916 opening of the Montlake Cut dropped the level of Lake Washington by almost nine feet, Union Bay and its low-lying marshes covered a significantly larger area, and Foster Island was isolated and much smaller in size. The steep eastern slopes of Capitol Hill define the southern half of the valley's western edge while a relatively low-lying area of land now occupied by the Montlake neighborhood lies along the northern half. Originally, this area was part of a larger hourglass-shaped strip of land that connected north and south Seattle and separated the waters of Lake Union's Portage Bay to the west and Union Bay to the east. A small brook flowed west across this narrow isthmus roughly following the route of today's SR520 and emptied into the southern end of Portage Bay, forming a shallow natural portage between the two bodies of water. Along the southwestern margin of the Montlake area, the high bluffs of Capitol Hill's northern end terminate in a deep wooded ravine, now preserved as Interlaken Park. Beyond the valley's eastern edge, the terrain rises to a high point within the gated Broadmoor community before gently sloping down to the shores of Lake Washington in the Madison Park neighborhood. Although land in the vicinity easily accessible by water was platted as early as the 1860s, these natural features restricted overland access from adjoining areas, delaying significant residential development until the first decades of the 20th century.

From the earliest days of Euro-American settlement in Seattle, the narrow neck of land between Lake Union and Lake Washington was seen as a logical location for a canal uniting these two major inland bodies of water. Previously, Duwamish Indians, an Original Peoples of the area, had used the brook across the isthmus as a canoe portage in order to travel between seasonal campsites and villages established in the area and points beyond, including several along the shores of Union Bay. As envisioned by settlers, the construction of additional canals to the west would link the two lakes with Puget Sound, facilitating the development of industry and commerce. In anticipation of this, pioneer settler Thomas Mercer proposed the "Lake Union" and "Union Bay" names to those gathered for

Independence Day celebrations on July 4, 1854. In the late 1860s, it also inspired Harvey L. Pike to name his newly platted town on the low neck of land "Union City," an area comprising sixteen blocks located to the north and south of a strip of land designated as the "Canal Reserve." Pike had turned his sights towards real estate development after an unsuccessful attempt to excavate a canal across the lower portion of the isthmus, using only a pickaxe, shovel and wheelbarrow. At the time Pike recorded his first plat in the summer of 1869, this area was considered far from the center of town in Pioneer Square and located just outside the Seattle city limits incorporated in December of that year with a northern boundary at Galer Street. Unlike other outlying areas where larger parcels were platted to serve as farms, Union City's small lots anticipated denser residential development that would not commence for almost forty years.

Over the next two years, Pike filed two additional plats to the north and south of "Union City" and then sold the rights to develop the canal in 1871 to the Lake Washington Canal Company, of which he was one of the incorporators. Pike probably anticipated that he would benefit from both the construction of the canal and real estate development in his town site. After failing to obtain federal support for the project, the firm built a narrow gauge railway to transfer coal extracted from east side mines between Lake Washington barges and Lake Union barges. Within a few years, this railway was abandoned when a rail outlet via Renton became available, and the tracks were removed in 1878. Five years later, a second attempt was made to excavate a canal across the isthmus. However, this effort proved more successful as the Lake Washington Improvement Company managed to construct a canal deep enough to float logs and small boats between the two lakes. Organized in 1883 by Judge Thomas Burke and pioneer entrepreneur David Denny among others, the company hired Chinese labor to complete the project by the mid-1880s. Dams and sluice gates regulated water flow through a narrow channel bordered by steep banks. Later, this channel was deepened and widened. Logs transported through what came to be called "The Portage" were stored in the millpond at the southern end of Portage Bay before being transferred to the sawmills at the south end of Lake Union, including one owned by David Denny. Shortly after the completion of the canal, Judge Burke joined with entrepreneur Daniel J. Gilman and others to organize the Seattle Lake Shore & Eastern Railway line, which reached Union Bay in 1887. Now the route of the Burke-Gilman Trail, this railroad skirted the northern shoreline of Lake Union and looped around Union Bay before heading north to continue along the western shore of Lake Washington.

The successful canal venture and improved access provided by the new railway line failed to spur the real estate development envisioned by Harvey Pike when he platted "Union City" and its subsequent additions. Limited access to the Montlake area remained a primary obstacle to its development. Although a wagon road connected the area to Capitol Hill and the new University of Washington campus by the mid-1890s, no streetcar or cable car lines served the neighborhood until 1909, well after the city's first lines were developed in the late 1880s and early 1890s. As is apparent on maps of the era, growth progressed in a linear fashion along the routes of these public transportation lines, accelerating the trend for residential and commercial development outside the city's original downtown core. This was the case with the Madison Street Cable Railway constructed in the late 1880s. With the financial backing of other individuals, Judge John J. McGilvra developed the line from

downtown Seattle in order to provide access to the large tract of land he owned at the eastern end of Madison Street. A native of New York, Judge McGilvra came to Olympia in 1861 after President Abraham Lincoln appointed him United States Attorney for the Washington Territory. When his term ended three years later, Judge McGilvra moved to Seattle where he acquired several hundred acres of land on the shores of Lake Washington and built a home for his family, which he called Laurel Shade. By the later 1860s, Judge McGilvra had cut a wagon road straight through the wilderness to Pioneer Square at his own expense.

For many years, the McGilvras remained the only permanent residents of today's Madison Park neighborhood even after Judge McGilvra platted two large tracts of his property south of Madison Street in the mid-1870s. In 1889, Judge McGilvra platted a third addition in the Madison Park area, mostly to the immediate south of Madison Street. At the same time, Judge McGilvra retained ownership of a large tract of land north of Madison Street and divided it into individual lots as well. However, with these lots, Judge McGilvra stipulated that only cottages could be built and solely on a leasehold basis. After constructing their dwellings, owners would be required to make annual payments for the use of the lots. Despite these limitations, many chose to build cottages on the small lots, which remained in the ownership of the McGilvra Estate until the land was eventually platted as the Loch-Gilvra Addition in 1919 and made available for sale.

As a spur to development, Judge McGilvra constructed the Madison Street Cable Railway and set aside more than twenty acres of land to create Madison Park, a private amusement park at the Lake Washington terminus. At that time, streetcar and cable car lines often terminated at a popular attraction so as to encourage real estate development along the length of the line and to increase ridership outside of regular commuting hours, especially on weekends. Bisected by Madison Street, Madison Park featured a large pavilion, a boathouse, piers, a promenade, and two floating bandstands with shoreline seating. Nearby, a crude baseball diamond was built on the north side of Madison Street, which hosted the first professional baseball game in Seattle on May 24, 1890. With cable cars running from Pioneer Square as often as every two minutes on Sundays, the park soon became the most popular beach in the city. Steamships plied the lake from the park's piers, carrying passengers for transportation as well as pleasure excursions and cruises. Despite these enticements, residential and commercial development progressed slowly, radiating east from downtown and, to a minor extent, west from Madison Park. Annexation of the area by the city of Seattle also did little to encourage residential or commercial growth. The North Seattle Annexation in May of 1891 encompassed the northern ends of Capitol and Queen Anne Hills as well as Magnolia, Fremont, Wallingford, Green Lake, Latona, and Brooklyn, which later became known as the University District. The annexed area included Union Bay and its marshlands west of 35th Avenue NE and south of NE 55th Street and the Montlake and Madison Park neighborhoods. This lack of growth is evident in the 1894 *McKee's correct road map of Seattle and vicinity*, which shows a large swath of undeveloped land north and south of Madison Street between Capitol Hill and Madison Park.

The Puget Mill Company, a division of the San Francisco firm of Pope and Talbot, owned a large portion of the undeveloped land mostly to the north of Madison Street, some 300 acres that is now the site of the Washington Park Arboretum and the Broadmoor community. Pope

and Talbot had established the Puget Mill Company in the early 1850s at Port Gamble to capitalize on Puget Sound's vast timber resources. At that time, early lumber companies acquired only their mill and town sites and concentrated on the manufacture of lumber, contracting with independent loggers to provide the raw materials for their operations. It was not deemed necessary to acquire their own forest lands when loggers could freely but illegally harvest timber on the federally owned land that surrounded them. The lack of laws governing the sale of timber from federal forest lands coupled with the absence of federal authority meant that this practice continued throughout much of the 19th century. However, the Puget Mill Company realized early on that a permanent supply of timber would be needed to support their operations at some point in the future and took advantage of every opportunity available to purchase property. The first chance arose in 1861 when a special commission headed by the Reverend Daniel Bagley sold land reserved by the federal government to provide funding for the construction and operation of the newly established Territorial University of Washington in Seattle. The Puget Mill Company's substantial purchase included the 300+ acres of land fronting on the shores of Union Bay. Over the next several decades, the Puget Mill Company eventually became the largest holder of timberlands in Washington, owning 186,000 acres in 1892 when it stopped buying land. Despite these vast holdings, the company continued to purchase logs on the open market into the first decade of the 20th century.

In 1890, the Puget Mill Company logged the 300+ acres with the intention of developing it, a decision likely influenced by the improved access provided by the new Madison Street Cable Railway. However, the financial crisis brought on by the Panic of 1893 delayed these plans for a decade. It was not until May of 1900 that the Puget Mill Company recorded the "First Subdivision of Washington Park Addition to the City of Seattle." This nine-block plat was located south of Madison Street between 33rd and 37th Avenues East and bordered John J. McGilvra's First and Second Additions to the south and east. In conjunction with the subdivision's development, the Puget Mill Company struck a deal with the city to provide some $35,000 worth of water main extensions. In exchange for these infrastructure improvements, the company donated a nearby strip of land along the extreme western edge of their property that contained 62 acres. This parcel extended from the shore of Union Bay south to East Prospect Street and lined the eastern side of the valley. Through Ordinance No. 5740 introduced in November 1899 and passed in January 1900, the City of Seattle accepted the property for the purposes of a public park, beginning the process of acquiring the land that would become the Washington Park Arboretum.

Washington Park

This initial acquisition occurred shortly after the Seattle City Council appropriated $100,000 for the purchase of Woodland Park, including a portion of Green Lake, from the widow of Guy Phinney, a wealthy lumber mill owner and real estate developer. After acquiring his property in the late 1880s, Phinney had created an elegant English-style estate, complete with formal gardens, and opened it to the public to promote development in his adjacent real estate holdings. His untimely death in 1893 at the age of 41 eventually forced his wife to sell the private park to the City in November 1899. Acquisition of Woodland Park had been proposed in the 1892 Annual Report of the Park Commissioners, which first highlighted the need for a comprehensive system of parks and boulevards in Seattle. At that time, the City's

three public parks, Denny, Volunteer (then City) and Kinnear Parks, were outnumbered by the five privately owned destination parks built by real estate developers, Madison, Madrona, Leschi, Woodland and Ravenna Parks. Parks Superintendent Edward Otto Schwagerl, a prominent landscape architect and engineer, completed designs for a comprehensive park and boulevards plan for Seattle in the mid-1890s, but a lack of funding prevented its implementation. No major action towards the development of a park system occurred until the 1899 purchase of Woodland Park and the subsequent donation of the Puget Mill Company's 62-acre parcel.

By 1902, the new park property on Union Bay was identified as Washington Park after the nearby Lake Washington. The same year, the City began the process of purchasing adjoining parcels, eventually acquiring the 230 acres that now comprise the Washington Park Arboretum. The first major purchase was the nearly 20 acres extending south to East Madison Street that covered the southern portion of the valley. A high wood trestle bridge that carried the cable railway over the valley's stream marked the southern boundary of the property. In December of 1903, George and Angie Kinnear sold the City their 37½ acre parcel that encompassed the western side of the valley between East Galer and East Lynn Streets. Smaller parcels along the western margin were acquired the following year through both purchase and condemnation. Later in the decade, the City had the opportunity to acquire the marshlands beyond the northern end of the park property after the State of Washington authorized the sale of shore lands in 1907 to fund the Alaska-Yukon-Pacific Exposition planned for 1909. The City followed this acquisition with the 1910 purchase of two privately owned parcels located nearby to the west within Pike's Second Addition to Union City. The City largely completed its acquisition of land for Washington Park with the 1917 purchase of Foster Island and the 1920-21 purchase of all but one lot of the Bard-Foster Washington Park Addition. Platted in 1910, this addition contained five irregular shaped blocks located roughly between East Highland and East Prospect Streets and 26th and 28th Avenues East. Most of the Seattle Japanese Garden lies within the two eastern blocks of the addition.

Although this process of land acquisition spanned some two decades, plans for improvements to Washington Park began almost immediately. The new park property was already included along the route of the immensely popular Lake Washington Path, a ten-mile cinder bicycle path that linked downtown Seattle with Lake Washington. Completed in the summer of 1897 by the Queen City Good Roads Club, the path roughly followed the route of today's Lakeview and Interlaken Boulevards and eventually became part of a larger 25-mile system of bicycle paths. Assistant City Engineer George F. Cotterill developed this system with the assistance of volunteers by walking about and surveying the city and published a guide map in 1900. In 1903, the Olmsted Brothers landscape firm of Brookline, Massachusetts utilized some of Cotterill's existing bicycle routes, including the portion now comprising Interlaken Boulevard, as part of their plans for a comprehensive park and boulevard system for Seattle. The City had hired the illustrious firm that same year to prepare a report detailing their plans for such a system as well as suggestions for improvements to existing parks. This move was largely brought on by the public interest generated for the planned Alaska-Yukon-Pacific Exposition and the need for improvements to the recently acquired Woodland and Washington Parks, two large tracts of mostly undeveloped land. In anticipation of the

Alaska-Yukon-Pacific Exposition, the plan placed emphasis on the development of Washington Park as a boulevard entry to the Exposition to be held on the grounds of the University of Washington. However, there were no plans for the general improvement of the park at that time.

Improvements for the boulevard began in 1903 with slashing and clearing for the proposed roadway undertaken before the completion of detailed plans. The improvements proceeded the following year with continued clearing and grading of the roadway following designs prepared by the Olmsted Brothers firm. The first phase of Lake Washington Boulevard, 2,150 feet of macadam roadway extending north from Madison Street, was completed by August 1905. Within a year, a graded and graveled roadway continued to Union Bay. Although the Olmsted Brothers also produced planting plans for the boulevard in 1906, it is not known to what extent these were implemented. However, it is certain that the preliminary plans produced by the Olmsted Brothers for other portions of Washington Park were not executed at that time nor was the firm given the approval to prepare an overall park plan. In the absence of such a plan, subsequent improvements to Washington Park over the next three decades progressed somewhat haphazardly. In 1908, a portion of the park property was privately developed as a public course for harness races along what is now known as Azalea Way. A barn was also constructed at the southern end of the track to serve the speedway. Although interest in racing soon waned, horseback riding remained a popular activity within the park. By 1909, a massive sanitary fill by the city garbage department had created enough area for an athletic field, complete with bleachers, at the southern end of the ravine north of Madison Street. The same year, the Parks Department constructed a maintenance facility at Washington Park in the meadow below East Helen Street, featuring a stable for eight horses and storage space for tools, steamrollers and other equipment.

A more permanent but nonetheless attractive feature on the landscape was the North Trunk Sewer Viaduct constructed between 1910 and 1912 from designs by W.R.B. Willcox & W.J. Sayward. Now known as the Willcox Footbridge or Arboretum Aqueduct, the concrete and brick veneer structure supports and conceals the sewer line that was extended to serve the Puget Mill Company's adjoining property, subsequently developed as the Broadmoor community. Further improvements were made to the athletic field in 1930 with the completion of a shelter house at the northern end of the field near the children's play area. Designed in a simplified Tudor Revival style, this shelter house was one of eight similar shelter houses constructed in Seattle parks in the late 1920s and early 1930s, following a policy to build only structures that would be pleasing in design and permanent in nature. These buildings housed large rooms for organized recreation activities in addition to public restroom facilities. Office space for recreation instructors was also provided. Other brief but active uses of Washington Park included an archery range located east of the boulevard to the north of Boyer Avenue East and a trap shooting area on Foster Island. Even with these improvements and uses, Washington Park remained largely undeveloped three decades after the initial property acquisition in 1900.

University of Washington Arboretum

In the mid-1920s, this lack of development led Dr. Henry Suzzallo, President of the University of Washington, to propose that Washington Park would be the ideal location for

an arboretum jointly developed by the University and the City of Seattle. Since the University had established its present campus in the 1890s, there had been plans to develop an arboretum on the extensive grounds. However, these plans never progressed beyond the initial plantings of native and exotic trees, many of which were removed as part of the preparations for the Alaska-Yukon-Pacific Exposition. By the 1920s, it was obvious to Dean Hugo Winkenwerder of the College of Forestry that campus building growth would prevent the realization of the planned arboretum unless another location could be identified. Dean Winkenwerder met with Dr. Suzzallo to explore other site possibilities, settling on Washington Park as the preferred alternative. Dr. Suzzallo worked to enlist the support of business and professional groups before formally presenting his proposal in a letter to the Board of Park Commissioners dated February 7, 1924. In response, the Board passed a resolution setting aside the entire area of Washington Park as a botanical garden and arboretum and granting the University the privilege of using certain buildings and greenhouses. However, a lack of funding prevented the plan from moving forward, and no work occurred with the exception of some limited clearing and the establishment of a Parks Department nursery in 1927. This situation did not improve with the onset of the economic depression in the 1930s as dwindling financial resources prevented expenditures for capital improvements.

In addition to a lack of funds, there was also no formal agreement between the City and the University over how the proposed arboretum would be developed and administered and no mechanism to seek financing for the undertaking. All parties involved realized the need to resolve these issues at the same time that funding sources were sought. However, initial efforts to establish an arboretum and botanical society that could address these issues were abandoned soon after forming in 1930 due to the financial challenges of the times. By 1933, arboretum supporters had decided to pursue state and federal relief funds targeted toward unemployment relief as the best means to realize their dreams. In order to be eligible for such funding, the project needed an official organization to act as sponsor and a development plan. Arboretum supporters also recognized the need to create a legal entity with the University acting as the operating agency and worked to development a formal lease agreement between the University's Board of Regents and the City's Board of Park Commissioners. Despite some opposition over relinquishing control to the University, the Parks Board approved an agreement in December of 1934 that donated the entire Washington Park acreage, including the athletic field, as a site for an arboretum to be constructed and operated by the University. Later that month, the Seattle City Council passed an ordinance (#65130), authorizing the agreement with the University to establish and maintain an arboretum and botanical garden in Washington Park that would become known as the University of Washington Arboretum.

The following year, a provision in the agreement to form an advisory council was fulfilled with the establishment of the Arboretum and Botanical Garden Committee, consisting of at least seven members, three to be appointed by the Mayor of Seattle, three by the President of the University of Washington, and the seventh member to be appointed by the Governor of the State of Washington. The Arboretum Advisory Council, as it became known, acted immediately to form the Arboretum Foundation in June of 1935. This non-profit organization would act as sponsor for the project and raise revenue to help establish the

Arboretum. Over the same period of time, others were working to create a development plan that could be used to establish the Arboretum with federal relief funds. In the early 1930s, Frederick W. Leissler, Jr., the Parks Department's staff landscape architect, and others produced plans and surveys of Washington Park in anticipation of the work to come. Leissler also adapted his own plan for a botanical garden to the Washington Park site. These plans proved to be very helpful when the Olmsted Brothers landscape firm was once again hired in 1935, this time to prepare a preliminary general plan for the development of an arboretum. Under the leadership of Mrs. Sophie Krauss, the Seattle Garden Club raised the $3,000 needed to pay for services of the Olmsted Brothers and donated that sum to the University. James Frederick Dawson, the firm's partner in charge of the design, used Frederick Leissler's design as the basis for his plan and worked closely with Leissler, who had been hired by Dean Winkenwerder to oversee development of the Arboretum. However, even before the completion of the *General Plan for the University of Washington Arboretum* in March of 1936, it was necessary to begin work on the site so as to be able to take advantage of the work relief funds and labor already available.

Works Progress Administration

Over the course of 1935, work relief crews totaling some 300 men focused their efforts on clearing and contouring the landscape and preparing the topographic map and tree survey used to develop the preliminary general plan. Initially, this work was completed under the auspices of the Washington Emergency Relief Administration (WERA), a relief agency operated by the Washington State government from 1933 to 1937. In addition to creating work for the unemployed, WERA also provided other public welfare assistance, including aid to the aged, the homeless, and the impoverished. After May of 1935, the Works Progress Administration (WPA) provided the laborers for the project. Created in May of 1935, the WPA consolidated and superseded several earlier programs and became the best known of all the federal relief programs before ending in 1941. One of early projects completed by WPA workers was the construction of a storage barn, now known as the Maintenance Headquarters, from designs prepared by Frederick Leissler. Before the completion of the Olmsted Brothers' plan, WPA workers prepared additional surveys, cleared brush and stumps, subsoiled acreage, installed portions of the water and drainage systems, constructed rustic fencing, excavated the greenhouse site, and made improvements at the north and south entrances.

Once the general development plan was ready and approved for implementation, the Arboretum's entire area was divided into six sections (A through F starting at the southern end and proceeding north), each with projects averaging a total anticipated cost of $100,000. Plans for each section detailed the work to be completed underground (water systems, drainage and conduits), on the surface (roads, trails and plantings), and above ground (buildings, lighting systems, and green houses). After funding was approved for the first three sections A, B, and C, work began in October 1936 and continued until July 1941 when the WPA program ceased operations. During this five year period, WPA workers completed much of basic infrastructure that is present today. Most of the work followed the Olmsted Brothers design although there were departures as locations of certain features were changed to better suit the site conditions. Completed features included a new road, the Upper Road (later renamed Arboretum Drive), which roughly followed the route of the early bicycle path

through the park, dredged lagoons at Foster Island with plantings of bamboo and Japanese iris, and a system of walks. WPA workers also constructed greenhouses, propagation houses, lath houses, potting sheds and cold frames, creating an extensive service area, and installed fences along the Broadmoor property line.

More substantial and public structures came in the form of a stone gatehouse located near the south entrance at Madison Street, an overlook or gazebo on a hillside at the southern end of the Arboretum, and a stone kiosk at the Interlaken Boulevard intersection with Lake Washington Boulevard. Designed by architects Arthur Loveless & Lester P. Fey, these structures reflect the rustic style of park architecture that was prevalent during this era while the intricate stonework is representative of the craftsmanship that was a hallmark of WPA construction. It is likely that Loveless and Fey also designed the stone pylons at the gatehouse and kiosk as well as the entry pylons at the northern and southern entrances. Similar craftsmanship was employed in the construction of two stone bridges over Arboretum Creek, which meandered along the Arboretum's western margin. The south bridge was constructed at the southern end of a pond developed immediately southwest of the intersection of the two boulevards in an area designated as the Maple Section. Although the Olmsted Brothers plan had identified several areas for ponding of the creek, this was the only one completed. The combination of the existing water feature and the surrounding maple trees later made it the ideal choice for the location of the Seattle Japanese Garden.

Several major landscape elements were also completed by WPA workers, often under the supervision of local landscape architects and designers. This included the Rhododendron Glen, which followed a planting plan prepared by Otto Holmdahl, using collections from the late Dr. Cecil Tenny and the estate of Charles O. Dexter. Holmdahl also completed the plan for the Maple Collection around the pond in the southwest corner of the Arboretum and supervised construction of the Rock Garden/Rockery in a location chosen by Frederick Leissler near the intersection of Lake Washington Boulevard and Arboretum Drive. WPA workers constructed the pools of the Woodland Garden but did not implement the planting plan designed by Swiss-German landscape architect E.A. Fabi, who died in 1939 just as work got underway. Although the Olmsted Brothers firm completed the *General Plan* with the idea that they would be hired for additional design work for specific elements, they only executed a detailed planting plan for Azalea Way. With donations from the Seattle Garden Club, WPA workers transformed the former speedway into a three-quarter mile long stroll through banks of flowering azaleas, Japanese cherries, and eastern dogwoods. The *General Plan* also provided a sequential arrangement of the plant collection based on a taxonomic classification system laid down by the botanists, Engler and Prantl, with the family Coniferae, the collection commonly known as the Pinetum, situated at the beginning of the sequence in the northwest portion of the Arboretum. Although this first section was completed under the auspices of the WPA, most plant collections were initiated following the end of the Second World War.

In addition, several major elements of the Olmsted Brothers plan were never executed, including the Lakeside Boulevard, the Rose Garden and the Administration Building/Herbarium/Library. An attempt was made to develop an elaborate rose garden on the site of the athletic field at the southern end of the Arboretum, but this plan engendered a

storm of opposition. Although the plan was abandoned, the controversy eventually led to a modification of the 1934 agreement in order to exclude the playfield as well as a proposed new service yard for the Parks Department from the Arboretum's jurisdiction. In December 1948, the Seattle City Council passed an ordinance approving the modification that returned a portion of Washington Park to the City for playground and recreational purposes. A similar modification occurred in 1981 when the University of Washington transferred management of the Seattle Japanese Garden back to the City.

Japanese Garden Proposal

In the late 1930s as work on the University of Washington Arboretum progressed, the Arboretum Foundation invited the Japanese Society for International Cultural Relations, or Kokusai Bunka Shinkōkai, to beautify five acres of Foster Island by creating a formal Japanese garden. Founded in April 1934, the Society aimed to develop mutual understanding with other nations of the world through cultural exchange. In July of 1937, the Society brought an exhibit of a 13th-century *tokonoma* or alcove from a Japanese nobleman's house of the Kamakura period (1185-1333) to what is now the Burke Museum on the University of Washington campus. Earlier that summer, the Arboretum Foundation extended the invitation to sponsor the garden to the Japanese Consul-General in Seattle, Issaku Okamoto, who then sent a letter of recommendation to the Society in Tokyo. Apparently, the proposal was well received by the Society as a September 1937 newspaper article reported that they had agreed to spend $50,000 for flowers, shrubs, trees, bridges and a decorative archway. The Society also promised to send an engineer to supervise the work of landscaping in the fall of 1937 in preparation for plantings to be made the following year. A member of the Society's Board, Count Michimasa Soyeshima, traveled through Seattle during this period and assured Consul-General Okamoto of the Society's interest in creating an exact replica of one of Japan's noted formal gardens. Despite this enthusiasm on both sides, the plan was apparently abandoned when it faced a growing anti-Japanese sentiment at the time, no doubt influenced by the Japanese invasion of China in 1937. As a result, the plan for a Japanese garden in the Arboretum remained on hold for another two decades before being revived once again by members of the Arboretum Foundation.

History of Japanese Gardens

Although most Americans conceived of a Japanese garden as simply an attractive collection of certain elements, garden design developed in Japan over more than 1000 years of history in response to social, political, religious, and cultural changes. In the middle of the 6th century, Chinese culture began to permeate all aspects of Japanese life, including ideas of gardening. Over the next several centuries, these ideas were developed and refined until the Heian period (794-1185), the first great era of Japanese garden history. This era began when the capital of Japan was moved in 794 to Heian-kyō, Capital of Peace and Tranquility (present-day Kyoto), where it remained until 1868. Attributed to Tachibana no Toshitsuna (1028-1094), an aristocrat accomplished in landscape garden design, the 11th-century *Sakuteiki* (Notes on Garden Making) is the earliest known written document on Japanese garden design. *Sakuteiki* outlines the three overall principles that form the prototype for all garden making: observance of the natural landscape, study of the work of past masters, and remembrance of famous places of scenic beauty. Together, these principles should inform the design of a garden comprised of six basic compositional elements: artificial hills, the

pond, the island, the white sand south garden, the garden stream and the waterfall. The primary focus of the work is stone setting, which forms the structure of the garden while trees and plants serve only as decorative accents. The placement of stones was the basis for garden design in the Heian period and for centuries afterward. The gardens did not exist as independent entities but were designed to correlate to the function and style of architecture from the large palaces of the emperor to the homes of the nobility. Buildings opened onto private gardens featuring large ponds with islands linked by bridges in a carefully composed collection of natural features, all for the sole enjoyment of the owner.

During the Kamakura period (1185-1333), the introduction of Zen Buddhism created an emphasis on a new garden type, *kare-sansui* (literally "withered mountain-water"). This refers to the small dry landscape gardens of rocks and raked sand or stone that were not designed as a pleasure garden but an object to be contemplated from several vantage points. The intent of the garden's abstract composition was to suggest the inner essence of nature not to reproduce its outward forms in a naturalistic landscape. Contemplation of such a garden does not lead to enlightenment rather it shows the product of an enlightened mind who seeks to express that experience in the garden's design. The pond and island garden of the Heian period continued to be popular and was often designed to be enjoyed on foot, but the *kare-sansui* gained prominence to the point that it was no longer included as an element in a larger garden but on its own. Overall, the size of the gardens became smaller and more attention was paid to plant material. These concepts were further refined during the Muromachi period (1333-1568) as landscaping continued to develop the use of small space to form a picture garden.

The Momoyama period (1568-1603) is probably best known for its development of a new garden type, the *roji* (literally "dewy ground"), an enclosed garden with a path leading to a small rustic hut where the tea ceremony is performed. Primary features include the stepping stones that lead visitors to the teahouse and prepare them for the tea ceremony, stone lanterns that light the way, and simple stone basins that enable visitors to cleanse themselves physically and spiritually. At the same time this simpler garden type developed, the pond gardens of the period became more complex in their overall design with larger and more impressive rock formations, jutting peninsulas, and craggy inlets. In addition, gardens were no longer designed mainly for strolling in but were increasingly constructed with a view from the surrounding buildings in mind. The growing unity and power of the ruling class was demonstrated in the construction of many large and heavily ornamental gardens.

During the Edo period (1603-1868), the Tokugawa shoguns brought peace, stability and isolationism by imposing a rigid social structure on Japanese society and closing their doors to outside influences from China and the West. Many of the gardens of this era were imitations of the prototypes of earlier times with an added emphasis on the use of *shakkei* or "borrowed scenery," a compositional technique that incorporates distant views into the overall design of a garden. A new prototype, the large strolling garden, did emerge, however, and made use of numerous popular features such as hills, ponds, islands, winding streams, waterfalls and rocks in a completely new way. The intent was to include a greater number and variety of all elements to enhance the visitor's experience of the changing vistas and set views. With the opening of Japan to the West and world trade during the Meiji

period (1868-1912), outside influences crept into garden design often resulting in a strange juxtaposition of styles. While a large number of older gardens of earlier periods were opened to the public and restored after falling into disrepair, many traditional architecture features, such as stone lanterns and rocks, were sold, and many traditional design concepts were abandoned.

Japanese Gardens in the United States

Just as traditional Japanese gardens were losing popularity in their own country, they were being embraced with great enthusiasm in the United States. Americans got their first glimpse of a Japanese garden at the 1876 Centennial International Exhibition held in Philadelphia to celebrate the 100th anniversary of the signing of the Declaration of Independence. The Japanese government had accepted an invitation to participate in the first official world's fair in the United States and sent displays as well as the materials to construct the buildings to house them. These included a Japanese Dwelling and Japanese Bazaar, a low structure that served as a bazaar and teahouse. The trapezoidal plot in front of the Bazaar was fenced in and landscaped in a vaguely Japanese style, complete with a large stone lantern. The Japanese government also had displays in the Main Exhibition Building and the Agricultural Hall. Although many were repeat visitors, some 10 million people attended the fair, a number representing some 20% of country's population at the time. The exhibits at the Philadelphia Exhibition were relatively small in comparison to those that followed as Japan soon took full advantage of the opportunity the fairs provided to influence world opinion. With the 1893 World's Columbian Exposition in Chicago, Japan began the construction of major pavilions and gardens as well as massive displays in various exhibition halls, becoming the largest and often the most popular foreign exhibitor at fairs. The Japanese government constructed its national pavilion, the Hōōden, amid garden paths that wound through thousands of plants brought from Japan. Another garden flanked the Nippon Tea House and featured stone lanterns and bronze cranes. Although the Japanese government was unable to participate in the 1894 California Midwinter International Exposition in San Francisco's Golden Gate Park, local entrepreneur G.T. Marsh acquired the concession to create "The Japanese Village." Marsh himself designed the hill and water garden that surrounded the village's five buildings. At the close of the fair, this site became the popular Japanese Tea Garden, the oldest extant Japanese-style garden open to the public outside Japan.

Ten years later at the 1904 Louisiana Purchase Exposition in St. Louis, the Japanese government created the sensation of the fair with its 175,000 square foot compound known as the Imperial Japanese Garden. The six traditional structures included the Formosa Tea Pavilion, the Bellevue Tea House, the Bazaar, the Main Pavilion, the Commissioner's Residence, and a replica of the Kinkaku, a famous 14th century Golden Pavilion in Kyoto. These temple-style wooden buildings were arranged within a large stroll garden of meandering paths, picturesque plantings, and a small body of water at the center. The close proximity of a large Ferris wheel enabled visitors to have a panoramic view of the Imperial Japanese Garden. Smaller regional fairs, such as the 1915 Panama-Pacific International Exposition in San Francisco, also attracted equally large exhibits and proved to be wildly popular with fairgoers. These late 19th and early 20th century fairs and expositions introduced millions of Americans to Japanese-style gardens and inspired the creation of hundreds of

public and private gardens across the country. Many of the great estates of the gilded age installed Japanese gardens of varying degrees of size and authenticity. This was duplicated on a smaller scale among those of more modest means, especially in California where Japanese-style gardens were seen as eminently compatible with Craftsman-style bungalows. Commercial tea gardens modeled on those found at the fairs were also very popular in the early decades of the 20th century. By the 1930s, this ardor for Japanese-style gardens had cooled as American relations with the Japanese government became increasingly strained. Despite the anti-Japanese fervor of the Second World War, Japanese-style gardens experienced a renaissance in America less than a decade after the war's end that continues to the present day.

Japanese Gardens in Seattle

The history of Japanese gardens in Seattle largely mirrors that of the rest of country. At the same time that he proposed a comprehensive park and boulevard system in the early 1890s, Parks Superintendent Edward Otto Schwagerl thought that Seattle should have a Japanese garden and a botanical garden and identified Sand Point as a possible location. While nothing came of Schwagerl's proposal, there continued to be interest and popularity in Japanese-style gardens. An undated postcard from the early 20th century shows a "Japanese Tea Garden" in Madison Park where a rustic gazebo overlooks a small pond lined with stones and surrounded by grass. This is likely not the teahouse purchased by Emma Watts and placed in Madison Park after the conclusion of the 1909 Alaska-Yukon-Pacific Exposition. Historic photos show this elaborate structure within the Japanese Village located at the lower end of the Pay Streak, a concourse of concessions and popular entertainments. At the entrance to the Village, a sign reading "Street of Tokio" hung from a torii gate situated between the Tokio Café and the Japanese Theatre. The Japan Tea House fronted onto a Japanese-style garden, complete with a small pond, a bridge, stepping stones and lanterns. The official Japanese Government Building stood to the west of Rainier Vista with minimal plantings around its exterior. Like the other fairs before it, the Alaska-Yukon-Pacific Exposition presented a popular but not entirely accurate vision of Japan and its culture and likely stimulated interest in a Japanese garden for Seattle.

Shortly after the fair, a group of Seattle businessmen visited Japan, a result of which was a gift of an admired lantern that was placed in Mt. Baker Park in 1911. The Parks Board proposed to build a Japanese garden around the lantern, but the cost estimate was in excess of $8,000. In June of 1919, Architect A.H. Albertson sent a letter to the Parks Board requesting a permit to erect a Japanese Tea Garden in Volunteer Park for the "purposes of popularizing the drinking of Japanese Tea." The proposal included relocating an existing teahouse from the southwest corner of Fifth Avenue and University Street and designing a new Japanese garden around it. The teahouse would be operated as a concession sponsored by the Japan Central Tea Association, a semi-official government entity. Albertson promoted the plan as being of "public interest and educational value" and a "courtesy to the Japanese Government." Although nothing seems to have come of this request, interest remained in the creation of some sort of Japanese garden as evidenced by a September 1929 letter from the Seattle Chamber of Commerce to the Parks Board. The letter notified the Parks Board that the Chamber's Board of Trustees had adopted a recommendation proposing that a portion of "some suitable park" be set aside for "Oriental landscaping, exhibition and display of

Oriental shrubs, flowers, architecture, etc." The Chamber offered to assist the Parks Board in enlisting support for the project among the Japanese and Chinese organizations and residents of the City. It is likely that financial difficulties brought on by the economic depression of the 1930s prevented consideration of such a plan. However, the idea of soliciting funding from a Japanese organization almost succeeded in realizing the 1937 plan to develop a Japanese garden at the University of Washington Arboretum. This time, it was anti-Japanese sentiment and not a lack of funds that caused the plan to be abandoned.

Japanese Americans in Seattle

While many in Seattle and the rest of the country were fascinated by Japanese art and culture in the late 19th and early 20th centuries, there was also an underlying racism and discrimination towards Americans of Japanese descent. In addition to restrictions on immigration, local, state and federal laws prevented Japanese from owning land, living in certain areas or becoming naturalized U.S. citizens. Paradoxically, it was these Japanese and first generation (Issei) Japanese immigrants who designed, constructed and maintained most of the public and private Japanese-style gardens that were celebrated and admired in the period before the Second World War. Although they took great pride in their work and built prosperous businesses, many turned to landscaping and gardening because it was one of the few occupations open to them. It is estimated that roughly 30% of the Japanese American labor force was employed in the gardening or nursery trades in the pre-war period. This situation did not improve for their children. Even though they were born in this country, many Nisei or second generation Japanese could not find professional employment after graduating from college, forcing them to settle for jobs as bellhops, grocery clerks, gardeners, dishwashers and truck drivers. It was not until the third generation (Sansei) that many of these barriers were removed.

In Seattle, a large and lively ghetto in the south end of downtown developed at the turn of the 20th century as a result of the restrictive real estate covenants and employment discrimination. Nihonmachi or Japantown was the center of community life until the forced incarcerations of the 1940s emptied it of residents and workers. Historic photographs serve as a record of the community that vanished and show the continued influence of Japanese art and culture in people's daily lives. In a ca. 1930 photograph, a Mr. Hatate stands in the Japanese-style garden of the Maneki Café, a restaurant which continues to operate today a block south of the original location more than 100 years after its founding. When Japanese Americans were imprisoned in western concentration camps during the 1940s, many attempted to bring this culture with them, beautifying the barren landscape with small-scale Japanese-style gardens. Often, this work was completed by men who had worked as landscapers, gardeners and nurserymen. Upon their release, many of these men resumed their former occupations, contributing to the post-war renaissance in the popularity of Japanese-style gardens.

For many of the first generation of Japanese gardeners, Seattle's temperate climate reminded them of Japan, making it easier for them to them to adapt their gardening techniques and design ideas when they began their landscaping businesses. They also found that they could earn a good living for themselves and their families. As a measure of their success, a group of 25 gardeners established the Seattle Japanese Gardeners Association in 1927 to provide

mutual support and serve the community. After the war's end, the association re-formed and later formed a loose federation with gardeners in California and Vancouver, BC in the early 1960s. While many Nisei joined their fathers in their work, few of their own children had an interest in continuing in the family business with all the professional opportunities available to them. Although the association remained active into the 1980s, it eventually disbanded in 2004.

Of the many who practiced this profession in the Seattle area, none are better known than Fuijtaro Kubota (1880-1973). Born and raised in Japan's Kochi Prefecture, Kubota came to the United States around 1906 and eventually settled in Seattle. After working first at a sawmill, then on a farm and later in a hotel, Kubota established the Kubota Gardening Company in 1923. Over the next decade, his business prospered, enabling him to buy some 20 acres in Seattle's Rainier Beach neighborhood by 1929. Along with his sons Tom and Tak, Kubota created an authentic Japanese garden inspired by Ritsurin Park in Takamatsu after researching landscapes in Japan. Kubota opened his garden for community celebrations and picnics before all such activities ended with the family's incarceration at Minidoka in Idaho. Upon his return to Seattle, Kubota rebuilt his successful landscaping business and refurbished his abandoned property, converting it to a drive-through nursery where clients could choose plants and get design ideas for their own gardens. Over his career, Kubota generally adapted Japanese design principles to American culture rather than maintain pure Japanese styles. The gardens on the Seattle University campus and the Japanese Garden at the Bloedel Reserve on Bainbridge Island are public examples of his work. In recognition of his achievements in the pioneering of Japanese-style gardening in the Northwest, the Japanese government awarded him the Fifth Class Order of the Sacred Treasure in 1972, a year before his death. His property was later designated a City of Seattle landmark in 1981 and acquired as a public park in 1987.

Seattle Japanese Garden

It was Fuijtaro Kubota who provided the initial cost estimate of $60,000 for the Seattle Japanese Garden when Mrs. Neil (Emily H.) Haig, Chair of the Arboretum Foundation's Special Projects Committee consulted him. Mrs. Haig had been asked by Carl Ballard, Board President of Arboretum Foundation, to Chair the committee and resurrect the idea of building a Japanese garden in the Arboretum. On June 5, 1957, Mrs. Haig held the first meeting of this committee and created a work plan that covered issues such as location, cost, landscape architect, funding sources, and parking. In her efforts to gather preliminary information, Mrs. Haig contacted the Japanese Tea Garden at Golden Gate Park in San Francisco in the belief that it could serve as a useful model. She also wrote to and spoke with Fuijtaro Kubota, who offered to look at the proposed location and provide a rough idea of the estimated project cost. Realizing that the project would benefit from the assistance of the Japanese government, Mrs. Haig contacted the Japanese Consul-General in Seattle, Yoshiharu Takeno. She also called Ewen C. Dingwall, the project director for the Seattle World's Fair Century 21 Exposition, to talk about the proposed Japanese garden and its relation to the Fair. Mr. Dingwall attended the next meeting of the committee held on September 10, 1957 to discuss the plans for the Fair. It was at this meeting that Mrs. Haig presented Fuijtaro Kubota's cost estimate, which gave the group a better sense of how much money needed to be raised. Early fundraising efforts focused on holding garden tours,

something that would have been very familiar to members of the Arboretum Foundation. Mrs. Haig also reported that the Japanese Vice Consul, Mr. Yamada, had expressed interest in the plan and requested more information.

As plans proceeded, Mrs. Haig contacted the newly formed Kobe-Seattle Sister City Affiliation Committee, an organization founded to foster greater friendship and understanding after Seattle formally established ties with Kobe, Japan in October of 1957. The previous year, Seattle Mayor Gordon S. Clinton had appointed a study committee, which included former Seattle Mayor William F. Devin, in response to President Dwight D. Eisenhower's efforts to promote people-to-people programs between America and the rest of the world. Mr. Devin had already established friendly ties with Dr. Chujiro Haraguchi, the mayor of Kobe, and knew the Japanese city to be a great seaport with a distinguished university. With the two cities' similar backgrounds in education, shipping, and the arts, the committee members decided that Kobe was the logical choice for Seattle's first sister city relationship. Mrs. Haig asked the organization if they would be interested in assisting in the efforts to establish a Japanese garden and secured the support of Kenneth Sorrells, Chair of the Garden Committee. On February 17, 1958, Mr. Sorrells accompanied Mrs. Haig and Edward B. Dunn, the new president of the Arboretum Foundation, on a visit to Consul-General Takeno to present the idea for a Japanese garden. At Consul-General Takeno's suggestion, Mrs. Haig prepared a letter of introduction and compiled a prospectus on the project with plans and photographs that could be sent to the Japanese government to secure support. Consul-General Takeno also thought that different cities in Japan would be willing to make donations to the garden. Arboretum Director Brian O. Mulligan joined Mrs. Haig and Mr. Sorrells on a site visit with Consul-General Takeno, who was impressed by the possibilities

In July of 1958, Mr. Tatsuo Moriwaki, a landscape architect and Superintendent of the Tokyo Park Department, visited Seattle and was taken on a site visit to the Arboretum. Subsequently, Mr. Moriwaki offered to provide the landscape architectural work for the garden and indicated that the City of Tokyo would provide a teahouse as an ornamental feature. Letters were sent to the Governor of the Tokyo Metropolis, The Honorable Seiichiro Yasui, to express appreciation for Mr. Moriwaki's offer. Later that year, the City of Kobe made a donation of two stone lanterns, a large *Kasuga*-style lantern, which became known as the Kobe Friendship Lantern, and a smaller *okazaki* style lantern with a turtle carved at the base. At this point, momentum on the project was building rapidly. Arboretum staff produced the survey maps and photographs that would be used by the Japanese designers in developing the garden plan. The Seattle Japanese Gardeners Association offered to donate their services and plant material, and Genji Mihara of Seattle's Japanese American community expressed the community's desire to assist in every way possible. Most importantly, lumber magnate Prentice Bloedel made the first of several substantial donations that would fund much of the construction of the garden.

In January 1959, Mrs. Haig received a letter from the Governor of Tokyo formally presenting the teahouse for the Arboretum as a goodwill gift. The 480 square foot structure would be shipped on March 1, 1959 on the Mitsui Line's Akagisan Maru at the expense of the Tokyo government. Upon its arrival, it would be first assembled for display at a Trade Fair before

being erected at the Arboretum. At the Special Project Committee's meeting on January 27, there was some discussion as to who would cover the estimated $2,000 cost of assembling and reassembling the structure at the two locations. Ultimately, the committee decided that they would bear no more than half the cost if necessary. It was also reported at the meeting that they were still waiting for plans to be sent from Tokyo. The following week at a February 3 meeting of the Arboretum Foundation Board, a working committee was appointed to handle publicity and arrangements for the installation of the teahouse and the construction of the garden. Immediate responsibilities of the committee included making arrangements for the arrival and transportation of the teahouse, groundbreaking, and landscaping and securing the building site. One of the most important obligations of the committee was to select the landscape architect who would supervise construction of the garden and execute the plans prepared in Tokyo. After much investigation, Juki Iida (1889-1977) of the Iida Landscape Engineering Co. of Tokyo was selected to perform the work. Mr. Iida was the creator of more than a thousand Japanese gardens at home and abroad and was honored by the Emperor of Japan for his gardens. He also owned his own stone quarry, employing craftsman in the construction of stone lanterns, and operated a number of retail plant nurseries.

On March 21, 1959, the teahouse packed in fourteen crates arrived in Seattle at Pier 20 where Consul-General Takeno formally presented it to Mayor Clinton. The Port of Seattle stored the crates until it was time to move them to the National Guard Armory (now the Seattle Center House) for assembly under the supervision of Tomosaburo Kato, chief engineer of the Shimizu Construction Co. of Tokyo. The Trade Fair paid $1,000 of the estimated $5,000 construction costs while the City of Seattle covered the remaining expenditures. From April 24 to May 3, the teahouse was on display at the Eighth Annual Washington State International Trade Fair where it was promoted as a gift from the City of Tokyo to the people of Seattle. A few weeks later, a groundbreaking ceremony held was held on May 19 with Mayor Clinton and Consul-General Takeno once again in attendance. Sad Ishimitsu of K. Ishmitsu & Sons constructed the teahouse under the supervision Tomosaburo Kato and a representative of the Tokyo Metropolitan Government. A chain link fence was erected around the perimeter of the teahouse for security purposes, giving it a somewhat forlorn appearance that was out of context with its surroundings. Initially, the teahouse was not open to the public but used for special occasions, the first of which was a tea ceremony held on July 4, 1959. It was performed by Grand Master Soshitsu Sen XV of the Urasenke Foundation in Kyoto, Japan, who was traveling through Seattle on his way home from Europe.

In late November of 1959, Juki Iida and his assistant Nobumasa Kitamura traveled to Seattle for a two-week trip to present the design, survey the garden and make preliminary plans. With James Fukuda of the Japanese Consul-General's office acting as interpreter, Mr. Iida unfolded the more than thirty sheets of drawings that outlined the basic design. Prepared by Kiyoshi Inoshita and then modified by Ryuo Moriwaki, Nobumasa Kitamura, Iwao Ishikawa, Naotomo Ueno, Riki Ito and Iida himself, the plans presented a design primarily with loose perspective sketches and details that incorporated the existing pond and the stone bridge over the creek and retained existing vegetation at the periphery. Mr. Fukuda also acted as interpreter for Mr. Iida when he interviewed the local workers that would construct the

garden and toured examples of their work. A three-man crew of second-generation Japanese Americans was chosen, William S. Yorozu as contractor, Richard Yamasaki for stone work and Sad Ishimitsu for wood construction. While Juki Iida and the Japanese designers retain prominence for their work in designing the garden, the significant role of the Japanese Americans who constructed and later maintained the garden has not always been acknowledged as it should. Mr. Iida also visited local nurseries to select plant materials and traveled to the Bandera area near Snoqualmie Pass to locate suitable granite stones. Some 600 tons of Bandera Mountain stone was used in the garden. Following a trip to Washington, DC to work on designs for a garden for the Japanese Embassy, Mr. Iida made a brief stop in Seattle to select and plan the placement of stones and the construction of the pond and grassy knoll before returning to Japan for the winter. In his absence, the work crews cleared brush, bulldozed the site, burned material and hauled rocks. Upon his return in early March of 1960 with Mr. Kitamura, Mr. Iida found that much of the large-scale site work had been completed. The two men divided oversight duties with Mr. Kitamura in charge of the pond and Mr. Iida in charge of the waterfall and stream, each directing the placement of every stone, rock, tree and shrub.

As work progressed over the Spring of 1960, the actual costs soon exceeded the original estimates, causing concern among the members of the Arboretum Foundation's working committee. However, the project benefited from the donation of plant material and labor, including 100 flowering trees from the Japanese Community Service of Seattle and the services of 32 members of the Seattle Japanese Gardeners Association. The City of Seattle provided the funding for fencing the garden and sidewalk paving, and Seattle City Light donated the lighting equipment. All of this work culminated in the dedication of the not fully completed Japanese Garden on Sunday, June 5, 1960. Avery F. Peterson, Deputy Assistant Secretary for Far Eastern Economic Affairs in the U.S. Department of State was the principal speaker on a program that also featured Mayor Clinton, Consul-General Takeno, Dr. Charles E. Odegaard, President of the University of Washington, Griffith Way, Chairman of the Japan-America Centennial Committee, Gordon Marckworth, President of the University of Washington Arboretum, and Juki Iida. Edward B. Dunn, President of the Arboretum Foundation, presided. Unfortunately, the festivities were somewhat marred by the senseless damage done to the teahouse by vandals who broke into the garden in late May. Nonetheless, it should be considered quite an achievement that only three years elapsed between the first meeting of the Special Projects Committee and the dedication of the Japanese Garden. According to author Kendall H. Brown, the Seattle Japanese Garden "represents the earliest postwar public construction of a Japanese-style garden on the Pacific Coast and, as such, had a great impact on other gardens, serving as the template in design and function for most of the large civic pond-and-teahouse gardens built over the next forty years."

Since the June 1960 dedication, the Seattle Japanese Garden has been a work in progress. In May of 1961, turnstile counters with a ten cent admission fee were installed to generate revenue for the maintenance of the garden. That same year, the south gate was constructed to provide safe and convenient access to the nearest parking area. The section of the garden south of the stone bridge was not a part of the original plan and was designed and built by Richard Yamasaki. The *azumaya* or viewing arbor was constructed in 1967, and the *machiai*

or waiting arbor within the tea garden was completed in 1970, both of them the work of Sad Ishimitsu. Supporting this work financially was the Arboretum Foundation's Prentice Bloedel Unit #86, formed in 1966 for the specific purpose of completing and perpetuating the Japanese Garden. The greatest change that occurred was the tragic loss of the teahouse, which was destroyed by arson fire on April 9, 1973. Over the next eight years, the Arboretum Foundation raised the necessary funds to rebuild the structure with major financial support provided by the Urasenke Foundation of Kyoto. Grand Master Soshitsu Sen XV traveled to Seattle in 1981 to bestow upon the new teahouse the name Shoseian, "Arbor of the Murmuring Pines," and to once again perform the first tea ceremony. Fred Sugita, a Japanese-born craftsman from Seattle, largely followed the original plans in completing the reconstruction of the teahouse with the assistance of Seichi Kawasaki, a carpenter-artisan from Hiroshima, Japan. The dedication on May 16, 1981 was truly a celebration of the restoration of the teahouse. That same year, the University of Washington transferred the management of the Japanese Garden to Seattle Parks and Recreation, which has undertaken several major projects in recent years. ADA revisions were planned and built in 1997, and shoreline restoration was completed in 2002. Major and regular pine pruning has been ongoing since 1998. Today, the Seattle Japanese Garden is ranked within the top ten of North America's more than 300 public Japanese gardens.

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East side of pool soon after excavation started, December 31, 1959.

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The features of the Landmark to be preserved include: the entire site as described in the Japanese Garden Boundary Description (above), including structures, site elements and plant material located within the site boundaries, excluding the existing south entry gate and ticket booth, the service area structures, the pump house, the existing electric light standards, and the chain link fencing.

Issued: June 4, 2008

Karen Gordon
City Historic Preservation Officer

cc: Timothy Gallagher, Superintendent, Parks and Recreation
Andy Sheffer, DOPAR
Kathleen Conner, DOPAR
Kelly Goold, DOPAR
Stephen Lee, Chair, LPB
Diane Sugimura, DPD
Ken Mar, DPD
Cheryl Mosteller, DPD

Historic Inventory Property Form:
Governor Albert D. Rossellini Bridge

Historic Property Inventory Report for *Governor Albert D. Rosellini Bridge* at *Lake Washington, vicinity of Seattle, WA*

LOCATION SECTION

Field Site No.: SR5 **OAHP No.:**

Historic Name: *Governor Albert D. Rosellini Bridge* **Common Name:** *Evergreen Point Bridge*

Property Address: Lake Washington, vicinity of Seattle, WA

Comments: Bridge stretches from the Montlake area of Seattle, east across Lake Washington to Evergreen Point in Medina

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
King					SEATTLE NORTH

UTM Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** Other
Sequence: 1 **Easting:** 553897 **Northing:** 5277039
Sequence: 2 **Easting:** 556881 **Northing:** 5276342

Tax No./Parcel No. N/A **Plat/Block/Lot** N/A **Supplemental Map(s)** **Acreage**

IDENTIFICATION SECTION

Survey Name: SR 520 Bridge Replacement

Field Recorder: Lori Durio **Date Recorded:** 10/2/2008

Owner's Name: State of Washington, Department of Transportation
Owner Address: 310 Maple Park Avenue SE
City/State/Zip: Olympia, WA 98504

Classification: Structure **Resource Status** Survey/Inventory **Comments**

Within a District? No

Contributing?

National Register Nomination:

Local District:

National Register District/Thematic Nomination Name:

View of Looking east from Montlake area **taken** 3/7/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

DESCRIPTION SECTION

Historic Use: Transportation - Road-Related (vehicular)

Current Use: Transportation - Road-Related (vehicular)

Plan: Other **No. of Stories:** N/A

Structural System: Other

Changes to plan: Intact
Changes to original cladding:
Changes to windows:
Changes to interior:
Changes to other:
Other (specify): Replacement of dra

Style
Other

Form/Type
Other

Cladding
None

Foundation
Concrete - Poured
Other

Roof Material
None

Roof Type
None

NARRATIVE SECTION

Date Of Construction: 1960-63

Architect:

Builder: Guy Atkinson; General Construction Co; Manson Con.

Engineer: Charles E. Andrews, Ken Arkin, Mike Thomas, et al

Study Unit	Other
Transportation	
Community Planning/Development	
Science & Engineering	

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local):

Statement of Significance

The Evergreen Point Bridge, the second span across Lake Washington, lies 4 miles north of the first floating bridge, the Lacey V. Murrow Memorial Bridge. The Evergreen Point Bridge formed the center portion of the 5.8-mile project connecting the area's two main north-south highways, Interstate 405 on the lake's east side and Seattle's Interstate 5. (Hobbs and Holstine 2004). Construction on the Evergreen Point Bridge began in August 1960 and took almost 3 years (837 days) to complete (Hobbs and Holstine 2004). Its opening ceremony was held August 28, 1963. Although still generally referred to as the Evergreen Point bridge, it was officially renamed the Governor Albert D. Rosellini Bridge in 1988 (Mauldin, n.d.).

The floating pontoon bridge design was originally conceived by engineer Homer Hadley and was first used on the Lacey V. Murrow bridge. Charles E. Andrew was chief consulting engineer on the Evergreen Point Bridge for the State Toll Bridge Authority. Ken Arkin was senior field engineer in charge of field engineering for the bridge, and Mike Thomas was design engineer for the structure. ("Bridge Offices..." 1954) The Project Engineer was Harold S. Sitzman, and the Resident Engineer was John C. Tucker. ("Evergreen Point Bridge" nd) The contractor for the floating portion was Guy F. Atkinson, and for the approach structures, the contractors were General Construction Company and Manson Construction and Engineering Company. ("Vital Statistics" n.d.)

At the time of its construction, the Evergreen Point Bridge was the largest floating span in the world at 1.4 miles long. It cost $24,972,000 (the floating section alone was $10.9 million), making it the most expensive floating bridge in the world (Hobbs and Holstine 2004). The State Toll Bridge Authority issued a $30 million bond for the bridge, with a 40-year retirement limit. The bridge had a 35-cent toll from 1963 to 1979. In June 1979, the bond was paid in full (20 years ahead of schedule) and the toll booths were removed. The bridge enabled the rapid growth of the north part of the Eastside, especially northern Bellevue, Redmond and Kirkland, leading to greatly increased development and with it, greatly increased commuter traffic.

Changes to the bridge over the years have mostly consisted of basic maintenance tasks, such as painting, cable replacement, repair/replacement of expansion joints, replacement and rehabilitation of guide rollers, repair of columns, and miscellaneous electrical and mechanical rehabilitation. More substantial work was done to increase the safety of the bridge, including the replacement of the draw span and the addition of an emergency stop bar in 1994, the addition of ladders and catwalks to selected pontoons, and the installation of a median barrier. None of these alterations are substantial and do not detract from the appearance, operation or significance of the bridge.

The bridge, having had few substantial alterations over its lifetime, appears today much as it did when completed in 1963. It continues to fulfill its original function, although it now must handle more than twice its intended capacity. The bridge is already over 40 years old, and will meet the 50 year mark for National Register eligibility in August 2013. Although it is not yet 50 years old, it qualifies for the NRHP under Criteria Consideration G for its exceptional importance. With the sinking of the original Lake Washington floating

bridge, the Evergreen Point Bridge became the oldest remaining floating bridge across Lake Washington, exemplifying an engineering feat of outstanding proportions. As noted above, it was also the longest and most expensive at its time of construction. It is eligible for the NRHP as a structure under criterion A for its significant impact on the development of the Seattle area, specifically on the communities on the east side of Lake Washington, and criterion C for its outstanding and innovative engineering design.

Description of Physical Appearance

The bridge stretches from the Montlake area of Seattle, across Lake Washington to Medina. The floating section of the bridge is 7,578 feet long (1.4 miles), with 33 floating sections and 62 anchors. A standard pontoon measures 360 feet long by 60 feet wide and 14'9" deep, and weighs 4,725 tons. ("Vital Statistics" n.d) The 62 reinforced-concrete anchors each weigh 77 tons and are connected to the pontoons by two ¾-inch steel cables. The roadway accommodates four lanes of traffic and is 54 feet wide. It has a 2-foot-wide median and 3-foot-wide walkway. The Evergreen Point Bridge was designed with a "no bulge" lift-draw span which opens to 200 feet to allow passage of ships. The lift spans are raised 7 feet, allowing retraction of the moveable pontoons. At each end of the floating section, elevated steel truss spans with fixed piers connect to the shore and provide enough vertical clearance to accommodate large pleasure craft (Hobbs and Holstine 2004).

Major Bibliographic References

"Bridge Offices Will Be Brought to U. On Barge," Seattle Times. August 13, 1954.

"Evergreen Point Bridge." n.d.

Hobbs, Richard S. and Craig E. Holstine. Spanning Washington: Historic Highway Bridges of the Evergreen State, "Our Amazing Floating Bridges." Publication pending, January 2004.

Mauldin, D. B. "Washington's Wondrous Highways That Float," newspaper clipping in DOT Environmental Affairs Office. n/d.

"Record of Contract Work (1972-2002)" n.d.

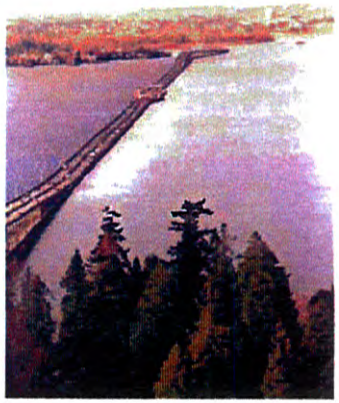
SR 520 Bridge Replacement & HOV Project. "Vital Statistics Our Bridge Today." n.d. http://www.wsdot.wa.gov/projects/SR520Bridge/faqs.htm Accessed on June 24, 2004.

Additional Photos for: *Governor Albert D. Rosellini Bridge* **at** *Lake Washington, vicinity of Seattle, WA*

View of aerial view of bridge, looking east **taken** 3/7/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:



View of aerial view of bridge, looking west from Medina **taken** 3/7/2004

Photography Neg. No (Roll No./Frame No.):

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

Historic Inventory Property Form:
James Arntson House

Historic Property Inventory Report for *Arntson, James House - formerly 76th Avenue NE* **at** *2851 Evergreen Point Rd, Medina, WA 98004*

LOCATION SECTION

Field Site No.: SR520E3 **OAHP No.:**

Historic Name: *Arntson, James House - formerly 76th Avenue NE* **Common Name:** *2851 Evergreen Point Road*

Property Address: 2851 Evergreen Point Rd, Medina, WA 98004 **Comments:**

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
King	T25R04E	24			KIRKLAND

Coordinate Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** Unknown
Sequence: 0 **Easting:** 557143 **Northing:** 5276244

Tax No./Parcel No.	Plat/Block/Lot	Supplemental Map(s)	Acreage
2425049180	N/A		.11

IDENTIFICATION SECTION

Survey Name: SR 520 Eastside Transit and HOV Project

Field Recorder: Lori Durio **Date Recorded:** 7/1/2008

Owner's Name:	Owner Address:	City/State/Zip:
Stephen A. Sharon	2851 Evergreen Point Road	Medina, WA 98039

Classification: Building **Resource Status** Survey/Inventory **Comments**

Within a District? No

Contributing?

National Register Nomination:

Local District:

National Register District/Thematic Nomination Name:

View of West elevation that faces Lake Washington **taken** 3/8/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

DESCRIPTION SECTION

Historic Use: Domestic - Single Family House

Current Use: Domestic - Single Family House

Plan: L-Shape **No. of Stories:** 1

Structural System: Balloon Frame

Changes to plan: Slight **Changes to interior:** Unknown **Style** Modern **Form/Type** Single Family

Changes to original cladding: Intact **Changes to other:**

Changes to windows: Intact **Other (specify):**

Cladding	Foundation	Roof Material	Roof Type
Wood - Clapboard	Concrete - Poured	Asphalt / Composition	Gable - Front Gable
Vertical - Boards			Gable - Side Gable

NARRATIVE SECTION

Date Of Construction: 1953

Architect: Unknown

Builder: Unknown

Engineer: Unknown

Study Unit	Other
Architecture/Landscape Architecture	

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local):

Statement of Significance

The house may be eligible for the NRHP under Criterion C, for its distinctive architectural characteristics, uniquely representative of its mid-century period. It may be eligible for the WHR for its strong architectural qualities. The original owner, Mr. James Arntson, was employed by Noble and White Engineering in Bellevue, WA, but no further information was available. Although no information was discovered on the architect or designer of the house, it is a good representative example of mid-century modern architecture, with its L-shaped plan, courtyard, and rear cantilevered balcony. The wide, low intersecting gables of the roof emphasize its horizontality, and the many windows and exterior spaces reflect the original wooded isolation of the site, on a bluff overlooking Lake Washington. Although part of the lot was taken for the original construction of the Evergreen Point Bridge/SR 520, and new construction has since been built near the home, the site still retains much of is original feeling. It is well adapted to its setting, with the private courtyard and the rear deck that once looked out at the lake. The house has received few alterations, most notably the enclosure of the original carport into a garage. The form and design of the house are still visually striking and make it worthy of consideration for the NRHP and WHR for its intact display of distinctive mid-century modern architectural design. Although the design and setting of the property have been somewhat impacted, it retains integrity of materials, feeling, location, association, and workmanship.

Medina has an interesting history associated with the scenic shoreline, the timber industry, and berry-growing. It was originally a summer retreat area for Seattle citizens who could afford the luxury of a country place across the lake. This house is near the Lake Washington shoreline and is one of the few older houses remaining in this area, which is dominated by new construction. Those extant houses in the vicinity that date from before 1968 are generally not architecturally distinguished and have also been altered, with a few exceptions. This house and its neighboring structures do not form a cohesive collection of historic buildings that are able to convey the historic development of the community. Therefore, there is no potential for a historic district here.

Description of Physical Appearance

This Modern style residence was constructed 1953. Its L-shape design surrounds a private courtyard. At the rear is a cantilevered balcony and a deck that originally looked out over Lake Washington. (That view is now obscured by a 1970s house.) The house has a poured concrete foundation, is clad in wood clapboard and vertical wood siding, and features an intersecting pair of low, wide gable roofs punctuated by wide brick chimneys. It has extensive use of plate glass windows. The only apparent alteration to the building is the enclosure of the original front carport to form an enclosed garage.

Major Bibliographic References

King County Assessor's Records

King County Real Property Cards, on file at Puget Sound Regional Archives, Seattle, WA

Additional Photos for: *Arntson, James House - formerly 76th Avenue NE* **at** *2851 Evergreen Point Rd, Medina, WA 98004*

View of east elevation of garage, facing Evergreen Point Road **taken** 1/22/2009

Photography Neg. No (Roll No./Frame No.): N/A

Comments: View looking west

View of east and south elevations **taken** 1/22/2009

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

Historic Inventory Property Form:
Helen Pierce House

Historic Property Inventory Report for *Pierce, Helen House - formerly 76th Avenue NE* **at** *2857 Evergreen Point Rd, Medina, WA 98004*

LOCATION SECTION

Field Site No.: SR520E2 **OAHP No.:**

Historic Name: *Pierce, Helen House - formerly 76th Avenue NE* **Common Name:** *2857 Evergreen Point Road*

Property Address: 2857 Evergreen Point Rd, Medina, WA 98004 **Comments:**

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
King	T25R04na	24	SW		KIRKLAND

Coordinate Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** Unknown
Sequence: 0 **Easting:** 556991 **Northing:** 5276280

Tax No./Parcel No.	Plat/Block/Lot	Supplemental Map(s)	Acreage
2425049074	N/A		.92

IDENTIFICATION SECTION

Survey Name: SR 520 Eastside Transit and HOV Project

Field Recorder: Lori Durio **Date Recorded:** 7/1/2008

Owner's Name:	Owner Address:	City/State/Zip:
Gail W. Gowdy, John C. Wiseman	9815 15th NW	Seattle, WA 98117

Classification: Building **Resource Status** Survey/Inventory **Comments**

Within a District? No

Contributing?

National Register Nomination:

Local District:

National Register District/Thematic Nomination Name:

DESCRIPTION SECTION

Historic Use: Domestic - Single Family House

Current Use: Domestic - Single Family House

View of north elevation, showing original part of house **taken** 1/30/2009

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

Plan: Irregular **No. of Stories:** 1

Structural System: Balloon Frame

Changes to plan: Slight **Changes to interior:** Unknown **Style** Vernacular **Form/Type** Single Family - Gable Front and Wing

Changes to original cladding: Intact **Changes to other:**

Changes to windows: Slight **Other (specify):**

Cladding	Foundation	Roof Material	Roof Type
Wood - Drop Siding	Unknown	Wood - Shingle	Gable - Parallel Gables
Other			Gable - Front Gable
			Gable - Cross Gable

NARRATIVE SECTION

Date Of Construction: 1920, 1932

Architect: Unknown

Builder: Unknown

Engineer: Unknown

Study Unit	Other
Community Planning/Development	
Architecture/Landscape Architecture	

Property appears to meet criteria for the National Register of Historic Places: No

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local):

Statement of Significance

This house appears to be one of the original buildings in the Medina area. Originally owned by Helen R. Pierce, it was built in 1920. Sited at the foot of the bluff near the shore of Lake Washington, it originally had a cistern/water tower and a concrete pump house; the remains of these structures are still on the site. The main house suffered a fire in 1929, and was rebuilt in 1932 and remodeled in 1937. The front portion of the house, facing the water, is what remains of the original 1920 structure, according to the owner. The building has had a few alterations and small rear additions since the 1930s. The front façade has had a large picture window with inoperable shutters added – this appears to be the most prominent alteration. A carport was added to the side of the house, but is not attached to it. The rear additions are marked by a combination of shed and gable roofs. The property retains integrity of feeling, location, and association, but the setting, materials, workmanship, and design have been impacted by alterations, additions, and the intrusion of SR 520 and the Evergreen Point Bridge. Therefore it does not qualify for the NRHP.

The house and grounds remain fairly isolated and relatively unchanged except for the intrusion of the Evergreen Point bridge, which is immediately adjacent to it. Despite its alterations, this remains one of the earliest houses in Evergreen Point that is still extant in this area of high property values and increasing modern residential development pressure. It is representative of some of the early residences of the Points area, many of which were summer houses or lake camps, most of which have been removed and/or replaced, or so altered that they no longer retain any visual evidence of the original house. Therefore it appears to be eligible for the WHR as a representative element of the early settlement of the community.

The history of Medina and its neighboring Points communities is associated with the scenic shoreline, the timber industry, and berry-growing. It was originally a summer retreat area for Seattle citizens who could afford the luxury of a country place across the lake. This house is on the Lake Washington shoreline and is one of the few older houses remaining in this area, which is dominated by new construction and experiences strong pressure from modern residential development. Those extant houses in the vicinity that date from before 1968 are generally not architecturally distinguished and have also been altered, with a few exceptions. This house and its neighboring structures do not form a cohesive collection of historic buildings that are able to convey the historic development of the community. Therefore, there is no potential for a historic district here.

Description of Physical Appearance

This one story home was built in 1920, suffered a fire in 1929, and was rebuilt in 1932, then remodeled in 1937. The front wing of the house facing the water is the section that remains from the original 1920 house, according to the owner. Siding on the original section is drop siding, and on the addition it mimics log siding. The front façade has had a large picture window with inoperable shutters added – this appears to be the major alteration. The gable ends are faced with vertical siding with pointed ends. Most of the windows are 6/1 wood windows. The entry is on the north elevation, in the original portion of the house. A detached carport with a wood shingled, gable roof has been added north of the house. The foundation of the building is enclosed with vinyl panels and is not visible, although it appears to be brick.

The property originally had a pump house and a water tower, and remnants of these structures still exist. Originally, every house in the Points area had to have its own pump and a pipe extending 500 feet out into the lake to pump water into the house. Drinking water was carried from one of the several wells on the Point until at least 1924 ("Our History"

1993). It is likely that this pump house and water tower served the purpose of pumping and storing water for this residence.

The house has had small additions on the rear elevation. The roof structure reflects the evolution of the house, with a front gable on the main section that faces the water, a side or cross gable on the 1932 addition, and another, parallel front gable on the south elevation wing. The rear additions have shed roofs.

Major Bibliographic References

King County Assessor's Records, Seattle, WA

"Our History." 1993. Town of Hunt's Point. http://ci.hunts-point.wa.us/history.htm, accessed June 23, 2004.

Personal communication with property owner, March 8, 2004

Additional Photos for: *Pierce, Helen House - formerly 76th Avenue NE* **at** *2857 Evergreen Point Rd, Medina, WA 98004*

View of west elevation that faces Lake Washington **taken** 3/8/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

View of remains of pumphouse, located west of main house near the coastline **taken** 3/8/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

View of Remains of well/cistern, west of main house, near water's edge **taken** 3/8/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

View of West and south elevations **taken** 3/8/2004

Photography Neg. No (Roll No./Frame No.): N/A

Comments:

National Register of Historic Places Inventory Nomination Forms: Port of Tacoma and Port of Olympia Historic Properties

Historic Register Report

Historic Name: Fire Station No. 15

Address: 3510 East Eleventh Street
City: Tacoma
County: Pierce

Download nomination form

Historic Use: Government
Style: Spanish - Spanish Colonial Revival
Built: 1929
Architect: Nicholson, Morton J.
Builder: Walesby Construction Co.

Smithsonian Number: 45PI00650
Date Listed: 5/2/1986
Listing Status: WHR/NR
Classification: BLDG(S)
Resource Count: 1
Area of Significance: Architecture
Level of Significance: Local
Listing Criteria: A, C

Statement of Significance

Photos

HISTORIC PROPERTY INVENTORY FORM

P1 650

State of Washington
Office of Archaeology and Historic Preservation
111 W. 21st Ave. KL-11
Olympia, WA 98504
(206) 753-5010

IDENTIFICATION SECTION

Site No.: _____
Site Name: Historic Fire Station No. 15
Common _____
Field Recorder: Mark L. Brack
Date Recorded: July 16, 1985
Owner's Name: City of Tacoma
Street 747 Market Street
City/Town Tacoma
County Pierce
Zip Code 98402

Status:
- National Register ☐
- State Register ☐
- Survey/Inventory ☒
- Determined Eligible ☐
- Other (NHL, HABS, HAER) Indicate ☐

Classification		Date:
District	☐	
Site	☐	previously
Building	☒	surveyed 1980
Structure	☐	
Object	☐	

LOCATION SECTION

Street Number 3510 E. 11th Street
City/Town Tacoma Zip Code 98421
County Pierce Twp. N/a Range - - Sect - - ¼ Sect - - ¼ ¼ Sect - -
Tax No./Parcel No. 227 520-043-0
UTM References _____ Zone 10 Easting 545 660 Northing 5235720
Tacoma North, WA

Acreage: less than one
Legal Boundary Description: Ashton's Replat of Tacoma Tidelands, Block 10 Lots 1 - 3.

PHOTOGRAPHY

Photography Neg. No.: Roll 1, Neg. #2
(Roll No. + Frame No.)
View: NW and SW elevations, facing east
Date: August 1985

DESCRIPTION SECTION

Materials & Features/Structural Types:

Roof Material:
- Wood Shingle ☐
- Asbestos/Asphalt Shingle ☒
- Slate ☐
- Tar ☒
- Metal (specify) _____ ☐
- Other (specify) _____ ☐

Roof Type:
- Gable ☒
- Flat ☒
- Monitor ☐
- Gambrel ☐
- Shed ☐
- Hip ☐
- Pyramid ☐
- Sawtooth ☐
- Other (specify) _____ ☐

Foundation:
- Log ☐
- Post & Pier ☐
- Stone ☐
- Concrete
  - Block ☐
  - Poured ☒
- Brick ☐
- Other (specify) _____ ☐

Cladding (Exterior Wall Surfaces):
- Log ☐
- Horizontal Wood Siding { Rustic/Novelty ☐ / Clapboard ☐
- Wood Shingle { Split Shakes ☐ / Re-sawn ☐ / Machine Shingle ☐
- Asbestos/Asphalt Shingle ☐
- Brick Masonry ☐
- Stone Masonry ☐
- Stucco ☒
- Terra Cotta ☐
- Carrara Glass ☐
- Vinyl/Aluminum Siding ☐
- Other (specify) _____ ☐

Height/No. of Stories:
- One ☒
- One and one-half ☐
- Two ☐
- Two and one-half ☐
- Three ☐
- Other (specify) _____ ☐

Style/Form: (Check one or more of the following)
- Pioneer/Homestead ☐
- Greek Revival ☐
- Gothic Revival ☐
- Italianate ☐
- Second Empire ☐
- Stick/Eastlake ☐
- Queen Anne ☐
- Shingle Style ☐
- Richardsonian Romanesque ☐
- Chicago School/ Sullivanesque ☐
- Beau Arts Classicism ☐
- Princess Anne ☐
- Neo-Colonial ☐
- Dutch Colonial ☐
- Spanish Colonial ☐
- English Revival ☐
- Bungalow ☐
- Craftsman ☐
- American Foursquare/ Classic Box ☐
- Prairie Style ☐
- Art Deco/Moderne ☐
- Commercial Vernacular ☐
- Vernacular ☐
- Other (specify) ☒ Spanish Period Revival

Integrity: (include detailed description in 'Additional Description' section)

	Intact	Slight	Moderate	Excessive
Additions to house plan	☒	☐	☐	☐
Changes to windows	☒	☐	☐	☐
Changes to roof shape	☒	☐	☐	☐
Changes to interior plan	☒	☐	☐	☐
Other (specify)	☐	☐	☐	☐

NARRATIVE SECTION

Areas of Significance/Study Unit Themes: (check one or more of the following)

Agriculture	☐	Conservation	☐	Military	☐
Architecture/Landscape Architecture	☒	Education	☐	Politics/Government/Law	☒
Arts	☐	Entertainment/Recreation	☐	Religion	☐
Commerce	☐	Ethnic Heritage (specify)_____	☐	Science & Engineering	☐
Communications	☐	Health/Medicine	☐	Social Movements/Organizations	☐
Community Planning/Development	☐	Manufacturing/Industry	☐	Transportation	☐
				Other (Specify)_____	☐

Statement of Significance: (Reference names, dates, events, areas of significance/study unit themes)

Date of Construction: 1928 - 1929 (Period of significance: 1928 - 1935)

Architect/Builder: Morton J. Nicholson, Architect - Walesby Construction Company, Contractor

Historical Significance: Fire Station No. 15 is significant for its association with the development of Tacoma's port/industrial area and the growth of the city's vital municipal services. The building is also an important local example of the innovations in fire station design that followed the motorization of firefighting equipment. Station No. 15 was erected in a newly annexed tideflat section of the city, and it shared the fireboat's responsibilities for answering calls along the waterfront. Its jurisdiction also included the industrial zones further removed from the water and a residential district in northeast Tacoma. The introduction of motorized equipment allowed stations to be reduced in height to one story, as firemen no longer required separation from the station's horses. Consequently, fire stations developed an even greater domestic appearance. Zurier describes these buildings as "bungalow" stations. Station No. 15 utilized an enlarged version of the floor plan of Nos. 10 and 14 yet stylistically it is articulated quite differently. The station's Hispanic design reflects popular Period Revival tendencies of the 1920's, which were shared by fire stations across the country. It is the only fire station in the city to display such Hispanic-inspired details. Like the Fireboat Station, its picturesque quality is very different from the utilitarian industrial character of the surrounding area. The growth of the city and the general economic prosperity which preceded the Depression

(cont'd)

Additional Descripton of Physical Appearance & Significant Architectural Features: (Architectural significance; can include interior & site features; address integrity issues specifically) Fire Station No. 15 is located in a port/industrial area characterized by warehouses, factories and undeveloped land. The simple Spanish-inspired detailing of the building is typical of Period Revival structures of this era. The station was constructed of hollow tile, with a finish coat of rough textured stucco. Projecting from the northwest facade is the two bay apparatus room, which is covered by a gable roof perpendicular to the primary roofline. The main pedestrian entrance to the building is through a small porch recessed behind the arcade on the west corner of the building. The corner pier of this arcade has a small buttress. The dormitory wing is located at the rear of the main gabled section. It has a flat roof behind a tiled parapet wall. The hose tower is also on the rear of the station and is articulated with arched louvered vents, a pyramidal roof and exposed beams in imitation of Hispanic vigas. Windows are 1/1 and 3/1 double-hung wood sash. A band of five 1/1 windows illuminates the station's dayroom. The interior is in an excellent state of preservation. Original features include: a tiled bathroom with marble stall partitions, plywood lockers in the dormitories, and a dining nook with Craftsman style furniture. Th

(cont'd)

Major Bibliographic References: (Include books, periodicals, manuscripts, newspapers, legal documents, maps, photos, oral sources, etc.)

Tacoma Daily Ledger, March 14, 1928, p. 1; December 28, 1929, p.12.
Tacoma Fire Department Annual Report, 1929 (available at Northwest Room, Tacoma Public Library)
Tacoma Fire Department Records (901 South Fawcett Avenue, Tacoma, Washington)
Tacoma News Tribune, March 14, 1928, p.1.

(cont'd)

HISTORIC PROPERTY INVENTORY FORM
(Continuation Sheet)

State of Washington
Office of Archaeology and Historic Preservation
111 W. 21st Ave. KL-11
Olympia, WA 98504
(206) 753-5010

Site No.: _____
Site Name:
Historic Fire Station No. 15
Common _____

Additional Photographs: (include roll no. & frame no.; date; & view)

Significance (cont'd)

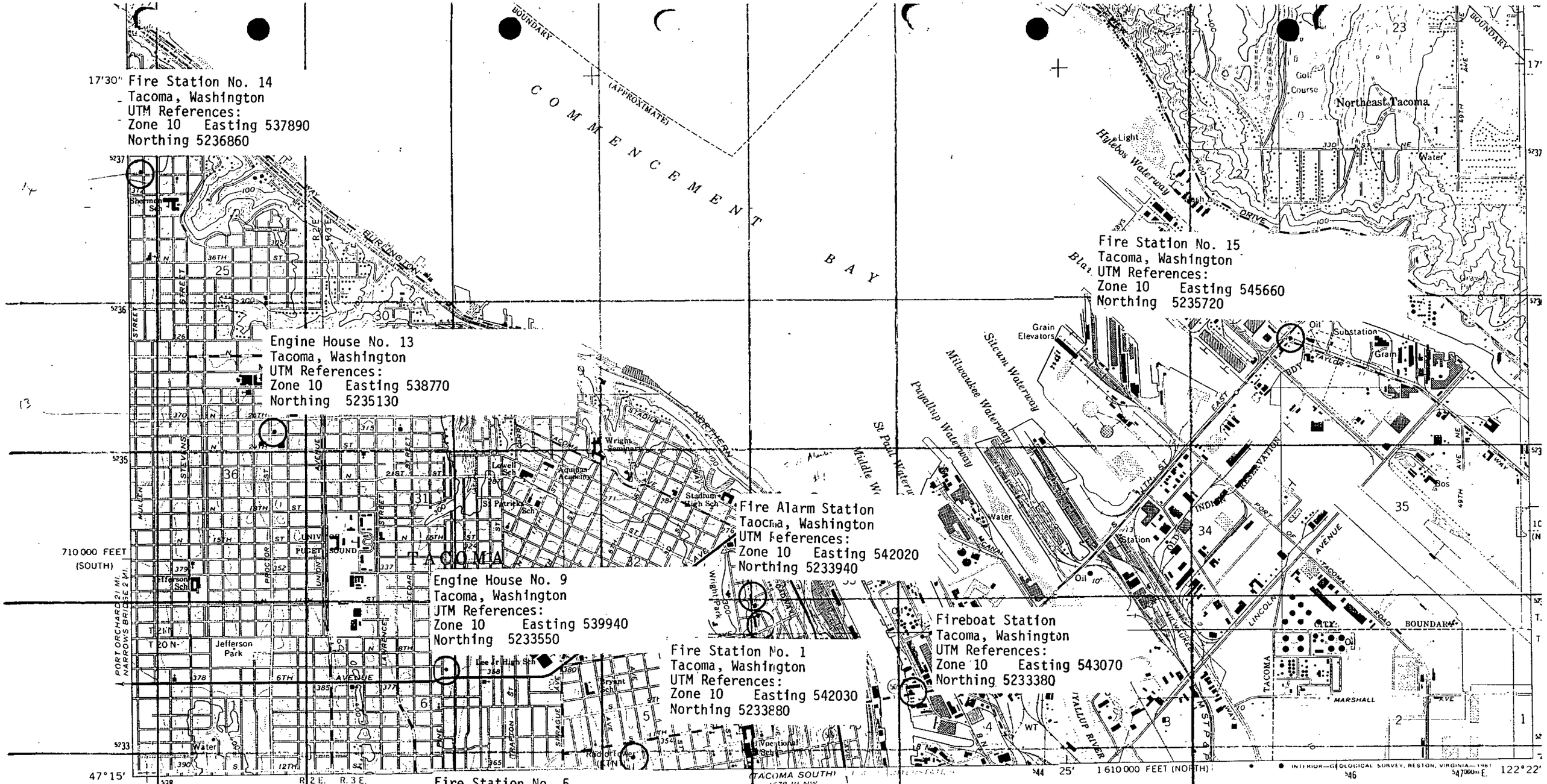
prompted voters to approve a bond issue in 1928 that included funds for four new stations, the fire alarm station and the fireboat. Fire Station No. 15 exemplifies the growth of the city and its services, and it continues to refl the important legacy of the Tacoma Fire Department.

Description (cont'd)

most notable alterations include: the remodeling of kitchen cabinetry and the replacement of the original segmentally-arched wooden apparatus doors with flat-arch metal and glass roll-up doors.

Bib. References (cont'd)

Talbot, Clyde and Decker, Ralph, 100 Years of Firefighting in the City of Destiny, Tacoma: Pyro Press, 1981.
Zurier, Rebecca, The American Firehouse, An Architectural and Social History, New York: Abbeville Press, 1982.
Original 1928 blueprints (available at the City of Tacoma's Building Division)



Mapped, edited, and published by the Geological S

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1957. Field checked 1961

Selected hydrographic data compiled from NOS charts 6407 and 6460 (1958). This information is not intended for navigational purposes

Polyconic projection. 10,000-foot grid ticks based on Washington coordinate system, south and north zones. 1000-meter Universal Transverse Mercator grid ticks, zone 10, shown in blue

1927 North American Datum. To place on the predicted North American Datum 1983 move the projection lines 23 meters north and 93 meters east as shown by

0°25' 7 MILS — 21° 373 MILS

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 10 FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOWER LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 8 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
State Route

WASHINGTON
QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled from aerial photographs taken 1978 and other sources.

TACOMA NORTH, WASH.

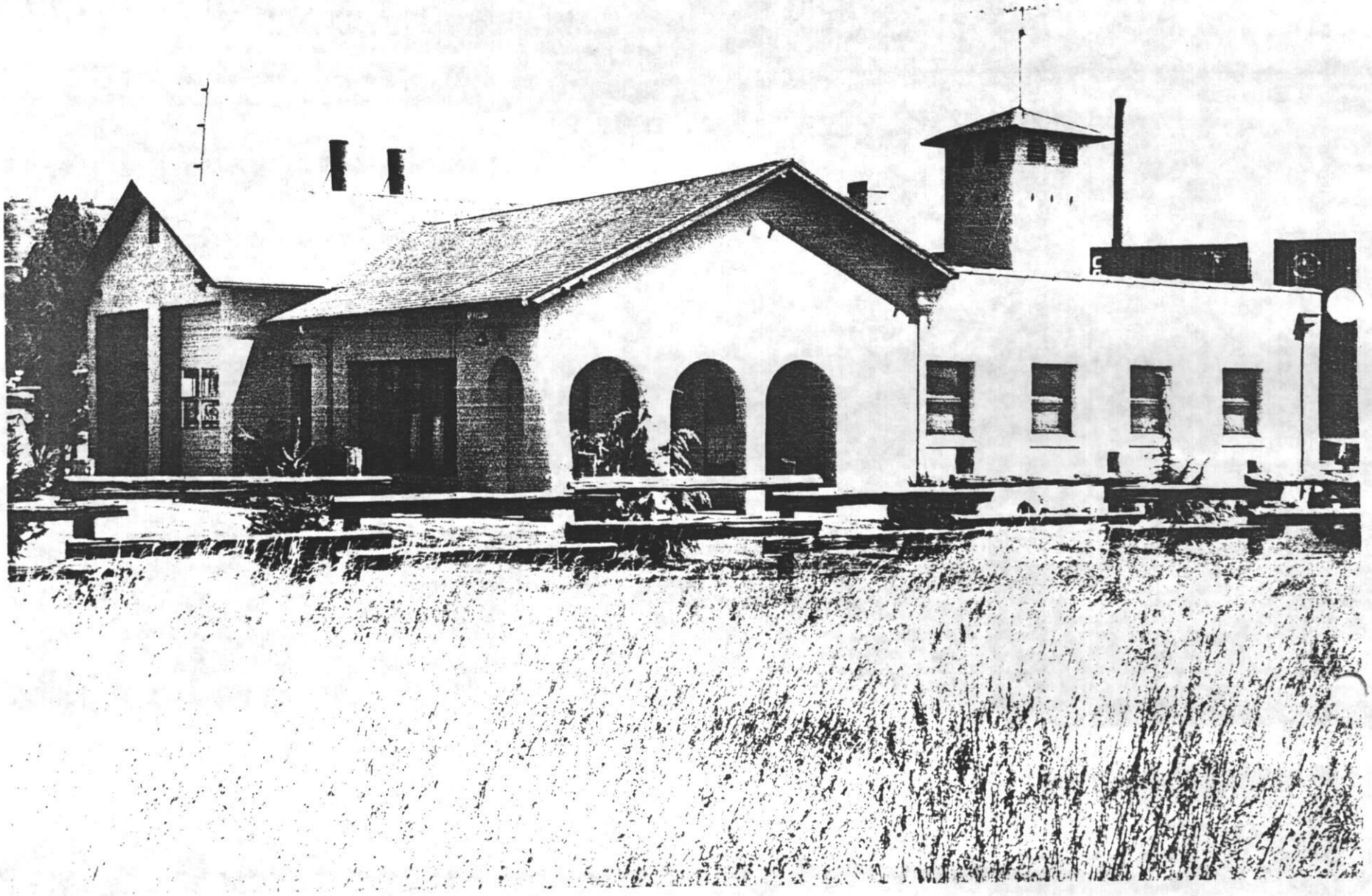
N4715—W12222.5/7.5

1961

Fire Station No. 15
5520 East 4th Street

Roll # 30
(15)

FIRE STATION NO 15. TACOMA, WA



Historic Property Inventory Report

Location

Field Site No. Gharbor

DAHP No.

Historic Name: Concrete Technology Corporation Plant

Common Name: Concrete Technology Corporation Plant

Property Address: 1123 Port of Tacoma Rd, Tacoma, WA 98421

Comments:

Tax No./Parcel No. 6965000202, 8888877420

Plat/Block/Lot

Acreage

Supplemental Map(s)

Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	County	Quadrangle
T21R03E	34			Pierce	TACOMA NORTH

Coordinate Reference

Easting: 1168082

Northing: 711115

Projection: Washington State Plane South

Datum: HARN (feet)

Historic Property Inventory Report

Identification

Survey Name: SR 520 Pontoon Construction Project

Date Recorded: 03/09/2009

Field Recorder: Hetzel, Christopher

Owner's Name: Concrete Technology Corporation

Owner Address: P.O. Box 2259

City: Tacoma

State: WA

Zip: 98401-2259

Classification: Building

Resource Status:
Survey/Inventory

Comments:
Eligible

Within a District? No

Contributing?

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Determined Eligible - SHPO

Determination Date: 6/3/2009

Determination Comments: 122107-37-FHWA determined on 6/3/2009

Description

Historic Use: Commerce/Trade - Professional

Current Use: Commerce/Trade - Professional

Plan: Rectangle

Stories: 2

Structural System: Platform Frame

Changes to Plan: Intact

Changes to Interior: Unknown

Changes to Original Cladding: Intact

Changes to Windows: Slight

Changes to Other:

Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Modern	Veneer Veneer - Stucco	Flat with Eaves	Unknown

Foundation:	Form/Type:
Concrete - Poured	Commercial

Narrative

Study Unit	Other
Manufacturing/Industry Architecture/Landscape Architecture	

Date of Construction: 1956 Built Date

Builder:

Engineer: Anderson, Arthur and Thomas

Architect: Price, Robert B.

Property appears to meet criteria for the National Register of Historic Places:Yes

Property is located in a potential historic district (National and/or local): Yes - Local

Property potentially contributes to a historic district (National and/or local): Yes

Statement of Significance:

The two-story administration building at 1123 Port of Tacoma Road was evaluated at a reconnaissance level in a cultural resources survey completed for the SR520 Pontoon Construction Project in the City of Tacoma, Pierce County, Washington. The building is one of several structures that comprise the facilities of the Concrete Technology Corporation at the Port of Tacoma. It was constructed circa 1956, based on its appearance in aerial photographs in the collections of the Tacoma Public Library, and was designed by Robert B. Price, a well-known Tacoma architect. The integrity of the building is fair due to possible alterations to the existing fenestration, including the full-height mirror-glass curtain wall at the south elevation.

The Concrete Technology Corporation is recognized as being historically significant for having pioneered the development of the pre-stressed concrete industry in the United States. After serving in World War II, where he directed testing of a prototype of the United State's first pre-stressed concrete bridge (the Walnut Lane Bridge in Philadelphia), Arthur R. Anderson and his brother Thomas Anderson moved back to Tacoma and founded Concrete Technology Corporation and ABAM Engineers. The brothers, both engineers with degrees from the Massachusetts Institute of Technology, established the company's initial production facility in 1951 at the Port of Tacoma. Pre-stressed concrete was a new technology in the United States, and the Andersons' Tacoma facility was the first pre-stressing factory plant in the country. According to the company's website, the modest four-employee company was the culmination of a yearlong investigation by the Andersons throughout Europe to see the few pre-stressed concrete structures in existence at that time.

The Andersons developed and promoted the technology of pre-stressed elements for construction throughout the 1950s and 1960s. The company invented and marketed the Anderson Post-tensioning System, developed a family of bridge I-girders that was adopted by the Washington State Department of Transportation as a construction standard, and devised new methods for producing long hollow concrete members and segmental bridge construction, among other innovations. The Concrete Technology Corporation's success led to growth in sales and demand, and the company's involvement in many significant, large capital improvement projects in the Pacific Northwest and across the country.

This success resulted in the expansion of the company's facilities at the Port of Tacoma. The original production facility, which is now the research and development laboratory, was constructed in 1951. The company's expansion in the 1950s included the construction of two office and administration buildings circa 1956 and completion of the main Structural Plant between 1956 and 1960. Tacoma architect Robert B. Price is credited with the design of the administration buildings and the Structural Plant, along with Thomas and Arthur Anderson who provided the engineering. Robert B. Price is recognized as one of the most prolific architects in the Tacoma area from the 1950s to the 1970s. His work spanned a variety of building types, from single-family homes to banks and public buildings, but he is probably best known for his specialization in his design of schools throughout the Puget Sound region. During his career, Price received 59 national, regional and local awards for design excellence. Among his award winning projects was the Tacoma Fire Station No. 17 (1955); the Joe Long Jr. House on American Lake (1956); Hoyt Elementary School in Tacoma (1958); and his own architectural Tacoma office (1963). Many of Price's other projects were featured in a variety of magazines including Sunset, House and Garden and Architectural Record.

The Concrete Technology Corporation added a second major production building to its Port of Tacoma facility in 1967 to accommodate the rising demand for precast building elements. Production expansion in the 1970s included facilities for semi-automated casting of hollow-core slabs, and the construction of the existing 150' x 500' graving dock for the construction of floating concrete structures.

Thousands of bridges, buildings, piers, tanks, floats and other structures throughout the Pacific Northwest and Alaska have been constructed with Concrete Technology Corporation products, in addition to other projects throughout the United States. The company manufactured structural members for the original Seattle monorail, the Disney World monorail, the Interstate-90 lid, Freeway Park in Seattle, and most freeway overpasses in the region. The facility was also involved in casting beams for Safeco Field and Husky Stadium. It now focuses on beams and pilings.

The property has been evaluated according to the eligibility criteria for listing in the National Register of Historic Places (NRHP). The property appears eligible for listing in the NRHP under Criteria A and C at the local level of significance. Under NRHP Criterion A, the administration building is considered historically significant for its association with the Concrete Technology Corporation and its pioneering role in the development of the pre-stressed concrete industry in the United States. Under NRHP Criterion C, the building embodies the characteristics and method of construction of the Modern style in 1950s, and is a commercially designed building associated with Robert B. Price, who is considered a well-known master architect in the Tacoma area, and engineers Arthur and Thomas Anderson. The administration building strongly exhibits its style and, except for alterations to the fenestration, the building remains essentially unaltered and retains good integrity.

Based on our review, the property has fair integrity and appears eligible for individual listing in the National Register of Historic Places, or as a contributor to an eligible historic district associated with the Concrete Technology Corporation.

Description of Physical Appearance:

The property contains a two-story administration building, constructed circa 1956 for the Concrete Technology Corporation at the Port of Tacoma. It is one of four extant structures that make up the company's industrial facility from the 1950s. The other structures are grouped to the east and northeast of the building. The administration building and structures of the adjacent research and development laboratory are located within a rectangular area of land, defined by a mature hedgerow. The entire area between the buildings has been paved with concrete.

The administration building is oriented to the north-south, with a secondary elevation facing south towards Port of Tacoma Road. It has an irregular rectangular-shaped plan and wood-frame construction on a poured concrete foundation. The building was originally designed in the Moderne style. Its has a flat roof characterized by wide boxed overhangs. The exterior walls are clad with stucco. A smooth mullioned, mirrored glass curtain wall is present at the western half of the street-facing side elevation. The eastern half of this elevation is clad with pebble-textured stucco. A one-story flat–roofed entryway is present at the building's southeast corner. It is supported by thin posts and has a rear wall clad in ceramic tile. The building's front entrance, which is located in the entryway at a right angle to the street, has a pair of single-light glass doors in a metal frame. The entry also features wide, flat concrete posts that double as brise-soleil for this recessed portion of the side elevation.

The building's east and west elevations are each five bays wide with large plate glass windows on both the first and second stories. Nearly all of the bays are inset from the elevation and delineated by two-story high, engaged buttresses that end at the roof's overhanging eaves. The northernmost bay on the east elevation is not recessed and features a narrow ribbon of reflecting glass clerestory windows above an unadorned, stucco clad exterior wall. A freestanding abstract sculpted pillar of exposed concrete is present to the southeast of the entryway, marking the entrance to the facility. It features four vertical columns set within a water feature. Mature bush and tree specimens are present in front of the street facing elevation. The mirror-glass window bank at the street facing elevation appears to be a later alteration.

Major Bibliographic References:	Concrete Technology Corporation Website. http://www.concretetech.com/history.htm. Docomomo-WEWA. "Price, Robert B." http://www.docomomo-wewa.org/architects_detail.php?id=73. 2009. Beers, Carole. "Arthur R. Anderson, 85, Pioneer In Concrete Construction Methods." The Seattle Times, 5 July 1995. Pierce County Tax Assessor Online Records Tacoma Public Library Image Archives—Port of Tacoma Aerial Photographs Sanborn Fire Insurance Maps Washington State Digital Archives Wilhelm, Steve. "Pioneer firm, Concrete Technology, stretches technology of strong girders." Puget Sound Business Journal, 6 June 2008.

Photos

South and East Elevations, Looking North

South and East Elevations, Looking North

Identification

Survey Name: SR 520 Pontoon Construction Project

Date Recorded: 03/09/2009

Field Recorder: Hetzel, Christopher

Owner's Name: Concrete Technology Corporation

Owner Address: P.O. Box 2259

City: Tacoma

State: WA

Zip: 98401-2259

Classification: Building

Resource Status: Survey/Inventory

Comments: Eligible

Within a District? No

Contributing?

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Not Determined - SHPO

Determination Date: 1/1/0001

Determination Comments:

Description

Historic Use: Industry/Processing/Extraction - Manufacturing Facility

Current Use: Industry/Processing/Extraction - Manufacturing Facility

Plan: Rectangle

Stories: 2

Structural System: Unknown

Changes to Plan: Intact

Changes to Interior: Unknown

Changes to Original Cladding: Intact

Changes to Windows: Intact

Changes to Other:

Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Vernacular Modern - International Style	Veneer - Stucco	Gable	Asphalt / Composition - Shingle

Foundation:	Form/Type:
Concrete - Poured	Industrial

Narrative

Study Unit	Other
Manufacturing/Industry	
Architecture/Landscape Architecture	

Date of Construction:

Builder:

1951 Built Date

Engineer: Anderson, Arthur and Thomas

Architect:

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes - Local

Property potentially contributes to a historic district (National and/or local): Yes

Statement of Significance: The two-story laboratory building at 1123 Port of Tacoma Road was evaluated at a reconnaissance level in a cultural resources survey completed for the SR520 Pontoon Construction Project in the City of Tacoma, Pierce County, Washington. The building is one of several structures that comprise the facilities of the Concrete Technology Corporation at the Port of Tacoma. It was constructed in 1951, based on historical information and its appearance in aerial photographs in the collections of the Tacoma Public Library. The building appears to be essentially unaltered.

The Concrete Technology Corporation is recognized as being historically significant for having pioneered the development of the pre-stressed concrete industry in the United States. After serving in World War II, where he directed testing of a prototype of the United State's first pre-stressed concrete bridge (the Walnut Lane Bridge in Philadelphia), Arthur R. Anderson and his brother Thomas Anderson moved back to Tacoma and founded Concrete Technology Corporation and ABAM Engineers. The brothers, both engineers with degrees from the Massachusetts Institute of Technology, established the company's initial production facility in 1951 at the Port of Tacoma. The initial production facility appears to have consisted of what are now the laboratory building and an adjacent one-story building immediately to the north. Pre-stressed concrete was a new technology in the United States, and the Andersons' Tacoma facility was the first pre-stressing factory plant in the country. According to the company's website, the modest four-employee company was the culmination of a yearlong investigation by the Andersons throughout Europe to see the few pre-stressed concrete structures in existence at that time.

The Andersons developed and promoted the technology of pre-stressed elements for construction throughout the 1950s and 1960s. The company invented and marketed the Anderson Post-tensioning System, developed a family of bridge I-girders that was adopted by the Washington State Department of Transportation as a construction standard, and devised new methods for producing long hollow concrete members and segmental bridge construction, among other innovations. The Concrete Technology Corporation's success led to growth in sales and demand, and the company's involvement in many significant, large capital improvement projects in the Pacific Northwest and across the country.

This success resulted in the expansion of the company's facilities at the Port of Tacoma. The original production facility, which is now the research and development laboratory, was constructed in 1951. The company's expansion in the 1950s included the construction of two office and administration buildings circa 1956 and completion of the main Structural Plant between 1956 and 1960. The Concrete Technology Corporation added a second major production building to its Port of Tacoma facility in 1967 to accommodate the rising demand for precast building elements. Production expansion in the 1970s included facilities for semi-automated casting of hollow-core slabs, and the construction of the existing 150' x 500' graving dock for the construction of floating concrete structures.

Thousands of bridges, buildings, piers, tanks, floats and other structures throughout the Pacific Northwest and Alaska have been constructed with Concrete Technology Corporation products, in addition to other projects throughout the United States. The company manufactured structural members for the original Seattle monorail, the Disney World monorail, the Interstate-90 lid, Freeway Park in Seattle, and most freeway overpasses in the region. The facility was also involved in casting beams for Safeco Field and Husky Stadium. It now focuses on beams and pilings.

The property has been evaluated according to the eligibility criteria for listing in the National Register of Historic Places (NRHP). The property appears eligible for listing in the NRHP under Criteria A and C at the local level of significance, and possibly at the state or national levels as well. Under NRHP Criterion A, the laboratory building is considered historically significant for its association with the Concrete Technology Corporation and its pioneering role in the development of the pre-stressed concrete industry in the United States. Under NRHP Criterion C, the building embodies the characteristics and method of construction of a pre-stressed concrete industrial plant from the early 1950s and is recognized as being the first of its kind in the United States. The laboratory building strongly exhibits its style and associations, and remains essentially unaltered with good integrity.

Based on our review, the property has good integrity and appears eligible for individual listing in the National Register of Historic Places, or as a contributor to an eligible historic district associated with the Concrete Technology Corporation.

Description of Physical Appearance:

The property contains a two-story industrial building, constructed in 1951 for the Concrete Technology Corporation at the Port of Tacoma. It functions as the part of the company's research and design laboratory, and is one of four extant structures that make up the company's industrial facility from the 1950s. The other structures are located to the west and northeast of the building, with a smaller one-story structure situated immediately to the north. The laboratory building and two other structures are located within a rectangular area of land, defined by a mature hedgerow. The entire area between the buildings has been paved with concrete.

The laboratory building is oriented to the east-west situated parallel to the north side of Port of Tacoma Road. It has a rectangular-shaped plan and consists of wood-frame construction on a poured concrete foundation. The building was originally designed in a modernist style exhibiting International style influences in an industrial form. The roof is a low-pitched (nearly flat) side-gable roof clad with composition asphalt shingles and featuring exposed structural beams in the gable ends. The exterior walls are finished with smooth stucco. The building's north and south elevations are similarly designed. Each elevation is seven bays wide with large banks of ribbon windows on the second story of each bay. The banks of windows each consist of two stacked rows of clerestory windows with eight openings in each row. The openings contain single-pane fixed sash windows set in from the exterior wall with no visible window frame. A narrow band course separates the first story from the second, and a narrow, two-story, reverse-angled, engaged buttress ending at the roof's overhanging eaves defines each bay. The north elevation is further articulated by large vehicular freight door openings in two of the center bays and a second-story pedestrian entrance, accessed by a flight of steps, at the building's northwest corner. Additional door openings are located on the building's east and west elevations. The secondary elevations are further characterized by a small shed-roofed one-story addition at the east elevation, and four twelve-light fixed industrial sash windows at the west elevation—three on the second story and one on the first.

Major Bibliographic References:

Concrete Technology Corporation Website. Http://www.concretetech.com/history.htm.

Docomomo-WEWA. "Price, Robert B." http://www.docomomo-wewa.org/architects_detail.php?id=73. 2009.

Beers, Carole. "Arthur R. Anderson, 85, Pioneer In Concrete Construction Methods." The Seattle Times, 5 July 1995.

Pierce County Tax Assessor Online Records

Tacoma Public Library Image Archives—Port of Tacoma Aerial Photographs

Sanborn Fire Insurance Maps

Washington State Digital Archives

Wilhelm, Steve. "Pioneer firm, Concrete Technology, stretches technology of strong girders." Puget Sound Business Journal, 6 June 2008.

Photos

West and South Elevations, Looking East

Identification

Survey Name: SR 520 Pontoon Construction Project

Date Recorded: 03/09/2009

Field Recorder: Hetzel, Christopher

Owner's Name: Concrete Technology Corporation

Owner Address: P.O. Box 2259

City: Tacoma

State: WA

Zip: 98401-2259

Classification: Building

Resource Status: Survey/Inventory

Comments: Eligible

Within a District?

Contributing?

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Not Determined - SHPO

Determination Date: 1/1/0001

Determination Comments:

Description

Historic Use: Industry/Processing/Extraction - Manufacturing Facility

Current Use: Industry/Processing/Extraction - Manufacturing Facility

Plan: Irregular

Stories: 1

Structural System: Platform Frame

Changes to Plan: Slight

Changes to Interior: Unknown

Changes to Original Cladding: Intact

Changes to Windows: Intact

Changes to Other:

Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Modern	Veneer - Stucco	Gable	Asphalt / Composition

Foundation:	Form/Type:
Concrete - Poured	Industrial

Narrative

Study Unit	Other
Manufacturing/Industry	
Architecture/Landscape Architecture	

Date of Construction: 1951 Built Date

Builder:

Engineer: Anderson, Arthur and Thomas

Architect:

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes - Local

Property potentially contributes to a historic district (National and/or local): Yes

Statement of Significance:

The one-story research building at 1123 Port of Tacoma Road was evaluated at a reconnaissance level in a cultural resources survey completed for the SR520 Pontoon Construction Project in the City of Tacoma, Pierce County, Washington. The building is one of several structures that comprise the facilities of the Concrete Technology Corporation at the Port of Tacoma. It was constructed in 1951, based on historical information and its appearance in aerial photographs in the collections of the Tacoma Public Library. The building appears to be essentially unaltered.

The Concrete Technology Corporation is recognized as being historically significant for having pioneered the development of the pre-stressed concrete industry in the United States. After serving in World War II, where he directed testing of a prototype of the United State's first pre-stressed concrete bridge (the Walnut Lane Bridge in Philadelphia), Arthur R. Anderson and his brother Thomas Anderson moved back to Tacoma and founded Concrete Technology Corporation and ABAM Engineers. The brothers, both engineers with degrees from the Massachusetts Institute of Technology, established the company's initial production facility in 1951 at the Port of Tacoma. The initial production facility appears to have consisted of what are now the research building and an adjacent two-story building immediately to the south. Pre-stressed concrete was a new technology in the United States, and the Andersons' Tacoma facility was the first pre-stressing factory plant in the country. According to the company's website, the modest four-employee company was the culmination of a yearlong investigation by the Andersons throughout Europe to see the few pre-stressed concrete structures in existence at that time.

The Andersons developed and promoted the technology of pre-stressed elements for construction throughout the 1950s and 1960s. The company invented and marketed the Anderson Post-tensioning System, developed a family of bridge I-girders that was adopted by the Washington State Department of Transportation as a construction standard, and devised new methods for producing long hollow concrete members and segmental bridge construction, among other innovations. The Concrete Technology Corporation's success led to growth in sales and demand, and the company's involvement in many significant, large capital improvement projects in the Pacific Northwest and across the country.

This success resulted in the expansion of the company's facilities at the Port of Tacoma. The original production facility, which is now the research and development laboratory, was constructed in 1951. The company's expansion in the 1950s included the construction of two office and administration buildings circa 1956 and completion of the main Structural Plant between 1956 and 1960. The Concrete Technology Corporation added a second major production building to its Port of Tacoma facility in 1967 to accommodate the rising demand for precast building elements. Production expansion in the 1970s included facilities for semi-automated casting of hollow-core slabs, and the construction of the existing 150' x 500' graving dock for the construction of floating concrete structures.

Thousands of bridges, buildings, piers, tanks, floats and other structures throughout the Pacific Northwest and Alaska have been constructed with Concrete Technology Corporation products, in addition to other projects throughout the United States. The company manufactured structural members for the original Seattle monorail, the Disney World monorail, the Interstate-90 lid, Freeway Park in Seattle, and most freeway overpasses in the region. The facility was also involved in casting beams for Safeco Field and Husky Stadium. It now focuses on beams and pilings.

The property has been evaluated according to the eligibility criteria for listing in the National Register of Historic Places (NRHP). The property appears eligible for listing in the NRHP under Criteria A and C at the local level of significance, and possibly at the state or national levels as well. Under NRHP Criterion A, the research building is considered historically significant for its association with the Concrete Technology Corporation and its pioneering role in the development of the pre-stressed concrete industry in the United States. Under NRHP Criterion C, the building embodies the characteristics and method of construction of a pre-stressed concrete industrial plant from the early 1950s and is recognized as being the first of its kind in the United States. The research building strongly exhibits its style and associations, and remains essentially unaltered with good integrity.

Based on our review, the property has good integrity and appears eligible for listing in the National Register of Historic Places as a contributor to an eligible historic district associated with the Concrete Technology Corporation.

Description of Physical Appearance:

The property contains a one-story industrial building, constructed in 1951 for the Concrete Technology Corporation at the Port of Tacoma. It functions as the part of the company's research and design laboratory, and is one of four extant structures that make up the company's industrial facility from the 1950s. The other structures are located to the west and northeast of the building, with a two-story industrial building situated immediately to the south. The research building and two other structures are located within a rectangular area of land, defined by a mature hedgerow. The entire area between the buildings has been paved with concrete.

The research building is oriented to the east-west situated parallel to the north side of Port of Tacoma Road. It has two sections, consisting of what could be defined as two attached buildings. Situated to the south, one has a rectangular-shaped plan and consists of wood-frame construction on a poured concrete foundation. It exhibits a modernist style similar to that of the adjacent two-story industrial building, with International style influences. The roof is a low-pitched (nearly flat) side-gable roof clad with composition roofing and featuring open eaves with wide fascia. The exterior walls are finished with smooth stucco. The building's south elevation is four bays wide. Horizontal, eight-light industrial sash windows with a wood sill punctuate all but one of the bays. The elevation's westernmost bay contains a larger multiple-light fixed window. Reverse-angled, engaged buttresses ending at the roof's overhanging eaves defines each bay. The structure's east and west elevations are each punctuated by three-regularly space multiple -light windows with wood sills.

Attached to the building's north elevation is the large secondary structure. The structure has a wide rectangular plan. It has a flat roof punctuated by several mechanical units and metal ductwork. The north and south elevations are each six bays wide. Vertical pilasters define each bay. Except for a single door opening on the north elevation, the north and south elevations are otherwise unadorned. The building's east and west elevations each contain a row of clerestory windows. There are six windows on the west elevation and four on the east. The east elevation also contains freight door openings at the section's southeast corner.

Major Bibliographic References:

Concrete Technology Corporation Website. http://www.concretetech.com/history.htm.

Docomomo-WEWA. "Price, Robert B." http://www.docomomo-wewa.org/architects_detail.php?id=73. 2009.

Beers, Carole. "Arthur R. Anderson, 85, Pioneer In Concrete Construction Methods." The Seattle Times, 5 July 1995.

Pierce County Tax Assessor Online Records

Tacoma Public Library Image Archives—Port of Tacoma Aerial Photographs

Sanborn Fire Insurance Maps

Washington State Digital Archives

Wilhelm, Steve. "Pioneer firm, Concrete Technology, stretches technology of strong girders." Puget Sound Business Journal, 6 June 2008.

Photos

West and South Elevations, Looking East

Identification

Survey Name: SR 520 Pontoon Construction Project

Date Recorded: 03/09/2009

Field Recorder: Hetzel, Christopher

Owner's Name: Concrete Technology Corporation

Owner Address: P.O. Box 2259

City: Tacoma

State: WA

Zip: 98401-2259

Classification: Building

Resource Status: Survey/Inventory

Comments: Eligible

Within a District?

Contributing?

National Register:

Local District:

National Register District/Thematic Nomination Name:

Eligibility Status: Not Determined - SHPO

Determination Date: 1/1/0001

Determination Comments:

Description

Historic Use: Industry/Processing/Extraction - Manufacturing Facility

Current Use: Industry/Processing/Extraction - Manufacturing Facility

Plan: Irregular

Stories: 3

Structural System: Concrete - Poured

Changes to Plan: Slight

Changes to Interior: Unknown

Changes to Original Cladding: Intact

Changes to Windows: Moderate

Changes to Other:

Other (specify):

Style:	Cladding:	Roof Type:	Roof Material:
Modern - International Style	Concrete - Poured	Other	Other

Foundation:	Form/Type:
Concrete - Poured	Industrial

Narrative

Study Unit	Other
Manufacturing/Industry	
Architecture/Landscape Architecture	

Date of Construction: 1956 Built Date

Builder:

Engineer: Anderson, Arthur and Thomas

Architect: Price, Robert B.

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): Yes - Local

Property potentially contributes to a historic district (National and/or local): Yes

Statement of Significance: The Structural Plant at 1123 Port of Tacoma Road was evaluated at a reconnaissance level in a cultural resources survey completed for the SR520 Pontoon Construction Project in the City of Tacoma, Pierce County, Washington. The plant is one of several structures that comprise the facilities of the Concrete Technology Corporation at the Port of Tacoma. It was constructed in 1956-1960, based on historical information and its appearance in aerial photographs in the collections of the Tacoma Public Library. Some of the plant's fenestration has been modified and several small additions added, but overall it appears to have good integrity.

The Concrete Technology Corporation is recognized as being historically significant for having pioneered the development of the pre-stressed concrete industry in the United States. After serving in World War II, where he directed testing of a prototype of the United State's first pre-stressed concrete bridge (the Walnut Lane Bridge in Philadelphia), Arthur R. Anderson and his brother Thomas Anderson moved back to Tacoma and founded Concrete Technology Corporation and ABAM Engineers. The brothers, both engineers with degrees from the Massachusetts Institute of Technology, established the company's initial production facility in 1951 at the Port of Tacoma. The initial production facility appears to have consisted of what are now two buildings associated with the company's research and development laboratory located to the southwest of the Structural Plant. Pre-stressed concrete was a new technology in the United States, and the Andersons' Tacoma facility was the first pre-stressing factory plant in the country. According to the company's website, the modest four-employee company was the culmination of a yearlong investigation by the Andersons throughout Europe to see the few pre-stressed concrete structures in existence at that time.

The Andersons developed and promoted the technology of pre-stressed elements for construction throughout the 1950s and 1960s. The company invented and marketed the Anderson Post-tensioning System, developed a family of bridge I-girders that was adopted by the Washington State Department of Transportation as a construction standard, and devised new methods for producing long hollow concrete members and segmental bridge construction, among other innovations. The Concrete Technology Corporation's success led to growth in sales and demand, and the company's involvement in many significant, large capital improvement projects in the Pacific Northwest and across the country.

This success resulted in the expansion of the company's facilities at the Port of Tacoma. The original production facility, which is now the research and development laboratory, was constructed in 1951. The company's expansion in the 1950s included the construction of two office and administration buildings circa 1956 and completion of the Structural Plant between 1956 and 1960. Tacoma architect Robert B. Price is credited with the design of the administration buildings and the Structural Plant, along with Thomas and Arthur Anderson who provided the engineering. Robert B. Price is recognized as one of the most prolific architects in the Tacoma area from the 1950s to the 1970s. His work spanned a variety of building types, from single-family homes to banks and public buildings, but he is probably best known for his specialization in his design of schools throughout the Puget Sound region. During his career, Price received 59 national, regional and local awards for design excellence. Among his award winning projects was the Tacoma Fire Station No. 17 (1955); the Joe Long Jr. House on American Lake (1956); Hoyt Elementary School in Tacoma (1958); and his own architectural Tacoma office (1963). Many of Price's other projects were featured in a variety of magazines including Sunset, House and Garden and Architectural Record.

Thousands of bridges, buildings, piers, tanks, floats and other structures throughout the Pacific Northwest and Alaska have been constructed with Concrete Technology Corporation products, in addition to other projects throughout the United States. The company manufactured structural members for the original Seattle monorail, the Disney World monorail, the Interstate-90 lid, Freeway Park in Seattle, and most freeway overpasses in the region. The facility was also involved in casting beams for Safeco Field and Husky Stadium. It now focuses on beams and pilings.

The property has been evaluated according to the eligibility criteria for listing in the National Register of Historic Places (NRHP). The property appears eligible for listing in the NRHP under Criteria A and C at the local level of significance, and possibly at the state or national levels as well. Under NRHP Criterion A, the Structural Plant is considered historically significant for its association with the Concrete Technology Corporation and its pioneering role in the development of the pre-stressed concrete industry in the United States. Under NRHP Criterion C, the building embodies the characteristics and method of construction of a pre-stressed concrete industrial plant from the late 1950s and is an industrial design associated with Robert B. Price, who is considered a well-known master architect in the Tacoma area, and engineers Arthur and Thomas Anderson. The Structural Plant strongly exhibits its style and associations, and remains largely unaltered with good integrity.

Based on our review, the property has good integrity and appears eligible for individual listing in the National Register of Historic Places, or as a contributor to an eligible historic district associated with the Concrete Technology Corporation.

Description of Physical Appearance:

The property contains a two to three-story industrial plant, constructed in 1956-1960 for the Concrete Technology Corporation at the Port of Tacoma. It functions as the main structural plant for the construction of pre-stressed concrete products, and is one of four extant structures that make up the company's industrial facility from the 1950s. The other structures are located to the southwest of the plant. The entire area between the buildings has been paved with concrete.

The structural plant is oriented to the north-south situated perpendicular to the north side of Port of Tacoma Road and south of the Blair Waterway. Much of the plant is contained within a three-part central massing that has an irregular rectangular plan and poured concrete construction. The three sections stand parallel to each other on a north-south axis. The westernmost section is two-stories tall and contains enclosed office and warehouse space. It has a unique roof comprised of a series of cast concrete barrel vaults set side by side in a north-south configuration. The section's south elevation, and a portion of its west elevation, was originally designed with International style elements and feature courses of ribbon windows on the first and second stories. The structural plant's main entrance is located in the center of the first story of the south elevation.

The central massing's center section is three-stories tall and has a similarly designed barrel vaulted roof. The roof shelters a full-height production area that is completely open on the north and south elevations. The section's eastern elevation is characterized by a band of clerestory windows in the ends of the roof's barrel vaults. Extending north and south of the central section are large concrete structural beams and support columns that form craneways in and out of the plant. The craneways extend from the plant north into the Blair Waterway and south to Port of Tacoma Road.

The plant's easternmost section is two-stories tall and continues the roof configuration and overall design of the other two sections. It consists of an enclosed warehouse area. There is an exterior freight entrance in the center of the section's south elevation.

In addition to the three-part central massing and craneways, the structural plant contains an integrated concrete production facility at its northeast corner and several smaller one-story additions along the east and west elevations. The concrete production facility is characterized by pairs of engaged, free-standing concrete silos, metal storage tanks set on steel frame bases, conveyors, and a two-story metal support structure.

Major Bibliographic References:

Concrete Technology Corporation Website. http://www.concretetech.com/history.htm.

Docomomo-WEWA. "Price, Robert B." http://www.docomomo-wewa.org/architects_detail.php?id=73. 2009.

Beers, Carole. "Arthur R. Anderson, 85, Pioneer In Concrete Construction Methods." The Seattle Times, 5 July 1995.

Pierce County Tax Assessor Online Records

Tacoma Public Library Image Archives—Port of Tacoma Aerial Photographs

Sanborn Fire Insurance Maps

Washington State Digital Archives

Wilhelm, Steve. "Pioneer firm, Concrete Technology, stretches technology of strong girders." Puget Sound Business Journal, 6 June 2008.

Photos

Structural Plant, Looking East

South Elevation, Looking East

South Elevation, Looking Northeast

South Elevation, Looking Northeast

West and South Elevations, Looking Northeast

Historic Property Inventory Report for *Port of Olympia Rail Line* **at** *Olympia, WA 98501*

LOCATION SECTION

Field Site No.: **OAHP No.:**

Historic Name: *Port of Olympia Rail Line* **Common Name:** *Port of Olympia Rail Line*

Property Address: Olympia, WA 98501 **Comments:**

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
Thurston	T18R14W	14			TUMWATER

UTM Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** Unknown
Sequence: 1 **Easting:** 507498 **Northing:** 5210865

Tax No./Parcel No. **Plat/Block/Lot** **Supplemental Map(s)** **Acreage** linear

IDENTIFICATION SECTION

Survey Name: Port of Olympia Intermodal

Field Recorder: Pam Trautman **Date Recorded:** 2/8/2008

Owner's Name: Port of Olympia **Owner Address:** 915 Washington Street NE **City/State/Zip:** Olympia, WA 98501

Classification: Object **Resource Status** Survey/Inventory **Comments**

Within a District? No

Contributing?

National Register Nomination:

Local District:

National Register District/Thematic Nomination Name:

View of Port of Olympia Rails adjacent to the Port of Olympia Office, view facing NW, **taken** 2/8/2008

Photography Neg. No (Roll No./Frame No.):

Comments:

DESCRIPTION SECTION

Historic Use: Transportation - Rail-Related

Current Use: Transportation - Rail-Related

Plan: Other **No. of Stories:**

Structural System:

Changes to plan: Extensive **Changes to interior:** **Style** **Form/Type**

Changes to original cladding: **Changes to other:**

Changes to windows: **Other (specify):**

Cladding	Foundation	Roof Material	Roof Type

NARRATIVE SECTION

Date Of Construction: 1929

Architect:

Builder:

Engineer:

Study Unit	Other
Transportation	
Commerce	
CommunityPlanning/Development	

Property appears to meet criteria for the National Register of Historic Places: No

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local):

Statement of Significance

As the fledgling Washington territory expanded, competition between cities was intense to establish a rail terminal, but Tacoma won out over Olympia in 1873, even though Olympia had the best claim as state capital and the Northern Pacific had purchased land in Olympia via an agent. The agent died just before the terminal decision was to be made. It would have taken too long to straighten out the legalities of property ownership and the decision went to Tacoma (Miller 1921). Olympia was bypassed all together for the time being and passengers had to disembark from the train in Tenino and take a wagon to Olympia (Stevenson and Fowler). Fears of economic loss and suggestions that the capital should actually be moved to a more accessible location drove the citizens of Olympia to take matters into their own hands (Miller 1921).

In 1878 the citizens of Olympia constructed a narrow gauge spur line from the main line in Tenino. Nearly every citizen in the cash-strapped Olympia subscribed to the initial fund by contributing cash, land, materials and labor. Money was raised in part by exchanging land for stock. Once Congress passed a bill allowing the county to issue bonds, construction could begin (Miller 1921).

Dubbed the “Tenino Cannonball” because of the way the train pitched and rolled down the roller coaster road bed on homemade cars (Dwelley 1987, Newell 1985), this narrow gauge line was purchased by the Port Townsend Southern Railway (PT&S) in 1890. The line came into town from the south onto a trestle on the west side of the Deschutes waterway and under the 4th Avenue Bridge to terminate at a depot on West Bay Drive. Olympia was able to fend off attempts by other cities to wrest away the capital and thus become successful as a major lumber export and milling center for years to follow (Dwelley 1987). The PT&S became a subsidiary of the Northern Pacific Railroad in 1902 (Hannum 2006), but the railroad is now abandoned (Robins & Martin 2007).

By 1891 the Northern Pacific had constructed its own branch line on another route from Tacoma to Grays Harbor, with a spur to Olympia (Newell 1950). However, this proved inadequate because the Northern Pacific Railroad did not actively support the development of the Olympia waterfront (Hannum 2006).

In 1909-1911, much of the today’s downtown area north of Olympia Avenue and the Deschutes Parkway were filled from intensive dredging of the bay (Stevenson 1982). This dynamic dredging operation—called the Carlyon Fill after its originator, P.H. Carlyon—extended the original Olympia area nearly a mile to the north from Olympia Avenue, creating 29 new city blocks from over 2 million cubic yards of fill (Stevenson and Fowler 1997).

In response to newly created development on the waterfront, the Olympia Terminal Railway Company was created and incorporated by Carlyon with plans to connect rail service with the Northern Pacific’s Point Defiance line. Once the line was completed between the waterfront and East Olympia, ownership was deeded on the very last day of 1915 to a subsidiary of the Union Pacific Railroad—the Oregon Washington Railroad and Navigation Company. This transaction was the death knell to the PT&S which soon abandoned all of its line south of Capitol Lake (Hannum 2006).

In 1916, the Northern Pacific completed its Point Defiance line. After that the Northern Pacific and the Union Pacific’s Oregon Washington Railway and Navigation company both maintained mainline service to the East Olympia depot (Dwelley 1987).

A vote of the citizens of Thurston County later established the Port of Olympia on November 7, 1922, capitalizing on Legislation in 1911 to allow the formation of port districts. The

first vessel shipped out in 1925.

Once the Port of Olympia was established, industrial development continued including the placement of railroad tracks extending from downtown Olympia the length of the fill. Railroad beltlines were included in the list of improvements for the Port fill. More tracks were installed later, and the alignment has been altered many times over the years. Tracks were extended further north in 1943 and a locomotive boom crane was acquired. Once this was accomplished, the Port installed additional tracks, terminal and connections to the Union Pacific Railroad in 1945 to facilitate increased shipments for the war effort (Stevenson and Fowler 1997). The alignement has been altered numerous times over the years to meet the needs of the Port of Olympia. Tthe railroad segments within the APE are not eligible for listing in the NRHP.

Description of Physical Appearance

The tracks are currently wooden creosote-treated railroad ties and the rails are now considered substandard in this area compared to the rest of the track on the Port Marine Terminal. They have been consistently repaired and upgraded over the years, and the alignment altered to meet the needs of the Port of Olympia. The rails are in good condition.

Major Bibliographic References

Dwelley, Arthur G.
1987, “The Cannonball: Rails to the Capital via Tenino” in Columbia Magazine, fall 1987.

Hannum, James S. Hannum
2006, South Puget Sound Railroad Mania. Illustrated by Carol B. Hannum. Hannum House Publications, Olympia.

Miller, William Winlock
1921, “The Olympia Narrow Gauge Railroad” in Washington Historical Quarterly 16 (1921): 243-250.

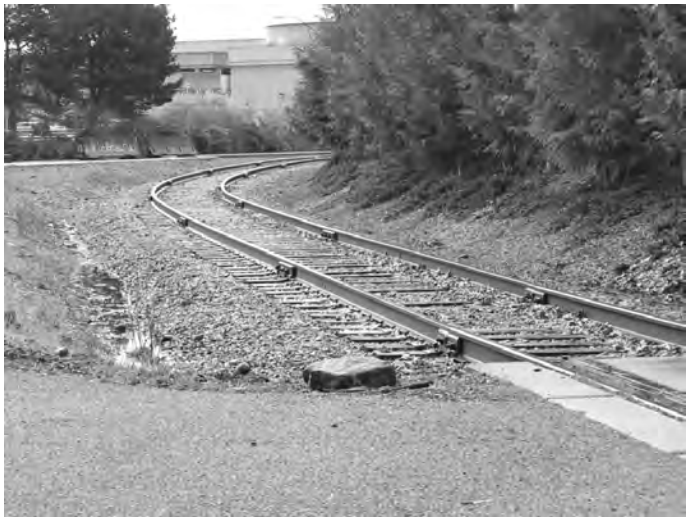
Newell, Gordon
1950, So Fair A Dwelling Place: A History of Olympia and Thurston County, Washington. The Olympia News Publishing Company, Olympia.

Robbins, Jeff, and Dan Martin
2007, Archaeological site form for the Roadbed of the Olympia and Chehalis Valley Railroad on file at the DAHP, Olympia.

Stevenson, S.
1982, Olympiana: Historical Vignettes of Olympia. Published by the Washington State Capitol Museum, Olympia.

Stevenson, S., and C. R. Fowler
1997, The Port of Olympia: A 75 Year History. Researched and written by Shanna Stevenson and Chuck Fowler. Published by the Port of Olympia.

Additional Photos for: *Port of Olympia Rail Line* **at** *Olympia, WA 98501*



View of Port of Olympia Rails as they exit the Port complex, view facing SE. **taken** 2/8/2008

Photography Neg. No (Roll No./Frame No.):

Comments:

View of Port of Olympia Rails as they enter the Port complex, view facing NW. **taken** 2/8/2008

Photography Neg. No (Roll No./Frame No.):

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

View of **taken**

Photography Neg. No (Roll No./Frame No.):

Comments:

Historic Property Inventory Report for *Port of Olympia Office* **at** *915 NE Washington St, Olympia, WA 98501*

LOCATION SECTION

Field Site No.: **OAHP No.:**

Historic Name: *Port of Olympia Office* **Common Name:** *(#34-640)*

Property Address: 915 NE Washington St, Olympia, WA 98501 **Comments:**

County	Township/Range/EW	Section	1/4 Sec	1/4 1/4 Sec	Quadrangle
Thurston	T18R02W	14	NW		TUMWATER

UTM Reference
Zone: 10 **Spatial Type:** Point **Acquisition Code:** Unknown
Sequence: 1 **Easting:** 507500 **Northing:** 5209740

Tax No./Parcel No. 91001400000
Plat/Block/Lot FCT Ptn NICA Lot 1
Supplemental Map(s)
Acreage

IDENTIFICATION SECTION

Survey Name: Port of Olympia Intermodal

Field Recorder: Pam Trautman **Date Recorded:** 12/6/2007

Owner's Name: Port of Olympia
Owner Address: 915 Washington Street NE
City/State/Zip: Olympia, WA 98501

Classification: Building
Resource Status Survey/Inventory
Comments

Within a District? No

Contributing?

National Register Nomination:

Local District:

National Register District/Thematic Nomination Name:

View of Port of Olympia General Office Building, front façade. **taken** 12/6/2007

Photography Neg. No (Roll No./Frame No.):

Comments:

DESCRIPTION SECTION

Historic Use: Commerce/Trade - Business

Current Use: Commerce/Trade - Professional

Plan: Square **No. of Stories:** 2

Structural System: Concrete - Block

Changes to plan: Moderate **Changes to interior:** Extensive
Changes to original cladding: Intact **Changes to other:**
Changes to windows: Slight **Other (specify):**

Style Art Deco - Zig Zag
Form/Type

Cladding	Foundation	Roof Material	Roof Type
Concrete - Block	Concrete - Block	Asphalt / Compostion - Rolled	Hip

NARRATIVE SECTION

Date Of Construction:

Architect: Wohleb, Joseph

Builder:

Engineer:

Study Unit	Other
Architecture/Landscape Architecture	
Commerce	
Transportation	

Property appears to meet criteria for the National Register of Historic Places: Yes

Property is located in a potential historic district (National and/or local): No

Property potentially contributes to a historic district (National and/or local):

Statement of Significance

Exports were shipped from Olympia as early as 1848. The principal exports were salmon, logs, and firewood. As shipping increased over the years, the need for a deep water port became acute. Dredging of the shallow harbor took place during 1909-1911 to accommodate that need. The dredging spoils were used to create much of the today's downtown area north of Olympia Avenue and the Deschutes Parkway (Stevenson 1982). This dynamic dredging operation—called the Carlyon Fill after its originator, P.H. Carlyon—extended the original Olympia commercial area nearly a mile to the north from Olympia Avenue (Stevenson 1982), creating 29 new city blocks from over 2 million cubic yards of fill.

A vote by the citizens of Thurston County later established the Port of Olympia on November 7, 1922, capitalizing on legislation in 1911 to allow the formation of port districts. The first vessel shipped out from the new Port of Olympia in 1925. Shipping from 1928 to 1930 totaled 298 million board feet of lumber. During WWII, The Port warehoused and shipped an assortment of materials for the war effort. The 1950s signified another lumber export boom period. Demand from Japan for raw logs influenced exports during the 1960s. Port expansion includes a marina, the airdustrial center and the airport (Stevenson 1982 and 1985).

The Port of Olympia Office Building was one of the many at the Port designed by Olympia Architect Joseph Wohleb between 1927 and 1949. He designed at least 12 structures for the Port including transit sheds, one of the docks and a cold storage building, since demolished. The Port of Olympia Office Building is the only remaining example of Joseph Wohleb's work at the Port (Maddox 1985). However, another building, the KGY Radio station located at 1240 North Washington Street was later designed by Robert Wohleb and Associates and constructed by Philips Construction in 1960 (Stevenson 1982 and 2003).

The Port of Olympia Office Building was constructed in 1947 and utilized by the Washington Veneer Company, which was then owned by the Weyerhaeuser Company. One year after completion of the building, Weyerhaeuser sold its interest in Washington Veneer to the Georgia-Pacific Corporation. Georgia-Pacific soon constructed new headquarters on Capitol Way and moved there in 1952 (Christie 2006). The building was then used for other purposes, such as a doctor's office for mill employees, until the Port remodeled it as their headquarters in 1966 (Eric Egge, Port of Olympia, personal communication 2007).

The Port Office Building was inventoried in 1985 and at that time determined not eligible for inclusion in the NRHP (Stevenson 1985) likely because it had not reached the 50 year threshold. It is not listed on the Olympia Heritage Register Properties Listing Through 2007 (City of Olympia 2007). However, this building mostly retains its original exterior finishes and is in good physical condition. It has been somewhat altered from its original design by replacing the wood windows with the vinyl units. Although designed by famed architect, Joseph Wohleb, finer examples of his work are present in southern Puget Sound. Nevertheless, the building's historic significance lies in being the only remaining example of Wholeb's 12 original designs for the Port of Olympia property. As the sole Wohleb structure and as the original administrative building associated with the historic port district, the Port Office building meets the criteria for the listing NRHP under Criteria A and B.

Description of Physical Appearance

This rectangular two-story structure was constructed in the Art Moderne style of painted concrete blocks and remains much the same as it was when originally inventoried in 1985 by Stevenson: "Its shallow hip roof is covered with composition shingles and surrounded by a flat parapet painted a contrasting color. The walls are topped by a tiered concrete cornice below the parapet band, and between stories is a scalloped belt course. Across the fact of the parapet on the front (east) walls are Modern-style letters readying 'PORT OF OLYMPIA – GENERAL OFFICE.' Centered on the façade is a one-story, flat-roofed porch with glasses-in walls; the porch shelters the main entry door with its glass block sidelights. Fenestration is a single, paired and tripartite double-hung sash with narrow horizontal mullions and projecting concrete sills. A two-story extension to the south has similar fenestration and a side-entry door. The building is maintained in good condition."

The building today continues to be used by the Port of Olympia as an office building. The interior was remodeled in 1966 when the Port moved in (Eric Egge, Port of Olympia, personal communication). The exterior of the building is close to original, except the windows have been replaced with vinyl units. The building is maintained and in good condition.

Major Bibliographic References

Maddox, Dawn
n.d., The Architecture of Joseph Henry Wohleb (1887-1958), Puget Sound Eclectic, undated manuscript on file at the DAHP, Olympia.

1985, Joseph Wohleb: Resident Architect of the State Capital. Landmarks 3(4):2-13.

Stevenson, S.
1982, Superior Shipping Service: A History of the Port of Olympia. Published by the Port of Olympia.

1985, Historic Property Inventory Form for Port of Olympia Office Building, on file at the DAHP, Olympia.

2003, Historic Property Inventory Form for KGY Radio Station, on file at the DAHP, Olympia.

City of Olympia
2007, City of Olympia Heritage Register Properties Listing Through 2007. Available online at http://www.olympiawa.gov. Assessed February 2008.

Additional Photos for: *Port of Olympia Office* **at** *915 NE Washington St, Olympia, WA 98501*

View of Port of Olympia General Office Building, close up front entrance. **taken** 12/6/2007

Photography Neg. No (Roll No./Frame No.):

Comments:

View of Port of Olympia General Office Building, view facing northeast. **taken** 12/6/2007

Photography Neg. No (Roll No./Frame No.):

Comments:

View of Port of Olympia General Office Building, view facing northwest. **taken** 12/6/2007

Photography Neg. No (Roll No./Frame No.):

Comments:

View of Port of Olympia General Office Building, view facing southwest. **taken** 12/6/2007

Photography Neg. No (Roll No./Frame No.):

Comments:

FHR-8-300 (11-78)

United States Department of the Interior
Heritage Conservation and Recreation Service

National Register of Historic Places Inventory—Nomination Form

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Historic Bridges and Tunnels in Washington State

and/or common

2. Location

street & number see individual inventory forms ___ not for publication

city, town ___ vicinity of congressional district

state code county code

3. Classification

Category	Ownership	Status	Present Use	
___ district	___ public	___ occupied	___ agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
X structure	X both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	___ yes: restricted	___ government	___ scientific
X thematic group	___ being considered	___ yes: unrestricted	___ industrial	X transportation
		___ no	___ military	___ other:

4. Owner of Property

name Multiple Ownership

street & number

city, town ___ vicinity of state

5. Location of Legal Description

courthouse, registry of deeds, etc. State Department of Transportion; county courthouses; city halls

street & number

city, town state

6. Representation in Existing Surveys

title Historic Bridge Survey has this property been determined eligible? ___ yes ___ no

date January 1979 - April 1980 ___ federal X state ___ county ___ local

depository for survey records State Office of Archaeology and Historic Preservation

city, town 111 West 21st Avenue, Olympia state Washington 98504

Bridges Already Listed in the National Register of Historic Places:

Baker River Bridge
Cascade Tunnels: Stevens Pass Historic District
Devil's Corner
Grays River Covered Bridge
Jack Knife Bridge
Lower Custer Way Crossing: Tumwater Historic District
Monroe Street Bridge
Rock Island Railroad Bridge
Waitsburg Bridge: Waitsburg Historic District

Bridges Determined Eligible for Listing in the National Register of Historic Places:

Lacey V. Murrow Bridge
Pasco-Kennewick Bridge
Prosser Steel Bridge
Washington Street Bridge
Orient Bridge
"F" Street Bridge
West Monitor Bridge

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	___ original site
___ good	___ ruins	___ altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The legacy of existing bridges throughout the State of Washington is one of diverse structural types - as diverse as the vast and varied terrain that they were built to traverse. The primary intent of this nomination is to outline the legacy set forward by these extant structures, and to place them within the context of bridge engineering history, or within the context of their role in the social, economic, and industrial development of the locality, state, region, or nation.

The nomination is the result of a systematic inventory of historic bridges throughout the State, conducted by the State Office of Archaeology and Historic Preservation (SOAHP) in cooperation with the Washington State Department of Transportation (WSDOT) and the Historic American Engineering Record (HAER) of the Department of the Interior. The inventory, which was authorized by the Surface Transportation Act of 1978 (Public Law 95-599), was funded by the WSDOT. As a result, emphasis was placed on the recording of highway bridges. However, railroad bridges and other privately-owned bridges also were inventoried.

Before the information retrieval process could begin, it was necessary to establish bottom-line criteria for the selection of historic bridges. In consultation with HAER, the SOAHP decided that all existing bridges built during or prior to 1940 would be considered for inclusion in the HAER inventory. Although this cut-off date includes bridges less than the National Register's age guideline of 50 years, it was believed that it was essential to give the WSDOT leeway to facilitate future long-range planning decisions. In addition, Washington State's context of history is much more recent than that of other areas in the United States, and it is important that the boundaries of the historic bridge inventory reflect that context. These same boundaries were used to select the bridges eligible for listing in the National Register. Because it was not possible to photograph every culvert in the State, and there are only a few rare examples of bridges less than 50 feet in length that possess engineering or historical significance, it was decided that in almost all instances only bridges greater than 50 feet in length would be included in the inventory.

In conducting the historic bridge inventory (which provided the information base for the nomination) the SOAHP attempted to evaluate all bridges built during or prior to 1940, and greater than 50 feet in length, and to place each of them in one of the following three categories:

Category I. The first category of bridges includes those bridges eligible for listing in the National Register of Historic Places. It must be emphasized that Category I bridges were not selected until the inventory was completed. The bridges were evaluated according to the general criteria stated in 36 C.F.R. Part 60.6. More specifically, those bridges included in the nomination are bridges that:

1. are significant in the history of bridge engineering, in the history of bridge design principles, and in the development of bridge construction techniques;

2. are significant in the social, economic, and industrial development of the locality, state, region, or nation;

3. are significant examples of bridges designed or built by renowned engineers;

4. are significant examples of structural designs associated with the efforts of historic individuals or groups;

5. are significant examples of an early bridge engineering effort commonly used throughout the State of Washington for a specific purpose or reason;

6. are significant early examples, or significant representative examples, of a specific bridge type;

7. are rare examples of a specific bridge type within the state;

8. possess architectural or artistic significance.

Category II includes those properties which are of historical and engineering interest, are worthy of recording through photographic and written documentation, but are not eligible for inclusion in the National Register of Historic Places. It includes the following bridge types which were constructed during or prior to 1940, and are greater than 50 feet in length: trussed bridges; arches; moveable bridges; suspension bridges; aqueducts; cantilever bridges; tunnels; steel and cast and wrought iron girders; steel viaducts. Concrete and timber slabs, beams, girders, viaducts, or trestles are included in Category II only when they are of unusual length or height; when they are socially and economically significant to the locality, state, or region; when they are particularly early examples of the bridge type; when they possess architectural or artistic significance; or when innovative design principles or building techniques have been used in bridge construction.

Category III consists of all other bridges that were constructed during or before 1940 and are greater than fifty feet in length, but are not of such quality as to be included in either Category I or II. Category III includes all concrete and timber slabs, beams, girders, viaducts, and trestles unless they are particularly early examples of the bridge type, or are of unusual length or height, or are socially and economically significant to the locality, state, region, or nation, or demonstrate the use of innovative design principles or construction techniques, or possess architectural or artistic significance.

An Historic American Engineering Record inventory card was prepared for all properties identified under Category I and II. A brief form outlining basic structural information was used to record Category III bridges. Although the individual Category III bridges are not significant enough to warrant substantial documentation, they have furnished valuable statistics on when and where builders, contractors, and fabricators worked which provided insights into bridge construction history throughout the State, and helped to formulate the context in which Category I and II bridges were built.

The examination of the WSDOT computer print-out list was the first step in the lengthy information gathering process. The list provided basic structural data on all state, county, and city-owned highway bridges that were built during or prior to 1940, and were greater than 20 feet in length. By Federal standards, any structure less than 20 feet long is not considered a bridge. Although it had been decided that the historic bridge inventory would include bridges greater than 50 feet in length, the computer print-out provided enough information to determine which bridges less than 50 feet in length had potential engineering significance, and should be included in the inventory.

The inventory and evaluation process was conducted on a county-by-county basis. After the raw structural data was attained, the state, county, and local highway commission files were tapped for information regarding the names of bridge builders, contractors, fabricators, and designers. The files provided recent photographs, occasionally old construction photographs, original contractual agreements, plans and drawings, and more extensive structural and design information on the bridges listed on the computer print-out sheet. This information formed the basis for determining whether the bridge would fall into Category II or III. When the inventory was completed, Category I bridges were selected from those bridges listed in Category II.

In addition to researching the state, county, and local highway commission files, bridge lists were acquired from the Burlington Northern Railroad, Inc., the Chicago, St. Paul, Milwaukee, and Pacific Railroad, and the Union Pacific Railroad. Information also was gathered on Forest Service bridges, as well as privately-owned bridges, including abandoned logging structures. However, the information gathering process for the privately-owned bridges was arbitrary, and by no means comprehensive. Because the majority of the railroad bridge records are lodged in the midwest, and there are no records remaining for many of the other privately-owned bridges, it was often necessary to rely heavily on contemporary articles about the bridges, rather than on original blueprints.

Contemporary newspaper articles, engineering journals, and bridge engineering books provided valuable source material. The national journals, Engineering News-Record and Railway Age Gazette, and the regional magazine, Western Construction News, were systematically examined for articles on the construction of bridges in Washington.

After the inventory cards were completed, and the highway commission files were integrated with the literature source material, statistical information was compiled to define the statewide context for the individual bridges. Approximately 1400 bridges were inventoried, 218 of which are railroad bridges. Ninety-five bridges have been included in the nomination, and about 500 have been listed on the HAER Inventory. Of the 1400 bridges, roughly seven percent were constructed before 1910, and approximately 20 percent were built before 1920. There are only five bridges on the inventory that were constructed before 1900.

When the 95 bridges included in the nomination are discussed individually, they will be compared to other bridges within the State of a similar type. However, the following tables provide a general overview and a statewide context, by relating the bridge types included in the nomination to all bridges surveyed:

United States Department of the Interior
Heritage Conservation and Recreation Service

National Register of Historic Places Inventory—Nomination Form

For HCRS use only
received
date entered

RAILROAD BRIDGES: BREAKDOWN OF TYPES

	100 CONCRETE		200 CONTINUOUS CONCRETE		300 STEEL		400 CONTINUOUS STEEL		500 PRESTRESSED CONCRETE		600 PRESTRESSED CONTINUOUS CONCRETE		700 TIMBER	
TYPE	@	&	@	&	@	&	@	&	@	&	@	&	@	&
020	13													
-01	1													
-02	2		1		9								6	1
-03			1		35		1							
-04			2											
-05														
-06														
-07					1									
-08														
-09					8	3							2	2
-10					80	4							5	3
-11	3	3			2	2								
-12	1													
-13														
-14														
-15					1	1								
-16					2	1								
-17					10	4								
-18	30	3												
-19														
-20					7	2								

@ Surveyed
& Listed in National Register

Total number of railroad bridges surveyed: 218
Total number of railroad bridges recommended for listing in the National Register: 29
(includes those already listed, and those determined eligible)

United States Department of the Interior
Heritage Conservation and Recreation Service

National Register of Historic Places Inventory—Nomination Form

For HCRS use only
received
date entered

HIGHWAY BRIDGES: BREAKDOWN OF TYPES

	100 CONCRETE		200 CONTINUOUS CONCRETE		300 STEEL		400 CONTINUOUS STEEL		500 PRESTRESSED CONCRETE		600 PRESTRESSED CONTINUOUS CONCRETE		700 TIMBER	
TYPE	@	&	@	&	@	&	@	&	@	&	@	&	@	&
020	21	1												
-01	33		24						1				2	
-02	48		8		52		5		3				186	
-03	7		9	1	28		6						2	
-04	83	1	87				1		2		1		1	
-05	8				4						1			
-06	5	1	3	1	2									
-07	1	1							2				18	
-08													1	1
-09	1		2		14	3	3							
-10	1	1	1	1	233	9	1	1					20	4
-11	111	8	14	1	3	3	2	2						
-12	8	5	2		1									
-13					1	1	1	1					10	1
-14														
-15					9	2								
-16					9	7								
-17					4	1	2							
-18	13												1	
-19	5												1	
-20	15		2		10				1				17	

@ Surveyed
& Listed in National Register

Total number of highway bridges surveyed: 1173
Total number of highway bridges recommended for listing in the National Register: 58
(includes those already listed, and those determined eligible)

KEY TO BRIDGE TYPES

FIRST DIGIT

1 Concrete

2 Concrete Continuous

3 Steel

4 Steel continuous

5 Prestress concrete

6 Prestress concrete continuous

7 Timber

8 Masonry

9 Aluminum, wrought iron or cast iron

0 Other

SECOND AND THIRD DIGITS

01 Slab

02 Stringer/Multi-beam or girder

03 Girder and Floorbeam system

04 Tee beam

05 Box beam or girders - multiple

06 Box beam or girders - single or spread

07 Frame

08 Orthotropic

09 Truss-deck

10 Truss-through

11 Arch-deck

12 Arch-through

13 Suspension

14 Stayed girder

15 Movable-lift

16 Movable-bascule

17 Movable-swing

18 Tunnel

19 Culvert

20 Other or Combination

8. Significance

Period	Areas of Significance—Check and justify below			
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture
___ 1600–1699	___ architecture	___ education	___ military	___ social/ humanitarian
___ 1700–1799	___ art	___ engineering	___ music	___ theater
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ transportation
___ 1900–	___ communications	___ industry	___ politics/government	___ other (specify)
		___ invention		

Specific dates **Builder/Architect**

Statement of Significance (in one paragraph)

PREFACE: EXPLANATION OF METHODOLOGY

The existing historic bridges and tunnels throughout Washington transmit a legacy that is multifaceted. The structural systems of the individual bridges poignantly reveal the evolution of bridge design and technology from both a national and regional perspective. In addition, each individual structure cannot be isolated from the transportation system of which it is an integral part. The significance of the bridges and tunnels has been interpreted within this dual context.

Early bridge construction within the state is tightly linked to the development of the railroads within the State. There are seventeen bridges and tunnels in the nomination that have been a significant part of the State's early railroad development, and were discussed within this context. Four structures were treated from the perspective of their association with the early highway bridge construction over the Columbia River. And five structures were discussed in terms of their role in logging and mining transportation systems. Most of the twenty-six bridges and tunnels that were evaluated primarily in terms of the transportation systems of which they were a significant part, also were discussed in terms of their structural significance.

The nomination does include a number of structures that are less than fifty years old. As was stated earlier, the nomination mirrors the criteria set by the initial inventory. There is only one structure that was constructed after 1940, the cut-off date set by the inventory. This is a 250 foot log cable-stayed girder bridge, and is one of the first of its type to be constructed within the United States. Its parts are composed of untreated logs which are extremely susceptible to the ravages of time. Consequently, it is essential that this unusual structure is acknowledged and documented without delay.

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Tyrrell, Henry Grattan, History of Bridge Engineering, Chicago: H.J. Tyrrell, 1911.
Waddell, J.A.L., Bridge Engineering, 2 Vols., New York: John Wiley and Sons, 1916.
Refer to individual inventory forms for additional references.

10. Geographical Data

Acreage of nominated property _____ refer to individual inventory forms.

Quadrangle name _____ Quadrangle scale _____

UMT References

	Zone	Easting	Northing		Zone	Easting	Northing
A				B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

List all states and counties for properties overlapping state or county boundaries

state	code	county	code
state	code	county	code

11. Form Prepared By

name/title Lisa Soderberg, Historian

organization Office of Archaeology and Hist. Pres. date August 1980

street & number 111 West 21st Avenue telephone (206) 754-2395

city or town Olympia state Washington 98504

12. State Historic Preservation Officer Certification

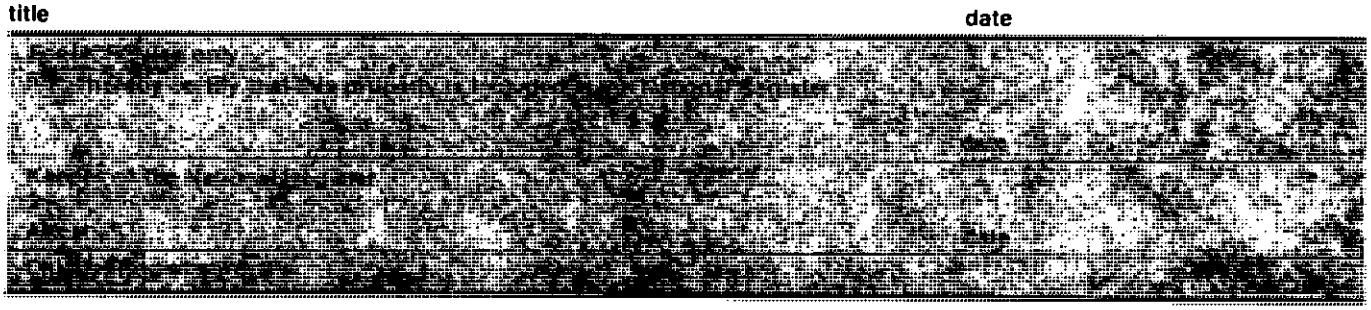
The evaluated significance of this property within the state is:

___ national ___ state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the Heritage Conservation and Recreation Service.

State Historic Preservation Officer signature

title date



HISTORIC BRIDGES AND TUNNELS IN WASHINGTON STATE

Lisa Soderberg
Washington State Office of
Archaeology and Historic
Preservation
Olympia, Washington
November, 1980

I. BRIDGES THAT REFLECT RAILROAD DEVELOPMENT IN WASHINGTON STATE

The construction of the earliest bridges and tunnels of major proportions within the State is associated with the construction of the transcontinental railroads. It was in 1864 that the Northern Pacific Railroad was chartered by Congress to build a mainline from Lake Superior to Puget Sound. However, it was not until 1883 that the Northern Pacific established a route between Duluth and Puget Sound by means of connecting its line to the existing Oregon Railroad and Navigation Company line along the south bank of the Columbia River. The two systems were linked by two car ferries: a car ferry across the Snake River which connected with a short railway spur that ran to Wallula, and a car ferry across the Columbia River between Portland and Kalama which connected with the Northern Pacific line that ran between Kalama and its terminus at Tacoma. This circuitous route to Puget Sound was feasible only because of daring financial manipulations made by the northwest railroad magnate, Henry Villard. Although the railroads retained their individual corporate identities, Henry Villard obtained control of both systems. However, in January of 1884 Villard's empire collapsed, and the two railroads reverted to separate control.[1]

Once again cut off from Puget Sound, the Northern Pacific immediately began work on a route across the mountains. The Pasco-Kennewick Bridge (1), the first bridge to be built across the Columbia River, was constructed as a temporary structure in 1888 as part of the Northern Pacific's effort to redirect its route across the mountains. By 1887, a treacherous, temporary switchback was in service over the mountains through Stampede Pass. The completion of the two mile tunnel (2) in May, 1888 initiated the first adequate and direct through railroad service to Puget Sound.

Five years after the completion of the Northern Pacific route, the Great Northern Railroad, under the direction of James J. Hill, was operating a transcontinental line from Minneapolis to Seattle. In 1893, a complex system of switchbacks across the Cascades at Stevens Pass was opened to service, and a large steel truss (3) was erected across the Columbia. The completion of the

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[1] D.W. Meinig, The Great Columbia Plain, (Seattle, 1968), p. 268.

Cascade Tunnel (4,5) in 1900, confirmed that the historic focus of the whole northern portion of the interior of the state, which had been oriented down the Columbia River to Portland had finally been diverted to Puget Sound.[2] And it was the Great Northern Railroad that provided Seattle with the vital rail connections that were instrumental in turning the new focus on Puget Sound, specifically towards Seattle.

The last transcontinental line to be built across Washington to Puget Sound was the Chicago, Milwaukee, and St. Paul Railroad's route to the coast through the interior of the state (13). The line was completed in 1909, more than 15 years after the beginning of transcontinental railroad construction through Washington.

The Milwaukee Railroad was the first railroad to electrify a substantial portion of its line. The Beverly Bridge carries vestiges of the superstructure used to support the copper cables. The advantages of railroad electrification were particularly apparent in the increased load capacity of the freight trains. Railroad electrification also alleviated the dangerous conditions within the long mountain pass tunnels. The Penstock Bridge (5) played an integral role in the water transportation system that powered the Great Northern trains through one of the early Cascade Tunnels.

Competition and power plays between the major railroad companies plagued and profoundly influenced railroad and bridge construction throughout the state. In 1900, James J. Hill surreptitiously purchased the rights of way for a new trunk line between Spokane and Portland on the north bank of the Columbia River in the hopes of obtaining a direct outlet to Portland for the rapidly growing traffic of Spokane and the southern portion of the interior. It was a venture to be shared by the Great Northern and the Northern Pacific. However, it directly competed with the Oregon Railroad and Navigation Company (OR&N) on the south bank of the river, which had been subsumed by the Union Pacific Railroad under the direction of Edward H. Harriman. Harriman valiantly attempted to thwart the construction of the Spokane, Portland, and Seattle Railway (SP&S) by using a variety ploys. While the court battles raged, "construction crews fought with fists, rocks, pickhandles, and dynamite." The last court encounter ended in victory for

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[2] Ibid., p. 270.

Hill in 1906.[3]

The line form Spokane to Portland was finally completed and in operation by 1909. "As a transportation route it represents the highest result of the railroad builder's art," reported an engineer before a meeting of the Pacific-Northwest Society of Civil Engineers in 1925.[4] Because the Great Northern and Northern Pacific desired a high capacity railroad with low operating costs, they did not make use of the existing Northern Pacific line between Spokane and Pasco. Instead, they constructed a new low grade roadbed with a minimum of curves. Their aim was "to make the roadbed of the most permanent character."[5] The bridges on the line certainly reflect this aim. Permanent steel viaducts or earth fills were built initially, rather than temporary timber structures. From Spokane, the line makes its only west-bound ascent of 375 feet. It follows Cow Creek through Adams County. "At the junction of Cow Creek and the Palouse River, the Portland and Seattle encounters the most expensive stretch of railroad construction, except that in Devil's Canyon, ever known in Washington. The valley is crooked and entered frequently by steep, narrow gulches; the road is built across a succession of 'hog backs' and gulches. Eighty-foot cuts are followed by 90-foot fills in alteration; short tunnels are frequent; high steel trestles are necessary in many places."[6] Of the steel trestles built in this area the Cow Creek Viaduct (9) is the longest and the highest. The line passes through the Washtucna Coulee and follows the east bank of the Snake River through Devil's Canyon. Here the treacherous terrain is traversed by four enormous steel viaducts, the highest of which is the Box Canyon Viaduct at 250 feet (8). The route makes use of the Northern Pacific tracks at only one point: the Columbia River crossing between Pasco-Kennewick (1). It follows the north bank of the Columbia across an early reinforced concrete arch (7) at Lyle, and eventually reaches Vancouver crossing the Columbia River to Portland by means of a large steel pinconnected swing bridge (10).

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[3]Charles and Dorothy Wood, Spokane, Portland, and Seattle Railway, (Seattle, 1974), p. 23.

[4]"Cascade Tunnel Route," extracts from a paper read befor the Pacific-Northwest Society of Civil Engineers, Seattle, Washington, October 1925.

[5]W.P. Hardesty, "The Construction of the Portland and Seattle Railway," Engineering News, Vol. 59, No.7, p. 161.

[6]Railroad Gazette, 27 September 1907.

Because of the success of the Spokane, Portland, and Seattle Railway, the Oregon-Washington Railroad and Navigation Company (O-WRN) moved quickly to upgrade its line between Portland and Spokane. The largest structure on the O-WRN's new low grade line was the 3,920 foot Joso Viaduct (12) over the Snake River at Lyons Ferry. The completion of the new Union Pacific line was yet another example of the continuing competition between the Hill and Harriman interests to dominate and control the major railroad routes of the Northwest.

In 1912, the Oregon Trunk Railway, a subsidiary of the Spokane, Portland, and Seattle Railway, was completed, representing one of the first steps in the entry of the Hill lines into Oregon, a territory which previously had been associated exclusively with the Harriman lines. In has virtual autonomy over the railroads in Oregon and California, Harriman had effectively controlled the major railroad links to tidewater. However, Hill's entrance into Oregon made his dream of stretching the Great Northern empire from Spokane to San Francisco plausible. Although the Great Northern did not reach the Pacific coast of California until 1931, long after Hill's death, the completion of the Oregon Trunk Railway represented a significant step towards the fulfillment of Hill's dream. The Celilo Bridge (13), the largest of ten steel bridges built on the Oregon Trunk Line, was a major link in connecting the SP&S to Union Pacific Territory.

The legacy of extant structures associated with railroad development within the state span a vast, varied, and often treacherous topography, and stand as a fitting testimony to the grand schemes and boundless ingenuity of the early railroad maganates in their efforts to dominate the major routes of the Northwest.

II. BRIDGES THAT REFLECT EARLY HIGHWAY DEVELOPMENT

In 1911, the Washington State Highway Commissioner proclaimed that: "A system of State roads is today the livest [sic] issue before the people of Washington or any other state. We are living in a transition period and changes come rapidly. Evolution in transportation methods affects road construction in no less a degree than a deepening of waterways, and the construction of easier grades and easier curves on the trunk railways."[1] With the proliferation of the automobile, the engineer was confronted with a new and complex range of urgent structural demands. As the Washington State Highway Commissioner observed, the foremost demand was the rapid construction of highways, of which the building of adequate highway bridges was an integral part. The heavy load capacities required by railroad traffic had previously shaped the development of bridge design. Automobile traffic, however, exerted different demands and design requirements on the bridge construction engineer which eventually shifted existing patterns and changed the direction of American bridge building. Although there are examples of concrete structures, the railroad bridge has been almost exclusively built in steel, and is characterized by the heavy riveted steel truss. The lower highway loadings enabled the engineer to use a range of bridge types and materials which resulted in a vast number of concrete structures on the highways. However, the dominance of the steel truss did not diminish on the roadways. And steel remained the most suitable material for extremely long spans over navigable wayterways.[2] It is interesting to note that the design of the earliest highway structures of major proportions in Washington were based on a technology that originated in railroad bridge construction of the 19th century.

The first highway bridge to be constructed across the Columbia River was a pinconnected steel cantilever truss at Wenatchee (14). It was built in 1908 to transport automobiles and water to east Wenatchee in order to develop the land for the expanding apple industry. Like most of these large,

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[1] W.J. Roberts, "System of Roads: Routes, Mileage and Costs," Pacific Builder and Engineer, 18 November 1911, p. 337.

[2] Carl Condit, American Building Art, 2 Vols., (New York, 1961), 2: 5-6.

early highway structures, the Wenatchee Bridge was privately financed, though subsequently purchased by the State Highway Department in 1909.

In 1916, construction began on a bridge between Vancouver and Portland (15). This enormous structure which consists of a series of simple trusses was financed by Clark and Multnomah Counties. In 1929, Washington and Oregon purchased the bridge from the counties.

A highway bridge was built across the Columbia between Pasco and Kennewick (16) in 1922. It was the first of five steel structures, and the first of four cantilever trusses to be constructed across the Columbia River during the 1920's, marking the beginning of a proliferation of major bridge construction in this new transportation era. The State Highway Department purchased the bridge from its private owners in 1931.

Though the construction of the Longview Bridge (17) was entrenched in controversy, its completion represented another effort to bridge the Columbia River with highway structures. It formed an important connecting link in the Pacific Highway extending from Vancouver, B.C. to Tia Juana, Mexico. The Longview Bridge was the last privately-financed bridge to be constructed across the Columbia River, and represented a turning point in the financing of bridge construction in the State. Soon after this time, the State purchased all privately-owned toll bridges. The construction of bridges throughout the State became increasingly dependent upon, and influenced by state and federal aid programs.

III. SPECIALIZED STRUCTURES: LOGGING AND MINING BRIDGES

The State's abundant resources have always been unattainable and useless without a transportation network to retrieve the minerals and vast supplies of timber, and a means of depositing them at a location where they can be processed for public consumption. The structures that are a part of these transportation systems embody an important segment of bridge construction history within the State.

These grand transportation schemes often involved the construction of large structures in remote, inaccessible territory. The earliest bridge associated with the development of logging and mining interests remaining within the State, is a timber deck Howe truss (18) over the Little Sheep Creek in Stevens County. It was constructed in 1896 as part of the Red Mountain Railroad which ran between Northport and Rossland. The railroad was conceived and financed by D.C. Corbin to link the untapped Canadian mineral deposits in the Kootenay district to the smelters in the United States. At Newport, the Red Mountain spur line connected to another one of D.C. Corbin's railroads, the Spokane Falls and Northern mainline. Through D.C. Corbin's initiative, the mining of the Kootenay district brought great, though momentary wealth to Spokane during the late nineteenth century.

The earliest extant bridge associated with the logging industry is the Winslow Railroad Bridge (19). It is a timber deck Howe truss which was constructed in 1916-17 by the Winslow Lumber Manufacturing Company as part of a 25 mile track system used to transport logs to the company's mill in Orin. As the logging industry developed, there became a growing separation between the logging and milling businesses. However, the Winslow Railroad, like most of the earliest logging railroads, was built by operators of the lumber mill who needed a dependable supply of logs.

Two enormous steel arches (20,21) rising almost 400 feet above wooded gorges were constructed by the Simpson Logging Company in 1929. They were built during a time when high costs were bringing an end to the era of logging railroads. By the 1930's, the West's most accessible timber had been logged,

and the initial investment of construction and equipment costs for even the shortest railroad lines was becoming prohibitive.[1] It was only the largest corporations, such as the Simpson Logging Company, that would find that the unit cost of hauling logs by rail was cheaper than that by truck. The Vance Creek Bridge remains in use as a railroad bridge, while the High Steel Bridge was converted for use by vehicular traffic approximately 20 years ago. The awesome permanence of the steel structure over Vance Creek belies its seemingly anachronistic function, and reflects a changing era in the use of logging railroads. During the late 19th and early 20th centuries, the logging railroad bridges were usually timber structures. Although the mainline of the logging railroads were in service for a number of years, the structures on the spur lines, which often included extremely long and high timber trestles, were temporary, and were abandoned or reused at different locations as soon as the specific area was logged. However, as construction costs increased, enormous structures like the Vance Creek and High Steel Bridges were only economically feasible if they could be used over a long period of time. As a case in point, after a period of more than fifty years, both the Vance Creek Bridge and the High Steel Bridge remain in use. The alterations which have been made to the High Steel Bridge reflect the inevitable changes in the transportation of timber -- the gradual disappearance of the logging railroads and their replacement by trucks.

The magnificent raw power of the 250 foot log cable-stayed girder bridge (22) spanning the Quinault River is undeniable. It was designed and constructed by the Aloha Logging Company's Superintendent in 1952 to support the weight of a loaded logging truck, as part of the road system built to retrieve the company's timber fron the dense forests of the Olympic Peninsula. The Chow Chow Bridge, which was constructed from a 12 foot scale model, was designed by a man who had unusual constructive ability, but who had no formal engineering background. Although the existing timber structures associated with logging and mining industries within the State span a period of almost sixty years, the bridge builders shared a common trait; they shared an intuitive constructive ability. The logging superintendent's spirit and inventive genius can be compared to the American bridge builders of the 18th and early 19th centuries who were

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[1]Kramer Adams, Logging Railroads of the West, (Seattle, 1961), p. 54.

"practical men...who depended upon their own resources and natural instinct, experimenting with models and profiting by previous failures, but who had no accurate knowledge of the strains produced on the various members of a structure by the exterior forces."[2] Practice always preceded the science; consequently structural systems were invented long before the theory was developed. The Chow Chow Bridge is indeed an example of a structural system that was used to solve a problem before the formal theory was developed. It is one of the first examples of a cable-stayed girder bridge within the United States. Although there are numerous European applications of the cable-stayed design, the bridge type has not been used in the United States until very recently, because it is a statically indeterminate system, and has been difficult to analyze with any reasonable degree of accuracy.

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[2] C. Schneider, "Evolution of Bridge Building," Engineering News-Record, 22 June 1905, p. 649.

IV. REPRESENTATION OF BRIDGE TYPES: TRESTLES

There still remains within Washington a sparse sampling of structures that are representative of bridge types which once predominated the landscape. The timber trestle which has evolved as a distinctly American structure, characterized railroad construction in Washington during the late 19th and early 20th centuries. The 984 foot Wilberton Trestle (23) which rises to a height of 98 feet above Mercer Slough, demonstrates the magnitude of the length and height of the early timber trestles that once traversed the varied and seemingly formidable topography of Washington. It is a rare surviving example within the State of a bridge type that once dominated transcontinental railroad construction. During this period, when the railroad's primary objective was to cross the continent rapidly, steel construction became a luxury, both in time of construction, and in initial expense. Timber, however, was abundant throughout western Washington, and was free for the taking.

After the transcontinental route was completed, the looming timber structures were often replaced by solid earth fills or permanent steel viaducts. The steel viaduct which was also a distinctly American structure associated with railroad construction, is best represented in the two long steel Spokane, Portland and Seattle Railraod viaducts over Cow Creek (9) and Box Canyon (8), and in the Union Pacific Joso Viaduct. (12).

IV. REPRESENTATION OF BRIDGE TYPES: TRUSSES

As exemplified in the table of bridge types, the truss is clearly the most common bridge form constructed in Washington between 1880 and 1940 for both railroad and highway structures. Because Washington was settled long after the major experimentation with truss types had occurred, there is not a vast representation of truss forms.

The earliest truss form represented is the timber Howe truss which was patented in 1840. The Little Sheep Creek Railroad Bridge (18) constructed in 1896 and the Winslow Railroad Bridge (19) constructed in 1916-17 are the oldest extant examples within the State of this once common truss type. Timber continued to be used for the construction of railroad bridges throughout Washington during the first quarter of the century due to the abundance of the resource, and its initial economic advantages. The use of treated timber also extended the life of these structures. There is one Milwaukee Railroad standard timber Howe through truss remaining within the State (24). Although it was constructed in 1930, it replaced an identical structure built in the teens.

There are two examples of timber trusses within the State that are of the Pratt configuration (25,26). In the Howe truss, the vertical members resist the load in tension, while the diagonal members resist the load in compression. The tensile strength of steel or iron coincides with the function of the vertical members, and the compressive qualities of wood coincide with the function of the diagonal members. However, in the Pratt truss, the function of the vertical and diagonal members is reversed; consequently the vertical components are timber, and the diagonal components are steel. Although the Pratt truss was patented in 1844, the Howe truss design continued to be the most common form in timber construction. It was not until the introduction of all steel and iron trusses that the Pratt truss design prevailed.

These untreated timber structures had a life span of approximately 10 to 15 years. In an effort to extend the life of the bridges, the timber components were protected by constructing housing around them. There are four covered bridges remaining within the State. The oldest is a highway structure, a two span Howe truss constructed across Grays River (27) in 1905. In 1918 a covered timber Howe truss (28) was constructed across the Palouse River

outside of Colfax as part of the Spokane and Inland Empire Railroad, an expansive interurban electric railroad line scheme that extended from the Palouse to Spokane. Because it was necessary to provide for the connection between the locomotive and the overhead electric lines, the top of the bridge was left uncovered. Over the Chehalis River at Doty stands the last standard Milwaukee Road covered bridge (29). At one time several of these stark, utilitarian structures, constructed by company forces, spanned the waterways of Washington. A short-spanned timber Howe pony truss covered with corrugated metal (30) was constructed across the Chehalis River in 1934.

The seemingly endless source of timber throughout much of Washington, providing a cheap building material, may account for the fact that a number of timber highway trusses continued to be built throughout the 1930's. Because most of the early bridge construction in Washington occurred long after the technology of iron or steel truss construction had been developed, the timber and steel truss existed within the State simultaneously. The predominance of timber construction over that of steel or iron was not a matter of technology, but rather one of economy and accessibility. However, the iron or steel truss provided a strength, durability, and resistance to fire that the timber truss would never be able to attain.

There is a limited representation within Washington of the early steel truss forms which consisted of complex systems of triangulation. These early truss forms are demonstrated in the lattice or triple-intersection Warren truss over the Spokane River (31) and the double-intersection Warren truss over the Wishkah River (38). The double-intersection Pratt truss (1) over the Columbia River is similar to the lattice truss, and was a common truss form in railroad construction in the late nineteenth century. These three bridges share this multiple system of triangulation which was claimed to create an "unavoidable ambiguity in stress distribution."[1] These complex truss forms have been replaced almost exclusively by two other nineteenth century designs: the simple system of verticals and diagonals of the Pratt truss and the straightforward single system of triangles of the Warren truss. It is interesting to note that in contrast to the east coast, there are very few examples within Washington

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[1] J.A.L. Waddell, Bridge Engineering, 2 Vols., (New York, 1916), 1: 476.

Washington of trusses with a multiple system of triangulation which in itself may shed light on the evolution of the truss form. Even during the early years of bridge construction within the State, the superiority of the Warren and Pratt configuration had been confirmed.

During the early twentieth century, the Pratt truss was claimed to be the most commonly used bridge type in America for spans under 250 feet. The two earliest and least altered examples of this truss type remaining within Washington are the F Street Bridge in Palouse (33) and the West Monitor Bridge (34). Both of these are pinconnected structures which preceded the more rigid riveted truss. With the improvement of riveting techniques, and the development of the pneumatic riveter during the early twentieth century, the pinconnected truss soon became a rarity.

During the mid-ninteenth century, the Parker truss was developed. In contrast to the uniform depth of the parallel chords of the basic Pratt truss, the polygonal top chord of the Parker truss which reaches its greatest height at the center panels, reflects the increase in bending moment that occurs from the ends of the truss to the center. The use of the arched top chord increased the rigidity of the structure, and enabled the construction of longer spans. The earliest, least altered examples of the Parker truss within the State are the Curlew Bridge (35), the Orient Bridge (36), and the Prosser Steel Bridge (37).

In an effort to construct longer spans, the Pratt truss configuration was adapted and modified by sub-dividing the panels with additional substruts and subties. The development of the Petit truss during the 1870's represented a major advance in strengthening the standard Pratt truss form. The Middle Fork Nooksack River Bridge (38) is the longest pinconnected modified Petit highway truss within the State, while the White River Bridge (39) constructed in 1908, is the oldest pinconnected modified Baltimore Petit structure.

In 1913, Clallam County constructed a two-span deck truss over the Elwha River (41). Its Warren truss configuration was patented in 1848, and is composed of diagonals which are placed alternately in tension and compression. The Elwha River Bridge is the oldest Warren truss in the State constructed for highway use. Like the Pratt truss, this single system of triangles continues to be used by engineers in modern steel trusses.

The largest truss bridges are cantilever structures which consist of a combination of anchor spans, cantilevers, and suspended spans. The oldest cantilever truss within the State is a pinconnected structure constructed across the Columbia River in 1908 (13). The Pasco-Kennewick Bridge (16), the Lyons Ferry Bridge (42), and the Longview Bridge (17) all represent cantilever construction that occurred during the 1920's. The George Washington Memorial Bridge (43), the Grand Coulee Bridge (44), and the Deception Pass Bridge (45) were built during the 30's and reflect a departure in form from the cantilever structures built in Washington during the previous decade. They reflect the refinement and progressive simplification of the cantilever truss form in the twentieth century.[2] The George Washington Memorial Bridge and the Deception Pass Bridge demonstrate the final merging of a functional and aesthetic form in the cantilever truss.

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[2]Carl Condit, American Building Art, 2 Vols., (New York, 1961), 2: 104.

IV. REPRESENTATION OF BRIDGE TYPES: MOVEABLE BRIDGES

A very specific bridge technology evolved from the necessity of spanning navigable waterways. The earliest moveable bridges within the State are swing bridges, and are essentially steel trusses which rotate around a center pier. The Spokane, Portland, and Seattle Railway Bridge (10) which spans the Columbia River is the oldest swing bridge remaining within the State. Its 462 foot pinconnected draw span was long for its day, and was even acknowledged by the bridge engineer, Henry G. Tyrrell, in his book, History of Bridge Engineering. The Puyallup Waterway Crossing (47) is an example of a pinconnected swing span which was once frequently visible on the navigable waterways of the late nineteenth and early twentieth centuries.

In his authoritative volume on Bridge Engineering, J.A.L. Waddell remarks that in 1916, the swing bridge remained the most common type of moveable bridge. However, it was during this period that many of the early swing bridges spanning the waterways were being replaced by bascule structures. The bascule bridge, whose prototype is the medieval drawbridge, derives its name from the French word meaning balance. The bascule span is opened and closed much more rapidly than the swing bridge by means of a counterweight system. The absence of a central pivot pier in the bascule bridge was a great asset. The timber structure extending from the pier which served to protect the draw span was a dangerous obstruction in narrow channels, and often usurped valuable dock space. The advantages of the bascule structure over that of its predecessor were numerous, and particularly apparent in the populated, congested cities where both roadway and waterway traffic were heavy.[3]

Methods of refining and improving the counterweight system in the bascule spans absorbed the energies of many bridge engineers during the late nineteenth and early twentieth ceturies. The earliest examples of bascule bridge design within Washington are of the trunnion type. The Salmon Bay Great Northern Railroad Bridge (48) constructed in 1913 is an early example of the Strauss heel trunnion single leaf bascule bridge. The single leaf bascule was preferred for railroad traffic due to its greater rigidity. The heel trunnion, single leaf bascule bridge was patented by

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[3] J.A.L. Waddell, Bridge Engineering, 2 Vols., (New York, 1916) 1: 664, 700-702.

J.B. Strauss of the Strauss Bascule Bridge Company of Chicage in 1911, and consists of an overhead counterweight which is pivoted on a fixed trunnion by a parallelogram of linkages. The structure's center of gravity does not move either vertically of horizontally as the bridge opens and closes. Consequently, this design enabled the construction of simple economical foundations. The heel trunnion design was a modification of, and eventually superceded earlier Strauss designs. In 1914, a single leaf Strauss heel trunnion bascule bridge (49) was constructed across the Ebey Slough in Everett. It was the first of its type to be used within the State as a highway structure.

The construction of several moveable spans was incorporated into the design of Seattle's Lake Washington Ship Canal. Between 1915 and 1919 three double-leaf trunnion bascule bridges of the transverse cross-girder type were constructed to span the new waterway (50-52). These bridges, which are the earliest examples within the State of a double-leaf bascule bridge, were designed by the City of Seattle, and followed a general design developed by the Chicago Department of Public Works in 1898. In 1924-25 a fourth double-leaf trunnion bascule bridge (53) was constructed across the canal on foundations that had been constructed when the ship canal was first built. A unique feature of the Montlake Avenue Bridge was that the trunnions were supported on a cantilever projection extending from the pier which eliminated the need for the transverse cross-girder used in the earlier canal bridges. In contrast to the three earlier bascule bridges constructed over the canal, ornate towers loom over the piers of the Montlake Avenue Bridge, evoking an aura of monumental dignity.

The Hoquiam River Bridge (54) was designed by the Strauss Bascule Bridge Company of Chicago, and was constructed in 1928. It is a patented Strauss trunnion double-leaf bascule bridge.

The 14th Avenue South Bridge (55) which was constructed across the Duwamish River in Seattle in 1931 is the only Scherzer rolling lift bascule bridge within the State. The bridge type was developed by William Scherzer in 1895. In this type, the leaf rotates on a quadrant which rolls along horizontal track girders. In contrast to the fixed position of axis rotation of the trunnion bascule, the axis of rotation of the Scherzer Bridge has a "motion of translation longitudinally with the structure."

Consequently, the Scherzer Bridge generally provides a greater clear opening for any total length of span than that provided by the fixed trunnion type. However, because the rolling action constantly changed the location of the center of pressure of the load on the abutment, solid rock foundations were necessary.

J.A.L. Waddell's synthesis of the significance of the bascule bridge is apt. He states that all bascule bridges are "inherently ugly, and for all but comparatively short spans are uneconomic in comparison to the vertical lift; but they are scientific and they represent, probably, the best and most profound thought that has ever been devoted to bridge engineering."[4]

The vertical lift bridge developed simultaneously with the bascule bridge. The earliest vertical lift highway structure remaining within the State is the City Waterway Bridge (56) which was constructed by the renowned early twentieth century bridge engineering frim of Waddell and Harrington. The Vancouver-Portland Interstate Bridge (15), designed in 1916 by the newly formed firm of Harrington, Howard, and Ash is another early example of a vertical lift bridge.

In 1914, the Northern Pacific constructed a Strauss direct vertical lift bridge over Steilacoom Creek (57). The design,which replaced the usual counterweight cables, chains, sheaves, and winding drums of the vertical lift bridge with a system of counterbalanced levers and rack and pinion gearing, was patented by J.B. Strauss of Chicago, and was put on the market by the Strauss Bascule Bridge Company in 1912. The Steilacoom Creek Bridge was one of the first of this design to be constructed. The Strauss direct lift bridge possesses many of the design elements of the Strauss heel trunnion bridge. Like the Strauss bascule, the lifting mechanism of the direct lift bridge consists of a parallel link counterweight which moved on fixed trunnions, or pivot points. The stark steel form is blatant in its bold adherence to its functional purpose. Although the design of the Steilacoom Creek Bridge was limited to short spanned structures, it is significant in its demonstration of the evolution and experimentation of bridge design during the early twentieth century, in its demonstration of the way in which the concepts of bascule bridge design were merged with the design concepts of the vertical lift bridge.

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[4]J.A.L. Waddell, Bridge Engineering, 2 Vols., (New York, 1916), 1: 713-14.

In 1916, J.A.L. Waddell accurately interpreted the importance of the vertical lift brdige in relation to other moveable sturctures. He wrote that the type had come to stay, and that it would continue to be used more and more as time went on, "for not only is it inexpensive in first cost comparatively speaking, but it is also simple, rigid, easy to operate, and economical of power. It has met with considerable opposition up to the present time, mainly from the owners of bascule patents; but it has overcome that opposition most satisfactorily and unequivocally, consequently the future of the type may be counted upon as assured."[5]

The design of the Lake Washington Floating Bridge (58) which includes an unusual moveable span was unprecedented within the United States. Because piers could not be constructed in the 150 to 200 foot depths of Lake Washington, under which lies almost 100 feet of soft mud, it was not possible to bridge the 7800 foot crossing with a more conventional long span structure. A bridge of pontoon construction eliminated the problem of pier construction. The 6561 foot deck is anchored to a series of floating reinforced concrete boxes which lie only a few feet beneath the surface of the lake. A total of 64 cables secure the floating structure transversely and horizontally to anchors on the lake bottom. The required 200 foot channel is provided by the horizontal movement of a portion of the floating deck into a recess in an adjacent fixed pontoon.

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[5] Ibid., p. 746.

IV. REPRESENTATION OF BRIDGE TYPES: ARCHES

During the early twentieth century the steel arch was not extensively used in the United States in comparison to other bridge forms. In his book, Bridge Engineering, J.A.L. Waddell explains the reason for the paucity of arches in the United States. "Arches are employed very generally in Europe on account of their superior appearance as compared with simple truss bridges, and because of the powerful influence of the old masonry arch upon the minds of European bridge designers, regardless of the consideration of economy. American engineers, on the other hand, have been indifferent to the question of aesthetics, and have preferred simple spans to arches mainly for reasons of simplicity and economy, but sometimes on account of their rigidity."[6]

The Twelfth Avenue West Bridge on Dearborn Avenue (60) was constructed by the City of Seattle in 1911 and is the oldest extant steel arch within the State. Of the earliest steel arches within the State, it is the only example of a spandrel-braced arch. There are two examples within the State of a three-hinged lattice arch, one built over Ravenna Park (61) in 1912-13 by the City of Seattle, and one built over the Carbon River (62) in 1921 by the State and Pierce County. The three-hinged arch, with a hinge at the crown and at the two abutments, was widely used by American engineers. Although it is the least rigid of all arch structures, there is no ambiguity of stress distribution, and the method of stress calculation is relatively simple. A solid-rib two-hinged parabolic steel arch dramatically spans a steep wooded ravine on North Queen Anne Hill (63). This attenuated striking steel form was designed by the Seattle Engineering Department in 1935. It is the only one of its type within the State that was constructed before 1940. The Canoe Pass Bridge (46) constructed in 1935, and the two high steel arches erected by the Simpson Logging Company (20, 21) in 1929 are more recent examples of the spandrel-braced arch.

There has been little change in the form of the steel arch since the last decade of the nineteenth century. The essential components of ribs, stiffening trusses, and spandrel posts must always be present, and

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[6] J.A.L. Waddell, Bridge Engineering, 2 Vols., (New York, 1916), 1: 617.

have left little scope for variations. The design innovations in the arch bridge were linked to the developments of reinforced concrete.[7]

The earliest extant reinforced concrete arches within the State are the Washington Street Brdige (65) constructed over the Spokane River in 1908, and the Klickitat River Bridge (7) constructed by the Spokane, Portland, and Seattle Railway during the same year. The Arboretum Sewer Trestle (66) which was built in 1910 by the City of Seattle demonstrates how many of the earliest reinforced concrete bridges were park bridges, which were "notable more for their artistic design than for their large proportions."[8] The solid-barrel arch rings which were used in the Klickitat River Bridge and in the Arboretum Sewer Trestle were predominant in the earliest reinforced concrete arch designs. Often these early structures were constructed as monoliths, and the metal reinforcing acted more as a binding element than as reinforcing. The Washington Street Bridge is an early example of a ribbed arch. The flattened form of the ribs of the Washington Street Bridge reflected future developments in concrete arch design.

When the Monroe Street Bridge (67) was completed in 1911, its monolithic arch was hailed as the largest concrete arch in the United States. The Monroe Street Bridge was similar to the Walnut Lane Bridge of Philadelphia, constructed in 1906-8, which was an important forerunner in the design of long-span fixed arches. The great size of the massive arched ribs of these two structures reveals the limits of unreinforced concrete in long span structures. However, the open spandrels and flattened ribs of the Monroe Street's central arch pointed toward the future in concrete arch design. The Latah Creek Bridge (68) was the second of Spokane's grand monumental concrete arches, and is an early example within the State of a long-span fixed-end reinforced concrete arch.

The commanding monumental form of the Rosalia Bridge (69) constructed by the Milwaukee Railroad in 1915 rivals that of the two Spokane arches. The Rosalia Bridge is the only multiple span concrete arch railroad bridge within the State. Because of the high impact of railroad loads, concrete arches were never widely used in the construction of railroad bridges,

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[7]Carl Condit, American Building Art, 2 Vols., (New York, 1961), 2: 128.

[8]Henry Grattan Tyrell, History of Bridge Engineering, (Chicago, 1911), p. 427.

particularly in long span structures.

The Lower Custer Way Crossing (70) is an early example within the State of a Luten arch. The Luten arch was introduced to the United States from Germany in 1900, and was one of the early scientific solutions to bar reinforcing in concrete. Unlike many of the earliest solutions to arch reinforcing which indiscriminately placed steel shapes throughout the concrete, the Luten system pointed to later techniques which distributed the steel primarily in the tension zones. In the Luten system, several bars forming a complete loop were laid transversely through the vault and invert of the arch. These series of loops were also laid throughout the length of the structure at regular intervals. The bars were bent to conform to the semicircular section of the vault, and were placed near the surfaces of maximum tension under live load.[9]

As the reinforcing of concrete became better understood, the rigid concrete and the elastic steel were scientifically designed to function together organically, and it became possible to build lighter, more attenuated forms. The minimal, graceful form of the 34th Street Bridges (74, 75) in Tacoma and the Cowen Park Bridge (73) in Seattle reveal the capabilities of reinforced concrete, and reflect the progressive reduction in the quantity of structural material used in concrete arch design. However, the bold, dynamic innovative concrete forms of the European designers, Maillart and Freyssinet have never been equalled in the United States. "The scarcity of advanced designs in concrete bridges has arisen in part from the necessities of American practice: lower working stresses than are the rule in Europe; much higher traffic loads, both rail and highway; the higher cost of formwork, chiefly because of high labor costs; and in many places, higher wind and snow loads."[10]

During the 1920's and 30's five reinforced concrete tied arches were constructed within the State (76-80). In these arches, the deck slab is hung by suspenders from a pair of arch ribs above the roadway. In most arches, massive abutments and foundations are necessary to resist the horizontal thrust exerted by the arch on the skewbacks. However, in the tied arch, the horizontal thrust is resisted by longitudinal ties

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[9] Ibid., 2: 197.

[10] Ibid., 2: 195-196.

which extend between the hinged springing points. In most of the five tied arches in Washington, the deck slab itself acts as a tie. The double function of the deck slab was an economical solution, and it eliminated the need of massive abutments. Although there are examples of tied arches that were built throughout the 20's and 30's, the tied arch has remained a rare concrete arch form.[11]

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[11] Ibid., 2: 206.

IV. REPRESENTATION OF BRIDGE TYPES: CONCRETE BEAMS, GIRDERS, AND TRUSSES

The concrete girder has become a predominant feature in the landscape of the American highway. The two earliest examples within the State of concrete girder highway bridges are the North 23rd (81) and the North 21st (82) Street Bridges in Tacoma. Both bridges were designed by Waddell and Harrington. The North 23rd Street Bridge was built in 1909, and is an early example of a concrete rigid frame girder bridge. The concrete beams are massive and overdesigned. The rigid frame was not adopted on any extensive scale, until after World War I. The 21st Street Bridge constructed in 1910 is a continuous concrete rigid frame girder bridge. It was built almost simultaneously with the 950 foot Asylum Avenue Viaduct in Knoxville, which Carl Condit documented in American Building Art, as the first continuous concrete girder bridge to be constructed.[12]

There are three concrete structures within the nomination which are early American applications of the European innovation of concrete hollow-box construction. In cellular construction, the concrete is poured around hollow box forms thus reducing to a minimum the amount of material used. The steel and concrete is placed only at those points where it functions actively under live load. This economical hollow-box form was used extensively throughout Europe, but was not widely used in the United States. The Purdy Bridge, constructed over Henderson Bay in 1936, is one of the few box-girder bridges within the United States, and has the longest single span among concrete-girder forms.[13] The design features and layout of the bridge were suggested by Homer M. Hadley, and was one of several unique concrete bridge designs of cellular constructions conceived and carried out by Mr. Hadley throughout Washington during his lifetime.

Homer Hadley also designed the McMillan Bridge (87), a reinforced concrete truss of hollow-box construction. At the time that it was built, its 170 foot main span was the longest beam span within the United States. The

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[12] Carl W. Condit, American Building Art, (New York, 1961), 2:207.

[13] Ibid., p. 209.

organic strength of concrete that is so frequently revealed through the arch form, is shrouded by the massive breadth and scale of this truss at McMillan. The McMillan Bridge demonstrates the use of concrete for a design that traditionally evolved and conformed to the structural properties of timber and steel.

The Seattle Engineering Department introduced hollow box construction in the design of concrete rigid frame bridges when it built a concrete structure in Schmitz Park (86) in 1935.

There are two concrete beams within the nomination that are included for their architectural merits. The Johnson Bridge (83), is a three-span concrete T-beam. The engineers have used a straightforward, commonplace bridge type, and through the addition and integration of simple, subtle geometric shapes have transformed the structure into one which has an aesthetically compelling visual impact. As the most impressive of several short spanned structures with similar ornamental motifs throughout Walla Walla County, the Johnson Bridge reflects the impact of a single creative engineer on regional bridge design. The Capitol Boulevard Crossing (84) is one of the best examples within the State of the influence of Art Deco and Modernistic Architecture on bridge design. The concrete viaduct exemplifies the way in which decoration was used to transform an ordinary structure into an entrance-way into the Capital City.

IV. REPRESENTATION OF BRIDGE TYPES: SUSPENSION BRIDGES

The thin parabolic cables of the suspension bridge stretching between two towers has an unyielding visual force. "The principle of the suspension bridge is simple,' stated the bridge engineer, David B. Steinman. 'It consists of three essential parts: the towers, the anchorages, and the cables. The roadway and the stiffening construction have local importance, but both may be wholly or partially destroyed without causing the collapse of the bridge. In all other types of bridge construction, the failure or buckling of a single member will precipitate the collapse of the entire structure. A suspension bridge is the safest type of construction in that any local overloading or structural deficiency will not jeopardize the safety of the whole."[1] However at the beginning of the 20th century the bridge engineering profession did not have this same confidence in the suspension bridge. In 1911, the bridge engineer, Henry Tyrrell wrote that although the suspension bridge is one of the oldest bridge forms, it has not been adopted as rapidly as other bridge types, because of its lack of rigidity and the absence of correct theory for proportioning stiffening trusses.[2] Mr. Tyrrell's cautiousness is perhaps explained by the fact that he was writing during the era of the railroad. Because of the flexibility of the suspension bridge design, it was not widely used for the heavier railroad loadings. It was the advent of the automobile that initiated the proliferation of the suspension bridge, particularly for long-spanned structures.

The oldest extant suspension bridges within the State are a series of timber suspension bridges crossing deep lateral gorges in the North Cascades at Devil's Corner (87). They were built by miners in the 1890's to provide access to their claims, and stand as a testimony to man's ingenuity and to the dogged persistence of the early miner's in breaching the formidable mountain barrier.

Although there are numerous examples of timber suspension bridges throughout the State, the Yale Bridge (88) is the only example of a short-spanned steel suspension bridge. Steel suspension bridges of moderate length

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[1] David B. Steinman and Sara Ruth Watson, Bridges and their Builders, (New York, 1941) p. 326.

[2] Henry Grattan Tyrrell, History of Bridge Engineering (Chicago, 1911), p. 254.

have remained rare because cost factors have prevented them from competing with simple steel trusses, cantilevers, or arches for ordinary highway structures.

The suspension bridge was primarily used for the very longest spans. When the graceful, ribbonlike Tacoma Narrows Bridge (89) was opened to traffic on July 1, 1940, it was the third longest suspension bridge in the world. The design of the Tacoma Narrows Bridge followed the mainline of development in the evolution of the suspension bridge. It represented a culmination of the trend to increase the span length, to reduce the width of the deck and to minimize the depth of the stiffening components, which simplified and distilled the bridge form; it represented the epitome of a move towards a suspension bridge of slender proportions that placed a premium of economy on flexible design.

However, on November 7, 1940 only four months after the opening of the bridge, the design ended in disaster. Gale force winds created torsional oscillations in the bridge that eventually reached catastrophic proportions causing the sinuous main span to break away from the undulating mass and plunge into the water below. The collapse of the bridge initiated a deluge of scientific investigation. Studies revealed that the bridge was destroyed by a combination of factors, factors that were more pronounced in the Tacoma span than in any other modern suspension bridge.

One critical factor was the vertical slenderness and resulting vertical flexibility of the structure which was caused by the construction of high flexible towers and a thin suspended span. Another flaw in the design of the bridge was the use of slender, solid web plate girders to stiffen the deck rather than the use of the complex and conventional truss. The steel truss acts like a sieve to the forces of the wind. However, the wind could not penetrate the solid wall of the girder. Because the span was highly flexible, the cross-section of the solid plate girders in combination with a solid floor was particularly sensitive to aerodynamic forces. The characteristics of this cross-section caused small undulations of the bridge to amplify. There was a tendency for these undulations to change into a twisting motion which would generate harmonic movements of dangerous magnitude. It was these harmonic motions that eventually proved fatal to the bridge.[3]

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[3]Steinman, op. cit, pp. 353-357.

Other bridge designs did benefit from the mistakes made in the construction of the Tacoma Narrows Bridge. The noted engineer, Ottmar H. Amman, who had designed the recently completed Bronx-Whitestone Bridge in New York with stiffening girders, quickly replaced them with trusses. The knowledge gained from the research following the disaster was valuable to the entire engineering profession in terms of understanding the importance of aerodynamics in suspension bridge design.

V. THE ROLE OF THE BRIDGE ENGINEER

The singular role of the bridge engineer in the development of Washington is undeniable. This role was probably most pronounced in the construction of the grand transportation schemes of the transcontinental railroads. The awesome scale of the land demanded structures of equal proportion. The bridge and tunnel engineers of this era were men who had more than unusual constructive abilities; they were men with vision; they were dreamers, planners, managers, and builders who built on an enormous scale.

These qualities were exemplified in men like Mr. Nelson Bennett who completed the two mile long Stampede tunnel through the "backbone of the Cascade range" under unyielding odds. The immensity of the projects in which these engineers were involved is reflected in the career of John Frank Stevens. Stevens surveyed the Great Northern route over the Cascades which resulted in the construction of the Cascade Tunnel, and then went on to play a major role in the construction of the Panama Canal.

There were a handful of prominent, prolific bridge engineers who devoted their early careers to railroad bridge construction. For example, there was Ralph Modjeski who contributed to the design and construction of several major spans during the 20's and 30's including the San Francisco Bay Bridge. His early years were spent as chief bridge engineer of the Oregon Trunk Railway, and it was he who was responsible for the construction of the Celilo Bridge across the Columbia River in 1911-12.

The impact of the bridge engineer is visible throughout Washington. There are numerous examples of the influence of a single creative engineering talent on a particular region. For example, E.R. Smith's tenure as county engineer during the 20's and 30's has left its impact throughout rural Walla Walla County. Through the addition of simple, softly colored geometric shapes, several short-spanned concrete T-beams were transformed into visually compelling structures.

During the period between 1909 and 1914, two enormous multiple spanned concrete arches were constructed in the city of Spokane. There are few bridges within the State that are monuments of such a grand scale. It was the foresight and perserverance of a few individuals within the city engineering department who were responsible for the construction of these

forceful, concrete forms. An abundant number of concrete arches were built throughout the city of Spokane during this era by the engineering department directly impacting the visual countenance of the city. However, it is the magnitude of the Monroe Street Bridge and the Latah Street Bridge that make them particularly unique. Their rhythmic arch forms are commanding architectural focal points within the city. Morton McCartney, who was a key individual in the construction of the Monroe Street Bridge, supervised the design and construction of the Latah Creek Bridge as City Engineer.

The engineer, Homer Hadley, designed several unique concrete bridges throughout the state of Washington during his lifetime. The Purdy Bridge and the McMillin Bridge were both designed by Mr. Hadley. They are early American applications of the European innovation of concrete hollow-box construction. This economical method of construction was used extensively throughout Europe, but was not widely used in the United States. It was Homer Hadley who originally conceived the design of a floating bridge across Lake Washington. He visualized a floating roadway made up of a series of hollow concrete barges. Mr. Hadley's unusual work reveals the effects of a single innovative engineer on bridge design within the State.

There are other examples of bridge builders within Washington who forged outside of the mainstream of American bridge design practices. The 250 foot log cable-stayed girder bridge that was constructed across the Quinault River by the Logging Superintendent, Frank Milward, in 1952 is a prime example of a bold design that did not conform to American design patterns. It was the tenacious pioneering spirit of Mr. Milward, who constructed one of the first examples of a cable-stayed girder bridge within the United States. A segment of the history of bridge construction within Washington is revealed by the fact that structures were built in the mid-20th century by an individual whose background and methods of building closely paralleled those of 19th century engineers. Pioneering mavericks with little formal education were building innovative structures within the State simultaneously with engineers who used the most contemporary scientific analyses to determine appropriate bridge designs.

The history of bridge construction, and the role of the bridge engineer in the development of Washington is indeed multifaceted. Throughout the State's bridge construction history, there are repeated demonstrations of the resourcefulness and persistence of talented individuals who sought to

direct "the great sources of power in nature for the use and convenience of man."[1] Without question, the bridge engineer's role is a significant one. In some respects, the bridge engineer played an indispensable role in the development of the state. Several of the earliest bridge engineers built structures that were integral parts of vast transportation systems which made Puget Sound and an inscrutable wilderness accessible to large numbers of people, directly impacting the course of settlement patterns within the State. The influence of the bridge engineer is pervasive; the construction of even the shortest spans affect people's lives, easing their ability to move from one location to another. This pervasive influence of the bridge engineer is reflected in the extant historic bridges and tunnels remaining within Washington.

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[1]Julius Adams, "The Dinner," Proceedings of the American Society of Civil Engineers, I (1874), 175; as quoted from Raymond H. Merritt, Engineering in American Society, Lexington, 1969, p. 3.

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KI 223

NAER INVENTORY

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

1. SITE I.D. NO

2. INDUSTRIAL CLASSIFICATION: Bridges, Trestles, and Aqueducts

MOVE: bascule 7650

3. PRIORITY: 1

5. DATE: 1915-1919

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

6. GOVT SOURCE OF THREAT: OWNER ADMIN

7. OWNER/ADMIN: City of Seattle

8. NAME(S) OF STRUCTURE
h. University Bridge
c. Fremont Bridge
a,b. Ballard Bridge

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

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

STATE COUNTY COUNTY NAME CITY/VICINITY CONG. DIST

11. SITE ADDRESS (STREET & NO.)
Crossing: Lake Washington Ship Canal
h. 10 551150 5277780
c. 10 548920 5277150

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

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

14. UTM ZONE / EASTING / NORTHING / SIGN / SCALE / QUAD NAME

a. 10 | 546930 | 5278820 | SCALE ☒ 1:24 ☐ 1:62.5 ☐ OTHER | QUAD NAME Seattle North, Washington

b. 10 | 546930 | 5278820 | SCALE ☒ 1:24 ☐ 1:62.5 ☐ OTHER | QUAD NAME Seattle North, Washington

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

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

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

The construction of several moveable spans was incorporated into the design of Seattle's Lake Washington Ship Canal. Between 1915 and 1919, three double-leaf trunnion bascule bridges of the transverse cross-girder type were constructed to span the waterway at Fremont Avenue, at 15th Avenue Northwest, and at Eastlake Avenue. The bridges, which are the earliest examples within the State of a double-leaf bascule bridge, were designed by the City of Seattle under the direction of A.H. Dimock, City Engineer. They were erected under the supervision of F.A. Rapp.

The bascule bridge design was selected over a fixed span and vertical lift design. The fixed span design was eliminated immediately because it necessitated the construction of extremely long approaches. In a letter to the city council, the city engineer wrote that a vertical lift bridge would require 200 foot towers in order to provide the necessary vertical clearance of 150 feet. "Such towers ... of steel are far from pleasing ornaments to any waterfront."

(CONT OVER)

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

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

City Engineering Department files.
"Three Double-Leaf Bascule Bridges at Seattle, Washington," Engineering News-Record, Vol. 84, pp. 718-722.
"Service Performance of Grid Deck on University Bridge, Seattle," Engineering News-Record, 20 September 1934, p. 376.

(CONT OVER)

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

21. NW

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

23. EDITOR INDEXER

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

50 51 52

FHR 8 260 1/79 HCRS REGION

GPO 871 981

Description (continued)

He emphasized the merits of the bascule bridge design and claimed that "the advantage of this type from the navigator's point of view is that it provides a perfectly clear and unobstructed channel permitting the passage of a vessel of any height. This feature of the bascule bridge was in direct contrast to the design of the lift bridge in which the height of the vessel passing beneath the bridge was limited by the height of the lift span.

The double-leaf trunnion bascule design adopted by the city of Seattle has its origins in a general design developed by the Chicago Department of Public Works in 1898. The three bridges consist of half-through type trusses with a horizontal top chord and a curved bottom chord. The trusses are raised and lowered by means of two counterweights that are built into the rear of the trusses, below the deck. These counterweights are composed of steel boxes that are filled with concrete. Two pockets were formed in the concrete to provide for a means of adjusting the weight according to wet and dry seasons.

The leaves are each operated by two direct current motors of 100 horsepower capacity at 550 volts. Each leaf was designed to be operated independently, and by one motor. The internal gears in the operating mechanism are composed of cast steel concave racks that were designed and patented by Alexander Van Babo, engineer of bridge design at the Chicago Department of Public Works. The gear trains drive operating pinions of forged steel that engage the innerfaces of the racks which are built into the counterweight arms of the trusses. There is also an emergency hand operating connection which can open the bridge in six hours. In 1928, auxiliary power equipment was placed in the three bridges.

All connections were assembled and reamed before the trusses were erected. The leaves were erected in the horizontal position. However, when one leaf was completed it was raised to the vertical position so that half of the channel remained unobstructed throughout construction.

Because the Federal government assumed a share of the cost of the canal, it placed conditions upon the general proportions of the bridges. The government maintained that "the structures should be of a permanent character and should give a clear channel width of 200 feet with a clearance height of 30 feet above the lake level for a width of 150 feet." All three bascule spans are greater than 200 feet in length. The curb of the Fremont Avenue Bridge is 37 feet above the waterline. The clearance height of the other two bridges is 52 feet, substantially above the height set by the Federal government. The additional height enabled small craft to pass beneath the bridges and minimized the number of openings. Because of the greater height of the Eastlake Avenue and 15th Avenue Bridges, there was no need to construct counterweight pits. The three bridges were each 40 feet wide and were designed to carry a double-track railway.

Construction began first on the University Bridge at Eastlake Avenue which was to replace two temporary timber draw spans. However, the 291 foot structure which consists of a 218 foot bascule span, was not completed until 1919 because of delays in carrying out specifications for the substructure. The massive, concrete substructure is 20 feet thick, 65 feet high, and 40 feet wide. The foundation rested directly on firm material on one side of the channel. However, on the other side of the channel, it was necessary to drive deep pile foundations in order to support the bridge. Booker, Kiehl, and Whipple were the contractors for the substructure. The United States Steel Products Company was the contractor for the superstructure. Construction was supervised by E.K. Triol.

The total cost of constructing the University Bridge which included a permanent steel span and two temporary untreated timber trestle approaches was $825,275, almost twice the cost of each of the other two bascule bridges. This was due to the cost of the massive concrete foundations and to the reletting of portions of the work at wartime prices.

Description (continued)

In 1933, an open mesh deck was installed to reduce the floor weight which permitted the widening of the roadway. The decking was designed and built by the Irving Iron Works of Long Island City, New York. Shop-welded cantilever girders were extended from the steel span to support the two additional traffic lanes.

The 502 foot bridge at Fremont Avenue was completed in 1917, and provided the primary entranceway to the community of Fremont. The steel for the 242 foot bascule span was fabricated by the Pacific Coast Steel Company. The United States Steel Products Company was the contractor for the superstructure. The substructure was built by the Pacific States Construction Company. In contrast to the University Bridge, permanent concrete approaches were built initially at Fremont Avenue by the West Coast Construction Company. The Fremont Avenue Bridge was equipped with four 100 horsepower motors. The total cost of the bridge was $410,000. In 1928, the original wood block paving was removed and replaced with open, steel pavement. At this time, new operating motors with hydraulic variable speed transmission were also added. These motors were considered to be a "new venture in moveable bridge machinery."

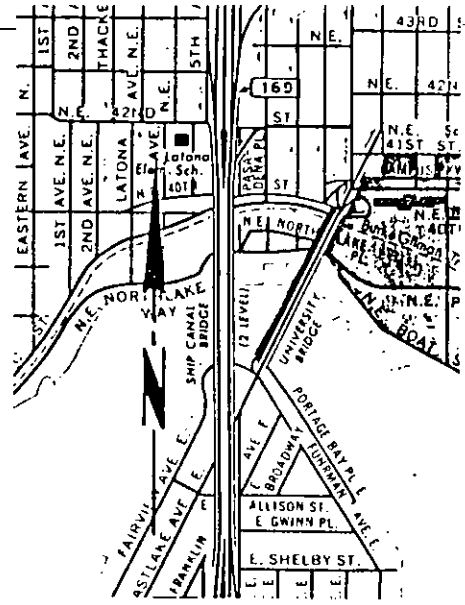
In 1917, the 15th Avenue N.W. Bridge was also completed, firmly linking Seattle and Ballard. The 295 foot structure which consisted of a 218 foot bascule span cost $479,000. The steel was fabricated by the Dyer Brothers of San Francisco. Hans Pederson was the contractor for both the substructure and superstructure, and J. Charles Rathburn was the city's superintendent for the construction of the bridge. In 1941, the temporary approaches were replaced by permanent approach spans. The four towers were replaced by a single tower in 1969.

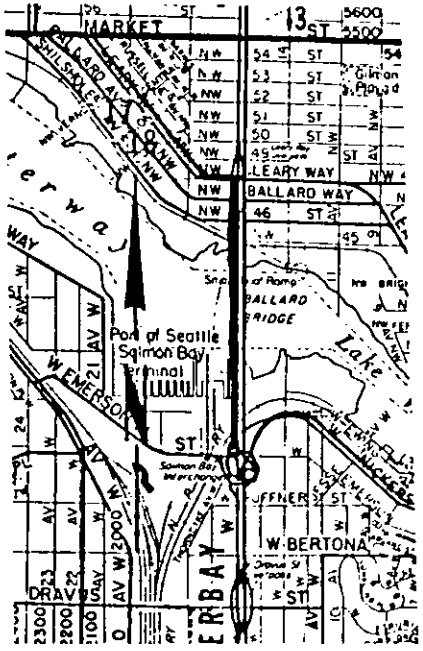
The design engineers in Seattle articulated the importance of aesthetics in city bridge design. On April 20, 1914 the city engineer wrote a letter to the city council: "of late years, it is recognized that it may be possible to secure graceful and pleasing lines, even in steel structures, without spending any large additional amount of money. It is fortunately possible owing to the height at which our bridges will be built above the water level to secure equal mechanical efficiency with a well balanced and pleasing effect." D.R. Huntington, City Architect, was responsible for the architectural treatment of the piers of the three bascule bridges. The massive, concrete piers of the University Bridge and the handsome towers on the Fremont Bridge provide an appropriate architectural frame for the passageway between Puget Sound and Lake Washington. However, the architectural treatment of these three bascule bridges do not equal the monumental stature of the cross-girder bascule bridge built across the canal at Montlake Avenue in 1924.

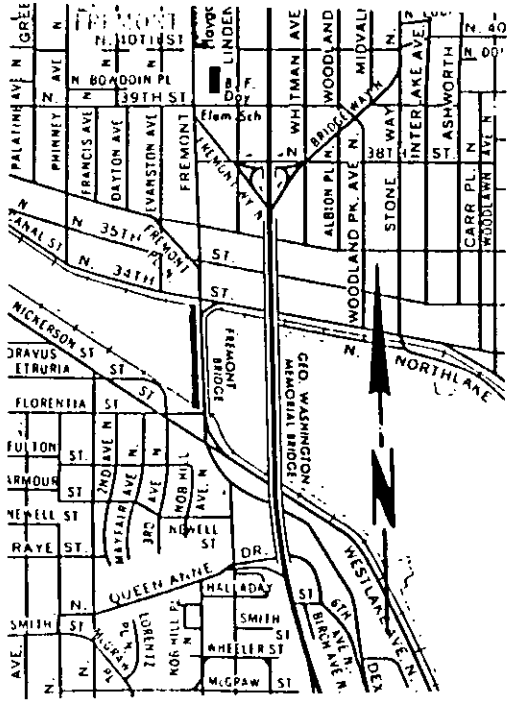
References (continued)

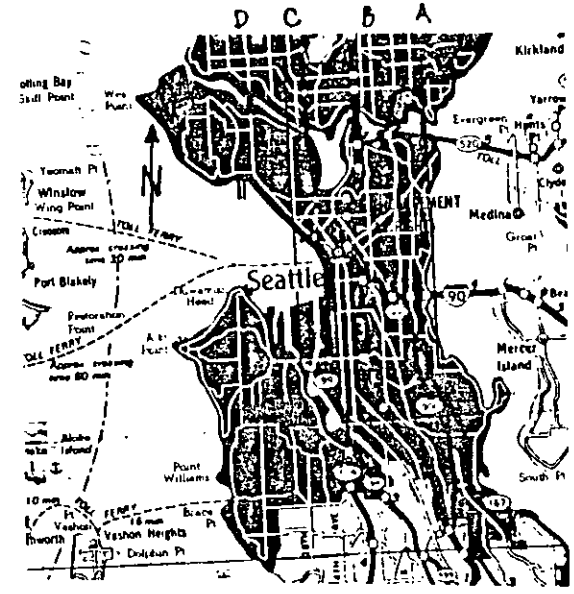
F.A. Rapp, "Heavy Foundation Work for Bascule Bridge at Seattle," Engineering News-Record, 15 April 1920, pp. 774-776.
Letter from City Engineer to City Council, April 20, 1914.

25. Sketch Map of Location









A Montlake Avenue Bridge
B University Bridge
C Fremont Bridge
D Ballard Bridge

50
51
52

UNIVERSITY BRIDGE SEATTLE

KI0223

17 2 1

17 2 4

17 2 7

17 2 2

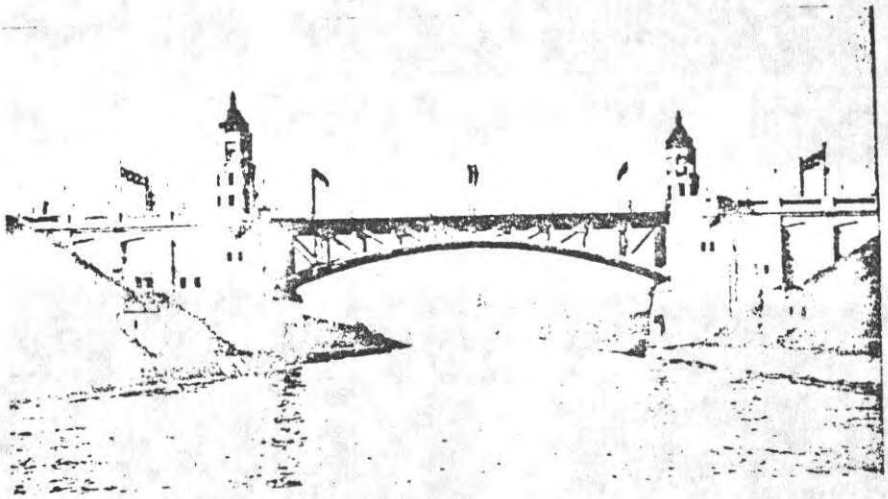
17 2 5

17 2 8

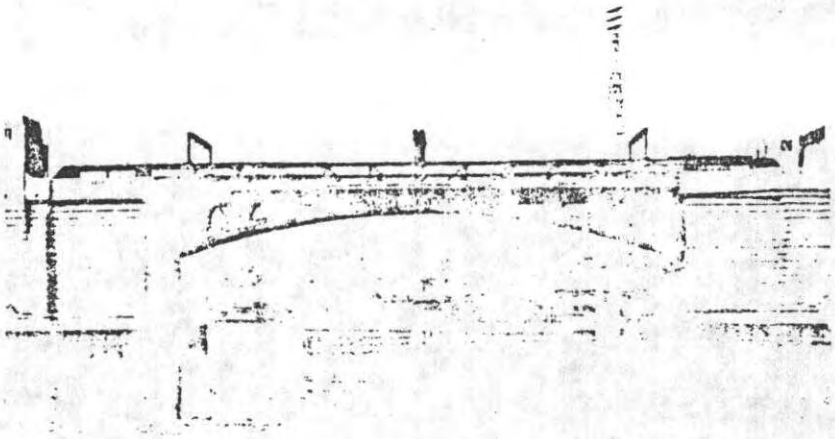
17 2 3

17 2 6

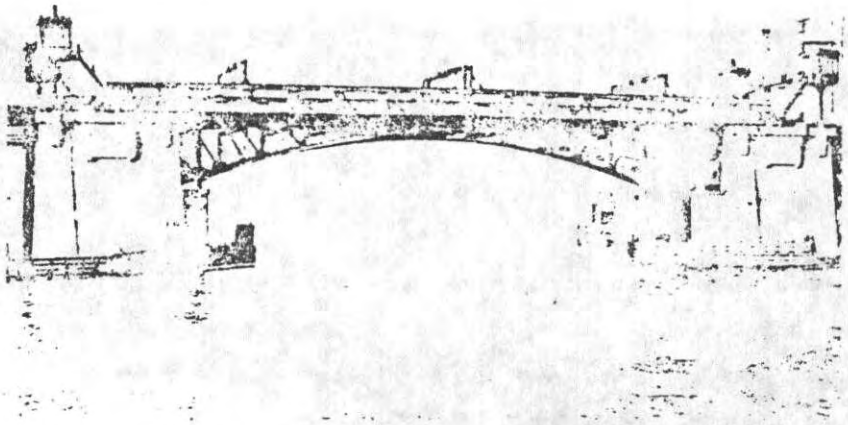
CANAL BRIDGES



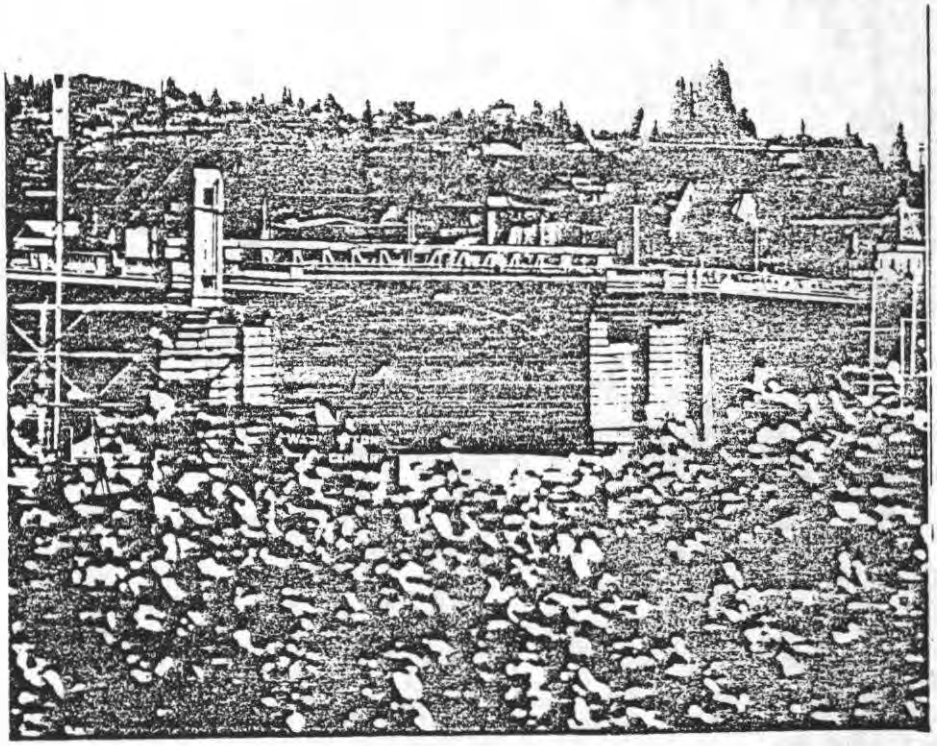
Montlake Bridge



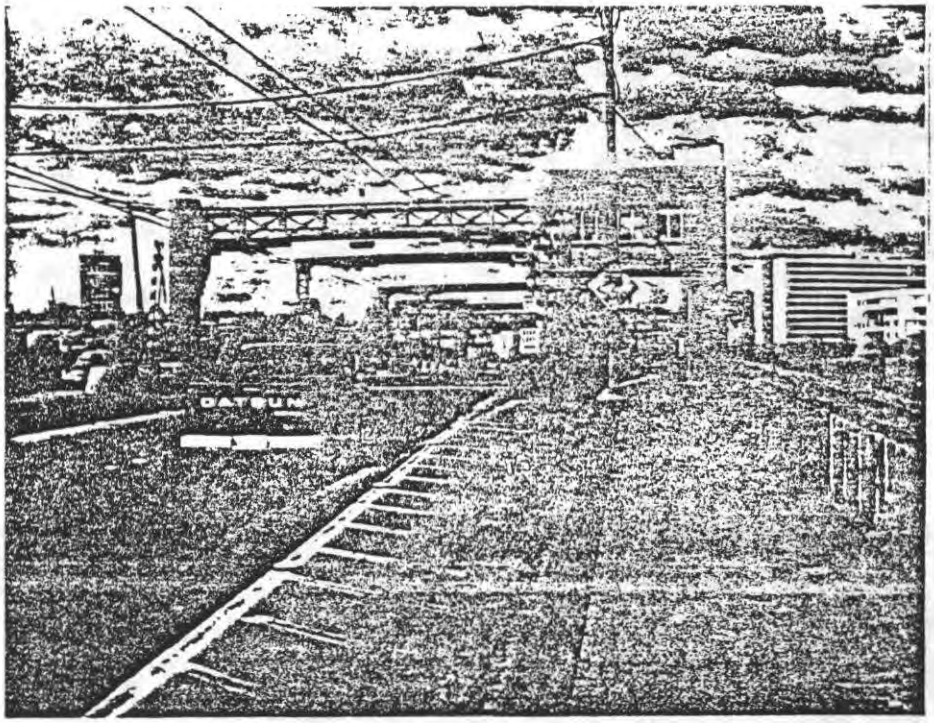
University Bridge



Ballard Bridge



University Bridge,
side elevation, looking northwest



University Bridge,
looking northeast

NPS Form 10-900
(Oct. 1990)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions i *How to Complete the National Register of Historic Places Registration For* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for 'not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instruction. Place additiona entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter or computer, to complete all items.

1. Name of Property

historic name: Lake Washington Ship Canal Bridge

other names/site number: Bridge Number 5/570

2. Location

street and number: Interstate 5 through downtown Seattle and over Lake Washington Ship Canal N/A not for publication

city or town: Seattle X vicinity

state: Washington county: King County zip code:

3. State/Federal/Tribal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this X nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally X statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency or Tribal Government

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title Date

State or Federal agency or Tribal Government

4. National Park Service Certification

I hereby certify that the property is: Signature of the Keeper Date of Action

- ☐ entered in the National Register.
  - ☐ See continuation sheet.
- ☐ determined eligible for the National Register.
  - ☐ See continuation sheet.
- ☐ determined not eligible for the National Register.
- ☐ removed from the National Register.
- ☐ other. (explain:)

5. Classification

Ownership of Property
(Check as many boxes as apply)

- [ ] private
- [ ] public-local
- [X] public-State
- [ ] public-Federal

Category of Property
(Check only one box)

- [ ] building(s)
- [ ] district
- [ ] site
- [X] structure
- [ ] object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
		buildings
		sites
1		structures
		objects
1	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

Bridges and Tunnels Built in Washington State, 1951-1960

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

Transportation

Current Functions
(Enter categories from instructions)

Transportation

Historic Subfunctions
(Enter subcategories from instructions)

Road-Related

Current Subfunctions
(Enter subcategories from instructions)

Road-Related

7. Description

Architectural Classification
(Enter categories from instructions)

No Style

Materials
(Enter categories from instructions)

Foundation Concrete
Other Steel

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

X **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

B Property is associated with the lives of persons significant in our past.

X **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

D Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations

(Mark "x" in all the boxes that apply.)

Property is

A owned by religious institution or used for religious purposes..

B removed from its original location.

C a birthplace or grave.

D a cemetery.

E a reconstructed building, object, or structure.

F a commemorative property.

X **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Engineering
Transportation

Period of Significance

1958 - 1960

Significant Dates

1961
1958

Significant Person

(Complete if criterion B is marked above)

N/A

Cultural Affiliation

Architect/Builder

WA State Department of Highways, Designer
Scheurnann and Johnson, Builder
Allied Structural Steel Company, Builder

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.

Previous documentation on file (NPS:)

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested.
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey
- ☐ recorded by Historic American Engineering Record

☐ See continuation sheet for additional HABS/HAER documentation.

Primary location of additional data:

- X State Historic Preservation Office
- X Other State Agency (Repository Name: WSDOT)

10. Geographical Data

Acreage of Property: 1.00

UTM References

(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing		Zone	Easting	Northing
1	10	550977	5277714	3			
2	10	550977	5277846	4			

☐ See continuation sheet

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title: Oscar R. "Bob" George, Bridge Engineer

organization: Washington State Department of Transportation / Environmental Affairs Office date: 6/30/2001

street & number: PO Box 47332 telephone: (360) 570-6639

city or town: Olympia state: Washington zip code: 98504-7332

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name: Washington State Department Of Transportation

street & number: PO Box 47300 telephone: 360-705-7000

city or town: Olympia state: Washington zip code: 98504-7300

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 *et seq.*).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspec of this form to the Chief, Administrative Program Center, National Park Service, 1849 C Street NW, Washington DC 20240; and the Office of Managemen and Budget, Paperwork Reductions Projects (1024-0018), Washington, DC 20503.

US GOVERNMENT PRINTING OFFICE : 1993 O - 350-416 QL 3

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

The Lake Washington Ship Canal Bridge carries twelve lanes of traffic on north-south Interstate 5 through downtown Seattle and high over the busy Lake Washington Ship Canal. The 4,429-foot bridge spans the long gap created by the canal between Seattle's North Capitol Hill District to the south and the University District to the north. As the bridge crosses the canal, it has a 2,294 feet double-deck configuration. The upper deck carries four lanes of traffic in each direction, while four lanes carried on the lower deck are reversible lanes directed either northbound or southbound to handle peak directional traffic.

The bridge is best described in three separate sections as a south approach, a "main crossing" and a north approach. The south approach, beginning just south of Seneca Street, has three elevated sections: the first carrying four northbound lanes towards the canal, the second carrying four southbound lanes away from the canal, and the third carrying four central reversible lanes down towards the lower deck of the main crossing. Starting at the south end, eight reinforced concrete slab spans varying in length from 28 feet to 36 feet carry the separated north and southbound lanes. The lanes continue to the north on separate converging bridges, each carried by nine reinforced concrete box girder spans with alternating span lengths of 90 and 120 feet, ending at the south end of the main crossing of the bridge. In the seventh span, the lanes are joined together on a single full-width roadway. The reversible lanes, starting at the south end, are supported on sub-grade material until they reach a location at the north end of the third box girder spans carrying the northbound and southbound lanes. From this point, the reversible lanes are carried north on six reinforced concrete box girder spans, supported on struts extending between the pier columns of the adjacent northbound and southbound spans, to their junction with the south end of the main crossing.

The southerly concrete slab span is carried on an end wall pier supported on a concrete spread footing. Intermediate supports for the slab spans are three rectangular column piers, with each column founded on an individual spread footing. Pier supports for the concrete box girder spans are two or three square concrete columns, with a common cap. The columns taper out in both directions, and the column corners are inset for architectural effect. Each column is supported on an individual concrete spread footing founded on multiple concrete piles.

The "main crossing" section of the bridge consists of three simply supported and three continuous riveted steel Warren truss spans. These spans function as a deck truss for the northbound and southbound lanes, and as a through truss for the reversible lanes. This section of the bridge has a main 552-foot span, flanked by and continuous with a 347 foot 8 inch anchor span at each end; two southerly spans, 348 feet 4 inches long and 349 feet 3 ½ inches long; and one 348 feet 7 ½ inch long northerly span. The lower chord of the main span has a parabolic shape. Depth of the main span truss varies from about 40 feet 6 inches at the centerline of span, where it provides 135 feet of vertical clearance to the channel below, to 70 feet 6 inches at the piers. The lower chords of the flanking spans rise in a parabolic curve from the pier to resume a 40 foot-6 inch depth at the end of the span. The two southerly spans and the northerly span have a constant 40 foot 6 inch depth. The main span truss is divided into sixteen 34 foot 6 inch panels. Each of the other truss spans are divided into ten 34 foot 6 inch panels. All trusses are 68 feet 6 inches wide.

All truss chord and web members are box shape, and constructed from steel plates and rolled steel angle or channel sections, riveted together. K-bracing within each panel at the upper and lower chords, provide lateral stability to the trusses. At each panel point, a 7-foot deep steel "I" section floor beam, built from a web plate and double-angle flanges with cover plates, extends between the lower portions of the outer trusses. The floorbeams support seven equally spaced longitudinal stringers in each adjacent panel. This floor system supports a 60-foot wide reinforced concrete slab roadway, carrying reversible-lane traffic through the truss. A second floorbeam spans transversely between the outer trusses at each panel point. This floorbeam is similar in configuration to the lower floorbeam in the area between the trusses except that it is about 9 feet deep. Also, the upper floorbeam cantilevers out an additional 23 feet 9 inches from each truss for an out-to-out length of 116 feet. The upper floorbeams support thirteen longitudinal stringers in each adjacent panel (seven between the exterior

truss sections and three on each cantilever). Floorbeams and stringers support the 112-foot wide reinforced concrete slab roadway carrying the northbound and southbound traffic lanes on the bridge. Floorbeams and stringers for both the upper and lower decks have stud shear connectors welded to their top flanges and act compositely with the roadway slabs in carrying traffic loads.

Supports for each of the truss spans are two column piers, varying in height from 90 to 139 feet from the pier top to the base of the footing or seal. Each column is square with recessed corners and tapers out in each direction from its top dimension. A 5-foot wide, variable depth concrete strut connects the tops of the columns. The bottom of the strut has an arched shape for architectural effect. Each column rests on an individual concrete spread footing.

The north approach section of the bridge ends at the north end of the northerly truss span. Starting at this location, the northbound and southbound lanes extend on a single structure for two reinforced concrete box girder spans about 100 feet and 130 feet in length. The northbound and southbound lanes then diverge and are carried on separate bridges. Seven additional reinforced box girder spans, 75 feet to 100 feet long, carry the southbound lanes, while nine similar spans carry the northbound lanes until they once again become at-grade roadways. Three reinforced concrete box girder spans (span lengths of 100 feet, 130 feet, and 100 feet) carry the reversible lanes north to grade, while a ramp, carried by four additional concrete box girder spans curves to the east and lands on East 42nd Street.

Pier supports for the concrete box girder spans are two square concrete columns with a common cap. The columns taper out in both directions and column corners are inset for architectural effect. Each column is supported on an individual concrete spread footing. Ramp piers are supported on concrete columns resting on concrete spread footings.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Begun in 1958, the Lake Washington Ship Canal Bridge is eligible for listing in the National Register of Historic Places under Criterion A for its association with bridge building in Washington in the 1950s as per the "Bridges and Tunnels Built in Washington State, 1951-1960" MPD. The bridge is also eligible under Criterion C for its type, period, materials, and method of construction. It is also noteworthy for its association with the historic Seattle freeway construction project, as well as the long history of the Ship Canal. For its exceptional engineering and role in local transportation development, the Ship Canal Bridge meets the threshold established by Criteria Consideration G for properties not yet 50 years of age.

The significant engineering features of the bridge are its double-deck spans, including nine reinforced concrete box girder spans, and five steel truss spans, providing an innovative approach to handling peak traffic loads with reversible lanes. The steel truss spans are the only steel double-deck bridge spans in Washington. The double-deck concrete box girder spans were preceded by the construction of the mile and one-half long double-deck concrete segment of the Alaskan Way Viaduct, constructed between 1950 and 1958. However, the configuration of the spans on the two bridges is quite different.

When constructed in 1958 to 1961, the 552-foot long main span was the longest steel deck truss span in Washington. This record stood until 1992, when the span was exceeded by the 600-foot deck truss span on the Hoffstadt Creek Bridge on State Route 504, the Highway leading to Mount St. Helens' National Volcanic Monument.

Floorbeams and stringers carrying the upper and lower decks have stud shear connectors welded to their upper flanges. The steel components act compositely with the roadway slab in carrying traffic loads. This was one of the first uses of shear connectors in the state.

The construction of the Lake Washington Ship Canal Bridge constituted the largest project on the historic Seattle Freeway, eventually to become Interstate 5. The long awaited freeway project began in 1958 with award of a contract for the construction of piers for this bridge.

This is the sixth and largest bridge to cross the historic Ship Canal.

Historic Context:

Seattle Pioneer Judge Thomas Mercer is credited with suggesting, at a Fourth of July picnic in 1854, the building of a canal between the fresh waters of Lake Washington and the saltwater of Puget Sound.(1) Mercer proposed the names for Union Bay and Lake Union, envisioning their eventual connection as a canal.(2)

Six years later Harvey L. Pike dug a shallow ditch at the current Montlake Cut to allow passage of logs from Lake Washington to the lower end of Portage Bay. This ditch was widened and deepened by the Lake Washington Improvement Company, under the direction of Judge Thomas Burke, in 1883. Then in 1867 the U. S. Navy endorsed the proposal for a canal to link Puget Sound and Lake Washington to provide their ships with a fresh water haven. At this time the only route from Elliott Bay to Lake Washington was via the Black River Slough and the Duwamish River, suitable only for shallow-draft boats and barges.

While the Navy continued to urge construction of a canal, delays in the project led the Navy to establish its shipyard near Bremerton, rather than on Lake Washington. The U. S. Army Corps of Engineers joined those in support of the canal in 1891.(1)

In 1895 former Territorial Governor Eugene Semple urged a controversial southern route through Beacon Hill for the canal, but supporters of the northern route quashed those efforts. In 1900, the Washington State Legislature endorsed the northern

route, and by 1906, the Federal Government had begun deepening the channel leading from Shilshole Bay to the Ballard wharves. Developer James A. Moore received Congressional approval to organize a private company to begin work on the canal. As new commander of the U.S. Army Corps of Engineers in 1906, General Hiram M. Chittenden urged completion of the canal, even though he did not think highly of developer Moore's efforts. Chittenden continued his advocacy after his retirement in 1908 and helped convince Congress to appropriate the $2,275,000 needed for construction of locks for the canal, which they did on June 25, 1910. Construction began on November 10, 1911, and continued until October 21, 1916, when a temporary dam at the Montlake cut was breached, uniting Lakes Washington and Union and lowering the level of Lake Washington by nine feet. The "Government Locks" and waterway were opened for boat traffic on May 8, 1917. The project cost had grown to more than $3 million. On July 4, 1917, a ceremonial flotilla, led by Admiral Perry's polar flagship Roosevelt passed through the canal.(1)

Unfortunately, when the locks and canal opened in 1917, Hiram Chittenden had been confined to a wheelchair by a stroke. (He died later that year.) In 1956, the Corps of Engineers renamed the Ballard locks to honor his memory. The locks and canal have since been designated as a National Historic District.(1)

With the opening of Lake Union and Lake Washington via the canal, Seattle has become a focal point for commercial ships and pleasure craft in the interlocking system of protected waterways formed by Puget Sound. The development of the extensive shorelines of Lake Washington and Lake Union would fuel Seattle's economy for decades.

Advanced planning for a Seattle Freeway (known today as I-5) began with topographic studies in 1931, although studies had been made well before that time. In September 1946, the Traffic Engineering Division of the city of Seattle prepared a plan for a north-south freeway through the city. Planning became more serious in 1947 when an origin and destination study was conducted by the State Highway Department in cooperation with the city of Seattle and the U. S. Bureau of Public Roads. Preliminary design work began in 1950 by the State Department of Highways assisted by the Seattle Engineering Department. As the work went on, it was concluded that this would be a costly proposition, well beyond what could be handled with available highway funds.(3)

The concept of a toll road emerged as a way of financing the project. A study by the Washington State Council for Highway Research found the plan for a toll road was feasible. As a result of this report in 1953, the Washington State Legislature enacted laws authorizing the Washington Toll Bridge Authority to study the financial and engineering feasibility of building and operating a toll road between Tacoma, Seattle and Everett. The Toll Authority hired the New York traffic engineering firm, Coverdale and Colpitts, to conduct the study. Their recommendation was to finance the cost of the road through a $227 million bond issue until the road was underway and earning money. In the meantime, the 1955 Legislature authorized construction of the toll road. The next step was to determine if enough traffic would use the road to support its cost. Coverdale and Colpitts submitted a report in April 1955, indicating the toll road was feasible, but they recommended a $5 million guarantee from the motor vehicle fund to ensure salability of the bonds. Potential bond buyers wanted the toll road law tested in the courts. After hearing the case, the Thurston County Superior Court held up the law to be constitutional and it was appealed to the State Supreme Court for a final determination. Then on December 4, 1955 the Supreme Court ruled that the 1955 Toll Road Act was unconstitutional. Shortly after the ruling, the Washington Toll Bridge Authority adopted a formal resolution, turning the responsibility for building the new road, as a free facility, over to the State Highway Commission.(4)

By this time, Seattle was suffering from acute traffic congestion. Traffic entering the city from the south spread itself out into a number of four-to-six-lane streets leading to downtown Seattle. All went through the industrial area, mixing with heavy truck traffic and heavy peak hour automobile and bus traffic. Traffic signals further impeded free traffic flow. With the principal streets through Seattle carrying heavy volumes, traffic speeds during peak hours slowed to eight to ten miles per hour.(5)

Enactment of the Federal Aid Highway Act of 1956 renewed hope for the freeway project. Under the provisions of the act, the freeway could be built as a free facility using federal funds plus state matching funds as a part of the National Interstate Highway Program. The State Department of Highways moved quickly to start the project.

In early 1958, the Department of Highways' Bridge Division began design of the bridge. The first contract on the Seattle Freeway project was awarded on August 5, 1958, to Scheumann and Johnson of Seattle, for construction of the seven piers supporting the truss spans for the Ship Canal Bridge for about $964,000. This was followed on January 20, 1959 with the award of the contract for construction of the six steel truss spans to Allied Structural Steel Company of Chicago, Illinois, for about $6,944,000. Structural steel for this project was fabricated in three locations under the overall coordination of the prime contractor. The fabricators were Midland Structural Steel Company of Hammond, Indiana, Clinton Bridge and Iron Works of Clinton, Iowa, and Isaacson Iron Works of Seattle.(6)

Following construction of the piers supporting the steel truss spans, erection of the more than 11,000 tons of steel for the spans began on May 10, 1960. The prime contractor had sub-contracted the steel erection to the Industrial Construction Company of Minneapolis, Minnesota. All the steel, except the stringers, was shipped to Seattle by rail. Materials to be erected over land were then moved by truck to the bridge site. Material erected over water was yarded at the Foss Launch and Tug Company site on Lake Union, and moved to the bridge site on barges. Two 125-ton cranes on shore unloaded trucks and placed falsework and steel whenever possible. All steel beyond the limits of the cranes was hoisted into position from travelers operating on top of the upper deck. The three simply supported truss spans and the anchor spans for the three-span continuous unit were erected on falsework. The 552-foot main span was erected using cantilever construction. The center section of the three-span continuous unit was jacked into position and closed on January 14, 1961.(6)

On February 18, a contract for construction of the north approach structures had been awarded to MacRae Brothers from Seattle for just under $1,840,000. This was followed by award of a contract to S. S. Mullen from Seattle for construction of the south approach structures for just under $2,480,000. The multiple contracts proceeded at full speed until completion of the bridge in the fall of 1961. The total cost of the four contracts on the bridge was just over $12.2 million.

George H. Andrews, the State Highway Department's Urban Bridge Engineer, was in overall charge of the construction project. (Andrews was later to become Director of the State Department of Highways.) Ed Wilkerson was the state's resident engineer.(6)

The new bridge was completed for more than a year before it was opened to traffic in December 1962. Delays caused by labor strikes, relocation of utility lines, and a controversial proposal for covering and developing areas above the downtown freeway, had put construction of adjacent parts of the Seattle freeway far behind schedule. Historian Paul Dorpat summed it up by saying, "Consequently, the bridge stood silently towering above the channel and the neighborhoods, all finished and freshly painted but with nothing to do."(7) During planning for the 1962 Seattle World's Fair, the World's Fair Commission, the State Department of Highways, and Seattle City Transit found a job for the "unemployed" bridge—they proposed to use it as a parking lot for up to 2500 cars. Because the bridge was more than two miles from the site of the fair, Seattle City Transit made plans to operate a shuttle between the bridge and the fairgrounds. The plan for this $12.2 million parking lot was abandoned when it was determined that a flurry of new private parking areas, provided closer to the fairgrounds, would be sufficient to handle the anticipated crowds.(7,8)

The multi-million dollar Seattle Freeway project was the largest transportation project in the state's history, presenting unprecedented problems and unique solutions. Contributing to the growth and economic success of the city of Seattle that was yet to come, the project began with the Lake Washington Ship Canal Bridge.

Engineering Context:

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

The double-deck configuration of the Lake Washington Ship Canal Bridge enables twelve lanes to pass through a relatively narrow transportation corridor in the heart of Seattle, with four lanes used in a reversible mode to flow in the direction of peak traffic. Use of a steel deck truss superstructure over the canal, not only handily accommodated the lower deck but also allowed the use of longer spans and fewer tall piers (canal piers reached a height of almost 140 feet).

The design also provides an appearance complementing the historic Aurora Avenue (George Washington Memorial) Bridge (listed in the National Register) that crosses the Ship Canal a mile and one-half to the west.

The composite design of the floor system for the upper and lower decks on this bridge was an early use of this concept in the state. Composite design was to become a standard on steel girder superstructures in the future.

United States Department of the Interior
National Park Service

National Register of Historic Places
Continuation Sheet

(1) Walt Crowley, "Lake Washington Ship Canal- A Snapshot History," HistoryLink.org web page, July 1999.

(2) Kay Conger, "Seattle Freeway Bridge to be Sixth Canal Crossing," Washington State Department of Highways, Highway News, Volume 7, Number 6, January-February 1958, pp. 11-13.

(3) Unauthored article, "The Seattle Freeway," Washington State Department of Highways, Highway News, Volume 9, Number 8, September-October 1961.

(4) Unauthored article, "Tacoma-Seattle-Everett Road – Free Instead of Toll," State Department of Highways, Highway News, December 1958, pp.12, 13, 29.

(5) Unauthored article, "Director Discusses Seattle Freeway, Needs of Heavy Traffic," State Department of Highways, Highway News, March-April 1958, pp. 14-17.

(6) George H. Andrews, Urban Bridge Engineer, Washington State Highway Department, "Steel Bridge-May to January," Pacific Builder & Engineer, June 1961, pp. 86-87.

(7) Paul Dorpat and Genevieve McCoy, Building Washington- A History of Washington State Public Works, Tartu Publications, Seattle, 1998, p. 131.

(8) Kay Conger, "13-Million-Dollar Parking Lot," Washington State Department of Highways, Highway News, Volume 9, Number 8, September-October 1961, p. 4.

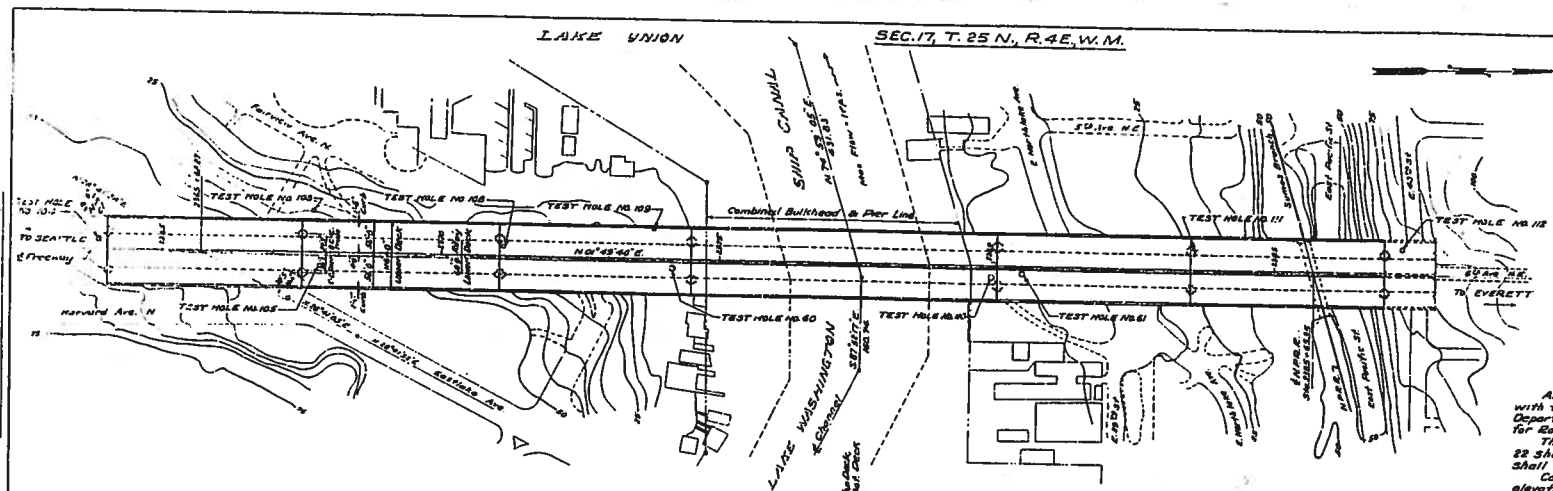
United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

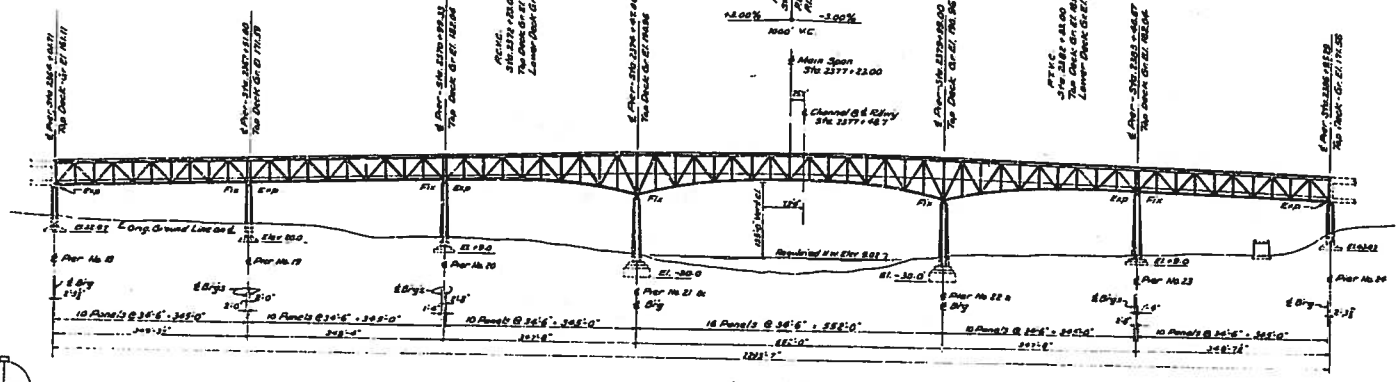
Verbal Boundary Description
Longitudinal Boundaries: Extends to the pavement seats of the three ramps at either end of the bridge, and to the pavement seat of the reversible lanes ramp at the north end of the structure.

Lateral Boundaries: Extend to the edges of the structure.

Verbal Boundary Justification
The boundaries include all contributing elements and non-contributing elements of the structure.



PLAN



ELEVATION

DATUM

CITY OF SEATTLE

GENERAL NOTES

All material and work shall be in accordance with the requirements of the State of Washington, Department of Highways, Standard Specifications for Road and Bridge construction, dated July 1957.

The concrete in the seals of Piers Nos. 21 and 22 shall be Class H mix. All other concrete shall be Class F mix.

Concrete seals are designed for a water elevation of 9.02 feet. After seals are poured, cofferdams shall not be unwatered when the water surface is above elevation 9.02 and provision shall be made to flood the cofferdam in the event the water surface is above the design elevation.

The maximum soil pressure is four (4) tons per square foot.

APPROXIMATE QUANTITIES

Structure Excavation	34,000	Cu. Yds.
Mechanical Tamper	630	Hrs.
Shoring & Cribs, or Extra Excavation	Lump Sum	
Concrete Class F	12,520	Cu. Yds.
Concrete Class H	6,600	Cu. Yds.
Steel Reinforcing Bars	1,733,000	Lbs.
Structural Carbon Steel	Lump Sum	

LOADING H 20-S16

PRIMARY STATE HIGHWAY NO. 1
SEATTLE FREEWAY
LAKE WASHINGTON SHIP CANAL BRIDGE
PIERS NO'S 18 TO 24 INCLUSIVE
KING COUNTY

LAYOUT

WASHINGTON STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
OLYMPIA, WASHINGTON

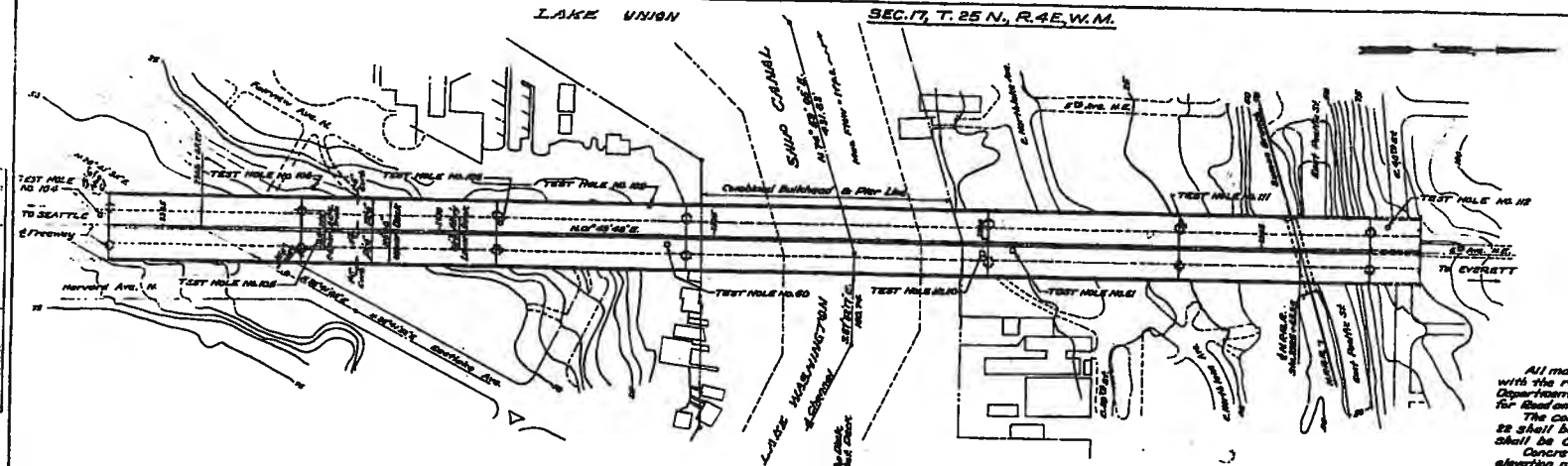
A. L. Crosby, Chairman
R. R. Stevens, Member
O. R. Evans, Member
R. R. Stevens, Member
E. T. Anderson, Member

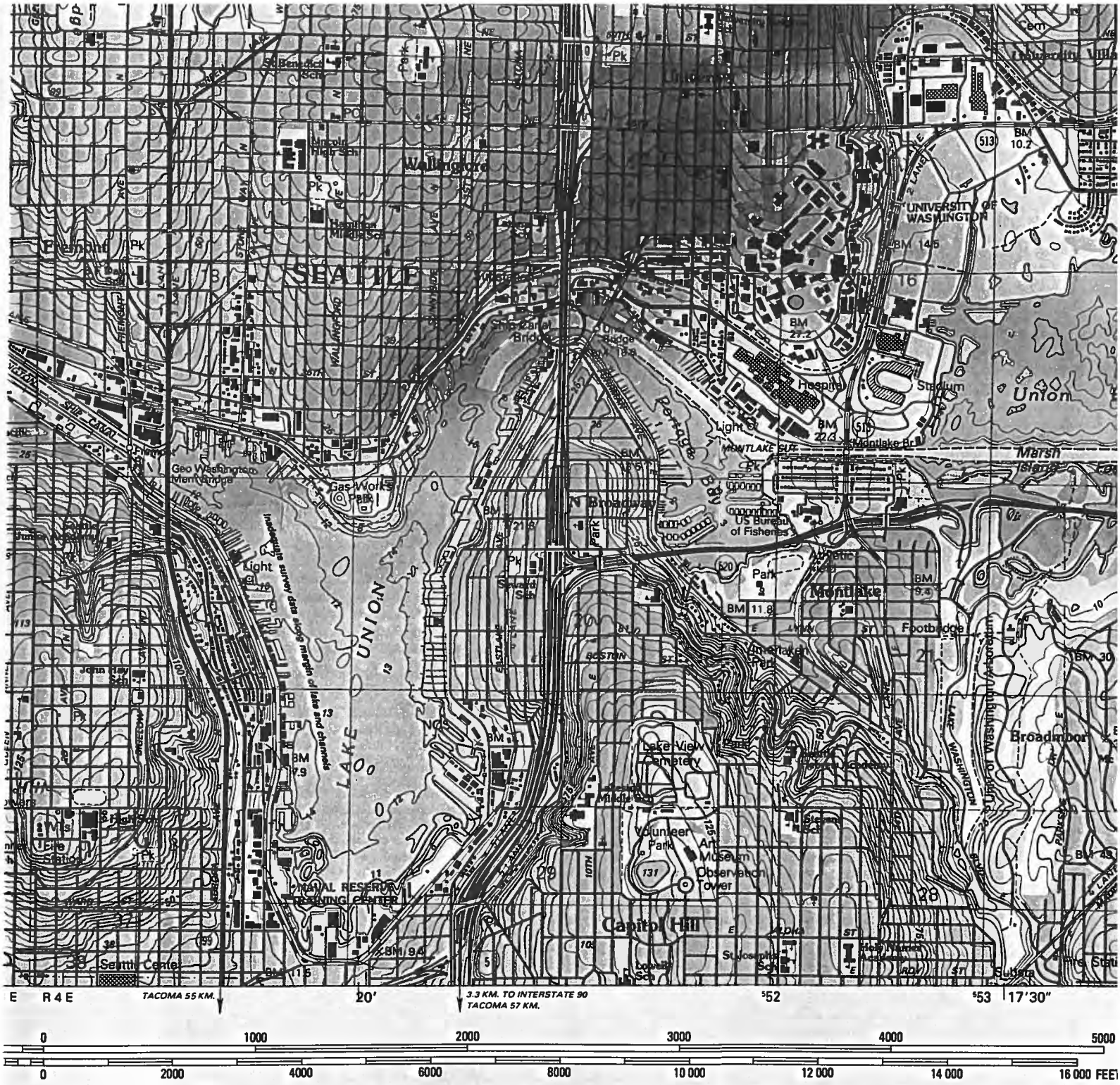
APPROVED July 3, 1958
DIRECTOR OF HIGHWAYS
DIVISION NUMBER 5770

SHEET 10 OF 17 SHEETS

159/8

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	WASH.	S-510(26)		10	17


LAKE UNION
SEC. 17, T. 25 N., R. 4 E., W.M.
SHIP CANAL
LAKE WASHINGTON
TO SEATTLE
TO EVERETT
TEST HOLE NO. 104
TEST HOLE NO. 105
TEST HOLE NO. 106
TEST HOLE NO. 108
TEST HOLE NO. 109
TEST HOLE NO. 110
TEST HOLE NO. 111
TEST HOLE NO. 112
Harvard Ave. N.
Fairview Ave. N.
Boylston Ave.
Bellevue Place
Bellevue Place
Bellevue Place



HYDROGRAPHIC SURVEY INFORMATION

SURVEY NUMBER	SURVEY DATE	SURVEY SCALE	SURVEY LINE SPACING (NAUT. MILES)
H-2608	1902	1:10,000	.02-.14
H-2609	1902	1:10,000	.06-.25
H-5709	1934-35	1:20,000	.05-.25
H-5710	1936	1:10,000	.10-.10
H-5711	1935	1:10,000	.02-.12
H-5724	1935	1:10,000	.02-.06
H-5846	1935	1:5,000	.01-.07
H-7076	1946	1:1,200	.10-02
H-9167	1970	1:5,000	.02-.05
H-9742	1978	1:10,000	.03-10
H-9747	1978	1:5,000	.01-.03
NOS CHART 18446 1:25,000 1978		NOS CHART 18447 1:10,000 1981	

Le Washington Ship Canal Bridge
th: 10 550977E 5277714N
th: 10 550977E 5277946N