

# Portage Bay Area - Existing Conditions Aerial



Scale: 1" = 100'

Washington State Department of Transportation

520

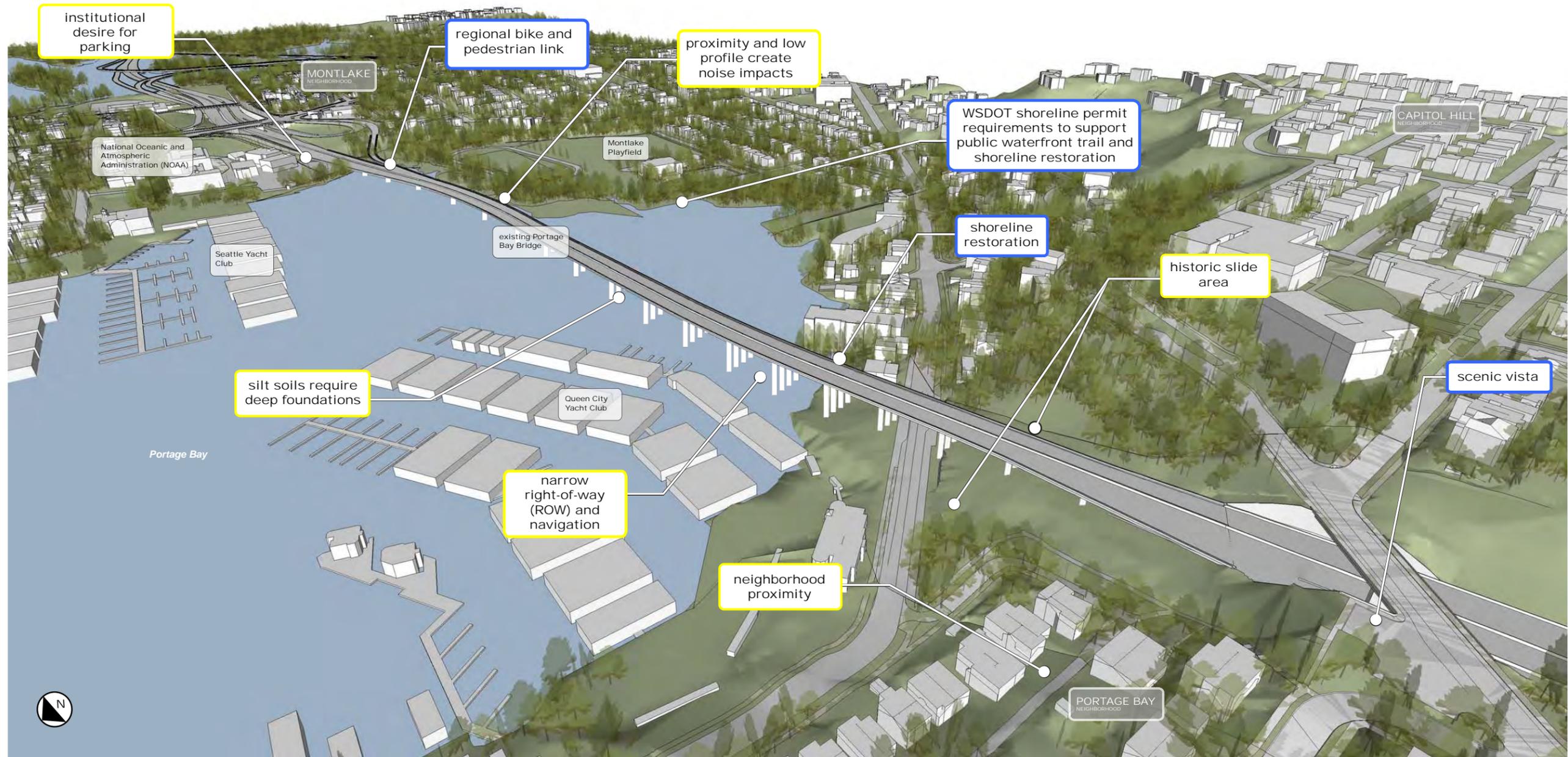
# Portage Bay Bridge - Existing Site Conditions and Future Opportunities

## Description

Portage Bay Bridge area is characterized by its historic residential neighborhoods, active waterways, well-used open spaces and parks, and a high volume of both motorized and non-motorized travel. Considerations for the

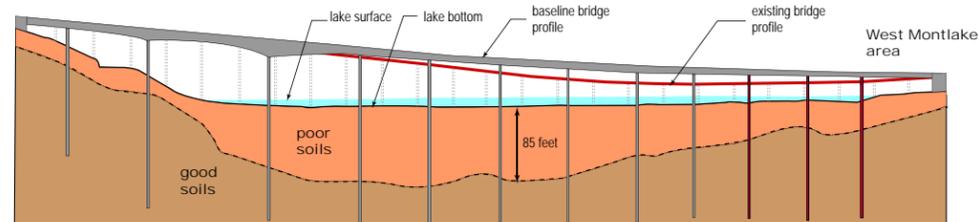
appropriate bridge size, location and type within this context include 1) building for difficult soil types on land and in Portage Bay itself, 2) preserving and enhancing views, 3) access to safe, efficient and attractive connections for

drivers, pedestrians and cyclists, 4) protecting and enhancing the shoreline and green network, and 5) establishing a contextual identity for the bridge.



## SOIL PROFILE

10th and Delmar area



## LEGEND

- Existing site conditions
- Opportunities

# Portage Bay Bridge - Baseline Design

## Description

Portage Bay Bridge connects from the Montlake area to the Roanoke area and the I-5 interchange. For the purposes of environmental analysis, the baseline design was assumed to be constructed as a cast-in-place box girder type bridge with faux arches applied on the west side of the bridge for aesthetic treatment.

### Over

- No overhead structures and no significant architectural character

### Under

- Beam bridge with variable span lengths at the east end
- Box girder bridge at the west end capable of supporting faux arches
- Maximum span length of 300 feet with column rows, most span lengths 160-200 feet, which will populate the waterway

### On

- Medium-thickness bridge deck
- Roadway alignment for six lanes, which includes general purpose lanes and a reversible transit/HOV lane in both eastbound and westbound directions
- Center-planted median
- Westbound managed shoulder for peak evening traffic

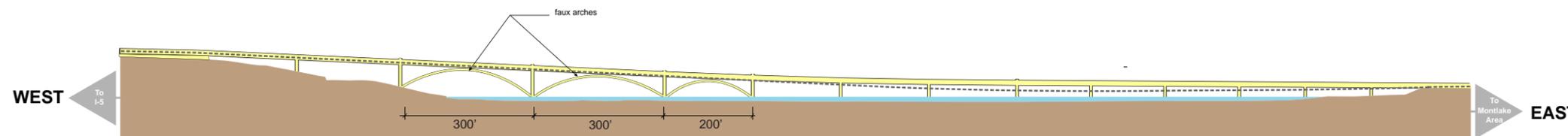
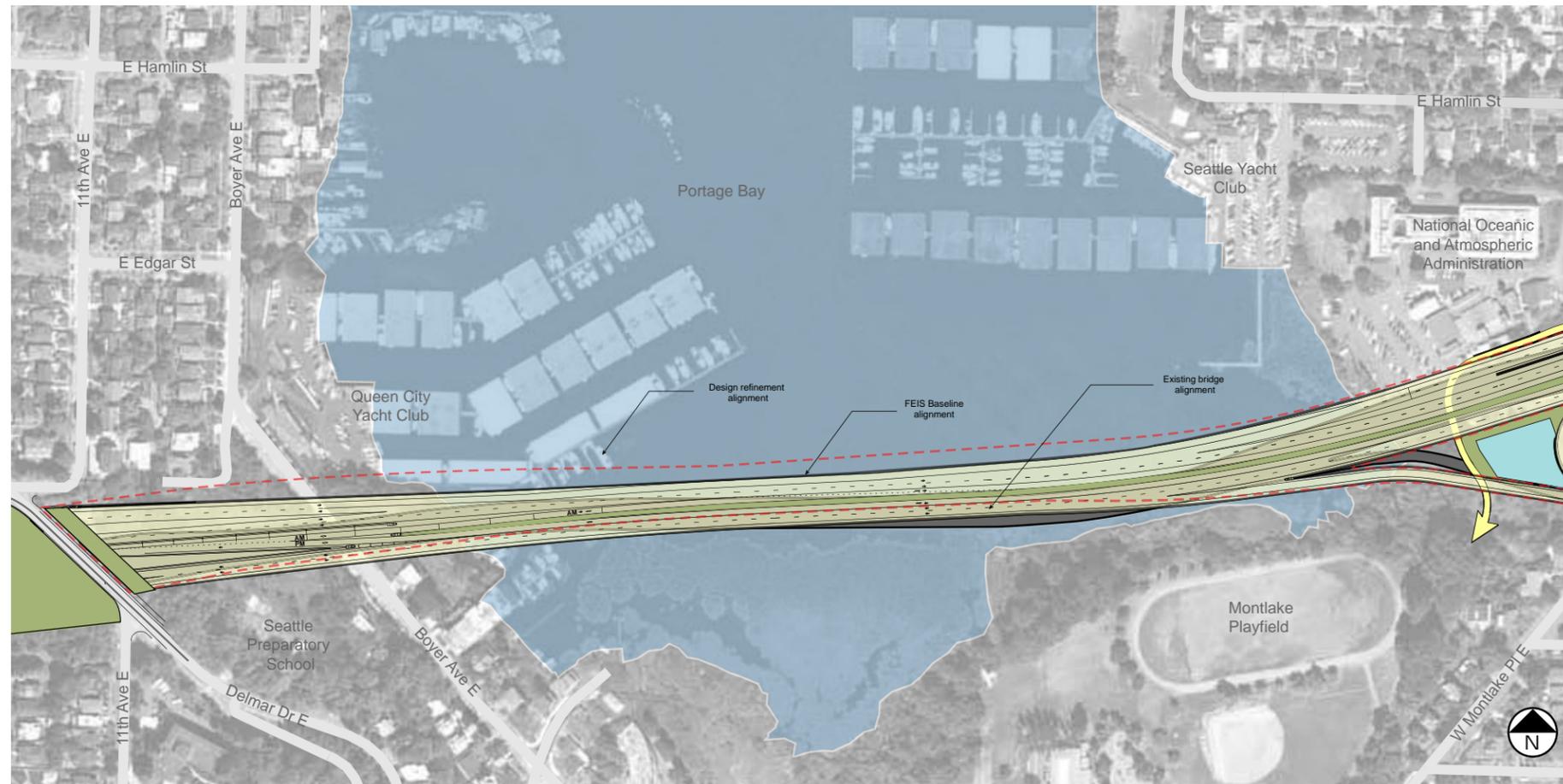
## Function

- Connect the SR 520 mainline facility to the I-5 interchange
- Enhance vehicular and non-motorized connectivity and mobility for neighborhoods and region
- Protect shorelines
- Improve safety of underbridge areas at West Montlake/Bill Dawson Trail and Boyer Avenue East

## Design Goals

- Preserve and enhance views to and from the Portage Bay Bridge
- Seek a narrow bridge width and minimal impacts upon the community and the environment
- Create a contextually appropriate signature bridge structure
- Reduce visual impacts and barriers to drivers, bicyclists and pedestrians

Baseline Bridge Alignment



Location Key



**NOTE:** Architectural illustrations are intended to describe the approximate type, size and location of bridge alternatives. Engineering analysis is ongoing.

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# Portage Bay Bridge - Box Girder Option

## Description

The box girder bridge design option maintains the roadway operations of the baseline while the alignment is shifted slightly to the north to ease constructability issues.

### Over

- No structure above bridge deck

### Under

- Box girder bridge at the west end with a maximum span length of 360 feet
- More structure under bridge

### On

- Thicker bridge deck with segmental construction
- Beam bridge to the east with variable span lengths
- Modified planted median

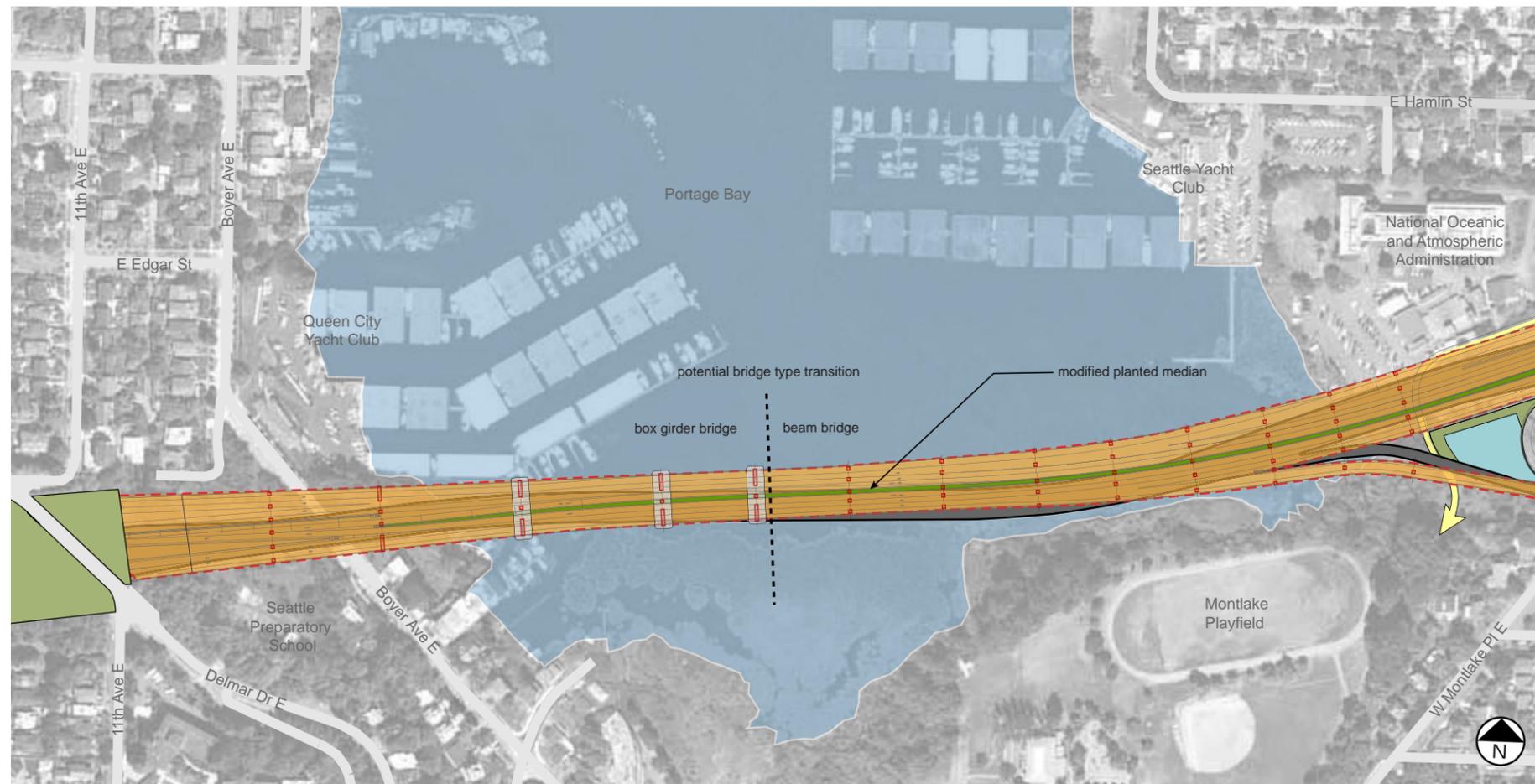
## Benefits

- Cost-efficient structure with moderate span lengths
- Variable depth at the columns provides curvilinear form

## Considerations

- Moderate span lengths create operational and construction impacts on west-end of bridge
- More in-water and hillside foundations in poor soils because more spans are required

## Bridge Footprint



## Location Key



## Precedents



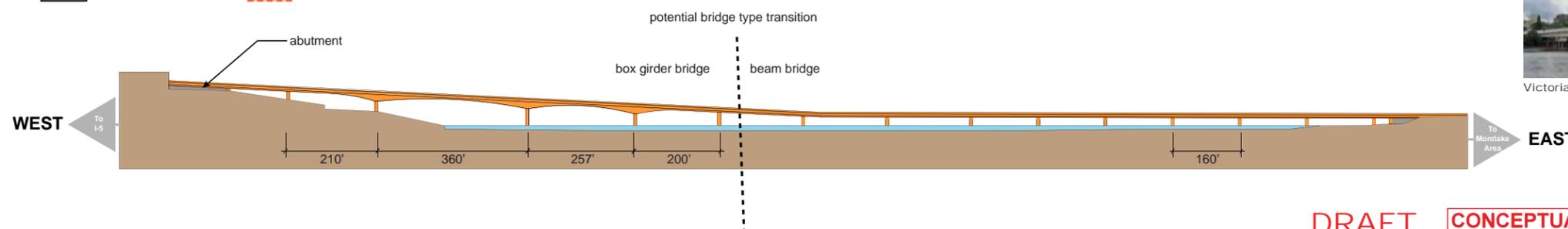
Folsom Dam Bridge Folsom, California



Queensborough Bridge Vancouver, BC



Victoria Bridge Queensland, Australia



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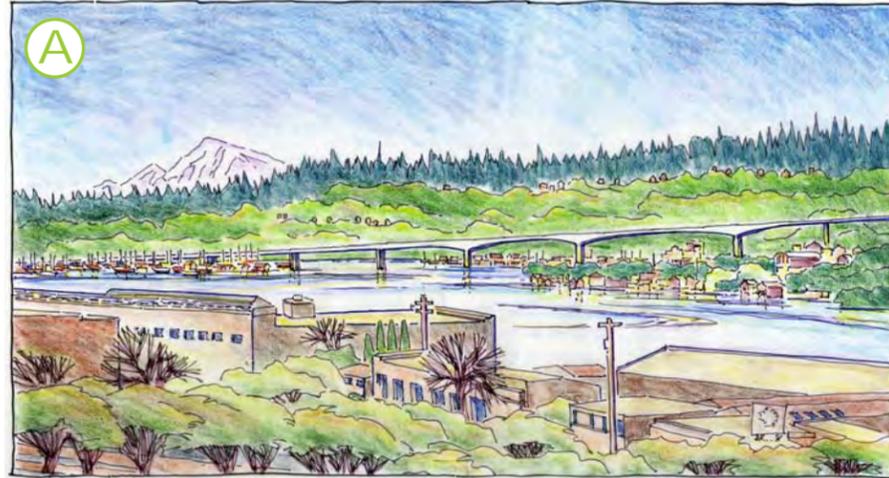
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# Portage Bay Bridge Views from Public Locations - Box Girder Option

Montlake Neighborhood and Mt. Rainier from University Bridge

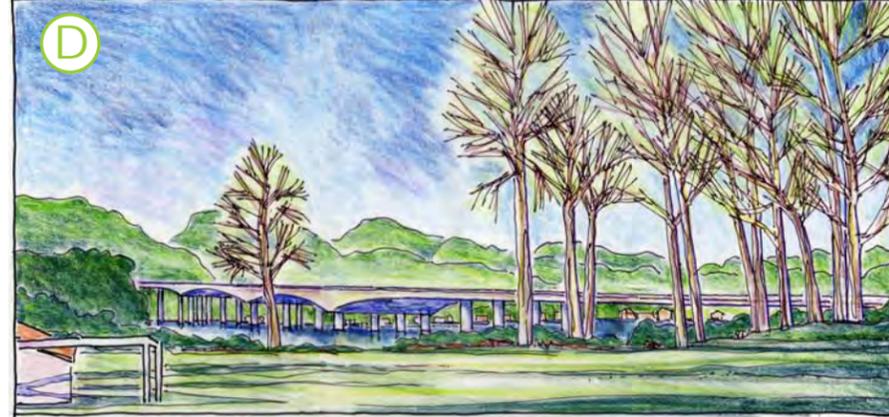


Existing View



Looking southeast from University Bridge

Portage Bay and Roanoke Neighborhood from Montlake Playfield

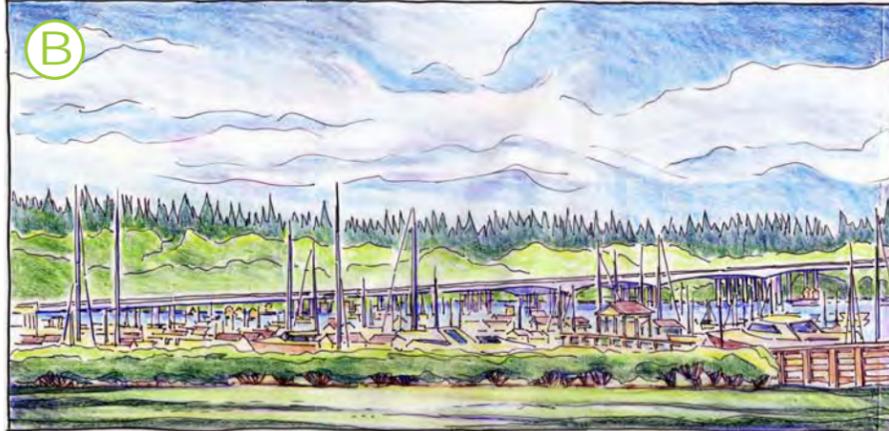


Existing View



Looking northwest from Montlake Playfield

Standing at West Montlake Park

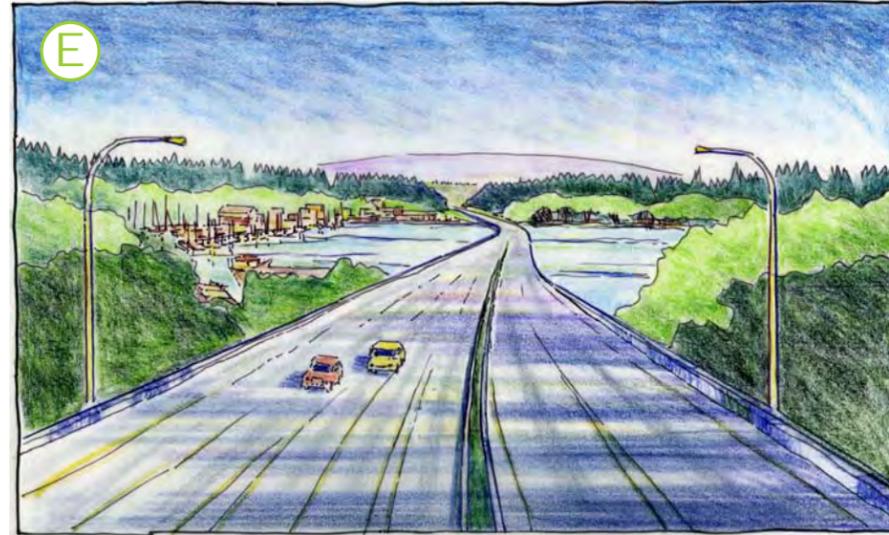


Existing View



Looking southwest from West Montlake Park

Cascade Mountains and Montlake Neighborhood from Delmar Dr E

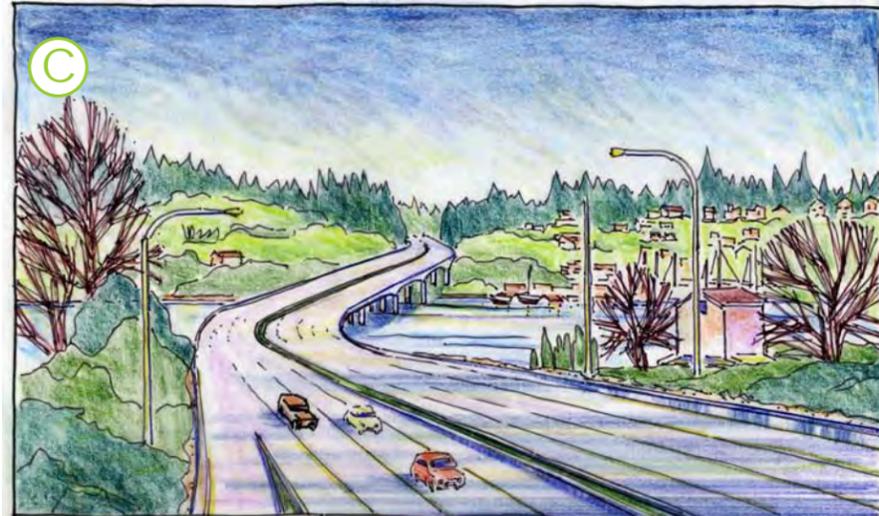


Existing View



Looking east from Delmar Drive East

Roanoke Neighborhood and Bridge from Montlake Boulevard E

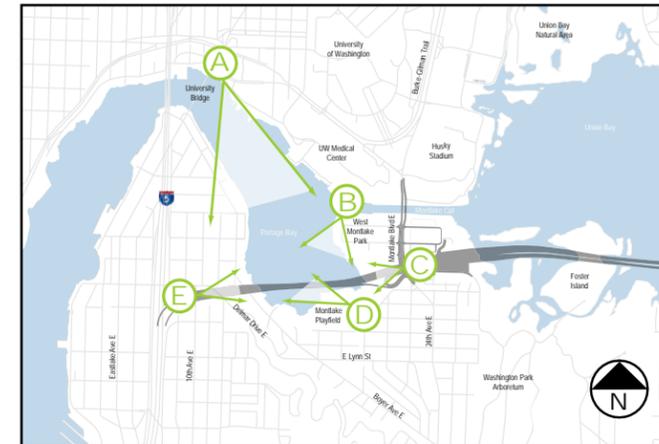


Existing View



Looking west from Montlake Boulevard East

View Location Map



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# Portage Bay Bridge - Extradosed Option

## Description

The Extradosed bridge design option maintains the roadway operations of the baseline while being shifted slightly to the north to ease constructability issues.

### Over

- Two sets of lower height towers (approximately 65 feet above bridge deck) at west end of bridge

### Under

- One hillside foundation south of Boyer Street with a main span of 700 feet minimizing impact on the Queen City Yacht Club's operations
- Longer span reduces in-water foundations and allows improved visibility and water access
- Gap of 15 feet between bridge structures reduces scale of structure from below and allows light and air flow

### On

- Thick segmental beam bridge deck supported by cable stays reduces height of towers
- Eastern bridge type may consider a beam type to match the depth of the extradosed beam deck

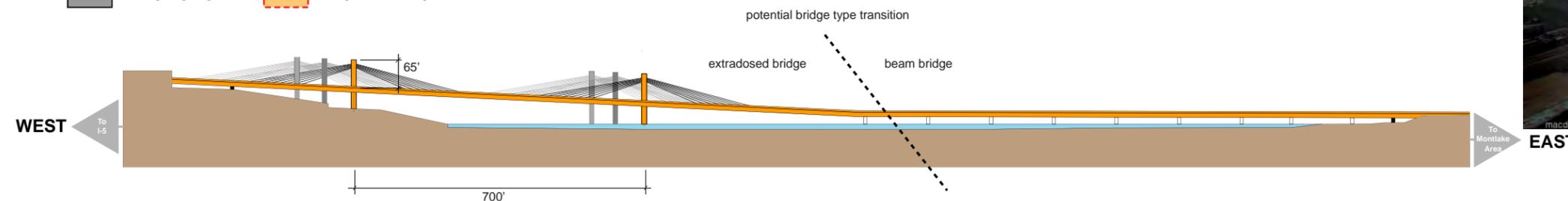
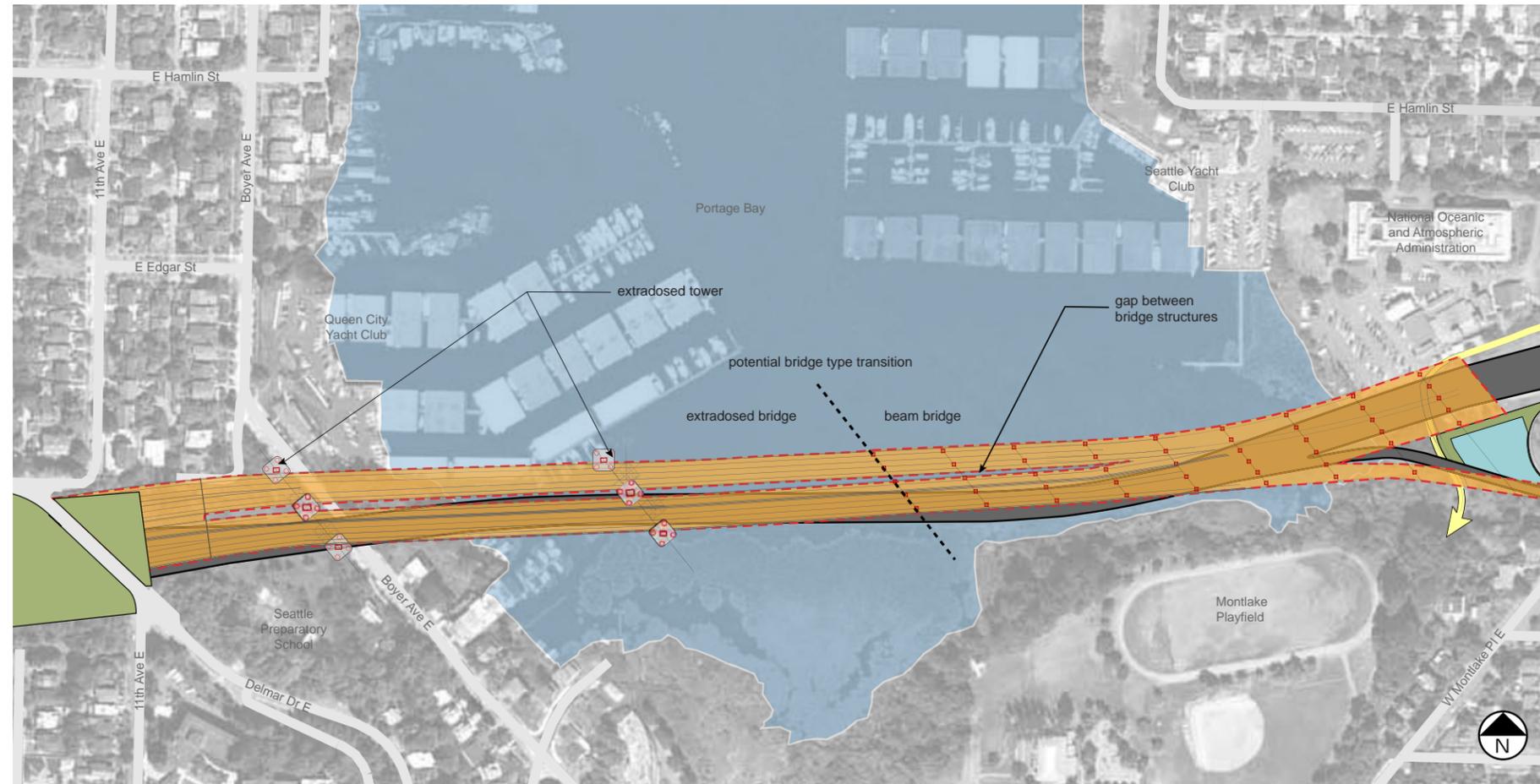
## Benefits

- Unique design concept, which would be a signature bridge at Portage Bay
- Hybrid structure combining elements of box girder and cable stay allows shorter support towers and a moderate scale above the deck

## Considerations

- More weight from the deck beam will require larger foundations
- Higher design complexity needs to stay within the budget

## Bridge Footprint



## Location Key



## Precedents



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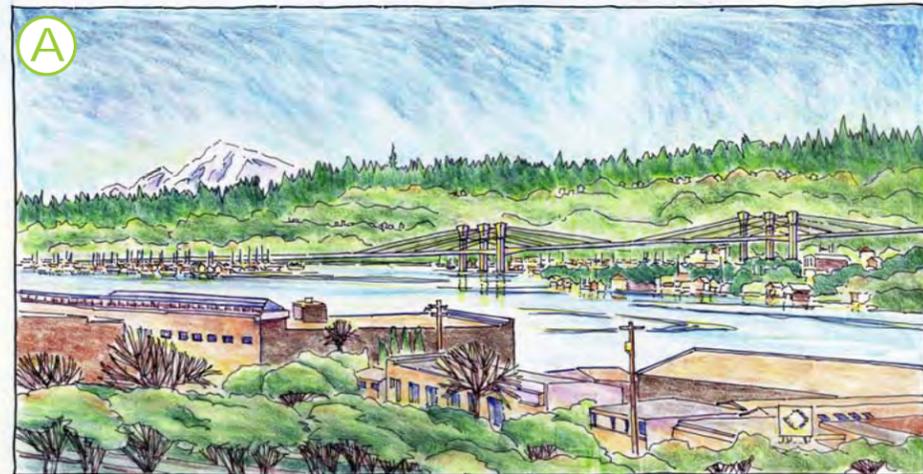
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# Portage Bay Bridge Views from Public Locations - Extradosed Option

Montlake Neighborhood and Mt. Rainier from University Bridge



Existing View



Looking southeast from University Bridge

Portage Bay and Roanoke Neighborhood from Montlake Playfield



Existing View



Looking northwest from Montlake Playfield

Standing at West Montlake Park

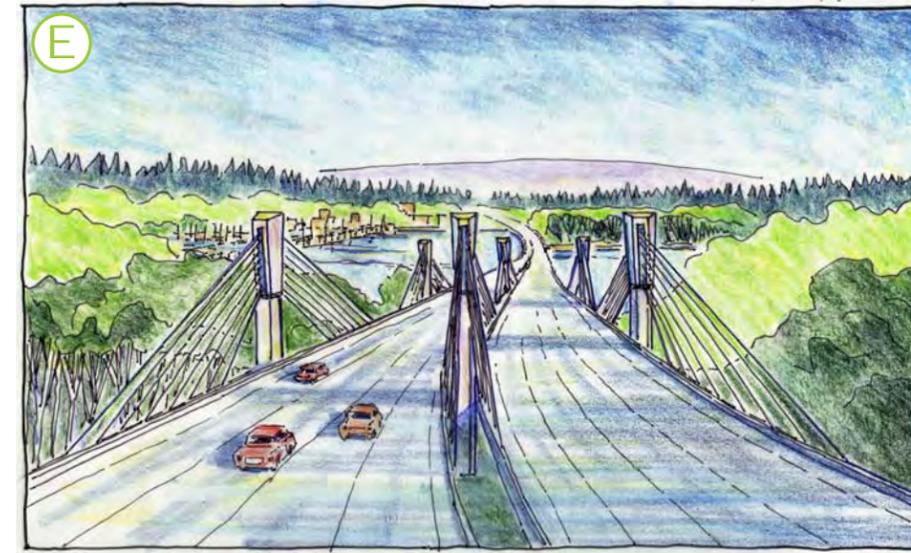


Existing View



Looking southwest from West Montlake Park

Cascade Mountains and Montlake Neighborhood from Delmar Dr E



Existing View



Looking east from Delmar Drive East

Roanoke Neighborhood and Bridge from Montlake Boulevard E

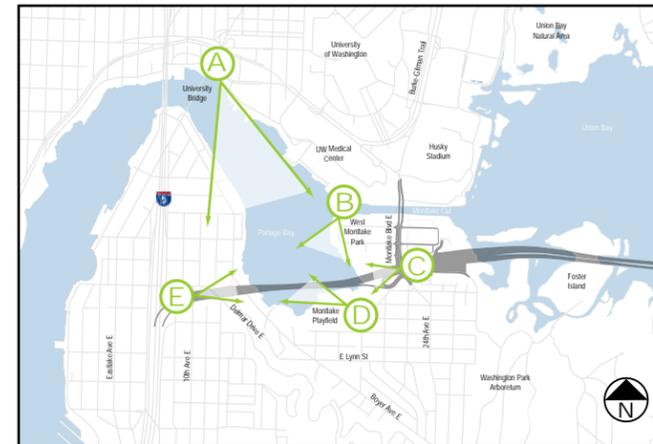


Existing View



Looking west from Montlake Boulevard E

View Location Map



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# Portage Bay Bridge - Cable Stay Option

## Description

The Cable Stay bridge design option maintains the roadway operations of the baseline while being shifted slightly to the north to ease constructability issues.

### Over

- Two sets of moderate height cable stay towers (approximately 180 feet tall) at west end of bridge

### Under

- One hillside foundation west of Boyer Avenue East with main span of 800 feet minimizing impacts on Queen City Yacht Club operations
- Longer span reduces in-water foundations and allows improved visibility and water access across Portage Bay
- Gap of 15 feet between bridge structures reduces scale of structure from below and allows light and air flow

### On

- Thin, light bridge deck supported by cable stays
- Eastern bridge type beam bridge with common span lengths

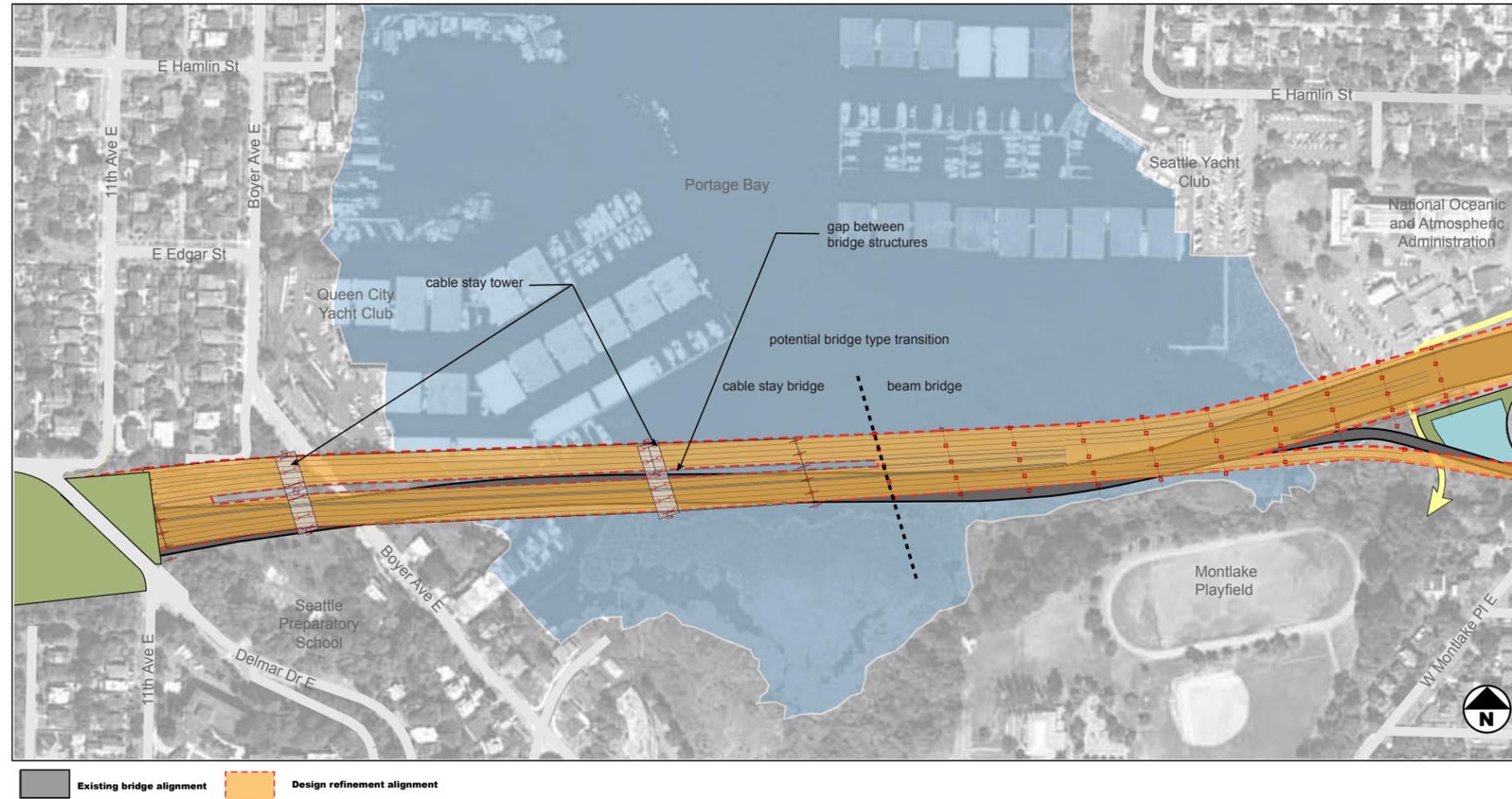
## Benefits

- Provides a regional signature bridge at Portage Bay
- Represents a modern design with lightness and transparency
- The long span opens the bay below for access and visibility
- Less material and less in-water work

## Considerations

- Higher design complexity needs to stay within the budget
- The towers must have rational and beautiful design

## Bridge Footprint



## Location Key



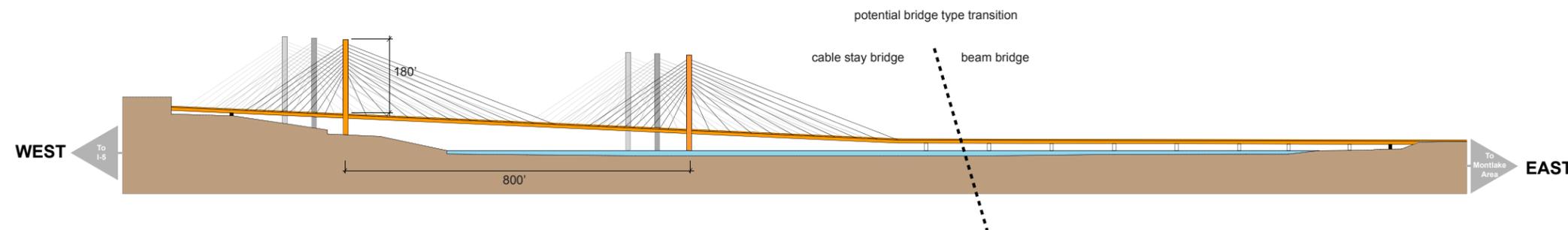
## Precedents



Anzac Bridge Sydney, Australia



Erasmus Bridge Rotterdam, Netherlands



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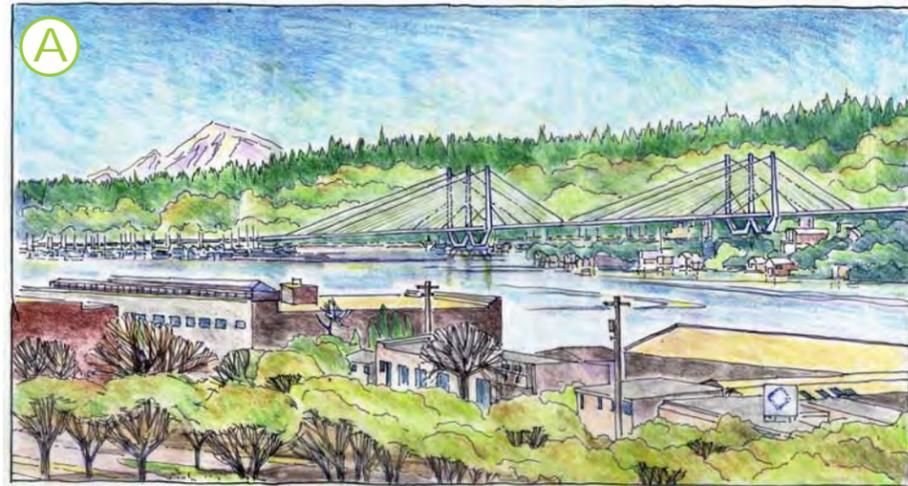
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# Portage Bay Bridge Views from Public Locations - Cable Stay Option

Montlake Neighborhood and Mt. Rainier from University Bridge



Existing View



Looking southeast from University Bridge

Portage Bay and Roanoke Neighborhood from Montlake Playfield



Existing View



Looking northwest from Montlake Playfield

Standing at West Montlake Park



Existing View



Looking southwest from West Montlake Park

Cascade Mountains and Montlake Neighborhood from 10th Ave E

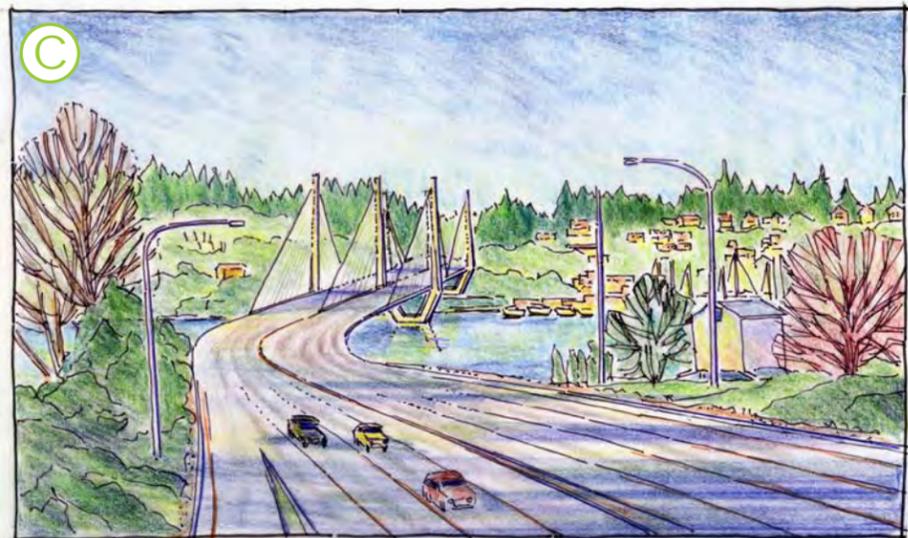


Existing View



Looking east from 10th Avenue East

Roanoke Neighborhood and Bridge from Montlake Boulevard E

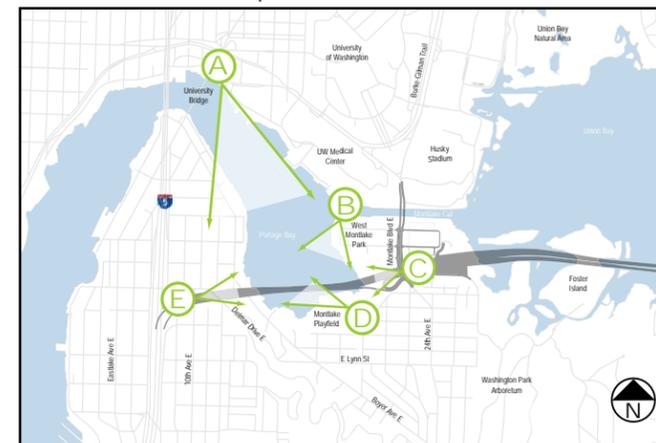


Existing View



Looking west from Montlake Boulevard E

View Location Map



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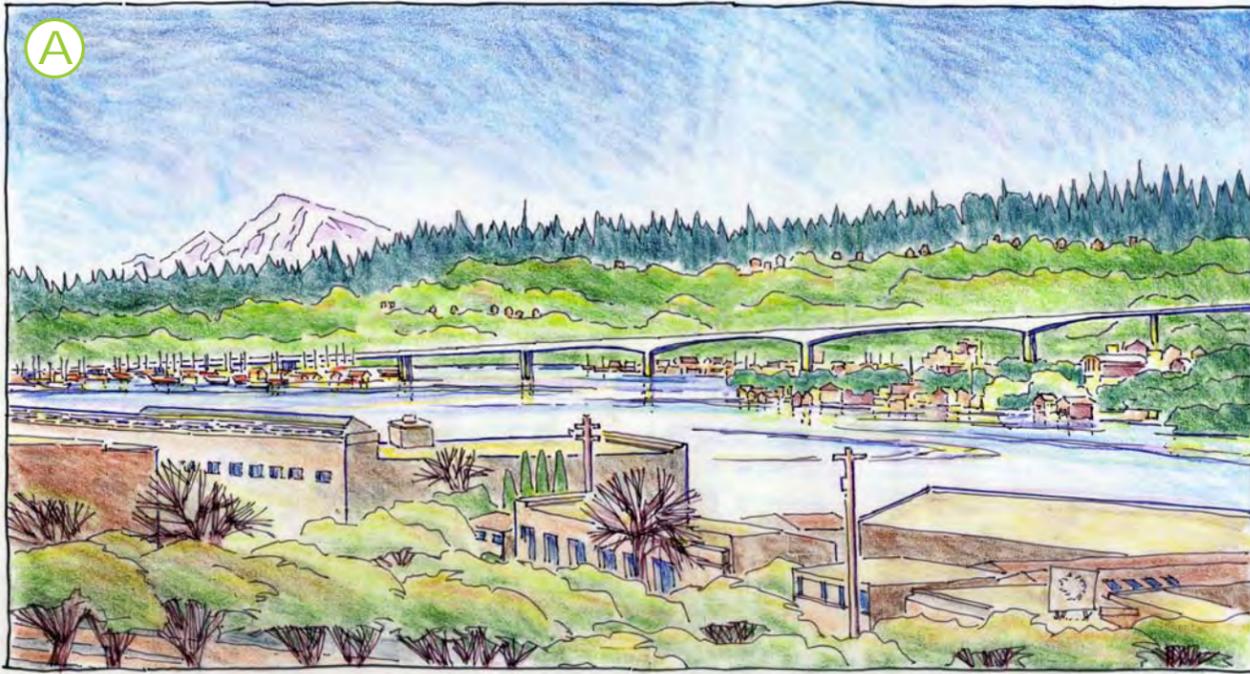
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# Portage Bay Bridge - Comparing Bridge Options from One View

## Montlake Neighborhood and Mt. Rainier from University Bridge

### Box Girder



### Existing View

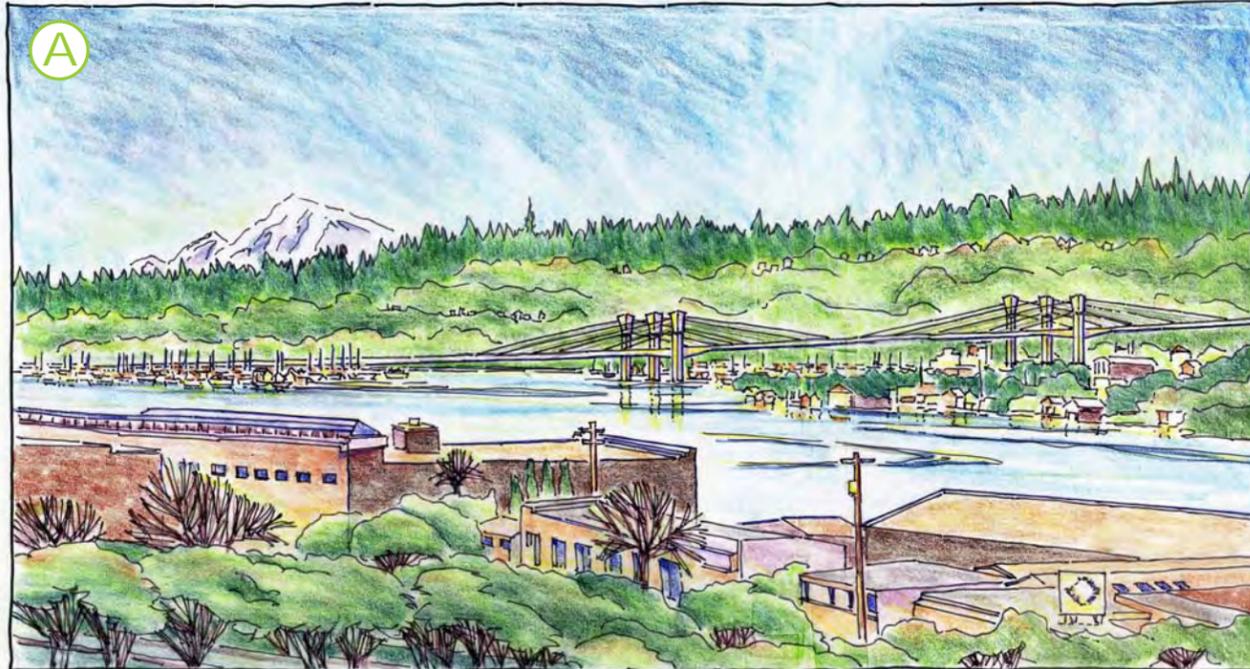


Existing view from University Bridge looking southeast toward Portage Bay Bridge

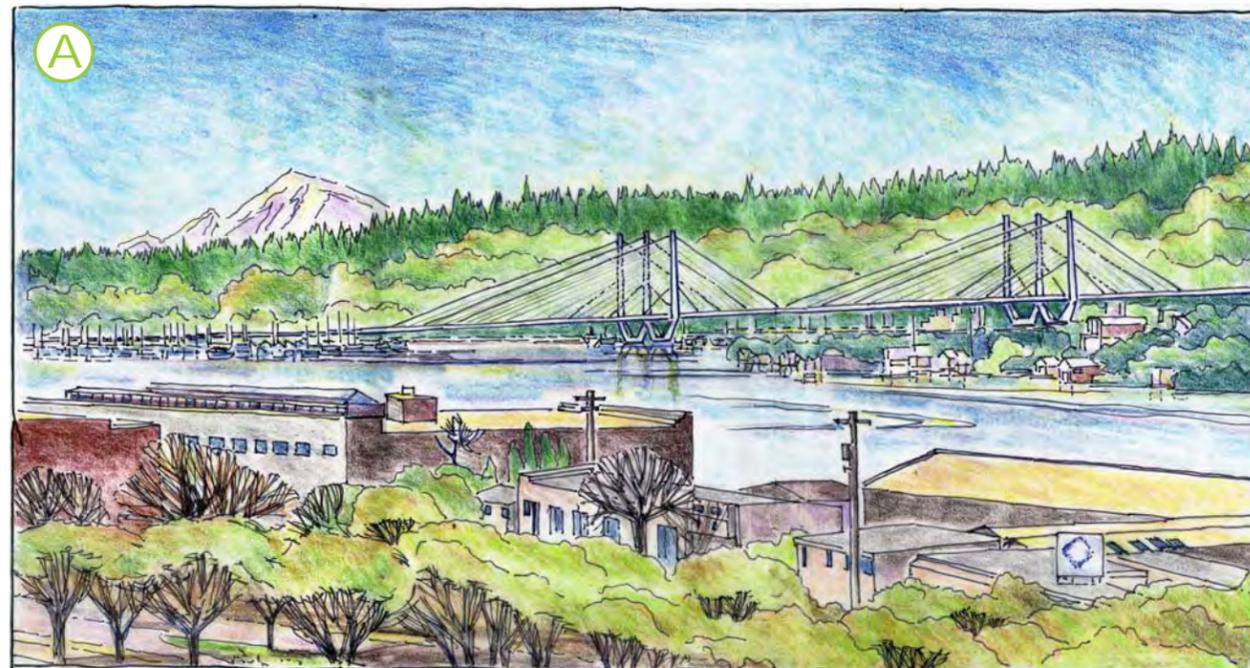
### View Location Map



### Extradosed



### Cable Stay



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