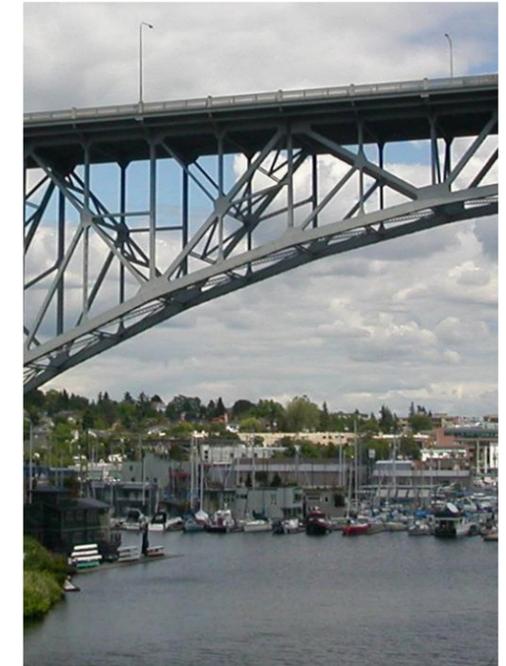


# SR 99 AURORA AVENUE BRIDGE FENCE

Design Committee

Work Book



**DRAFT**  
8 2008

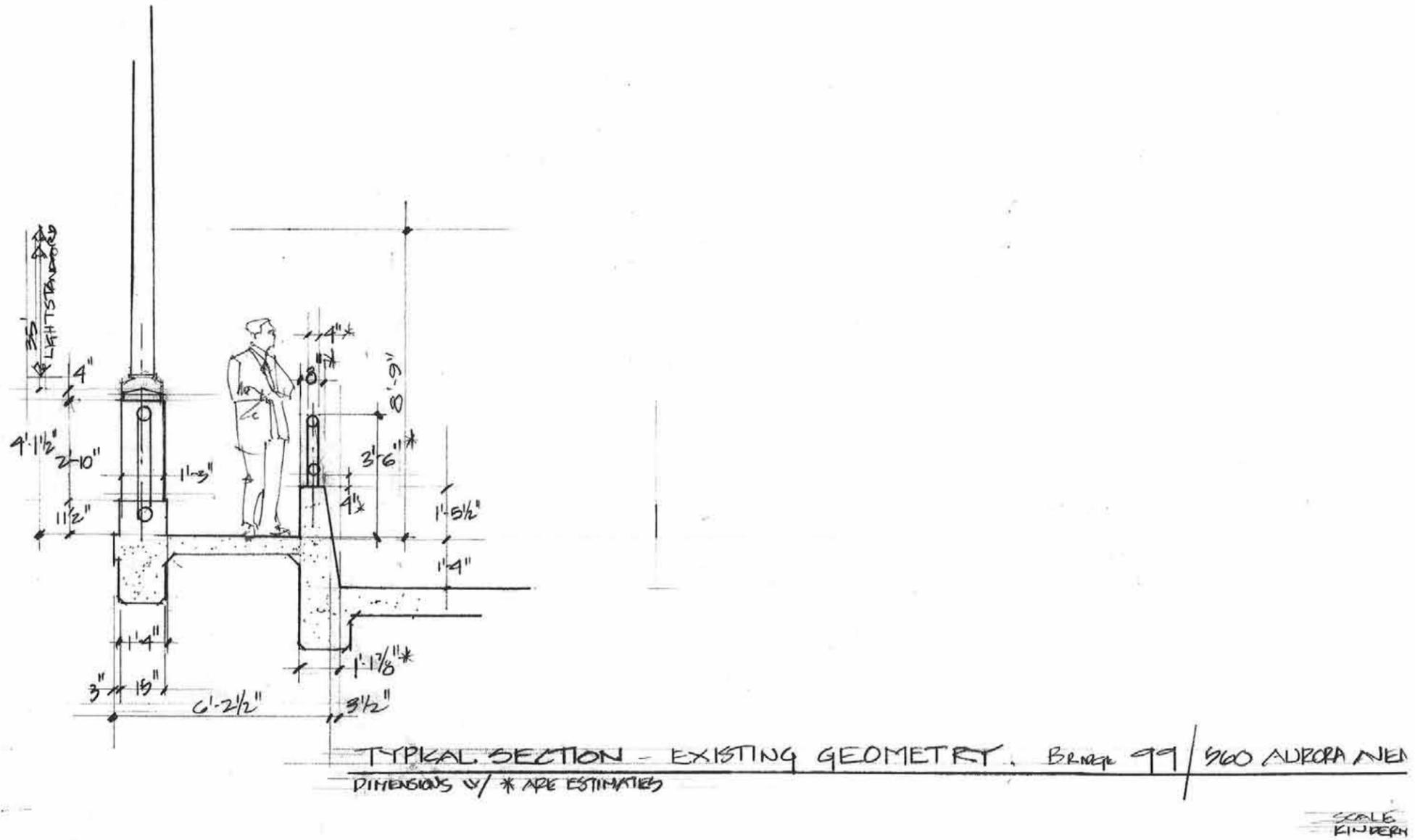
# Index

## Page

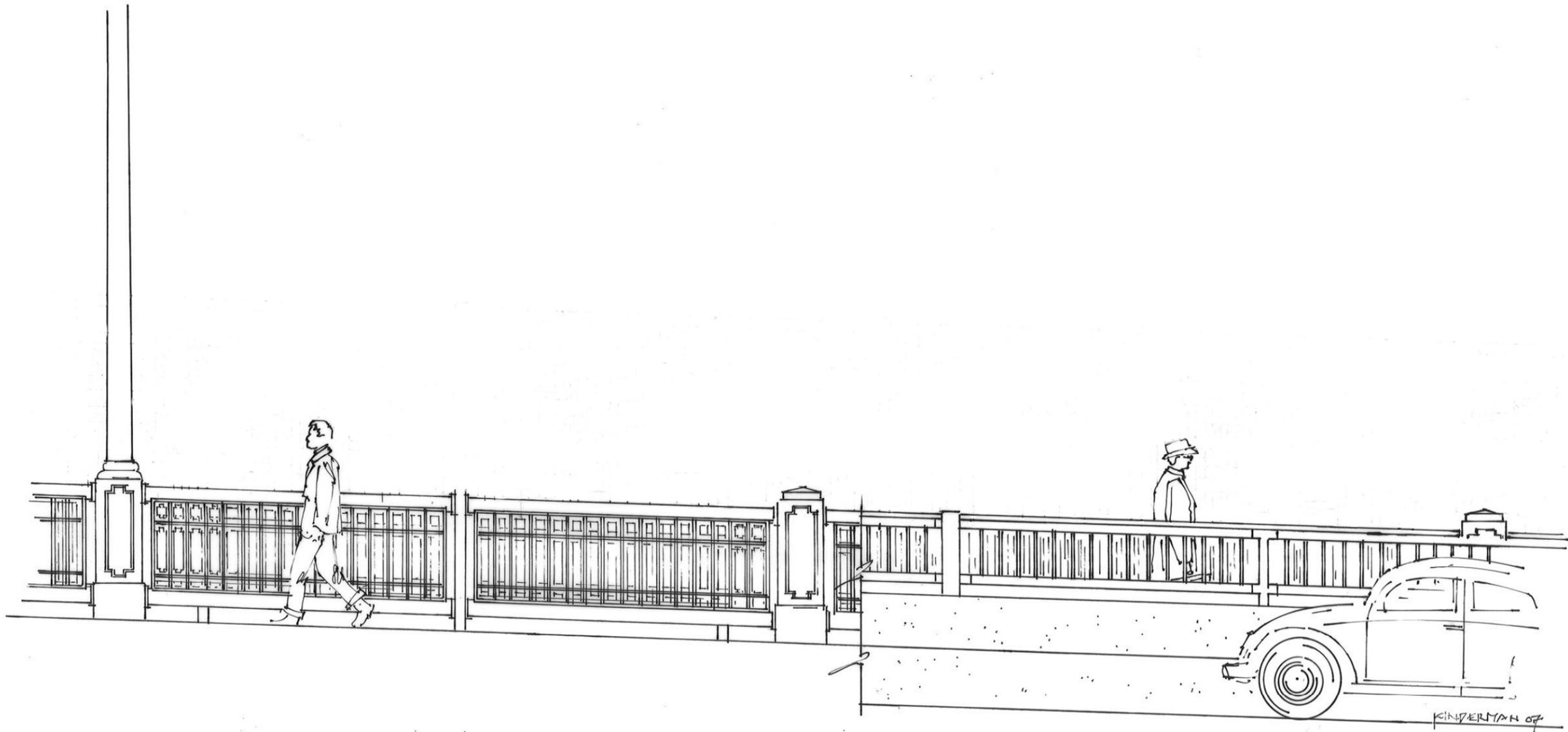
• Existing Conditions	• 3
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## Existing Geometry

- Typical Section of sidewalk
- Elevation View from the Roadway



Existing Typical Section

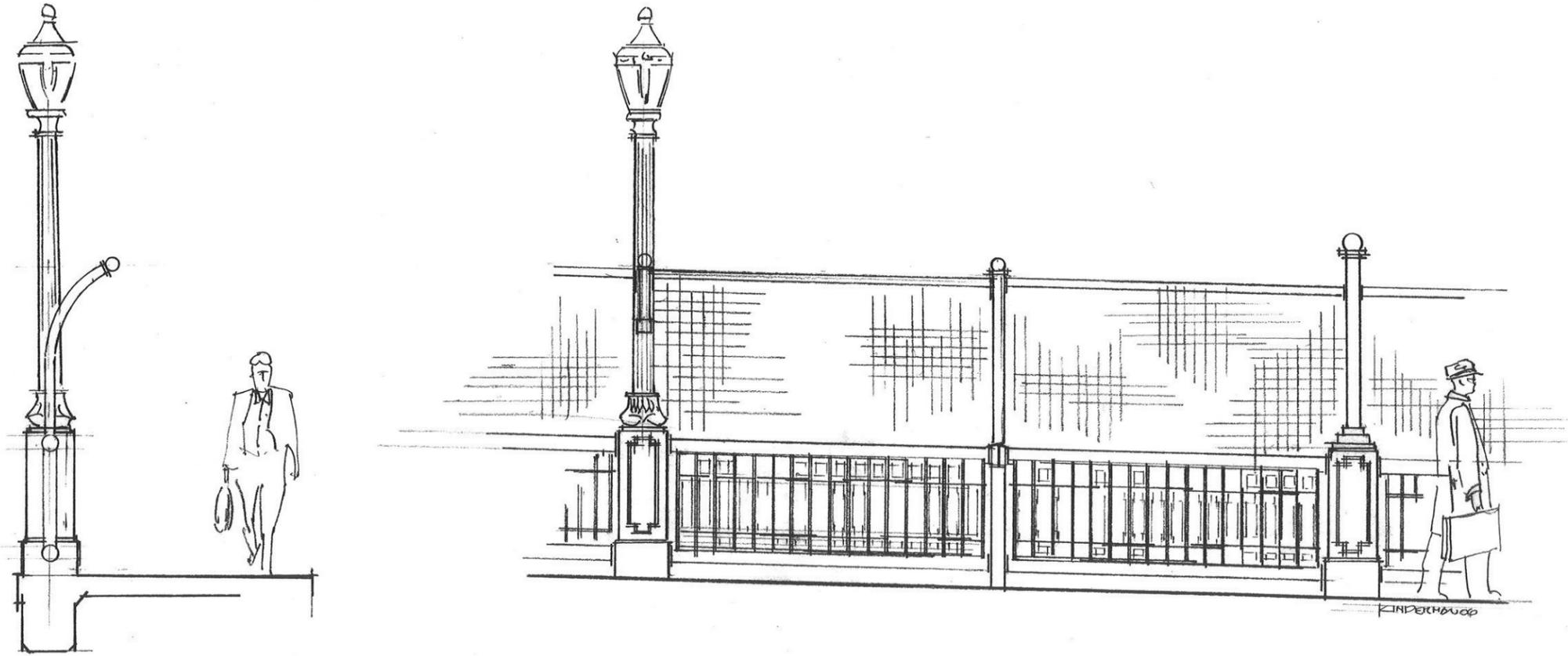


Existing Elevation

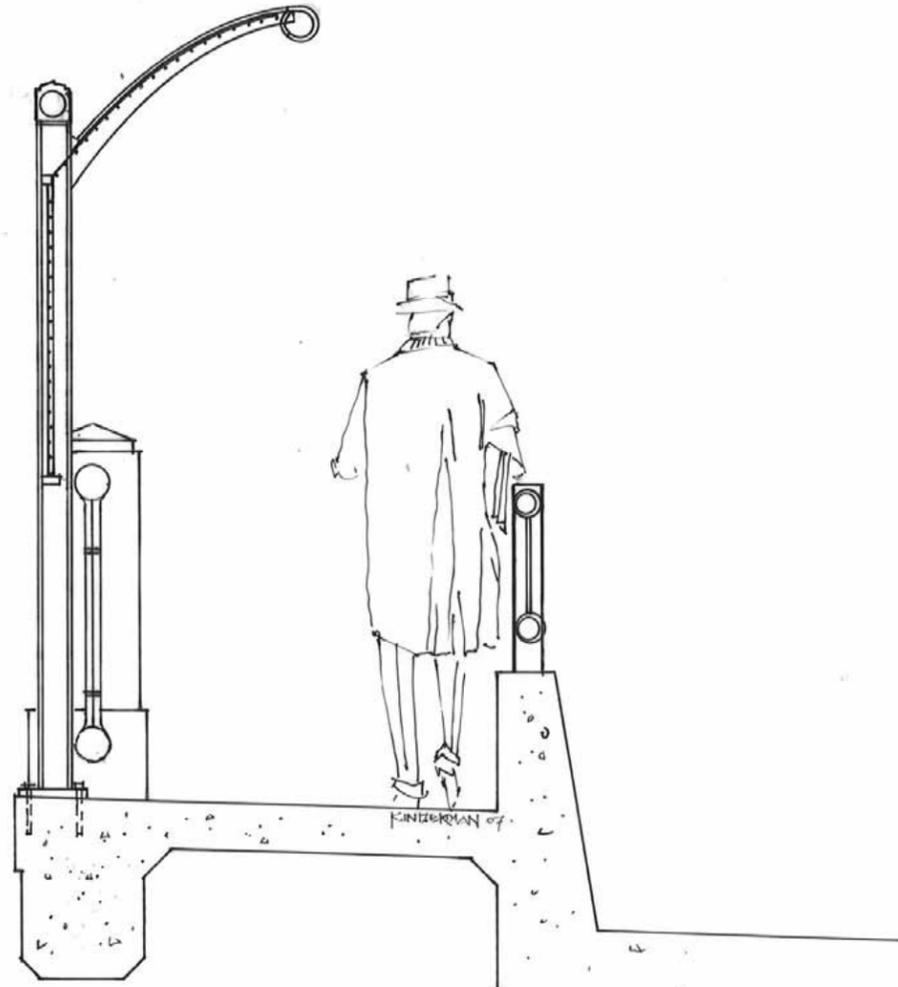
## Preliminary Design Concepts

### Provided during the early project funding phases

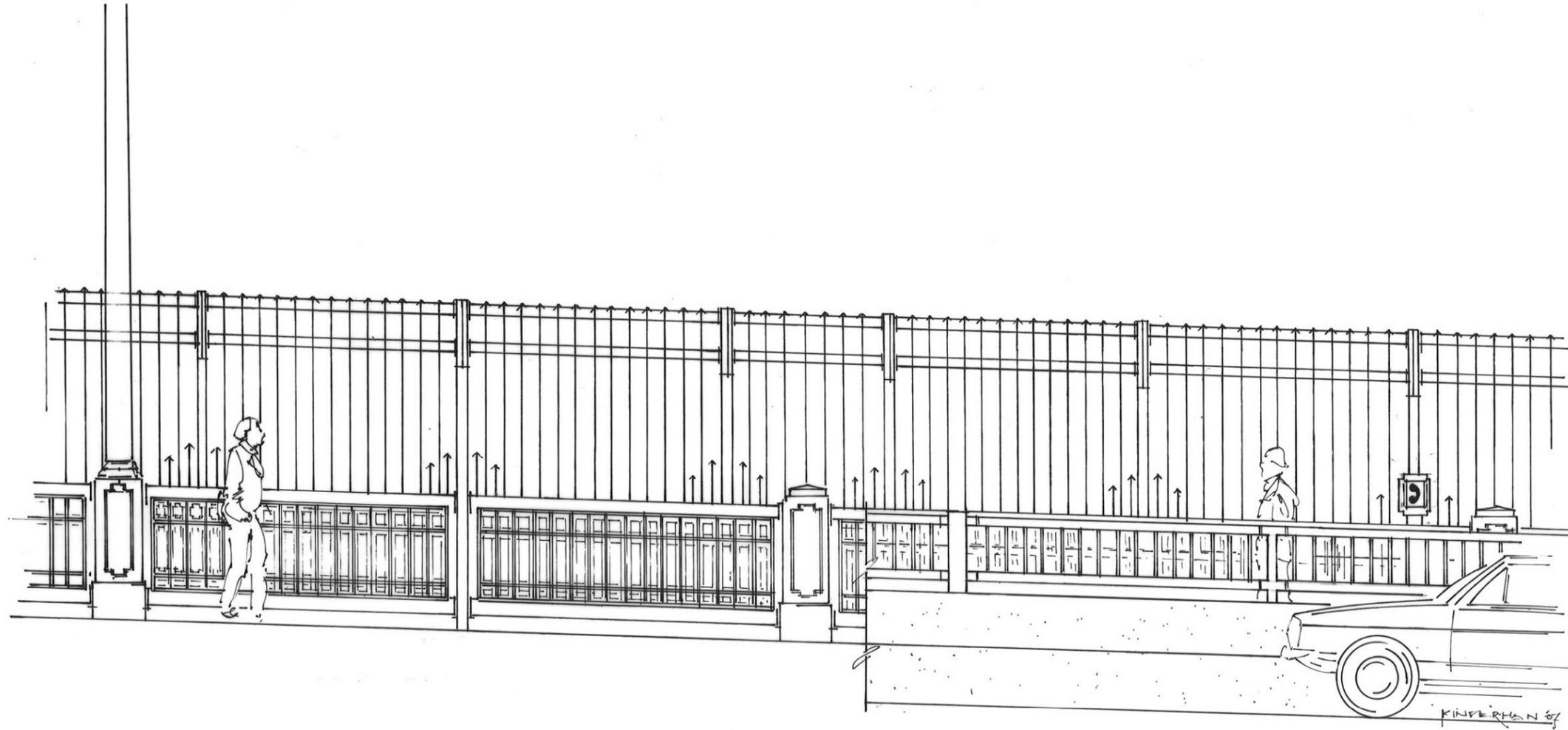
- Design for the Secretary of Transportation
- Design for the Washington State Legislature



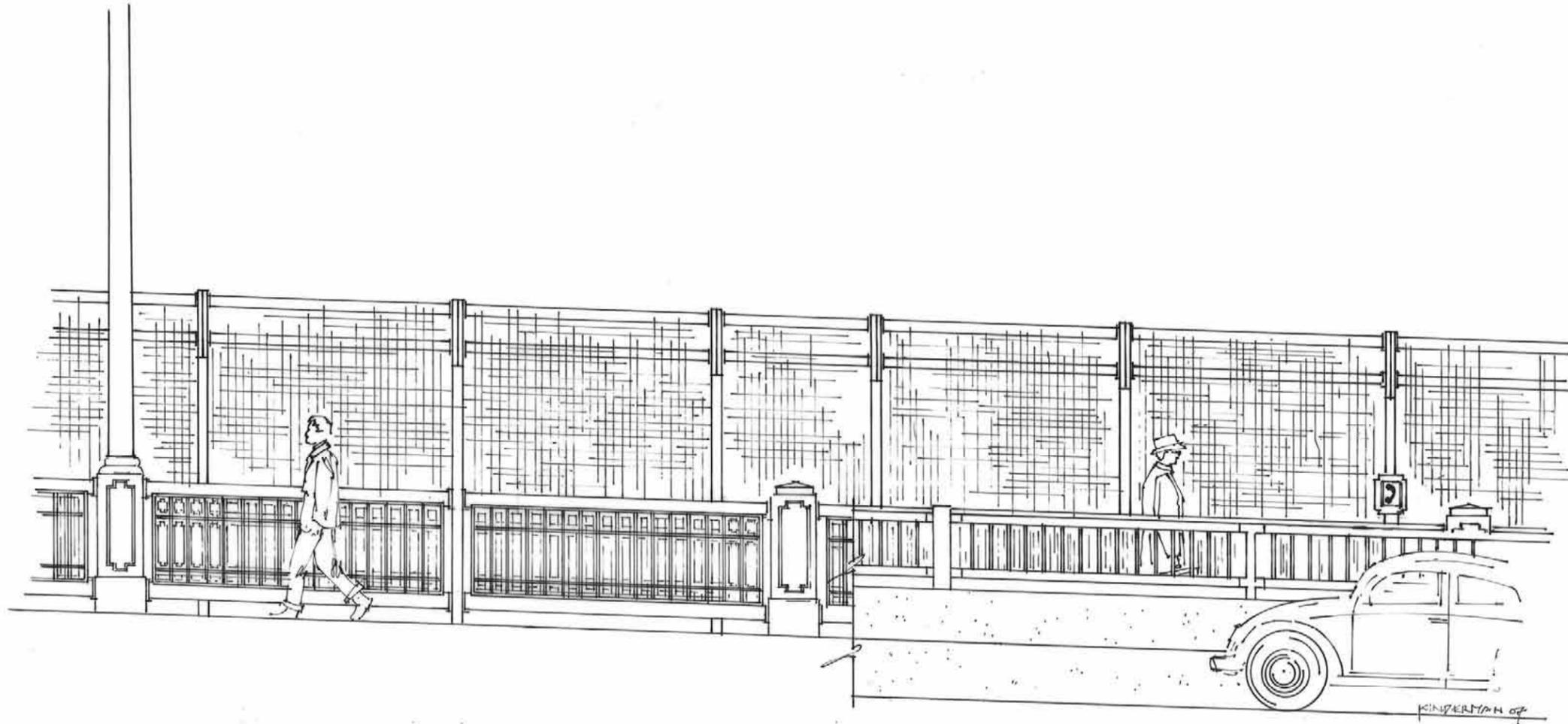
Design for the Secretary of Transportation



Design for the State Legislature



Design with Bars for the State Legislature

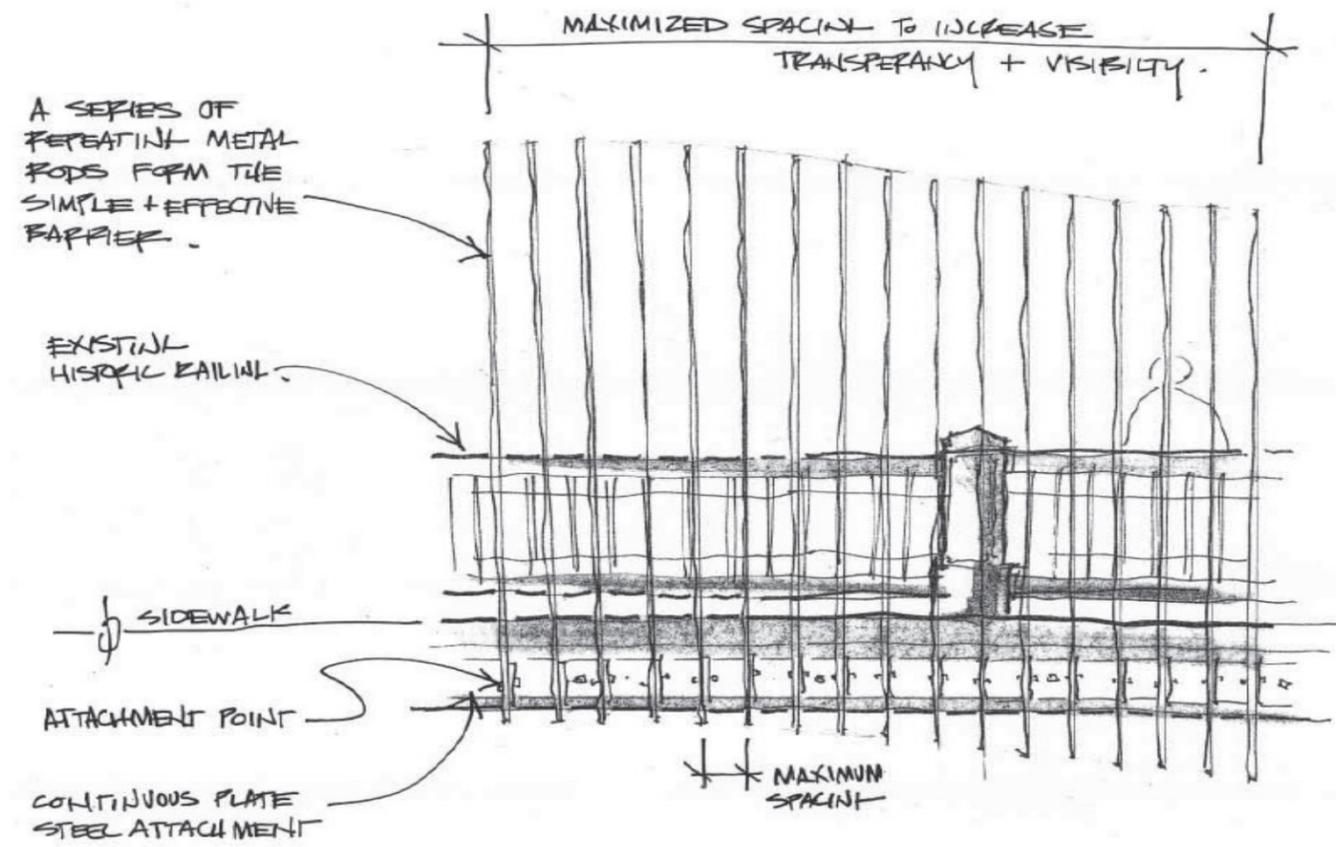
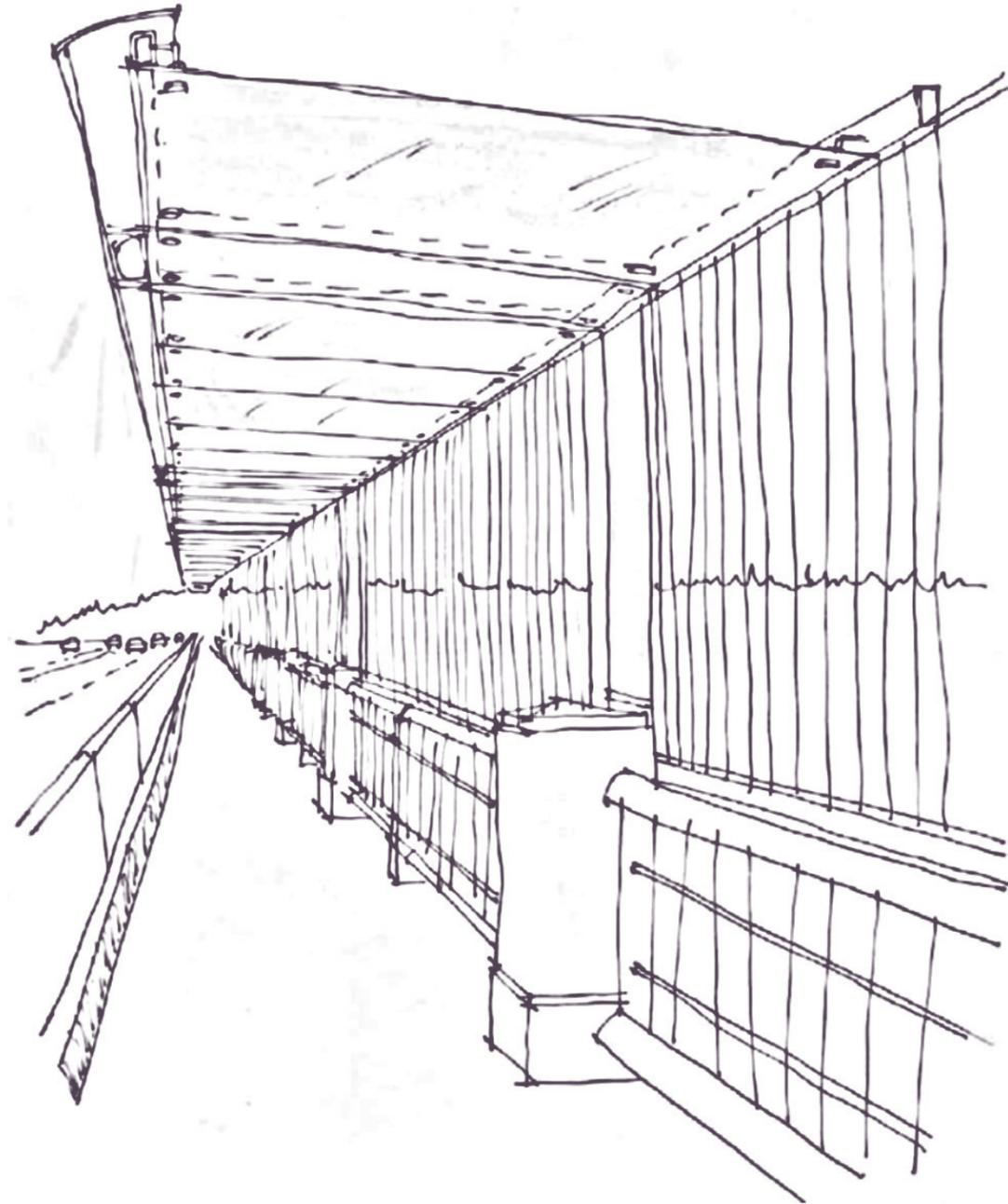


Design with screen for the State Legislature

## Design Concepts

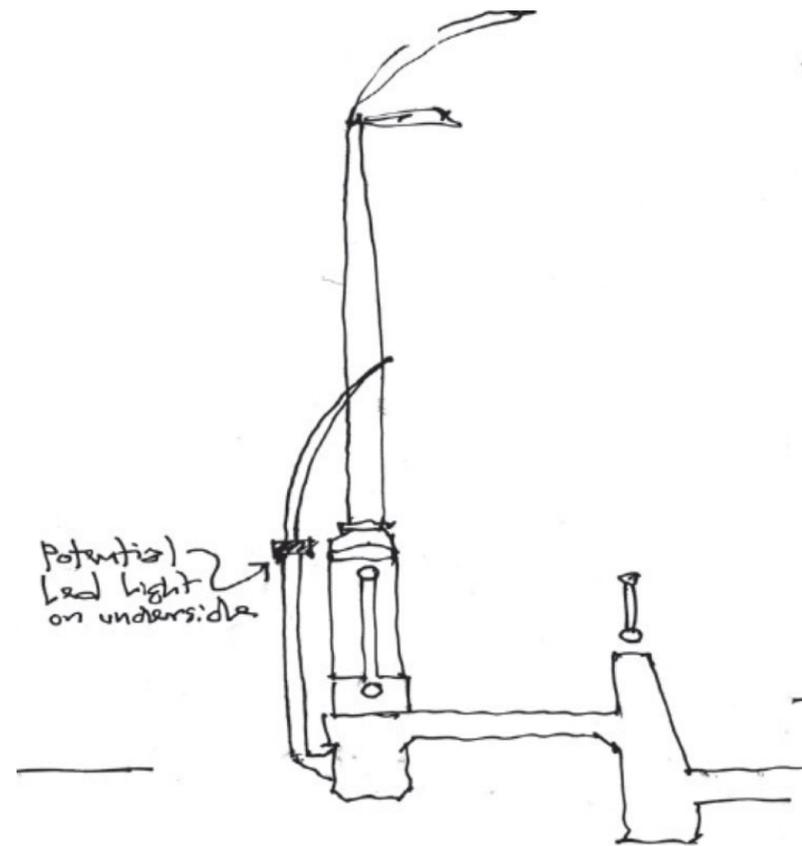
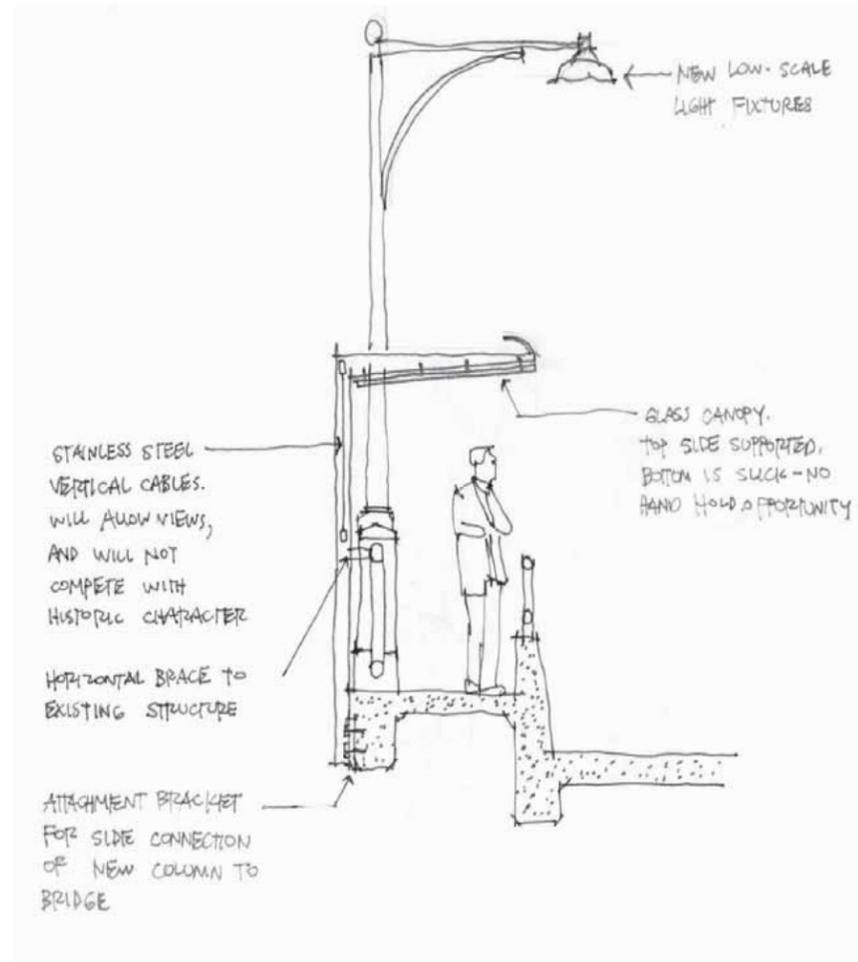
- Designs concepts from the *Community Conceptual Design Report 2007* to be integrated into the final design

## Vertical Elements

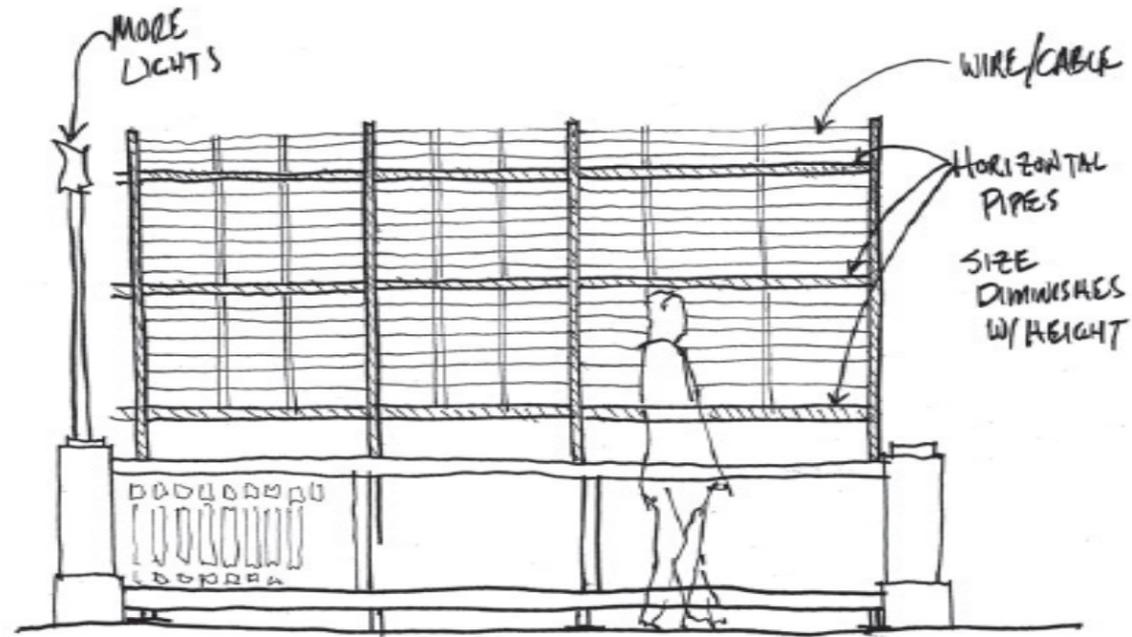




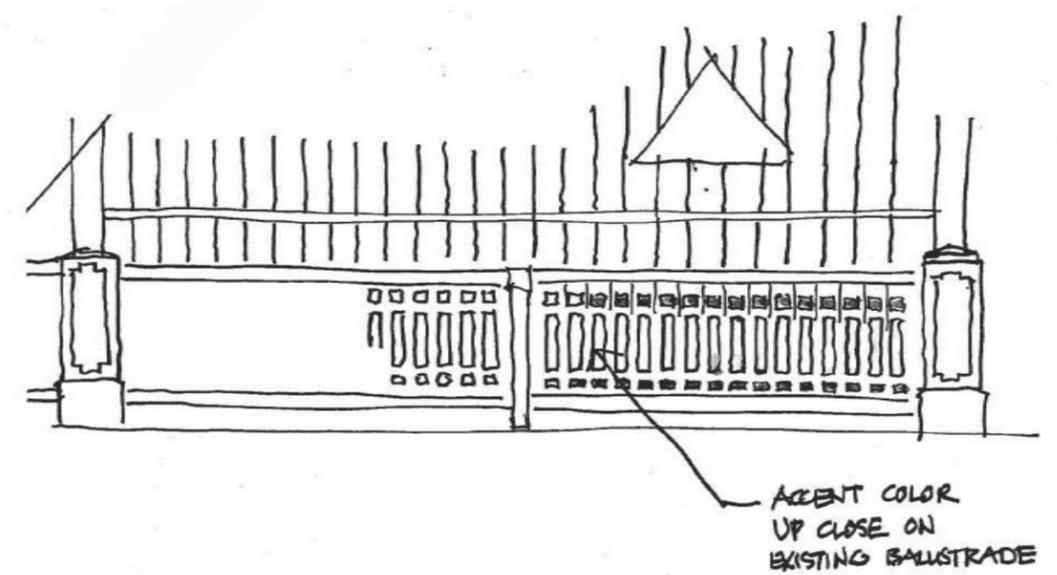
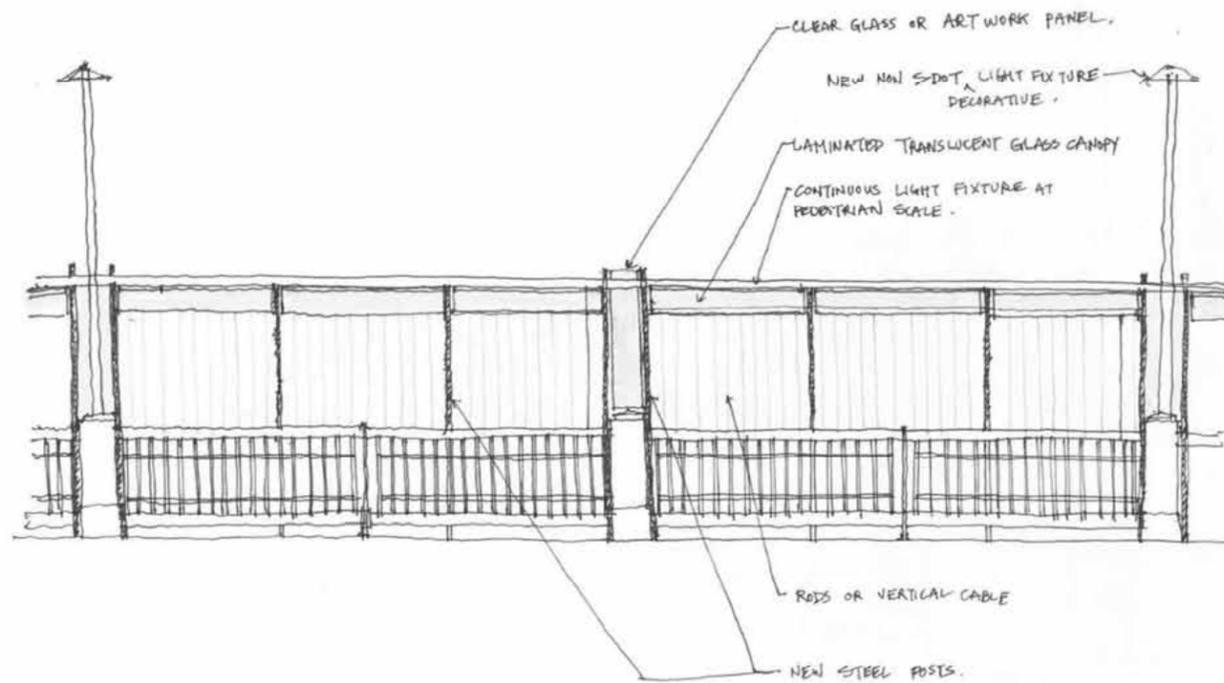
## Pedestrian Lighting



## Historic Character



## Pedestrian Scale



## City of Seattle Lighting Standards

- Standard lights from the City's Right of Way Manual



Z11



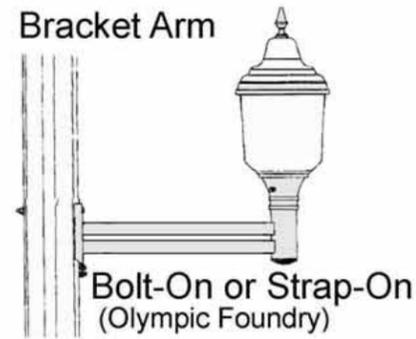
Z15



Z40



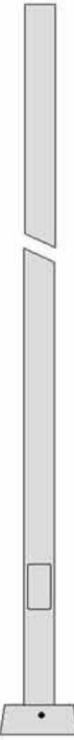
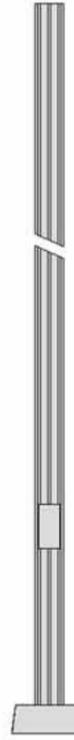
Z47A



**Colors**

-  BKTX, Textured Black
-  GYTX, Textured Grey
-  GN8TX, Textured Dark Green
-  BRTX, Textured Bronze

**Poles and Bases**

-  APR4
-  P134A
-  B104
-  B40

Preapproved Manufacturer - Lumec

## City of Seattle Pedestrian Lighting Design Standards

- City of Seattle Right of Way Manual figure 4-21

# Anthropometric Data

- Human Dimensions

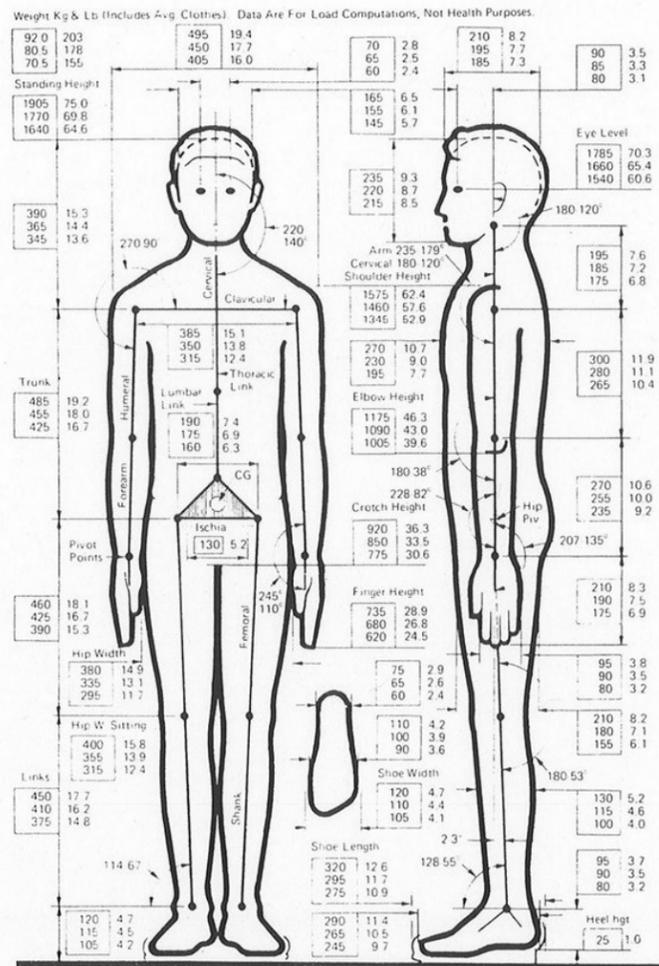
INTRODUCTION TO  
ANTHROPOMETRIC DATA

The following anthropometric drawings show three values for each measurement: the top figure is for the large person or 97.5 percentile; the middle figure, the average person or 50 percentile; and the lower figure, the small person or 2.5 percentile. The chosen extreme percentiles thus include 95%. The remaining 5% include some who learn to adapt and others, not adequately represented, who are excluded to keep designs for the majority from becoming too complex and expensive. Space and access charts are designed to accept the 97.5 percentile large man and will cover all adults except a few giants. Therefore, use the 97.5 percentile to determine space envelopes, the 2.5 percentile to determine the maximum "kinetospheres" or reach areas by hand or foot, and the 50 percentile to establish control and display heights. To accommodate both men and women, it is useful at times to add a dimension of the large man to the corresponding dimension of the small woman and divide by 2 to obtain data for the average adult. This is the way height standards evolve. Youth data are for combined sex. Although girls and boys do not grow at the same

rate, differences are small when compared with size variations.

Pivot point and link systems make it easy to construct articulating templates and manikins. Links are simplified bones. The spine is shown as a single link; since it can flex, pivot points may be added. All human joints are not simple pivots, though it is convenient to assume so. Some move in complicated patterns like the roving shoulder. Reaches shown are easy and comfortable; additional reach is possible by bending and rotating the trunk and by extending the shoulder. Stooping to reach low is better than stretching to reach high. The dynamic body may need 10% more space than the static posture allows. Shoes have been included in all measurements; allowance may need to be made for heavy clothing. Sight lines and angles of vision given in one place or another apply to all persons.

The metric system of measurement has been included, since it is used in scientific work everywhere and is the most practical system of measurement ever devised. Millimeters have been chosen to avoid use of decimals. Rounding to 5 mm aids mental retention while being within the tolerance of most human measurements.

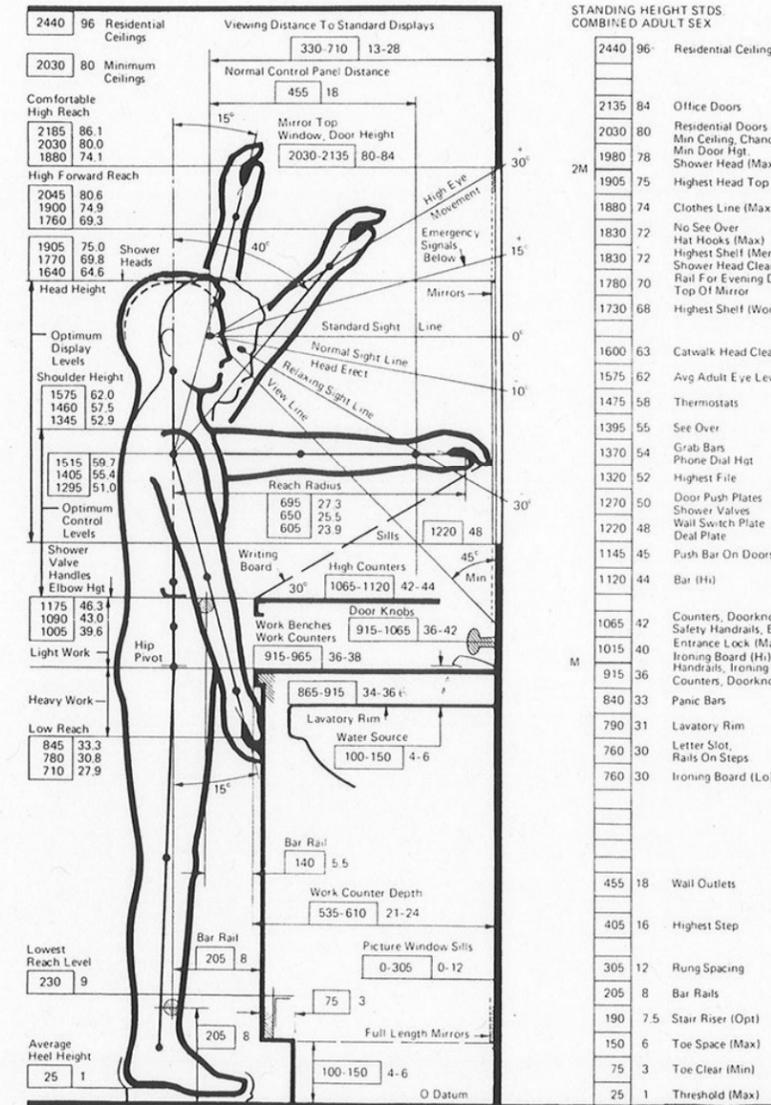
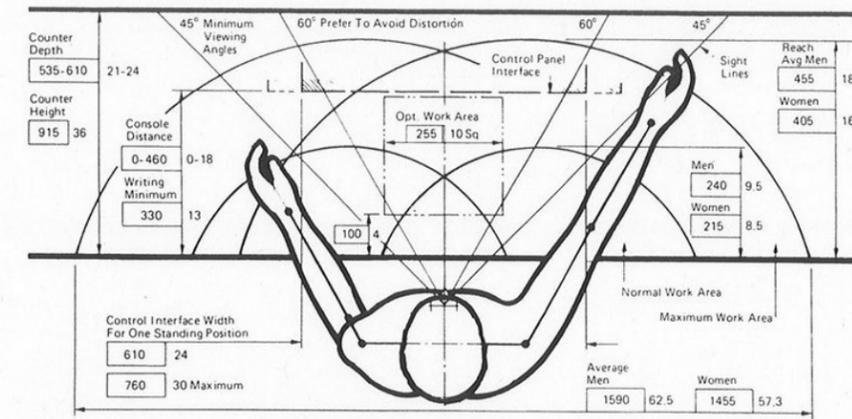


Male and	female standing heights (including shoes)	
1905	75.0	1790 70.4 large = 97.5 percentile
1775	69.8	1665 65.5 average = 50 percentile
1640	64.6	1540 60.6 small = 2.5 percentile

includes 95% U.S. adults

Niels Diffrient, Alvin R. Tilley, Henry Dreyfuss Associates, New York, New York

1 HUMAN DIMENSIONS

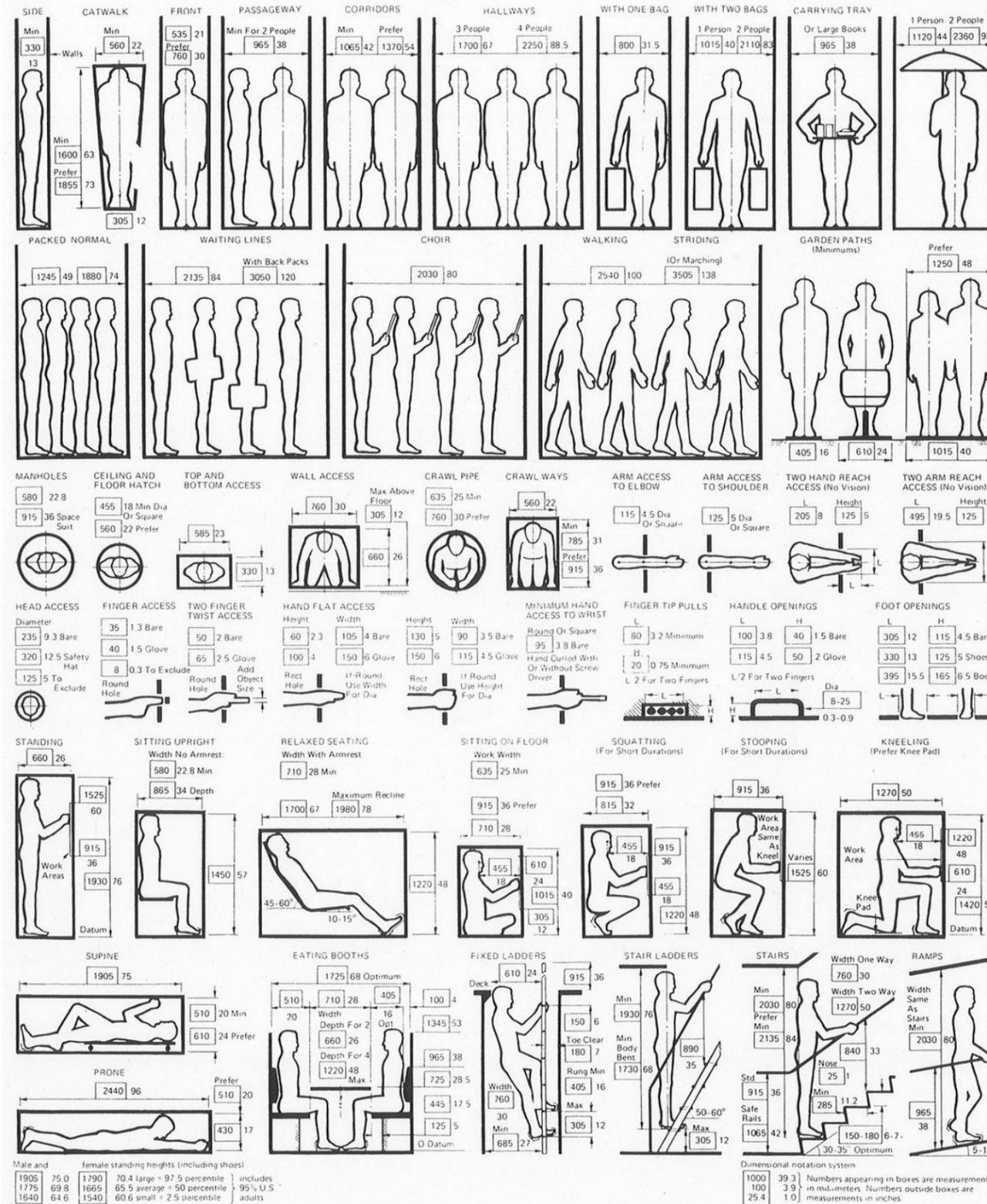


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Niels Diffrient, Alvin R. Tilley, Henry Dreyfuss Associates, New York, New York

1 HUMAN DIMENSIONS

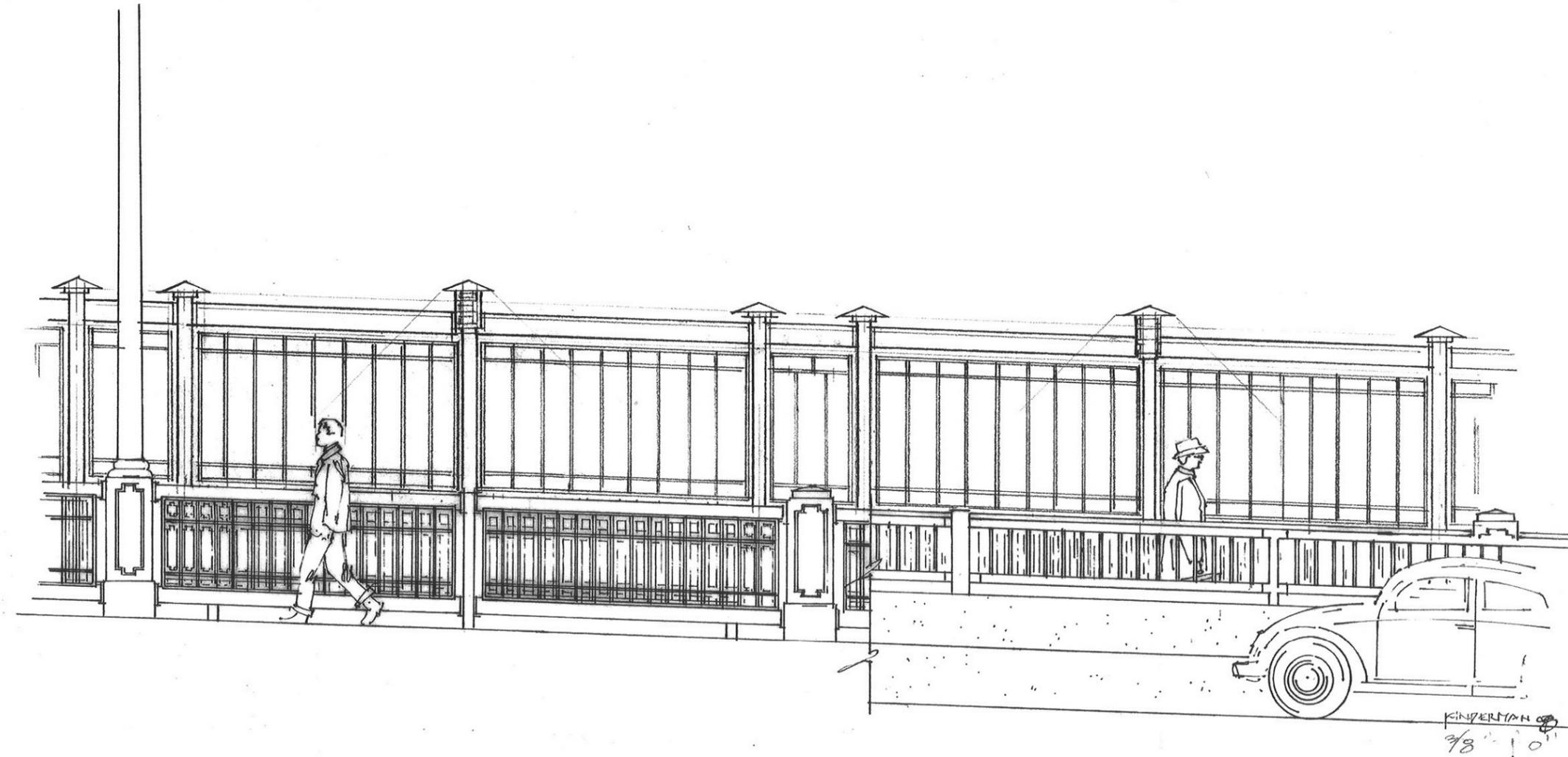


Fields Diffrient, Alvin R. Tilley, Henry Dreyfuss Associates, New York, New York

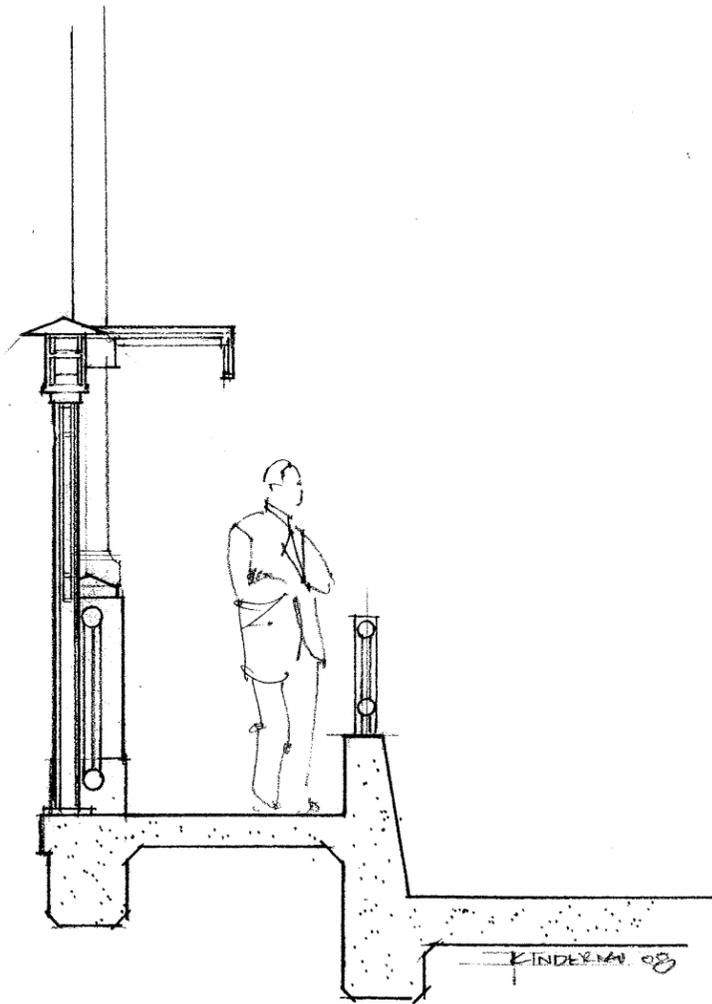
# Anthropometric Data

## Design Concepts

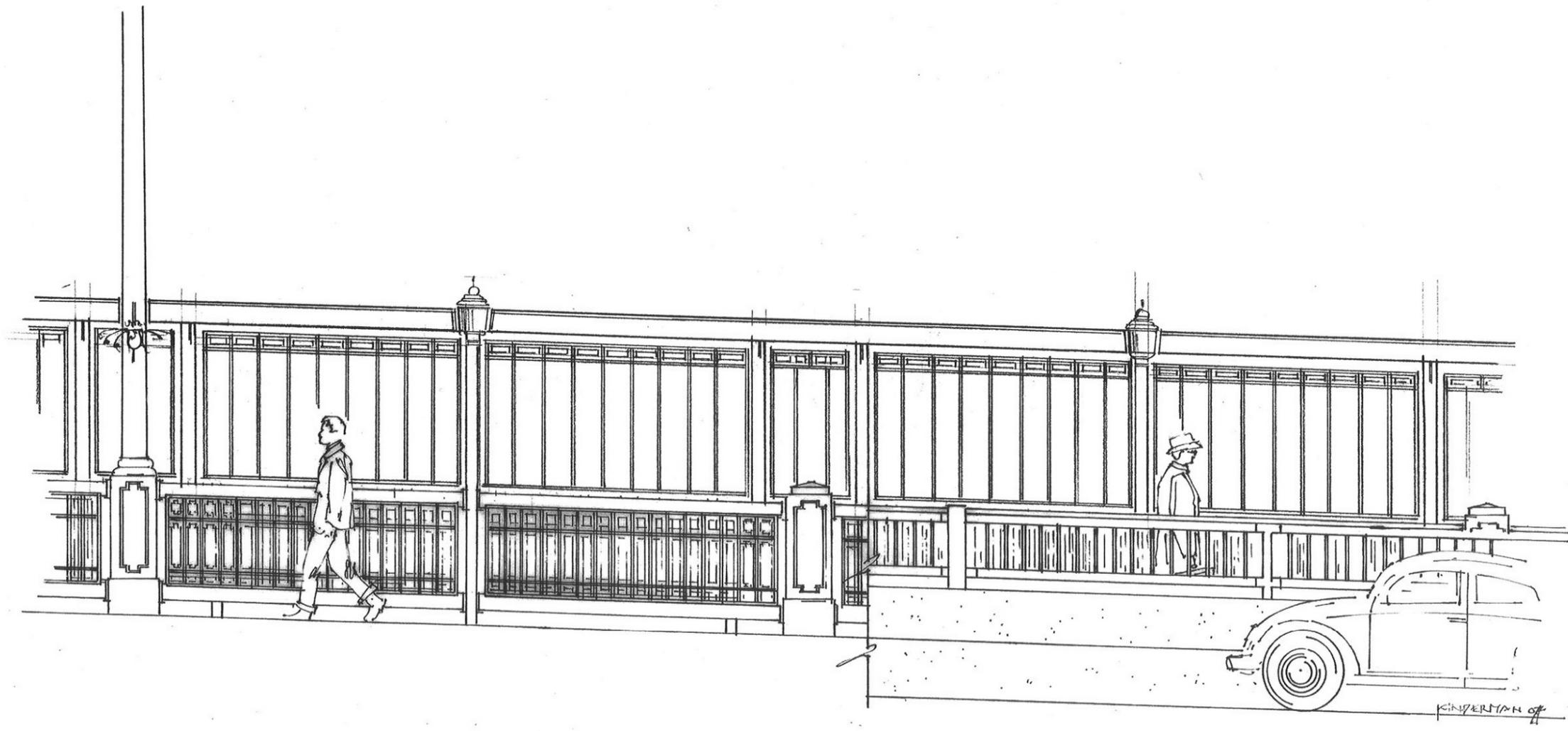
- First designs following the *Community Conceptual Design Report 2007*



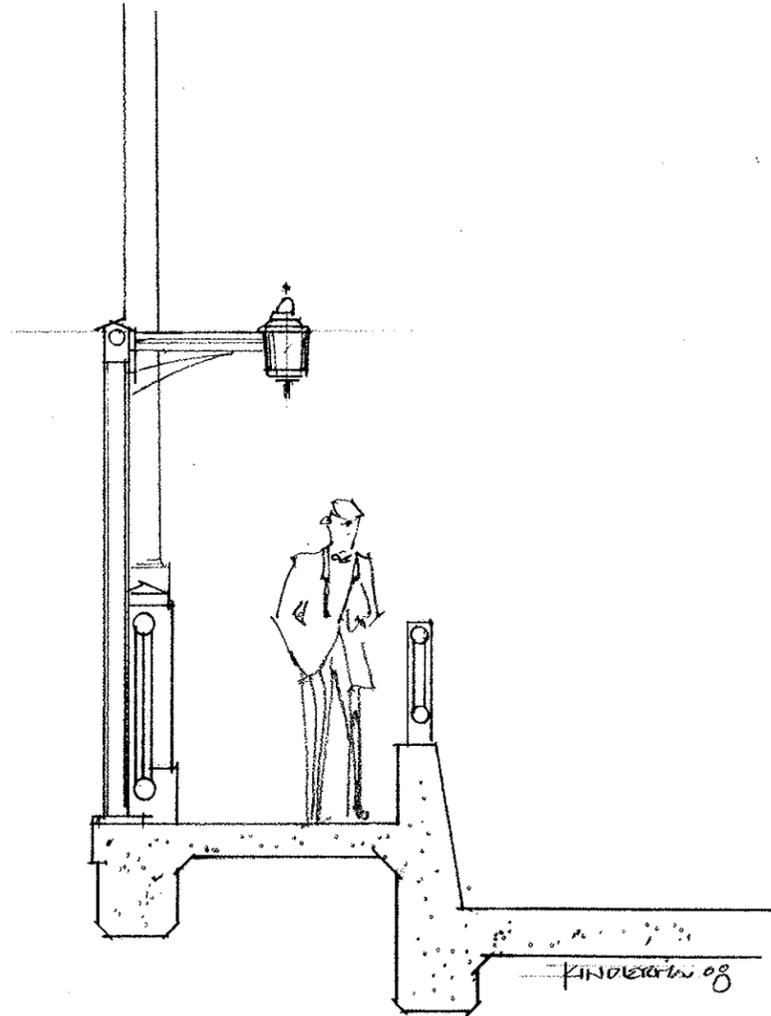
**Concept A**  
**Classic Fence with Pedestrian Lights**  
**Niland Aspen Series light standard similar**



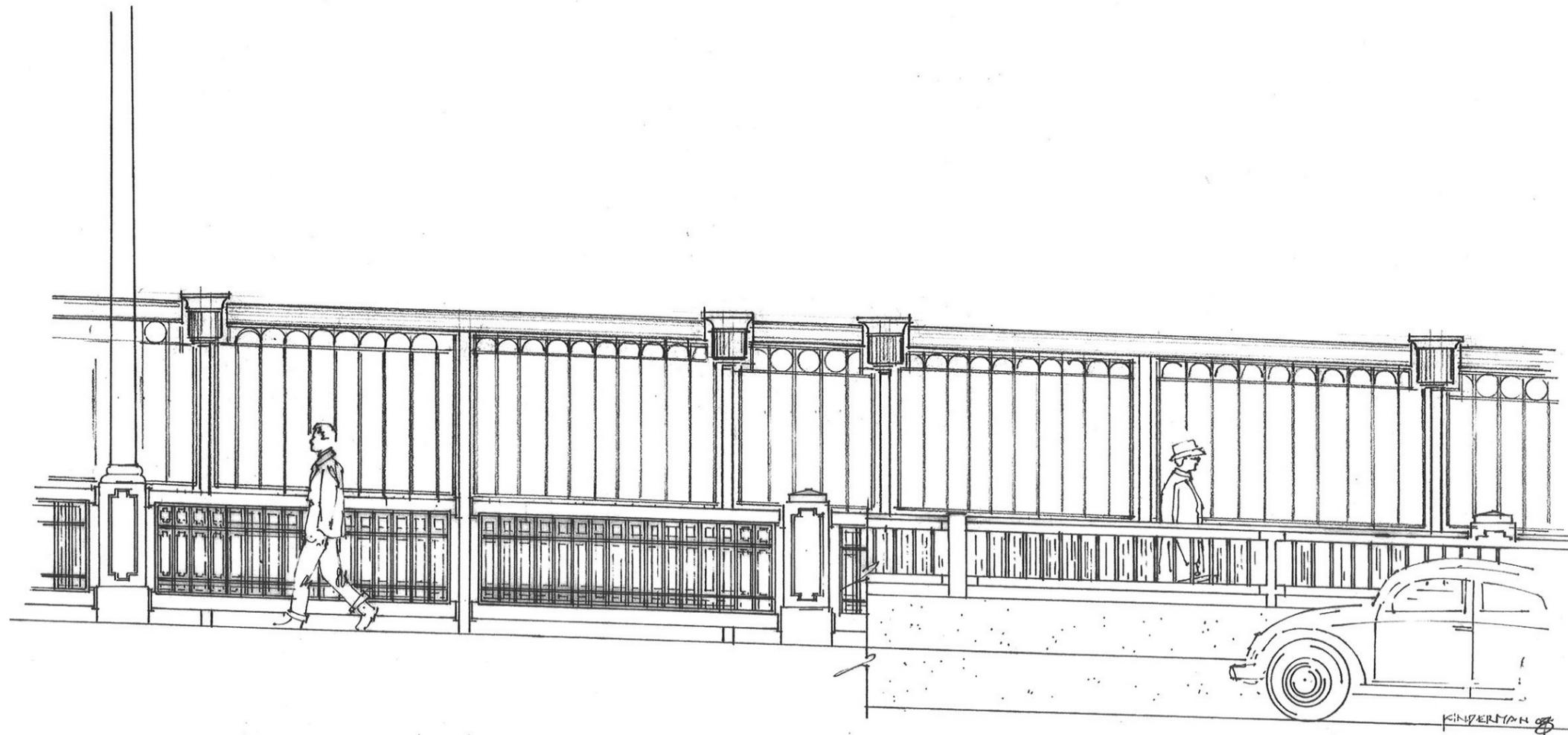
**Concept A Typical Section**  
**Classic Fence with Pedestrian Lights**  
**Niland Aspen Series light standard similar**



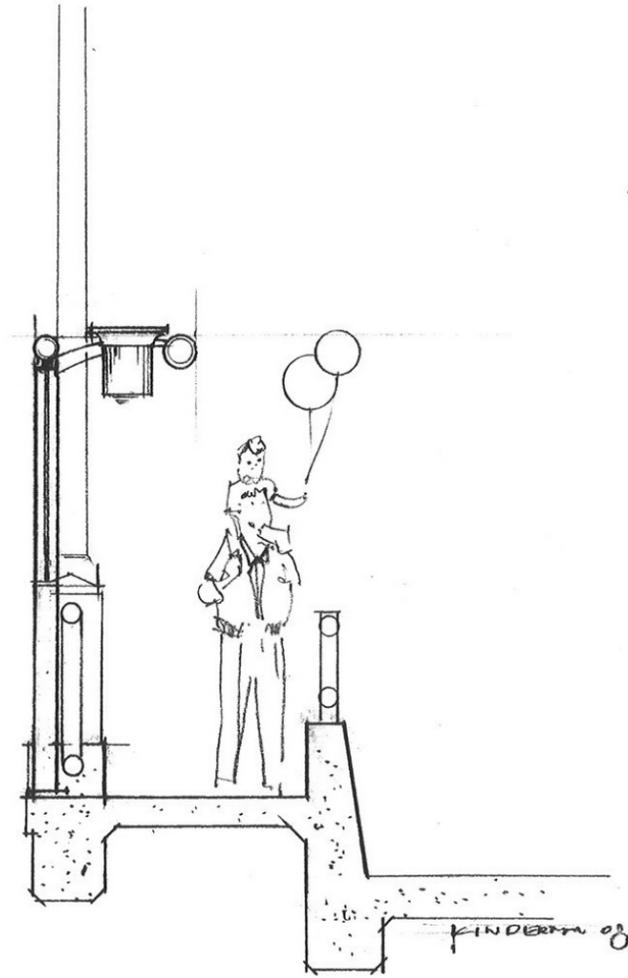
**Concept B**  
**Classic Fence with Pedestrian Lights**  
**Lumec Z47A light standard similar**



Concept B Typical Section  
Classic Fence with Pedestrian Lights  
Lumec Z47A light standard similar



**Concept C**  
**Classic Fence with Pedestrian Lights**  
**Lumec Z11 light standard similar**



Concept C Typical Section  
Classic Fence with Pedestrian Lights  
Lumec Z11 light standard similar

## Post Advisory Committee Meetings 1 & 2

.

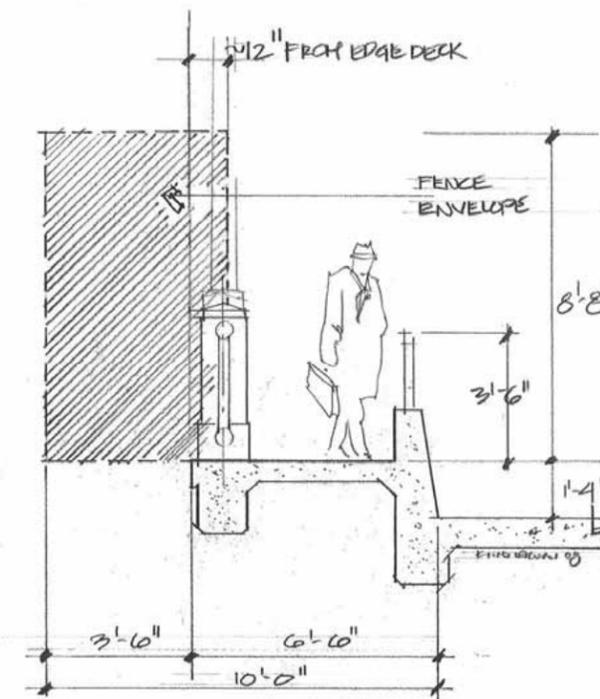
# Design Considerations

## Qualitative

- Use vertical elements as the main fence safety feature.
- Do not use bars, mesh or wire fabric.
- The elements should be stainless steel wire rope or bars. Small diameters contribute to visibility from the bridge.
- The fence may extend 'outward' toward the water to provide a more 'open' experience for pedestrians.
- The fence should have an overhang to discourage climbing. Recognize the 'face validity' of such an assembly. Although climbable by some, the overhang may be perceived as difficult to climb.
- Provide view point belvederes at locations along the bridge.
- Pedestrian lighting, if used, should be low wattage and essentially decorative.

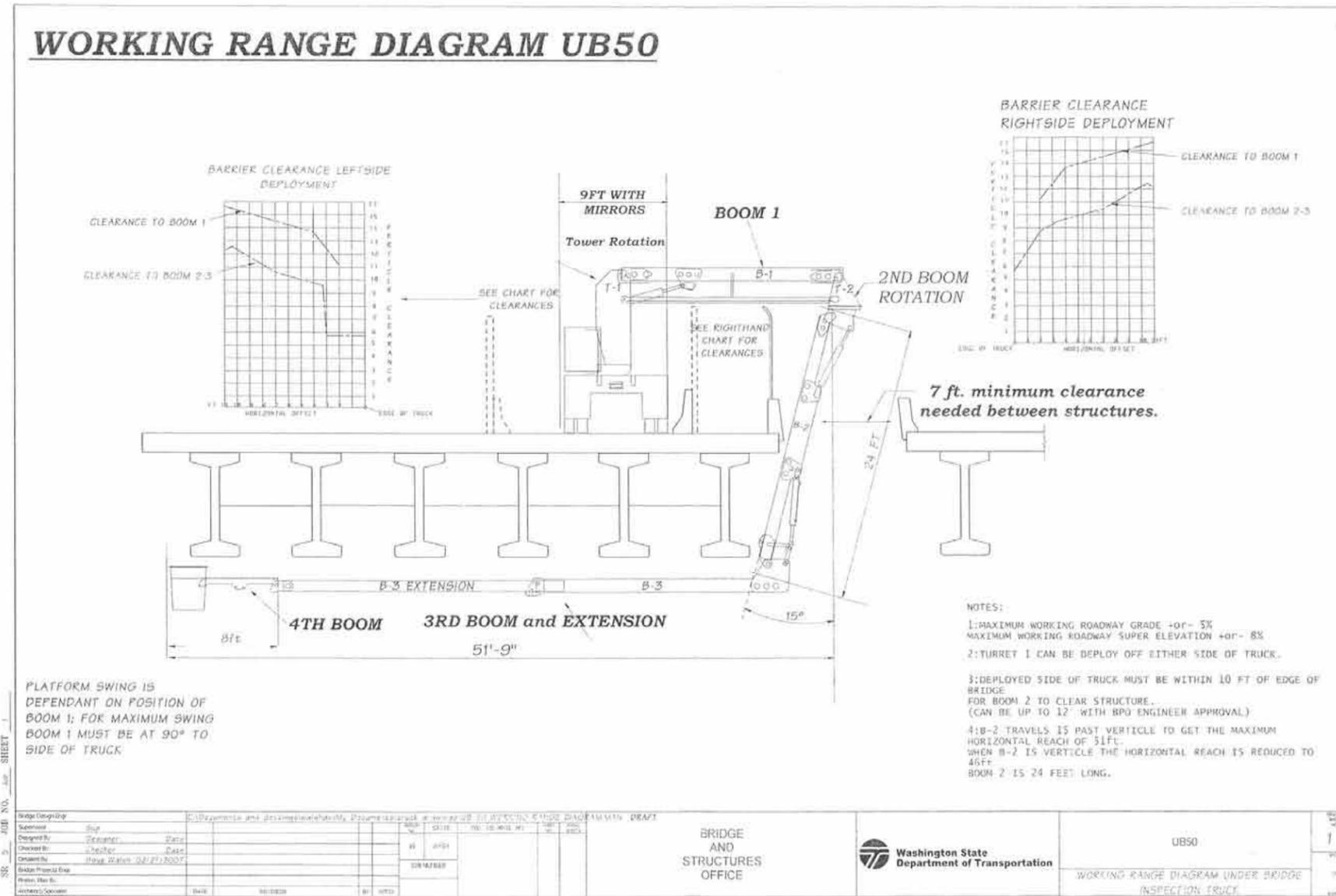
## Quantitative

- The elements should be spaced no greater than 6" apart.
- The overhang is limited by inspection truck requirements. The Bridge Office is studying inspection traffic control requirements which may affect the dimension.

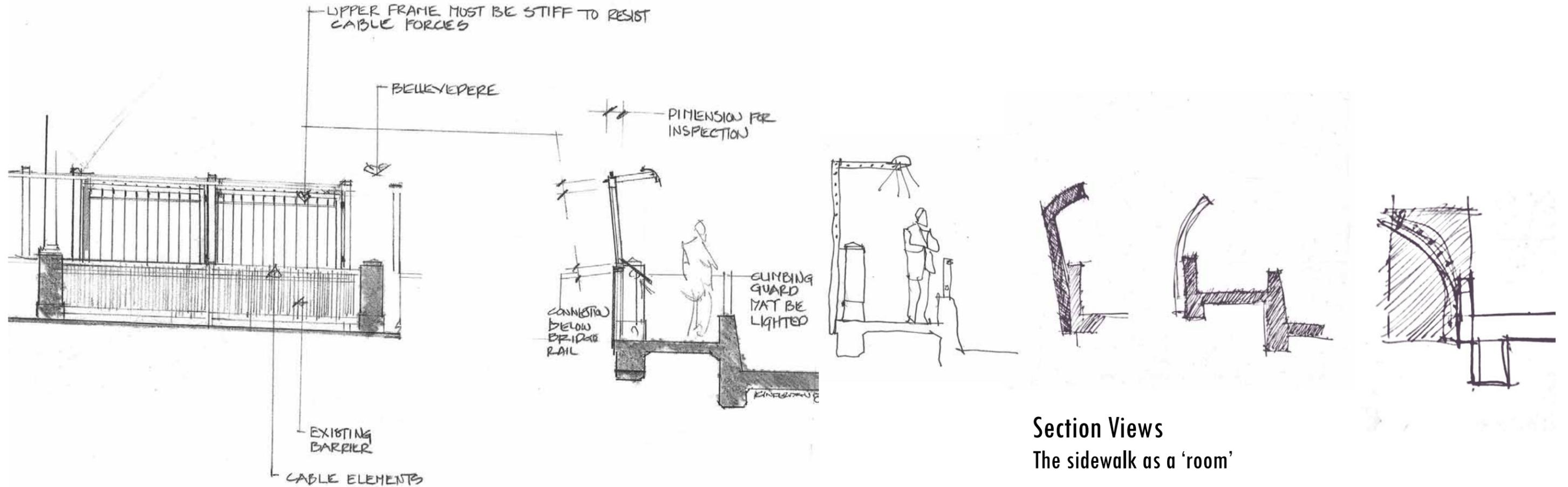


## Fence Envelope

The fence must be contained within this space.

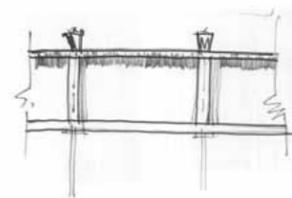


## Under Bridge Inspection Truck (UBIT)

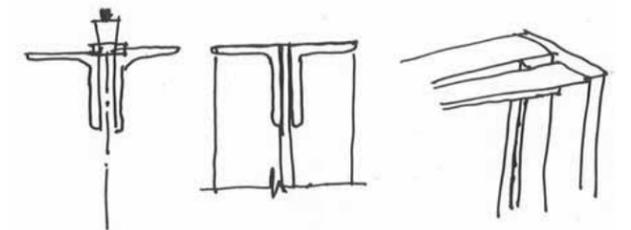


Section Views  
The sidewalk as a 'room'

Elevation View  
Vertical cables concept.

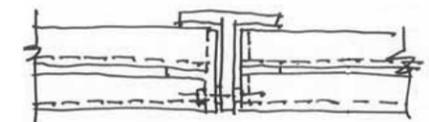
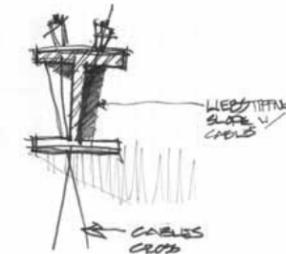
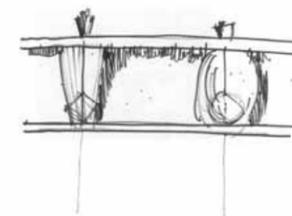
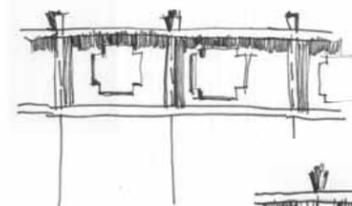


Upper frame style ideas.

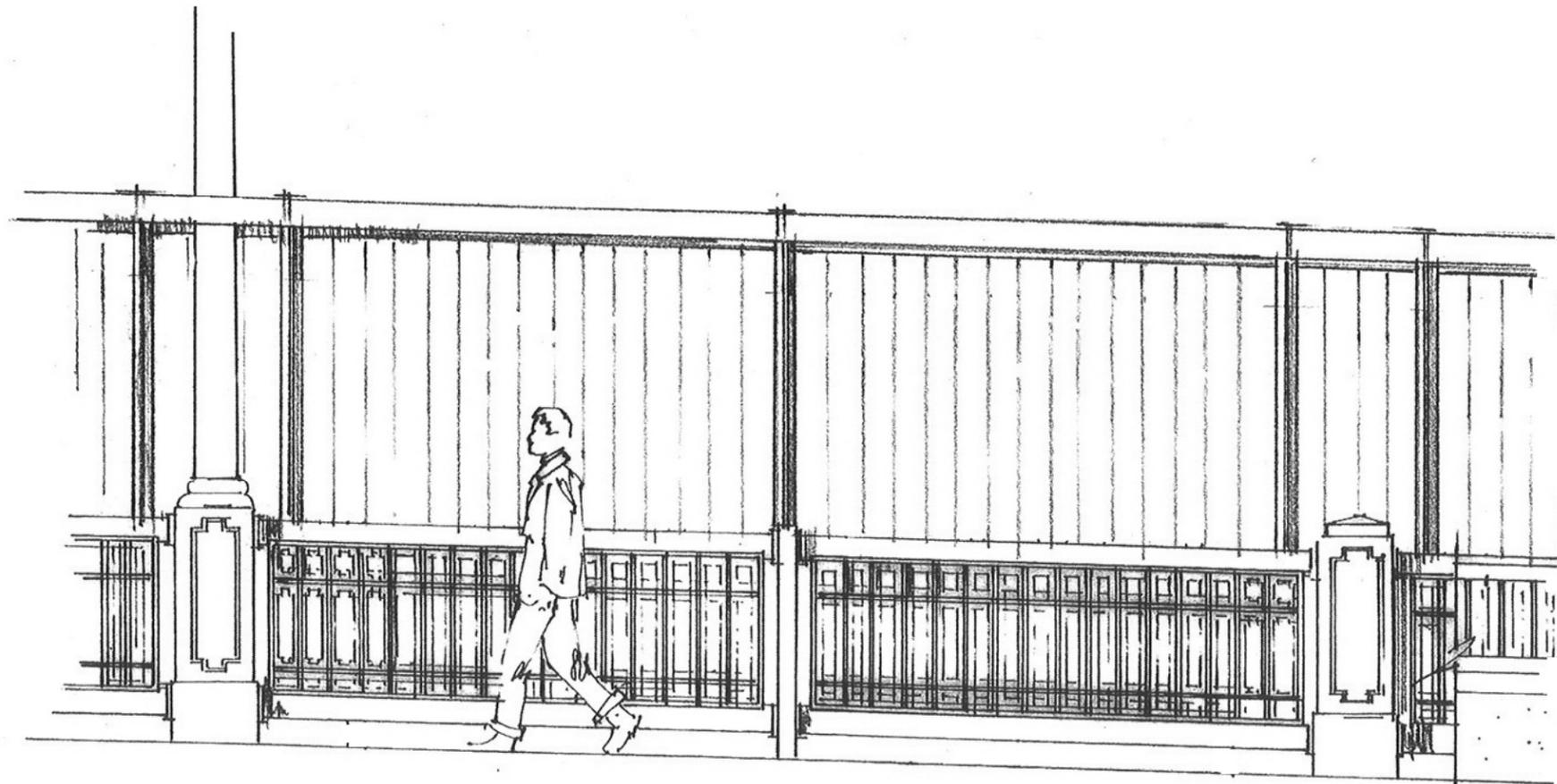


# Design Committee: Sketch Diary

Conversations with citizen architects David Clinkston AIA and Marc Pevoto AIA



Frame section shapes should be light in weight and appearance.



**Elevation**  
Viewed from the traveled way

## CURRENT DESIGN DISCUSSION

Provide a demountable double T frame system to house 3/16" stainless steel cables. Tension cables to prohibit spreading.

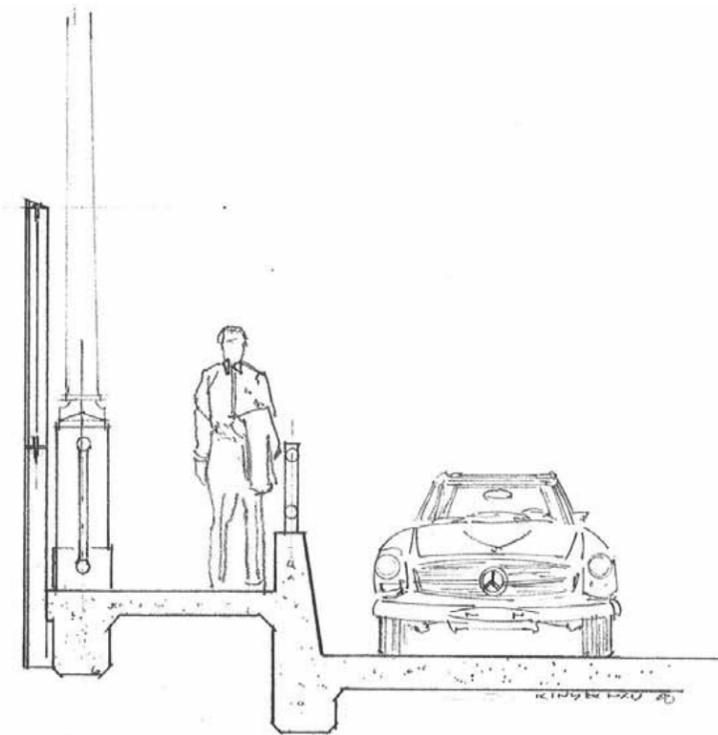
Design an overhang to discourage climbing.

Frame detailing will be visually light to facilitate views.

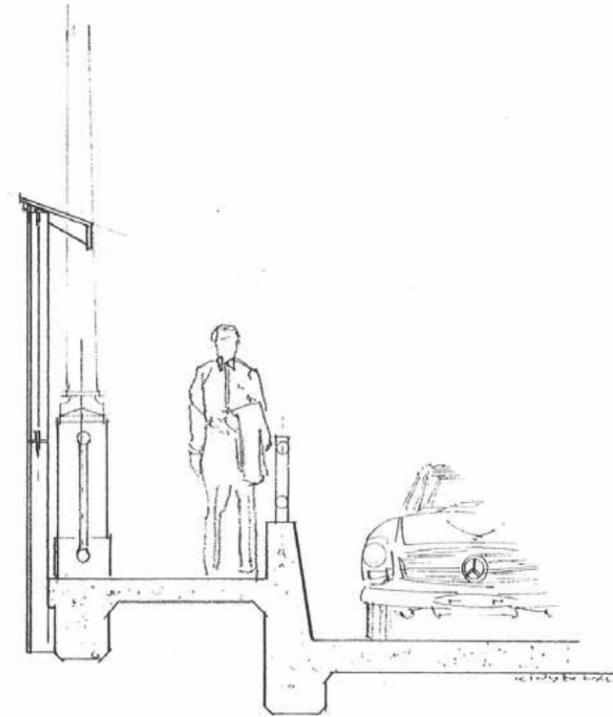
Provide belvederes by extending the fence outward toward the water.

The fence weight is critical to structural bridge preservation issues.

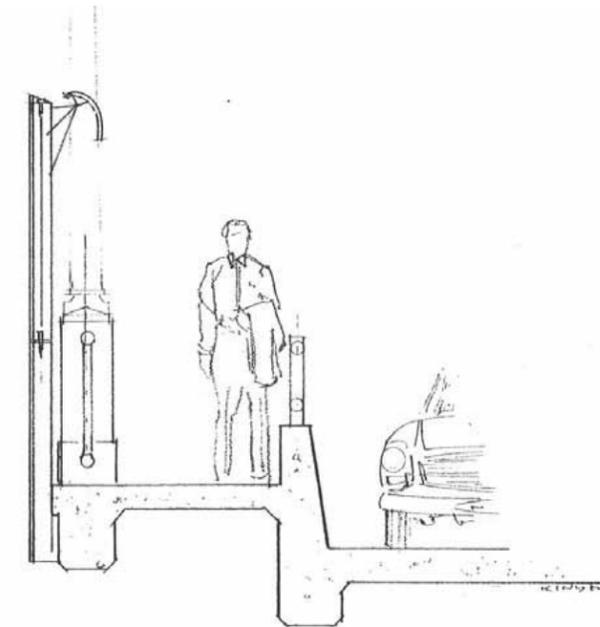
## Vertical Cable Design



**Straight Fence**



**Sloping Cap**



**Curved Cap**

### Discussion

The fence should have an overhang. The style will visually dominate the fence.

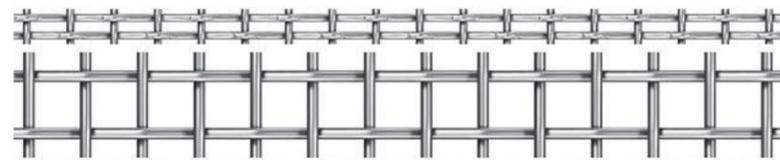
The designs shown are intended to be schematic in nature. The final design style will be developed as the project goes forward.

Typical Section Scenarios

## Vertical Cable Design



Cable system hardware for vertical elements.



The top of the overhang for the straight cap option.

## Materials

Currently under consideration.