

# CHICAGO LAKEFRONT TRAIL

## NAVY PIER FLYOVER PEDESTRIAN BRIDGE

Dan Burke, SE, PE

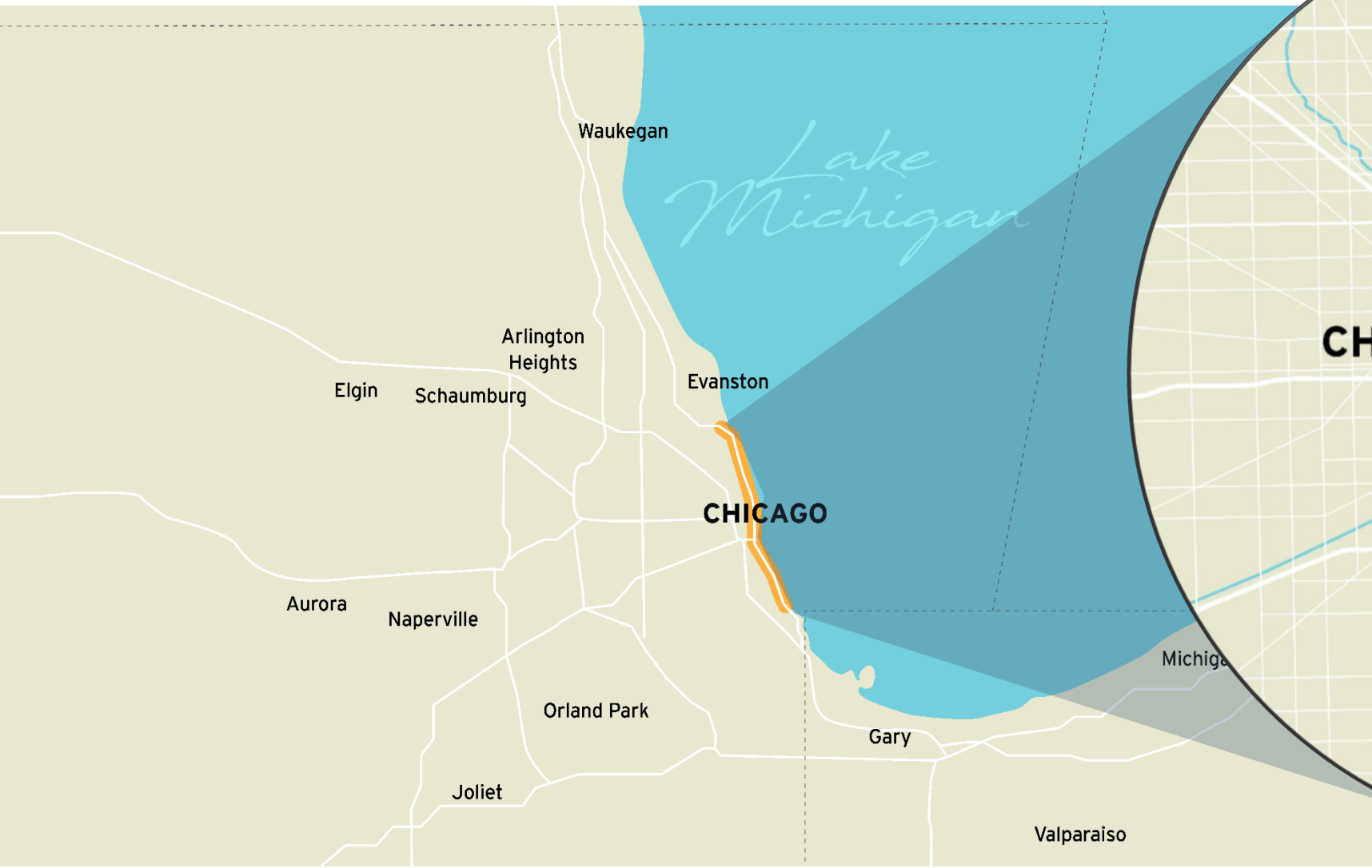
Tony F. Shkurti, PhD, SE, PE



ILLINOIS  
TRANSPORTATION  
AND HIGHWAY  
ENGINEERING  
CONFERENCE




# PROJECT LOCATION




# PROJECT FACTS

18   
MILES  
LONG

50   
ACCESS  
POINTS

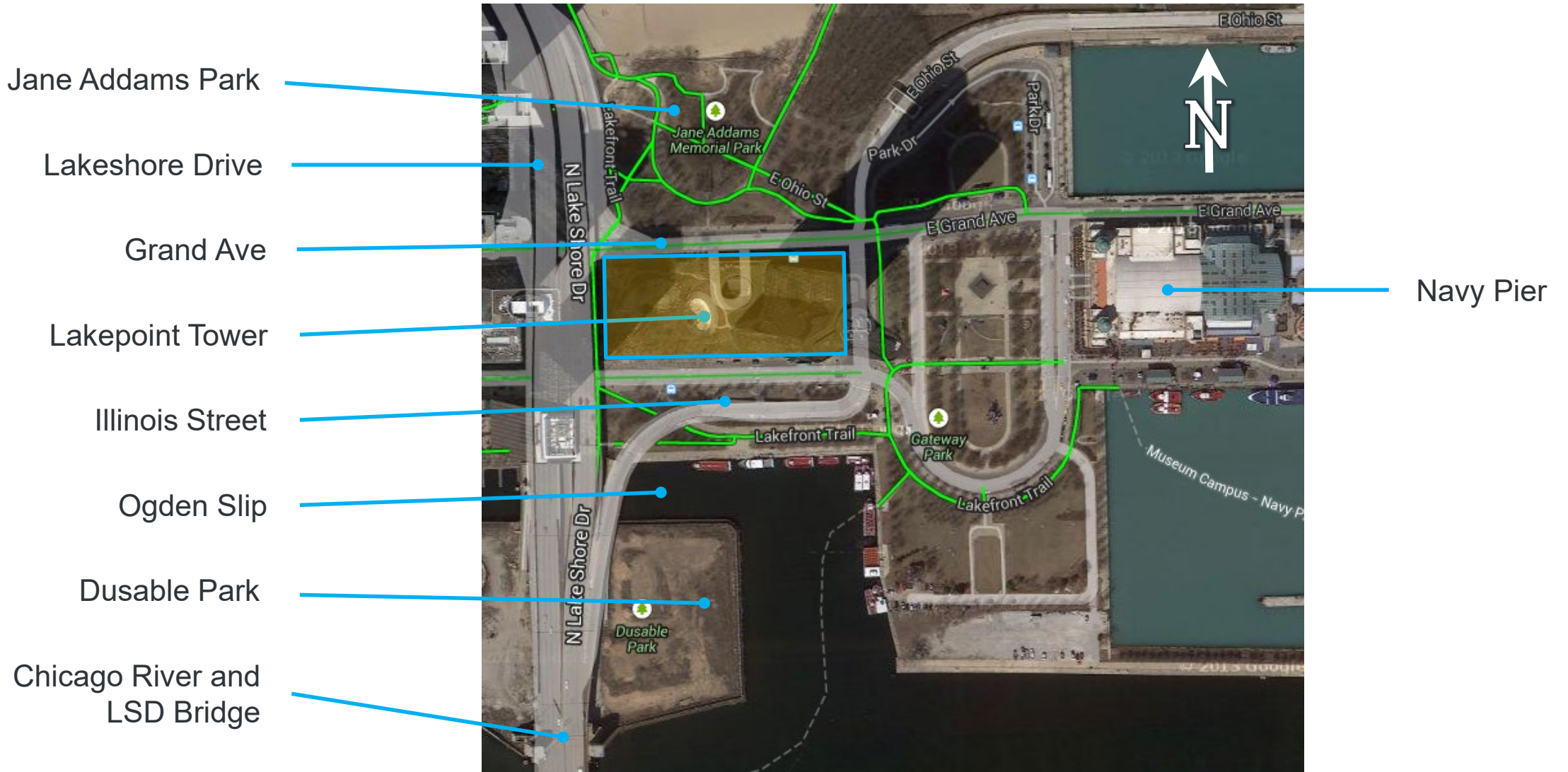
30,000   
PEDESTRIANS DAILY  
(SUMMER)

MAJOR   
TRAFFIC   
ARTERY

30%   
OF USERS ARE  
BICYCLISTS

1,200-  
1,600   
BICYCLISTS  
PER HOUR

# EXISTING LAKEFRONT TRAIL



# EXISTING CONDITIONS

## CONFLUENCE

OF HEAVY  
PEDESTRIAN  
TRAFFIC



VEHICLE  
CROSSING  
POINTS



ABSENT OR  
DETERIORATED  
PAVEMENT  
MARKINGS



LACK OF  
SIGNAGE



POOR  
RIDING  
SURFACES



LIMITED  
VERTICAL AND  
HORIZONTAL  
CLEARANCES



DUSABLE  
PARK  
SUPERFUND  
SITE



# EXISTING DUSABLE PARK



# EXISTING PEDESTRIAN RAMP

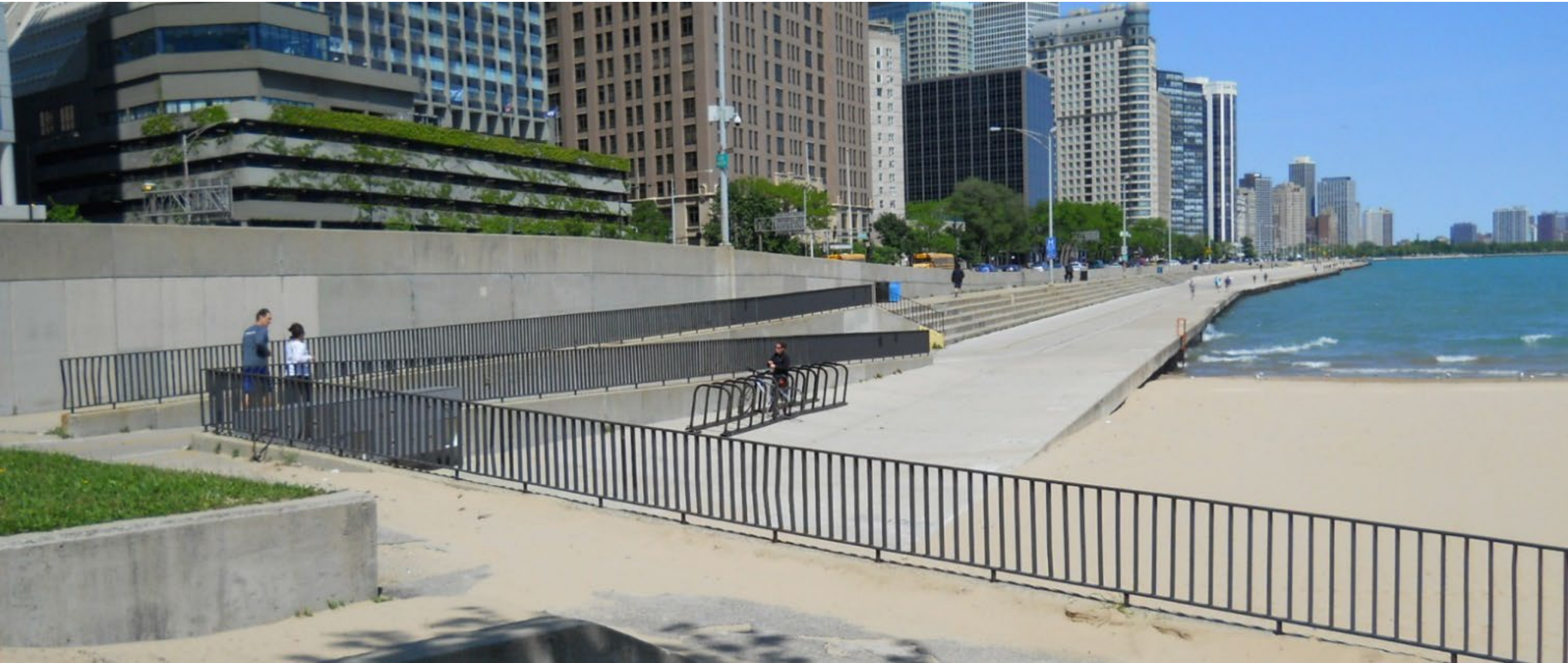


# EXISTING PATH TRAIL





# EXISTING NORTH END OF PEDESTRIAN TRAIL



# EXISTING SHARED CROSS POINTS



# PROPOSED SOLUTION

## CREATE SEPARATION

BETWEEN PEDESTRIANS AND VEHICLES



## ELIMINATE SHARED CROSSING POINTS



## IMPROVE ACCESS

TO NAVY PIER FACILITIES

## REDUCE PEDESTRIANS CONGESTION

AT JANE ADDAMS PARK



## IMPROVE

RIDING SURFACES, SIGNAGE AND PAVEMENT MARKINGS



## DEVELOP DUSABLE PARK






# PROJECT AERIAL & NEW PATH ALIGNMENT



*General Plan & Aerial*  
**NAVY PIER FLYOVER - LAKEFRONT TRAIL IMPROVEMENT**  
 CDOT # E-0-534 - SECTION # 00-E0534-00-BR



	PROJECT NAME	BRIDGE CONDITION REPORT	ENVIRONMENTAL	PROJECT DEVELOPMENT REPORT
	1. OVER THE CHICAGO RIVER	NEW BCR FOR 016-6030	ESR 9898B	NEW STAND ALONE PDR
	2. OVER OGDEN SLIP AND DUSABLE PARK	ADDENDUM II FOR 016-6103 & 016-6104	ESR 9898C	ADDENDUM II TO ORIGINAL
	3. FROM NORTH OGDEN SLIP TO JANE ADDAMS PARK	ADDENDUM I FOR 016-6105 & 016-6106	ECOCAT	ADDENDUM I TO ORIGINAL



# STRUCTURAL DESIGN



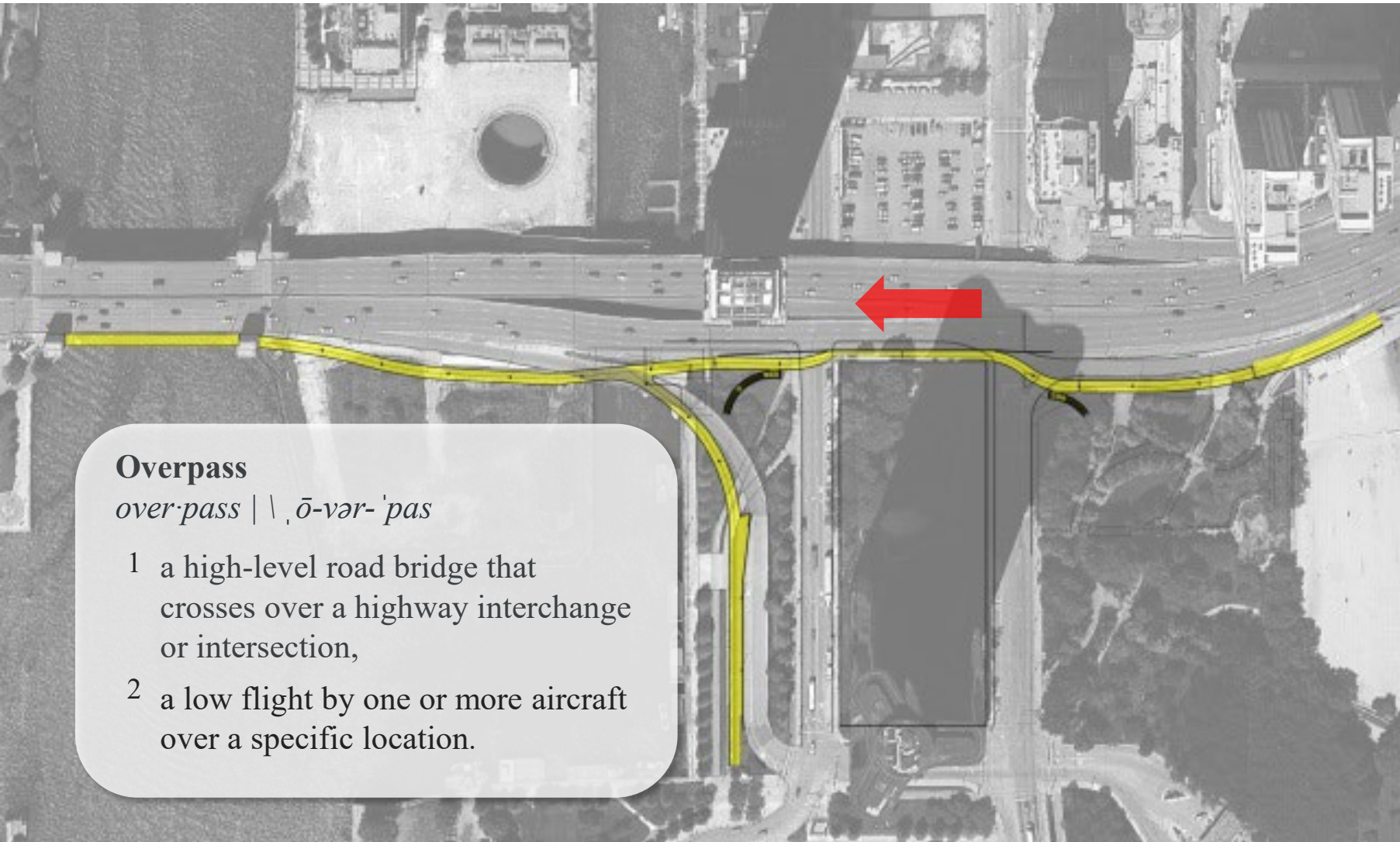
# Structural Concept History

**PHASE 1 –  
DESIGN**

**ARCHITECTURAL  
FEATURES**

**FINAL WINNING  
CONCEPT WE  
HAVE TODAY**

# THE FLYOVER – WHAT IS IT?



## Overpass

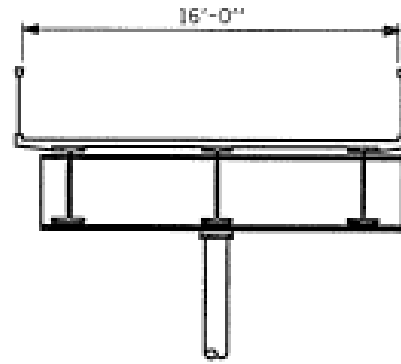
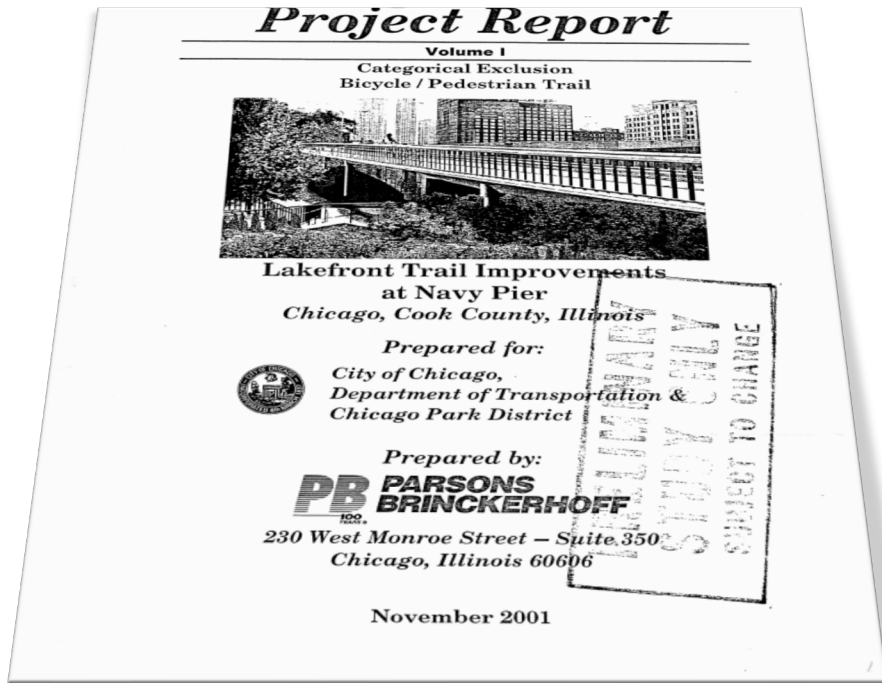
*over-pass* | \ , ȯ-vər- 'pas

- 1 a high-level road bridge that crosses over a highway interchange or intersection,
- 2 a low flight by one or more aircraft over a specific location.

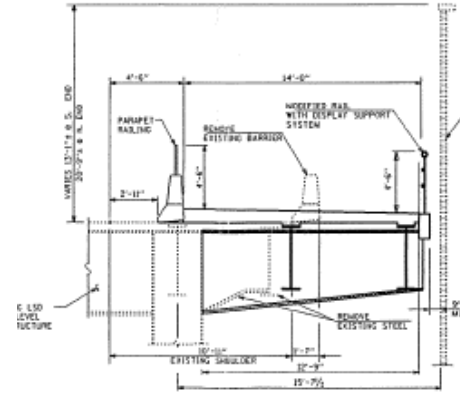


# CONCEPTION OF THE FORM – HOW, WHAT, WHY?

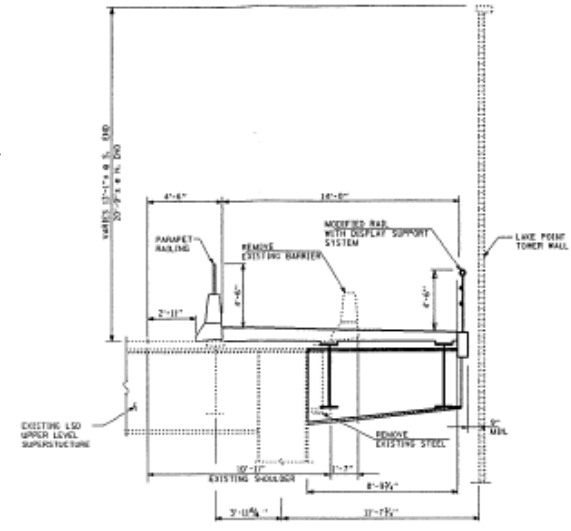
From Phase I



**CROSS SECTION**  
AT JANE ADDAMS PARK  
NEXT TO LAKE SHORE DRIVE  
LOOKING NORTH



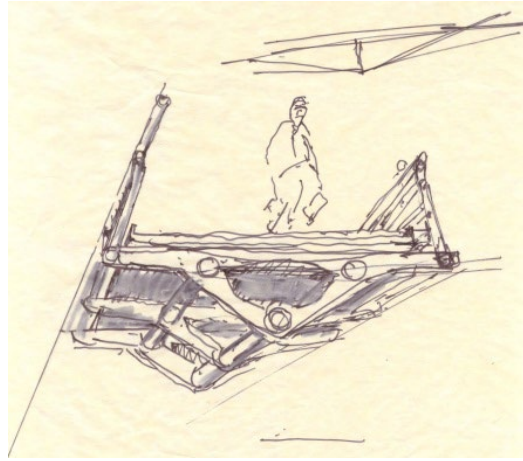
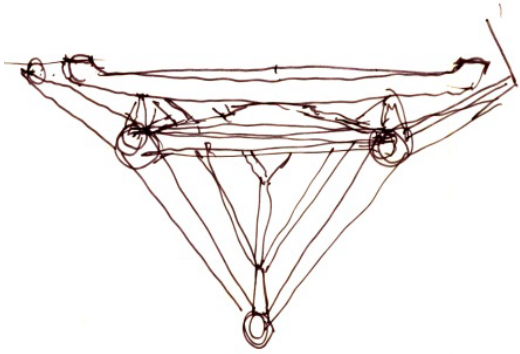
**COLUMN 3**  
**CROSS SECTIONS**  
AT LAKE SHORE DRIVE SHOULDER  
NEXT TO LAKE POINT TOWER  
LOOKING NORTH



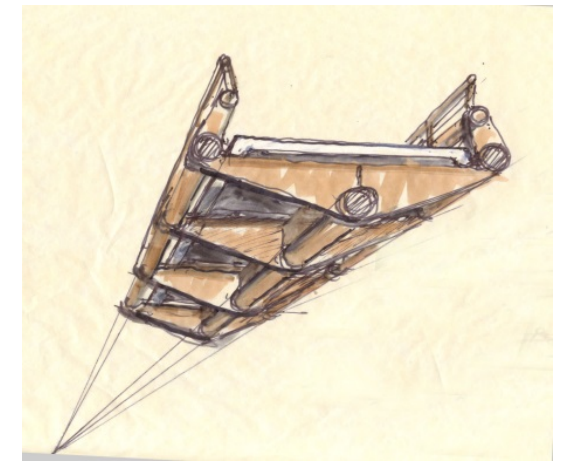
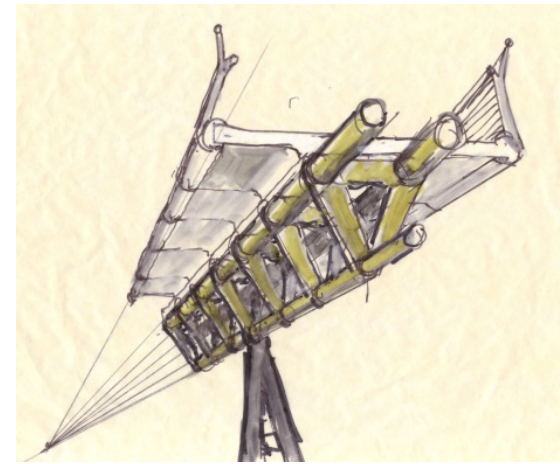
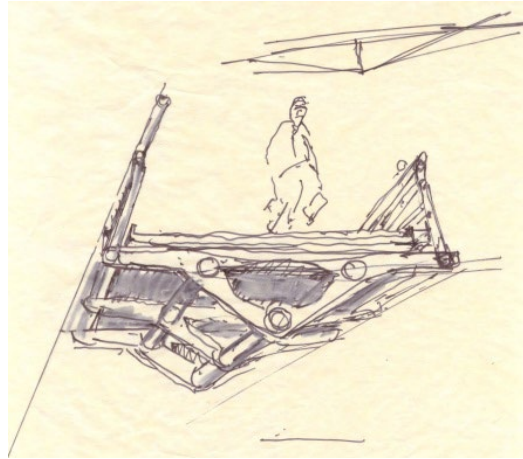
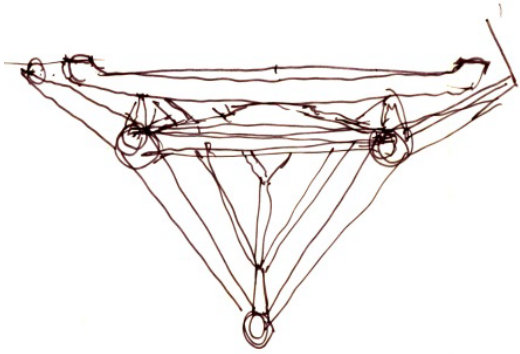
**COLUMN 1**



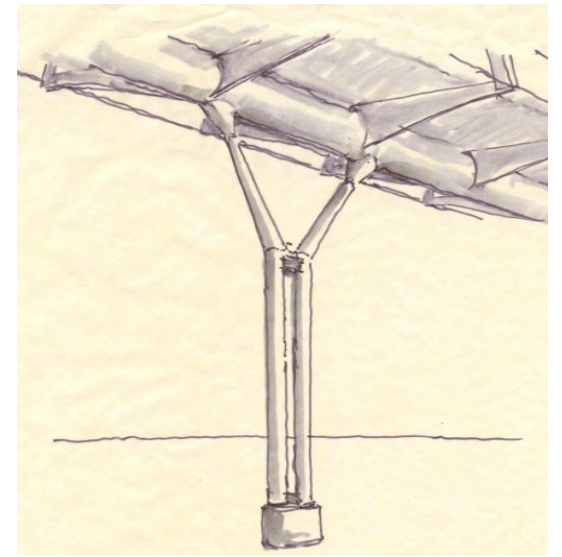
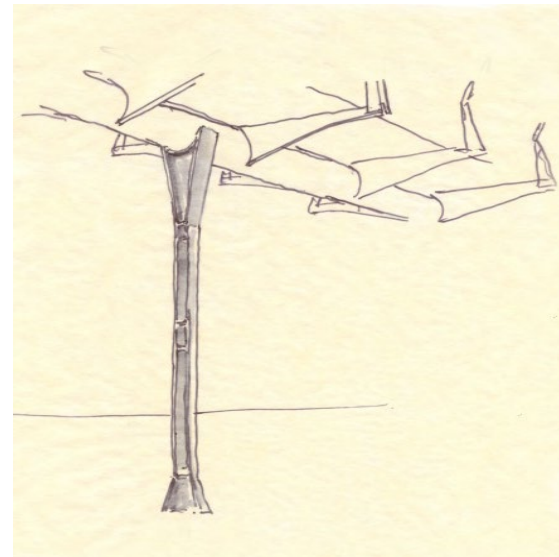
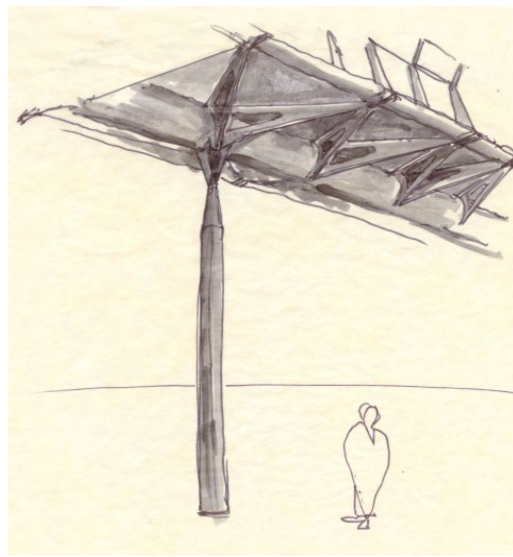
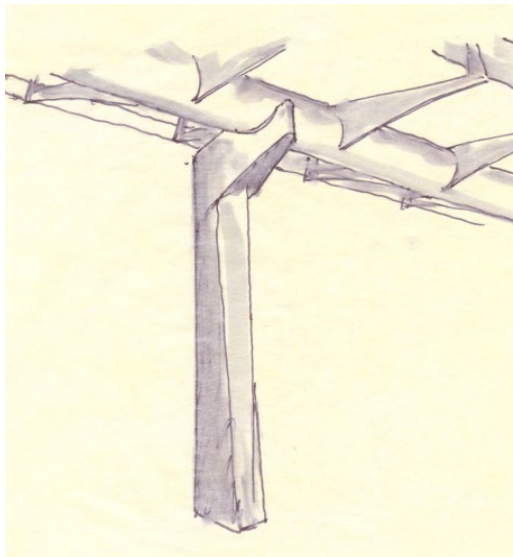
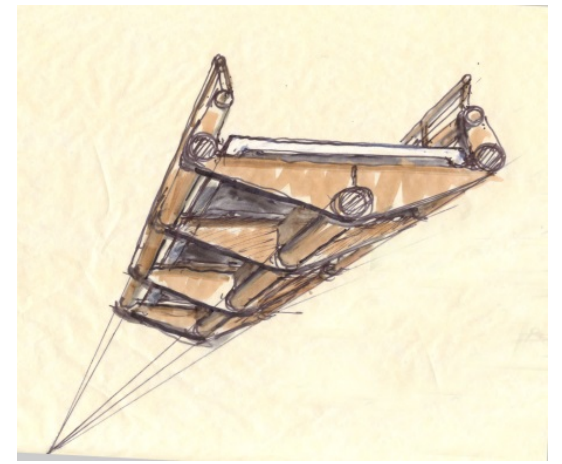
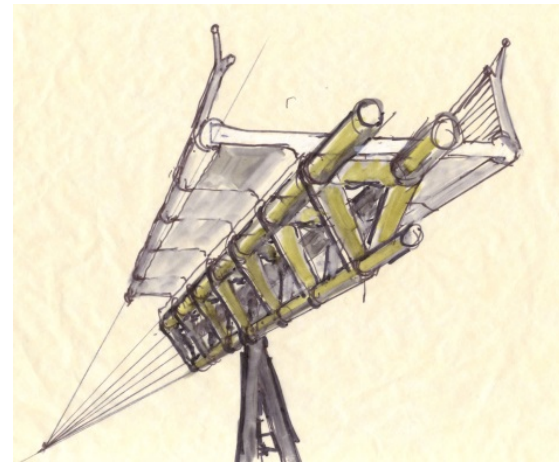
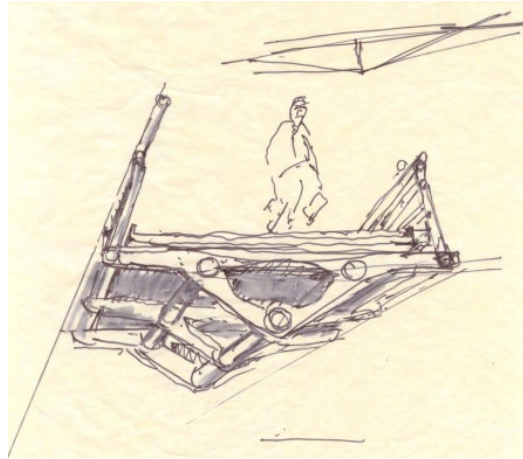
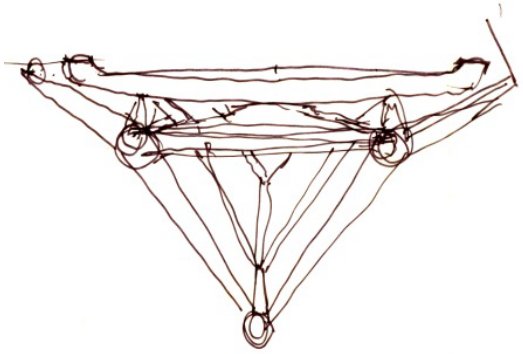
# CONCEPTION OF THE FORM – HOW, WHAT, WHY?



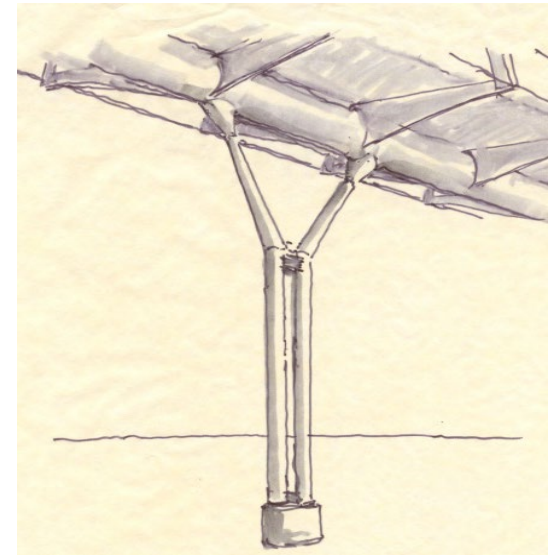
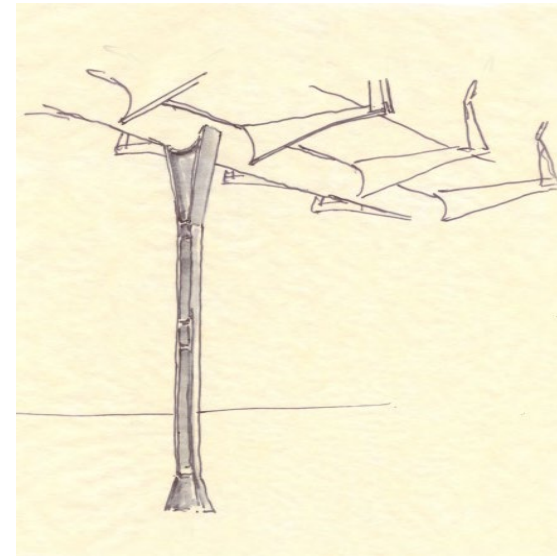
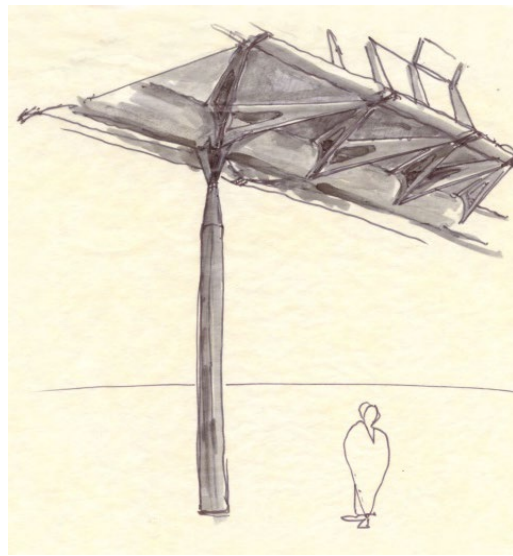
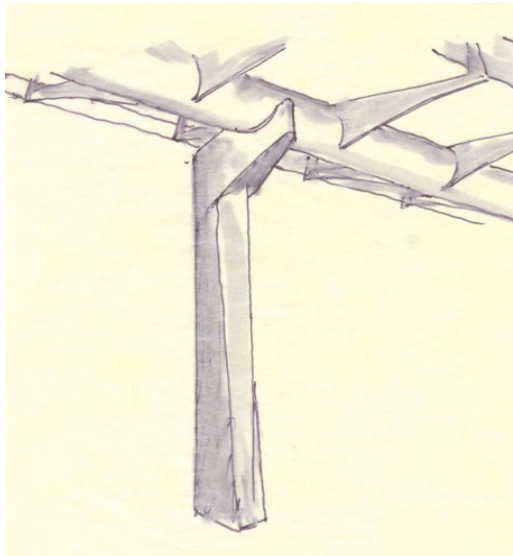
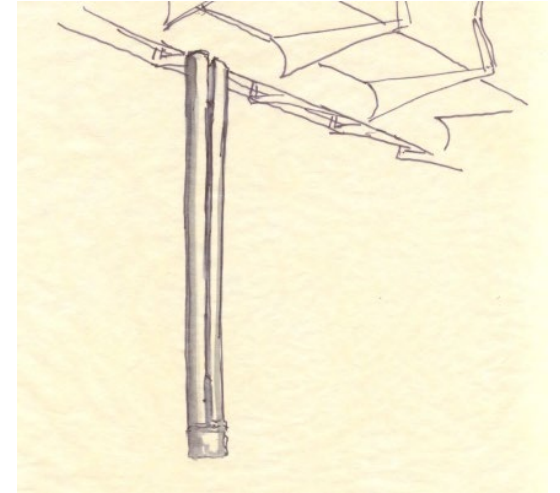
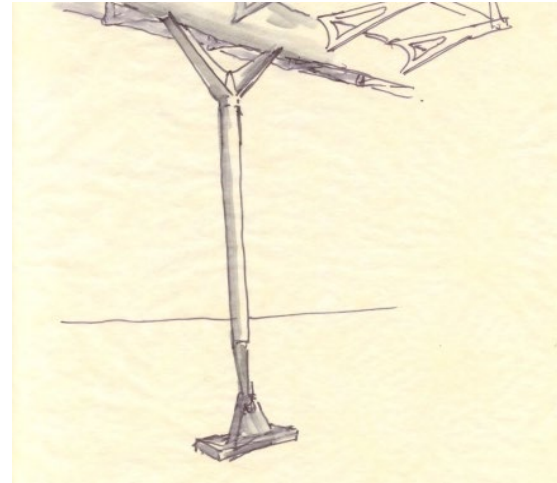
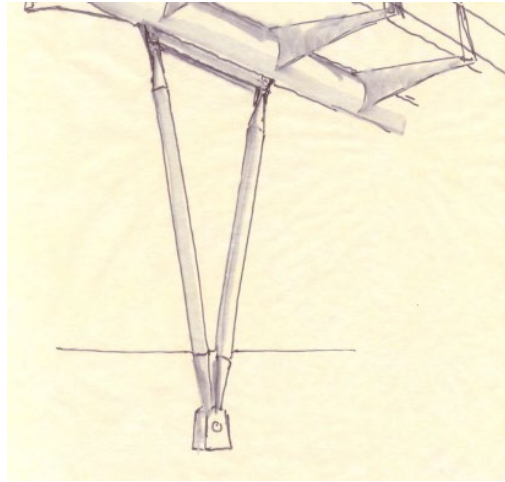
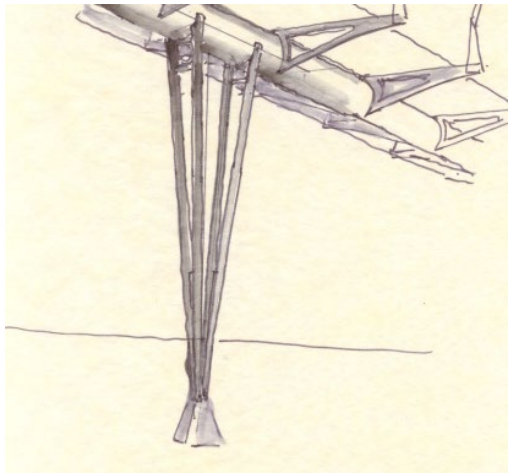
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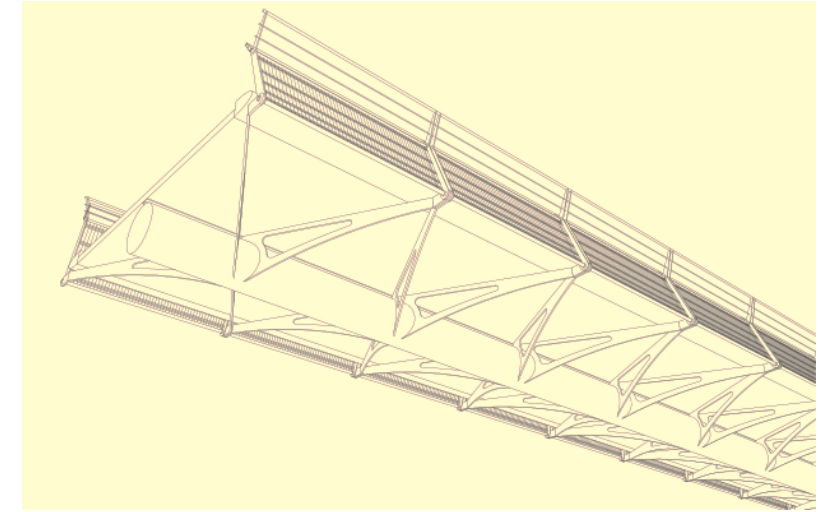
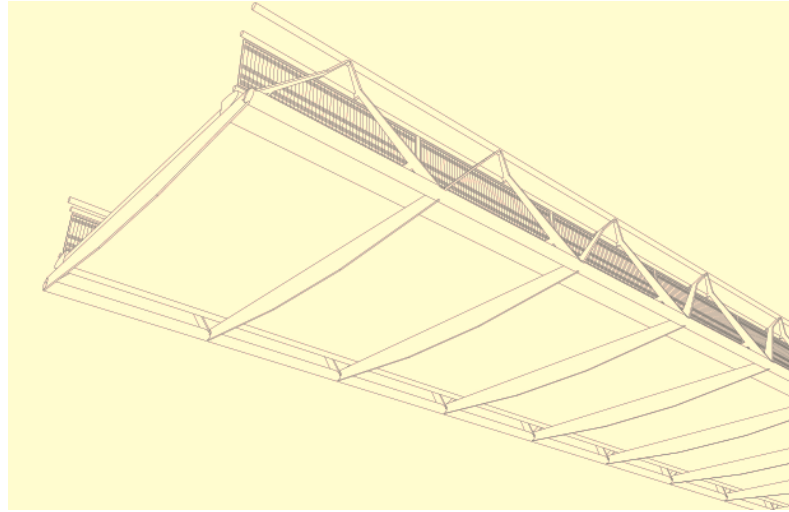
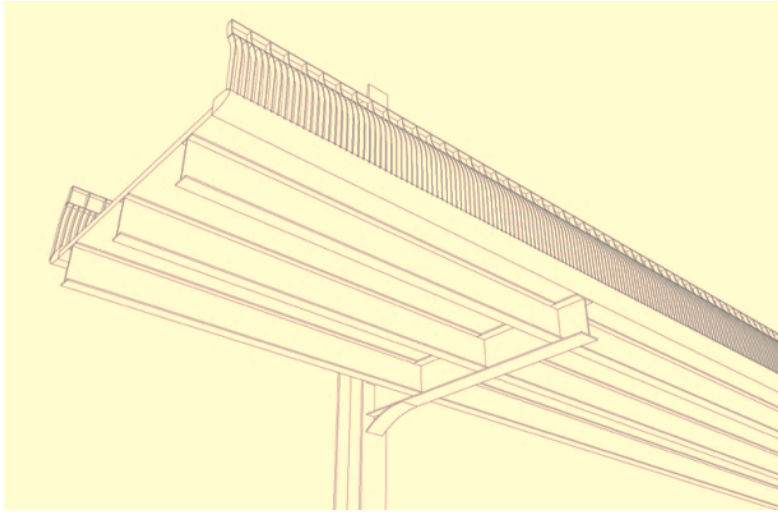
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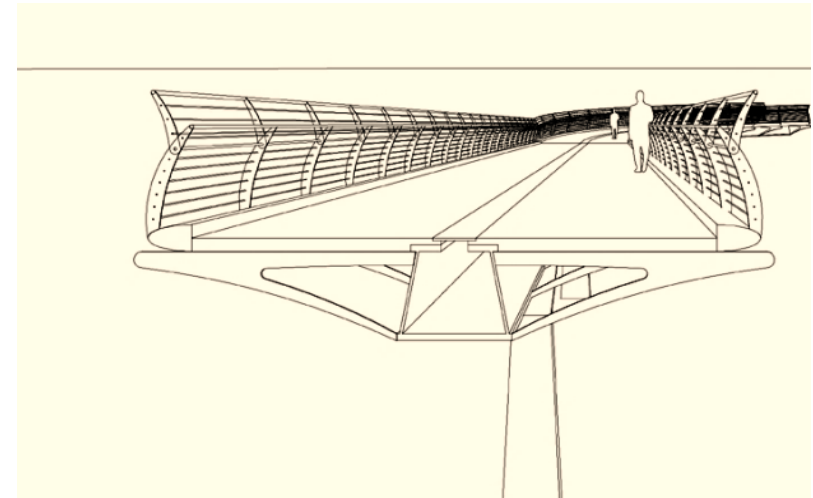
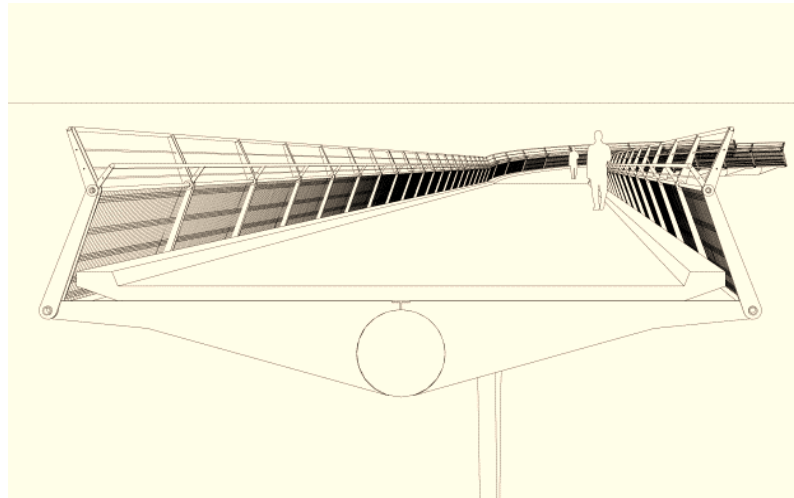
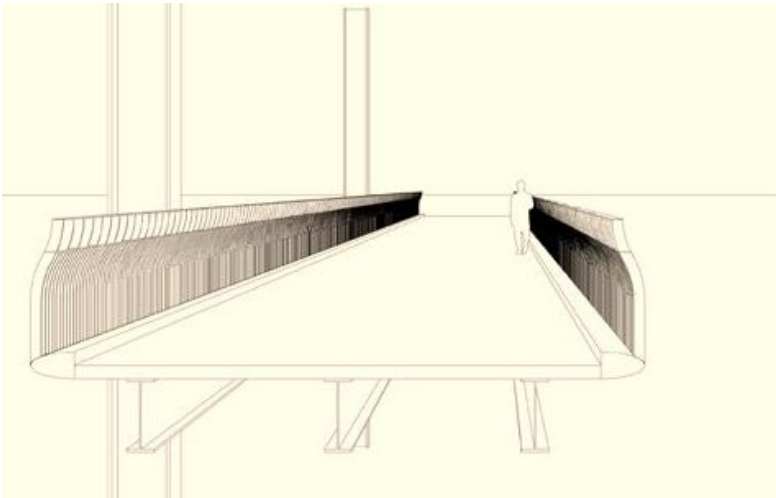
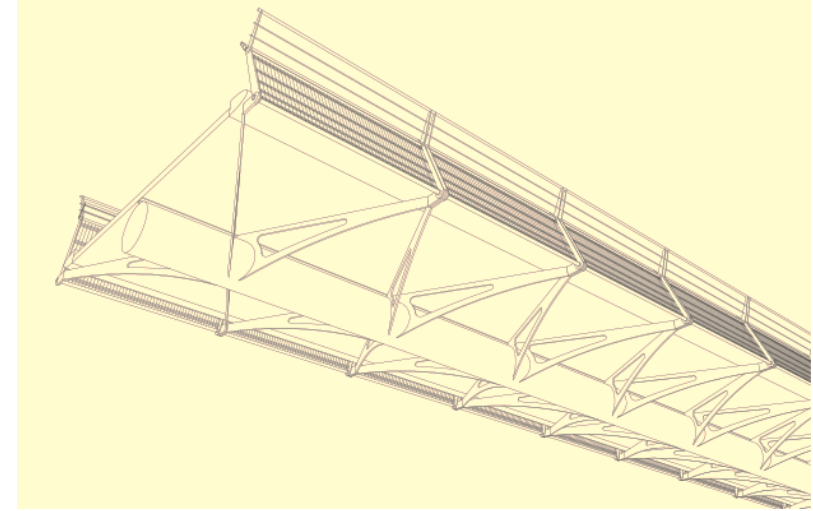
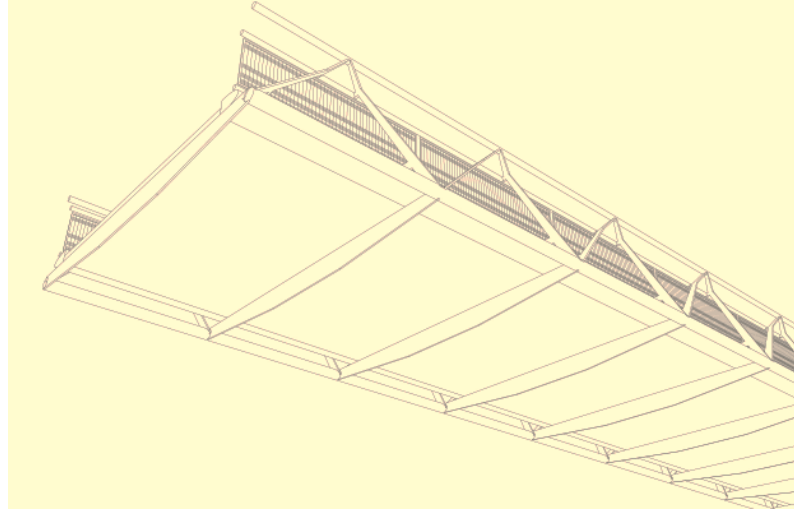
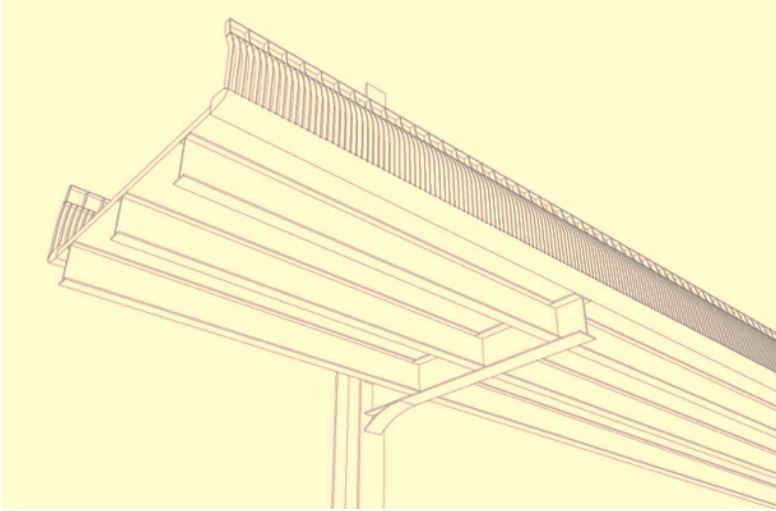
# CONCEPTION OF THE FORM – HOW, WHAT, WHY?



# CONCEPTION OF THE FORM – HOW, WHAT, WHY?



# CONCEPTION OF THE FORM – HOW, WHAT, WHY?



# THE PIPE DOES IT ALL

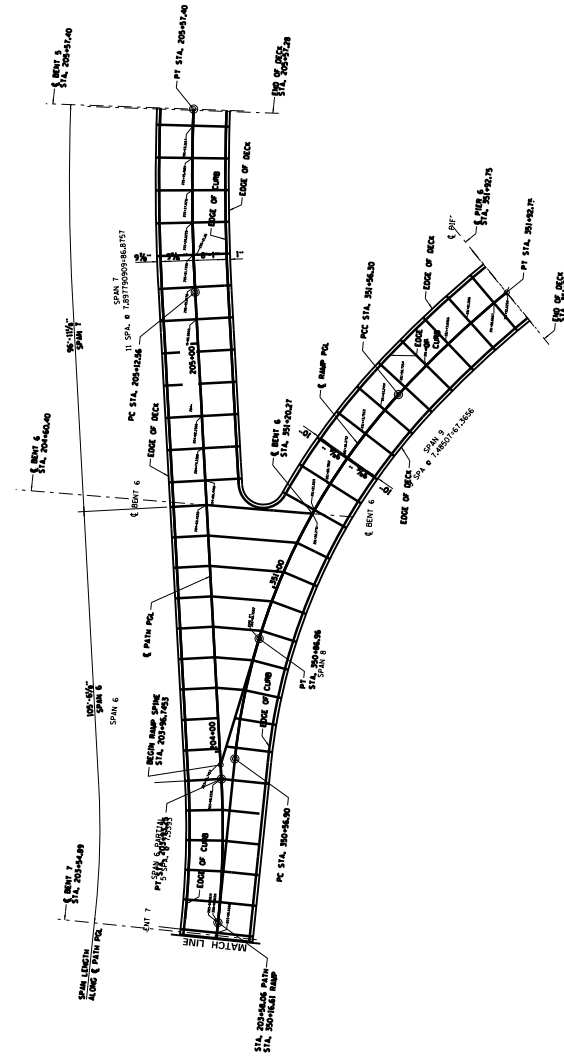
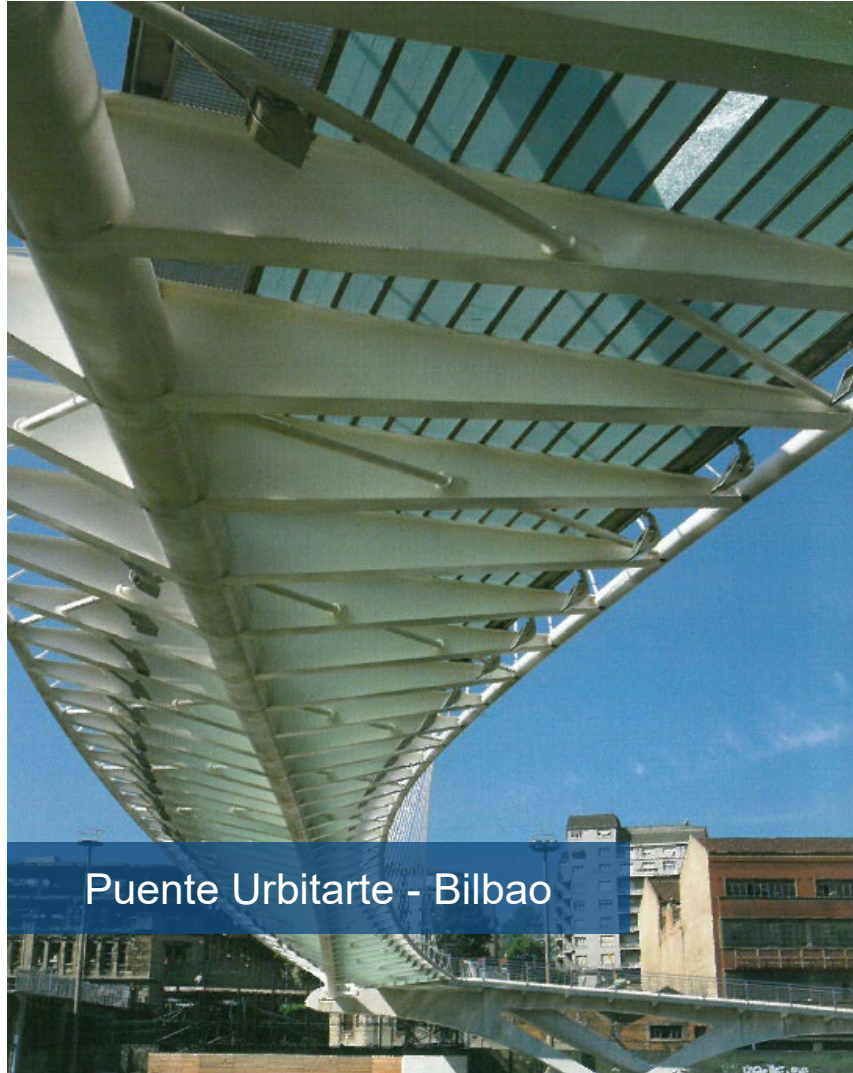


# DESIGN CRITERIA

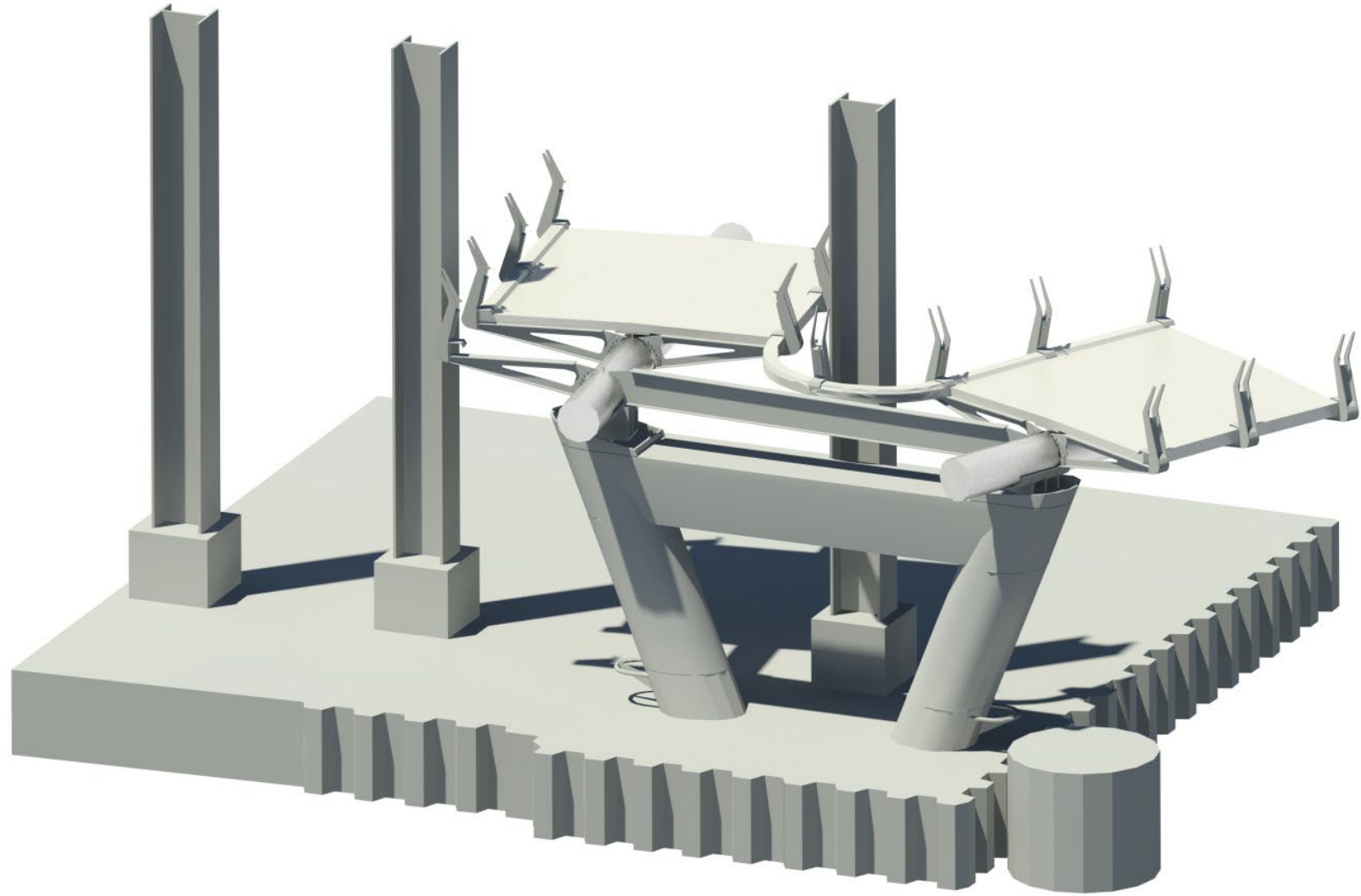
- LFD design approach
- AASHTO Guide Specifications for the Design of Pedestrian Bridges
- Pedestrian Live Load 100 psf
- AASHTO H10 Maintenance Vehicle
- Serviceability: Vibration – US and British Codes



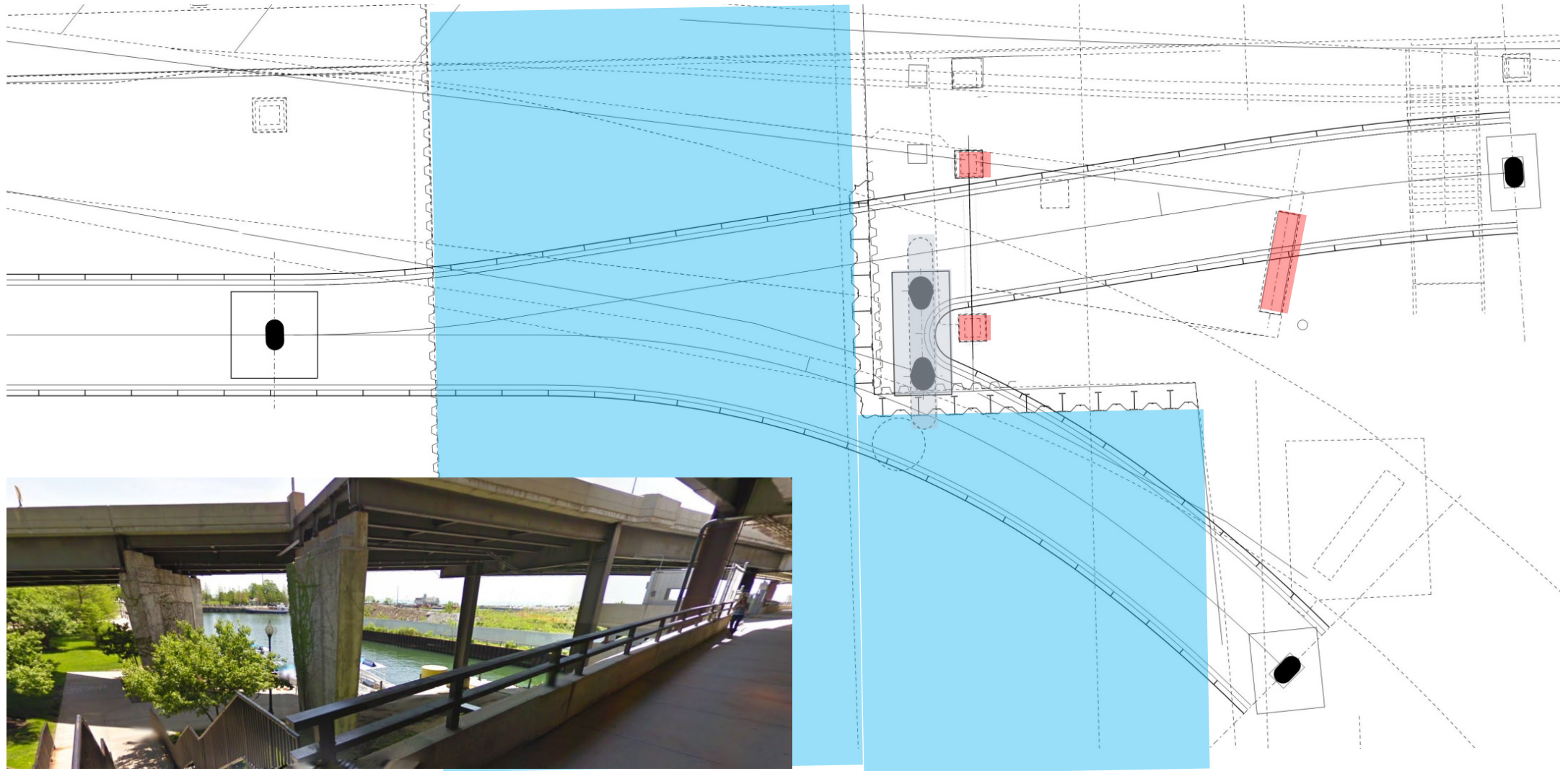
# PRELIMINARY DESIGN – SERPENTINE FRAMING PLAN



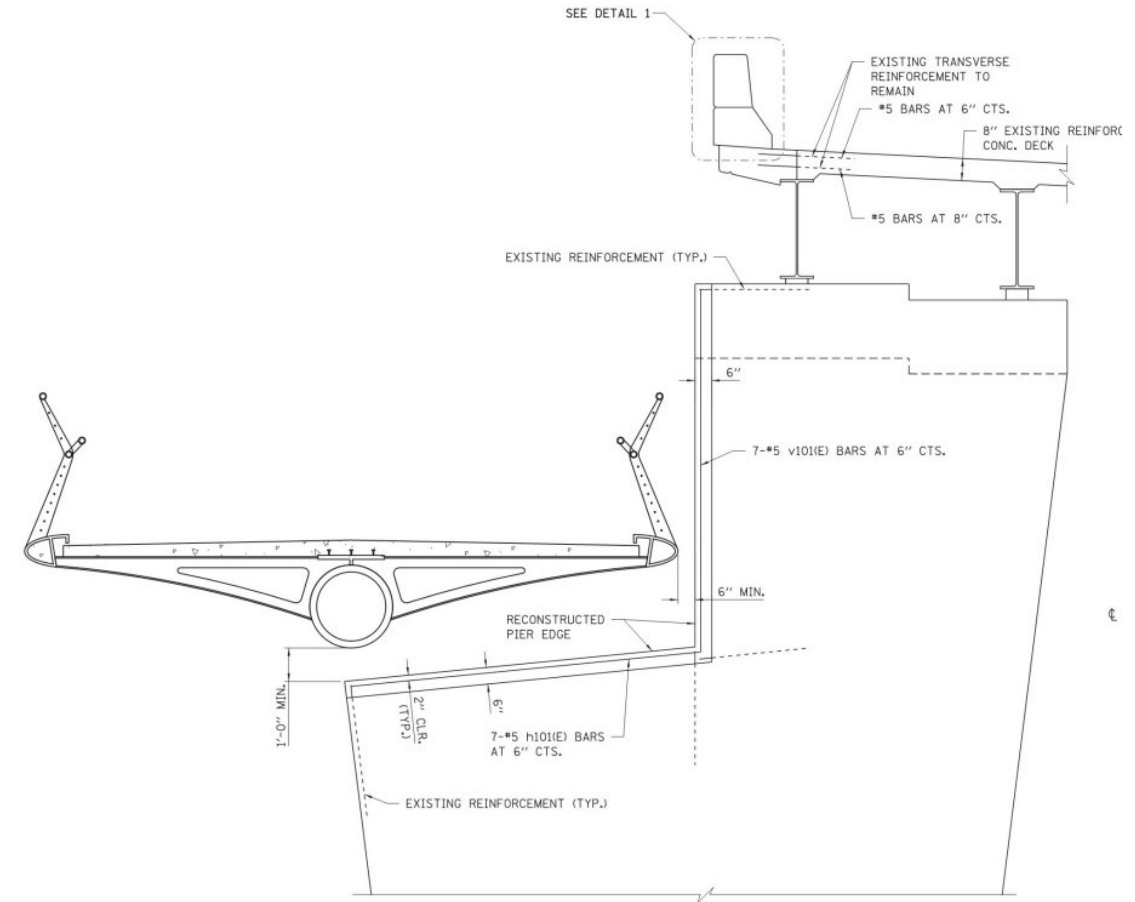
# BIFURCATION



# BIFURCATION & OGDEN SLIP CROSSING

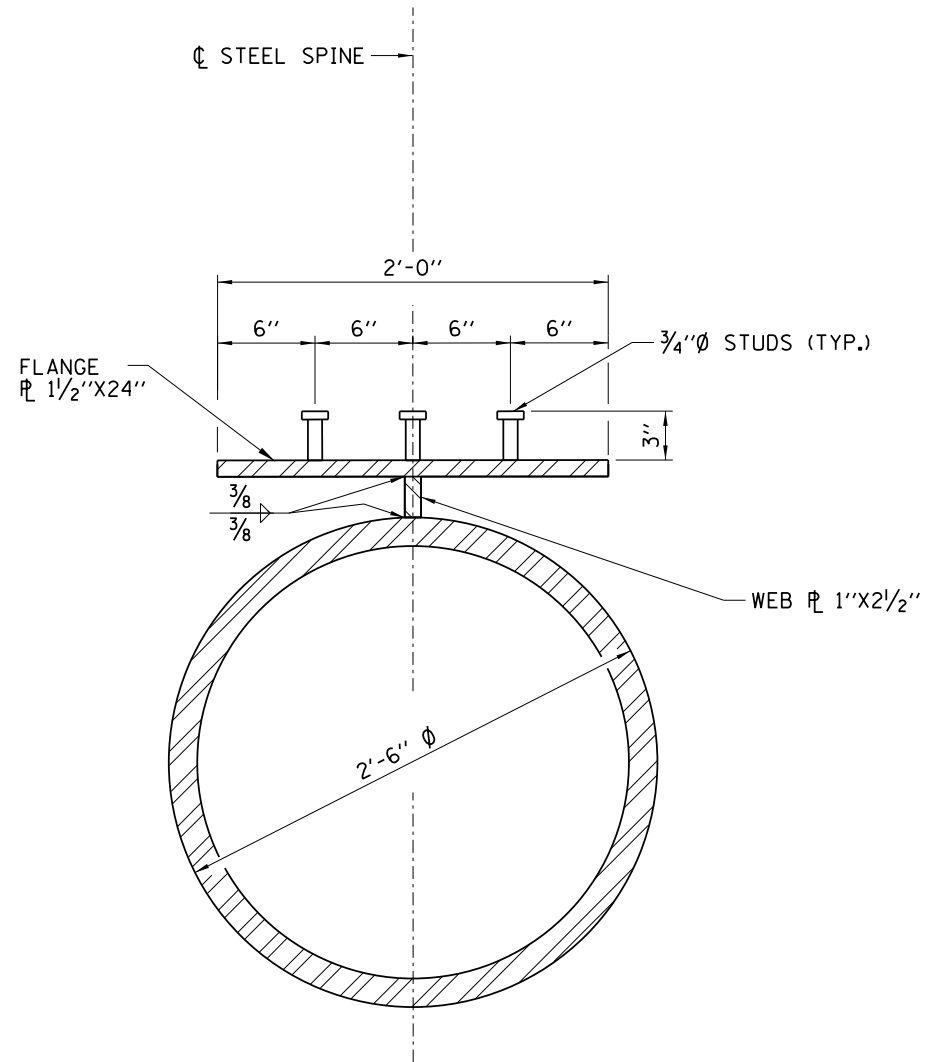


# PIER REMOVAL

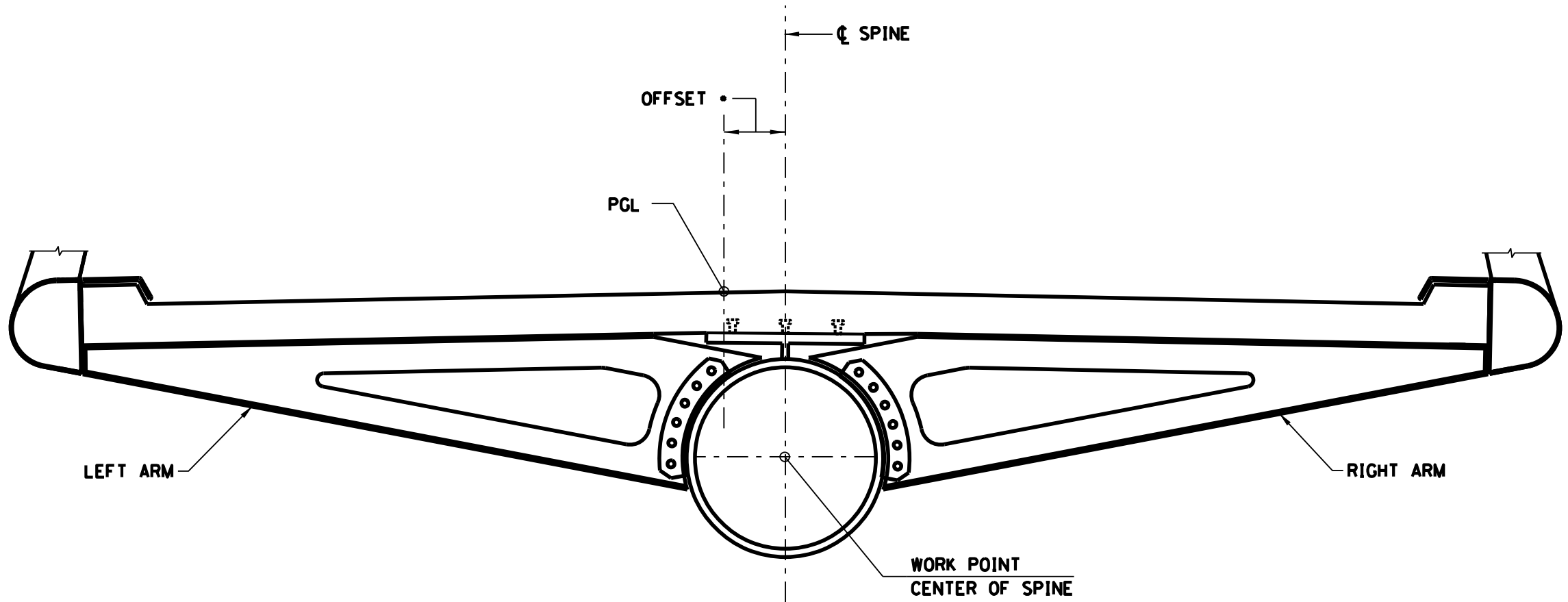


**EXISTING PIER 09M**  
(LOOKING NORTH)

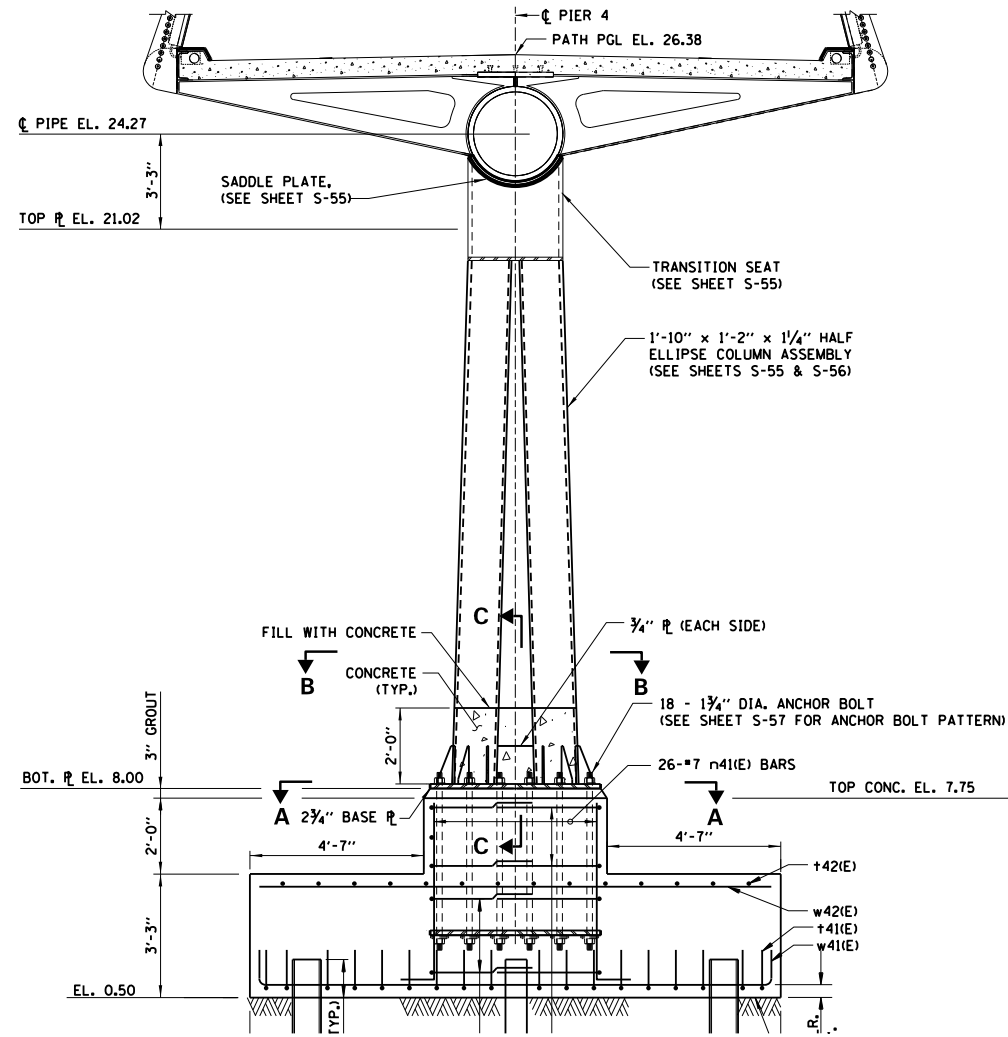
# MAIN SPINE



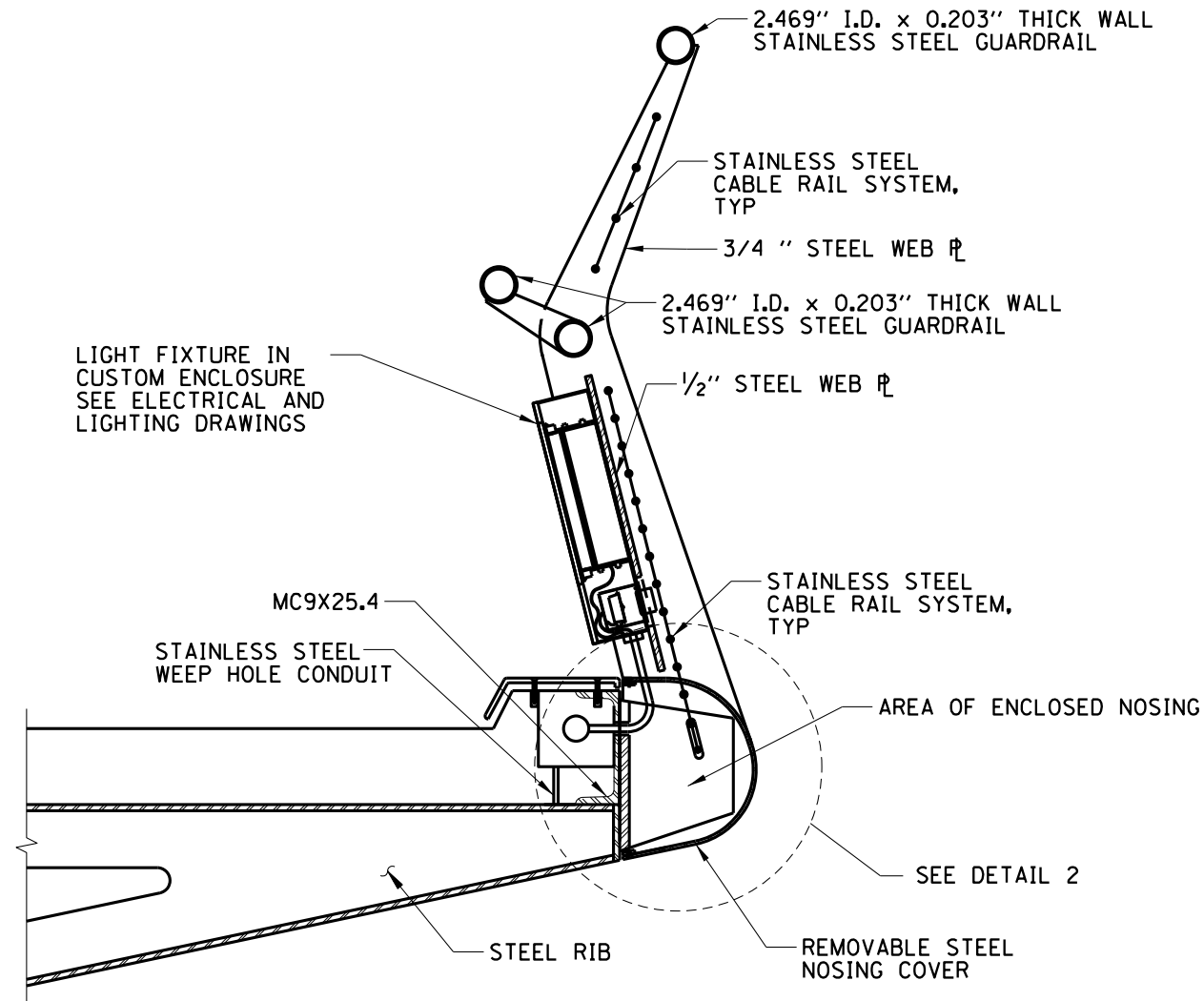
# TYPICAL CROSS SECTION



# PROPOSED PIER COLUMN

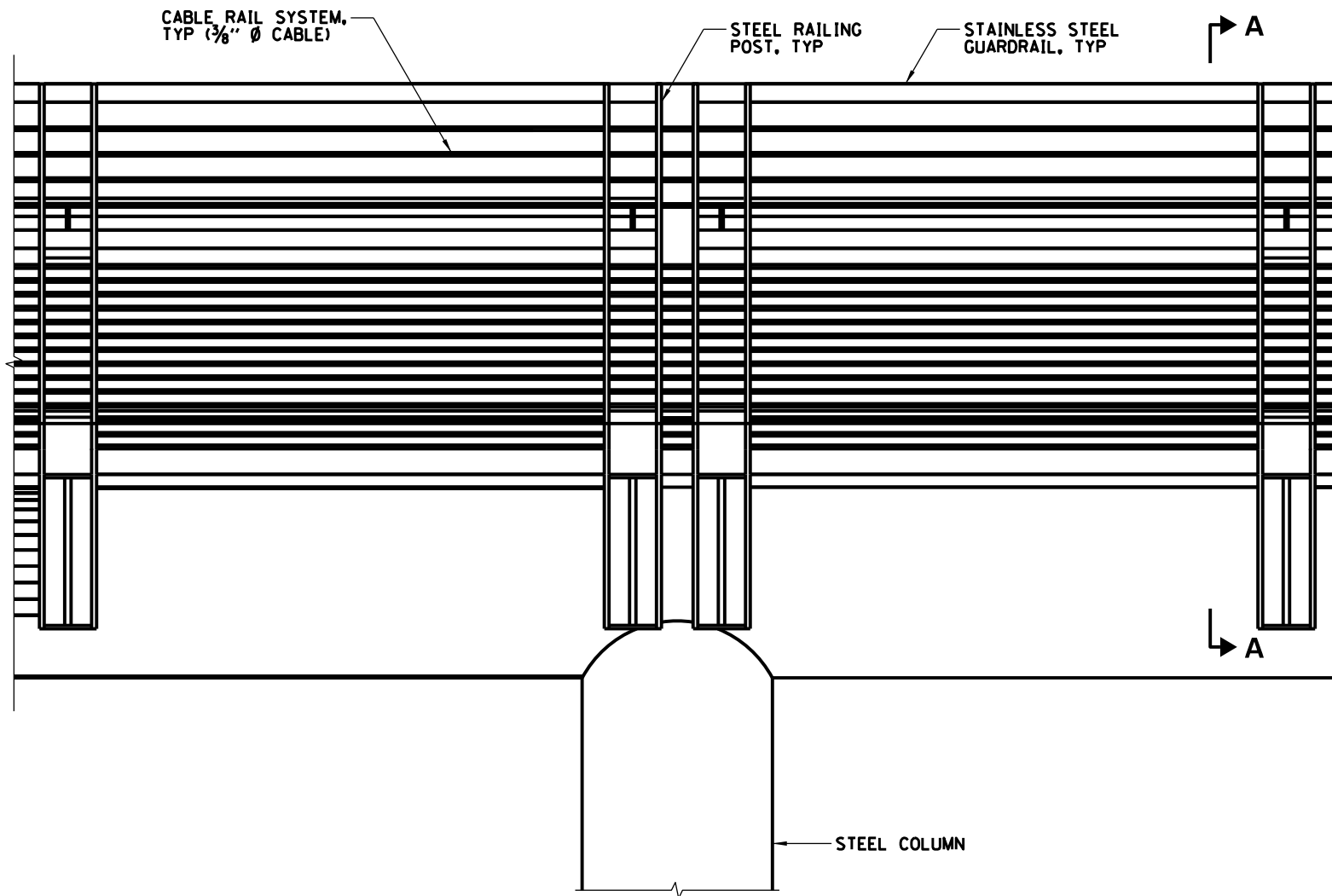


# CABLE RAILING





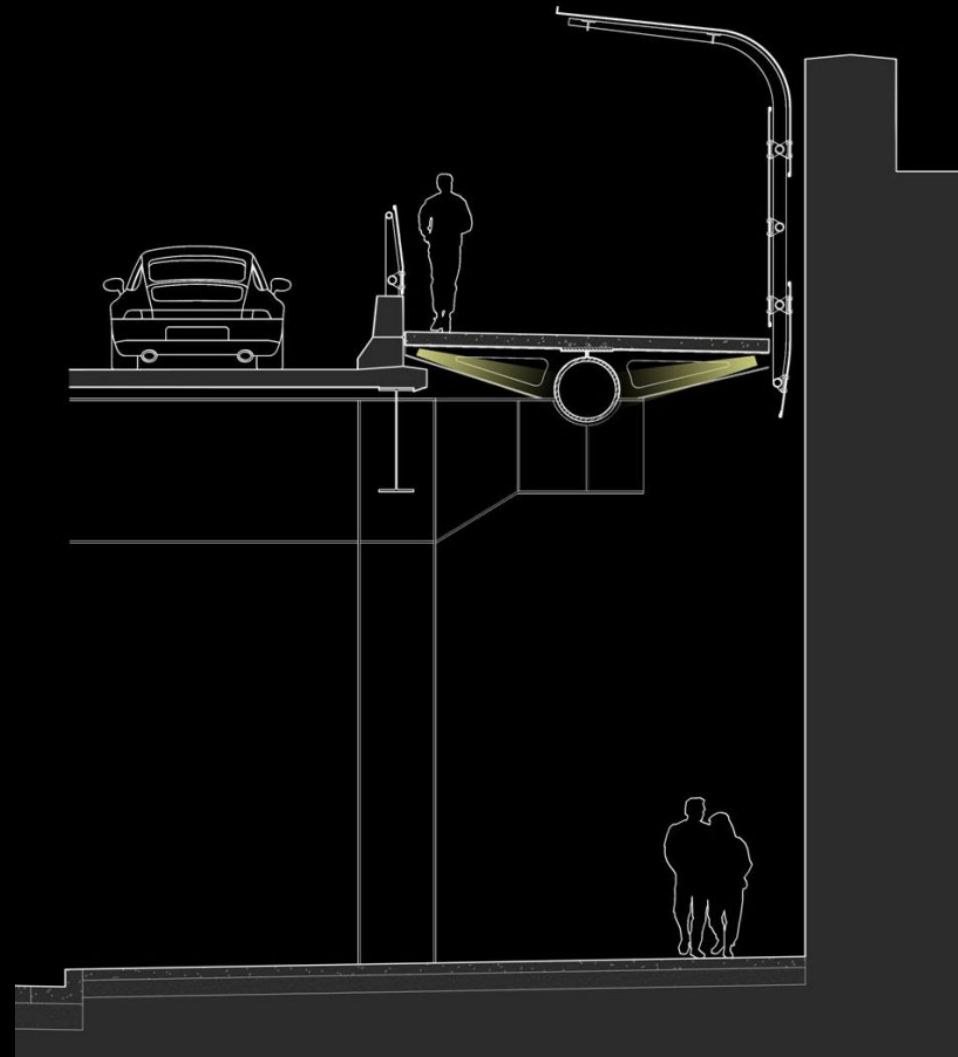
# CABLE RAILING



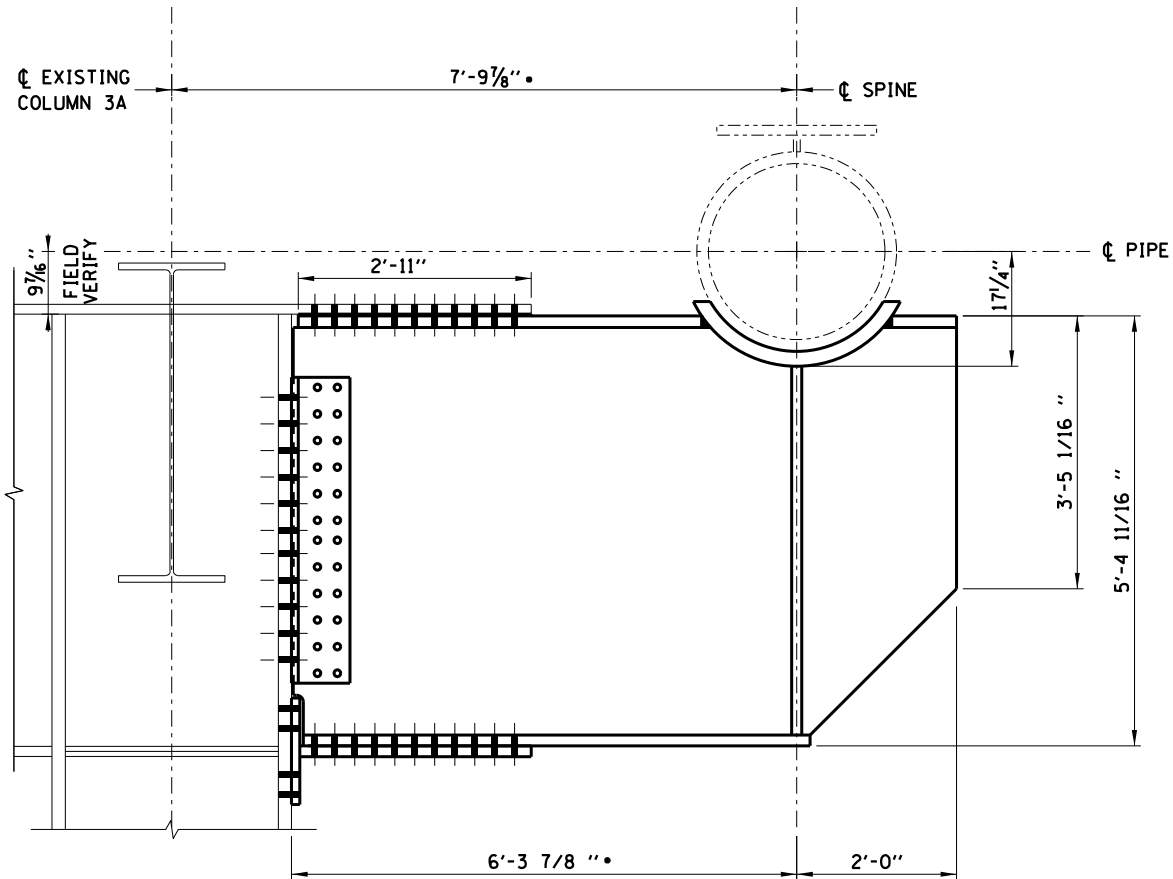
# PROPOSED ELEVATED PATH



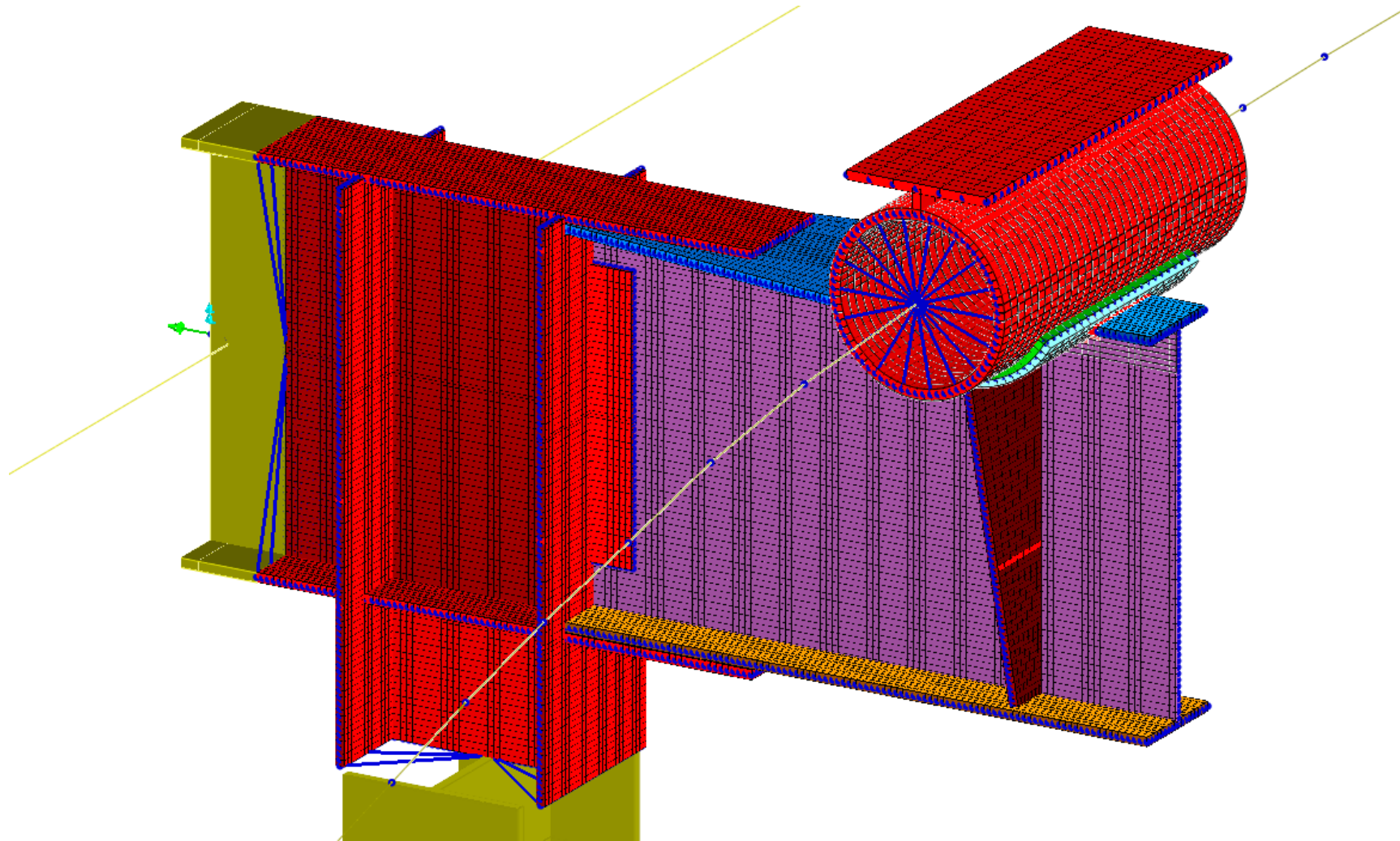
# UPPER LAKE SHORE DRIVE REMOVAL



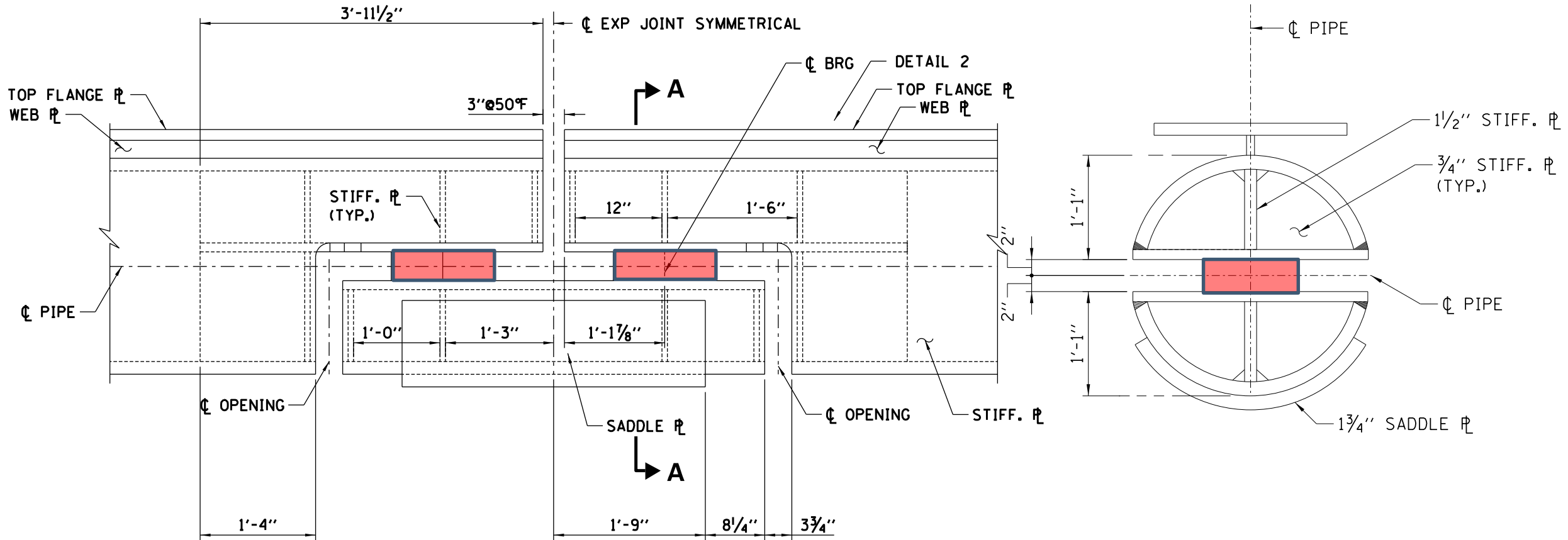
# LAKE SHORE DRIVE BENT BRACKET



# FEM MODEL –CONNECTION BRACKET

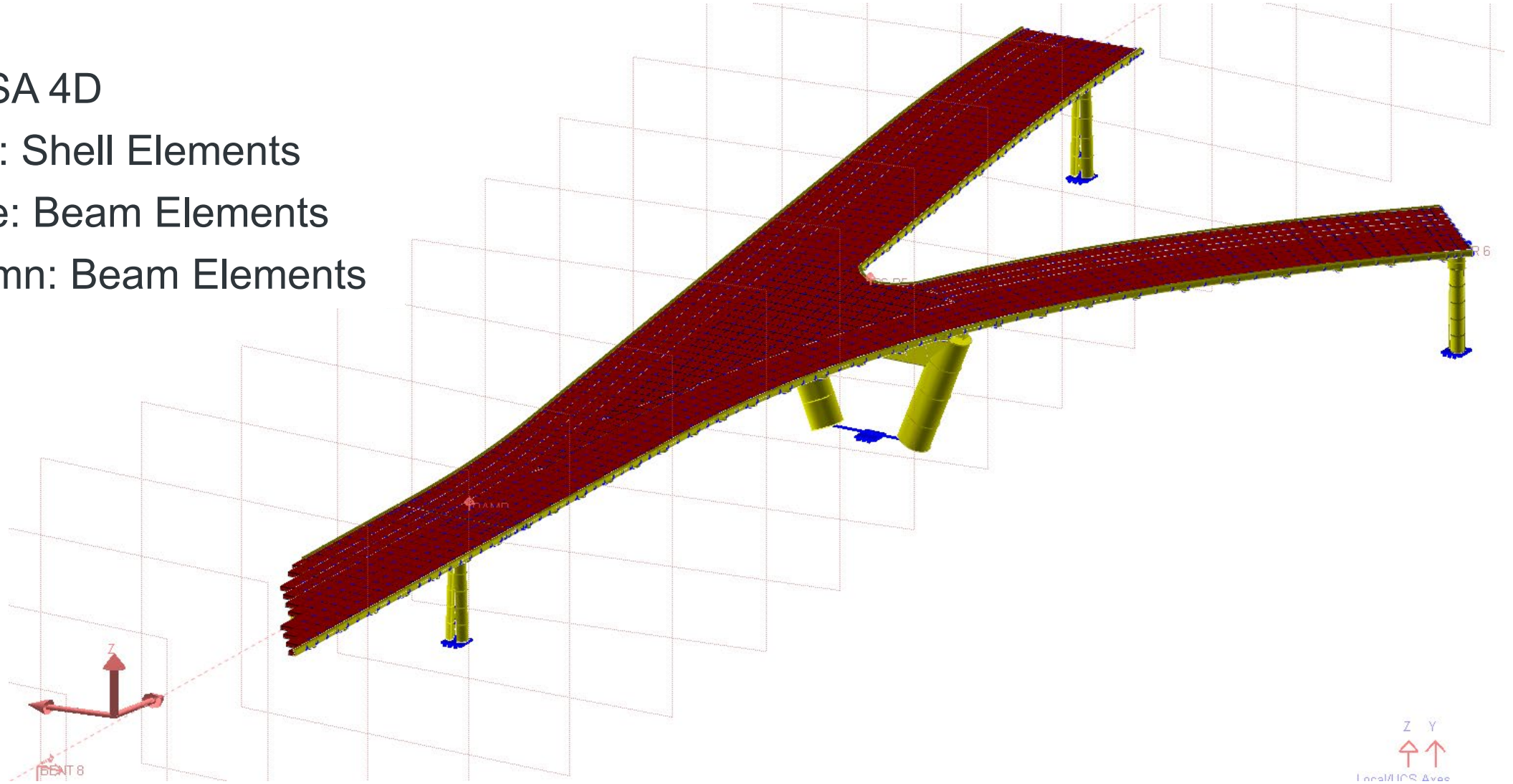


# EXPANSION CONNECTION



# BRIDGE MODELING

- LARSA 4D
- Deck: Shell Elements
- Spine: Beam Elements
- Column: Beam Elements

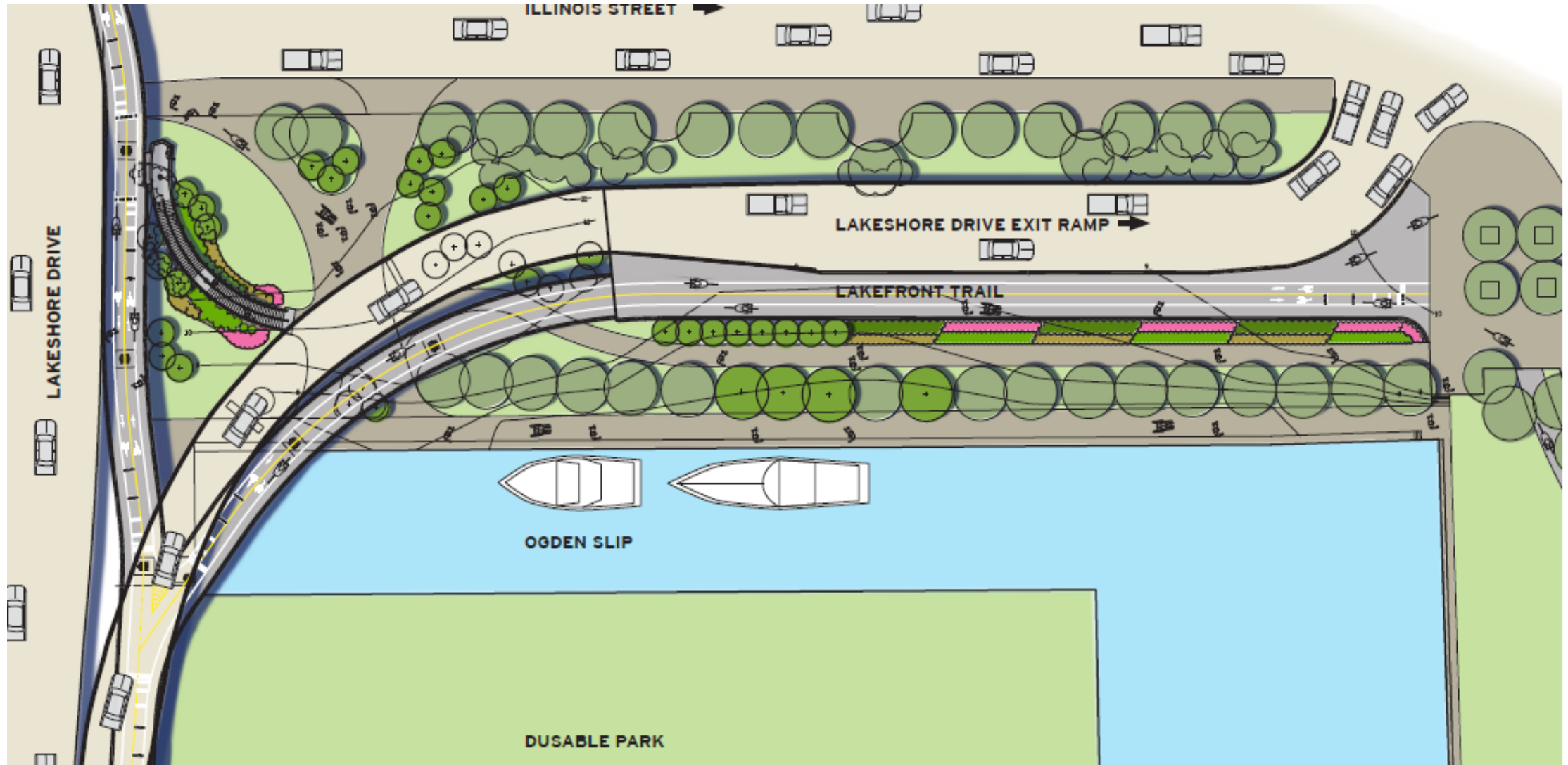


# PROJECT AREA IMPROVEMENTS





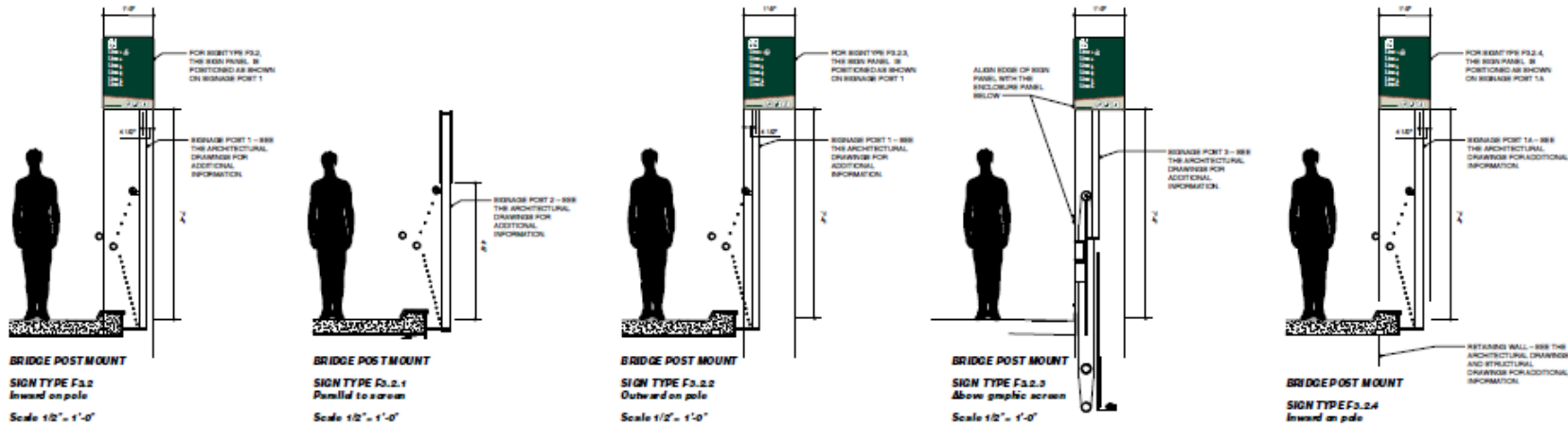
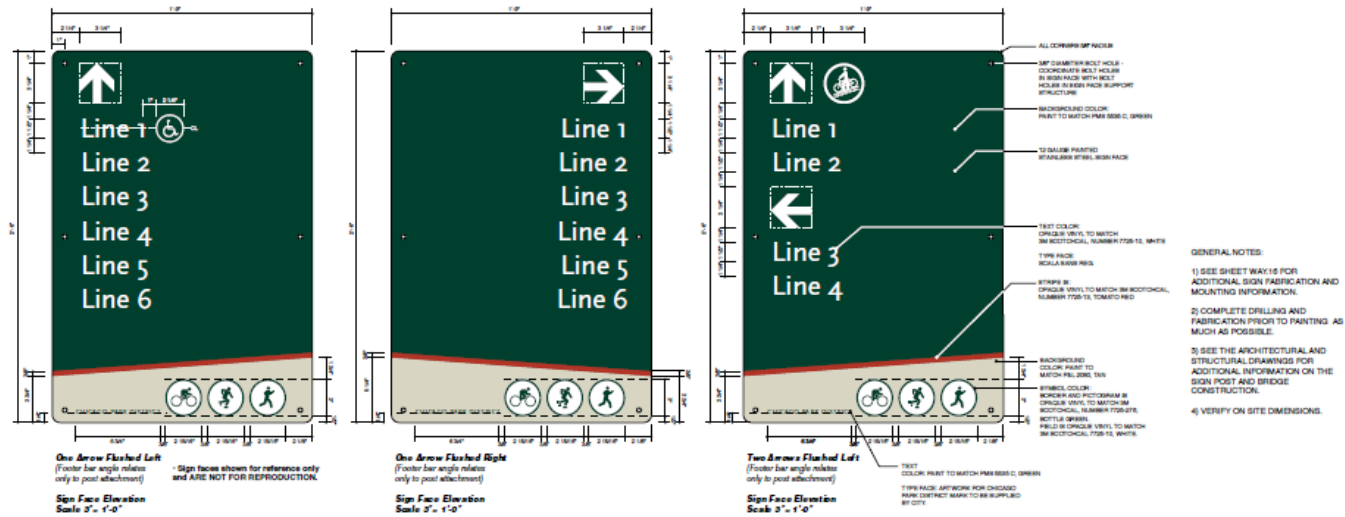
# PROJECT AREA IMPROVEMENTS



# PROJECT AREA IMPROVEMENTS

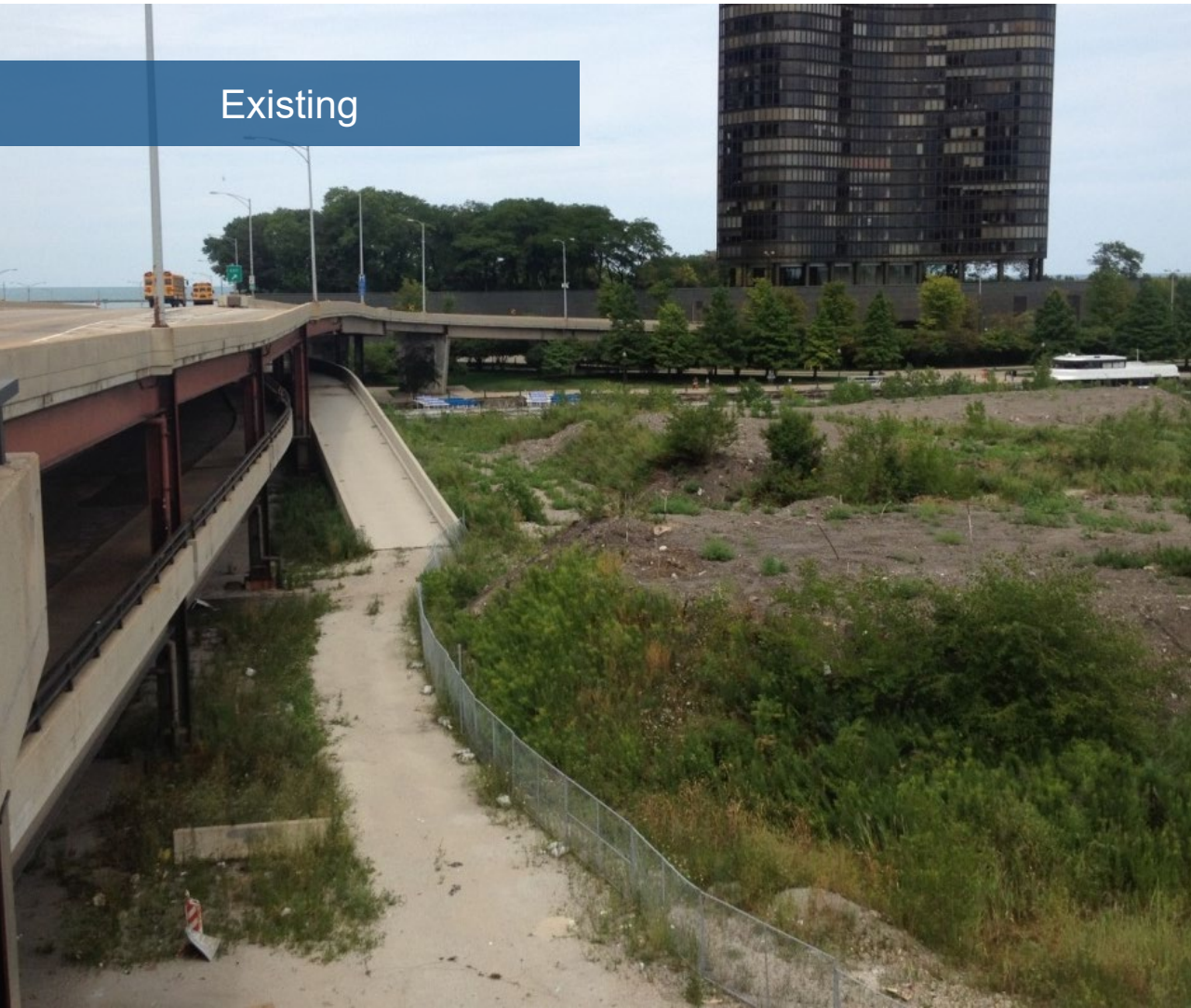


# PROJECT AREA IMPROVEMENTS



# DUSABLE PARK IMPROVEMENTS

Existing



Proposed



# DUSABLE PARK – FUTURE PLANS



# DUSABLE PARK – THORIUM

## Lindsay Light Streeterville Thorium Monitoring Area

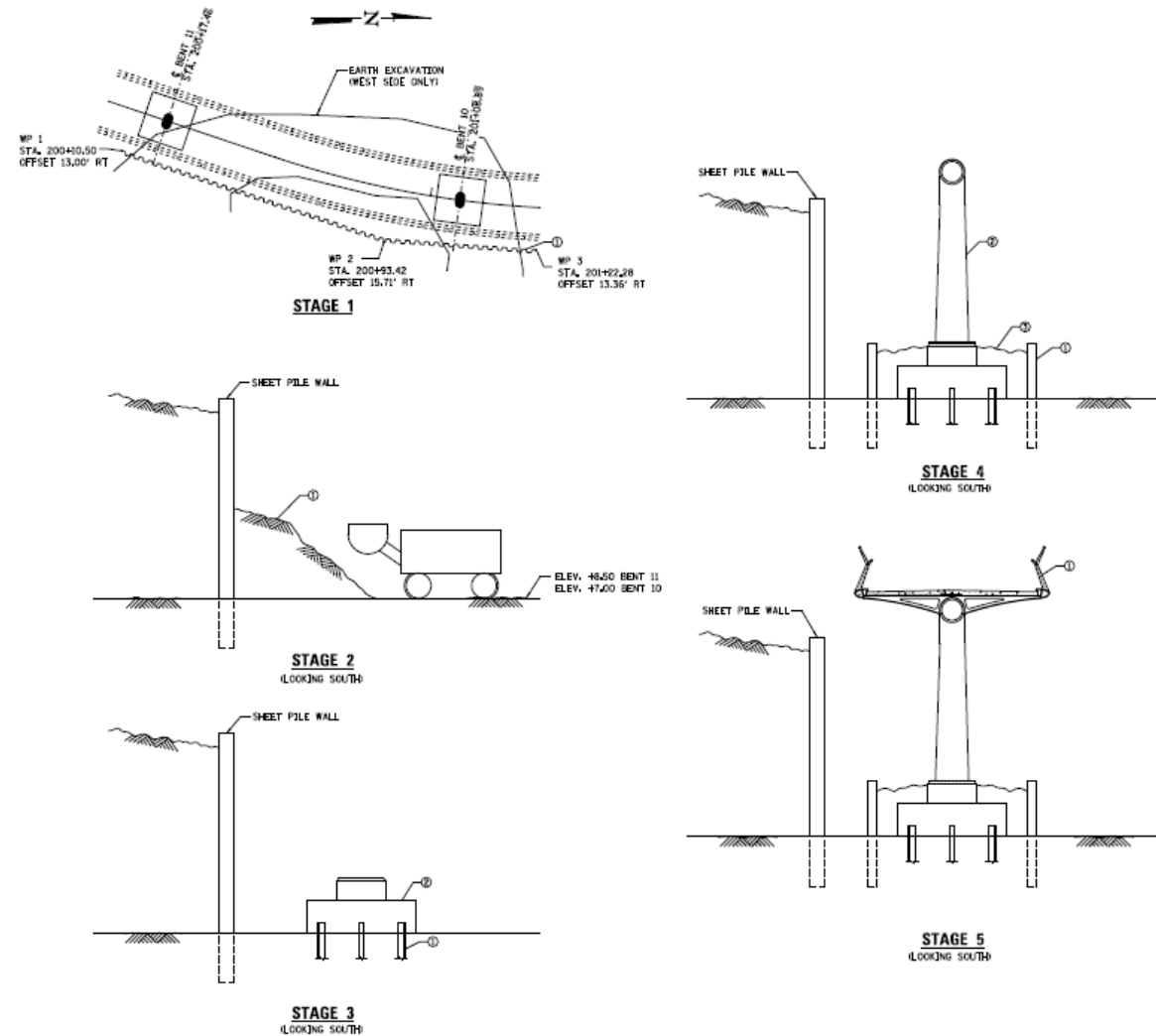


April 9, 2014



# DEALING WITH THORIUM

- Minimize Site Excavation
- Footings Constructed At Grade
- Include items for Thorium Monitoring, containment & remediation



# PROJECT AREA IMPROVEMENTS

- Green Catch Basins
- Bioswale
- New pavement markings throughout project corridor
- Drainage Improvement at Ohio Street Underpass
- New sprinkler systems at Jane Addams Park
- ADA Compliant Corridor



# CONSTRUCTION



**CDOT**  
CHICAGO DEPARTMENT  
OF TRANSPORTATION

**THE**  
TRANSPORTATION  
TRUSTWAY  
ENGINEERING  
CONSULTANTS

**HNTB**

# CONSTRUCTION - MAY 2014

Lakeshore Drive Shoulder  
& Fascia Girder Removal



# CONSTRUCTION - MAY 2014

Lakeshore Drive  
Fascia Girder Removal



# CONSTRUCTION - JUNE 2014

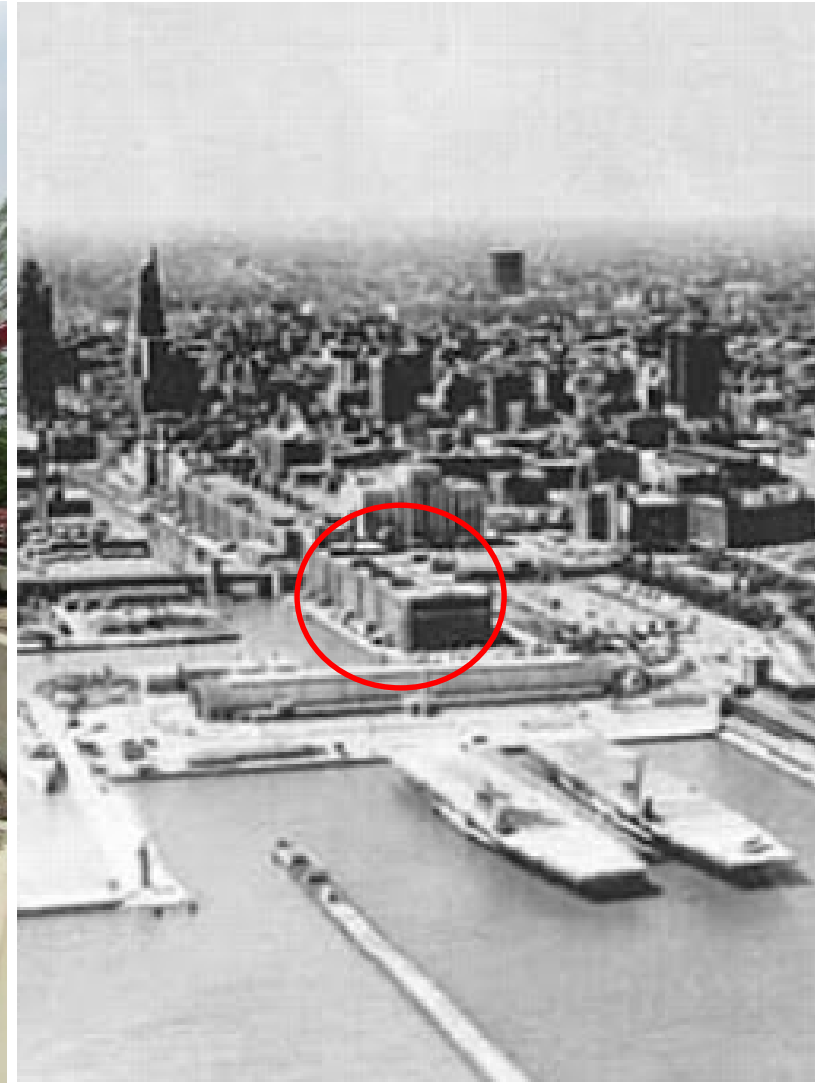


Lakeshore Drive Fascia  
Girder Bent Brackets Removed



# CONSTRUCTION - JUNE 2014

Pile Placement of Bent Foundation



# CONSTRUCTION - JUNE 2014

Construction of Bent Foundation



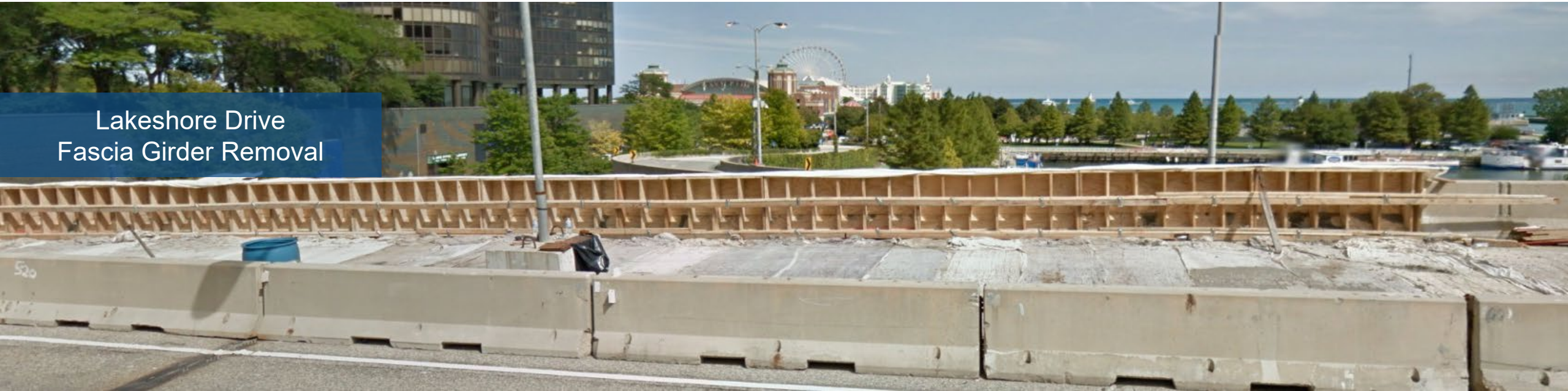
# CONSTRUCTION - JUNE 2014

Flyover Mock Up On Site



# CONSTRUCTION - AUGUST 2014

Lakeshore Drive  
Fascia Girder Removal





# CONSTRUCTION - AUGUST 2014

Lakefront Trail Connection  
Brackets Installed



# CONSTRUCTION - AUGUST 2014

East Ramp Retaining Wall



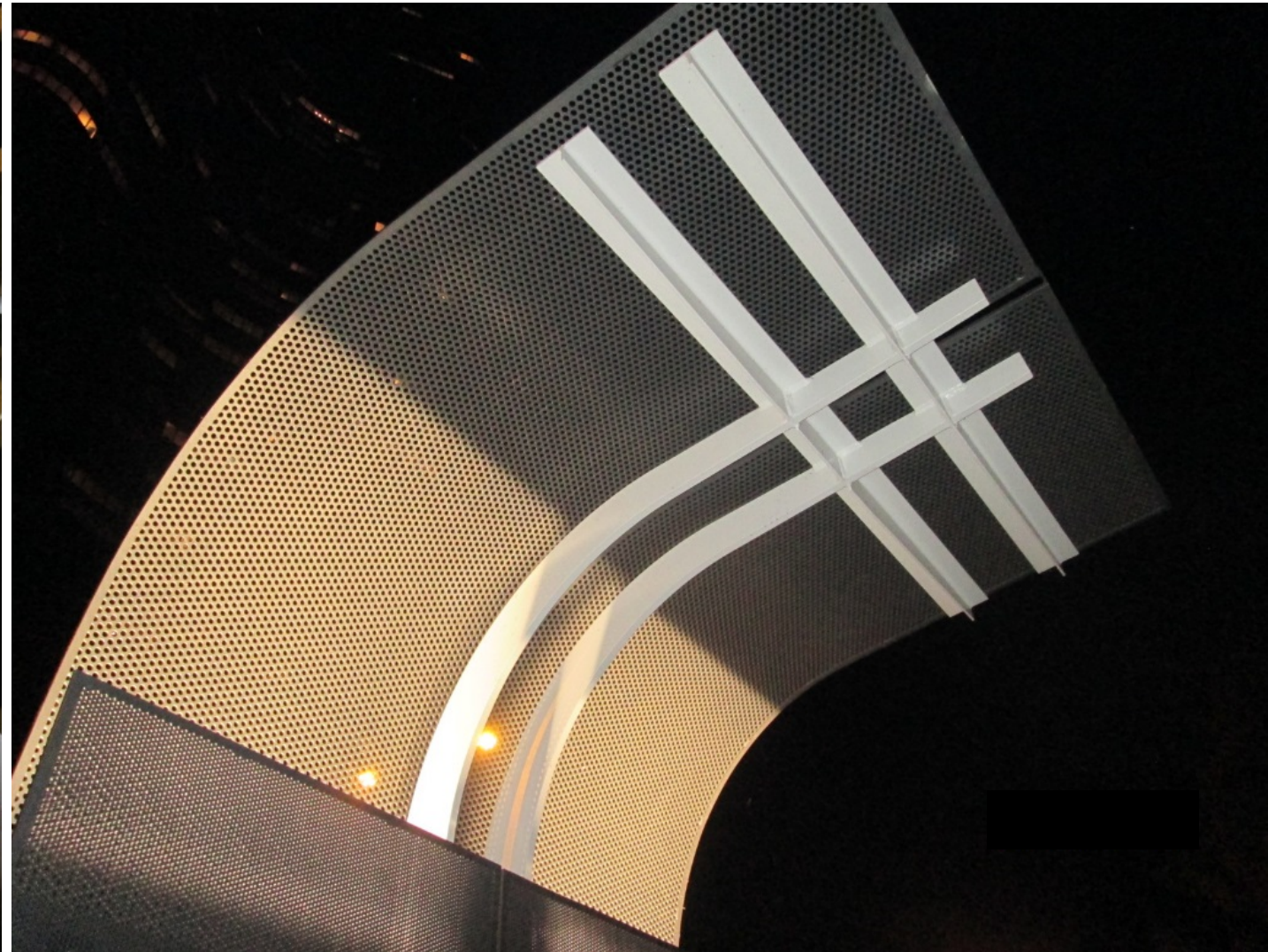
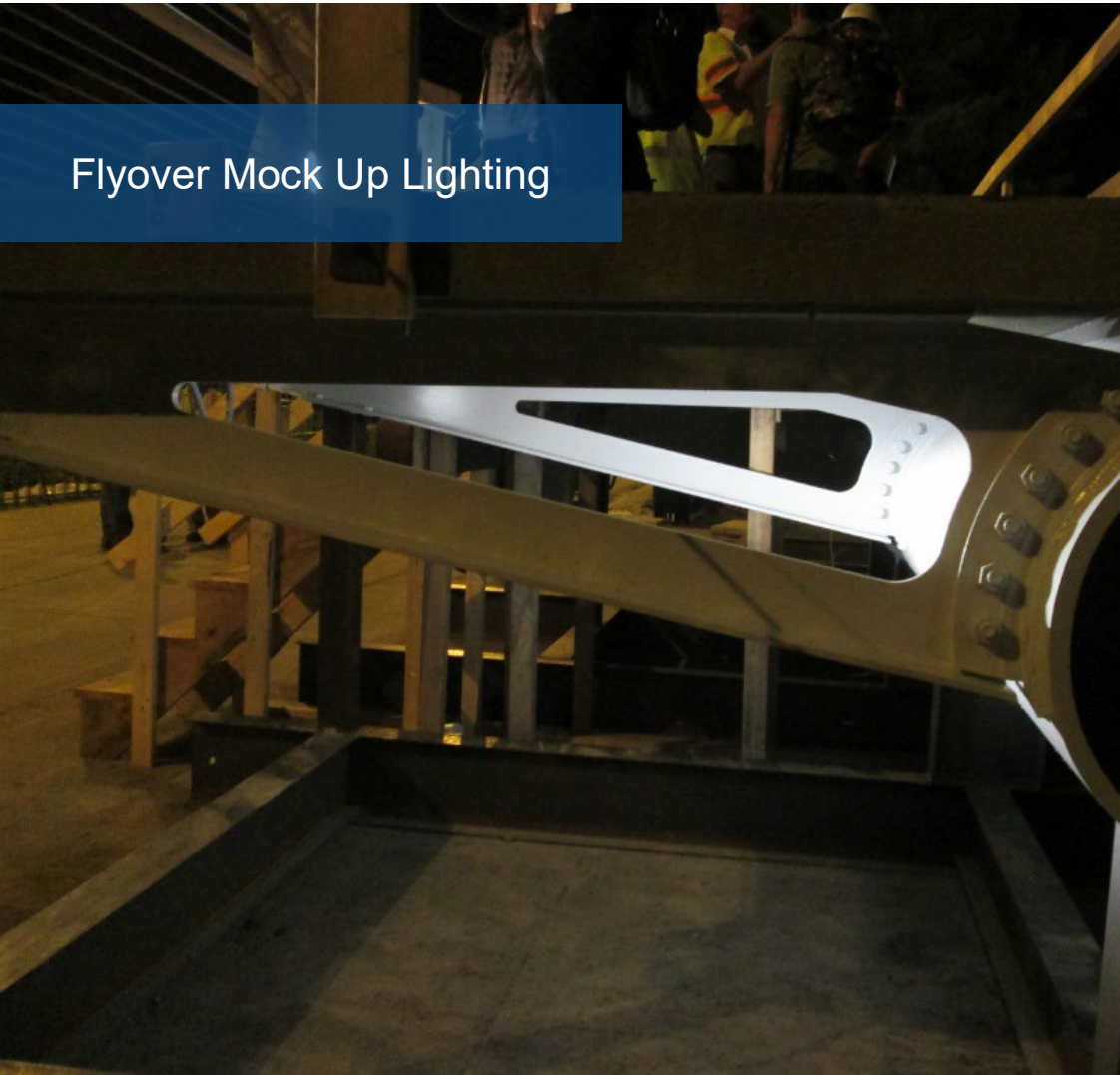
# CONSTRUCTION - AUGUST 2014

Flyover Mock Up Railing



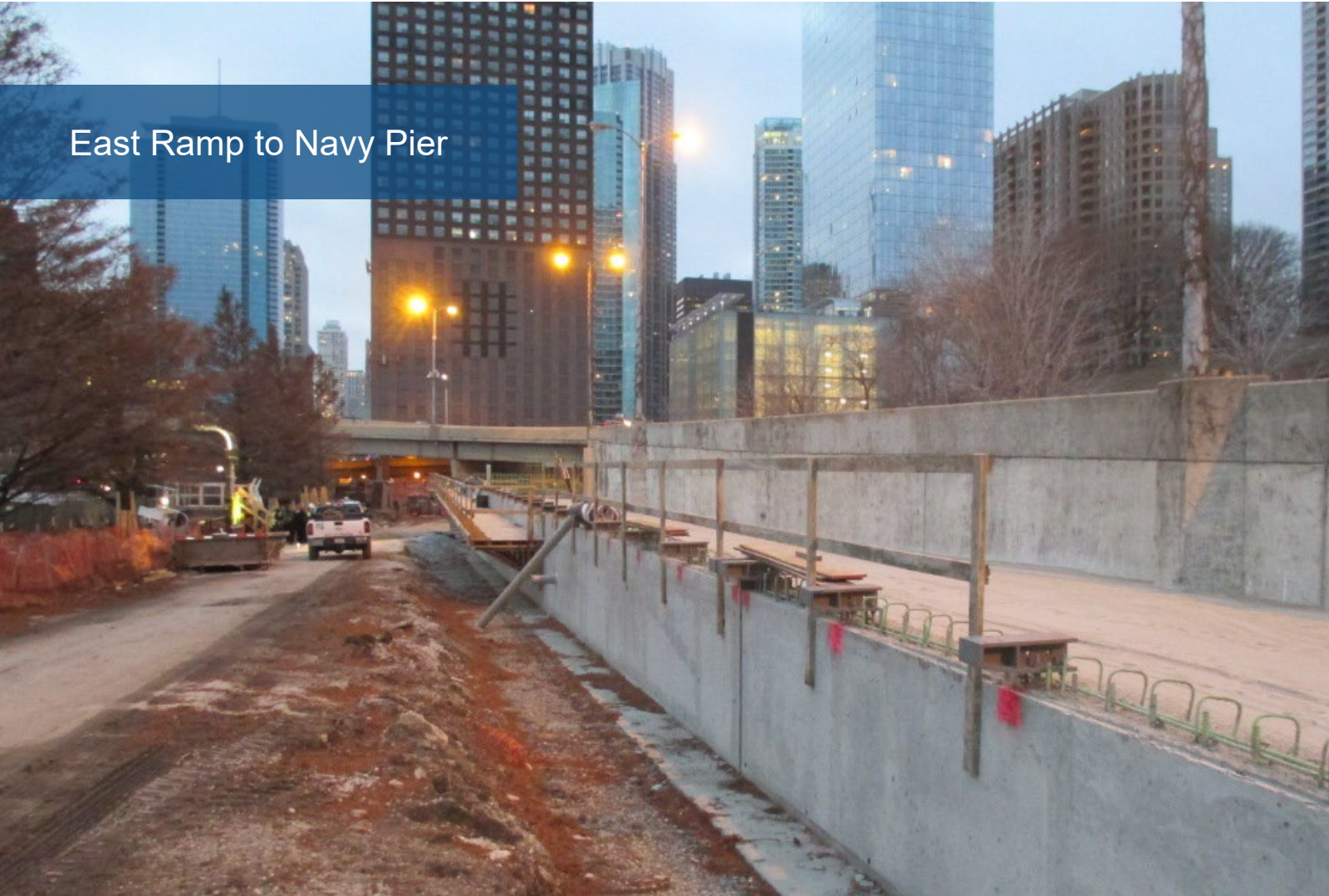
# CONSTRUCTION - AUGUST 2014

Flyover Mock Up Lighting



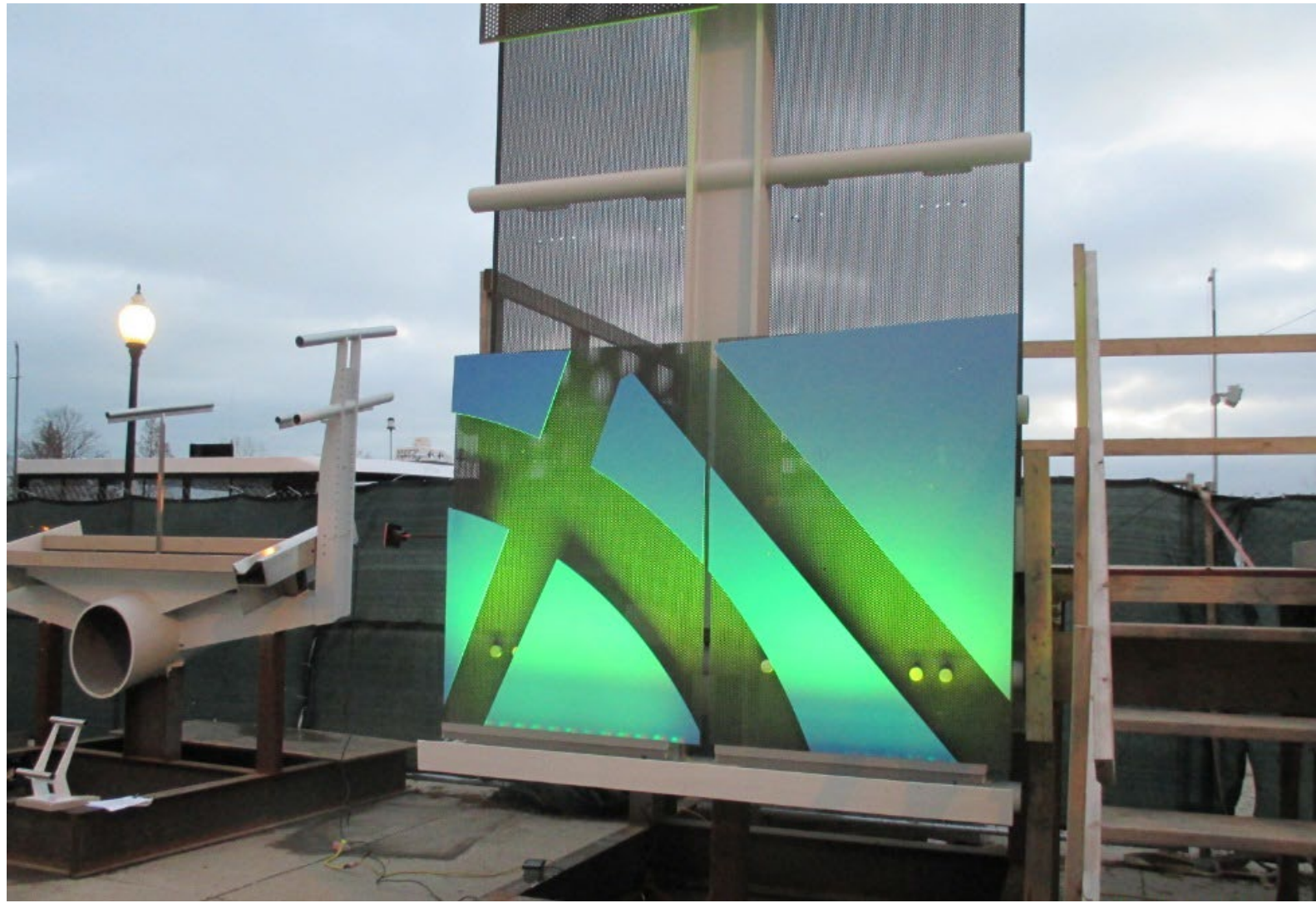
# CONSTRUCTION - DECEMBER 2014

East Ramp to Navy Pier



# CONSTRUCTION - DECEMBER 2014

Flyover Mock Up Lighting



# CONSTRUCTION - DECEMBER 2014

Erection of Bents



# CONSTRUCTION – JANUARY 2015

Erection of Bents





# CONSTRUCTION – FEBRUARY 2015

Flyover Mock Up On



# CONSTRUCTION – FEBRUARY 2015

Ramp Construction  
and Bent Erection



# CONSTRUCTION – FEBRUARY 2015

Bent Erection



# CONSTRUCTION – FEBRUARY 2015

Fabrication of Spine



# CONSTRUCTION – FEBRUARY 2015

Fabrication of Spine



# CONSTRUCTION – APRIL 2015

Spine and Rib Erection



# CONSTRUCTION – APRIL 2015

Spine and Rib Erection



# CONSTRUCTION – JUNE 2015

Ribs Ready for Erection  
and Spine Splice





# CONSTRUCTION – JUNE 2015

Pier 4 in the Grand Ave Median



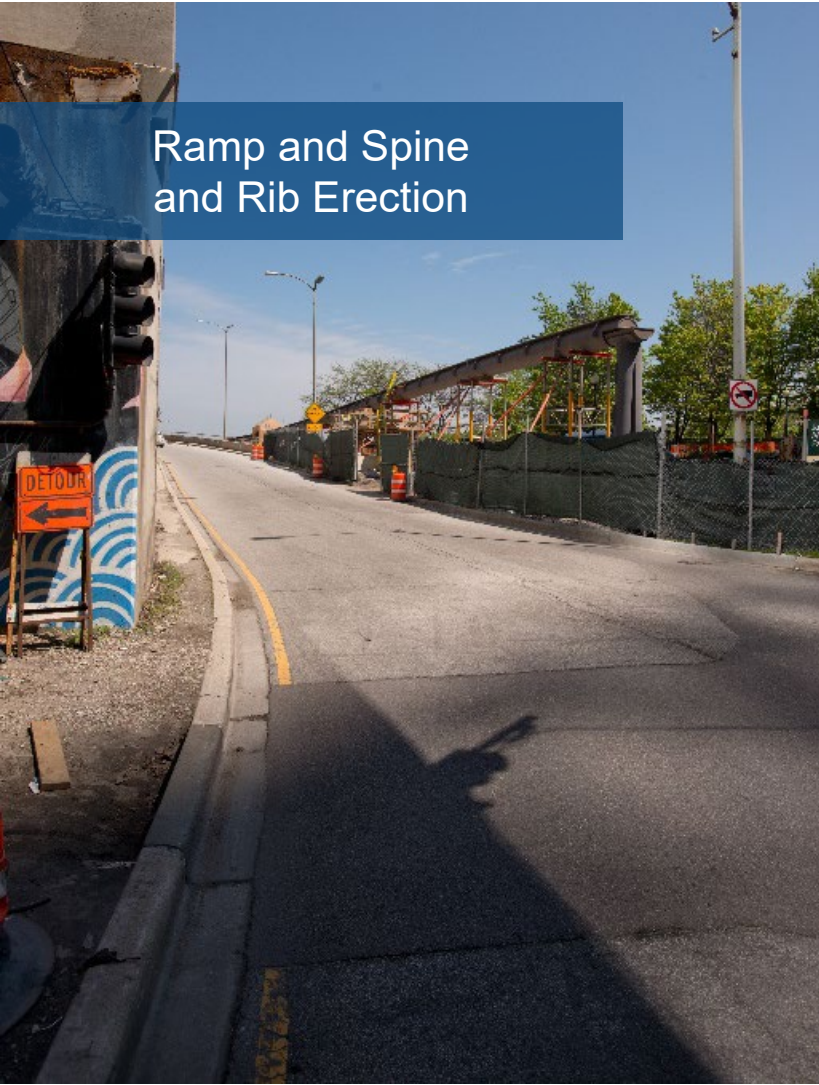
# CONSTRUCTION – JUNE 2015

Spine and Rib Erection



# CONSTRUCTION – JUNE 2015

Ramp and Spine  
and Rib Erection



# CONSTRUCTION

Ramp and Spine  
and Rib Erection



# CONSTRUCTION

Ramp Columns and Spine Erection



# CONSTRUCTION – JULY 2018

Micropiles and Seawall Installation



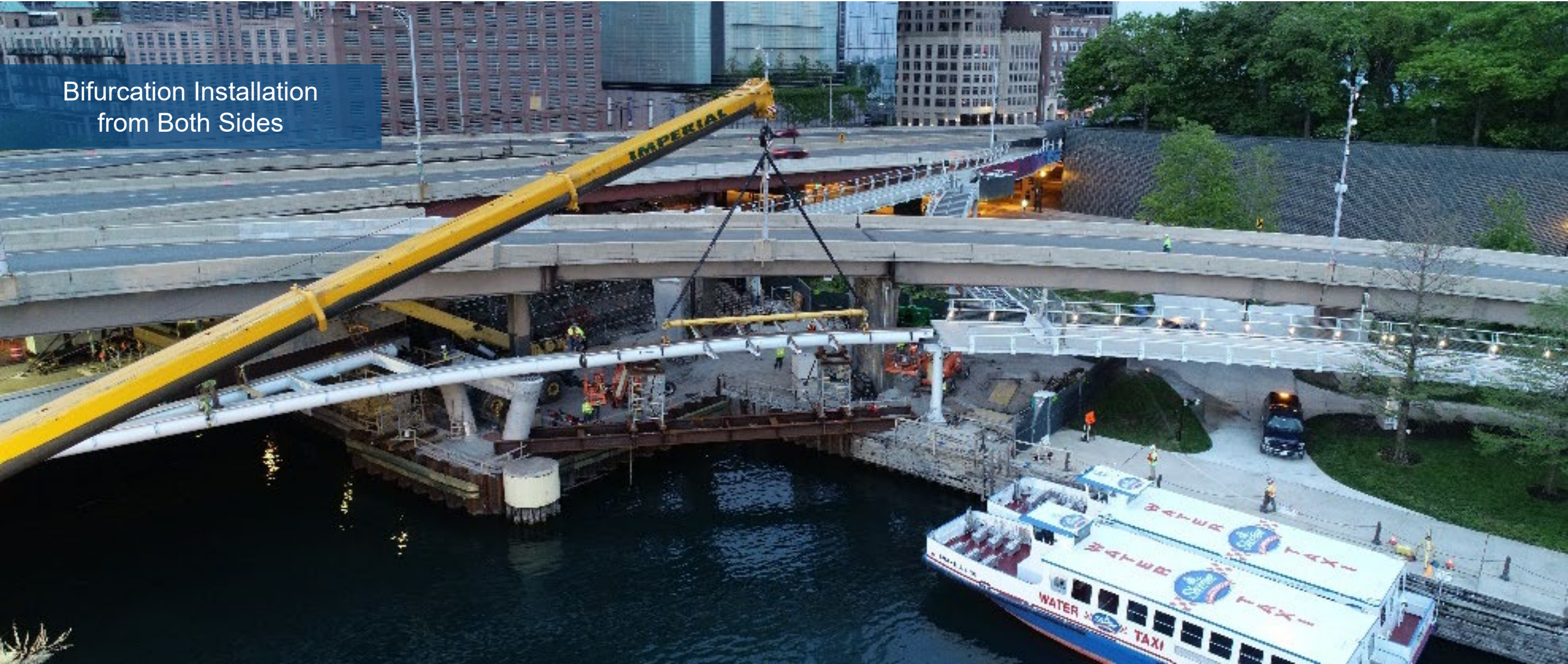
# CONSTRUCTION – JULY 2018

Spine and Ribs Fabrication



# CONSTRUCTION – JULY 2018

Bifurcation Installation  
from Both Sides





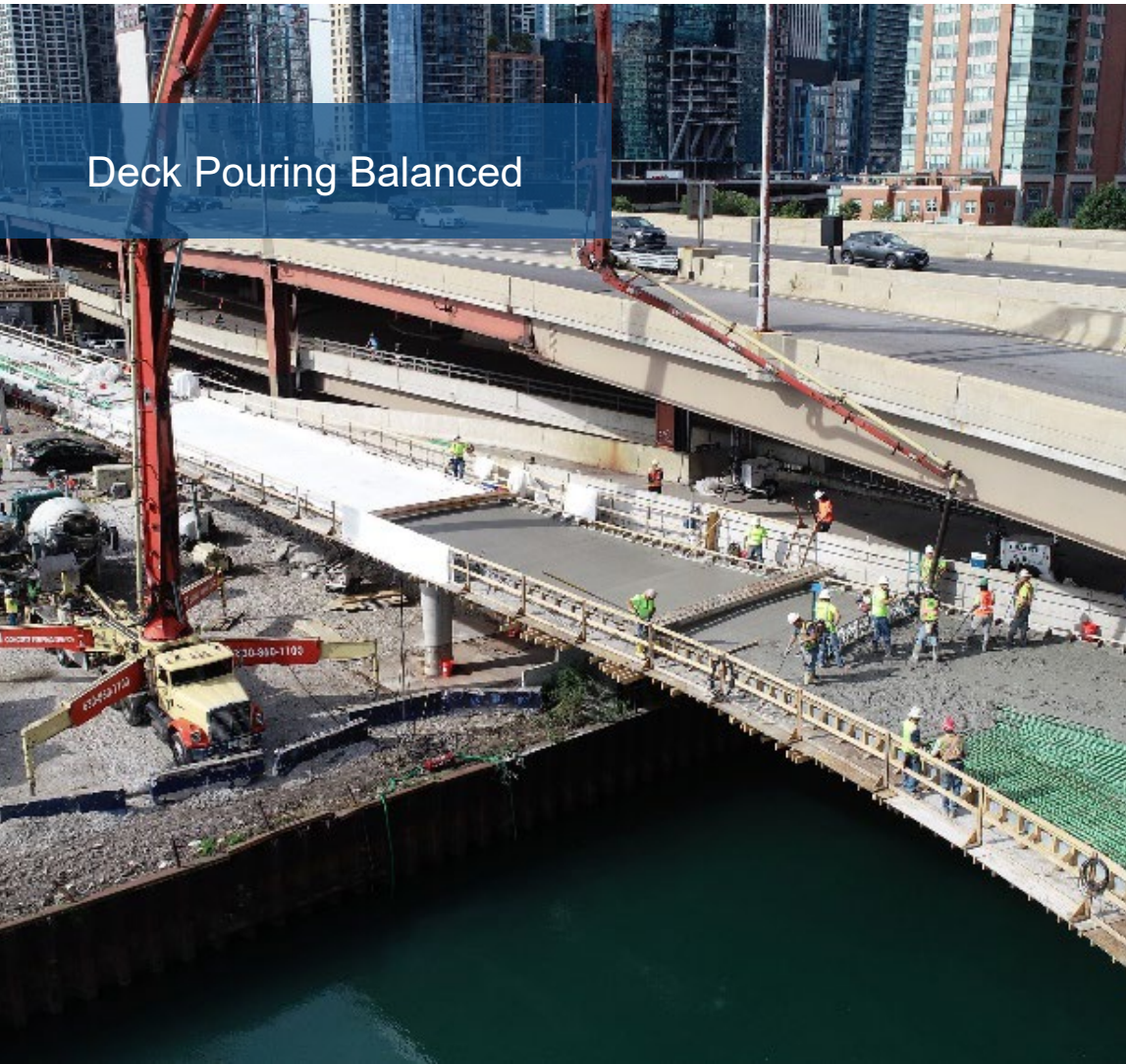
# CONSTRUCTION – JULY 2018

Bifurcation Installation  
from Both Sides



# CONSTRUCTION – AUGUST 2019

Deck Pouring Balanced



# ACKNOWLEDGEMENTS



**THANK YOU!**

Navy Pier

Lakefront Trail

Lakefront Trail





MARCIA  
ACCO

**CDOT**  
CHICAGO DEPARTMENT  
OF TRANSPORTATION

**THE**  
ILLINOIS  
TRANSPORTATION  
AND HIGHWAY  
ENGINEERING  
CONFERENCE

**HNTB**

↑  
S. Lakefront Trail  
Grant Park  
Millennium Park  
Museum Campus  
Navy Pier  
Grand Ave.  
♿ ♿ ♿

LAKE POINT TOWER  
PRIVATE RESIDENCES



CAUTION  
Ramp Ends  
Yield to  
Pedestrians









SPEED  
LIMIT  
40

CAUTION - YIELD!  
2-Way Traffic Ahead  
Does Not Stop  
← S. Lakefront Trail  
→ N. Lakefront Trail











↑  
S. LaSalle Street  
Grant Park  
Millennium Park  
Museum Campus  
Navy Pier  
Grant Ave.  
CDOT

TOURS  
RENTALS  
SERVICE

**CDOT**  
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TRANSPORTATION  
AND HIGHWAY  
ENGINEERING  
CONFERENCE

**HNTB**









SPEED  
LIMIT  
40



←  
N. Lakefront Trail  
Michigan St.  
Grand Ave.  
Ohio St. Underpass  
Ohio St. Beach  
P.D.





# LAKE POINT TOWER

PRIVATE RESIDENCES





H  
Hwy 55  
Chicago  
←



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