Presented by:

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OTEC
October 25 - 26, 2016
Project Design Team

LEAD AGENCIES

JOINT VENTURE CONSULTANT TEAM

site design group, ltd.
Project Location

The Dan Ryan Expressway (I-90/94) to the south

The Eisenhower Expressway (I-290) to the west

The Kennedy Expressway (I-90/94) on the north

Congress Parkway to the east
History & Overview

Late 1950’s
early 1960’s

The facility is in need of major repair and reconstruction.
Circle Interchange was built in the late 1950’s and early 1960’s, and the facility is in need of major repair and reconstruction.
More than 400,000 vehicles a day travel through the interchange

On average, 940 crashes per year

Slowest, most congested highway freight bottleneck in the nation

American Transportation Research Institute (ATRI) + Federal Highway Administration
The *Circle Interchange* is highly congested and operates in breakdown conditions for most of the day.

**Goals & Objectives**

- Operational & safety improvements
- Upgrade the aging infrastructure
- Stay within the existing ROW
- Neighborhood improvements
Existing Site Constraints

- N. Halsted St. Bridge
- W. Van Buren St. Bridge
- W. Harrison St. Bridge
- Des Plaines St. Underpass
Existing Site Constraints

CTA Station & Tunnels
Below Interchange
Existing Site Constraints

Cermak Pump Station
Existing Site Constraints

Haberdasher Square Lofts
Cermak Pumping Station

- 6-50 MGD electric pumps
- Supplies downtown, near south & west sides
- 3-54” and 2-48” discharge mains
- 2 active water supply tunnels (7’ & 13’)
- Several abandoned water tunnels
Water Tunnel Exploratory Dive
Operational and Safety Deficiencies

Over Capacity: Kennedy & Dan Ryan
Operational and Safety Deficiencies

Over Capacity: Ramp NW
Operational and Safety Deficiencies

Over Capacity: Ramp EN
The current safety and congestion problems warrant making improvements to key movements in the Circle Interchange.

- 4 Lanes I-90/94
- 2 Lane ramps
Why do we need to build flyovers?

**Expansion issues:**
- Displace homes, businesses, parking
- Devastate the community and very costly

**Tunnel issues:**
- In the event of a major rain event, and if a pump fails, there will be enough water to create a life safety issue (fatal flaw)
Preferred Alternative

• Improve the safety and mobility
• Improve the bridges, roadway, & drainage system
• Minimizes environmental impacts
• Enhances community connectivity on the local street network
Interchange Footprint Comparison

Jane Byrne Interchange
400,000 VPD

I-55 & I-80
130,000 VPD
<table>
<thead>
<tr>
<th>Stage</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Morgan Street - FINISHED</td>
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<tr>
<td></td>
<td>Harrison Street - FINISHED</td>
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<tr>
<td></td>
<td>Halsted Street - FINISHED</td>
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<tr>
<td></td>
<td>Peoria Street - FINISHED</td>
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<tr>
<td></td>
<td>Ramp NW Flyover – To Open This Fall/Winter</td>
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<tr>
<td></td>
<td>Taylor Street – To Open This Fall/Winter</td>
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<tr>
<td>Stage 2</td>
<td>I-290/Congress Parkway – WB Began 10/10/16</td>
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<td>EB to Begin in 2017</td>
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<td>Stage 3</td>
<td>I-90/94</td>
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<tr>
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<td>Van Buren Street</td>
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<td></td>
<td>Jackson Boulevard</td>
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<td></td>
<td>Adams Street</td>
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<td>Monroe Street</td>
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<td>Remaining Ramps</td>
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Key Features of the Preferred Alternative

New Bridges

- Cross Road Bridges
- Flyover Ramps
- Other Bridges
Bridges

- Project impacts 22 existing bridges ranging from two spans to multi-span flyover ramps
- 18 bridges completely replaced
- 7 curved steel girder bridges, including a long NW flyover bridge
- Combination of ramp closures and staged construction
Bridges

- 10 local road bridge crossings over I-90/94 and I-290
- New pedestrian bridge at Peoria Street
- Staged construction for Halsted, Morgan and Taylor Street bridges
- CTA Station facilities attached to 3 bridges
- Bridge construction to allow continuous pedestrian access to CTA
Retaining Walls

- Project consists of 11 existing walls requiring rehabilitation
- New bridge approach ramps on fill sections supported by MSE Walls (26 total walls)
- Soldier pile and lagging or secant type walls for cut sections (23 total walls)
- Combination of aggregate columns as ground improvements and light weight fills to control settlements
Architectural Elements

- Decorative bridge parapet
- Fencing
- Piers
- Retaining walls
- Noise walls
- Landscape
Unique Features/Challenges

- Drilled shafts (Caissons) as preferred foundation option
- Driven steel sheet piling and H-piles not allowed due to vibration concerns
- Existing CTA tunnels (two existing and two future)
Unique Features/Challenges

- Coordination with CDOT, CTA, Water Management (proximity to Cermak Pump Station)
- Several neighborhoods and adjacent properties, including UIC and Greektown
- Access to Cermak Pump Station needed at all times
Unique Features/Challenges

- Existing piers and foundations
Unique Features/Challenges

- Existing Piers and Foundations
- Existing and future CTA tunnels
Unique Features/Challenges

• Existing Piers and Foundations
• Existing and Future CTA Tunnels
• Existing and proposed main drain sewers
Unique Features/Challenges

- Existing Piers and Foundations
- Existing and Future CTA Tunnels
- Existing and Proposed Main Drain Sewers
- Watermain tunnel bulkheading
Unique Features/Challenges

- Existing Piers and Foundations
- Existing and Future CTA Tunnels
- Existing and Proposed Main Drain Sewers
- Watermain Tunnel Bulkheading
- Proposed bridge piers and foundations
Building Vibration Monitoring Program

- Building vibration monitoring program
  - Before construction
  - During construction
- Building condition surveys
  - Pre-construction
  - Post-construction
- Vibration monitoring - baseline
  - Blastmate with cellular modem
  - Geosonics with download capability
The NW Flyover

- Total of 13 spans over Harrison St, I-90/94, Live CTA Tunnels, I-290, Halsted St and several other features (almost 2,000 feet long)
- Girder depths varies from 48 inch to 90 inches
- Pier locations to accommodate future CTA tunnel extension
- New interchange will be built underneath the flyover
Alternative Methods for Steel Erection

- Heavy Duty Helicopter
- Tower Crane
- Gantry Crane
- Fixed/Stationary Crane
### Ramp NW Flyover Girder Weights

<table>
<thead>
<tr>
<th>GIRDER #</th>
<th>PIER 6 to Splice #4-1</th>
<th>Splice #4-1 to Splice #4-2</th>
<th>Splice #4-2 to PIER 8</th>
<th>TOTAL WEIGHTS</th>
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<tbody>
<tr>
<td>G1</td>
<td>30</td>
<td>45</td>
<td>29</td>
<td>104</td>
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<td>G2</td>
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<td>G6</td>
<td>23</td>
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<td>78</td>
</tr>
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G6 122" Main Drain
G5 122" Main Drain
G4 78" Main Drain
G3 78" Main Drain
G2 78" Main Drain
G1 78" Main Drain

Splice #4-1
Splice #4-2
SB I-90/94
NB I-90/94
Future 78" Main Drain

**Girder Weights Exhibit**

*March 14, 2014*
Precast Deck Panel Installation
Peoria Street - State’s First Precast Deck Panel Bridge with UHPC joints
Most Recent Construction Photos
NW Flyover Bridge – Pier Construction
Most Recent Construction Photos

NW Flyover Bridge – Pier Construction
Most Recent Construction Photos
NW Flyover Bridge – Girder Erection
Most Recent Construction Photos
NW Flyover Bridge – Girder Erection
Most Recent Construction Photos
Wall 3 and 4 – Lightweight Fill Construction
Most Recent Construction Photos
Aerial View
Benefits

• Reduction of up to 5 million hours annually of drivers sitting in congested traffic.

• Savings of $185 million annually in lost production from delayed travelers.

• Reduction in idle time resulting in nearly 1.6 million gallons annually.

• Reduce greenhouse gas emissions by one-third.

After Project Completion,
A 50% reduction in delay for all vehicles over the course of the day.

5,000 Jobs

The improvement will create a safer environment for the motoring public by reducing the predicted number of severe crashes by up to 25%.
Acknowledgement
IDOT-District 1, Bureau of Bridges and Structures
FHWA
TranSystems

Thank You