




I-5 over 26th Ave Bridge Replacement

Joel Tubbs, P.E., S.E.
Robert DeVassie, P.E., PMP, STP







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Project Team (Design-Bid-Build)


- [Oregon Department of Transportation](#), Owner
- [David Evans and Associates](#), Design Consultant
- [HP Civil](#), Contractor





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About the Facility

- Interstate 5
- Classified as Urban Interstate
- Federally Designated Truck Route
- AADT = 131,000
- % of Heavy Veh: 9.27 %
- Posted Speed: 55MPH
- 6 lanes with shoulders

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About the Bridge

Existing Bridge:

- 3-span concrete bridge built in 1959, widened and overlaid in 1985
- Deck is thin and delaminating
- Substandard shoulders, highly congested
- Supported on timber piles

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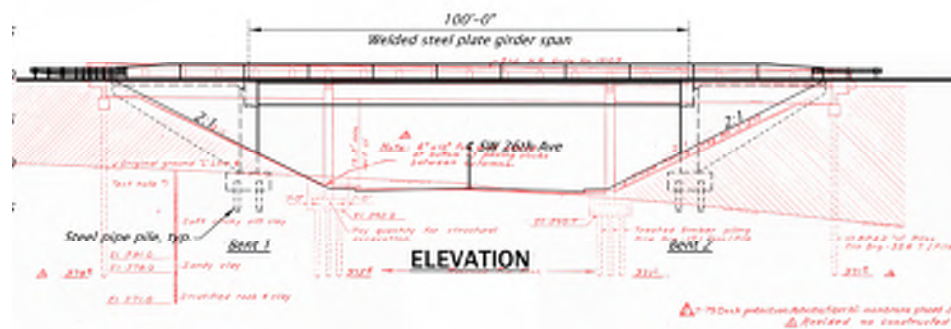
Project Scope

Objectives

- Replace structure using staged construction
- Maintain all 6 lanes of traffic
- Widen Shoulders
- Accommodate City of Portland Improvements
- Design and construction complete in 36 months
- Value Engineering @ 30% Design

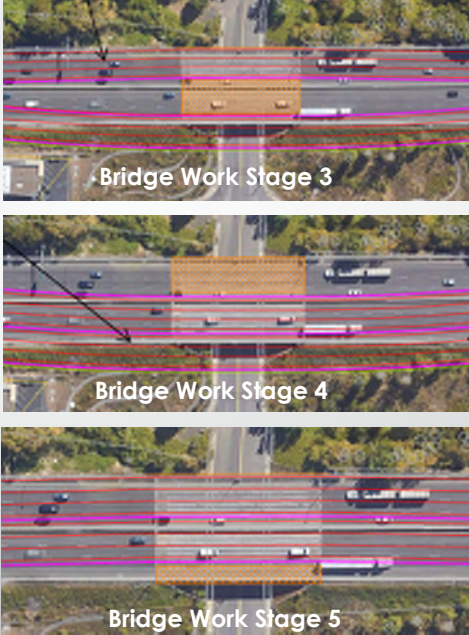


Initial Concept



Initial Concept

- Demolish existing three span bridge, construct single span bridge
- Completed in 5 stages
- Island Workzone
- \$19,118,000 construction cost




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Initial Concept - Risks

- Water Quality Facility
- Right-of-Way Impacts
- PBOT project on SW 26th Way




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Value Engineering

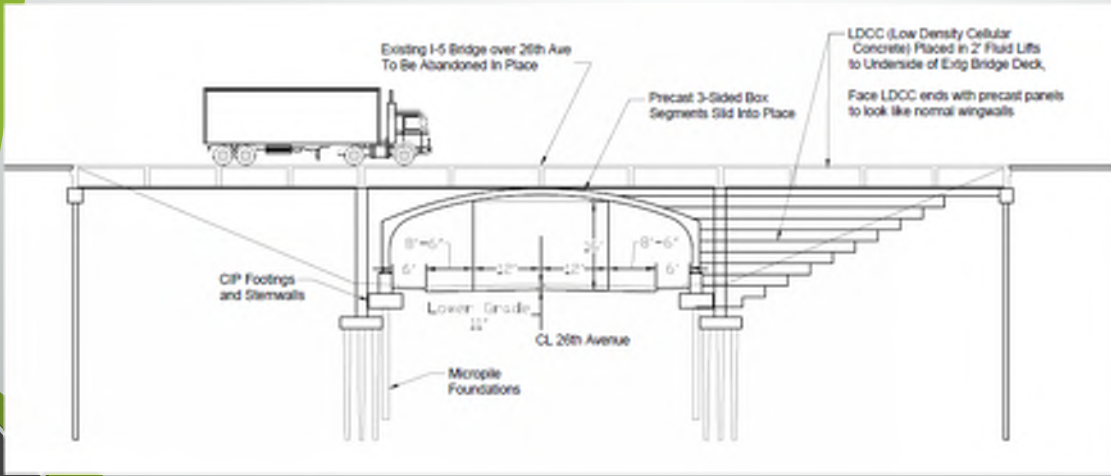
Value Engineering (VE) is a systematic and structured approach for adding value to projects, products, processes, services and organizations. A process that intentionally focuses on creativity. A 5-day multi-discipline workshop at about 30% Design

$$\text{Value} = \frac{\uparrow \text{Performance}}{\downarrow \text{Cost} + \downarrow \text{Time} + \downarrow \text{Risk}}$$


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VE Alt A: Leave Existing Superstructure in Place



Existing I-5 Bridge over 26th Ave To Be Abandoned In Place

Precast 3-Sided Box Segments Slid Into Place


LDCC (Low Density Cellular Concrete) Placed in 2' Fluid Lifts to Underside of Exstg Bridge Deck, Face LDCC ends with precast panels to look like normal sidewalks

GIP Footings and Stemwalls

Lower Grade 12"

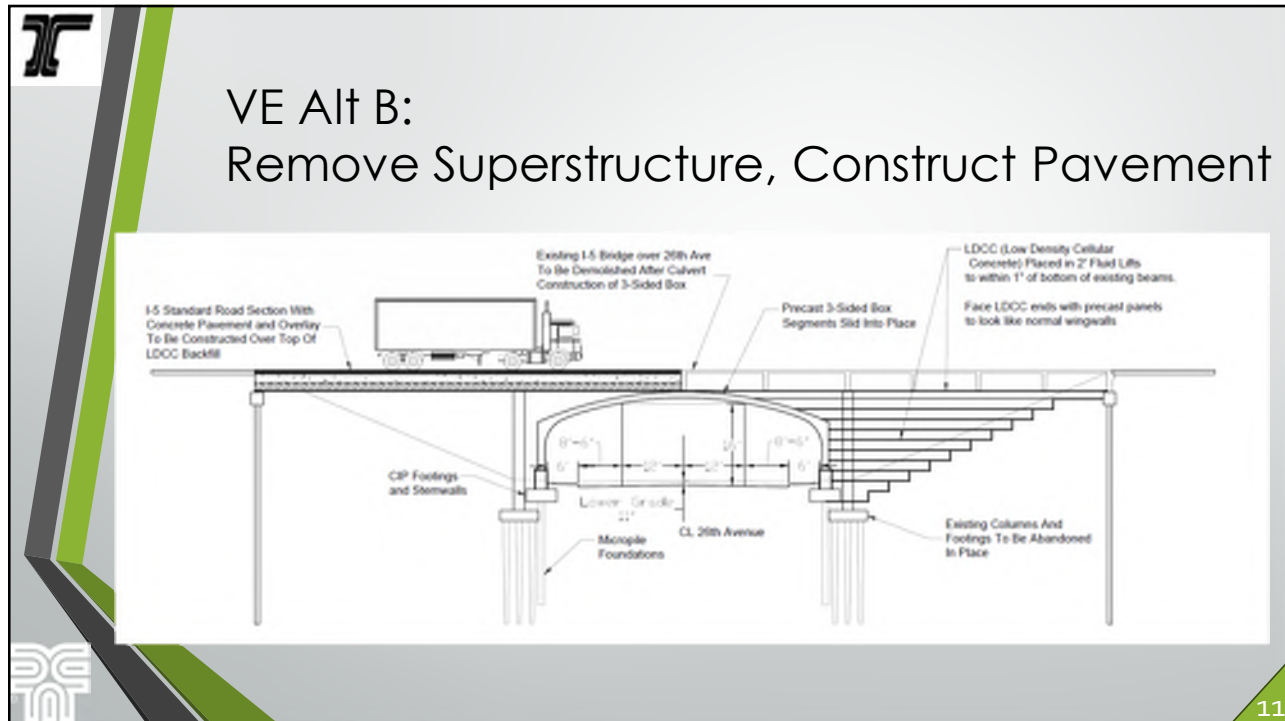
CL 26th Avenue

Micropile Foundations

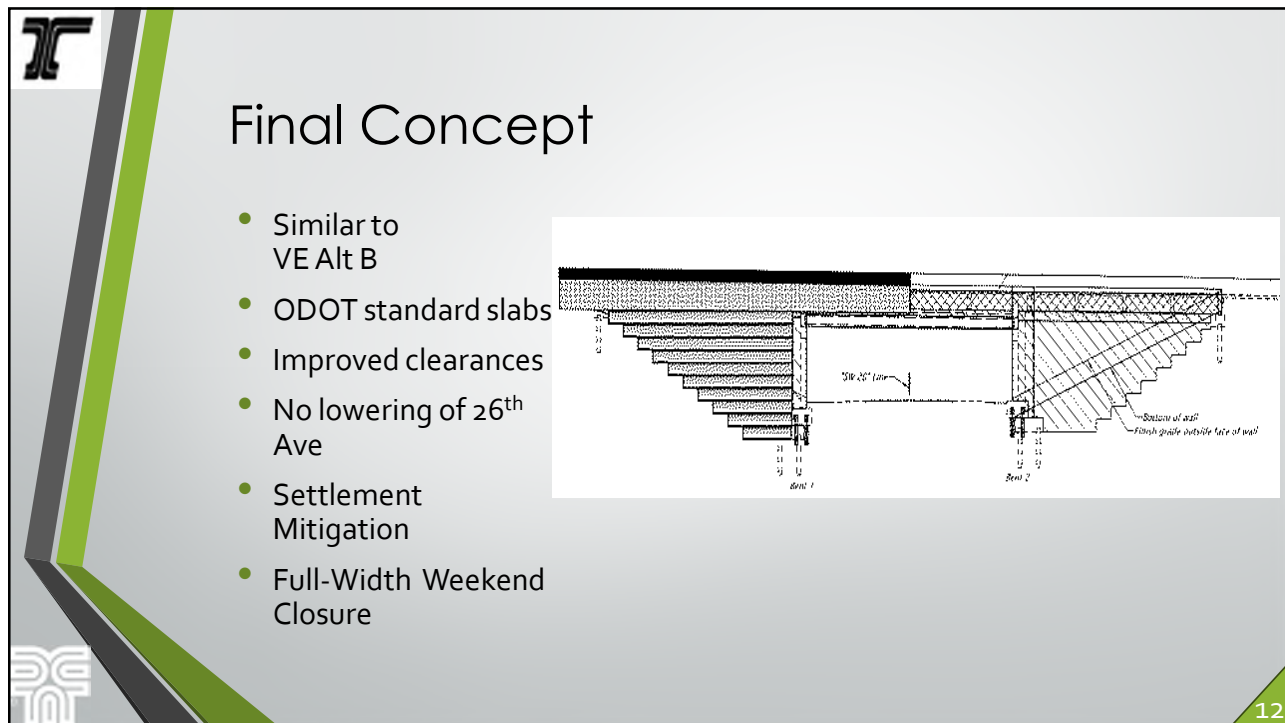


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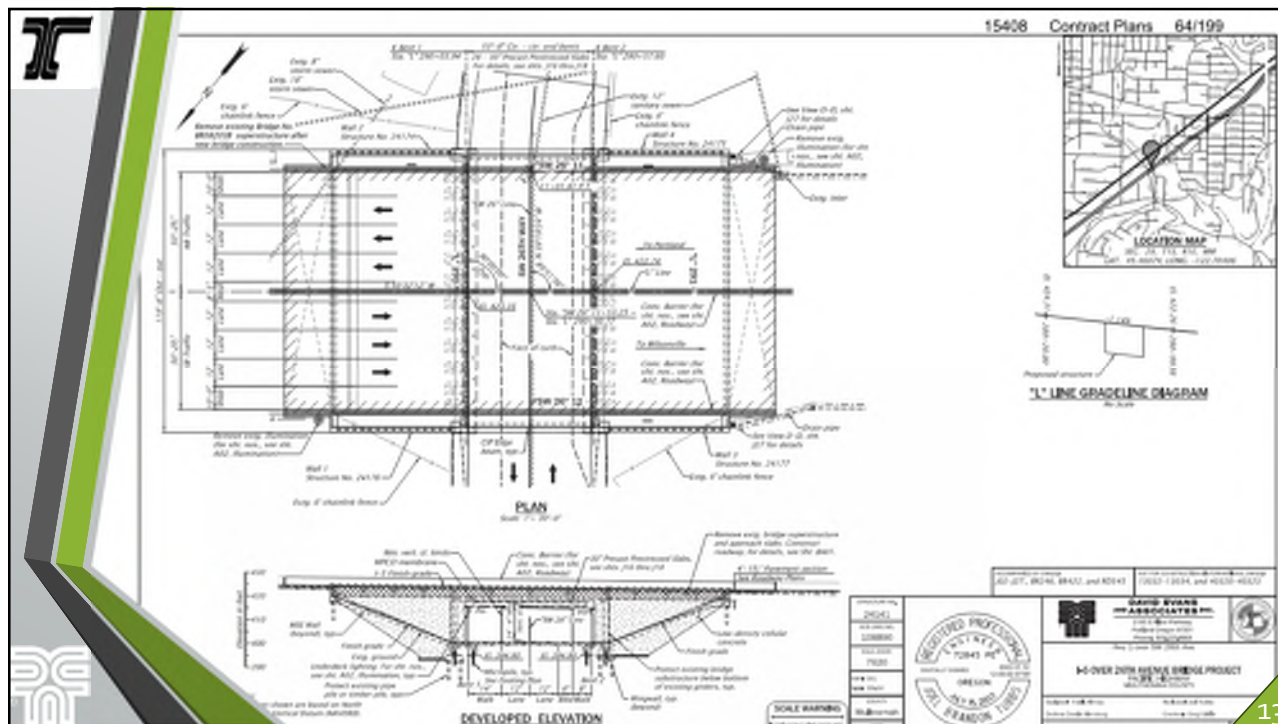
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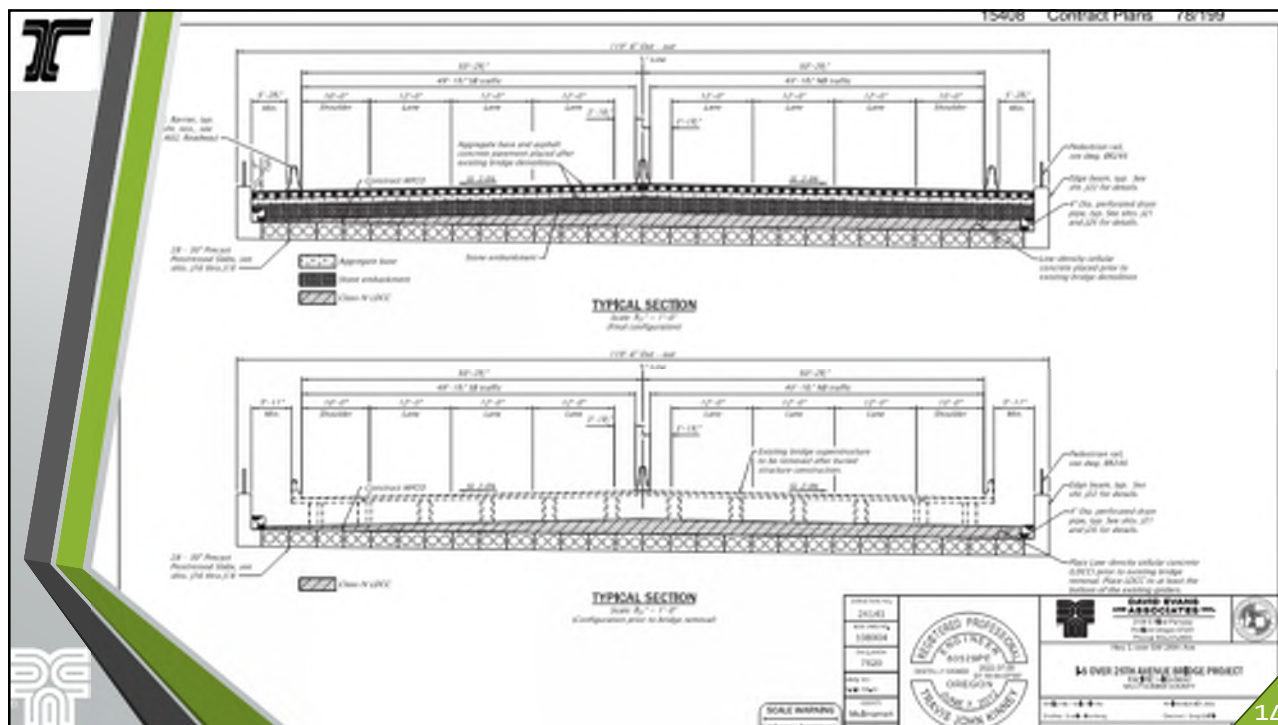
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Maintenance of Traffic

- Short, local vehicular detour for 26th Ave
- 6 Lanes maintained on I-5
- Weekend closure detour



Maintenance of Traffic

- Community appreciation for pedestrian access





The Highlights:

The Good


- I-5 Traffic impacts reduced by 2 years
- Bridge demolition/ construction without freeway workzone
- Reduced construction costs
- Reduced construction duration
- Pedestrians easily accommodated

The Bad:

- Full closure of I-5 required!!!
- You've got to build a bridge under a bridge under live traffic...
- ...Then demo the old bridge without damaging the new structure

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The Highlights:

ABC/Specialized Techniques:

- Contractor Constructability Review
- Micropile foundations
- Precast concrete elements
- Lateral translation of beams
- Unique superstructure connection
- Low Density Cellular Concrete (LDCC) filled, mechanically stabilized walls
- Near-net-zero settlement mitigation
- Re-use of concrete debris as fill
- Full-Width Weekend Closure

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Contractor Constructability Review


The Design team met with 7 different contractors (1:1 Sessions) with expertise in the following:

- Bridge demolition
- Micropile installation
- Bridge construction
- Pavement construction
- Retaining wall construction
- Low Density Cellular Concrete (LDCC)



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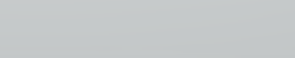
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Contractor Constructability Review


Significant Risk and Opportunities Identified

- **Opportunity** – Allow 3” to 15” bridge debris as sub-base
- **Opportunity** – Provide staging/stockpile area and allow off-road haul trucks
- **Opportunity** – Change soldier pile wall to MSE wall
- **Threat** – Timber piling/falsework obstructing micropile installation. Recommended response is to modify pile layout and allow flexibility.



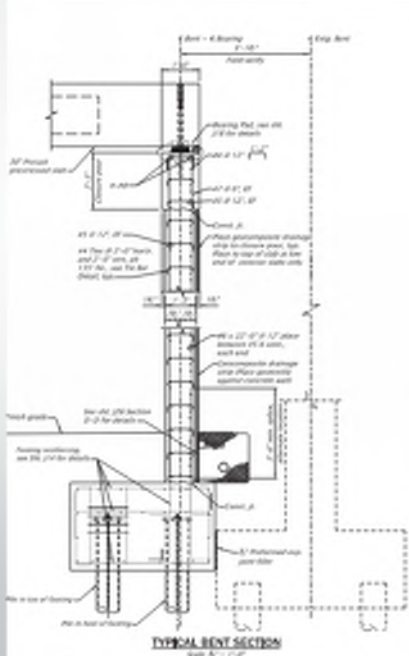
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Micropile Foundation / Substructure Construction

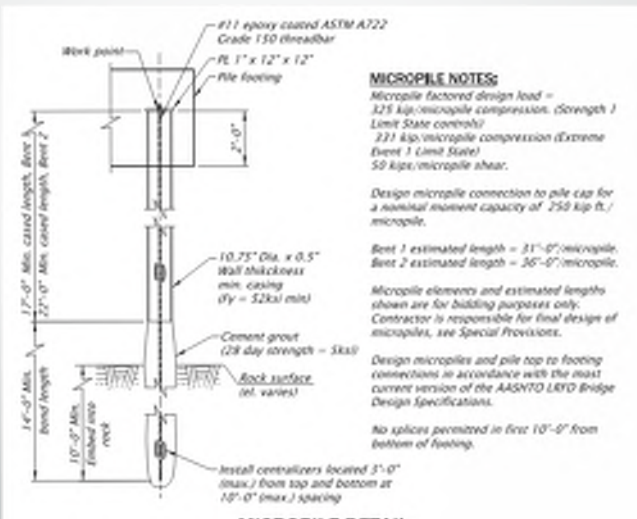
- Deep foundations required
- No vertical access for pile driving
- Existing bridge under live traffic





Micropile Foundation / Substructure Construction

- Approx. 330 k compression
- 50 k shear
- 250 k-ft nominal moment capacity





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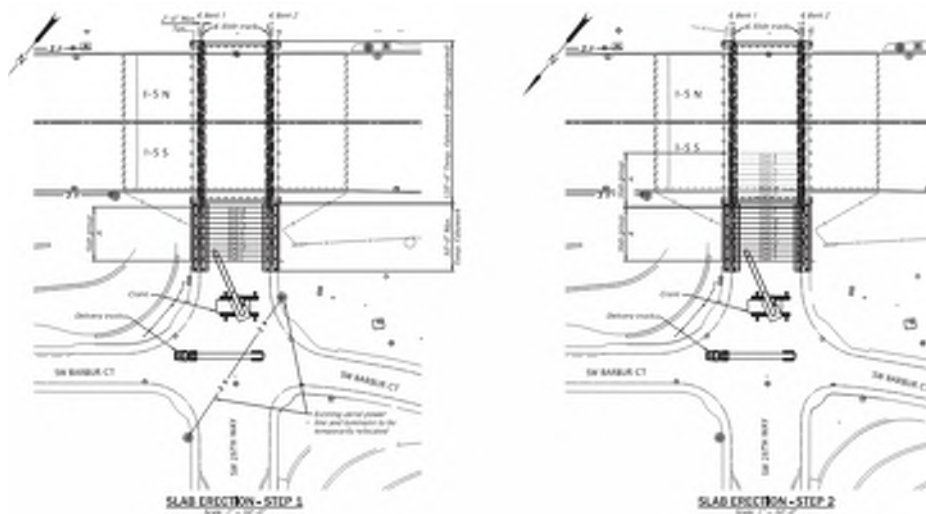
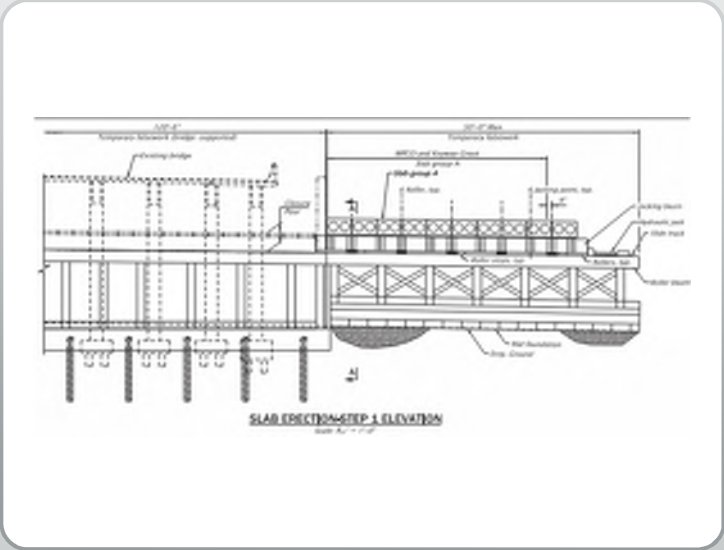


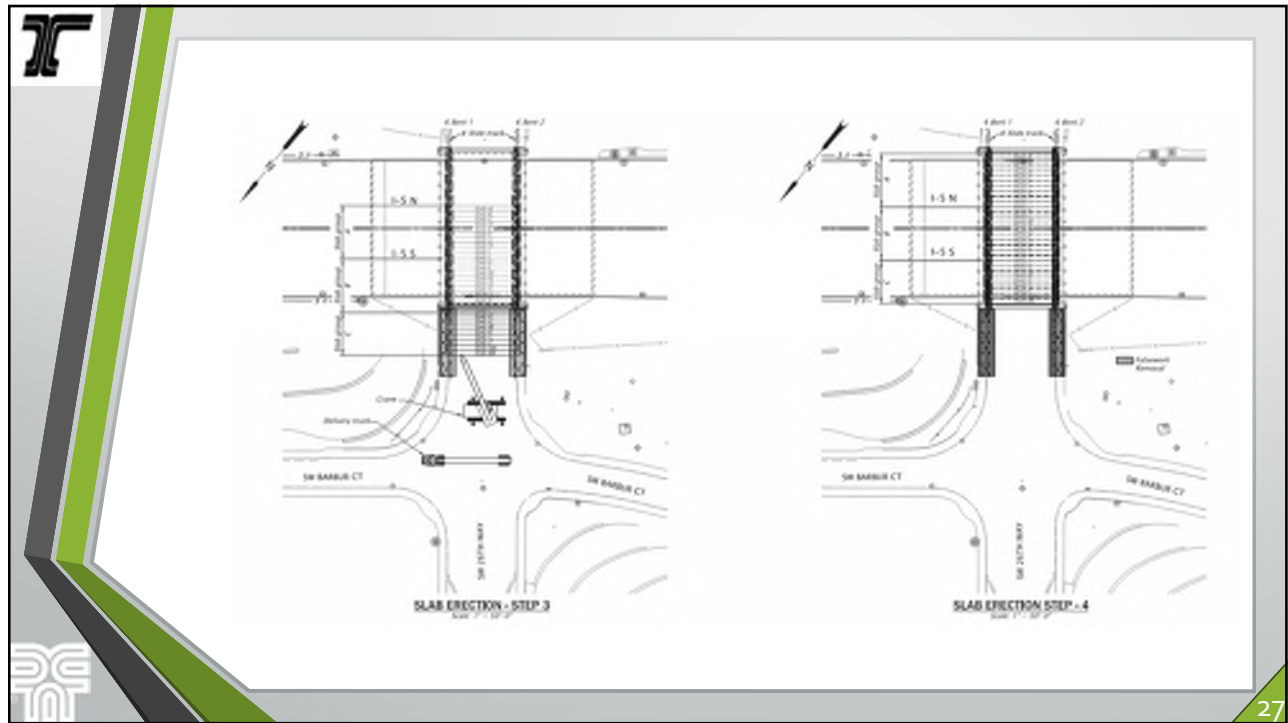
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Accelerated Bridge Construction

- No vertical access for setting slabs
- No vertical access for slab-abutment connection
- Limited right of way





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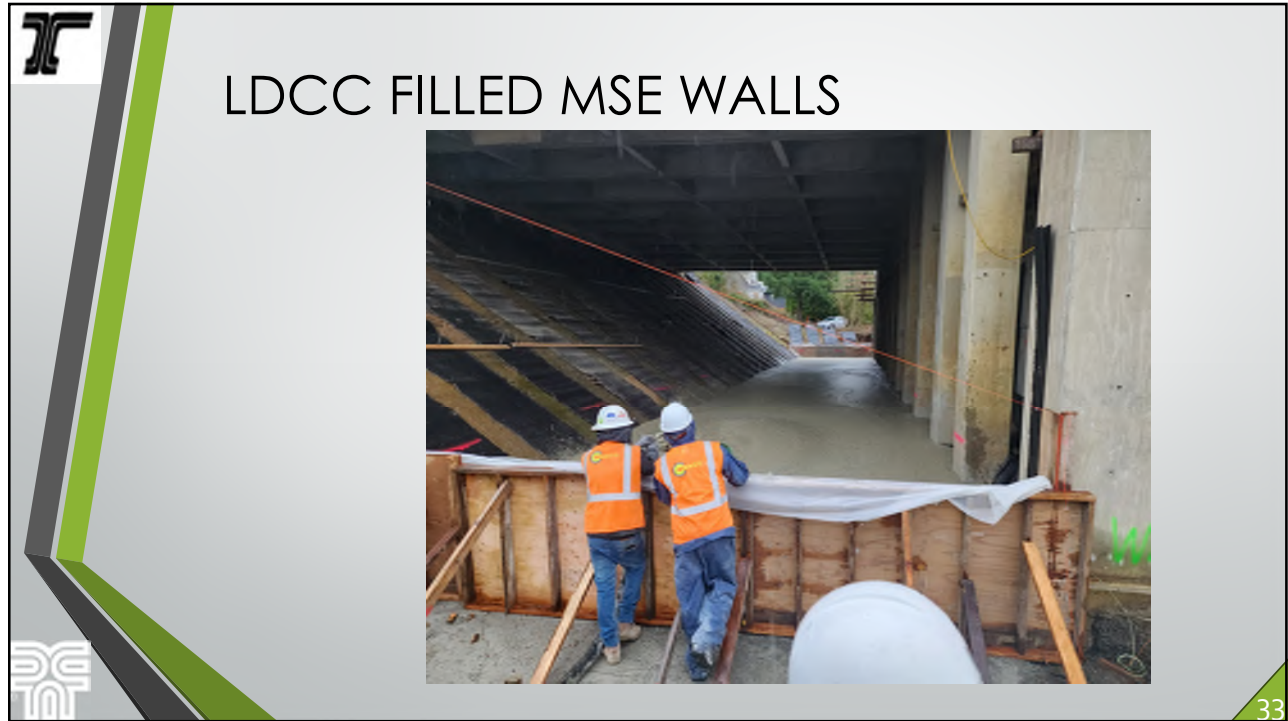
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LDCC-FILLED MSE WALLS

- Backfill the new structure
- Protect the new slabs during demolition
- Offset settlement
- Class II & Class IV

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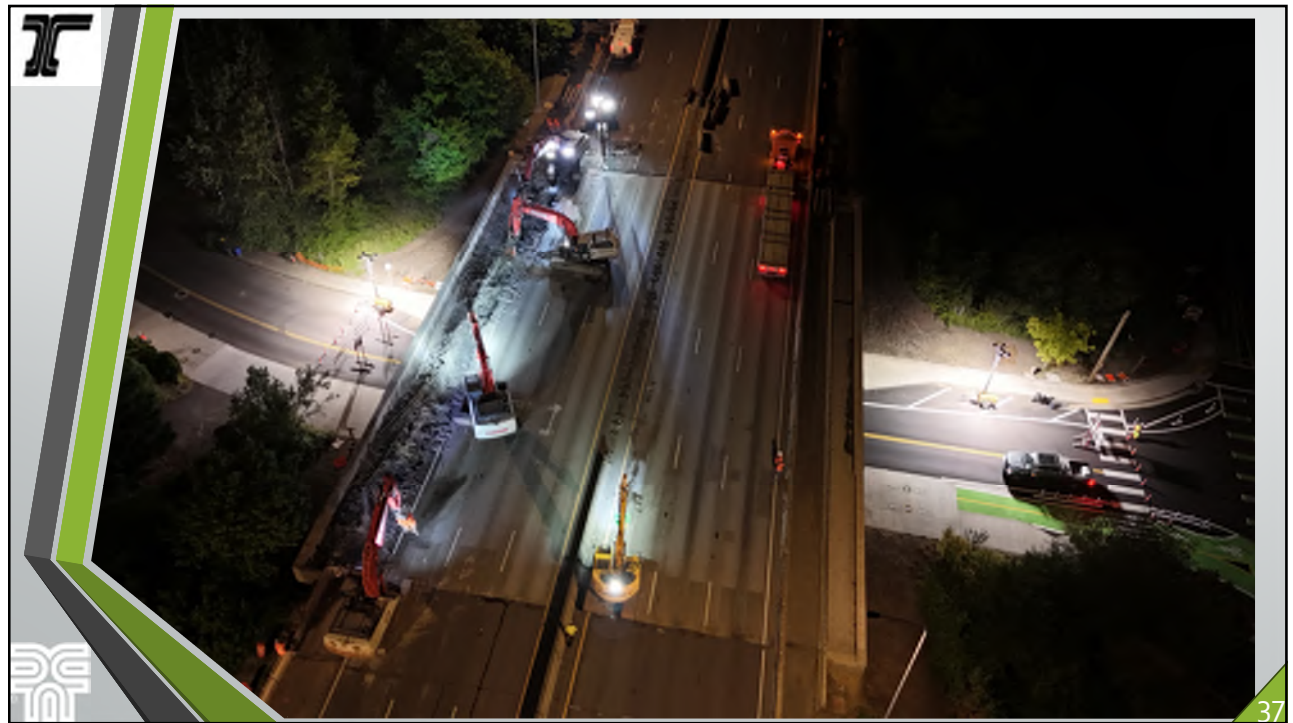


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I-5 Full-Width Weekend Closure

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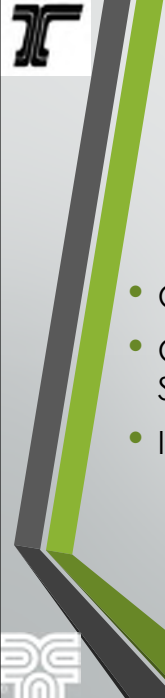
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Proven Value

Proof	Initial Concept	As-Built Solution
• Construction Cost	\$19.1M	\$13.6M
• Construction Schedule	>24 Months	18 Months
• Impacts to I-5 traffic	5 stages, 2 years	One Weekend and limited nighttime lane closures

No Bridge Demolition/Construction in I-5 Workzone...Priceless!




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Lesson's Learned:

- VE Studies will question the project criteria that may not have been up for discussion during your work... embrace it!
- If you are doing something unique, make sure all the decision makers are at the table.
- Contractor constructability review invaluable
- Communicate, communicate and communicate some more.



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Public Outreach and Communication

- Project Kickoff: *June 2020*
- VE Study: *August 2020*
- Mobility Advisory Committee: *November 2021*
- Contractor Constructability Review: *January 2022*
- Mobility Advisory Committee: *April 2022*
- Online Open House: *April 2022*
- Construction Approach Decision: *Summer 2022*
- Bid Opening: *September 2022*

➤ [Project Website](#)

I-5 over SW 26th Avenue Project | **October 2020**

Bridge replacement
We need to replace the aging I-5 bridge over SW 26th Avenue to keep people and goods moving safely through our region on I-5.

We evaluated two solutions:

- 1** Build a replacement bridge, which means building a detour bridge and shifting traffic to it during construction, creating **major traffic impacts on I-5 for almost two years.**
- 2** Build a new support structure underneath, then replace the deck and pave during **one weekend closure of I-5 in both directions.**

We chose the option with lower costs, shorter construction time, fewer traffic impacts, less nighttime noise, fewer environmental impacts, and improved safety for workers and drivers.

Work zone safety
The work zone and workers will be below the bridge for the majority of construction.

Efficient use of time and money
Saves 6 months of construction. Less disruption to traffic and fewer detours in the region, keeping people and goods moving.

Cost savings
Project saves up to \$5.5 million with weekend I-5 closure.

Fewer environmental impacts
Including less construction waste, no impact to a nearby water drainage area, and less construction fuel consumption.

Less noisy work
Limiting nighttime work to only 90 nights so project noise is less disruptive to the surrounding neighborhood.

4 out of 5 work zone crash victims are drivers and their passengers, not workers.

One weekend closure of I-5 plus nighttime lane closures and possible nighttime one-direction closure instead of almost two years of a detour structure and frequent major I-5 impacts.

\$13 million (NEW COST) vs **\$19 million** (NEW COST)


18 months (NEW TIME) vs **2 years** (NEW TIME)

Preparing for the full closure

Friday night to Monday morning
June 28 – July 1


Coordination included:

- Emergency Response
- Traffic Management Operations Center (TMOC)
- City of Portland's Signs and Lighting
- State Police Patrols
- and many others




Outreach Summary and Stats

- Coordinated with over 9 other Agencies
- Email updates to over 2,700 subscribers
- Website had 26k+ visits
- Social media had 2.8+ million views, "breaking an ODOT record"
- Advertised in local media outlets




Bracing yourself to tell Portland we are closing I-5 for a full weekend, but knowing this construction method will cost less and save time overall for travelers.



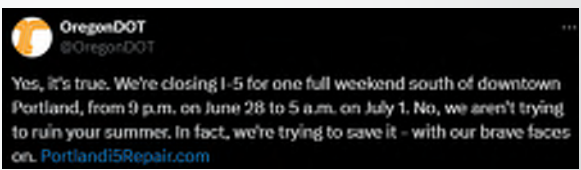
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Construction and I-5 Closure


- All major risks were responded to prior to closure
- Full 56 hour I-5 Closure implemented 9pm on June 28th to 5am July 1
- Work completed and closure lifted in 54 hours
- Construction office did not observe any severe traffic conditions



COMMUTING

Make travel plans now for disruptive full closure of I-5 freeway in SW Portland next weekend

Updated Jun. 25, 2024, 5:07 a.m. | Published Jun. 21, 2024, 8:39 a.m.



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 Oregon Department of Transportation

QUESTIONS?

An aerial photograph of a highway interchange. A multi-lane highway runs horizontally across the frame, with several cars and a white truck. A road crosses over the highway via a bridge. The surrounding area is lush with green trees and vegetation. A small green box with the number "50" is in the bottom right corner.

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