



I-5 Dunsmuir Gap CMGC Project

Project Case Study: Benefits
of CMGC Project Delivery for
Structures Projects



Project Description

Project Location:
I-5
City of Dunsmuir
Siskiyou County
District 2

\$140,630,444

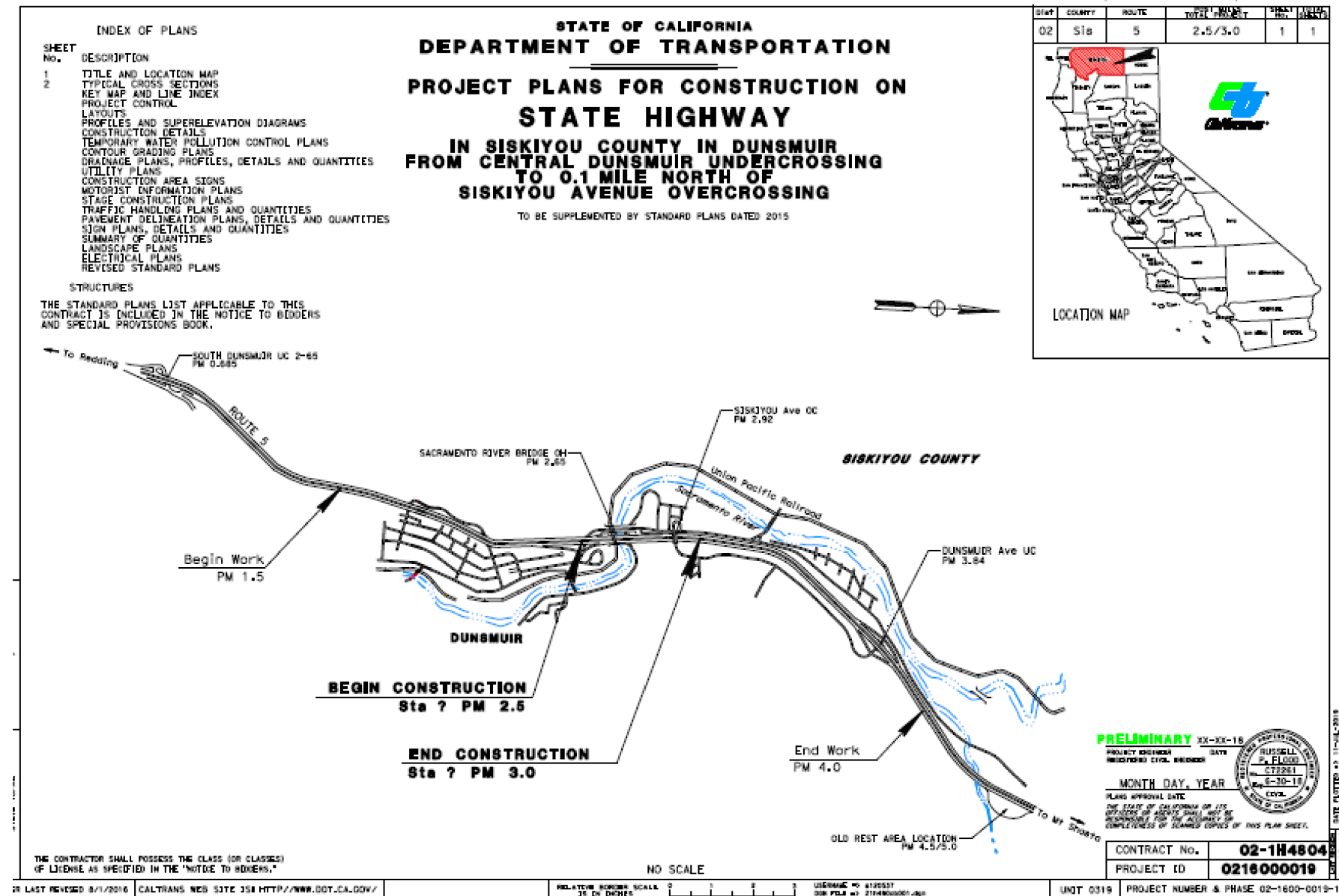
Start: 4/17/23
Finish: 12/15/25

- 02-1H480
 - SB I-5 replace bridge deck, railing, approaches
- 02-3H320
 - NB I-5 replace 10 miles of JPCP all lanes
 - NB I-5 grind PCC paving 3.3 miles, 0.1 ft polyester concrete overlay
- May-November work window

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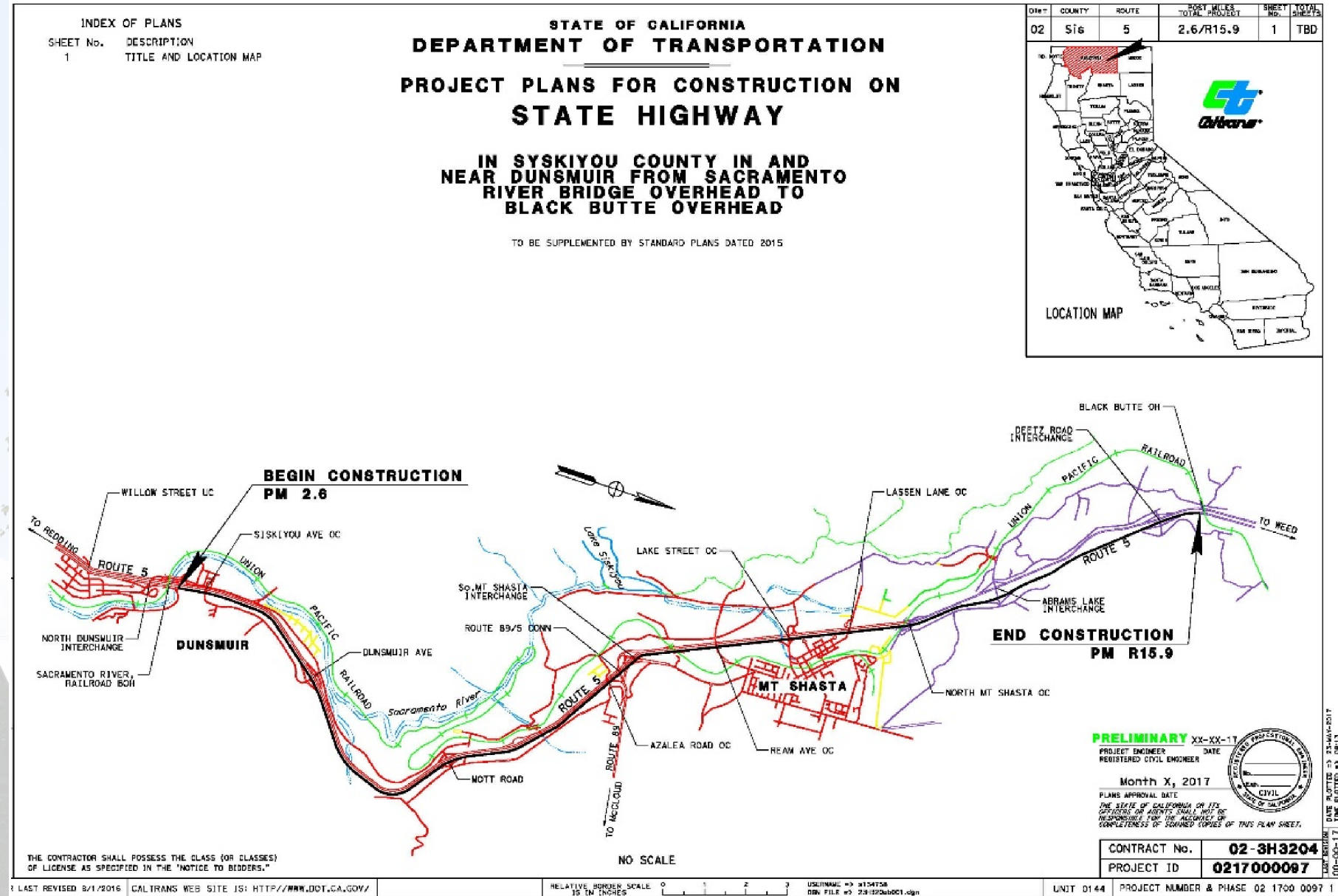
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Why CMGC

- **2 overlapping projects, combine into one**
- **Constructability**
 - Limited work window
 - Local community
 - RR
- **Optimize**
 - Construction techniques
 - Materials
 - Means and methods
 - Cost
 - Schedule
- **CCO & design change avoidance**

Why CMGC

- **Permits & ROW**

- UPRR, City of Dunsmuir, USACOE 404, RWQCB, 401, Dept. of Fish & Wildlife, NPDES

- **Utility relocations & coordination**

- 14" waterline connecting upper & lower Dunsmuir
- Local community
- RR

- **Early construction activities during PS&E**

- Schedule savings

- **CMGC Tools**

- Design & constructability reviews, risk management, innovations, cost and schedule development, phasing, staging, sequencing, stakeholder management

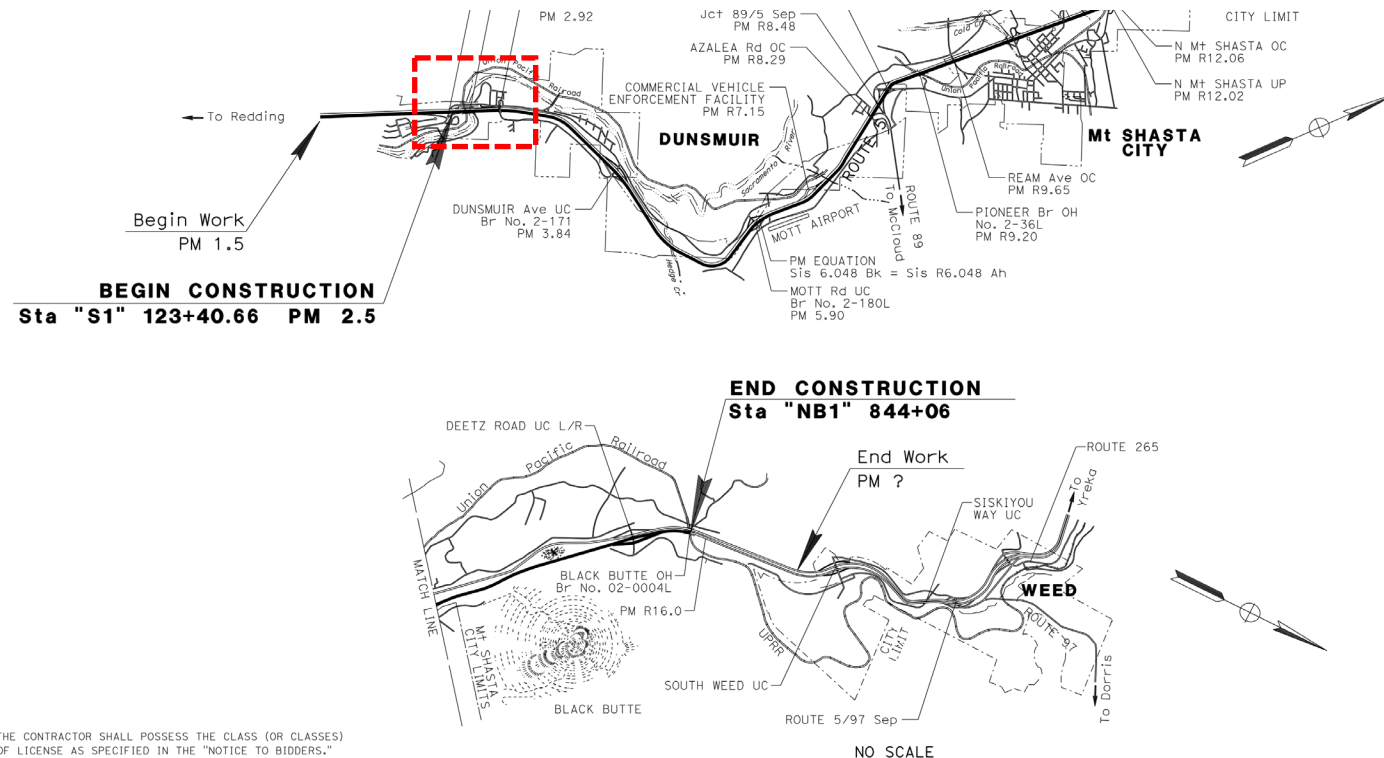
CMGC Goals

- Safety
- Mobility
- Quality
- Public Interaction
- Environmental Compliance
- Project Delivery
- Innovation

Addressing Key Constructability Challenges

■ Challenge: Winter Work Moratorium

- Reason: Seasonal work volume, restoration of traffic
- Solution: Optimized phasing, access, design, constructability during PS&E



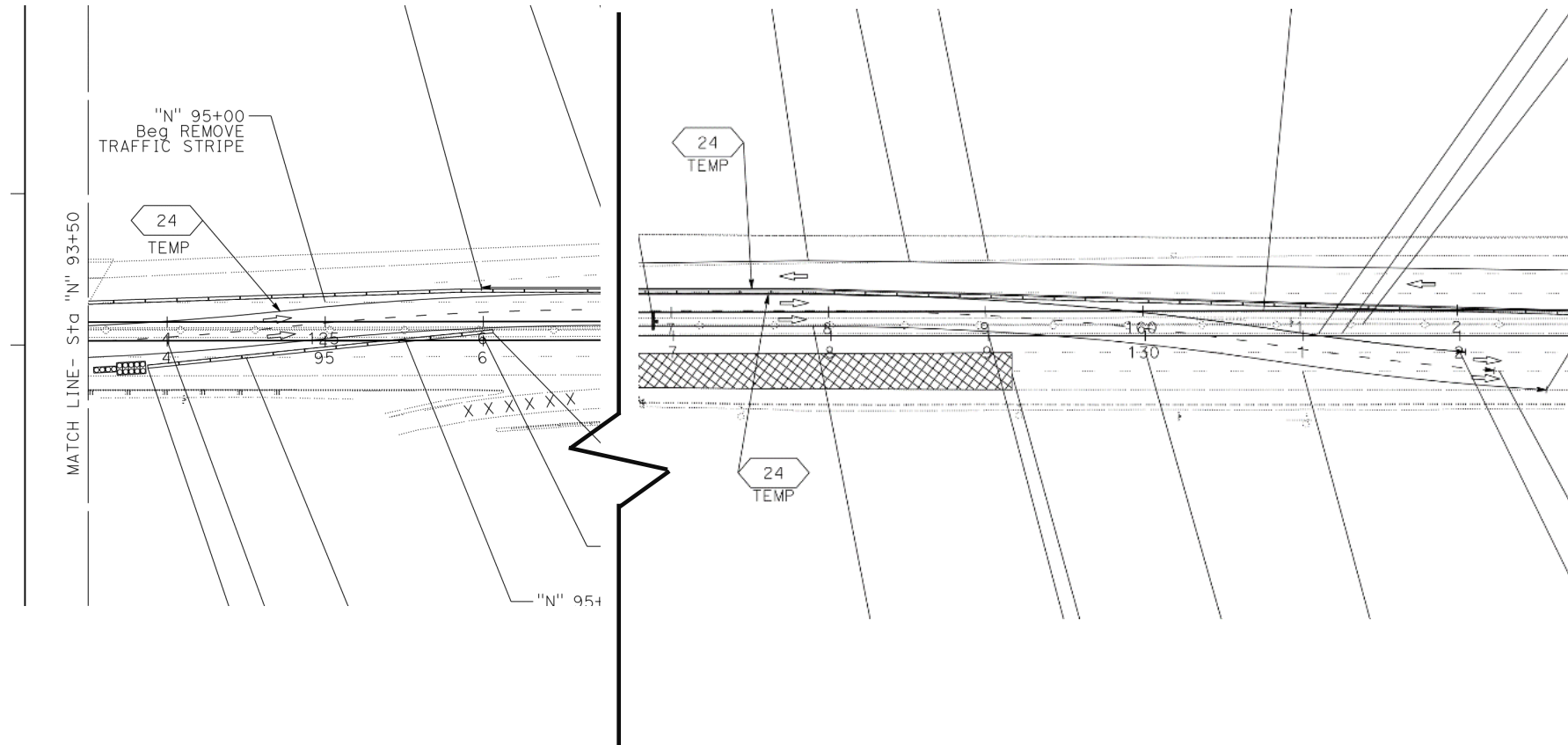
Addressing Key Constructability Challenges



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Addressing Key Constructability Challenges



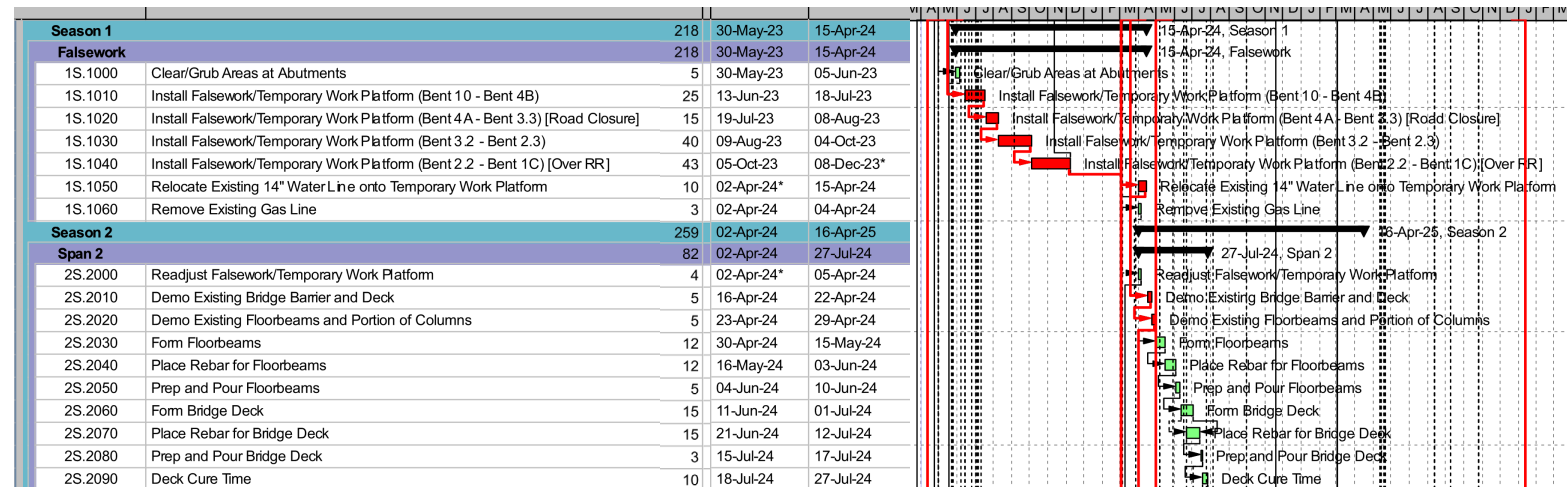
“Crossover” MOT strategy

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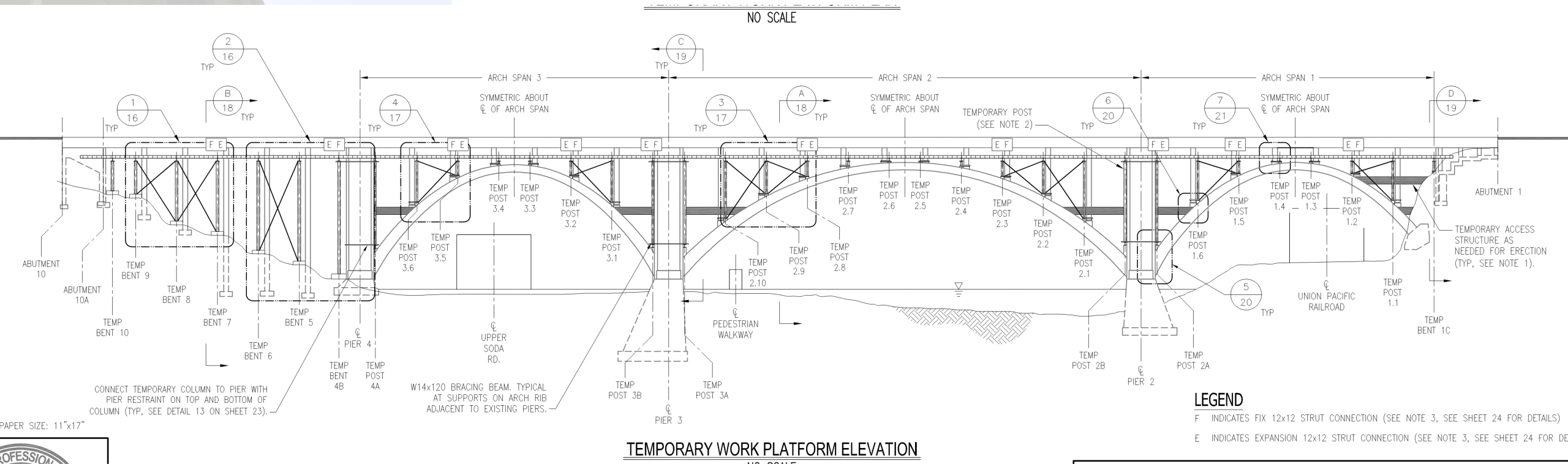


Addressing Key Constructability Challenges

- **Challenge:** Maintain existing structure integrity / temp platform design
- **Reason:** Temp. loading conditions for arch spans
- **Solution:** Final temp. support design, demo / reconstruction sequence



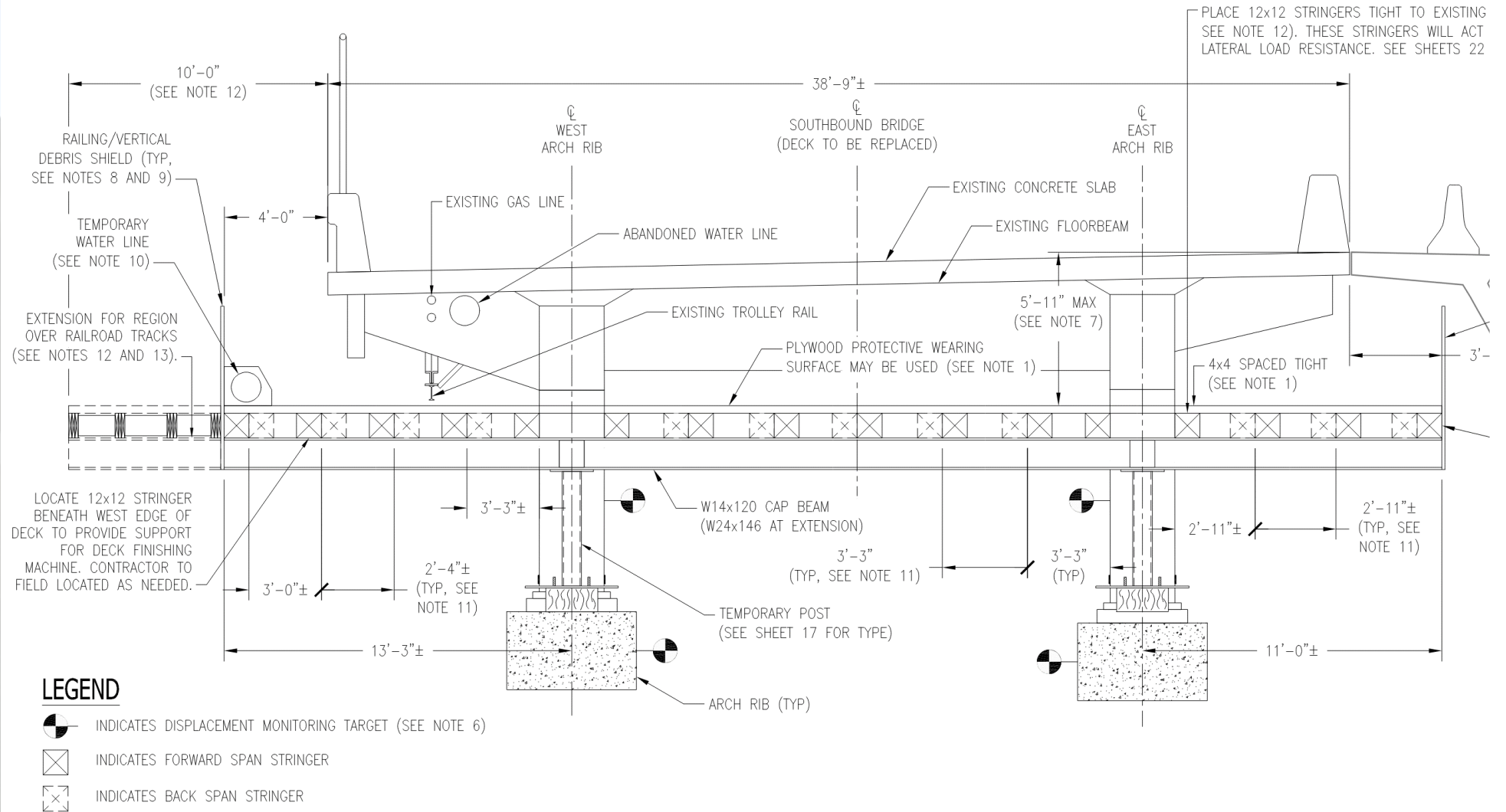
Addressing Key Constructability Challenges



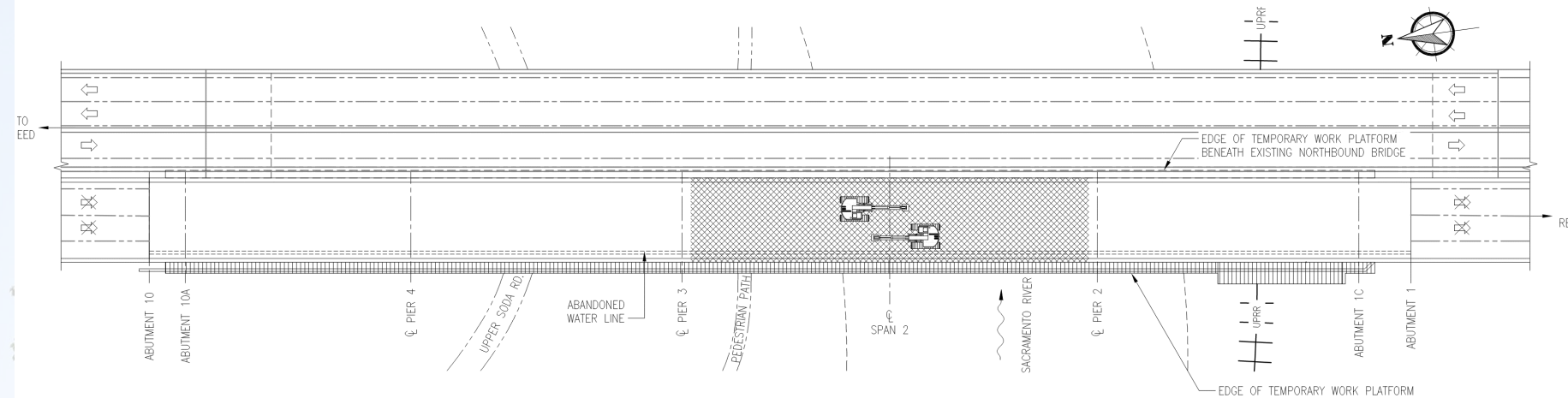
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Addressing Key Constructability Challenges

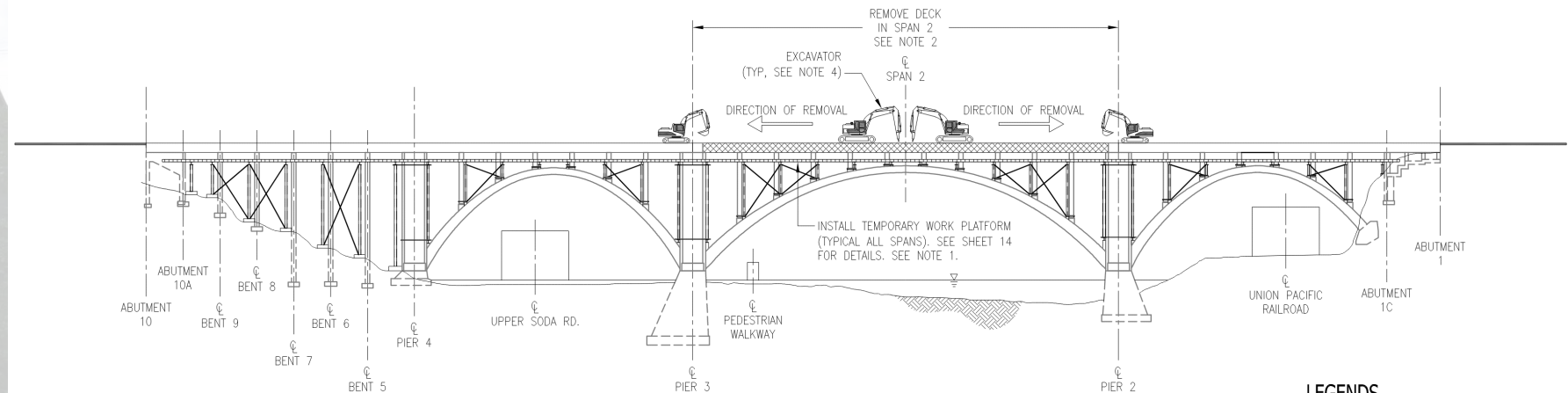


Addressing Key Constructability Challenges



REPLACEMENT SEQUENCE STAGE 1 AND 2 PLAN

SEE NOTE 4



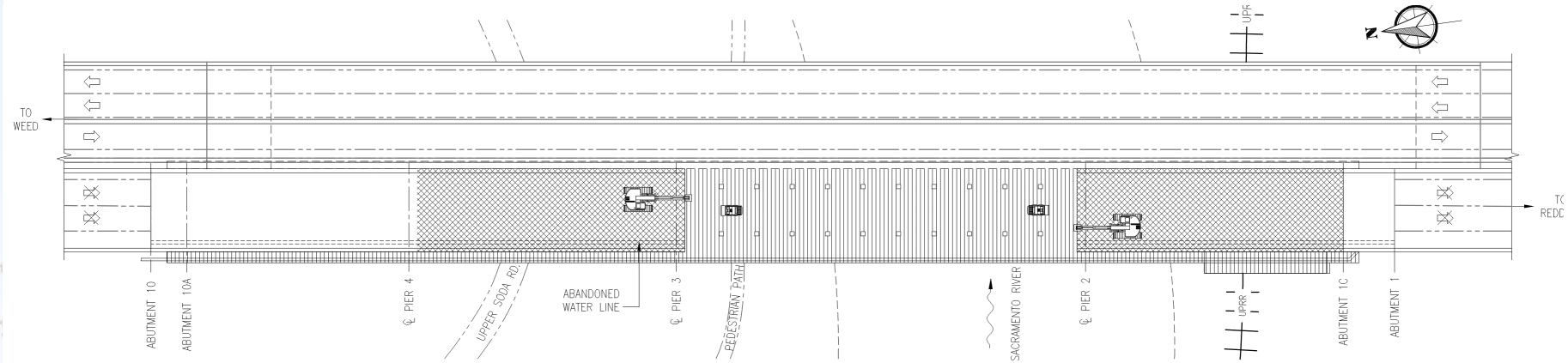
REPLACEMENT SEQUENCE STAGE 1 AND 2 ELEVATION

NO SCALE

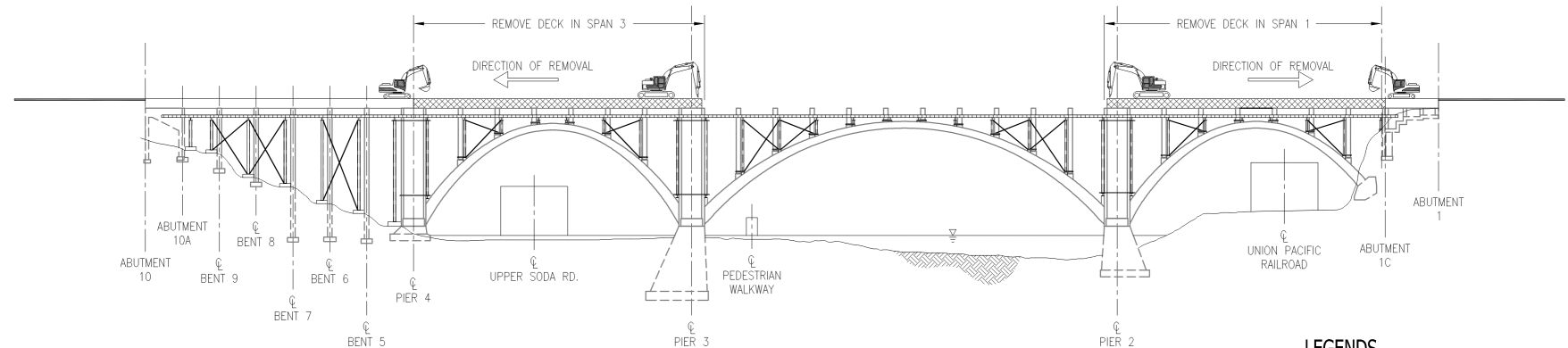
LEGENDS

- INDICATES LIMITS OF DECK REMOVAL
- INDICATES TEMPORARY WORK PLATFORM

Addressing Key Constructability Challenges



REPLACEMENT SEQUENCE STAGE 3 PLAN
SEE NOTE 3

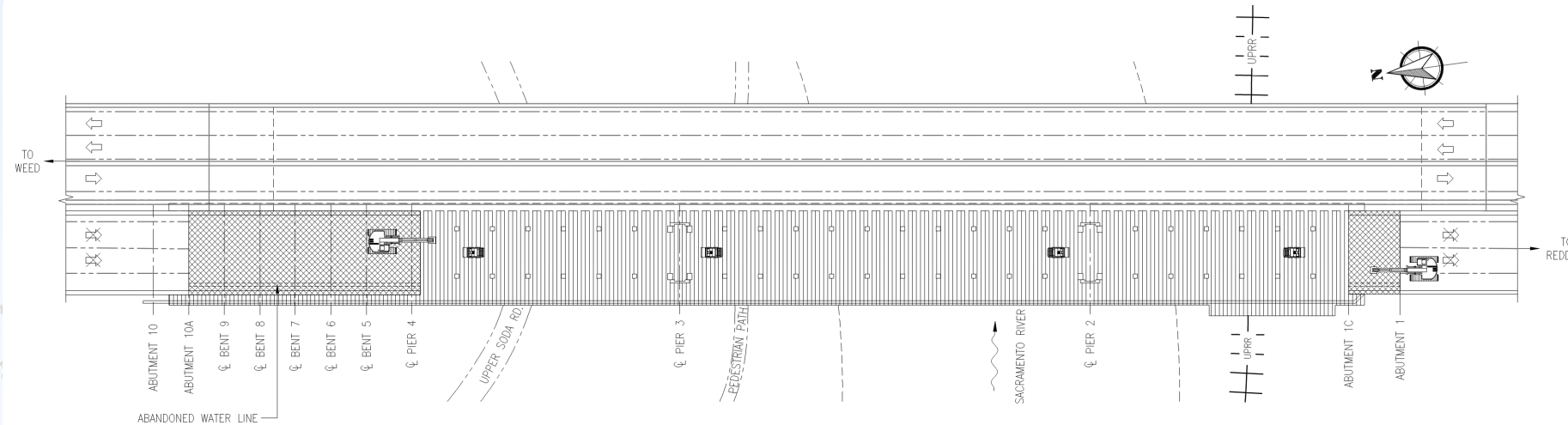


REPLACEMENT SEQUENCE STAGE 3 ELEVATION
NO SCALE

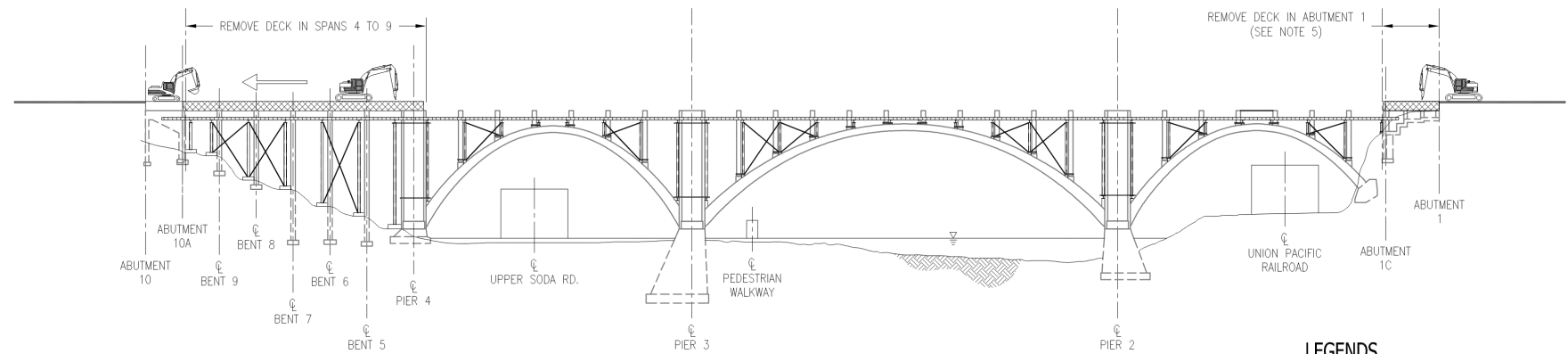
LEGENDS

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Addressing Key Constructability Challenges



REPLACEMENT SEQUENCE STAGE 4 PLAN
SEE NOTE 3

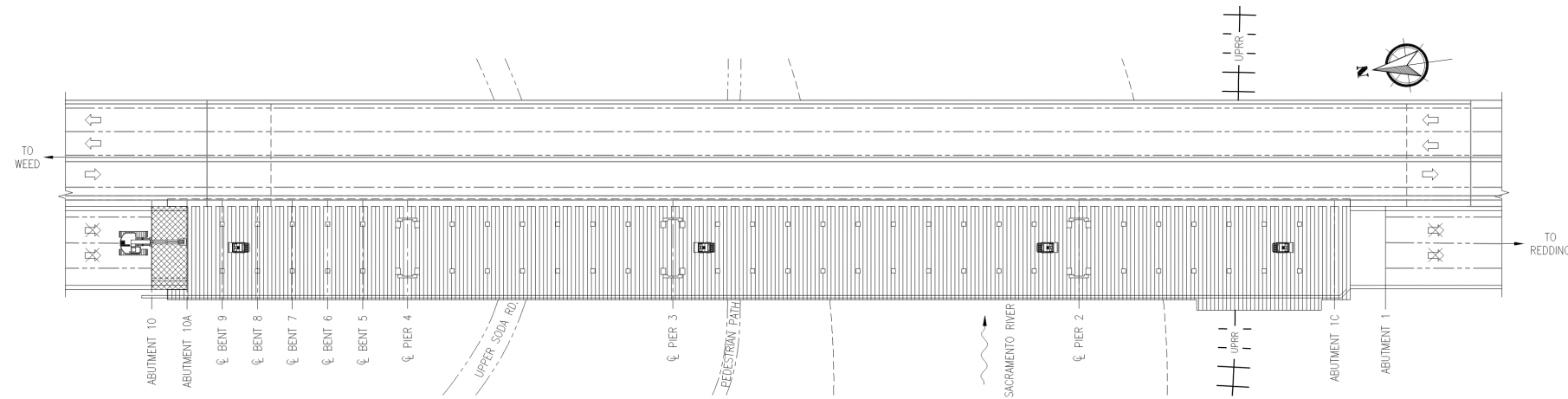


REPLACEMENT SEQUENCE STAGE 4 ELEVATION
NO SCALE

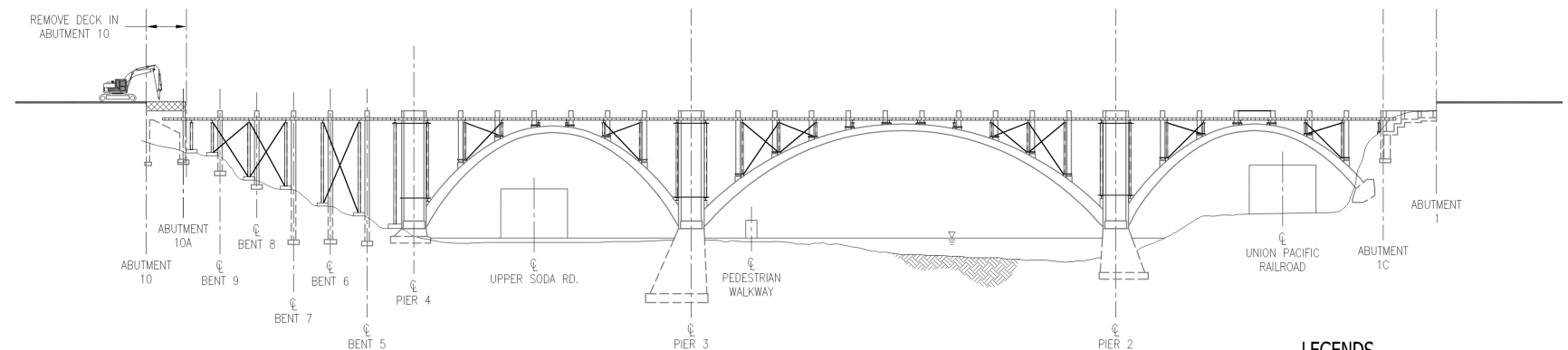
LEGENDS

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- INDICATES TEMPORARY WORK PLATFORM

Addressing Key Constructability Challenges



REPLACEMENT SEQUENCE STAGE 5 PLAN
NO SCALE

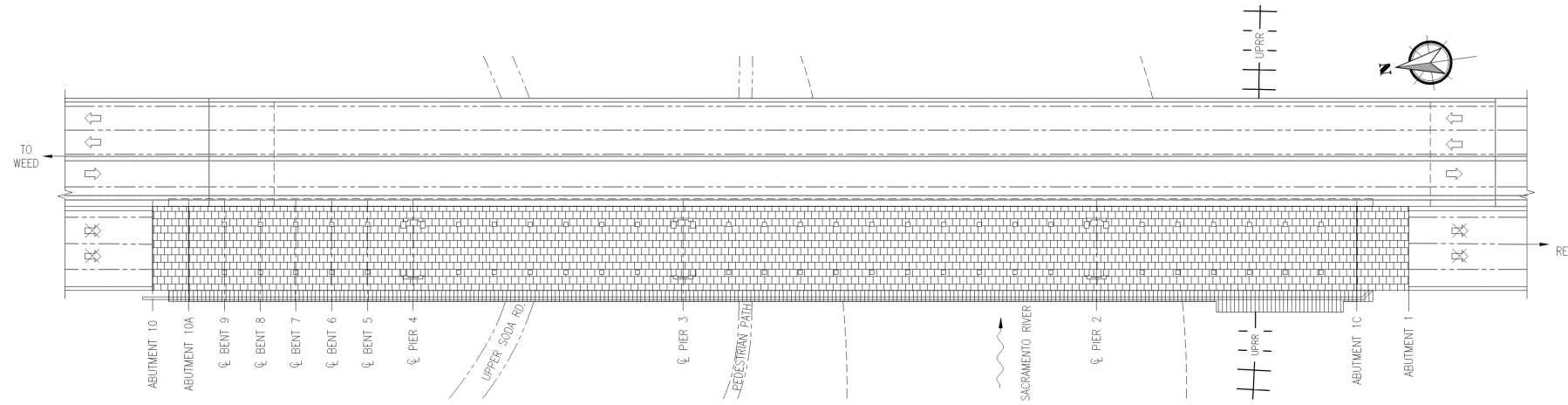


REPLACEMENT SEQUENCE STAGE 5 ELEVATION
NO SCALE

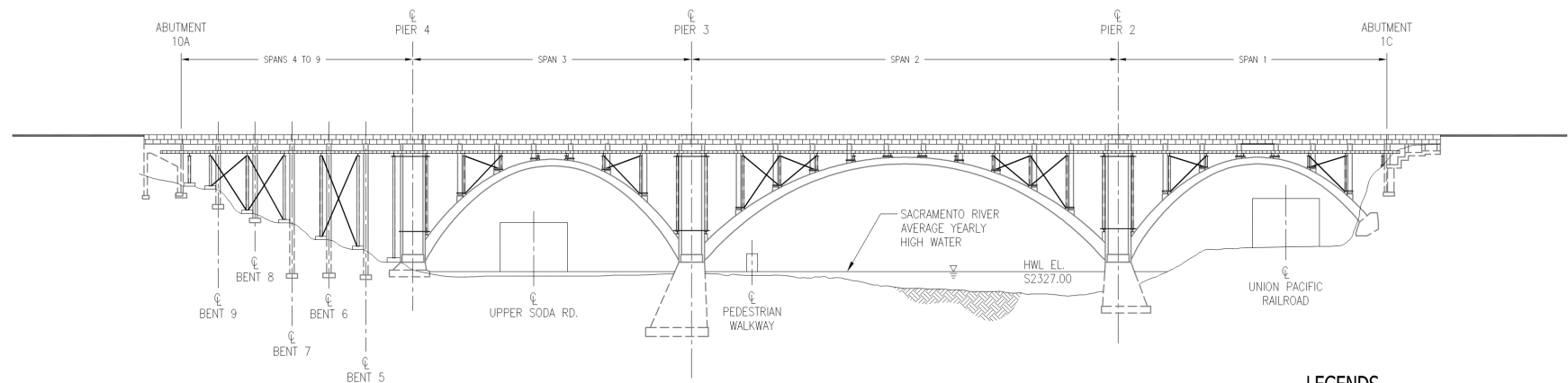
LEGENDS

- INDICATES LIMITS OF DECK REMOVAL
- INDICATES TEMPORARY WORK PLATFORM

Addressing Key Constructability Challenges



REPLACEMENT SEQUENCE STAGE 6 PLAN
NO SCALE



REPLACEMENT SEQUENCE STAGE 6 ELEVATION
NO SCALE

LEGENDS

- INDICATES FORMWORK
- INDICATES TEMPORARY WORK PLATFORM

Addressing Key Constructability Challenges



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Addressing Key Constructability Challenges

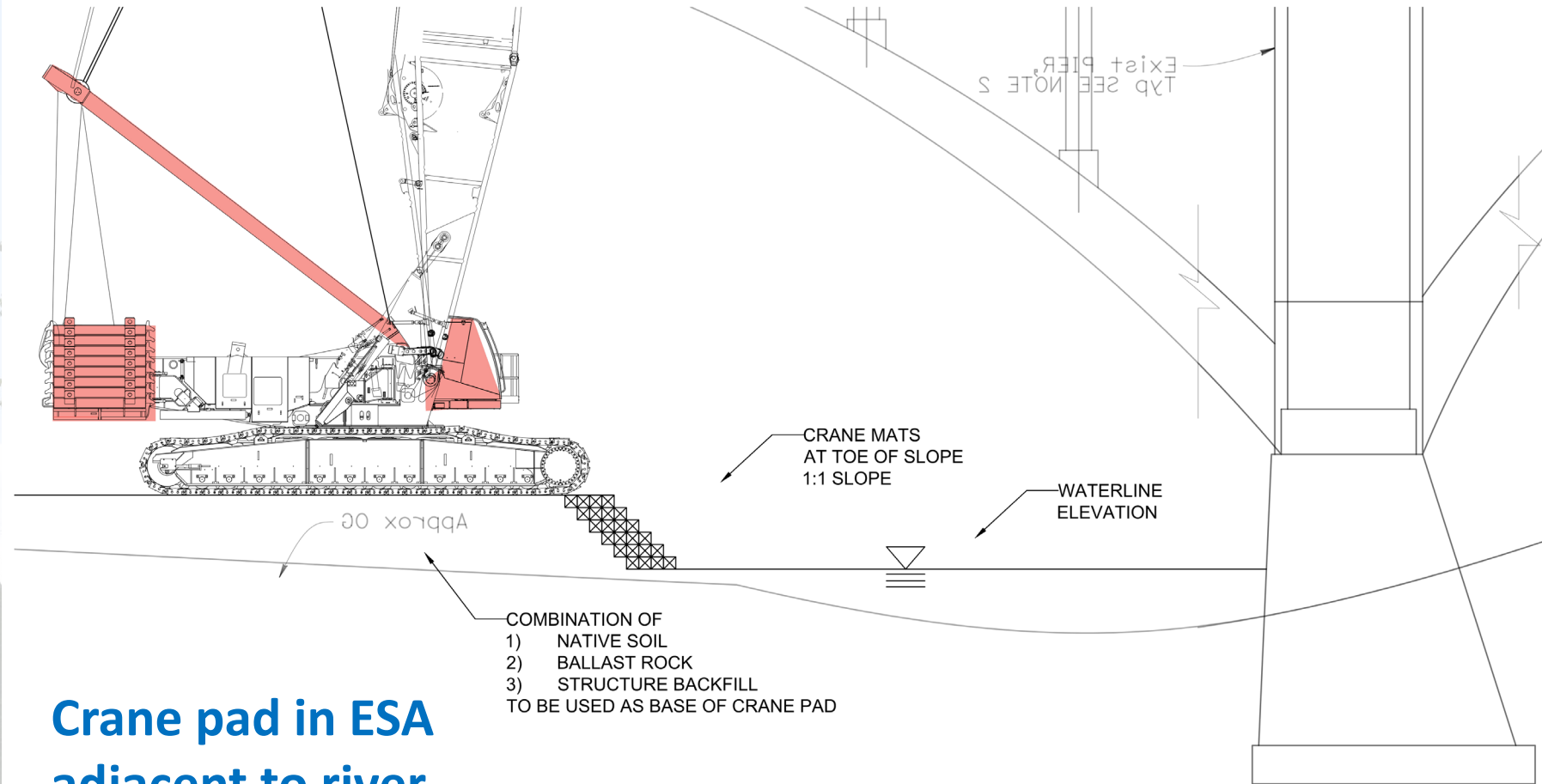
- **Challenge:** Environmental Permitting

- **Reason:** Application/approvals highly dependent on constructability strategies (cost/schedule)
- **Solution:** CMGC Process: permanent & temp. designs, phasing/staging, access, regulatory compliance

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Addressing Key Constructability Challenges



**Crane pad in ESA
adjacent to river**

Addressing Key Constructability Challenges

3 & 4. Path along the river & Fishing access

Path along the river will be maintained. Due to the diminishing return of public safety, pedestrian crossing adjacent to Pier 3 will be closed and traffic directed to area adjacent to Pier 4 before they are re-directed back to the trail underneath the existing structure.



Addressing Key Constructability Challenges

- **Challenge:** Difficult Construction Access

- **Reason:** River, existing bridges, RR, city park, ESA

- **Solution:** Crane selection, erection plan, avoid river diversion or trestle



Addressing Key Constructability Challenges



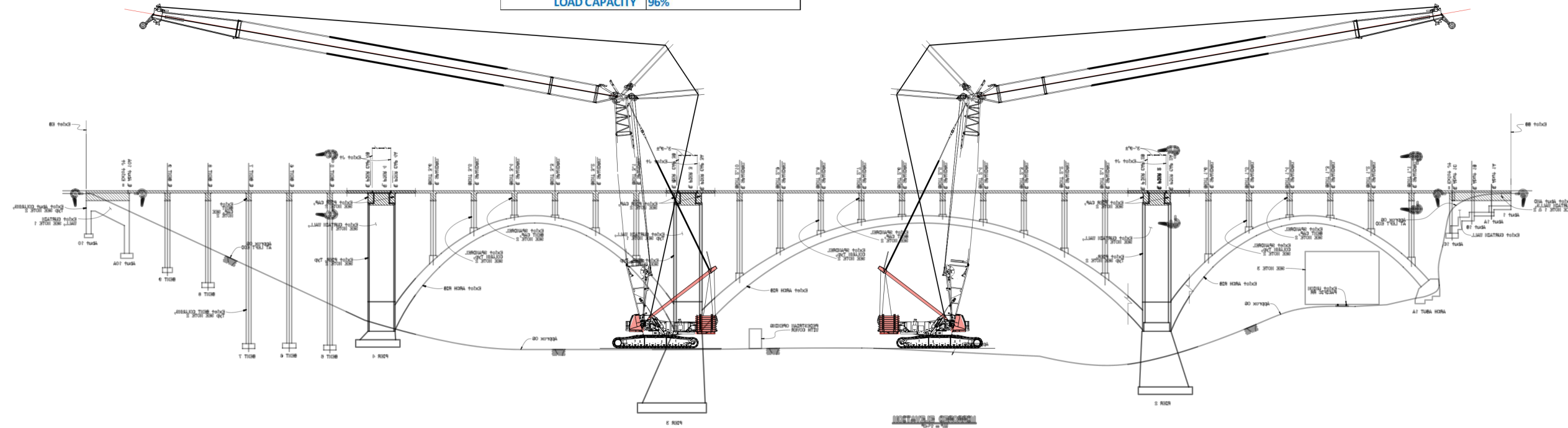
**Arch bridge deck
replacement
adjacent to box
girder bridge**

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Addressing Key Constructability Challenges

CRANE	MANITOWC 16000 400TONS
SERIES	16000
MAIN BOOM (FT)	98.4
JIB	LUFFING JIB
JIB LENGTH (FT)	196.9
RADIUS (FT)	205
MAIN BOOM ANGLE	87
STAGING	TAUHINDAULI PARK
CHART	16 OF 131
PICKING CAPACITY	47,000
MAX BENT WEIGHT (1-C)	8,910
OFFSET BEAM WEIGHT	25,950
LOAD BLOCK	10,200
RIGGING	250
OVERALL WEIGHT	45,310
LOAD CAPACITY	96%



[illegible]

Addressing Key Constructability Challenges

- **Challenge:** Mobilization / setup of 440T crane
 - **Reason:** Large crane, narrow access roads, tight corners, limited staging area
 - **Solution:** Worked with crane companies during PS&E



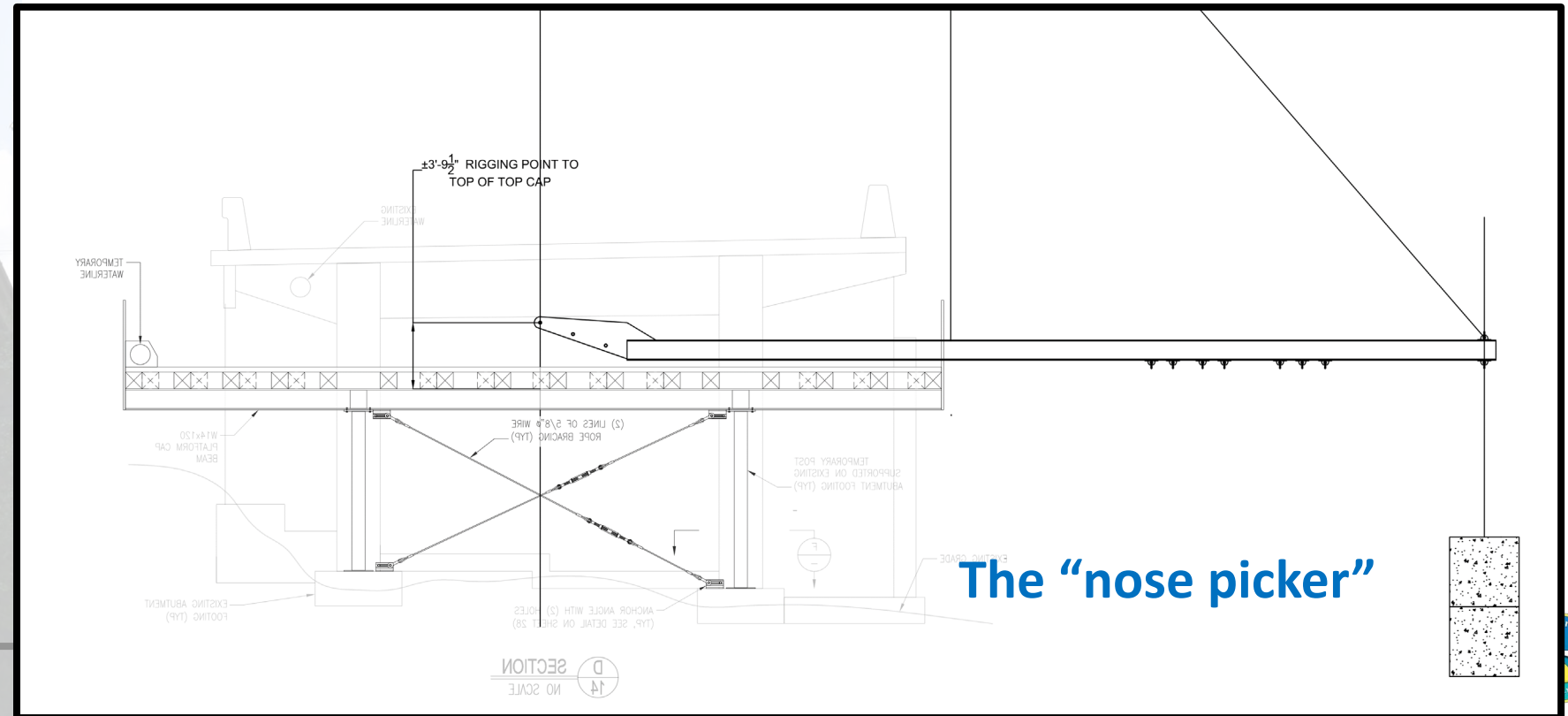
Addressing Key Constructability Challenges



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Addressing Key Constructability Challenges

- **Challenge:** Work platform erection under existing bridge
 - **Reason:** No way to set up for traditional falsework erection
 - **Solution:** (1) Right-sized crane and positioning, (2) the “nose-picker”



Addressing Key Constructability Challenges



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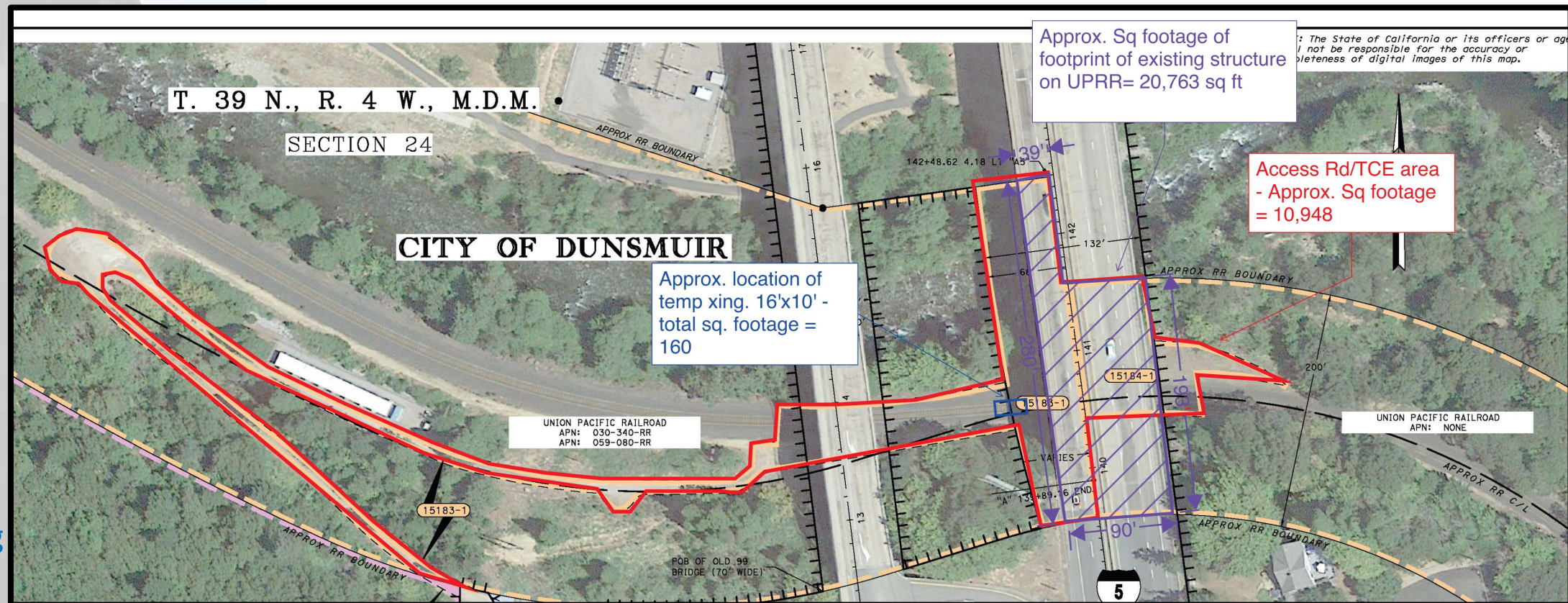
Addressing Key Constructability Challenges



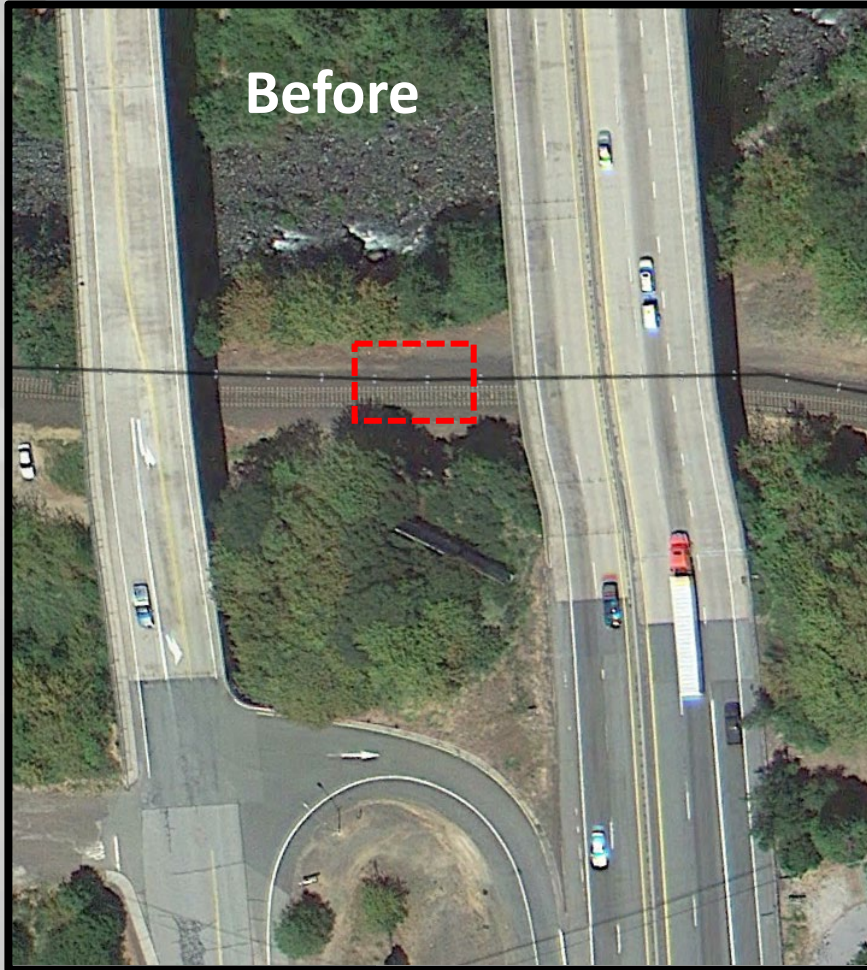
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Addressing Key Constructability Challenges

- **Challenge:** UPRR TCE, new RR grade crossing
 - **Reason:** Use of existing UPRR access road, new RR crossing for access
 - **Solution:** Contractor input for PS&E coordination with UPRR



Addressing Key Constructability Challenges



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