

# Lateral Slide of Historic Bridge In Washington State



Presented By: Kevin Dusenberry, SE  
Structures Lead Engineer, Jacobs

# Project Overview





## Appendix M1

### Conceptual Plans

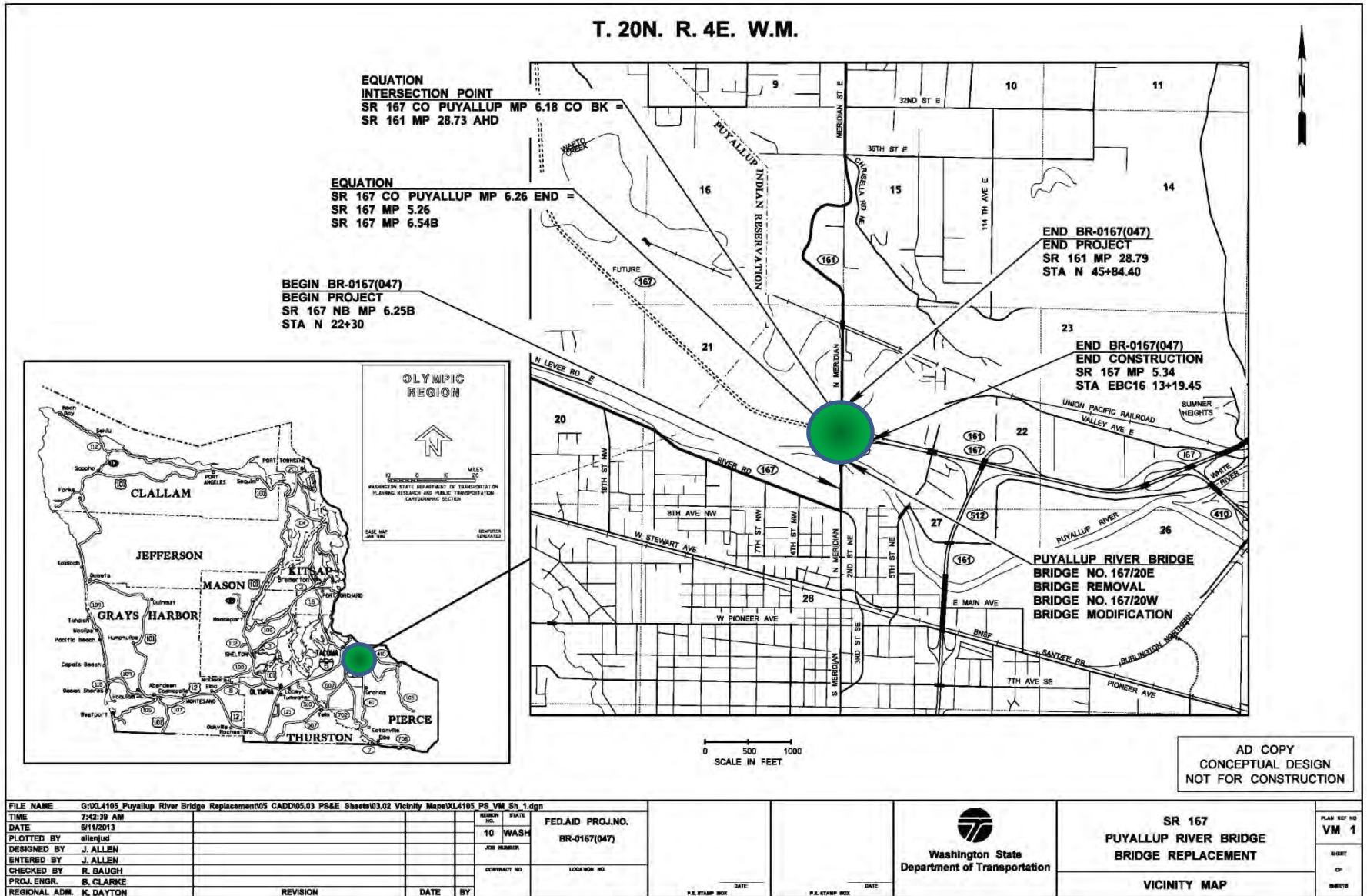
Washington State Department of Transportation

**ATKINSON**  
CONSTRUCTION

**JACOBS**<sup>®</sup>

  
**HARTCROWSER**

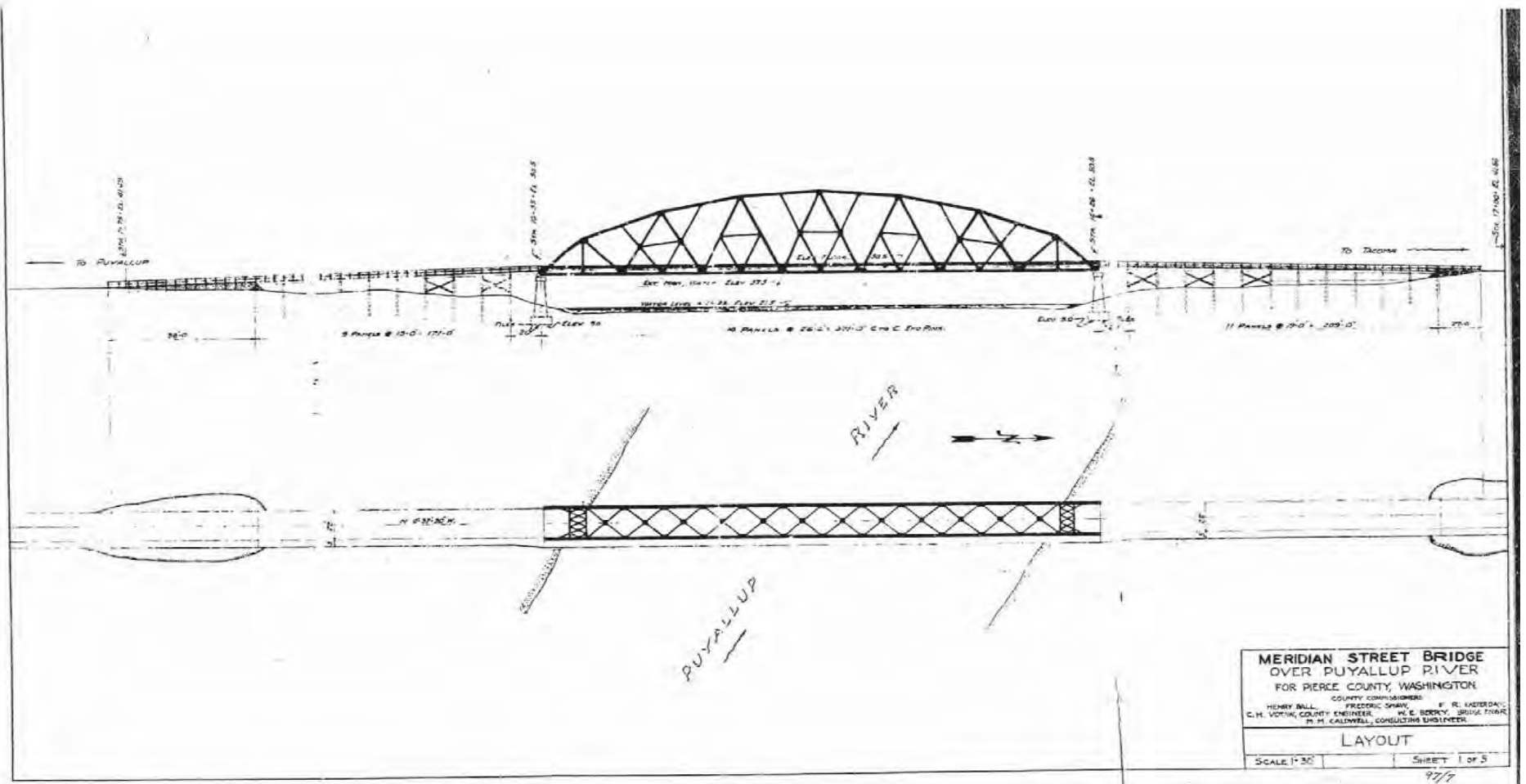
# Project Location



# Historic Truss



# Warren truss



# Proposed Three Span Steel Plate Girder Bridge On Original Alignment



# Three Span Steel Girder Bridge

## ATC 6 REAL Steel Bridge

- Maintains NB alignment upstream of SB bridge
- Eliminates Fred Meyer and other retaining walls, minimizing impacts to businesses
- Eliminates southbound alignment widening
- Eliminates utilities relocation (water, sewer, storm, fiber) and the risk that today's utilities are thrown away in the future
- Eliminates two new stormwater outfalls
- Reduces new pollution-generating impervious surface by 94%
- Reduces environmental impact footprint by 89%
- Reduces lane and road closures by 20 each
- Pier and abutment placement increases floodway and meets zero rise criteria
- Provides WSDOT flexibility for future master plan construction
- Temporary south side work bridge provides construction access to Pier 2, spans/maintains access to 4th Street and pedestrian/bike path
- Simplifies permitting - eliminates 401 and 404 permits
- West pedestrian sidewalk remains open throughout construction
- Upon completion, pedestrian sidewalks on both east and west sides of highway
- Light standards reused during future widening - eliminates throw-away materials

## ATC 6 REAL Steel Bridge

### Large Diameter Shafts

- Eliminates need and risk of ground improvements
- Designed to withstand liquefaction, lateral spreading, flow failure and down-drag
- Design and construction methods to accommodate artesian water head
- Outside Ordinary High Water (OHW) mark
- Minimizes risk of obstructions during construction
- Installed using rotator-oscillator method to minimize vibration impacts to existing structures/utilities
- Fully-cased shaft during construction minimizes risk of caving and turbidity discharges

### Intersection Improvements

- Eliminates two intersection rebuilds
- Eliminates new signals and minimizes throw-away work

### Pier Design

- Designed as in-water pier for future levee widening

### North and South Abutments

- Large structural elements resist seismic lateral loads/improves global stability
- Abutment location and no SB approach fills reduce abutment loading by 80%

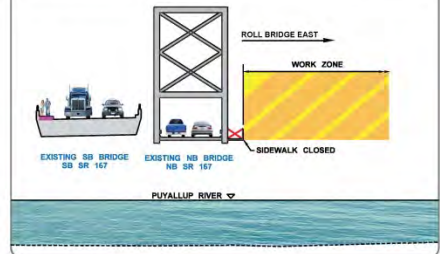
### Eliminated In-Water Pier

- Eliminates vibration/settlement impacts to existing SB in-water bridge pier
- Eliminates fish window schedule constraint (two years)
- Provides schedule float for pier construction
- Eliminates risky ground improvements in the water and associated environmental risks
- Eliminates risk of settlement repair within fish window

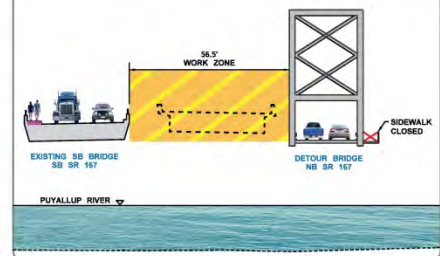
### North Abutment

- Accommodates future levee widening

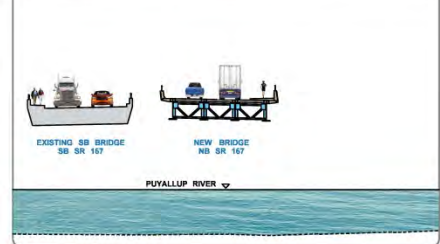
## Stage 1 - Construct Detour Bridge



## Stage 2 - Construct Permanent Bridge



## Final Condition

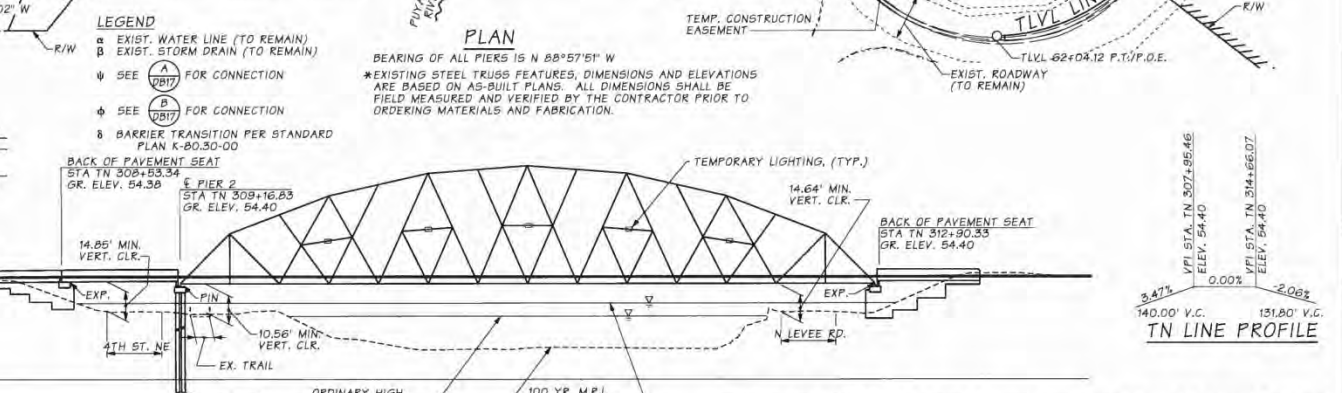
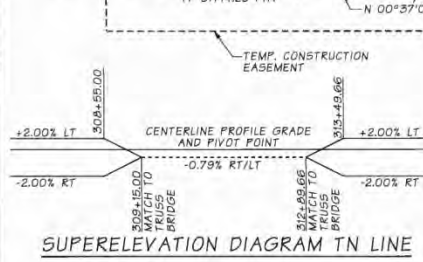
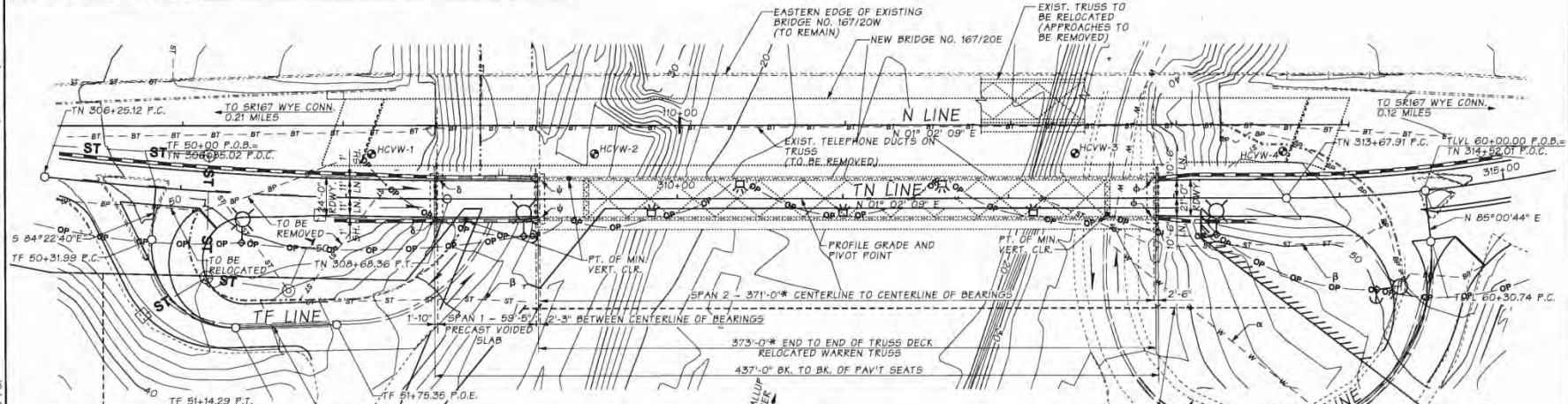




# Detour Bridge Layout

SEC. 21 & 22, T. 20 N., R. 4E., W.M. SR 167  
CITY OF PUYALLUP

P.I. STA.	CURVE DATA	RADIUS	TANGENT	LENGTH	BACK TANGENT BEARING
TN LINE 307+46.66	06°20'05" LT.	2200.00'	121.74'	243.13'	N 07°22'14" E
TN LINE 314+60.23	11°44'59" LT.	800.00'	82.32'	164.06'	N 01°02'09" E
TF LINE 50+66.63	86°14'22" LT.	49.00'	54.65'	82.31'	S 84°22'40" E
TLVL LINE 61+44.55	84°36'28" RT.	105.00'	113.80'	173.38'	N/A



NON COMPOSITE PRECAST VOIDED SLAB APPROACH  
SPAN LOADING: HL-93  
STEEL WARREN TRUSS LOADING:  
AS CURRENTLY POSTED  
(TRUCKS OVER 10,000 GVW SHALL USE RIGHT LANE)

DATUM  
N.A.V.D. 88

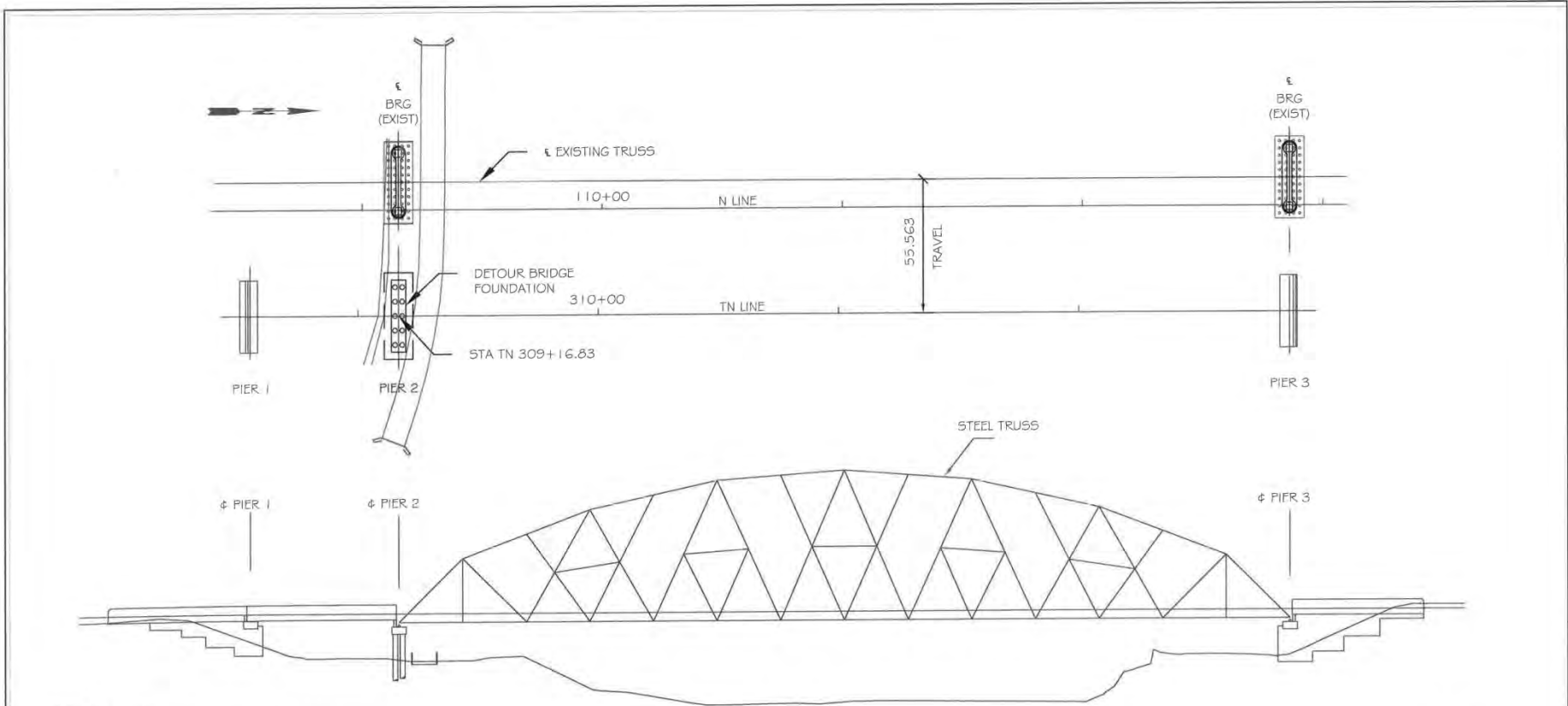
FILE NAME c:\pwworking\malduen\td0112970\CS13_PS_D801.dgn	REGION NO. 10	STATE WASH	FED.AID PROJ.NO. BR-0167(047)			SR 167 PUYALLUP RIVER BRIDGE BRIDGE REPLACEMENT	PLAN REF NO DB01
TIME 5:13:39 PM	DATE 3/18/2014	DESIGNED BY L. ANDREWS	JOB NUMBER				CONTRACT NO. C8513
PLOTTED BY duenk	ENTERED BY B. PRATHER	REVISION REV 0 - RELEASED FOR CONSTRUCTION	DATE 03/21/14	DATE 02/28/14	DATE 12/24/2013	DATE 12/24/2013	DATE 12/24/2013
DESIGNED BY L. ANDREWS	ENTERED BY B. PRATHER	REVISION REV B - FINAL REVIEW	DATE 03/21/14	DATE 02/28/14	DATE 12/24/2013	DATE 12/24/2013	DATE 12/24/2013
CHECKED BY K. DUSENBERRY	PROJ. ENGR. B. CLARKE	REVISION REV A - PRELIMINARY REVIEW	DATE 03/21/14	DATE 02/28/14	DATE 12/24/2013	DATE 12/24/2013	DATE 12/24/2013
REGIONAL ADM. K. DAYTON		REVISION	DATE	BY			

POINT OF MIN. VERT. CLR.  
 TN LINE STA. 308+71.9 (15.0' RT.)  
 TN LINE STA. 309+34.66 (15.0' LT.)  
 TN LINE STA. 312+56.55 (10.50' RT.)  
 TEMPORARY BRIDGE PILES AND PRECAST VOIDED SLAB APPROACH SPANS CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI  
 SR 167 JOB NO. C8513 SHEET D801

# The Move



# Truss Relocation Plan



**GENERAL NOTES:**

1. ALL STRUCTURAL STEEL TO BE ASTM A36 U.N.O.
2. ALL STRUCTURAL STEEL TO BE DETAILED AS PER AISC STANDARDS. MEMBER SIZES SHOWN ARE MINIMUM REQUIRED AND MAY BE SUBSTITUTED WITH APPROVAL BY THE ENGINEER.
3. ALL WELDING SHALL BE DONE WITH E70 ELECTRODES IN ACCORDANCE WITH AWS D1.1
4. ALL WOOD TO BE DF NO. 2 OR BETTER.
5. SEE CONTRACT DRAWINGS FOR DETOUR BRIDGE DESIGN AND DETAILS.
6. ITEMS LABELED AS SUPPLIED BY "NR" REFERS TO EQUIPMENT SUPPLIER NORDHOLM RENTALS.



NO.	ISSUE DATE	ISSUE RECORD - DESCRIPTION	DESIGNED BY	ENTERED BY	CHECKED BY	SCALE
0	5/19/14	RELEASE FOR CONSTRUCTION	C. DEGASPARIS	C. DEGASPARIS	I. COUTRE	10 WASH
						08513

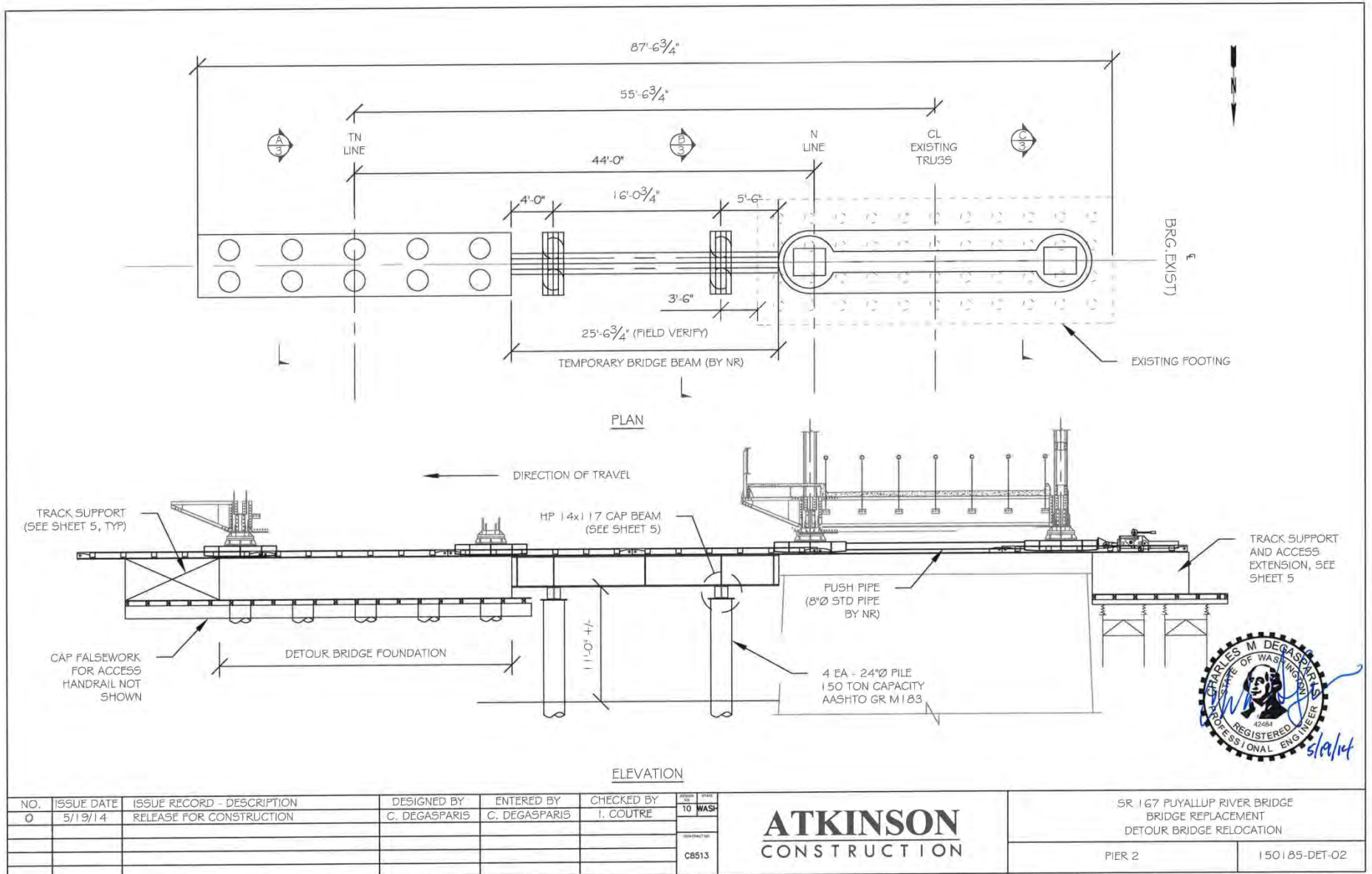
**ATKINSON  
CONSTRUCTION**

SR 167 PUYALLUP RIVER BRIDGE  
BRIDGE REPLACEMENT  
DETOUR BRIDGE RELOCATION

GENERAL ARRANGEMENT

150185-DET-01

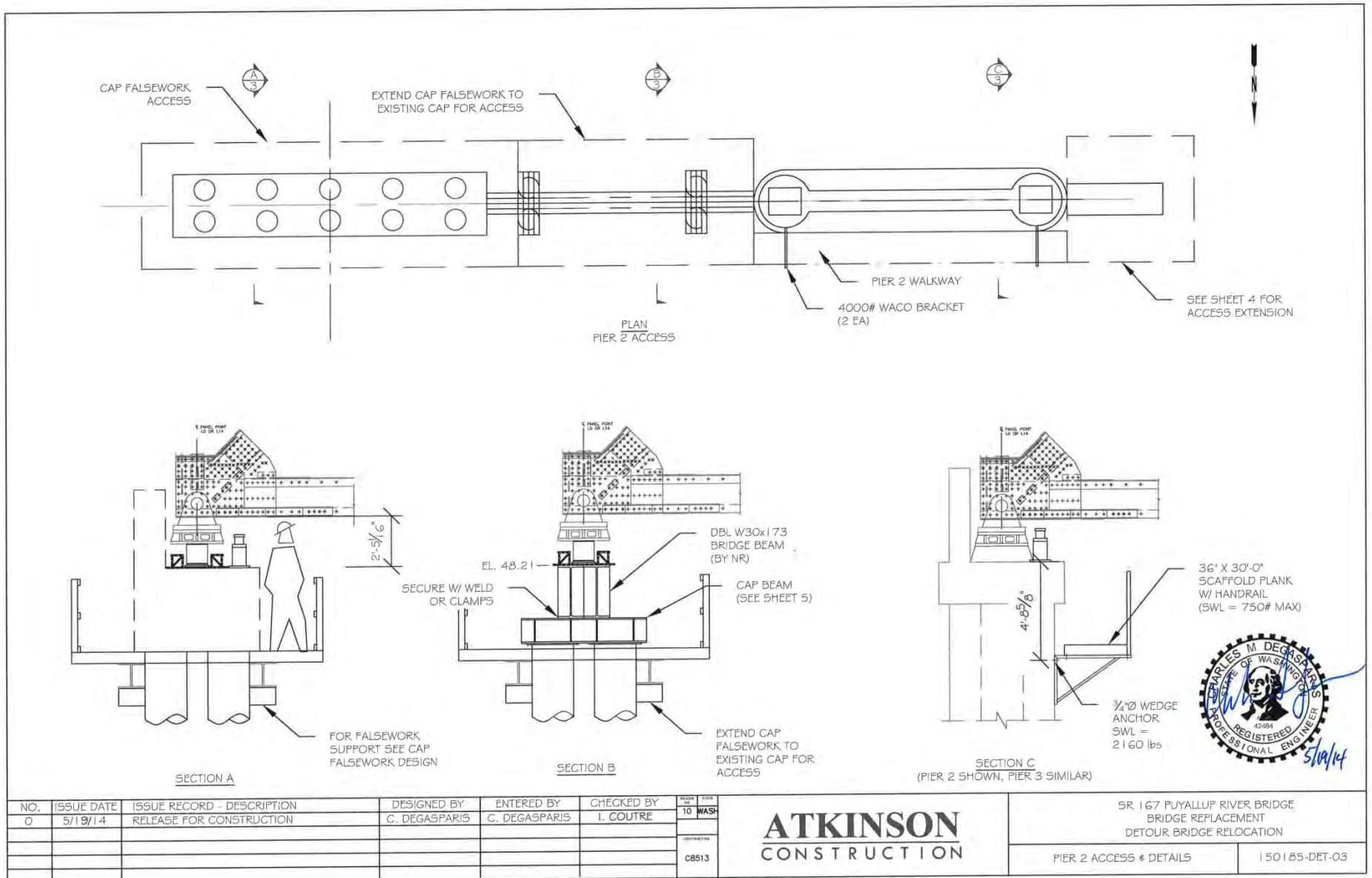
# Pier 2 Plan & Elevation



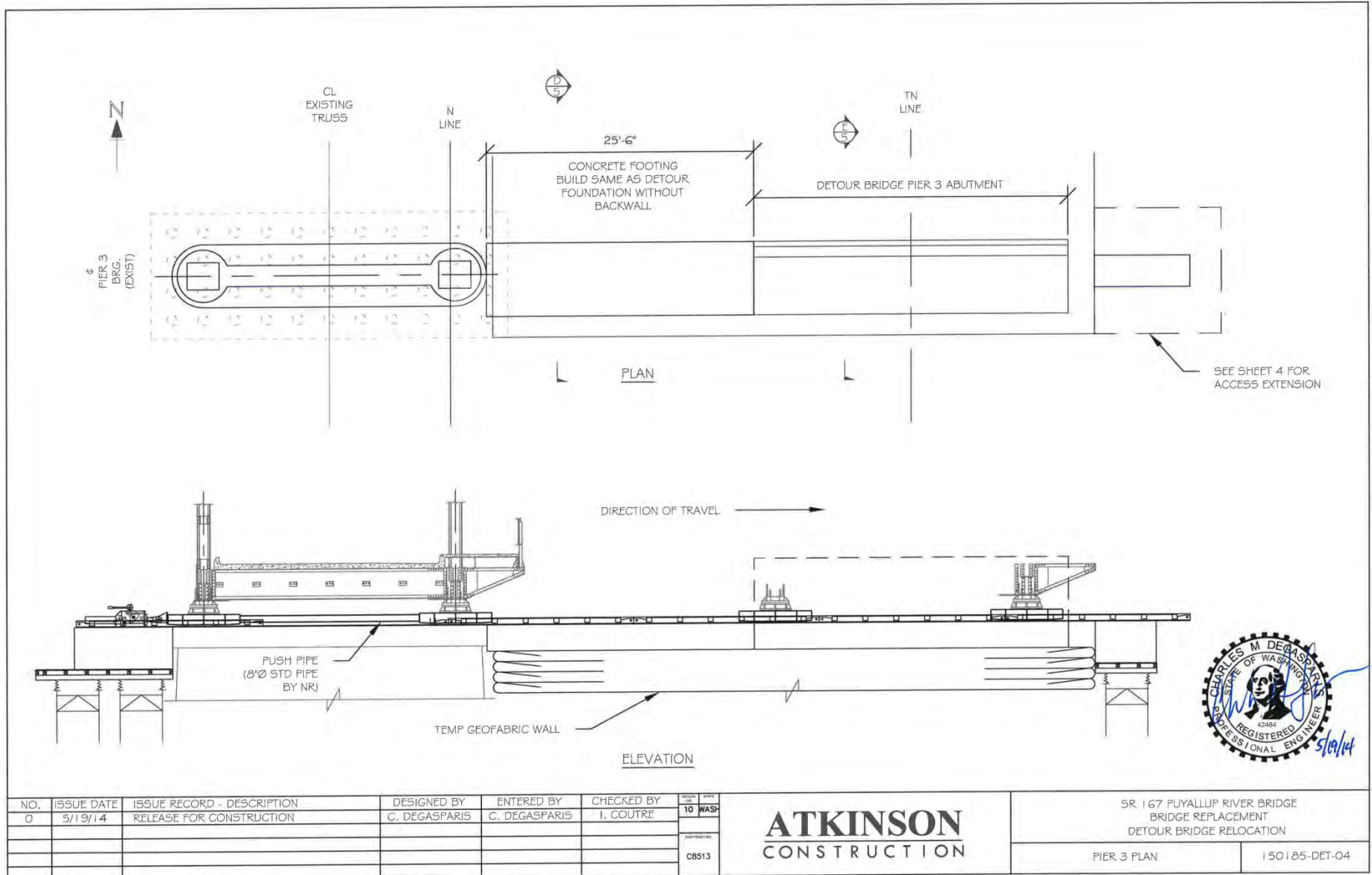
# Pier 2 Transport Beam



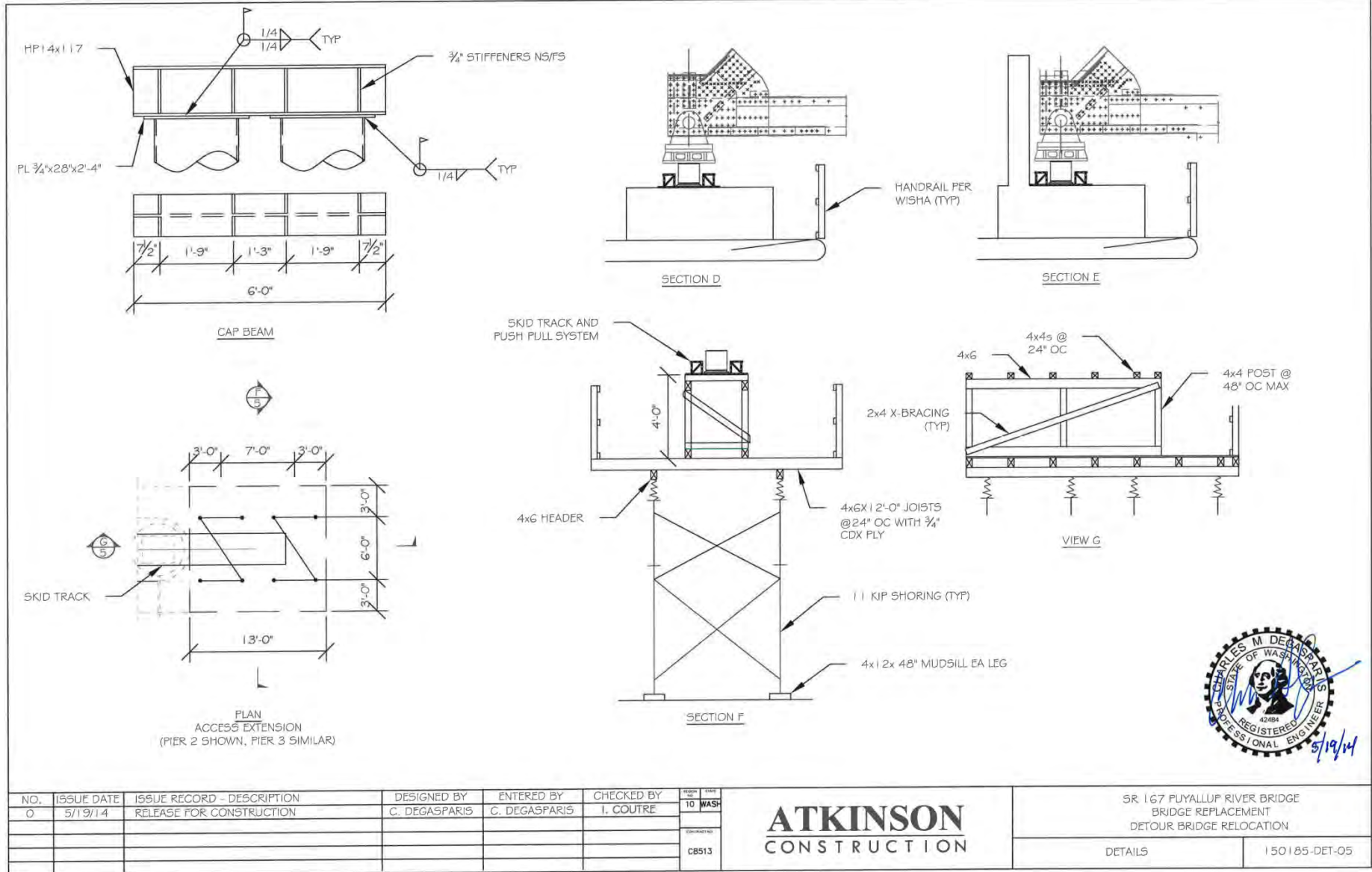
# Pier 2 Plan & Details



# Pier 3 Plan & Elevation



# Details



NO.	ISSUE DATE	ISSUE RECORD - DESCRIPTION	DESIGNED BY	ENTERED BY	CHECKED BY	DATE
0	5/19/14	RELEASE FOR CONSTRUCTION	C. DEGASPARIS	C. DEGASPARIS	I. COUTRE	10 WASH
						CB513

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SR 167 PUYALLUP RIVER BRIDGE  
BRIDGE REPLACEMENT  
DETOUR BRIDGE RELOCATION

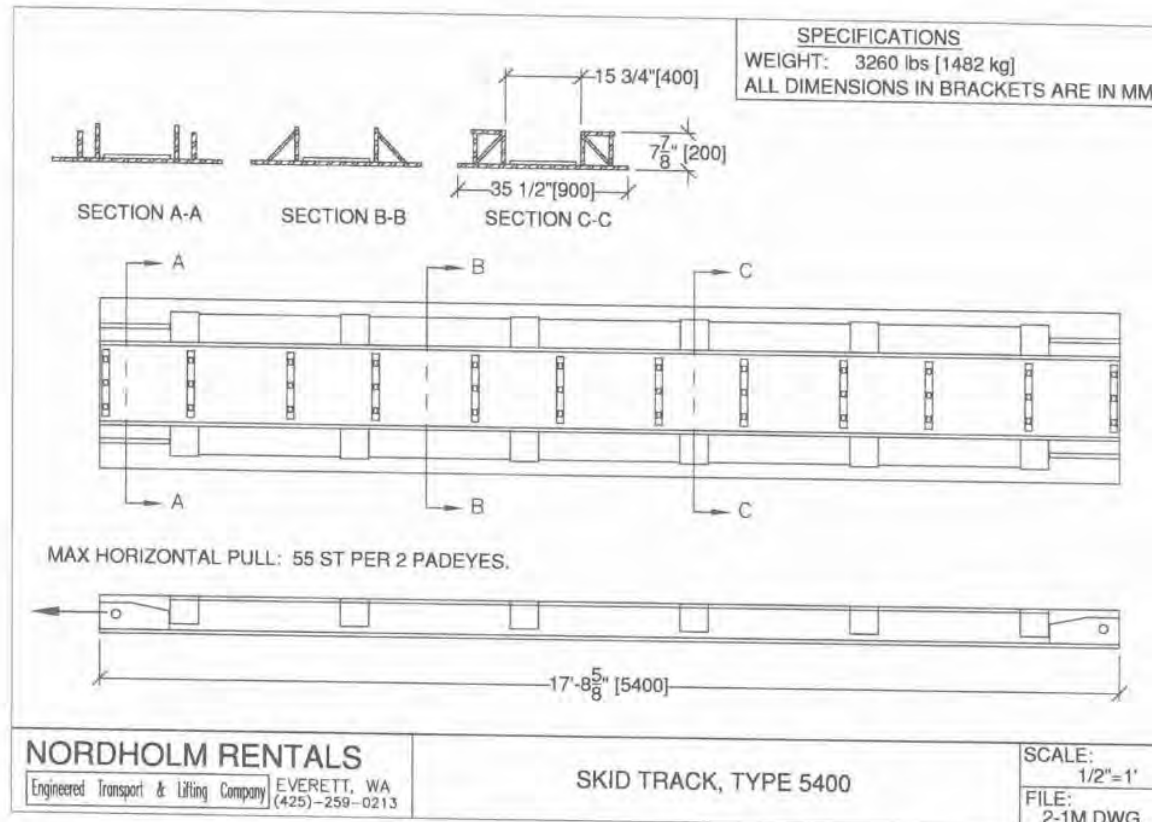
DETAILS | 150185-DET-05



# Equipment



# Skid Track Type 5400



# Skid Track



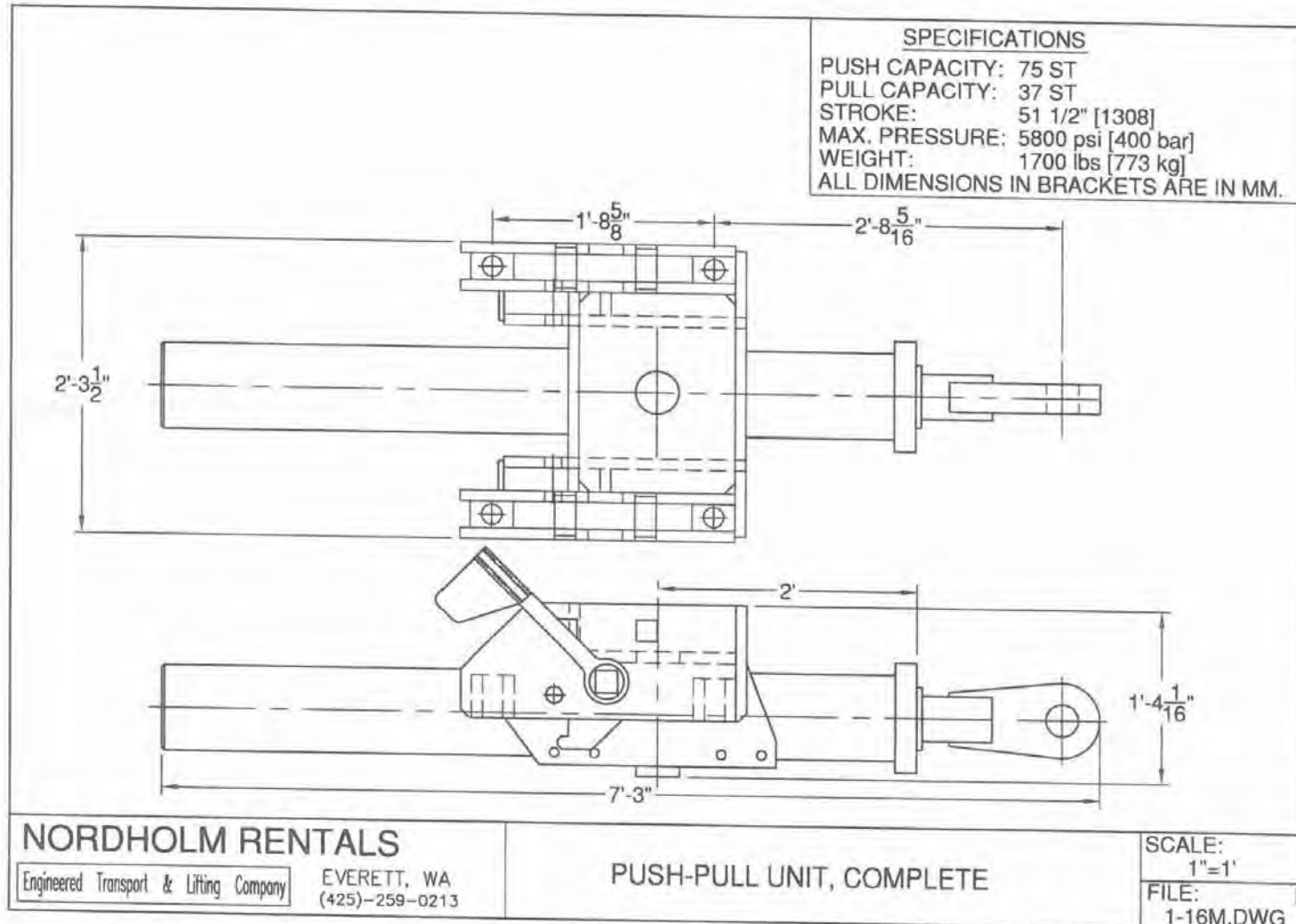
# Track Installed with Skidder Unit



# Video 1 - Placing Skid Track



# Translation Device (Push/Pull Unit)





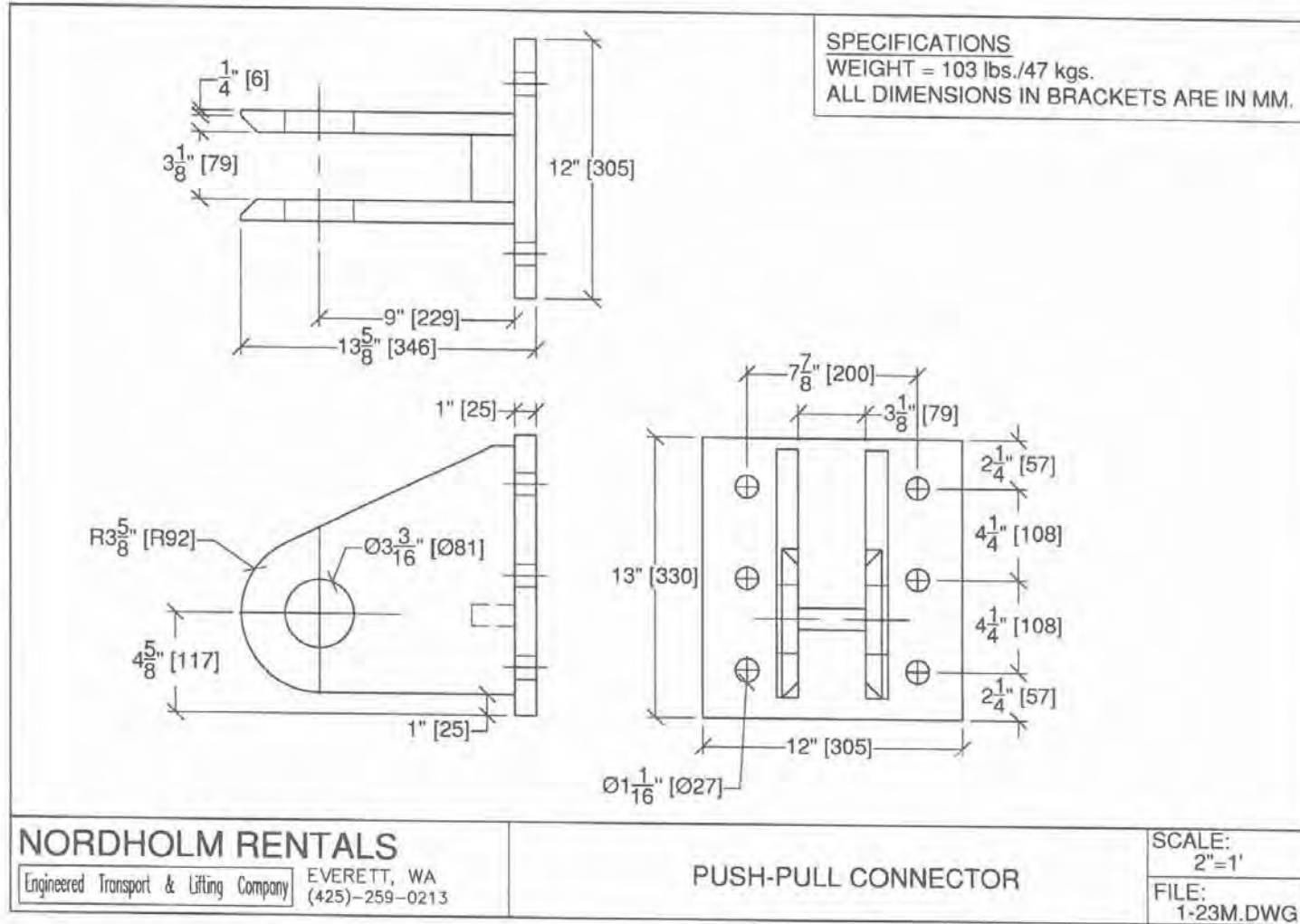
**Push Pull Unit**



# Teflon Pads



# Push Pull Connector



**NORDHOLM RENTALS**

Engineered Transport & Lifting Company  
 EVERETT, WA  
 (425)-259-0213

PUSH-PULL CONNECTOR

SCALE:  
 2"=1'  
 FILE:  
 1-23M.DWG

3

# Jacks!



Lift



# Liftoff!





Remove Exist.  
Pedestal and  
Cut Off  
Anchor  
Bolts

# Bunking up



# Pier 2 Lift Complete



# Track





# Bringing in the Skidder





Set  
Down  
on Skid

# Pier 3



# Cutting the Anchor Bolts



# Shackled lower to upper Bearings





Lift  
Complete

# Placing Track



# Skidder in Place





# Lowered onto Skid



# Bridge under way



# Video 2 – Jacking & Moving





# Video 3 – WSDOT Time-Lapse



# Move Complete



# Questions

The background image shows a large steel truss bridge under construction over a river. On the left, a concrete bridge structure is visible. In the center, a construction site with a yellow excavator and other equipment is active. On the right, the steel truss structure of the bridge is prominent. The sky is clear and blue, and there are trees and bushes in the foreground and background.

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Project Web Page:  
<http://www.wsdot.wa.gov/projects/sr167/puyallupriverbridge/>