



March 13, 2026

Letter No. 377
BY-CRE-04926

Washington State Department of Transportation
I-405/SR 167 Program
18911 N Creek Pkwy S, Suite 150
Bothell, WA 98011

Attention: Evelyn Pao, P.E.
Project Director

Project: I-405/Brickyard to SR 527 – Improvement Project
Contract No.: 009727

Subject: Notice of Protest 016 – Supplemental - Issue SKA-0308 – Bridge No. 405/70N-W Deck Thickness Change

NOTICE OF PROTEST SUPPLEMENTAL INFORMATION

Dear Ms. Pao:

Skanska USA Civil West as the Design-Builder, hereby provides supplemental information in support of Notice of Protest 016, originally submitted via Skanska Serial Letter No. 359 on February 26, 2026. This supplemental information is submitted in response to WSDOT Serial Letter No. 9727-283 dated February 27, 2026, and in accordance with the protest procedures outlined in Section 1-04.5 of the RFP: Procedure, Protest, and Dispute by the Design-Builder. Penhall (“Penhall”) has provided their supplemental information letter, which is attached hereto. Skanska incorporates this letter by reference and provides the following additional information.

a. *The date and nature of the protested order, direction, instruction, interpretation, determination:*

Date of Protested Order: February 12, 2026

Nature of Protested Order: On February 12, 2026, WSDOT issued Serial Letter No. 9727-264 determining that the conditions described in Skanska Serial Letter No. 334 do not constitute a Differing Site Condition under Section 1-04.7. WSDOT’s determination stated: “WSDOT has determined that a Differing Site Condition does not exist. No adjustment will be made to the Contract Price or Contract Time.” WSDOT based its denial on three grounds: (1) RFP Section 2.13.1 disclaims dimensional accuracy of as-built plans and requires the Design-Builder to field measure and verify existing dimensions; (2) the as-built drawings in Appendix N are designated as Reference Documents under Sections 1-01.3 and 1-02.2; and (3) Skanska certified through Form A that it had inspected the Site and familiarized itself with surface and subsurface conditions.

b. *A full discussion of the circumstances which caused the protest, including names of Persons involved, time, duration and nature of the Work involved, and a review of the Contract Documents/Design Documents referenced to support the protest:*

Background

SKANSKA

During deck removal operations on Bridge No. 405/70N-W (northbound I-405 to westbound SR 522) at the 405/522 Interchange, Skanska's demolition subcontractor Penhall Company encountered actual bridge deck thicknesses that materially exceed the dimensions indicated in the as-built drawings provided in Appendix N. The condition was discovered by Penhall through field coring on Saturday, January 24, 2026, and verbally communicated to Skanska upon discovery. Skanska verbally notified WSDOT of the condition on Monday, January 26, 2026 — the next business day. Skanska received Penhall's formal written notice on January 27, 2026. On January 28, 2026, WSDOT followed up via email regarding the verbalized discussions, which Skanska's Zach Lucarelli promptly confirmed in writing. Skanska subsequently issued formal written notice to WSDOT via Serial Letter No. 334 on January 29, 2026. The only reasonable source of deck thickness information at the time of bid was the as-built drawings listed in the RFP as NO1_AsBuilts and NO2_BridgeAsBuilts, which indicated deck thicknesses ranging from 5¾" to 7". Penhall made the only reasonable assumption available at bidding—that the bridge deck thickness was approximately 7", the highest value listed in the as-built drawings. Penhall's field verification through core samples taken from each span confirmed an average deck thickness of 9.2" along the NW bridge and 8.1" along the NE bridge, with a percentage deviation from the as-builts of up to 45%. This results in an additional 192 cubic yards of concrete requiring safe removal, processing, hauling, and disposal—an increase of approximately 5%.

A span-by-span comparison of as-built versus measured deck thicknesses, including the Deck Thickness Mapping conducted by Penhall, is included in the attached Penhall Supplemental Information Package (Enclosure 1). The as-built structural drawings from the original 1967 contract (Worthington, Skilling, Helle & Jackson) showing the deck sections relied upon at bid are also attached (Enclosure 2).

Upon discovery of the increased deck thickness, Penhall immediately directed its third-party demolition engineer, Modjeski and Masters, to evaluate the impact on the previously submitted demolition sequence and associated structural calculations. The engineer confirmed that the additional deck thickness results in increased dead load and that the prior demolition calculations were based on the thinner deck shown in the contract as-builts. A supplemental engineering analysis was conducted incorporating the revised section properties and self-weight effects. The Modjeski and Masters structural verification memorandum dated February 9, 2026, confirming the results of this evaluation, is included in the attached Penhall Supplemental Information Package (Enclosure 1). This engineering re-evaluation required 4 weeks to complete and resulted in \$38,500 in additional engineering costs (\$22,000 for third-party verification and \$16,500 for engineering re-evaluation).

Persons involved include Zachary Lucarelli (Skanska), Jose Cipres and Andrew Park (Penhall Company), and Evelyn Pao (WSDOT Project Director). The condition is ongoing and Penhall continues to document impacts as deck removal operations progress.

Differing Site Condition – Section 1-04.7 Analysis

Skanska submits that the encountered deck thickness constitutes a Differing Site Condition under Section 1-04.7, prong (b): "physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of Work provided for in the Contract and the Work Site characteristics."

Bridge deck thicknesses exceeding the as-built dimensions by 25% to 45% are physical conditions of an unusual nature that no reasonable contractor would anticipate or generally recognize as inherent in bridge demolition work. The as-built drawings in Appendix N represent the only available indication of existing bridge deck thickness in the Contract Documents, and a contractor preparing a bid for bridge demolition would reasonably rely on these dimensions to estimate the volume of material to be removed, the equipment and methods required, and the duration of operations. The actual deck thicknesses encountered — varying up to 11" against an expected 7" — differ materially from those indications and from what a reasonable contractor would anticipate. Furthermore, the actual internal thickness of a bridge deck is a latent physical condition not discoverable through reasonable investigation and analysis, as verification would have required destructive testing on an active interstate structure — an activity not reasonably feasible during procurement or prior to commencement of demolition operations.

Response to WSDOT's Grounds for Denial

Section 2.13.1 – Field Measure and Verify: WSDOT's determination relies on the provision in RFP Section 2.13.1 requiring the Design-Builder to "field measure and verify existing dimensions as required for their Work." This obligation is reasonably directed at dimensions required for design and fit-up of new construction interfacing with existing elements—not at verifying the internal composition of structures being entirely removed. Bridge deck thickness of a structure slated for full demolition is not a dimension that a Design-Builder would ordinarily field-verify. Furthermore, accurately characterizing deck thickness across Bridge No. 405/70N-W would not be achieved through a single core — the thickness variability across the structure required multiple cores at various locations to properly map actual conditions. Obtaining that number of cores on a structure carrying active interstate traffic is not feasible, as it would require lane closures, traffic control, and Owner coordination — resources and access unavailable to any proposer during procurement and prior to contract award. The phrase "as required for their Work" cannot reasonably be read to impose an investigative burden of this magnitude on a pre-award Design-Builder.

Form A Site Examination Certification: The Form A certification addresses general site familiarity and conditions discernible from the surface. The actual internal thickness of a bridge deck is not a condition discernible from the surface; it is a latent physical condition that was not revealed until demolition operations commenced and field coring was performed. Accurate verification would have required multiple coring and lane closures on an active interstate structure—activities not reasonably feasible during the procurement phase.

Pre-Bid Investigation Standard: No proposer could have reasonably been expected to core active bridge decks on I-405 during the procurement phase to verify as-built deck thicknesses for a demolition scope. The practical constraints of coring on a live interstate—traffic control, structural safety, permitting, and cost—render pre-bid verification of this dimension unreasonable and beyond the scope of a "reasonable investigation" contemplated by Section 1-04.7.

Reliance on Contract-Provided Information: Because accurate verification of existing bridge deck thickness could only be achieved through destructive testing — an investigative method that was neither practical nor reasonably contemplable during the procurement phase — Skanska had no choice but to rely on the information provided by WSDOT in the Contract Documents, including the as-built drawings in Appendix N, when preparing its proposal. Where a Design-Builder is effectively precluded from independently verifying a physical condition through any reasonable means, and must therefore rely on Owner-furnished information to bid the work, any material variance between that information and actual field conditions constitutes grounds for entitlement. The unanticipated deck thickness variations encountered on Bridge No. 405/70N-W are precisely the type of condition the differing site condition provision of Section 1-04.7 is intended to address.

Subcontractor's Position

Penhall Company, in its response to WSDOT SL No. 9727-264 dated February 23, 2026 (attached), independently confirms that the condition qualifies as a Differing Site Condition under Section 1-04.7, citing: material deviation from as-built dimensions; the latent nature of deck thickness as a physical condition; the impracticality of pre-bid verification through coring on an active interstate; and that neither Section 2.13.1 nor the Reference Document disclaimer eliminates Section 1-04.7 protections.

c. ***The estimated dollar cost, if any, of the protested Work and a detailed breakdown showing how that estimate was determined:***

Skanska estimates the total cost impact associated with the increased deck thickness on Bridge No. 405/70N-W at **\$378,613**. This figure represents a Rough Order of Magnitude (ROM) estimate based on information available at this time and includes additional labor, equipment, and haul-away costs incurred by Penhall Company because of the unanticipated thickness variations. A detailed cost breakdown is included as an attachment to this Supplemental Written Statement. These costs are subject to revision as additional field data is gathered during active construction operations.

d. ***An analysis of the progress schedule showing the schedule change or disruption if the Design-Builder is asserting a schedule change or disruption:***

These unanticipated thickness variations materially extended the duration of demolition operations, including saw cut and pick operations over waterways, increased haul-away cycles due to greater material volume, and additional engineering time required for Penhall to reassess and revise their demolition plan. Collectively, these impacts result in a 34-calendar-day delay to completion of Bridge No. 405/70N-W demolition sequence, with direct cascade to successive pier construction activities for the new NB 405/SR-522 DAR bridge and risk to downstream project milestones, Milestone E and Substantial Completion.

While this is delaying the milestones, Skanska is not submitting a formal Time Impact Analysis (TIA) as part of this Supplemental Written Statement because PCO 010B represents the controlling critical path of the project.

Should PCO 010B be mitigated, resolved, or otherwise removed from the critical path, Skanska's position is that this 34-calendar-day delay will emerge as a critical path delay directly impacting project completion. Skanska will submit a formal TIA in support of time-related compensation at such time as the schedule conditions warrant.

Extension Request and Reservation of Right to Supplement

Skanska notes that it requested a 14 Calendar Day extension to the supplemental statement deadline in its Notice of Protest dated February 26, 2026, which WSDOT declined. At the time of this submission, Penhall Company's resources remain actively dedicated to the ongoing demolition of bridge spans over SR 522—the same operations in which the differing site condition continues to be encountered. Requiring the Design-Builder to compile a complete cost and schedule impact assessment while simultaneously executing safety-critical demolition operations on a compressed timeline has constrained the completeness of the information presented herein.

The full extent of cost and schedule impacts has not been fully quantified as the condition is ongoing and the affected Work is still being performed. Skanska reserves the right to supplement this submission with updated cost, schedule, and impact information as it becomes available. Skanska expressly reserves all rights under Sections 1-04.5, 1-04.7, and 1-09.11, including the right to provide corrected or supplemental information pursuant to Section 1-04.5.

This letter is without prejudice to, and with full reservation of, Skanska's rights, remedies, causes of action, and defenses under the Contract, at law, in equity, or otherwise. Nothing in this letter shall be construed as a waiver or release of any such rights, remedies, causes of action, or defenses, all of which are expressly reserved.

I appreciate your prompt attention to this matter. Please do not hesitate to contact me directly if you have any questions.

Regards,



Patrick Prendergast, Vice President

Skanska USA Civil
18911 N Creek Parkway S
Suite 300

SKANSKA

Bothell, WA 98011

Attachments:

1. Attachment A - Penhall Company Supplemental Information Package (March 12, 2026), including: Supplemental Letter, Deck Thickness Mapping, Cost Breakdown, As-Built Structural Drawings, Modjeski and Masters Structural Verification Memo (Feb. 9, 2026), and Supporting Email Correspondence
2. Attachment B - Penhall Company Response to WSDOT SL No. 9727-264 (February 23, 2026)
3. Attachment C - Penhall Company Change in Condition – Deck Thickness Notice (January 27, 2026)
4. Attachment D – Skanska Detailed Cost Breakdown ROM



(800) 661-1340
info@penhall.com
www.penhall.com
1212 Corporate Dr. Suite 500
Irving, TX 75038

March, 12, 2026

Skanska USA Civil
18911 North Creek Parkway, Suite 300
Bothell, WA 98011

ATTN: **Zachary Lucarelli**
Reference: **Contract No. 9727**
I-405, Brickyard to SR 527 Improvement Project
Subject: RE: WSDOT SL No. 9727-264
1-04.7 Potential Differing Site Condition Bridge No. 405/70N-W
(Northbound I-405 to Westbound SR 522) Supplemental Information Package

Mr. Lucarelli:

Pursuant to our letter sent on February 23, 2026 and in accordance with contract requirements and the WSDOT submittal requirement of supplemental information pertaining to Penhall's disagreement with WSDOT SL No. 9727-264, the materially increased bridge deck thickness does qualify as a Differing Site Condition under Section 1-04.7 for the following reasons:

The only reasonable source of deck thickness at the time of bid was the as-built drawings listed in the RFP as NO1_AsBuilts and NO2_BridgeAsBuilts which list the deck thickness as ranging from 5 ¾" to 7" in thickness. The only accurate method of verification would have required destructive core drilling on an active freeway interchange, this is not reasonably feasible during the procurement phase, nor would this process typically be considered a "field measurement", which is the verification requirement in 2.13.1.

Penhall made the only reasonable assumption available at the time of bidding that the bridge deck thickness was approximately 7", the highest value listed in the as-built drawings. Once the differing site condition was discovered, an immediate decision was made to validate the engineering work already completed and verify that proceeding with demolition according to plan was still safe for personnel, equipment, and surrounding structures. This was the only prudent decision Penhall could make, to do anything else would have been putting the work crews, public, and the I405/522 infrastructure at risk. A delayed schedule and engineering cost was incurred due to this differing site condition requiring a reassessment.

During this time Penhall took core samples from each span of the NE and NW bridges, demonstrating an average deck thickness of 9.2" along the northwest bridge, and 8.1 inches along the NE bridge with a percentage deviation from the as-builts of up to 45%. This results in an extra 192 cubic yards of concrete which must be safely removed, processed, hauled off, and disposed of, an increase of approximately 5%. The Deck Thickness Mapping conducted by Penhall will be included with this letter.

Schedule Impact: 4.5 Weeks

- 4 Weeks Engineering re-evaluation
- 0.5 Weeks additional demolition time

Cost Impact: Additional Engineering fees

- Third Party Verification: \$22,000
- Engineering Re-Evaluation: \$16,500

Cost Impact: 5% increase in removal cost of 405/70NW Bridge and 405/70NE Bridge

- \$235,000

Cost Impact: \$25,000 in overhead costs

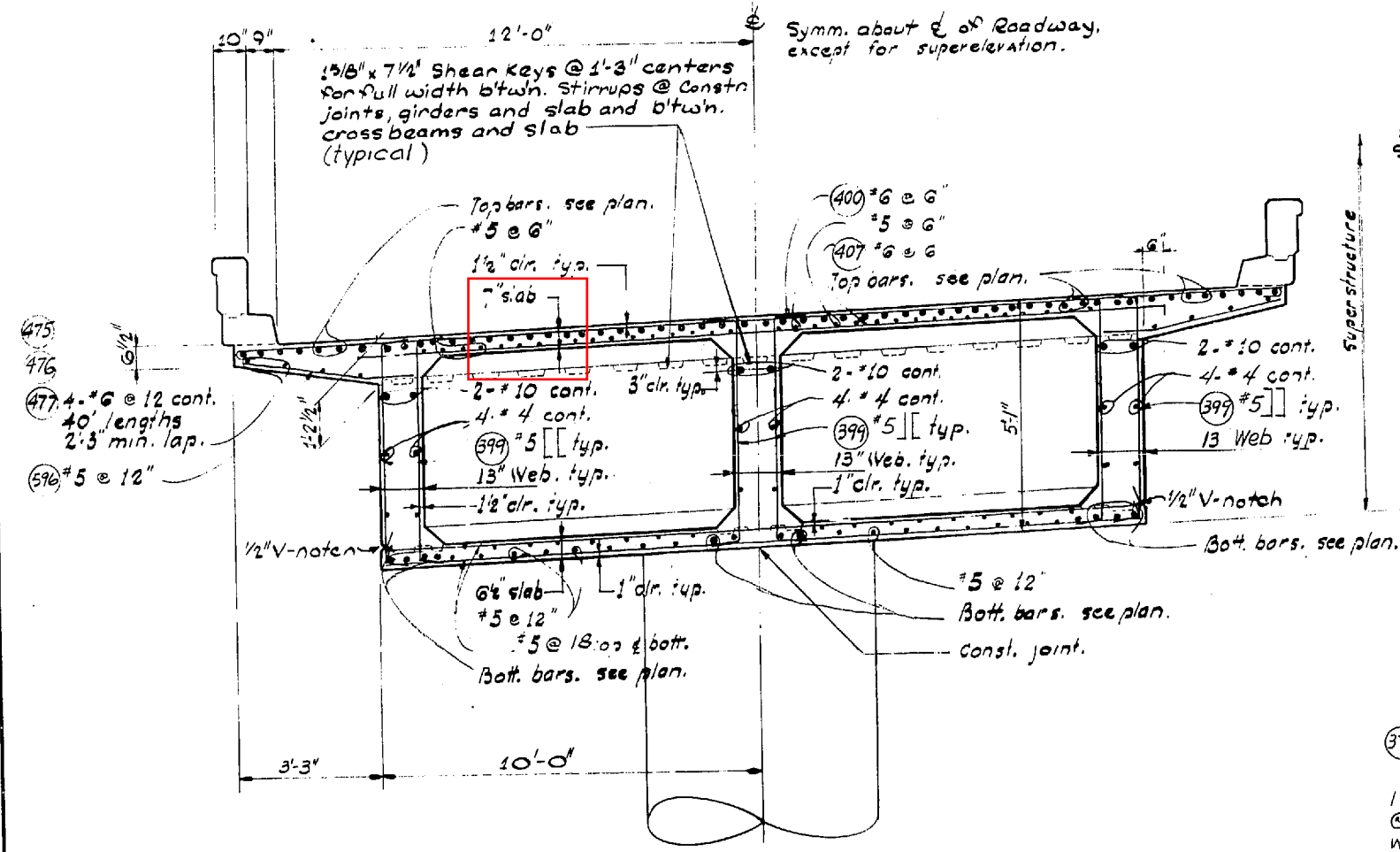
Nothing herein shall be construed as waiver of any rights, remedies, or entitlements available to Penhall under the Subcontract, Prime Contract, or applicable law, all of which are expressly reserved.

Respectfully,

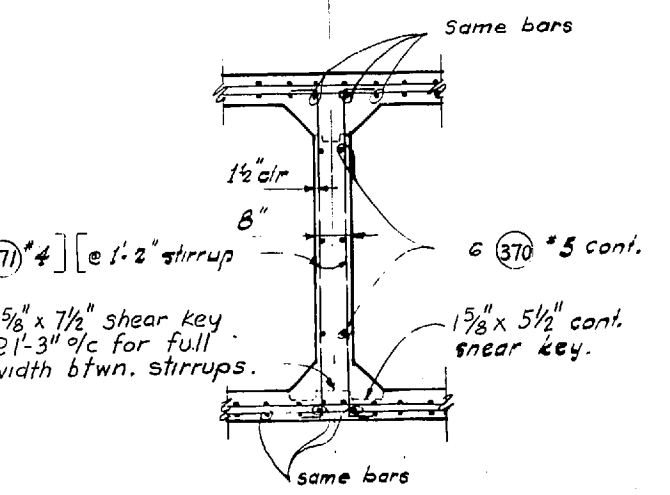
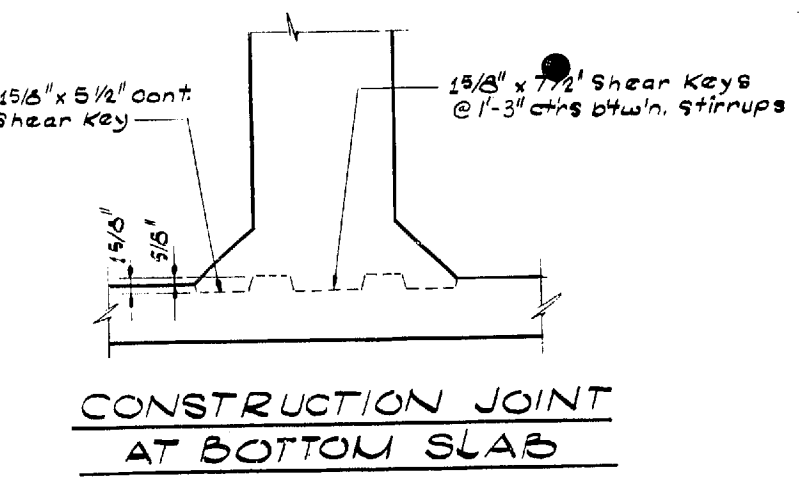
Andrew Park

Digitally signed by Andrew Park
DN: C=US, E=apark@penhall.com,
O="Penhall ", OU=Major Projects,
CN="Andrew Park "
Reason: I am approving this document
Date: 2026.03.13 09:57:15-07'00'

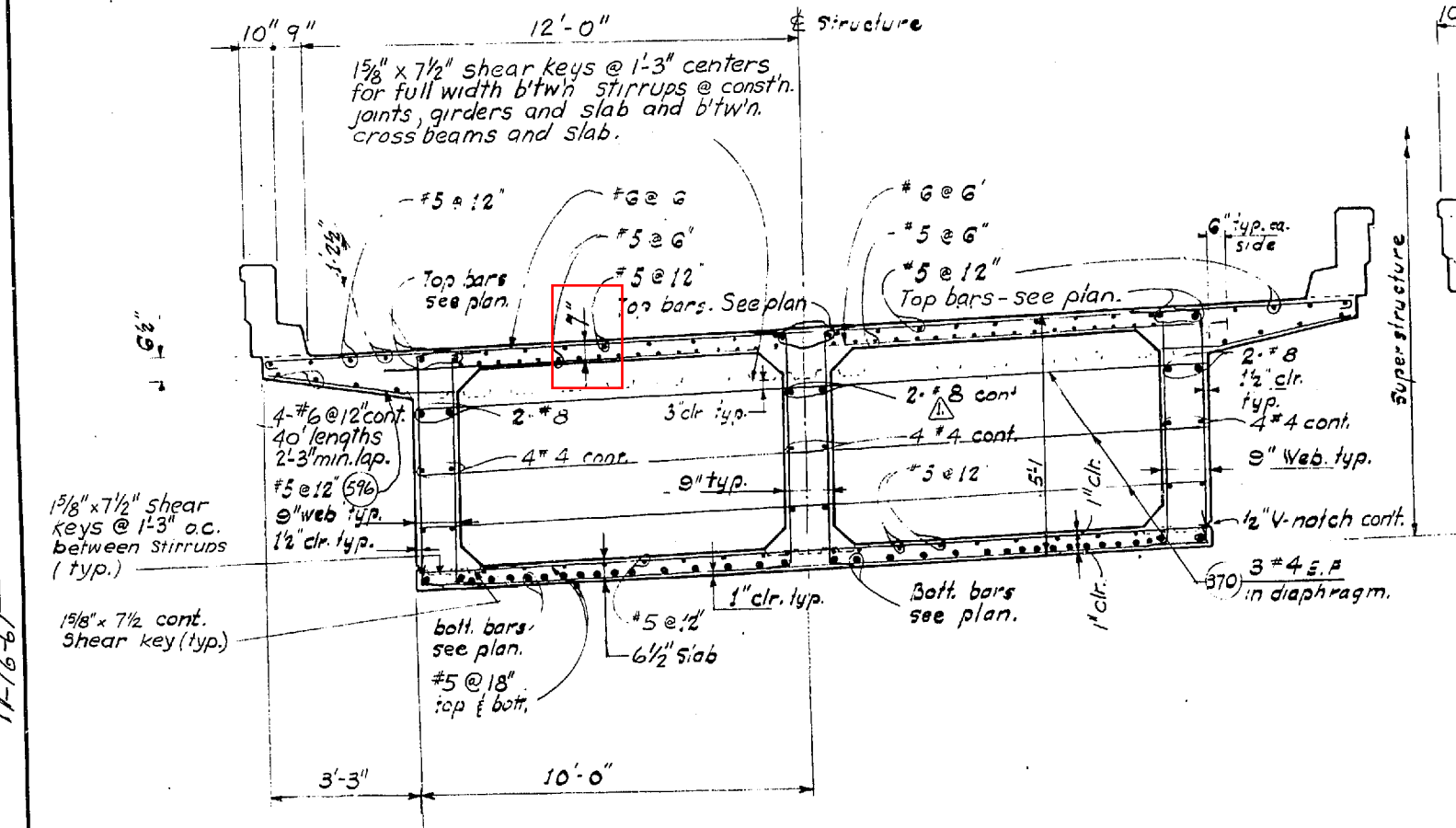
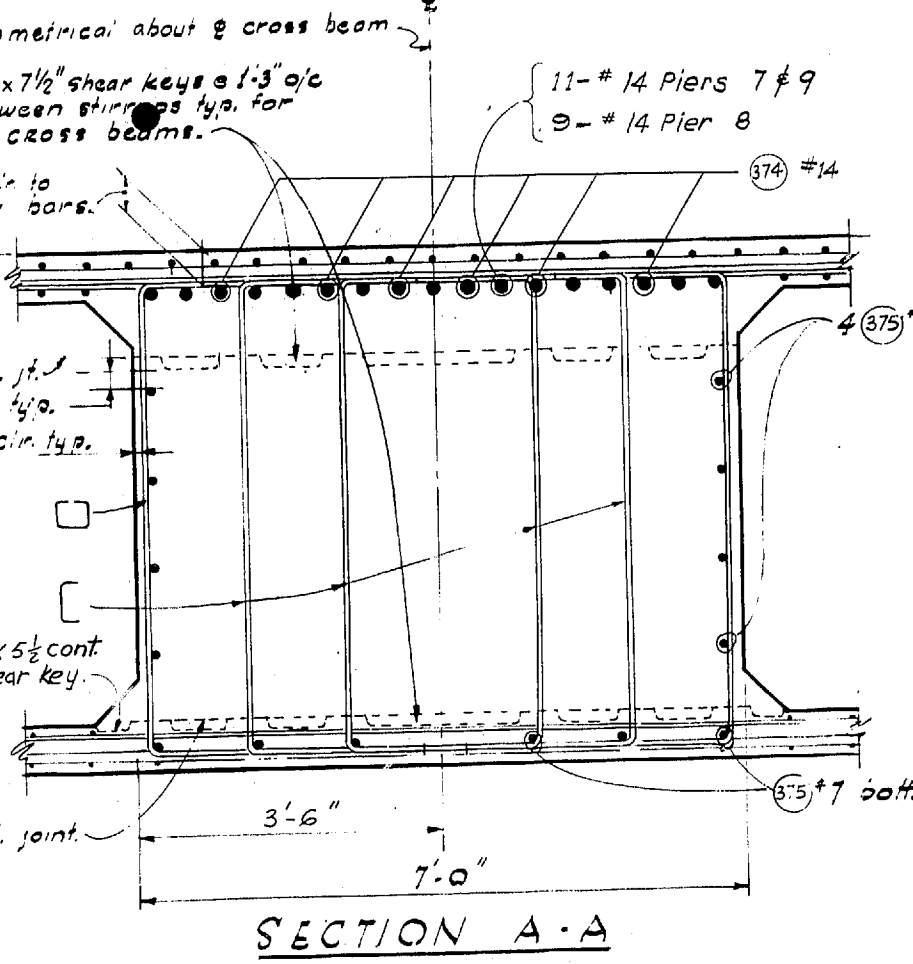
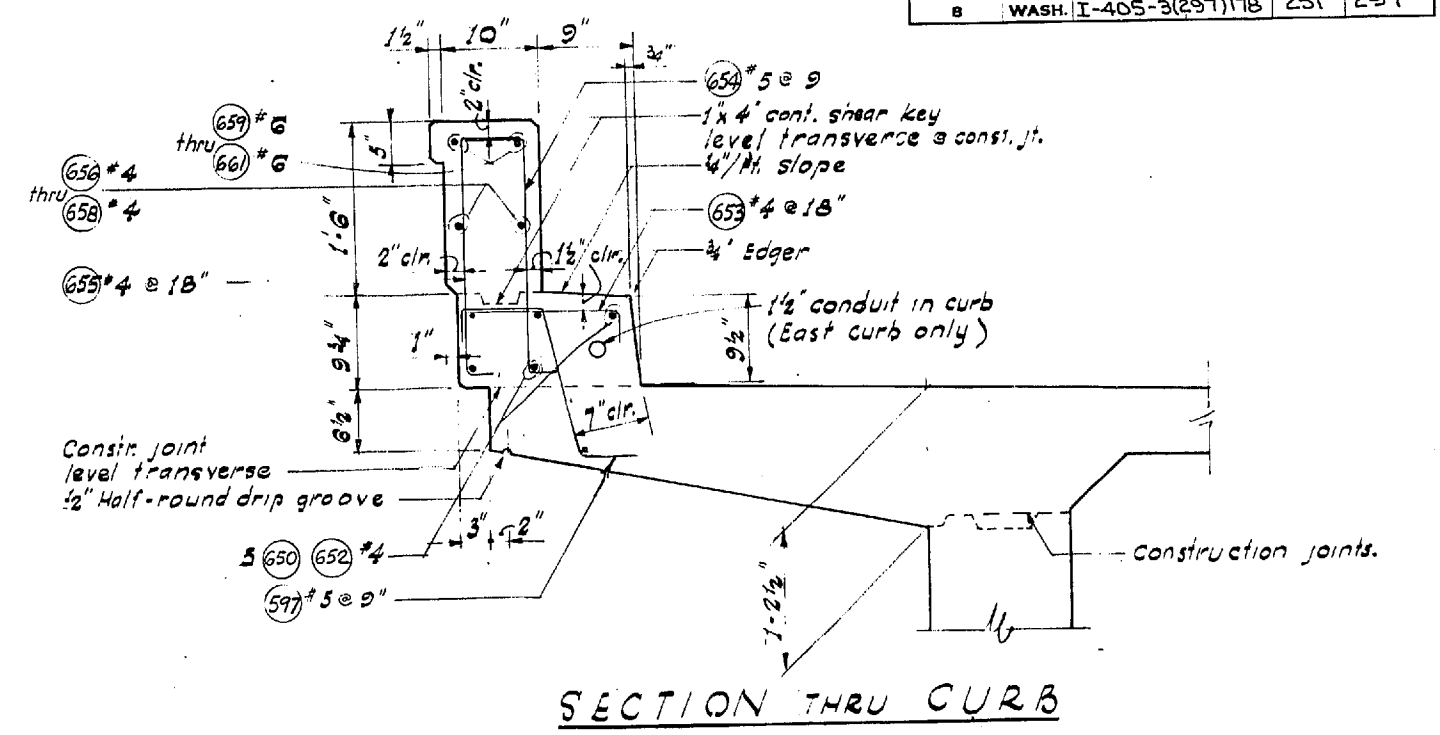
Andrew Park
Penhall Company
Project Manager



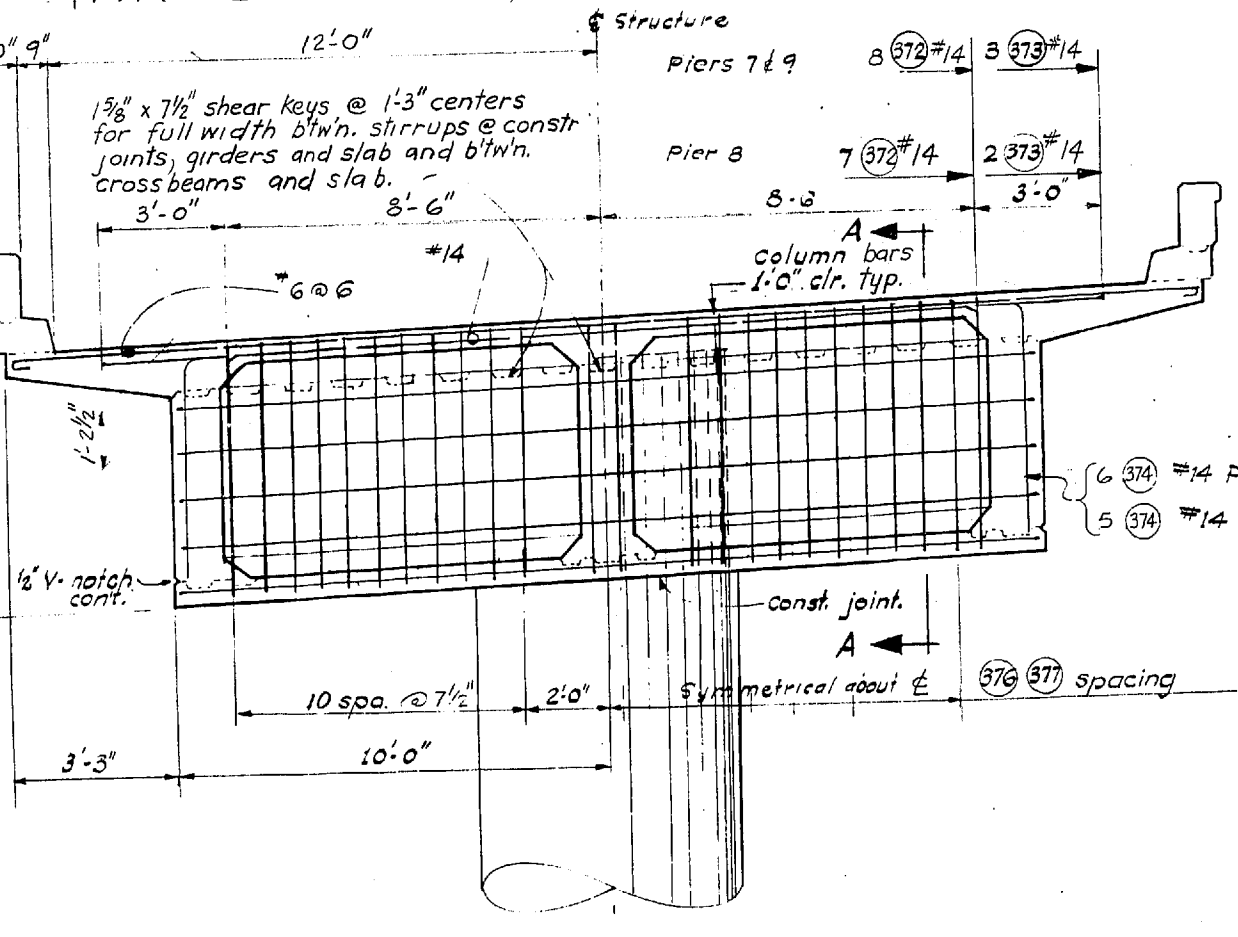
SECTION @ N-W PIERS 7 thru 9



SECTION THRU DIAPHRAGM (TYPICAL ALL UNITS)



SECTION NEAR ϵ OF SPAN



CROSS BEAM @ PIERS 7 thru 9

DATE	REVISION	BY
2-7-68	Revised Bar Size	NWS
WORTHINGTON, SKILLING HELLE & JACKSON Consulting Civil and Structural Engineers SEATTLE WASHINGTON		

SR 405
MP 23.49 TO MP 23.76
WOODINVILLE INTERCHANGE
KING COUNTY
N-W & N-E STRUCTURE

TRANSVERSE SECTIONS

WASHINGTON STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
OLYMPIA, WASHINGTON

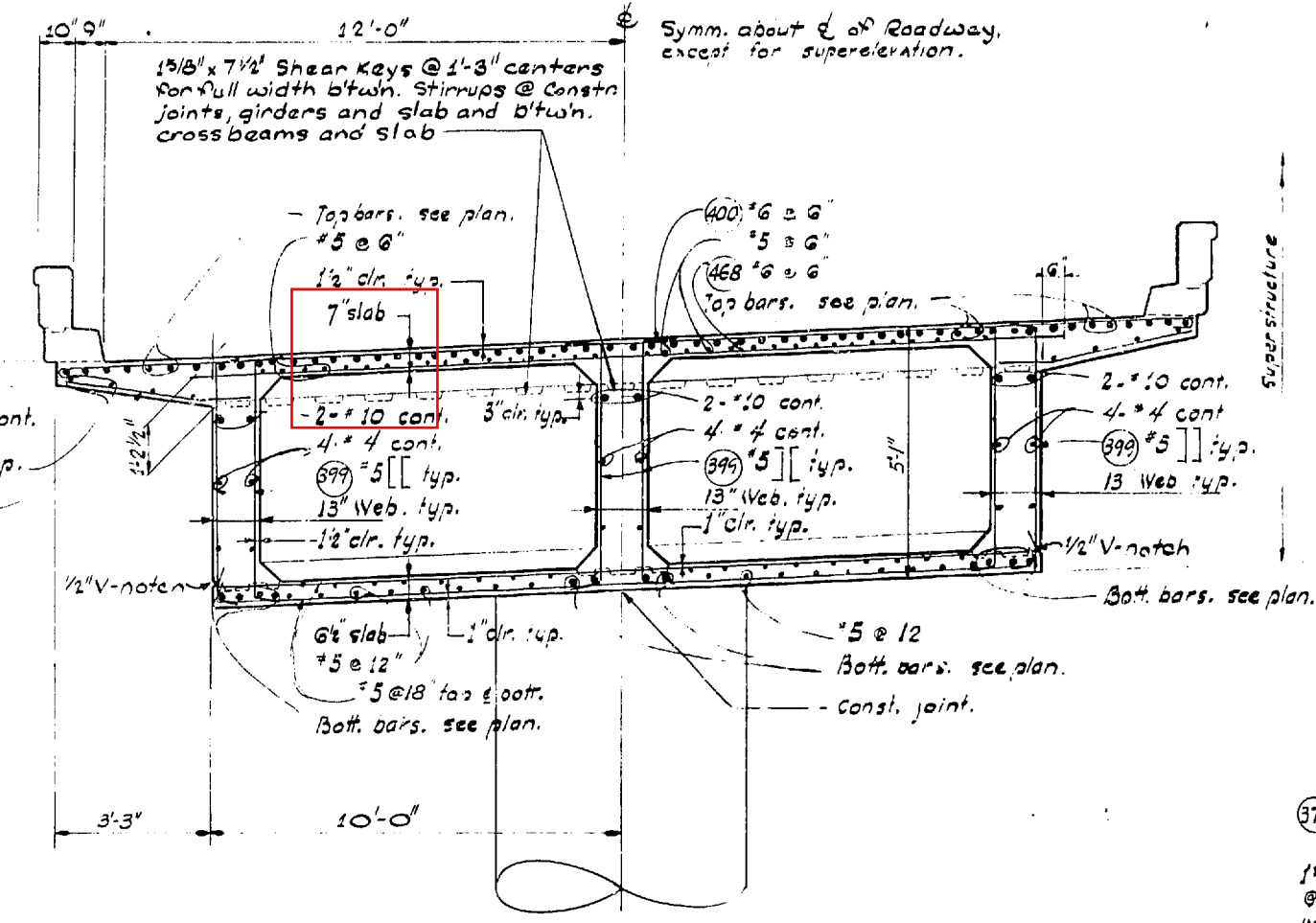
GEORGE D. ZAMM, CHAIRMAN
E. I. MIYASON, H. WALSH
BARRY FERBISON, JOHN H. RUFF

APPROVED December 7, 1967
SHEET 251 of 297 SHEETS
CONTRACT NO. 8982

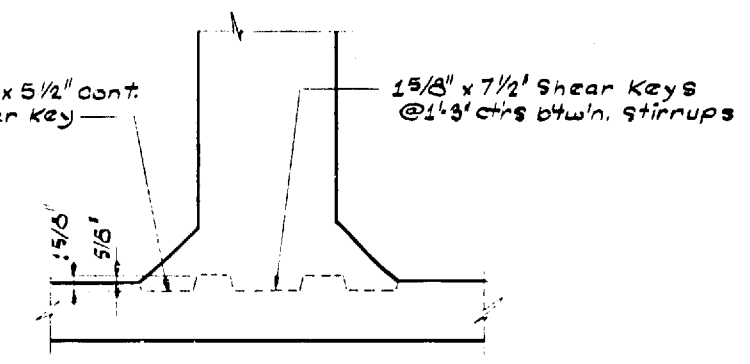
BRIDGE ENGINEER

DRAWN BY: []
 CHECKED BY: []
 QUANTITIES CHECKED: []
 REVISION NO. 7-10
 N-W TRANSVERSE SECTIONS
 SHEET 24 OF 25

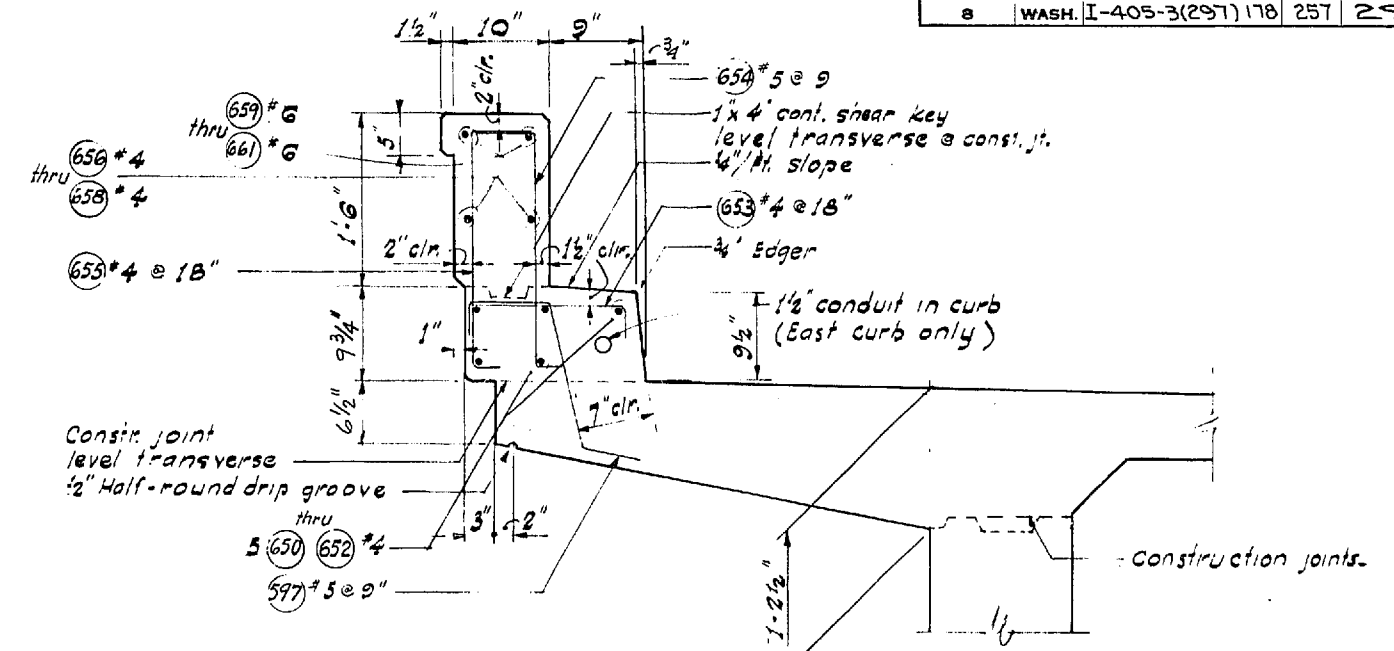
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	WASH.	I-405-3(297) 178	257	297



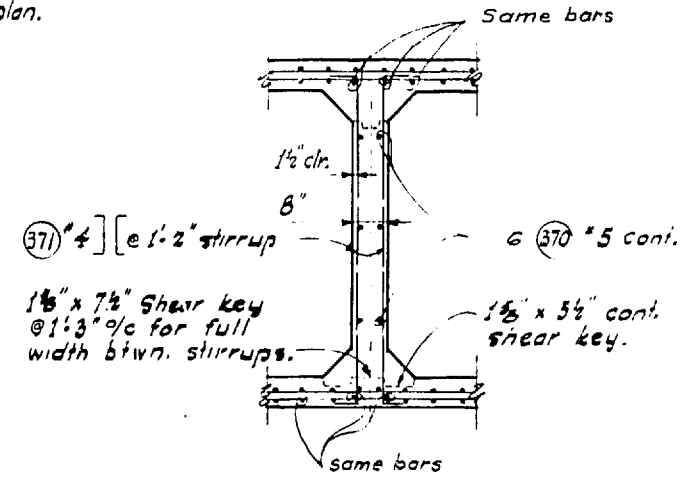
SECTION @ N-W PIERS 10 thru 12



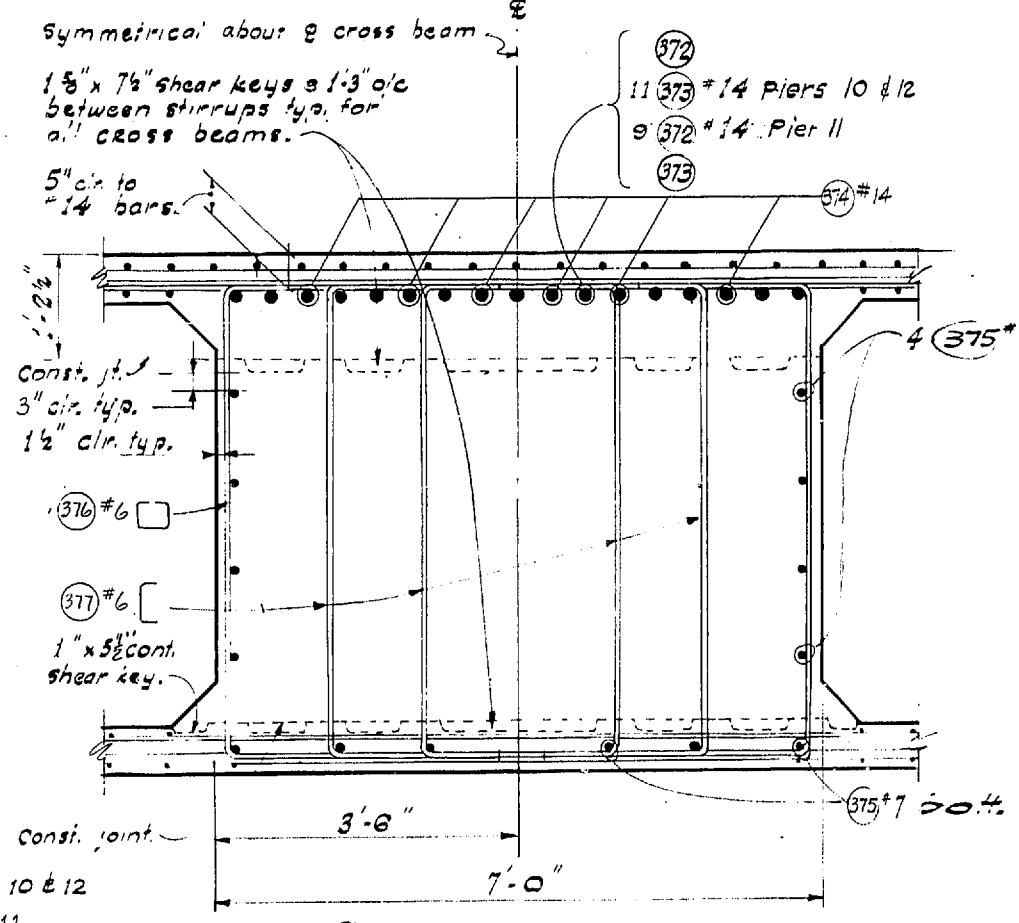
CONSTRUCTION JOINT AT BOTTOM SLAB



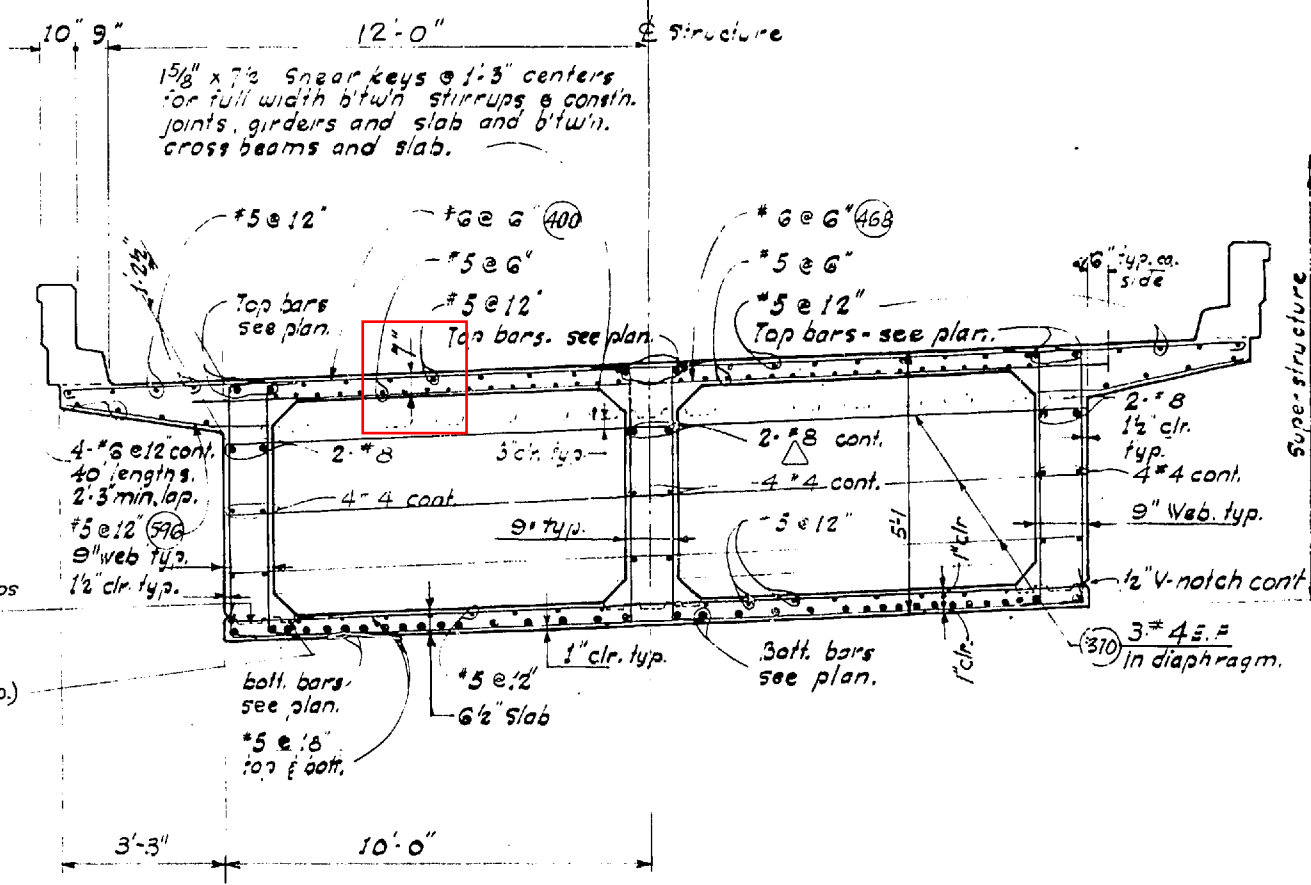
SECTION THRU CURB



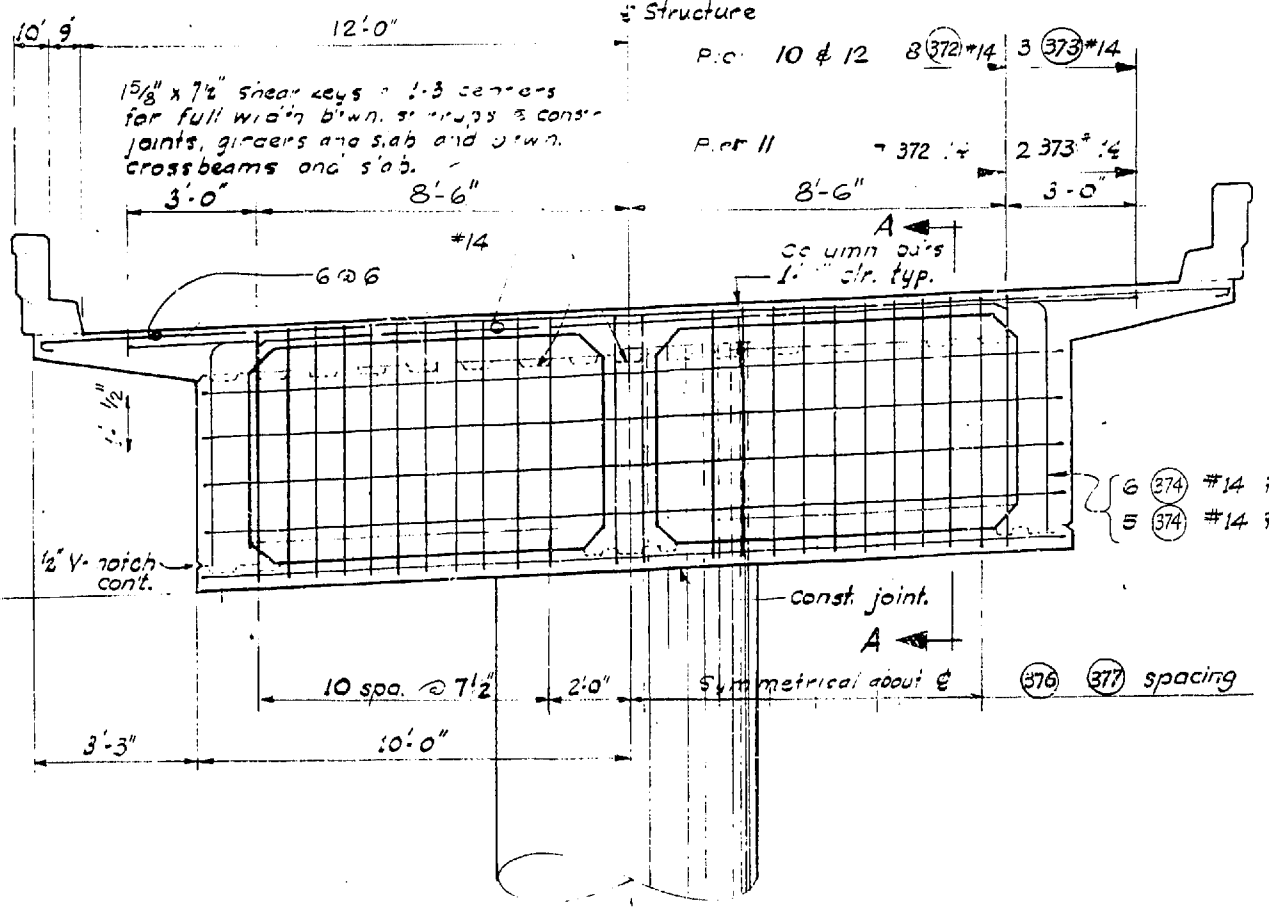
SECTION THRU DIAPHRAGM (TYPICAL ALL UNITS)



SECTION A-A



SECTION NEAR 2/3 OF SPAN



CROSS BEAM @ PIERS 10 thru 12

DESIGNED BY	DATE
CHECKED BY	
QUANTITIES FORWARDED	
QUANTITIES CHECKED	

81

TRANSVERSE CROSS SECTIONS

DATE	
BY	
CHECKED	
LOCKED	
DATE FORG.	

WOODVILLE INTERCHANGE
 PSH NO. 1-RE/PSH NO. 2-BO
 N-W STRUCTURE
 TRANSVERSE SECTIONS
 SHEET 249 OF 257
 11-16-67

2-7-68 Revised bar size

DATE	REVISION	BY

WORTHINGTON, SKILLING
 HELLE & JACKSON
 Consulting Civil and Structural Engineers
 SEATTLE WASHINGTON

SR 405
 MP 23.49 TO MP 23.76
 WOODVILLE INTERCHANGE
 KING COUNTY
 N-W & N-E STRUCTURE
 TRANSVERSE SECTIONS

WASHINGTON STATE HIGHWAY COMMISSION
 DEPARTMENT OF HIGHWAYS
 OLYMPIA, WASHINGTON

GEORGE D. ZAMM, CHAIRMAN

APPROVED December 7, 1967
 SHEET 257 OF 297 SHEETS
 CONTRACT NO. 8382

9/1996

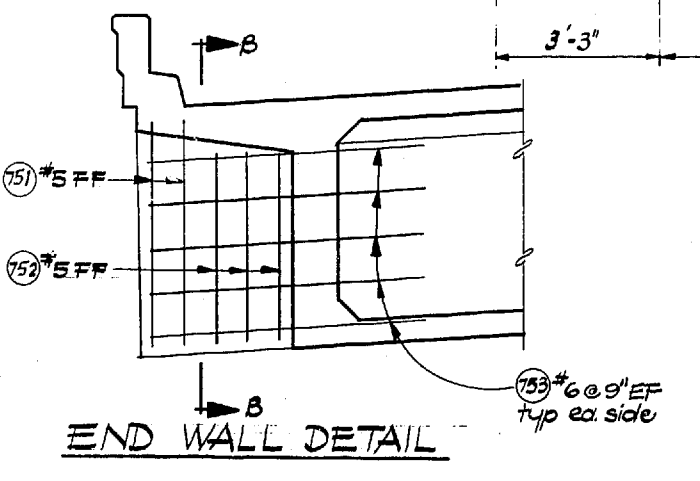
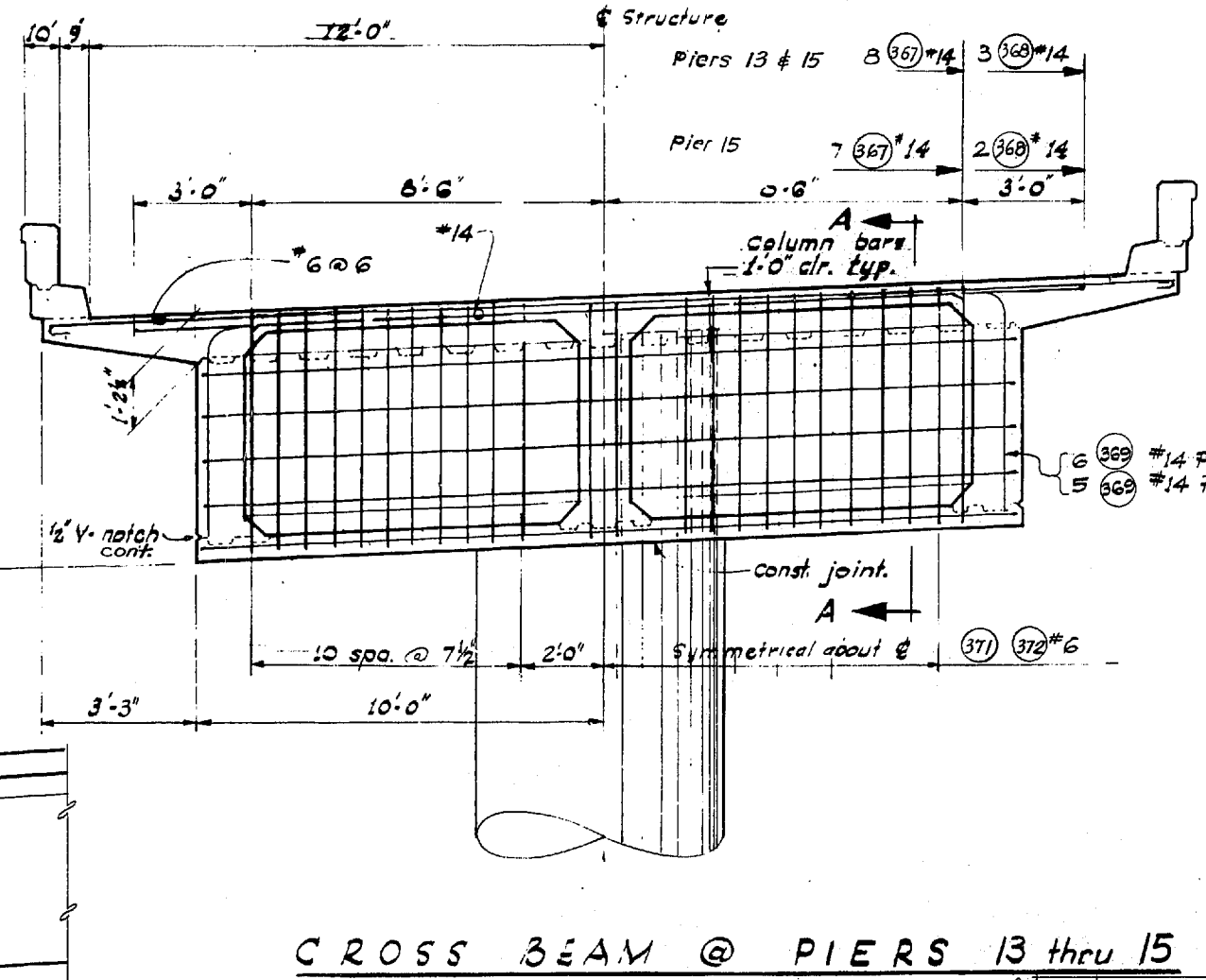
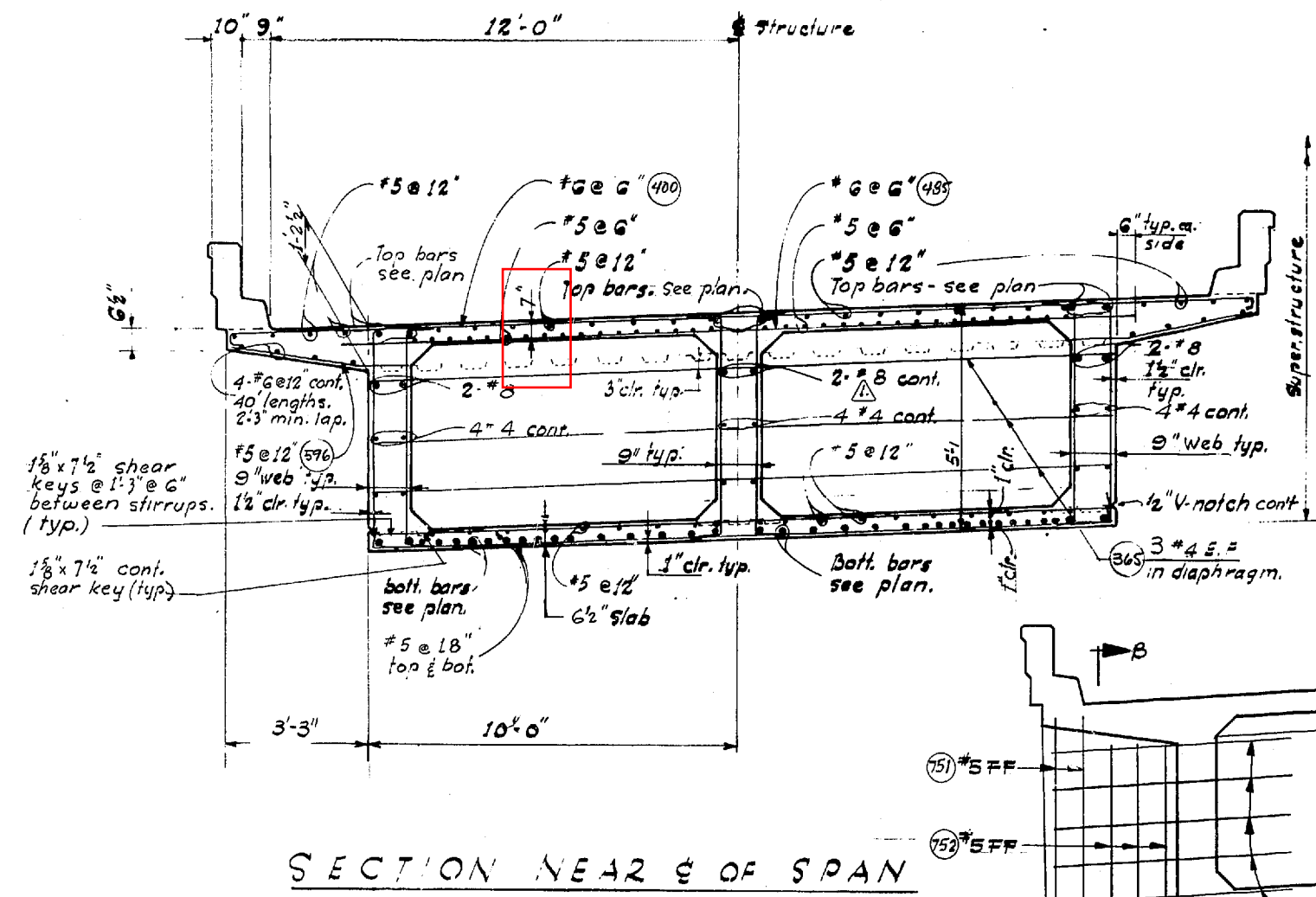
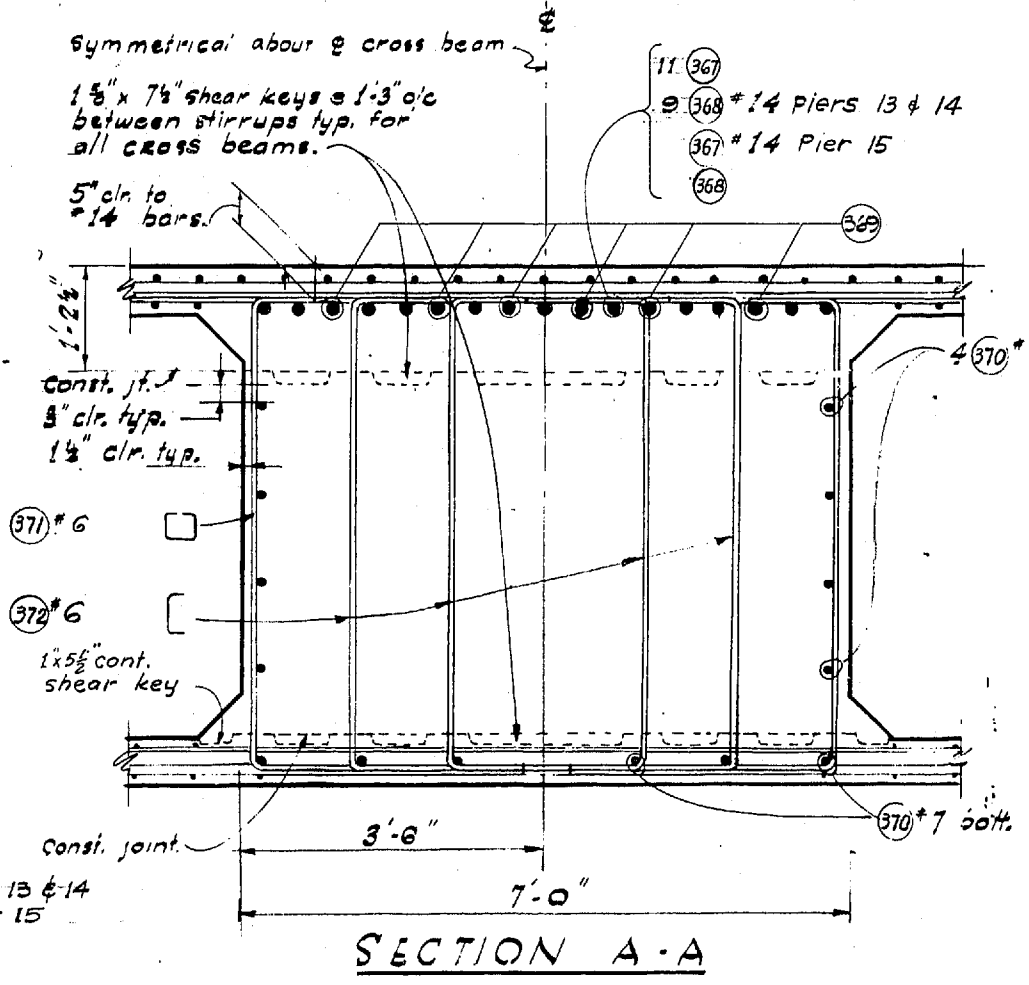
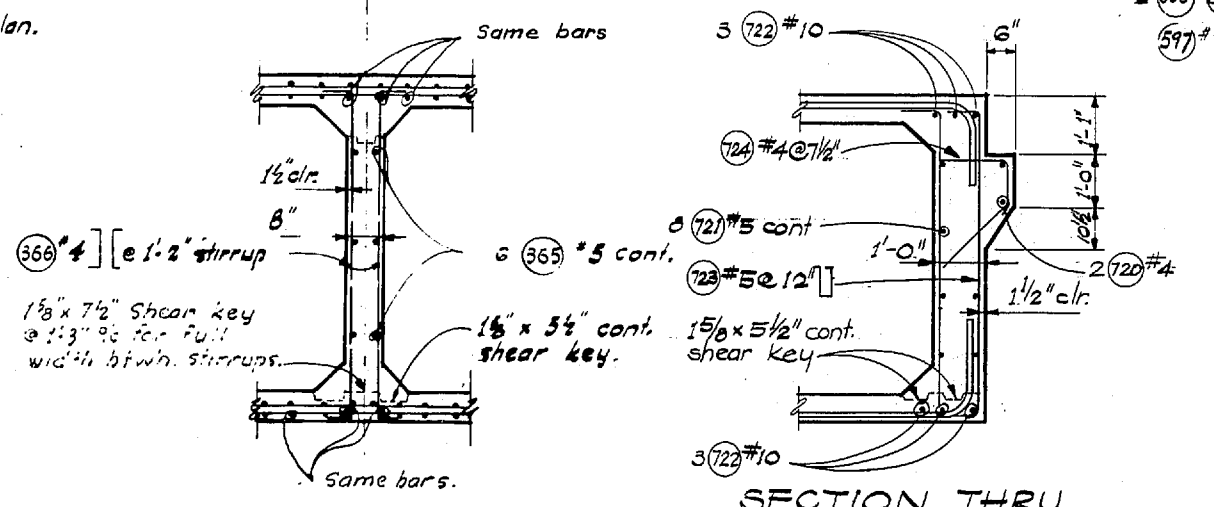
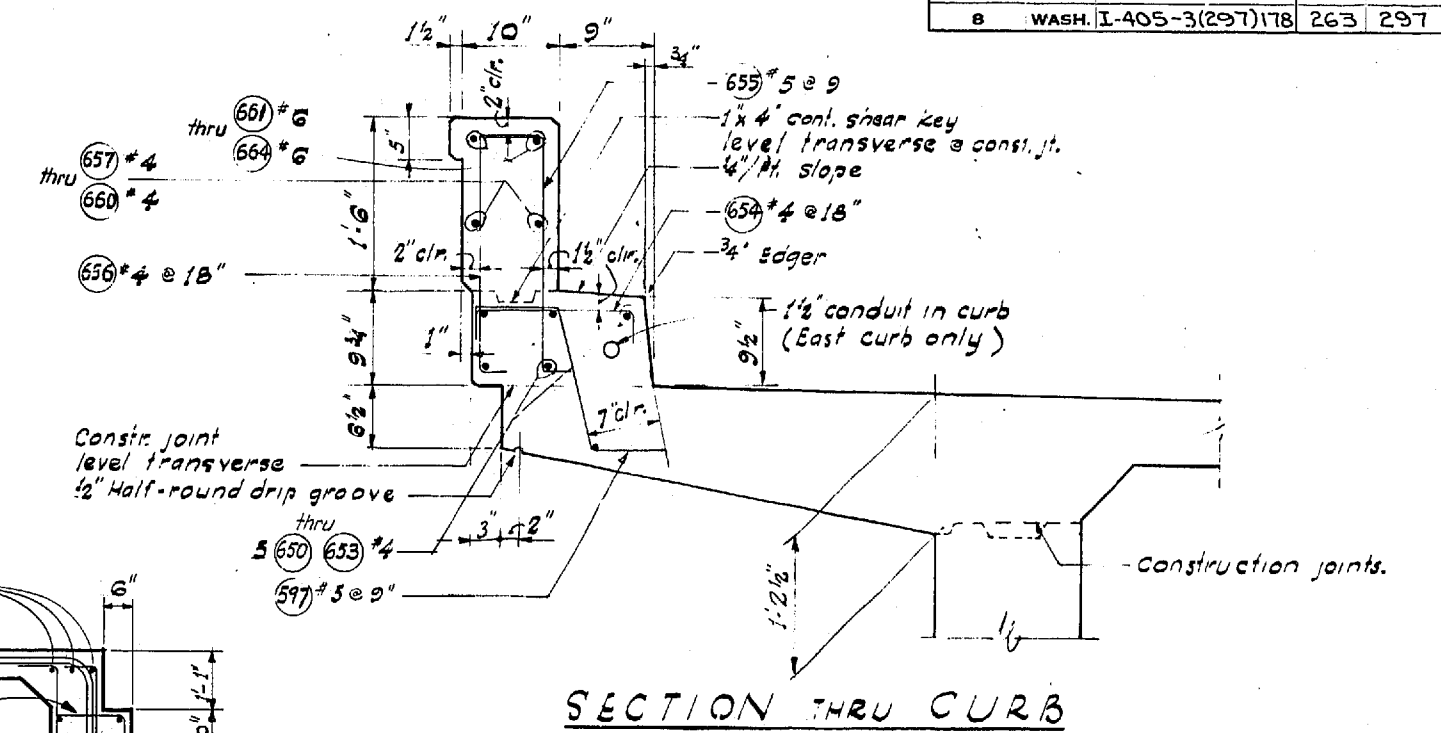
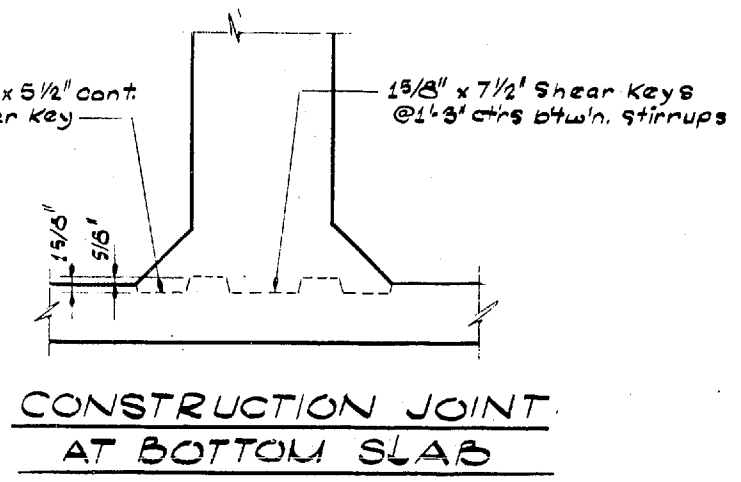
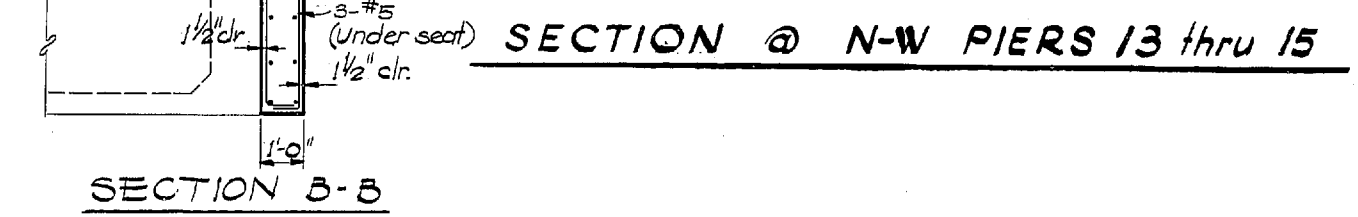
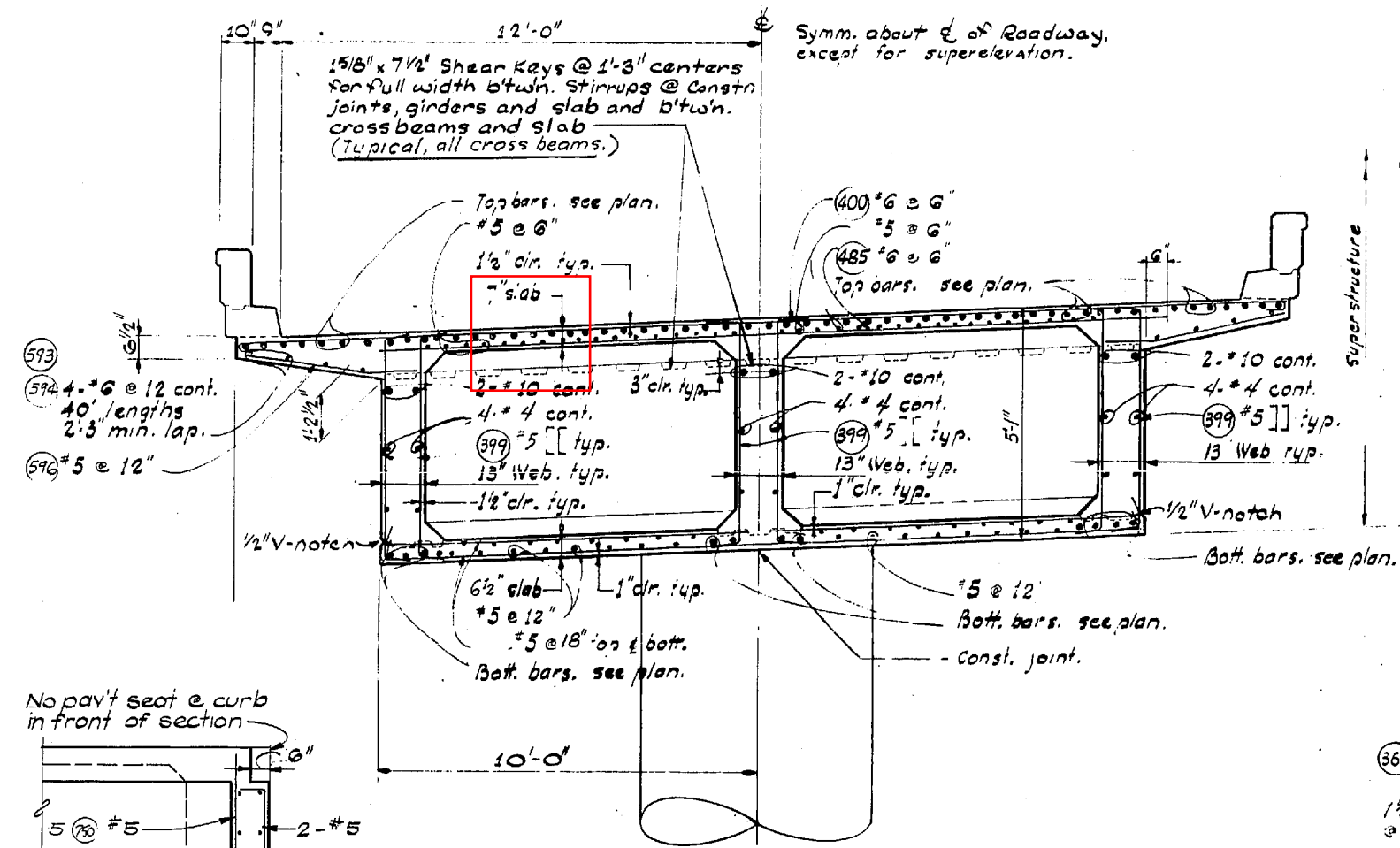
DESIGNED BY	
CHECKED BY	
QUANTITIES CHECKED	
DATE	

37

TRANSVERSE CROSS SECTIONS

DATE	
BY	
CHECKED	
LOC. INCH.	
DATE	

WOODVILLE INTERCHANGE
PSH NO. 1-R/PSH NO. 2-B0
STRUCTURE
SECTION OF
SHEET 263 OF 297
11-16-67



DATE	2-1-68	Revised Bar Size	BY	WJL
REVISION				

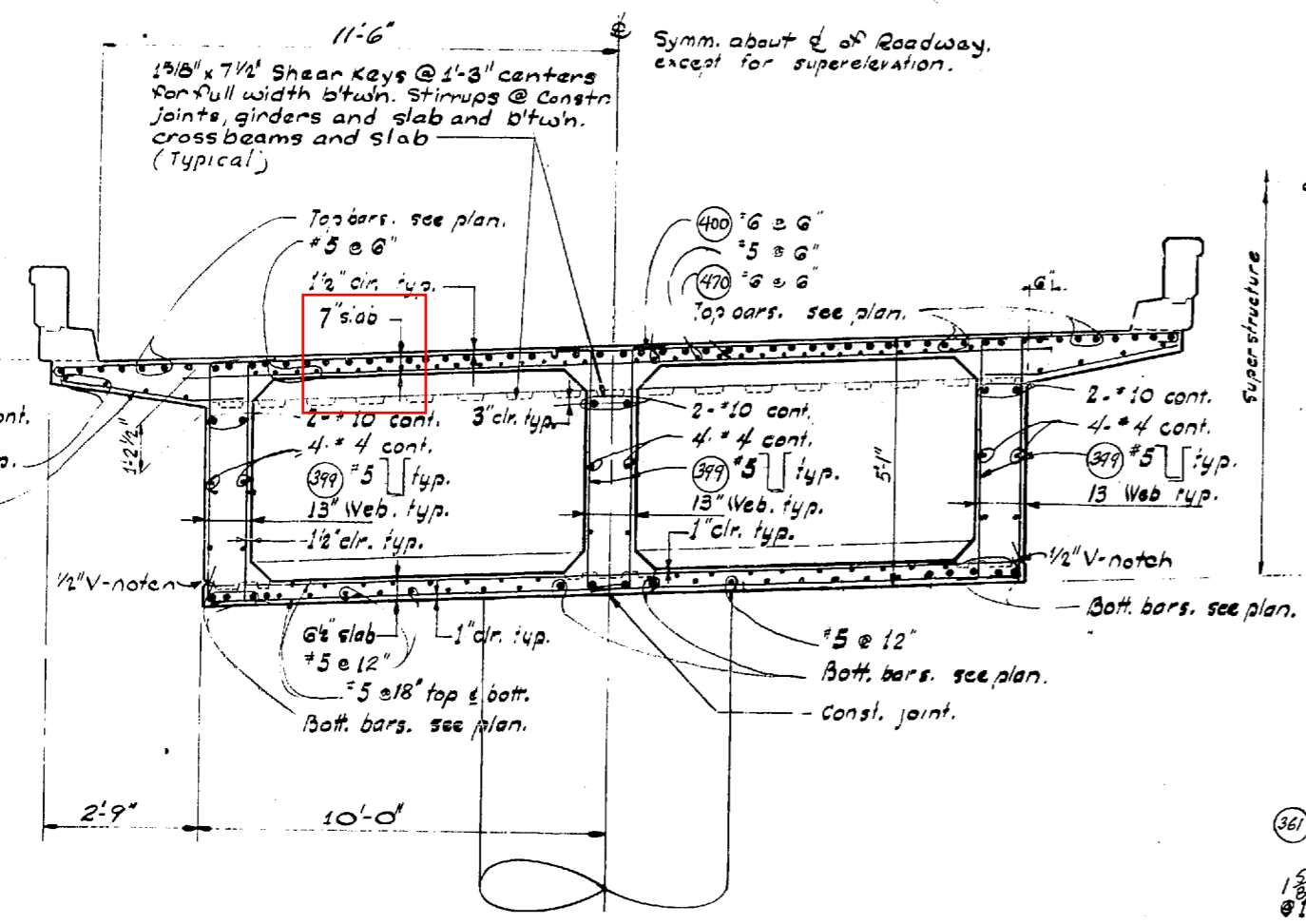
SR 405
MP 23.49 TO MP 23.76
WOODVILLE INTERCHANGE
 KING COUNTY
N-W & N-E STRUCTURE

TRANSVERSE SECTIONS

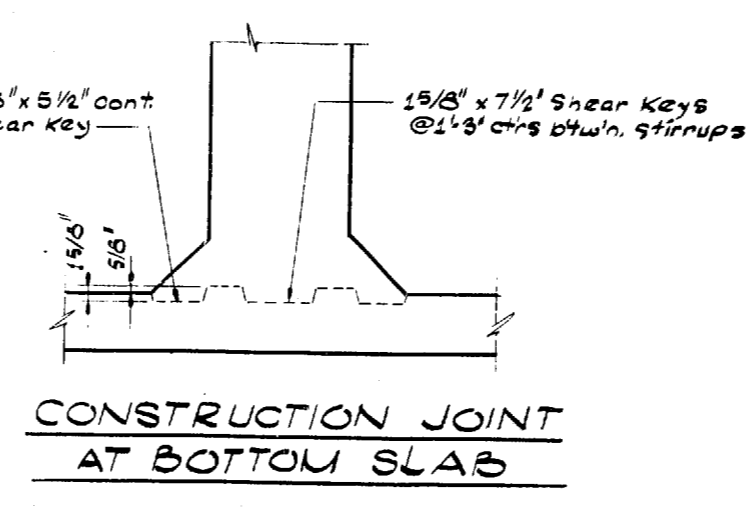
WASHINGTON STATE HIGHWAY COMMISSION
 DEPARTMENT OF HIGHWAYS
 OLYMPIA, WASHINGTON

GEORGE D. ZANK, CHAIRMAN
 BAKER FERRELL
 JOHN H. RUPP

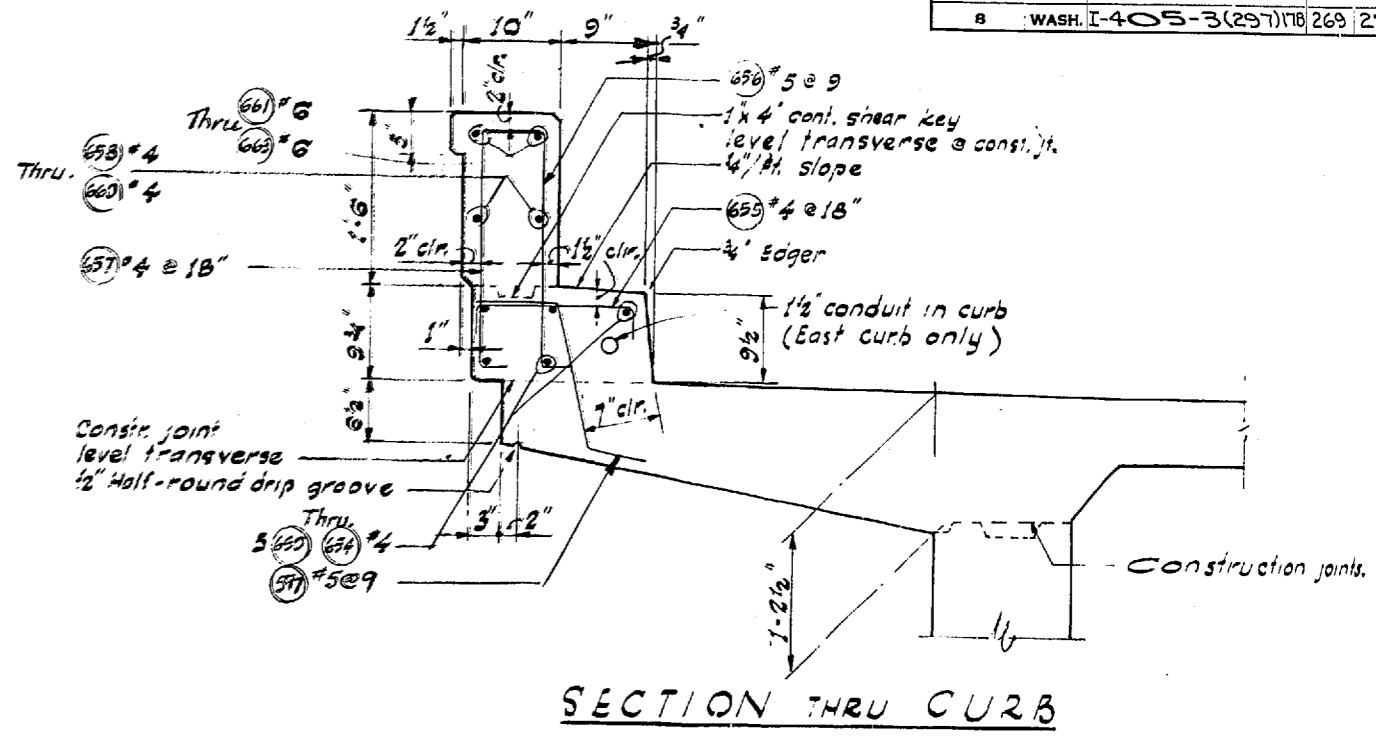
APPROVED: December 7, 1967
 SHEET 263 OF 297 SHEETS
 CONTRACT NO. 8382



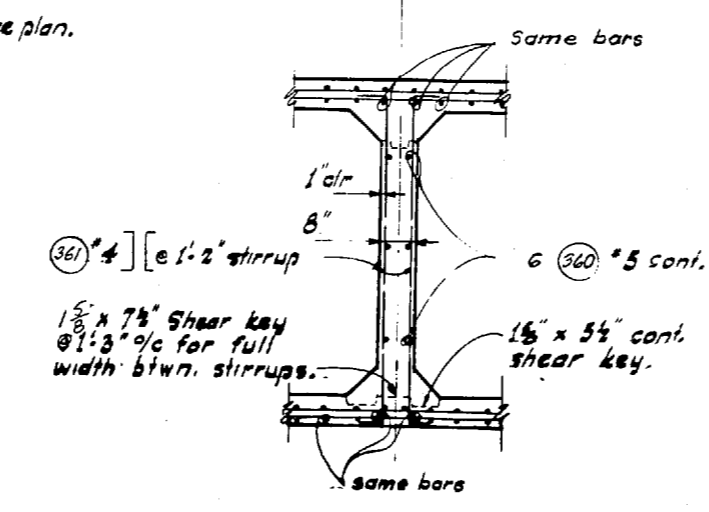
SECTION @ N-E PIERS 4 thru 6



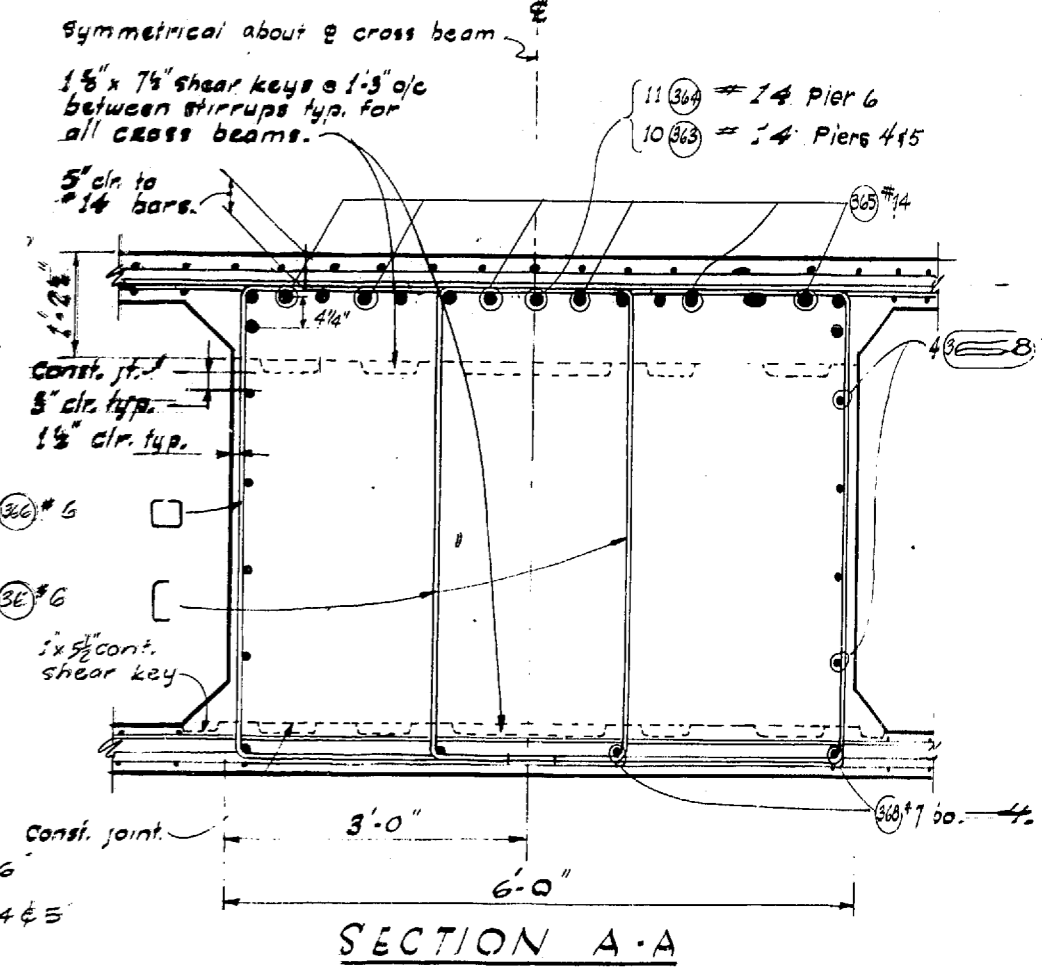
CONSTRUCTION JOINT AT BOTTOM SLAB



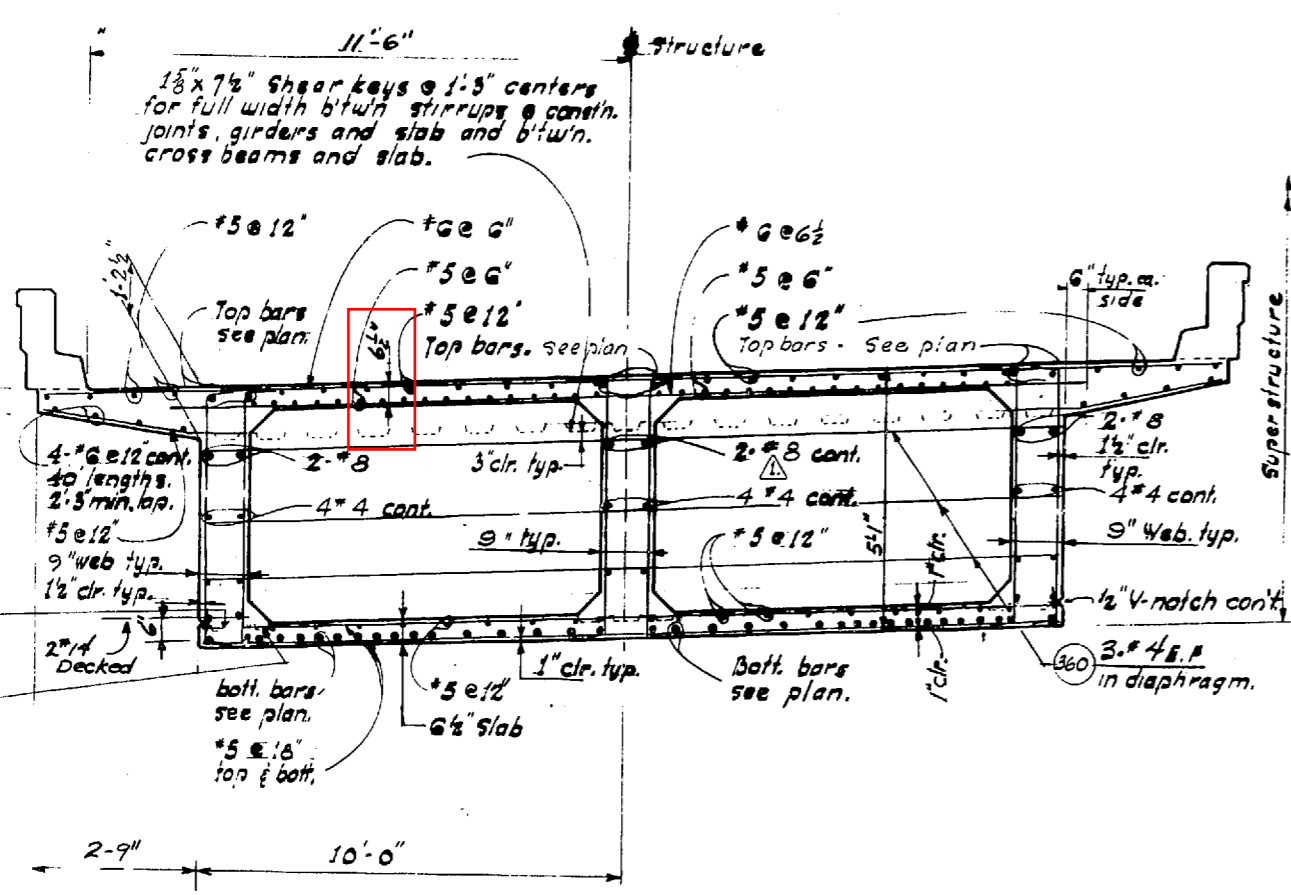
SECTION THRU CURB



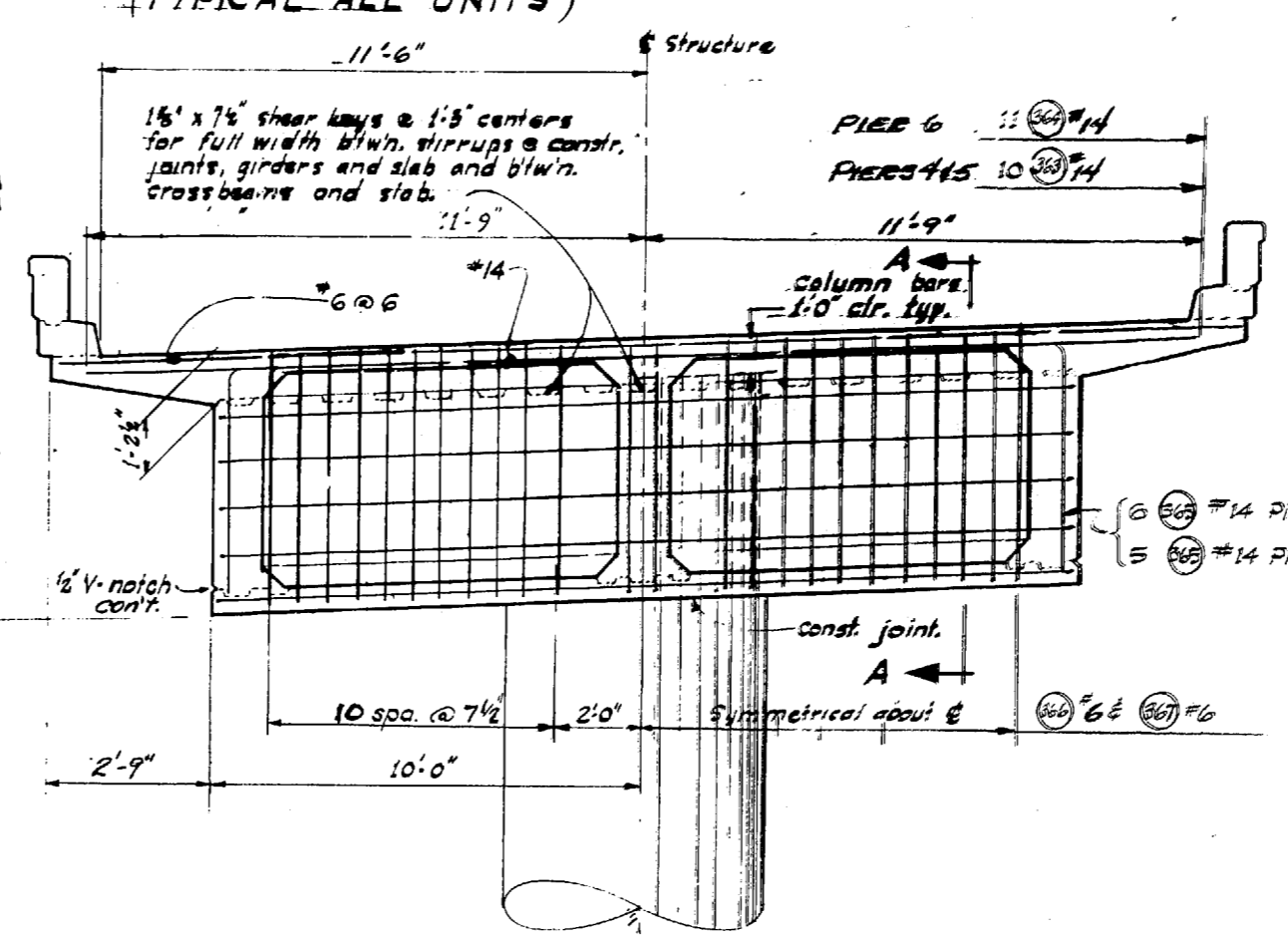
SECTION THRU DIAPHRAGM (TYPICAL ALL UNITS)



SECTION A-A



SECTION NEAR C OF SPAN



CROSSBEAM @ PIERS 4 thru 6

DESIGNED	
CHECKED	
QUANTITIES CHECKED	

43

TRANSVERSE CROSS BEAMS

DATE	
BY	
CHECKED	
LOC. INCH.	
DIST. INCH.	

WOODVILLE INTERCHANGE
PSH NO. 1-RE/PSH NO. 2-BO
N-E STRUCTURE
TRANSVERSE SECTIONS
SHEET 261 OF 269
11-16-67

DATE	REVISION	BY
	2-1-68 Revised Bar Size	WKS

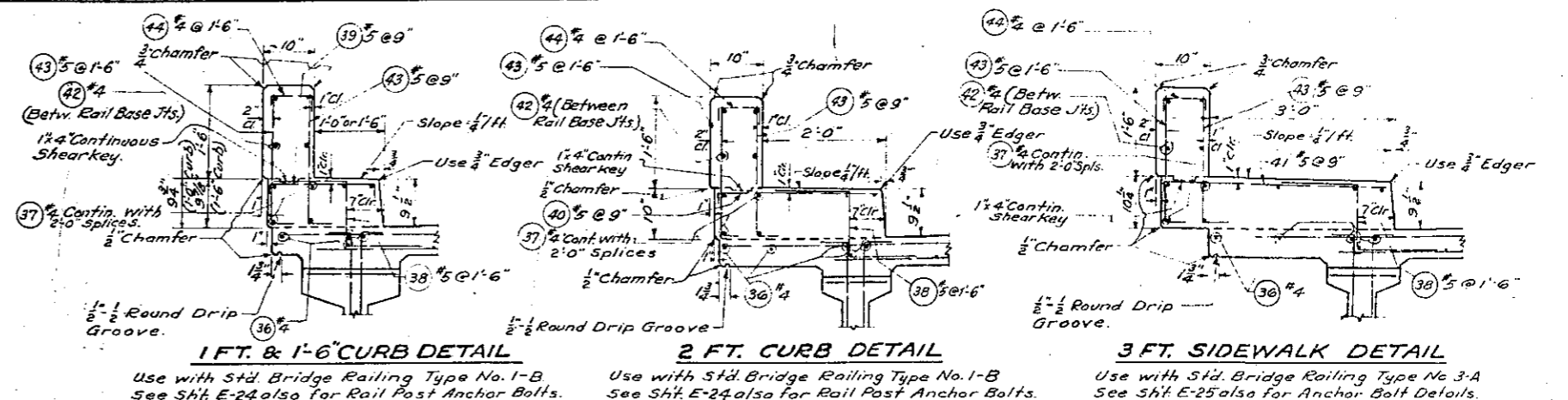
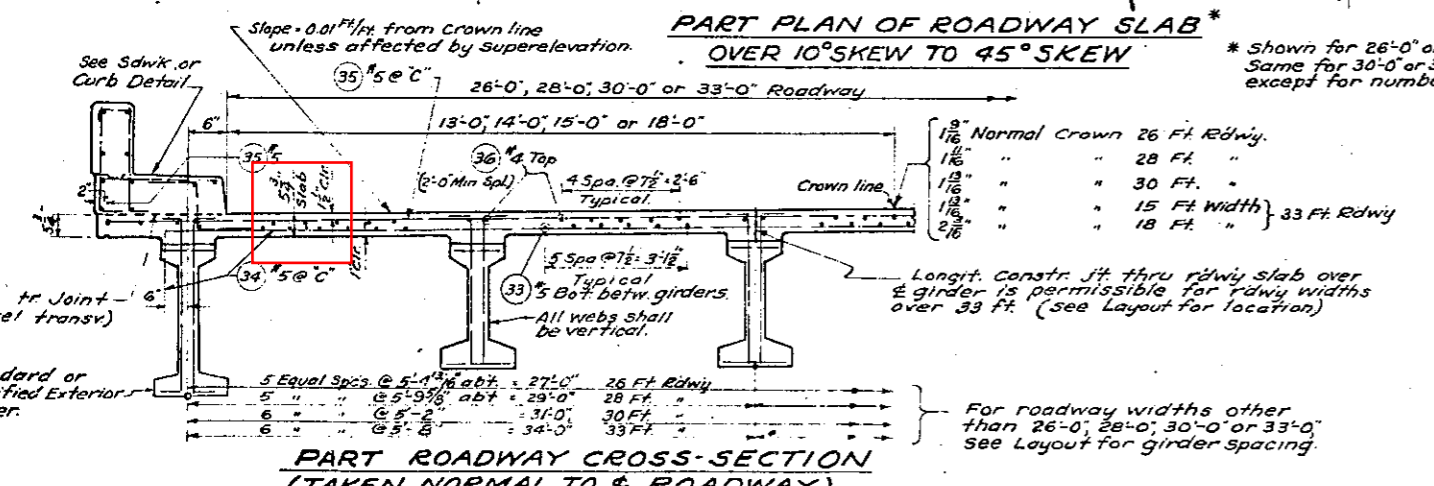
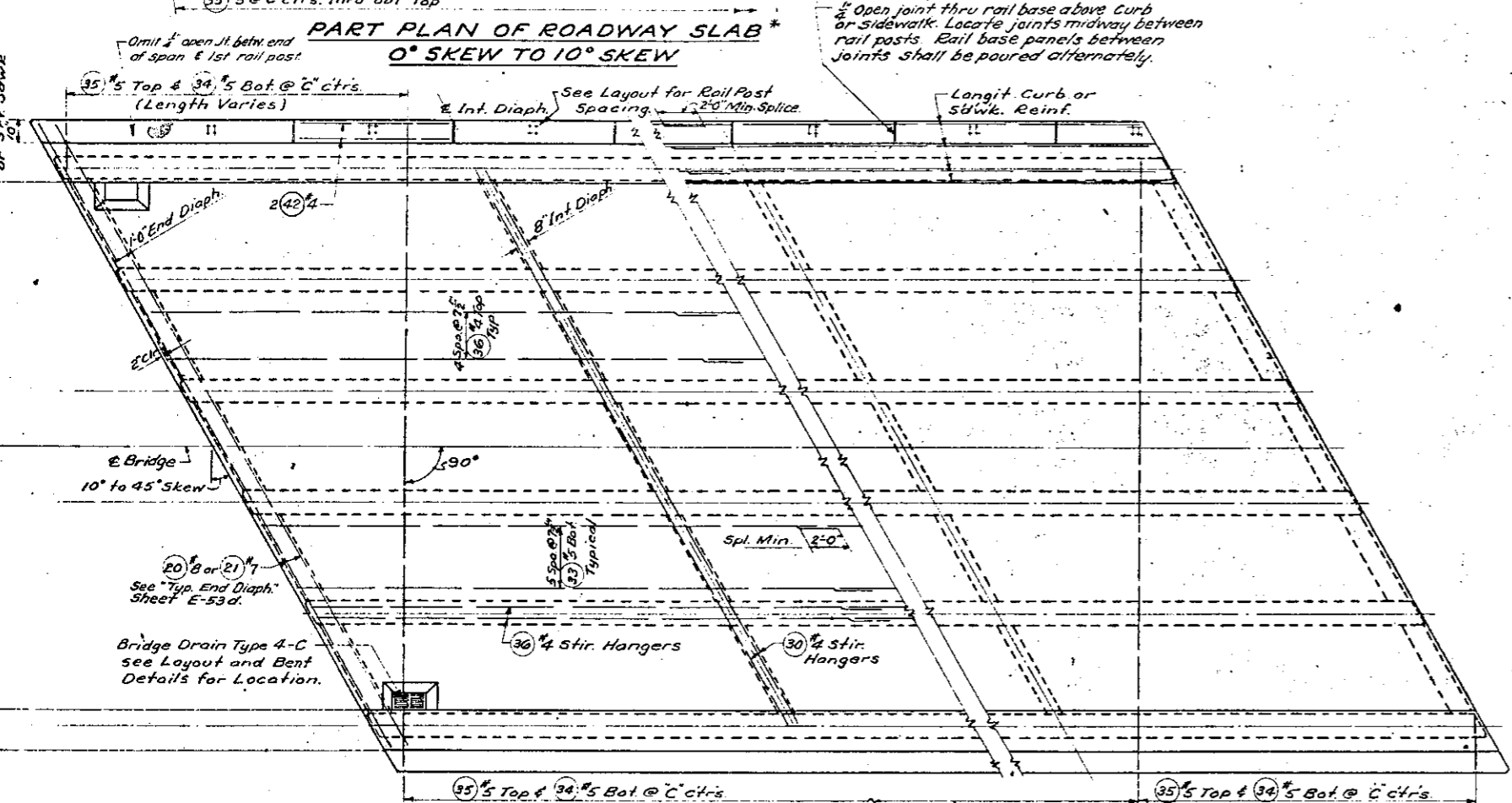
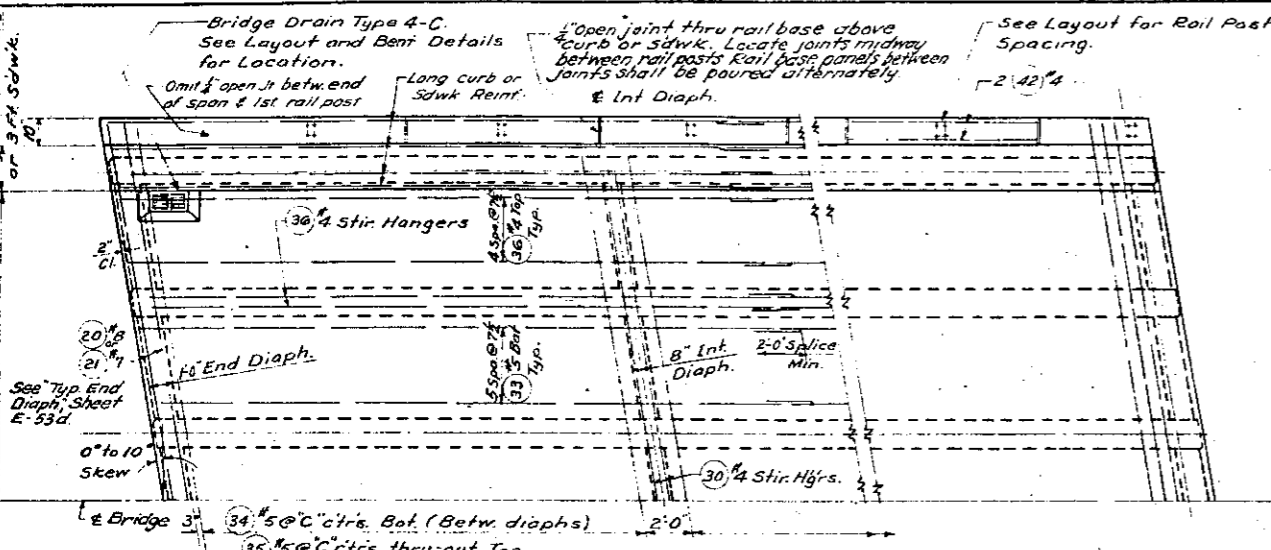
WORTHINGTON, SKILLING
HELLE & JACKSON
Consulting Civil and Structural Engineers
SEATTLE WASHINGTON

SR 405
MP 23.49 TO MP 23.76
WOODVILLE INTERCHANGE
KING COUNTY
N-W & N-E STRUCTURE
TRANSVERSE SECTIONS

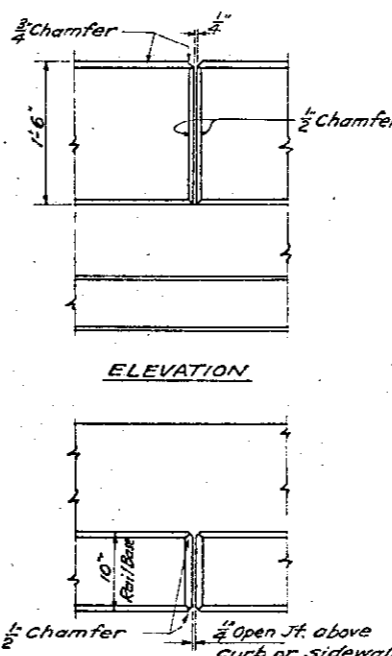
WASHINGTON STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
OLYMPIA, WASHINGTON

APPROVED December 7, 1967
SHEET 269 OF 297 SHEETS
CONTRACT NO. 6382

8/1995



CURB OR SIDEWALK DETAIL - METAL RAILING
See General Notes for strength of roadway slab concrete at time of pouring curbs and sidewalks.



TYP. RAIL BASE JOINT BETWEEN RAIL POSTS

TRANSV. SLAB REINF. TABLE
C = Longitudinal spacing of #34 & #35 slab bars

Inferior Girder Series	Roadway Width			
	30 Ft.	26 Ft.	33 Ft.	28 Ft.
30	5 3/4"	5 1/2"	5 1/2"	5 1/2"
40	"	"	"	"
50	"	"	"	"
60	"	"	"	"
70	6"	5 3/4"	5 1/2"	5 1/2"
80	"	"	"	"
90	6 1/2"	6"	5 3/4"	5 1/2"
100	"	"	"	"

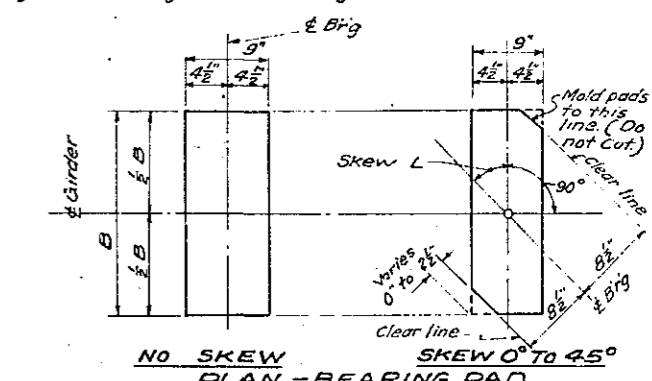
Note: For roadway widths other than those shown:
Girder Spacing use C shown for:
5'-1" to 5'-3" 30 Ft. Rdwy width
5'-3" to 5'-6" 26 " " "
5'-6" to 5'-9" 33 " " "
5'-9" to 5'-11" 28 " " "

Maximum girder spacing normal to girder.

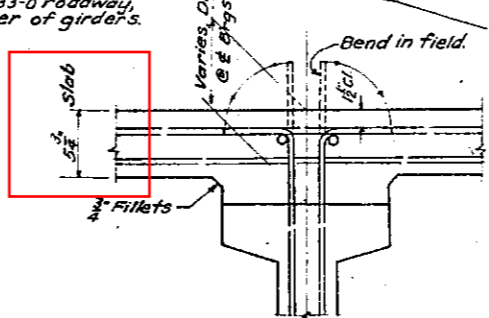
BEARING PAD DIMENSIONS

SERIES	B
30	1-0
40	1-2
50	1-5
60	1-5
70	1-10
80	1-10
90	1-10
100	1-10

Thickness - All Pads = 1 1/2"



NO SKEW - BEARING PAD PLAN - BEARING PAD

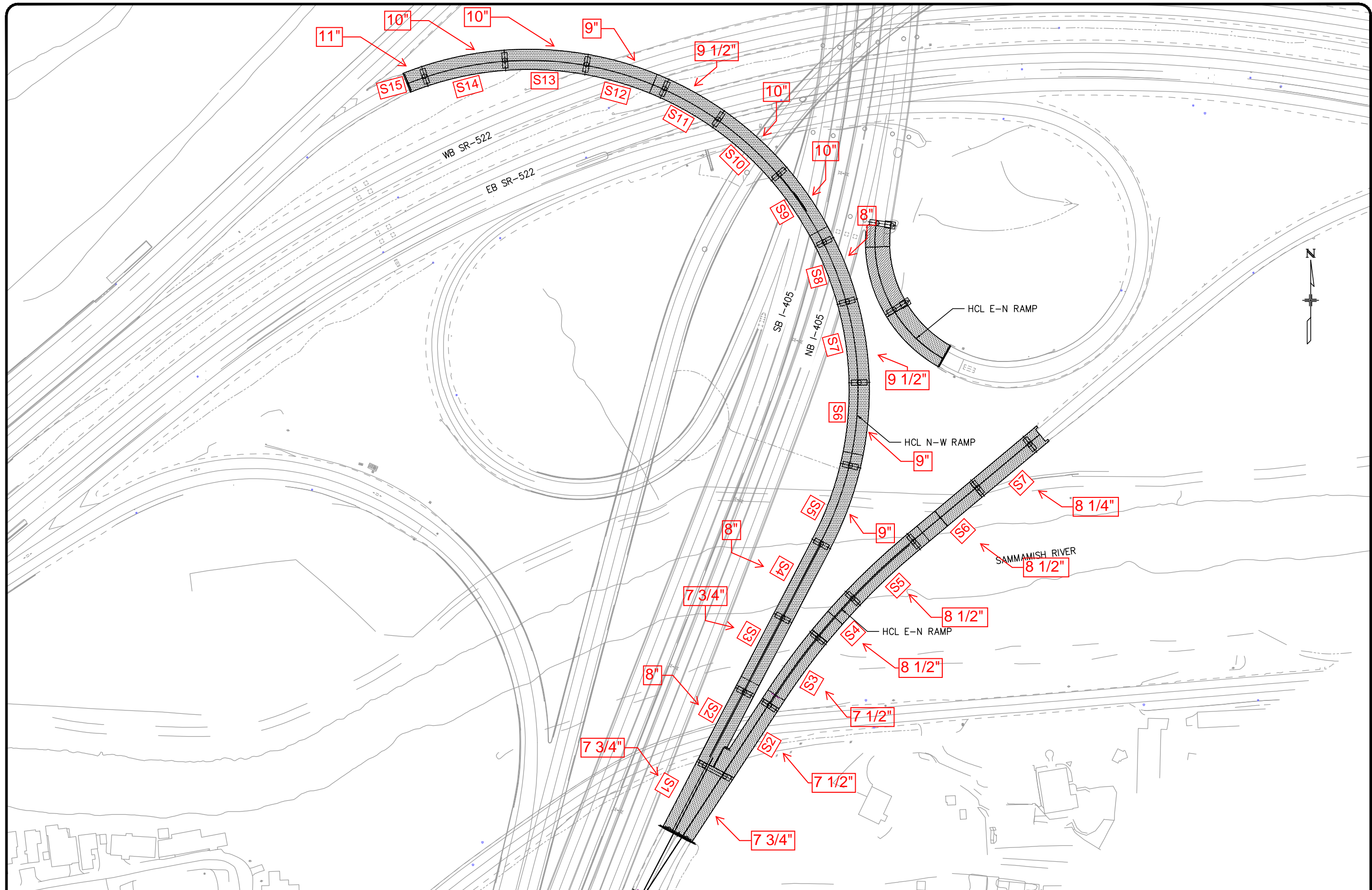


TYPICAL SECTION THRU GIRDER SHOWING METHOD OF ADJUSTING ROADWAY ELEV. FOR VERT. CURVES, CAMBER OR SUPERELEVATION.

STANDARD
PRESTRESSED CONCRETE BRIDGES
SLAB DETAILS
WASHINGTON STATE HIGHWAY COMMISSION
DEPARTMENT OF HIGHWAYS
OLYMPIA, WASHINGTON

APPROVED: Dec. 22, 1956.

Signature



BRIDGE LAYOUT

ISSUED FOR APPROVAL

PROJECT ENGINEER JMV	PROJECT MANAGER JMV	DRAWN BY J.E.	ISSUE DATE
7	6	5	4
3	2	1	
REVISIONS	DATE	BY	
PREPARED FOR: PENHALL COMPANY			
PREPARED BY: MODJESKI & MASTERS <i>Engineering & Architecture</i>			
PROJECT: PENHALL COMPANY			
I-405 & SR-522 INTERCHANGE			
DEMOLITION PLAN			
TITLE OF DRAWING: SITE LAYOUT			
DRAWING NO. DM 02			

Deck Thickness Mapping

Bridge	Span	Length (in)	Deck Thickness Measurement (in)	Deck Thickness As Built (in)	Difference (in)	Deck Width-Typ (in)	Extra Volume (CY)
NE/NW	1	1169.9	7.8	7.0	0.8	204.0	3.8
NE	2	1308.0	7.5	7.0	0.5	204.0	2.9
NE	3	1308.0	7.5	7.0	0.5	204.0	2.9
NE	4	828.0	8.5	7.0	1.5	204.0	5.4
NE	5	1308.0	8.5	7.0	1.5	204.0	8.6
NE	6	1308.0	8.5	6.8	1.8	204.0	10.0
NE	7	1068.0	8.3	6.8	1.5	204.0	7.0
NW	2	1308.0	8.0	7.0	1.0	204.0	5.7
NW	3	1308.0	7.8	7.0	0.8	204.0	4.3
NW	4	1308.0	8.0	7.0	1.0	204.0	5.7
NW	5	1308.0	9.0	7.0	2.0	204.0	11.4
NW	6	1308.0	9.0	7.0	2.0	204.0	11.4
NW	7	1279.9	9.5	7.0	2.5	204.0	14.0
NW	8	998.4	8.0	7.0	1.0	204.0	4.4
NW	9	1279.9	10.0	7.0	3.0	204.0	16.8
NW	10	1279.9	10.0	7.0	3.0	204.0	16.8
NW	11	967.0	9.5	7.0	2.5	204.0	10.6
NW	12	1279.9	9.0	7.0	2.0	204.0	11.2
NW	13	1279.9	10.0	7.0	3.0	204.0	16.8
NW	14	1279.9	10.0	7.0	3.0	204.0	16.8
NW	15	300.0	11.0	7.0	4.0	204.0	5.2

Mean			8.8	7.0	1.6	Total (CY)	191.7
Average			8.8	7.0	1.8		



 (800) 661-1340
 info@penhall.com
 www.penhall.com
 1212 Corporate Dr. Suite 500
Irving, TX 75038

January 27, 2026

Skanska USA Civil West California District, Inc.
18911 North Creek Parkway, Suite 300
Bothell, WA 98011

Attention: Zachary Lucarelli
Contract No.: 90009590.234165OS
Reference: I-405 Brickyard to SR527

Subject: Change in condition – Deck Thickness Notice

Mr. Lucarelli,

Pursuant to Section 11 of the Subcontract Agreement, this letter serves as Penhall Company's formal written notice of a change in condition affecting our Work on the referenced project.

Penhall has encountered a condition that differs from those contemplated at the time of bid and execution of the Subcontract. Specifically, during lost decking removal operations, Penhall observed that the bridge deck thickness exceeds the dimensions indicated in the as-built documents by approximately 2 to 4 inches. This condition was confirmed on January 24, 2026.

This condition has impacted, or is reasonably expected to impact, Penhall's means and methods, sequence of work, productivity, schedule, and/or cost of performance.

At this time, the full extent of the impacts has not yet been determined, as the condition is ongoing and evolving. However, Penhall reasonably anticipates that this condition may result in additional costs, time impacts, and/or other contractual relief beyond that provided for in the Subcontract.

Penhall is providing this notice within seventy-two (72) hours of the commencement of the condition in order to preserve its rights under the Subcontract and applicable Contract Documents. Penhall expressly reserves all rights to seek an equitable adjustment for all impacts arising from this condition, including but not limited to additional compensation, schedule relief, and associated costs.

Penhall will continue to document the condition and its impacts and will supplement this notice with additional detail and supporting documentation as such information becomes available, in accordance with the Subcontract and Prime Contract requirements.

Nothing herein shall be construed as a waiver of any rights, remedies, or entitlements available to Penhall under the Subcontract, Prime Contract, or applicable law, all of which are expressly reserved.

Please acknowledge receipt of this notice. Penhall remains willing to cooperate in good faith to mitigate impacts where reasonably possible.

Respectfully,

Jose A. Cipres Jr

Digitally signed by Jose A. Cipres Jr
DN: C=US, E=jcipres@penhall.com,
O=Penhall Company, OU=Project
Manager, CN=Jose A. Cipres Jr
Date: 2023.01.27 08:10:01-0600'

Penhall Company
Jose Cipres



Re: 800.251002 Brickyard - Change in Condition - Deck Thickness

From Mike Drury <mdrury@penhall.com>

Date Wed 1/28/2026 9:20 AM

To Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>

Cc Jose (Beto) Cipres <jcipres@penhall.com>; Zarecor, Cody <Cody.Zarecor@skanska.com>; Muro Villanueva, Jesus <jmurovillanueva@modjeski.com>; Anthony Dallaire <adallaire@penhall.com>; Travis Verrall <trverrall@penhall.com>; Brian McGeo <Bmcgeo@penhall.com>; Prescott, Ryan <Ryan.Prescott@skanska.com>; Prendergast, Patrick <Patrick.Prendergast@skanska.com>; Kevin Sheridan <Ksheridan@penhall.com>

Zach,

Thank you for the update and for passing this through to WSDOT.

Penhall will continue to perform the work as directed while the merit review moves forward. As noted in our notice, we are still working through the full extent of the condition and its associated impacts and will continue to document our findings as additional information becomes available.

Consistent with the Subcontract and Prime Contract, Penhall reserves its rights to pursue any cost and schedule adjustments that may result from this condition. Our intent is to work cooperatively through the process and provide the information needed to support the review.

Please let us know if there is anything specific WSDOT would like to see at this stage.

Thank you,

Mike Drury
Senior Project Manager



817.346.6181 | 940.371.9553

mdrury@penhall.com

www.penhall.com

We're Hiring at careers.penhall.com



From: Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>

Sent: Tuesday, January 27, 2026 4:16 PM

To: Jose (Beto) Cipres <jcipres@penhall.com>

Cc: Zarecor, Cody <Cody.Zarecor@skanska.com>; Muro Villanueva, Jesus <jmurovillanueva@modjeski.com>; Mike Drury <mdrury@penhall.com>; Anthony Dallaire <adallaire@penhall.com>; Travis Verrall <trverrall@penhall.com>; Brian McGeo <Bmcgeo@penhall.com>; Prescott, Ryan <Ryan.Prescott@skanska.com>; Prendergast, Patrick <Patrick.Prendergast@skanska.com>

Subject: Re: 800.251002 Brickyard - Change in Condition - Deck Thickness

This Message Is From an External Sender

This message came from outside your organization.

Beto,

Received. We will pass this through to WSDOT for merit determination. Please familiarize yourself with Chapter 1's requirements for Differing Site Conditions and the contract processes/timelines, etc.

Let me know if you have any questions.

Thanks,

Zach

From: Jose (Beto) Cipres <jcipres@penhall.com>

Sent: Tuesday, January 27, 2026 6:28 AM

To: Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>

Cc: Zarecor, Cody <Cody.Zarecor@skanska.com>; Muro Villanueva, Jesus <jmurovillanueva@modjeski.com>; Mike Drury <mdrury@penhall.com>; Anthony Dallaire <adallaire@penhall.com>; Travis Verrall <trverrall@penhall.com>; Brian McGeo <Bmcgeo@penhall.com>

Subject: 800.251002 Brickyard - Change in Condition - Deck Thickness

Zach,

Please see the attached change in the condition letter.

We encountered thicker concrete than expected on the deck. We are continuing to investigate the impacts.

We anticipate this could take additional engineering to verify the impacts.

Let me know if you have any questions.

Thank you.

Jose (Beto) Cipres
Project Manager



770.415.9632 | 956.898.2068

jcipres@penhall.com

www.penhall.com

TX

 We're Hiring at careers.penhall.com





Re: 800.251002 Brickyard - Change in Condition - Deck Thickness-Notice

From Mike Drury <mdrury@penhall.com>

Date Thu 1/29/2026 11:08 AM

To Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>

Cc Kevin Sheridan <Ksheridan@penhall.com>; Jose (Beto) Cipres <jcipres@penhall.com>; Travis Verrall <trverrall@penhall.com>; Anthony Dallaire <adallaire@penhall.com>; Murphy, Thomas P. <TPMurphy@modjeski.com>

Jesus,

Thank you for your prompt acknowledgment of Penhall's directive and for initiating the engineering evaluation associated with the increased deck thickness condition on the I-405 Brickyard project.

To support ongoing coordination with Skanska and WSDOT under the Design-Build RFP Chapter 1 differing site condition process, Penhall respectfully requests that, upon completion of your current evaluation, you provide a Qualified Professional Statement (QPS) documenting the engineering basis and professional opinion related to this condition.

The QPS should be limited to your professional findings and conclusions and is intended to address, at a high level, the following:

- The original engineering assumptions relied upon in the previously submitted demolition calculations, including assumed deck thickness and associated dead load
- The verified increase in deck thickness and resulting change in dead load
- The engineering implications of this change relative to the prior demolition calculations
- Whether the previously submitted demolition calculations can be relied upon without further evaluation under the revised condition
- The need for additional analysis and/or potential revision to the demolition approach, if indicated
- The status and anticipated completion of the current engineering evaluation, including any preliminary observations appropriate to share

The intent of this statement is to document the professional engineering considerations associated with the verified condition and to support safe, technically compliant decision-making. The statement does not need to address contractual entitlement, pricing, or schedule impacts beyond identifying whether reliance on prior calculations is appropriate pending completion of the revised analysis.

If feasible, we request that the QPS be provided concurrently with, or shortly following, completion of your initial evaluation currently anticipated by **February 9**, or as soon thereafter as practicable.

Please let me know if you have any questions regarding the requested content or format. We appreciate your continued responsiveness and support as we work through this condition.

Mike Drury
Senior Project Manager



817.346.6181 | 940.371.9553

mdrury@penhall.com

www.penhall.com

We're Hiring at careers.penhall.com



From: Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>

Sent: Wednesday, January 28, 2026 3:58 PM

To: Mike Drury <mdrury@penhall.com>

Cc: Kevin Sheridan <Ksheridan@penhall.com>; Jose (Beto) Cipres <jcipres@penhall.com>; Travis Verrall <trverrall@penhall.com>; Anthony Dallaire <adallaire@penhall.com>; Murphy, Thomas P. <TPMurphy@modjeski.com>

Subject: RE: 800.251002 Brickyard - Change in Condition - Deck Thickness-Notice

This Message Is From an External Sender

This message came from outside your organization.

Mike,

We acknowledge receipt of Penhall's directive regarding the increased deck thickness condition identified on the I-405 Brickyard project.

We will proceed immediately with an engineering evaluation of the structure based on the proposed demolition sequence submitted in our second submittal, explicitly accounting for the verified increased deck thickness and associated additional dead load. The evaluation will include the necessary structural analysis, calculations, and engineering recommendations to assess the feasibility of the proposed demolition approach under the revised condition.

Our anticipated completion date for this initial engineering evaluation is February 9.

If the results of this analysis indicate that the structure cannot safely accommodate the demolition loads associated with the currently proposed sequence, a revised demolition concept and corresponding engineering analysis may be required. The scope and duration of any redesign effort will be assessed following completion of the initial evaluation.

All time and effort associated with this work will be tracked separately as engineering services arising from the deck thickness differing site condition, consistent with your directive.

Thank you,

Jesus Muro Villanueva, PhD, PE

Project Manager - National Bridge Group | Denver

720.287.8093



Re: Demo plan spans 9, 8 over 405

From Mike Drury <mdrury@penhall.com>

Date Thu 1/29/2026 11:23 AM

To Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>

Cc Jose (Beto) Cipres <jcipres@penhall.com>; Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>; Kevin Sheridan <Ksheridan@penhall.com>; Snyder, Daniel <Daniel.Snyder@skanska.com>; McNellis, Mark <mark.mcnellis@skanska.com>; Zarecor, Cody <Cody.Zarecor@skanska.com>

Zach,

I want to clarify status and expectations related to the demolition plan and schedule in light of the verified deck thickness condition.

As discussed, Penhall has directed our engineer to immediately evaluate the impact of the increased deck thickness on the previously submitted demolition sequence and associated calculations. The engineer has confirmed that the additional deck thickness results in increased dead load and that the prior demolition calculations were based on the thinner deck shown in the contract as-builts.

Until the current engineering evaluation is completed and the engineer confirms whether the previously proposed demolition sequence can be safely executed under the revised condition, Penhall cannot rely on the prior calculations to proceed with demolition as originally scheduled. The engineer’s initial evaluation is currently anticipated to be completed by **February 9**.

As a result, while we continue to work diligently to mitigate impacts and support the overall project schedule, the ability to safely perform demolition in accordance with the baseline sequence is contingent upon receipt of the engineer’s confirmation. If the evaluation confirms the original sequence is acceptable, we will proceed accordingly. If revisions are required, we will coordinate promptly on an updated approach.

We recognize the importance of the upcoming closures and remain committed to working collaboratively to maintain them where possible. At the same time, proceeding without confirmed engineering support would not be appropriate given the verified change in condition.

Please let us know if Skanska or WSDOT would like a formal interim update from the engineer or if there is additional information we can provide in the meantime.

Mike Drury
Senior Project Manager



817.346.6181 | 940.371.9553

mdrury@penhall.com

www.penhall.com

We're Hiring at careers.penhall.com



From: McNellis, Mark <mark.McNellis@skanska.com>

Sent: Thursday, January 29, 2026 8:49 AM

To: Jose (Beto) Cipres <jcipres@penhall.com>

Cc: Muro Villanueva, Jesus <jmurovillanueva@modjeski.com>; Kevin Sheridan <Ksheridan@penhall.com>; Mike Drury <mdrury@penhall.com>; Snyder, Daniel <Daniel.Snyder@skanska.com>; Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>; Zarecor, Cody <Cody.Zarecor@skanska.com>

Subject: Demo plan spans 9, 8 over 405

This Message Is From an External Sender

This message came from outside your organization.

Beto,

Please confirm that we are still tracking for the demo plan to be received by Skanska to receive by Friday (1-30-26). The previous review had many questions and we expect an extensive review. We are still tracking to meet our closure dates and as you are aware need this plan and calcs ASAP. Let us know if there is any additional information you need from Skanska's team.

Thanks,

Mark McNellis

Superintendent

Skanska USA Civil

951-295-1187

From: Mike Drury <mdrury@penhall.com>
Sent: Wednesday, January 28, 2026 8:37 AM
To: Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>
Cc: Kevin Sheridan <Ksheridan@penhall.com>; Jose (Beto) Cipres <jcipres@penhall.com>; Travis Verrall <trverrall@penhall.com>; Anthony Dallaire <adallaire@penhall.com>
Subject: Re: 800.251002 Brickyard - Change in Condition - Deck Thickness-Notice

Caution: This email originated from outside the Modjeski and Masters, Inc. network. Do not click links or open attachments unless you recognize the sender and know the content is safe. When in doubt, contact the IT Department -> helpdesk@modjeski.com

This email serves as Penhall Company's directive for you to proceed immediately with the engineering evaluation and associated work necessary to address the increased deck thickness condition recently identified on the I-405 Brickyard project.

As you are aware, field verification has confirmed that the existing deck thickness exceeds the dimensions indicated in the contract documents and as-built drawings. This differing condition requires prompt engineering review and analysis to evaluate impacts to the planned demolition approach, means and methods, sequencing, and related technical considerations.

You are hereby directed to proceed with the necessary engineering services to evaluate and accommodate the verified deck thickness, including any analysis, calculations, sketches, or recommendations reasonably required to support continued performance of the work.

Given the potential schedule impacts associated with this condition, time is critical. Please provide, within **twenty-four (24) hours** of receipt of this directive, an initial response identifying:

- The anticipated duration required to complete the requested engineering evaluation, and
- Any interim information or preliminary findings that may be available to support near-term decision-making.

This request is intended to support ongoing schedule mitigation efforts and to demonstrate prompt action in response to this unforeseen condition.

This directive is issued pursuant to your pass-through agreement with Penhall and is directly related to a differing site condition currently under review by Skanska and WSDOT. All time and costs associated with this effort shall be tracked separately and clearly identified as work arising from the deck thickness differing condition.

Nothing in this directive shall be construed as a waiver of Penhall's rights under the Subcontract, Prime Contract, or applicable law. Penhall expressly reserves the right to seek full reimbursement and schedule relief for all costs and impacts associated with this condition, including engineering services performed pursuant to this notice.

Please proceed immediately and confirm receipt of this directive. If you have any questions regarding scope, tracking, or documentation requirements, contact me or Beto directly.

Mike Drury
Senior Project Manager

 [817.346.6181](tel:817.346.6181) |  [940.371.9553](tel:940.371.9553)

 mdrury@penhall.com www.penhall.com We're Hiring at careers.penhall.com

From: Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>**Sent:** Tuesday, January 27, 2026 5:19 PM**To:** Mike Drury <mdrury@penhall.com>**Cc:** Kevin Sheridan <Ksheridan@penhall.com>; Jose (Beto) Cipres <jcipres@penhall.com>; Travis Verrall <trverrall@penhall.com>**Subject:** RE: 800.251002 Brickyard - Change in Condition - Deck Thickness

Attached are the demolition calculations for the bridge, developed based on the as-built plans provided with this submittal. During field operation, it was discovered that the girder top slab is significantly thicker than indicated in the as-built drawings. The attached calculations are applicable only to the conditions shown on the as-built plans and do not account for the increased slab thickness. As a result, an updated analysis will be required to evaluate the revised section properties, dead load, and demolition sequence associated with the actual field condition before proceeding.


I also included response to most of the comments from the reviewer. Some of those require your or Skanska's response.

Thank you,

Jesus

Jesus Muro Villanueva, PhD, PE

Project Manager - National Bridge Group | Denver

 [720.287.8093](tel:720.287.8093)

From: Mike Drury <mdrury@penhall.com>**Sent:** Tuesday, January 27, 2026 9:43 AM**To:** Muro Villanueva, Jesus <JMuroVillanueva@modjeski.com>**Cc:** Kevin Sheridan <Ksheridan@penhall.com>; Jose (Beto) Cipres <jcipres@penhall.com>; Travis Verrall <trverrall@penhall.com>**Subject:** Fw: 800.251002 Brickyard - Change in Condition - Deck Thickness

Caution: This email originated from outside the Modjeski and Masters, Inc. network. Do not click links or open attachments unless you recognize the sender and know the content is safe. When in doubt, contact the IT Department -> helpdesk@modjeski.com

Jesus,

Thank you for the hard work and getting the info last night. Please note the change to the deck thickness. We need to quickly understand the magnitude of this and how much re-engineering

may be needed, including time (time will be very important). Beto is going to do more investigation into other areas as well as the bottom of the bridge.

Mike Drury
Senior Project Manager



 817.346.6181 |  940.371.9553

 mdrury@penhall.com

 www.penhall.com



 We're Hiring at careers.penhall.com



From: Jose (Beto) Cipres <jcipres@penhall.com>

Sent: Tuesday, January 27, 2026 8:28 AM

To: Lucarelli, Zachary <zachary.lucarelli@skanska.com>

Cc: Zarecor, Cody <cody.zarecor@skanska.com>; Muro Villanueva, Jesus <jmurovillanueva@modjeski.com>; Mike Drury <mdrury@penhall.com>; Anthony Dallaire <adallaire@penhall.com>; Travis Verrall <trverrall@penhall.com>; Brian McGeo <Bmcgeo@penhall.com>

Subject: 800.251002 Brickyard - Change in Condition - Deck Thickness

Zach,

Please see the attached change in the condition letter.

We encountered thicker concrete than expected on the deck. We are continuing to investigate the impacts.

We anticipate this could take additional engineering to verify the impacts.

Let me know if you have any questions.

Thank you.

Jose (Beto) Cipres
Project Manager

Office: [770.415.9632](tel:770.415.9632)

Mobile: [956.898.2068](tel:956.898.2068)







Jose (Beto) Cipres

From: Jose (Beto) Cipres
Sent: Wednesday, February 4, 2026 4:32 PM
To: Lucarelli, Zachary; Mike Drury
Cc: Anthony Dallaire; Kevin Sheridan; Zarecor, Cody; McNellis, Mark
Subject: RE: Schedule

Zach,

The Penhall team will commit to a demolition start of 3/26/26.

Thank you.

Jose (Beto) Cipres Project Manager	 770.415.9632  956.898.2068
	 jcipres@penhall.com
	 www.penhall.com
	 TX

 We're Hiring at careers.penhall.com



From: Lucarelli, Zachary <Zachary.Lucarelli@skanska.com>
Sent: Tuesday, February 3, 2026 6:02 PM
To: Jose (Beto) Cipres <jcipres@penhall.com>; Mike Drury <mdrury@penhall.com>
Cc: Anthony Dallaire <adallaire@penhall.com>; Kevin Sheridan <Ksheridan@penhall.com>; Zarecor, Cody <Cody.Zarecor@skanska.com>; McNellis, Mark <mark.McNellis@skanska.com>
Subject: Schedule

This Message Is From an External Sender

This message came from outside your organization.

Can you guys look at this overnight? WSDOT is asking for a commitment on 1 set of dates by EOD tomorrow.

BEST CASE - Thicker Deck DOES NOT Change Demo Plan Details

CLOSURE	ACTIVITY	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	2/12	2/13	2/14	2/15	2/16	
		Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mor	
WB 522	WD 529 - Demo Plan (All Spans except 405)	MODJESKI								WSDOT	RFC						
	WD 562 - Shoring Towers	SKANSKA			DOT				WSDOT			RFC					TOY
	XXX - Deck Thickness Evaluation (Plan A)	MODJESKI		OTS INFO					WSDOT	MODJESKI							WS
EB & WB 522	No other Submittals Needed																
NB 405 Weekend 1	WD 537 - Demo Plan (Spans over 405)	WSDOT								MODJESKI							
	WD XXX - Demo Plan (Loop Ramp)	MODJESKI								WSDOT	LOAD RATING						
NB 405 Weekend 2	No other Submittals Needed																
Closure	Weekend of																
WB 522	2/20/2026																
EB & WB 522	2/27/2026																
NB & SB 405	3/6/2026																
NB & SB 405	3/13/2026																

WORST CASE - Thicker Deck DOES Change Demo Plan Details

CLOSURE	ACTIVITY	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	2/12	2/13	2/14	2/15	2/16	
		Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mon	Tue	Wed	Thur	Fri	Sat	Sun	Mor	
WB 522	WD 529 - Demo Plan (All Spans except 405)	MODJESKI								WSDOT	RFC						
	WD 562 - Shoring Towers	SKANSKA			DOT				WSDOT			RFC					TOY
	XXX - Deck Thickness Evaluation (Plan B)	MODJESKI		OTS INFO					WSDOT	MODJESKI							
EB & WB 522	No other Submittals Needed																
NB 405 Weekend 1	WD 537 - Demo Plan (Spans over 405)	WSDOT								MODJESKI							
	WD XXX - Demo Plan (Loop Ramp)	MODJESKI								WSDOT	LOAD RATING						
NB 405 Weekend 2	No other Submittals Needed																
Closure	Weekend of																
WB 522	3/27/2026																
EB & WB 522	4/3/2026																
NB & SB 405	4/10/2026																
NB & SB 405	4/17/2026																

Zachary Lucarelli, P.E.

Skanska USA Civil West
 18911 North Creek Parkway, Suite 300
 Bothell, WA 98011
 (206) 450-9098



MEMORANDUM

To: Jason Pang, PE - WSDOT
From: Jesus Muro Villanueva, PE – Project Manager
Date: February 9, 2026

Project: I-405 and SR-522 Interchange
Subject: Structural Verification of Demolition Plans due to Increased Top Slab Thickness

Demolition plans and associated structural calculations for the referenced project were developed based on the available as-built drawings and contract documents. During field demolition operations, the contractor identified that the top slab thickness of the concrete box girders exceeds the as-built dimensions by approximately 2 to 4 inches. This differing condition was formally communicated by the contractor in a memorandum dated January 27, 2026.

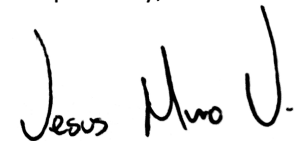
Upon receipt of this information, a supplemental engineering analysis was conducted to evaluate girder capacities and demolition-induced demands incorporating the increased top slab thickness. The review considered the revised section properties, self-weight effects, and all applicable load combinations associated with the demolition sequence defined in the original issued plans.

The results of this evaluation demonstrate that the increased slab thickness does not adversely affect the structural capacity of the girders under the planned demolition operations. All governing capacity to demand ratios remain within acceptable limits, and the demolition activities may safely proceed in accordance with the original demolition plans and sequencing, without modification.

Calculations documenting this verification and reflecting the increased top slab thickness are attached hereto for reference.

Please let us know if you have any questions or require additional information.

Respectfully,



Jesus Muro Villanueva, PE

2 – CAPACITY CHECKS

2.1 – Capacities and Demand-to-Capacity Ratios



NW Unit 5 Capacities

Notes:

- Global load factors are applied to both permanent and transient loads, and may be used to introduce additional conservatism to the calculation of demand-to-capacity ratios.
- LG: Left girder, CG: Center girder, RG: Right girder, DH: Diaphragms, C: Columns.

Global load factors				
LG	CG	RG	DH	C
1.25	1.25	1.25	1.25	1.25

1. Material properties

Superstructure concrete

Compressive strength	$f'_{c,sp} = 4.0$ ksi	- Class AX Concrete, Design Drawings
Concrete density modification factor	$\lambda = 1.0$	A. BDS. 5.4.2.8
Unit weight	$w_{c,sp} = 0.145$ kcf	A. BDS. Table 3.5.1-1
Aggregate correction factor	$K_1 = 1.0$	A. BDS. C5.4.2.4
Modulus of elasticity	$E_{c,sp} = 3987$ ksi	A. BDS. Eq. 5.4.2.4-1

Pier column concrete

Compressive strength	$f'_{c,c} = 4.0$ ksi	- Class AX Concrete, Design Drawings
Concrete density modification factor	$\lambda = 1.0$	A. BDS. 5.4.2.8
Unit weight	$w_{c,c} = 0.145$ kcf	A. BDS. Table 3.5.1-1
Aggregate correction factor	$K_1 = 1.0$	A. BDS. C5.4.2.4
Modulus of elasticity	$E_{c,c} = 3987$ ksi	A. BDS. Eq. 5.4.2.4-1

Superstructure steel reinforcement

Longitudinal reinforcement

Minimum yield strength	$f_y = 40$ ksi	- ASTM A-15/A-408, Design Drawings
Modulus of elasticity	$E_s = 29000$ ksi	A. BDS. 5.4.3.2
Yield strain	$\epsilon_y = 0.0014$ in/in	A. BDS. 5.6.2.1

Transverse reinforcement

Minimum yield strength	$f_y = 40$ ksi	- ASTM A-15/A-408, Design Drawings
Modulus of elasticity	$E_s = 29000$ ksi	A. BDS. 5.4.3.2
Yield strain	$\epsilon_y = 0.0014$ in/in	A. BDS. 5.6.2.1

Web shear reinforcement

Minimum yield strength	$f_y = 40$ ksi	- ASTM A-15/A-408, Design Drawings
Modulus of elasticity	$E_s = 29000$ ksi	A. BDS. 5.4.3.2
Yield strain	$\epsilon_y = 0.0014$ in/in	A. BDS. 5.6.2.1

Pier column steel reinforcement

Longitudinal reinforcement

Minimum yield strength	$f_y = 40$ ksi	- ASTM A-15/A-408, Design Drawings
Modulus of elasticity	$E_s = 29000$ ksi	A. BDS. 5.4.3.2
Yield strain	$\epsilon_y = 0.0014$ in/in	A. BDS. 5.6.2.1

Transverse reinforcement (hoop reinforcement)

Minimum yield strength	$f_y = 40$ ksi	- ASTM A-15/A-408, Design Drawings
Modulus of elasticity	$E_s = 29000$ ksi	A. BDS. 5.4.3.2
Yield strain	$\epsilon_y = 0.0014$ in/in	A. BDS. 5.6.2.1

2. Geometry and reinforcement

2.1 Superstructure geometry and reinforcement

Box girder gross section

Gross section height	$h = 5.08$ ft	
Gross section width within overhangs	20.0 ft	- Between outside face of exterior webs
Gross section top slab thickness	7.0 in	
Gross section bottom slab thickness	6.5 in	
Number of cells	2.0	

Exterior web width	Varies	in	
Interior web width	Varies	in	
Overhang width	3.25	ft	- Measured from outside face of exterior web

Sections after demolition

Notes:

- LG: Left girder, CG: Center girder, RG: Right girder, DH: Diaphragms

Girder	LG	CG	RG	DH	
Section	95	95	66	-	
Number of sections	95	95	95	-	
Top flange width	$b_{ft} = 2.88$	6.25	2.88	2.00	ft
Top flange thickness	$t_{ft} = 7.00$	7.00	7.00	7.00	in
Web width	$b_w = 13.00$	13.00	13.00	8.00	in
Web height	$h_w = 3.96$	3.96	3.96	3.96	ft
Bottom flange width	$b_{fb} = 3.88$	8.25	3.88	2.00	ft
Bottom flange thickness	$t_{fb} = 6.50$	6.50	6.50	6.50	in

- Gross section properties

Area	$A_g = 1161.25$	1786.00	1161.25	704.00	in ²	
Centroid location	$y_g = 32.11$	32.47	32.11	30.23	in	- Measured from the top of top slab

Diaphragm flange geometry for in-plane bending and lateral shear assessment

Diaphragm top flange width	$b_{ft} = 3.00$	ft
Diaphragm bottom flange width	$b_{fb} = 3.00$	ft

Longitudinal reinforcement

Notes:

- The variable, c_i , defines the cover to the rebar closest to the bridge centerline and web outside face for the center and left/right girders, respectively.
- The rebar spacing for rebar groups is given by s_i and s_{i+1} .
- The variable y_{i+1} indicates an offset to the second group rebar that is closest to the bridge centerline and web outside face for the center and left/right girders, respectively.

Girder	LG	CG	RG	DH	
a.1) Top slab - Top mat reinforcement					
Bar size	#11	#11	#14	#6	
Number of bars	2	2	6	2	
Area of group	3.12	3.12	13.50	0.88	in ²
Bar diameter of group	1.41	1.41	1.69	0.75	in
Group centroid location	2.96	2.96	3.10	1.88	in
					- Measured from top of top slab
Bar size	#5	#5	-	-	
Number of bars	1	6	-	-	
Area of group	0.31	1.86	-	-	in ²
Bar diameter of group	0.63	0.63	-	-	in
Group centroid location	2.56	2.56	-	-	in
					- Measured from top of top slab
Layer 1 - Effective area	3.43	4.98	13.50	0.88	in ²
Layer 1 - Effective location	2.92	2.81	3.10	1.88	in
					- Measured from top of top slab

- Reinforcement layout geometry parameters for girder flange in-plane bending assessment

$c_i =$	2.83	5.75	2.97	-	in
$s_i =$	11.00	6.25	5.50	-	in
$y_{i+1} =$	22.00	6.25	-	-	in
$s_{i+1} =$	12.00	12.00	-	-	in

a.2) Top slab - Bottom mat reinforcement

Bar size	#5	#5	#5	#6	
Number of bars	5	11	5	2	
Area of group	1.55	3.41	1.55	0.88	in ²
Bar diameter of group	0.63	0.63	0.63	0.75	in
Group centroid location	2.06	2.06	2.06	1.38	in
					- Measured from bottom of top slab

- Reinforcement layout geometry parameters for girder flange in-plane bending assessment

Cover to closest rebar	$c_t =$	9.00	9.00	9.00	-	in	
Reinforcement spacing	$s_t =$	6.00	6.00	6.00	-	in	
Bar size		-	-	-	-		
Number of bars		-	-	-	-		
Area of group		-	-	-	-	in ²	
Bar diameter of group		-	-	-	-	in	
Group centroid location		-	-	-	-	in	- Measured from bottom of top slab
Layer 2 - Effective area		1.55	3.41	1.55	0.88	in ²	
Layer 2 - Effective location		2.06	2.06	2.06	1.38	in	- Measured from bottom of top slab

a.3) Web reinforcement

- Top layer

Bar size	#8	#8	#10	#5	
Number of bars	2	2	2	2	
Layer 3 - Effective area	1.58	1.58	2.54	0.62	in ²
Layer 3 - Effective location	17.50	17.50	17.50	17.50	in

- Measured from top of top slab

- Intermediate layer

Bar size	#4	#4	#4	#5	
Number of bars	2	2	2	2	
Layer 4 - Effective area	0.40	0.40	0.40	0.62	in ²
Layer 4 - Effective location	30.75	30.75	30.75	30.75	in

- Measured from top of top slab

- Bottom layer

Bar size	#4	#4	#4	#5	
Number of bars	2	2	2	2	
Layer 5 - Effective area	0.40	0.40	0.40	0.62	in ²
Layer 5 - Effective location	44.00	44.00	44.00	44.00	in

- Measured from top of top slab

a.4) Bottom slab - Top mat reinforcement

Bar size	#5	#5	#5	#5	
Number of bars	3	7	3	2	
Area of group	0.93	2.17	0.93	0.62	in ²
Bar diameter of group	0.63	0.63	0.63	0.63	in
Group centroid location	1.94	1.94	1.94	1.31	in

- Measured from top of bottom slab

- Reinforcement layout geometry parameters for girder flange in-plane bending assessment

$c_t =$	21.00	15.00	21.00	-	in
$s_t =$	12.00	12.00	12.00	-	in
Bar size	-	-	-	-	
Number of bars	-	-	-	-	
Area of group	-	-	-	-	in ²
Bar diameter of group	-	-	-	-	in
Group centroid location	-	-	-	-	in

- Measured from top of bottom slab

Layer 6 - Effective area	0.93	2.17	0.93	0.62	in ²
Layer 6 - Effective location	1.94	1.94	1.94	1.31	in

- Measured from top of bottom slab

a.5) Bottom slab - Bottom mat reinforcement

Bar size	#14	#14	#14	#5	
Number of bars	5	10	4	2	
Area of group	11.25	22.50	9.00	0.62	in ²
Bar diameter of group	1.69	1.69	1.69	0.63	in
Group centroid location	2.47	2.47	2.47	1.31	in

- Measured from bottom of bottom slab

Bar size	#14	-	#14	-	
Number of bars	2	-	3	-	
Area of group	4.50	-	6.75	-	in ²
Bar diameter of group	1.69	-	1.69	-	in
Group centroid location	2.47	-	2.47	-	in

- Measured from bottom of bottom slab

Layer 7 - Effective area	15.75	22.50	15.75	0.62	in ²
--------------------------	-------	-------	-------	------	-----------------

Layer 7 - Effective location 2.47 2.47 2.47 1.31 in - Measured from bottom of bottom slab

- Reinforcement layout geometry parameters for girder flange in-plane bending assessment

$c_i =$	3.00	5.00	3.00	-
$s_i =$	5.25	10.00	5.25	-
$y_{i+1} =$	31.50	-	22.75	-
$s_{i+1} =$	10.50	-	7.00	-

Longitudinal reinforcement - Design information summary

Notes:

- The distances to layer and total longitudinal reinforcement centroids, y_i and $y_{A_{s,l}}$, are measured from the top of top slab.
- (+) values of $e_{A_{s,l}}$ indicate that the longitudinal reinforcement centroid is below the gross section centroid.

Girder

	LG	CG	RG	DH	
Layer	Effective area, $A_{s,l}$				
1	3.43	4.98	13.50	0.88	in ²
2	1.55	3.41	1.55	0.88	in ²
3	1.58	1.58	2.54	0.62	in ²
4	0.40	0.40	0.40	0.62	in ²
5	0.40	0.40	0.40	0.62	in ²
6	0.93	2.17	0.93	0.62	in ²
7	15.75	22.50	15.75	0.62	in ²

Layer	Distance to centroid, y_i				
1	2.92	2.81	3.10	1.88	in
2	4.94	4.94	4.94	5.63	in
3	17.50	17.50	17.50	17.50	in
4	30.75	30.75	30.75	30.75	in
5	44.00	44.00	44.00	44.00	in
6	56.44	56.44	56.44	55.81	in
7	58.53	58.53	58.53	59.69	in

Total area of longitudinal reinforcement	$A_{s,l} =$	24.04	35.44	35.07	4.86	in ²
Centroid location of long. reinforcement	$y_{A_{s,l}} =$	43.66	43.11	31.31	27.86	in
Ecc. btw/ long. reinf. and gross section centroids	$e_{A_{s,l}} =$	11.55	10.64	-0.80	-2.37	in

Transverse reinforcement

Girder

	LG	CG	RG	DH	
--	----	----	----	----	--

Top slab - Transverse reinforcement

- Top reinforcement mat

Bar size	#6	#6	#6	-	
Bar diameter	0.75	0.75	0.75	-	in

- Bottom reinforcement mat

Bar size	#6	#6	#6	#5	
Bar diameter	0.75	0.75	0.75	0.625	in

Bottom slab - Transverse reinforcement

- Top reinforcement mat

Bar size	#5	#5	#5	-	
Bar diameter	0.625	0.625	0.625	-	in

- Bottom reinforcement mat

Bar size	#5	#5	#5	#5	
Bar diameter	0.625	0.625	0.625	0.625	in

Center-to-center torsion reinforcement spacing	$s_t =$	18.0	18.0	18.0	-	in
------------------------------------------------	---------	------	------	------	---	----

Web shear reinforcement

Girder

	LG	CG	RG	DH	
--	----	----	----	----	--

Bar size	#5	#5	#5	#4	
Bar diameter	0.625	0.625	0.625	0.50	in
Bar area	0.31	0.31	0.31	0.20	in ²
Number of legs of transverse reinforcement	$N_{legs} =$	2	2	2	2

Center-to-center shear reinforcement spacing	$s_v =$	6.00	6.00	5.00	14.0	in
Effective area of transverse reinforcement	$A_v =$	0.62	0.62	0.62	0.40	in ²
Angle of inclination to longitudinal axis	$\alpha =$	90.0	90.0	90.0	90.0	deg

Diaphragm flange reinforcement for in-plane bending and lateral shear assessment

Notes:

- The distance to layer centroid, d_i , is measured from the flange width ends.
- Of the four flange bars adjacent to the web shear reinforcement in the typical diaphragm section, only two were conservatively included in the capacity calculations, as these are the ones needed to tie the web and flange reinforcement. The concern arises because this reinforcement is not spaced in accordance with the transverse flange reinforcement.

Diaphragm top flange					Diaphragm bottom flange				
Layer	Bar size	Bars	$A_{s,i}$ [in ²]	d_i [in]	Layer	Bar size	Bars	$A_{s,i}$ [in ²]	d_i [in]
1	#6	2	0.88	9.13	1	#5	2	0.62	9.00
2	#6	1	0.44	15.13	2	#5	1	0.31	15.19
3	#6	1	0.44	20.88	3	#5	1	0.31	20.81
4	#6	2	0.88	26.88	4	#5	2	0.62	27.00

Reinforcement covers

Top slab - Transverse reinforcement

Clear cover to top mat transverse reinf.	$cover_{top,ts} =$	1.50	1.50	1.50	1.50	in
Clear cover to bot. mat transverse reinf.	$cover_{bot,ts} =$	1.00	1.00	1.00	1.00	in

Bottom slab - Transverse reinforcement

Clear cover to top mat transverse reinf.	$cover_{top,bs} =$	1.00	1.00	1.00	1.00	in
Clear cover to bot. mat transverse reinf.	$cover_{bot,bs} =$	1.00	1.00	1.00	1.00	in

Girder and diaphragm - Web shear reinforcement

Clear cover to web shear reinforcement	$cover_{ws} =$	1.50	1.50	1.50	1.50	in
----------------------------------------	----------------	------	------	------	------	----

2.2 Substructure geometry and reinforcement

Pier column gross section

Column	C15
Pier column diameter	$D_c = 6.0$ ft
Pier column gross area	$A_{g,c} = 4072$ in ²

Longitudinal reinforcement

Number of bars	$N_{bl} = 20$	
Bar size _l	#14	
Bar diameter	1.69	in
Bar area	2.25	in ²
Area of longitudinal reinforcement	$A_{sl} = 45.00$	in ²
Longitudinal reinforcement ratio	$\rho_{sl} = 0.011$	
Number of rows of reinforcement	10	- Two bars at section bottom
Reinforcement ring radius	$r_{bl} = 33.154$	in
Angular spacing of bars	$\theta_{bl} = 18.00$	deg
Spacing of bars along circumference	$S_{bl} = 10.42$	in

Transverse reinforcement

Center-to-center hoop spacings:		
	$S_{h,ends} =$	6.0 in
	$S_{h,mid} =$	12.0 in
Bar size _t	#4	
Bar diameter	0.50	in
Bar area	0.20	in ²

Reinforcement cover

Clear cover to hoop reinforcement $cover_n = 1.50$ in

3. Flexural capacities of superstructure sections

Equivalent rectangular stress block parameters

$\alpha_1 =$	0.85	A. BDS. 5.6.2.2
$\beta_1 =$	0.85	A. BDS. 5.6.2.2
$k_c =$	0.85	A. BDS. 5.6.4.4

Strain limits

Tension-controlled strain limit	$\epsilon_{ti} = 0.005$	in/in	A. BDS. 5.6.2.1
Compression-controlled strain limit	$\epsilon_{ci} = 0.001$	in/in	A. BDS. 5.6.2.1
Strain limit of concrete in compression	$\epsilon_{cu} = 0.003$	in/in	A. BDS. 5.6.2.1

Flexural capacities

Last update: **2/3/2026 9:21**

Notes:

- The auxiliary variable, Z, is a multiplier of the yield strain and is used to define specific values of strain in the extreme layer of tension reinforcement. Positive values correspond to compressive strains.
- (+) values of $y_{bar,c}$ indicate that the concrete compression zone centroid is above the gross section centroid.
- (-) values of $y_{bar,t}$ indicate that the resultant tensile force is below the gross section centroid.
- Positive strain, stress and force values are compressive.
- Moments are evaluated about the centroid of the section, because moments from structural analysis are reported with respect to this axis.

Neglect web reinforcement on capacity? No

Region	(+)	(-)	Which girder to update?	DH
Auxiliary variable	Z = -57.30	-57.12		
Depth to the neutral axis	c = 2.18	2.17	$c = [\epsilon_{cu}/(\epsilon_{cu} - Z\epsilon_y)]d_t$	
Depth of the equivalent rectangular stress block	a = 1.86	1.84	A. BDS. 5.6.2.2	
Area of flange concrete compression zone	$A_{c,f} = 44.53$	44.24	$A_{c,f} = b_f \min(a, t_f)$	
Area of web concrete compression zone	$A_{c,w} = 0.00$	0.00	$A_{c,w} = b_w \max(a - t_f, 0)$	
Area of concrete compression zone	$A_c = 44.53$	44.24	$A_c = A_{c,f} + A_{c,w}$	
Centroid of flange concrete compression zone	$y_{bar,c,f} = 29.57$	29.58	$y_{bar,c,f} = [h - \min(a, t_f)]/2$	
Centroid of web concrete compression zone	$y_{bar,c,w} = 23.50$	24.00	$y_{bar,c,w} = h/2 - t_f \max(a - t_f, 0)/2$	
Centroid of concrete compression zone	$y_{bar,c} = 29.57$	29.58	$y_{bar,c} = (A_{c,f} y_{bar,c,f} + A_{c,w} y_{bar,c,w})/A_c$	
Location of resultant tensile force	$y_{bar,t} = 3.11$	7.29	$y_{bar,t} = \sum M_{si,t} / F_{si,t} $	
Resultant of concrete compression force	$C_c = 151.4$	150.4	$C_c = \alpha_1 f'_c A_c$	
Nominal axial load capacity	$P_n = 0.0$	0.0	$P_n = C_c + \sum F_{si}$	
Nominal moment capacity	$M_n = 433$	520	$M_n = C_c y_{bar,c} + \sum M_{si}$	
Strength reduction factor	$\phi = 0.90$	0.90	A. BDS. 5.5.4.2	
Factored axial load capacity	$\phi P_n = 0.0$	0.0	A. BDS. Eq. 5.6.4.4-1	
Factored moment capacity	$\phi M_n = 390$	468	A. BDS. 5.6.3.2.1-1	

Update Flexural Capacities

Forces and moments from reinforcement

OK OK

Notes:

- Measured from the most compressed concrete fiber, d_i indicates the centroid location of bars in a row.

Girder	DH	Section		M (+)				M (-)					
		(+)	(-)	ϵ_{si}	f_{si}	F_{si}	M_{si}	ϵ_{si}	f_{si}	F_{si}	M_{si}		
Bar Layer		$A_{s,i}$	$d_{i,M(+)}$	$d_{i,M(-)}$	[in/in]	[ksi]	[k]	[k.ft]	[in/in]	[ksi]	[k]	[k.ft]	
(Outermost)	Top	1	0.88	1.88	59.13	0.0004	12.27	7.8	18.6	-0.0788	-40.00	-35.2	84.0
	Top	2	0.88	5.63	55.38	-0.0047	-40.00	-35.2	-73.0	-0.0736	-40.00	-35.2	73.0
(Top)	Side	3	0.62	17.50	43.50	-0.0211	-40.00	-24.8	-26.9	-0.0572	-40.00	-24.8	26.9
	Side	4	0.62	30.75	30.25	-0.0393	-40.00	-24.8	0.5	-0.0388	-40.00	-24.8	-0.5
	Side	5	0.62	44.00	17.00	-0.0575	-40.00	-24.8	27.9	-0.0205	-40.00	-24.8	-27.9
(Outermost)	Bot	6	0.62	55.81	5.19	-0.0737	-40.00	-24.8	52.3	-0.0042	-40.00	-24.8	-52.3
	Bot	7	0.62	59.69	1.31	-0.0790	-40.00	-24.8	60.3	0.0012	34.35	19.2	46.7

Demand-capacity ratios in flexure

Last update: **2/3/2026 9:28**

Notes:

- When computing D/C ratios, the pure flexure capacities computed above were reduced when tension loads were present. The capacity was linearly reduced by assuming a linear portion connecting the pure tensile and flexure capacities in the interaction diagram. In the presence of compression

loads, capacities were conservatively kept constant. This was not performed for diaphragms.

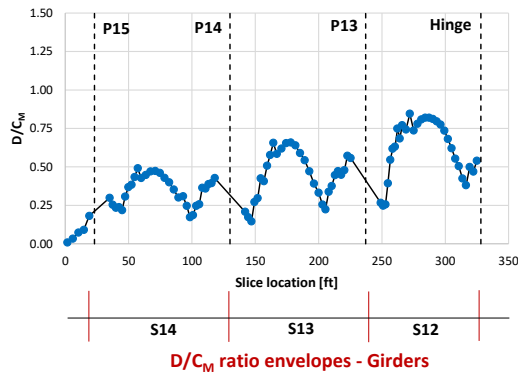
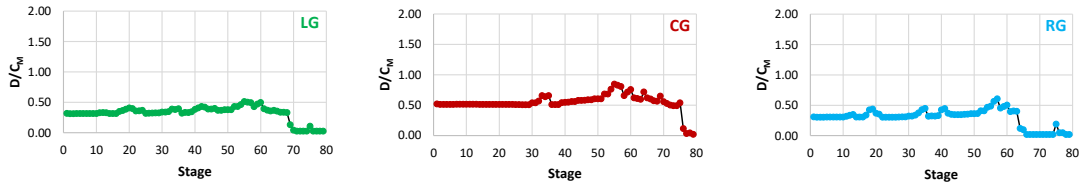
- Peak demand-capacity ratios in flexure

Girder/Diaph.	LG	CG	RG	S14BC	S14AB	S13BC	S13AB	S12CD	S12BC
D/C _{max}	0.51	0.85	0.61	0.30	0.50	0.30	0.49	0.37	0.32
Stage	55	55	57	19	20	41	42	64	63

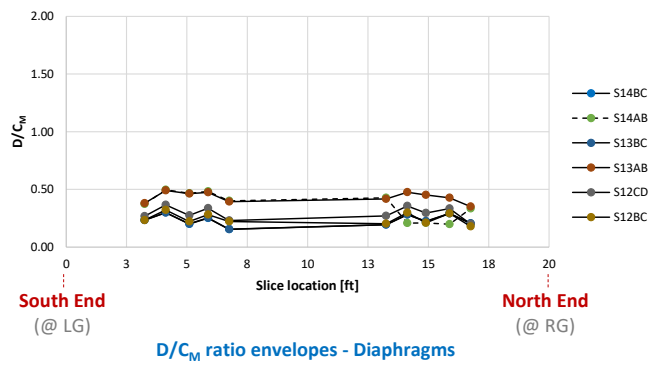
Which girder to update? **DH**

Update D/C Ratios in Flexure

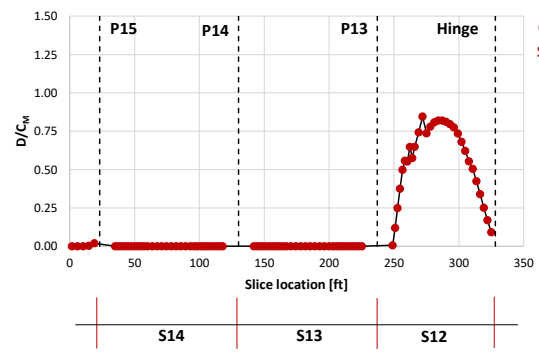
- Envelope of demand-capacity ratios in flexure



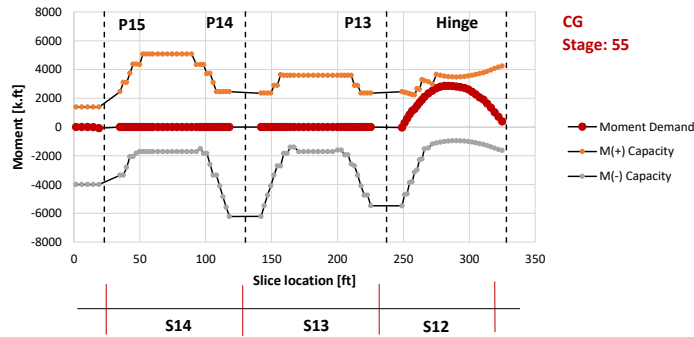
Girder: CG



- Demand-capacity ratios in flexure for selected girder and stage



Girder: CG
 Stage: 55
 Stage description:
 D/C_{M,max}: 0.85
 Location: 272.028 ft
 Section: 77
 Slice: Center Girder Slice 77



4. Shear capacities of superstructure sections

Factored loads

Last update: **2/3/2026 14:12**

Notes:

- N_u (+): tension, N_u (-): compression, A. BDS. 5.7.3.4.2
- Axial compression loads acting on the section are not neglected.

Which girder to update? **CG**

Update Capacities and D/C Ratios in Shear

Girder	Diaph.	Stage	Section	Sign M_u
CG	-	57	72	(+)

Neglect axial compression? **No**

Factored moment	$ M_u =$	21862	k.in	A. BDS. 5.7.3.4.2
Factored shear force	$ V_u =$	170.63	k	
Factored axial force	$N_u =$	28.42	k	
Factored torsional moment	$T_u =$	69.34	k.ft	

4.1 Shear capacities of superstructure sections

Net longitudinal tensile strain in the section at the centroid of tension reinforcement

Notes:

- When the moment demand is zero, the minimum of the steel areas on the flexural tension sides for $M(+)$ and $M(-)$ is conservatively assumed as the effective steel area on the flexural tension side. A similar approach is taken for the effective shear depth (i.e., the shear depth is minimized).

Steel area on the flexural tension side	$A_s =$	17.09	in ²	A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-1
Effective shear depth:				
	$y_{bar,c} + y_{bar,t} =$	45.63	in	
	$0.9(0.5h + y_{bar,t}) =$	42.41	in	
	$d_v =$	45.63	in	A. BDS. 5.7.2.8, Eq. 5.7.2.8-2
Net longitudinal tensile strain	$\epsilon_s =$	0.0013	in/in	A. BDS. Eq. 5.7.3.4.2-4

Minimum transverse reinforcement

Notes:

- This requirement applies to sections where transverse reinforcement is required.

Effective web width	$b_w =$	13.0	in	A. BDS. 5.7.2.8
Minimum required transverse reinf.	$A_{v,min} =$	0.16	in ²	A. BDS. Eq. 5.7.2.5-1
	$A_{v,min} / A_v =$	0.27		OK

Shear resistance parameters

Notes:

- When minimum shear reinforcement is not provided, the following assumptions are made:
 - The crack spacing parameter, s_x , is conservatively taken as equal to the effective shear depth, d_v .
 - The maximum aggregate size, a_g , is assumed to be 0.75 in.

A. BDS. Eq. 5.7.3.4.2-1 applicable?	Yes			
Crack spacing parameter	$s_x =$	-	in	A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-3a
Maximum aggregate size	$a_g =$	-	in	
Crack spacing parameter as influenced by a_g	$s_{xe} =$	-	in	A. BDS. Eq. 5.7.3.4.2-7
	$\beta =$	2.39		A. BDS. Eq. 5.7.3.4.2-1 or -2
	$\theta =$	33.7	deg	A. BDS. Eq. 5.7.3.4.2-3

Shear capacity

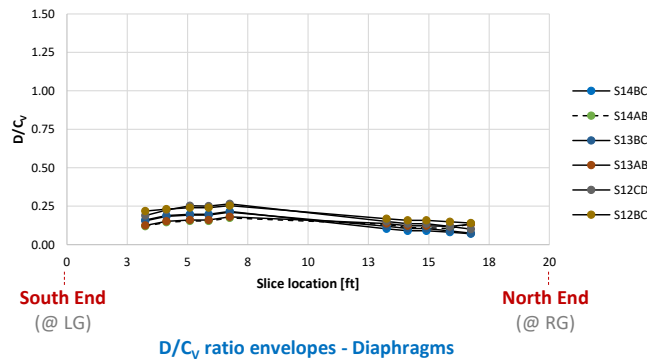
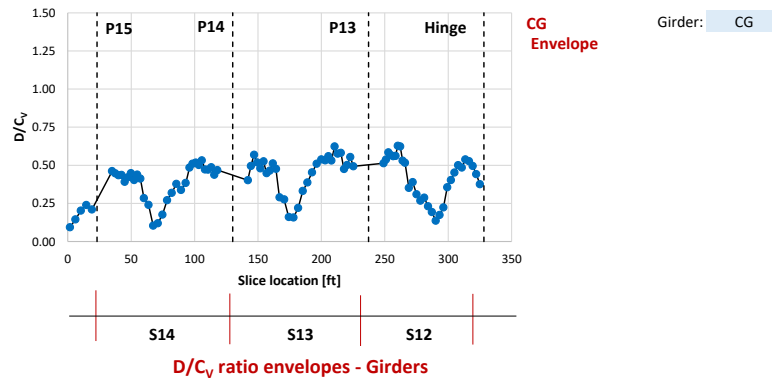
Nominal shear resistance of concrete	$V_c =$	90	k	A. BDS. Eq. 5.7.3.3-3
Shear resistance provided by transverse reinf.	$V_s =$	212	k	A. BDS. Eq. 5.7.3.3-4
Nominal shear resistance	$V_n =$	302	k	A. BDS. Eq. 5.7.3.3-1, 2
Strength reduction factor	$\phi =$	0.90		A. BDS. 5.5.4.2
Factored shear resistance	$\phi V_n =$	272	k	A. BDS. Eq. 5.7.2.1-1
D/C =		0.63		OK

Demand-capacity ratios in shear

- Peak demand-capacity ratios in shear

Girder/Diaph.	LG	CG	RG	S14BC	S14AB	S13BC	S13AB	S12CD	S12BC
D/C _{max}	0.29	0.63	0.35	0.22	0.17	0.21	0.18	0.26	0.25
Stage	33	57	34	21	23	43	45	57	69

- Envelope of demand-capacity ratios in shear



5. Torsion capacities of superstructure sections

5.1 Torsion capacities of girders

5.1.1 Girder flange assessment for in-plane bending and axial load

Factored loads

Notes:
 - N_u (+): tension, N_u (-): compression.

Girder	Stage	Section
RG	64	66

Girder region

	TF	BF		
Factored axial force	$N_u =$	82.8	-39.8	k
Factored in-plane moment	$M_u =$	32.5	11.5	k.ft
		(+)	(+)	

Strain limits

Last update: **2/5/2026 8:55**

Which girder to update?

Update D/C Ratios for Girder Flanges under In-plane

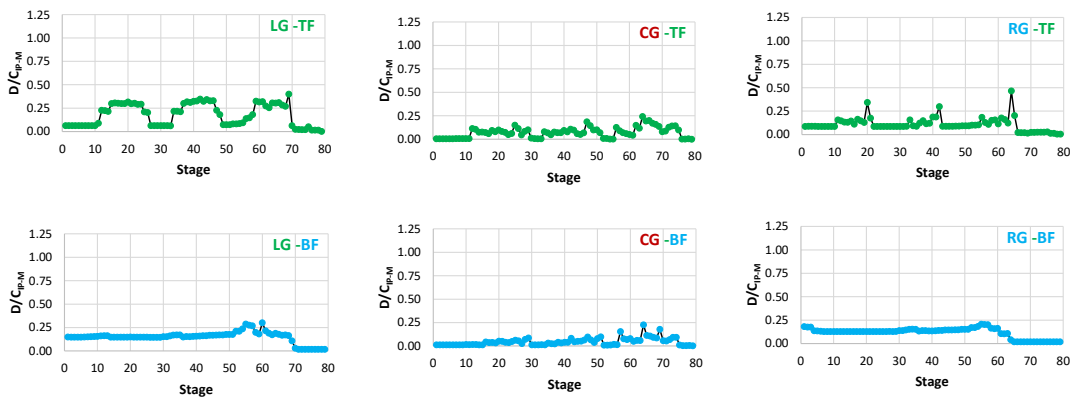
Bar Layer	A _{s,i} [in ²]	(+)		M (+)				M (-)			
		d _{i M(+)}	d _{i M(-)}	ε _{si}	f _{si}	F _{si}	M _{si}	ε _{si}	f _{si}	F _{si}	M _{si}
		[in]	[in]	[in/in]	[ksi]	[k]	[k.ft]	[in/in]	[ksi]	[k]	[k.ft]
1	2.25	3.00	43.50	0.0012	34.59	70.2	118.4	-	-	-	-
2	2.25	8.25	38.25	-0.0020	-40.00	-90.0	-112.5	-	-	-	-
3	2.25	13.50	33.00	-0.0051	-40.00	-90.0	-73.1	-	-	-	-
4	2.25	18.75	27.75	-0.0083	-40.00	-90.0	-33.8	-	-	-	-
5	0.31	21.00	25.50	-0.0096	-40.00	-12.4	-2.3	-	-	-	-
6	2.25	25.75	20.75	-0.0125	-40.00	-90.0	18.8	-	-	-	-
7	2.25	32.75	13.75	-0.0167	-40.00	-90.0	71.3	-	-	-	-
8	0.31	33.00	13.50	-0.0169	-40.00	-12.4	10.1	-	-	-	-
9	2.25	39.75	6.75	-0.0209	-40.00	-90.0	123.8	-	-	-	-
10	0.31	45.00	1.50	-0.0241	-40.00	-12.4	22.5	-	-	-	-

Demand-capacity ratios for girder flange in-plane bending and axial load

- Peak demand-capacity ratios for in-plane bending and axial load

Girder Region	LG		CG		RG	
	TF	BF	TF	BF	TF	BF
D/C _{max}	0.40	0.30	0.24	0.23	0.47	0.21
Stage	69	60	64	64	64	55

- Envelope of demand-capacity ratios for in-plane bending and axial load



5.1.2 Girder flange assessment for lateral shear

Factored loads

Notes:
 - N_i (+): tension, N_i (-): compression.

Girder	Stage	Section
RG	55	66

Girder region

TF	BF
----	----

Last update: 2/3/2026 16:41

Update D/C Ratios for Girder Flange Lateral Shear

Neglect axial compression? No

Factored axial force	$N_u =$	-13.90	0.00	k	
Factored shear force	$ V_u =$	59.29	0.00	k	
Factored in-plane moment	$M_u =$	5.03	0.00	k.ft	
Effective factored in-plane moment	$ M_u =$	1472.66	0.00	k.in	A. BDS. 5.7.3.4.2
		(+)			

Net longitudinal tensile strain in the section at the centroid of tension reinforcement

Notes:

- When the moment demand is zero, the minimum of the steel areas on the flexural tension sides for M(+) and M(-) is conservatively assumed as the effective steel area on the flexural tension side.
- The effective shear depth is assumed as equal to 0.72h.

Gross section height for lateral shear	$h =$	34.50	46.50	in	
Steel area on the flexural tension side:					A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-1
	$A_s (+) =$	7.68	7.37	in ²	
	$A_s (-) =$	7.37	9.31	in ²	
	$A_s =$	7.68	7.37	in ²	
Effective shear depth	$d_v =$	24.84	33.48	in	A. BDS. 5.7.2.8, Eq. 5.7.2.8-2
Net longitudinal tensile strain	$\epsilon_s =$	0.0005	0.0000	in/in	A. BDS. Eq. 5.7.3.4.2-4

Shear reinforcement

	#6	#5	
Bar size			
Bar diameter	0.75	0.625	in
Bar area	0.44	0.31	in ²
Number of legs of transverse reinforcement	$N_{legs} =$	2	2
Effective area of transverse reinforcement	$A_v =$	0.88	0.62 in ²
Angle of inclination to longitudinal axis	$\alpha =$	90.0	90.0 deg
Shear reinforcement spacing	$s_v =$	6.0	18.0 in
Minimum clear cover to the nearest concrete surface		1.00	1.00 in

Development lengths of transverse reinforcement

- Modification factors:

Concrete density modification factor	$\lambda =$	1.00	1.00	A. BDS. 5.4.2.8
Reinforcement location factor	$\lambda_{lf} =$	1.00	1.00	A. BDS. 5.10.8.2.1b
Coating factor	$\lambda_{cf} =$	1.00	1.00	A. BDS. 5.10.8.2.1b
Reinforcement confinement factor	$\lambda_{rc} =$	0.55	0.48	A. BDS. 5.10.8.2.1c
Excess reinforcement factor	$\lambda_{er} =$	1.00	1.00	A. BDS. Eq. 5.10.8.2.1c-4

- Development length:

Basic development length	$l_{db} =$	36.0	30.0	in	A. BDS. 5.10.8.2.1a-2
Modified tension development length	$l_d =$	19.6	14.3	in	A. BDS. Eq. 5.10.8.2.1a-1

Available development length and reinforcement stress

Available development length	$l_{d,a} =$	15.46	18.26	in
Available reinforcement stress	$f_{s,a} =$	31.50	40.00	ksi

Minimum transverse reinforcement

Minimum required transverse reinf.	$A_{v,min} =$	0.08	0.18	in ²	A. BDS. Eq. 5.7.2.5-1
	$A_{v,min} / A_v =$	0.10	0.30		
		OK	OK		

Shear resistance parameters

Notes:

- When minimum shear reinforcement is not provided, the following assumptions are made:
 - The crack spacing parameter, s_x , is conservatively taken as equal to the effective shear depth, d_v .
 - The maximum aggregate size, a_g , is assumed to be 0.75 in.

A. BDS. Eq. 5.7.3.4.2-1 applicable?		Yes	Yes		
Crack spacing parameter	$s_x =$	-	-	in	A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-3a
Maximum aggregate size	$a_g =$	-	-	in	
Crack spacing parameter as influenced by a_g	$s_{xe} =$	-	-	in	A. BDS. Eq. 5.7.3.4.2-7

$\beta = 3.49 \quad 4.80$ A. BDS. Eq. 5.7.3.4.2-1 or -2
 $\theta = 30.8 \quad 29.0$ deg A. BDS. Eq. 5.7.3.4.2-3

Shear capacity

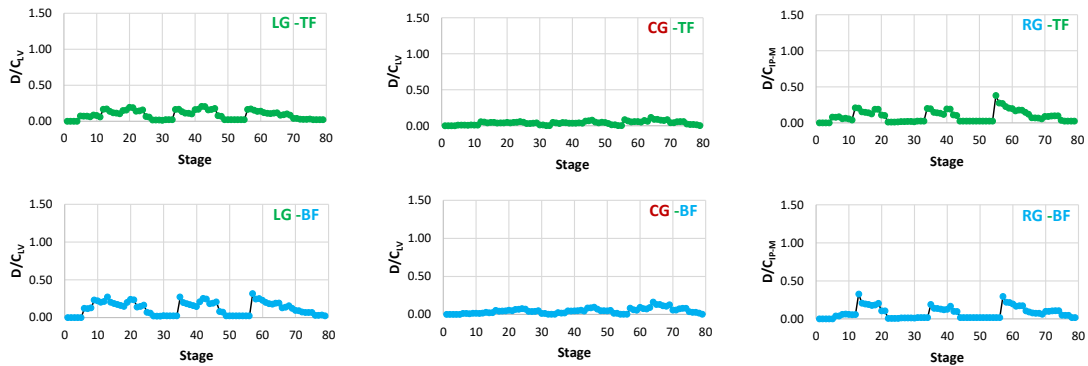
Effective web width	$b_v = 7.00 \quad 6.50$ in	A. BDS. 5.7.2.8
Nominal shear resistance of concrete	$V_c = 38.34 \quad 66.02$ k	A. BDS. Eq. 5.7.3.3-3
Shear resistance provided by transverse reinf.	$V_s = 192.88 \quad 83.22$ k	A. BDS. Eq. 5.7.3.3-4
Nominal shear resistance	$V_n = 173.88 \quad 149.23$ k	A. BDS. Eq. 5.7.3.3-1, 2
Strength reduction factor	$\phi = 0.90 \quad 0.90$	
Factored shear resistance	$\phi V_n = 156.49 \quad 134.31$ k	A. BDS. Eq. 5.7.2.1-1
	D/C = 0.38 0.00	
	OK OK	

Demand-capacity ratios for girder flange lateral shear

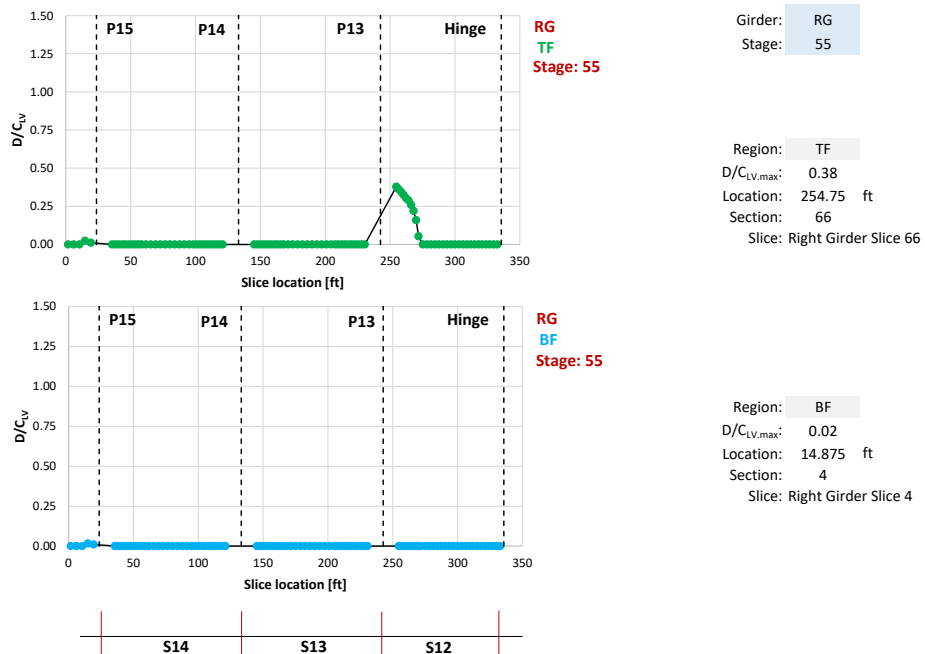
- Peak demand-capacity ratios for lateral shear

Girder Region	LG		CG		RG	
	TF	BF	TF	BF	TF	BF
D/C _{max}	0.21	0.32	0.11	0.16	0.38	0.33
Stage	42	57	64	64	55	13

- Envelope of demand-capacity ratios for lateral shear



- Demand-capacity ratios for lateral shear for selected girder and stage



5.2 Torsion capacities of diaphragms

5.2.1 Diaphragm flange assessment for in-plane bending and axial load

Last update: 2/9/2026 8:54

Factored loads

Peak top flange in-plane bending moment	$ M_{u,tf} =$	77.77	k.ft
Concurrent axial force	$P_{u,tf} =$	27.26	k
Peak bottom flange in-plane bending moment	$ M_{u,bf} =$	31.15	k.ft
Concurrent axial force	$P_{u,bf} =$	5.82	k

Update D/C Ratios for Diaphragm Flanges under In-plane Bending and Axial Load

Capacities and demand-capacity ratios for diaphragm flange in-plane bending and axial loads

Strain limits

Tension-controlled strain limit	$\epsilon_{ti} =$	0.005	A. BDS. 5.6.2.1
Compression-controlled strain limit	$\epsilon_{ci} =$	0.001379	A. BDS. 5.6.2.1
Strain limit of concrete in compression	$\epsilon_{cu} =$	0.003	A. BDS. 5.6.2.1

Diaphragm flange capacities for in-plane bending

Notes:

- The auxiliary variable, Z, is a multiplier of the yield strain and is used to define specific values of strain in the extreme layer of tension reinforcement. Positive values correspond to compressive strains.
- (+) values of $y_{bar,c}$ indicate that the concrete compression zone centroid is above the gross section centroid.
- (+) values of $y_{bar,t}$ indicate that the resultant tensile force is below the gross section centroid.
- Positive strain, stress and force values are compressive.
- Moments are evaluated about the centroid of the section, because moments from structural analysis are reported with respect to this axis.

Diaphragm region	TF	BF	
Auxiliar variable	Z = -12.92	-13.91	
Depth to the neutral axis	c = 3.87	3.65	in
Depth of equivalent rectangular stress block	a = 3.29	3.10	in
Area of concrete compression zone	$A_c = 23.04149$	20.17	in ²
Centroid of concrete compression zone	$y_{bar,c} = 16.35$	16.45	in
Location of resultant tensile force	$y_{bar,t} = 0.00$	0.00	in
Resultant of concrete compression force	$C_c = 78.3$	68.6	k
Nominal axial load capacity	$P_n = -27.26$	-5.82	k
Nominal moment capacity	$M_n = 107$	94	k.ft
Strength reduction factors:	$\phi = 0.90$	0.90	
Factored moment capacity	$\phi M_n = 96.1$	84.6	k.ft

Forces and moments from reinforcement

OK OK

Notes:

- Measured from the most compressed concrete fiber, d_i indicates the centroid location of bars in a row.

Bar Layer	$A_{s,i}$ [in ²]	d_i [in]	Diaphragm top flange			
			ϵ_{si} [in/in]	f_{si} [ksi]	F_{si} [k]	M_{si} [k.ft]
1	0.88	9.13	-0.00407	-40.00	-35.20	-26.03
2	0.44	15.13	-0.00872	-40.00	-17.60	-4.22
3	0.44	20.88	-0.01317	-40.00	-17.60	4.22
4	0.88	26.88	-0.01782	-40.00	-35.20	26.03

Bar Layer	$A_{s,i}$ [in ²]	d_i [in]	Diaphragm bottom flange			
			ϵ_{si} [in/in]	f_{si} [ksi]	F_{si} [k]	M_{si} [k.ft]
1	0.62	9.00	-0.0044	-40.00	-24.80	-18.60
2	0.31	15.19	-0.00948	-40.00	-12.40	-2.91
3	0.31	20.81	-0.0141	-40.00	-12.40	2.91
4	0.62	27.00	-0.01919	-40.00	-24.80	18.60

Demand-capacity ratios for diaphragm flange in-plane bending

Diaphragm region

	TF	BF
D/C =	0.81	0.37
	OK	OK

5.2.2 Diaphragm flange assessment for lateral shear

Factored loads

Notes:

- P_u (+): tension, P_u (-): compression.

Girder region	TF	BF	
Stage	69	69	
Section number	1	2	
Slice location	3.25	4.63	ft
Load case number	32	34	
Controlling diaphragm	S12BC	S12BC	
Concurrent axial force	$N_u = 6.23$	-6.25	k
Peak lateral shear force	$ V_u = 34.16$	41.53	k
Concurrent in-plane moment	$M_u = 58.37825$	-19.55	k.ft
Effective factored in-plane moment	$ M_u = 885.31$	1076.37	k.in

Neglect axial compression? **No**

A. BDS. 5.7.3.4.2

Net longitudinal tensile strain in the section at the centroid of tension reinforcement

Notes:

- The effective shear depth is assumed as equal to 0.72h.

Gross section height for lateral shear	$h = 36.00$	36.00	in	
Steel area on the flexural tension side	$A_s = 1.32$	0.93	in ²	A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-1
Effective shear depth	$d_v = 25.92$	25.92	in	A. BDS. 5.7.2.8, Eq. 5.7.2.8-2
Net longitudinal tensile strain	$\epsilon_s = 0.0019$	0.0030	in/in	A. BDS. Eq. 5.7.3.4.2-4

Shear reinforcement

Notes:

- The diaphragm top flange shear reinforcement at the controlling slice consists of #5 @ 6" in the bottom mat and #5 @ 12" in the top mat. For conservatism, #5 @ 12" was assumed for both mats.

- The diaphragm bottom flange shear reinforcement at the controlling slice consists of #14 @ 10" in the bottom mat and #5 @ 12" in the top mat. Conservatively, #5 @ 12" was assumed for both mats. Note that a single mat of #14 @ 10" was also evaluated to determine whether this configuration would exacerbate development-length demands. This was not the case, so the conservative assumption described above is used in the calculations.

	#5	#5	
Bar size	0.625	0.625	in
Bar diameter	0.31	0.31	in ²
Bar area	$N_{legs} = 2$	2	
Number of legs of transverse reinforcement	$A_v = 0.62$	0.62	in ²
Effective area of transverse reinforcement	$\alpha = 90.0$	90.0	deg
Angle of inclination to longitudinal axis	$s_v = 12.0$	12.0	in
Shear reinforcement spacing	1.75	1.63	in
Minimum clear cover to the nearest concrete surface			

Development lengths of transverse reinforcement

- Modification factors:

Concrete density modification factor	$\lambda = 1.00$	1.00	A. BDS. 5.4.2.8
Reinforcement location factor	$\lambda_{rl} = 1.00$	1.00	A. BDS. 5.10.8.2.1b
Coating factor	$\lambda_{cf} = 1.00$	1.00	A. BDS. 5.10.8.2.1b
Reinforcement confinement factor	$\lambda_{rc} = 0.40$	0.40	A. BDS. 5.10.8.2.1c
Excess reinforcement factor	$\lambda_{er} = 1.00$	1.00	A. BDS. Eq. 5.10.8.2.1c-4

- Development length:

Basic development length	$l_{db} = 30.0$	30.0	in	A. BDS. 5.10.8.2.1a-2
Modified tension development length	$l_d = 12.0$	12.0	in	A. BDS. Eq. 5.10.8.2.1a-1

Available development length and reinforcement stress

Available development length	$l_{d,a} = 13.72$	13.08	in
Available reinforcement stress	$f_{s,a} = 40.00$	40.00	ksi

Minimum transverse reinforcement

Minimum required transverse reinf.	$A_{v,min} =$	0.13	0.12	in ²	A. BDS. Eq. 5.7.2.5-1
	$A_{v,min} / A_v =$	0.21	0.20		
		OK	OK		

Shear resistance parameters

Notes:

- When minimum shear reinforcement is not provided, the following assumptions are made:
 - The crack spacing parameter, s_x , is conservatively taken as equal to the effective shear depth, d_v .
 - The maximum aggregate size, a_g , is assumed to be 0.75 in.

A. BDS. Eq. 5.7.3.4.2-1 applicable?	Yes	Yes			
Crack spacing parameter	$s_x =$	-	-	in	A. BDS. 5.7.3.4.2, Fig. 5.7.3.4.2-3a
Maximum aggregate size	$a_g =$	-	-	in	
Crack spacing parameter as influenced by a_g	$s_{xe} =$	-	-	in	A. BDS. Eq. 5.7.3.4.2-7
	$\beta =$	2.00	1.49		
	$\theta =$	35.5	39.4	deg	A. BDS. Eq. 5.7.3.4.2-3

Shear capacity

Effective web width	$b_w =$	7.00	6.50	in	A. BDS. 5.7.2.8
Nominal shear resistance of concrete	$V_c =$	22.94	15.86	k	A. BDS. Eq. 5.7.3.3-3
Shear resistance provided by transverse reinf.	$V_s =$	75.02	65.28	k	A. BDS. Eq. 5.7.3.3-4
Nominal shear resistance	$V_n =$	97.95	81.14	k	A. BDS. Eq. 5.7.3.3-1, 2
Strength reduction factor	$\phi =$	0.90	0.90		
Factored shear resistance	$\phi V_n =$	88.16	73.02	k	A. BDS. Eq. 5.7.2.1-1
	D/C =	0.39	0.57		
		OK	OK		

5.2.3 Diaphragm web assessment for out-of-plane bending

Factored loads

Peak out-of-plane moment	4.18	k.ft/ft
--------------------------	------	---------

Development length of reinforcement resisting out-of-plane bending

- Modification factors:

Reinforcement confinement factor	$\lambda_{rc} =$	0.80		A. BDS. 5.10.8.2.4b
Coating factor	$\lambda_{cw} =$	1.00		A. BDS. 5.10.8.2.4b
Excess reinforcement factor	$\lambda_{er} =$	1.00		A. BDS. 5.10.8.2.4b
Concrete density modification factor	$\lambda =$	1.00		A. BDS. 5.4.2.8

- Development length:

Basic development length	$l_{hb} =$	6.33	in	A. BDS. 5.10.8.2.4a-2
Modified tension development length	$l_{dh} =$	5.07	in	A. BDS. Eq. 5.10.8.2.1a-1

Available development length and reinforcement stress

Available development length	$l_{d,a} =$	2.25	in
Available reinforcement stress	$f_{s,a} =$	0.44	fy

Diaphragm web out-of-plane bending capacity

Chamfer dimension	$d_{ch} =$	5.875	in	- At diaphragm web and flange intersection
-------------------	------------	-------	----	--------------------------------------------

Reinforcement location:

$d_{s,int} =$	7.625	in
$d_{s,ext} =$	12.125	in

Reinforcement effective depth	$d_s =$	9.875	in
Diaphragm web design width	$b_{eff} =$	12.0	in
Effective area of flexural reinforcement	$A_{s,eff} =$	0.34	in ² /ft

- Strain limits

Tension-controlled strain limit	$\epsilon_{ti} = 0.005$	in/in	A. BDS. 5.6.2.1
Compression-controlled strain limit	$\epsilon_{ci} = 0.001379$	in/in	A. BDS. 5.6.2.1
Strain limit of concrete in compression	$\epsilon_{cu} = 0.003$	in/in	A. BDS. 5.6.2.1

- Flexural capacity

Notes:

- Positive strains are tension strains.

Depth of equivalent rectangular stress block	$a = 0.34$	in	A. BDS. Eq. 5.6.3.1.1-4
Depth to the neutral axis	$c = 0.40$	in	A. BDS. 5.6.2.2

$c/d_{s,int} = 0.05$	
$(c/d_s)_{limit} = 0.69$	A. BDS. Eq. 5.6.2.1-1
OK	

Strain in the extreme tension steel	$\epsilon_t = 0.089$	in/in
-------------------------------------	----------------------	-------

Nominal moment capacity	$M_n = 11.09$	k.ft/ft	A. BDS. Eq. 5.6.3.2.2-1
Strength reduction factor	$\phi = 0.90$		A. BDS. 5.5.4.2
Factored moment capacity	$\phi M_n = 9.98$	k.ft/ft	A. BDS. 5.6.3.2.1-1

Effective factored moment capacity	$\phi M_{n,eff} = 4.43$	k.ft/ft
$D/C = 0.94$		
OK		

6. Column capacities for the interaction of axial loads and bending moments

Column	<u>C15</u>
--------	------------

Equivalent rectangular stress block parameters

$\alpha_1 = 0.85$	A. BDS. 5.6.2.2
$\beta_1 = 0.85$	A. BDS. 5.6.2.2
$k_c = 0.85$	A. BDS. 5.6.4.4

Strain limits

Tension-controlled strain limit	$\epsilon_{ti} = 0.005$	A. BDS. 5.6.2.1
Compression-controlled strain limit	$\epsilon_{ci} = 0.001379$	A. BDS. 5.6.2.1
Strain limit of concrete in compression	$\epsilon_{cu} = 0.003$	A. BDS. 5.6.2.1

Compressive axial capacity

Nominal compressive axial capacity	$P_n = 12392.09$	k	A. BDS. Eq. 5.6.4.4-3
Resistance factor	$\phi = 0.75$		A. BDS. 5.5.4.2
Factored compressive axial capacity	$\phi P_n = 9294$	k	A. BDS. Eq. 5.6.4.4-1

Tensile axial capacity

Nominal tensile axial capacity	$P_n = -1800$	k	A. BDS. 5.6.6.1, Eq. 5.8.2.4.1-1
Resistance factor	$\phi = 0.90$		A. BDS. 5.5.4.2
Factored tensile axial capacity	$\phi P_n = -1620$	k	A. BDS. Eq. 5.6.6.1-1

Update Capacities and D/C Ratios for P-M

Capacities at different strain distributions

Last update: **2/5/2026 13:51**

Notes:

- The auxiliary variable, Z, is a multiplier of the yield strain and is used to define specific values of strain in the extreme layer of tension reinforcement. Positive values correspond to compressive strains.
- (+) values of $y_{bar,c}$ indicate that the concrete compression zone centroid is above the gross section centroid.
- (-) values of $y_{bar,t}$ indicate that the resultant tensile force is below the gross section centroid.
- Positive strain, stress and force values are compressive.
- Moments are evaluated about the centroid of the section, because moments from structural analysis are reported with respect to this axis.

Auxiliar variable	Z = 0	-0.5	-1.0	-2.5	-4.0	-11.74	
Depth to the neutral axis	c = 68.75	55.90	47.09	31.98	24.21	10.75	in
Depth of the equivalent rectangular stress block	a = 58.43	47.51	40.03	27.19	20.58	9.13	in
Angle defining concrete compression zone	$\alpha = 128.55$	108.65	96.43	75.83	64.64	41.73	deg
Area of concrete compression zone	$A_c = 3539$	2850	2325	1408	961	300	in ²
Centroid of concrete compression zone	$y_{bar,c} = 4.20$	9.28	13.13	20.14	23.89	30.56	in
Location of resultant tensile force	$y_{bar,t} = N/A$	30.29	28.42	22.49	18.40	10.47	in
Resultant of concrete compression force	$C_c = 12034$	9691	7906	4786	3266	1020	k

$$c = (\epsilon_{cu}/(\epsilon_{cu} - Z\epsilon_t))d_1$$

$$A. BDS. 5.6.2.2$$

$$\alpha = \cos^{-1}((0.5D_c - a)/(0.5D_c))$$

$$A_c = D_c^2(\alpha - \sin\alpha\cos\alpha)/4$$

$$y_{bar,c} = (D_c \sin\alpha)^3/12A_c$$

$$y_{bar,t} = \sum M_{s,i}/|F_{s,i}|$$

$$C_c = \alpha_1 f'_c A_c$$



Nominal axial load capacity	$P_n =$	13125	10434	8250	4566	2791	0.0	k	$P_n = C_c + \Sigma F_{si}$
Nominal moment capacity	$M_n =$	5421	9348	11179	10919	9270	4552	k.ft	$M_n = C_c Y_{bar,c} + \Sigma M_{si}$
Strength reduction factors:	$\phi =$	0.75	0.75	0.75	0.84	0.90	0.90		A. BDS. 5.5.4.2
Factored axial load capacity	$\phi P_n =$	9844	7825	6187	3816	2512	0	k	A. BDS. Eq. 5.6.4.4-1
Factored moment capacity	$\phi M_n =$	4066	7011	8384	9125	8343	4097	k.ft	A. BDS. 5.6.3.2.1-1

Forces and moments from reinforcement

OK

Notes:

- Y is the angle between the bottom vertical and the radius to one of the bars in a row.
- Measured from the most compressed concrete fiber, d_i indicates the centroid location of bars in a row.
- The bottom bar row has bars located based on half the angular spacing of bars to get a conservative estimate of the column moment capacity.

Bar Row	# bars	Y [deg]	d_i [in]	Z = 0				Z = -0.5			
				ϵ_{si}	f_{si}	F_{si}	M_{si}	ϵ_{si}	f_{si}	F_{si}	M_{si}
				[in/in]	[ksi]	[k]	[k.ft]	[in/in]	[ksi]	[k]	[k.ft]
Bottom 1	2	9.00	68.75	0	0.00	0.0	0.0	-0.00069	-20.00	-90.0	245.6
2	2	27.00	65.54	0.00014	4.06	3.0	-7.3	-0.00052	-15.01	-67.5	166.3
3	2	45.00	59.44	0.000406	11.77	37.7	-73.6	-0.00019	-5.52	-24.8	48.5
4	2	63.00	51.05	0.000772	22.39	85.5	-107.2	0.00026	7.54	18.6	-23.4
5	2	81.00	41.19	0.001203	34.88	141.6	-61.2	0.000789	22.89	87.7	-37.9
6	2	99.00	30.81	0.001655	40.00	164.7	71.2	0.001346	39.04	160.4	69.3
7	2	117.00	20.95	0.002086	40.00	164.7	206.6	0.001876	40.00	164.7	206.6
8	2	135.00	12.56	0.002452	40.00	164.7	321.8	0.002326	40.00	164.7	321.8
9	2	153.00	6.46	0.002718	40.00	164.7	405.4	0.002653	40.00	164.7	405.4
10	2	171.00	3.25	0.002858	40.00	164.7	449.4	0.002825	40.00	164.7	449.4
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

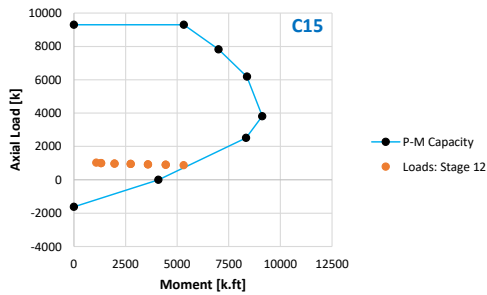
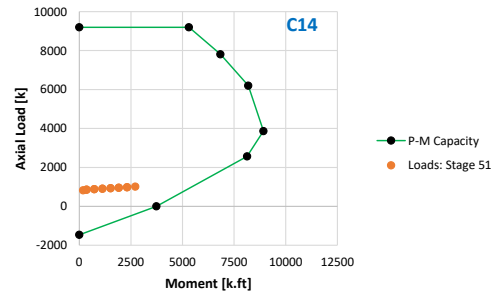
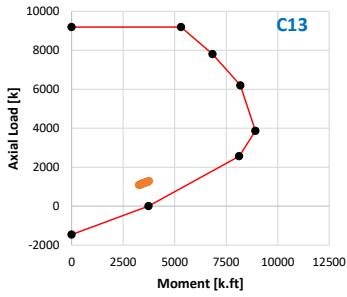
Bar Row	# bars	Y [deg]	d_i [in]	Z = -1				Z = -2.5			
				ϵ_{si}	f_{si}	F_{si}	M_{si}	ϵ_{si}	f_{si}	F_{si}	M_{si}
				[in/in]	[ksi]	[k]	[k.ft]	[in/in]	[ksi]	[k]	[k.ft]
Bottom 1	2	9.00	68.75	-0.00138	-40.00	-180.0	491.2	-0.00345	-40.00	-180.0	491.2
2	2	27.00	65.54	-0.00118	-34.08	-153.4	377.5	-0.00315	-40.00	-180.0	443.1
3	2	45.00	59.44	-0.00079	-22.82	-102.7	200.6	-0.00258	-40.00	-180.0	351.6
4	2	63.00	51.05	-0.00025	-7.31	-32.9	41.3	-0.00179	-40.00	-180.0	225.8
5	2	81.00	41.19	0.000376	10.91	33.8	-14.6	-0.00086	-25.03	-112.7	48.7
6	2	99.00	30.81	0.001037	30.07	120.0	51.9	0.00011	3.18	-1.0	-0.4
7	2	117.00	20.95	0.001666	40.00	164.7	206.6	0.001035	30.02	119.8	150.2
8	2	135.00	12.56	0.0022	40.00	164.7	321.8	0.001822	40.00	164.7	321.8
9	2	153.00	6.46	0.002588	40.00	164.7	405.4	0.002394	40.00	164.7	405.4
10	2	171.00	3.25	0.002793	40.00	164.7	449.4	0.002695	40.00	164.7	449.4
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Bar Row	# bars	Y [deg]	d_i [in]	Z = -4				Z = -11.74			
				ϵ_{si}	f_{si}	F_{si}	M_{si}	ϵ_{si}	f_{si}	F_{si}	M_{si}
				[in/in]	[ksi]	[k]	[k.ft]	[in/in]	[ksi]	[k]	[k.ft]
Bottom 1	2	9.00	68.75	-0.00552	-40.00	-180.0	491.2	-0.01619	-40.00	-180.0	491.2
2	2	27.00	65.54	-0.00512	-40.00	-180.0	443.1	-0.0153	-40.00	-180.0	443.1
3	2	45.00	59.44	-0.00436	-40.00	-180.0	351.6	-0.0136	-40.00	-180.0	351.6
4	2	63.00	51.05	-0.00333	-40.00	-180.0	225.8	-0.01125	-40.00	-180.0	225.8
5	2	81.00	41.19	-0.0021	-40.00	-180.0	77.8	-0.0085	-40.00	-180.0	77.8
6	2	99.00	30.81	-0.00082	-23.71	-106.7	-46.1	-0.0056	-40.00	-180.0	-77.8
7	2	117.00	20.95	0.000405	11.73	37.5	47.0	-0.00285	-40.00	-180.0	-225.8
8	2	135.00	12.56	0.001444	40.00	164.7	321.8	-0.00051	-14.67	-66.0	-128.9
9	2	153.00	6.46	0.0022	40.00	164.7	405.4	0.001196	34.70	140.8	346.7
10	2	171.00	3.25	0.002597	40.00	164.7	449.4	0.002091	40.00	164.7	449.4
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Column axial load-bending moment interaction diagrams

Notes:

- Compressive capacities and demands are positive.



Column	C13	C14	C15
Stage	57	51	12

Demand-capacity ratios for the interaction of axial loads and bending moments

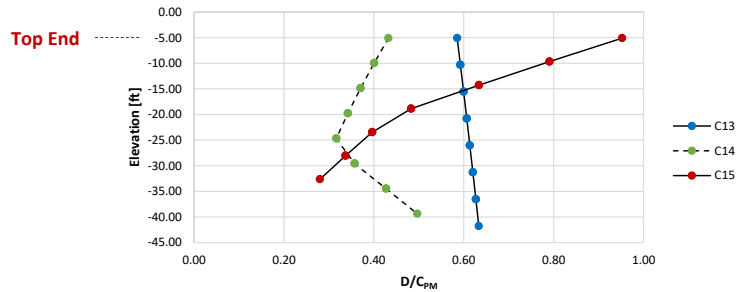
Notes:

- Demand capacity ratios were determined based on the ratio of moment demands and capacities (i.e., $M_u/\Phi M_n$). Factored moment capacities correspond to the axial load in a P_u, M_u demand pair.

- Peak demand-capacity ratios

Column	C13	C14	C15
D/C_{max}	0.63	0.50	0.95
Stage	57	51	12

- Envelope of demand-capacity ratios



D/C_{PM} ratio envelopes - Columns

2.2 – N-W Unit 5 Reinforcement Layout



NW Unit 5 Reinforcement

Notes:

- The variable, c_v , defines the cover to the rebar closest to the bridge centerline and web outside face for the center and left/right girders, respectively.
- The rebar spacing for rebar groups is given by s_v and s_{v+1} .
- The variable y_{v+1} indicates an offset to the second group rebar that is closest to the bridge centerline and web outside face for the center and left/right girders, respectively.

1. Left girder reinforcement

1.1 Left girder top mat reinforcement @ top slab

LG-1

Section No.	Span	Pier	Slice	Slice location				Top slab - Top mat									
				L ₁ [ft]	L ₂ [ft]	L ₃ [ft]	L ₄ [ft]	Longitudinal reinforcement				c _v [in]	s _v [in]	y _{v+1} [in]	s _{v+1} [in]		
								Bar size	Number	Bar size	Number						
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	Abut.	0.00	0.00	22.55	-	#14	4	-	-	2.97	8.50	-	-	-	-
1	-	-	Left Girder Slice 1	1.75	1.75	20.80	-	#14	4	-	-	2.97	8.50	-	-	-	-
2	-	-	Left Girder Slice 2	6.00	6.00	16.55	-	#14	4	-	-	2.97	8.50	-	-	-	-
3	15	-	Left Girder Slice 3	10.25	10.25	12.30	-	#14	4	-	-	2.97	8.50	-	-	-	-
4	-	-	Left Girder Slice 4	14.50	14.50	8.05	-	#14	4	-	-	2.97	8.50	-	-	-	-
5	-	-	Left Girder Slice 5	18.75	18.75	3.80	-	#14	4	-	-	2.97	8.50	-	-	-	-
-	-	15	-	22.55	22.55	0.00	-	#14	4	-	-	2.97	8.50	-	-	-	-
-	-	15	-	22.55	0.00	104.55	52.27	#14	4	-	-	2.97	8.50	-	-	-	-
6	-	-	Left Girder Slice 6	34.25	11.70	92.84	40.57	#14	4	-	-	2.97	8.50	-	-	-	-
7	-	-	Left Girder Slice 7	36.67	14.12	90.43	38.15	#14	4	-	-	2.97	8.50	-	-	-	-
8	-	-	Left Girder Slice 8	39.08	16.54	88.01	35.74	#14	3	#5	1	2.97	8.50	25.50	12.00	-	-
9	-	-	Left Girder Slice 9	41.50	18.95	85.59	33.32	#14	3	#5	1	2.97	8.50	25.50	12.00	-	-
10	-	-	Left Girder Slice 10	43.92	21.37	83.18	30.90	#14	2	#5	1	2.97	17.00	25.50	12.00	-	-
11	-	-	Left Girder Slice 11	46.33	23.79	80.76	28.49	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
12	-	-	Left Girder Slice 12	48.75	26.20	78.34	26.07	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
13	-	-	Left Girder Slice 13	51.17	28.62	75.93	23.65	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
14	-	-	Left Girder Slice 14	53.58	31.04	73.51	21.24	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
15	-	S14BC	Left Girder Slice 15	56.00	33.45	71.09	18.82	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
16	-	S14BC	Left Girder Slice 16	58.75	36.20	68.34	16.07	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
17	-	-	Left Girder Slice 17	62.31	39.76	64.79	12.51	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
18	-	-	Left Girder Slice 18	65.86	43.32	61.23	8.96	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
19	-	-	Left Girder Slice 19	69.42	46.87	57.68	5.40	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
20	-	-	Left Girder Slice 20	72.97	50.43	54.12	1.85	#11	2	#5	1	2.83	17.00	25.50	12.00	-	-
21	14	-	Left Girder Slice 21	76.53	53.98	50.57	1.71	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
22	-	-	Left Girder Slice 22	80.08	57.54	47.01	5.26	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
23	-	-	Left Girder Slice 23	83.64	61.09	43.45	8.82	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
24	-	-	Left Girder Slice 24	87.19	64.65	39.90	12.38	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
25	-	S14AB	Left Girder Slice 25	90.75	68.20	36.34	15.93	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
26	-	S14AB	Left Girder Slice 26	93.50	70.95	33.59	18.68	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
27	-	-	Left Girder Slice 27	95.92	73.37	31.18	21.10	#14	3	-	-	2.97	15.00	-	-	-	-
28	-	-	Left Girder Slice 28	98.33	75.79	28.76	23.51	#14	5	-	-	2.97	5.00	-	-	-	-
29	-	-	Left Girder Slice 29	100.75	78.20	26.34	25.93	#14	5	-	-	2.97	5.00	-	-	-	-
30	-	-	Left Girder Slice 30	103.17	80.62	23.93	28.35	#14	6	-	-	2.97	5.00	-	-	-	-
31	-	-	Left Girder Slice 31	105.58	83.04	21.51	30.76	#14	6	-	-	2.97	5.00	-	-	-	-
32	-	-	Left Girder Slice 32	108.00	85.45	19.09	33.18	#14	6	-	-	2.97	5.00	-	-	-	-
33	-	-	Left Girder Slice 33	110.42	87.87	16.68	35.60	#14	6	-	-	2.97	5.00	-	-	-	-
34	-	-	Left Girder Slice 34	112.83	90.29	14.26	38.01	#14	6	-	-	2.97	5.00	-	-	-	-
35	-	-	Left Girder Slice 35	115.25	92.70	11.84	40.43	#14	6	-	-	2.97	5.00	-	-	-	-
-	-	14	-	127.09	104.55	0.00	52.27	#14	6	-	-	2.97	5.00	-	-	-	-
-	14	-	-	127.09	0.00	104.55	52.27	#14	6	-	-	2.97	5.00	-	-	-	-
36	-	-	Left Girder Slice 36	139.00	11.91	92.64	40.37	#14	6	-	-	2.97	5.00	-	-	-	-
37	-	-	Left Girder Slice 37	141.39	14.30	90.25	37.98	#14	6	-	-	2.97	5.00	-	-	-	-
38	-	-	Left Girder Slice 38	143.78	16.69	87.86	35.59	#14	6	-	-	2.97	5.00	-	-	-	-
39	-	-	Left Girder Slice 39	146.17	19.07	85.47	33.20	#14	6	-	-	2.97	5.00	-	-	-	-
40	-	-	Left Girder Slice 40	148.56	21.46	83.09	30.81	#14	6	-	-	2.97	5.00	-	-	-	-
41	-	-	Left Girder Slice 41	150.94	23.85	80.70	28.42	#14	6	-	-	2.97	5.00	-	-	-	-
42	-	-	Left Girder Slice 42	153.33	26.24	78.31	26.03	#14	5	-	-	2.97	5.00	-	-	-	-
43	-	-	Left Girder Slice 43	155.72	28.63	75.92	23.65	#14	5	-	-	2.97	5.00	-	-	-	-
44	-	-	Left Girder Slice 44	158.11	31.02	73.53	21.26	#14	3	-	-	2.97	15.00	-	-	-	-
45	-	S13BC	Left Girder Slice 45	160.50	33.41	71.14	18.87	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
46	-	S13BC	Left Girder Slice 46	163.25	36.16	68.39	16.12	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
47	-	-	Left Girder Slice 47	166.83	39.74	64.81	12.53	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
48	-	-	Left Girder Slice 48	170.42	43.32	61.22	8.95	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
49	-	-	Left Girder Slice 49	174.00	46.91	57.64	5.37	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
50	-	-	Left Girder Slice 50	177.58	50.49	54.06	1.78	#11	2	#5	1	2.83	15.00	20.00	12.00	-	-
51	13	-	Left Girder Slice 51	181.17	54.07	50.47	1.80	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
52	-	-	Left Girder Slice 52	184.75	57.66	46.89	5.38	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
53	-	-	Left Girder Slice 53	188.33	61.24	43.31	8.97	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
54	-	-	Left Girder Slice 54	191.92	64.82	39.72	12.55	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
55	-	S13AB	Left Girder Slice 55	195.50	68.41	36.14	16.13	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
56	-	S13AB	Left Girder Slice 56	198.25	71.16	33.39	18.88	#11	2	#5	1	2.83	11.00	22.00	12.00	-	-
57	-	-	Left Girder Slice 57	200.64	73.55	31.00	21.27	#14	2	-	-	2.97	11.00	-	-	-	-
58	-	-	Left Girder Slice 58	203.03	75.94	28.61	23.66	#14	2	-	-	2.97	11.00	-	-	-	-
59	-	-	Left Girder Slice 59	205.42	78.32	26.22	26.05	#14	4	-	-	2.97	5.50	-	-	-	-
60	-	-	Left Girder Slice 60	207.81	80.71	23.84	28.44	#14	5	-	-	2.97	5.50	-	-	-	-
61	-	-	Left Girder Slice 61	210.19	83.10	21.45	30.83	#14	5	-	-	2.97	5.50	-	-	-	-
62	-	-	Left Girder Slice 62	212.58	85.49	19.06	33.22	#14	5	-	-	2.97	5.50	-	-	-	-
63	-	-	Left Girder Slice 63	214.97	87.88	16.67	35.61	#14	6	-	-	2.97	5.50	-	-	-	-
64	-	-	Left Girder Slice 64	217.36	90.27	14.28	37.99	#14	6	-	-	2.97	5.50	-	-	-	-
65	-	-	Left Girder Slice 65	219.75	92.66	11.89	40.38	#14	6	-	-	2.97	5.50	-	-	-	-
-	-	13	-	231.64	104.55	0.00	52.27	#14	6	-	-	2.97	5				

75	-	S12CD	Left Girder Slice 75	260.00	28.36	60.51	27.27	#14	2	-	-	2.97	11.00	-	-
76	-	S12CD	Left Girder Slice 76	262.50	30.86	58.01	24.77	#14	2	-	-	2.97	11.00	-	-
77	-	-	Left Girder Slice 77	265.50	33.86	55.01	21.77	#11	2	#5	1	2.83	11.00	22.00	12.00
78	-	-	Left Girder Slice 78	268.50	36.86	52.01	18.77	#11	2	#5	1	2.83	11.00	22.00	12.00
79	-	-	Left Girder Slice 79	271.50	39.86	49.01	15.77	#11	2	#5	1	2.83	11.00	22.00	12.00
80	-	-	Left Girder Slice 80	274.50	42.86	46.01	12.77	#11	2	#5	1	2.83	11.00	22.00	12.00
81	12	-	Left Girder Slice 81	277.50	45.86	43.01	9.77	#11	2	#5	1	2.83	11.00	22.00	12.00
82	-	-	Left Girder Slice 82	280.50	48.86	40.01	6.77	#11	2	#5	1	2.83	11.00	22.00	12.00
83	-	-	Left Girder Slice 83	283.50	51.86	37.01	3.77	#11	2	#5	1	2.83	11.00	22.00	12.00
84	-	-	Left Girder Slice 84	286.50	54.86	34.01	0.77	#11	2	#5	1	2.83	11.00	22.00	12.00
85	-	S12BC	Left Girder Slice 85	289.50	57.86	31.01	2.23	#11	2	#5	1	2.83	11.00	22.00	12.00
86	-	S12BC	Left Girder Slice 86	292.25	60.61	28.26	4.98	#11	2	#5	1	2.83	11.00	22.00	12.00
87	-	-	Left Girder Slice 87	295.08	63.44	25.42	7.81	#11	2	#5	1	2.83	11.00	22.00	12.00
88	-	-	Left Girder Slice 88	297.92	66.28	22.59	10.65	#11	2	#5	1	2.83	11.00	22.00	12.00
89	-	-	Left Girder Slice 89	300.75	69.11	19.76	13.48	#11	2	#5	1	2.83	11.00	22.00	12.00
90	-	-	Left Girder Slice 90	303.58	71.94	16.92	16.31	#11	2	#5	1	2.83	11.00	22.00	12.00
91	-	-	Left Girder Slice 91	306.42	74.78	14.09	19.15	#11	2	#5	1	2.83	11.00	22.00	12.00
92	-	-	Left Girder Slice 92	309.25	77.61	11.26	21.98	#11	2	#5	1	2.83	11.00	22.00	12.00
93	-	-	Left Girder Slice 93	312.08	80.44	8.42	24.81	#11	2	#5	1	2.83	11.00	22.00	12.00
94	-	-	Left Girder Slice 94	314.92	83.28	5.59	27.65	#11	2	#5	1	2.83	11.00	22.00	12.00
95	-	-	Left Girder Slice 95	317.75	86.11	2.76	30.48	#11	2	#5	1	2.83	11.00	22.00	12.00
-	-	Hinge	-	320.51	88.86	0.00	33.24	#11	2	#5	1	2.83	11.00	22.00	12.00

1.2 Left girder bottom mat reinforcement @ bottom slab

LG-2

Section No.	Span	Pier	Slice	Slice location				Bottom slab - Bottom mat Longitudinal reinforcement								
				L ₁ [ft]	L ₂ [ft]	L ₃ [ft]	L ₄ [ft]	Bar size [-]	Number [-]	Bar size [-]	Number [-]	C _i [in]	S _i [in]	Y _{i+1} [in]	S _{i+1} [in]	
-	-	-	Abut.	0.00	0.00	22.55	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
1	-	-	Left Girder Slice 1	1.75	1.75	20.80	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
2	-	-	Left Girder Slice 2	6.00	6.00	16.55	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
3	15	-	Left Girder Slice 3	10.25	10.25	12.30	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
4	-	-	Left Girder Slice 4	14.50	14.50	8.05	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
5	-	-	Left Girder Slice 5	18.75	18.75	3.80	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
-	-	15	-	22.55	22.55	0.00	-	#10	2	#5	3	3.00	4.50	16.50	12.00	L2
6	-	-	Left Girder Slice 6	34.25	11.70	92.84	40.57	#14	4	-	-	3.00	4.50	-	-	L4
7	-	-	Left Girder Slice 7	36.67	14.12	90.43	38.15	#14	6	-	-	3.00	4.50	-	-	L4
8	-	-	Left Girder Slice 8	39.08	16.54	88.01	35.74	#14	8	-	-	3.00	4.50	-	-	L4
9	-	-	Left Girder Slice 9	41.50	18.95	85.59	33.32	#14	8	-	-	3.00	4.50	-	-	L4
10	-	-	Left Girder Slice 10	43.92	21.37	83.18	30.90	#14	9	-	-	3.00	4.50	-	-	L4
11	-	-	Left Girder Slice 11	46.33	23.79	80.76	28.49	#14	9	-	-	3.00	4.50	-	-	L4
12	-	-	Left Girder Slice 12	48.75	26.20	78.34	26.07	#14	9	-	-	3.00	4.50	-	-	L4
13	-	-	Left Girder Slice 13	51.17	28.62	75.93	23.65	#14	10	-	-	3.00	4.50	-	-	L4
14	-	-	Left Girder Slice 14	53.58	31.04	73.51	21.24	#14	10	-	-	3.00	4.50	-	-	L4
15	-	S14BC	Left Girder Slice 15	56.00	33.45	71.09	18.82	#14	10	-	-	3.00	4.50	-	-	L4
16	-	S14BC	Left Girder Slice 16	58.75	36.20	68.34	16.07	#14	10	-	-	3.00	4.50	-	-	L4
17	-	-	Left Girder Slice 17	62.31	39.76	64.79	12.51	#14	10	-	-	3.00	4.50	-	-	L4
18	-	-	Left Girder Slice 18	65.86	43.32	61.23	8.96	#14	10	-	-	3.00	4.50	-	-	L4
19	-	-	Left Girder Slice 19	69.42	46.87	57.68	5.40	#14	10	-	-	3.00	4.50	-	-	L4
20	-	-	Left Girder Slice 20	72.97	50.43	54.12	1.85	#14	10	-	-	3.00	4.50	-	-	L4
21	14	-	Left Girder Slice 21	76.53	53.98	50.57	1.71	#14	10	-	-	3.00	4.50	-	-	L4
22	-	-	Left Girder Slice 22	80.08	57.54	47.01	5.26	#14	10	-	-	3.00	4.50	-	-	L4
23	-	-	Left Girder Slice 23	83.64	61.09	43.45	8.82	#14	10	-	-	3.00	4.50	-	-	L4
24	-	-	Left Girder Slice 24	87.19	64.65	39.90	12.38	#14	10	-	-	3.00	4.50	-	-	L4
25	-	S14AB	Left Girder Slice 25	90.75	68.20	36.34	15.93	#14	10	-	-	3.00	4.50	-	-	L4
26	-	S14AB	Left Girder Slice 26	93.50	70.95	33.59	18.68	#14	9	-	-	3.00	4.50	-	-	L4
27	-	-	Left Girder Slice 27	95.92	73.37	31.18	21.10	#14	9	-	-	3.00	4.50	-	-	L4
28	-	-	Left Girder Slice 28	98.33	75.79	28.76	23.51	#14	8	#5	1	3.00	4.50	40.50	-	L4
29	-	-	Left Girder Slice 29	100.75	78.20	26.34	25.93	#14	8	#5	1	3.00	4.50	40.50	-	L4
30	-	-	Left Girder Slice 30	103.17	80.62	23.93	28.35	#14	6	#5	1	3.00	4.50	40.50	-	L4
31	-	-	Left Girder Slice 31	105.58	83.04	21.51	30.76	#14	6	#5	1	3.00	4.50	40.50	-	L4
32	-	-	Left Girder Slice 32	108.00	85.45	19.09	33.18	#14	4	#5	1	3.00	4.50	40.50	-	L4
33	-	-	Left Girder Slice 33	110.42	87.87	16.68	35.60	#14	4	#5	1	3.00	4.50	40.50	-	L4
34	-	-	Left Girder Slice 34	112.83	90.29	14.26	38.01	#14	9	-	-	3.00	4.50	-	-	L4
35	-	-	Left Girder Slice 35	115.25	92.70	11.84	40.43	#14	9	-	-	3.00	4.50	-	-	L4
-	-	14	-	127.09	104.55	0.00	52.27	#14	9	-	-	3.00	4.50	-	-	L4
36	-	-	Left Girder Slice 36	127.09	0.00	104.55	52.27	#14	8	-	-	3.00	6.25	-	-	L4
37	-	-	Left Girder Slice 37	139.00	11.91	92.64	40.37	#14	8	-	-	3.00	6.25	-	-	L4
38	-	-	Left Girder Slice 38	141.39	14.30	90.25	37.98	#14	8	-	-	3.00	6.25	-	-	L4
39	-	-	Left Girder Slice 39	143.78	16.69	87.86	35.59	#14	8	-	-	3.00	6.25	-	-	L4
40	-	-	Left Girder Slice 40	146.17	19.07	85.47	33.20	#14	5	-	-	3.00	6.25	-	-	L4
41	-	-	Left Girder Slice 41	148.56	21.46	83.09	30.81	#14	5	-	-	3.00	6.25	-	-	L4
42	-	-	Left Girder Slice 42	150.94	23.85	80.70	28.42	#14	7	-	-	3.00	6.25	-	-	L4
43	-	-	Left Girder Slice 43	153.33	26.24	78.31	26.03	#14	7	-	-	3.00	6.25	-	-	L4
44	-	-	Left Girder Slice 44	155.72	28.63	75.92	23.65	#14	7	-	-	3.00	6.25	-	-	L4
45	-	-	Left Girder Slice 45	158.11	31.02	73.53	21.26	#14	7	-	-	3.00	6.25	-	-	L4
46	-	S13BC	Left Girder Slice 46	160.50	33.41	71.14	18.87	#14	7	-	-	3.00	6.25	-	-	L4
47	-	S13BC	Left Girder Slice 47	163.25	36.16	68.39	16.12	#14	8	-	-	3.00	6.25	-	-	L4
48	-	-	Left Girder Slice 48	166.83	39.74	64.81	12.53	#14	8	-	-	3.00	6.25	-	-	L4
49	-	-	Left Girder Slice 49	170.42	43.32	61.22	8.95	#14	8	-	-	3.00	6.25	-	-	L4
50	-	-	Left Girder Slice 50	174.00	46.91	57.64	5.37	#14	8	-	-	3.00	6.25	-	-	L4
51	13	-	Left Girder Slice 51	177.58	50.49	54.06	1.78	#14	8	-	-	3.00	6.25	-	-	L4
52	-	-	Left Girder Slice 52	181.17	54.07	50.47	1.80	#14	7	-	-	3.00	6.25	-	-	L4
53	-	-	Left Girder Slice 53	184.75	57.66	46.89	5.38	#14	7	-	-	3.00	6.25	-	-	L4
54	-	-	Left Girder Slice 54	188.33	61.24	43.31	8.97	#14	7	-	-	3.00	6.25	-	-	L4
55	-	-	Left Girder Slice 55	191.92	64.82	39.72	12.55	#14	7	-	-	3.00	6.25	-	-	L4
56	-	S13AB	Left Girder Slice 56	195.50	68.41	36.14	16.13	#14	7	-	-	3.00	6.25	-	-	L4
57	-	S13AB	Left Girder Slice 57	198.25	71.16	33.39	18.88	#14	7	-	-	3.00	6.25	-	-	L4
58	-	-	Left Girder Slice 58	200.64	73.55	31.00	21.27	#14	7	-	-	3.00	6.25	-	-	L4
59	-	-	Left Girder Slice 59	203.03	75.94	28.61	23.66	#14	7	-	-	3.00	6.25	-	-	L4
60	-	-	Left Girder Slice 60	205.42	78.32	26.22	26.05	#14	7	-	-	3.00	6.25	-	-	L4
61	-	-	Left Girder Slice 61	207.81	80.71	23.84	28.44	#14	5	-	-	3.00	6.25	-	-	L4
62	-	-	Left Girder Slice 62	210.19	83.10	21.45	30.83	#14	5	-	-	3.00	6.25	-	-	L4
63	-	-	Left Girder Slice 63	212.58	85.49	19.06	33.22	#14	5							



-	13	-	231.64	104.55	0.00	52.27	#14	6	-	-	3.00	6.25	-	-
-	13	-	231.64	0.00	88.86	55.63	#14	4	#14	3	3.00	5.25	22.75	7.00
66	-	Left Girder Slice 66	243.75	12.11	76.76	43.52	#14	4	#14	3	3.00	5.25	22.75	7.00
67	-	Left Girder Slice 67	245.56	13.92	74.95	41.71	#14	4	#14	3	3.00	5.25	22.75	7.00
68	-	Left Girder Slice 68	247.36	15.72	73.14	39.91	#14	4	-	-	3.00	5.25	-	-
69	-	Left Girder Slice 69	249.17	17.53	71.34	38.10	#14	4	-	-	3.00	5.25	-	-
70	-	Left Girder Slice 70	250.97	19.33	69.53	36.30	#14	4	-	-	3.00	5.25	-	-
71	-	Left Girder Slice 71	252.78	21.14	67.73	34.49	#14	4	-	-	3.00	5.25	-	-
72	-	Left Girder Slice 72	254.58	22.94	65.92	32.69	#14	4	#14	2	3.00	5.25	26.25	10.50
73	-	Left Girder Slice 73	256.39	24.75	64.12	30.88	#14	8	-	-	3.00	5.25	-	-
74	-	Left Girder Slice 74	258.19	26.55	62.31	29.08	#14	8	-	-	3.00	5.25	-	-
75	S12CD	Left Girder Slice 75	260.00	28.36	60.51	27.27	#14	8	-	-	3.00	5.25	-	-
76	S12CD	Left Girder Slice 76	262.50	30.86	58.01	24.77	#14	8	-	-	3.00	5.25	-	-
77	-	Left Girder Slice 77	265.50	33.86	55.01	21.77	#14	8	-	-	3.00	5.25	-	-
78	-	Left Girder Slice 78	268.50	36.86	52.01	18.77	#14	9	-	-	3.00	5.25	-	-
79	-	Left Girder Slice 79	271.50	39.86	49.01	15.77	#14	9	-	-	3.00	5.25	-	-
80	-	Left Girder Slice 80	274.50	42.86	46.01	12.77	#14	9	-	-	3.00	5.25	-	-
81	12	Left Girder Slice 81	277.50	45.86	43.01	9.77	#14	9	-	-	3.00	5.25	-	-
82	-	Left Girder Slice 82	280.50	48.86	40.01	6.77	#14	9	-	-	3.00	5.25	-	-
83	-	Left Girder Slice 83	283.50	51.86	37.01	3.77	#14	9	-	-	3.00	5.25	-	-
84	-	Left Girder Slice 84	286.50	54.86	34.01	0.77	#14	9	-	-	3.00	5.25	-	-
85	S12BC	Left Girder Slice 85	289.50	57.86	31.01	2.23	#14	9	-	-	3.00	5.25	-	-
86	S12BC	Left Girder Slice 86	292.25	60.61	28.26	4.98	#14	9	-	-	3.00	5.25	-	-
87	-	Left Girder Slice 87	295.08	63.44	25.42	7.81	#14	9	-	-	3.00	5.25	-	-
88	-	Left Girder Slice 88	297.92	66.28	22.59	10.65	#14	9	-	-	3.00	5.25	-	-
89	-	Left Girder Slice 89	300.75	69.11	19.76	13.48	#14	9	-	-	3.00	5.25	-	-
90	-	Left Girder Slice 90	303.58	71.94	16.92	16.31	#14	9	-	-	3.00	5.25	-	-
91	-	Left Girder Slice 91	306.42	74.78	14.09	19.15	#14	5	#14	2	3.00	5.25	31.50	10.50
92	-	Left Girder Slice 92	309.25	77.61	11.26	21.98	#14	5	#14	2	3.00	5.25	31.50	10.50
93	-	Left Girder Slice 93	312.08	80.44	8.42	24.81	#14	5	#14	2	3.00	5.25	31.50	10.50
94	-	Left Girder Slice 94	314.92	83.28	5.59	27.65	#14	5	#14	2	3.00	5.25	31.50	10.50
95	-	Left Girder Slice 95	317.75	86.11	2.76	30.48	#14	5	#14	2	3.00	5.25	31.50	10.50
-	Hinge	-	320.51	88.86	0.00	33.24	#14	5	#14	2	3.00	5.25	31.50	10.50

1.3 Left girder web hoop and longitudinal reinforcement

LG-3

Section No.	Span	Pier	Slice	Slice location				Web Width	Web reinforcement				
				L ₁	L ₂	L ₃	L ₄		Hoop	Layer _{top}	Layer _{int}	Layer _{bot}	
[-]	[-]	[-]	[-]	[ft]	[ft]	[ft]	[ft]	[in]	S _y	Bar size	Bar size	Bar size	Bar size
-	-	Abut.	-	0.00	0.00	22.55	-	13.00	15.00	#10	#4	#4	#4
1	-	-	Left Girder Slice 1	1.75	1.75	20.80	-	13.00	15.00	#10	#4	#4	#4
2	-	-	Left Girder Slice 2	6.00	6.00	16.55	-	13.00	15.00	#10	#4	#4	#4
3	15	-	Left Girder Slice 3	10.25	10.25	12.30	-	13.00	15.00	#10	#4	#4	#4
4	-	-	Left Girder Slice 4	14.50	14.50	8.05	-	13.00	12.00	#10	#4	#4	#4
5	-	-	Left Girder Slice 5	18.75	18.75	3.80	-	13.00	6.00	#10	#4	#4	#4
-	-	15	-	22.55	22.55	0.00	-	13.00	6.00	#10	#4	#4	#4
6	-	15	Left Girder Slice 6	34.25	11.70	92.84	40.57	13.00	6.00	#10	#4	#4	#4
7	-	-	Left Girder Slice 7	36.67	14.12	90.43	38.15	13.00	6.00	#10	#4	#4	#4
8	-	-	Left Girder Slice 8	39.08	16.54	88.01	35.74	13.00	6.00	#10	#4	#4	#4
9	-	-	Left Girder Slice 9	41.50	18.95	85.59	33.32	13.00	8.00	#10	#4	#4	#4
10	-	-	Left Girder Slice 10	43.92	21.37	83.18	30.90	13.00	8.00	#10	#4	#4	#4
11	-	-	Left Girder Slice 11	46.33	23.79	80.76	28.49	13.00	10.00	#10	#4	#4	#4
12	-	-	Left Girder Slice 12	48.75	26.20	78.34	26.07	13.00	12.00	#8	#4	#4	#4
13	-	-	Left Girder Slice 13	51.17	28.62	75.93	23.65	13.00	12.00	#8	#4	#4	#4
14	-	-	Left Girder Slice 14	53.58	31.04	73.51	21.24	13.00	12.00	#8	#4	#4	#4
15	-	S14BC	Left Girder Slice 15	56.00	33.45	71.09	18.82	13.00	15.00	#8	#4	#4	#4
16	-	S14BC	Left Girder Slice 16	58.75	36.20	68.34	16.07	9.00	18.00	#8	#4	#4	#4
17	-	-	Left Girder Slice 17	62.31	39.76	64.79	12.51	9.00	18.00	#8	#4	#4	#4
18	-	-	Left Girder Slice 18	65.86	43.32	61.23	8.96	9.00	18.00	#8	#4	#4	#4
19	-	-	Left Girder Slice 19	69.42	46.87	57.68	5.40	9.00	18.00	#8	#4	#4	#4
20	-	-	Left Girder Slice 20	72.97	50.43	54.12	1.85	9.00	18.00	#8	#4	#4	#4
21	14	-	Left Girder Slice 21	76.53	53.98	50.57	1.71	9.00	18.00	#8	#4	#4	#4
22	-	-	Left Girder Slice 22	80.08	57.54	47.01	5.26	9.00	18.00	#8	#4	#4	#4
23	-	-	Left Girder Slice 23	83.64	61.09	43.45	8.82	9.00	18.00	#8	#4	#4	#4
24	-	-	Left Girder Slice 24	87.19	64.65	39.90	12.38	9.00	12.00	#8	#4	#4	#4
25	-	S14AB	Left Girder Slice 25	90.75	68.20	36.34	15.93	9.00	12.00	#8	#4	#4	#4
26	-	S14AB	Left Girder Slice 26	93.50	70.95	33.59	18.68	13.00	12.00	#8	#4	#4	#4
27	-	-	Left Girder Slice 27	95.92	73.37	31.18	21.10	13.00	12.00	#8	#4	#4	#4
28	-	-	Left Girder Slice 28	98.33	75.79	28.76	23.51	13.00	10.00	#8	#4	#4	#4
29	-	-	Left Girder Slice 29	100.75	78.20	26.34	25.93	13.00	8.00	#10	#4	#4	#4
30	-	-	Left Girder Slice 30	103.17	80.62	23.93	28.35	13.00	8.00	#10	#4	#4	#4
31	-	-	Left Girder Slice 31	105.58	83.04	21.51	30.76	13.00	6.00	#10	#4	#4	#4
32	-	-	Left Girder Slice 32	108.00	85.45	19.09	33.18	13.00	6.00	#10	#4	#4	#4
33	-	-	Left Girder Slice 33	110.42	87.87	16.68	35.60	13.00	6.00	#10	#4	#4	#4
34	-	-	Left Girder Slice 34	112.83	90.29	14.26	38.01	13.00	5.00	#10	#4	#4	#4
35	-	-	Left Girder Slice 35	115.25	92.70	11.84	40.43	13.00	5.00	#10	#4	#4	#4
-	-	14	-	127.09	104.55	0.00	52.27	13.00	4.00	#10	#4	#4	#4
36	-	14	Left Girder Slice 36	127.09	0.00	104.55	52.27	13.00	5.00	#10	#4	#4	#4
37	-	-	Left Girder Slice 37	141.39	14.30	90.25	37.98	13.00	6.00	#10	#4	#4	#4
38	-	-	Left Girder Slice 38	143.78	16.69	87.86	35.59	13.00	8.00	#10	#4	#4	#4
39	-	-	Left Girder Slice 39	146.17	19.07	85.47	33.20	13.00	8.00	#10	#4	#4	#4
40	-	-	Left Girder Slice 40	148.56	21.46	83.09	30.81	13.00	8.00	#10	#4	#4	#4
41	-	-	Left Girder Slice 41	150.94	23.85	80.70	28.42	13.00	10.00	#10	#4	#4	#4
42	-	-	Left Girder Slice 42	153.33	26.24	78.31	26.03	13.00	10.00	#10	#4	#4	#4
43	-	-	Left Girder Slice 43	155.72	28.63	75.92	23.65	13.00	12.00	#8	#4	#4	#4
44	-	-	Left Girder Slice 44	158.11	31.02	73.53	21.26	13.00	15.00	#8	#4	#4	#4
45	-	S13BC	Left Girder Slice 45	160.50	33.41	71.14	18.87	13.00	15.00	#8	#4	#4	#4
46	-	S13BC	Left Girder Slice 46	163.25	36.16	68.39	16.12	9.00	15.00	#8	#4	#4	#4
47	-	-	Left Girder Slice 47	166.83	39.74	64.81	12.53	9.00	18.00	#8	#4	#4	#4
48	-	-	Left Girder Slice 48	170.42	43.32	61.23	8.95	9.00	18.00	#8	#4	#4	#4
49	-	-	Left Girder Slice 49	174.00	46.91	57.64	5.37	9.00	18.00	#8	#4	#4	#4
50	-	-	Left Girder Slice 50	177.58	50.49	54.06	1.78	9.00	18.00	#8	#4	#4	#4
51	13	-	Left Girder Slice 51	181.17	54.07	50.47	1.80	9.00	18.00	#8	#4	#4	#4
52	-	-	Left Girder Slice 52	184.75	57.66	46.89	5.38	9.00	18.00	#8	#4	#4	#4
53	-	-	Left Girder Slice 53	188.33	61.24	43.31	8.97	9.00	18.00	#8	#4	#4	#4



Project: Penhall Woodinville Interchange Demo
 Structure: Woodinville Interchange - SR 405
 Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
 Checked by: DSCK 01/26/2026
 Bridge ID: -

54	-	Left Girder Slice 54	191.92	64.82	39.72	12.55	9.00	18.00	#8	#4	#4
55	S13AB	Left Girder Slice 55	195.50	68.41	36.14	16.13	9.00	18.00	#8	#4	#4
56	S13AB	Left Girder Slice 56	198.25	71.16	33.39	18.88	13.00	12.00	#8	#4	#4
57	-	Left Girder Slice 57	200.64	73.55	31.00	21.27	13.00	12.00	#8	#4	#4
58	-	Left Girder Slice 58	203.03	75.94	28.61	23.66	13.00	10.00	#8	#4	#4
59	-	Left Girder Slice 59	205.42	78.32	26.22	26.05	13.00	10.00	#8	#4	#4
60	-	Left Girder Slice 60	207.81	80.71	23.84	28.44	13.00	8.00	#10	#4	#4
61	-	Left Girder Slice 61	210.19	83.10	21.45	30.83	13.00	8.00	#10	#4	#4
62	-	Left Girder Slice 62	212.58	85.49	19.06	33.22	13.00	6.00	#10	#4	#4
63	-	Left Girder Slice 63	214.97	87.88	16.67	35.61	13.00	6.00	#10	#4	#4
64	-	Left Girder Slice 64	217.36	90.27	14.28	37.99	13.00	6.00	#10	#4	#4
65	-	Left Girder Slice 65	219.75	92.66	11.89	40.38	13.00	5.00	#10	#4	#4
-	13	-	231.64	104.55	0.00	52.27	13.00	4.00	#10	#4	#4
-	13	-	231.64	0.00	88.86	55.63	13.00	4.00	#10	#4	#4
66	-	Left Girder Slice 66	243.75	12.11	76.76	43.52	13.00	5.00	#10	#4	#4
67	-	Left Girder Slice 67	245.56	13.92	74.95	41.71	13.00	5.00	#10	#4	#4
68	-	Left Girder Slice 68	247.36	15.72	73.14	39.91	13.00	6.00	#10	#4	#4
69	-	Left Girder Slice 69	249.17	17.53	71.34	38.10	13.00	6.00	#10	#4	#4
70	-	Left Girder Slice 70	250.97	19.33	69.53	36.30	13.00	6.00	#10	#4	#4
71	-	Left Girder Slice 71	252.78	21.14	67.73	34.49	13.00	6.00	#10	#4	#4
72	-	Left Girder Slice 72	254.58	22.94	65.92	32.69	13.00	8.00	#8	#4	#4
73	-	Left Girder Slice 73	256.39	24.75	64.12	30.88	13.00	8.00	#8	#4	#4
74	-	Left Girder Slice 74	258.19	26.55	62.31	29.08	13.00	8.00	#8	#4	#4
75	S12CD	Left Girder Slice 75	260.00	28.36	60.51	27.27	13.00	8.00	#8	#4	#4
76	S12CD	Left Girder Slice 76	262.50	30.86	58.01	24.77	9.00	8.00	#8	#4	#4
77	-	Left Girder Slice 77	265.50	33.86	55.01	21.77	9.00	10.00	#8	#4	#4
78	-	Left Girder Slice 78	268.50	36.86	52.01	18.77	9.00	12.00	#8	#4	#4
79	-	Left Girder Slice 79	271.50	39.86	49.01	15.77	9.00	12.00	#8	#4	#4
80	12	Left Girder Slice 80	274.50	42.86	46.01	12.77	9.00	18.00	#8	#4	#4
81	-	Left Girder Slice 81	277.50	45.86	43.01	9.77	9.00	18.00	#8	#4	#4
82	-	Left Girder Slice 82	280.50	48.86	40.01	6.77	9.00	18.00	#8	#4	#4
83	-	Left Girder Slice 83	283.50	51.86	37.01	3.77	9.00	18.00	#8	#4	#4
84	-	Left Girder Slice 84	286.50	54.86	34.01	0.77	9.00	18.00	#8	#4	#4
85	S12BC	Left Girder Slice 85	289.50	57.86	31.01	2.23	9.00	18.00	#8	#4	#4
86	S12BC	Left Girder Slice 86	292.25	60.61	28.26	4.98	13.00	18.00	#8	#4	#4
87	-	Left Girder Slice 87	295.08	63.44	25.42	7.81	13.00	18.00	#8	#4	#4
88	-	Left Girder Slice 88	297.92	66.28	22.59	10.65	13.00	18.00	#8	#4	#4
89	-	Left Girder Slice 89	300.75	69.11	19.76	13.48	13.00	18.00	#8	#4	#4
90	-	Left Girder Slice 90	303.58	71.94	16.92	16.31	13.00	15.00	#8	#4	#4
91	-	Left Girder Slice 91	306.42	74.78	14.09	19.15	13.00	15.00	#8	#4	#4
92	-	Left Girder Slice 92	309.25	77.61	11.26	21.98	13.00	12.00	#8	#4	#4
93	-	Left Girder Slice 93	312.08	80.44	8.42	24.81	13.00	10.00	#8	#4	#4
94	-	Left Girder Slice 94	314.92	83.28	5.59	27.65	13.00	8.00	#8	#4	#4
95	-	Left Girder Slice 95	317.75	86.11	2.76	30.48	13.00	6.00	#8	#4	#4
-	Hinge	-	320.51	88.86	0.00	33.24	13.00	6.00	#8	#4	#4

2. Center girder reinforcement

2.1 Center girder top mat reinforcement @ top slab

CG-1

Section No.	Span	Pier/Diaphragm	Slice	Slice location				Top slab - Top mat							
				L ₁ [ft]	L ₂ [ft]	L ₃ [ft]	L ₄ [ft]	Longitudinal reinforcement		C ₁		S ₁	Y ₋₁	S ₊₁	
[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]	Bar size	Number	Bar size	Number	[in]	[in]	[in]	[in]
-	-	Abut.	-	0.00	0.00	23.08	-	#14	8	-	-	5.75	10.00	-	-
1	-	-	Center Girder Slice 1	1.75	1.75	21.33	-	#14	8	-	-	5.75	10.00	-	-
2	-	-	Center Girder Slice 2	6.06	6.06	17.02	-	#14	8	-	-	5.75	10.00	-	-
3	15	-	Center Girder Slice 3	10.38	10.38	12.71	-	#14	8	-	-	5.75	10.00	-	-
4	-	-	Center Girder Slice 4	14.69	14.69	8.39	-	#14	8	-	-	5.75	10.00	-	-
5	-	-	Center Girder Slice 5	19.00	19.00	4.08	-	#14	8	-	-	5.75	10.00	-	-
-	15	-	-	23.08	23.08	0.00	-	#14	8	-	-	5.75	10.00	-	-
-	15	-	-	23.08	0.00	107.03	53.51	#14	8	-	-	5.75	10.00	-	-
6	-	-	Center Girder Slice 6	35.00	11.92	95.11	41.59	#14	6	#5	2	5.75	10.00	30.00	10.00
7	-	-	Center Girder Slice 7	37.47	14.39	92.64	39.12	#14	6	#5	2	5.75	10.00	30.00	10.00
8	-	-	Center Girder Slice 8	39.94	16.86	90.16	36.65	#14	4	#5	6	5.75	10.00	10.00	10.00
9	-	-	Center Girder Slice 9	42.42	19.34	87.69	34.18	#14	2	#5	6	5.75	10.00	10.00	10.00
10	-	-	Center Girder Slice 10	44.89	21.81	85.22	31.71	#14	2	#5	6	5.75	10.00	10.00	10.00
11	-	-	Center Girder Slice 11	47.36	24.28	82.75	29.23	#11	2	#5	6	5.75	10.00	10.00	12.00
12	-	-	Center Girder Slice 12	49.83	26.75	80.27	26.76	#11	2	#5	6	5.75	10.00	10.00	12.00
13	-	-	Center Girder Slice 13	52.31	29.23	77.80	24.29	#11	2	#5	6	5.75	10.00	10.00	12.00
14	-	-	Center Girder Slice 14	54.78	31.70	75.33	21.82	#11	2	#5	6	5.75	10.00	10.00	12.00
15	S14BC	-	Center Girder Slice 15	57.25	34.17	72.86	19.34	#11	2	#5	6	5.75	10.00	10.00	12.00
16	S14BC	-	Center Girder Slice 16	60.00	36.92	70.11	16.59	#11	2	#5	6	5.75	10.00	10.00	12.00
17	-	-	Center Girder Slice 17	63.67	40.59	66.44	12.93	#11	2	#5	6	5.75	10.00	10.00	12.00
18	-	-	Center Girder Slice 18	67.33	44.25	62.77	9.26	#11	2	#5	6	5.75	10.00	10.00	12.00
19	-	-	Center Girder Slice 19	71.00	47.92	59.11	5.59	#11	2	#5	6	5.75	10.00	10.00	12.00
20	-	-	Center Girder Slice 20	74.67	51.59	55.44	1.93	#11	2	#5	6	5.75	10.00	10.00	12.00
21	14	-	Center Girder Slice 21	78.33	55.25	51.77	1.74	#11	2	#5	6	5.75	5.50	5.50	12.00
22	-	-	Center Girder Slice 22	82.00	58.92	48.11	5.41	#11	2	#5	6	5.75	5.50	5.50	12.00
23	-	-	Center Girder Slice 23	85.67	62.59	44.44	9.07	#11	2	#5	6	5.75	5.50	5.50	12.00
24	-	-	Center Girder Slice 24	89.33	66.25	40.77	12.74	#11	2	#5	6	5.75	5.50	5.50	12.00
25	S14AB	-	Center Girder Slice 25	93.00	69.92	37.11	16.41	#11	2	#5	6	5.75	5.50	5.50	12.00
26	S14AB	-	Center Girder Slice 26	96.00	72.92	34.11	19.41	#11	2	#5	2	5.75	5.50	5.50	11.00
27	-	-	Center Girder Slice 27	98.44	75.36	31.66	21.85	#14	2	#5	4	5.75	5.50	22.00	11.00
28	-	-	Center Girder Slice 28	100.89	77.81	29.22	24.29	#14	2	#5	4	5.75	5.50	22.00	11.00
29	-	-	Center Girder Slice 29	103.33	80.25	26.78	26.74	#14	4	#5	2	5.75	5.50	33.00	5.50
30	-	-	Center Girder Slice 30	105.78	82.70	24.33	29.18	#14	6	#5	2	5.75	5.50	33.00	5.50
31	-	-	Center Girder Slice 31	108.22	85.14	21.89	31.63	#14	6	#5	2	5.75	5.50	33.00	5.50
32	-	-	Center Girder Slice 32	110.67	87.59	19.44	34.07	#14	8	#5	2	5.75	5.50	33.00	5.50
33	-	-	Center Girder Slice 33	113.11	90.03	17.00	36.52	#14	10	#5	2	5.75	5.50	33.00	5.50
34	-	-	Center Girder Slice 34	115.56	92.48	14.55	38.96	#14	12	#5	2	5.75	5.50	33.00	5.50
35	-	-	Center Girder Slice 35	118.00	94.92	12.11	41.41	#14	14	-	-	5.75	5.50	-	-
-	14	-	-	130.11	107.03	0.00	53.51	#14	14	-	-	5.75	5.50	-	-
-	14	-	-	130.11	0.00	107.03	53.51	#14	14	-	-	5.75	5.50	-	-
36	-	-	Center Girder Slice 36	142.00	11.89	95.14	41.62	#14	14	-	-	5.75	5.50	-	-
37	-	-	Center Girder Slice 37	144.47	14.36	92.66	39.15	#14	12	-	-	5.75	5.50	-	-
38	-	-	Center Girder Slice 38	146.94	16.84	90.19	36.68	#14	10	-	-	5.75	5.50	-	-
39	-	-	Center Girder Slice 39	149.42	19.31	87.72	34.21	#14	8	#5	2	5.75	5.50	33.00	5.50



Table with 11 columns: Row number, Pier, Slice, and reinforcement details (bar size, number, length, etc.). Includes sections for 13 and 12, with various slice numbers and reinforcement specifications.

2.2 Center girder bottom mat reinforcement @ bottom slab

Detailed reinforcement table for section CG-2. Columns include Section No., Span, Pier, Slice, Slice location (L1-L4), and Bottom slab - Bottom mat (Bar size, Number, C1, S1, Y1, S2). Includes sub-sections for 15 and 14.



Project: Penhall Woodville Interchange Demo
Structure: Woodville Interchange - SR 405
Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
Checked by: DSCK 01/26/2026
Bridge ID: -

Line No.	Span	Pier	Slice	L1	L2	L3	L4	Web Width	Hoop	Layer_top	Layer_int	Layer_bot	Bar size	Bar size	Bar size
31	-	-	Center Girder Slice 31	108.22	85.14	21.89	31.63	#14	4	#5	6	4.00	8.00	16.00	12.00
32	-	-	Center Girder Slice 32	110.67	87.59	19.44	34.07	#14	4	#5	6	4.00	8.00	16.00	12.00
33	-	-	Center Girder Slice 33	113.11	90.03	17.00	36.52	#14	4	#5	6	4.00	8.00	16.00	12.00
34	-	-	Center Girder Slice 34	115.56	92.48	14.55	38.96	#14	4	#5	6	4.00	8.00	16.00	12.00
35	-	-	Center Girder Slice 35	118.00	94.92	12.11	41.41	#14	4	#5	6	4.00	8.00	16.00	12.00
-	14	-	-	130.11	107.03	0.00	53.51	#14	4	#5	6	4.00	8.00	16.00	12.00
36	-	-	Center Girder Slice 36	130.11	0.00	107.03	53.51	#14	4	#5	4	6.00	12.00	24.00	12.00
37	-	-	Center Girder Slice 37	144.47	14.36	92.66	39.15	#14	4	#5	4	6.00	12.00	24.00	12.00
38	-	-	Center Girder Slice 38	146.94	16.84	90.19	36.68	#14	4	#5	4	6.00	12.00	24.00	12.00
39	-	-	Center Girder Slice 39	149.42	19.31	87.72	34.21	#14	4	#5	4	6.00	12.00	24.00	12.00
40	-	-	Center Girder Slice 40	151.89	21.78	85.25	31.73	#14	6	-	-	6.00	12.00	-	-
41	-	-	Center Girder Slice 41	154.36	24.25	82.78	29.26	#14	6	-	-	6.00	12.00	-	-
42	-	-	Center Girder Slice 42	156.83	26.73	80.30	26.79	#14	8	-	-	6.00	12.00	-	-
43	-	-	Center Girder Slice 43	159.31	29.20	77.83	24.32	#14	8	-	-	6.00	12.00	-	-
44	-	-	Center Girder Slice 44	161.78	31.67	75.36	21.84	#14	8	-	-	6.00	12.00	-	-
45	S13BC	-	Center Girder Slice 45	164.25	34.14	72.89	19.37	#14	8	-	-	6.00	12.00	-	-
46	S13BC	-	Center Girder Slice 46	167.00	36.89	70.14	16.62	#14	8	-	-	6.00	12.00	-	-
47	-	-	Center Girder Slice 47	170.67	40.56	66.47	12.96	#14	8	-	-	6.00	12.00	-	-
48	-	-	Center Girder Slice 48	174.33	44.23	62.80	9.29	#14	8	-	-	6.00	12.00	-	-
49	-	-	Center Girder Slice 49	178.00	47.89	59.14	5.62	#14	8	-	-	6.00	12.00	-	-
50	-	-	Center Girder Slice 50	181.67	51.56	55.47	1.96	#14	8	-	-	6.00	12.00	-	-
51	13	-	Center Girder Slice 51	185.33	55.23	51.80	1.71	#14	8	-	-	6.00	12.00	-	-
52	-	-	Center Girder Slice 52	189.00	58.89	48.14	5.38	#14	8	-	-	6.00	12.00	-	-
53	-	-	Center Girder Slice 53	192.67	62.56	44.47	9.05	#14	8	-	-	6.00	12.00	-	-
54	-	-	Center Girder Slice 54	196.33	66.23	40.80	12.71	#14	8	-	-	6.00	12.00	-	-
55	S13AB	-	Center Girder Slice 55	200.00	69.89	37.14	16.38	#14	8	-	-	6.00	12.00	-	-
56	S13AB	-	Center Girder Slice 56	203.00	72.89	34.14	19.38	#14	8	-	-	6.00	12.00	-	-
57	-	-	Center Girder Slice 57	205.47	75.36	31.66	21.85	#14	8	-	-	6.00	12.00	-	-
58	-	-	Center Girder Slice 58	207.94	77.84	29.19	24.32	#14	8	-	-	6.00	12.00	-	-
59	-	-	Center Girder Slice 59	210.42	80.31	26.72	26.80	#14	8	-	-	6.00	12.00	-	-
60	-	-	Center Girder Slice 60	212.89	82.78	24.25	29.27	#14	6	-	-	6.00	12.00	-	-
61	-	-	Center Girder Slice 61	215.36	85.25	21.78	31.74	#14	6	-	-	6.00	12.00	-	-
62	-	-	Center Girder Slice 62	217.83	87.73	19.30	34.21	#14	4	#5	4	6.00	12.00	24.00	12.00
63	-	-	Center Girder Slice 63	220.31	90.20	16.83	36.68	#14	4	#5	4	6.00	12.00	24.00	12.00
64	-	-	Center Girder Slice 64	222.78	92.67	14.36	39.16	#14	4	#5	4	6.00	12.00	24.00	12.00
65	-	-	Center Girder Slice 65	225.25	95.14	11.89	41.63	#14	4	#5	4	6.00	12.00	24.00	12.00
-	13	-	-	237.14	107.03	0.00	53.51	#14	4	#5	4	6.00	12.00	24.00	12.00
66	-	-	Center Girder Slice 66	249.00	11.86	79.11	45.08	#14	4	#5	6	5.00	10.00	20.00	12.00
67	-	-	Center Girder Slice 67	250.89	13.75	77.22	43.20	#14	4	#5	6	5.00	10.00	20.00	12.00
68	-	-	Center Girder Slice 68	252.78	15.64	75.33	41.31	#14	4	#5	6	5.00	10.00	20.00	12.00
69	-	-	Center Girder Slice 69	254.67	17.53	73.44	39.42	#14	4	#5	6	5.00	10.00	20.00	12.00
70	-	-	Center Girder Slice 70	256.56	19.42	71.55	37.53	#14	4	#5	6	5.00	10.00	20.00	12.00
71	-	-	Center Girder Slice 71	258.44	21.31	69.67	35.64	#14	4	#5	6	5.00	10.00	20.00	12.00
72	-	-	Center Girder Slice 72	260.33	23.20	67.78	33.75	#14	6	#5	2	5.00	10.00	40.00	12.00
73	-	-	Center Girder Slice 73	262.22	25.09	65.89	31.86	#14	6	#5	2	5.00	10.00	40.00	12.00
74	-	-	Center Girder Slice 74	264.11	26.98	64.00	29.97	#14	8	#5	2	5.00	10.00	40.00	12.00
75	S12CD	-	Center Girder Slice 75	266.00	28.86	62.11	28.08	#14	8	#5	2	5.00	10.00	40.00	12.00
76	S12CD	-	Center Girder Slice 76	269.00	31.86	59.11	25.08	#14	8	#5	2	5.00	10.00	40.00	12.00
77	-	-	Center Girder Slice 77	272.03	34.89	56.08	22.06	#14	8	-	-	5.00	10.00	-	-
78	-	-	Center Girder Slice 78	275.06	37.92	53.05	19.03	#14	10	-	-	5.00	10.00	-	-
79	-	-	Center Girder Slice 79	278.08	40.95	50.03	16.00	#14	10	-	-	5.00	10.00	-	-
80	-	-	Center Girder Slice 80	281.11	43.98	47.00	12.97	#14	10	-	-	5.00	10.00	-	-
81	12	-	Center Girder Slice 81	284.14	47.00	43.97	9.95	#14	10	-	-	5.00	10.00	-	-
82	-	-	Center Girder Slice 82	287.17	50.03	40.94	6.92	#14	10	-	-	5.00	10.00	-	-
83	-	-	Center Girder Slice 83	290.19	53.06	37.92	3.89	#14	10	-	-	5.00	10.00	-	-
84	-	-	Center Girder Slice 84	293.22	56.09	34.89	0.86	#14	10	-	-	5.00	10.00	-	-
85	S12BC	-	Center Girder Slice 85	296.25	59.11	31.86	2.17	#14	10	-	-	5.00	10.00	-	-
86	S12BC	-	Center Girder Slice 86	299.25	62.11	28.86	5.17	#14	10	-	-	5.00	10.00	-	-
87	-	-	Center Girder Slice 87	302.11	64.98	26.00	8.03	#14	10	-	-	5.00	10.00	-	-
88	-	-	Center Girder Slice 88	304.97	67.84	23.14	10.89	#14	10	-	-	5.00	10.00	-	-
89	-	-	Center Girder Slice 89	307.83	70.70	20.28	13.75	#14	10	-	-	5.00	10.00	-	-
90	-	-	Center Girder Slice 90	310.69	73.56	17.42	16.61	#14	10	-	-	5.00	10.00	-	-
91	-	-	Center Girder Slice 91	313.56	76.42	14.55	19.47	#14	10	-	-	5.00	10.00	-	-
92	-	-	Center Girder Slice 92	316.42	79.28	11.69	22.33	#14	10	-	-	5.00	10.00	-	-
93	-	-	Center Girder Slice 93	319.28	82.14	8.83	25.19	#14	10	-	-	5.00	10.00	-	-
94	-	-	Center Girder Slice 94	322.14	85.00	5.97	28.05	#14	10	-	-	5.00	10.00	-	-
95	-	-	Center Girder Slice 95	325.00	87.86	3.11	30.92	#14	10	-	-	5.00	10.00	-	-
-	Hinge	-	-	328.11	90.97	0.00	34.02	#14	10	-	-	5.00	10.00	-	-

2.3 Center girder web hoop and longitudinal reinforcement

Section No.	Span	Pier	Slice	Slice location				Web Width	Web reinforcement				
				L1	L2	L3	L4		Hoop	Layer_top	Layer_int	Layer_bot	
[-]	[-]	[-]	[-]	[ft]	[ft]	[ft]	[ft]	[in]	[in]	Bar size	Bar size	Bar size	Bar size
-	-	Abut.	-	0.00	0.00	23.08	-	13.00	15	#10	#4	#4	#4
1	-	-	Center Girder Slice 1	1.75	1.75	21.33	-	13.00	15	#10	#4	#4	#4
2	-	-	Center Girder Slice 2	6.06	6.06	17.02	-	13.00	15	#10	#4	#4	#4
3	15	-	Center Girder Slice 3	10.38	10.38	12.71	-	13.00	15	#10	#4	#4	#4
4	-	-	Center Girder Slice 4	14.69	14.69	8.39	-	13.00	12	#10	#4	#4	#4
5	-	-	Center Girder Slice 5	19.00	19.00	4.08	-	13.00	6	#10	#4	#4	#4
-	15	-	-	23.08	23.08	0.00	-	13.00	6	#10	#4	#4	#4
6	-	-	Center Girder Slice 6	35.00	11.92	95.11	41.59	13.00	6	#10	#4	#4	#4
7	-	-	Center Girder Slice 7	37.47	14.39	92.64	39.12	13.00	6	#10	#4	#4	#4
8	-	-	Center Girder Slice 8	39.94	16.86	90.16	36.65	13.00	6	#10	#4	#4	#4
9	-	-	Center Girder Slice 9	42.42	19.34	87.69	34.18	13.00	8	#10	#4	#4	#4
10	-	-	Center Girder Slice 10	44.89	21.81	85.22	31.71	13.00	8	#10	#4	#4	#4
11	-	-	Center Girder Slice 11	47.36	24.28	82.75	29.23	13.00	10	#10	#4	#4	#4
12	-	-	Center Girder Slice 12	49.83	26.75	80.27	26.76	13.00	12	#8	#4	#4	#4
13	-	-	Center Girder Slice 13	52.31	29.23	77.80	24.29	13.00	12	#8	#4	#4	#4
14	-	-	Center Girder Slice 14	54.78	31.70	75.33	21.82	13.00	15	#8	#4	#4	#4
15	S14BC	-	Center Girder Slice 15	57.25	34.17	72.86	19.34	13.00	15	#8	#4	#4	#4
16	S14BC	-	Center Girder Slice 16	60.00	36.92	70.11	16.59	9.00	18	#8	#4	#4	#4
17	-	-	Center Girder Slice 17	63.67	40.59	66.44	12.93	9.00	18	#8	#4	#4	#4
18	-	-	Center Girder Slice 18	67.33	44.25	62.77	9.26	9.00	18	#8	#4	#4	#4



Project: Penhall Woodville Interchange Demo
 Structure: Woodville Interchange - SR 405
 Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
 Checked by: DSCK 01/26/2026
 Bridge ID: -

19	-	Center Girder Slice 19	71.00	47.92	59.11	5.59	9.00	18	#8	#4	#4
20	-	Center Girder Slice 20	74.67	51.59	55.44	1.93	9.00	18	#8	#4	#4
21	14	Center Girder Slice 21	78.33	55.25	51.77	1.74	9.00	18	#8	#4	#4
22	-	Center Girder Slice 22	82.00	58.92	48.11	5.41	9.00	18	#8	#4	#4
23	-	Center Girder Slice 23	85.67	62.59	44.44	9.07	9.00	18	#8	#4	#4
24	-	Center Girder Slice 24	89.33	66.25	40.77	12.74	9.00	12	#8	#4	#4
25	S14AB	Center Girder Slice 25	93.00	69.92	37.11	16.41	9.00	12	#8	#4	#4
26	S14AB	Center Girder Slice 26	96.00	72.92	34.11	19.41	13.00	12	#8	#4	#4
27	-	Center Girder Slice 27	98.44	75.36	31.66	21.85	13.00	12	#8	#4	#4
28	-	Center Girder Slice 28	100.89	77.81	29.22	24.29	13.00	10	#8	#4	#4
29	-	Center Girder Slice 29	103.33	80.25	26.78	26.74	13.00	8	#10	#4	#4
30	-	Center Girder Slice 30	105.78	82.70	24.33	29.18	13.00	8	#10	#4	#4
31	-	Center Girder Slice 31	108.22	85.14	21.89	31.63	13.00	6	#10	#4	#4
32	-	Center Girder Slice 32	110.67	87.59	19.44	34.07	13.00	6	#10	#4	#4
33	-	Center Girder Slice 33	113.11	90.03	17.00	36.52	13.00	6	#10	#4	#4
34	-	Center Girder Slice 34	115.56	92.48	14.55	38.96	13.00	5	#10	#4	#4
35	-	Center Girder Slice 35	118.00	94.92	12.11	41.41	13.00	5	#10	#4	#4
-	14	-	130.11	107.03	0.00	53.51	13.00	4	#10	#4	#4
-	14	-	130.11	0.00	107.03	53.51	13.00	5	#10	#4	#4
36	-	Center Girder Slice 36	142.00	11.89	95.14	41.62	13.00	6	#10	#4	#4
37	-	Center Girder Slice 37	144.47	14.36	92.66	39.15	13.00	6	#10	#4	#4
38	-	Center Girder Slice 38	146.94	16.84	90.19	36.68	13.00	8	#10	#4	#4
39	-	Center Girder Slice 39	149.42	19.31	87.72	34.21	13.00	8	#10	#4	#4
40	-	Center Girder Slice 40	151.89	21.78	85.25	31.73	13.00	8	#10	#4	#4
41	-	Center Girder Slice 41	154.36	24.25	82.78	29.26	13.00	10	#10	#4	#4
42	-	Center Girder Slice 42	156.83	26.73	80.30	26.79	13.00	10	#10	#4	#4
43	-	Center Girder Slice 43	159.31	29.20	77.83	24.32	13.00	12	#8	#4	#4
44	-	Center Girder Slice 44	161.78	31.67	75.36	21.84	13.00	15	#8	#4	#4
45	S13BC	Center Girder Slice 45	164.25	34.14	72.89	19.37	13.00	15	#8	#4	#4
46	S13BC	Center Girder Slice 46	167.00	36.89	70.14	16.62	9.00	15	#8	#4	#4
47	-	Center Girder Slice 47	170.67	40.56	66.47	12.96	9.00	18	#8	#4	#4
48	-	Center Girder Slice 48	174.33	44.23	62.80	9.29	9.00	18	#8	#4	#4
49	-	Center Girder Slice 49	178.00	47.89	59.14	5.62	9.00	18	#8	#4	#4
50	13	Center Girder Slice 50	181.67	51.56	55.47	1.96	9.00	18	#8	#4	#4
51	-	Center Girder Slice 51	185.33	55.23	51.80	1.71	9.00	18	#8	#4	#4
52	-	Center Girder Slice 52	189.00	58.89	48.14	5.38	9.00	18	#8	#4	#4
53	-	Center Girder Slice 53	192.67	62.56	44.47	9.05	9.00	18	#8	#4	#4
54	-	Center Girder Slice 54	196.33	66.23	40.80	12.71	9.00	18	#8	#4	#4
55	S13AB	Center Girder Slice 55	200.00	69.89	37.14	16.38	9.00	18	#8	#4	#4
56	S13AB	Center Girder Slice 56	203.00	72.89	34.14	19.38	13.00	12	#8	#4	#4
57	-	Center Girder Slice 57	205.47	75.36	31.66	21.85	13.00	12	#8	#4	#4
58	-	Center Girder Slice 58	207.94	77.84	29.19	24.32	13.00	10	#8	#4	#4
59	-	Center Girder Slice 59	210.42	80.31	26.72	26.80	13.00	10	#8	#4	#4
60	-	Center Girder Slice 60	212.89	82.78	24.25	29.27	13.00	8	#10	#4	#4
61	-	Center Girder Slice 61	215.36	85.25	21.78	31.74	13.00	8	#10	#4	#4
62	-	Center Girder Slice 62	217.83	87.73	19.30	34.21	13.00	6	#10	#4	#4
63	-	Center Girder Slice 63	220.31	90.20	16.83	36.68	13.00	6	#10	#4	#4
64	-	Center Girder Slice 64	222.78	92.67	14.36	39.16	13.00	6	#10	#4	#4
65	-	Center Girder Slice 65	225.25	95.14	11.89	41.63	13.00	5	#10	#4	#4
-	13	-	237.14	107.03	0.00	53.51	13.00	4	#10	#4	#4
-	13	-	237.14	0.00	90.97	56.95	13.00	4	#10	#4	#4
66	-	Center Girder Slice 66	249.00	11.86	79.11	45.08	13.00	5	#10	#4	#4
67	-	Center Girder Slice 67	250.89	13.75	77.22	43.20	13.00	5	#10	#4	#4
68	-	Center Girder Slice 68	252.78	15.64	75.33	41.31	13.00	6	#10	#4	#4
69	-	Center Girder Slice 69	254.67	17.53	73.44	39.42	13.00	6	#10	#4	#4
70	-	Center Girder Slice 70	256.56	19.42	71.55	37.53	13.00	6	#10	#4	#4
71	-	Center Girder Slice 71	258.44	21.31	69.67	35.64	13.00	6	#10	#4	#4
72	-	Center Girder Slice 72	260.33	23.20	67.78	33.75	13.00	8	#8	#4	#4
73	-	Center Girder Slice 73	262.22	25.09	65.89	31.86	13.00	8	#8	#4	#4
74	-	Center Girder Slice 74	264.11	26.98	64.00	29.97	13.00	8	#8	#4	#4
75	S12CD	Center Girder Slice 75	266.00	28.86	62.11	28.08	13.00	8	#8	#4	#4
76	S12CD	Center Girder Slice 76	269.00	31.86	59.11	25.08	9.00	8	#8	#4	#4
77	-	Center Girder Slice 77	272.03	34.89	56.08	22.06	9.00	10	#8	#4	#4
78	-	Center Girder Slice 78	275.06	37.92	53.05	19.03	9.00	12	#8	#4	#4
79	-	Center Girder Slice 79	278.08	40.95	50.03	16.00	9.00	12	#8	#4	#4
80	12	Center Girder Slice 80	281.11	43.98	47.00	12.97	9.00	18	#8	#4	#4

L3
L2

L3
L2



Project: Penhall Woodville Interchange Demo
 Structure: Woodville Interchange - SR 405
 Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
 Checked by: DSCK 01/26/2026
 Bridge ID: -

81	-	-	Center Girder Slice 81	284.14	47.00	43.97	9.95	9.00	18	#8	#4	#4
82	-	-	Center Girder Slice 82	287.17	50.03	40.94	6.92	9.00	18	#8	#4	#4
83	-	-	Center Girder Slice 83	290.19	53.06	37.92	3.89	9.00	18	#8	#4	#4
84	-	-	Center Girder Slice 84	293.22	56.09	34.89	0.86	9.00	18	#8	#4	#4
85	S12BC	-	Center Girder Slice 85	296.25	59.11	31.86	2.17	9.00	18	#8	#4	#4
86	S12BC	-	Center Girder Slice 86	299.25	62.11	28.86	5.17	13.00	18	#8	#4	#4
87	-	-	Center Girder Slice 87	302.11	64.98	26.00	8.03	13.00	18	#8	#4	#4
88	-	-	Center Girder Slice 88	304.97	67.84	23.14	10.89	13.00	18	#8	#4	#4
89	-	-	Center Girder Slice 89	307.83	70.70	20.28	13.75	13.00	18	#8	#4	#4
90	-	-	Center Girder Slice 90	310.69	73.56	17.42	16.61	13.00	15	#8	#4	#4
91	-	-	Center Girder Slice 91	313.56	76.42	14.55	19.47	13.00	15	#8	#4	#4
92	-	-	Center Girder Slice 92	316.42	79.28	11.69	22.33	13.00	12	#8	#4	#4
93	-	-	Center Girder Slice 93	319.28	82.14	8.83	25.19	13.00	10	#8	#4	#4
94	-	-	Center Girder Slice 94	322.14	85.00	5.97	28.05	13.00	8	#8	#4	#4
95	-	-	Center Girder Slice 95	325.00	87.86	3.11	30.92	13.00	6	#8	#4	#4
-	Hinge	-	-	328.11	90.97	0.00	34.02	13.00	6	#8	#4	#4

L3

3. Right girder reinforcement

3.1 Right girder top mat reinforcement @ top slab

RG-1

Section No.	Span	Pier	Slice	Slice location				Top slab - Top mat								
				L1	L2	L3	L4	Longitudinal reinforcement								
				[ft]	[ft]	[ft]	[ft]	Bar size	Number	Bar size	Number	C1	S1	Y1-1	S1-1	
[-]	[-]	[-]	[-]	[ft]	[ft]	[ft]	[ft]	[-]	[-]	[-]	[-]	[in]	[in]	[in]	[in]	
-	-	Abut.	-	0.00	0.00	23.62	-	#14	4	-	-	2.97	8.50	-	-	
1	-	-	Right Girder Slice 1	1.75	1.75	21.87	-	#14	4	-	-	2.97	8.50	-	-	
2	-	-	Right Girder Slice 2	6.13	6.13	17.49	-	#14	4	-	-	2.97	8.50	-	-	
3	15	-	Right Girder Slice 3	10.50	10.50	13.12	-	#14	4	-	-	2.97	8.50	-	-	
4	-	-	Right Girder Slice 4	14.88	14.88	8.74	-	#14	4	-	-	2.97	8.50	-	-	
5	-	-	Right Girder Slice 5	19.25	19.25	4.37	-	#14	4	-	-	2.97	8.50	-	-	
-	-	15	-	23.62	23.62	0.00	-	#14	4	-	-	2.97	8.50	-	-	
-	-	15	-	23.62	0.00	109.51	54.75	#14	4	-	-	2.97	8.50	-	-	
6	-	-	Right Girder Slice 6	35.75	12.13	97.37	42.62	#14	4	-	-	2.97	8.50	-	-	
7	-	-	Right Girder Slice 7	38.28	14.66	94.85	40.09	#14	4	-	-	2.97	8.50	-	-	
8	-	-	Right Girder Slice 8	40.81	17.19	92.32	37.56	#14	3	#5	1	2.97	8.50	25.50	12.00	
9	-	-	Right Girder Slice 9	43.33	19.72	89.79	35.04	#14	2	#5	1	2.97	17.00	25.50	12.00	
10	-	-	Right Girder Slice 10	45.86	22.25	87.26	32.51	#14	2	#5	1	2.97	17.00	25.50	12.00	
11	-	-	Right Girder Slice 11	48.39	24.77	84.74	29.98	#11	2	#5	1	2.83	17.00	25.50	12.00	
12	-	-	Right Girder Slice 12	50.92	27.30	82.21	27.45	#11	2	#5	1	2.83	17.00	25.50	12.00	
13	-	-	Right Girder Slice 13	53.44	29.83	79.68	24.93	#11	2	#5	1	2.83	17.00	25.50	12.00	
14	-	-	Right Girder Slice 14	55.97	32.36	77.15	22.40	#11	2	#5	1	2.83	17.00	25.50	12.00	
15	S14BC	-	Right Girder Slice 15	58.50	34.88	74.62	19.87	#11	2	#5	1	2.83	17.00	25.50	12.00	
16	S14BC	-	Right Girder Slice 16	61.75	38.13	71.37	16.62	#11	2	#5	1	2.83	17.00	25.50	12.00	
17	-	-	Right Girder Slice 17	65.44	41.83	67.68	12.93	#11	2	#5	1	2.83	17.00	25.50	12.00	
18	-	-	Right Girder Slice 18	69.14	45.52	63.99	9.23	#11	2	#5	1	2.83	17.00	25.50	12.00	
19	-	-	Right Girder Slice 19	72.83	49.22	60.29	5.54	#11	2	#5	1	2.83	17.00	25.50	12.00	
20	-	-	Right Girder Slice 20	76.53	52.91	56.60	1.84	#11	2	#5	1	2.83	17.00	25.50	12.00	
21	14	-	Right Girder Slice 21	80.22	56.61	52.90	1.85	#11	2	#5	1	2.83	15.00	20.00	12.00	
22	-	-	Right Girder Slice 22	83.92	60.30	49.21	5.55	#11	2	#5	1	2.83	15.00	20.00	12.00	
23	-	-	Right Girder Slice 23	87.61	64.00	45.51	9.24	#11	2	#5	1	2.83	15.00	20.00	12.00	
24	-	-	Right Girder Slice 24	91.31	67.69	41.82	12.94	#11	2	#5	1	2.83	15.00	20.00	12.00	
25	S14AB	-	Right Girder Slice 25	95.00	71.38	38.12	16.63	#11	2	#5	1	2.83	15.00	20.00	12.00	
26	S14AB	-	Right Girder Slice 26	98.25	74.63	34.87	19.88	#11	2	#5	1	2.83	15.00	20.00	12.00	
27	-	-	Right Girder Slice 27	100.78	77.16	32.35	22.41	#14	3	-	-	2.97	15.00	-	-	
28	-	-	Right Girder Slice 28	103.31	79.69	29.82	24.94	#14	3	-	-	2.97	15.00	-	-	
29	-	-	Right Girder Slice 29	105.83	82.22	27.29	27.46	#14	5	-	-	2.97	5.00	-	-	
30	-	-	Right Girder Slice 30	108.36	84.75	24.76	29.99	#14	6	-	-	2.97	5.00	-	-	
31	-	-	Right Girder Slice 31	110.89	87.27	22.24	32.52	#14	6	-	-	2.97	5.00	-	-	
32	-	-	Right Girder Slice 32	113.42	89.80	19.71	35.05	#14	6	-	-	2.97	5.00	-	-	
33	-	-	Right Girder Slice 33	115.94	92.33	17.18	37.57	#14	6	-	-	2.97	5.00	-	-	
34	-	-	Right Girder Slice 34	118.47	94.86	14.65	40.10	#14	6	-	-	2.97	5.00	-	-	
35	-	-	Right Girder Slice 35	121.00	97.38	12.12	42.63	#14	6	-	-	2.97	5.00	-	-	
-	-	14	-	133.12	109.51	0.00	54.75	#14	6	-	-	2.97	5.00	-	-	
-	-	14	-	133.12	0.00	109.51	54.75	#14	6	-	-	2.97	5.00	-	-	
36	-	-	Right Girder Slice 36	145.25	12.13	97.38	42.63	#14	6	-	-	2.97	5.00	-	-	
37	-	-	Right Girder Slice 37	147.78	14.65	94.85	40.10	#14	6	-	-	2.97	5.00	-	-	
38	-	-	Right Girder Slice 38	150.31	17.18	92.33	37.57	#14	6	-	-	2.97	5.00	-	-	
39	-	-	Right Girder Slice 39	152.83	19.71	89.80	35.05	#14	6	-	-	2.97	5.00	-	-	
40	-	-	Right Girder Slice 40	155.36	22.24	87.27	32.52	#14	6	-	-	2.97	5.00	-	-	
41	-	-	Right Girder Slice 41	157.89	24.77	84.74	29.99	#14	5	-	-	2.97	5.00	-	-	
42	-	-	Right Girder Slice 42	160.42	27.29	82.22	27.46	#14	5	-	-	2.97	5.00	-	-	
43	-	-	Right Girder Slice 43	162.94	29.82	79.69	24.93	#14	3	-	-	2.97	15.00	-	-	
44	-	-	Right Girder Slice 44	165.47	32.35	77.16	22.41	#14	3	-	-	2.97	15.00	-	-	
45	S13BC	-	Right Girder Slice 45	168.00	34.88	74.63	19.88	#11	2	#5	1	2.83	15.00	20.00	12.00	
46	S13BC	-	Right Girder Slice 46	171.25	38.13	71.38	16.63	#11	2	#5	1	2.83	15.00	20.00	12.00	
47	-	-	Right Girder Slice 47	174.97	41.85	67.66	12.91	#11	2	#5	1	2.83	15.00	20.00	12.00	
48	-	-	Right Girder Slice 48	178.69	45.57	63.94	9.18	#11	2	#5	1	2.83	15.00	20.00	12.00	
49	-	-	Right Girder Slice 49	182.42	49.29	60.22	5.46	#11	2	#5	1	2.83	15.00	20.00	12.00	
50	-	-	Right Girder Slice 50	186.14	53.02	56.49	1.74	#11	2	#5	1	2.83	15.00	20.00	12.00	
51	13	-	Right Girder Slice 51	189.86	56.74	52.77	1.98	#11	2	#5	1	2.83	11.00	22.00	12.00	
52	-	-	Right Girder Slice 52	193.58	60.46	49.05	5.71	#11	2	#5	1	2.83	11.00	22.00	12.00	
53	-	-	Right Girder Slice 53	197.31	64.18	45.33	9.43	#11	2	#5	1	2.83	11.00	22.00	12.00	
54	-	-	Right Girder Slice 54	201.03	67.90	41.60	13.15	#11	2	#5	1	2.83	11.00	22.00	12.00	
55	S13AB	-	Right Girder Slice 55	204.75	71.63	37.88	16.87	#11	2	#5	1	2.83	11.00	22.00	12.00	
56	S13AB	-	Right Girder Slice 56	207.75	74.63	34.88	19.87	#11	2	#5	1	2.83	11.00	22.00	12.00	
57	-	-	Right Girder Slice 57	210.28	77.15	32.35	22.40	#14	2	-	-	2.97	11.00	-	-	
58	-	-	Right Girder Slice 58	212.81	79.68	29.83	24.93	#14	2	-	-	2.97	11.00	-	-	
59	-	-	Right Girder Slice 59	215.33	82.21	27.30	27.46	#14	4	-	-	2.97	5.50	-	-	
60	-	-	Right Girder Slice 60	217.86	84.74	24.77	29.98	#14	4	-	-	2.97	5.50	-	-	
61	-	-	Right Girder Slice 61	220.39	87.27	22.24	32.51	#14	5	-	-	2.97	5.50	-	-	

Station	Notes	Description	L1	L2	L3	L4	Bar size	Number	Bar size	Number	C ₁	S ₁	Y ₊₁	S ₊₁
-	13	-	242.63	0.00	93.08	58.27	#14	6	-	-	2.97	5.50	-	-
66	-	Right Girder Slice 66	254.75	12.12	80.96	46.15	#14	6	-	-	2.97	5.50	-	-
67	-	Right Girder Slice 67	256.67	14.04	79.05	44.23	#14	6	-	-	2.97	5.50	-	-
68	-	Right Girder Slice 68	258.58	15.95	77.13	42.32	#14	6	-	-	2.97	5.50	-	-
69	-	Right Girder Slice 69	260.50	17.87	75.21	40.40	#14	5	-	-	2.97	5.50	-	-
70	-	Right Girder Slice 70	262.42	19.79	73.30	38.48	#14	5	-	-	2.97	5.50	-	-
71	-	Right Girder Slice 71	264.33	21.70	71.38	36.57	#14	5	-	-	2.97	5.50	-	-
72	-	Right Girder Slice 72	266.25	23.62	69.46	34.65	#14	5	-	-	2.97	5.50	-	-
73	-	Right Girder Slice 73	268.17	25.54	67.55	32.73	#14	4	-	-	2.97	5.50	-	-
74	-	Right Girder Slice 74	270.08	27.45	65.63	30.82	#14	4	-	-	2.97	5.50	-	-
75	-	Right Girder Slice 75	272.00	29.37	63.71	28.90	#14	2	-	-	2.97	11.00	-	-
76	S12CD	Right Girder Slice 76	275.25	32.62	60.46	25.65	#11	2	#5	1	2.83	11.00	22.00	12.00
77	-	Right Girder Slice 77	278.33	35.70	57.38	22.57	#11	2	#5	1	2.83	11.00	22.00	12.00
78	-	Right Girder Slice 78	281.42	38.79	54.30	19.48	#11	2	#5	1	2.83	11.00	22.00	12.00
79	-	Right Girder Slice 79	284.50	41.87	51.21	16.40	#11	2	#5	1	2.83	11.00	22.00	12.00
80	12	Right Girder Slice 80	287.58	44.95	48.13	13.32	#11	2	#5	1	2.83	11.00	22.00	12.00
81	-	Right Girder Slice 81	290.67	48.04	45.05	10.23	#11	2	#5	1	2.83	11.00	22.00	12.00
82	-	Right Girder Slice 82	293.75	51.12	41.96	7.15	#11	2	#5	1	2.83	11.00	22.00	12.00
83	-	Right Girder Slice 83	296.83	54.20	38.88	4.07	#11	2	#5	1	2.83	11.00	22.00	12.00
84	-	Right Girder Slice 84	299.92	57.29	35.80	0.98	#11	2	#5	1	2.83	11.00	22.00	12.00
85	S12BC	Right Girder Slice 85	303.00	60.37	32.71	2.10	#11	2	#5	1	2.83	11.00	22.00	12.00
86	S12BC	Right Girder Slice 86	306.25	63.62	29.46	5.35	#11	2	#5	1	2.83	11.00	22.00	12.00
87	-	Right Girder Slice 87	309.19	66.56	26.52	8.29	#11	2	#5	1	2.83	11.00	22.00	12.00
88	-	Right Girder Slice 88	312.14	69.51	23.57	11.24	#11	2	#5	1	2.83	11.00	22.00	12.00
89	-	Right Girder Slice 89	315.08	72.45	20.63	14.18	#11	2	#5	1	2.83	11.00	22.00	12.00
90	-	Right Girder Slice 90	318.03	75.40	17.68	17.13	#11	2	#5	1	2.83	11.00	22.00	12.00
91	-	Right Girder Slice 91	320.97	78.34	14.74	20.07	#11	2	#5	1	2.83	11.00	22.00	12.00
92	-	Right Girder Slice 92	323.92	81.29	11.80	23.02	#11	2	#5	1	2.83	11.00	22.00	12.00
93	-	Right Girder Slice 93	326.86	84.23	8.85	25.96	#11	2	#5	1	2.83	11.00	22.00	12.00
94	-	Right Girder Slice 94	329.81	87.17	5.91	28.91	#11	2	#5	1	2.83	11.00	22.00	12.00
95	-	Right Girder Slice 95	332.75	90.12	2.96	31.85	#11	2	#5	1	2.83	11.00	22.00	12.00
-	Hinge	-	335.71	93.08	0.00	34.81	#11	2	#5	1	2.83	11.00	22.00	12.00

3.2 Right girder bottom mat reinforcement @ bottom slab

RG-2

Section No.	Span	Pier	Slice	Slice location				Bottom slab - Bottom mat Longitudinal reinforcement							
				L ₁	L ₂	L ₃	L ₄	Bar size	Number	Bar size	Number	C ₁	S ₁	Y ₊₁	S ₊₁
[-]	[-]	[-]	[-]	[ft]	[ft]	[ft]	[ft]	[-]	[-]	[-]	[-]	[in]	[in]	[in]	[in]
-	-	Abut.	-	0.00	0.00	23.62	-	#10	2	#5	3	3.00	4.50	16.50	12.00
1	-	-	Right Girder Slice 1	1.75	1.75	21.87	-	#10	2	#5	3	3.00	4.50	16.50	12.00
2	-	-	Right Girder Slice 2	6.13	6.13	17.49	-	#10	2	#5	3	3.00	4.50	16.50	12.00
3	15	-	Right Girder Slice 3	10.50	10.50	13.12	-	#10	2	#5	3	3.00	4.50	16.50	12.00
4	-	-	Right Girder Slice 4	14.88	14.88	8.74	-	#10	2	#5	3	3.00	4.50	16.50	12.00
5	-	-	Right Girder Slice 5	19.25	19.25	4.37	-	#10	2	#5	3	3.00	4.50	16.50	12.00
-	15	-	-	23.62	23.62	0.00	-	#10	2	#5	3	3.00	4.50	16.50	12.00
-	15	-	Right Girder Slice 6	23.62	0.00	109.51	54.75	#14	4	#5	2	3.00	4.50	23.50	12.00
6	-	-	Right Girder Slice 6	35.75	12.13	97.37	42.62	#14	4	-	-	3.00	4.50	-	-
7	-	-	Right Girder Slice 7	38.28	14.66	94.85	40.09	#14	4	-	-	3.00	4.50	-	-
8	-	-	Right Girder Slice 8	40.81	17.19	92.32	37.56	#14	6	-	-	3.00	4.50	-	-
9	-	-	Right Girder Slice 9	43.33	19.72	89.79	35.04	#14	8	-	-	3.00	4.50	-	-
10	-	-	Right Girder Slice 10	45.86	22.25	87.26	32.51	#14	8	-	-	3.00	4.50	-	-
11	-	-	Right Girder Slice 11	48.39	24.77	84.74	29.98	#14	9	-	-	3.00	4.50	-	-
12	-	-	Right Girder Slice 12	50.92	27.30	82.21	27.45	#14	9	-	-	3.00	4.50	-	-
13	-	-	Right Girder Slice 13	53.44	29.83	79.68	24.93	#14	10	-	-	3.00	4.50	-	-
14	-	-	Right Girder Slice 14	55.97	32.36	77.15	22.40	#14	10	-	-	3.00	4.50	-	-
15	S14BC	-	Right Girder Slice 15	58.50	34.88	74.62	19.87	#14	10	-	-	3.00	4.50	-	-
16	S14BC	-	Right Girder Slice 16	61.75	38.13	71.37	16.62	#14	10	-	-	3.00	4.50	-	-
17	-	-	Right Girder Slice 17	65.44	41.83	67.68	12.93	#14	10	-	-	3.00	4.50	-	-
18	-	-	Right Girder Slice 18	69.14	45.52	63.99	9.23	#14	10	-	-	3.00	4.50	-	-
19	-	-	Right Girder Slice 19	72.83	49.22	60.29	5.54	#14	10	-	-	3.00	4.50	-	-
20	-	-	Right Girder Slice 20	76.53	52.91	56.60	1.84	#14	10	-	-	3.00	4.50	-	-
21	14	-	Right Girder Slice 21	80.22	56.61	52.90	1.85	#14	10	-	-	3.00	4.50	-	-
22	-	-	Right Girder Slice 22	83.92	60.30	49.21	5.55	#14	10	-	-	3.00	4.50	-	-
23	-	-	Right Girder Slice 23	87.61	64.00	45.51	9.24	#14	10	-	-	3.00	4.50	-	-
24	-	-	Right Girder Slice 24	91.31	67.69	41.82	12.94	#14	10	-	-	3.00	4.50	-	-
25	S14AB	-	Right Girder Slice 25	95.00	71.38	38.12	16.63	#14	9	-	-	3.00	4.50	-	-
26	S14AB	-	Right Girder Slice 26	98.25	74.63	34.87	19.88	#14	9	-	-	3.00	4.50	-	-
27	-	-	Right Girder Slice 27	100.78	77.16	32.35	22.41	#14	8	#5	1	3.00	4.50	40.50	-
28	-	-	Right Girder Slice 28	103.31	79.69	29.82	24.94	#14	8	#5	1	3.00	4.50	40.50	-
29	-	-	Right Girder Slice 29	105.83	82.22	27.29	27.46	#14	6	#5	1	3.00	4.50	40.50	-
30	-	-	Right Girder Slice 30	108.36	84.75	24.76	29.99	#14	6	#5	1	3.00	4.50	40.50	-
31	-	-	Right Girder Slice 31	110.89	87.27	22.24	32.52	#14	4	#5	1	3.00	4.50	40.50	-
32	-	-	Right Girder Slice 32	113.42	89.80	19.71	35.05	#14	4	#5	1	3.00	4.50	40.50	-
33	-	-	Right Girder Slice 33	115.94	92.33	17.18	37.57	#14	9	-	-	3.00	4.50	-	-
34	-	-	Right Girder Slice 34	118.47	94.86	14.65	40.10	#14	9	-	-	3.00	4.50	-	-
35	-	-	Right Girder Slice 35	121.00	97.38	12.12	42.63	#14	9	-	-	3.00	4.50	-	-
-	14	-	-	133.12	109.51	0.00	54.75	#14	9	-	-	3.00	4.50	-	-
-	14	-	Right Girder Slice 36	133.12	0.00	109.51	54.75	#14	8	-	-	3.00	6.25	-	-
36	-	-	Right Girder Slice 36	145.25	12.13	97.38	42.63	#14	8	-	-	3.00	6.25	-	-
37	-	-	Right Girder Slice 37	147.78	14.65	94.85	40.10	#14	8	-	-	3.00	6.25	-	-
38	-	-	Right Girder Slice 38	150.31	17.18	92.33	37.57	#14	8	-	-	3.00	6.25	-	-
39	-	-	Right Girder Slice 39	152.83	19.71	89.80	35.05	#14	8	-	-	3.00	6.25	-	-
40	-	-	Right Girder Slice 40	155.36	22.24	87.27	32.52	#14	5	-	-	3.00	6.25	-	-
41	-	-	Right Girder Slice 41	157.89	24.77	84.74	29.99	#14	7	-	-	3.00	6.25	-	-
42	-	-	Right Girder Slice 42	160.42	27.29	82.22	27.46	#14	7	-	-	3.00	6.25	-	-
43	-	-	Right Girder Slice 43	162.94	29.82	79.69	24.93	#14	7	-	-	3.00	6.25	-	-
44	-	-	Right Girder Slice 44	165.47	32.35	77.16	22.41	#14	7	-	-	3.00	6.25	-	-
45	S13BC	-	Right Girder Slice 45	168.00	34.88	74.63	19.88	#14	7	-	-	3.00	6.25	-	-
46	S13BC	-	Right Girder Slice 46	171.25	38.13	71.38	16.63	#14	8	-	-	3.00	6.25	-	-
47	-	-	Right Girder Slice 47	174.97	41.85	67.66	12.91	#14	8	-	-	3.00	6.25	-	-
48	-	-	Right Girder Slice 48	178.69	45.57	63.94	9.18	#14	8	-	-	3.00	6.25	-	-
49	-	-	Right Girder Slice 49	182.42	49.29	60.22	5.46	#14	8	-	-	3.00	6.25	-	-
50	-	-	Right Girder Slice 50	186.14	53.02	56.49	1.74	#14	8	-	-	3.00	6.25	-	-
51	13	-	Right Girder Slice 51	189.86	56.74	52.77	1.98	#14	7	-	-	3.00	6.25	-	-
52	-	-	Right Girder Slice 52	193.58	60.46	49.05	5.71	#14	7	-	-	3.00	6.25	-	-
53	-	-	Right Girder Slice 53	197.31	64.18	45.33	9.43	#14	7	-	-	3.00	6.25	-	-
54	-	-													



Project: Penhall Woodinville Interchange Demo
 Structure: Woodinville Interchange - SR 405
 Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
 Checked by: DSCK 01/26/2026
 Bridge ID: -

56	S13AB	Right Girder Slice 56	207.75	74.63	34.88	19.87	#14	7	-	-	3.00	6.25	-	-
57	-	Right Girder Slice 57	210.28	77.15	32.35	22.40	#14	7	-	-	3.00	6.25	-	-
58	-	Right Girder Slice 58	212.81	79.68	29.83	24.93	#14	7	-	-	3.00	6.25	-	-
59	-	Right Girder Slice 59	215.33	82.21	27.30	27.46	#14	7	-	-	3.00	6.25	-	-
60	-	Right Girder Slice 60	217.86	84.74	24.77	29.98	#14	5	-	-	3.00	6.25	-	-
61	-	Right Girder Slice 61	220.39	87.27	22.24	32.51	#14	5	-	-	3.00	6.25	-	-
62	-	Right Girder Slice 62	222.92	89.79	19.72	35.04	#14	5	-	-	3.00	6.25	-	-
63	-	Right Girder Slice 63	225.44	92.32	17.19	37.57	#14	5	-	-	3.00	6.25	-	-
64	-	Right Girder Slice 64	227.97	94.85	14.66	40.09	#14	6	-	-	3.00	6.25	-	-
65	-	Right Girder Slice 65	230.50	97.38	12.13	42.62	#14	6	-	-	3.00	6.25	-	-
-	13	-	242.63	109.51	0.00	54.75	#14	6	-	-	3.00	6.25	-	-
-	13	-	242.63	0.00	93.08	58.27	#14	4	#14	3	3.00	5.25	22.75	7.00
66	-	Right Girder Slice 66	254.75	12.12	80.96	46.15	#14	4	#14	3	3.00	5.25	22.75	7.00
67	-	Right Girder Slice 67	256.67	14.04	79.05	44.23	#14	4	#14	3	3.00	5.25	22.75	7.00
68	-	Right Girder Slice 68	258.58	15.95	77.13	42.32	#14	4	#14	3	3.00	5.25	22.75	7.00
69	-	Right Girder Slice 69	260.50	17.87	75.21	40.40	#14	4	-	-	3.00	5.25	-	-
70	-	Right Girder Slice 70	262.42	19.79	73.30	38.48	#14	4	-	-	3.00	5.25	-	-
71	-	Right Girder Slice 71	264.33	21.70	71.38	36.57	#14	4	-	-	3.00	5.25	-	-
72	-	Right Girder Slice 72	266.25	23.62	69.46	34.65	#14	4	-	-	3.00	5.25	-	-
73	-	Right Girder Slice 73	268.17	25.54	67.55	32.73	#14	4	#14	2	3.00	5.25	26.25	10.50
74	-	Right Girder Slice 74	270.08	27.45	65.63	30.82	#14	8	-	-	3.00	5.25	-	-
75	S12CD	Right Girder Slice 75	272.00	29.37	63.71	28.90	#14	8	-	-	3.00	5.25	-	-
76	S12CD	Right Girder Slice 76	275.25	32.62	60.46	25.65	#14	8	-	-	3.00	5.25	-	-
77	-	Right Girder Slice 77	278.33	35.70	57.38	22.57	#14	8	-	-	3.00	5.25	-	-
78	-	Right Girder Slice 78	281.42	38.79	54.30	19.48	#14	9	-	-	3.00	5.25	-	-
79	-	Right Girder Slice 79	284.50	41.87	51.21	16.40	#14	9	-	-	3.00	5.25	-	-
80	-	Right Girder Slice 80	287.58	44.95	48.13	13.32	#14	9	-	-	3.00	5.25	-	-
81	12	Right Girder Slice 81	290.67	48.04	45.05	10.23	#14	9	-	-	3.00	5.25	-	-
82	-	Right Girder Slice 82	293.75	51.12	41.96	7.15	#14	9	-	-	3.00	5.25	-	-
83	-	Right Girder Slice 83	296.83	54.20	38.88	4.07	#14	9	-	-	3.00	5.25	-	-
84	-	Right Girder Slice 84	299.92	57.29	35.80	0.98	#14	9	-	-	3.00	5.25	-	-
85	S12BC	Right Girder Slice 85	303.00	60.37	32.71	2.10	#14	9	-	-	3.00	5.25	-	-
86	S12BC	Right Girder Slice 86	306.25	63.62	29.46	5.35	#14	9	-	-	3.00	5.25	-	-
87	-	Right Girder Slice 87	309.19	66.56	26.52	8.29	#14	9	-	-	3.00	5.25	-	-
88	-	Right Girder Slice 88	312.14	69.51	23.57	11.24	#14	9	-	-	3.00	5.25	-	-
89	-	Right Girder Slice 89	315.08	72.45	20.63	14.18	#14	9	-	-	3.00	5.25	-	-
90	-	Right Girder Slice 90	318.03	75.40	17.68	17.13	#14	9	-	-	3.00	5.25	-	-
91	-	Right Girder Slice 91	320.97	78.34	14.74	20.07	#14	5	#14	2	3.00	5.25	31.50	10.50
92	-	Right Girder Slice 92	323.92	81.29	11.80	23.02	#14	5	#14	2	3.00	5.25	31.50	10.50
93	-	Right Girder Slice 93	326.86	84.23	8.85	25.96	#14	5	#14	2	3.00	5.25	31.50	10.50
94	-	Right Girder Slice 94	329.81	87.17	5.91	28.91	#14	5	#14	2	3.00	5.25	31.50	10.50
95	-	Right Girder Slice 95	332.75	90.12	2.96	31.85	#14	5	#14	2	3.00	5.25	31.50	10.50
-	Hinge	-	335.71	93.08	0.00	34.81	#14	5	#14	2	3.00	5.25	31.50	10.50

3.3 Right girder web hoop and longitudinal reinforcement

RG-3

Section No.	Span	Pier	Slice	Slice location				Web Width	Web reinforcement			
				L ₁	L ₂	L ₃	L ₄		Hoop s _v	Layer _{top} Bar size	Layer _{int} Bar size	Layer _{bot} Bar size
[-]	[-]	[-]	[-]	[ft]	[ft]	[ft]	[ft]	[in]	[in]	[-]	[-]	[-]
-	-	-	Abut.	0.00	0.00	23.62	-	13.00	15.00	#10	#4	#4
1	-	-	Right Girder Slice 1	1.75	1.75	21.87	-	13.00	15.00	#10	#4	#4
2	-	-	Right Girder Slice 2	6.13	6.13	17.49	-	13.00	15.00	#10	#4	#4
3	15	-	Right Girder Slice 3	10.50	10.50	13.12	-	13.00	15.00	#10	#4	#4
4	-	-	Right Girder Slice 4	14.88	14.88	8.74	-	13.00	12.00	#10	#4	#4
5	-	-	Right Girder Slice 5	19.25	19.25	4.37	-	13.00	6.00	#10	#4	#4
-	15	-	-	23.62	23.62	0.00	-	13.00	6.00	#10	#4	#4
-	15	-	-	23.62	0.00	109.51	54.75	13.00	5.00	#10	#4	#4
6	-	-	Right Girder Slice 6	35.75	12.13	97.37	42.62	13.00	6.00	#10	#4	#4
7	-	-	Right Girder Slice 7	38.28	14.66	94.85	40.09	13.00	6.00	#10	#4	#4
8	-	-	Right Girder Slice 8	40.81	17.19	92.32	37.56	13.00	6.00	#10	#4	#4
9	-	-	Right Girder Slice 9	43.33	19.72	89.79	35.04	13.00	8.00	#10	#4	#4
10	-	-	Right Girder Slice 10	45.86	22.25	87.26	32.51	13.00	8.00	#10	#4	#4
11	-	-	Right Girder Slice 11	48.39	24.77	84.74	29.98	13.00	10.00	#10	#4	#4
12	-	-	Right Girder Slice 12	50.92	27.30	82.21	27.45	13.00	12.00	#8	#4	#4
13	-	-	Right Girder Slice 13	53.44	29.83	79.68	24.93	13.00	12.00	#8	#4	#4
14	-	-	Right Girder Slice 14	55.97	32.36	77.15	22.40	13.00	15.00	#8	#4	#4
15	S14BC	-	Right Girder Slice 15	58.50	34.88	74.62	19.87	13.00	18.00	#8	#4	#4
16	S14BC	-	Right Girder Slice 16	61.75	38.13	71.37	16.62	9.00	18.00	#8	#4	#4
17	-	-	Right Girder Slice 17	65.44	41.83	67.68	12.93	9.00	18.00	#8	#4	#4
18	-	-	Right Girder Slice 18	69.14	45.52	63.99	9.23	9.00	18.00	#8	#4	#4
19	-	-	Right Girder Slice 19	72.83	49.22	60.29	5.54	9.00	18.00	#8	#4	#4
20	-	-	Right Girder Slice 20	76.53	52.91	56.60	1.84	9.00	18.00	#8	#4	#4
21	14	-	Right Girder Slice 21	80.22	56.61	52.90	1.85	9.00	18.00	#8	#4	#4
22	-	-	Right Girder Slice 22	83.92	60.30	49.21	5.55	9.00	18.00	#8	#4	#4
23	-	-	Right Girder Slice 23	87.61	64.00	45.51	9.24	9.00	18.00	#8	#4	#4
24	-	-	Right Girder Slice 24	91.31	67.69	41.82	12.94	9.00	12.00	#8	#4	#4
25	S14AB	-	Right Girder Slice 25	95.00	71.38	38.12	16.63	9.00	12.00	#8	#4	#4
26	S14AB	-	Right Girder Slice 26	98.25	74.63	34.87	19.88	13.00	12.00	#8	#4	#4
27	-	-	Right Girder Slice 27	100.78	77.16	32.35	22.41	13.00	12.00	#8	#4	#4
28	-	-	Right Girder Slice 28	103.31	79.69	29.82	24.94	13.00	10.00	#8	#4	#4
29	-	-	Right Girder Slice 29	105.83	82.22	27.29	27.46	13.00	8.00	#10	#4	#4
30	-	-	Right Girder Slice 30	108.36	84.75	24.76	29.99	13.00	8.00	#10	#4	#4
31	-	-	Right Girder Slice 31	110.89	87.27	22.24	32.52	13.00	6.00	#10	#4	#4
32	-	-	Right Girder Slice 32	113.42	89.80	19.71	35.05	13.00	6.00	#10	#4	#4
33	-	-	Right Girder Slice 33	115.94	92.33	17.18	37.57	13.00	6.00	#10	#4	#4
34	-	-	Right Girder Slice 34	118.47	94.86	14.65	40.10	13.00	5.00	#10	#4	#4
35	-	-	Right Girder Slice 35	121.00	97.38	12.12	42.63	13.00	5.00	#10	#4	#4
-	14	-	-	133.12	109.51	0.00	54.75	13.00	4.00	#10	#4	#4
-	14	-	-	133.12	0.00	109.51	54.75	13.00	5.00	#10	#4	#4
36	-	-	Right Girder Slice 36	145.25	12.13	97.38	42.63	13.00	6.00	#10	#4	#4
37	-	-	Right Girder Slice 37	147.78	14.65	94.85	40.10	13.00	6.00	#10	#4	#4
38	-	-	Right Girder Slice 38	150.31	17.18	92.33	37.57	13.00	8.00	#10	#4	#4
39	-	-	Right Girder Slice 39	152.83	19.71	89.80	35.05	13.00	8.00	#10	#4	#4
40	-	-	Right Girder Slice 40	155.36	22.24	87.27	32.52	13.00	8.00	#10	#4	#4
41	-	-	Right Girder Slice 41	157.89	24.77	84.74	29.99	13.00	10.00	#10	#4	#4
42	-	-	Right Girder Slice 42	160.42	27.29	82.22	27.46	13.00	12.00	#8	#4	#4
43	-	-	Right Girder Slice 43	162.94	29.82	79.69	24.93	13.00	12.00	#8	#4	#4



Project: Penhall Woodville Interchange Demo
 Structure: Woodville Interchange - SR 405
 Content: NW Unit 5 Reinforcement

Made by: MDA 01/25/2026
 Checked by: DSCK 01/26/2026
 Bridge ID: -

44	-	Right Girder Slice 44	165.47	32.35	77.16	22.41	13.00	15.00	#8	#4	#4
45	S13BC	Right Girder Slice 45	168.00	34.88	74.63	19.88	13.00	15.00	#8	#4	#4
46	S13BC	Right Girder Slice 46	171.25	38.13	71.38	16.63	9.00	18.00	#8	#4	#4
47	-	Right Girder Slice 47	174.97	41.85	67.66	12.91	9.00	18.00	#8	#4	#4
48	-	Right Girder Slice 48	178.69	45.57	63.94	9.18	9.00	18.00	#8	#4	#4
49	-	Right Girder Slice 49	182.42	49.29	60.22	5.46	9.00	18.00	#8	#4	#4
50	-	Right Girder Slice 50	186.14	53.02	56.49	1.74	9.00	18.00	#8	#4	#4
51	13	Right Girder Slice 51	189.86	56.74	52.77	1.98	9.00	18.00	#8	#4	#4
52	-	Right Girder Slice 52	193.58	60.46	49.05	5.71	9.00	18.00	#8	#4	#4
53	-	Right Girder Slice 53	197.31	64.18	45.33	9.43	9.00	18.00	#8	#4	#4
54	-	Right Girder Slice 54	201.03	67.90	41.60	13.15	9.00	18.00	#8	#4	#4
55	S13AB	Right Girder Slice 55	204.75	71.63	37.88	16.87	9.00	18.00	#8	#4	#4
56	S13AB	Right Girder Slice 56	207.75	74.63	34.88	19.87	13.00	12.00	#8	#4	#4
57	-	Right Girder Slice 57	210.28	77.15	32.35	22.40	13.00	12.00	#8	#4	#4
58	-	Right Girder Slice 58	212.81	79.68	29.83	24.93	13.00	10.00	#8	#4	#4
59	-	Right Girder Slice 59	215.33	82.21	27.30	27.46	13.00	10.00	#8	#4	#4
60	-	Right Girder Slice 60	217.86	84.74	24.77	29.98	13.00	8.00	#10	#4	#4
61	-	Right Girder Slice 61	220.39	87.27	22.24	32.51	13.00	8.00	#10	#4	#4
62	-	Right Girder Slice 62	222.92	89.79	19.72	35.04	13.00	6.00	#10	#4	#4
63	-	Right Girder Slice 63	225.44	92.32	17.19	37.57	13.00	6.00	#10	#4	#4
64	-	Right Girder Slice 64	227.97	94.85	14.66	40.09	13.00	6.00	#10	#4	#4
65	-	Right Girder Slice 65	230.50	97.38	12.13	42.62	13.00	5.00	#10	#4	#4
-	13	-	242.63	109.51	0.00	54.75	13.00	4.00	#10	#4	#4
-	13	-	242.63	0.00	93.08	58.27	13.00	4.00	#10	#4	#4
66	-	Right Girder Slice 66	254.75	12.12	80.96	46.15	13.00	5.00	#10	#4	#4
67	-	Right Girder Slice 67	256.67	14.04	79.05	44.23	13.00	5.00	#10	#4	#4
68	-	Right Girder Slice 68	258.58	15.95	77.13	42.32	13.00	6.00	#10	#4	#4
69	-	Right Girder Slice 69	260.50	17.87	75.21	40.40	13.00	6.00	#10	#4	#4
70	-	Right Girder Slice 70	262.42	19.79	73.30	38.48	13.00	6.00	#10	#4	#4
71	-	Right Girder Slice 71	264.33	21.70	71.38	36.57	13.00	6.00	#10	#4	#4
72	-	Right Girder Slice 72	266.25	23.62	69.46	34.65	13.00	8.00	#8	#4	#4
73	-	Right Girder Slice 73	268.17	25.54	67.55	32.73	13.00	8.00	#8	#4	#4
74	-	Right Girder Slice 74	270.08	27.45	65.63	30.82	13.00	8.00	#8	#4	#4
75	S12CD	Right Girder Slice 75	272.00	29.37	63.71	28.90	13.00	8.00	#8	#4	#4
76	S12CD	Right Girder Slice 76	275.25	32.62	60.46	25.65	9.00	8.00	#8	#4	#4
77	-	Right Girder Slice 77	278.33	35.70	57.38	22.57	9.00	10.00	#8	#4	#4
78	-	Right Girder Slice 78	281.42	38.79	54.30	19.48	9.00	12.00	#8	#4	#4
79	-	Right Girder Slice 79	284.50	41.87	51.21	16.40	9.00	18.00	#8	#4	#4
80	-	Right Girder Slice 80	287.58	44.95	48.13	13.32	9.00	18.00	#8	#4	#4
81	12	Right Girder Slice 81	290.67	48.04	45.05	10.23	9.00	18.00	#8	#4	#4
82	-	Right Girder Slice 82	293.75	51.12	41.96	7.15	9.00	18.00	#8	#4	#4
83	-	Right Girder Slice 83	296.83	54.20	38.88	4.07	9.00	18.00	#8	#4	#4
84	-	Right Girder Slice 84	299.92	57.29	35.80	0.98	9.00	18.00	#8	#4	#4
85	S12BC	Right Girder Slice 85	303.00	60.37	32.71	2.10	9.00	18.00	#8	#4	#4
86	S12BC	Right Girder Slice 86	306.25	63.62	29.46	5.35	13.00	18.00	#8	#4	#4
87	-	Right Girder Slice 87	309.19	66.56	26.52	8.29	13.00	18.00	#8	#4	#4
88	-	Right Girder Slice 88	312.14	69.51	23.57	11.24	13.00	18.00	#8	#4	#4
89	-	Right Girder Slice 89	315.08	72.45	20.63	14.18	13.00	18.00	#8	#4	#4
90	-	Right Girder Slice 90	318.03	75.40	17.68	17.13	13.00	15.00	#8	#4	#4
91	-	Right Girder Slice 91	320.97	78.34	14.74	20.07	13.00	15.00	#8	#4	#4
92	-	Right Girder Slice 92	323.92	81.29	11.80	23.02	13.00	12.00	#8	#4	#4
93	-	Right Girder Slice 93	326.86	84.23	8.85	25.96	13.00	10.00	#8	#4	#4
94	-	Right Girder Slice 94	329.81	87.17	5.91	28.91	13.00	8.00	#8	#4	#4
95	-	Right Girder Slice 95	332.75	90.12	2.96	31.85	13.00	6.00	#8	#4	#4
-	Hinge	-	335.71	93.08	0.00	34.81	13.00	6.00	#8	#4	#4

L3
L2

L3



(800) 661-1340
info@penhall.com
www.penhall.com
1212 Corporate Dr. Suite 500
Irving, TX 75038

February, 23, 2026

Skanska USA Civil
18911 North Creek Parkway, Suite 300
Bothell, WA 98011

ATTN: **Zachary Lucarelli**
Reference: **Contract No. 9727**
I-405, Brickyard to SR 527 Improvement Project
Subject: RE: WSDOT SL No. 9727-264
1-04.7 Potential Differing Site Condition Bridge No. 405/70N-W
(Northbound I-405 to Westbound SR 522)

Mr. Lucarelli:

Penhall Company, through Skanska USA Civil West California District Inc., respectfully disagrees with WSDOT's February 12, 2026 Written Determination that no Differing Site Condition exists.

The materially increased bridge deck thickness qualifies as a Differing Site Condition under Section 1-04.7 for the following reasons:

- **Material Deviation:** The actual deck thickness materially exceeds the dimensions indicated in the as-built documentation included in Appendix N.
- **Latent Physical Condition:** Deck thickness is not observable and cannot be verified without destructive testing.
- **Not Reasonably Discoverable:** Accurate verification would have required coring and lane closures on an active interstate structure—activities not reasonably feasible during procurement.
- **Field Verification Clause:** Section 2.13.1 does not eliminate Section 1-04.7 protections. "Field measure and verify" cannot reasonably be interpreted to require invasive structural investigation prior to award.
- **Reference Document Disclaimer:** A general disclaimer does not shift the risk of materially inaccurate owner-furnished structural dimensions or nullify the Differing Site Condition clause.

The condition differs materially from Contract indications and was not reasonably discoverable through customary pre-bid investigation methods. Accordingly, it is compensable under Section 1-04.7.

If a supplemental written statement is required, Penhall requests an extension from 14 days to 28 days for submittal.

Pursuant to the Prime Contract and applicable flow-down provisions, Penhall reserves all rights and nothing herein shall be construed as a waiver of any such rights.

Sincerely,

A handwritten signature in black ink, appearing to read "Andrew Park".

Andrew Park
Project Engineer





 (800) 661-1340
 info@penhall.com
 www.penhall.com
 1212 Corporate Dr. Suite 500
Irving, TX 75038

January 27, 2026

Skanska USA Civil West California District, Inc.
18911 North Creek Parkway, Suite 300
Bothell, WA 98011

Attention: Zachary Lucarelli
Contract No.: 90009590.234165OS
Reference: I-405 Brickyard to SR527

Subject: Change in condition – Deck Thickness Notice

Mr. Lucarelli,

Pursuant to Section 11 of the Subcontract Agreement, this letter serves as Penhall Company's formal written notice of a change in condition affecting our Work on the referenced project.

Penhall has encountered a condition that differs from those contemplated at the time of bid and execution of the Subcontract. Specifically, during lost decking removal operations, Penhall observed that the bridge deck thickness exceeds the dimensions indicated in the as-built documents by approximately 2 to 4 inches. This condition was confirmed on January 24, 2026.

This condition has impacted, or is reasonably expected to impact, Penhall's means and methods, sequence of work, productivity, schedule, and/or cost of performance.

At this time, the full extent of the impacts has not yet been determined, as the condition is ongoing and evolving. However, Penhall reasonably anticipates that this condition may result in additional costs, time impacts, and/or other contractual relief beyond that provided for in the Subcontract.

Penhall is providing this notice within seventy-two (72) hours of the commencement of the condition in order to preserve its rights under the Subcontract and applicable Contract Documents. Penhall expressly reserves all rights to seek an equitable adjustment for all impacts arising from this condition, including but not limited to additional compensation, schedule relief, and associated costs.

Penhall will continue to document the condition and its impacts and will supplement this notice with additional detail and supporting documentation as such information becomes available, in accordance with the Subcontract and Prime Contract requirements.

Nothing herein shall be construed as a waiver of any rights, remedies, or entitlements available to Penhall under the Subcontract, Prime Contract, or applicable law, all of which are expressly reserved.

Please acknowledge receipt of this notice. Penhall remains willing to cooperate in good faith to mitigate impacts where reasonably possible.

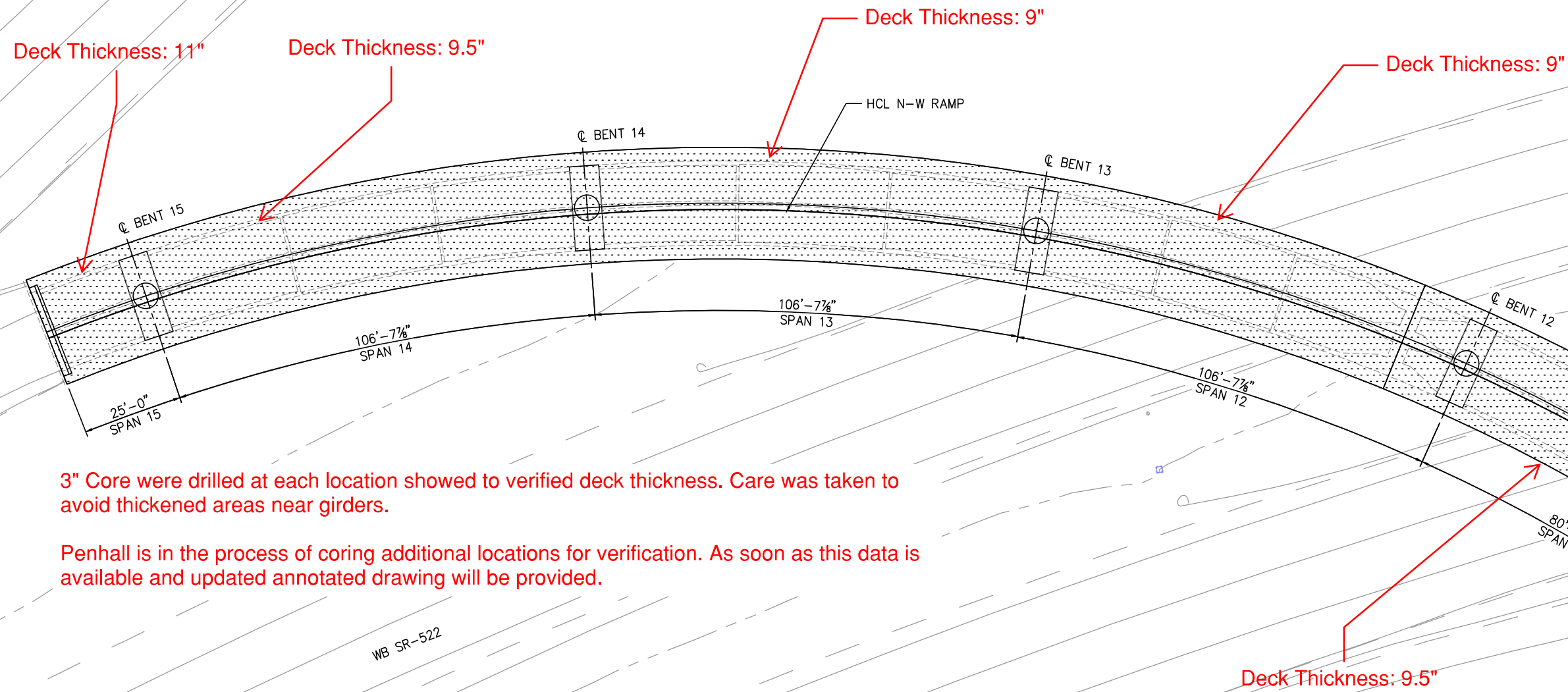
Respectfully,

Jose A. Cipres Jr

Digitally signed by Jose A. Cipres Jr
DN: C=US, E=jcipres@penhall.com,
O=Penhall Company, OU=Project
Manager, CN=Jose A. Cipres Jr
Date: 2026.01.27 08:10:01-06'00'

Penhall Company

Jose Cipres



3" Core were drilled at each location showed to verified deck thickness. Care was taken to avoid thickened areas near girders.

Penhall is in the process of coring additional locations for verification. As soon as this data is available and updated annotated drawing will be provided.

BRIDGE LAYOUT

ISSUED FOR APPROVAL

PROJECT ENGINEER	PROJECT MANAGER	DRAWN BY	ISSUE DATE
JMV	JMV	J.E.	

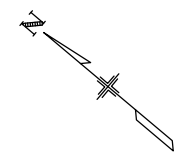
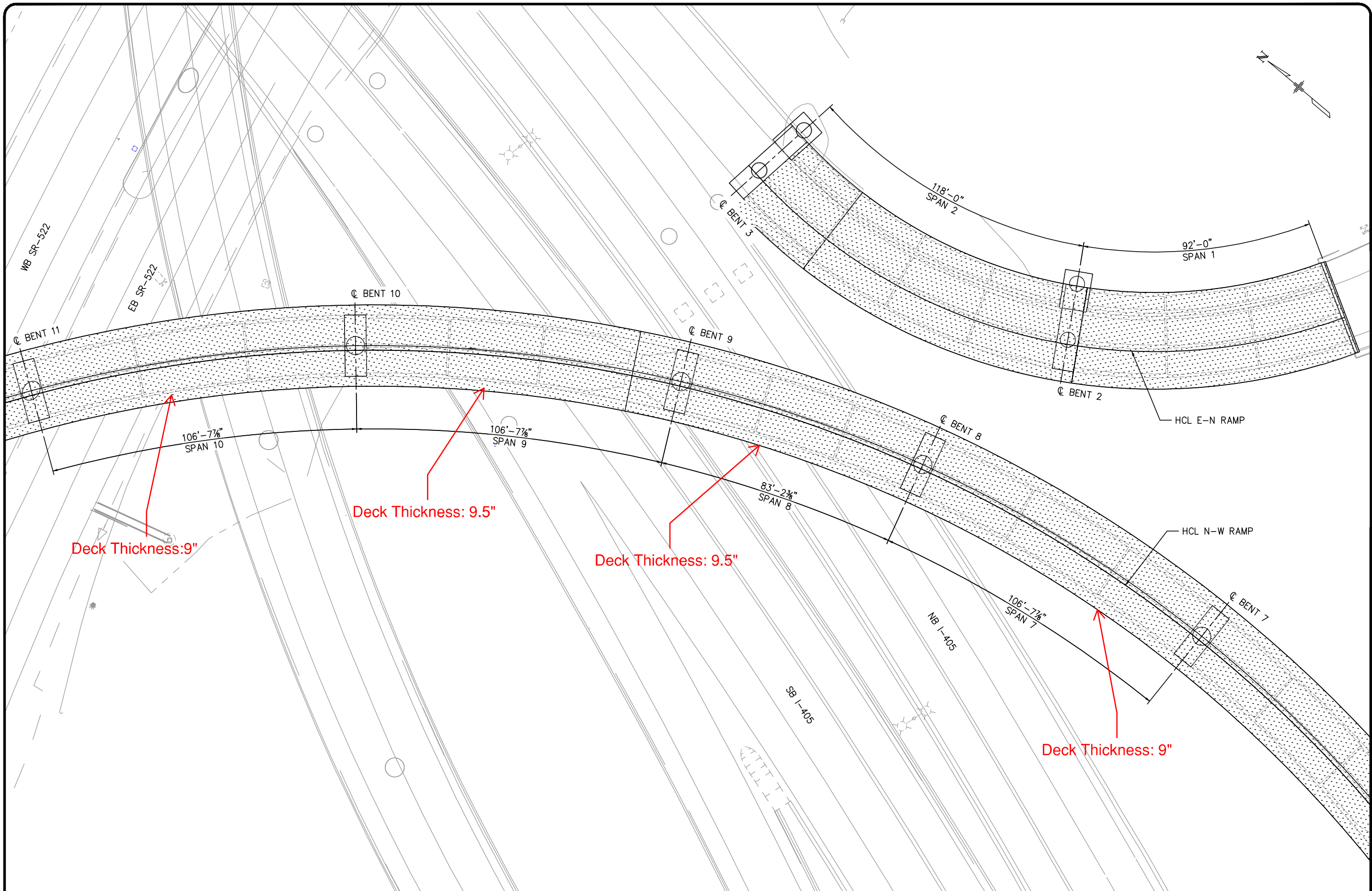
7	REVISIONS	DATE	BY
6			
5			
4			
3			
2			
1			

PREPARED FOR:

PREPARED BY:

PROJECT	PENHALL COMPANY
	I-405 & SR-522 INTERCHANGE
	DEMOLITION PLAN
TITLE OF DRAWING	RAMP LAYOUT DETAILS (1 OF 4)

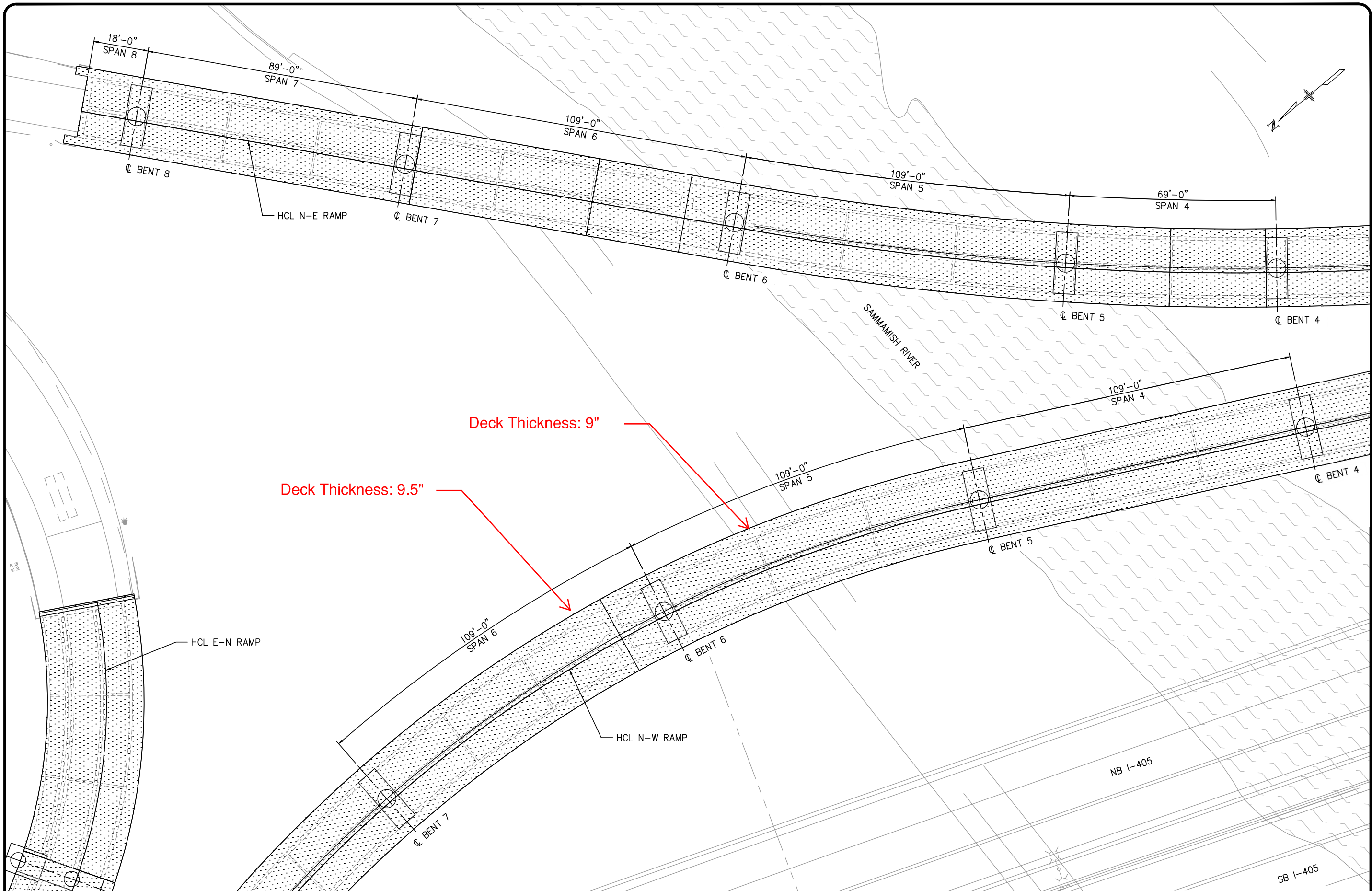
DRAWING NO.	DM
	03



BRIDGE LAYOUT

ISSUED FOR APPROVAL

PROJECT ENGINEER JMV	PROJECT MANAGER JMV	DRAWN BY J.E.	ISSUE DATE	REVISIONS	DATE	BY	BY
PROJECT PENHALL COMPANY I-405 & SR-522 INTERCHANGE DEMOLITION PLAN				TITLE OF DRAWING RAMP LAYOUT DETAILS (2 OF 4)			
DRAWING NO. DM 04							



Deck Thickness: 9"
Deck Thickness: 9.5"

BRIDGE LAYOUT

ISSUED FOR APPROVAL

PROJECT ENGINEER JMV	PROJECT MANAGER JMV	DRAWN BY J.E.	ISSUE DATE
7	6	5	4
3	2	1	

REVISIONS DATE BY

PROFESSIONAL ENGINEER
STATE OF WASHINGTON
12626

PREPARED FOR:
PENHALL COMPANY

PREPARED BY:
MODJESKI-MASTERS
Experience great bridges

PROJECT
PENHALL COMPANY
I-405 & SR-522 INTERCHANGE
DEMOLITION PLAN

TITLE OF DRAWING
RAMP LAYOUT DETAILS (3 OF 4)

DRAWING NO.
DM
05

Project Name: I-405/Brickyard to SR527 Improvements

Project No. 009727

Source Documents: SKA-0308 - DSC 008: Bridge No. 405/70N-W Deck Thickness Change

Date: 03/13/2026

Contractor: Skanska Civil USA West

Description: The as-built deck thickness of Bridge No. 405/70N-W was found to vary significantly from the expected 7", with field conditions measuring up to 11" — a difference of up to 57%. This unanticipated variation required Penhall Company to revise their demolition approach, resulting in increased labor, equipment, and haul-away costs, as well as a 34-calendar-day extension to the bridge demolition sequence. The costs presented below are Rough Order of Magnitude (ROM) values based on information available at this time and are subject to revision as additional field data is gathered during active construction.

Line	Item	Cost
A	SKA Labor Costs	
B		Costs \$ 17,000.00
D		31% Markup \$ 5,270.00
E	SKA Equipment Costs	
F		Costs \$ 6,000.00
H		21% Markup \$ 1,260.00
I	SKA Materials/Services Costs	
J		Costs \$ 4,800.00
L		21% Markup \$ 1,008.00
M	Materials/Services Tax	\$ -
N	Services	\$ -
O	AECOM	\$ -
P		15% Markup \$ -
Q	SKA Services	\$ -
R	Subtotal Skanska Cost (A+B+C+D+E+F+G)	\$ 35,338.00
S		
T	Subcontractor Costs	
U		Costs \$ 298,500.00
W		15% Markup \$ 44,775.00
X	Subtotal Subcontractor Cost (J+K)	\$ 343,275.00
Y		
Z	Total Cost of Change Work (H+L)	\$ 378,613.00