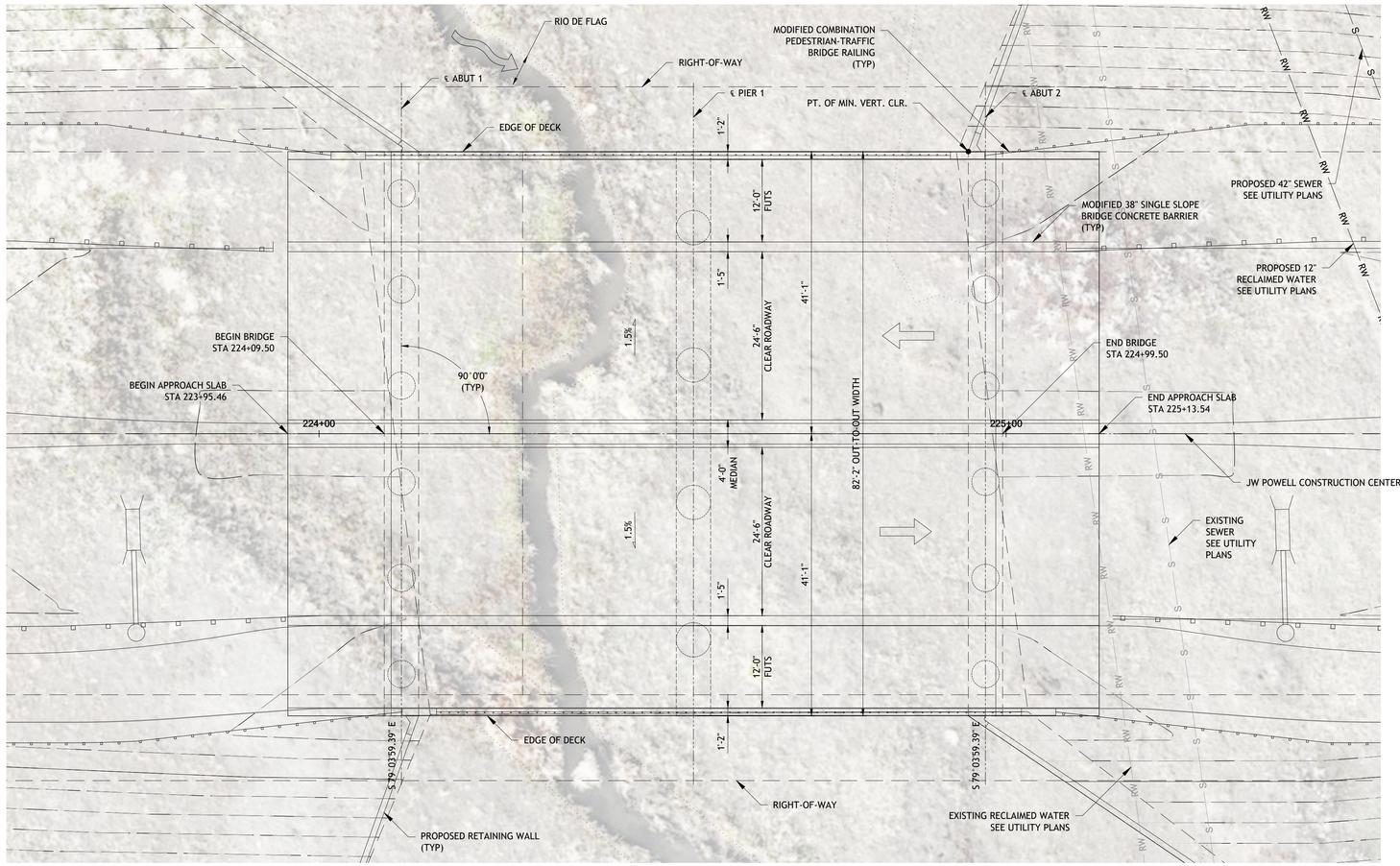
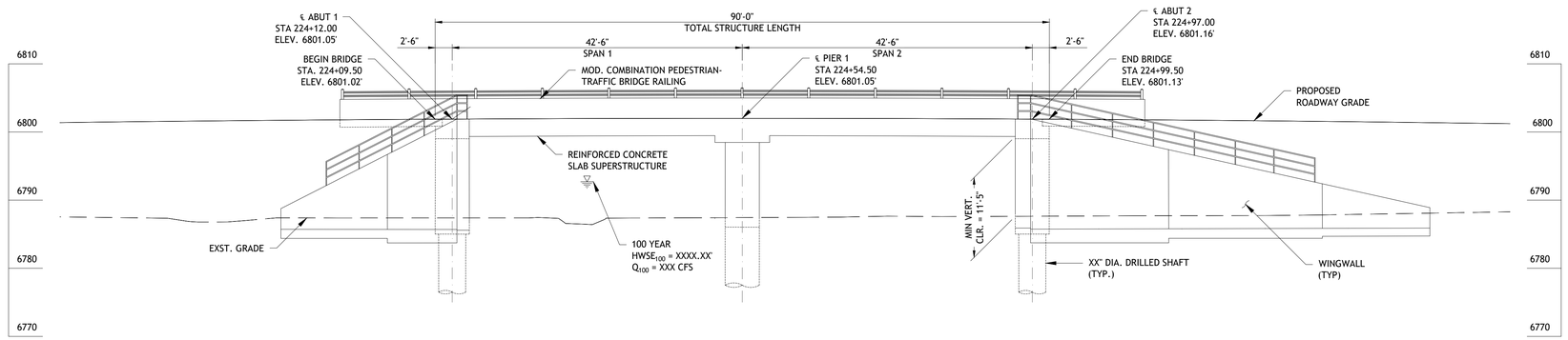


PLAN

NEW TWO-SPAN REINFORCED CONCRETE SLAB BRIDGE
SKEW = NONE
SCALE: 1"=10'-0"



ELEVATION

SCALE: 1"=10'-0"

INDEX OF DRAWINGS

NOTES

1. Bridge stations and elevations are taken along the JW Powell construction centerline.
2. Bridge width and transverse dimensions are measured normal to the construction centerline.

60% DESIGN
COF PROJECT NO: 03-16010

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REVISION

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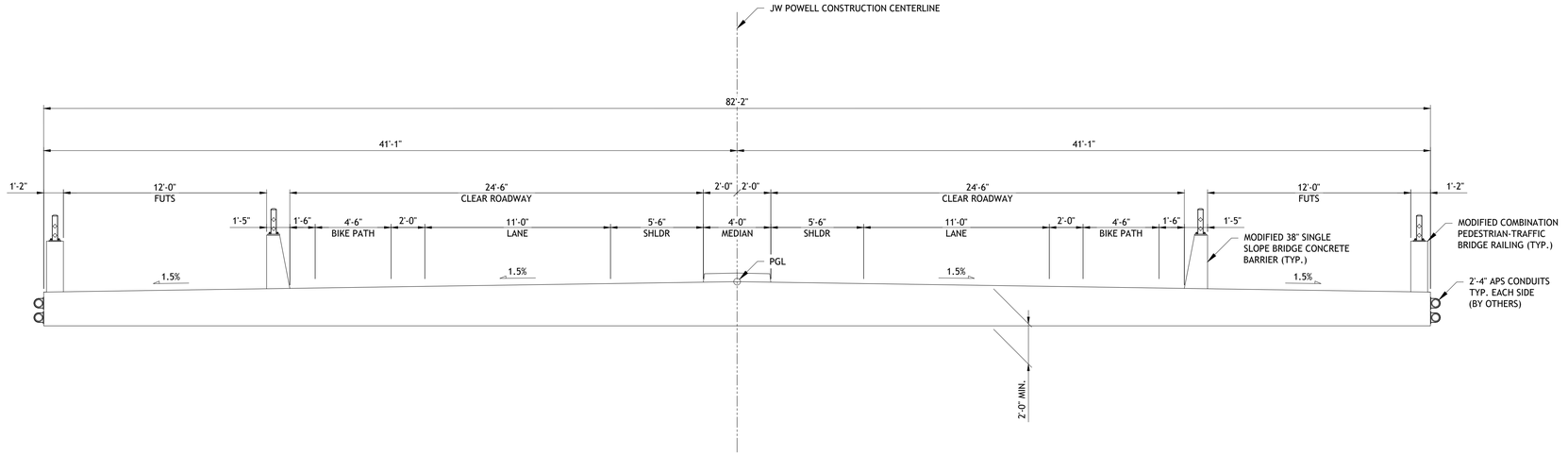
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
GENERAL PLAN & ELEVATION

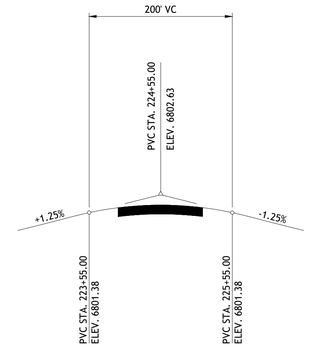
JOB NO: US00054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.01



TYPICAL SECTION

LOOKING AHEAD STATION
SCALE: ¼"=1'-0"



PROFILE GRADE - JW POWELL

N.T.S.

60% DESIGN
COF PROJECT NO: 03-16010

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JW POWELL OVER RDF BRIDGE
TYPICAL SECTION

JOB NO: US00543311.0614 | BY: A. RASHEED
DATE: MAY 2026 | CHECKED: A. GALIETTI

S1.02

GENERAL NOTES:

CONSTRUCTION SPECIFICATION

Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, Edition of 2021.

DESIGN SPECIFICATIONS

AASHTO LRFD Bridge Design Specifications, 9th edition, 2020.

DEAD LOAD

Dead load includes allowance of 25 pounds per square foot for future wearing surface (FWS).

LIVE LOAD

Loading Class= HL-93

SEISMIC

Bridge site is classified as Seismic Zone X, Site Class X with Peak Ground Acceleration (PGA) A = of X.XXX g and Spectral Acceleration at 0.2-sec. S0 = X.XXX g and at 1.0-sec. S01= X.XXX g as modified by the appropriate site factors.

INVENTORY AND OPERATING

Ratings for HL-93 are in accordance with the AASHTO Manual for Bridge Evaluation, 3rd edition in accordance with the load and resistance factor rating (LRFR) method. Rating Factors shown do not include FWS allowance load.

Inventory Load Rating 1.63
Operating Load Rating 2.12

CONCRETE

All concrete shall be ADOT class "S" unless noted otherwise.

REINFORCING STEEL

Reinforcing steel shall conform to ASTM specification A615 (AASHTO M31). All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO article 5.10.2 unless noted otherwise. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2" clear cover unless noted otherwise.

All mechanical splices shall conform to the requirements for mechanical connections in section 605-3.02 of the standard specifications.

Lap Splice locations and lengths shall only be as shown in the Plans. Alternate Lap Splice layouts shall be submitted to the Engineer for Review and Approval.

Reinforcing steel designated with an (E) shall be epoxy coated and shall conform ASTM A775.

CONSTRUCTION JOINT

All construction joints shall be intentionally roughened to an amplitude of ¼" unless noted otherwise, and be cleared of dirt, oil and otherwise deleterious debris.

Mechanical Splices may be used at all construction joints and formed joints where reinforcing must pass between pours, unless noted otherwise.

BARRIER

Barriers and medians shall be constructed after spans ave taken dead load deflection. Barriers shall not be slip formed.

CHAMFER

All exposed corners shall be chamfered ¾" unless noted otherwise. (See Detail this Sheet)

DIMENSION

Dimensions shall not be scaled from the drawings.

PAINT

Bridge shall be in painted in accordance with the Architectural Treatment Details, the Construction Specifications, and the Special Provisions.

MATERIAL STRENGTHS (UNLESS OTHERWISE NOTED)

Deck, Median..... f'c = 4.5 ksi
Abutment, Pier and Drilled Shafts..... f'c = 3.5 ksi
All Other Class "S" Concrete..... f'c = 3.0 ksi
Grade 60 Transverse Deck Reinforcement..... fy = 24.0 ksi
All other Grade 60 Reinforcement..... fy = 60.0 ksi

GENERAL NOTES (CONTINUED):

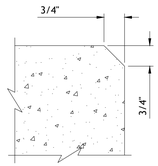
LEGEND

DETAIL Marker — 1 / XXX — Detail Number; Drawing Number (S-XXX Series)

SECTION Marker — A / XXX — Section Letter; Drawing Number (S-XXX Series)

NOTE:

A line (-) in place of the Drawing Number indicated that the SECTION or DETAIL is located on the same Drawing from which the SECTION or DETAIL is cut



CHAMFER DETAIL 1

NO SCALE

RETAINING WALL NOTES

Geometry for all retaining walls is referenced to the Wall Layout Line.

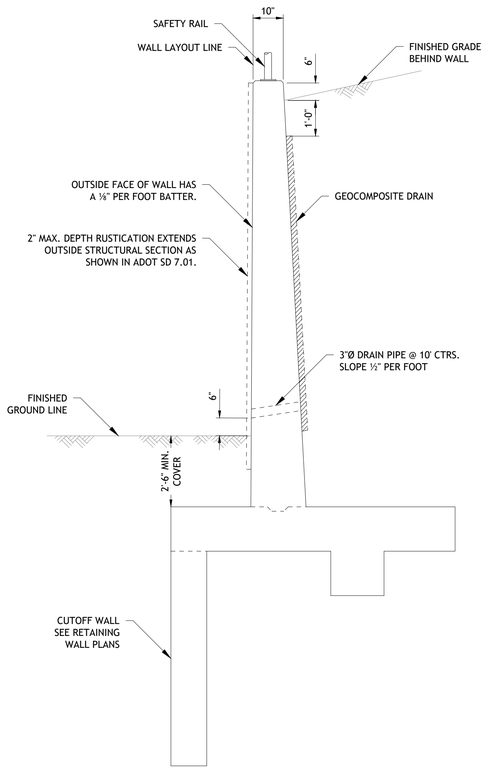
Length of wall segments is measured along the Wall Layout Line.

Wall Cross-Section Dimensions and reinforcing shall be per "H" indicated on the Project Plans and specified in ADOT SD 7.01. Top of Wall and Top of Footing Elevations shall be as shown in the Project Plans regardless of the value of "H".

Retaining Walls shall be rusticated and painted in accordance with the Architectural Treatment Details, the Construction Specifications, and the Special Provisions.

The thickness of the rustication shall be considered as an addition to the wall structural thickness. Rustication and surface texture shall extend to a minimum of 1'-0" below final grade.

Railing shall be installed to the limits shown. See the Architectural Treatment Details, the Construction Specifications, and the Special Provisions.



RETAINING WALL TYPICAL SECTION

NTS

APPROXIMATE QUANTITIES

Item	Struct Exc	Struct Backfill	Class "S" Concrete		Reinforcing Steel	DRILLED SHAFT			
			f'c = 3,500 psi	f'c = 4,500 psi		48" Ø		60" Ø	
Units	CY	CY	CY	CY	LB	No.	LF	No.	LF
Abutment 1	55	135	225		33,375			6	360
Abutment 2	55	135	225		33,750			6	360
Pier	15	10	45		13,500	4	240		
Superstructure				650	182,000				
Total	125	280	495	650	263,000	4	240	12	720
As-Built Total									

Approach Slab (SD 2.01)..... 2,465 SFT
38" Single Slope Bridge Concrete Barrier..... 236 LFT
Combination Pedestrian - Traffic Railing Barrier and Fence..... 236 LFT
Retaining Wall (Reinforced Concrete Cantilever)..... 1178 SFT

60% DESIGN
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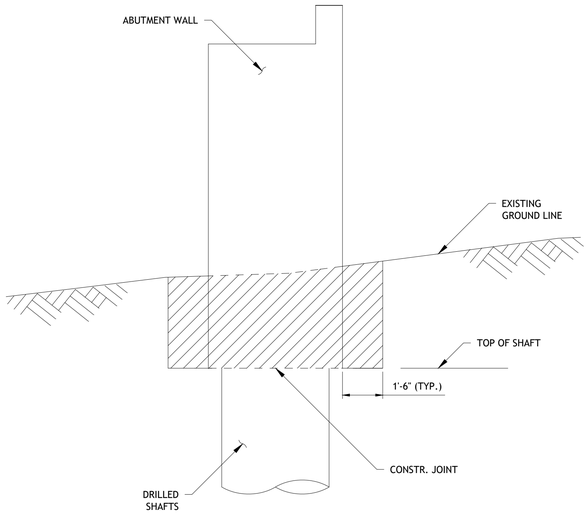
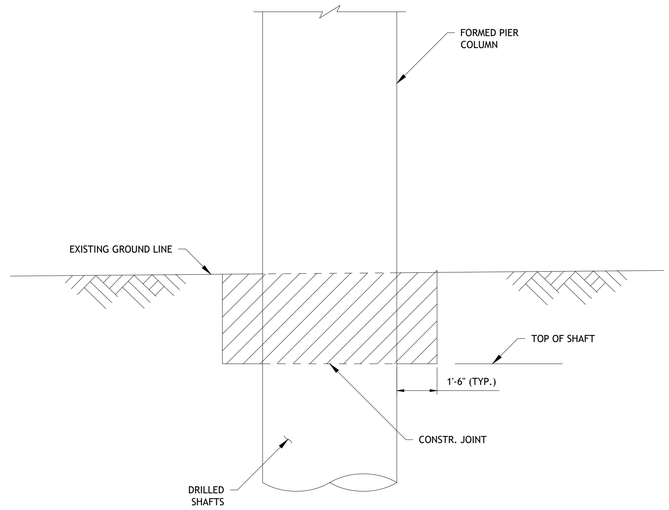
CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
GENERAL NOTES

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.03

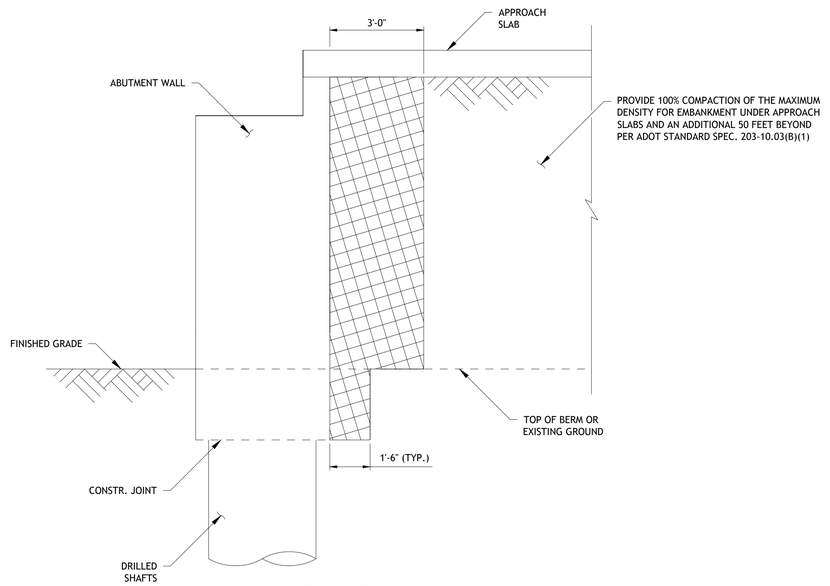


ABUTMENT



PIER

STRUCTURAL EXCAVATION



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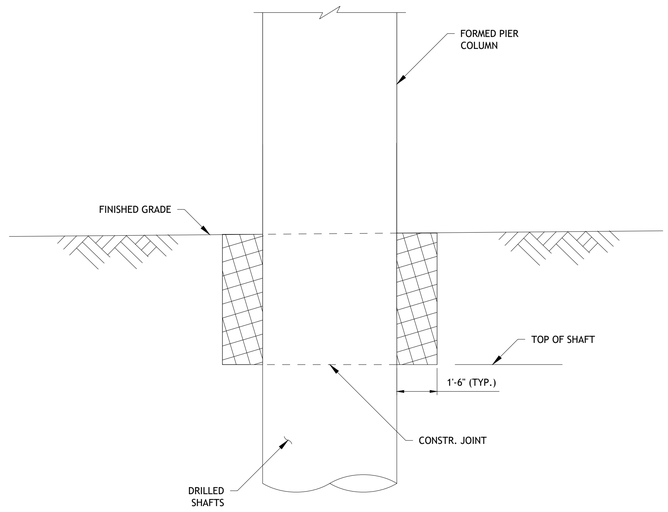

PIER

STRUCTURAL BACKFILL

LEGEND

STRUCTURAL EXCAVATION

STRUCTURAL BACKFILL

60% DESIGN
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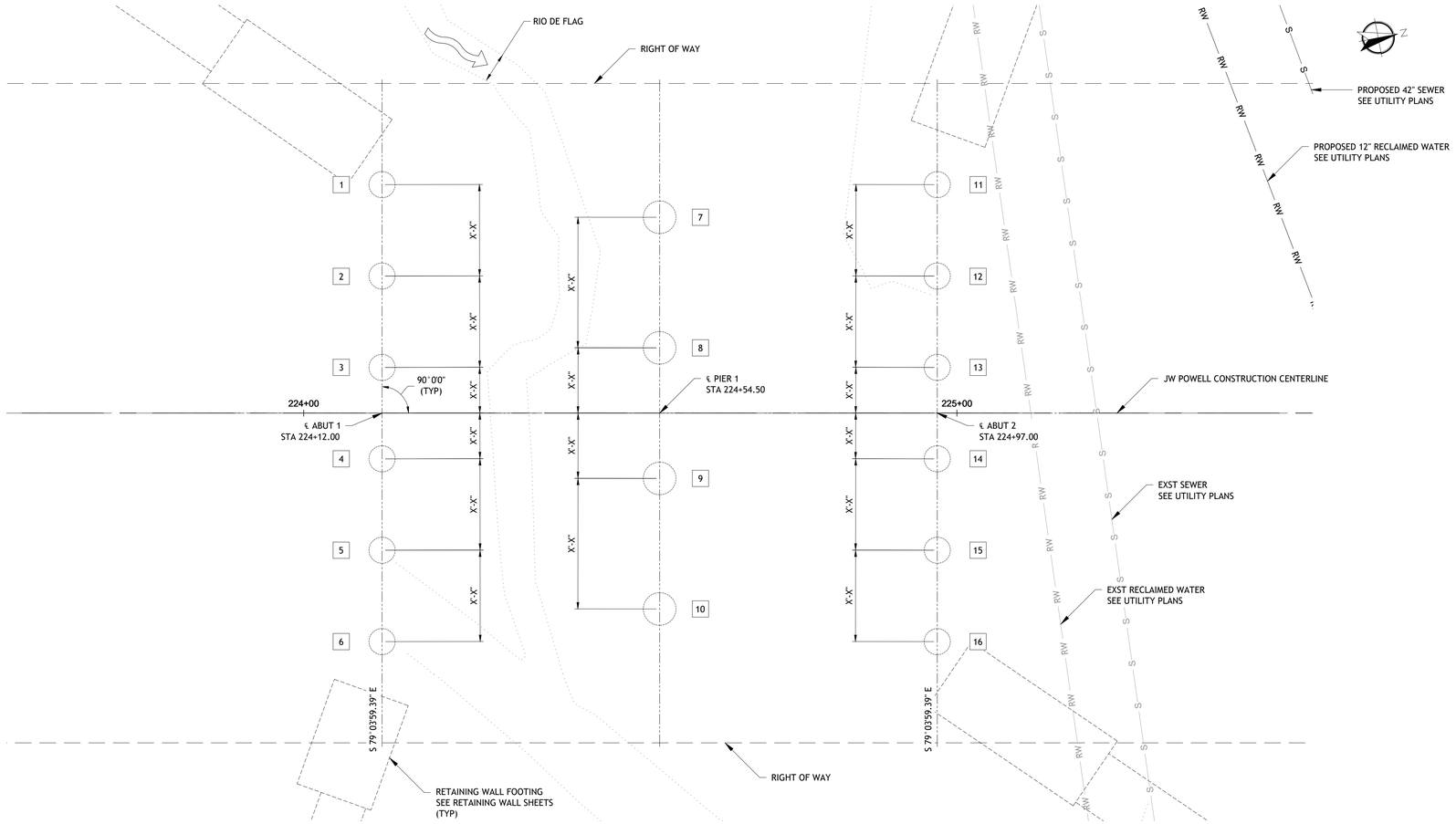
CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
EARTHWORK DETAILS

JOB NO: US00543311.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.04



FOUNDATION PLAN

SCALE: 1"=10'-0"

DRILLED SHAFT DATA									
LOCATION	SHAFT NO.	JW POWELL CST ℄		TOP OF SHAFT ELEV.	BOTTOM OF SHAFT ELEV.	SHAFT LENGTH	SERVICE LIMIT STATE	STRENGTH LIMIT STATE	ESTIMATED DESIGN SETTLEMENT
		STATION	OFFSET			(FT)	(KIPS)	(KIPS)	(IN)
ABUT 1	1	XXX+XX.XX	XX.XX' LT	XXXX.XX'	XXXX.XX'	XX	XXXX	XXXX	X.X
	2								
	3								
	4								
	5								
	6								
PIER 1	7								
	8								
	9								
	10								
ABUT 2	11								
	12								
	13								
	14								
	15								
	16								

Location of all existing utilities shown are approximate. Utilities to be removed are included in the utility removal items. For utilities to remain. It shall be the contractor's responsibility to protect them in place.

NOTES:

1. Dimensions are given along or perpendicular to support centerline, unless noted otherwise.
2. [X] Indicates drilled shaft foundation identification number.
3. The contractor shall select one XX" Dia. drilled shaft as confirmation shaft per Section 609 of the specifications as modified by the Special Provisions. The selected shaft shall be indicated in the Contractor's drilled shaft installation plan.
4. For Project Geotechnical information, see the Final Geotechnical Report by XXXX Consultants, Inc. Dated XXX XX, 2026.
5. The contractor shall submit a plan detailing the drilling construction procedures for approval in the Drilled Shaft Installation Plan prior to starting drilled shaft construction.
6. Temporary support of steel casing (if needed) is the contractor's responsibility and is considered included in the drilled shaft pay item.
7. See Utility Plans for additional information and details.

60% DESIGN
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CITY OF FLAGSTAFF
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JW POWELL OVER RDF BRIDGE
FOUNDATION PLAN

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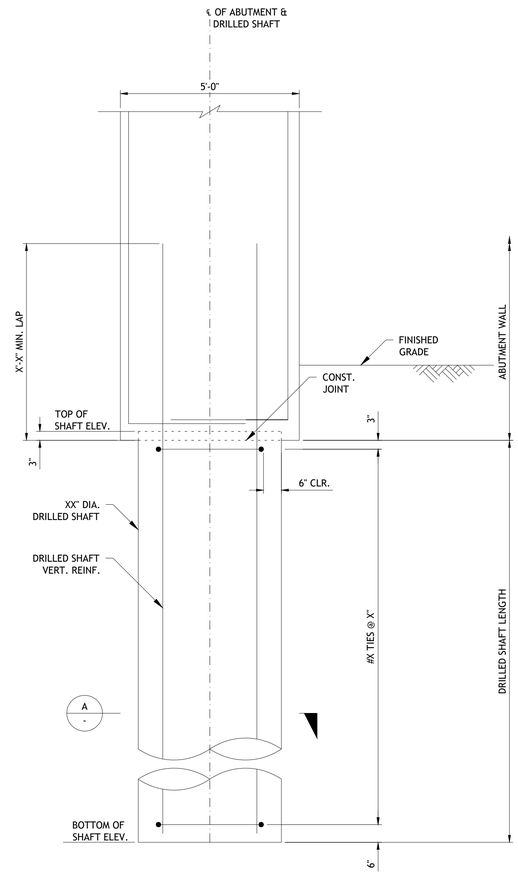
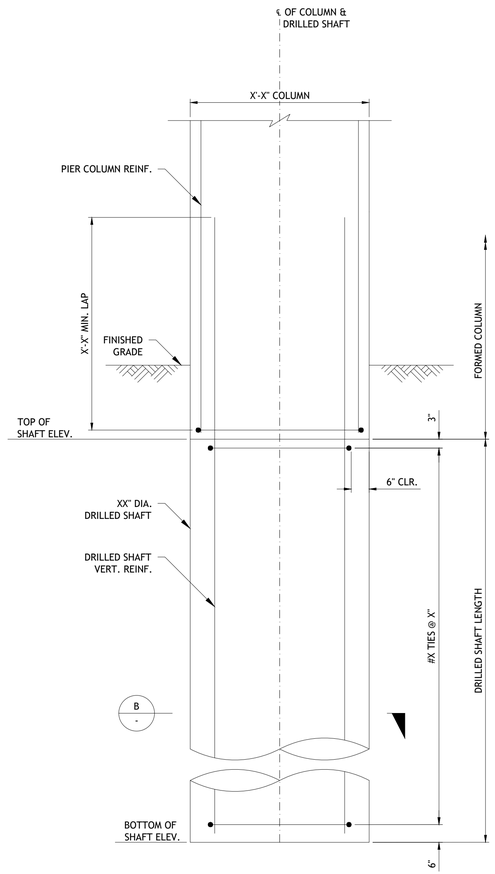
DATE: MAY 2026
BY: A. RASHEED
CHECKED: A. GALIETTI

S1.05



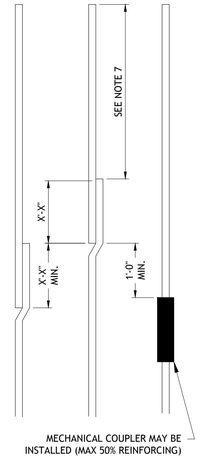
ABUTMENT DRILLED SHAFT DETAIL

SCALE: ½"=1'-0"



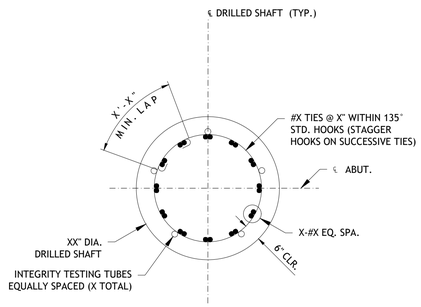
PIER DRILLED SHAFT DETAIL

SCALE: ½"=1'-0"



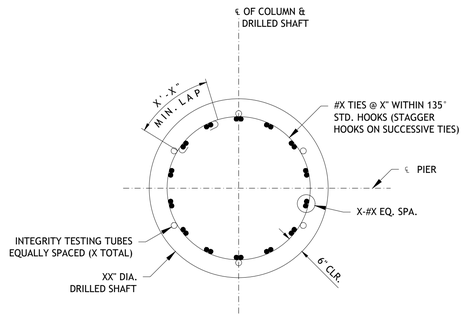
RESTRICTION ON SPLICE AT DRILLED SHAFTS

NTS



SECTION - ABUTMENT SHAFT (A -)

SCALE: ½"=1'-0"



SECTION - PIER SHAFT (B -)

SCALE: ½"=1'-0"

DRILLED SHAFT NOTES:

1. Drilled Shafts shall be constructed into existing grade.
2. Shaft concrete shall be placed within 24 hours after the excavation has been completed and the reinforcing cage places in position.
3. Drilled shaft excavation will not be permitted until the concrete of any adjacent drilled shaft has been in place a minimum of 48 hours. An adjacent drilled shaft is any drilled shaft within 4 diameters measured from center to center.
4. Construction joints not shown in the project plans shall require the approval of the Engineer prior to construction.
5. In the event of a weak layer (silt, clay, loose sand, etc.) at the recommended tip elevation, the shaft shall be extended to bear on firm soil as determined by the Engineer.
6. The contractor shall orient the drilled shaft reinforcing cage to minimize conflict within the reinforcing columns.
7. Drilled shaft reinforcing shall not be spliced in the upper ⅓ of the shaft. Lap splices shall be staggered as far as possible below this region.
8. Integrity Testing Tubes shall be installed in all shafts. The size, type, and details of tubes shall be per the Standard Specifications and the Special Provisions. Tubes shall not be attached to vertical reinforcing.
9. The Integrity Testing Tubes shall be extended to within 6" of the completed tip elevation. If the tip elevation is greater that 3'-0" below plan, support reinforcing for the tubes shall be installed to provide a maximum unsupported length of 3'-0".
10. The cost of drilled shaft vertical reinforcing projection above top elevation, any mechanical couplers, any casings and any additional concrete required for oversized casings shall be considered incidental to the drilled shaft pay item.
11. Shaft cage shall be held in position during placement of shaft concrete.
12. Payment for any and all work required below the tip elevation shown shall be based on the unit price per linear food for the drilled shaft pay item.
13. See Standard Specifications and Special Provisions for additional requirements.

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CITY OF FLAGSTAFF
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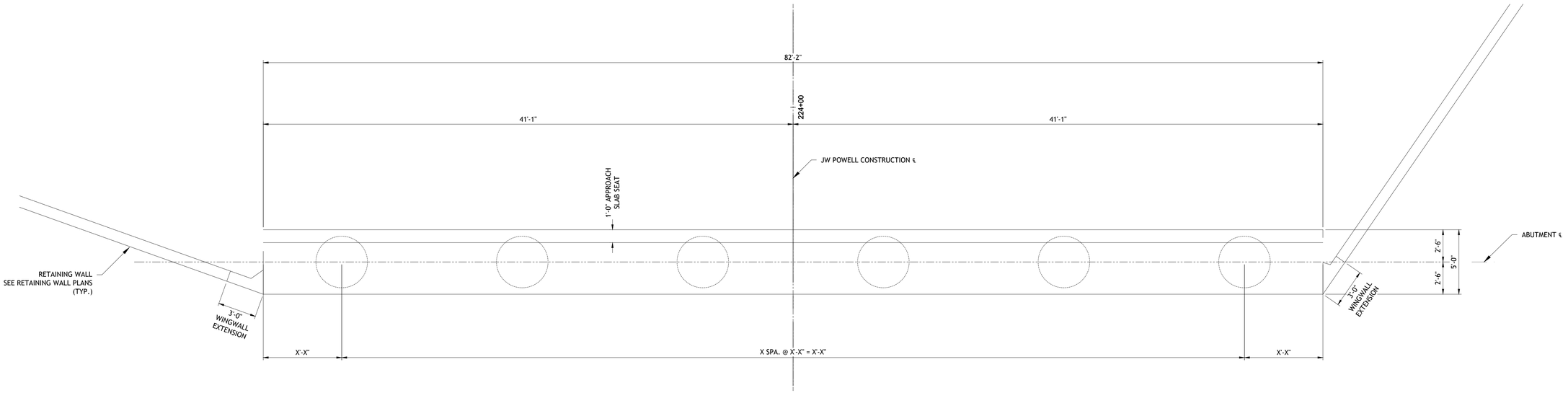
JW POWELL OVER RDF BRIDGE
FOUNDATION DETAILS

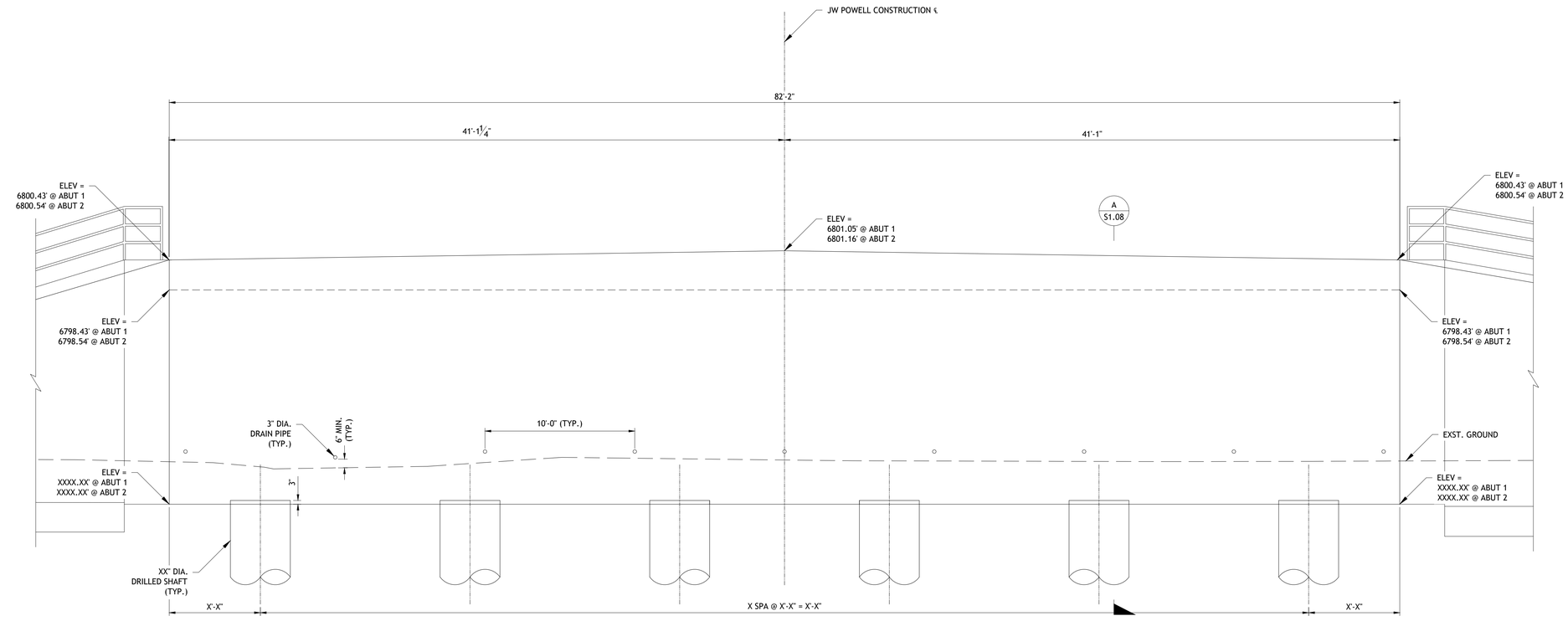
JOB NO: US00543310614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.06



ABUTMENT PLAN

ABUTMENT 1 SHOWN, ABUTMENT 2 SIMILAR
SCALE: ¼"=1'-0"



ABUTMENT ELEVATION

ABUTMENT 1 SHOWN, ABUTMENT 2 SIMILAR
SCALE: ¼"=1'-0"

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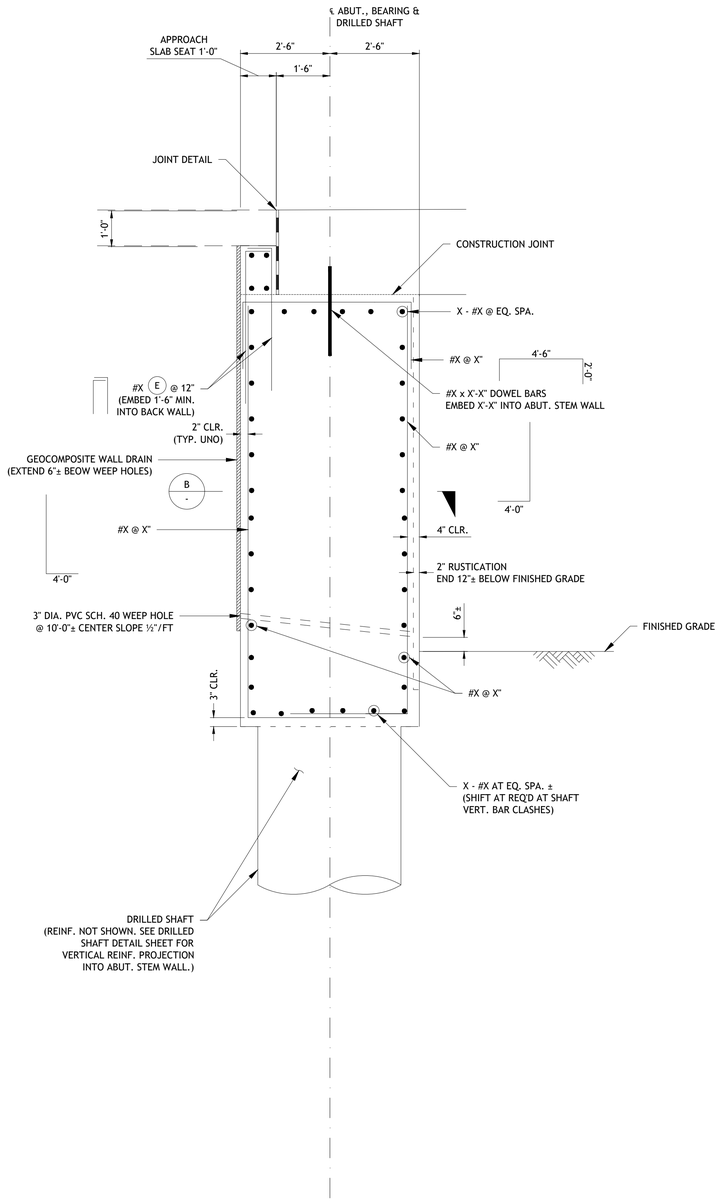
JOB NO: USD054331.0614 | BY: A. RASHEED
DATE: MAY 2026 | CHECKED: A. GALIETTI

S1.07



ABUTMENT SECTION (A)

SCALE: ½"=1'-0"

[TO BE PROVIDED IN FUTURE SUBMITTAL]

ABUTMENT PARTIAL PLAN (B)

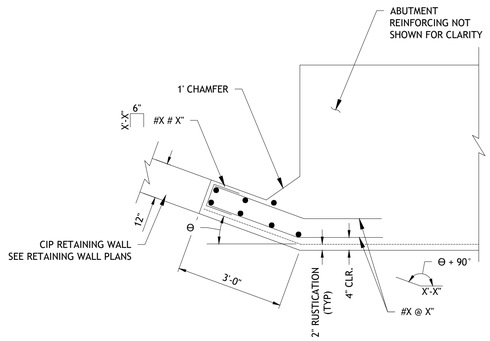
SCALE: ½"=1'-0"

[TO BE PROVIDED IN FUTURE SUBMITTAL]

JOINT DETAIL

SCALE: ½"=1'-0"

WINGWALL EXTENSION SKEW	
LOCATION	Θ
ABUT 1 - LT	XX° XX' XX"
ABUT 1 - RT	XX° XX' XX"
ABUT 2 - LT	XX° XX' XX"
ABUT 2 - RT	XX° XX' XX"



WINGWALL EXTENSION DETAIL

SCALE: ½"=1'-0"

NOTES

1. Horizontal reinforcement may be spliced with a minimum lap length of X'-X".
2. Bars shall not be spliced within the required lap length of adjacent bars.

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JW POWELL OVER RDF BRIDGE
ABUTMENT DETAILS 1

JOB NO: US00543311.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.08

[SHEET LEFT BLANK INTENTIONALLY]

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ABUTMENT DETAILS 2

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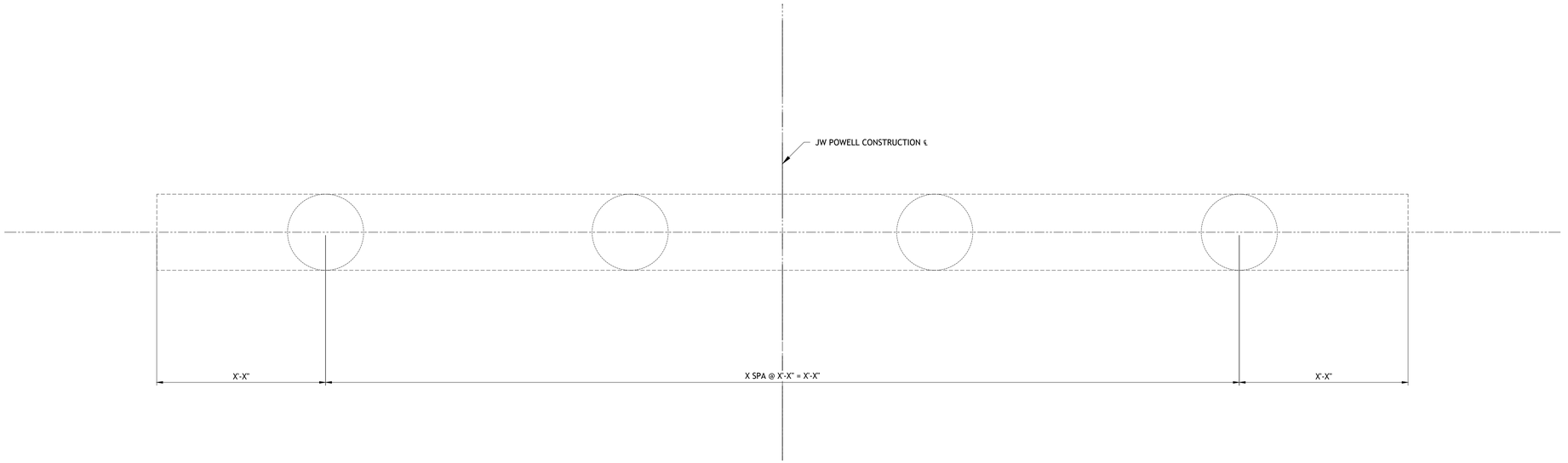
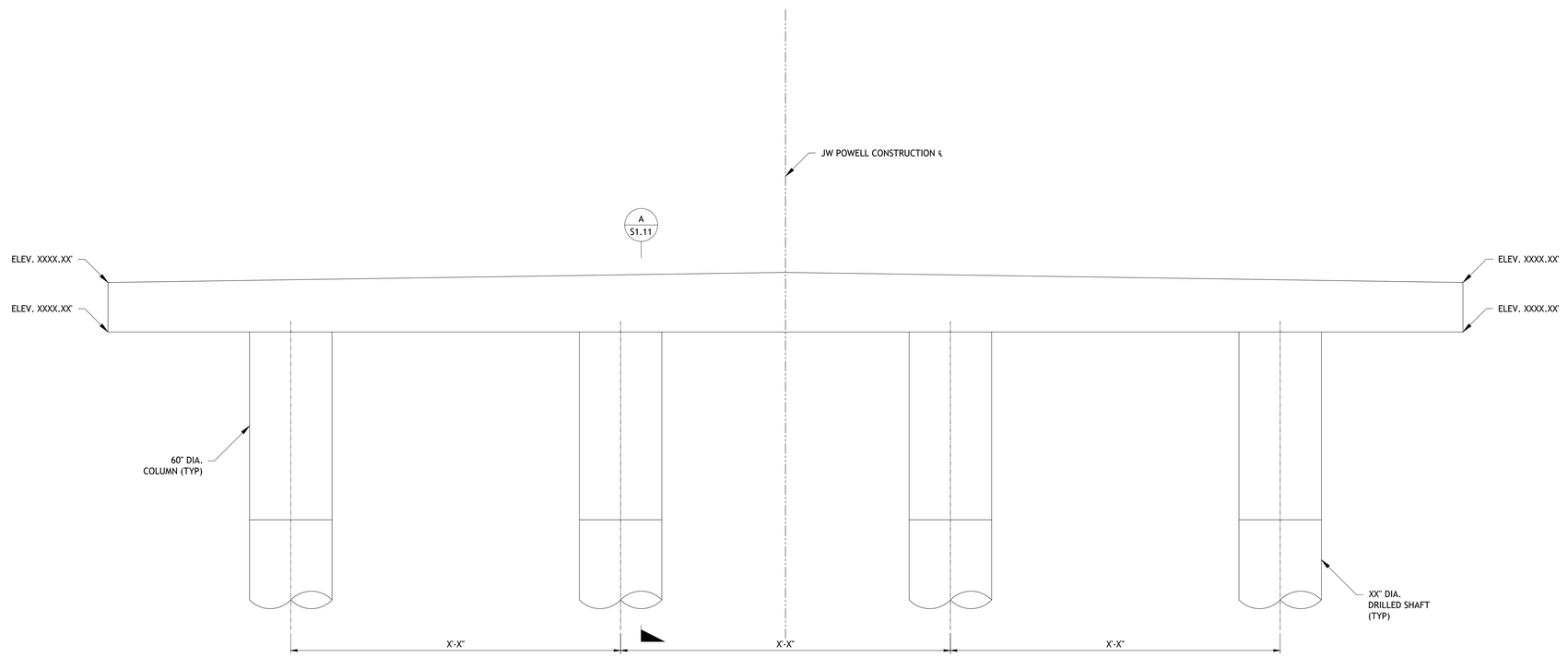
DATE: MAY 2026 | CHECKED: A. GALIETTI

S1.09



PIER PLAN

LOOKING AHEAD STATION
SCALE: ¼"=1'-0"



PIER ELEVATION

SCALE: ¼"=1'-0"

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DATE: MAY 2026 | CHECKED: A. GALIETTI

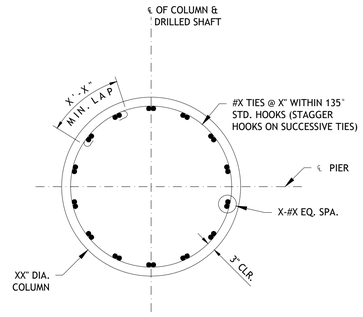
S1.10

[TO BE PROVIDED IN FUTURE SUBMITTAL]

SECTION - PIER

SCALE: ½"=1'-0"

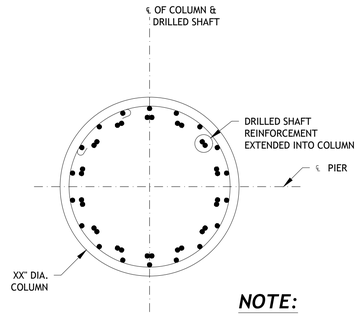
A



SECTION - PIER COLUMN

SCALE: ½"=1'-0"

B



NOTE:

SEE SECTION B FOR INFORMATION NOT SHOWN

SECTION - PIER COLUMN

SCALE: ½"=1'-0"

C

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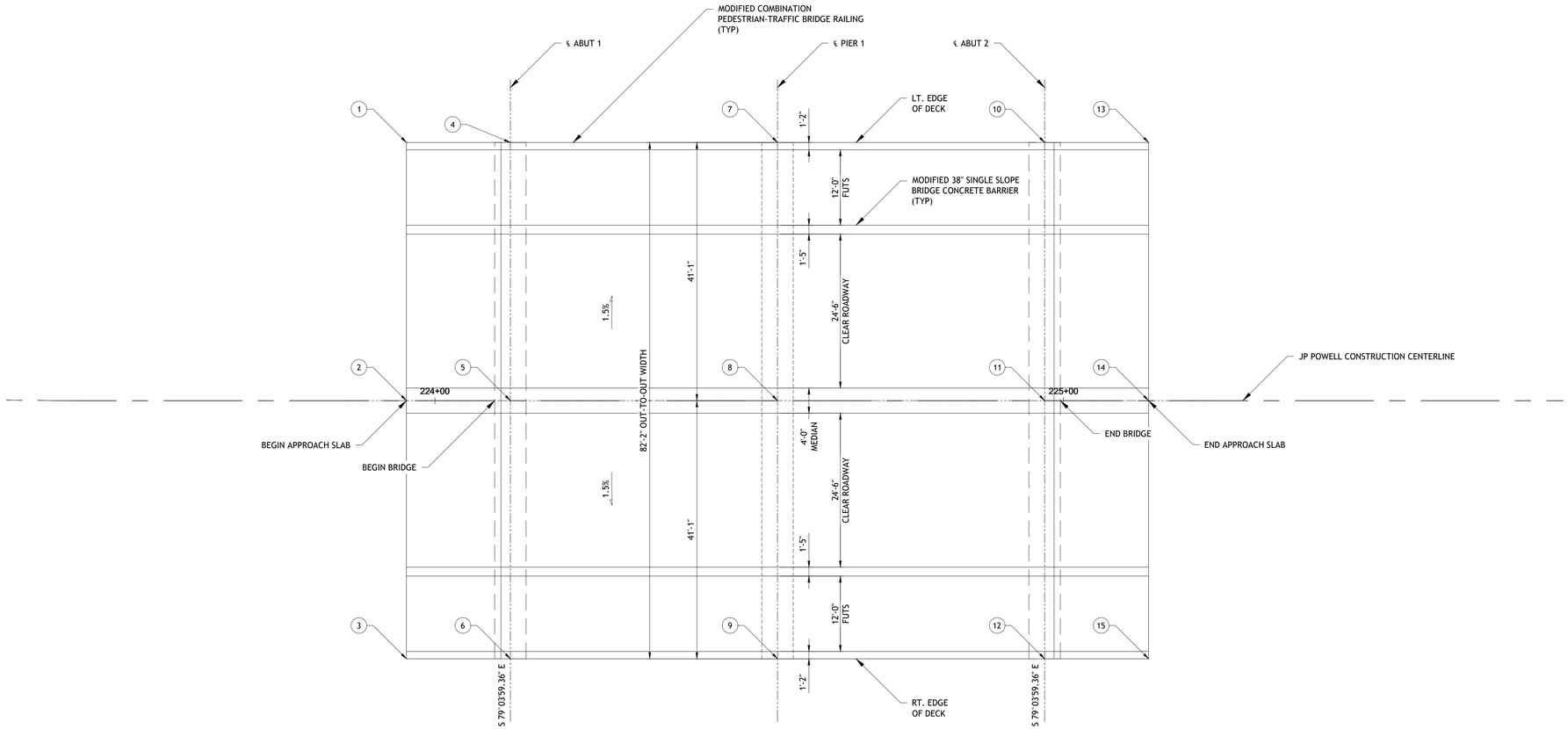
CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
PIER DETAILS

JOB NO: US00543311.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.11

60% DESIGN
COF PROJECT NO: 03-16010



DECK PLAN

SCALE: 1"=10'-0"

DECK ELEVATIONS			
	JW POWELL CST ℄		ELEVATION
LOCATION	STATION	OFFSET	
1	223+95.46	42.08' LT	6800.94'
2	223+95.46	0.00' LT	6801.78'
3	223+95.46	42.08' RT	6800.94'
4	224+12.00	42.08' LT	6801.05'
5	224+12.00	0.00' LT	6801.89'
6	224+12.00	42.08' RT	6801.05'
7	224+54.50	42.08' LT	6801.16'
8	224+54.50	0.00' LT	6802.00'
9	224+54.50	42.08' RT	6801.16'
10	224+97.00	42.08' LT	6801.05'
11	224+97.00	0.00' LT	6801.89'
12	224+97.00	42.08' RT	6801.05'
13	225+13.54	42.08' LT	6800.95'
14	225+13.54	0.00' LT	6801.79'
15	225+13.54	42.08' RT	6800.95'

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE	DESCRIPTION	REVISION

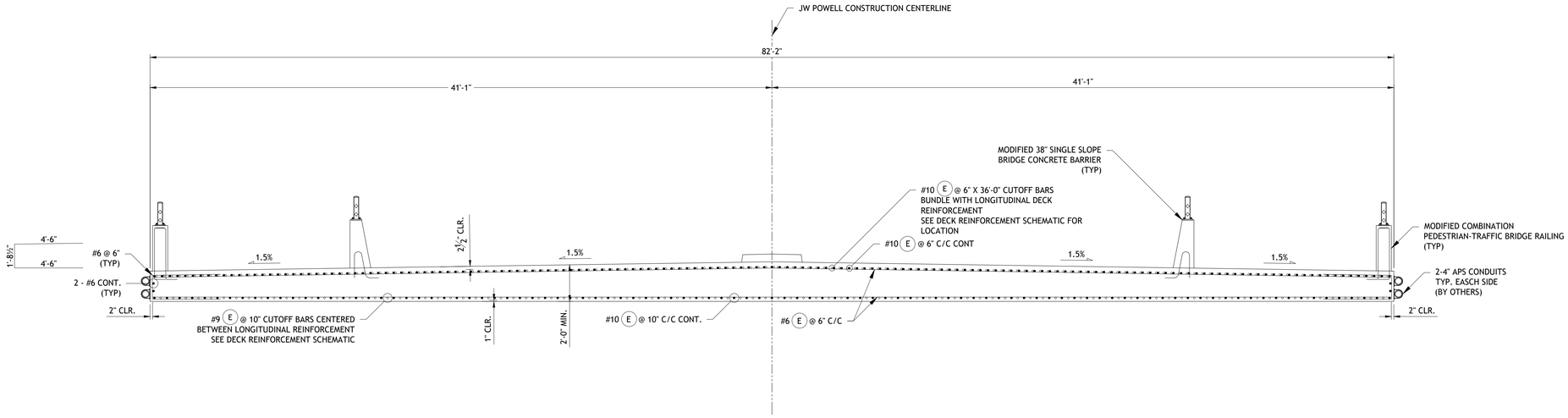
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary
Not For
Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
DECK PLAN

JOB NO: US0054331.0614 | BY: A. RASHEED
DATE: MAY 2026 | CHECKED: A. GALIETTI

S1.12

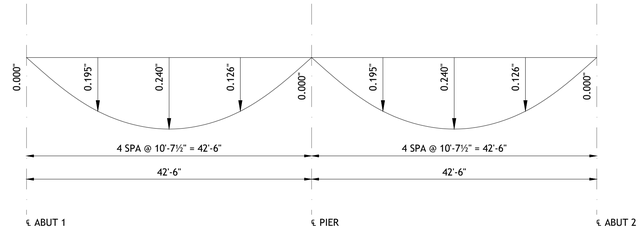


DECK SECTION

SCALE: ¼"=1'-0"

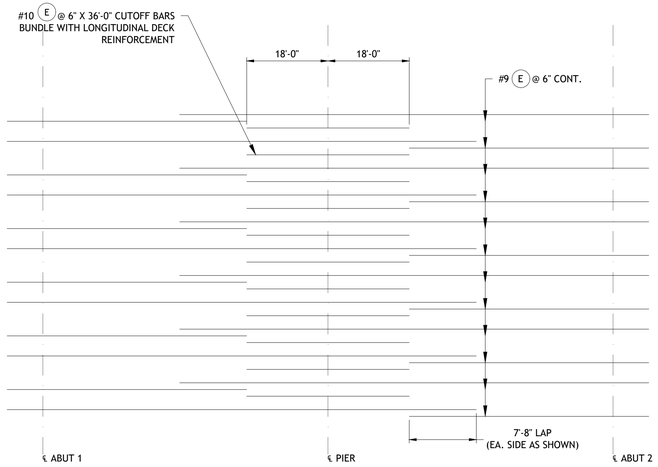
NOTES:

1. Minimum lap length for bar splices
   #6 Bars ..... 3'-4"
2. Bars shall not be spliced within the required lap length of adjacent bars



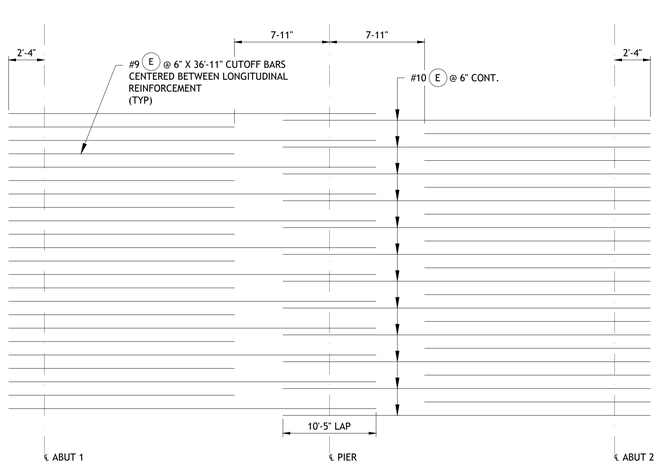
DEAD LOAD DEFLECTION DIAGRAM

NTS



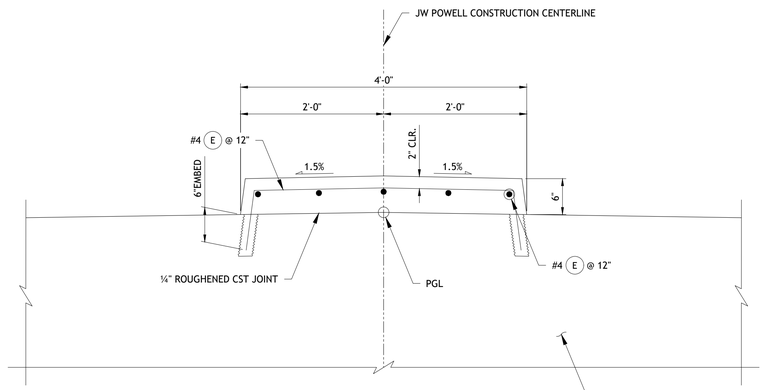
DECK REINFORCING SCHEMATIC - TOP LONGITUDINAL BARS

NTS



DECK REINFORCING SCHEMATIC - BOTTOM LONGITUDINAL BARS

NTS



MEDIAN DETAIL

SCALE: 1"=1'-0"

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE
DESCRIPTION
REVISION

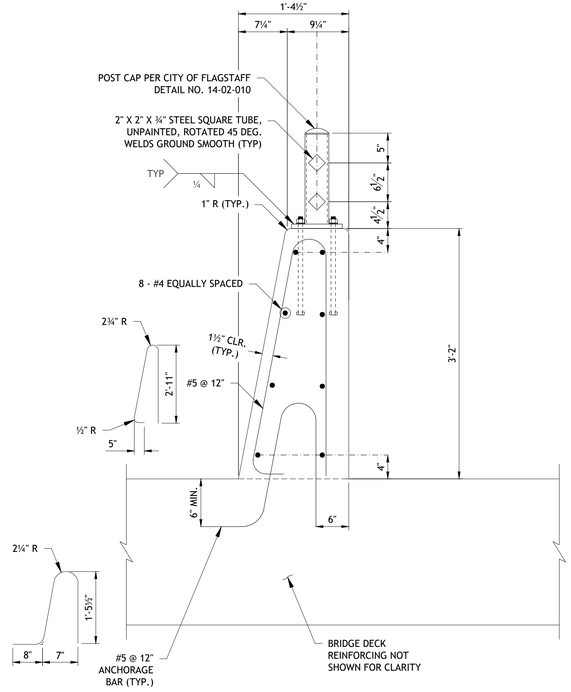
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
DECK SECTION

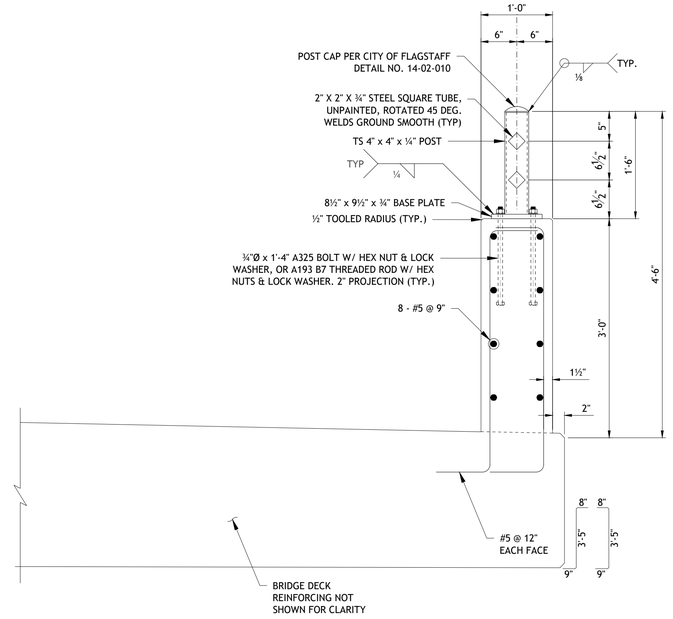
JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.13



MODIFIED ADOT SD1.10 BARRIER

SCALE: 1"=1'-0"



MODIFIED ADOT SD 1.12 BARRIER

SCALE: 1"=1'-0"

NOTES

1. For material specifications, fabrication requirements and other information not shown, see ADOT standard details 1.10 and 1.12

60% DESIGN
COF PROJECT NO: 03-16010

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REVISION

WSP USA
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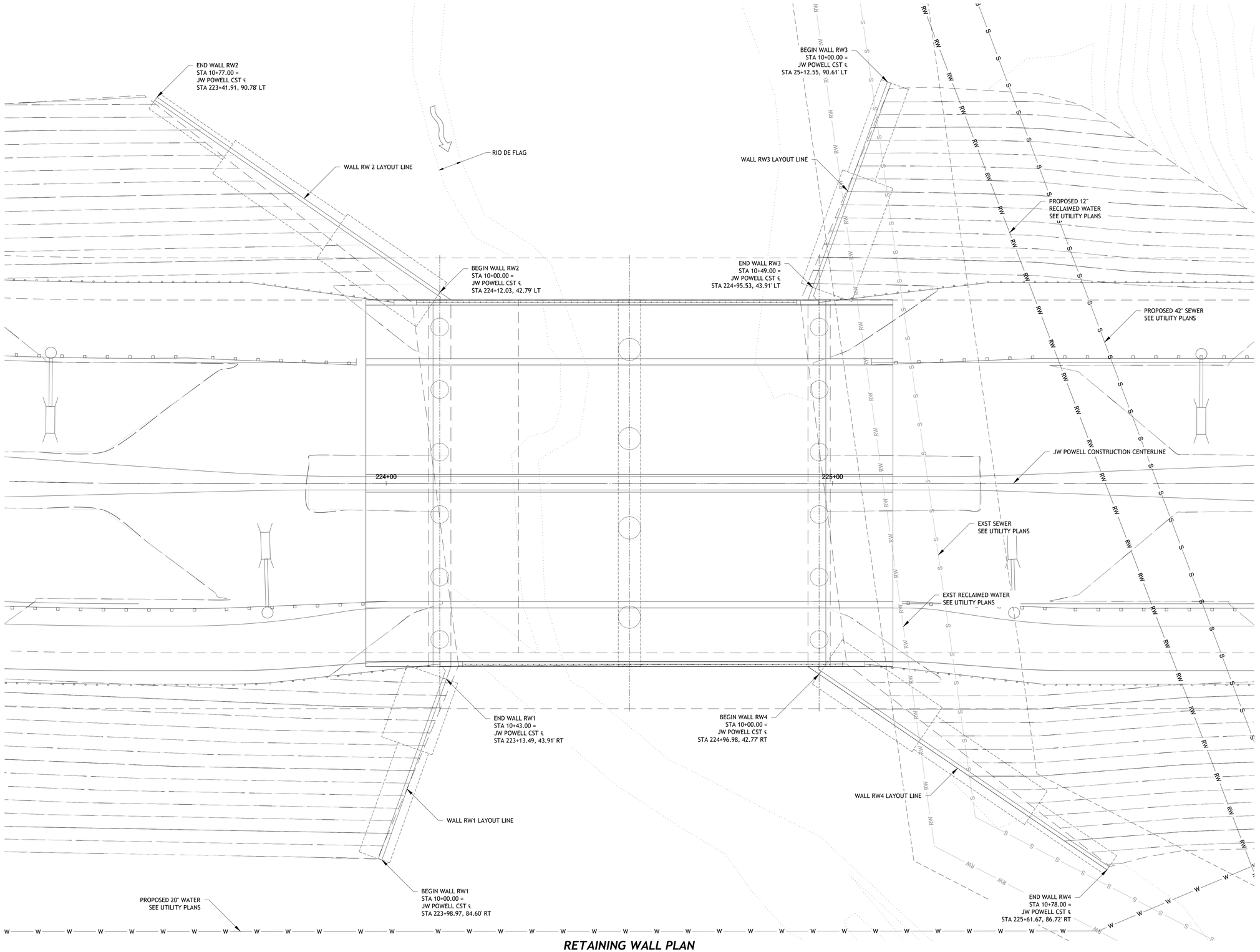
Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
BARRIER DETAILS

JOB NO: US00543310614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.14



RETAINING WALL PLAN

SCALE: 1"=10'-0"

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE	DESCRIPTION	REVISION

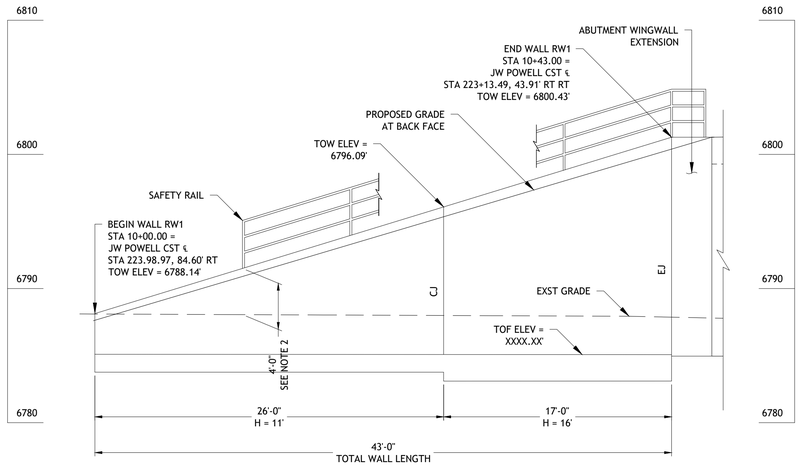
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary
Not For
Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
RETAINING WALL PLAN

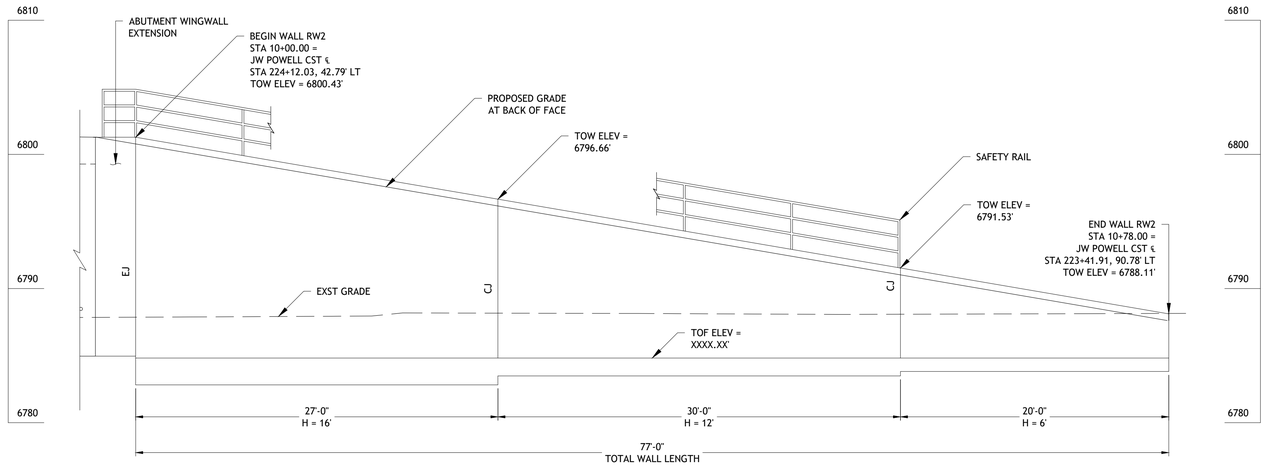
JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.15



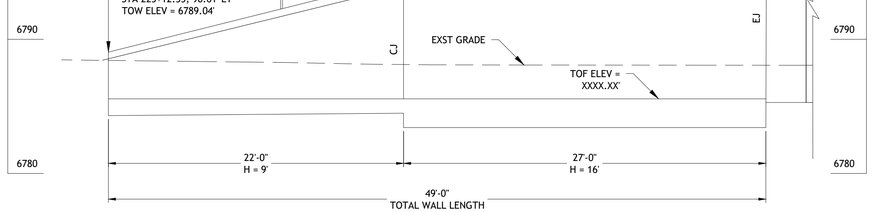
RETAINING WALL RW1 ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"



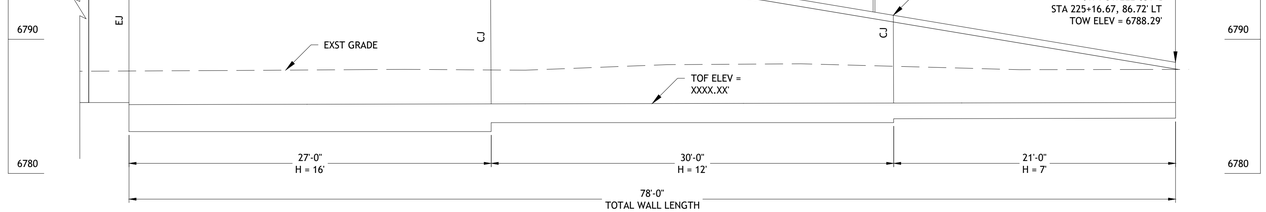
RETAINING WALL RW2 ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"



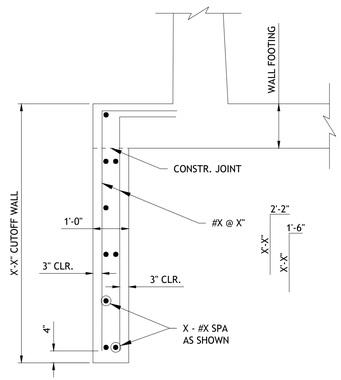
RETAINING WALL RW3 ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"



RETAINING WALL RW4 ELEVATION

SCALE: $\frac{3}{16}$" = 1'-0"



CUTOFF WALL DETAIL

SCALE: ½" = 1'-0"

NOTES:

1. All walls are ADOT SD 7.01, Case III
2. Safety rail shall extend to point where top of wall is 4'-0" form finished grade at front face of wall.

EJ = Expansion Joint
CJ = Construction Jpint
TOW = Top of Wall
TOF = Top of Footing

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

REVISION	DESCRIPTION	DATE

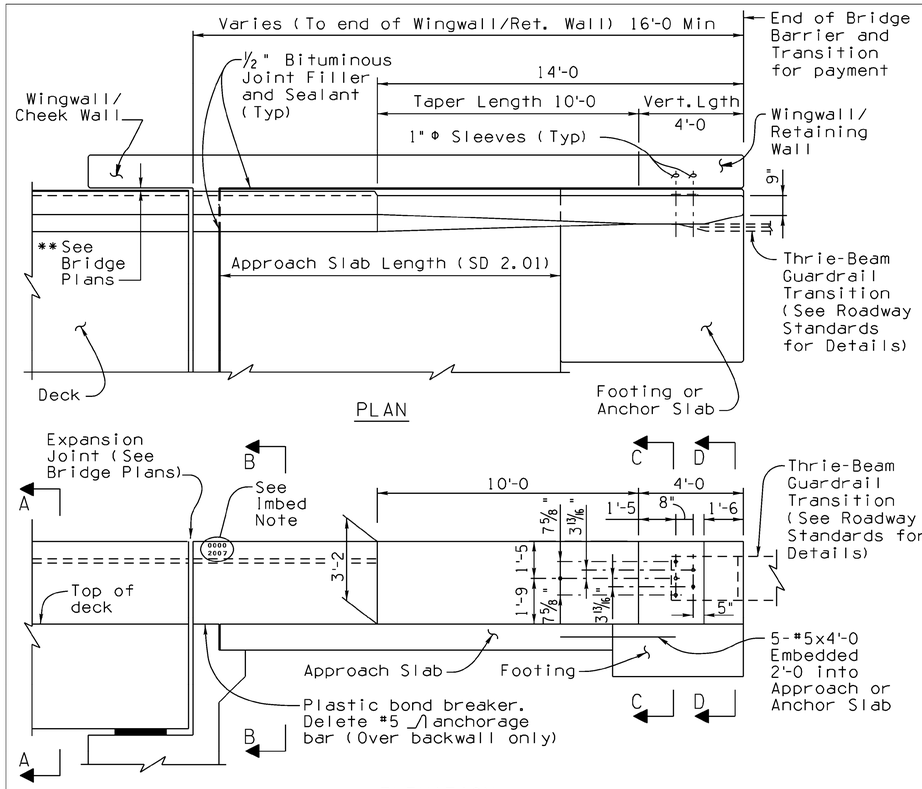
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

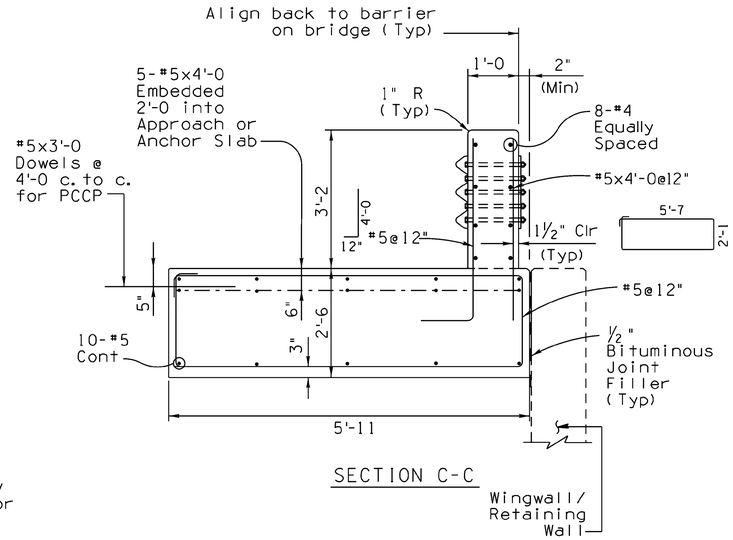
Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
RETAINING WALL ELEVATIONS

JOB NO: US00543310614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.16





AC OVERLAY NOTE:

This barrier was designed to allow for the concrete deck to receive an AC overlay with a thickness not exceeding 2 inches.

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 8th Edition 2017.

This bridge barrier has been evaluated and approved to be of equal strength to barriers with like geometry, which were successfully crash tested to meet MASH 16 requirements for Test Level 4.

Design Loads:

Dynamic Load (For barrier Design) = 80^{k}

Dynamic load is based on NCHRP 20-07(395) MASH Equivalency of NCHRP Report 350 - Approved Bridge Railings.

Equivalent Static Load (For footing design) = 28^{k}

Footing design is based on NCHRP Web Only Document 326.

Continuous barrier on footing designed as Test Level 4 barrier system.

All Concrete shall be Class "S" (f'c = 4000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60. All reinforcing shall be epoxy coated at locations above an elevation of 4000 feet.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2 inch clear cover unless noted otherwise.

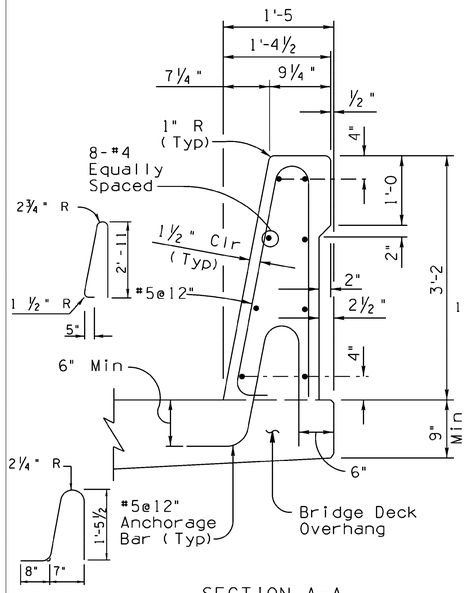
Concrete barriers on continuous superstructures shall have ½" bituminous joint filler in open joints over piers.

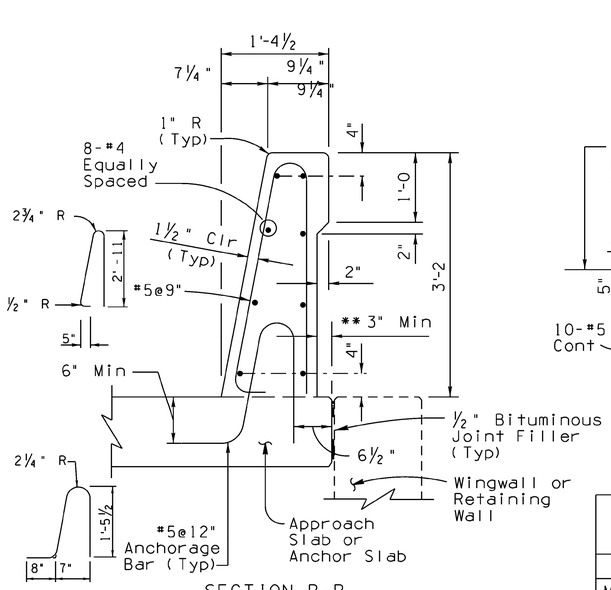
Embed ½", Bridge Number and Year Built, using 1½"w x 2"h number impressions in concrete, located as shown at the approach end of the outside lane.

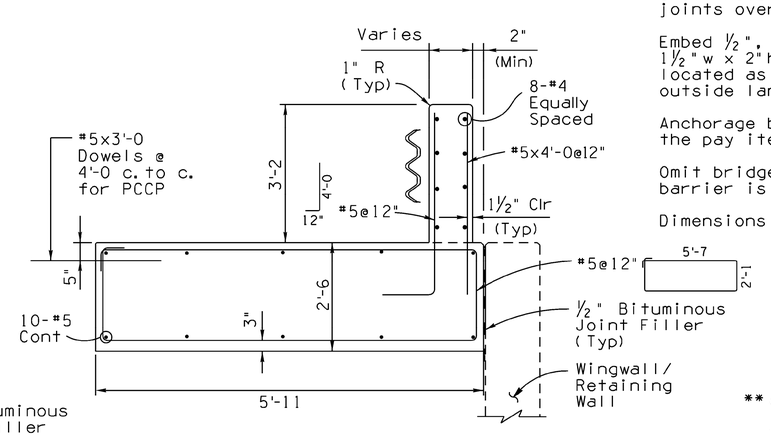
Anchorage bars and footing will be included in the pay item for the barrier (Item No. 6011151).

Omit bridge barrier transition when concrete barrier is continuous beyond the bridge.

Dimensions shall not be scaled from drawings.







** A 1" bituminous joint filler thickness is assumed at the cheek wall. Verify the thickness from the bridge plans.

Item	38" Single Slope Bridge Concrete Barrier and Transition
Item No.	6011150
Measurement	Linear Foot

STANDARDS ENGINEER
B. SINGH
RECOMMENDED FOR APPROVAL

GROUP MANAGER
D. BENTON
APPROVED

STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 09/24 DATE

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STANDARD DRAWING

38" SINGLE SLOPE BRIDGE CONCRETE BARRIER AND TRANSITION

DRAWING NO.
SD 1.10
(1 of 2)

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE
DESCRIPTION
REVISION

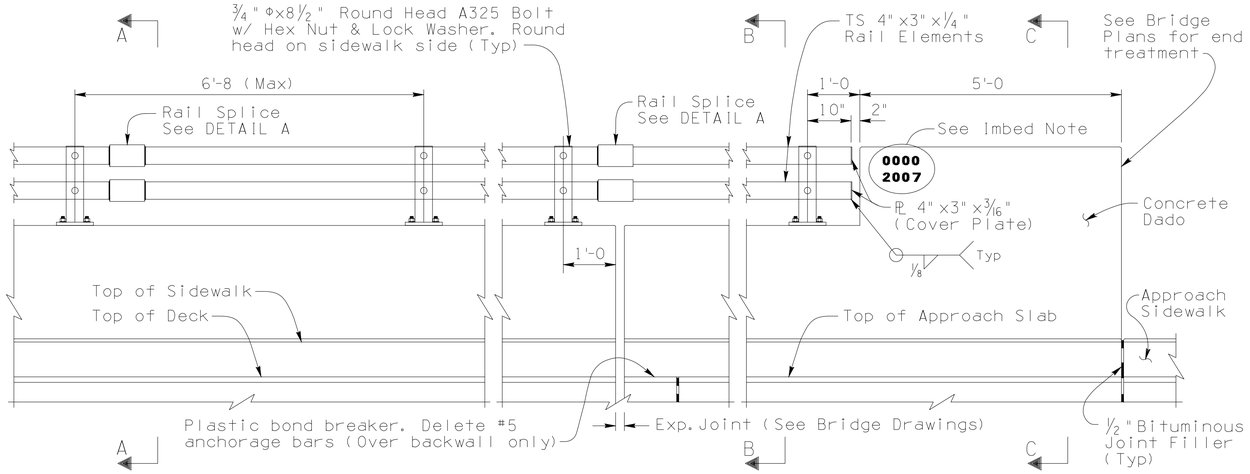
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

preliminary
Not For
Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

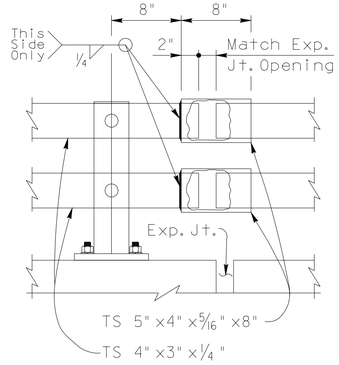
S1.17



TYPICAL PANEL ELEVATION | ELEVATION AT EXP. JT. | ELEVATION AT END POST

NOTE:

For rail splices not at expansion joints, provide 1 inch gap and weld both ends of splice tube



DETAIL A
(Exp. Splice Shown)

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 8th Edition 2017.

This barrier has been evaluated and approved to be of equal strength to barriers with like geometry, which were successfully crash tested to meet MASH 16 requirements for Test Level 4.

Design Loads:

Dynamic Load (For barrier Design) = 80^{k}

Dynamic load is based on NCHRP 20-07(395) MASH Equivalency of NCHRP Report 350 - Approved Bridge Railings.

Equivalent Static Load (For footing design) = 28^{k}

Footing design is based on NCHRP Report 663.

All Concrete shall be Class "S" (f'c = 4000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60. All reinforcing shall be epoxy coated at locations above EL. 4000 ft.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 1 1/2 inch clear cover unless noted otherwise.

Structural tubing (TS) shall be ASTM A500 Grade B. All other structural steel shall conform to ASTM A36 unless noted otherwise.

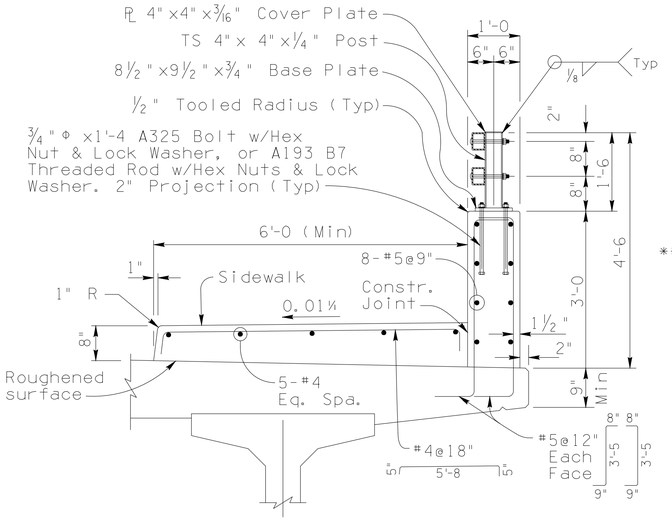
All welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/ AWS D1.5 Bridge Welding Code, latest Edition.

Concrete parapets on continuous superstructures shall have 1/2" bituminous joint filler in open joints over piers.

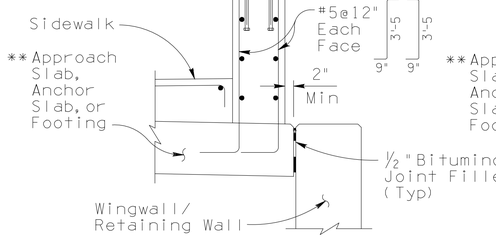
Imbed 1/2", Bridge Number and Year Built, using 1 1/2" w x 2"h number impressions in concrete, located as shown at the approach end of the outside lane.

Labor and materials for railing, footing, anchorage bars, parapet, dado, sidewalk and Pedestrian Fence (SD 1.13) are all included in the pay item (Item No. 6011132).

Dimensions shall not be scaled from drawings.

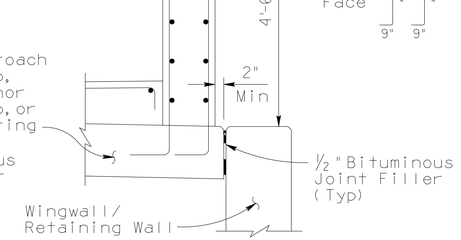


SECTION A-A



SECTION B-B

** See SD 1.10 for footing details



SECTION C-C

RAILING NOTES:

See Bridge Plans for rail layout, elevation, joint locations and rail end treatments.

All exposed steel edges shall be ground smooth. All structural steel rail assembly components shall be galvanized after fabrication in accordance with ASTM A123. All galvanizing that has been damaged in handling, transportation or welding shall be repaired by the application of a paste compound of an approved zinc powder and flux.

All post bolt heads shall be on sidewalk side. All bolts, nuts and washers shall be galvanized in accordance with the requirements of ASTM A153.

For fence attachment details, see SD 1.13. (Lower rail tube is not required with fence).

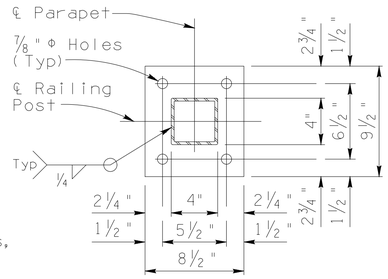
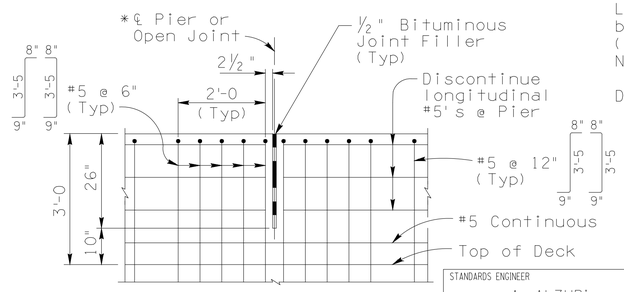


PLATE DETAIL



OPEN JOINT SECTION
AT CONTINUOUS PIERS ONLY

* Parapet Stirrups Reinforcement at expansion joints is similar to stirrup reinforcement near open joints at continuous piers

Item	Combination Pedestrian-Traffic Bridge Railing
Item No.	6011132
Measurement	Linear Foot

STANDARDS ENGINEER
A. ALZUBI
RECOMMENDED FOR APPROVAL
GROUP MANAGER
D. BENTON
APPROVED
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 04/23 DATE

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STANDARD DRAWING

COMBINATION PEDESTRIAN-TRAFFIC BRIDGE RAILING

DRAWING NO.
SD 1.12

60% DESIGN
COF PROJECT NO: 03-16010

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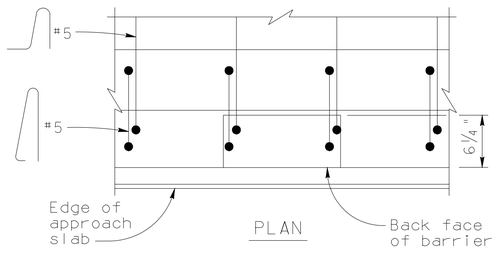
Preliminary Not For Construction

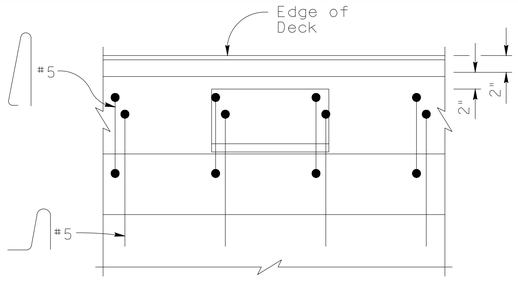
CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: USO054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

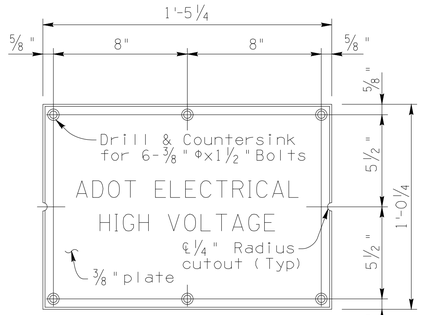
S1.18



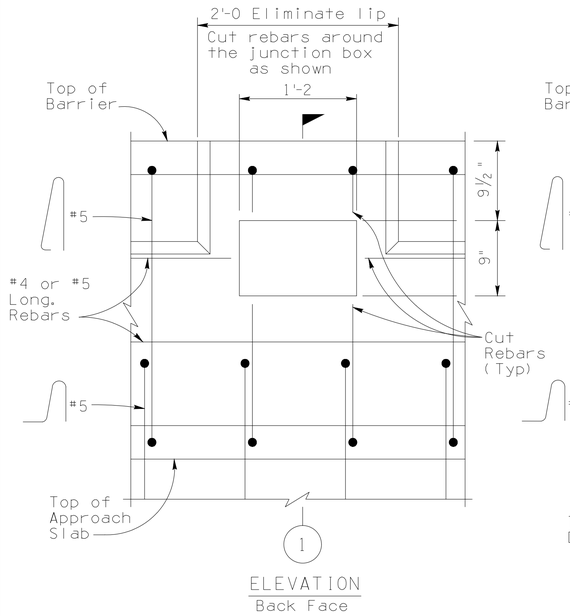
PLAN



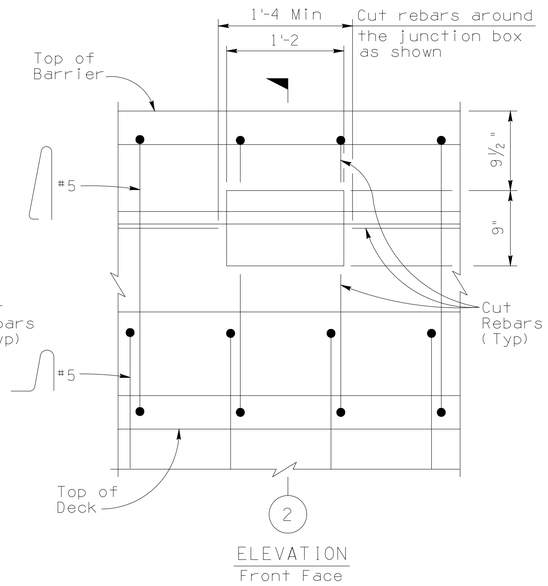
PLAN



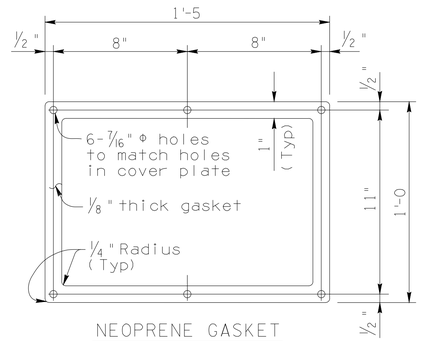
COVER PLATE



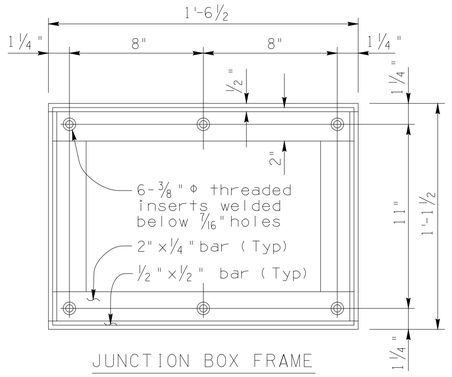
ELEVATION
Back Face



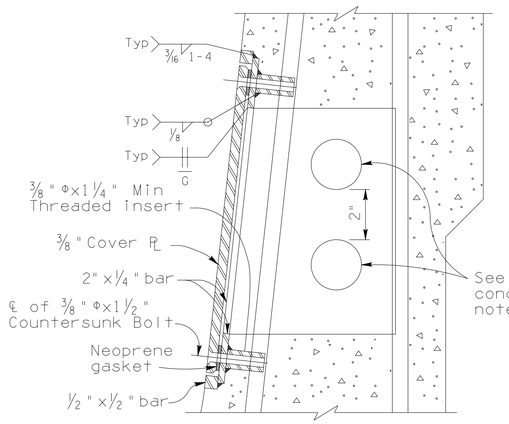
ELEVATION
Front Face



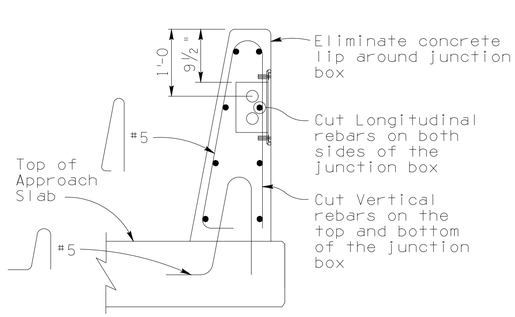
NEOPRENE GASKET



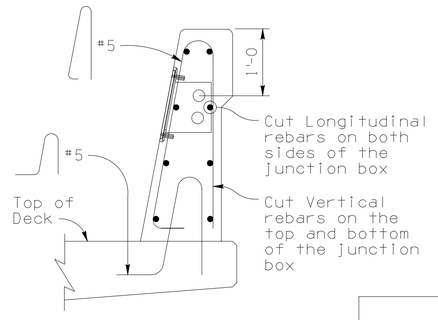
JUNCTION BOX FRAME



JUNCTION BOX DETAIL



TYPE I JUNCTION BOX
At Approach Transition (1)



TYPE II JUNCTION BOX
On Bridge (2)

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 8th Edition 2017.

Structural steel shall conform to ASTM A36.

All bolts shall conform to ASTM A307. Threaded inserts shall be loop type (U.N.C. thread).

All bolts, nuts and washers shall be galvanized in accordance with ASTM A153. All other steel shall be galvanized after fabrication in accordance with ASTM A123.

Chamfer all bottom edges of cover plate ⅛"x 45°.

Cover plate shall have 1" letters embeded ⅛" to say: "ADOT ELECTRICAL HIGH VOLTAGE".

All welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/ AWS D1.5 Bridge Welding Code, latest Edition.

Dimensions shall not be scaled from drawings.

Conduit placement in bridge barrier requires pre-approval by Bridge Group.

JUNCTION BOX NOTE:

Junction Box is shown for 38" Single Slope Bridge Concrete Barrier. Details are similar for the 42" Single Slope Barrier.

CONDUIT NOTE:

A maximum of three 2-inch or two 3-inch diameter conduits will be allowed. No other configurations will be allowed.

Item	Item No.	Measurement
Type I Junction Box	7320475	Each
Type II Junction Box	7320476	Each

STANDARDS ENGINEER
A. ALZUBI
RECOMMENDED FOR APPROVAL
GROUP MANAGER
D. EBERHART
APPROVED
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 01/20 DATE

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STANDARD DRAWING

BARRIER JUNCTION BOX

DRAWING NO.
SD 1.30

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE
DESCRIPTION
REVISION

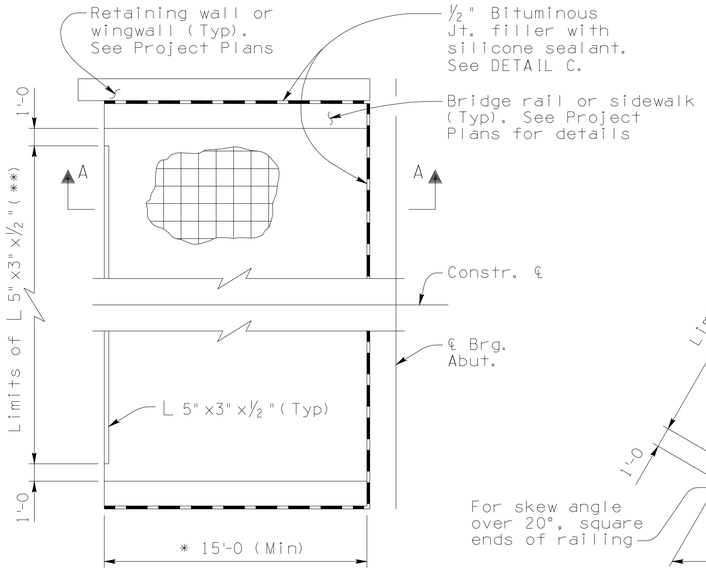
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not for Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

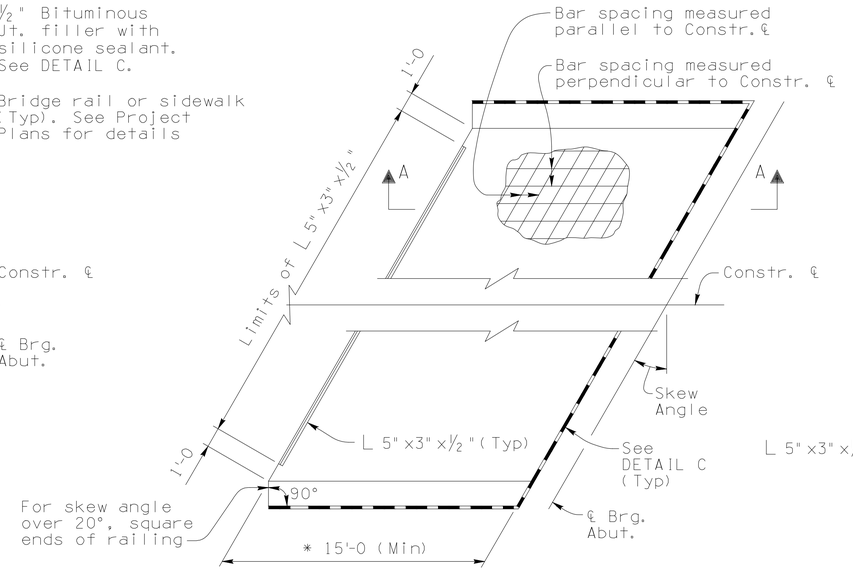
S1.19

JOB NO: US00543310614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026



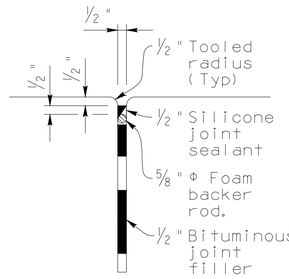
PLAN A

Right Angle Bridge

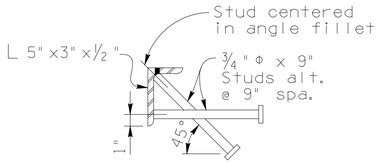


PLAN B

Skewed Bridge Without Anchor Slab
Skew Angle ≤ 45°



DETAIL C



ALTERNATE ANCHOR DETAIL

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 8th Edition 2017.

All Concrete shall be Class "S" (f'c = 4000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60. All reinforcing shall be epoxy coated at locations above 4000 foot elevation or as specified in the project plans.

All bends and hooks shall meet the requirements of AASHTO Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars.

All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2 inch clear cover unless noted otherwise.

Structural steel shall conform to ASTM specification A588 Grade 50 or A709 Grade 50W.

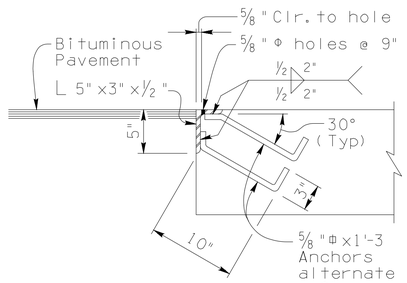
All welding shall conform to the requirements of the American Welding Society, ANSI/AASHTO/AWS D1.5 Bridge Welding Code, latest Edition.

Dimensions shall not be scaled from drawings.

Item	APPROACH SLAB
Item No.	6011371
Measurement	Square Foot

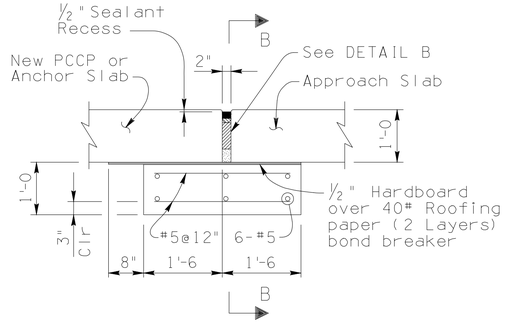
JOINT NOTE:

½"Silicone joint sealant shall be ASTM D5893 Type NS. 2" Silicone joint sealant shall be rapid-cure, self leveling, two-part silicone rubber sealant designed for expansion joints. Prime coat concrete sides of joint. Do not prime coat the backer rod. Backer rod shall be closed cell polyethylene foam.



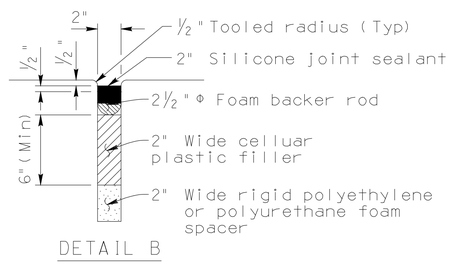
DETAIL A

Bituminous Pavement Alternate
(See Project Plans for joint detail when an integral abutment is used)

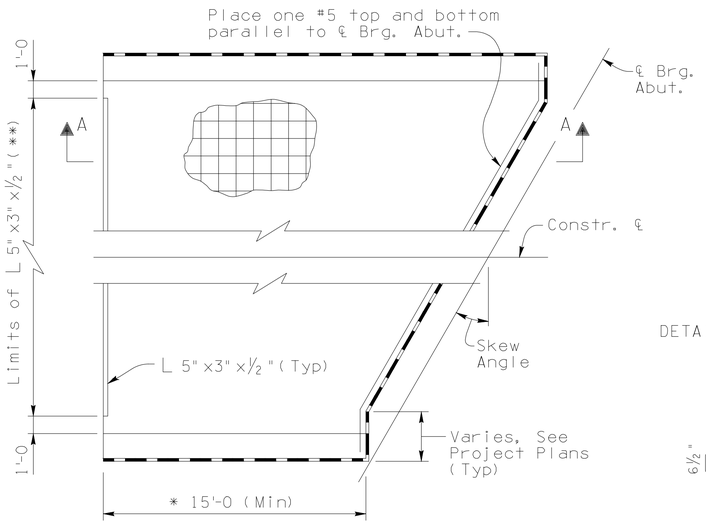


DETAIL A

Concrete Pavement Alternate

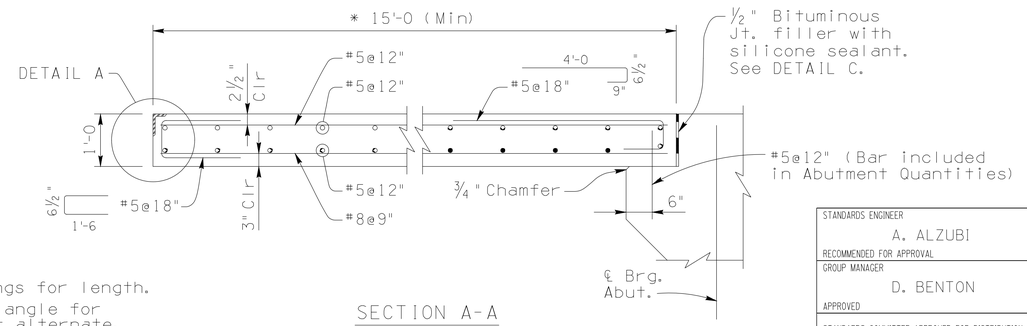


DETAIL B

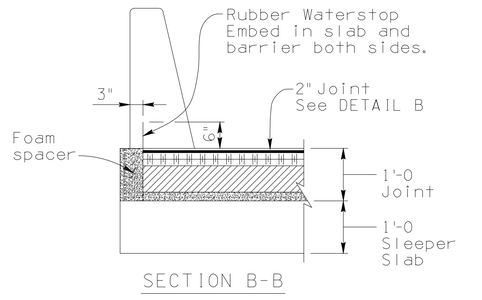


PLAN C

Skewed Bridge
Skew Angle > 45°



SECTION A-A



SECTION B-B

* See Bridge drawings for length.
** Omit total guard angle for concrete pavement alternate.

STANDARDS ENGINEER A. ALZUBI RECOMMENDED FOR APPROVAL	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION **BRIDGE GROUP STANDARD DRAWING**
GROUP MANAGER D. BENTON APPROVED	APPROACH SLAB DETAILS — DRAWING NO. SD 2.01
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 08/23 DATE	

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE
DESCRIPTION
REVISION

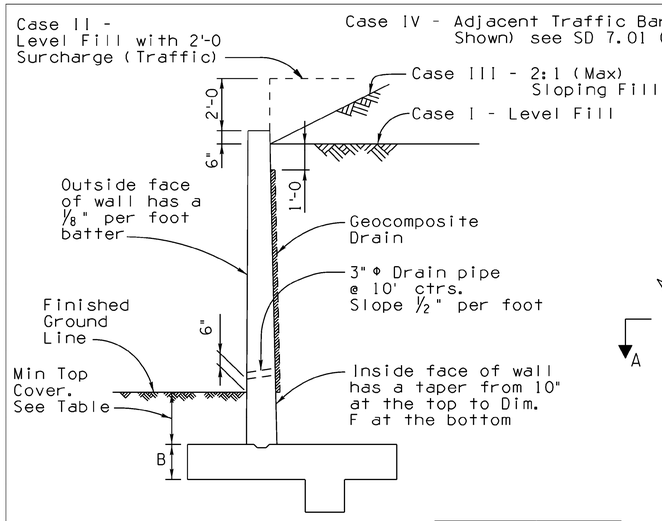
WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

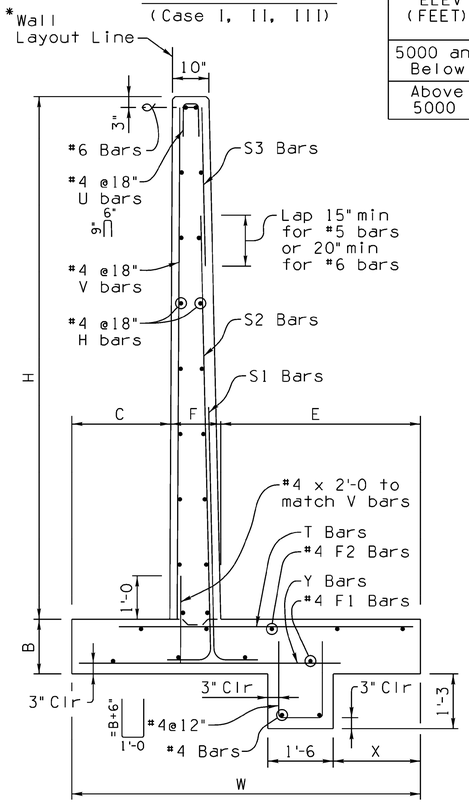
JOB NO: USD054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.20

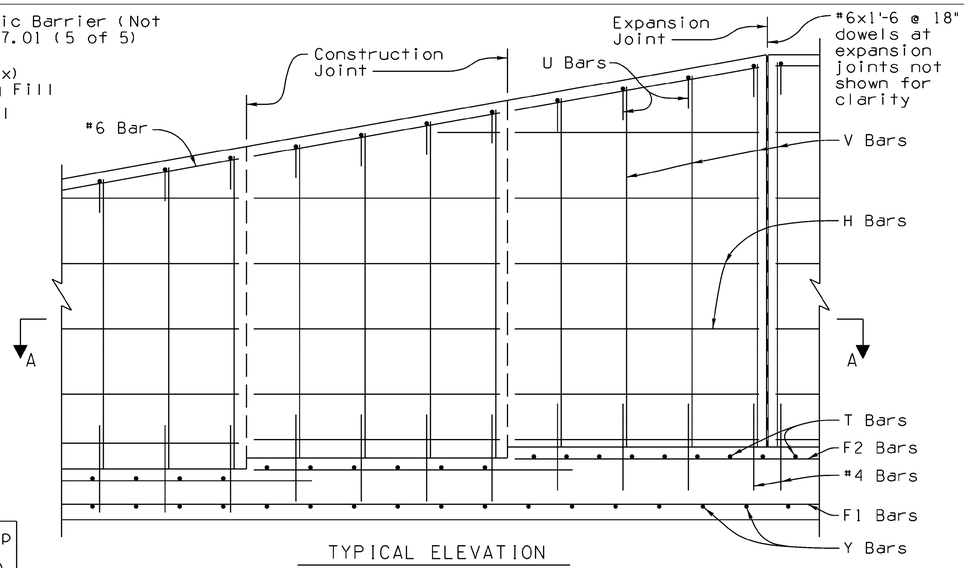


TYPICAL SECTION
(Case I, II, III)

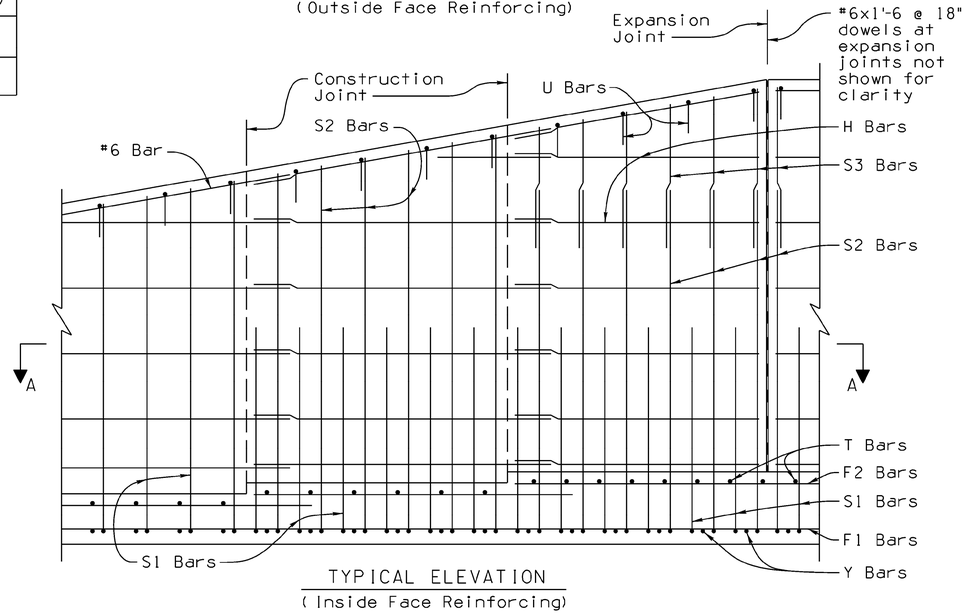
ELEV (FEET)	Min Top Cover (FEET)
5000 and Below	1'-6
Above 5000	2'-6



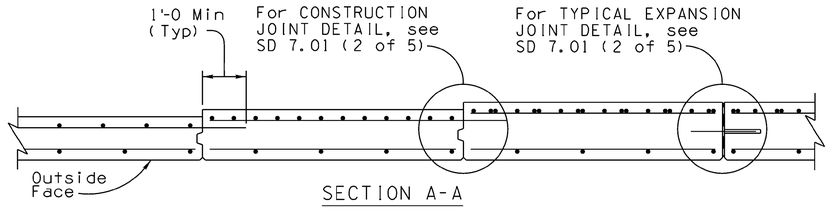
TYPICAL WALL DETAILS



TYPICAL ELEVATION
(Outside Face Reinforcing)



TYPICAL ELEVATION
(Inside Face Reinforcing)



SECTION A-A

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 8th Edition, 2017.

Design:

Soil weight = 120 p.c.f.
Backfill angle of internal friction = 33°
Existing ground angle of internal friction = 31°

All Concrete shall be Class "S" (f'c = 3000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars.

All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2 inch clear cover unless noted otherwise.

Chamfer all exposed corners 3/4" unless noted otherwise.

Compact structure backfill for footing and wall base minimum 100 percent of ASTM D698 maximum dry density.

See Project Plans for wall layout, top of footing and finished grade elevations, footing step and wall joint locations. Construction Joints shall match the locations of contraction joints.

See Project Plans for wall surface treatment. Increase the wall thickness at the outside face for the depth of surface treatment.

Dimensions shall not be scaled from drawings.

Pay item measure of square foot of wall constructed will be measured along the front face of the wall from top of footing to top of wall cap.

* See Project Plans for Wall Layout Line in relation to surface treatment.

Item	RETAINING WALL (REINFORCED CONCRETE CANTILEVER)
Item No.	9140178
Measure	Square Foot

NOTES:

For Retaining wall dimensions, quantities and additional details, see SD 7.01 sheets 2 thru 5.

For Structural Excavation and Structure Backfill Limits, see SD 7.01 (4 of 5).

STANDARDS ENGINEER B. SINGH RECOMMENDED FOR APPROVAL	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION **BRIDGE GROUP STANDARD DRAWING**
GROUP MANAGER D. BENTON APPROVED	RETAINING WALL REINFORCED CONCRETE CANTILEVER
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 10/24 DATE	DRAWING NO. SD 7.01 (1 of 5)

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE | DESCRIPTION | REVISION

WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.21

CASE I - LEVEL FILL

Dimensions							Steel List																			Service Limit State			Strength Limit State		
							S1			S2			S3			H	V	Y				F1	T			F2						
H	W	B	C	F	E	X	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Number Φ*	Length	Bar Size	Spacing	Length	Number Φ	Bar Size	Spacing	Length	Number Φ	Qtveu-SERV Lbs./Sq.Ft.	Qnveu-SERV Lbs./Sq.Ft.	B'SERV Ft.	Qtveu-STR Lbs./Sq.Ft.	Qnveu-STR Lbs./Sq.Ft.	B'STR Ft.
4'	3'-0	1'-0	10"	10"	1'-4	8"	5	12"	5'-6							4	3'-9	5	12"	2'-3	2	5	12"	2'-3	3	840	480	2.46	1130	650	2.36
5'	3'-6	1'-0	1'-0	10"	1'-8	9"	5	12"	6'-6							6	4'-9	5	12"	2'-9	2	5	12"	2'-9	3	920	560	2.91	1240	760	2.79
6'	4'-0	1'-0	1'-2	10"	2'-0	10"	5	12"	7'-6							6	5'-9	5	12"	3'-3	2	5	12"	3'-3	3	1010	650	3.31	1380	900	3.16
7'	4'-6	1'-0	1'-4	10"	2'-4	11"	5	12"	8'-6							8	6'-9	5	12"	3'-9	3	5	12"	3'-6	3	1110	750	3.70	1530	1040	3.52
8'	5'-0	1'-2	1'-6	10"	2'-8	1'-0	5	12"	9'-9							10	7'-9	5	12"	4'-3	3	5	12"	4'-0	3	1270	890	4.01	1750	1240	3.79
9'	5'-6	1'-2	1'-9	1'-0	2'-9	1'-2	5	12"	10'-9							10	8'-9	5	12"	4'-6	3	5	12"	4'-0	3	1350	970	4.40	1880	1370	4.14
10'	6'-0	1'-2	1'-9	1'-0	3'-3	1'-4	6	12"	11'-9							12	9'-9	5	12"	4'-9	3	5	12"	4'-6	4	1510	1130	4.73	2100	1590	4.45
11'	6'-6	1'-2	2'-0	1'-0	3'-6	1'-6	5	12"	4'-3	5	12"	12'-9				14	10'-9	5	12"	5'-3	4	5	12"	4'-9	4	1590	1210	5.12	2230	1710	4.81
12'	7'-0	1'-3	2'-0	1'-0	4'-0	1'-8	6	12"	5'-3	5	12"	13'-9				14	11'-9	5	12"	5'-6	4	6	12"	5'-6	5	1770	1380	5.42	2490	1960	5.08
13'	7'-6	1'-3	2'-3	1'-0	4'-3	1'-10	7	12"	6'-6	5	12"	14'-9				16	12'-9	5	12"	5'-9	4	6	9"	5'-9	5	1860	1470	5.81	2620	2090	5.43
14'	8'-0	1'-3	2'-3	1'-2	4'-7	2'-0	7	12"	7'-0	5	12"	15'-9				18	13'-9	5	12"	6'-3	4	7	12"	6'-9	5	2020	1630	6.14	2850	2320	5.74
15'	8'-6	1'-3	2'-6	1'-3	4'-9	2'-2	7	12"	8'-0	5	12"	16'-9				18	14'-9	6	12"	6'-6	5	7	12"	7'-0	5	2100	1710	6.53	2970	2450	6.10
16'	9'-0	1'-4	2'-6	1'-4	5'-2	2'-4	7	12"	7'-3	6	12"	8'-9	5	12"	10'-9	20	15'-9	6	12"	6'-9	5	8	12"	8'-3	6	2300	1900	6.82	3250	2710	6.36
17'	9'-6	1'-4	2'-9	1'-5	5'-4	2'-6	7	12"	6'-0	7	12"	9'-9	5	12"	10'-9	22	16'-9	6	9"	7'-3	5	8	12"	8'-6	6	2380	1980	7.21	3380	2840	6.72
18'	10'-0	1'-5	2'-9	1'-6	5'-9	2'-8	7	12"	7'-0	7	12"	10'-6	5	12"	11'-0	22	17'-9	6	9"	7'-6	5	7	8"	8'-6	6	2580	2170	7.50	3660	3110	6.99
19'	10'-6	1'-6	3'-0	1'-7	5'-11	2'-10	8	12"	8'-0	7	12"	10'-3	6	12"	12'-9	24	18'-9	6	9"	8'-0	6	8	9"	9'-3	7	2690	2270	7.86	3830	3260	7.30
20'	11'-0	1'-6	3'-0	1'-8	6'-4	3'-0	8	12"	7'-6	8	12"	11'-6	6	12"	12'-9	26	19'-9	6	8"	8'-3	6	8	8"	9'-6	7	2860	2440	8.19	4070	3500	7.61
21'	11'-6	1'-7	3'-3	1'-9	6'-6	3'-2	8	12"	8'-3	8	12"	12'-6	6	12"	12'-9	26	20'-9	7	12"	8'-9	6	9	9"	10'-6	7	2970	2540	8.54	4240	3660	7.92
22'	12'-0	1'-8	3'-3	1'-10	6'-11	3'-4	9	12"	9'-6	8	12"	13'-6	6	12"	13'-0	28	21'-9	7	12"	9'-0	6	9	9"	11'-0	7	3180	2740	8.83	4530	3940	8.18
23'	12'-6	1'-9	3'-6	2'-0	7'-0	3'-6	10	12"	12'-3	7	12"	14'-0	6	12"	13'-3	30	22'-9	8	12"	9'-3	6	8	6"	10'-3	7	3290	2840	9.18	4700	4100	8.49
24'	13'-0	1'-10	3'-6	2'-2	7'-4	3'-8	9	12"	9'-3	9	12"	15'-6	6	12"	13'-3	30	23'-9	8	12"	9'-6	7	8	6"	10'-6	8	3500	3040	9.47	5000	4380	8.76
25'	13'-6	2'-0	3'-9	2'-4	7'-5	3'-10	9	12"	10'-3	9	12"	16'-6	6	12"	13'-6	32	24'-9	8	12"	10'-0	7	8	6"	10'-9	8	3650	3170	9.78	5220	4580	9.02
26'	14'-0	2'-3	3'-9	2'-6	7'-9	4'-0	10	12"	13'-0	8	12"	17'-6	6	12"	13'-9	34	25'-9	8	12"	10'-3	7	8	6"	11'-0	8	3920	3410	9.99	5630	4940	9.19
27'	14'-6	2'-6	4'-0	2'-8	7'-10	4'-2	10	12"	12'-3	9	12"	18'-6	6	12"	14'-3	34	26'-9	8	12"	10'-6	7	8	6"	11'-0	8	4110	3570	10.26	5910	5180	9.41
28'	15'-0	2'-9	4'-0	2'-10	8'-2	4'-4	10	12"	13'-3	9	12"	19'-9	6	12"	14'-3	36	27'-9	8	12"	11'-0	7	8	6"	11'-6	8	4390	3820	10.47	6330	5550	9.58
29'	15'-6	3'-0	4'-3	3'-0	8'-3	4'-6	10	12"	12'-0	10	12"	21'-0	6	12"	14'-3	38	28'-9	8	12"	11'-3	7	8	6"	11'-9	9	4580	3980	10.73	6610	5800	9.79
30'	16'-0	3'-3	4'-3	3'-2	8'-7	4'-8	10	12"	13'-0	10	12"	22'-3	6	12"	14'-3	38	29'-9	8	12"	11'-6	8	8	6"	11'-9	9	4860	4230	10.94	7040	6180	9.97

Φ Total number of bars in cross section. * Total number includes the sum of both faces.

QUANTITIES

CASE I			
H	Concrete C.Y./Ln.Ft.	Steel Lbs./Ln.Ft.	Steel (Horiz. Lap) Lbs./Splice
4'	.30	27	10
5'	.35	31	12
6'	.40	33	12
7'	.45	38	14
8'	.53	42	15
9'	.61	44	15
10'	.67	53	17
11'	.72	57	19
12'	.80	66	20
13'	.86	78	21
14'	.96	84	22
15'	1.04	92	23
16'	1.16	108	25
17'	1.25	119	26
18'	1.37	128	26
19'	1.50	153	29
20'	1.61	171	30
21'	1.75	185	30
22'	1.90	203	32
23'	2.09	229	33
24'	2.29	236	34
25'	2.54	248	36
26'	2.84	264	37
27'	3.16	279	37
28'	3.50	294	38
29'	3.85	317	40
30'	4.22	328	41

LIMIT STATE NOTES:

Qtveu-SERV = Total equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

Qnveu-SERV = Net equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

B'SERV = Effective footing width to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

Qtveu-STR = Total equivalent uniform vertical bearing stress to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

Qnveu-STR = Net equivalent uniform vertical bearing stress to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

B'STR = Effective footing width to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

For other applicable limit states, perform project specific-analysis using the procedures in ADOT SF-1 (Spread Footing: Bearing Resistance and Settlement).

ADOT SF-1 memorandum is found on the Bridge Group website (Geotech Services LRFD Design Memorandums).

QUANTITIES NOTE:

Quantities are shown for information purposes only. The pay item is measured per square foot of wall.

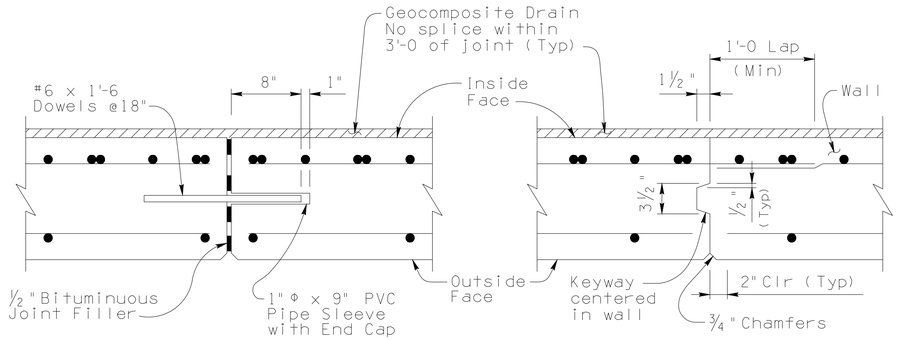
Quantities are for one L.F. of wall except for horizontal steel lap splices and footing steps.

Steel quantities for horizontal lap splices shall be added for wall segments greater than 30 feet, and add a splice for each additional wall segment greater than 30 feet. Horizontal 1'-0 lap splices occur at construction or contraction joints.

Steel and concrete quantities for footing steps shall be added to those shown in the table.

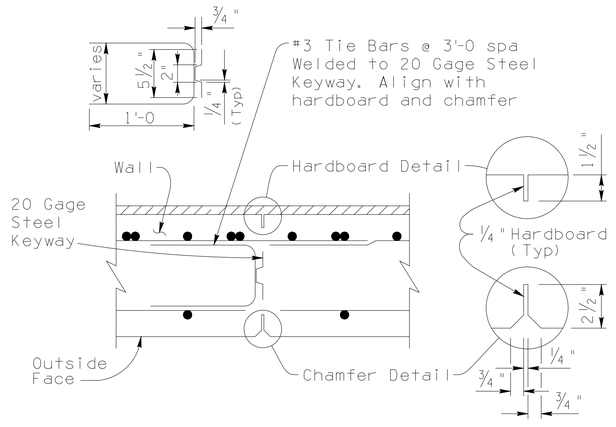
DOWEL NOTE:

Dowel placement includes furnishing and placing PVC pipe sleeves in the concrete forms, and placing metal dowels in the PVC pipe sleeves.

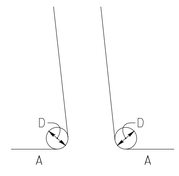


TYPICAL EXPANSION JOINT DETAIL

CONSTRUCTION JOINT DETAIL



CONTRACTION JOINT DETAIL



S2 BAR S1 BAR

Bar Size	Dimension A	Dimension D
5	1'-0	3¾"
6	1'-0	4½"
7	1'-2	5¼"
8	1'-4	6"
9	1'-8	9"
10	1'-10	10"
11	2'-0	11"

JOINT NOTES:

All retaining walls shall have construction joints or contraction joints spaced at not more than 30'-0 apart or as shown. Contraction joints may be substituted for construction joints for wall pours longer than 30'-0.

Expansion joints shall be provided at intervals not exceeding 90'-0.

Footings may be continuous with no joints (except at footing step locations).

NOTES:

For General Notes, Typical Elevations, Sections and Details see SD 7.01 (1, 3, and 4).

For Structural Excavation Limits and Structure Backfill Limits, see SD 7.01 (4 of 5).

STANDARDS ENGINEER A. ALZUBI RECOMMENDED FOR APPROVAL	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION **BRIDGE GROUP STANDARD DRAWING**
GROUP MANAGER D. EBERHART APPROVED	RETAINING WALL REINFORCED CONCRETE CANTILEVER
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 12/21 DATE	DRAWING NO. SD 7.01 (2 of 5)

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE

DESCRIPTION

REVISION

WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.22

CASE II-LEVEL FILL WITH 2' SURCHARGE (TRAFFIC)

Dimensions							Steel List																			Service Limit State			Strength Limit State		
							S1			S2			S3			H	V	Y			F1	T			F2							
H	W	B	C	F	E	X	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Number ⌖*	Length	Bar Size	Spacing	Length	Number ⌖	Bar Size	Spacing	Length	Number ⌖	qtveu-SERV Lbs./Sq.Ft.	qnveu-SERV Lbs./Sq.Ft.	B'SERV Ft.	qtveu-STR Lbs./Sq.Ft.	qnveu-STR Lbs./Sq.Ft.	B'STR Ft.
4'	3'-6	1'-0	1'-0	10"	1'-8	1'-0	5	12"	5'-6							4	3'-9	5	12"	2'-6	2	5	12"	3'-0	3	980	620	2.79	1420	930	2.64
5'	4'-0	1'-0	1'-2	10"	2'-0	1'-0	5	12"	6'-6							6	4'-9	5	12"	3'-0	2	5	12"	3'-3	3	1090	730	3.18	1580	1100	2.98
6'	4'-6	1'-0	1'-4	10"	2'-4	1'-2	5	12"	7'-6							6	5'-9	5	12"	3'-6	3	5	12"	3'-9	3	1210	850	3.53	1770	1280	3.29
7'	5'-1	1'-2	1'-6	10"	2'-9	1'-4	6	12"	8'-9							8	6'-9	5	12"	3'-9	3	5	12"	4'-0	3	1370	990	3.93	2010	1490	3.65
8'	5'-8	1'-2	1'-8	10"	3'-2	1'-6	6	9"	9'-9							10	7'-9	5	12"	4'-3	3	5	12"	4'-6	3	1470	1090	4.41	2150	1640	4.10
9'	6'-3	1'-2	1'-10	1'-0	3'-5	1'-8	6	9"	10'-9							10	8'-9	5	12"	4'-9	3	5	12"	4'-9	4	1560	1180	4.89	2280	1770	4.55
10'	6'-10	1'-3	2'-0	1'-0	3'-10	1'-9	7	12"	12'-0							12	9'-9	5	12"	5'-3	4	6	12"	5'-3	4	1690	1300	5.35	2470	1940	4.97
11'	7'-6	1'-3	2'-3	1'-0	4'-3	1'-10	6	12"	4'-9	6	12"	12'-9				14	10'-9	5	12"	5'-9	4	7	12"	6'-3	5	1750	1360	5.99	2550	2020	5.59
12'	8'-0	1'-3	2'-3	1'-2	4'-7	2'-0	6	12"	5'-0	6	12"	13'-9				14	11'-9	5	12"	6'-0	4	7	12"	6'-9	5	1840	1450	6.36	2680	2150	5.92
13'	8'-6	1'-3	2'-6	1'-3	4'-9	2'-2	7	12"	7'-6	5	12"	14'-9				16	12'-9	6	12"	6'-6	4	8	12"	7'-9	5	2000	1610	6.70	2910	2390	6.23
14'	9'-0	1'-3	2'-6	1'-4	5'-2	2'-4	7	12"	7'-3	6	12"	15'-9				18	13'-9	6	12"	6'-9	5	8	12"	8'-3	6	2160	1770	7.02	3150	2620	6.53
15'	9'-6	1'-4	2'-9	1'-5	5'-4	2'-6	8	12"	8'-9	6	12"	17'-0				18	14'-9	6	9"	7'-0	5	8	12"	8'-6	6	2280	1880	7.36	3320	2780	6.83
16'	10'-0	1'-5	2'-9	1'-6	5'-9	2'-8	7	12"	7'-0	7	12"	9'-0	6	12"	10'-9	20	15'-9	6	8"	7'-3	5	7	8"	8'-0	6	2470	2060	7.65	3610	3060	7.08
17'	10'-6	1'-6	3'-0	1'-7	5'-11	2'-10	8	12"	8'-0	7	12"	9'-0	6	12"	10'-9	22	16'-9	6	8"	7'-9	5	7	8"	8'-3	6	2590	2170	7.99	3790	3220	7.38
18'	11'-0	1'-7	3'-0	1'-8	6'-4	3'-0	7	10"	7'-6	7	10"	10'-0	6	10"	11'-9	22	17'-9	7	12"	8'-0	6	9	10"	10'-0	7	2790	2360	8.28	4080	3500	7.64
19'	11'-6	1'-8	3'-3	1'-9	6'-6	3'-2	8	12"	8'-0	8	12"	12'-6	6	12"	10'-9	24	18'-9	7	12"	8'-6	6	8	8"	9'-6	7	2900	2460	8.62	4250	3660	7.93
20'	12'-0	1'-9	3'-3	1'-10	6'-11	3'-4	9	12"	9'-6	8	12"	13'-3	6	12"	11'-0	26	19'-9	7	12"	8'-9	6	9	9"	10'-9	7	3110	2660	8.91	4550	3940	8.20
21'	12'-6	1'-10	3'-6	1'-11	7'-1	3'-6	8	10"	9'-0	8	10"	14'-3	6	10"	11'-3	26	20'-9	7	10"	9'-0	6	10	10"	11'-9	7	3220	2760	9.25	4720	4100	8.49
22'	13'-0	1'-11	3'-6	2'-0	7'-6	3'-8	9	12"	10'-0	9	12"	15'-9	6	12"	11'-0	28	21'-9	8	12"	9'-6	6	8	6"	10'-6	7	3420	2950	9.54	5020	4390	8.76
23'	13'-6	2'-0	3'-9	2'-2	7'-7	3'-10	10	12"	12'-9	8	12"	16'-3	6	12"	11'-3	30	22'-9	8	12"	9'-9	7	8	6"	10'-9	7	3540	3060	9.89	5190	4550	9.05
24'	14'-0	2'-2	3'-9	2'-4	7'-11	4'-0	10	12"	11'-6	9	12"	17'-9	6	12"	11'-3	30	23'-9	8	12"	10'-3	7	8	6"	11'-0	8	3780	3280	10.13	5550	4870	9.27
25'	14'-6	2'-4	4'-0	2'-6	8'-0	4'-2	10	12"	12'-6	9	12"	19'-0	6	12"	11'-3	32	24'-9	8	12"	10'-6	7	8	6"	11'-3	8	3930	3410	10.43	5770	5070	9.51
26'	15'-0	2'-6	4'-0	2'-8	8'-4	4'-4	9	10"	11'-6	9	10"	18'-6	6	10"	13'-0	34	25'-9	8	12"	11'-0	7	10	9"	13'-0	9	4170	3630	10.68	6130	5400	9.73
27'	15'-6	2'-9	4'-3	2'-10	8'-5	4'-6	10	12"	12'-3	10	12"	21'-3	6	12"	11'-9	34	26'-9	8	12"	11'-6	8	10	9"	13'-3	9	4360	3790	10.94	6420	5650	9.93
28'	16'-0	3'-0	4'-3	3'-0	8'-9	4'-8	10	12"	13'-3	10	12"	22'-0	6	12"	12'-3	36	27'-9	8	12"	11'-6	8	10	9"	13'-6	9	4640	4040	11.14	6840	6030	10.10
29'	16'-6	3'-3	4'-6	3'-3	8'-9	4'-10	11	12"	16'-3	9	12"	23'-0	6	12"	12'-3	38	28'-9	8	12"	12'-0	8	10	9"	13'-9	9	4830	4200	11.40	7130	6280	10.29
30'	17'-0	3'-6	4'-6	3'-6	9'-0	5'-0	11	12"	15'-9	10	12"	24'-0	6	12"	12'-9	38	29'-9	8	12"	12'-6	8	10	9"	14'-0	10	5120	4460	11.61	7560	6670	10.46

⌖ Total number of bars in cross section. * Total number includes the sum of both faces.

QUANTITIES

CASE II			
H	Concrete C.Y./Ln.Ft.	Steel Lbs./Ln.Ft.	Steel (Horiz. Lap) Lbs./Splice
4'	.32	28	10
5'	.37	32	12
6'	.42	35	12
7'	.51	43	14
8'	.56	52	15
9'	.65	56	16
10'	.73	65	18
11'	.79	74	20
12'	.88	78	20
13'	.96	93	21
14'	1.05	105	24
15'	1.16	121	24
16'	1.29	127	25
17'	1.41	138	26
18'	1.55	162	28
19'	1.69	169	29
20'	1.83	195	30
21'	1.99	223	30
22'	2.15	233	32
23'	2.35	248	34
24'	2.60	264	34
25'	2.87	276	36
26'	3.14	305	38
27'	3.48	326	38
28'	3.83	337	40
29'	4.25	355	41
30'	4.68	383	42

LIMIT STATE NOTES:

qtveu-SERV = Total equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

qnveu-SERV = Net equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

B'SERV = Effective footing width to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

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For other applicable limit states, perform project specific-analysis using the procedures in ADOT SF-1 (Spread Footing: Bearing Resistance and Settlement).

ADOT SF-1 memorandum is found on the Bridge Group website (Geotech Services LRFD Design Memorandums).

QUANTITIES NOTE:

Quantities are shown for information purposes only. The pay item is measured per square foot of wall.

Quantities are for one L.F. of wall except for horizontal steel lap splices and footing steps.

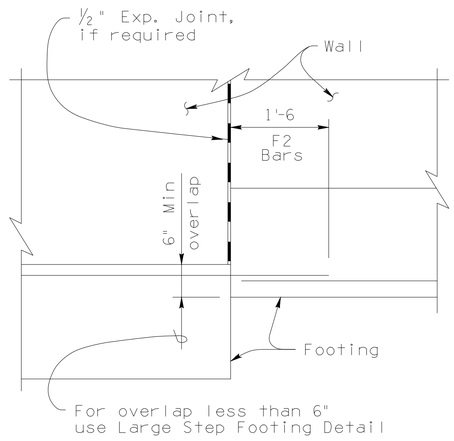
Steel quantities for horizontal lap splices shall be added for wall segments greater than 30 feet, and add a splice for each additional wall segment greater than 30 feet. Horizontal 1'-0 lap splices occur at construction or contraction joints.

Steel and concrete quantities for footing steps shall be added to those shown in the table.

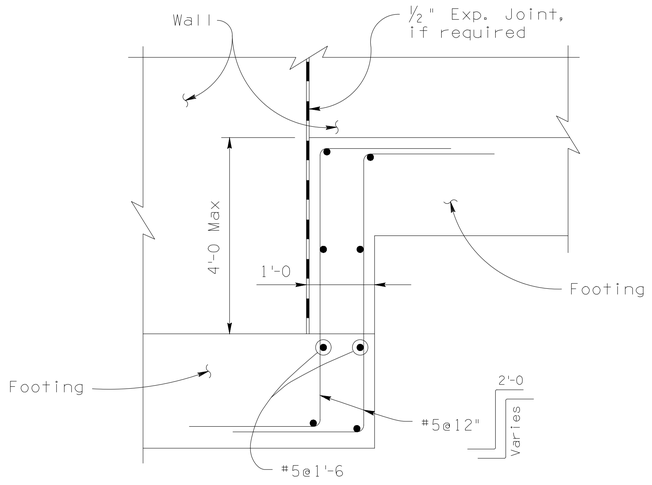
NOTES:

For General Notes, Typical Elevations, Sections and Details see SD 7.01 (1, 2, and 4).

For Structural Excavation Limits and Structure Backfill Limits, see SD 7.01 (4 of 5).



SMALL STEP FOOTING DETAIL



LARGE STEP FOOTING DETAIL

STANDARDS ENGINEER A. ALZUBI RECOMMENDED FOR APPROVAL	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION **BRIDGE GROUP STANDARD DRAWING**
GROUP MANAGER D. EBERHART APPROVED	RETAINING WALL REINFORCED CONCRETE CANTILEVER
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 12/21 DATE	DRAWING NO. SD 7.01 (3 of 5)

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE
DESCRIPTION
REVISION

WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.23

CASE III - 2:1 (MAX) SLOPING FILL

Dimensions							Steel List																			Service Limit State			Strength Limit State		
							S1			S2			S3			H	V	Y			F1	T			F2							
H	W	B	C	F	E	X	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Bar Size	Spacing	Length	Number Φ*	Length	Bar Size	Spacing	Length	Number Φ	Bar Size	Spacing	Length	Number Φ	Qtveu-SERV Lbs./Sq.Ft.	Qnveu-SERV Lbs./Sq.Ft.	B'SERV Ft.	Qtveu-STR Lbs./Sq.Ft.	Qnveu-STR Lbs./Sq.Ft.	B'STR Ft.
4'	3'-0	1'-0	1'-0	10"	1'-2	1'-0	5	12"	5'-6							4	3'-9	5	12"	2'-0	2	5	12"	2'-6	3	960	600	2.52	1320	830	2.44
5'	3'-6	1'-0	1'-0	10"	1'-8	1'-0	5	12"	6'-6							6	4'-9	5	12"	2'-6	2	5	12"	3'-0	3	1140	780	2.90	1570	1080	2.80
6'	4'-2	1'-0	1'-0	10"	2'-4	1'-0	5	12"	7'-6							6	5'-9	5	12"	3'-3	2	5	12"	3'-9	3	1300	940	3.46	1810	1320	3.34
7'	5'-0	1'-2	1'-2	10"	3'-0	1'-3	5	12"	8'-9							8	6'-9	5	12"	3'-9	3	5	12"	4'-3	4	1470	1090	4.19	2040	1530	4.05
8'	5'-9	1'-2	1'-4	10"	3'-7	1'-6	6	12"	9'-9							10	7'-9	5	12"	4'-3	3	6	12"	5'-0	4	1600	1220	4.89	2220	1710	4.73
9'	6'-6	1'-3	1'-6	1'-0	4'-0	1'-9	6	12"	10'-9							10	8'-9	5	12"	4'-9	3	6	9"	5'-6	5	1760	1370	5.55	2450	1930	5.37
10'	7'-3	1'-3	1'-8	1'-0	4'-7	2'-0	7	12"	12'-0							12	9'-9	5	12"	5'-3	4	7	12"	6'-9	5	1890	1500	6.25	2640	2110	6.06
11'	8'-3	1'-4	1'-10	1'-2	5'-3	2'-3	7	12"	13'-0							14	10'-9	5	12"	6'-0	4	8	12"	7'-9	6	2030	1630	7.25	2830	2290	7.04
12'	9'-0	1'-4	2'-0	1'-2	5'-10	2'-6	7	12"	14'-0							14	11'-9	5	12"	6'-6	4	8	12"	8'-6	7	2170	1770	7.95	3020	2480	7.73
13'	9'-9	1'-6	2'-2	1'-4	6'-3	2'-9	6	12"	6'-3	6	12"	15'-0				16	12'-9	5	12"	7'-0	5	8	9"	9'-3	8	2360	1940	8.58	3290	2730	8.34
14'	10'-6	1'-8	2'-4	1'-4	6'-10	3'-0	7	12"	8'-6	6	12"	16'-3				18	13'-9	5	12"	7'-6	5	7	6"	9'-0	8	2550	2110	9.22	3560	2970	8.95
15'	11'-3	1'-10	2'-6	1'-4	7'-5	3'-2	7	14"	6'-6	7	14"	17'-6				18	14'-9	6	14"	8'-3	5	8	7"	10'-9	9	2740	2280	9.86	3830	3210	9.56
16'	12'-0	2'-0	2'-8	1'-6	7'-10	3'-4	7	12"	6'-9	7	12"	10'-3	5	12"	10'-0	20	15'-9	5	12"	8'-9	6	8	6"	11'-0	9	2940	2460	10.49	4110	3460	10.18
17'	12'-6	2'-2	2'-8	1'-6	8'-4	3'-6	8	14"	7'-9	8	14"	11'-0	6	14"	11'-0	22	16'-9	6	14"	9'-3	6	9	7"	12'-0	9	3220	2720	10.72	4510	3840	10.37
18'	13'-0	2'-4	2'-10	1'-6	8'-8	3'-8	8	12"	8'-3	8	12"	11'-6	6	12"	11'-6	22	17'-9	6	12"	9'-6	6	9	6"	12'-6	10	3440	2920	11.02	4830	4130	10.64
19'	13'-6	2'-6	2'-10	1'-8	9'-0	3'-10	9	14"	8'-9	9	14"	13'-6	6	14"	11'-0	24	18'-9	6	12"	9'-9	7	9	6"	13'-0	10	3730	3190	11.24	5260	4530	10.83
20'	14'-0	2'-8	3'-0	1'-10	9'-2	4'-0	9	14"	9'-6	9	14"	14'-3	6	14"	11'-3	26	19'-9	6	12"	10'-3	7	10	7"	13'-6	11	3960	3400	11.53	5590	4840	11.10
21'	14'-6	2'-10	3'-2	2'-0	9'-4	4'-2	9	12"	9'-6	9	12"	14'-9	6	12"	12'-0	26	20'-9	6	12"	10'-6	7	10	6"	14'-0	11	4200	3620	11.82	5930	5150	11.36
22'	15'-0	3'-0	3'-2	2'-2	9'-8	4'-4	9	12"	10'-3	9	12"	15'-9	6	12"	12'-3	28	21'-9	7	12"	11'-0	8	10	6"	14'-6	11	4510	3910	12.04	6380	5570	11.54
23'	15'-8	3'-4	3'-4	2'-4	10'-0	4'-6	9	12"	11'-3	9	12"	16'-9	6	12"	12'-6	30	22'-9	7	12"	11'-6	8	10	6"	14'-9	12	4790	4150	12.48	6780	5920	11.96
24'	16'-4	3'-8	3'-6	2'-6	10'-4	4'-8	10	14"	11'-9	10	14"	19'-0	6	14"	12'-0	30	23'-9	7	12"	12'-0	8	11	7"	15'-9	12	5070	4390	12.93	7190	6270	12.37
25'	17'-0	4'-0	3'-8	2'-9	10'-7	4'-10	10	12"	13'-0	9	12"	19'-3	6	12"	12'-9	32	24'-9	7	12"	12'-6	8	11	6"	16'-6	12	5350	4630	13.38	7590	6620	12.79
26'	17'-6	4'-4	3'-10	3'-0	10'-8	5'-0	10	12"	13'-9	9	12"	20'-3	6	12"	13'-0	34	25'-9	7	12"	13'-0	9	11	6"	17'-0	13	5670	4910	13.59	8060	7030	12.96
27'	18'-0	4'-8	4'-0	3'-3	10'-9	5'-2	10	12"	15'-0	9	12"	21'-3	6	12"	13'-3	34	26'-9	7	12"	13'-0	9	11	6"	17'-6	13	6000	5200	13.81	8540	7460	13.14
28'	18'-8	5'-0	4'-3	3'-6	10'-11	5'-4	10	12"	13'-9	10	12"	22'-9	6	12"	13'-6	36	27'-9	7	12"	13'-6	9	11	6"	17'-9	13	6240	5400	14.29	8890	7760	13.59
29'	19'-4	5'-4	4'-6	3'-9	11'-1	5'-6	10	12"	14'-9	10	12"	24'-0	6	12"	13'-9	38	28'-9	7	12"	14'-0	10	11	6"	17'-9	13	6490	5610	14.77	9250	8060	14.03
30'	20'-0	5'-8	4'-9	4'-0	11'-3	5'-8	10	12"	15'-9	10	12"	25'-3	6	12"	13'-9	38	29'-9	7	12"	14'-6	10	11	6"	18'-0	13	6740	5820	15.25	9600	8360	14.48

⊕ Total number of bars in cross section. * Total number includes the sum of both faces.

QUANTITIES

CASE III			
H	Concrete C.Y./Ln.Ft.	Steel Lbs./Ln.Ft.	Steel (Horiz. Lap) Lbs./Splice
4'	.30	27	10
5'	.35	31	12
6'	.41	34	12
7'	.50	40	14
8'	.56	50	16
9'	.68	57	16
10'	.74	71	18
11'	.88	84	20
12'	.96	89	21
13'	1.13	107	24
14'	1.28	123	25
15'	1.44	140	26
16'	1.65	154	28
17'	1.81	181	29
18'	1.97	213	30
19'	2.20	229	32
20'	2.44	248	34
21'	2.69	292	34
22'	2.96	314	36
23'	3.35	320	38
24'	3.77	353	38
25'	4.25	400	39
26'	4.72	417	42
27'	5.22	432	42
28'	5.77	459	43
29'	6.35	473	45
30'	6.95	487	45

LIMIT STATE NOTES:

Qtveu-SERV = Total equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

Qnveu-SERV = Net equivalent uniform vertical bearing stress to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

B'SERV = Effective footing width to be used only for the evaluation of settlement based on the Service I Limit State as per ADOT SF-1.

Qtveu-STR = Total equivalent uniform vertical bearing stress to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

Qnveu-STR = Net equivalent uniform vertical bearing stress to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

B'STR = Effective footing width to be used only for the evaluation of bearing resistance based on the Strength I Limit State as per ADOT SF-1.

For other applicable limit states, perform project specific-analysis using the procedures in ADOT SF-1 (Spread Footing: Bearing Resistance and Settlement).

ADOT SF-1 memorandum is found on the Bridge Group website (Geotech Services LRFD Design Memorandums).

QUANTITIES NOTE:

Quantities are shown for information purposes only. The pay item is measured per square foot of wall.

Quantities are for one L.F. of wall except for horizontal steel lap splices and footing steps.

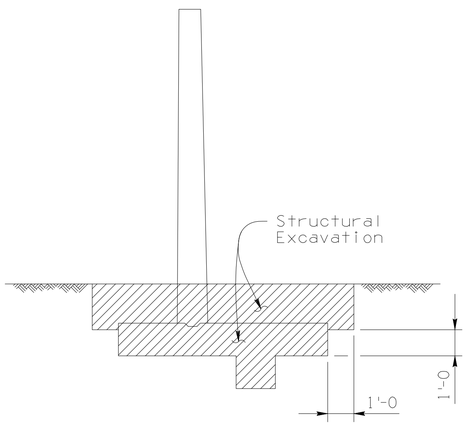
Steel quantities for horizontal lap splices shall be added for wall segments greater than 30 feet, and add a splice for each additional wall segment greater than 30 feet. Horizontal 1'-0 lap splices occur at construction or contraction joints.

Steel and concrete quantities for footing steps shall be added to those shown in the table.

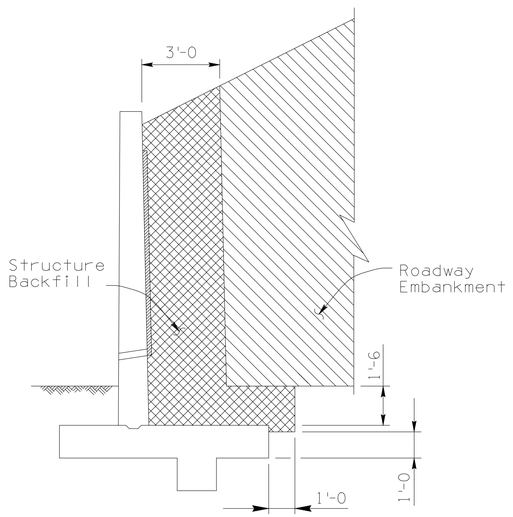
NOTES:

For General Notes, Typical Elevations, Sections and Details see SD 7.01 (1, 2, and 3).

For Structural Excavation Limits and Structure Backfill Limits, see SD 7.01 (4 of 5).



STRUCTURAL EXCAVATION LIMITS



STRUCTURE BACKFILL LIMITS

STANDARDS ENGINEER A. ALZUBI RECOMMENDED FOR APPROVAL	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION **BRIDGE GROUP STANDARD DRAWING**
GROUP MANAGER D. EBERHART APPROVED	RETAINING WALL REINFORCED CONCRETE CANTILEVER
STANDARDS COMMITTEE APPROVED FOR DISTRIBUTION 12/21 DATE	DRAWING NO. SD 7.01 (4 of 5)

60% DESIGN
COF PROJECT NO: 03-16010

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811
Call 811 or click Arizona811.com

DATE | DESCRIPTION | REVISION

WSP USA
1230 W. Washington St.
Suite 600
Tempe, AZ 85281

Preliminary Not For Construction

CITY OF FLAGSTAFF
JW POWELL EXTENSION
JW POWELL OVER RDF BRIDGE
ADOT STANDARD DETAIL

JOB NO: US0054331.0614 | BY: A. RASHEED | CHECKED: A. GALIETTI
DATE: MAY 2026

S1.24