

STATE PROJECT NUMBER			
5018-00-71			
BENCHMARKS		NAVD 88	
NO.	STA./OFFSET	DESCRIPTION	ELEV.
1	10+18.4, 6.0 RT.	CHIS + ON NE CORNER OF BRIDGE	928.71
2	10+51.6, 30.4 RT.	2 POLE NAILS IN 24" BOX ELDER	924.82
3	10+19.5, 29.4 LT.	2 POLE NAILS IN 12" BOX ELDER	925.22

**DESIGN DATA**

**LIVE LOAD:** DESIGN LOADING : HL-93  
INVENTORY RATING FACTOR : 1.18  
OPERATIONAL RATING FACTOR : 1.53  
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV) = 250 KIPS.  
STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 20 POUNDS PER SQUARE FOOT.

**TRAFFIC DATA:** A.A.D.T. (2018) = 100  
A.A.D.T. (2038) = 120  
RDS = 25 MPH

**MATERIAL PROPERTIES:**  
CONCRETE MASONRY, SLAB  $f'_c = 4,000$  P.S.I.  
ALL OTHER  $f'_c = 3,500$  P.S.I.  
HIGH-STRENGTH BAR STEEL REINFORCEMENT, GRADE 60  $f_y = 60,000$  P.S.I.

**FOUNDATION DATA:**  
ABUTMENTS TO BE SUPPORTED ON PILING STEEL HP 10-INCH X 42 LB. WITH PILE POINTS DRIVEN TO A REQUIRED DRIVING RESISTANCE OF 140 TONS \* PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA. ESTIMATED PILE LENGTHS ARE 20'-0" AT BOTH ABUTMENT BODIES. ESTIMATED PILE LENGTHS ARE 20'-0" AT ALL WINGS.

\* THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.5 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.

**HYDRAULIC DATA:**  
**100 YEAR FREQUENCY**  
DRAINAGE AREA 24.9 SQ. MI.  
Q100 - TOTAL 5,200 C.F.S.  
- THRU BRIDGE 1,489 C.F.S.  
- OVERTOPPING ROADWAY 3,711 C.F.S.  
VELOCITY - THRU BRIDGE 5.03 FT./SEC.  
WATERWAY AREA - THRU BRIDGE 296 SQ. FT.  
SCOUR CRITICAL CODE 8  
HIGH WATER100 ELEVATION 929.42  
Q2 ELEVATION (570 CFS) 921.23

**ROADWAY OVERFLOW DESIGN**  
OVERTOPPING FREQUENCY 15 YEARS  
Q15 2,325 C.F.S.  
HIGH WATER15 ELEVATION 927.44

CONSULTANT DESIGN CONTACT: LEAH RHODES (608) 355-8945  
BRIDGE OFFICE CONTACT: WILLIAM DREHER (608) 266-8489



- LIST OF DRAWINGS**
1. GENERAL PLAN
  2. CROSS SECTION, QUANTITIES & NOTES
  3. SUBSURFACE EXPLORATION
  4. SOUTH ABUTMENT
  5. SOUTH ABUTMENT DETAILS
  6. NORTH ABUTMENT
  7. NORTH ABUTMENT DETAILS
  8. SUPERSTRUCTURE
  9. RAILING TUBULAR TYPE M

NO.	DATE	REVISION	BY
<b>MSA</b> TRANSPORTATION • MUNICIPAL DEVELOPMENT • ENVIRONMENTAL 1230 South Boulevard Baraboo, WI 53913 608-356-2771 1-800-362-4505 Fax: 608-356-2770			
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION ACCEPTED <i>William C. Dreher</i> <b>05/12/17</b> CHIEF STRUCTURES DESIGN ENGINEER DATE			
<b>STRUCTURE B-41-313</b>			
OPAL ROAD OVER BRUSH CREEK			
COUNTY	MONROE	TOWN/CITY/VILLAGE	SHELDON
DESIGN SPEC.	AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS		
DESIGNED BY	JAS	DESIGN CK'D.	LJR
DRAWN BY	RLR	PLANS CK'D.	JAS
<b>GENERAL PLAN</b>			SHEET 1 OF 9

ELEVATIONS SHOWN ON THIS PLAN ARE REFERENCED TO USGS NAVD 88 (2012 ADJUSTED). BENCHMARK REFERENCES AT THE PROJECT SITE WERE SET BY THE CONSULTANT USING GPS TECHNOLOGY.

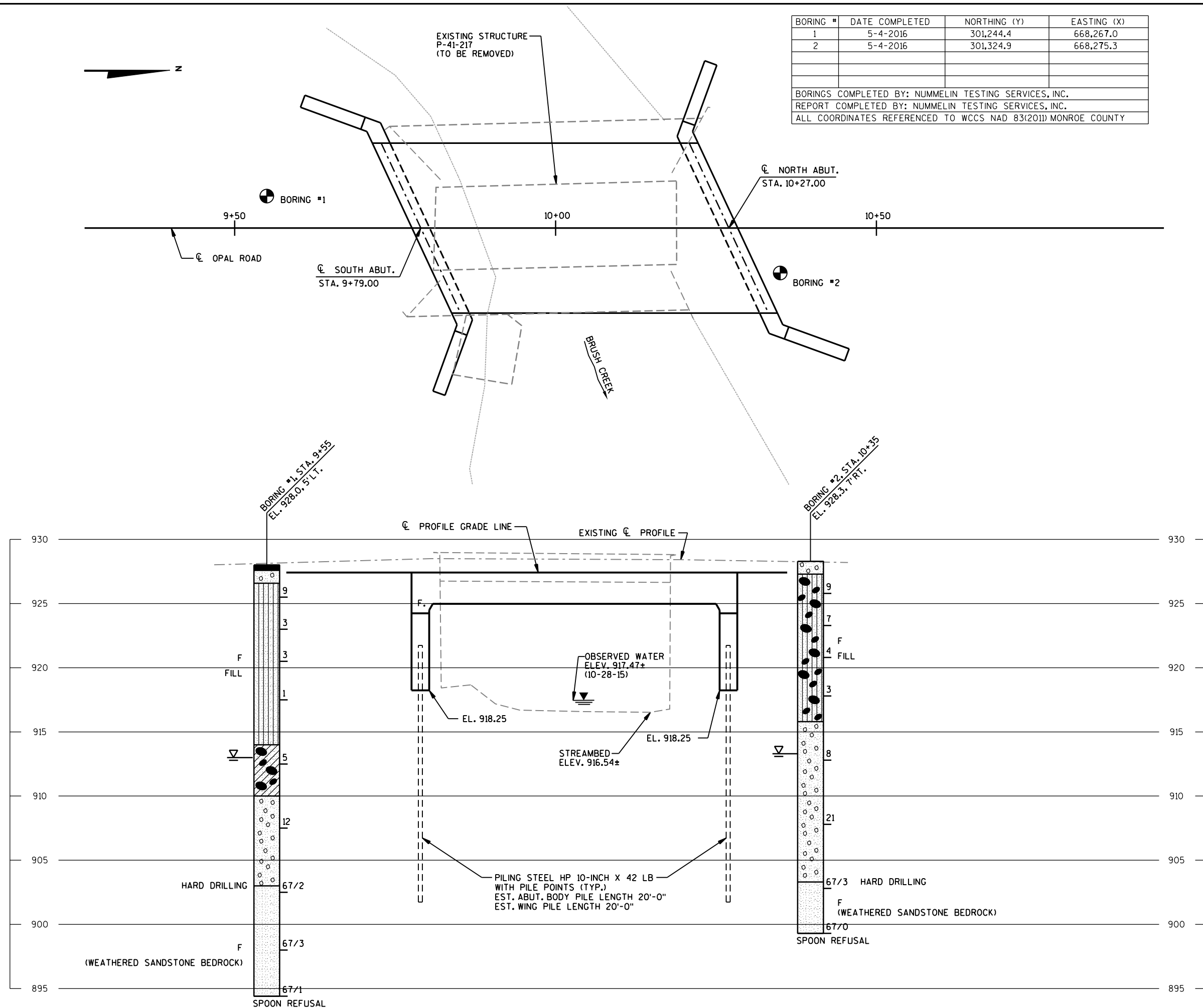


ITEM NUMBER	BID ITEM	UNIT	SOUTH ABUT.	NORTH ABUT.	SUPER	TOTAL
203.0600.S.01	REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STATION 10+00	LS	-	-	-	1
206.1000.01	EXCAVATION FOR STRUCTURES BRIDGES B-41-313	LS	-	-	-	1
210.1500	BACKFILL STRUCTURE TYPE A	TON	190	190	-	380
502.0100	CONCRETE MASONRY BRIDGES	CY	35	35	113	183
502.3200	PROTECTIVE SURFACE TREATMENT	SY	22	22	185	229
505.0400	BAR STEEL REINFORCEMENT HS STRUCTURES	LB	2290	2290	-	4580
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB	1735	1735	19500	22970
513.4061.01	RAILING TUBULAR TYPE M B-41-313	LF	-	-	105	105
516.0500	RUBBERIZED MEMBRANE WATERPROOFING	SY	6.5	6.5	-	13
550.0500	PILE POINTS	EACH	7	7	-	14
550.1100	PILING STEEL HP 10-INCH X 42 LB	LF	140	140	-	280
606.0300	RIPRAP HEAVY	CY	100	120	-	220
612.0406	PIPE UNDERDRAIN WRAPPED 6-INCH	LF	95	95	-	190
645.0111	GEOTEXTILE TYPE DF SCHEDULE A	SY	50	50	-	100
645.0120	GEOTEXTILE TYPE HR	SY	180	225	-	405
SPV.0105.01	TEMPORARY WATER DIVERSION, UNNAMED TRIBUTARY TO BRUSH CREEK	LS	-	-	-	1
	<b>NON-BID ITEMS</b>					
	PREFORMED FILLER	SIZE				½" & ¾"



STRUCTURE BACKFILL DETAIL

NO.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION			
STRUCTURE		B-41-313	
DRAWN BY		RLR	PLANS CK'D. JAS
CROSS SECTION, QUANTITIES & NOTES		SHEET 2 OF 9	


















BORING #	DATE COMPLETED	NORTHING (Y)	EASTING (X)
1	5-4-2016	301,244.4	668,267.0
2	5-4-2016	301,324.9	668,275.3
BORINGS COMPLETED BY: NUMMELIN TESTING SERVICES, INC.			
REPORT COMPLETED BY: NUMMELIN TESTING SERVICES, INC.			
ALL COORDINATES REFERENCED TO WCCS NAD 83(2011) MONROE COUNTY			

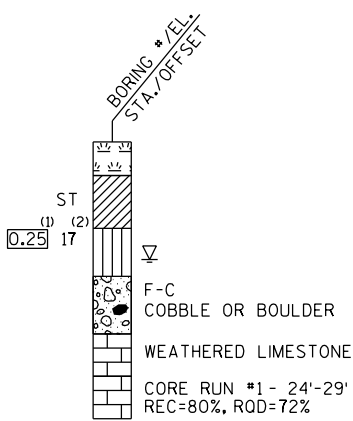
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## MATERIAL SYMBOLS

	ASPHALT		TOPSOIL		PEAT
	CONCRETE		FILL		GRAVEL
	SAND		CLAY		SILT
	BOULDERS OR COBBLES		LIMESTONE		BEDROCK (UNKNOWN)
	SHALE		SANDSTONE		IGNEOUS/ META




### LEGEND OF BORING



(1) UNCONFINED STRENGTH, AS DETERMINED BY A POCKET PENETROMETER (TSF)

2) UNLESS OTHERWISE, SPECIFIED THE SPT 'N' VALUE IS BASED ON AASHTO T-206, STANDARD PENETRATION TEST. THE SPT 'N' VALUE PRESENTED HAS NOT BEEN CORRECTED FOR OVERBURDEN PRESSURE OR HAMMER EFFICIENCY.

## GROUND WATER ELEVATION

 AT TIME OF DRILLING  
 END OF DRILLING  
 AFTER DRILLING

## ABBREVIATIONS

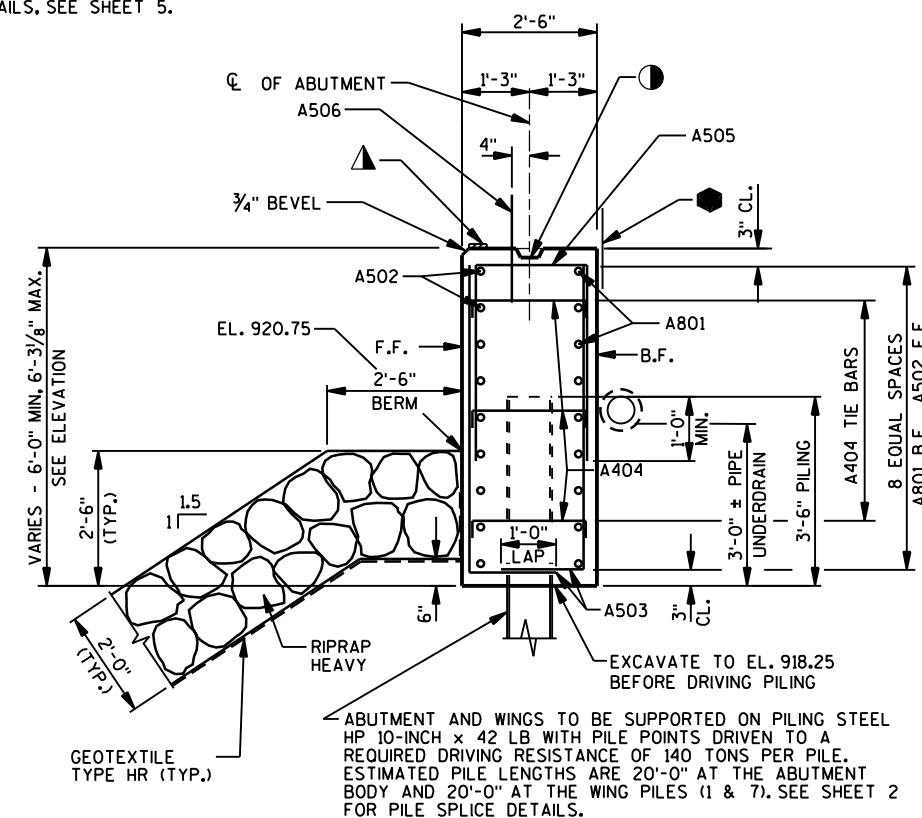
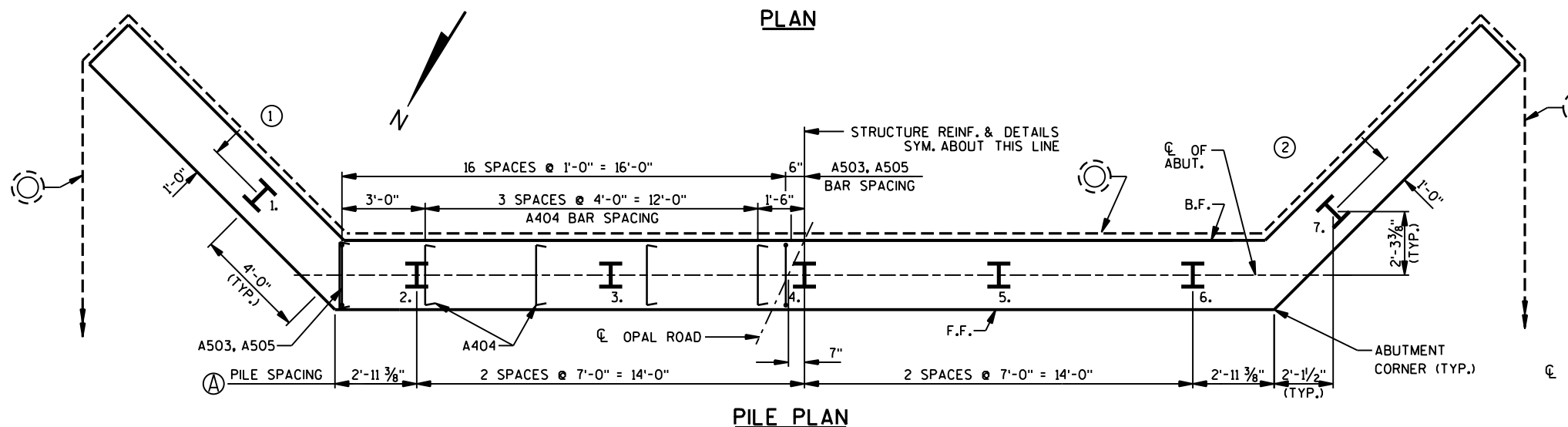
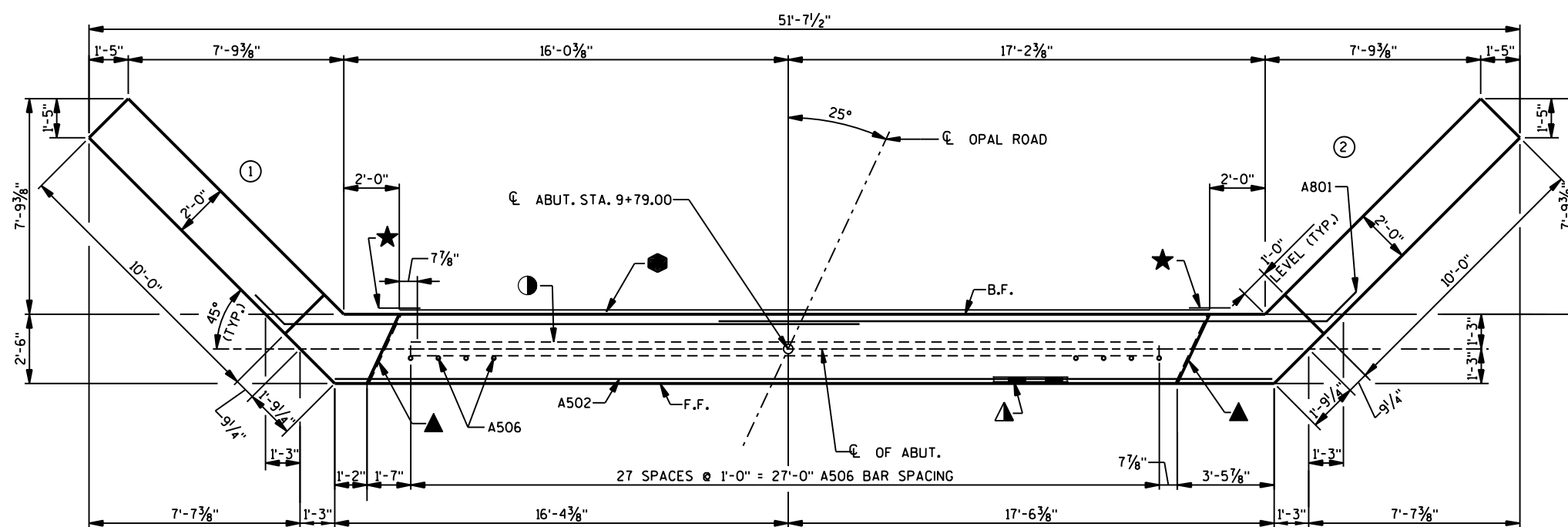
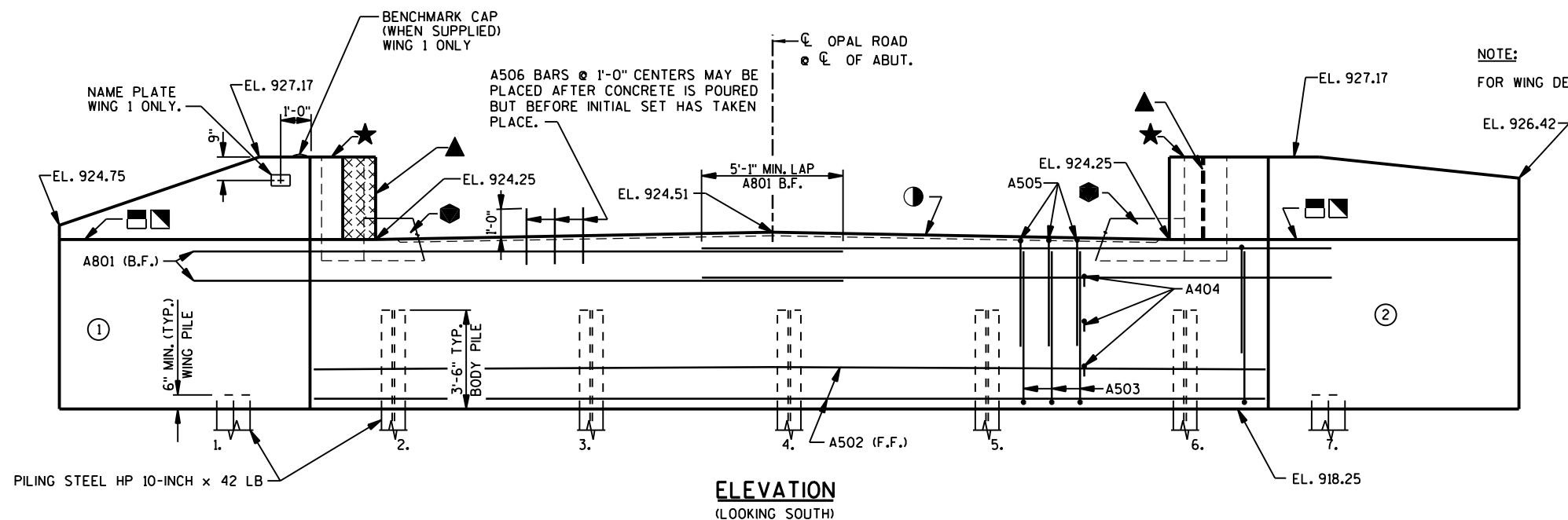
F-FINE      M-MEDIUM      C-COARSE      ST-SHELBY TUBE

## SUBSURFACE EXPLORATION FOR FOUNDATION DESIGN AND BIDDERS INFORMATION

BORINGS WERE COMPLETED AT POINTS APPROXIMATELY AS INDICATED ON THIS DRAWING TO OBTAIN INFORMATION CONCERNING THE CHARACTER OF SUBSURFACE MATERIALS FOUND AT THE SITE. BECAUSE THE INVESTIGATED DEPTHS ARE LIMITED AND THE AREA OF THE BORINGS IS VERY SMALL IN RELATION TO THE ENTIRE SITE, THE WISCONSIN DEPARTMENT OF TRANSPORTATION DOES NOT WARRANT SIMILAR SUBSURFACE CONDITIONS BELOW, BETWEEN, OR BEYOND THESE BORINGS. VARIATIONS IN SOIL CONDITIONS SHOULD BE EXPECTED AND FLUCTUATIONS IN GROUNDWATER LEVELS MAY OCCUR.

NO.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION			
STRUCTURE		B-41-313	
DRAWN BY		RLR	PLANS CK'D. JAS
SUBSURFACE EXPLORATION		SHEET 3 OF 9	

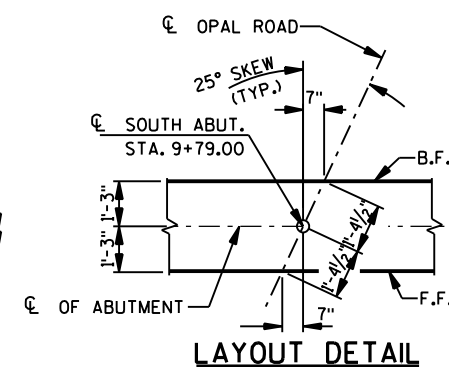




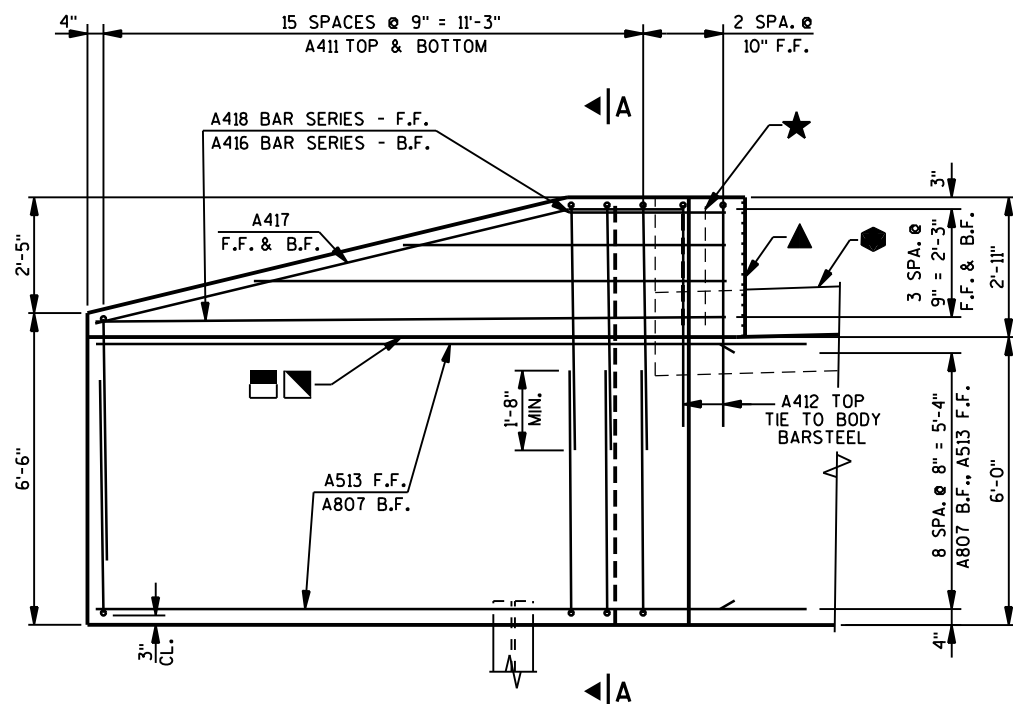
TYPICAL SECTION THRU ABUTMENT

### LEGEND

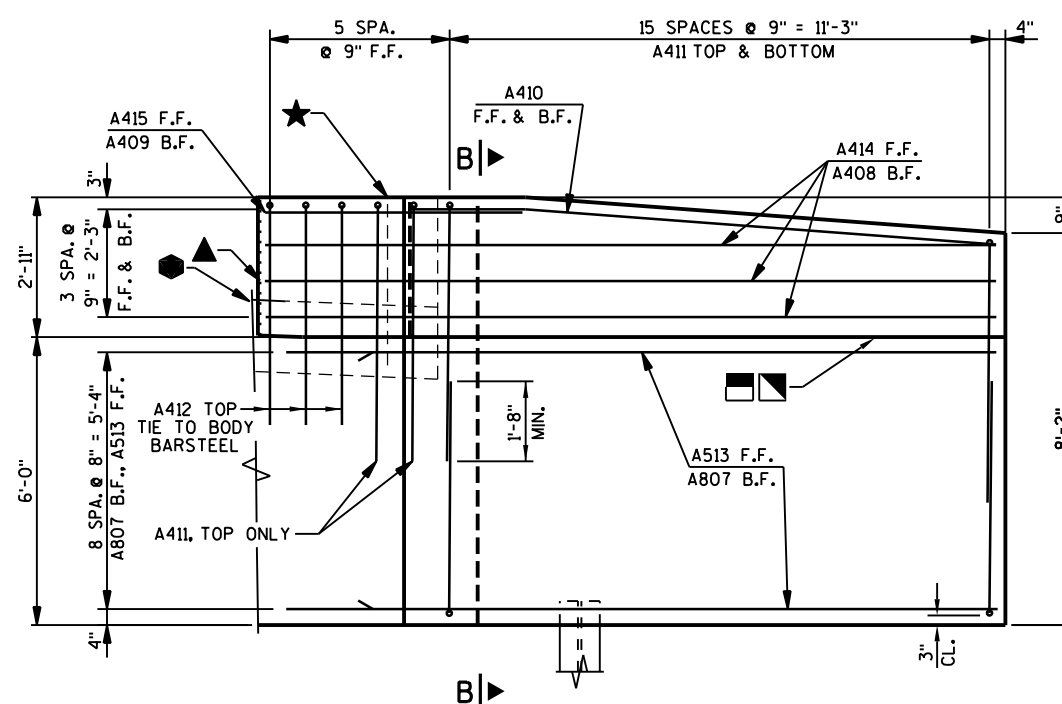
- — KEYPED CONSTRUCTION JOINT FORMED BY BEVELED 2x6.
- ▲ — 1/2" FILLER EXTEND AS SHOWN. SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP & HOLD 1/8" BELOW SURFACE OF CONCRETE).
- ▲ — 4"x 3/4" FILLER, EXTEND FULL LENGTH OF ABUTMENT BETWEEN EDGES OF SLAB.
- ★ — VERTICAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND FROM 9" BELOW BRIDGE SEAT TO TOP OF WINGS.
- ◆ — HORIZONTAL 18" WIDE RUBBERIZED MEMBRANE WATERPROOFING. EXTEND BETWEEN WINGS.
- — OPTIONAL KEYED CONST. JOINT ON WING FORMED BY BEVELED 2 X 6. IF JOINT IS USED, PLACE ◆ ON B.F. OF WING. COST OF ◆ IS INCIDENTAL TO BID ITEM "CONCRETE MASONRY BRIDGES".
- ▣ — 3/4" "V" GROOVE ON FRONT FACE OF WING WALL, REQUIRED ONLY WHERE CONSTRUCTION JOINT IS USED.
- — PIPE UNDERDRAIN WRAPPED 6-INCH. EXTEND THRU GEOTEXTILE FABRIC AT FACE OF RIPRAP HEAVY. SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. PROVIDE RODENT SHIELD AT ENDS OF PIPE. FOR RODENT DETAILS, SEE SHEET 5.
- Ⓐ — EXISTING FOUNDATION TYPE IS UNKNOWN. IF EXISTING PILING ARE PRESENT AND THEY CONFLICT WITH THE NEW PILES, ADJUST THE LOCATION OF THE NEW PILES UP TO AN 8'-0" MAXIMUM PILE SPACING. KEEP PILES 2 AND 6 BETWEEN A MINIMUM OF 2'-0" AND A MAXIMUM OF 3'-6" FROM THE ABUTMENT CORNERS.
- — INDICATES WING NUMBER      F.F. — FRONT FACE      B.F. — BACK FACE      CL. — CLEAR



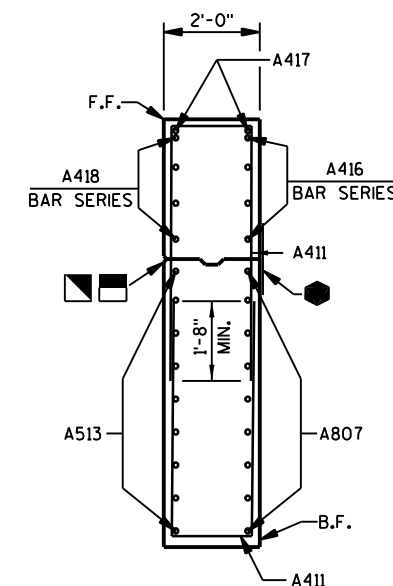
NO.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION			
STRUCTURE		B-41-313	
DRAWN BY		JDJ	PLANS CK'D. JAS
SOUTH ABUTMENT		SHEET 4 OF 9	



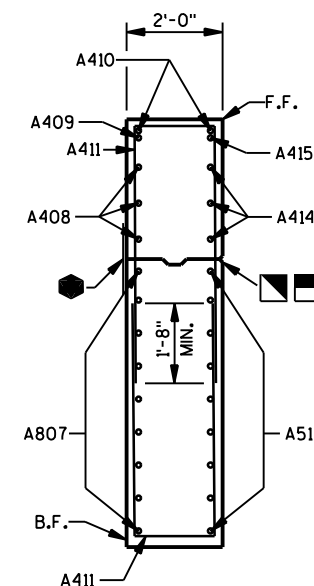
**ELEVATION - WING 1**  
(LOOKING AT F.F. OF WING)



**ELEVATION - WING 2**  
(LOOKING AT F.F. OF WING)



**SECTION A-A  
THRU WING 1**



**SECTION B-B  
THRU WING 2**

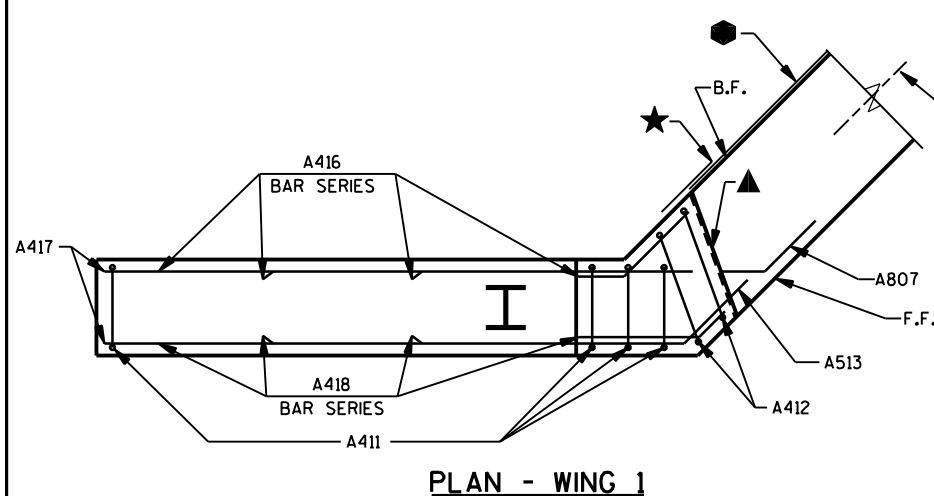
**UNCOATED 2290 LBS.  
COATED 1735 LBS.**

**BILL OF BARS (1 ABUTMENT)**

MARK	NUMBER COATED	REQUIRED UNCOATED	LENGTH	BENT	BAR SERIES	LOCATION
A801	-	18	22'-11"	X		ABUTMENT BODY - B.F. - HORIZ.
A502	-	9	33'-10"			ABUTMENT BODY - F.F. - HORIZ.
A503	-	68	7'-0"	X		ABUTMENT BODY - F.F. & B.F. - VERT.
A404	-	30	2'-9"	X		ABUTMENT BODY - TIES - HORIZ.
A505	-	34	8'-11"	X		ABUTMENT BODY - TOP - VERT.
A506	28	-	2'-0"			ABUTMENT BODY - TOP DOWELS - VERT.
A807	18	-	15'-2"	X		WINGS - B.F. - HORIZ.
A408	3	-	12'-9"	X		WING 2 - B.F. - HORIZ.
A409	1	-	4'-0"	X		WING 2 - B.F. - HORIZ.
A410	2	-	12'-3"	X		WING 2 - F.F. & B.F. - TOP - HORIZ.
A411	66	-	11'-8"	X		WINGS - TOP & BOTTOM - VERT.
A412	5	-	11'-6"	X		WINGS - TOP - VERT.
A513	18	-	13'-8"	X		WINGS - F.F. - HORIZ.
A414	3	-	15'-2"	X		WING 2 - F.F. - HORIZ.
A415	1	-	5'-4"	X		WING 2 - F.F. - HORIZ.
A416	4	-	7'-9"	X	⊙	WING 1 - B.F. - HORIZ.
A417	2	-	12'-4"	X		WING 1 - F.F. & B.F. - TOP - HORIZ.
A418	4	-	8'-3"	X	⊙	WING 1 - F.F. - HORIZ.

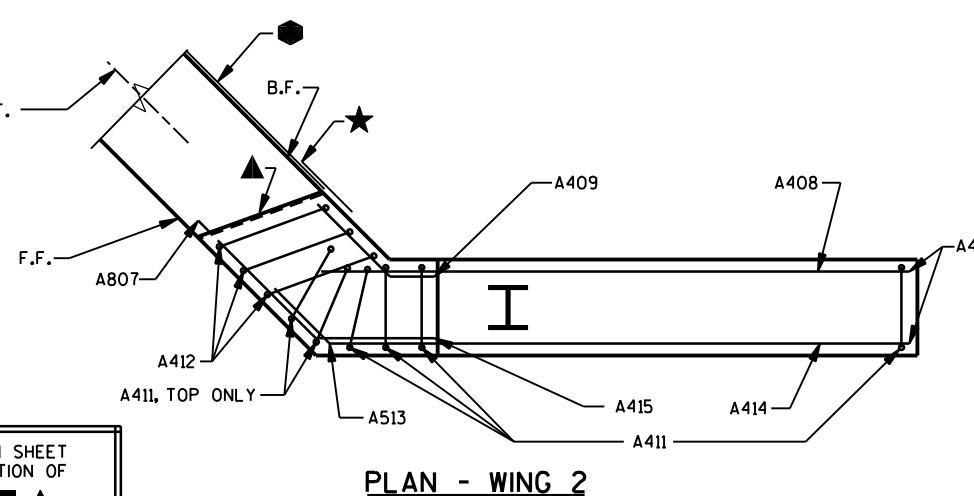
DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

⊙ - LENGTH SHOWN FOR BAR IS AN AVERAGE AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS. BENT BARS USED IN BAR SERIES TABLE SHALL BE BENT AFTER CUTTING.

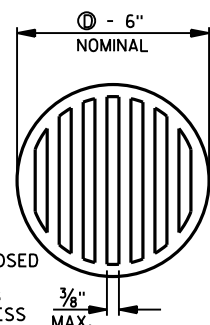


**PLAN - WING 1**

SEE LEGEND ON SHEET 4 FOR DESCRIPTION OF  
★ ● ▣ ▢ ▲

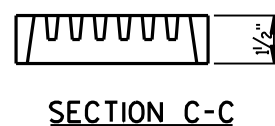


**PLAN - WING 2**



**RODENT SHIELD**

⊙ - DIMENSIONS ARE APPROXIMATE. THE GRATE IS SIZED TO FIT INTO A PIPE COUPLING.



**SECTION C-C**

MARK	A	B
A801	1'-6"	45°
A807	1'-6"	45°
A513	1'-6"	45°
A408	1'-10"	45°
A409	1'-10"	45°
A410	2'-5"	5°
A414	3'-0"	45°
A415	3'-0"	45°
A416	1'-9"	45°
A417	2'-5"	15°
A418	1'-0"	45°

**STIRRUPS AND TIES**

MARK	C	D
A404	4 1/2"	2'-2"
A505	3'-6"	2'-2"
A411	5'-1"	1'-8"
A412	4'-8"	2'-4"

BAR MARK	NO. REQ'D.	LENGTH
A416	1 SERIES OF 4	2'-10" TO 12'-8"
A418	1 SERIES OF 4	3'-4" TO 13'-2"

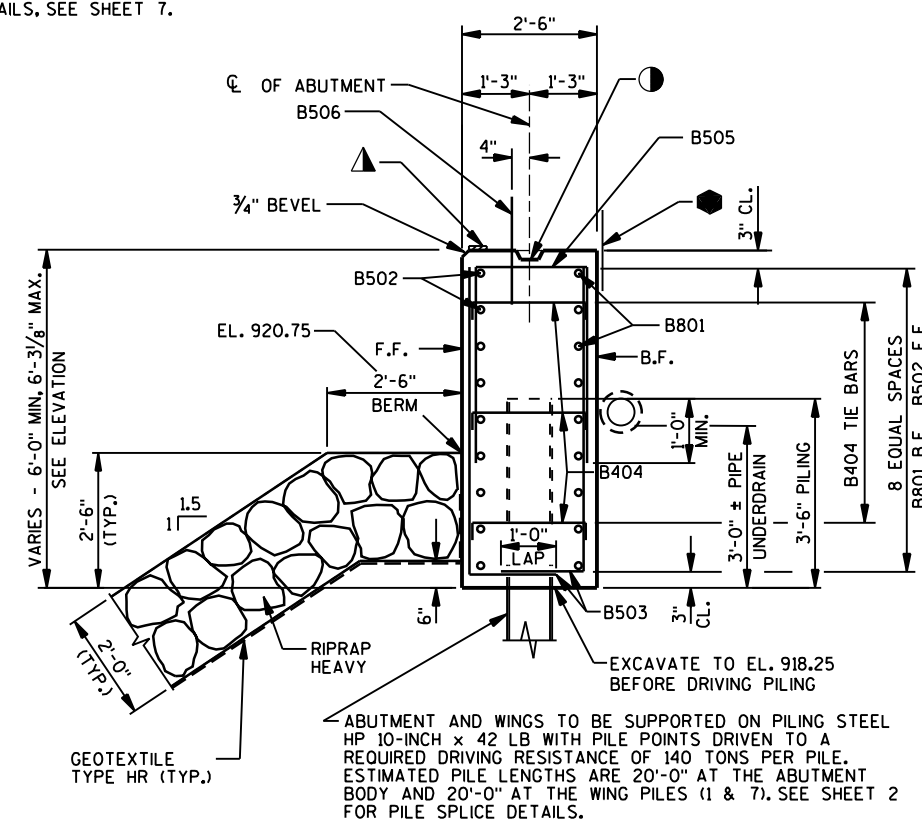
**BAR SERIES TABLE**

**RODENT SHIELD NOTES:**

ORIENT SHIELD SO SLOTS ARE VERTICAL.

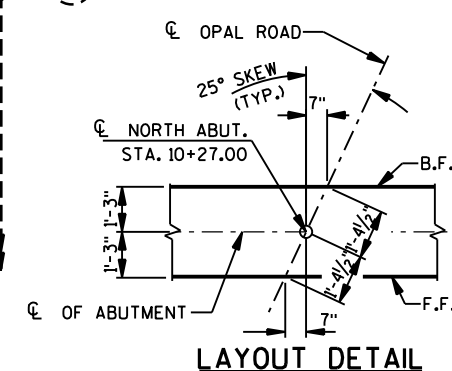
THE RODENT SHIELD SHALL BE A PVC GRATE SIMILAR TO THIS DETAIL. THE GRATE IS COMMERCIALY AVAILABLE AS A FLOOR STRAINER.

A PIPE COUPLING IS REQUIRED FOR THE ATTACHMENT OF THIS SHIELD TO THE EXPOSED END OF THE PIPE UNDERDRAIN. THE SHIELD SHALL BE FASTENED TO THE PIPE COUPLING WITH TWO OR MORE NO. 10 x 1-INCH STAINLESS STEEL SHEET METAL SCREWS. THE RODENT SHIELD, PIPE COUPLING AND SCREWS, SHALL BE INCLUDED IN THE BID ITEM "PIPE UNDERDRAIN WRAPPED 6-INCH".

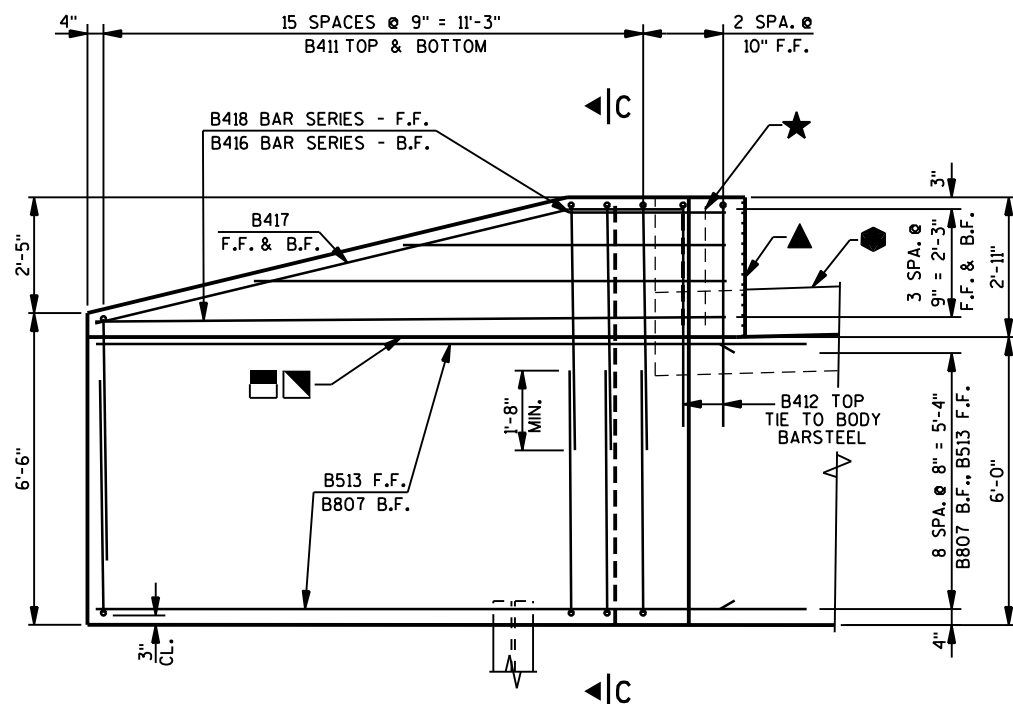


### LEGEND

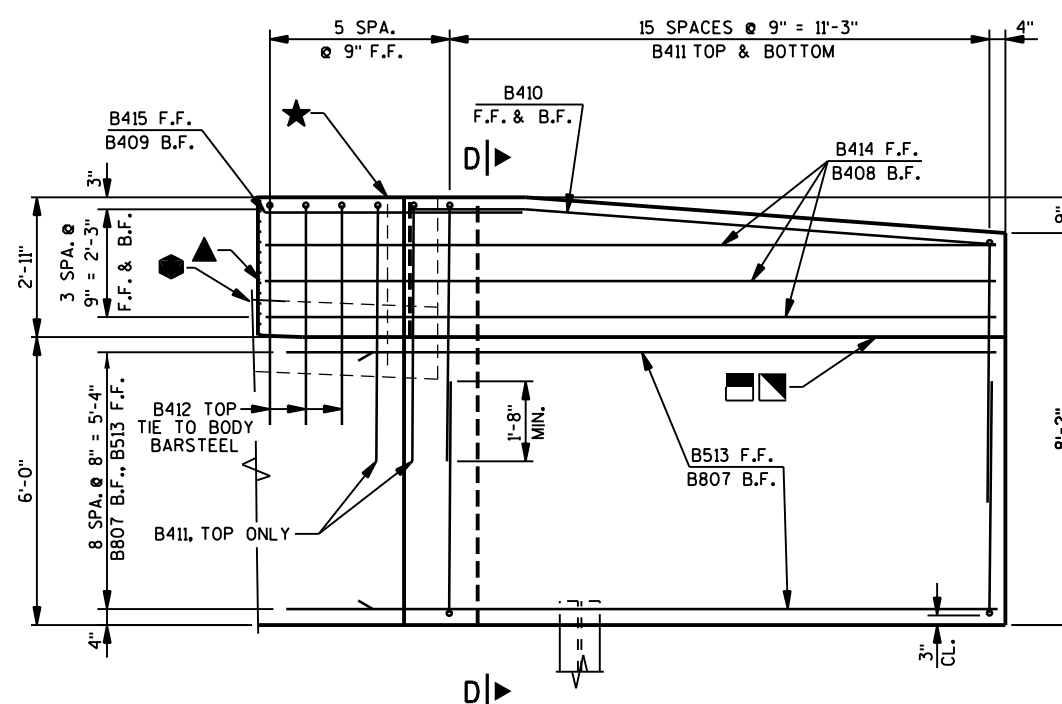
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- ▲ — 1/2" FILLER EXTEND AS SHOWN. SEAL ALL EXPOSED HORIZ. & VERT. SURFACES OF FILLER WITH NON-STAINING GRAY, NON-BITUMINOUS JOINT SEALER. (1" DEEP & HOLD 1/8" BELOW SURFACE OF CONCRETE).
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- — INDICATES WING NUMBER      F.F.— FRONT FACE      B.F.—BACK FACE      CL.—CLEAR



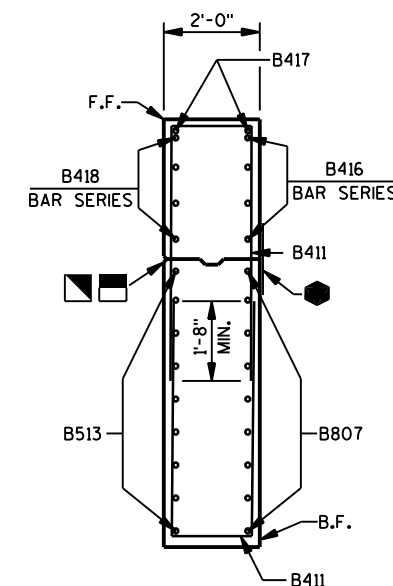
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STRUCTURE		B-41-313	
		DRAWN BY JDJ	PLANS CK'D. JAS
NORTH ABUTMENT		SHEET 6 OF 9	



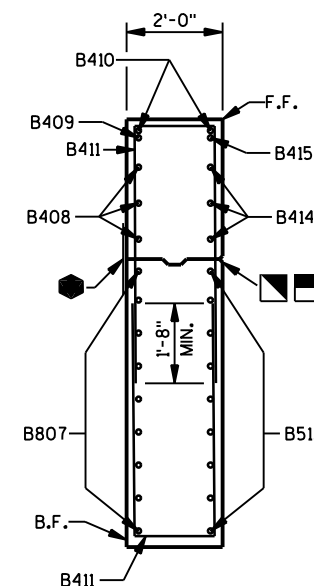
**ELEVATION - WING 3**  
(LOOKING AT F.F. OF WING)



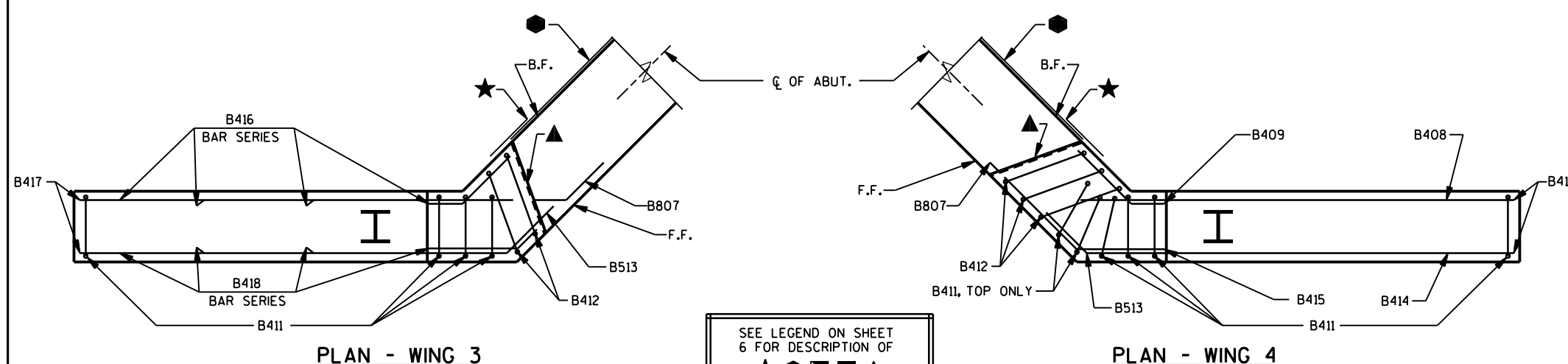
**ELEVATION - WING 4**  
(LOOKING AT F.F. OF WING)



**SECTION C-C  
THRU WING 3**



**SECTION D-D  
THRU WING 4**



**PLAN - WING 3**

**PLAN - WING 4**

SEE LEGEND ON SHEET  
6 FOR DESCRIPTION OF



**UNCOATED 2290 LBS.**  
**COATED 1735 LBS.**

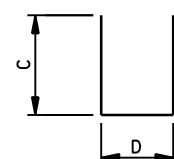
**BILL OF BARS (1 ABUTMENT)**

MARK	NUMBER REQUIRED COATED UNCOATED	LENGTH	BENT	BAR SERIES	LOCATION
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B502	- 9	33'-10"			ABUTMENT BODY - F.F. - HORIZ.
B503	- 68	7'-0"	X		ABUTMENT BODY - F.F. & B.F. - VERT.
B404	- 30	2'-9"	X		ABUTMENT BODY - TIES - HORIZ.
B505	- 34	8'-11"	X		ABUTMENT BODY - TOP - VERT.
B506	28 -	2'-0"			ABUTMENT BODY - TOP DOWELS - VERT.
B807	18 -	15'-2"	X		WINGS - B.F. - HORIZ.
B408	3 -	12'-9"	X		WING 4 - B.F. - HORIZ.
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B410	2 -	12'-3"	X		WING 4 - F.F. & B.F. - TOP - HORIZ.
B411	66 -	11'-8"	X		WINGS - TOP & BOTTOM - VERT.
B412	5 -	11'-6"	X		WINGS - TOP - VERT.
B513	18 -	13'-8"	X		WINGS - F.F. - HORIZ.
B414	3 -	15'-2"	X		WING 4 - F.F. - HORIZ.
B415	1 -	5'-4"	X		WING 4 - F.F. - HORIZ.
B416	4 -	7'-9"	X	Ⓢ	WING 3 - B.F. - HORIZ.
B417	2 -	12'-4"	X		WING 3 - F.F. & B.F. - TOP - HORIZ.
B418	4 -	8'-3"	X	Ⓢ	WING 3 - F.F. - HORIZ.

DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.

Ⓢ - LENGTH SHOWN FOR BAR IS AN AVERAGE AND SHOULD ONLY BE USED FOR BAR WEIGHT CALCULATIONS. SEE BAR SERIES TABLE FOR ACTUAL LENGTHS. BENT BARS USED IN BAR SERIES TABLE SHALL BE BENT AFTER CUTTING.

MARK	A	B
B801 B807 B513	1'-6"	45°
B408 B409	1'-10"	45°
B410	2'-5"	5°
B414 B415	3'-0"	45°
B416	1'-9"	45°
B417	2'-5"	15°
B418	1'-0"	45°



**STIRRUPS AND TIES**

MARK	C	D
B404	4 1/2"	2'-2"
B505	3'-6"	2'-2"
B411	5'-1"	1'-8"
B412	4'-8"	2'-4"

BAR MARK	NO. REQ'D.	LENGTH
B416	1 SERIES OF 4	2'-10" TO 12'-8"
B418	1 SERIES OF 4	3'-4" TO 13'-2"

**BAR SERIES TABLE**

**B503**

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<b>STRUCTURE B-41-313</b>			
DRAWN BY RLR		PLANS CK'D. JAS	
<b>NORTH ABUTMENT DETAILS</b>		SHEET 7 OF 9	

## GENERAL NOTES

ALL SLAB THICKNESS DIMENSIONS ARE MINIMUM. ANY TOLERANCES NECESSARY TO CORRECT CONSTRUCTION DISCREPANCIES ARE TO BE PLUS (+).

TOP TRANSVERSE BARS IN SLAB SHALL BE SUPPORTED BY INDIVIDUAL BAR CHAIRS AT APPROXIMATELY 3'-0" CENTERS EACH WAY. BOTTOM LONGITUDINAL BARS SHALL BE SUPPORTED BY CONTINUOUS BAR CHAIRS AT APPROXIMATELY 4'-0" CENTERS.

ALL TRANSVERSE BAR STEEL REINFORCEMENT SHALL BE PLACED ON THE SKEW.

## BILL OF BARS (COATED) 19,500 LBS.

MARK	NO. REQ'D.	LENGTH	BENT	LOCATION
S501	54	7'-9"	X	DIAPHRAGM @ ABUTS. - LONGIT.
S1102	27	50'-4"		SLAB BOTTOM - LONGIT.
S1103	26	38'-5"		SLAB BOTTOM - LONGIT.
S504	132	28'-10"		SLAB TOP & BOTTOM - TRANS.
S405	72	26'-5"		SLAB TOP - LONGIT.
S606	36	12'-0"	X	SLAB TOP @ RAIL POST, 2 PER POST
S607	56	6'-0"		SLAB TOP @ RAIL POST, 4 PER POST
S608	16	6'-0"	X	SLAB TOP @ RAIL END POST AS NOTED

DIMENSIONS IN BENDING DETAILS ARE OUT TO OUT OF BAR.  
EPOXY COAT ALL SUPERSTRUCTURE BAR STEEL REINFORCEMENT.

## CAMBER DIAGRAM

CAMBER SPANS AS SHOWN ABOVE AND IN THE TABLE OF VALUES TO PROVIDE FOR DEAD LOAD DEFLECTION AND FUTURE CREEP. CAMBER DOES NOT INCLUDE ALLOWANCE FOR FORM SETTLEMENT. DEAD LOAD DEFLECTION APPROXIMATES 1/3 OF CAMBER VALUES SHOWN.

TO DETERMINE FALSEWORK ELEVATION AT EDGE OF SLAB, CROWN OR REFERENCE LINE, FOLLOW THIS PROCEDURE:

- TOP OF SLAB ELEVATION AT FINAL GRADE
- SLAB THICKNESS
- + CAMBER
- + FORM SETTLEMENT/DEFLECTION DUE TO PLACEMENT OF SLAB CONCRETE (TO BE COMPUTED BY THE CONTRACTOR)
- = TOP OF SLAB FALSEWORK ELEVATION

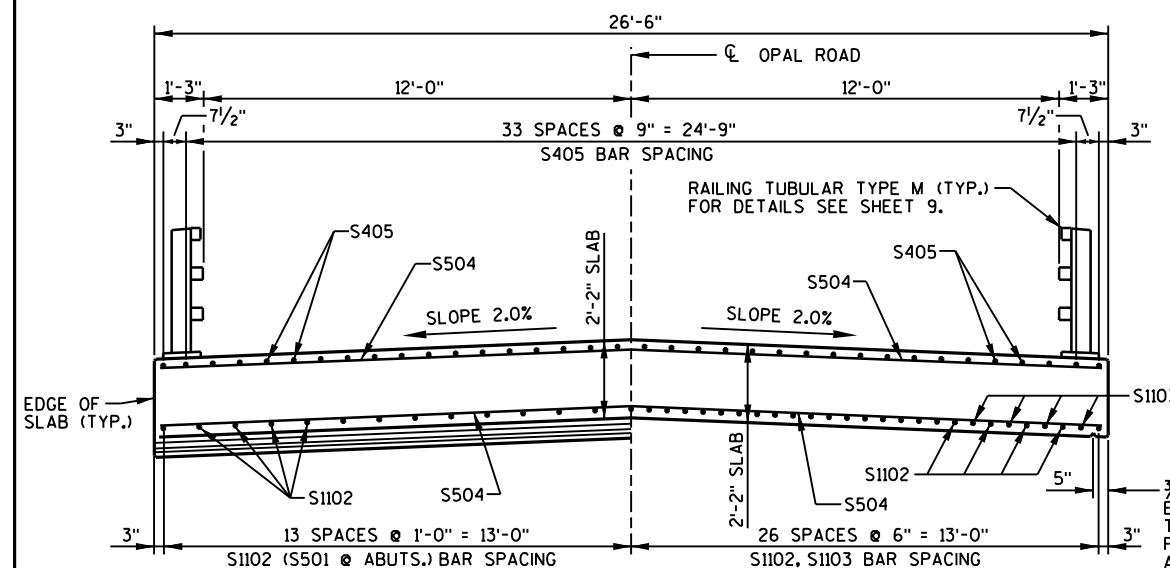
## SURVEY TOP OF SLAB ELEVATIONS

LOCATION	SPAN POINT	WEST SLAB EDGE	C/L OPAL ROAD	EAST SLAB EDGE
SOUTH ABUT.	1.0	927.22	927.42	927.18
	1.5	927.41	927.62	927.36
NORTH ABUT.	2.0	927.18	927.39	927.11

PRIOR TO RELEASING SLAB FALSEWORK, TAKE TOP OF SLAB ELEVATIONS AT THE C/L OF ABUTMENTS AND AT THE 0.5 PTS. TO VERIFY CAMBER. TAKE ELEVATIONS ALONG EDGE OF SLAB AND CROWN OR C/L. RECORD THE ELEVATIONS IN THE ABOVE TABLE FOR THE "AS BUILT" PLANS.

## TOP OF SLAB ELEVATIONS AND CAMBER VALUES

LOCATION	SPAN POINT	EAST SLAB EDGE	C/L OPAL ROAD	WEST SLAB EDGE	CAMBER VALUE (INCHES)
SOUTH ABUT.	1.0	927.17	927.43	927.17	0.0
	1.1	927.17	927.43	927.17	0.6
	1.2	927.17	927.43	927.17	1.1
	1.3	927.17	927.43	927.17	1.5
	1.4	927.17	927.43	927.17	1.8
	1.5	927.17	927.43	927.17	1.9
	1.6	927.17	927.43	927.17	1.8
	1.7	927.17	927.43	927.17	1.5
	1.8	927.17	927.43	927.17	1.1
	1.9	927.17	927.43	927.17	0.6
NORTH ABUT.	2.0	927.17	927.43	927.17	0.0

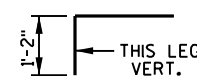


## AT ABUTMENTS

## IN SPAN

## CROSS SECTION THRU BRIDGE

(LOOKING NORTH)

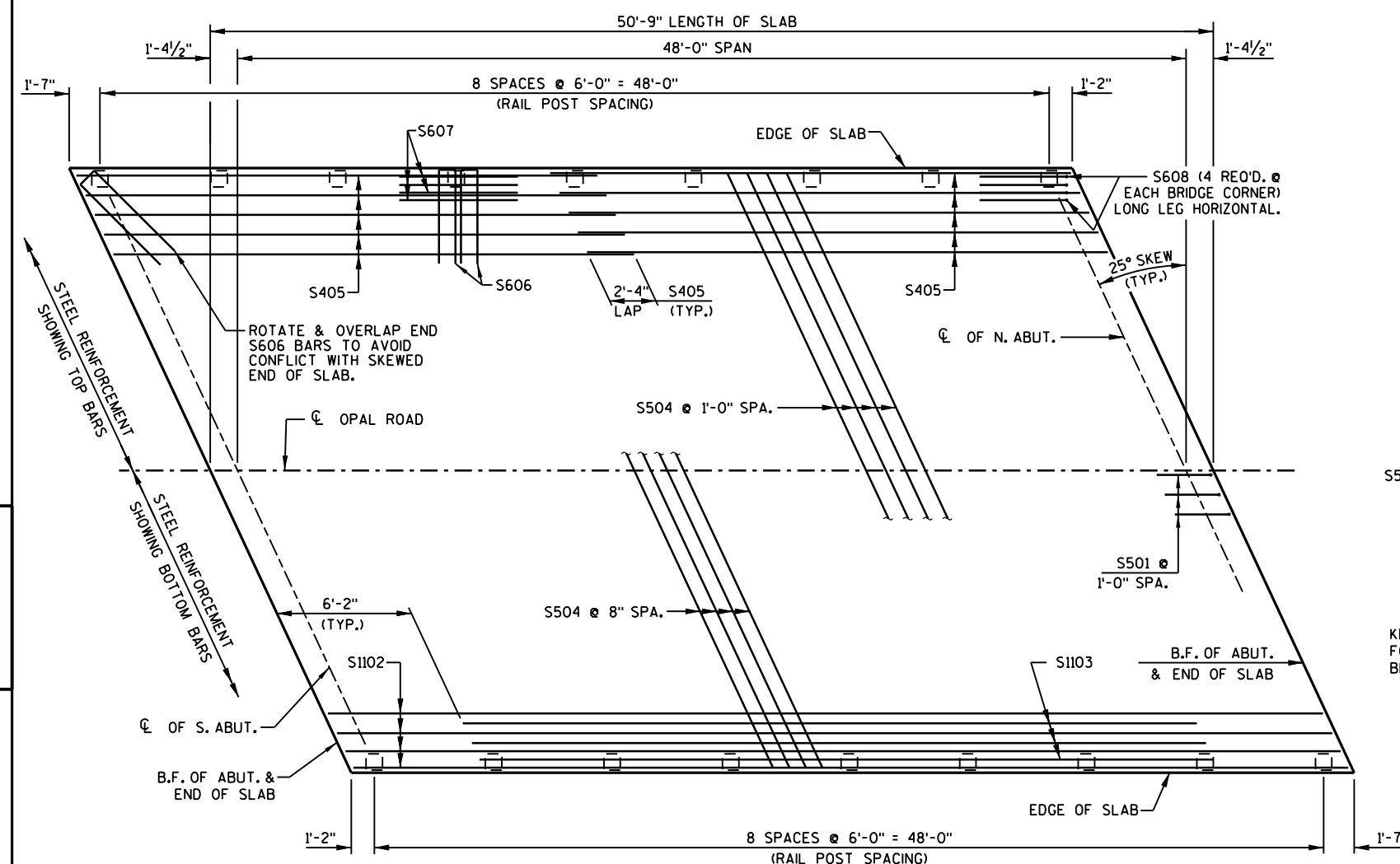


S608

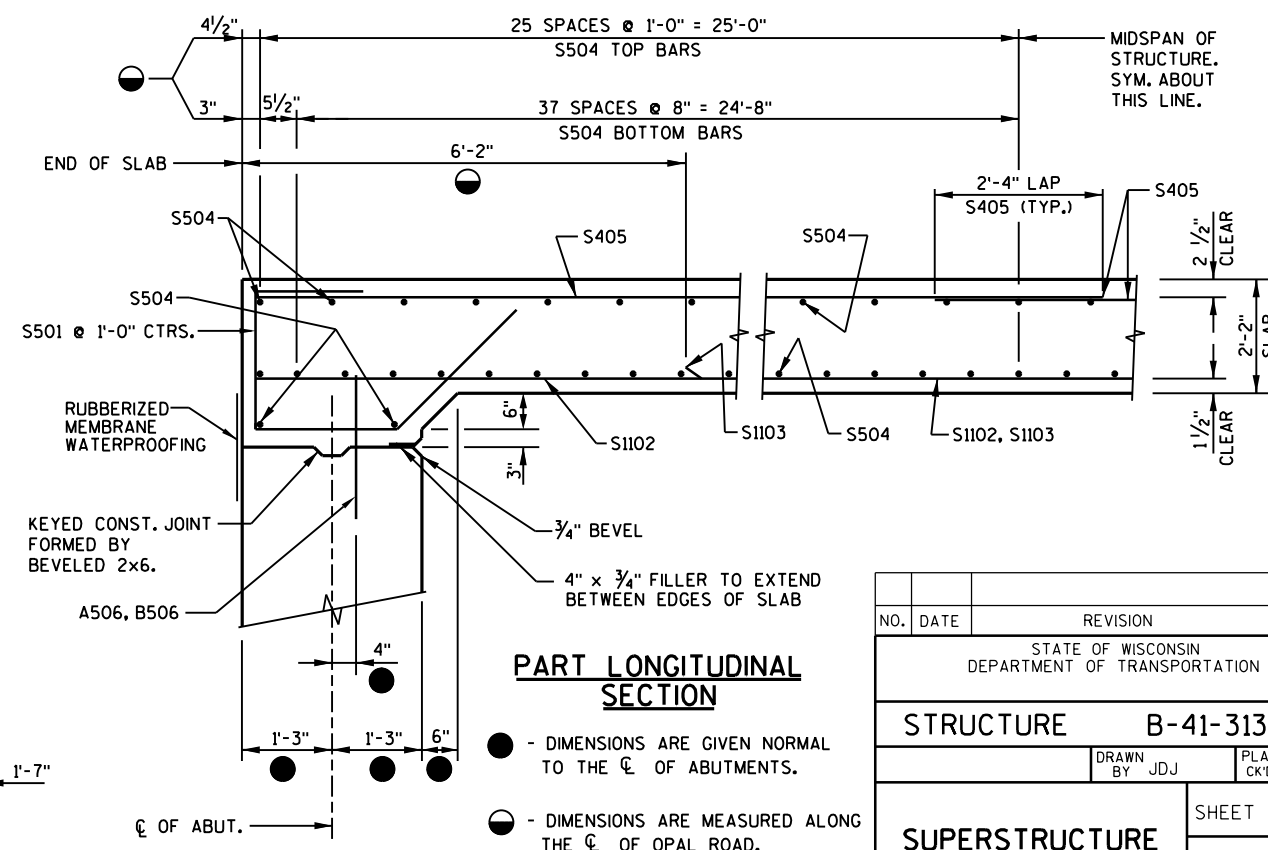


S501

S606



## PLAN



## PART LONGITUDINAL SECTION

● - DIMENSIONS ARE GIVEN NORMAL TO THE C/L OF ABUTMENTS.

● - DIMENSIONS ARE MEASURED ALONG THE C/L OF OPAL ROAD.

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NOTE: CONNECTIONS AT LOWER RAILS SHOWN.  
CONNECTIONS AT TOP RAIL SIMILAR.

### TYPICAL RAIL TO POST CONNECTIONS



- ① 6" x 25" WITH  $1/8"$  x  $1/2"$  HORIZ. SLOTS ON EACH SIDE OF POST FOR BOLT NO. 6. CUT BOTTOM OF POST TO MATCH CROSS SLOPE OF ROADWAY. PLACE POST VERTICAL. PLACE POSTS NORMAL TO GRADE LINE.
- ② PLATE  $1/4"$  x  $11 3/4"$  x  $1'-8"$  WITH  $1 5/8"$  x  $1 5/8"$  SLOTTED HOLES FOR ANCHOR BOLTS NO. 3. WELD TO NO. 1 AS SHOWN. SLOTS PARALLEL TO SHORT SIDE OF PLATE.
- ③ ASTM A449 -  $1/8"$  DIA. ANCHOR BOLTS WITH NUT AND HARDENED WASHER (ALL GALVANIZED). 5 REQ'D. PER POST. THREAD 3" AND PLACE NORMAL TO PLATE NO. 2. CHAMFER TOP OF BOLTS BEFORE THREADING. USE 1'-3" LONG.
- ④  $5/8"$  x  $11"$  x  $1'-8"$  ANCHOR PLATE (GALVANIZED) WITH  $1 5/8"$  DIA. HOLES FOR ANCHOR BOLTS NO. 3
- ⑤ TS 5 x 4 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑤A TS 5 x 5 x 0.25 STRUCTURAL TUBING. ATTACH TO NO. 1 WITH NO. 6.
- ⑥  $7/8"$  DIA. A325 SLOTTED ROUND HEAD BOLT WITH NUT,  $3/16"$  x  $1 5/8"$  x  $1 5/8"$  WASHER, AND LOCK WASHER (2 REQ'D. AT EACH RAIL TO POST LOCATION.)
- \* ⑦  $7/8"$  THK. BACK-UP PLATE WITH 2 -  $7/8"$  x  $1 1/2"$  THREADED SHOP WELDED STUDS (NO. 12). BOLT TO RAIL AS SHOWN IN DETAIL. REQUIRED AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYMMETRICALLY ABOUT TUBES NO. 5A.
- \* ⑧ 1" DIA. HOLES IN PLATE NO. 7 & TUBES NO. 5A FOR  $7/8"$  DIA. A325 BOLTS WITH HEX NUTS AND WASHERS. 6 HOLES IN TUBES AND PLATE NO. 7.
- ⑨ SPLICE SLEEVE FABRICATED FROM  $1/4"$  PLATE. PROVIDE "SLIDING FIT".
- ⑩  $3/8"$  x  $3 5/8"$  x  $2'-4"$  PLATE. 2 PER RAIL. USED IN NO. 5 & 5A.
- ⑩A  $3/8"$  x  $2 5/8"$  x  $2'-4"$  PLATE USED IN NO. 5.  $3/8"$  x  $3 5/8"$  x  $2'-4"$  PLATE USED IN NO. 5A. 2 PER RAIL.
- ⑪  $7/8"$   $\phi$  A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER. USE  $1 5/8"$  x  $1 1/4"$  LONGIT. SLOTTED HOLES AT FIELD JOINTS IN PLATE NO. 10A.
- \* ⑫  $7/8"$  DIA. x  $1 1/2"$  LONG THREADED SHOP WELDED STUDS (2 REQ'D).
- \* ⑬  $3/8"$  x 8" x 1'-6" ANCHOR PLATE. BOLT TO RAIL AS SHOWN IN DETAIL. REQ'D. AT THREE BEAM GUARD RAIL ATTACHMENTS ONLY. PLACE SYM. ABOUT TUBES NO. 5A.
- \* ⑭  $7/8"$  DIA. x 2" LONG A325 HEX BOLT WITH NUT AND WASHER (5 REQUIRED).
- \* ⑮ 1"  $\phi$  HOLES IN TUBES NO. 5A FOR  $7/8"$  DIA. A325 ROUND HEAD BOLT WITH NUT, WASHER, AND LOCK WASHER (4 REQ'D.). 4 HOLES IN TUBES.

1. BID ITEM SHALL BE "RAILING TUBULAR TYPE M B-41-313" WHICH INCLUDES ALL ITEMS SHOWN.
2. RAIL POST AND BASE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 50. HOLLOW RAILING STRUCTURAL TUBING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C WITH A CERTIFIED FY = 50 KSI, ANCHOR PLATES, AND SPLICE TUBE PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A709 GRADE 36.
3. THE NUT SECURING THE POST BASE PLATE TO THE CONCRETE SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL  $\frac{1}{8}$  TURN.
4. RAILS SHALL BE CONTINUOUS OVER A MINIMUM OF THREE (3) POSTS WITHOUT SPLICES WHERE POSSIBLE.
5. ENDS OF TUBE SECTIONS SHALL BE SAWED, GRIND SMOOTH EXPOSED EDGES. ALL CUT ENDS SHALL BE TRUE AND SMOOTH.
6. WELD IS THE SAME ON BOTH FLANGES. FLANGE WELD DOES NOT REQUIRE MAGNETIC PARTICLE TESTING.
7. FILL BOLT SLOT OPENINGS IN POST SHIMS AND PLATE NO. 2 AND CAULK AROUND PERIMETER OF PLATE NO. 2 WITH NON-STAINING GRAY NON-BITUMINOUS JOINT SEALER. STEEL POST SHIMS MAY BE USED UNDER POSTS WHERE REQ'D. FOR ALIGNMENT.
8. POST BASE PLATES SHALL BE FLAT WITH ALL SURFACES SMOOTH AND FREE FROM WARP AND ALL EDGES SMOOTH, STRAIGHT AND VERTICAL. ALL PLATE CUTS SHALL BE MACHINE OR MACHINE FLAME CUT.
9. ALL MATERIAL SHALL BE GALVANIZED AFTER FABRICATION, PRIOR TO GALVANIZING, ALL STEEL RAILING POSTS & STEEL TUBING SHALL BE GIVEN A NO. 6 BLAST CLEANING BY S.S.P.C. SPECIFICATIONS.
10. PAINTING IS NOT REQUIRED.
11. THIS RAILING MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TEST LEVEL 4 (TL-4).
- \* 12. DO NOT FURNISH ITEMS 7, 8, 12, 13, 14 AND 15. THRIE BEAM RAIL ATTACHMENT IS NOT INCLUDED.

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RAILING TUBULAR TYPE M		SHEET 9 OF 9	