

# MINNESOTA DEPARTMENT OF TRANSPORTATION ROCK COUNTY

CONSTRUCTION PLAN FOR BRIDGE NO. 67564 AND APPROACH GRADING  
LOCATED 0.1 MILES SOUTH OF JCT. C.S.A.H. 4 ON C.R. 55 OVER MINNESOTA SOUTHERN RAILWAY,  
3.8 MILES EAST OF LUVERNE, MN. (Geographical Description)

SEC. 9 TWP. 102 N R 44 W (Legal Description)

STATE PROJ. NO. 067-598-010

GROSS LENGTH 1085.00 FEET 0.205 MILES  
BRIDGES-LENGTH 82.50 FEET 0.016 MILES  
EXCEPTIONS-LENGTH \_\_\_\_\_ FEET \_\_\_\_\_ MILES  
NET. LENGTH 1085.00 FEET 0.205 MILES

**GOVERNING SPECIFICATIONS**  
THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

**LIST OF SHEETS**

NO.	TITLE
1	TITLE SHEET
2	GENERAL PLAN & ELEVATION
3	TYPICAL SECTION & QUANTITIES
4	BRIDGE LAYOUT
5	GENERAL ABUTMENT NOTES
6-12	ABUTMENT
13-14	PRESTRESSED CONCRETE BEAM SUPERSTRUCTURE
15-17	CONCRETE BARRIER TYPE SPECIAL STABILIZED AGGREGATE SLOPE PAVING UNDER BRIDGE
18	MISC. BRIDGE DETAILS
19	GUARDRAIL DETAILS
20	BRIDGE SURVEY
21-24	BRIDGE SURVEY ~ PLAN & PROFILE
25	ESTIMATE AND TYPICAL SECTIONS
26	CROSS SECTIONS
G1	
G2-G5	

THIS PLAN CONTAINS 31 SHEETS.

**DESIGN DESIGNATION FOR:**

FUNCTIONAL CLASSIFICATION	C.R. 55
NO. OF TRAFFIC LANES	RURAL/MINOR COLLECTOR
NO. OF PARKING LANES	2
DRIVING LANE WIDTH	0
SHOULDER WIDTH	11'
ADT (CURRENT YEAR) 2012	3
ADT (PROJECTED YEAR) 2032	135
PAVEMENT DESIGN	149
ESALS (20)	
R=VALUE	
SOIL FACTOR	
DESIGN SPEED	30 MPH
BASED ON SIGHT DISTANCE	200'
HEIGHT OF EYE / HEIGHT OF OBJECT	3.5' / 2.0'
DESIGN SPEED NOT ACHIEVED AT:	N/A

DESIGN ENGINEER: *John Sowada* JOHN SOWADA  
HEREBY CERTIFY THAT THIS PLAN (SHEETS 1-26) WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE 8-9-2012 LICENSE NUMBER 45936

APPROVED: *Mark K. Jella* DATE 8/9/12  
COUNTY ENGINEER

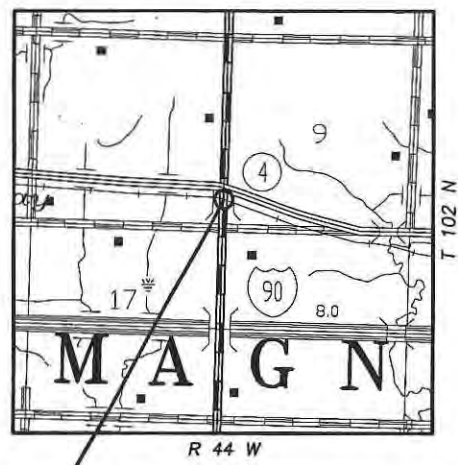
RECOMMENDED FOR APPROVAL: *Quill Erik* DATE 8/13/12  
STATE BRIDGE ENGINEER

DISTRICT STATE AID ENGINEER: *Dan Kubiak* DATE 8/9/2012  
REVIEWED FOR COMPLIANCE WITH STATE-AID RULES/POLICY

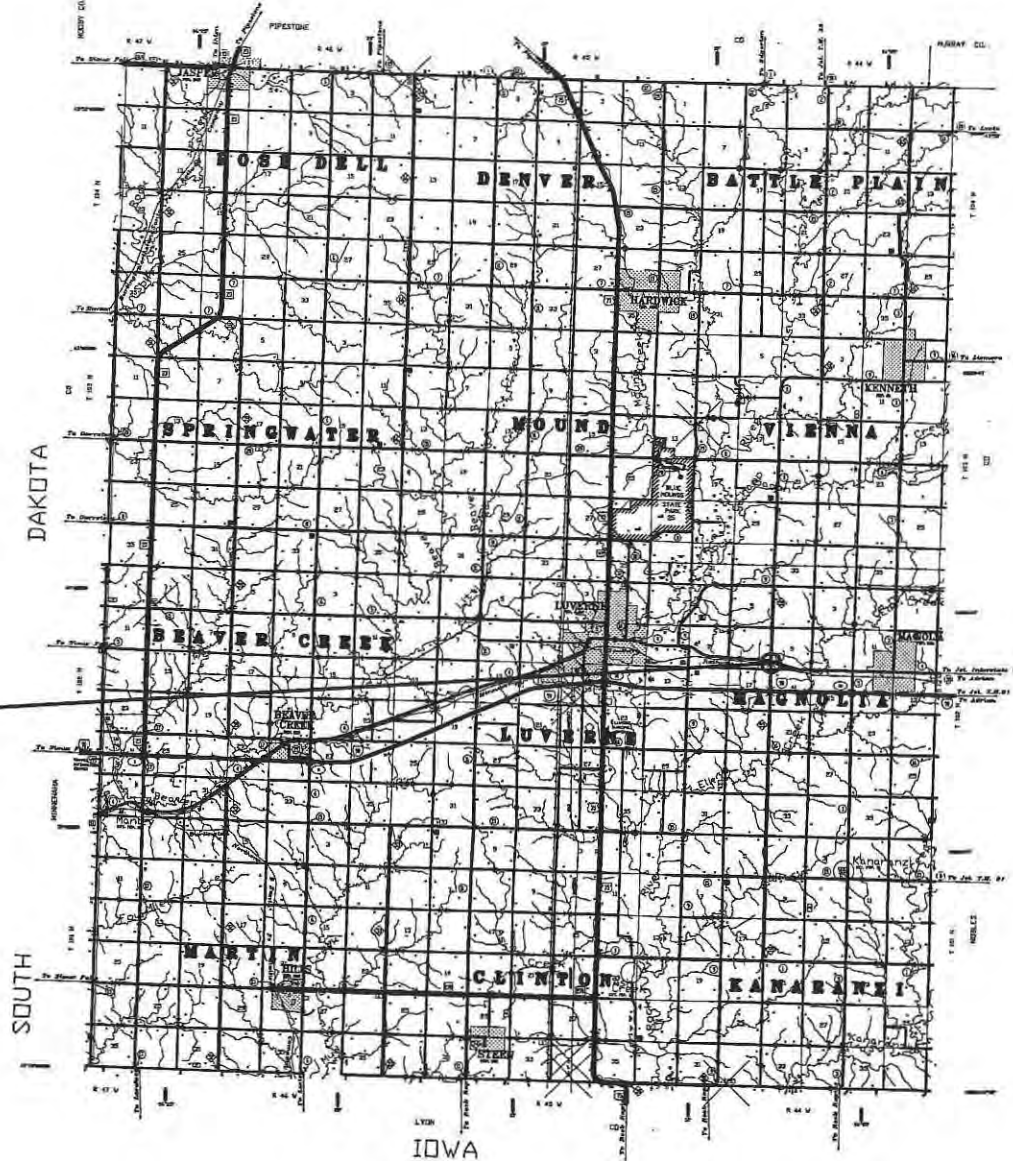
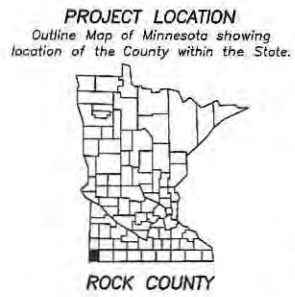
APPROVED FOR STATE & FEDERAL-AID FUNDING: STATE-AID ENGINEER DATE \_\_\_\_\_

**PLAN SYMBOLS**

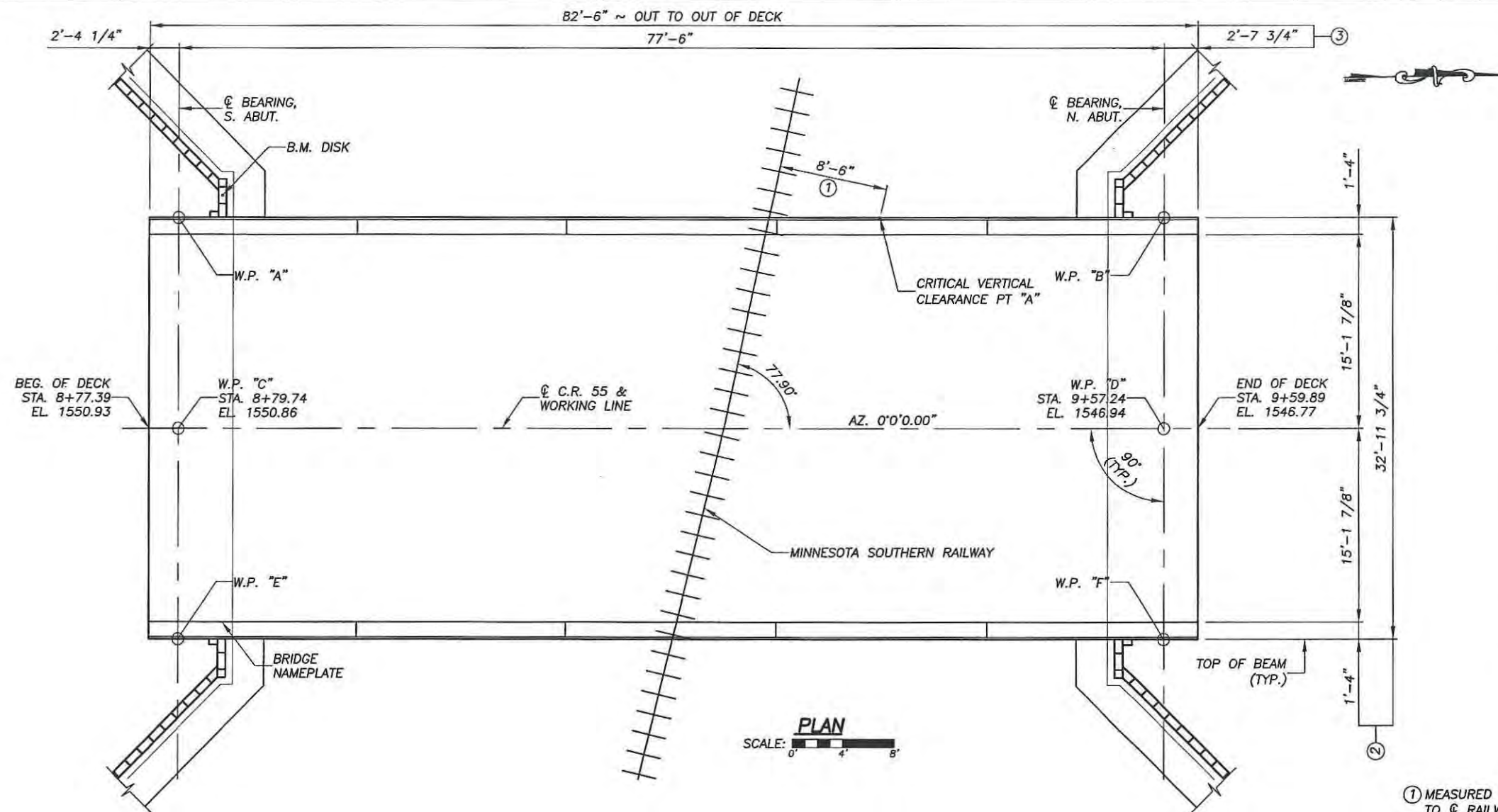
COUNTY LINE	---
TOWNSHIP OR RANGE LINE	----
SECTION LINE	-----
QUARTER LINE	-----
SIXTEENTH LINE	-----
EXISTING R/W	=====
NEW R/W	=====
TEMP EASE	-----
RAILROAD R/W	-----
UNSURFACED RD. OR SHLD.	-----
EDGE OF LAKE	-----
SWAMP BOUNDARY	-----
MISCELLANEOUS BOUNDARY	-----
CORPORATE OR CITY LIMITS	-----
VACATED PLATTED PROPERTY	-----
RECREATIONAL TRAIL	-----
ALIGNMENT STATIONS	110 --- 112
ALIGNMENT POINTS	-----
RIVER OR CREEK	-----
DRAINAGE DITCH	-----
BRIDGE	-----
RAILROAD (SINGLE TRACK)	-----
RR CROSSING PAVEMENT MARKING	-----
RR CROSSING GATE	-----
RR CROSSBUCK SIGN	-----
RR CROSSBUCK SIGN W/LIGHTS	-----
BARBED WIRE FENCE	-----
CHAIN LINK FENCE	-----
WOVEN WIRE, COMBINATION WOVEN AND BARB	-----
WOOD FENCE	-----
BILLBOARD	-----
RETAINING WALL	-----
GUARDRAIL (CABLE)	-----
GUARDRAIL (PLATE BEAM)	-----
DRAIN TILE	-----
CULVERT	-----
CULVERT WITH APRONS	-----
WOODS OR BRUSH, NURSERY	-----
DECIDUOUS TREES	-----
CONIFER (EVERGREEN) TREES	-----
HEDGE	-----
BUSH OR SHRUB	-----
STUMP	-----
SWAMP OR MARSH	-----
MONUMENT (CI,ACT,ACP,BCP,...)	-----
CONCRETE OR STONE MONUMENT	-----
IRON PIPE	-----
IRON PIN OR REBAR	-----
IRON PIN WITH BRASS DISK	-----
NAIL, PK NAIL, SPIKE, SFP, T-BAR, ...	-----
VERTICAL CONTROL	-----
HORIZONTAL CONTROL	-----
POWER POLE	-----
LIGHT POLE	-----
LIGHT AND TELEPHONE POLE	-----
LIGHT, TELEPHONE AND POWER POLE	-----
GUY POLE	-----
POLE ANCHOR	-----
TELEPHONE POLE	-----
TELEPHONE AND POWER POLE	-----
UNDERGROUND CABLE PEDESTAL	-----
TELEPHONE MANHOLE (VAULT)	-----
ELECTRIC CABLE IN CONDUIT	-----
TELEPHONE CABLE IN CONDUIT	-----
BURIED ELECTRIC CABLE	-----
BURIED TELEPHONE CABLE	-----
GAS LINE	-----
WATER LINE	-----
VALVE	-----
FIRE HYDRANT	-----
WATER MANHOLE	-----
WELL	-----
LAWN SPRINKLER HEAD	-----
MANHOLE	-----
CATCH BASIN	-----
SEPTIC TANK	-----
FORCE MAIN LIFT STA.	-----
SEWER LINE	-----
PERMANENT BARRICADE	-----
TRAFFIC SIGNAL LIGHT	-----
HAND HOLE	-----
ENTRANCE	-----
BUILDING	-----
SATELLITE DISH	-----
STEEL TOWER	-----
FLAG POLE	-----



PROP. BRIDGE NO. 67564  
S.P. 067-598-010  
BEG. PROJ. STA. 0+23.00  
END PROJ. STA. 11+08.00  
FORMER BRIDGE NO. L2170A (REMOVED)  
TIMBER BEAM SPAN  
LENGTH: 94.0'  
ROAD WIDTH: 15.0'  
YEAR BUILT: 1890



**SUBSURFACE UTILITY NOTE**  
THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."



**DESIGN DATA**

ABUTMENTS:  
2002 AND CURRENT INTERIM AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES

SUPERSTRUCTURE:  
2010 AND CURRENT INTERIM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS LOAD AND RESISTANCE FACTOR DESIGN METHOD HL-93 LIVE LOAD  
DEAD LOAD INCLUDES 20 POUND PER SQUARE FOOT ALLOWANCE FOR FUTURE WEARING COURSE MODIFICATIONS

MATERIAL DESIGN PROPERTIES:  
**REINFORCED CONCRETE**      **PRESTRESSED CONCRETE**  
 $f'_c = 4 \text{ KSI}$      $n = 8$        $f'_c = 8.5 \text{ KSI}$      $n = 1$   
 $F_y = 60 \text{ KSI REINFORCEMENT}$      $f_{pu} = 270 \text{ KSI STRANDS}$   
**STRUCTURAL STEEL**  
 $F_y = 36 \text{ KSI SPEC. 3306}$

DECK AREA = 2,721 SQ. FT.      CURRENT ADT (2012) 135  
DESIGN SPEED = 30 MPH      PROJ. ADT (2032) 149  
HL 93 LRFR OPERATING RF = 1.84

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26	BRIDGE SURVEY ~ PLAN & PROFILE

APPROVED: *Mark A. Selus*  
ROCK COUNTY ENGINEER

DATE: 8/9/12

I HEREBY CERTIFY THAT THIS PLAN (SHEETS 1-26) WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

*John Sowada*  
JOHN SOWADA

DATE: 8-9-2012 LIC. NO. 45936

**E** ERICKSON ENGINEERING  
9330 JAMES AVENUE SOUTH  
BLOOMINGTON, MN 55431

C.R. 55      ROCK COUNTY  
MINNESOTA DEPARTMENT OF TRANSPORTATION

**BRIDGE NO. 67564**

LOCATED 0.1 MILES SOUTH OF JCT. C.S.A.H. 4 ON C.R. 55 OVER MINNESOTA SOUTHERN RAILWAY

82.5' PRESTRESSED CONCRETE BOX GIRDER SPAN  
29.65' ROADWAY ~ 0' SKEW  
SPAN IDENTIFICATION NO. 507

**GENERAL PLAN & ELEVATION**

SEC. 9      TWP. 102 N      R 44 W

TOWNSHIP: MAGNOLIA  
COUNTY: ROCK

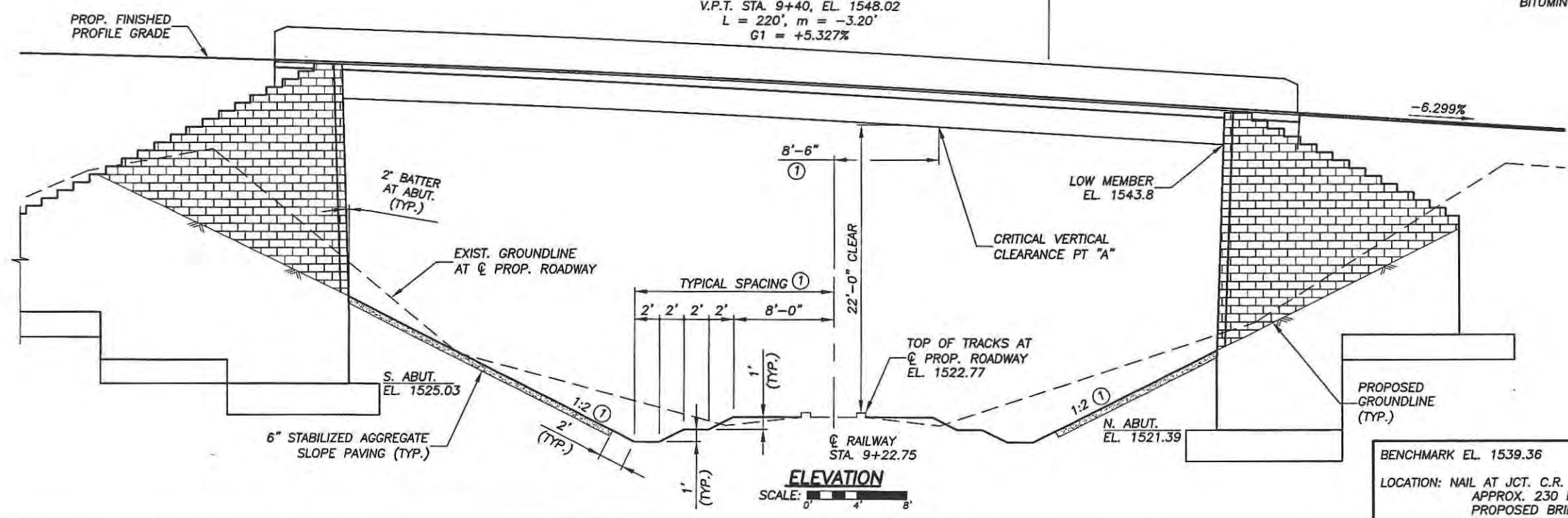
APPROVED: *David Elk*  
FOR STATE BRIDGE ENGINEER

DATE: 8/13/12

DES.: JAS	DRN.: DSP	<b>BRIDGE NO.</b> <b>67564</b>
CHK.: RLD	CHK.: JAS	
S.P. 067-598-010		
SHEET 2 OF 26 SHEETS		

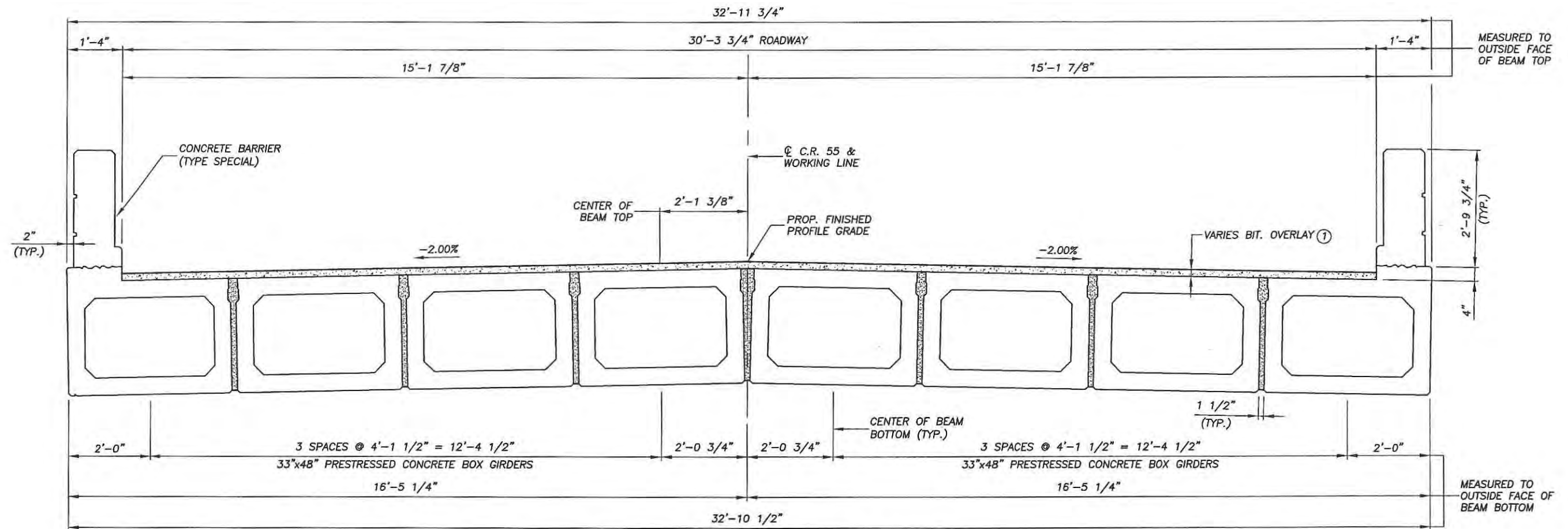
**VERTICAL CURVE**

V.P.C. STA. 7+20, EL. 1549.09  
V.P.I. STA. 8+30, EL. 1554.95  
V.P.T. STA. 9+40, EL. 1548.02  
 $L = 220'$ ,  $m = -3.20'$   
 $G1 = +5.327\%$



- ① MEASURED PERPENDICULAR TO & RAILWAY.
- ② MEASURED OUTSIDE FACE OF BEAM TOP.
- ③ MEASURED AT TOP OF BITUMINOUS.

BENCHMARK EL. 1539.36  
LOCATION: NAIL AT JCT. C.R. 55 & C.S.A.H. 4,  
APPROX. 230 FT. NORTH OF  
PROPOSED BRIDGE SITE



**TRANSVERSE SECTION THRU DECK**

SCALE: 0' 1' 2'

LIST OF STANDARD PLATES	
PLATE NO.	DESCRIPTION
8000 I	STANDARD BARRICADES
8318 C	GUARDRAIL ANCHORAGE PLATE FOR BRIDGES
8338 C	W-BEAM GUARDRAIL & END ANCHORAGES

THE ABOVE STANDARD PLATES, AS APPROVED BY THE F.H.W.A., SHALL APPLY ON THIS PROJECT.

SCHEDULE OF QUANTITIES FOR THE ENTIRE BRIDGE				
KEYNOTE	ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
	2021.501	MOBILIZATION	LUMP SUM	1
2	2105.522	SELECT GRANULAR BORROW MOD 10% (CV)	CU. YD.	3480
	2105.604	GEOSYNTHETIC REINFORCEMENT TYPE 1	SQ. YD.	15430
	2105.604	GEOSYNTHETIC REINFORCEMENT TYPE 2	SQ. YD.	2000
3	2211.503	AGGREGATE BASE (CV) CLASS 5 MODIFIED	CU. YD.	415
4	2360.503	TYPE SP 12.5 WEARING COURSE MIXTURE (2,B) 4" THICK	SQ. YD.	952
	2401.513	TYPE SPECIAL BARRIER CONCRETE (3Y46A)	LIN. FT.	165 (P)
	2401.541	REINFORCEMENT BARS (EPOXY COATED)	POUND	2890 (P)
	2401.601	SLOPE PREPARATION	LUMP SUM	1
	2401.601	STRUCTURE EXCAVATION	LUMP SUM	1
	2405.603	PRESTRESSED CONCRETE BOX BEAMS 33x48	LIN. FT.	661 (P)
1	2411.604	CONCRETE MASONRY WALL	SQ. FT.	4251
	2514.503	AGGREGATE SLOPE PAVING	SQ. YD.	160
5	2554.501	TRAFFIC BARRIER DESIGN SPECIAL	LIN. FT.	100
6	2554.501	TRAFFIC BARRIER DESIGN BB338	LIN. FT.	100
7	2554.523	END TREATMENT - TANGENT TERMINAL	EACH	4

**SCHEDULE OF QUANTITIES KEYNOTES:**

- CONCRETE MASONRY UNIT (CMU) BLOCKS
- REINFORCED BACKFILL
- REINFORCED SOIL FOUNDATION (RSF) & INTEGRATED APPROACH ZONE
- 4" AVERAGE, 2" MIN., 5 3/4" MAX.
- TYPICAL EACH CORNER OF BRIDGE.
- SOUTH CORNERS OF BRIDGE ONLY.
- 50' AT SOUTH CORNERS OF BRIDGE  
25' AT NORTH CORNERS OF BRIDGE

**CONSTRUCTION NOTES**

THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.  
 THE FIRST TWO DIGITS OF EACH BAR MARK INDICATE THE BAR SIZE IN MILLIMETERS. BARS MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH SPEC. 3301.  
 THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

① VARIES UNIFORMLY BETWEEN 2" MIN. BEGINNING & END OF DECK TO 5 3/4" MAX. @ MIDSPAN (ASSUMES 1" RESIDUAL CAMBER)

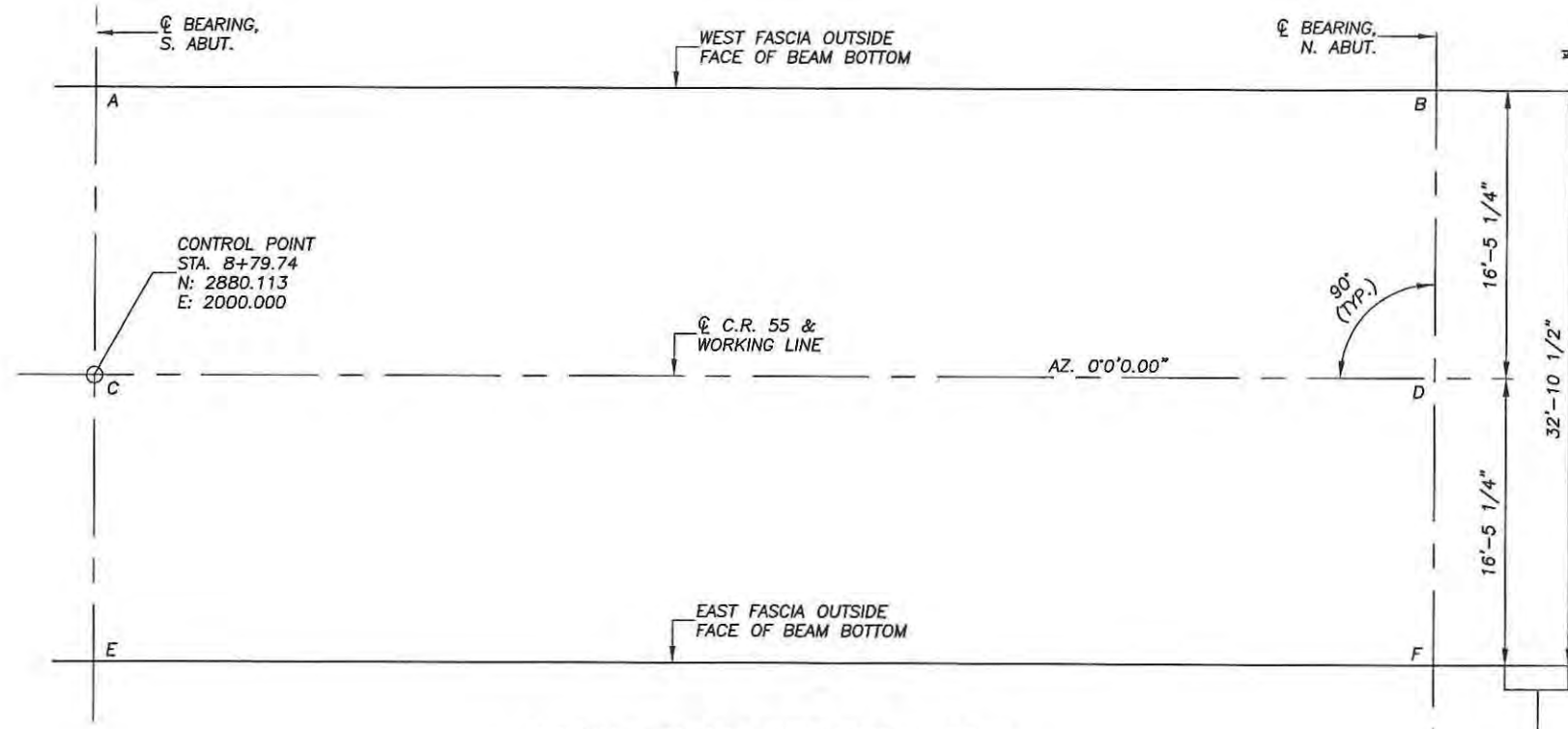
DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 8-9-2012



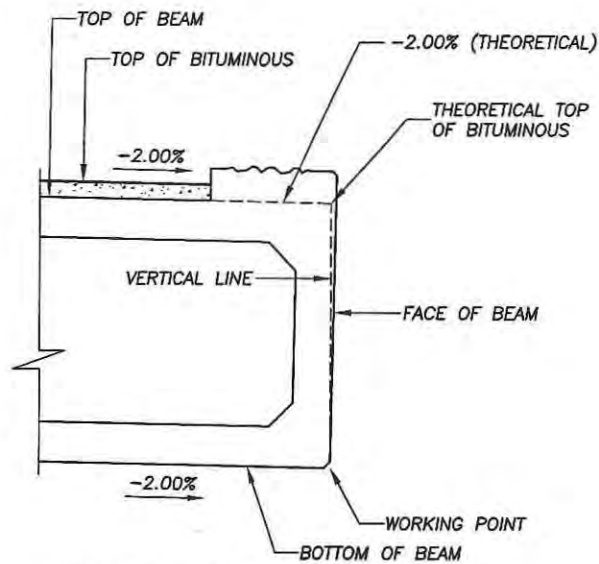
TYPICAL SECTION & QUANTITIES

S.P. 067-598-010  
 SHEET NO. 3 OF 26 SHEETS  
 BRIDGE NO. 67564



LAYOUT SHOWING WORKING POINTS

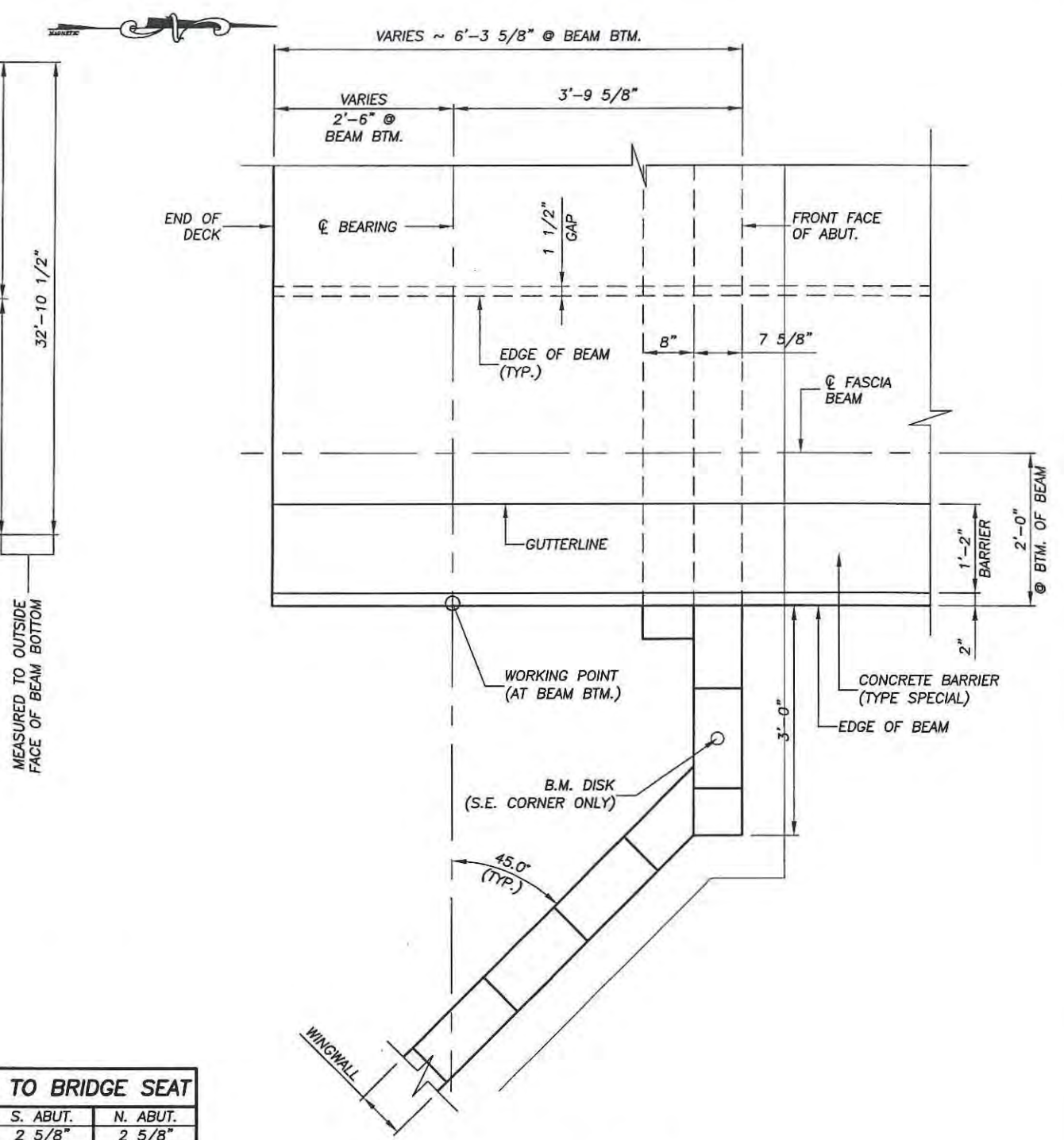
SCALE: 0' 4' 8'



WORKING POINT DETAIL

SCALE: 0' 1' 2'

① SEE WORKING POINT DETAIL FOR THEORETICAL TOP OF BITUMINOUS.



TYPICAL CORNER DETAILS

SCALE: 0' 1' 2'

TOP OF ROAD TO BRIDGE SEAT		
	S. ABUT.	N. ABUT.
BIT. THICKNESS	2 5/8"	2 5/8"
BEAM HEIGHT	2'-9"	2'-9"
TOTAL HEIGHT	2'-11 5/8"	2'-11 5/8"

WORKING POINTS				DIMENSIONS BETWEEN WORKING POINTS						ELEVATIONS			
POINT	STATION	NORTHING	EASTING	A	B	C	D	E	F	TOP OF BITUMINOUS	SLAB TO BRIDGE SEAT	BRIDGE SEAT	POINT
A	8+79.74	2880.113	1983.566		77.50	16.44	79.22		84.19	1550.53 (1)	2.97	1547.56	A
B	9+57.24	2957.613	1983.566				16.44	84.19	84.19	1546.61 (1)	2.97	1543.64	B
C	8+79.74	2880.113	2000.000				77.50	16.44	79.22	1550.86	2.97	1547.89	C
D	9+57.24	2957.613	2000.000						16.44	1546.94	2.97	1543.97	D
E	8+79.74	2880.113	2016.434						77.50	1550.53 (1)	2.97	1547.56	E
F	9+57.24	2957.613	2016.434							1546.61 (1)	2.97	1543.64	F

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

ERICKSON ENGINEERING  
WWW.ERICKSON-ENG.COM 800-545-8020

BRIDGE LAYOUT

S.P. 067-598-010

APPROVED:

BRIDGE NO. 67564

CERTIFIED BY: PROFESSIONAL ENGINEER/JOHN SOWADA  
LIC. NO. 45936 8-9-2012

SHEET NO. 4 OF 26 SHEETS

**DESIGN**

**DESIGN LOADS AND SOIL PROPERTIES**

Combined load: Superstructure (qLL + qB) 2 TSF maximum (service load, allowable stress design). Roadway live load surcharge: 260 psf uniform vertical

Road Base unit weight = 140 pcf, thickness = 33-inches

**Soil Conditions:**

Retained backfill: Unit weight = 130 pcf, friction angle = 30°, cohesion = 0 psf  
 $d_{max} \geq 0.5$ -inches  
 Foundation soil: Unit weight = 130 pcf, friction angle = 30°, cohesion = 0 psf  
 Reinforced fill: Unit weight = 110 pcf, friction angle = 38°, cohesion = 0 psf  
 RSF backfill: Unit weight = 110 pcf, friction angle = 38°, cohesion = 0 psf

**DESIGN SPECIFICATIONS**

1. Geosynthetic Reinforced Soil Integrated Bridge System Interim Implementation Guide, FHWA-HRT-11-026, January 2011.
2. Design methods follow the ASD design methods presented in Chapter 4 of the reference Manual. No seismic design assumed.
3. Design factor of safety against sliding is  $\geq 1.5$ ; Factor of safety against bearing failure is  $\geq 2.5$ .
4. Design factor of safety against global failure is  $\geq 1.5$ .
5. Performance criteria: tolerable vertical strain = 0.5% of wall height (H); tolerable lateral strain = 1.0% of b and  $a_b$  (bearing width and setback)
6. Settlement below the RSF is assumed to be less than 2". Less than a 1/2" differential settlement between abutments is assumed.
7. Sliding checks were conducted at the top and bottom of the RSF to meet the minimum factors of safety in the reference manual.
8. Road base thickness ( $h_{rb}$ ) assumes a 33-inch structure and 2 5/8-inch pavement thickness.

**CONSTRUCTION SPECIFICATIONS**

1. Site Layout/Survey: Construct the base of the GRS abutment and wingwalls within 1.0 inch of the staked elevations. Construct the external GRS abutment and wingwalls to within  $\pm 0.5$  inches of the surveyed stake dimensions.
2. Excavation: Comply with Occupational Safety and Health Administration (OSHA) for all excavations.
3. Compaction: Compact backfill to a minimum of 95 percent of the maximum dry density according to AASHTO-T-99 and  $\pm 2$  percent optimum moisture content in the bearing reinforcement zone, compact to 100 percent of the maximum dry density according to AASHTO-T-99. Only hand-operated compaction equipment is allowed within 3-feet of the wall face. Reinforcement extends directly beneath each layer of CMU blocks, covering  $\geq 85\%$  of the full width of the block to the front face of the wall.
4. Geosynthetic Reinforcement Placement: Pull the geosynthetic taught to remove any wrinkles and lay flat prior to placing and compacting the backfill material. Splices should be staggered at least 24-inches apart and splices are not allowed in the bearing reinforcement zone. No equipment is allowed directly on the geosynthetic. Place a minimum 6-inch layer of granular fill prior to operating only rubber-tired equipment over the geosynthetic at speeds less than 5 miles per hour with no sudden braking or sharp turning.
5. RSF Construction: The RSF should be encapsulated in geotextile reinforcement on all sides with minimum overlaps of 3.0 feet to prevent water infiltration. Wrapped corners need to be tight without exposed soil. Compact backfill material in lifts less than 6-inches in compacted height. Grade and level the top of the RSF prior to final encapsulation, as this will serve as the leveling pad for the CMU blocks of the GRS abutment.
6. GRS Wall Face Alignment: Check for level alignment of the CMU block row at least every other layer of the GRS abutment. Correct any alignment deviations greater than 0.25 inches.
7. Beam Seat Placement: Generally, the thickness of the beam seat is approximately 8 to 12 inches and consists of a minimum of two 4-inch lifts of wrapped-face GRS. Place precut 4-inch thick foam board on the top of the bearing bed reinforcement butt against the back face of the CMU block. Set half-height or full height (depending on wall height and required clear space) solid CMU blocks on top of the foam board. Wrap two approximately 4-inch lifts across the beam seat. Before folding the final wrap, it may be necessary to grade the surface aggregate of the beam seat slightly high, to about 0.5 inches, to aid in seating the superstructure and to maximize contact with the bearing area.

8. Superstructure Placement: The crane used for the placement of the superstructure can be positioned on the GRS abutment provided the outrigger pads are sized for less than 4,000 psf near the face of the abutment wall. Greater loads could be supported with increasing distance from the abutment face if checked by the Engineer of Record. An additional layout of geosynthetic reinforcement can be placed between the beam seat and the concrete or steel beams to provide additional protection of the beam seat. Set beams to grade without dragging across the beam seat surface.
9. Integrated Approach Placement: Following the placement of the superstructure, geotextile reinforcement layers are placed along the back of the superstructure, built in maximum lift heights of 6-inches (maximum vertical spacing of reinforcement  $\leq 6$ -inches). The top of the final wrap should be approximately 2-inches below the top of the superstructure to allow at least 2-inches of aggregate base cover over the geosynthetic to protect it from hot mix asphalt.
10. 1/4" BATTER PER 7 5/8" IS SHOWN, CONTRACTOR SHALL REVISE PLAN IF A DIFFERENT BATTER IS DESIRED, AND SHALL BE APPROVED BY THE ENGINEER.  
  
TOP OF BRIDGE SEAT WALL ELEVATIONS AND LOCATIONS SHALL NOT BE CHANGED. SETBACK BETWEEN BACK FACE OF TOP OF BRIDGE SEAT BLOCK AND FACE OF 5'-0" BEARING WIDTH SHALL BE 8".
11. PROTECT CMU BLOCK DURING PLACEMENT OF STABILIZED AGGREGATE SLOPE PAVING.
12. SEE WALL SECTIONS AND 'GRS WALL INFORMATION' TABLE FOR REQUIRED LENGTHS OF GEOSYNTHETIC REINFORCEMENT.
13. PROVIDE CORNER BLOCKS AND/OR DETAILS COMPATIBLE WITH THE SELECTED CMU BLOCK SYSTEM.
14. THE MINNESOTA DEPARTMENT OF TRANSPORTATION (MnDOT) IS INSTALLING SPECIALTY GEOTECHNICAL BRIDGE INSTRUMENTATION AND MONITORING EQUIPMENT AT THIS SITE AS PART OF A MONITORING PROGRAM. MULTIPLE SENSORS ARE TO BE INSTALLED DURING THE PROGRESS OF THE WORK AND BE ATTACHED TO, OR LOCATED AND PLACED WITHIN THE ABUTMENT EMBANKMENTS. THE SENSORS ARE TO BE FURNISHED BY MnDOT AND INSTALLED BY MnDOT (OR BY A GEOTECHNICAL CONSULTANT FOR MnDOT UNDER A SEPARATE CONTRACT). REFER TO THE CONTRACT SPECIAL PROVISIONS FOR ADDITIONAL DETAILS.
15. THE FOLLOWING WEBSITE IS AVAILABLE FOR ADDITIONAL REFERENCE INFORMATION RELATED TO CONSTRUCTION OF GEOSYNTHETIC REINFORCED SOIL WALLS:  
[www.fhwa.dot.gov/everydaycounts/technology/grs\\_ibs](http://www.fhwa.dot.gov/everydaycounts/technology/grs_ibs)

**REINFORCING STEEL**

Provide reinforcing steel in accordance with SPEC. 3301.

**CMU BLOCK**

In colder climates, freeze-thaw test (ASTM C1262-10) should be conducted to assess the durability of the CMU and ensure it follows the standard specification (ASTM C1372). Additives can be used to reduce efflorescence at the face of the blocks if they are at locations subject to de-icing chemicals.

Compressive strength = 4,000 psi minimum

Water absorption limit = 5 %

$H_{block} = 7\frac{5}{8}"$   $L_{block} = 15\frac{5}{8}"$   $b_{block} = 7\frac{5}{8}"$

Note: In many construction applications CMU blocks are placed with a  $\frac{3}{8}"$  mortar joint to create an in place nominal dimension of 8" x 8" x 16".

HOLLOW CORE, SOLID CORE, CONCRETE FILLED, AND CORNER CMU'S SHALL ALL MEET THE ABOVE SPECIFICATIONS.

**REINFORCED BACKFILL GRADATION**

SEE SPECIAL PROVISIONS FOR INFORMATION.

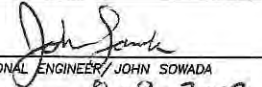

**GEOSYNTHETIC REINFORCEMENT TENSILE PROPERTIES**

TYPE 1 - USE FOR BEARING BED ZONE, GRS ZONE, AND WINGWALLS  
 Required ultimate tensile strength = 5,300 lb/ft by (ASTM D 4595 (geotextiles) or ASTM D 6637 (geogrids))  
 Tensile strength at 2% strain = 1,514 lb/ft

TYPE 2 - USE FOR RSF, BEAM SEAT ZONE, AND INTEGRATED APPROACH ZONE  
 Required ultimate tensile strength = 4,800 lb/ft by (ASTM D 4595 (geotextiles) ONLY)  
 Tensile strength at 2% strain = 900 lb/ft

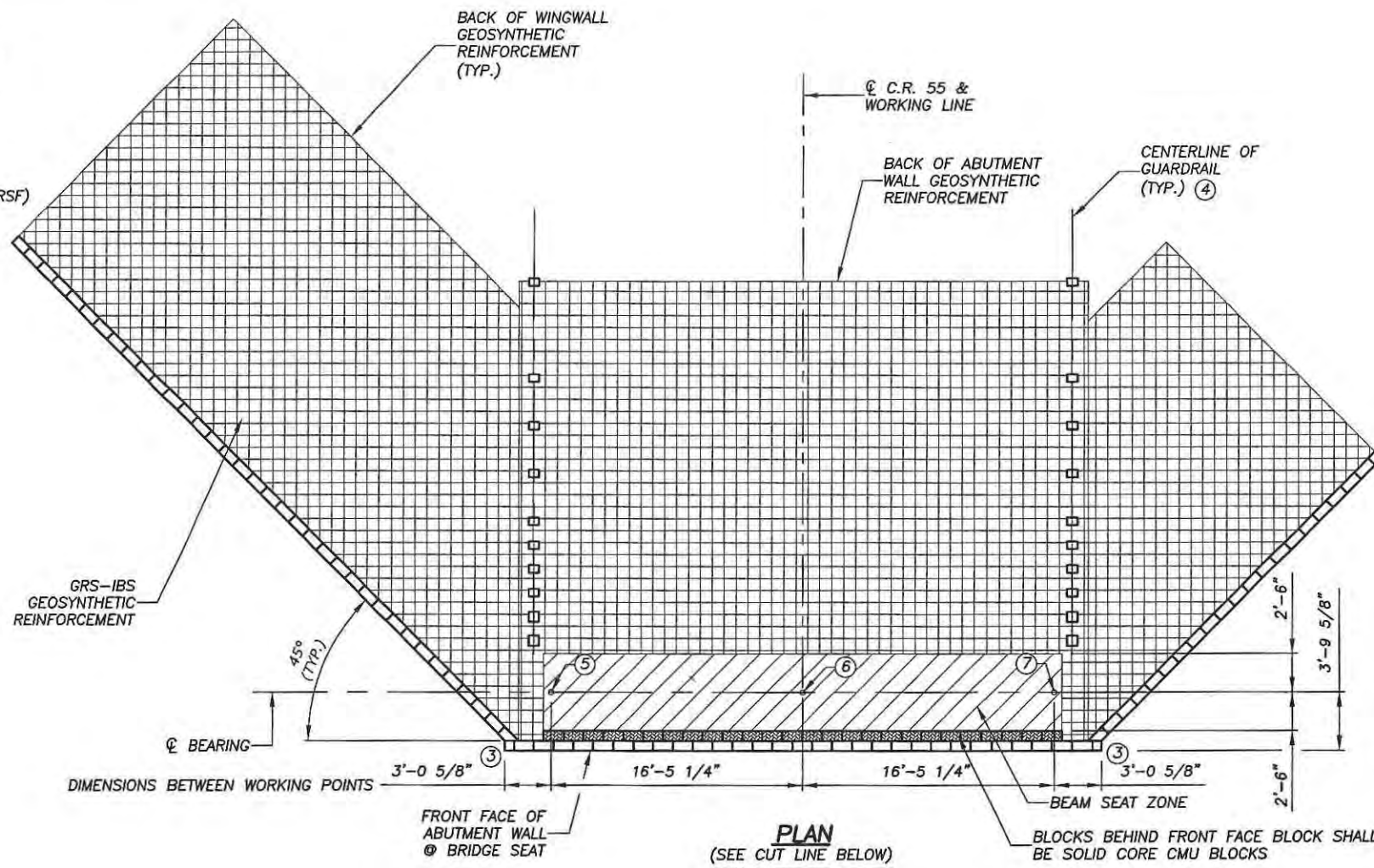
**POLYSTYRENE FOAM BOARD**

Provide polystyrene foam board in accordance with SPEC 3760 and conforming to AASHTO M230, type VI.

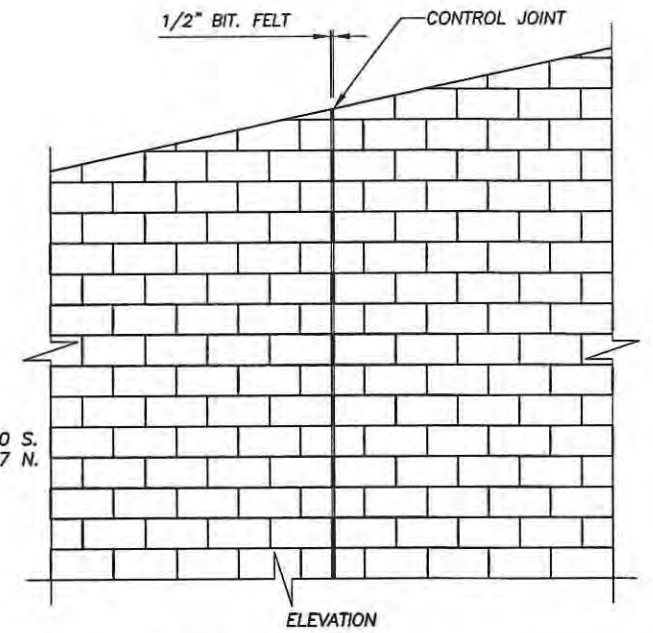
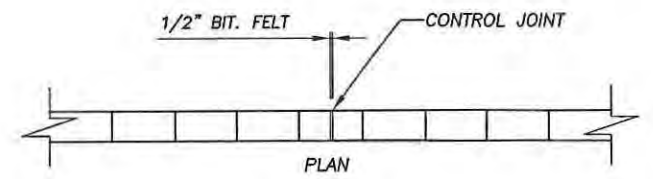
 CERTIFIED BY: PROFESSIONAL ENGINEER/JOHN SOWADA LIC. NO. 45936 8-9-2012	DES.: JAS	 ERICKSON ENGINEERING WWW.ERICKSON-ENG.COM 800-545-8020	GENERAL ABUTMENT NOTES	APPROVED:	S.P. 067-598-010 SHEET NO. 5 OF 26 SHEETS	BRIDGE NO. 67564
	CHK.: RLD					
	DRN.: DSP					
	CHK.: JAS					

**CROSS HATCH KEY:**

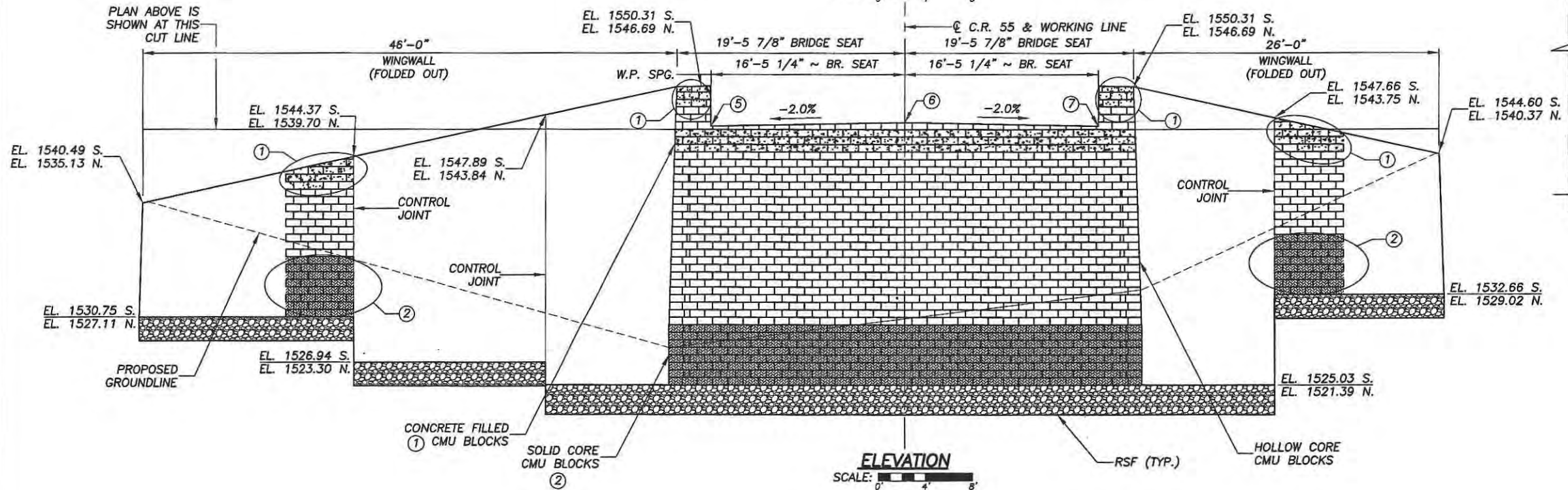
- = CONCRETE FILLED CMU BLOCKS
- = HOLLOW CORE CMU BLOCKS
- = SOLID CORE CMU BLOCKS
- = REINFORCED SOIL FOUNDATION (RSF)



**PLAN**  
(SEE CUT LINE BELOW)  
SCALE: 0' 4' 8'

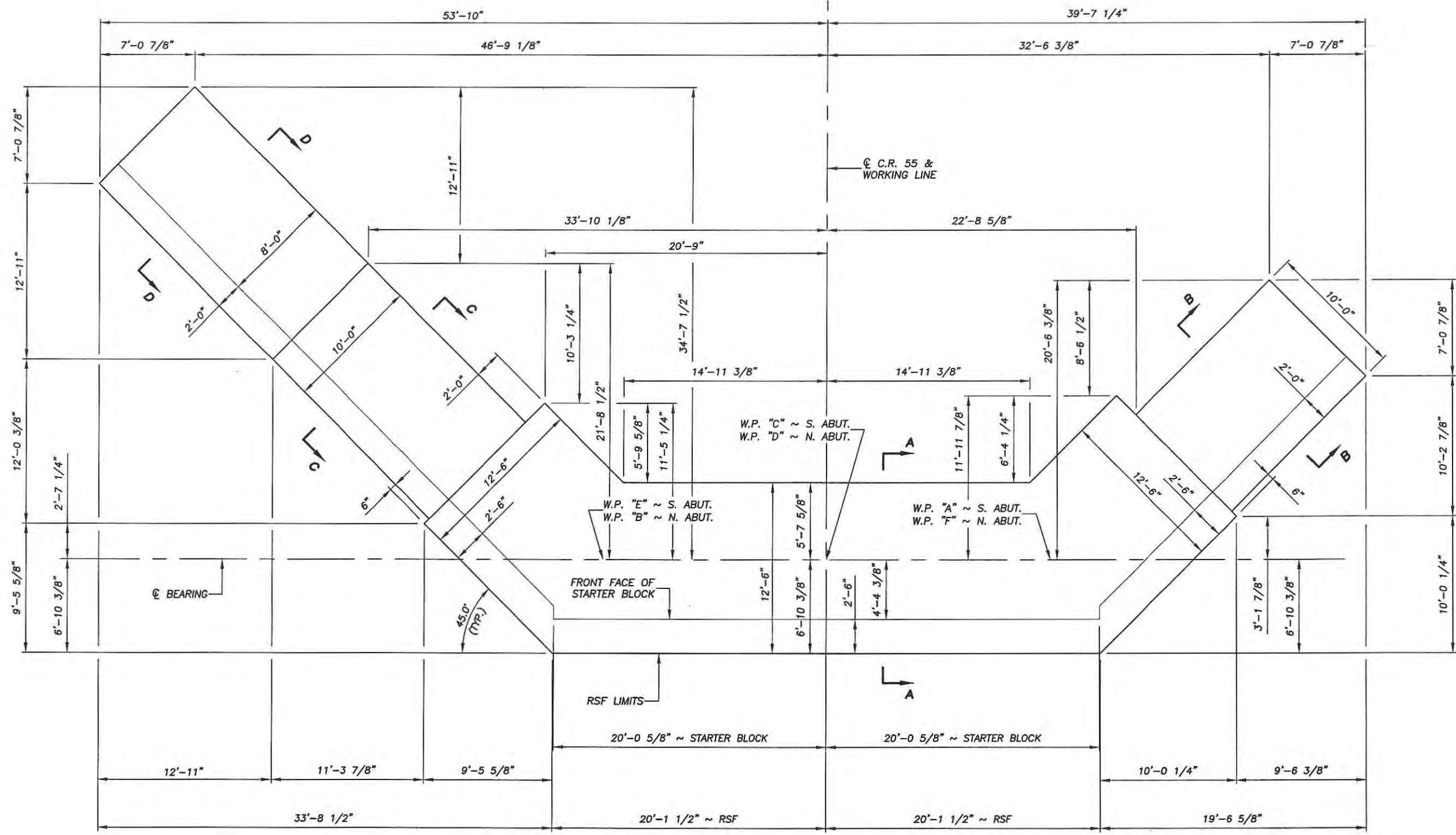


**CONTROL JOINT DETAIL**  
SCALE: 0' 2' 4'



**ELEVATION**  
SCALE: 0' 4' 8'

- NOTES:**
- ① ALONG ENTIRE LENGTH OF ABUTMENT WALL AND WINGWALLS INSERT NO. 13 REBAR INTO TOP THREE FULL LAYERS OF CMU'S AND ANY PARTIAL PORTION ABOVE, AND CORNER CMU'S, THEN FILL VOIDS WITH CONCRETE.
  - ② ALONG ENTIRE LENGTH OF ABUTMENT WALL AND WINGWALLS THE FIRST 8 LAYERS OF BLOCKS FROM THE RSF SHALL BE SOLID CORE CMU'S (5 FEET TYP.).
  - ③ CMU BLOCKS ARE STAGGERED, INCLUDING CORNERS, SO THERE ARE NO VERTICAL JOINTS GREATER THAN 1 CMU BLOCK HEIGHT, EXCEPT AT CONTROL JOINTS.
  - ④ GEOSYNTHETIC REINFORCEMENT SHALL BE BLOCKED OUT TO ACCOMMODATE PLACEMENT OF GUARDRAIL POSTS. SEE GUARDRAIL SHEETS FOR DETAILS.
  - ⑤ WORKING POINT "E" OR "B"
  - ⑥ WORKING POINT "C" OR "D"
  - ⑦ WORKING POINT "A" OR "F"
- ALL ELEVATIONS AND DIMENSIONS ARE GIVEN AT TOP OF RSF. TOP OF RSF SHOULD BE AT OR BELOW THESE ELEVATIONS.
- GEOSYNTHETIC REINFORCEMENT THICKNESS HAS BEEN NEGLECTED BETWEEN THE BLOCK COURSES AND 7 5/8" COURSE HEIGHT HAS BEEN USED TO DETERMINE ELEVATIONS SHOWN ON RSF PLAN.



**RSF PLAN**  
SCALE: 0' 4' 8'

DESIGNED BY: *John Sowada*  
 CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 DATE: 8-9-2012

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

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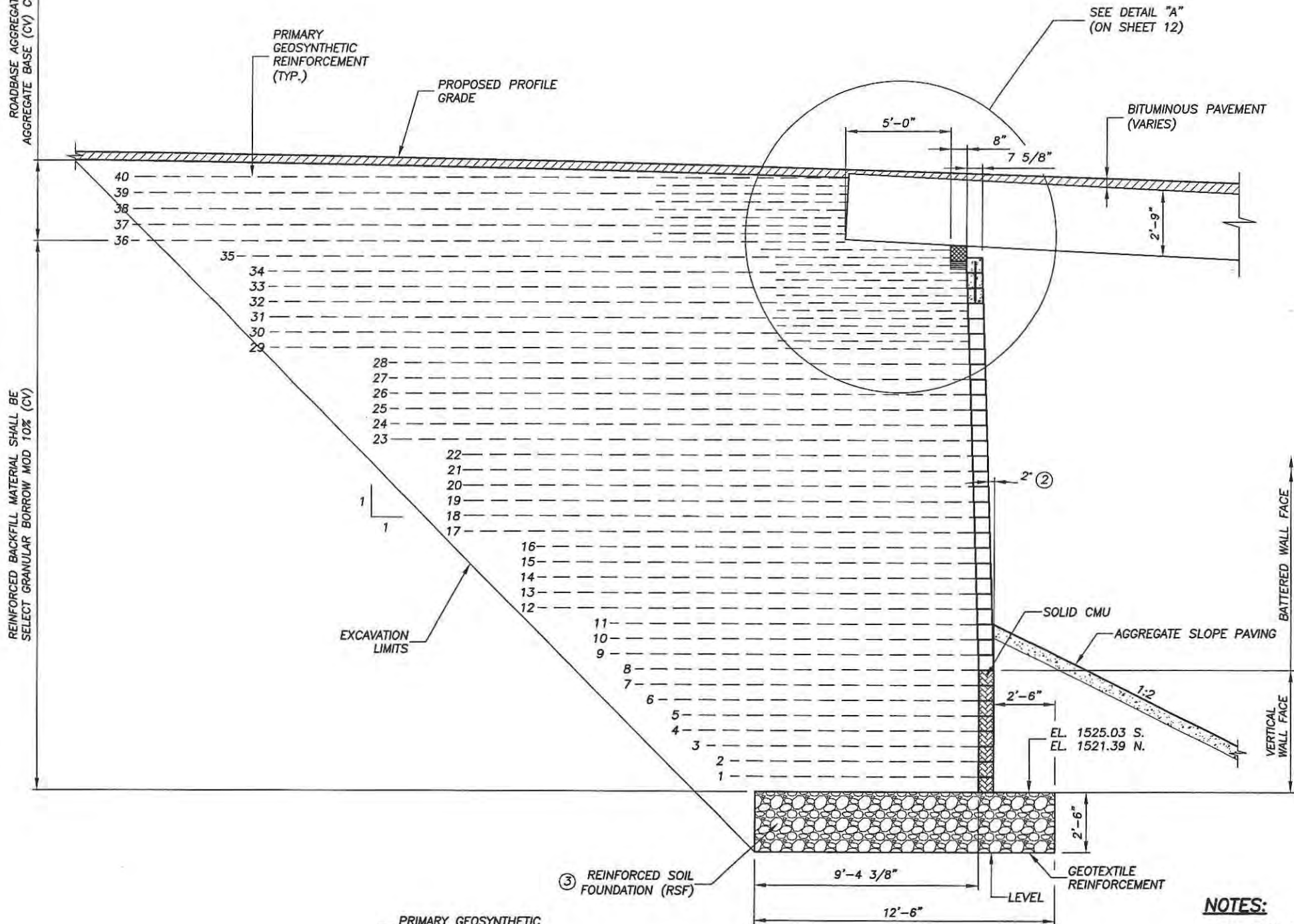
**ABUTMENT DETAILS**

S.P. 067-598-010  
 SHEET NO. 7 OF 26 SHEETS

BRIDGE NO. 67564

ROADBASE AGGREGATE SHALL BE AGGREGATE BASE (CV) CLASS 5 MODIFIED

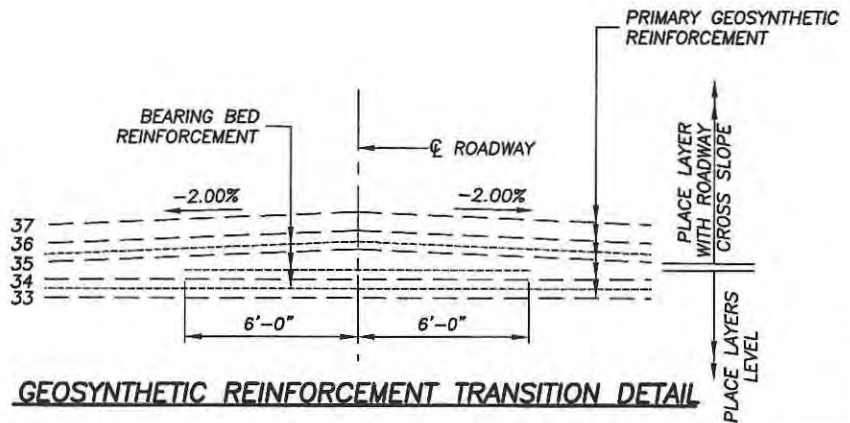
REINFORCED BACKFILL MATERIAL SHALL BE SELECT GRANULAR BORROW MOD 10% (CV)



GRS SECTION A-A INFORMATION

LAYER NUMBER	MINIMUM LENGTH OF PRIMARY GEOSYNTHETIC REINFORCEMENT S. ABUT. (FT.) ①	S. ABUT. EL. @ C. RDWY.	MINIMUM LENGTH OF PRIMARY GEOSYNTHETIC REINFORCEMENT N. ABUT. (FT.) ①	N. ABUT. EL. @ C. RDWY.
1	11	1525.67	11	1522.03
2	11	1526.30	11	1522.66
3	12	1526.94	12	1523.30
4	13	1527.58	13	1523.93
5	13	1528.21	13	1524.57
6	14	1528.85	14	1525.20
7	15	1529.48	15	1525.84
8	15	1530.12	15	1526.48
9	16	1530.75	16	1527.11
10	16	1531.39	16	1527.75
11	16	1532.02	16	1528.38
12	19	1532.66	19	1529.02
13	19	1533.29	19	1529.65
14	19	1533.93	19	1530.29
15	19	1534.56	19	1530.92
16	19	1535.20	19	1531.56
17	22	1535.84	22	1532.19
18	22	1536.47	22	1532.83
19	22	1537.11	22	1533.46
20	22	1537.74	22	1534.10
21	22	1538.38	22	1534.74
22	22	1539.01	22	1535.37
23	25	1539.65	25	1536.01
24	25	1540.28	25	1536.64
25	25	1540.92	25	1537.28
26	25	1541.55	25	1537.91
27	25	1542.19	25	1538.55
28	25	1542.83	25	1539.18
29	30	1543.46	30	1539.82
30	30	1544.10	30	1540.45
31	30	1544.73	30	1541.09
32	30	1545.37	30	1541.73
33	30	1546.00	30	1542.36
34	30	1546.64	30	1543.00
35	30	1547.24	35	1543.60
36	30	1547.90	30	1544.26
37	30	1548.57	21	1544.93
38	30	1549.24	10	1545.60
39	30	1549.90	N.A.	N.A.
40	30	1550.57	N.A.	N.A.

④  
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④



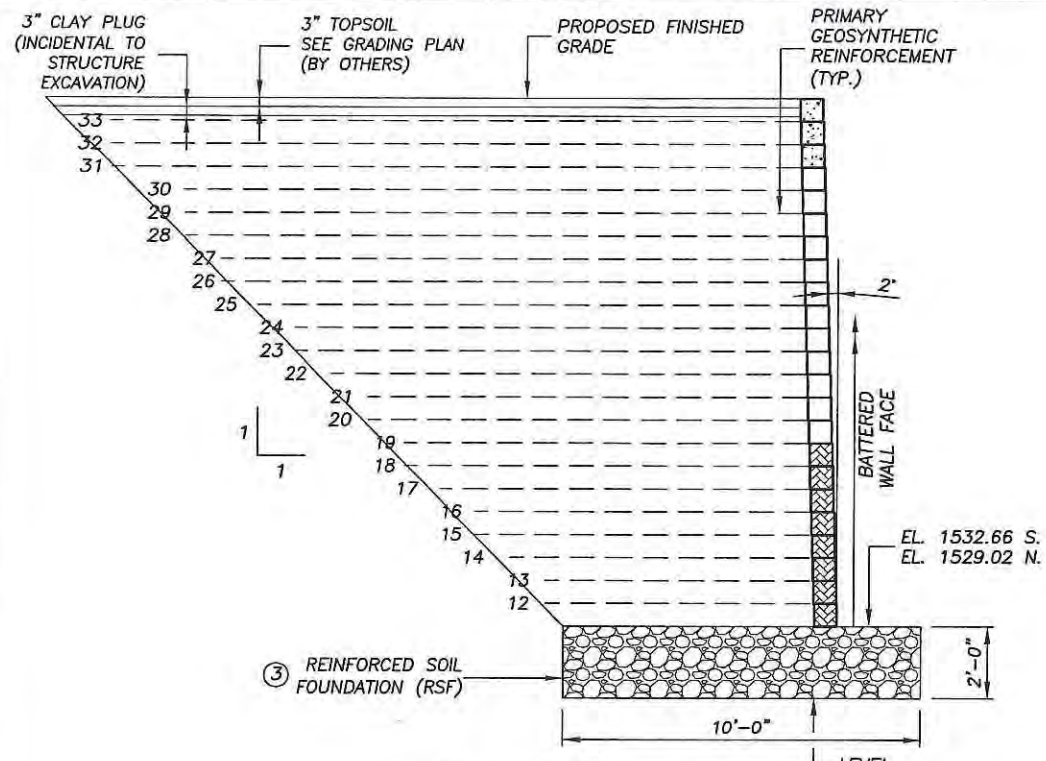
SECTION A-A  
SCALE: 0' 2' 4'  
(SOUTH ABUTMENT SHOWN)  
(NORTH ABUTMENT SIMILAR)

NOTES:

- ALL ELEVATIONS AND DIMENSIONS ARE GIVEN AT TOP OF RSF. TOP OF RSF SHOULD BE AT OR BELOW THESE ELEVATIONS.
- GEOSYNTHETIC REINFORCEMENT THICKNESS HAS BEEN NEGLECTED BETWEEN THE BLOCK COURSES AND 7 5/8" COURSE HEIGHT HAS BEEN USED TO DETERMINE ELEVATIONS SHOWN ON RSF PLAN.
- NUMBER ADJACENT TO PRIMARY GEOSYNTHETIC REINFORCEMENT IN SECTIONS INDICATES PRIMARY GEOSYNTHETIC REINFORCEMENT LAYER NUMBER. SEE TABLE FOR LENGTHS AND ELEVATIONS.

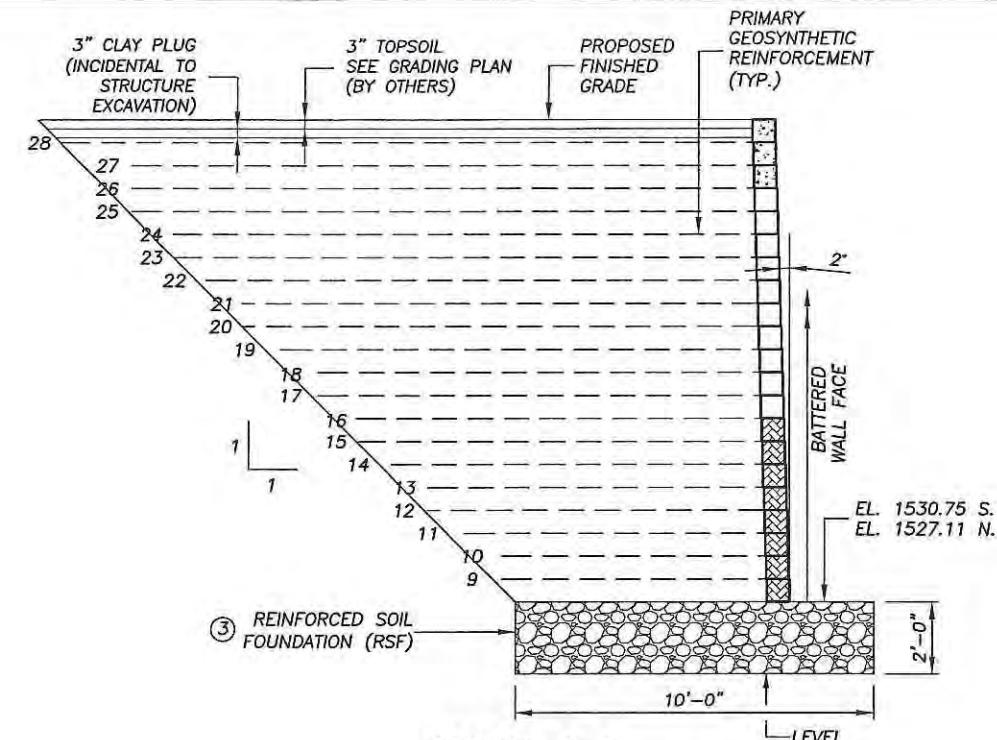
- ① LENGTH MEASURED FROM FRONT FACE OF CMU BLOCK TO END OF PRIMARY GEOSYNTHETIC REINFORCEMENT. (DOES NOT INCLUDE WRAPPED GEOSYNTHETIC REINFORCEMENT WHERE APPLICABLE.)
- ② 1/4" BATTER PER 7 5/8" BLOCK COURSE SHOWN.
- ③ USE ROADBASE AGGREGATE (AGGREGATE BASE (CV) CLASS 5 MODIFIED) ENCAPSULATED IN GEOTEXTILE REINFORCEMENT.
- ④ ADDITIONAL 8'-0" LONG BEARING BED REINFORCEMENT SHALL BE ADDED BETWEEN LAYERS 30 AND 36.
- ⑤ SEE GEOSYNTHETIC TRANSITION DETAIL THIS SHEET.





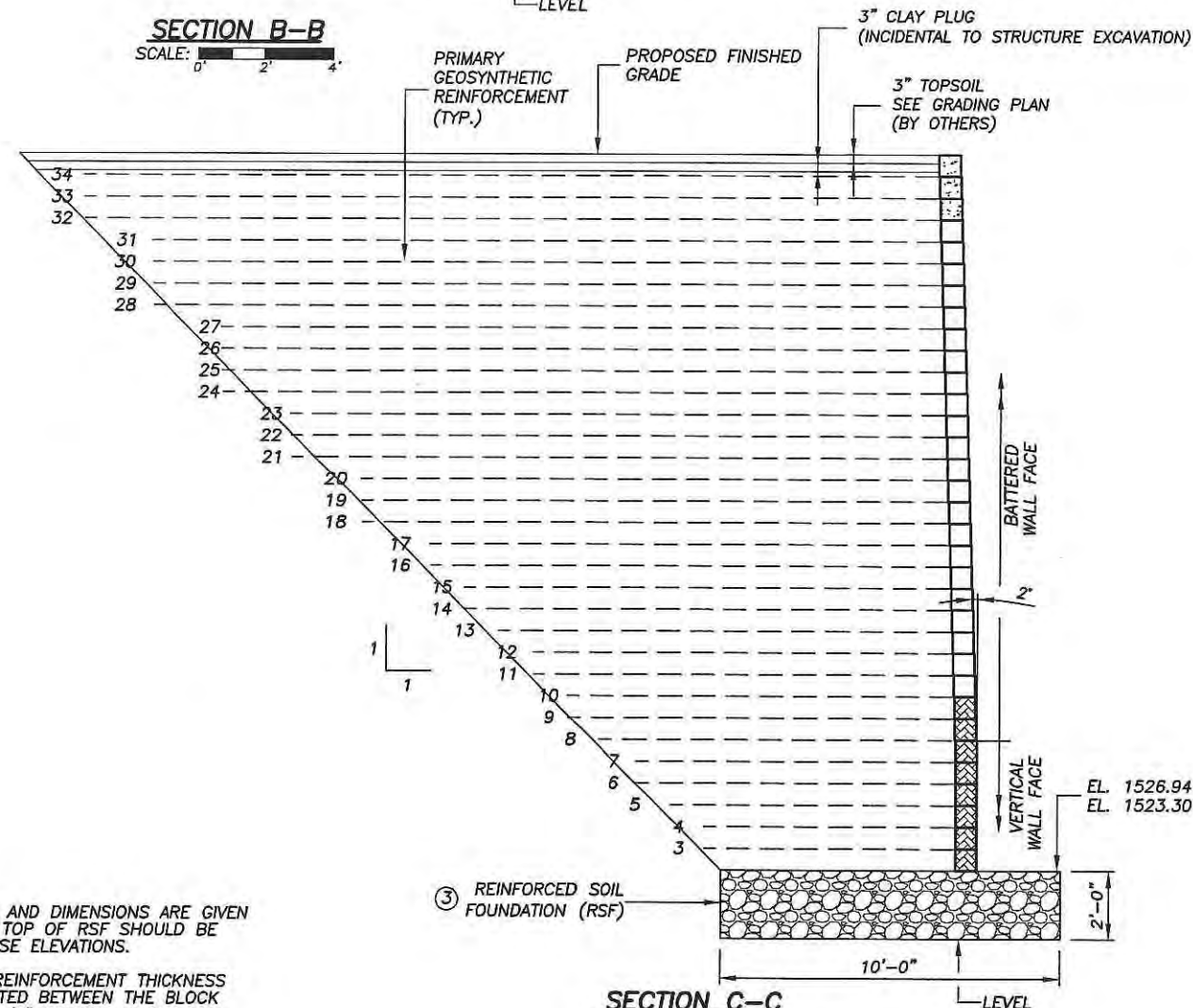
**GRS SECTION B-B INFORMATION**

LAYER NUMBER	MINIMUM LENGTH OF PRIMARY GEOSYNTHETIC REINFORCEMENT (FT.) ①	S. ABUT. EL.	N. ABUT. EL.
12	8	1532.66	1529.02
13	8	1533.29	1529.65
14	9	1533.93	1530.29
15	10	1534.56	1530.92
16	10	1535.20	1531.56
17	11	1535.84	1532.19
18	12	1536.47	1532.83
19	12	1537.11	1533.46
20	13	1537.74	1534.10
21	13	1538.38	1534.74
22	14	1539.01	1535.37
23	15	1539.65	1536.01
24	15	1540.28	1536.64
25	16	1540.92	1537.28
26	17	1541.55	1537.91
27	17	1542.19	1538.55
28	18	1542.83	1539.18
29	18	1543.46	1539.82
30	18	1544.10	1540.45
31	20	1544.73	1541.09
32	20	1545.37	1541.73
33	20	1546.00	1542.36



**SECTION D-D**  
SCALE: 0' 2' 4'

**SECTION B-B**  
SCALE: 0' 2' 4'



**SECTION C-C**  
SCALE: 0' 2' 4'

**GRS SECTION C-C INFORMATION**

LAYER NUMBER	MINIMUM LENGTH OF PRIMARY GEOSYNTHETIC REINFORCEMENT (FT.) ①	S. ABUT. EL.	N. ABUT. EL.
3	8	1526.94	1523.30
4	8	1527.58	1523.93
5	9	1528.21	1524.57
6	10	1528.85	1525.20
7	10	1529.48	1525.84
8	11	1530.12	1526.48
9	12	1530.75	1527.11
10	12	1531.39	1527.75
11	13	1532.02	1528.38
12	13	1532.66	1529.02
13	14	1533.29	1529.65
14	15	1533.93	1530.29
15	15	1534.56	1530.92
16	16	1535.20	1531.56
17	16	1535.84	1532.19
18	18	1536.47	1532.83
19	18	1537.11	1533.46
20	18	1537.74	1534.10
21	20	1538.38	1534.74
22	20	1539.01	1535.37
23	20	1539.65	1536.01
24	22	1540.28	1536.64
25	22	1540.92	1537.28
26	22	1541.55	1537.91
27	22	1542.19	1538.55
28	24	1542.83	1539.18
29	24	1543.46	1539.82
30	24	1544.10	1540.45
31	24	1544.73	1541.09
32	26	1545.37	1541.73
33	26	1546.00	1542.36
34	26	1546.64	1543.00

**GRS SECTION D-D INFORMATION**

LAYER NUMBER	MINIMUM LENGTH OF PRIMARY GEOSYNTHETIC REINFORCEMENT (FT.) ①	S. ABUT. EL.	N. ABUT. EL.
9	8	1530.75	1527.11
10	8	1531.39	1527.75
11	9	1532.02	1528.38
12	10	1532.66	1529.02
13	10	1533.29	1529.65
14	11	1533.93	1530.29
15	12	1534.56	1530.92
16	12	1535.20	1531.56
17	13	1535.84	1532.19
18	13	1536.47	1532.83
19	14	1537.11	1533.46
20	15	1537.74	1534.10
21	15	1538.38	1534.74
22	16	1539.01	1535.37
23	17	1539.65	1536.01
24	17	1540.28	1536.64
25	18	1540.92	1537.28
26	18	1541.55	1537.91
27	18	1542.19	1538.55
28	20	1542.83	1539.18

**NOTES:**

ALL ELEVATIONS AND DIMENSIONS ARE GIVEN AT TOP OF RSF. TOP OF RSF SHOULD BE AT OR BELOW THESE ELEVATIONS.

GEOSYNTHETIC REINFORCEMENT THICKNESS HAS BEEN NEGLECTED BETWEEN THE BLOCK COURSES AND 7 5/8" COURSE HEIGHT HAS BEEN USED TO DETERMINE ELEVATIONS SHOWN ON RSF PLAN.

NUMBER ADJACENT TO PRIMARY GEOSYNTHETIC REINFORCEMENT IN SECTIONS INDICATES PRIMARY GEOSYNTHETIC REINFORCEMENT LAYER NUMBER FOR LENGTHS. SEE TABLE FOR LENGTHS AND ELEVATIONS.

- ① LENGTH MEASURED FROM FRONT FACE OF CMU BLOCK TO END OF PRIMARY GEOSYNTHETIC REINFORCEMENT. (DOES NOT INCLUDE WRAPPED GEOSYNTHETIC REINFORCEMENT WHERE APPLICABLE.)
- ② 1/4" BATTER PER 7 5/8" BLOCK COURSE SHOWN.
- ③ USE ROADBASE AGGREGATE (AGGREGATE BASE (CV) CLASS 5 MODIFIED) ENCAPSULATED IN GEOTEXTILE REINFORCEMENT.

DESIGNED BY: *John Sprade*  
 CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 DATE: 8-9-2012

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

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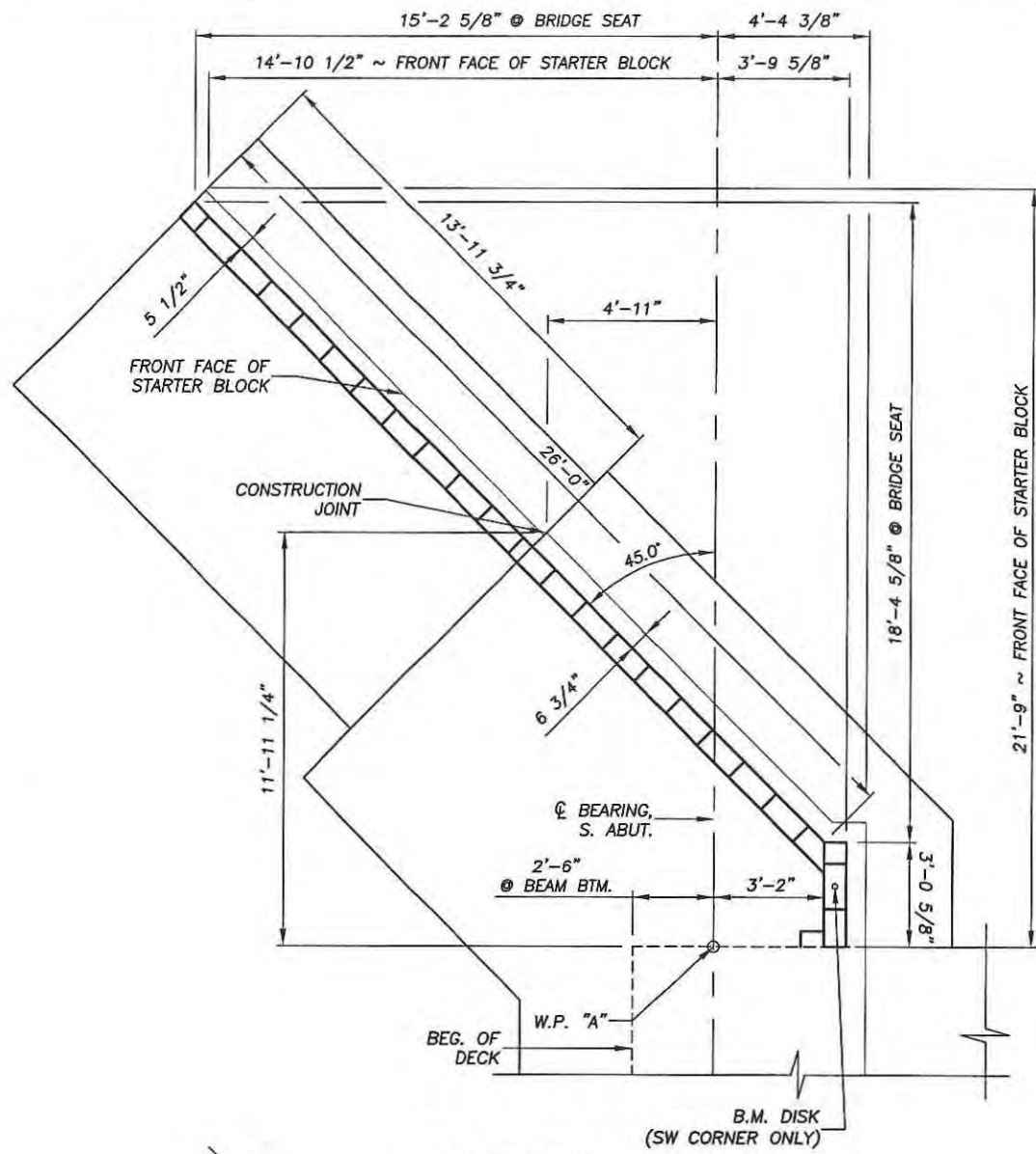
**ABUTMENT DETAILS**

S.P. 067-598-010

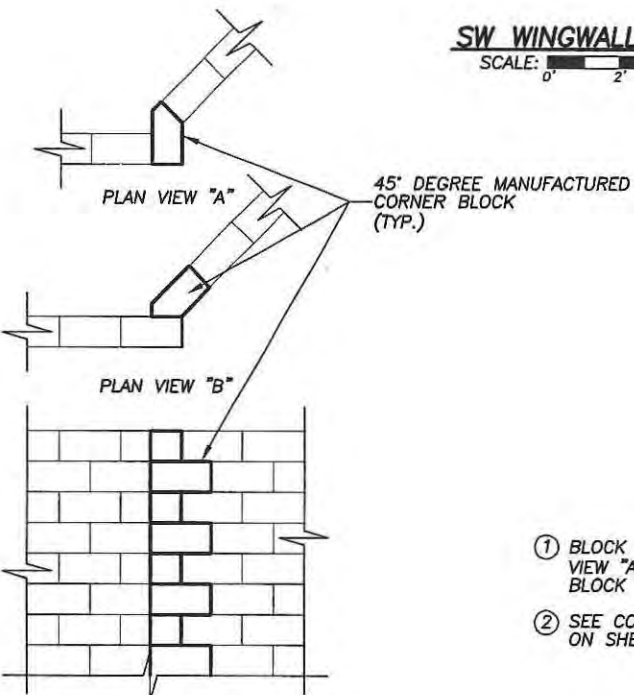
APPROVED:

SHEET NO. 9 OF 26 SHEETS

BRIDGE NO. 67564

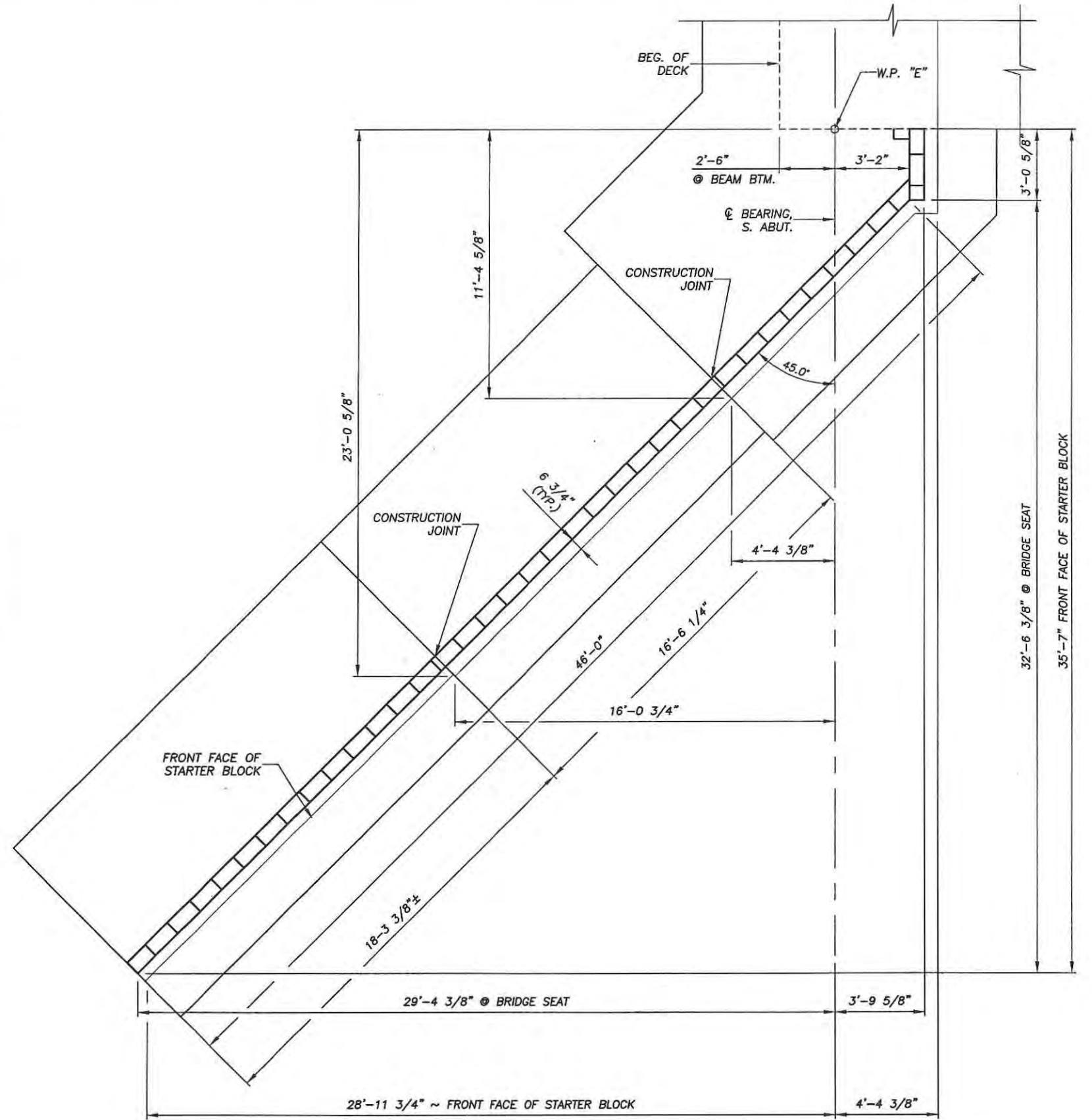


**SW WINGWALL PLAN**  
SCALE: 0' 2' 4'



**CORNER DETAIL** ① ②  
SCALE: 0' 2' 4'

- ① BLOCK LAYERS SHALL ROTATE BETWEEN PLAN VIEW "A" AND PLAN VIEW "B" IN ADJACENT BLOCK LAYERS.
- ② SEE CONSTRUCTION SPECIFICATION NOTE 13 ON SHEET 5.



**SE WINGWALL PLAN**  
SCALE: 0' 2' 4'

**NOTES:**

SEE SHEET 11 FOR TURN INTO FILL DETAIL.

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

CERTIFIED BY: *John Sowada*  
PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936 8-9-2012

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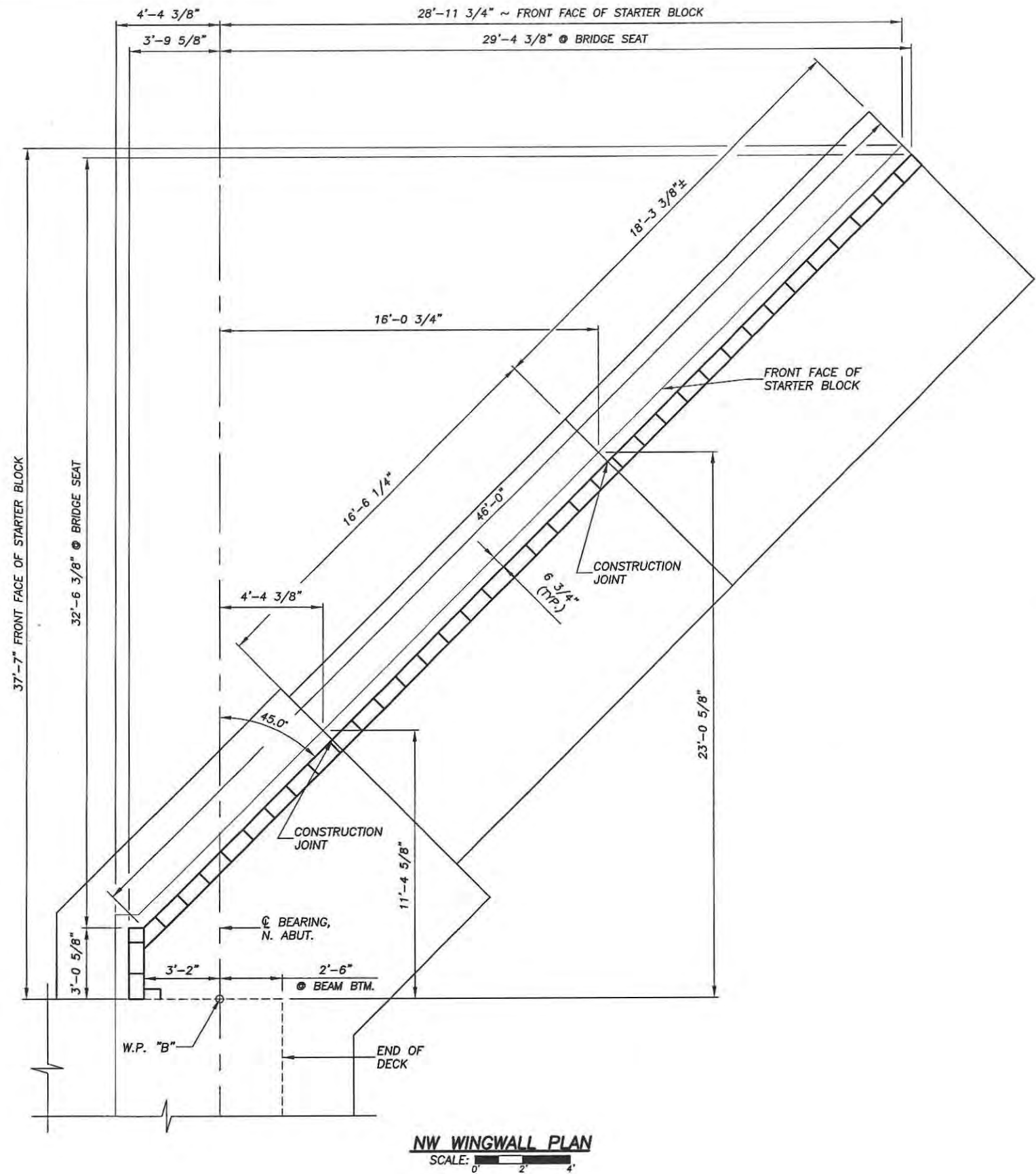
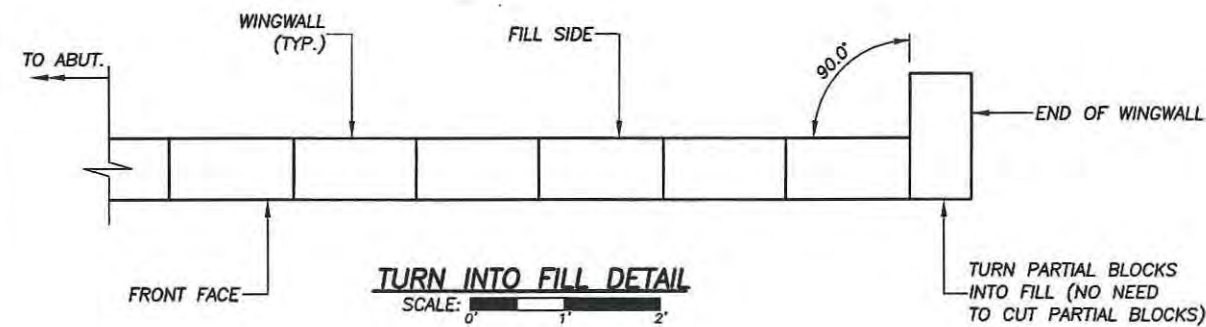
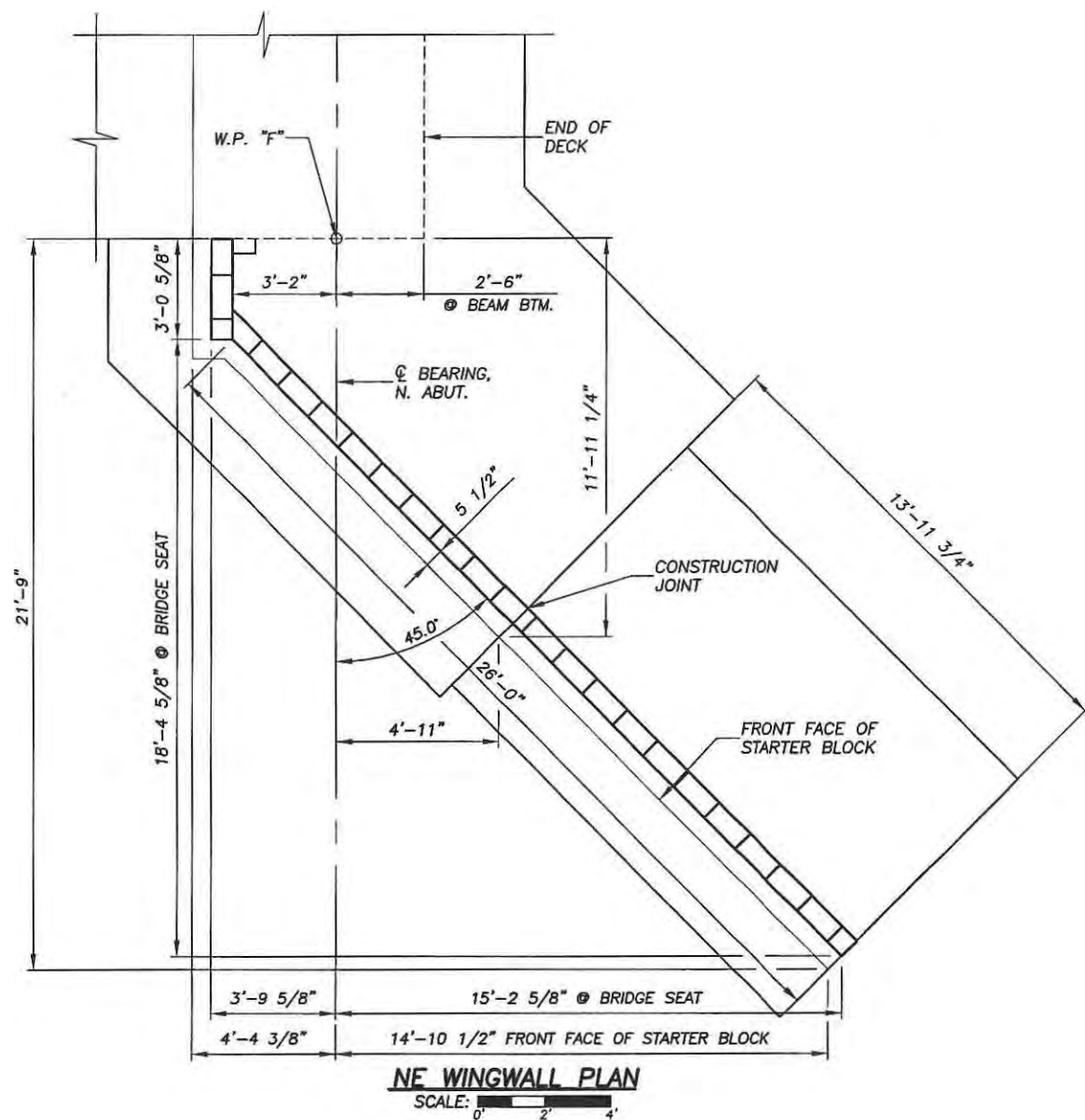
**WINGWALL PLAN**

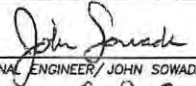
S.P. 067-598-010

APPROVED:

SHEET NO. 10 OF 26 SHEETS

BRIDGE NO. 67564



  
 CERTIFIED BY: PROFESSIONAL ENGINEER/JOHN SOWADA  
 LIC. NO. 45936  
 8-9-2012

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

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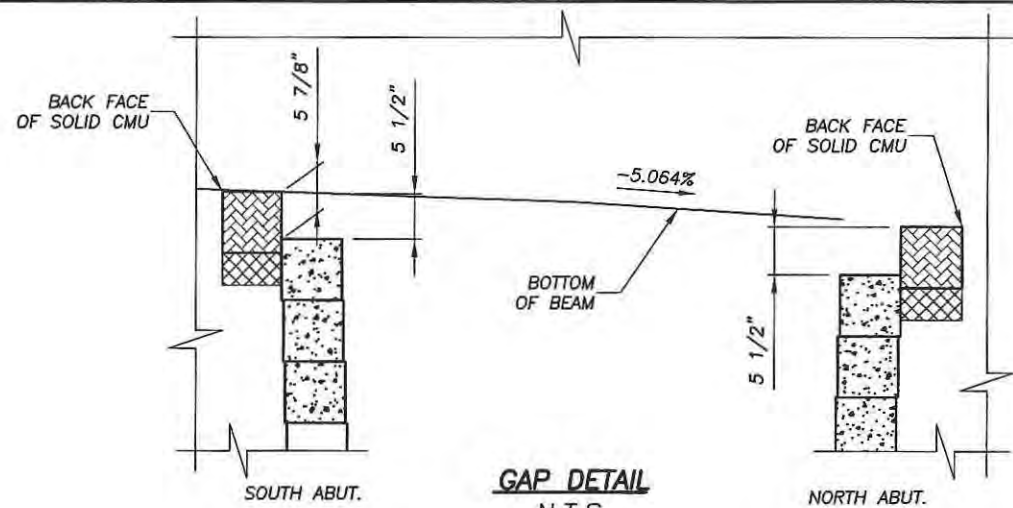
WINGWALL PLAN

S.P. 067-598-010

APPROVED:

SHEET NO. 11 OF 26 SHEETS

BRIDGE NO.  
67564



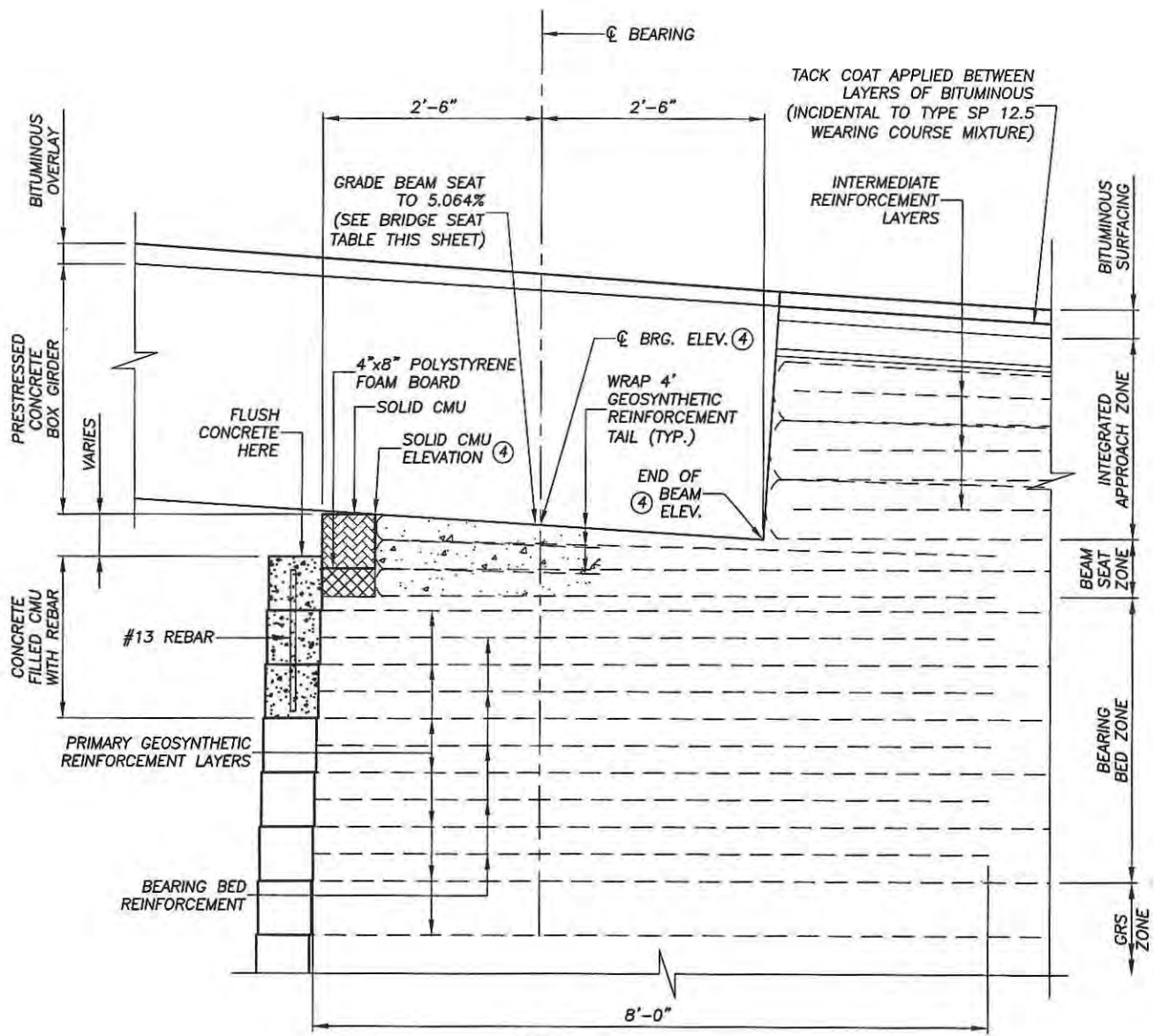
ABUT. LOCATION	LOCATION ALONG	CORRESPONDING WORKING PT.	℄ BEARING ELEVATION	SOLID CMU ELEVATION	END OF BEAM ELEVATION
SOUTH	W. FASCIA OUTSIDE	A	1547.56	1547.43	1547.69
NORTH	FACE OF BEAM BTM.	B	1543.64	1543.77	1543.51
SOUTH	BEAM BOTTOM @	C	1547.89	1547.76	1548.02
NORTH	℄ ROADWAY	D	1543.97	1544.10	1543.84
SOUTH	EAST FASCIA OUTSIDE	E	1547.56	1547.43	1547.69
NORTH	FACE OF BEAM BTM.	F	1543.64	1543.77	1543.51

BAR	NO.	LENGTH	SHAPE	LOCATION
A1301E	348	1'-8"	STRT.	CAP ~ VERTICAL

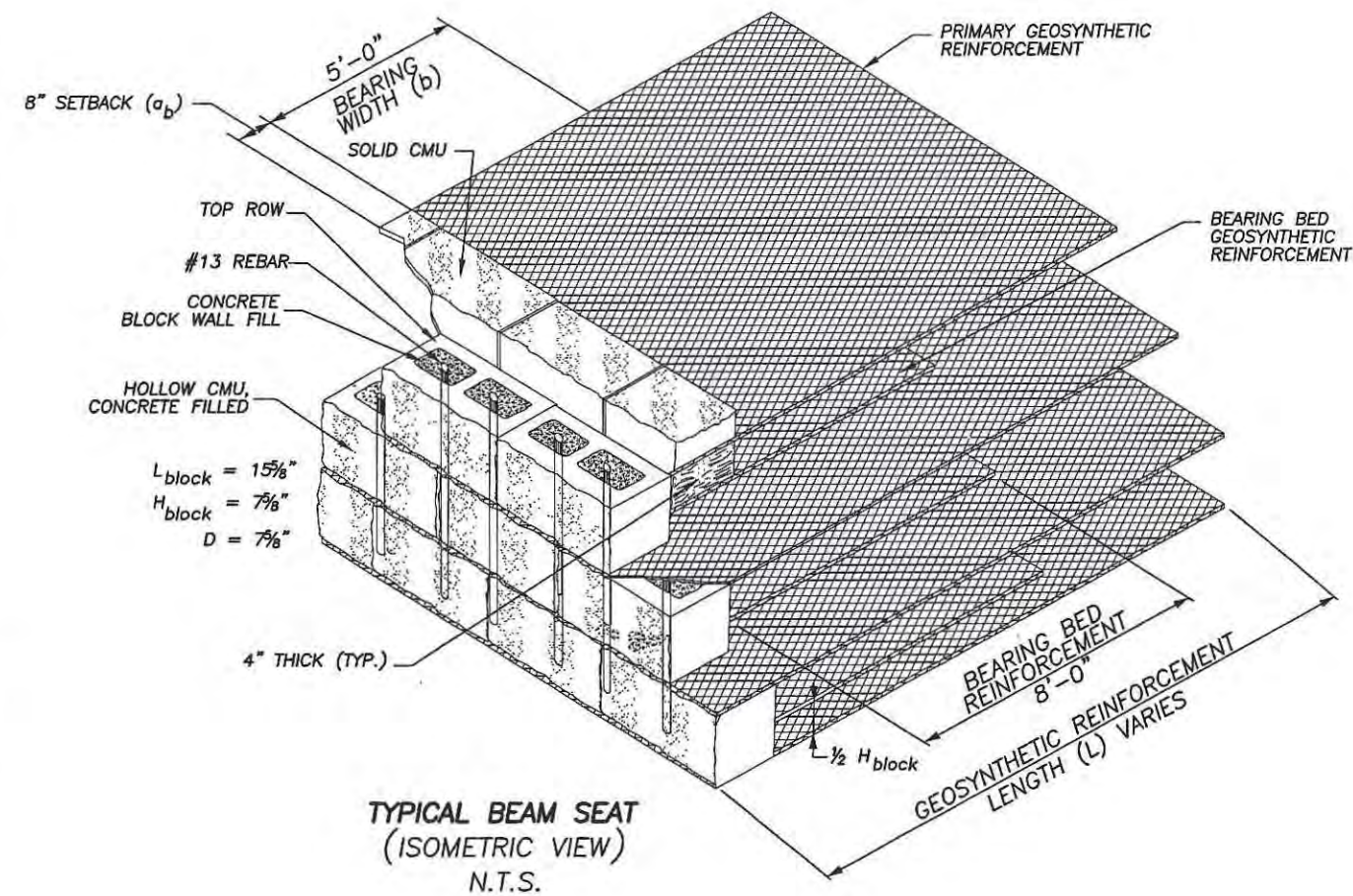
REINFORCEMENT BARS (EPOXY COATED)	390 POUND
① STRUCTURE EXCAVATION	1 LUMP SUM
⑤ CONCRETE MASONRY WALL	4251 SQ. FT.
AGGREGATE BASE (CV) CLASS 5 MODIFIED	415 CU. YD.
SELECT GRANULAR BORROW MODIFIED 10% (CV)	3480 CU. YD.
GEOSYNTHETIC REINFORCEMENT TYPE 1	15430 SQ. YD.
GEOSYNTHETIC REINFORCEMENT TYPE 2	2000 SQ. YD.
② BENCHMARK DISK	1 EACH

TYPE	LIN. FT.	SIZE	LOCATION
③ POLYSTYRENE	68	4"x8"	ABUTMENT - FRONT OF BEARING BED

- SEE SPECIAL PROVISIONS.
- COUNTY WILL FURNISH DISK. BEND PRONGS OUTWARD TO ANCHOR DISK IN CONCRETE. BOTTOM OF DISK TOP TO BE PLACED FLUSH WITH CONCRETE. PAYMENT FOR PLACING SHALL BE CONSIDERED INCIDENTAL TO CONCRETE PAY ITEMS.
- INCIDENTAL TO CONCRETE MASONRY WALL SEE SPECIAL PROVISIONS.
- SEE BRIDGE SEAT ELEVATION TABLE THIS SHEET.
- QUANTITY INCLUDES HOLLOW CORE CMU, SOLID CORE CMU, CONCRETE FILLED CMU, CONCRETE CORNER CMU'S, CONSTRUCTION JOINT MATERIAL, AND POLYSTYRENE FOAM BOARD.



**DETAIL A**  
SCALE: 0' 1' 2'  
(NORTH ABUT. SHOWN)  
(SOUTH ABUT. SIMILAR)



DESIGNED BY: *John Sowa*  
 CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 DATE: 8-9-2012

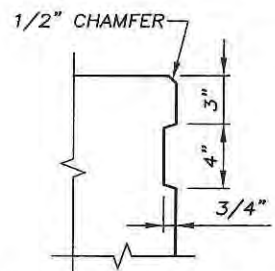
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 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

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**ABUTMENT DETAILS**

S.P. 067-598-010  
 SHEET NO. 12 OF 26 SHEETS

BRIDGE NO. 67564



**SHEAR KEY DETAIL**  
OMIT SHEAR KEY ON OUTSIDE FACE OF FASCIA BEAMS

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	11.883 KSI
LONG TERM LOSSES	19.000 KSI
TOTAL LOSSES	30.883 KSI

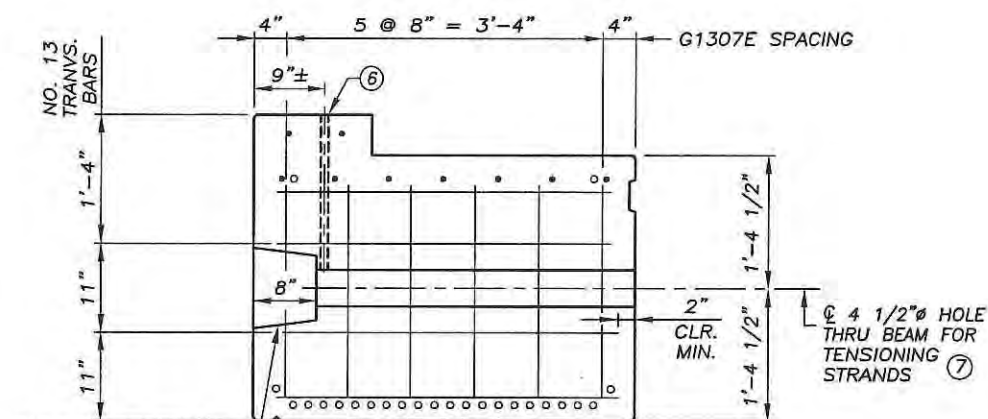
Y DISTANCES (INCHES)			
	NO.	CL. SPAN	END
TOTAL STRANDS	24	4.50	4.50

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.

□ CENTER OF GRAVITY AT END OF BEAM IS CALCULATED NEGLECTING THE DEBONDED STRANDS.

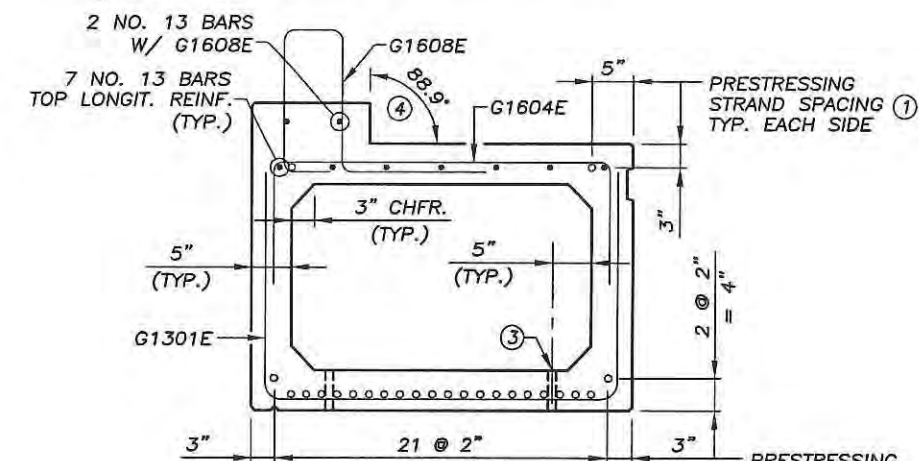
MINIMUM CONCRETE STRENGTH - P.S.I.	
⑨ f'ci	⑩ f'c
7,000	8,500

PRESTRESSING STRAND DIAMETER	
① 1/2"	□
① 0.60"	☒

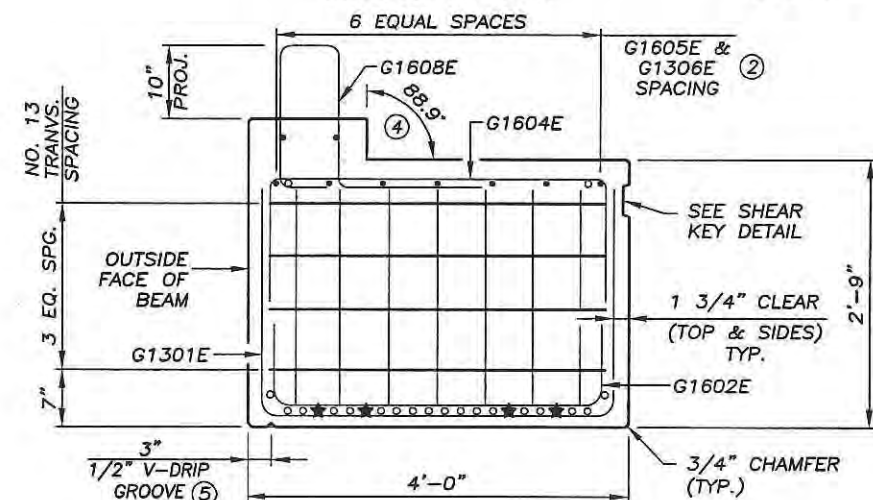


**SECTION AT DIAPHRAGM**

TAPERED RECESS FOR TENSIONING ROD END ANCHORAGE

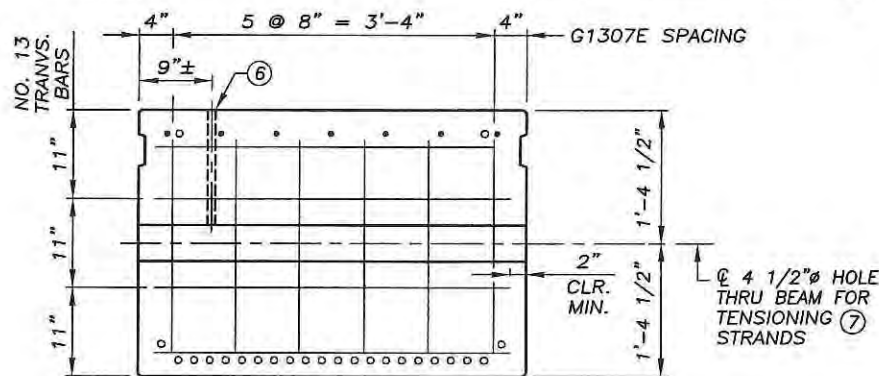


**SECTION AT VOID**



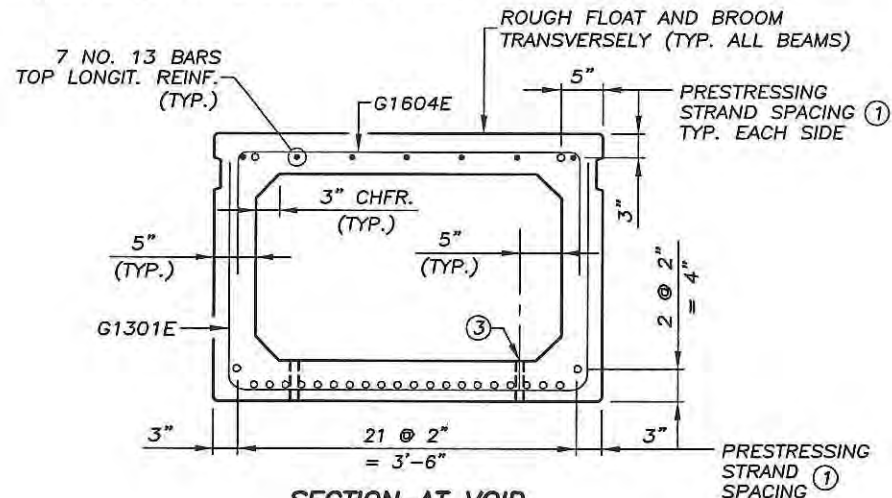
**END VIEW**

CUT STRANDS FLUSH WITH CONCRETE. PAINT ENDS WITH AN APPROVED GRAY EPOXY.  
**FASCIA BEAMS (B1 & B3)**

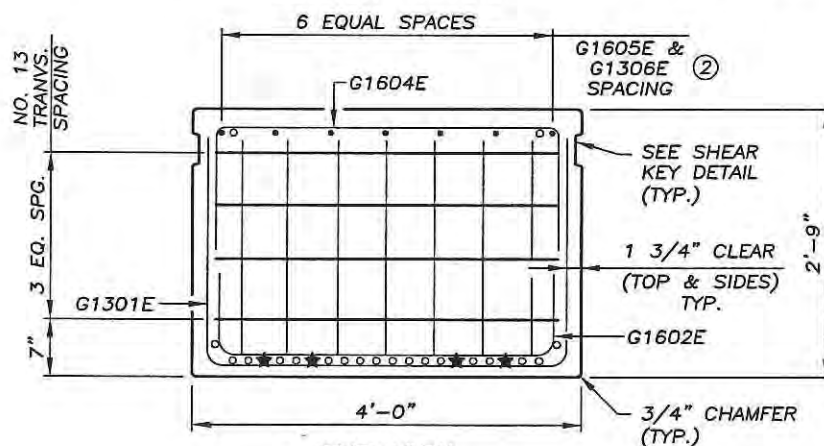


**SECTION AT DIAPHRAGM**

(H.D.P.E. PIPE AS SHOWN AT FIRST BEAM EAST OF CL. ROADWAY ONLY)



**SECTION AT VOID**



**END VIEW**

CUT STRANDS FLUSH WITH CONCRETE. PAINT ENDS WITH AN APPROVED GRAY EPOXY.

**INTERIOR BEAMS (B2)**

**GENERAL NOTES**

TOPS OF BEAMS SHALL BE ROUGH FLOATED AND BROOMED TRANSVERSELY FOR BOND.

PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.

EACH BEAM SHALL BE MARKED, SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS. MARKINGS SHALL BE MADE ON THE END OF THE BEAM, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE DECK HAS BEEN POURED. ALL MARKINGS SHALL BE STENCILLED AND BE CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.

ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET SHALL BE INCLUDED IN UNIT PRICE BID FOR "PRESTRESSED CONCRETE BOX BEAMS 33x48". SEE Mn/DOT SPEC. 2405.

SEE FRAMING PLAN FOR BEAM END MARKED "X".

APPROXIMATE WEIGHT OF BEAM IS 36.6 TONS (FASCIA BEAM).

GROUT BETWEEN BEAMS SHALL BE RODDED DURING INSTALLATION TO INSURE THAT THE VOIDS ARE COMPLETELY FILLED.

POST-TENSIONING OF THE TRANSVERSE STRANDS SHALL NOT BEGIN UNTIL THE GROUT BETWEEN THE PRECAST BEAMS HAS BEEN ALLOWED TO CURE FOR 48 HOURS.

POST-TENSIONING DUCTS SHALL BE PRESSURE GROUTED AFTER THE TRANSVERSE STRANDS ARE INSTALLED AND TENSIONED (SEE SPECIAL PROVISIONS).

BITUMINOUS PAVEMENT SHALL NOT BE PLACED UNTIL AFTER THE POST-TENSIONING HAS BEEN COMPLETED.

THE CEMENT AND FINE AGGREGATE FOR THE GROUT BETWEEN THE POST-TENSIONED BEAMS SHALL BE PROPORTIONED BY WEIGHT AS INDICATED IN THE SPECIAL PROVISIONS.

ABUTMENT BACKWALLS AND BITUMINOUS OVERLAY SHALL NOT BE POURED UNTIL AFTER THE POST-TENSIONING HAS BEEN COMPLETED.

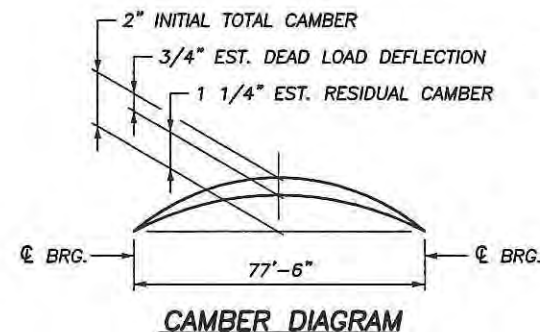
TRANSITION BETWEEN CHANGING SLOPES OF POST-TENSIONING DUCTS SHALL BE PROVIDED BY EITHER A CIRCULAR OR PARABOLIC CURVE WITH A MINIMUM LENGTH OF 3'-0".

POST-TENSIONING DUCTS SHALL BE PRESSURE GROUTED FROM ONE GROUT PIPE UNTIL ALL ENTRAPPED AIR IS EXPELLED AND GROUT BEGINS TO FLOW FROM THE OPEN GROUT PIPE. THE OPEN GROUT PIPE SHALL BE CLOSED AND A PRESSURE OF 50 PSI MAINTAINED FOR 15 SECONDS. THE GROUT COMPOSITION SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIAL PROVISIONS.

- ① PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION STRAND, CONFORMING TO ASTM A416, GRADE 270. STRAND DIAMETER = 0.60".
- ② G1605E SPACING IN EACH BEAM SHALL ALSO BE USED FOR NO. 13 BARS TOP LONGITUDINAL SPACING. 2'-0" MIN. LAP BETWEEN G1605E & ALL TOP LONGITUDINAL REINFORCEMENT.
- ③ 1" H.D.P.E. DRAIN PIPE AT EACH CORNER OF VOID (TYP.)
- ④ FACE SHALL BE VERTICAL TO MATCH RAIL FACE.
- ⑤ CONTINUOUS 1/2" V-DRIP GROOVE OR EQUIVALENT REQUIRED ON EXTERIOR SIDE OF FASCIA BEAM. TERMINATE 2'-0" FROM SUPPORTS.
- ⑥ 1" H.D.P.E. PIPE FOR GROUT INJECTION LOCATED AT FASCIA BEAMS AND FIRST BEAM EAST OF CL. ROADWAY.
- ⑦ FILL 4 1/2" HOLE AROUND TENSIONING ROD WITH GROUT AFTER TENSIONING. SEE SPECIAL PROVISIONS.
- ⑧ FILL TAPERED RECESS AT END OF TENSIONING ROD WITH GROUT AFTER TENSIONING. GROUT SHALL BE FLUSH WITH FACE OF BEAM. SEE SPECIAL PROVISIONS.
- ⑨ MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ⑩ MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ⑪ DEBONDED STRANDS TO BE DEBONDED FOR A LENGTH OF 5'-0" FROM THE END OF THE BEAM.

DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, RAILING, SIDEWALK AND MEDIAN WHERE APPLICABLE.

ENGINEER WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE CONTRACTOR TO BUILD FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS.



**CAMBER DIAGRAM**

- = DENOTES TOP LONGIT. REINF.
- = DENOTES STRAIGHT BONDED STRANDS
- ★ = DENOTES DEBONDED STRANDS (⑪)

CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936  
8-9-2012

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

**ERICKSON ENGINEERING**  
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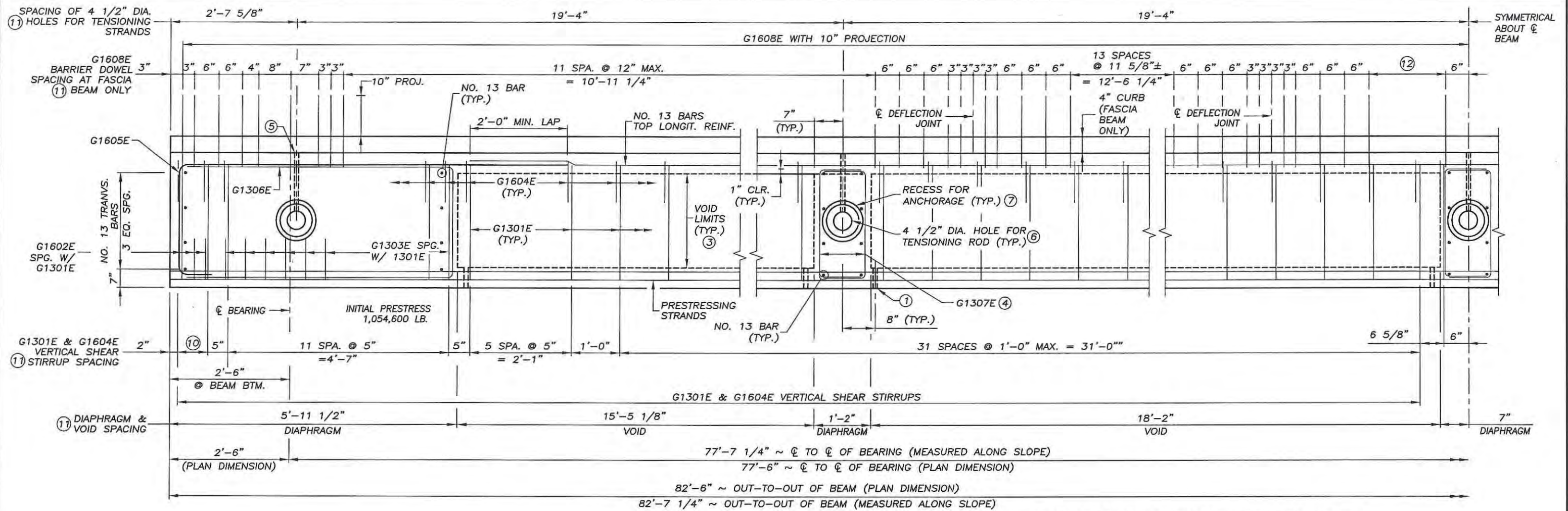
**33" PRESTRESSED CONCRETE BOX BEAM DETAILS**

S.P. 067-598-010

SHEET NO. 13 OF 26 SHEETS

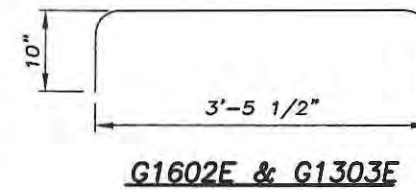
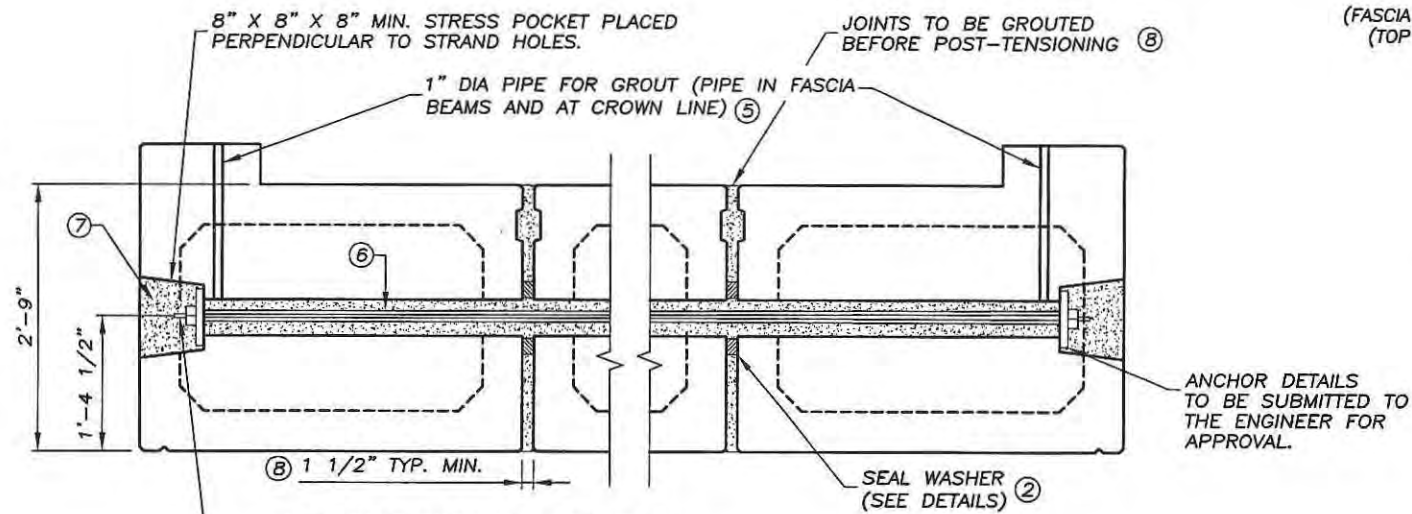
APPROVED:

BRIDGE NO. 67564



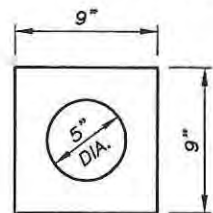
**BEAM ELEVATION**

(FASCIA BEAM SHOWN, INTERIOR BEAM SIMILAR)  
(TOP PRESTRESSING STRAND NOT SHOWN)

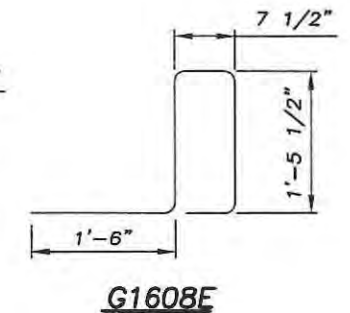
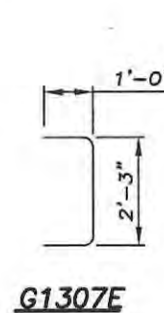
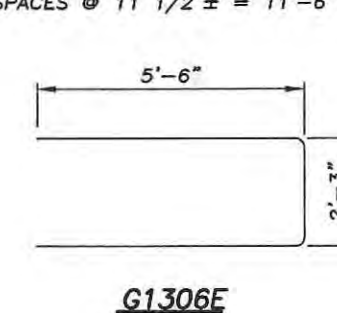
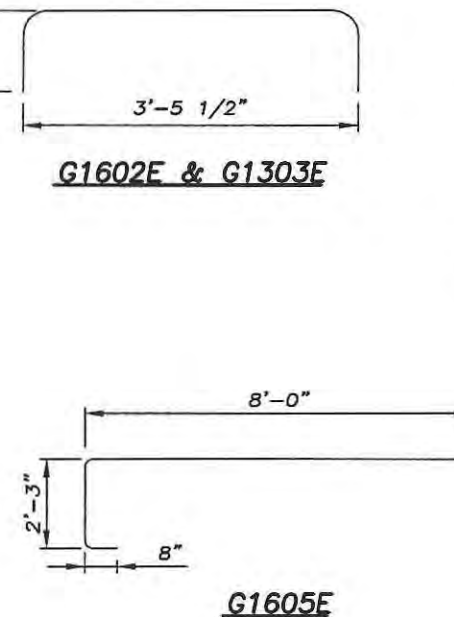
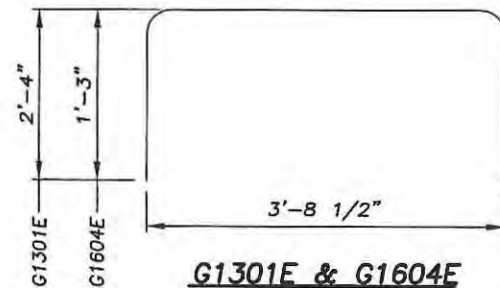


3 - 1/2" DIA STRANDS ( $f'_s = 270$  K.S.I.)  
POST-TENSIONED TO BE 86.7 KIPS PER DUCT  
OR OTHER APPROVED POST-TENSIONED SYSTEM (9)  
PROVIDING AN EQUAL FORCE.

**POST-TENSIONING DETAIL**



**SEAL WASHER (2)**  
(MAY ALSO BE 9" DIA. ROUND)



- (1) 1"  $\phi$  H.D.P.E. DRAIN PIPE AT EACH CORNER OF VOID (TYP.)
- (2) SEAL WASHER SHALL BE SPONGE NEOPRENE GASKET MATERIAL 2 1/2" MIN. THICK.
- (3) 3" INTERNAL CHAMFER NOT SHOWN.
- (4) PLACE HORIZONTAL LEG PARALLEL TO  $\bar{C}$  BEAM.
- (5) 1"  $\phi$  H.D.P.E. PIPE FOR GROUT INJECTION LOCATED AT FASCIA BEAMS AND FIRST BEAM EAST OF  $\bar{C}$  ROADWAY (TYP.). SEE SHEET 13 FOR LOCATION WITHIN CROSS SECTION.
- (6) FILL 4 1/2"  $\phi$  HOLE AROUND TENSIONING ROD WITH GROUT AFTER TENSIONING. SEE SPECIAL PROVISIONS. (TYP.)
- (7) OUTSIDE FACE OF FASCIA BEAM ONLY. FILL TAPERED RECESS AT END OF TENSIONING ROD WITH GROUT AFTER TENSIONING. GROUT SHALL BE FLUSH WITH FACE OF BEAM. SEE SPECIAL PROVISIONS. (TYP.)
- (8) FILL 1 1/2" SPACE BETWEEN BEAMS WITH GROUT AND ALLOW TO CURE FOR 48 HOURS MIN. BEFORE POST-TENSIONING. SEE SPECIAL PROVISIONS.
- (9) ANCHOR DETAILS TO BE SUBMITTED TO THE BRIDGE OFFICE FOR APPROVAL.
- (10) 2 SPACES @ 3 1/2" = 7"
- (11) MEASURED ALONG SLOPE.
- (12) 6 SPACES @ 11 1/2" ± = 11'-6 1/4"

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936

8-9-2012

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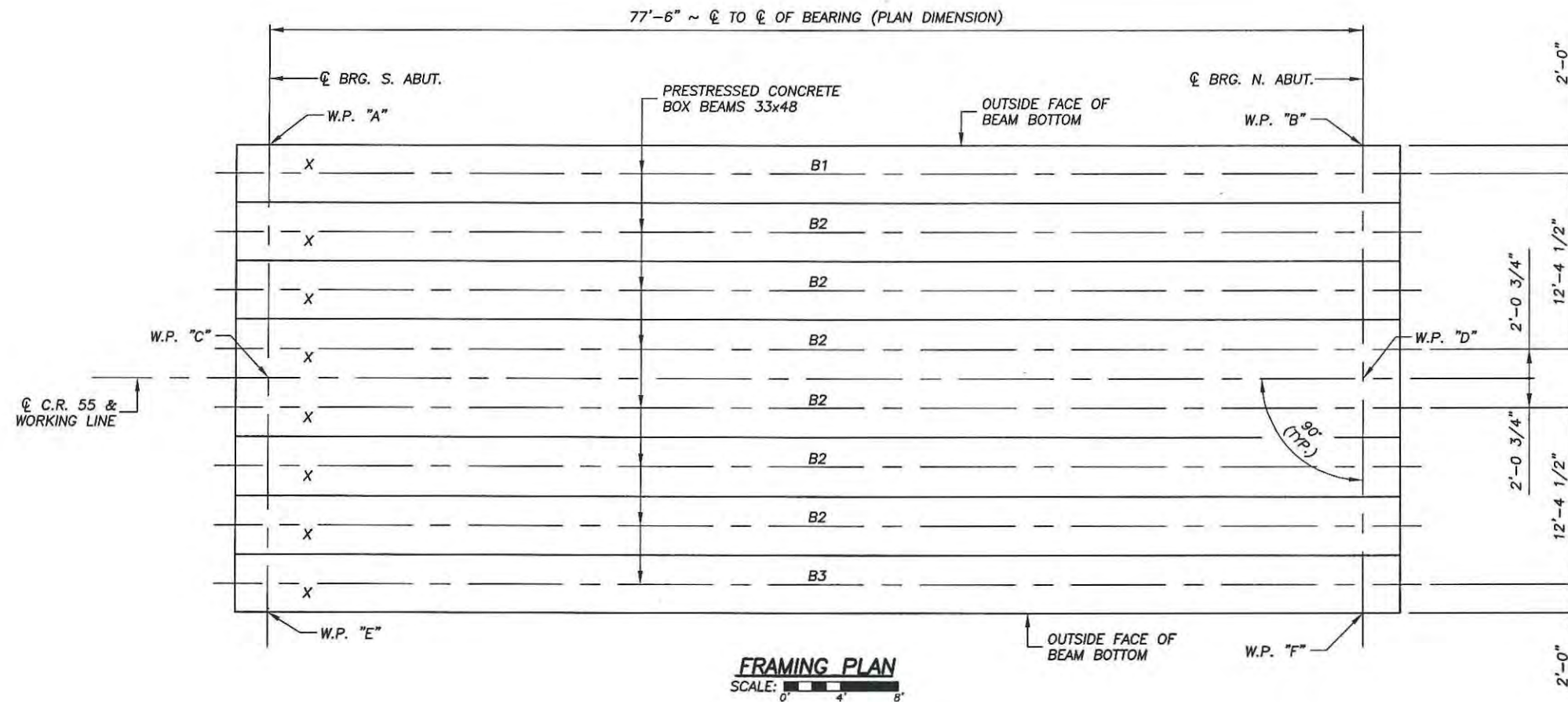
33" PRESTRESSED CONCRETE  
BOX BEAM DETAILS

S.P. 067-598-010

SHEET NO. 14 OF 26 SHEETS

APPROVED:

BRIDGE NO.  
67564



**NOTES**

"X" DENOTES END OF BEAM.

*John Sowada*  
CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936  
8-9-2012

DES.: JAS  
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DRN.: DSP  
CHK.: JAS

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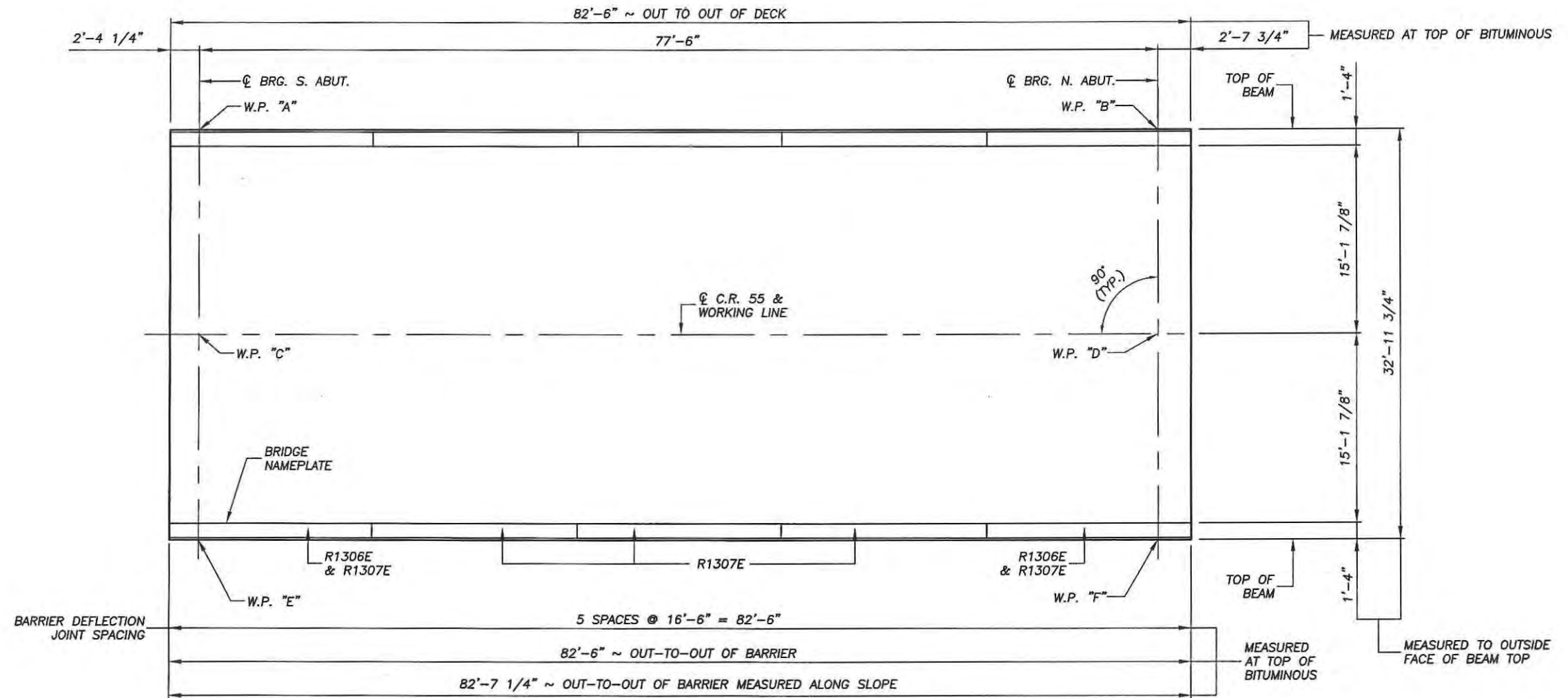
**SUPERSTRUCTURE DETAILS**

S.P. 067-598-010

APPROVED:

SHEET NO. 15 OF 26 SHEETS

BRIDGE NO.  
67564



**DECK PLAN**  
SCALE: 0" 4" 8"

**NOTES**

ALL DIMENSIONS ARE PLAN DIMENSIONS UNLESS NOTED OTHERWISE.

*John Sowada*  
CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
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DES.: JAS  
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DRN.: DSP  
CHK.: JAS

**ERICKSON ENGINEERING**  
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**SUPERSTRUCTURE DETAILS**

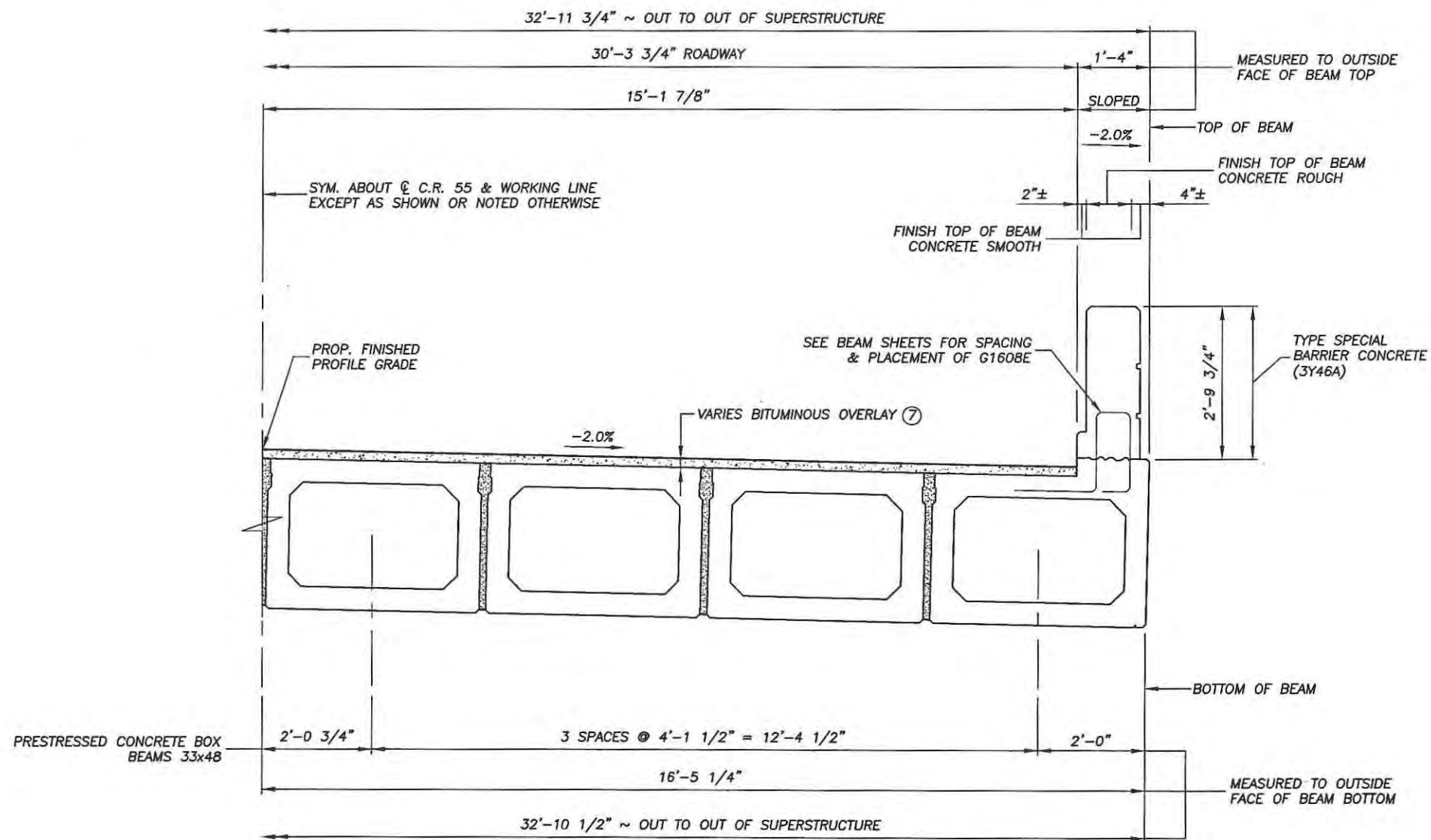
S.P. 067-598-010

APPROVED:

SHEET NO. 16 OF 26 SHEETS

BRIDGE NO. 67564





**PARITAL TRANSVERSE SECTION THRU DECK**

SCALE: 0' 1' 2'

SUMMARY OF QUANTITIES ~ SUPERSTRUCTURE		
④	TYPE SPECIAL BARRIER CONCRETE (3Y46A)	165 LIN. FT.
	REINFORCEMENT BARS (EPOXY COATED)	2500 POUND
⑤	PRESTRESSED CONCRETE BEAMS, TYPE 1-B3	8 EACH
	PRESTRESSED CONCRETE BOX BEAMS 33x48	661 LIN. FT.
②	BRIDGE NAMEPLATE (SEE DETAIL B101)	1 EACH
⑥	TYPE SP 12.5 WEARING COURSE MIXTURE (2,B) 4" THICK	952 SQ. YD.

LIST OF PREFORMED JOINT FILLERS			
TYPE	LIN. FT.	SIZE	LOCATION
①② CORK	15	1"x12"	BARRIER DEFLECTION JOINTS

- ① SEE SPECIAL PROVISIONS.
- ② PAYMENT SHALL BE CONSIDERED INCIDENTAL TO "TYPE SPECIAL BARRIER CONCRETE (3Y46A)."
- ③ INCLUDES RAILING QUANTITIES.
- ④ "TYPE SPECIAL BARRIER CONCRETE (3Y46A)" VOLUME IS APPROXIMATELY 18 CU. YDS.
- ⑤ PAYMENT FOR BEAMS INCLUDED IN ITEM "PRESTRESSED CONCRETE BOX BEAMS 33x48" PER LINEAR FOOT.
- ⑥ BITUMINOUS SHALL EXTEND 100 FEET EACH SIDE OF BRIDGE, SEE BRIDGE SURVEY PLAN AND PROFILE FOR LIMITS.
- ⑦ 2" MIN. @ BEGINNING AND END OF DECK  
5 3/4" MAX @ MIDSPAN

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 8-9-2012

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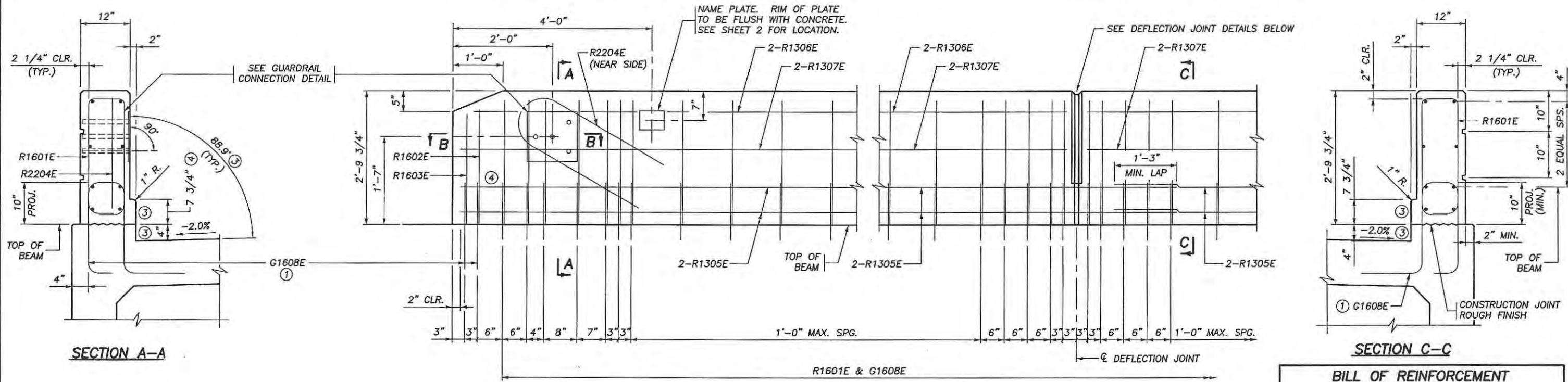
**SUPERSTRUCTURE DETAILS**

S.P. 067-598-010

APPROVED:

SHEET NO. 17 OF 26 SHEETS

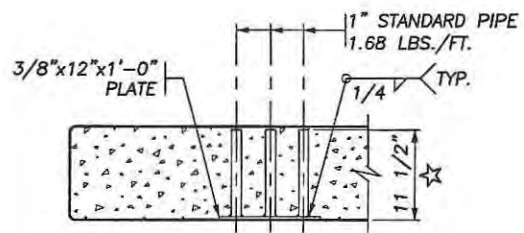
BRIDGE NO.  
67564



**SECTION A-A**

**INSIDE ELEVATION OF BARRIER**

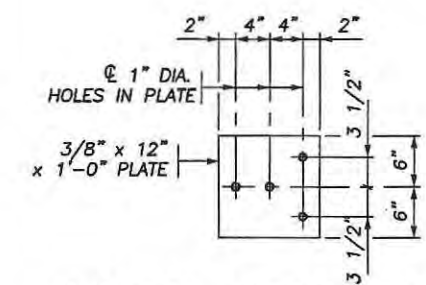
**SECTION C-C**



**SECTION B-B**

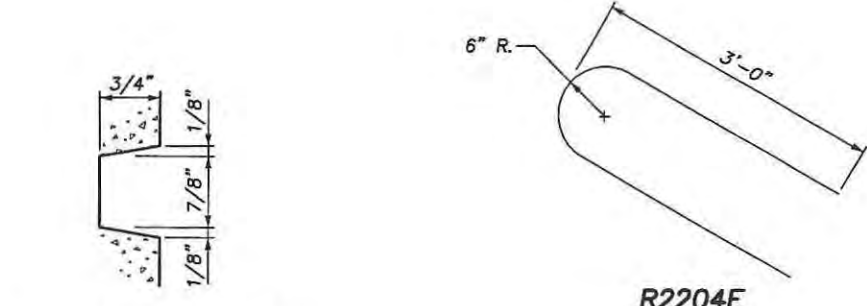
(REINFORCEMENT NOT SHOWN)

☆ DIMENSIONS INCLUDE 3/8" PLATE

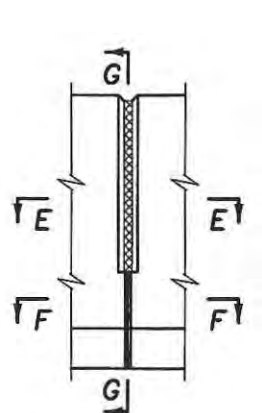


**GUARDRAIL CONNECTION DETAIL**

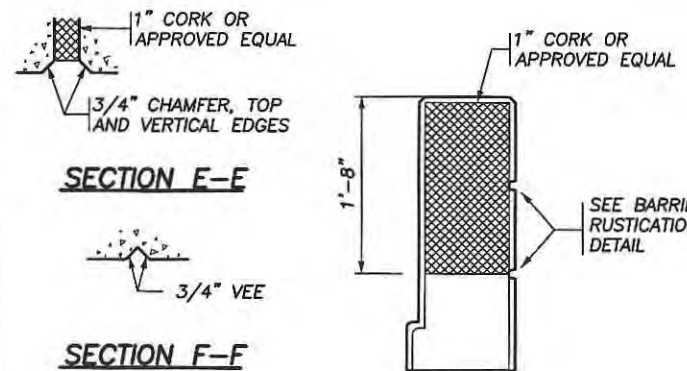
GALVANIZE AFTER FABRICATION PER Mn/DOT SPEC. 3394  
ESTIMATED WEIGHT = 22 LBS



**BARRIER RUSTICATION**



**ELEVATION**



**SECTION F-F**

**SECTION G-G**

**DEFLECTION JOINT DETAILS**

BILL OF REINFORCEMENT FOR BARRIER				
BAR	NO.	LENGTH	SHAPE	LOCATION
R1601E	220	6'-7"	□	BARRIER VERTICAL
R1602E	4	6'-1"	□	BARRIER VERTICAL
R1603E	4	5'-11"	□	BARRIER VERTICAL
R2204E	4	6'-6"	□	BARRIER VERTICAL
R1305E	24	28'-4"	—	BARRIER LONGIT.
R1306E	8	15'-11"	—	BARRIER LONGIT.
R1307E	32	16'-1"	—	BARRIER LONGIT.

**GENERAL NOTES**

LENGTH OF "CONCRETE BARRIER TYPE SPECIAL (3Y46A)" FOR PAYMENT SHALL BE MEASURED BETWEEN THE OUTSIDE FACES OF THE CONCRETE BARRIER.

CONCRETE BARRIER = 439 LBS./FT. (0.108 CU. YDS./FT.)

FINISH ALL EDGES OF BARRIER WITH 1/2" VEE, EXCEPT WHERE OTHERWISE NOTED.

MAXIMUM SPACING OF CONCRETE DEFLECTION JOINTS SHALL BE 20 FT.

SEE SUPERSTRUCTURE SHEET FOR JOINT SPACING.

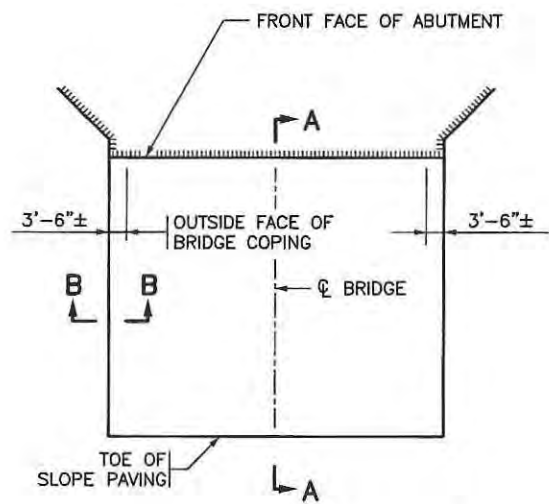
GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL, Mn/DOT SPEC. 3306.

GUARDRAIL CONNECTION, CORK, AND NAME PLATE TO BE CONSIDERED INCIDENTAL TO "CONCRETE BARRIER TYPE SPECIAL (3Y46A)".

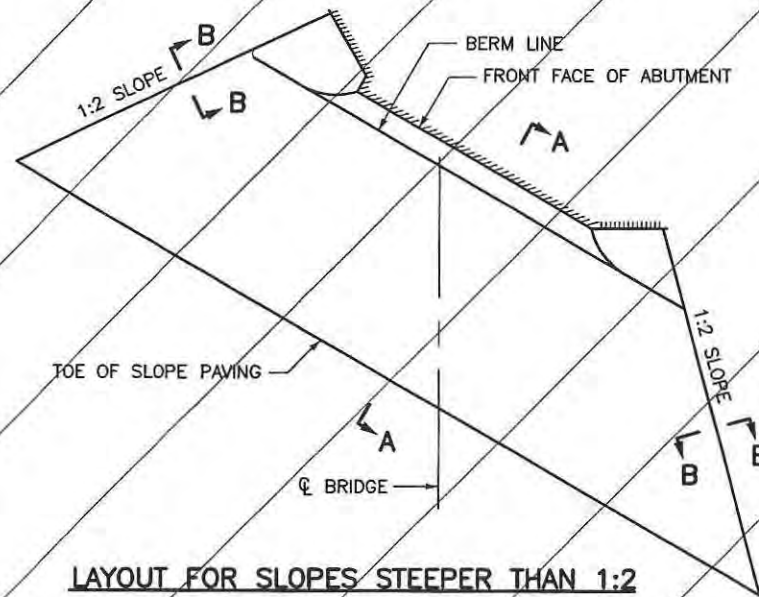
BARRIER QUANTITIES ARE LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.

- ① SEE SHEETS 13 AND 14 FOR DETAILS.
- ② 3 BARS PER LINE WITH 1'-3" MIN. LAP
- ③ RAIL FACE AND BEAM FACE SHOULD BE VERTICAL.
- ④ SEE GUARDRAIL SHEETS FOR DETAILS ON RUB RAIL ANCHORS AND CURB BLOCKOUT.

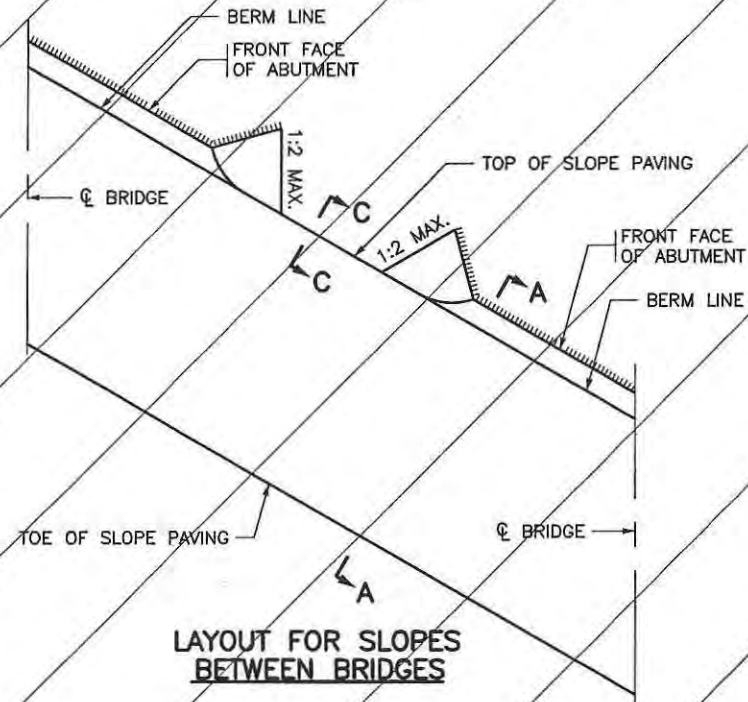
	DES.: JAS	<b>ERICKSON ENGINEERING</b> WWW.ERICKSON-ENG.COM 800-545-8020	<b>CONCRETE BARRIER TYPE SPECIAL</b> WITH INTEGRAL END POST (WITHOUT CONCRETE WEARING COURSE)	S.P. 067-598-010	APPROVED:	<b>BRIDGE NO.</b> 67564
	CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA LIC. NO. 45936			CHK.: RLD DRN.: DSP CHK.: JAS	SHEET NO. 18 OF 26 SHEETS	



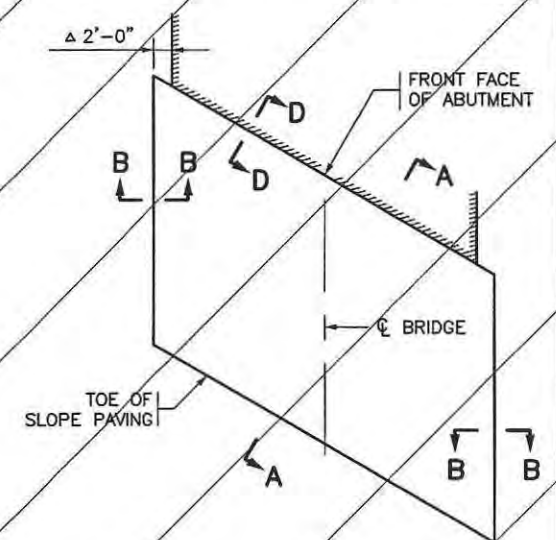
LAYOUT FOR SLOPES  
1:2 OR FLATTER ①



LAYOUT FOR SLOPES STEEPER THAN 1:2

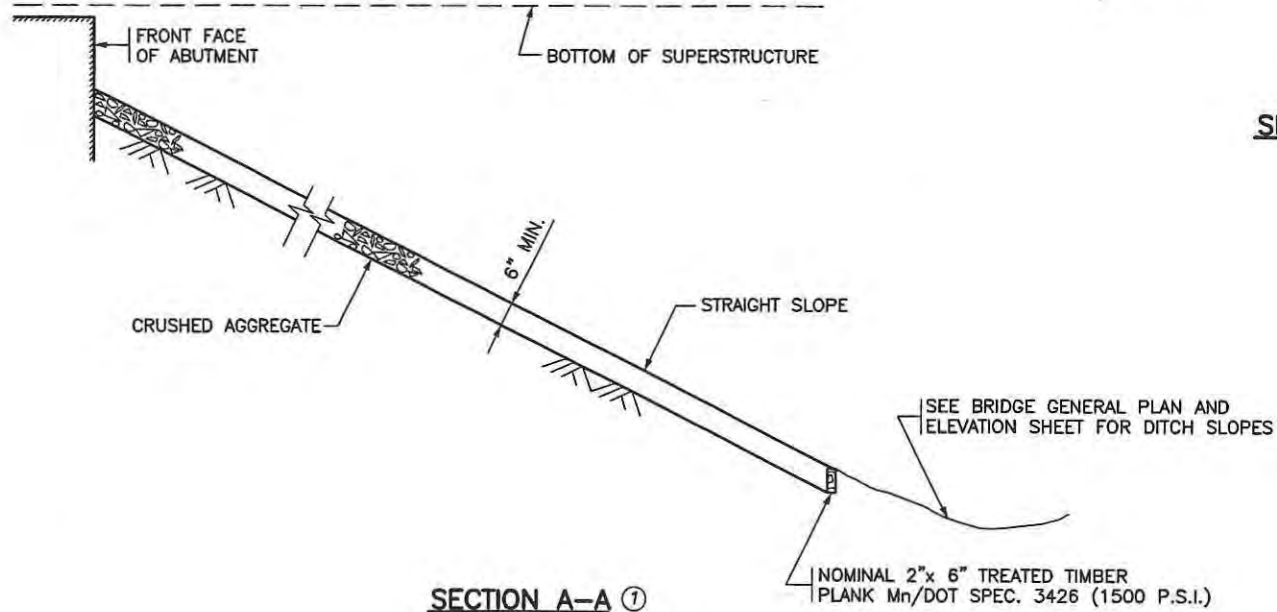


LAYOUT FOR SLOPES  
BETWEEN BRIDGES

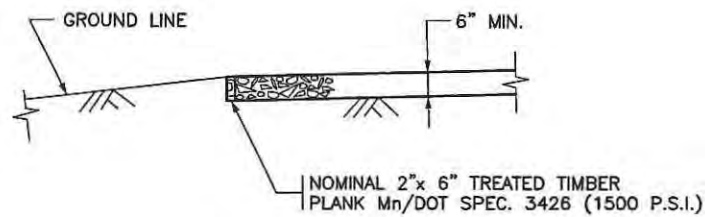


LAYOUT FOR SLOPES  
AT HIGH ABUTMENTS

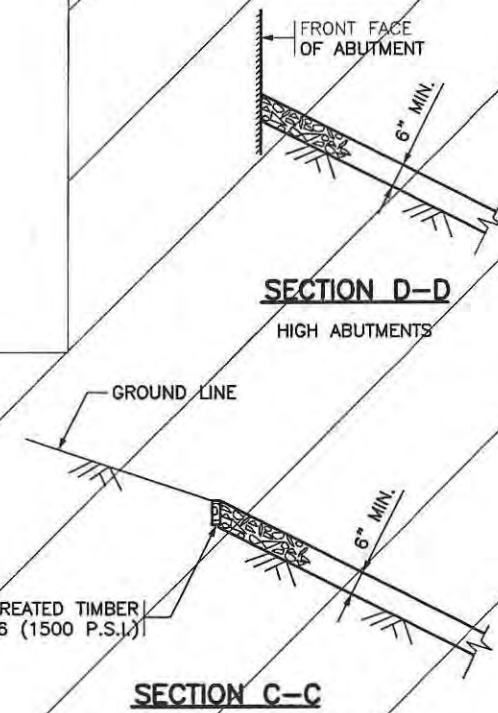
△ 2'-0" FOR TANGENT BRIDGE SUPERSTRUCTURES.  
VARIES 2'-0" MINIMUM FOR CURVED BRIDGE  
SUPERSTRUCTURES.



SECTION A-A ①



SECTION B-B



SECTION C-C

SECTION D-D  
HIGH ABUTMENTS

**GENERAL NOTE**

SLOPES ARE EXPRESSED AS A RATIO OF  
VERTICAL DISTANCE: HORIZONTAL DISTANCE.

① DETAIL MODIFIED.

REVISION:  
APPROVED: SEPTEMBER 26, 2003  
*Daniel J. Johnson*  
STATE BRIDGE ENGINEER

STANDARD SHEET NO.:  
5-397.302 MOD.  
STANDARD APPROVED:  
SEPTEMBER 26, 2003

CERTIFIED BY: *John Sowada*  
PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936  
B-9-2012

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

**ERICKSON ENGINEERING**  
WWW.ERICKSON-ENG.COM 800-545-8020

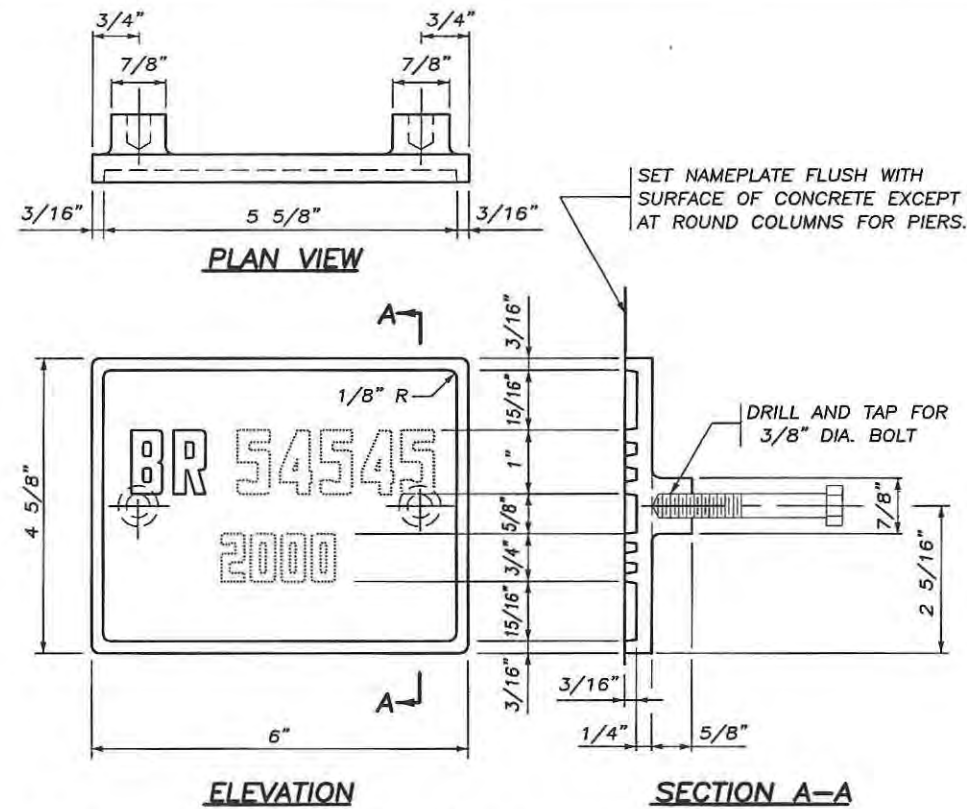
**STABILIZED AGGREGATE SLOPE  
PAVING UNDER BRIDGE**

S.P. 067-598-010

APPROVED:

SHEET NO. 19 OF 26 SHEETS

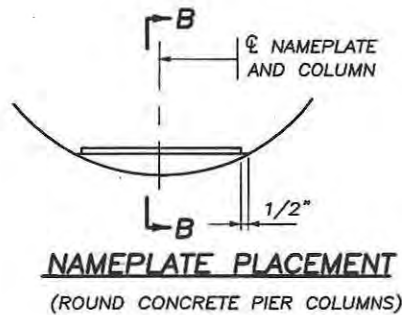
BRIDGE NO.  
67564



THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION. DATA TO BE SHOWN ON NAMEPLATE IS AS FOLLOWS:

BRIDGE 67564

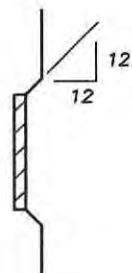
YEAR 2012



**NOTES:**

- NO SHOP DRAWING REQUIRED.
- MATERIAL SHALL COMPLY WITH Mn/DOT SPEC. 3327.
- LETTERS AND NUMBERS SHALL CONFORM TO THOSE SHOWN.
- DRAFT ON LETTERS AND NUMBERS SHALL NOT BE MORE THAN 3" IN 12".
- HORIZONTAL SPACING OF LETTERS AND NUMBERS SHALL PRODUCE A BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.
- TOP SURFACE OF LETTERS, NUMBERS AND FRAMES SHALL BE BURNISHED.
- FURNISH 2 STEEL BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE.
- ALL DIMENSIONS FOR 3/4" HIGH LETTERS AND NUMBERS SHALL BE IN DIRECT PROPORTION TO THOSE SHOWN FOR THE 1" HIGH LETTERS AND NUMBERS.

**SECTION B-B**



APPROVED: NOVEMBER 22, 2002

*Daniel J. Morgan*  
STATE BRIDGE ENGINEER

STATE OF MINNESOTA  
DEPARTMENT OF TRANSPORTATION

BRIDGE NAMEPLATE  
(FOR NEW BRIDGES)

REVISION

DETAIL NO.

B101

APPROVED: NOVEMBER 22, 2002

*Daniel J. Morgan*  
STATE BRIDGE ENGINEER

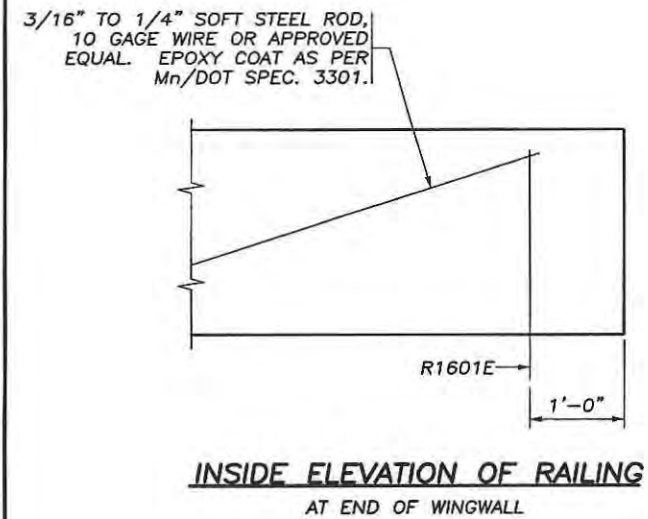
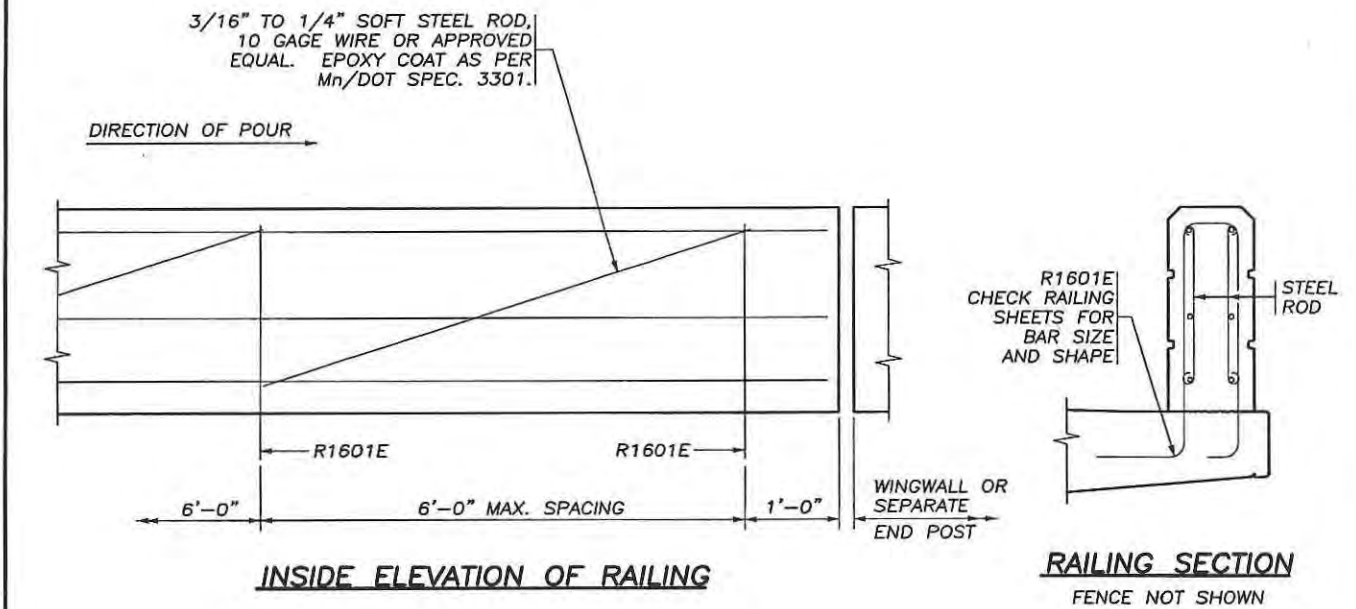
STATE OF MINNESOTA  
DEPARTMENT OF TRANSPORTATION

CONCRETE PARAPET RAILING  
(SLIPFORM ALTERNATE)

REVISION

DETAIL NO.

B831



**NOTES:**

- CONTRACTOR WILL TOOL V-GROOVE AT DEFLECTION JOINTS AT TIME RAIL IS CAST AND SHALL EXTEND V-GROOVE AROUND ENTIRE PERIMETER OF RAIL.
- FOR ADDITIONAL DIMENSIONS, DETAILS, REINFORCEMENT AND NOTES SEE RAILING SHEET.
- FORM RAIL FOR A MINIMUM OF 2' ON EACH SIDE OF EXPANSION DEVICES, LIGHT STANDARDS AND DECK DRAIN BOX OUTS.
- PAY QUANTITIES WILL NOT BE ADJUSTED AS A RESULT OF SELECTING THIS ALTERNATE.
- USE A SIMILAR METHOD FOR TALLER RAILINGS OR MODIFIED VERSIONS OF THIS RAILING.

*John Sowada*  
CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936  
8-9-2012

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

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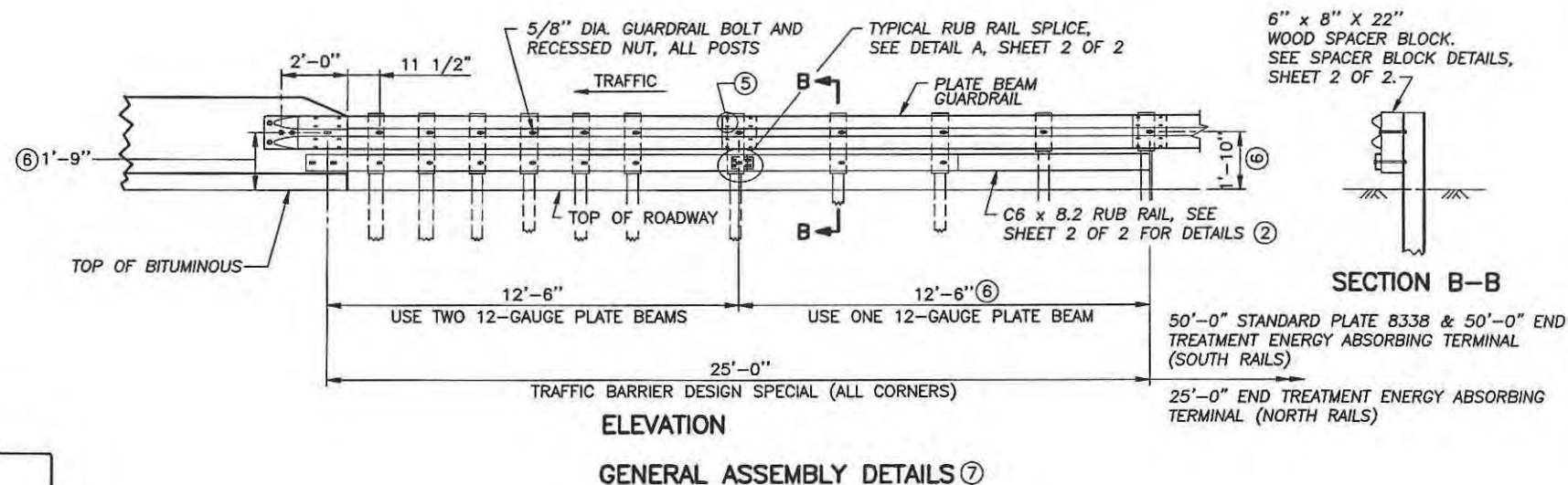
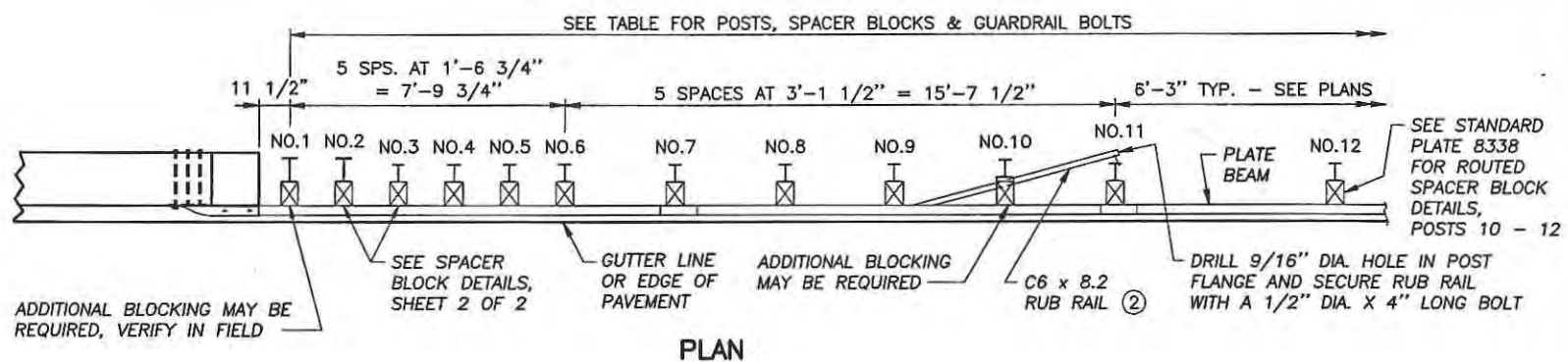
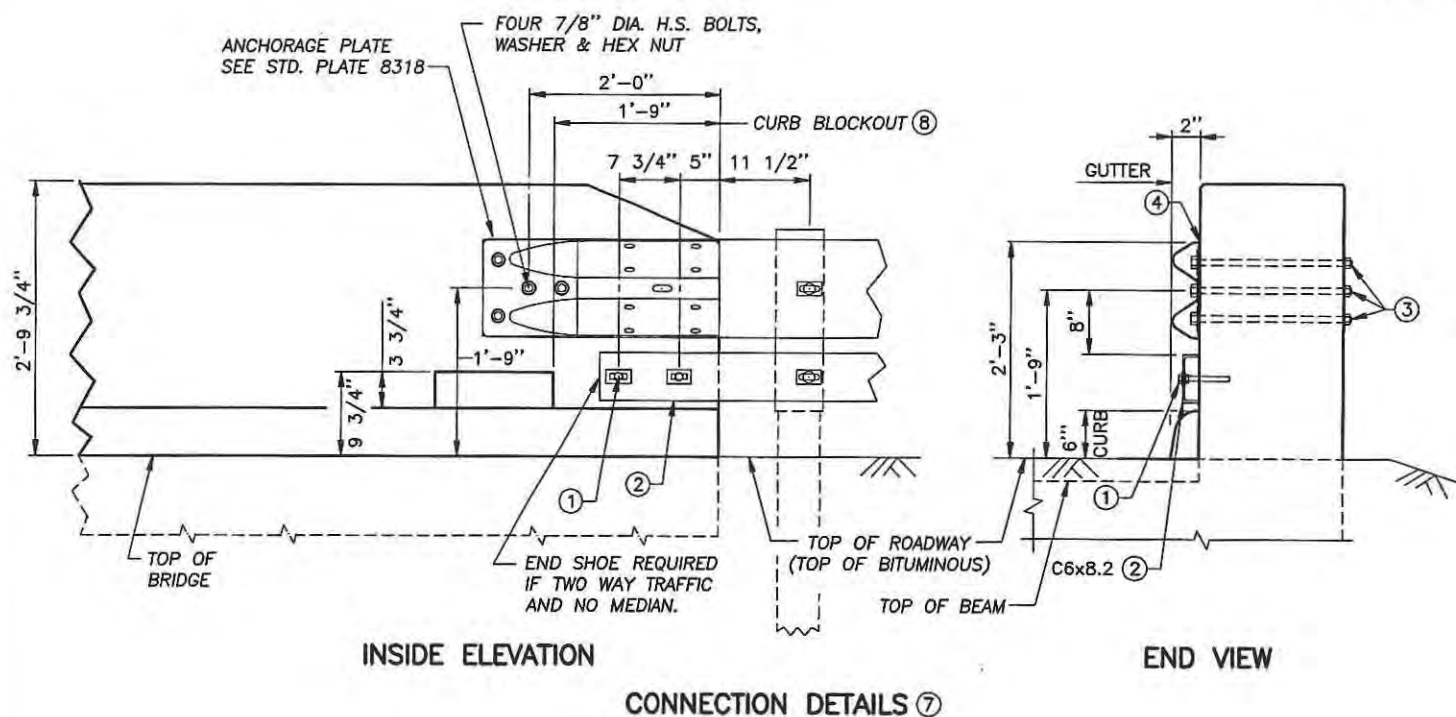
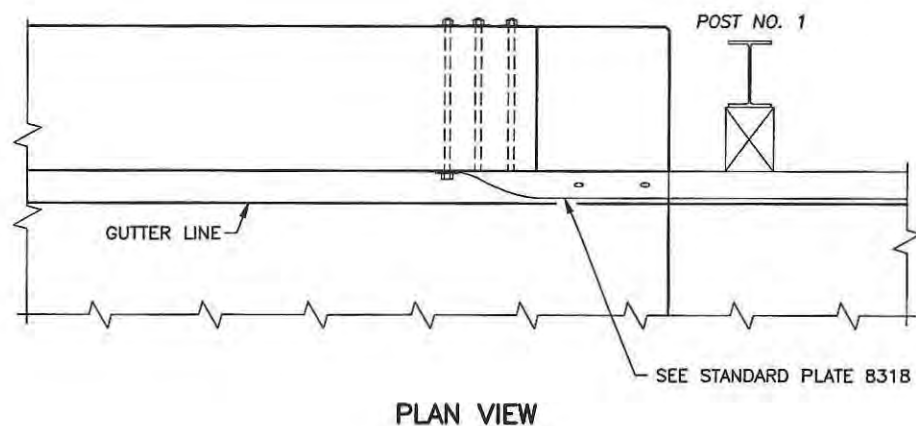
MISC. BRIDGE DETAILS

S.P. 067-598-010

APPROVED:

SHEET NO. 20 OF 26 SHEETS

BRIDGE NO.  
67564



POST, SPACER BLOCK & BOLT TABLE

DESCRIPTION	POST NO.	SIZE
POST	1 & 2	WB X 21 X 8'-0" MIN. LONG
	3 - 12	WB X 9 X 6'-0" MIN. LONG
SPACER BLOCK	1 - 9	6" X 8" X 22"
	10 - 12	6" X 8" X 14"
GUARDRAIL BOLT & RECESSED NUT	1 - 12	5/8" DIA. X 10" - GUARDRAIL
	1 - 9	5/8" DIA. X 12" - RUB RAIL

NOTES:

SOIL COMPACTION AT END POST AS PER SPEC. 2451.

GUARDRAIL CONNECTION SHALL BE THE SAME AS REQUIRED ON BRIDGE RAILINGS, SEE BRIDGE DETAILS MANUAL FOR ADDITIONAL INFORMATION.

- ① 5/8" DIA. BOLTS WITH APPROVED CONCRETE ANCHORS EMBEDDED 5" IN CONCRETE BARRIER. LOCATE CONCRETE ANCHORS TO MISS BRIDGE REINFORCEMENT
- ② RUB RAIL SHALL BE USED WHEN THERE IS NO CURBING ON APPROACH PANEL.
- ③ 7/8" DIA. H.S. BOLT OR EQUAL THREADED ROD, 3" X 2" X 1/4" PLATE WASHER AND HEX NUT (4 REQUIRED).
- ④ TIMBER BLOCKING MAY BE REQUIRED BEHIND GUARDRAIL CONNECTION AND RUB RAIL DEPENDING ON CURB WIDTH.
- ⑤ 5/8" DIA. X 1-1/4" LONG GUARDRAIL BOLTS AND NUTS TYPICAL AT SPLICES.
- ⑥ GUARDRAIL CENTERLINE HEIGHT IS 1'-9" FROM 0' TO 12'-6" FROM BRIDGE. HEIGHT TRANSITIONS FROM 1'-9" TO 1'-10" BETWEEN 12'-6" AND 25' FROM BRIDGE.
- ⑦ DETAIL MODIFIED
- ⑧ 3 3/4" X 1'-9" CURB BLOCKOUT REQUIRED TO ACCOMMODATE RUB RAIL.

TRAFFIC BARRIER DESIGN SPECIAL

STANDARD SHEET NO.:  
5-297.619 MOD. (1 OF 2)

STANDARD APPROVED:  
APRIL 2, 2012

DES.: JAS  
CHK.: RLD  
DRN.: DSP  
CHK.: JAS

CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
LIC. NO. 45936  
8-9-2012

ERICKSON ENGINEERING  
WWW.ERICKSON-ENG.COM 800-545-8020

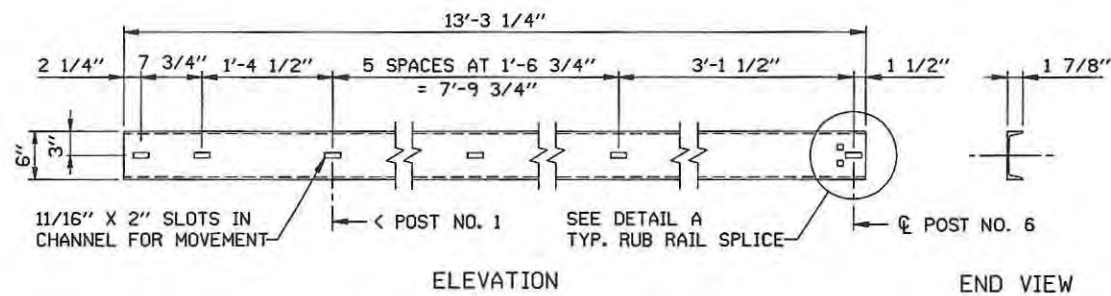
W-BEAM TRANSITION TO CONC. END POST WITH OR WITHOUT APPROACH CURB (STEEL POST)

S.P. 067-598-010

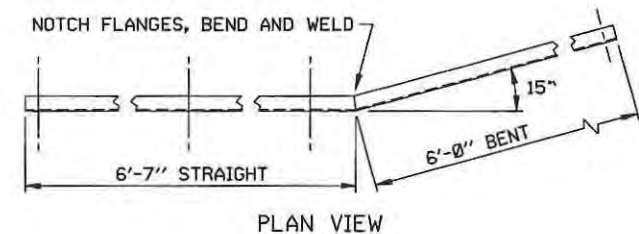
APPROVED:

SHEET NO. 21 OF 26 SHEETS

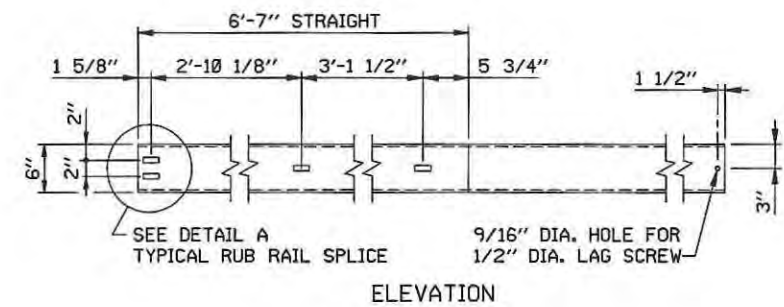
BRIDGE NO. 67564



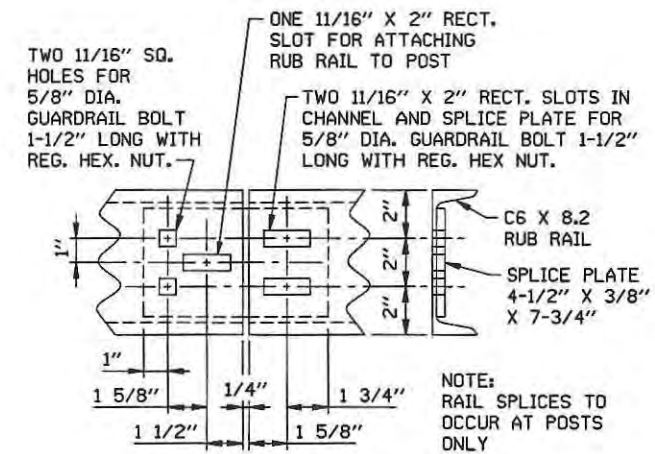
**RUB RAIL STRAIGHT SECTION**  
NON-STANDARD RUB RAIL LENGTH



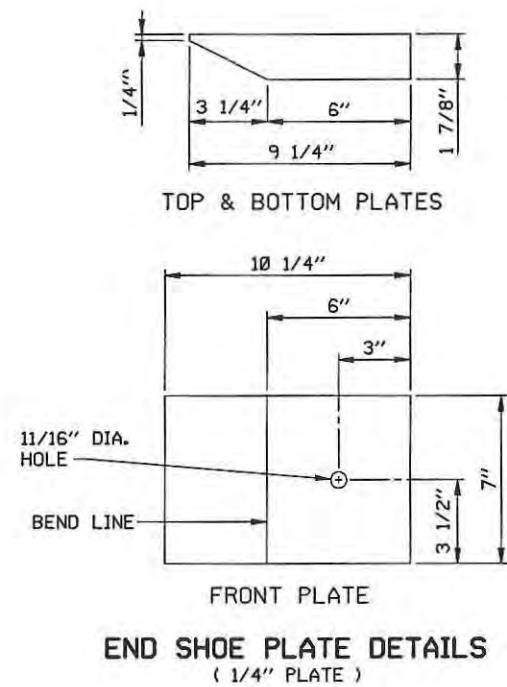
PLAN VIEW



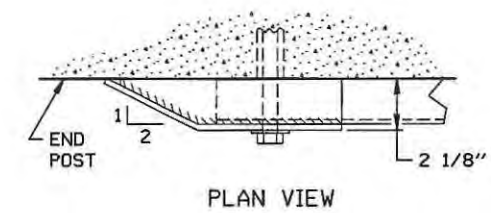
**RUB RAIL BENT SECTION**  
NON-STANDARD RUB RAIL LENGTH



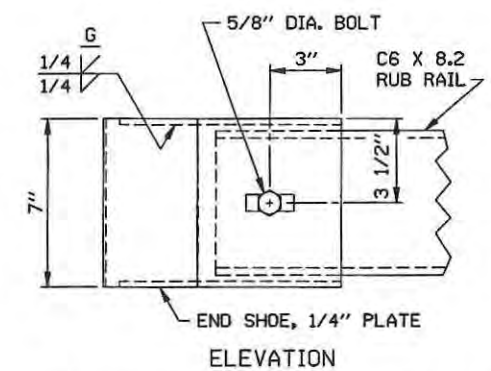
**DETAIL A**  
TYPICAL RUB RAIL SPLICE



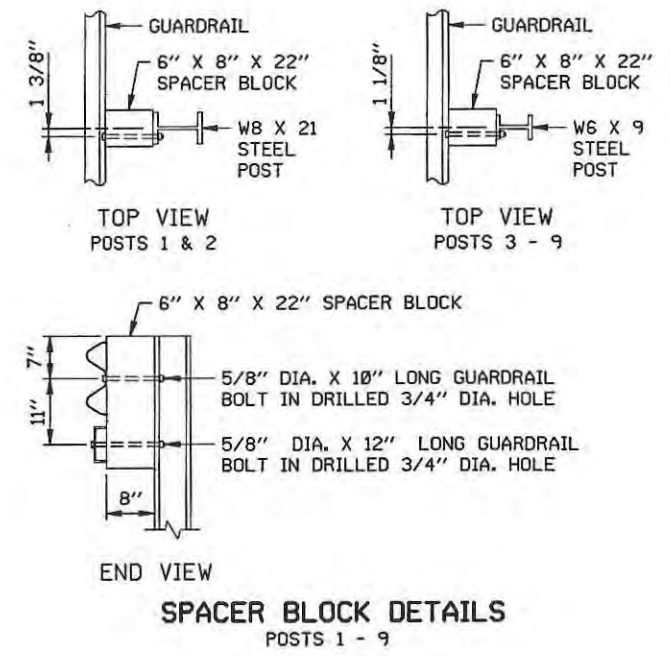
**END SHOE PLATE DETAILS**  
( 1/4" PLATE )



PLAN VIEW



**RUB RAIL END SHOE ASSEMBLY**  
( USE IF TWO WAY TRAFFIC WITH NO MEDIAN )

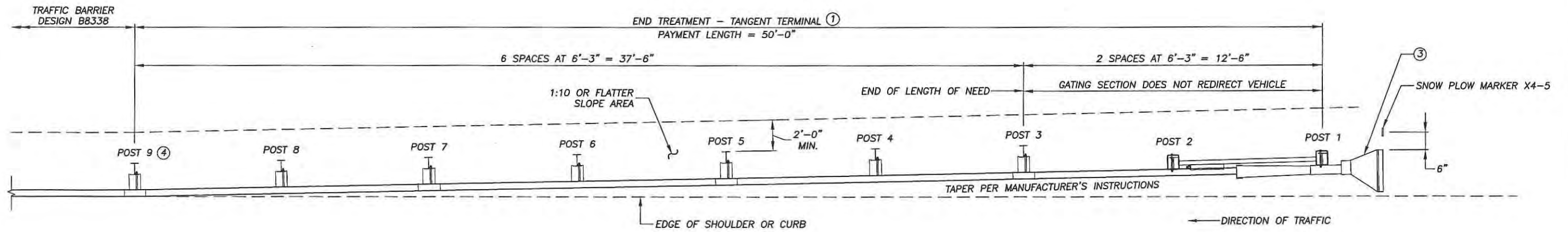


**SPACER BLOCK DETAILS**  
POSTS 1 - 9

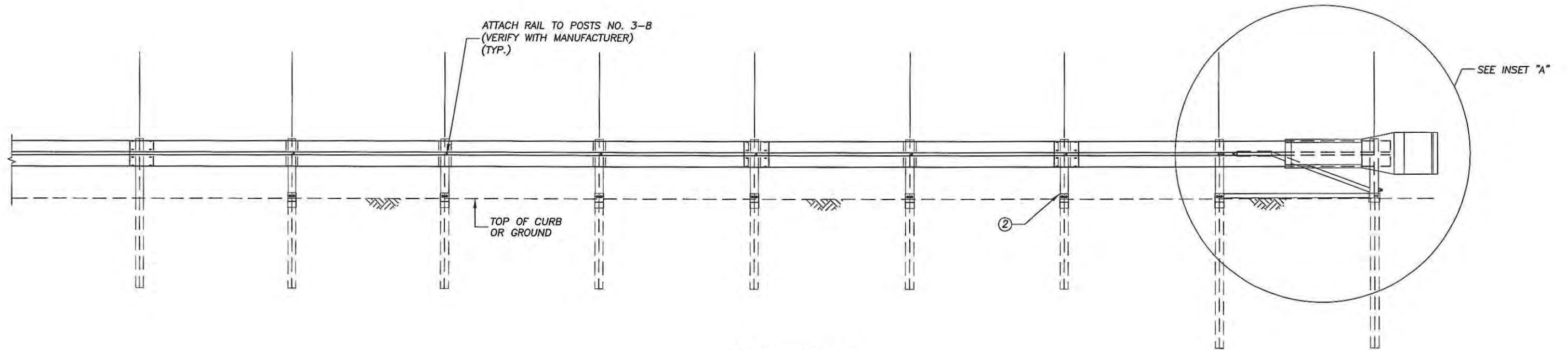
- NOTES:**
- GALVANIZE ALL HARDWARE PER SPEC. 3392.
  - USE END SHOE ON RUB RAIL IF TWO WAY TRAFFIC WITH NO MEDIAN.
  - RUB RAIL IS C6 x 8.2
  - STRUCTURAL STEEL PER SPEC. 3306 UNLESS OTHERWISE NOTED.
  - ALL SLOTTED HOLES ARE 11/16" x 2".
  - ALL SQUARE HOLES ARE 11/16".
  - GALVANIZE STRUCTURAL SHAPES PER SPEC. 3394 AFTER FABRICATION UNLESS OTHERWISE NOTED.
  - ① VERIFY DIMENSION IN FIELD.

**TRAFFIC BARRIER DESIGN SPECIAL**

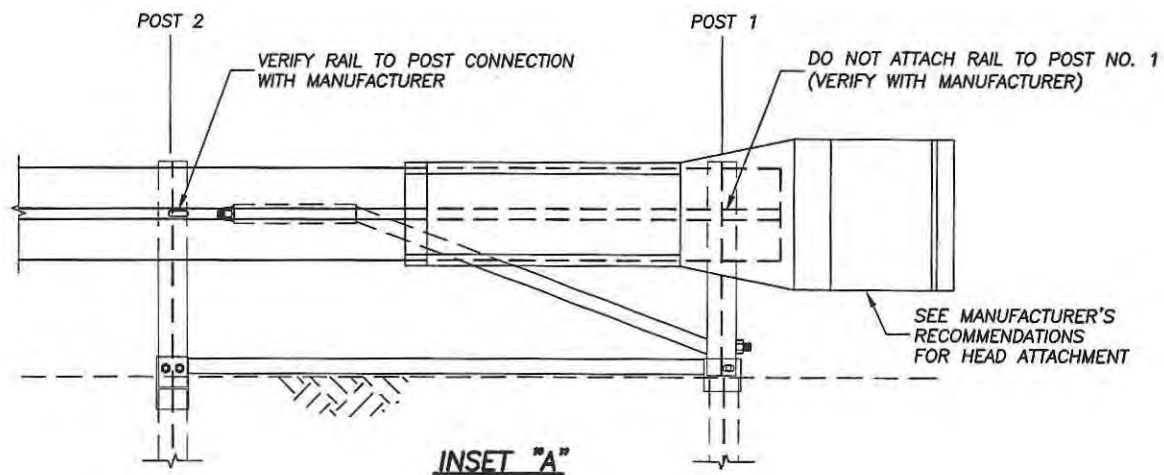
STANDARD SHEET NO.: 5-297.619 (2 OF 2)	DES.: JAS CHK.: RLD DRN.: DSP CHK.: JAS	ERICKSON ENGINEERING WWW.ERICKSON-ENG.COM 800-545-8020	W-BEAM TRANSITION TO CONC. END POST WITH OR WITHOUT APPROACH CURB (STEEL POST)	S.P. 067-598-010	APPROVED:	BRIDGE NO. 67564
STANDARD APPROVED: APRIL 2, 2012	CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA LIC. NO. 45936	8-9-2012		SHEET NO. 22 OF 26 SHEETS		



**PLAN VIEW**



**ELEVATION VIEW**



**INSET "A"**

**GENERAL NOTES:**

ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS, AND BEARING PLATES SHALL BE GALVANIZED.

THIS DRAWING IS FOR INFORMATION ONLY. CONTACT THE MANUFACTURER FOR CURRENT DETAILS AND INSTALLATION INSTRUCTIONS. REFER TO Mn/DOT STANDARD PLANS FOR ADDITIONAL GUARDRAIL INSTALLATION INFORMATION.

ALL ITEMS ON THIS SHEET AND REQUIRED BY MANUFACTURER ARE INCLUDED IN PAY ITEM "END TREATMENT - TANGENT TERMINAL" PER EACH UNLESS NOTED OTHERWISE.

SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

**KEYNOTES:**

- ① USE STEEL HINGED BREAKAWAY (HBA) POSTS OPTION ONLY ON POSTS NO. 1-8.
- ② THE NON-BREAKAWAY SECTION OF THE HBA POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE THE FINISHED GROUND LINE.
- ③ THE GUARDRAIL IS DESIGNED TO EXIT THE TERMINAL HEAD ON THE BACK SIDE OF THE GUARDRAIL INSTALLATION.
- ④ PAYMENT FOR POST 9 IS INCLUDED IN ITEM "TRAFFIC BARRIER DESIGN B8338" PER LIN. FT.

DESIGNED BY: *John Sowada*  
 CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936  
 DATE: 8-9-2012

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

**ERICKSON ENGINEERING**  
 WWW.ERICKSON-ENG.COM 800-545-8020

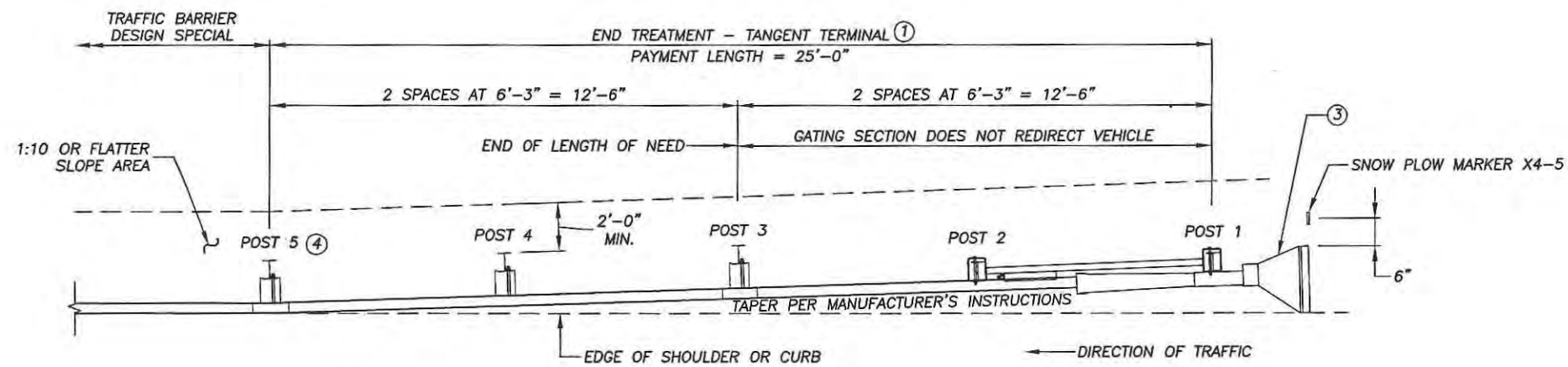
**END TREATMENT TANGENT TERMINAL SOUTH CORNERS ONLY**

S.P. 067-598-010

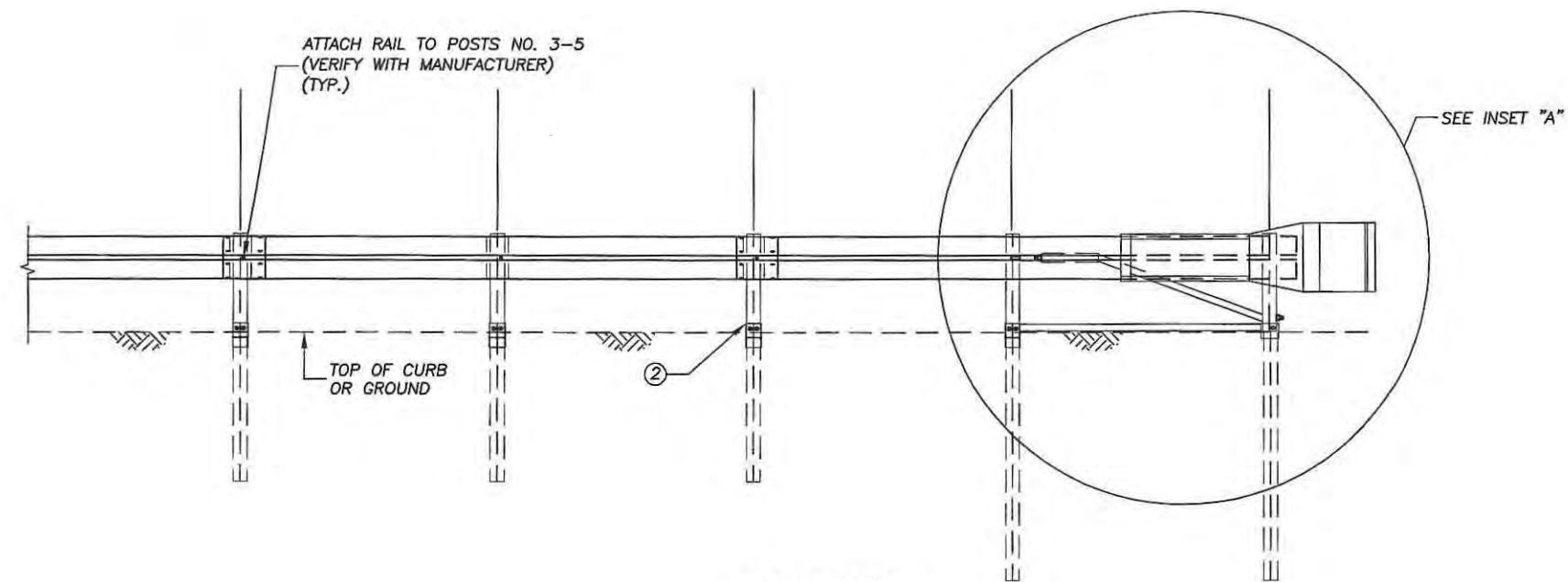
APPROVED:

SHEET NO. 23 OF 26 SHEETS

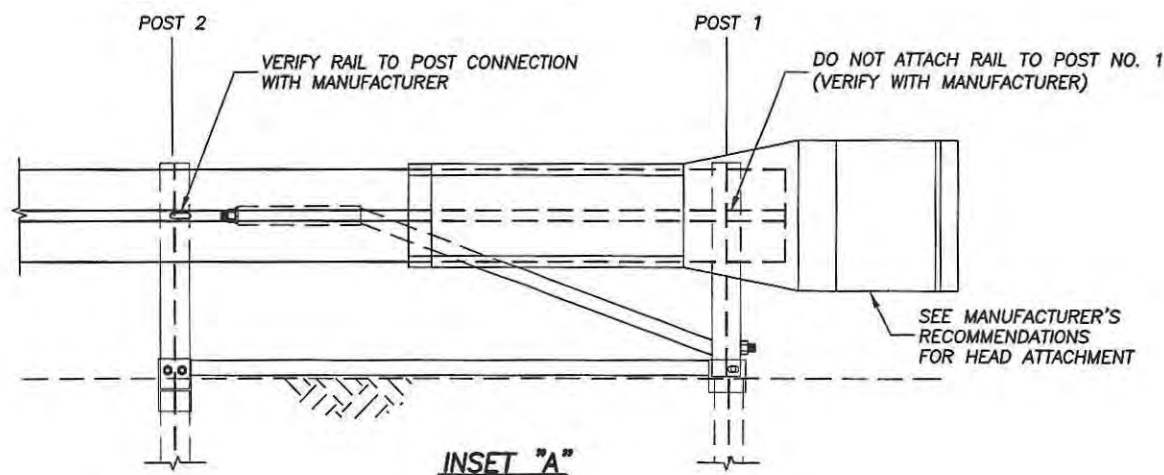
BRIDGE NO. 67564



**PLAN VIEW**



**ELEVATION VIEW**



**INSET "A"**

**GENERAL NOTES:**

ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS, AND BEARING PLATES SHALL BE GALVANIZED.

THIS DRAWING IS FOR INFORMATION ONLY. CONTACT THE MANUFACTURER FOR CURRENT DETAILS AND INSTALLATION INSTRUCTIONS. REFER TO Mn/DOT STANDARD PLANS FOR ADDITIONAL GUARDRAIL INSTALLATION INFORMATION.

ALL ITEMS ON THIS SHEET AND REQUIRED BY MANUFACTURER ARE INCLUDED IN PAY ITEM "END TREATMENT - TANGENT TERMINAL" PER EACH UNLESS NOTED OTHERWISE.

SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

**KEYNOTES:**

- ① USE STEEL HINGED BREAKAWAY (HBA) POSTS OPTION ONLY ON POSTS NO. 1-4.
- ② THE NON-BREAKAWAY SECTION OF THE HBA POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE THE FINISHED GROUND LINE.
- ③ THE GUARDRAIL IS DESIGNED TO EXIT THE TERMINAL HEAD ON THE BACK SIDE OF THE GUARDRAIL INSTALLATION.
- ④ PAYMENT FOR POST 5 IS INCLUDED IN ITEM "TRAFFIC BARRIER DESIGN SPECIAL" PER EACH.

DESIGNED BY: *John Sowada*  
 CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA  
 LIC. NO. 45936

DES.: JAS  
 CHK.: RLD  
 DRN.: DSP  
 CHK.: JAS

**ERICKSON ENGINEERING**  
 WWW.ERICKSON-ENG.COM 800-545-8020

**END TREATMENT  
 TANGENT TERMINAL  
 NORTH CORNERS ONLY**

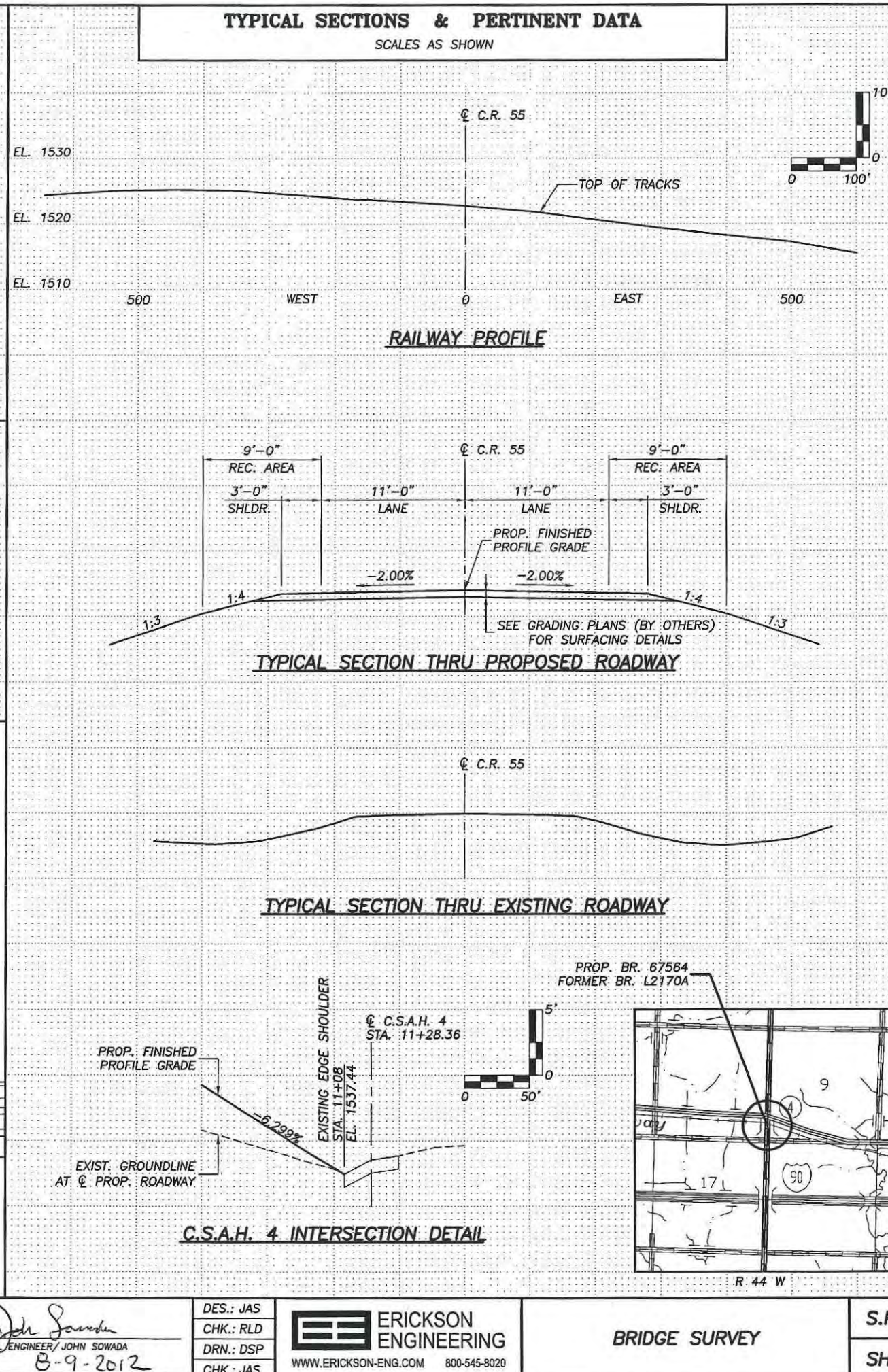
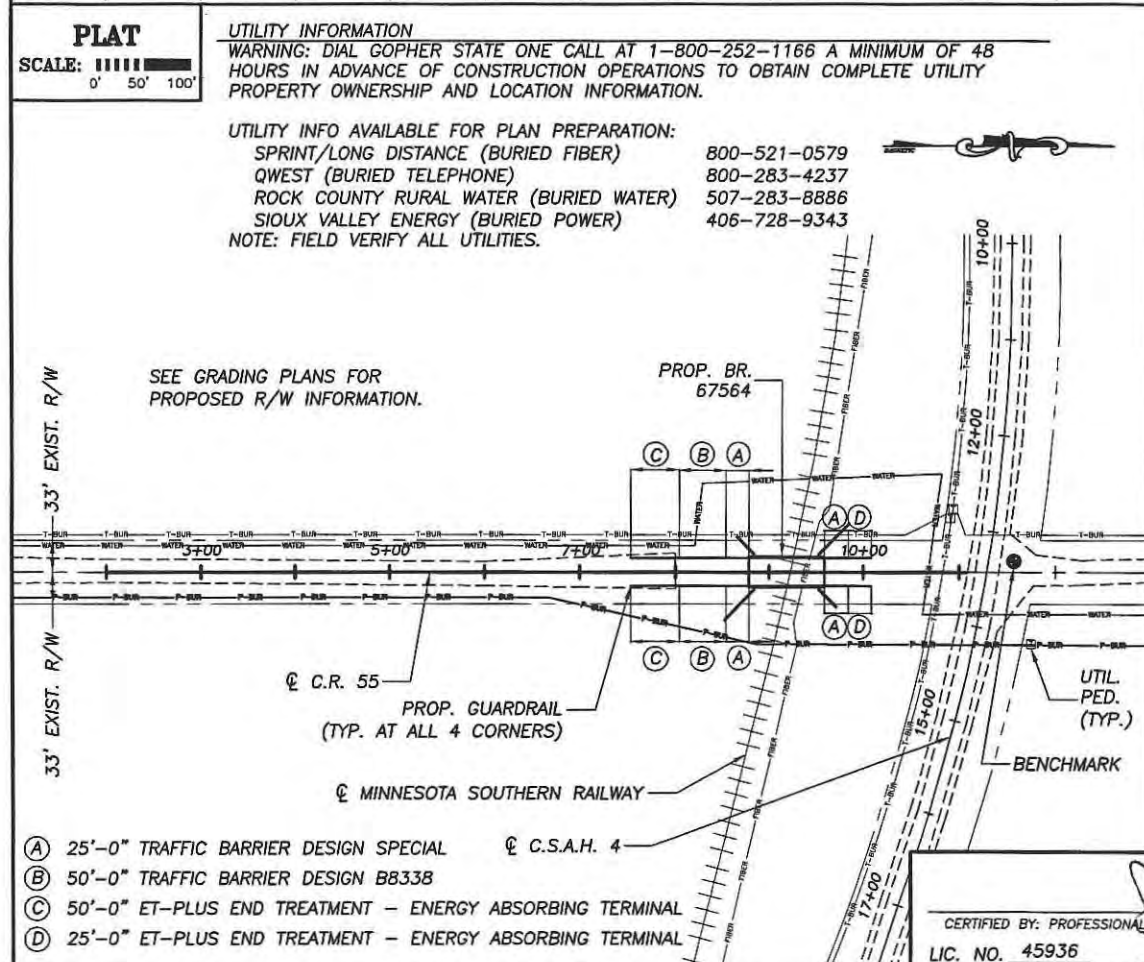
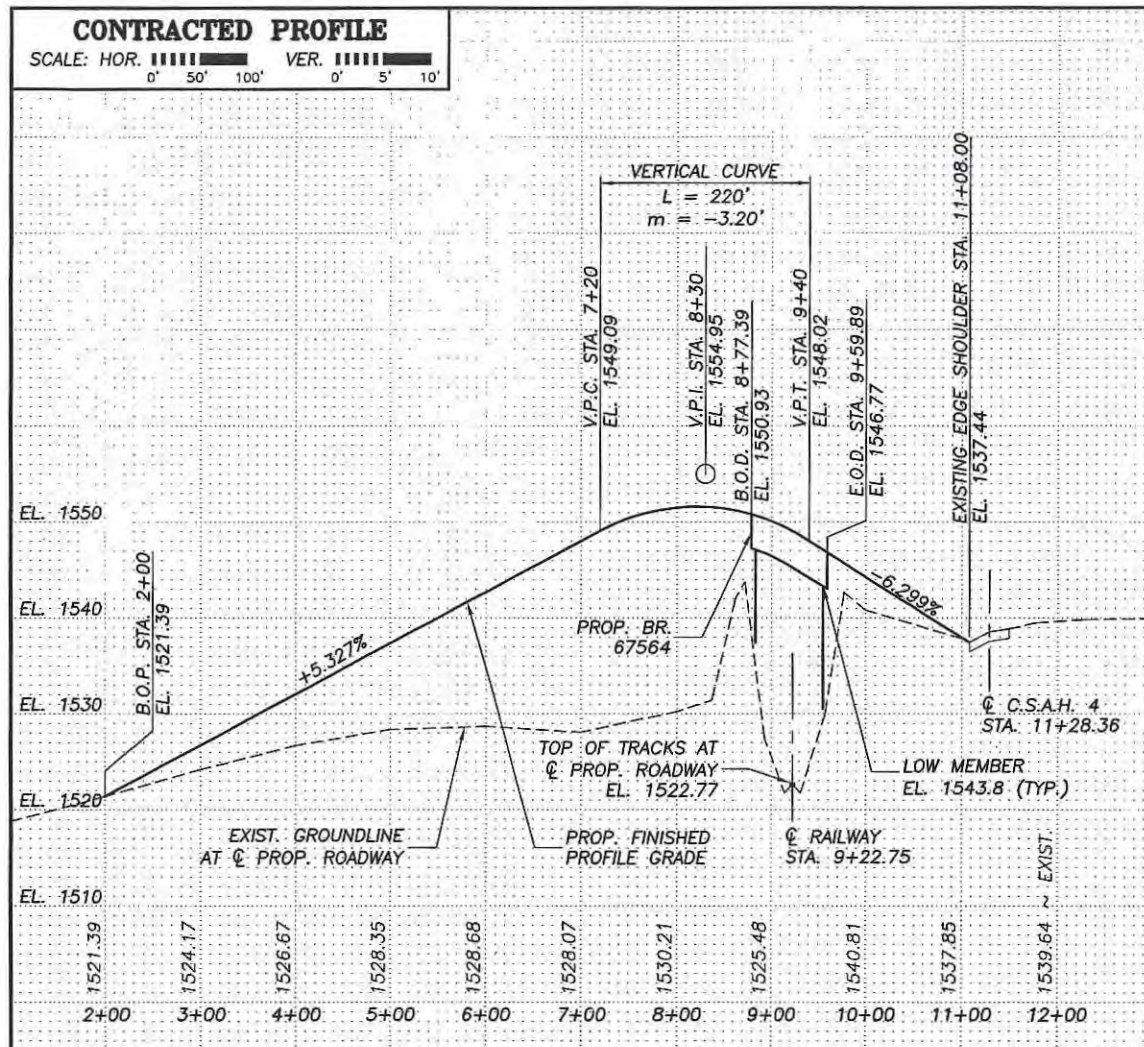
S.P. 067-598-010

APPROVED:

SHEET NO. 24 OF 26 SHEETS

BRIDGE NO.  
 67564

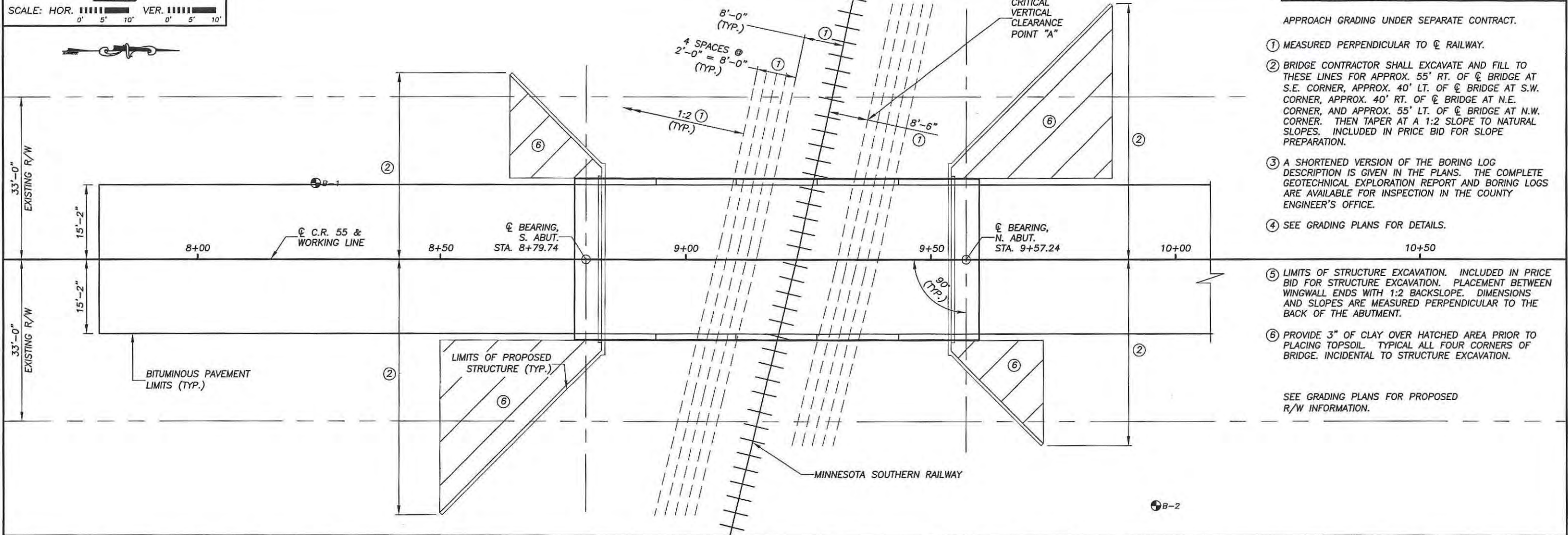




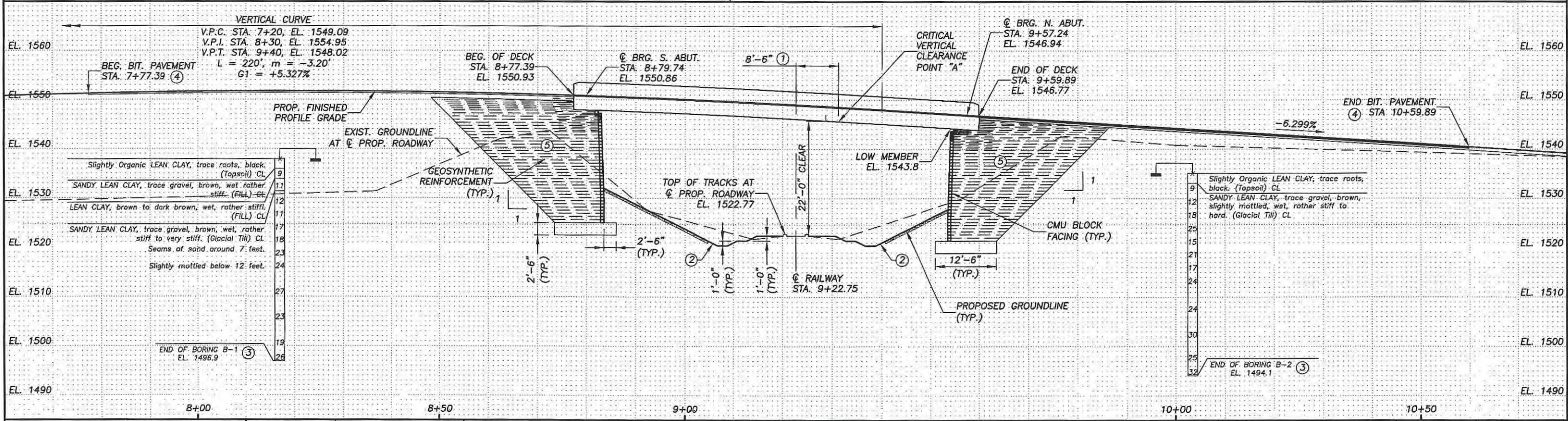
<b>Fed. Proj. No.</b>	
LOCATION ENGINEER'S OBSERVATION AT BRIDGE SITE	
DATE .....	
1. Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, rec. boots. ....	
2. Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway): Given location, type, length, height above high water, cross-sectional area, etc. ....	
3. Apparent Highwater Elevation ..... Feet Obtained from .....	
4. Other Data: Approx. velocity of water at time of survey .....	
<b>HYDRAULIC ENGINEER'S RECOMMENDATION</b>	
DATE .....	
Stream or Ditch Designation .....	
Drainage Area ..... SQ. MI.	
Max. Flood on Record ..... C.F.S.	
Max. Observed Highwater Elev. .... Feet	
Design Flood (___ yr. freq.) ..... C.F.S.	
Headwater Elevation ..... Feet	
Design Mean Velocity Through Structure ..... F.P.S.	
Total Stage Increase ..... Feet	
Low Member At or Above Elevation ..... Feet	
Waterway area req'd below elev. .... SQ. FT. (at right angles to channel)	
Basic Flood (100 yr. freq.) ..... C.F.S.	
Headwater Elevation ..... Feet	
Total Stage Increase ..... Feet	
Mean Velocity Through Structure ..... F.P.S.	
Flowline Elevation ..... Skew Angle .....	
Estimated Preliminary Total Scour At Pier Elevation ..... Feet (___ yr. freq.)	
<b>SCOUR CONFIRMATION RECOMMENDATION</b>	
DATE .....	
Total Scour At Pier Elevation ..... Feet (___ yr. freq.)	
Scour Code .....	
<b>ENGINEER'S RECOMMENDATION</b>	
DATE 10-20-2011	
82.5' PRESTRESSED CONCRETE BOX GIRDER SPAN	
29.65' ROADWAY ~ 0' SKEW	
Bridge Survey Sheets made from: SURVEY NOTES FROM ROCK COUNTY HIGHWAY DEPARTMENT (DATED AUGUST 2011)	
Benchmark Elevation 1539.36	
Location: NAIL AT JCT. C.R. 55 & C.S.A.H. 4, APPROX. 230 FT. NORTH OF PROPOSED BRIDGE SITE	
STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	
ON C.R. 55	
PROPOSED BRIDGE LOCATED 0.1 MILES SOUTH OF JCT. C.S.A.H. 4 OVER	
MINNESOTA SOUTHERN RAILWAY	
SEC. 9 TWP. 102 N R. 44 W	
TOWNSHIP MAGNOLIA COUNTY ROCK	
FORMER BRIDGE NO. L2170A (REMOVED)	
DES.: JAS	
CHK.: RLD	
DRN.: DSP	
CHK.: JAS	
ERICKSON ENGINEERING WWW.ERICKSON-ENG.COM 800-545-8020	
BRIDGE SURVEY	
S.P. 067-598-010	
APPROVED:	
SHEET NO. 25 OF 26 SHEETS	
BRIDGE NO. 67564	



Fed. Proj. No.



- APPROACH GRADING UNDER SEPARATE CONTRACT.
- ① MEASURED PERPENDICULAR TO C RAILWAY.
  - ② BRIDGE CONTRACTOR SHALL EXCAVATE AND FILL TO THESE LINES FOR APPROX. 55' RT. OF C BRIDGE AT S.E. CORNER, APPROX. 40' LT. OF C BRIDGE AT S.W. CORNER, APPROX. 40' RT. OF C BRIDGE AT N.E. CORNER, AND APPROX. 55' LT. OF C BRIDGE AT N.W. CORNER. THEN TAPER AT A 1:2 SLOPE TO NATURAL SLOPES. INCLUDED IN PRICE BID FOR SLOPE PREPARATION.
  - ③ A SHORTENED VERSION OF THE BORING LOG DESCRIPTION IS GIVEN IN THE PLANS. THE COMPLETE GEOTECHNICAL EXPLORATION REPORT AND BORING LOGS ARE AVAILABLE FOR INSPECTION IN THE COUNTY ENGINEER'S OFFICE.
  - ④ SEE GRADING PLANS FOR DETAILS.
  - ⑤ LIMITS OF STRUCTURE EXCAVATION. INCLUDED IN PRICE BID FOR STRUCTURE EXCAVATION. PLACEMENT BETWEEN WINGWALL ENDS WITH 1:2 BACKSLOPE. DIMENSIONS AND SLOPES ARE MEASURED PERPENDICULAR TO THE BACK OF THE ABUTMENT.
  - ⑥ PROVIDE 3" OF CLAY OVER HATCHED AREA PRIOR TO PLACING TOPSOIL. TYPICAL ALL FOUR CORNERS OF BRIDGE. INCIDENTAL TO STRUCTURE EXCAVATION.
- SEE GRADING PLANS FOR PROPOSED R/W INFORMATION.



BORINGS SHOWN: TAKEN WITH: STANDARD 140 LB HAMMER 30 INCH DROP 2 INCH O.D. SAMPLER	B-1 & B-2	DES.: JAS CHK.: RLD DRN.: DSP CHK.: JAS	ERICKSON ENGINEERING WWW.ERICKSON-ENG.COM 800-545-8020	BRIDGE SURVEY PLAN & PROFILE	S.P. 067-598-010	APPROVED:	BRIDGE NO. 67564
	CERTIFIED BY: PROFESSIONAL ENGINEER JOHN SOWADA LIC. NO. 45936 B-9-2012				SHEET NO. 26 OF 26 SHEETS		