
*Bridge Preliminary Design Report
Addendum*

**Ramp C over Norfolk Southern Tracks
SCI-823-1603**

**SCI-823-10.13
PID No. 79977**

Prepared for
Ohio Department of Transportation

May 2011

CH2MHILL

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ATTACHMENTS

- Detailed Cost Estimate
- Responses to previous ODOT comments
- Responses to NSRR comments
- Railroad clearance email and sketch
- Final Structure Site Plan (Sheet 1 of 3)
- Typical Transverse Section (Sheet 2 of 3)
- Abutment Section and Framing Plan (Sheet 3 of 3)

1. Introduction

Per the agreed upon scope of services CH2M HILL was tasked with addressing all review comments pertaining to the Preliminary Bridge Design Reports that were submitted to ODOT in November 2007. This addendum addresses two review comments in particular that required additional engineering investigation by CH2M HILL. One review comment was related to studying the lengths of the three bridges crossing the Norfolk Southern Tracks and confirming that the proposed bridges were ending at a location in which the cost of supporting the roadway on an MSE wall was more expensive than supporting the roadway with a bridge. The second review comment was related to investigating the feasibility and cost associated with supporting the proposed bridge piers on drilled shafts rather than steel H-piles as was originally proposed in the Preliminary Bridge Design Report.

2. Design Requirements / Specifications

All structural design on this project has been done in accordance with both the AASHTO Standard Design Specifications (LFD) and the 2004 ODOT Bridge Design Manual (LFD). Per an email received from ODOT on October 14, 2010, LFD will continue to be used on this project. Specifically, the guidelines for seismic design loading in section 301.4.3 of the ODOT BDM have been followed. As such no seismic design loading has been included in the design or analysis of the proposed drilled shafts which are discussed in this document. All design criteria as stated in the Bridge Preliminary Design Report remains accurate.

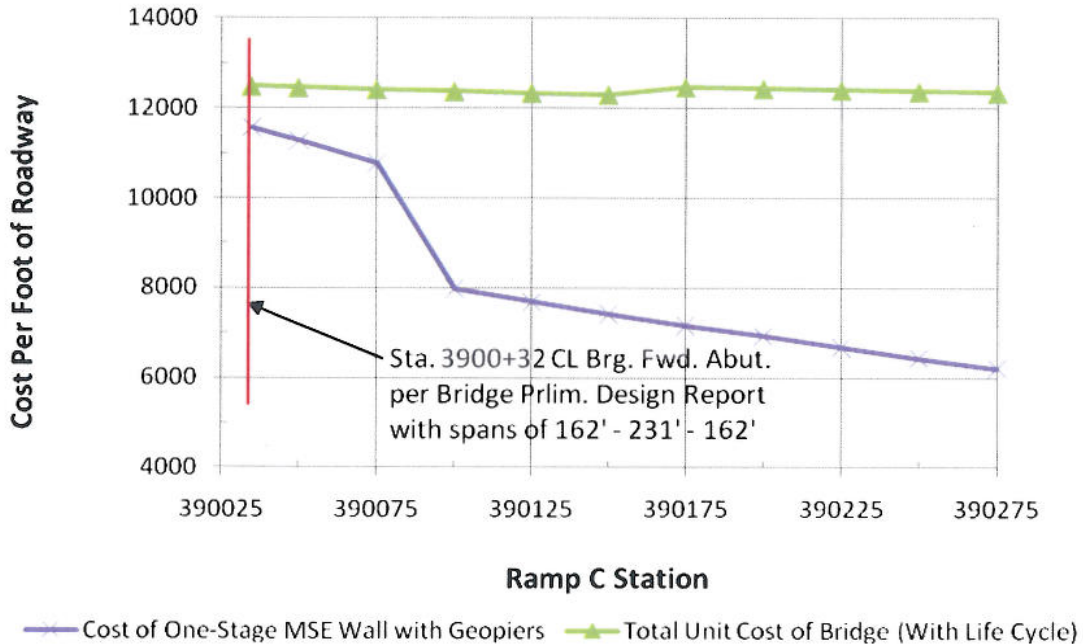
3. MSE Wall / Bridge Length Optimization

CH2M HILL was asked by ODOT to verify that the span lengths proposed in the November 2007 Bridge Preliminary Design Report provide an optimum balance between the costs for the bridge and the costs for MSE Wall 5 located at the forward abutment. The bridge proposed in the Report had span lengths of 162'-231'-162' (measured along baseline construction) for a total length of 555 feet. MSE Wall 5 has a height of $\pm 33'$ at the forward abutment. There are no walls at the rear abutment.

To accomplish this task, the bridge and wall costs from the 2007 report were updated to current costs. The MSE wall cost used was \$95 per square foot for wall heights less than or equal to 30 feet and \$135 per square foot for wall heights greater than 30 feet. These two unit prices were supplied to CH2M HILL by ODOT in an e-mail received on July 12, 2010. It was assumed that these unit prices included excavation, embankment, concrete leveling pads, precast panels and straps, drainage conduit, granular backfill, concrete coping cap on top of wall, and sealing of concrete surfaces. The updated wall costs include the use of Geopiers® as recommended by the project's geotechnical engineers, DLZ Inc., to mitigate settlement of the MSE wall. Also included in the MSE wall cost is roadway barrier, moment slab, and roadway pavement.

Total bridge and wall costs were then converted to a unit cost per foot of bridge and unit cost per foot of wall and were plotted in Figure 1. The wall and bridge unit costs do not intersect as shown in Figure 1. This shows that it will not be economical to lengthen the bridge and shorten the wall length.

Figure 1: Bridge vs MSE Wall Cost Comparison



It is recommended that the bridge length not be revised and the bridge as proposed in the November 2007 Bridge Preliminary Design Report be used.

4. Drilled Shaft Pier Foundation Study

The feasibility and cost of supporting the piers on drilled shafts was performed as part of this Preliminary Bridge Design Report Addendum. The cost and constructability of drilled shaft supported piers was then compared to that of pile supported piers. Two drilled shaft supported pier options were investigated. The first option was a 2-shaft option and the second option was a 4-shaft option. The 2-shaft option consists of 60" diameter drilled shafts in soil connected to 54" diameter drilled shafts in bedrock. The length of the 54" diameter drilled shaft in bedrock will be approximately 14'. The 4-shaft option consists of 48" diameter drilled shafts in soil connected to 42" diameter drilled shafts in bedrock. The length of the 42" diameter drilled shaft in bedrock will be approximately 7'. The size of the steel piles that were originally proposed in the Preliminary Bridge Design Report was HP 14x73, and the estimated length of those piles was 20' at Pier 1 and 25' at Pier 2. Essentially five factors were considered when determining the recommended foundation support for the piers. Those five factors were redundancy, the need for temporary shoring, the effect on the NSRR, cost, and the need for additional rock cores being required. A comparison matrix of those 5 factors is shown in Table 1.

Table 1: Foundation System Comparison

	Pile Option	2-Shaft Option	4-Shaft Option
Redundancy	Yes	No	Yes
Temporary Shoring	Yes	No	Yes, but amount reduced
Effect on NSRR	Greatest due to shoring and potential for tiebacks	Minimal	Reduced
Cost *	\$142,000	\$133,000	\$172,000
Additional Rock Cores Required	No	Yes	Yes

*The cost provided represents the estimated cost associated with constructing Pier 2 only.

The difference in estimated cost for supporting the two piers on 2 drilled shafts as opposed to steel H-piles is negligible. However, the 2-shaft option does minimize impacts on the Norfolk Southern railroad, and the 2-shaft option likely will not require temporary shoring. Due to these reasons and the negligible cost difference between the pile option and the 2-shaft option, CH2M HILL recommends that each pier be supported on 2 drilled shafts.

5. Cost Estimate

Table 2: Opinion of Probable Construction Cost

	Updated costs for bridge proposed in the November 2007 Preliminary Design Report (162'-231'-162')
Bridge Cost (initial)	\$4,005,049
Bridge Life Cycle Cost	\$2,927,202
Bridge Cost (initial plus life cycle)	\$6,932,251
Wall Cost (1)	\$2,485,075
Total Cost	\$9,417,326

(1) Cost shown is for the MSE wall and Geopier® only. Costs for moment slab, barrier along wall, and pavement are not included.

The updated cost for the bridge and MSE Wall 5 is presented in Table 2. The updated detailed bridge cost estimate is included as an attachment to this addendum. CH2M HILL established all unit prices for the cost estimate by using ODOT's online CMS portal and then working with ODOT estimating staff to verify all estimated unit prices. All comments and

revisions that were received from ODOT estimating staff were incorporated into the unit prices.

6. Recommendations:

Based upon the studies and cost estimates completed it is recommended that:

1. The preferred alternative recommended in the November 2007 Bridge Preliminary Design Report not be changed. It is recommended that the preferred alternative remain a three span curved steel plate girder bridge with spans of 162'-231'-162' (measured along baseline construction).
2. The deep foundations recommendation be revised from steel H-piles to two drilled shafts socketed into rock.
3. Additional rock cores be taken at both pier locations in order to complete final drilled shaft design.

SCI-823-1603: Ramp C over NSRR
DETAILED COST ESTIMATE

Alternative A: 555' Bridge (162'-231'-162') proposed in Bridge Preliminary Design Report (Nov. 2007) with pile supported piers
Alternative B: 555' Bridge (162'-231'-162') with Piers supported by 2 Drilled Shafts
Alternative C: 555' Bridge (162'-231'-162') with Piers supported by 4 Drilled Shafts

Description	Unit Cost	Unit	Alternative A		Alternative B		Alternative C	
			Quantity	Cost	Quantity	Cost	Quantity	Cost
QC/QA Concrete, Class QSC2, Superstructure (Parapet):	\$540.00	CY	176.8	\$95,472	176.8	\$95,472	176.8	\$95,472
QC/QA Concrete, Class QSC2, Superstructure:	\$550.00	CY	533.5	\$293,425	533.5	\$293,425	533.5	\$293,425
QC/QA Concrete, Class QSC2, Superstructure (Approach Slab), (T=17"), As Per Plan	\$225.00	SY	220	\$49,500	220	\$49,500	220	\$49,500
QC/QA Concrete, Class QSC1, Substructure:	\$570.00	CY	382.8	\$218,196	364.4	\$207,708	414.8	\$236,436
Epoxy Coated Reinforcing Steel (superstructure):	\$1.10	LB	202,436	\$222,680	202,436	\$222,680	202,436	\$222,680
Epoxy Coated Reinforcing Steel (substructure):	\$1.10	LB	41,809	\$45,990	39,509	\$43,460	45,809	\$50,390
Structural Steel Members, Level 5:	\$1.50	LB	1,230,000	\$1,845,000	1,230,000	\$1,845,000	1,230,000	\$1,845,000
Steel Piles HP12x53, Furnished:	\$25.00	FT	1,500	\$37,500	1,500	\$37,500	1,500	\$37,500
Steel Piles HP12x53, Driven:	\$13.00	FT	1,350	\$17,550	1,350	\$17,550	1,350	\$17,550
Steel Piles HP14x73, Furnished:	\$35.00	FT	990	\$34,650		\$0		\$0
Steel Piles HP14x73, Driven:	\$13.00	FT	810	\$10,530		\$0		\$0
Drilled Shafts, 42" Diameter, Above Bedrock:	\$230.00	FT		\$0		\$0		\$0
Drilled Shafts, 48" Diameter, Above Bedrock:	\$286.00	FT		\$0		\$0	152	\$43,472
Drilled Shafts, 54" Diameter, Above Bedrock:	\$377.00	FT		\$0		\$0		\$0
Drilled Shafts, 60" Diameter, Above Bedrock:	\$400.00	FT		\$0	76	\$30,400		\$0
Drilled Shafts, 66" Diameter, Above Bedrock:	\$782.00	FT		\$0		\$0		\$0
Drilled Shafts, 72" Diameter, Above Bedrock:	\$670.00	FT		\$0		\$0		\$0
Drilled Shafts, 78" Diameter, Above Bedrock:	\$670.00	FT		\$0		\$0		\$0
Drilled Shafts, 84" Diameter, Above Bedrock, As per Plan:	\$985.00	FT		\$0		\$0		\$0
Drilled Shafts, 42" Diameter, Into Bedrock:	\$416.00	FT		\$0		\$0	56	\$23,296
Drilled Shafts, 48" Diameter, Into Bedrock:	\$540.00	FT		\$0		\$0		\$0
Drilled Shafts, 54" Diameter, Into Bedrock:	\$616.00	FT		\$0	56	\$34,496		\$0
Drilled Shafts, 60" Diameter, Into Bedrock:	\$746.00	FT		\$0		\$0		\$0
Drilled Shafts, 66" Diameter, Into Bedrock:	\$1,190.00	FT		\$0		\$0		\$0
Drilled Shafts, 72" Diameter, Into Bedrock:	\$1,634.00	FT		\$0		\$0		\$0
Drilled Shafts, 78" Diameter, Into Bedrock:	\$2,300.00	FT		\$0		\$0		\$0
Drilled Shafts, 84" Diameter, Into Bedrock:	\$2,900.00	FT		\$0		\$0		\$0
Cofferdams and Excavation Bracing:	\$15.00	SF	434	\$6,510		\$0	434	\$6,510
Structure Incidental Cost (Note 1)	16%			\$460,320		\$460,350		\$467,397
Contingency	20%			\$667,465		\$667,508		\$677,725
TOTAL INITIAL BRIDGE COST				\$4,004,787		\$4,005,049		\$4,066,353
LIFE CYCLE COSTS:								
Structural Expansion Joint Including Elastomeric Strip Seal:	\$375.00	FT	66	\$24,750	66	\$24,750	66	\$24,750
Paint weathering steel plate girders (prep, prime, intermediate, final coats):	\$14.00	SF	115,638	\$1,618,932	115,638	\$1,618,932	115,638	\$1,618,932
Superplasticized Dense Concrete Overlay Using Hydrodemolition:	\$95.00	SY	3,736	\$354,920	3,736	\$354,920	3,736	\$354,920
Full Depth Repair:	\$23.61	SF	1,681	\$39,688	1,681	\$39,688	1,681	\$39,688
Portions of Structure Removed, As Per Plan (for deck removal):	\$15.00	SF	18,489	\$277,335	18,489	\$277,335	18,489	\$277,335
QC/QA Concrete, Class QSC2, Superstructure (Parapet):	\$540.00	CY	176.8	\$95,472	176.8	\$95,472	176.8	\$95,472
QC/QA Concrete, Class QSC2, Superstructure:	\$550.00	SY	533.5	\$293,425	533.5	\$293,425	533.5	\$293,425
Epoxy Coated Reinforcing Steel (superstructure):	\$1.10	LB	202,436	\$222,680	202,436	\$222,680	202,436	\$222,680
TOTAL LIFE CYCLE COST				\$2,927,202		\$2,927,202		\$2,927,202
TOTAL RELATIVE OWNERSHIP COST				\$6,931,989		\$6,932,251		\$6,993,555
MSE WALL COSTS:								
MSE Wall (wall height greater than 30 ft)	\$135.00	SF	2,169	\$292,815	2,169	\$292,815	2,169	\$292,815
MSE Wall (wall height less than or equal to 30 ft)	\$95.00	SF	16,396	\$1,557,620	16,396	\$1,557,620	16,396	\$1,557,620
Geopiers@	\$310.500	LUMP	1	\$310,500	1	\$310,500	1	\$310,500
Contingency	15%			\$324,140		\$324,140		\$324,140
TOTAL COST OF MSE WALL 5				\$2,485,075		\$2,485,075		\$2,485,075
TOTAL RELATIVE OWNERSHIP COST OF BRIDGE PLUS COST OF MSE WALL 5				\$9,417,065		\$9,417,326		\$9,478,630

Notes:

1. Structure incidental cost allowance includes provision for structure excavation, porous backfill & drainage pipe, sealing of concrete surfaces, falsework bents, bearings, (minor) temporary shoring, crushed aggregate slope protection, pile driving equipment mobilization, shear connectors, settlement platforms, expansion joints, joint sealers, and joint fillers costs.



inter-office communication

to:	James A. Brushart, District 9 Deputy Director	date:	Apr. 15, 2008
from:	Timothy J. Keller, Administrator, Office of Structural Engineering by: Ananda Dharma, P.E.		
subject:	SCI-823-10.17; PID 79977; Bridge No. SCI-823-1603; Ramp C over Norfolk Southern Railroad; Preliminary Design Review		

Attn.: Thomas M. Barnitz, District 9 Project Manager

We have briefly reviewed Preliminary Design submission from CH2MHill for the proposed bridge along Ramp C over Norfolk Southern Railroad. Our comments are shown below.

General Comments

1. We agree that the proposed structure should consist of three-span composite curved steel plate girders (ASTM A709, Grade 50W) with reinforced concrete deck and jointed rear stub abutment with spill-thru slope and jointed forward abutment supported on MSE wall and T-Type piers. Review comments pertaining to the MSE wall will be submitted separately. Please incorporate MSE wall comments prior to proceeding with Detail Design.
2. Please address comment #2 in the IOC dated July 18, 2007. We question why a 2:1 slope could not be utilized in front of the forward abutment and also at the location next to the proposed future tracks (on the east side of forward abutment). We agree that a wall will be needed on the west side of forward abutment due to close proximity of U.S.R. 23. However, we don't quite understand why a wall on the east side of forward abutment would also be required if we could maintain the 25'-0" horizontal clearance. Please explain.
3. The cost estimate shown in the Preliminary Design Report submission was based upon year 2006 costs. In the future, please update the cost estimate to reflect the costs at the time of the submission or the time of construction as stated in the ODOT's Project Development Process (PDP).
4. As stated in the e-mail from Rick Bruce in the ODOT – Office of Roadway Engineering Services dated May 30, 2007, the Design Consultant shall submit design exceptions for speed related deficiencies. The Technical Memorandum from CH2Mhill dated June 21, 2005 stated that design exceptions for speed related items were not required for ramps. However, Ramp C is considered to be a freeway to freeway connection which connects S.R. 823 to U.S.R. 23. The Technical Memorandum mentioned above was included in the Preliminary Design Report for Bridge No. SCI-823-1593 (Ramp B over Fairground Road).

5. In the Preliminary Design Report dated November 2007, page 5 discussed "H" steel piles vs. drilled shafts for pier foundation. The Design Consultant needs to prepare cost comparison and/or justification for the proposed pier foundation in order to determine the most economical pier foundation.

Site Plan - Sheet 1 of 3

6. In the Plan view, please avoid texts on top of other texts or on top of the lines by moving the texts or masking the lines because they are difficult to read.
7. The actual unfactored design loads of 75 tons and 95 tons correspond to HP10x42 and HP12x53, respectively. Please refer to BDM 202.2.3.2.a which was updated in the 2007 Fourth Quarter Revisions. The increase in the maximum allowable design loads for H-piles driven to refusal is to take advantage of the Grade 50 steel that is now used for steel piles.
8. Anchor dowels for the proposed fixed bearings at Pier 2 have to be designed to resist all forces, such as, centrifugal force, wind load force and also gravity force because there is a tendency for the entire steel superstructure to move downhill towards the forward abutment. Please incorporate this comment to other structures having similar configuration as this structure.
9. Please provide the location and description of benchmarks in the next submittal. (BDM 202.2.1)
10. In the Proposed Structure data block, Length of Span on curved alignments should be measured along a reference line which is a chord drawn from centerline of abutment bearings at the centerline of survey or baseline of construction. (BDM 202.2.1)

Our office recommends that the District approves the Preliminary Design submission subject to resolution of these comments. Your concurrence with the above comments submitted in writing constitutes compliance.

Nothing in these comments is to be construed as authorizing extra work for which additional compensation may be claimed. If you have reason to believe that these comments require work outside the limits of your Scope of Services, please contact this office before proceeding.

Should you have any questions concerning our review comments for the above referenced project, please contact our office.

TJK:JS:ad

c: Gary E. Cochenour, ODOT District 9
Lawrence A. Wills, ODOT District 9
Timothy J. Keller, Office of Structural Engineering
Jawdat Siddiqi, Office of Structural Engineering
Richard A. Bruce, Office of Roadway Engineering Services
file



DESIGNER RESPONSE TO REVIEW COMMENTS

BY: DATE: 8/31/2010

Jirschele

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: **408549.08.ST.CM**

REVIEWER: **Comments by ODOT OSE (Reviewer: Ananda Dharma, PE),
Inter-office communication to ODOT D9 dated April 15, 2008** PHASE: **Preliminary Design**

Step 8 – Major PDP

Comment No.	Review Comment	Designer Response
	Preliminary Design Review: SCI-823-1603 Ramp C over Norfolk Southern Railroad	
1	We agree that the proposed structure should consist of three-span composite curved steel plate girders (ASTM A709, Grade 50W) with reinforced concrete deck and jointed rear stub abutment with spill-thru slope and jointed forward abutment supported on MSE wall and T-Type piers. Review comments pertaining to the MSE wall will be submitted separately. Please incorporate MSE wall comments prior to proceeding with Detail Design.	Acknowledged.
2	Please address comment #2 in the IOC dated July 18, 2007. We question why a 2:1 slope could not be utilized in front of the forward abutment and also at the location next to the proposed future tracks (on the east side of forward abutment). We agree that a wall will be needed on the west side of forward abutment due to close proximity of U.S.R. 23. However, we don't quite understand why a wall on the east side of forward abutment would also be required if we could maintain the 25'-0" horizontal clearance. Please explain.	There are two reasons for the MSE wall at the location in question. First, there is a large proposed ditch that runs parallel to the wall. This ditch would be completely filled if the wall were eliminated which would severely impact drainage for the project. Secondly, a 2:1 slope would encroach on minimum clearance dimensions established by Norfolk Southern that permit ditches to be constructed along the edge of sub-ballast. See - <i>Norfolk Southern Corp, Standard Overhead Bridge Details, Ditch and Drainage Details, Sheet 3.</i>



DESIGNER RESPONSE TO REVIEW COMMENTS

BY: Jirschele
DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: **408549.08.ST.CM**

REVIEWER: **Comments by ODOT OSE (Reviewer: Ananda Dharma, PE),
Inter-office communication to ODOT D9 dated April 15, 2008** PHASE: **Preliminary Design**

3	The cost estimate shown in the Preliminary Design Report submission was based upon year 2006 costs. In the future, please update the cost estimate to reflect the costs at the time of the submission or the time of construction as stated in the ODOT's Project Development Process (PDP).	Acknowledged. The cost estimate for the preferred alternative for this structure is being updated as part of our current work on the project.
4	As stated in the e-mail from Rick Bruce in the ODOT - Office of Roadway Engineering Services dated May 30, 2007, the Design Consultant shall submit design exceptions for speed related deficiencies. The Technical Memorandum from CH2Mhill dated June 21, 2005 stated that design exceptions for speed related items were not required for ramps. However, Ramp C is considered to be a freeway to freeway connection which connects S.R. 823 to U.S.R. 23. The Technical Memorandum mentioned above was included in the Preliminary Design Report for Bridge No. SCI-823-1593 (Ramp B over Fairground Road).	Acknowledged. The design exception is being prepared and will be submitted to ODOT.
5	In the Preliminary Design Report dated November 2007, page 5 discussed "H" steel piles vs. drilled shafts for pier foundation. The Design Consultant needs to prepare cost comparison and/or justification for the proposed pier foundation in order to determine the most economical pier foundation.	Acknowledged. This study is underway and will be submitted to ODOT as an addendum to the Bridge Preliminary Design Report.
6	In the Plan view, please avoid texts on top of other texts or on top of the lines by moving the texts or masking the lines because they are difficult to read.	Acknowledged.



DESIGNER RESPONSE TO REVIEW COMMENTS

BY: Jirschele
DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: **408549.08.ST.CM**

REVIEWER: **Comments by ODOT OSE (Reviewer: Ananda Dharma, PE),
Inter-office communication to ODOT D9 dated April 15, 2008** PHASE: **Preliminary Design**

7	The actual unfactored design loads of 75 tons and 95 tons correspond to HP10x42 and HP12x53, respectively. Please refer to BDM 202.2.3.2.a which was updated in the 2007 Fourth Quarter Revisions. The increase in the maximum allowable design loads for H-piles driven to refusal is to take advantage of the Grade 50 steel that is now used for steel piles.	Acknowledged.
8	Anchor dowels for the proposed fixed bearings at Pier 2 have to be designed to resist all forces, such as, centrifugal force, wind load force and also gravity force because there is a tendency for the entire steel superstructure to move downhill towards the forward abutment. Please incorporate this comment to other structures having similar configuration as this structure.	Acknowledged.
9	Please provide the location and description of benchmarks in the next submittal. (BDM 202.2.1)	Benchmark information will be provided as soon as that information is available.
10	In the Proposed Structure data block, Length of Span on curved alignments should be measured along a reference line which is a chord drawn from centerline of abutment bearings at the centerline of survey or baseline of construction. (BDM 202.2.1)	Acknowledged. Span lengths will be measured along the construction chord and Proposed Structure data block will be updated accordingly.



STV/Ralph Whitehead Associates

3505 Koger Boulevard, Suite 205
Duluth, Georgia 30096
(770)452-0797 fax:(770)936-9171

June 18, 2008

Ms. R. A. Moore
Engineer, Public Improvements
Bridges and Structures
Norfolk Southern Corporation
1200 Peachtree St.
Atlanta, GA 30309

**Lucasville, OH SR 823/US 23 Interchange Bridges over Norfolk Southern
ODOT Project SCI-823-10.13, PID 79977
MP N-618.49 File BR0086615 / 117-29408**

Dear Ms. Moore:

On June 5, 2008, a site visit was made to the location of the three proposed SR 823/US 23 interchange bridges over the Norfolk Southern double main tracks north of Lucasville, OH. The following are comments made using the plans provided on May 22, 2008. Our comments are as follows:

1. Within the project limits along the railroad, there are no visible railroad utilities, the pole line has been removed, and there are no advertising billboards present on railroad property.
2. At the location of the Ramp "B" overhead bridge, Railroad Station 580+50, there is currently a private grade crossing. This crossing has a 16-foot wide, timber and asphalt type surface. The asphalt has generally been removed in the area of the track, and replaced by ballast. The crossing has a post and chain closure on the east side of the tracks secured by a non-railroad lock. There is a note indicating that the existing drive is to be removed. This crossing should be removed as part of the project once construction begins.
3. Near the grade crossing under proposed Ramp "B", the main track drainage is along the east side of the track. This ditch catches water draining along the farm road, toward the crossing. After the crossing is removed, the ditch along the tracks should be improved by the removal of the old roadway, and the ditch should be continuous.
4. Proposed Channel No. 2, which is south of the Ramp "B" area, is shown as a new ditch from Fairgrounds Road curving under the Ramp "B" structure and flowing into the existing Norfolk Southern ditch near Railroad Station 582+00. This water would then flow north toward the existing concrete culvert under the railroad at Railroad Station 585+70. There is no improvement shown for the existing railroad ditch between Railroad Station 582+00 and 585+70. Since this is additional water, drainage computations should



STV/Ralph Whitehead Associates

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Page two

- be provided to verify that the ditch and culvert can accept this additional water and still meet the Norfolk Southern's 100-year storm requirements. Improvements made to this ditch should be constructed such that it would not need to be relocated for the installation of the proposed future track shown on the east side of the existing mainline tracks.
5. The existing culvert under the tracks at Railroad Station 585+70 also is shown as accepting water from proposed Channel No. 3. This drainage would need to be analyzed, along with the flows from the existing ditch (including the added flows from proposed Channel No. 2), to verify that the culvert can handle this additional drainage and that it will handle the 100-year storm with both ditches flowing through this culvert.
 6. The existing box culvert at Railroad Station 585+70 is currently clean and free of debris.
 7. The proposed new drainage structure and associated ditches along the tracks at Railroad Station 587+70 will need to be designed for the 100-year storm; it should be verified that the ditches on each side of the tracks are designed so that water stays within the rip-rapped areas of the ditch.
 8. North of the location of the Ramp "C" overhead bridge, Railroad Station 591+25, there is currently a private grade crossing. This crossing has a 16-foot wide, timber and asphalt type surface. The asphalt has generally been removed in the area of the track and replaced by ballast. The crossing has a steel gate closure on the east side of the tracks secured by a non-railroad lock. There is a note indicating that the existing drive is to be removed. This crossing should be removed as part of the project once construction begins, and the drainage ditch along the east side improved to eliminate the existing water ponding near the crossing.
 9. All bridge vertical clearances are greater than the 23' minimum but there are no minimum horizontal clearances indicated. For the curved steel ramp girders the plans include erection plans and sequencing for the girders. The final sections are shown being placed over the tracks with craned located adjacent to the tracks.
 10. The plans include an Erection Sequence Plan which assumes crane types, capacities, and lifting locations. These erection plans are not shown for construction, but as a guide for the contractor. The selected contractor's erection plans will need to be reviewed and approved by Norfolk Southern before proceeding with the erection.
 11. As the plans become further developed, they will need to be reviewed for conformance to current Norfolk Southern criteria. The plans are currently at the Stage 1 Submission level.



STV/Ralph Whitehead Associates

Ms. R. A. Moore
June 18, 2008
Files BR0086615
Page three

Site photographs were taken during this site visit, and have been placed on the CD that accompanies this report.

If you have further questions or need additional information, please call me at 770-452-0797.

Sincerely yours,

STV Incorporated

A handwritten signature in cursive script, appearing to read "George T. Zimmerman", written in black ink.

George T. Zimmerman, P.E.
Project Manager

Enclosures



DESIGNER RESPONSE TO REVIEW COMMENTS

BY:
Wolpert
Jirschele
Sherk

DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: 408549.08.ST.CM

REVIEWER: **Comments by NSRR (STV/Ralph Whitehead Associates), Letter dated June 18, 2008** PHASE: Preliminary Design

Step 8 – Major PDP

Comment No.	Review Comment	Designer Response
	SR 823/US23 Interchange Bridges over Norfolk Southern	
1	Within the project limits along the railroad, there are no visible railroad utilities, the pole line has been removed, and there are no advertising billboards present on railroad property.	Acknowledged.
2	At the location of the Ramp “B” overhead bridge, Railroad Station 580+50, there is currently a private grade crossing. This crossing has a 16-foot wide, timber and asphalt type surface. The asphalt has generally been removed in the area of the track and replaced by ballast. The crossing has a post and chain closure on the east side of the tracks secured by a non-railroad lock. There is a note indicating the existing drive is to be removed. This crossing should be removed as part of the project once construction begins.	The intent of the work associated with the roadway improvements is to only remove the access point to US 23 NB. Any additional removal of the existing drive should be discussed with ODOT.
3	Near the grade crossing under proposed Ramp “B”, the main track drainage is along the east side of the track. This ditch catches water draining along the farm road, toward the crossing. After the crossing is removed, the ditch along the tracks should be improved by the removal of the old roadway, and the ditch should be continuous.	The intent of the work associated with the roadway improvements is to only remove the access point to US 23 NB. Any additional removal of the existing drive should be discussed with ODOT.



DESIGNER RESPONSE TO REVIEW COMMENTS

BY:
Wolpert
Jirschele
Sherk

DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: **408549.08.ST.CM**

REVIEWER: **Comments by NSRR (STV/Ralph Whitehead Associates), Letter dated June 18, 2008** PHASE: **Preliminary Design**

Step 8 – Major PDP

Comment No.	Review Comment	Designer Response
4	Proposed Channel No. 2, which is south of the Ramp “B” area, is shown as a new ditch from Fairgrounds Road curving under the Ramp “B” structure and flowing into the existing Norfolk Southern ditch near Railroad Station 582+00. This water would then flow north toward the existing concrete culvert under the railroad at Railroad Station 585+70. There is no improvement shown for the existing railroad ditch between Railroad Station 582+00 and 585+70. Since this is additional water, drainage computations should be provided to verify that the ditch and culvert can accept this additional water and still meet the Norfolk Southern’s 100-year storm requirements. Improvements made to this ditch should be constructed such that it would not need to be relocated for the installation of the proposed future track shown on the east side of the existing mainline tracks.	Acknowledged. Ditch grading from STA. 582+00 to 585+70 will be coordinated with Norfolk Southern Railway and revised in the next stage of the project. Calculations for the new drainage patterns were performed for the existing culvert and the 100-year storm requirements were met. The installation of the dual 48” culverts under the NFSS at STA. 587+62 removes a significant amount of flow from the existing culvert.
5	The existing culvert under the tracks at Railroad Station 585+70 also is shown as accepting water from proposed Channel No. 3. This drainage would need to be analyzed, along with the flows from the existing ditch (including the added flows from proposed Channel No. 2), to verify that the culvert can handle this additional drainage and that it will handle the 100-year storm with both ditches flowing through this culvert.	Calculations for the new drainage patterns were performed for the existing culvert and the 100-year storm requirements were met. The installation of the dual 48” culverts under the NFSS at STA. 587+62 removes a significant amount of flow from the existing culvert.



DESIGNER RESPONSE TO REVIEW COMMENTS

BY:
Wolpert
Jirschele
Sherk

DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: 408549.08.ST.CM

REVIEWER: **Comments by NSRR (STV/Ralph Whitehead Associates), Letter dated June 18, 2008** PHASE: Preliminary Design

Step 8 – Major PDP

Comment No.	Review Comment	Designer Response
6	The existing box culvert at Railroad Station 585+70 is currently clean and free of debris.	Acknowledged.
7	The proposed new drainage structure and associated ditches along the tracks at Railroad Station 587+70 will need to be designed for the 100-year storm; it should be verified that the ditches on each side of the tracks are designed so that water stays within the rip-rapped areas of the ditch.	Calculations for the new drainage patterns were performed and the dual 48" culverts at STA. 587+62 meet the 100-year storm requirements.
8	North of the location of the Ramp "C" overhead bridge, Railroad Station 591+25, there is currently a private grade crossing. This crossing has a 16-foot wide, timber and asphalt type surface. The asphalt has generally been removed in the area of the track and replaced by ballast. The crossing has a steel gate closure on the east side of the tracks secured by a non-railroad lock. There is a note indicating the existing drive is to be removed. This crossing should be removed as part of the project once construction begins, and the drainage ditch along the east side improved to eliminate the existing water ponding near the crossing.	The intent of the work associated with the roadway improvements is to only remove the access point to US 23 NB. Any additional removal of the existing drive should be discussed with ODOT.
9	All bridge vertical clearances are greater than the 23' minimum but there are no minimum horizontal clearances indicated. For the curved steel ramp girders the plans include erection plans and sequencing for the girders. The final sections are shown being placed over the tracks with cranes located adjacent to the tracks.	The actual horizontal clearances are shown as 25'-0" (minimum) on sheets 833 and 846 for the Ramp B and C bridges. The actual horizontal clearances are shown as 25'-6" and 25'-10" on sheet 841 for the SR 823 bridge.



DESIGNER RESPONSE TO REVIEW COMMENTS

BY:
Wolpert
Jirschele
Sherk

DATE: 8/31/2010

Portsmouth Bypass – Stage I Comments

PROJECT: **SCI-823-10.13: Portsmouth Bypass; PID 79977** PROJ. NO: 408549.08.ST.CM

REVIEWER: **Comments by NSRR (STV/Ralph Whitehead Associates), Letter dated June 18, 2008** PHASE: Preliminary Design

Step 8 – Major PDP

Comment No.	Review Comment	Designer Response
10	The plans include an Erection Sequence Plan which assumes crane types, capacities, and lifting locations. These erection plans are not shown for construction, but as guide for the contractor. The selected contractor's erection plans will need to be reviewed and approved by Norfolk Southern before proceeding with the erection.	Acknowledged.
11	As the plans become further developed, they will need to be reviewed for conformance to current Norfolk Southern criteria. The plans are currently at the Stage 1 Submission level.	Acknowledged.

-----Original Message-----

From: Wyatt, Dave [<mailto:dave.wyatt@nscorp.com>]
Sent: Tuesday, June 05, 2007 8:39 AM
To: Thompson, Shawn/COL
Subject: RE: RR Minimum Clearances - Portsmouth Bypass Project, OH

Shawn:

As discussed, your interpretation is somewhat confused. The T portion of the cap can not be any closer to the track than 10'-0" if bottom portion is less than 23'-0" above top of rail.

Thanks,

David Wyatt
System Engineer Public Improvements
Norfolk Southern Corporation
1200 Peachtree Street, N.E.
Atlanta, Georgia 30309

Telephone: 404/529-1641
Cell Phone: 404/245-2596
Fax: 404/527-2769
e-mail: dave.wyatt@nscorp.com

-----Original Message-----

From: Shawn.Thompson@CH2M.com [<mailto:Shawn.Thompson@CH2M.com>]
Sent: Friday, April 13, 2007 4:01 PM
To: Wyatt, Dave
Cc: steve.jirschele@ch2m.com; jrcox@transystems.com; mdweeks@transystems.com;
robert.miller@ch2m.com; Richard.Behrendt@dot.state.oh.us
Subject: RR Minimum Clearances - Portsmouth Bypass Project, OH

David,

Good afternoon. I hope you are doing well. Attached is a .pdf drawing showing our interpretation of your criteria for clearances at the US-23/SR-823 Interchange, as we understand them. Both Norfolk Southern and ODOT have clearance requirements. We will use the most conservative requirement, in the event of conflicts or differences between the two agencies.

One thing of note is the location of the T-type pier. Our understanding is that as long as the pier stem is a minimum of 22'-0" from the centerline of the track and 10'-0" high, the pier cap can extend inside of the 22'-0" clearance envelope. Again, due to the two new tracks and the curvature of the ramps, our goal is to shorten the span lengths as much as possible.

At your earliest convenience, please provide a response re: acceptance of our clearance understanding.

Thanks David. Have a great weekend.
Shawn



SCI-823-10.13
PID 79977

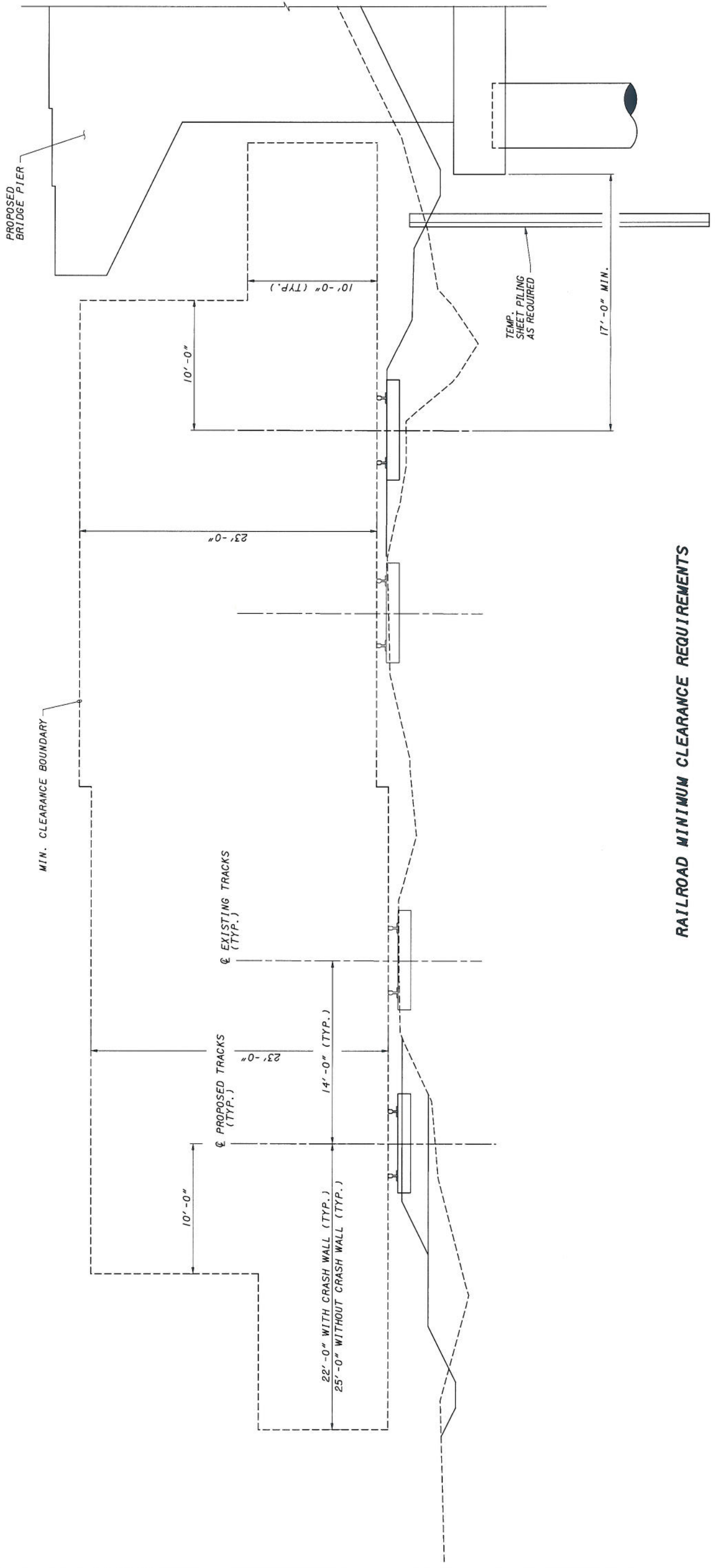
RAILROAD MINIMUM CLEARANCE REQUIREMENTS

BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN

DESIGNED	SKT	JBA	DATE
CHECKED	SCJ/DGS	VKN	04/11
REVISED	STRUCTURE FILE NUMBER		7306814

CH2MHILL
DESIGN AGENCY
1103 SCHROCK ROAD, SUITE 400
COLUMBUS, OHIO 43229

FOR NORFOLK SOUTHERN CORP. APPROVAL
CH2M HILL, REVISED AUGUST 26, 2010
SCI-823-0.00 PID 19415



RAILROAD MINIMUM CLEARANCE REQUIREMENTS

BENCHMARKS

CURVE C-2
 P.I. STA. = 3898+09.03
 $\Delta = 57^{\circ}43'34''$ (RT.)
 $Dc = 07^{\circ}45'00''$
 $R = 739.30'$
 $T = 407.49'$
 $L = 744.85'$
 $E = 104.87'$
 $\theta_{max} = 0.069$

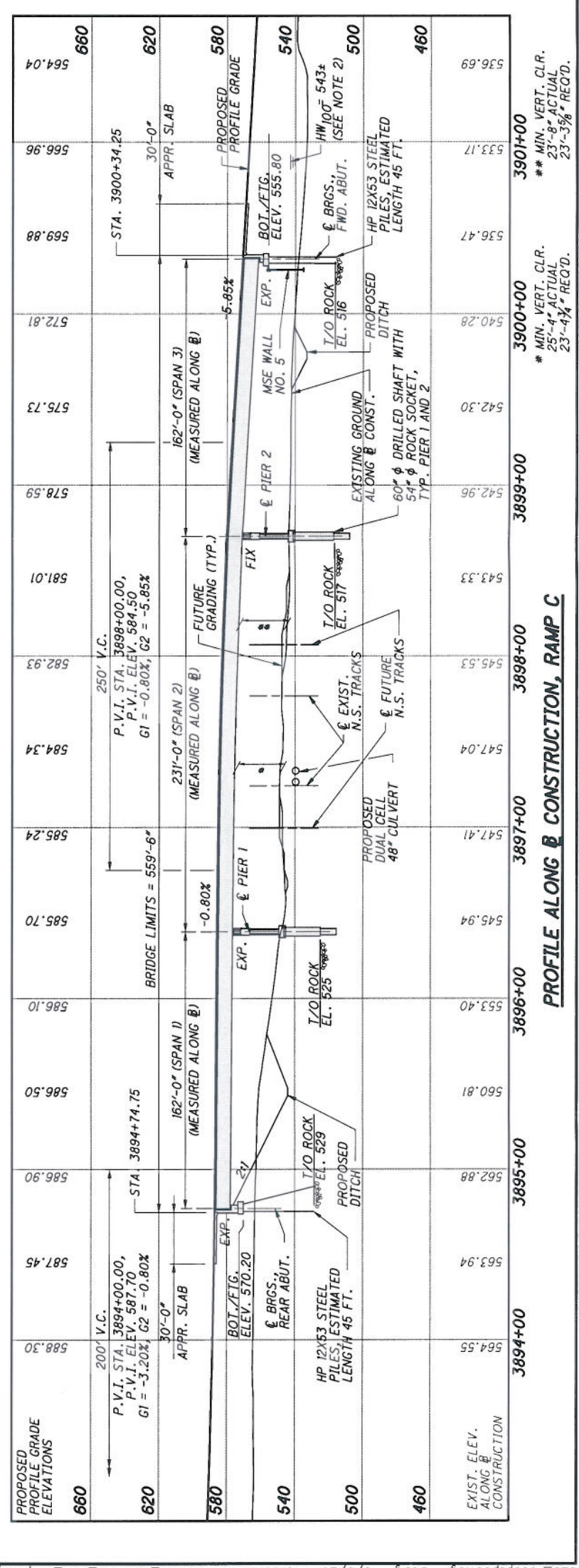
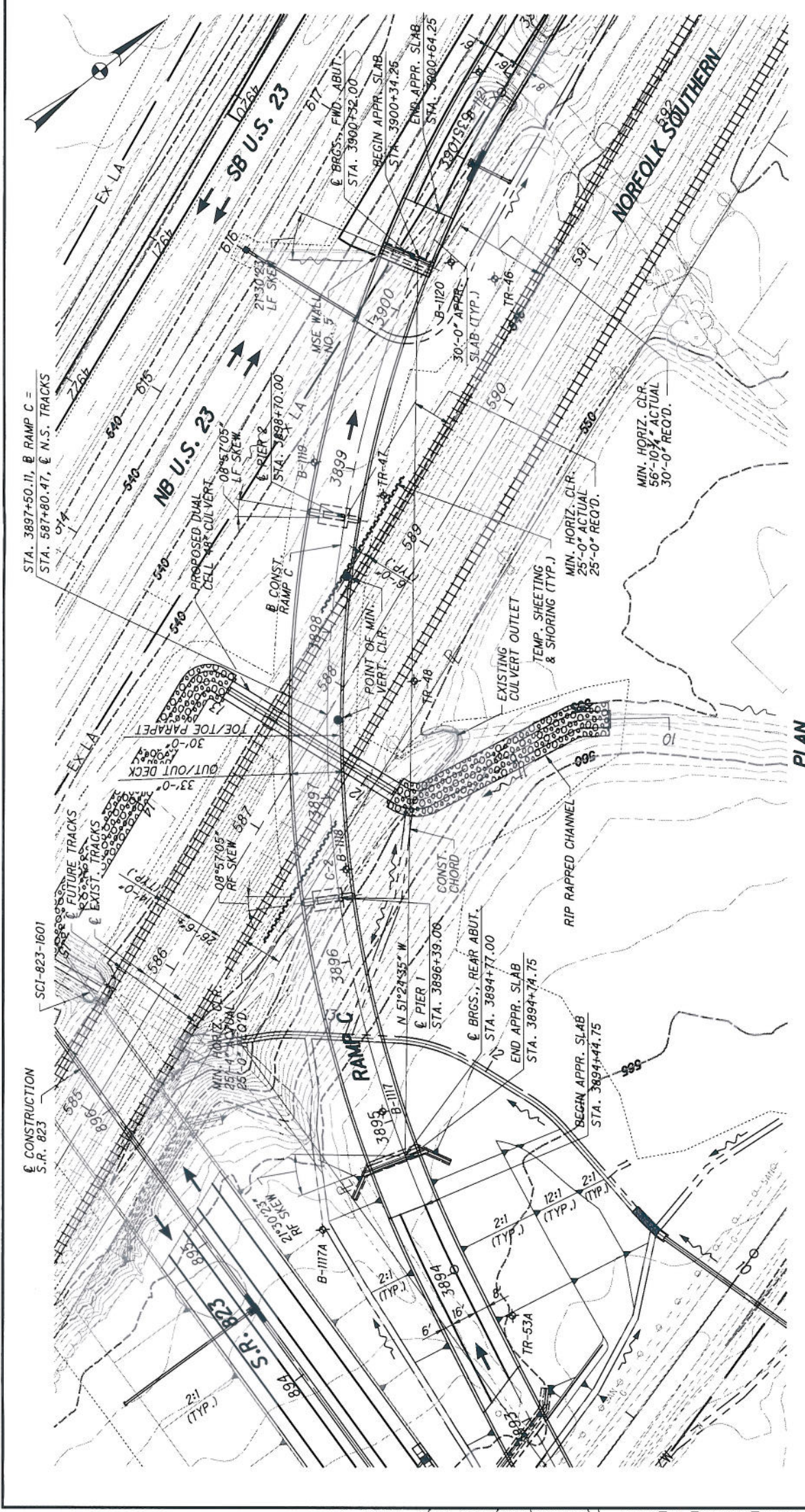
TRAFFIC DATA
 CURRENT ADT (2010) = 6200
 DESIGN ADT (2030) = 9400
 DESIGN ADTT = 1320

LEGEND
 ✦ DENOTES SOIL BORING LOCATION

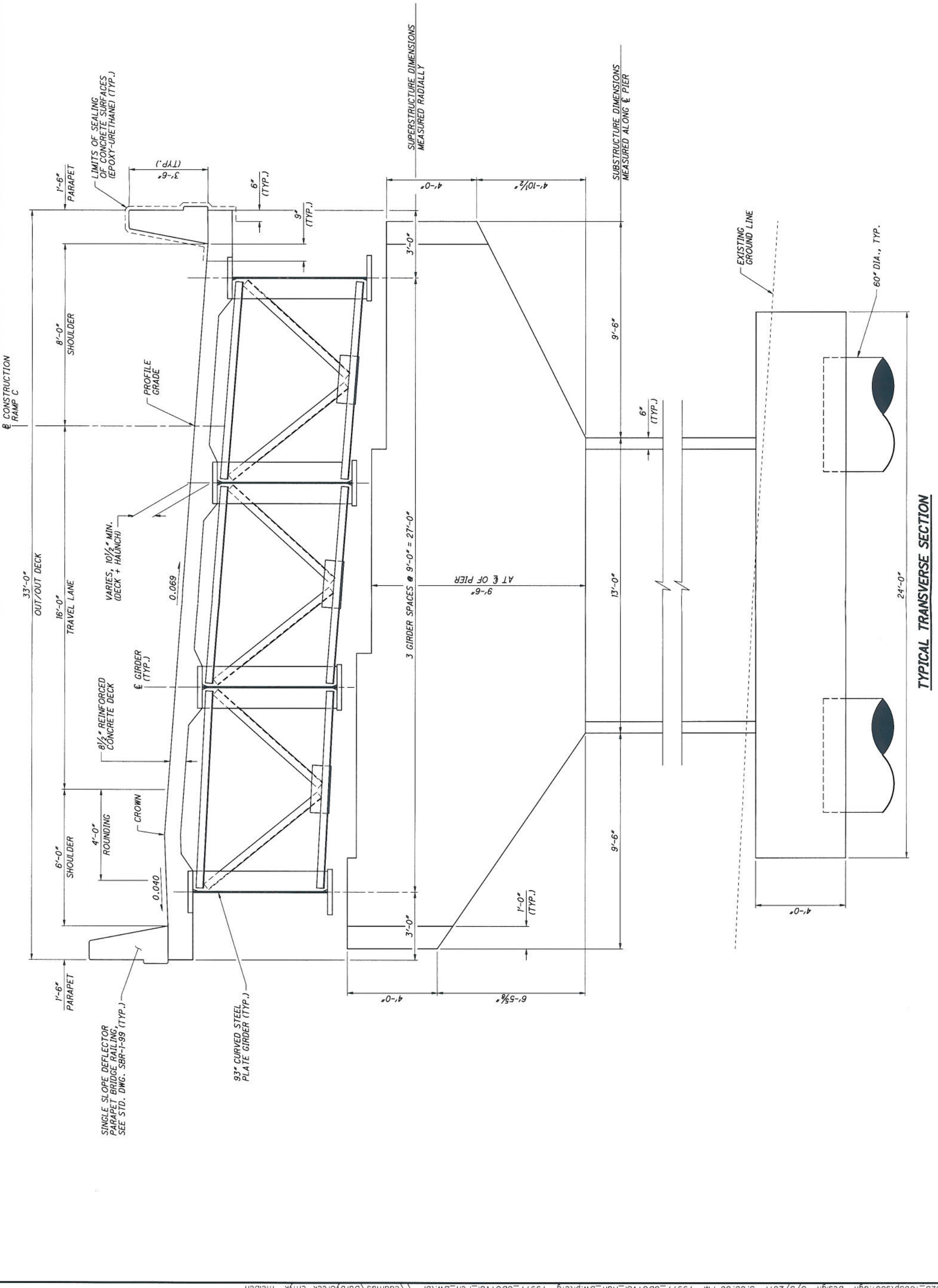
NOTES:
 1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL LIMITS SHALL CONFORM TO PLAN CROSS SECTIONS.
 2. HIGHWATER (HW) ELEV. 543+ IS THE 100 YEAR SCIOTO RIVER BACKWATER ELEVATION AS DETERMINED BY FEMA.

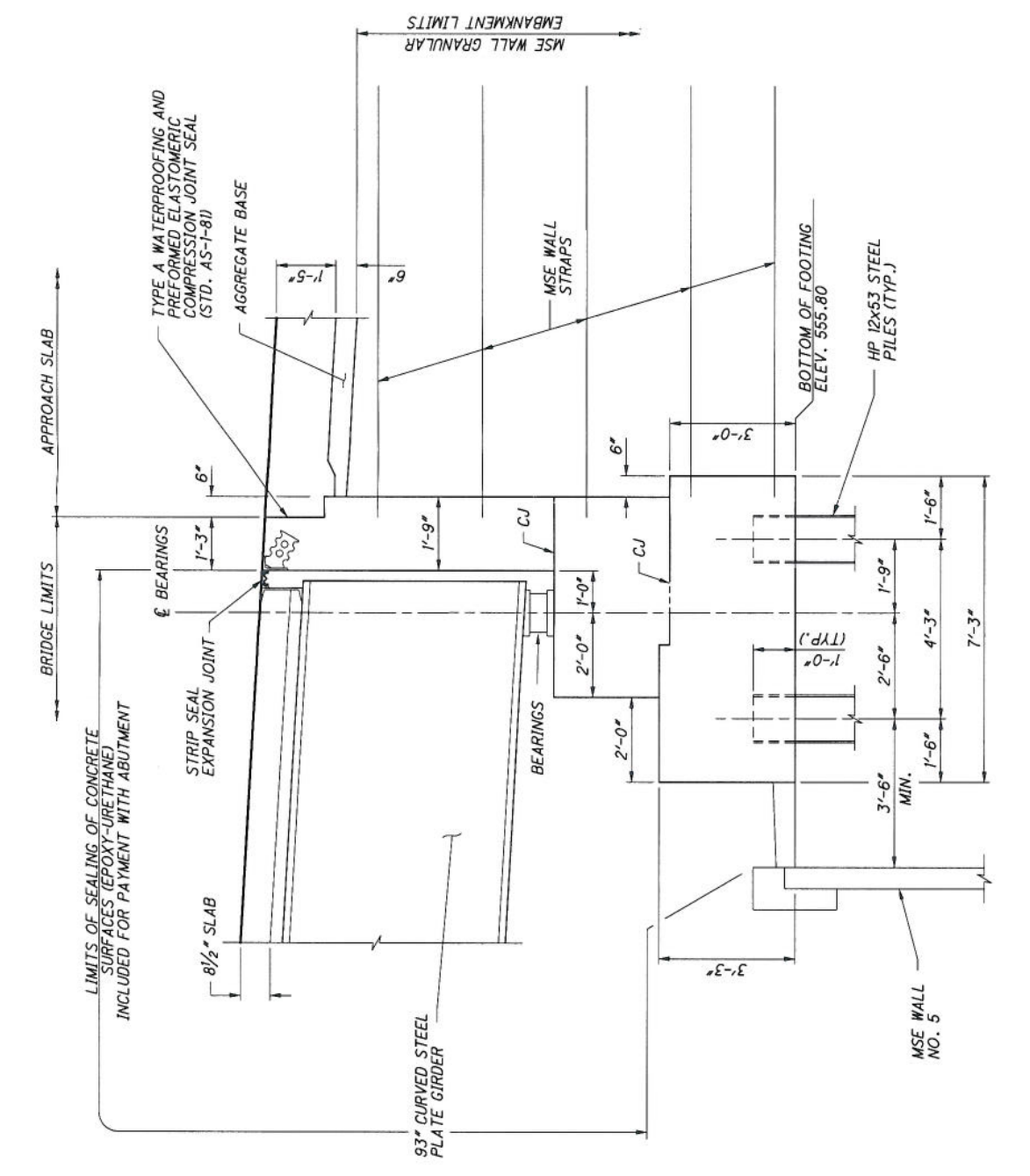
PROPOSED STRUCTURE

TYPE: THREE-SPAN COMPOSITE CURVED STEEL PLATE GIRDERS (WEATHERED ASTM A709, GR 50W) WITH REINFORCED CONCRETE DECK ON JOINTED STUB ABUTMENT (REAR) AND JOINTED STUB ABUTMENT ON MSE WALL (FWD.) WITH T-TYPE PIERS
LENGTH OF SPAN: 156'-0", 230'-0", 156'-0"
ROADWAY: 30'-0" TOE/TOE PARAPETS
SIDEWALK: NONE
DESIGN LOADING: HS25 (CASE III) AND THE ALTERNATE MILITARY LOADING, FWS = 60 LB/FT²
SKIEW: 21°30'23" RE (REAR ABUTMENT), 08°57'05" RF (PIER 1), 08°57'05" LF (PIER 2), 21°30'23" LF (FORWARD ABUTMENT), MEASURED FROM THE NORMAL TO THE CONSTRUCTION CHORD
WEARING SURFACE: MONOLITHIC CONCRETE
APPROACH SLABS: AS-1-81 (30'-0" LONG)
ALIGNMENT: HORIZONTALLY CURVED (RADIUS= 739.30 FT.)
SUPERELEVATION: 0.069 FT/FT
LATITUDE: N 38°53'34"
LONGITUDE: W 82°59'57"

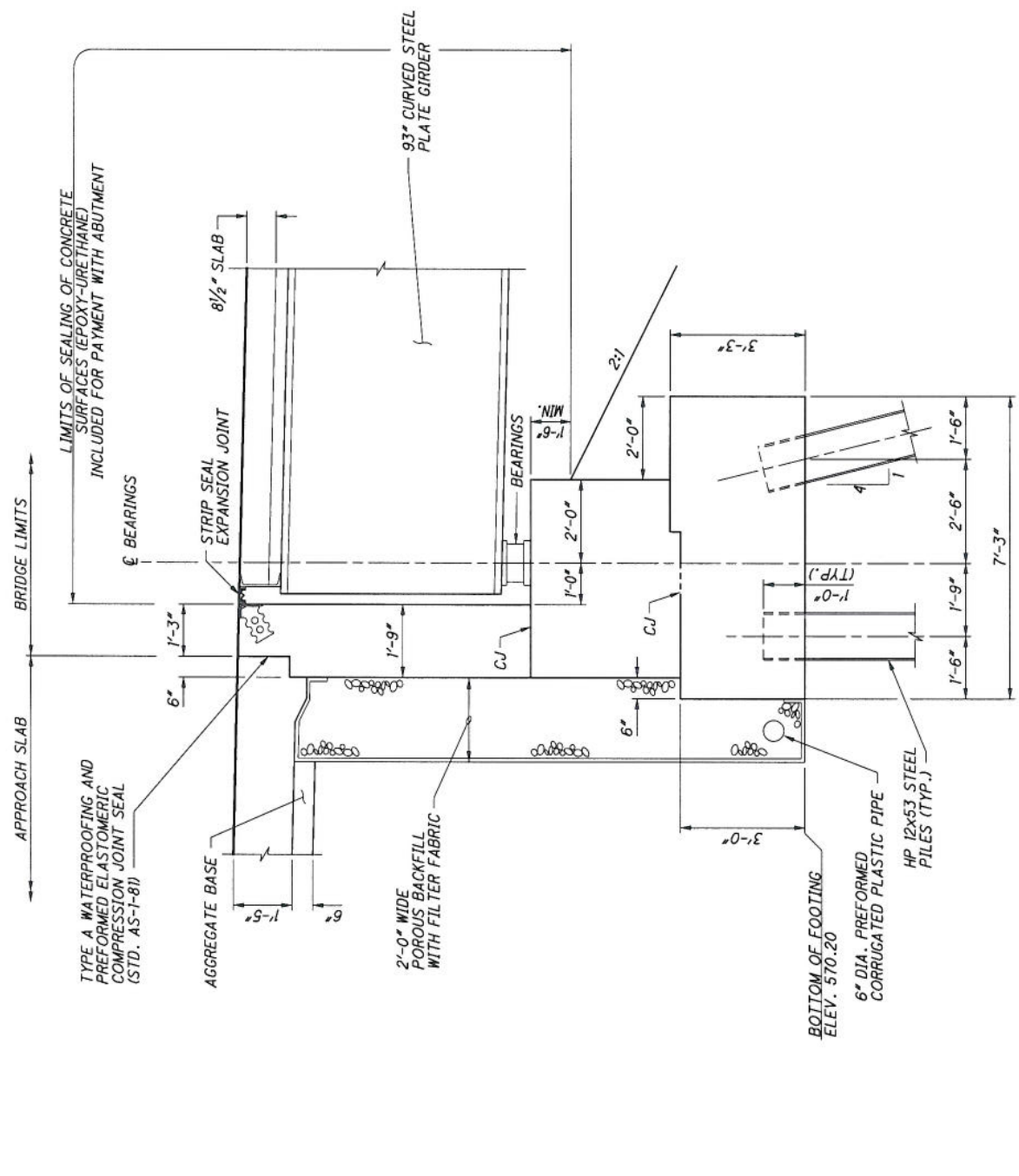


DESIGNED	SKT	JBA	VKN	DATE
CHECKED	SCJ/DGS	REVISED	STRUCTURE FILE NUMBER	730814

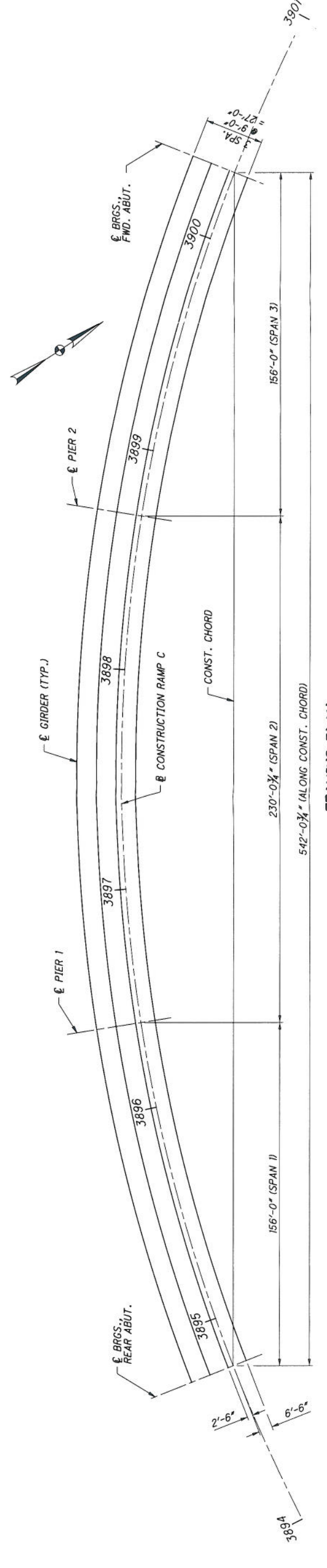




REAR ABUTMENT SECTION



FORWARD ABUTMENT SECTION



FRAMING PLAN