GEORGIA DEPARTMENT OF TRANSPORTATION

GDOT Project No: NH000-0575-01(028)

PI No: 713640

JBT Project No. 255717

Bridge No. 41
I-575 REVERSIBLE OVER TOWNE LAKE PKWY

November, 2009

CHEROKEE COUNTY

DESIGN CALCULATIONS

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience prior to the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.

(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not complete and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.

(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to pertinent factors and without proper regard for their purpose, could lead to erroneous conclusions.

(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work activity, a complete confirmation of the information contained herein should be performed prior to any such use.

(d) GTP has no responsibility for the use of this information not under its direct control.

Prepared for Georgia Transportation Partners
Atlanta, Georgia

J.B. TRIMBLE, INC.
2550 Heritage Ct, SE. Suite 250
Atlanta, GA 30339-3062
(770) 952-1022

Purpose of Calculation

Bridge design calculations for Bridge #41 were made for costing purposes.

1. Specifications and References

AASHTO 17th Edition, 2002
GDOT Bridge Design Manual, 2008

2. Computer

Computer Type Used: PC
Operating System: Windows XP, Pentium 4, 2GB RAM (min.)

3. Computer Programs (Standard Computer Program)

Excel, Microsoft Office 2003 – JBT Calculation Spreadsheets
BRLLCA, 2008 – Live Load Case Program, by GDOT
BRPIER, 2008 – Pier Design and Analysis, by GDOT
BRPSBM1, 2008 – PSC Beam Design and Analysis, by GDOT
LEAP Geomath 08.01.00.01 – Bridge and Structure Geometry, by Bentley Systems Inc.

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Bridge Geometry Output	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
	☐	☐	☐	☐	X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ○ NO	○	X	LEAP GEOMATH	08.01.00.01

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	45	45	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bridge Geometry Output
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Alignment ID: 575align

Start Station: 1433+09.8191

P.I.	North	East	Trans	Spiral-In	Spiral-Out	Radius
1	1,490,915.3065	2,186,382.5409	None			
2	1,491,928.6175	2,186,707.0435	Arc			2,879.9996
3	1,492,909.5117	2,186,294.7963	None			

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Alignment ID: 575align

Element # 1 Shape: Arc Radius 2,879.9996

	Station	North	East	Direction	Radius
Start:	1433+09.8191	1,490,915.3065	2,186,382.5409	N 17 45 25.698812	2,879.9996
End:	1453+48.2365	1,492,909.5117	2,186,294.7963	N 337 12 14.789024	2,879.9996
Length:	2,038.4174	Sense: Left		Delta: 40 33 10.909788	

Transition Point: CT Station: 1453+48.2365

Element # 2 Shape: Tangent

	Station	North	East	Direction	Radius
Start:	1453+48.2365	1,492,909.5117	2,186,294.7963	N 337 12 14.681238	INFINITY
End:	1453+48.2365	1,492,909.5117	2,186,294.7963	N 337 12 14.681238	INFINITY
Length:	0.0000			Delta: 0 00 00.000000	

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

XSection ID: 575xsect

SLOPE BREAK POINTS: 5

STATION	PGL-OFFSET	POINT	DIST-FR-PGL	GRADE	DESCRIPTION
1448+00.0000	0.0000	1	-35.6250		
				0.070000	BAR
		2	-34.0000		
				0.070000	IFBAR-HOVB
		3	-8.0000		
				0.070000	HOVBAR
		4	-6.0000		
				0.070000	HOVB-NBEP
		5	0.0000		

SLOPE BREAK POINTS: 5

STATION	PGL-OFFSET	POINT	DIST-FR-PGL	GRADE	DESCRIPTION
1451+00.0000	0.0000	1	-35.6250		
				0.070000	BAR
		2	-34.0000		
				0.070000	IFBAR-HOVB
		3	-8.0000		
				0.070000	HOVBAR
		4	-6.0000		
				0.070000	HOVB-NBEP
		5	0.0000		

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Profile ID: 575vert

VPI	Station	Elevation	Trans	Parabola-1	Parabola-2
1	1437+00.0000	891.5476	None		
2	1443+90.0000	895.8680	Parabola	1,380.0000	
3	1450+80.0000	914.0798	None		

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Profile ID: 575vert

Elem		Start	End	Apex		Transition
1	Sta	1437+00.0000	1437+00.0000	None	Length	0.0000
	Elev	891.5476	891.5476	None	Type	Tangent
	Grade	0.0063	0.0063			
2	Sta	1437+00.0000	1450+80.0000	None	Length	1,380.0000
	Elev	891.5476	914.0798	None	Type	Parabola
	Grade	0.0063	0.0264			
3	Sta	1450+80.0000	1450+80.0000	None	Length	0.0000
	Elev	914.0798	914.0798	None	Type	Tangent
	Grade	0.0264	0.0264			

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Alignment ID: TowneLkalign

Start Station: 491+04.8011

P.I.	North	East	Trans	Spiral-In	Spiral-Out	Radius
1	1,492,492.6748	2,185,975.2171	None			
2	1,492,576.4982	2,186,663.4238	None			

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Alignment ID: TowneLkalign

Element # 1 Shape: Tangent

	Station	North	East	Direction	Radius
Start:	491+04.8011	1,492,492.6748	2,185,975.2171	N 83 03 20.139851	INFINITY
End:	497+98.0938	1,492,576.4982	2,186,663.4238	N 83 03 20.139851	INFINITY
Length:	693.2927		Delta:	0 00 00.000000	

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

XSection ID: TowneLkxsect

SLOPE BREAK POINTS: 3

STATION	PGL-OFFSET	POINT	DIST-FR-PGL	GRADE	DESCRIPTION
493+00.0000	0.0000	1	-34.0000		
				0.020000	EOP-CL
		2	0.0000		
				-0.020000	CL-EOP
		3	34.0000		

SLOPE BREAK POINTS: 3

STATION	PGL-OFFSET	POINT	DIST-FR-PGL	GRADE	DESCRIPTION
497+00.0000	0.0000	1	-34.0000		
				0.020000	EOP-CL
		2	0.0000		
				-0.020000	CL-EOP
		3	34.0000		

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Profile ID: TowneLkvert

VPI	Station	Elevation	Trans	Parabola-1	Parabola-2
1	493+00.0000	886.3983	None		
2	493+50.0000	886.5467	None		
3	494+00.0000	886.6954	None		
4	494+50.0000	886.9474	None		
5	495+00.0000	887.2260	None		
6	495+50.0000	887.5693	None		
7	496+00.0000	888.0387	None		
8	496+50.0000	888.4604	None		
9	497+00.0000	888.7949	None		

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

Profile ID: TowneLkvert

Elem		Start	End	Apex		Transition
1	Sta	493+00.0000	493+50.0000	None	Length	50.0000
	Elev	886.3983	886.5467	None	Type	Tangent
	Grade	0.0030	0.0030			
3	Sta	493+50.0000	494+00.0000	None	Length	50.0000
	Elev	886.5467	886.6954	None	Type	Tangent
	Grade	0.0030	0.0030			
5	Sta	494+00.0000	494+50.0000	None	Length	50.0000
	Elev	886.6954	886.9474	None	Type	Tangent
	Grade	0.0050	0.0050			
7	Sta	494+50.0000	495+00.0000	None	Length	50.0000
	Elev	886.9474	887.2260	None	Type	Tangent
	Grade	0.0056	0.0056			
9	Sta	495+00.0000	495+50.0000	None	Length	50.0000
	Elev	887.2260	887.5693	None	Type	Tangent
	Grade	0.0069	0.0069			
11	Sta	495+50.0000	496+00.0000	None	Length	50.0000
	Elev	887.5693	888.0387	None	Type	Tangent
	Grade	0.0094	0.0094			
13	Sta	496+00.0000	496+50.0000	None	Length	50.0000
	Elev	888.0387	888.4604	None	Type	Tangent
	Grade	0.0084	0.0084			
15	Sta	496+50.0000	497+00.0000	None	Length	50.0000
	Elev	888.4604	888.7949	None	Type	Tangent
	Grade	0.0067	0.0067			

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

COORDINATE REPORT

Station Ref: 575

ID	STATION	OFFSET (ft)	NORTH (ft)	EAST (ft)	575 ELEV (ft)
B1&PGL	1448+78.2500	0.0000	1,492,463.3308	2,186,440.8104	909.0517
B2&PGL	1449+20.2500	0.0000	1,492,504.1069	2,186,430.7469	910.0495
B3&PGL	1450+08.2500	0.0000	1,492,589.0425	2,186,407.7393	912.2236
B4&PGL	1450+61.2500	0.0000	1,492,639.8436	2,186,392.6341	913.5875

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

COORDINATE REPORT

Station Ref: 575

ID	STATION	OFFSET (ft)	NORTH (ft)	EAST (ft)	575 ELEV (ft)
TLcl&575cl	1449+64.3844	0.0000	1,492,546.7923	2,186,419.5323	911.1258

Intersection: 0.0000ft RT 575align 1449+64.3844 = 0.0000ft RT TowneLkalign 495+52.3999

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

SPAN AND GIRDER REPORT

SPAN ID: B1-B2 ROADWAY: 575 ALIGNMENT: 575align NUMBER OF GIRDERS: 5
STARTING PIER: B1 STATION: 1448+78.2500 AZM: N 82.978352 SKEW: 6.424159
ENDING PIER: B2 STATION: 1449+20.2500 AZM: N 82.978352 SKEW: 7.259723

GIRDER	END POINT DISTANCES ALONG PIER CL			LENGTH		
	START	END	AZIMUTH	CL - CL	SEAT-SEAT	RADIUS
S1-G1	3.2066	1.6699	N 346.136411	41.9996	39.5761	INFINITY
S1-G2	9.1217	7.5850	N 346.136411	41.9996	39.5761	INFINITY
S1-G3	15.0368	13.5001	N 346.136411	41.9996	39.5761	INFINITY
S1-G4	20.9518	19.4151	N 346.136411	41.9996	39.5761	INFINITY
S1-G5	26.8669	25.3302	N 346.136411	41.9996	39.5761	INFINITY

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

SPAN AND GIRDER REPORT

SPAN ID: B2-B3 ROADWAY: 575 ALIGNMENT: 575align NUMBER OF GIRDERS: 5
STARTING PIER: B2 STATION: 1449+20.2500 AZM: N 82.978352 SKEW: 7.259723
ENDING PIER: B3 STATION: 1450+08.2500 AZM: N 82.978352 SKEW: 9.010427

GIRDER	END POINT DISTANCES ALONG PIER CL			LENGTH		
	START	END	AZIMUTH	CL - CL	SEAT-SEAT	RADIUS
S2-G1	1.6699	1.6699	N 344.843277	87.9966	86.1657	INFINITY
S2-G2	7.5850	7.5850	N 344.843277	87.9966	86.1657	INFINITY
S2-G3	13.5000	13.5000	N 344.843277	87.9966	86.1657	INFINITY
S2-G4	19.4150	19.4150	N 344.843277	87.9966	86.1657	INFINITY
S2-G5	25.3302	25.3302	N 344.843277	87.9966	86.1657	INFINITY

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

SPAN AND GIRDER REPORT

SPAN ID: B3-B4 ROADWAY: 575 ALIGNMENT: 575align NUMBER OF GIRDERS: 5
STARTING PIER: B3 STATION: 1450+08.2500 AZM: N 82.978352 SKEW: 9.010427
ENDING PIER: B4 STATION: 1450+61.2500 AZM: N 82.978352 SKEW: 10.064829

GIRDER	END POINT DISTANCES ALONG PIER CL			LENGTH		
	START	END	AZIMUTH	CL - CL	SEAT-SEAT	RADIUS
S3-G1	1.6699	3.4566	N 343.440690	52.9993	50.5593	INFINITY
S3-G2	7.5849	9.3716	N 343.440690	52.9993	50.5593	INFINITY
S3-G3	13.5000	15.2867	N 343.440724	52.9993	50.5593	INFINITY
S3-G4	19.4151	21.2018	N 343.440724	52.9993	50.5593	INFINITY
S3-G5	25.3301	27.1168	N 343.440724	52.9993	50.5593	INFINITY

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

CLEARANCE REPORT

SPAN : B2-B3 SPAN ROADWAY: 575

CLEAR ROADWAY: TowneLk

PIER ID	HORIZONTAL LT CLR	HORIZONTAL RT CLR
B2	8.03	7.99
B3	-7.57	-7.61

ID	MIN VERTICAL CLR	STATION	OFFSET	REF NODE NUMBER
S2-G1	16.83	495+24.5936	34.00	10
S2-G2	17.18	495+30.5099	34.00	10
S2-G3	17.53	495+36.4260	34.00	10
S2-G4	17.88	495+42.3422	34.00	10
S2-G5	18.23	495+48.2585	34.00	10

ID	MAX VERTICAL CLR	STATION	OFFSET	REF NODE NUMBER
S2-G1	18.64	495+12.9274	-34.00	9
S2-G2	18.99	495+18.8437	-34.00	9
S2-G3	19.33	495+24.7598	-34.00	9
S2-G4	19.68	495+30.6760	-34.00	9
S2-G5	20.02	495+36.5923	-34.00	9

LEFT EXTERIOR GIRDER ID: S2-G1
RIGHT EXTERIOR GIRDER ID: S2-G5

LEFT EDGE OF DECK STATION	OFFSET	ALONG	CLR	RIGHT EDGE OF DECK STATION	OFFSET	ALONG	CLR
1449+24.8455	-35.62	-0.54	-2.60	1449+20.2500	0.00	-2.28	9.54
1449+69.4081	-35.62	43.47	-2.34	1449+64.2500	0.00	41.72	9.87
1450+13.9708	-35.63	87.47	-2.75	1450+08.2500	0.00	85.72	9.54

MINIMUM CLEARANCE: LT -2.34 RT 9.54
MAXIMUM CLEARANCE: LT -2.75 RT 9.87

***** End of Report *****

Feet Datafile Modification Date: 10/27/2009 20:06

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

DECK ELEVATIONS ALONG OFFSETS (EQUAL SPACINGS)

SPAN ID: B1-B2 ROADWAY: 575 BETWEEN PIERS : B1 - B2 SPACES = 2

OFFSET	DISTANCE	STATION	OFFSET	ELEVATION
1	42.0076			
		1448+82.3118	-35.6250	906.6534
		1449+03.5786	-35.6250	907.1566
		1449+24.8455	-35.6250	907.6665
2	42.0073			
		1448+82.1243	-34.0000	906.7627
		1449+03.3788	-34.0000	907.2656
		1449+24.6334	-34.0000	907.7752
3	42.0017			
		1448+79.1533	-8.0000	908.5129
		1449+00.2126	-8.0000	909.0103
		1449+21.2720	-8.0000	909.5141
4	42.0013			
		1448+78.9270	-6.0000	908.6476
		1448+99.9715	-6.0000	909.1446
		1449+21.0159	-6.0000	909.6480
5	42.0000			
		1448+78.2500	0.0000	909.0517
		1448+99.2500	0.0000	909.5474
		1449+20.2500	0.0000	910.0495

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

DECK ELEVATIONS ALONG OFFSETS (EQUAL SPACINGS)

SPAN ID: B2-B3 ROADWAY: 575 BETWEEN PIERS : B2 - B3 SPACES = 2

OFFSET	DISTANCE	STATION	OFFSET	ELEVATION
1	88.0228			
		1449+24.8455	-35.6250	907.6665
		1449+69.4081	-35.6250	908.7563
		1450+13.9708	-35.6250	909.8751
2	88.0217			
		1449+24.6334	-34.0000	907.7752
		1449+69.1700	-34.0000	908.8642
		1450+13.7066	-34.0000	909.9821
3	88.0050			
		1449+21.2720	-8.0000	909.5141
		1449+65.3971	-8.0000	910.5908
		1450+09.5221	-8.0000	911.6958
4	88.0038			
		1449+21.0159	-6.0000	909.6480
		1449+65.1097	-6.0000	910.7237
		1450+09.2034	-6.0000	911.8278
5	88.0000			
		1449+20.2500	0.0000	910.0495
		1449+64.2500	0.0000	911.1224
		1450+08.2500	0.0000	912.2236

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

DECK ELEVATIONS ALONG OFFSETS (EQUAL SPACINGS)

SPAN ID: B3-B4 ROADWAY: 575 BETWEEN PIERS : B3 - B4 SPACES = 2

OFFSET	DISTANCE	STATION	OFFSET	ELEVATION
1	53.0189			
		1450+13.9708	-35.6250	909.8751
		1450+40.8122	-35.6250	910.5629
		1450+67.6537	-35.6250	911.2613
2	53.0180			
		1450+13.7066	-34.0000	909.9821
		1450+40.5323	-34.0000	910.6695
		1450+67.3580	-34.0000	911.3673
3	53.0042			
		1450+09.5221	-8.0000	911.6958
		1450+36.0981	-8.0000	912.3751
		1450+62.6740	-8.0000	913.0647
4	53.0031			
		1450+09.2034	-6.0000	911.8278
		1450+35.7603	-6.0000	912.5064
		1450+62.3172	-6.0000	913.1954
5	53.0000			
		1450+08.2500	0.0000	912.2236
		1450+34.7500	0.0000	912.9004
		1450+61.2500	0.0000	913.5875

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL PLACEMENT

SPAN : B1-B2 ROADWAY: 575 GIRDERS COMPLETED: 5
MIN BUILD UP, in : 0.7500
DECK THICKNESS, in : 7.3750
NUMBER OF CHECK PTS: 3

GIRDER DATA

GIRDER	LENGTH (ft)	GIRDER TYPE	CAMBER (in)	TOTAL DEFL (in)	DAP START (in)	DAP END (in)
S1-G1	39.5761	AASHTO-I(mod)	0.8450	0.4630	0.0000	0.0000
S1-G2	39.5761	AASHTO-I(mod)	0.8450	0.4630	0.0000	0.0000
S1-G3	39.5761	AASHTO-I(mod)	0.8450	0.4630	0.0000	0.0000
S1-G4	39.5761	AASHTO-I(mod)	0.8450	0.4630	0.0000	0.0000
S1-G5	39.5761	AASHTO-I(mod)	0.8450	0.4630	0.0000	0.0000

GIRDER	BRG TOP ELEVATION START (ft)	END (ft)	BUILD-UP THICKNESS MIN (in)	LOCATION (ft)	MAX (in)	LOCATION (ft)
S1-G1	903.7690	904.7268	0.7500	19.5590 L	2.2844	-1.5808 R
S1-G2	904.1645	905.1192	0.7500	19.5590 L	2.2842	-1.5808 R
S1-G3	904.5600	905.5116	0.7500	19.5590 L	2.2839	-1.5808 R
S1-G4	904.9555	905.9042	0.7500	19.5590 L	2.2837	-1.5808 R
S1-G5	905.3512	906.2968	0.7500	19.5590 L	2.2835	-1.5808 R

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL PLACEMENT

SPAN : B2-B3 ROADWAY: 575 GIRDERS COMPLETED: 5
MIN BUILD UP, in : 0.7500
DECK THICKNESS, in : 7.2500
NUMBER OF CHECK PTS: 3

GIRDER DATA

GIRDER	LENGTH (ft)	GIRDER TYPE	CAMBER (in)	TOTAL DEFL (in)	DAP START (in)	DAP END (in)
S2-G1	86.1657	AASHTO-III	2.4280	1.5980	0.0000	0.0000
S2-G2	86.1657	AASHTO-III	2.4280	1.5980	0.0000	0.0000
S2-G3	86.1657	AASHTO-III	2.4280	1.5980	0.0000	0.0000
S2-G4	86.1657	AASHTO-III	2.4280	1.5980	0.0000	0.0000
S2-G5	86.1657	AASHTO-III	2.4280	1.5980	0.0000	0.0000

GIRDER	BRG TOP ELEVATION START (ft)	END (ft)	BUILD-UP THICKNESS MIN (in)	LOCATION (ft)	MAX (in)	LOCATION (ft)
S2-G1	903.2928	905.4623	0.7500	43.1781 L	3.2024	-1.0108 R
S2-G2	903.6851	905.8473	0.7500	43.1781 L	3.2013	-1.0108 R
S2-G3	904.0774	906.2324	0.7500	43.1781 L	3.2001	-1.0108 R
S2-G4	904.4699	906.6176	0.7500	43.1781 L	3.1990	-1.0108 R
S2-G5	904.8625	907.0030	0.7500	43.1781 L	3.1979	-1.0108 R

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL PLACEMENT

SPAN : B3-B4 ROADWAY: 575 GIRDERS COMPLETED: 5
MIN BUILD UP, in : 0.7500
DECK THICKNESS, in : 7.2500
NUMBER OF CHECK PTS: 3

GIRDER DATA

GIRDER	LENGTH (ft)	GIRDER TYPE	CAMBER (in)	TOTAL DEFL (in)	DAP START (in)	DAP END (in)
S3-G1	50.5593	AASHTO-I(mod)	1.6660	0.9730	0.0000	0.0000
S3-G2	50.5593	AASHTO-I(mod)	1.6660	0.9730	0.0000	0.0000
S3-G3	50.5593	AASHTO-I(mod)	1.6660	0.9730	0.0000	0.0000
S3-G4	50.5593	AASHTO-I(mod)	1.6660	0.9730	0.0000	0.0000
S3-G5	50.5593	AASHTO-I(mod)	1.6660	0.9730	0.0000	0.0000

GIRDER	BRG TOP ELEVATION START (ft)	END (ft)	BUILD-UP THICKNESS MIN (in)	LOCATION (ft)	MAX (in)	LOCATION (ft)
S3-G1	906.9681	908.2946	0.7500	25.6787 L	2.6694	51.9823 R
S3-G2	907.3528	908.6747	0.7500	25.6787 L	2.6691	51.9823 R
S3-G3	907.7377	909.0549	0.7500	25.6787 L	2.6688	51.9823 R
S3-G4	908.1227	909.4352	0.7500	25.6787 L	2.6685	51.9823 R
S3-G5	908.5078	909.8158	0.7500	25.6787 L	2.6682	51.9823 R

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B1-B2 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.3750

GIRDER ID: S1-G1

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 346.136411					
WPT-WPT LEN,ft: 39.5761	Start:	1,492,460.7276	2,186,407.4047	903.7690	0.0000
PR-PR LEN,ft: 41.9996	End:	1,492,499.1508	2,186,397.9219	904.7268	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 0.8450 TOTAL DEFL,in: 0.4630
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070129 End: 0.069791 Avg: 0.069960
GIRDER PITCH,ft/ft: 0.024202 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	906.8598	906.8598	906.1024	0.7575
2	19.7881	907.3310	907.3696	906.6517	0.7179
3	39.5761	907.8176	907.8176	907.0602	0.7575

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	19.5590	L
MAXIMUM:	2.284	-1.5808	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	1.2952	1.7898	2.2844
2	20.9998	0.7500	1.2398	1.7296
3	41.9996	1.2743	1.7593	2.2443

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B1-B2 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.3750

GIRDER ID: S1-G2 BRG CO-ORDS ELEVATION DAP HEIGHT
AZIMUTH, deg: N 346.136411 North East (ft) (ft)
WPT-WPT LEN,ft: 39.5761 Start: 1,492,461.4507 2,186,413.2755 904.1645 0.0000
PR-PR LEN,ft: 41.9996 End: 1,492,499.8739 2,186,403.7926 905.1192 0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 0.8450 TOTAL DEFL,in: 0.4630
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070134 End: 0.069799 Avg: 0.069966
GIRDER PITCH,ft/ft: 0.024124 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	907.2552	907.2552	906.4978	0.7574
2	19.7881	907.7249	907.7635	907.0456	0.7179
3	39.5761	908.2100	908.2100	907.4525	0.7574

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	19.5590	L
MAXIMUM:	2.284	-1.5808	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	1.2949	1.7895	2.2842
2	20.9998	0.7500	1.2398	1.7297
3	41.9996	1.2740	1.7590	2.2441

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B1-B2 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.3750

GIRDER ID: S1-G3	BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 346.136411				
WPT-WPT LEN,ft: 39.5761 Start:	1,492,462.1738	2,186,419.1462	904.5600	0.0000
PR-PR LEN,ft: 41.9996 End:	1,492,500.5970	2,186,409.6633	905.5116	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 0.8450 TOTAL DEFL,in: 0.4630
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070139 End: 0.069806 Avg: 0.069972
GIRDER PITCH,ft/ft: 0.024047 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	907.6507	907.6507	906.8933	0.7574
2	19.7881	908.1188	908.1574	907.4395	0.7179
3	39.5761	908.6024	908.6024	907.8450	0.7574

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	19.5590	L
MAXIMUM:	2.284	-1.5808	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	1.2946	1.7893	2.2839
2	20.9998	0.7500	1.2399	1.7298
3	41.9996	1.2738	1.7588	2.2439

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B1-B2 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.3750

GIRDER ID: S1-G4	BRG CO-ORDS		ELEVATION	DAP HEIGHT
AZIMUTH, deg: N 346.136411	North	East	(ft)	(ft)
WPT-WPT LEN,ft: 39.5761 Start:	1,492,462.8968	2,186,425.0168	904.9555	0.0000
PR-PR LEN,ft: 41.9996 End:	1,492,501.3201	2,186,415.5339	905.9042	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 0.8450 TOTAL DEFL,in: 0.4630
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070144 End: 0.069813 Avg: 0.069978
GIRDER PITCH,ft/ft: 0.023970 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	908.0463	908.0463	907.2889	0.7574
2	19.7881	908.5129	908.5515	907.8336	0.7179
3	39.5761	908.9949	908.9949	908.2375	0.7574

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	19.5590	L
MAXIMUM:	2.284	-1.5808	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	1.2943	1.7890	2.2837
2	20.9998	0.7500	1.2399	1.7299
3	41.9996	1.2735	1.7586	2.2437

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B1-B2 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.3750

GIRDER ID: S1-G5		BRG CO-ORDS North	East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 346.136411					
WPT-WPT LEN,ft: 39.5761	Start:	1,492,463.6199	2,186,430.8876	905.3512	0.0000
PR-PR LEN,ft: 41.9996	End:	1,492,502.0432	2,186,421.4047	906.2968	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 0.8450 TOTAL DEFL,in: 0.4630
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070149 End: 0.069819 Avg: 0.069984
GIRDER PITCH,ft/ft: 0.023893 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	908.4419	908.4419	907.6845	0.7574
2	19.7881	908.9071	908.9457	908.2277	0.7179
3	39.5761	909.3875	909.3875	908.6301	0.7574

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	19.5590	L
MAXIMUM:	2.284	-1.5808	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	1.2940	1.7888	2.2835
2	20.9998	0.7500	1.2400	1.7300
3	41.9996	1.2732	1.7584	2.2435

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B2-B3 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S2-G1

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 344.843277					
WPT-WPT LEN,ft: 86.1657	Start:	1,492,500.9206	2,186,397.4638	903.2928	0.0000
PR-PR LEN,ft: 87.9966	End:	1,492,584.0889	2,186,374.9349	905.4623	0.0000

GIRDER TYPE:AASHTO-III CAMBER,in : 2.4280 TOTAL DEFL,in: 1.5980
TOP WIDTH,in: 16.0000 BOT WIDTH,in: 22.0000 HEIGHT,in: 45.0000

DECK SLOPE ,ft/ft Start: 0.070323 End: 0.069559 Avg: 0.069941
GIRDER PITCH,ft/ft: 0.025178 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	907.8619	907.8619	907.0428	0.8191
2	43.0828	908.9100	909.0432	908.3299	0.7133
3	86.1657	910.0314	910.0314	909.2123	0.8191

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	43.1781	L
MAXIMUM:	3.202	-1.0108	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	2.0656	2.6340	3.2024
2	43.9983	0.7500	1.3097	1.8693
3	87.9966	2.0833	2.6339	3.1846

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B2-B3 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S2-G2 BRG CO-ORDS ELEVATION DAP HEIGHT
AZIMUTH, deg: N 344.843277 North East (ft) (ft)
WPT-WPT LEN,ft: 86.1657 Start: 1,492,501.6437 2,186,403.3345 903.6851 0.0000
PR-PR LEN,ft: 87.9966 End: 1,492,584.8120 2,186,380.8056 905.8473 0.0000

GIRDER TYPE:AASHTO-III CAMBER,in : 2.4280 TOTAL DEFL,in: 1.5980
TOP WIDTH,in: 16.0000 BOT WIDTH,in: 22.0000 HEIGHT,in: 45.0000

DECK SLOPE ,ft/ft Start: 0.070328 End: 0.069569 Avg: 0.069948
GIRDER PITCH,ft/ft: 0.025094 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	908.2541	908.2541	907.4351	0.8190
2	43.0828	909.2986	909.4318	908.7185	0.7133
3	86.1657	910.4163	910.4163	909.5973	0.8190

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	43.1781	L
MAXIMUM:	3.201	-1.0108	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	2.0644	2.6328	3.2013
2	43.9983	0.7500	1.3097	1.8695
3	87.9966	2.0820	2.6327	3.1835

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B2-B3 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S2-G3 BRG CO-ORDS ELEVATION DAP HEIGHT
AZIMUTH, deg: N 344.843277 North East (ft) (ft)
WPT-WPT LEN,ft: 86.1657 Start: 1,492,502.3668 2,186,409.2052 904.0774 0.0000
PR-PR LEN,ft: 87.9966 End: 1,492,585.5351 2,186,386.6763 906.2324 0.0000

GIRDER TYPE:AASHTO-III CAMBER,in : 2.4280 TOTAL DEFL,in: 1.5980
TOP WIDTH,in: 16.0000 BOT WIDTH,in: 22.0000 HEIGHT,in: 45.0000

DECK SLOPE ,ft/ft Start: 0.070333 End: 0.069578 Avg: 0.069956
GIRDER PITCH,ft/ft: 0.025009 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	908.6464	908.6464	907.8274	0.8189
2	43.0828	909.6874	909.8206	909.1072	0.7133
3	86.1657	910.8013	910.8013	909.9824	0.8189

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	43.1781	L
MAXIMUM:	3.200	-1.0108	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	2.0632	2.6317	3.2001
2	43.9983	0.7500	1.3098	1.8696
3	87.9966	2.0808	2.6316	3.1824

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B2-B3 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S2-G4 BRG CO-ORDS ELEVATION DAP HEIGHT
AZIMUTH, deg: N 344.843277 North East (ft) (ft)
WPT-WPT LEN,ft: 86.1657 Start: 1,492,503.0898 2,186,415.0759 904.4699 0.0000
PR-PR LEN,ft: 87.9966 End: 1,492,586.2582 2,186,392.5470 906.6176 0.0000

GIRDER TYPE:AASHTO-III CAMBER,in : 2.4280 TOTAL DEFL,in: 1.5980
TOP WIDTH,in: 16.0000 BOT WIDTH,in: 22.0000 HEIGHT,in: 45.0000

DECK SLOPE ,ft/ft Start: 0.070339 End: 0.069588 Avg: 0.069963
GIRDER PITCH,ft/ft: 0.024925 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	909.0387	909.0387	908.2199	0.8188
2	43.0828	910.0762	910.2094	909.4961	0.7133
3	86.1657	911.1864	911.1864	910.3676	0.8188

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	43.1781	L
MAXIMUM:	3.199	-1.0108	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	2.0620	2.6305	3.1990
2	43.9983	0.7500	1.3098	1.8697
3	87.9966	2.0795	2.6304	3.1813

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B2-B3 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S2-G5

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 344.843277					
WPT-WPT LEN,ft: 86.1657	Start:	1,492,503.8129	2,186,420.9466	904.8625	0.0000
PR-PR LEN,ft: 87.9966	End:	1,492,586.9813	2,186,398.4177	907.0030	0.0000

GIRDER TYPE:AASHTO-III CAMBER,in : 2.4280 TOTAL DEFL,in: 1.5980
TOP WIDTH,in: 16.0000 BOT WIDTH,in: 22.0000 HEIGHT,in: 45.0000

DECK SLOPE ,ft/ft Start: 0.070344 End: 0.069598 Avg: 0.069971
GIRDER PITCH,ft/ft: 0.024842 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	909.4312	909.4312	908.6125	0.8187
2	43.0828	910.4652	910.5984	909.8851	0.7133
3	86.1657	911.5717	911.5717	910.7530	0.8187

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	43.1781	L
MAXIMUM:	3.198	-1.0108	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	2.0608	2.6293	3.1979
2	43.9983	0.7500	1.3099	1.8698
3	87.9966	2.0783	2.6293	3.1803

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B3-B4 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S3-G1		BRG CO-ORDS		ELEVATION	DAP HEIGHT
AZIMUTH, deg: N 343.440690		North	East	(ft)	(ft)
WPT-WPT LEN,ft: 50.5593	Start:	1,492,585.8534	2,186,374.4336	906.9681	0.0000
PR-PR LEN,ft: 52.9993	End:	1,492,634.3157	2,186,360.0238	908.2946	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 1.6660 TOTAL DEFL,in: 0.9730
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070180 End: 0.069712 Avg: 0.069946
GIRDER PITCH,ft/ft: 0.026237 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	910.0792	910.0792	909.3014	0.7778
2	25.2796	910.7299	910.8109	910.1035	0.7075
3	50.5593	911.4057	911.4057	910.6279	0.7778

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	25.6787	L
MAXIMUM:	2.669	51.9823	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	1.6482	2.1463	2.6444
2	26.4996	0.7500	1.2395	1.7291
3	52.9993	1.7075	2.1884	2.6694

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B3-B4 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S3-G2

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 343.440690					
WPT-WPT LEN,ft: 50.5593	Start:	1,492,586.5765	2,186,380.3043	907.3528	0.0000
PR-PR LEN,ft: 52.9993	End:	1,492,635.0388	2,186,365.8945	908.6747	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 1.6660 TOTAL DEFL,in: 0.9730
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070187 End: 0.069723 Avg: 0.069955
GIRDER PITCH,ft/ft: 0.026144 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	910.4639	910.4639	909.6861	0.7778
2	25.2796	911.1123	911.1934	910.4859	0.7075
3	50.5593	911.7858	911.7858	911.0080	0.7778

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	25.6787	L
MAXIMUM:	2.669	51.9823	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	1.6478	2.1460	2.6441
2	26.4996	0.7500	1.2396	1.7293
3	52.9993	1.7071	2.1881	2.6691

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B3-B4 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S3-G3

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 343.440724					
WPT-WPT LEN,ft: 50.5593	Start:	1,492,587.2995	2,186,386.1750	907.7377	0.0000
PR-PR LEN,ft: 52.9993	End:	1,492,635.7619	2,186,371.7653	909.0549	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 1.6660 TOTAL DEFL,in: 0.9730
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070195 End: 0.069734 Avg: 0.069964
GIRDER PITCH,ft/ft: 0.026053 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	910.8488	910.8488	910.0710	0.7778
2	25.2796	911.4948	911.5759	910.8684	0.7075
3	50.5593	912.1660	912.1660	911.3882	0.7778

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	25.6787	L
MAXIMUM:	2.669	51.9823	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	1.6474	2.1456	2.6438
2	26.4996	0.7500	1.2397	1.7294
3	52.9993	1.7066	2.1877	2.6688

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B3-B4 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S3-G4		BRG CO-ORDS		ELEVATION	DAP HEIGHT
AZIMUTH, deg: N 343.440724		North	East	(ft)	(ft)
WPT-WPT LEN,ft: 50.5593	Start:	1,492,588.0226	2,186,392.0457	908.1227	0.0000
PR-PR LEN,ft: 52.9993	End:	1,492,636.4850	2,186,377.6360	909.4352	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 1.6660 TOTAL DEFL,in: 0.9730
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070203 End: 0.069744 Avg: 0.069973
GIRDER PITCH,ft/ft: 0.025961 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	911.2337	911.2337	910.4560	0.7777
2	25.2796	911.8775	911.9586	911.2511	0.7075
3	50.5593	912.5463	912.5463	911.7686	0.7777

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	25.6787	L
MAXIMUM:	2.668	51.9823	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	CL (in)	RIGHT (in)
1	0.0000	1.6470	2.1452	2.6435
2	26.4996	0.7500	1.2397	1.7295
3	52.9993	1.7061	2.1873	2.6685

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

GIRDER VERTICAL GEOMETRY

SPAN ID: B3-B4 ROADWAY: 575
MIN BUILD-UP,in: 0.7500 DECK THICK,in: 7.2500

GIRDER ID: S3-G5

		BRG CO-ORDS North	BRG CO-ORDS East	ELEVATION (ft)	DAP HEIGHT (ft)
AZIMUTH, deg: N 343.440724					
WPT-WPT LEN,ft: 50.5593	Start:	1,492,588.7457	2,186,397.9164	908.5078	0.0000
PR-PR LEN,ft: 52.9993	End:	1,492,637.2081	2,186,383.5067	909.8158	0.0000

GIRDER TYPE:AASHTO-I(mod) CAMBER,in : 1.6660 TOTAL DEFL,in: 0.9730
TOP WIDTH,in: 14.0000 BOT WIDTH,in: 18.0000 HEIGHT,in: 28.0000

DECK SLOPE ,ft/ft Start: 0.070210 End: 0.069754 Avg: 0.069982
GIRDER PITCH,ft/ft: 0.025870 ROLL,deg: 0.000000

CHECK POINT	DIST ALONG CENTERLINE WPT-WPT (ft)	FINAL DECK ELEVATION (ft)	SCREED ELEVATION (ft)	GIRDER TOP ELEVATION (ERECTED) (ft)	SCREED HT. ABOVE GIRDER (ft)
1	0.0000	911.6189	911.6189	910.8411	0.7777
2	25.2796	912.2604	912.3414	911.6340	0.7075
3	50.5593	912.9268	912.9268	912.1491	0.7777

BUILD-UP	THICKNESS,in	LOCATION,ft	SIDE
MINIMUM:	0.750	25.6787	L
MAXIMUM:	2.668	51.9823	R

CHECK POINT	DIST ALONG CENTERLINE END-END (ft)	BUILD-UP LEFT (in)	BUILD-UP CL (in)	BUILD-UP RIGHT (in)
1	0.0000	1.6466	2.1449	2.6432
2	26.4996	0.7500	1.2398	1.7296
3	52.9993	1.7057	2.1869	2.6682

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B1 LEFT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S1-G1	3.2066	AASHTO-I(mod)	2.5000				
				a	-0.7923	-1.0069	903.5493
				b	-0.8915	-1.8343	903.5721
				c	0.4323	-1.9931	903.5721
				d	0.5316	-1.1657	903.5493
				BrgCtr	-0.1800	-1.5000	903.5607
S1-G2	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7923	-1.0069	903.9447
				b	-0.8915	-1.8343	903.9675
				c	0.4323	-1.9931	903.9675
				d	0.5316	-1.1657	903.9447
				BrgCtr	-0.1800	-1.5000	903.9561
S1-G3	5.9150	AASHTO-I(mod)	2.5000				
				a	-0.7923	-1.0069	904.3402
				b	-0.8915	-1.8343	904.3630
				c	0.4323	-1.9931	904.3630
				d	0.5316	-1.1657	904.3402
				BrgCtr	-0.1800	-1.5000	904.3516
S1-G4	5.9150	AASHTO-I(mod)	2.5000				
				a	-0.7923	-1.0069	904.7359
				b	-0.8915	-1.8343	904.7585
				c	0.4323	-1.9931	904.7585
				d	0.5316	-1.1657	904.7359
				BrgCtr	-0.1800	-1.5000	904.7472
S1-G5	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7923	-1.0069	905.1316
				b	-0.8915	-1.8343	905.1542
				c	0.4323	-1.9931	905.1542
				d	0.5316	-1.1657	905.1316
				BrgCtr	-0.1800	-1.5000	905.1429
RIGHT	3.4331						

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B2 RIGHT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S1-G1	1.6699	AASHTO-I(mod)	2.5000				
				a	0.7210	0.4131	904.5272
				b	0.8203	1.2405	904.5097
				c	-0.5035	1.3994	904.5097
				d	-0.6028	0.5720	904.5272
				BrgCtr	0.1087	0.9062	904.5185
S1-G2	5.9151	AASHTO-I(mod)	2.5000				
				a	0.7210	0.4131	904.9195
				b	0.8203	1.2405	904.9021
				c	-0.5035	1.3994	904.9021
				d	-0.6028	0.5720	904.9195
				BrgCtr	0.1087	0.9062	904.9108
S1-G3	5.9150	AASHTO-I(mod)	2.5000				
				a	0.7210	0.4131	905.3119
				b	0.8203	1.2405	905.2946
				c	-0.5035	1.3994	905.2946
				d	-0.6028	0.5720	905.3119
				BrgCtr	0.1087	0.9062	905.3033
S1-G4	5.9150	AASHTO-I(mod)	2.5000				
				a	0.7210	0.4131	905.7045
				b	0.8203	1.2405	905.6872
				c	-0.5035	1.3994	905.6872
				d	-0.6028	0.5720	905.7045
				BrgCtr	0.1087	0.9062	905.6958
S1-G5	5.9151	AASHTO-I(mod)	2.5000				
				a	0.7210	0.4131	906.0971
				b	0.8203	1.2405	906.0798
				c	-0.5035	1.3994	906.0798
				d	-0.6028	0.5720	906.0971
				BrgCtr	0.1087	0.9062	906.0885
RIGHT	1.6698						

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B2 LEFT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S2-G1	1.6699	AASHTO-III	2.5000				
				a	-0.8130	-0.3876	903.0726
				b	-0.9310	-1.2126	903.0963
				c	0.5539	-1.4249	903.0963
				d	0.6719	-0.5999	903.0726
				BrgCtr	-0.1295	-0.9062	903.0845
S2-G2	5.9151	AASHTO-III	2.5000				
				a	-0.8130	-0.3876	903.4649
				b	-0.9310	-1.2126	903.4885
				c	0.5539	-1.4249	903.4885
				d	0.6719	-0.5999	903.4649
				BrgCtr	-0.1295	-0.9063	903.4767
S2-G3	5.9150	AASHTO-III	2.5000				
				a	-0.8130	-0.3876	903.8573
				b	-0.9310	-1.2126	903.8809
				c	0.5539	-1.4249	903.8809
				d	0.6719	-0.5999	903.8573
				BrgCtr	-0.1295	-0.9062	903.8691
S2-G4	5.9150	AASHTO-III	2.5000				
				a	-0.8130	-0.3876	904.2498
				b	-0.9310	-1.2126	904.2733
				c	0.5539	-1.4249	904.2733
				d	0.6719	-0.5999	904.2498
				BrgCtr	-0.1295	-0.9062	904.2616
S2-G5	5.9151	AASHTO-III	2.5000				
				a	-0.8130	-0.3876	904.6424
				b	-0.9310	-1.2126	904.6658
				c	0.5539	-1.4249	904.6658
				d	0.6719	-0.5999	904.6424
				BrgCtr	-0.1295	-0.9062	904.6541
RIGHT	1.6698						

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B3 RIGHT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S2-G1	1.6699	AASHTO-III	2.5000				
				a	0.8130	0.3876	905.2631
				b	0.9310	1.2126	905.2448
				c	-0.5539	1.4249	905.2448
				d	-0.6719	0.5999	905.2631
				BrgCtr	0.1295	0.9062	905.2540
S2-G2	5.9151	AASHTO-III	2.5000				
				a	0.8130	0.3876	905.6481
				b	0.9310	1.2126	905.6298
				c	-0.5539	1.4249	905.6298
				d	-0.6719	0.5999	905.6481
				BrgCtr	0.1295	0.9062	905.6389
S2-G3	5.9150	AASHTO-III	2.5000				
				a	0.8130	0.3876	906.0331
				b	0.9310	1.2126	906.0149
				c	-0.5539	1.4249	906.0149
				d	-0.6719	0.5999	906.0331
				BrgCtr	0.1295	0.9062	906.0240
S2-G4	5.9150	AASHTO-III	2.5000				
				a	0.8130	0.3876	906.4183
				b	0.9310	1.2126	906.4002
				c	-0.5539	1.4249	906.4002
				d	-0.6719	0.5999	906.4183
				BrgCtr	0.1295	0.9062	906.4093
S2-G5	5.9151	AASHTO-III	2.5000				
				a	0.8130	0.3876	906.8036
				b	0.9310	1.2126	906.7856
				c	-0.5539	1.4249	906.7856
				d	-0.6719	0.5999	906.8036
				BrgCtr	0.1295	0.9062	906.7946
RIGHT	1.6698						

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B3 LEFT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S3-G1	1.6699	AASHTO-I(mod)	2.5000				
				a	-0.7407	-0.3849	906.7469
				b	-0.8788	-1.2067	906.7726
				c	0.4361	-1.4276	906.7726
				d	0.5742	-0.6058	906.7469
				BrgCtr	-0.1523	-0.9062	906.7597
S3-G2	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7407	-0.3849	907.1317
				b	-0.8788	-1.2067	907.1573
				c	0.4361	-1.4276	907.1573
				d	0.5742	-0.6058	907.1317
				BrgCtr	-0.1523	-0.9062	907.1445
S3-G3	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7407	-0.3849	907.5166
				b	-0.8788	-1.2067	907.5421
				c	0.4361	-1.4276	907.5421
				d	0.5742	-0.6058	907.5166
				BrgCtr	-0.1523	-0.9062	907.5293
S3-G4	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7407	-0.3849	907.9016
				b	-0.8788	-1.2067	907.9271
				c	0.4361	-1.4276	907.9271
				d	0.5742	-0.6058	907.9016
				BrgCtr	-0.1523	-0.9062	907.9143
S3-G5	5.9151	AASHTO-I(mod)	2.5000				
				a	-0.7407	-0.3849	908.2868
				b	-0.8788	-1.2067	908.3121
				c	0.4361	-1.4276	908.3121
				d	0.5742	-0.6058	908.2868
				BrgCtr	-0.1523	-0.9062	908.2995
RIGHT	1.6699						

***** End of Report *****

Filename: N:\TRA\255717\Eng\BR41\Geomath\I-575 BR41.gmd

PIER CAP BEAM SEAT REPORT

PIER: B4 RIGHT OF PIER CL

GIRDER	WORK PT DISTANCE (ft)	GIRDER TYPE	PAD THICK (in)		DISTANCE FROM WORK PT ALONG CL (ft)	PERP TO CL (ft)	ELEVATION (ft)
S3-G1	3.4566	AASHTO-I(mod)	2.5000				
				a	0.8404	0.9786	908.0953
				b	0.9785	1.8004	908.0772
				c	-0.3364	2.0214	908.0772
				d	-0.4745	1.1996	908.0953
				BrgCtr	0.2520	1.5000	908.0862
S3-G2	5.9151	AASHTO-I(mod)	2.5000				
				a	0.8404	0.9786	908.4753
				b	0.9785	1.8004	908.4573
				c	-0.3364	2.0214	908.4573
				d	-0.4745	1.1996	908.4753
				BrgCtr	0.2520	1.5000	908.4663
S3-G3	5.9151	AASHTO-I(mod)	2.5000				
				a	0.8404	0.9786	908.8555
				b	0.9785	1.8004	908.8376
				c	-0.3364	2.0214	908.8376
				d	-0.4745	1.1996	908.8555
				BrgCtr	0.2520	1.5000	908.8465
S3-G4	5.9151	AASHTO-I(mod)	2.5000				
				a	0.8404	0.9786	909.2358
				b	0.9785	1.8004	909.2180
				c	-0.3364	2.0214	909.2180
				d	-0.4745	1.1996	909.2358
				BrgCtr	0.2520	1.5000	909.2269
S3-G5	5.9151	AASHTO-I(mod)	2.5000				
				a	0.8404	0.9786	909.6163
				b	0.9785	1.8004	909.5986
				c	-0.3364	2.0214	909.5986
				d	-0.4745	1.1996	909.6163
				BrgCtr	0.2520	1.5000	909.6074
RIGHT	3.5332						

***** End of Report *****

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Slab Design	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	Excel	2003

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience prior the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not complete and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work activity, a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Slab Design calculations are included for spans 1, 2 and 3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	12	12	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Slab Design
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AIE
CHECKED BY: JCR

✓ JCR
10-8-2007

Span 1 Type I-MOD @ 5-10 1/2"

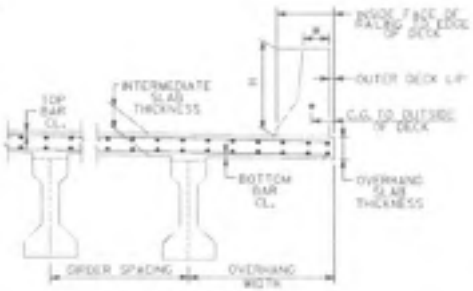
ELIMINARY INFORMATION

Georgia County	North of Fall Line?	ADT?	Standard Loading	BARRIER TYPE:	FENCING OPTION:
Cherokee	Y	>= 2000	H-20	Jersey Barrier	None

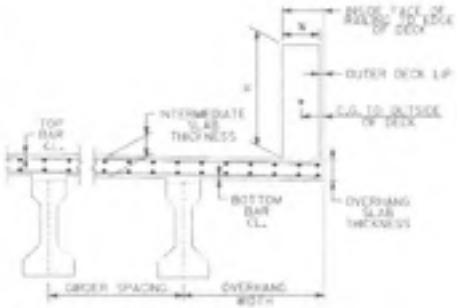
INTERIOR BEAM TYPE: PSC-Type I Mod (TB, PSC, BULB-T)

FASCIA BEAM TYPE: PSC-Type I Mod (TB, PSC, BULB-T)

INTERIOR BEAM TOP FLANGE WIDTH =	14 in.	
FASCIA BEAM TOP FLANGE WIDTH =	14 in.	
INTERMEDIATE SLAB THICKNESS =	7.375 in.	
OVERHANG SLAB THICKNESS =	7.375 in.	
GIRDER SPACING =	5.875 ft.	
NUMBER OF GIRDERS =	5	
OVERHANG WIDTH =	2.600 ft.	
CONCRETE STRENGTH, f'c =	3500 psi.	
STEEL STRENGTH, fy =	60000 psi.	
RAILING HEIGHT (H) =	2.667 ft.	
RAILING WIDTH (W) =	0.750 ft.	
OUTER DECK LIP =	1.500 in.	
INSIDE FACE OF RAILING TO EDGE OF DECK =	1.625 ft.	
C.G. FROM OUTSIDE =	7.955 in.	
TOP BAR CLEARANCE =	2.750 in.	
BOTTOM BAR CLEARANCE =	1.000 in.	
GROOVED DEPTH =	0.250 in.	
DESIGN SPEED =	70.00 mph	(IF CENTRIFUGAL CONSIDERED)
RADIUS =	2880.000 ft.	(IF CENTRIFUGAL CONSIDERED)
WHEEL LOAD =	16 kips	DECK SLOPE = 7.0000 %
IMPACT FACTOR =	1.30	
FUTURE WEARING SURFACE =	30.00 psf	
RAILING LOAD =	10.00 kip	AT TOP OF PARAPET



JERSEY BARRIER DETAILS



PARAPET DETAILS

INTERMEDIATE SLAB DESIGN

EFFECTIVE SPAN LENGTH = 4.708 ft. *AASHTO 3.24.1.2*

DEAD LOAD

SLAB D.L. = 0.092 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.

TOTAL D.L. = 0.122 kips / ft. / lf.

DEAD LOAD MOMENT = 1.3 * (WT DL) * $(SPAN)^2$ / 10 = 0.352 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD = 16.00 kips

CONT. FACTOR = 0.60
IMPACT = 1.30

LIVE LOAD MOMENT = 2.17 * ((S + 2)/32) * P(LL + I) * 0.8 = 7.569 kip-ft. / lf. *AASHTO 3.24.3.1*

CENTRIFUGAL LOAD *AASHTO 3.10.1*

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * ((S + 2)/32) * P (LL+ I) * 0.8 * C = 0.515 kip-ft. / lf. *AASHTO TABLE 3.22.1A*

TOTAL DESIGN MOMENT (∅ Mu) = 8.437 kip-ft. / lf. = 101.24 k-in. / lf.

FLEXURE STRENGTH *AASHTO 8.16.3.2*

∅ Mn > Mu ∅ = 0.90

∅ Mn = ∅ * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As

d_{top} = 4.313 in. USE 5 BAR As = 0.31 in.^2 / lf.

d_{bot} = 5.813 in. USE 5 BAR As = 0.31 in.^2 / lf.

TOP STEEL

232.875 As - 45.38 As^2 = 101.24 k-in. / lf.

TOP BAR = NO.	5	SPACED AT	7.500 in.	As =	0.50 in.^2 / lf.

∅ Mn = 104.34 k-in. / lf. ≥ ∅ Mu = 101.24 k-in. / lf. OK

BOTTOM STEEL

313.875 As - 45.38 As^2 = 101.24 k-in. / lf.

BOT BAR = NO.	5	SPACED AT	7.500 in.	As =	0.50 in.^2 / lf.

∅ Mn = 144.52 k-in. / lf. ≥ ∅ Mu = 101.24 k-in. / lf. OK

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AIE
CHECKED BY: JCR

Span 1 Type I-MOD @ 5-10 1/2"

OVERHANG SLAB DESIGN

EFFECTIVE SPAN LENGTH = 2.017 ft. *AASHTO 3.24.5.1*

DEAD LOAD

BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

SLAB D.L. = 0.092 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.
PARAPET D.L. = 0.405 kips / ft. / lf.

DL MOMENT @ FLANGE:

SLAB MOM = 0.187 kip-ft. / lf.
ADD'L MOM = 0.002 kip-ft. / lf.
PARAPET MOM = 0.549 kip-ft. / lf.

TOTAL MOM = 0.738 kip-ft. / lf. KIP-FT/LF

DL MOMENT @ EDGE OF BARRIER:

SLAB MOM = 0.122 kip-ft. / lf.
ADD'L MOM = 0.000 kip-ft. / lf.
PARAPET MOM = 0.390 kip-ft. / lf.

TOTAL MOM = 0.512 kip-ft. / lf.

DEAD LOAD MOMENT @ FLANGE= 1.3 * TOTAL MOMENT = 0.960 kip-ft. / lf.
D.L. MOMENT @ EDGE OF BARRIER= 1.3 * TOTAL MOMENT = 0.665 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD 16 kips

IMPACT = 1.30
MOM ARM (X)= -0.02 ft.
E = 0.8 * X + 3.75 = 3.73 ft.

LIVE LOAD MOMENT = 2.17 * (P(LL + I) / E) * X = -0.303 kip-ft. / lf. *AASHTO 3.24.5.1.1*

CENTRIFUGAL LOAD

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * (P(LL + I) / E) * X * C = -0.034 kip-ft. / lf.

RAILING LOAD *AASHTO 3.24.5.2*

RAILING LOAD = 10.00 kips

RAILING LOAD @ FLANGE:

MOM ARM (H) = 3.08 ft.
DISTANCE (X) = 1.35 ft.
E = 0.8 * X + 5.00 = 6.08 ft.

RAILING LOAD @ EDGE OF BARRIER:

MOM ARM (H) = 3.08 ft.
DISTANCE (X) = 0.96 ft.
E = 0.8 * X + 5.00 = 5.77 ft.

RAIL MOM @ FLANGE= 2.17 * (P_{RAIL}/ E) * H = 10.974 kip-ft. / lf.

RAIL MOM @ EDGE OF BARRIER= 2.17 * (P_{RAIL}/ E) * H = 11.570 kip-ft. / lf.

SUMMARY OF MOMENTS:

DL + LL @ FLANGE = 0.623 kip-ft. / lf.
DL + RAIL @ FLANGE = 11.934 kip-ft. / lf.
DL + RAIL @ BARRIER = 12.235 kip-ft. / lf.

TOTAL DESIGN MOMENT (∅ Mu) = 12.235 KIP-FT / LF = 146.83 k-in / lf.

FLEXURE STRENGTH *AASHTO 8.16.3.2*

∅ Mn > Mu ∅ = 0.90

∅ Mn = ∅ * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As
d_{top} = 4.313 in. USE **5 BAR** As = 0.31 in.^2 / lf.
PROVIDE ADDITIONAL OVERHANG STEEL = **5 BAR** As = 0.31 in.^2 / lf.

TOP STEEL

232.875 As - 45.38 As^2 = 146.83 k-in. / lf.

TOP BAR = NO. 5 SPACED AT 7.50 in. As = 0.50 in.^2 / lf.

∅ Mn = 104.34 k-in. / lf. < ∅ Mu = 146.83 k-in. / lf. ADD. REINF. NEEDED!

ADD'L BAR = NO. 5 SPACED AT 15.00 in. As = 0.25 in.^2 / lf.

Mn = 148.14 k-in. / lf. > Mu = 146.83 k-in. / lf. OK

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Span 2 Type III @ 5'-10 1/4"

✓ JCR 10-8-2009

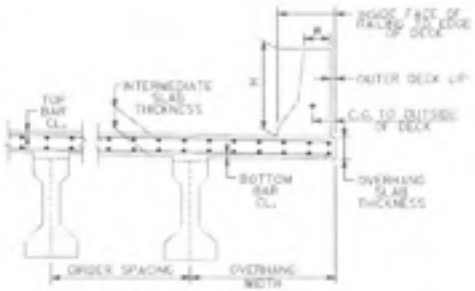
PRELIMINARY INFORMATION

Georgia County	North of Fall Line?	ADT?	Standard Loading	BARRIER TYPE	FENCING OPTION
Cherokee	Y	>= 2000	H-20	Jersey Barrier	None

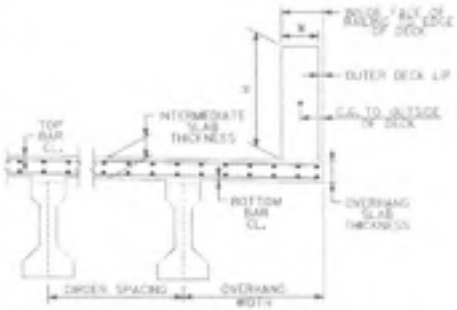
INTERIOR BEAM TYPE: PSC-Type III (TB, PSC, BULB-T)

FASCIA BEAM TYPE: PSC-Type III (TB, PSC, BULB-T)

INTERIOR BEAM TOP FLANGE WIDTH =	16 in.	
FASCIA BEAM TOP FLANGE WIDTH =	16 in.	
INTERMEDIATE SLAB THICKNESS =	7.250 in.	
OVERHANG SLAB THICKNESS =	7.250 in.	
GIRDER SPACING =	5.854 ft.	
NUMBER OF GIRDERS =	5	
OVERHANG WIDTH =	2.800 ft.	
CONCRETE STRENGTH, f'c =	3500 psi.	
STEEL STRENGTH, fy =	60000 psi.	
RAILING HEIGHT (H) =	2.667 ft.	
RAILING WIDTH (W) =	0.750 ft.	
OUTER DECK LIP =	1.500 in.	
INSIDE FACE OF RAILING TO EDGE OF DECK =	1.625 ft.	
C.G. FROM OUTSIDE =	7.955 in.	
TOP BAR CLEARANCE =	2.750 in.	
BOTTOM BAR CLEARANCE =	1.000 in.	
GROOVED DEPTH =	0.250 in.	
DESIGN SPEED =	70.00 mph	(IF CENTRIFUGAL CONSIDERED)
RADIUS =	2880.000 ft.	(IF CENTRIFUGAL CONSIDERED)
WHEEL LOAD =	16 kips	DECK SLOPE = 7.0000 %
IMPACT FACTOR =	1.30	
FUTURE WEARING SURFACE =	30.00 psf	
RAILING LOAD =	10.00 kip	AT TOP OF PARAPET



JERSEY BARRIER DETAILS



PARAPET DETAILS

INTERMEDIATE SLAB DESIGN

EFFECTIVE SPAN LENGTH = 4.521 ft. *AASHTO 3.24.1.2*

DEAD LOAD

SLAB D.L. = 0.091 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.

TOTAL D.L. = 0.121 kips / ft. / lf.

DEAD LOAD MOMENT = 1.3 * (WT DL) * (SPAN)^2 / 10 = 0.321 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD = 16.00 kips

CONT. FACTOR = 0.80
IMPACT = 1.30

LIVE LOAD MOMENT = 2.17 * ((S + 2)/32) * P(LL + I) * 0.8 = 7.358 kip-ft. / lf. *AASHTO 3.24.3.1*

CENTRIFUGAL LOAD *AASHTO 3.10.1*

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * ((S + 2)/32) * P (LL+ I) * 0.8 * C = 0.501 kip-ft. / lf. *AASHTO TABLE 3.22.1A*

TOTAL DESIGN MOMENT (Ø Mu) = 8.180 kip-ft. / lf. = 98.16 k-in. / lf.

FLEXURE STRENGTH *AASHTO 8.16.3.2*

Ø Mn > Mu Ø = 0.90

Ø Mn = Ø * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As

d_{top} = 4.188 in. USE 5 BAR As = 0.31 in.^2 / lf.

d_{bot} = 5.688 in. USE 5 BAR As = 0.31 in.^2 / lf.

TOP STEEL

226.125 As - 45.38 As^2 = 98.16 k-in. / lf.

TOP BAR = NO.	5	SPACED AT	7.500 in.	As =	0.50 in.^2 / lf.

Ø Mn = 100.99 k-in. / lf.	≥	Ø Mu = 98.16 k-in. / lf.	OK

BOTTOM STEEL

307.125 As - 45.38 As^2 = 98.16 k-in. / lf.

BOT BAR = NO.	5	SPACED AT	7.500 in.	As =	0.50 in.^2 / lf.

Ø Mn = 141.17 k-in. / lf.	≥	Ø Mu = 98.16 k-in. / lf.	OK

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AIE
CHECKED BY: JCR

Span 2 Type III @ 5'-10 1/4"

OVERHANG SLAB DESIGN

EFFECTIVE SPAN LENGTH = 2.133 ft. *AASHTO 3.24.5.1*

DEAD LOAD

BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

SLAB D.L. = 0.091 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.
PARAPET D.L.= 0.405 kips / ft. / lf.

DL MOMENT @ FLANGE:

SLAB MOM = 0.206 kip-ft. / lf.
ADD'L MOM = 0.004 kip-ft. / lf.
PARAPET MOM = 0.596 kip-ft. / lf.

TOTAL MOM = 0.806 kip-ft. / lf. KIP-FT/LF

DL MOMENT @ EDGE OF BARRIER:

SLAB MOM = 0.120 kip-ft. / lf.
ADD'L MOM = 0.000 kip-ft. / lf.
PARAPET MOM = 0.390 kip-ft. / lf.

TOTAL MOM = 0.510 kip-ft. / lf.

DEAD LOAD MOMENT @ FLANGE= 1.3 * TOTAL MOMENT = 1.048 kip-ft. / lf.
D.L. MOMENT @ EDGE OF BARRIER= 1.3 * TOTAL MOMENT = 0.663 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD 16 kips

IMPACT = 1.30
MOM ARM (X)= 0.18 ft.
E = 0.8 * X + 3.75 = 3.89 ft.

LIVE LOAD MOMENT = 2.17 * (P(LL + I) / E) * X = 2.031 kip-ft. / lf. *AASHTO 3.24.5.1.1*

CENTRIFUGAL LOAD

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * (P(LL + I) / E) * X * C = 0.231 kip-ft. / lf.

RAILING LOAD *AASHTO 3.24.5.2*

RAILING LOAD = 10.00 kips

RAILING LOAD @ FLANGE:

MOM ARM (H) = 3.07 ft.
DISTANCE (X) = 1.47 ft.
E = 0.8 * X + 5.00 = 6.18 ft.

RAILING LOAD @ EDGE OF BARRIER:

MOM ARM (H) = 3.07 ft.
DISTANCE (X) = 0.96 ft.
E = 0.8 * X + 5.00 = 5.77 ft.

RAIL MOM @ FLANGE= 2.17 * (P_{rail}/ E) * H = 10.784 kip-ft. / lf.

RAIL MOM @ EDGE OF BARRIER= 2.17 * (P_{rail}/ E) * H = 11.544 kip-ft. / lf.

SUMMARY OF MOMENTS:

DL + LL @ FLANGE = 3.309 kip-ft. / lf.
DL + RAIL @ FLANGE = 11.832 kip-ft. / lf.
DL + RAIL @ BARRIER = 12.207 kip-ft. / lf.

TOTAL DESIGN MOMENT (∅ Mu) = 12.207 KIP-FT / LF = 146.48 k-in / lf.

FLEXURE STRENGTH

AASHTO 8.16.3.2

∅ Mn > Mu ∅ = 0.90

∅ Mn = ∅ * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As
d_{top} = 4.188 in. USE **5 BAR** As = 0.31 in.^2 / lf.
PROVIDE ADDITIONAL OVERHANG STEEL = **4 BAR** As = 0.20 in.^2 / lf.

TOP STEEL

226.125 As - 45.38 As^2 = 146.48 k-in. / lf.

TOP BAR = NO.	5	SPACED AT	7.50 in.	As =	0.50 in.^2 / lf.

∅ Mn = 100.99 k-in. / lf. < ∅ Mu = 146.48 k-in. / lf. ADD. REINF. NEEDED!

ADD'L BAR = NO.	4	SPACED AT	7.50 in.	As =	0.25 in.^2 / lf.

Mn = 154.30 k-in. / lf. ≥ Mu = 146.48 k-in. / lf. OK

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Span 3 - Type I MOD @ 5'10"

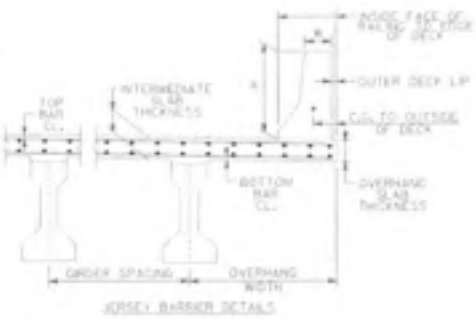
ELIMINARY INFORMATION

Georgia County	North of Fall Line?	ADT?	Standard Loading	BARRIER TYPE	FENCING OPTION
Cherokee	Y	>= 2000	H-20	Jersey Barrier	None

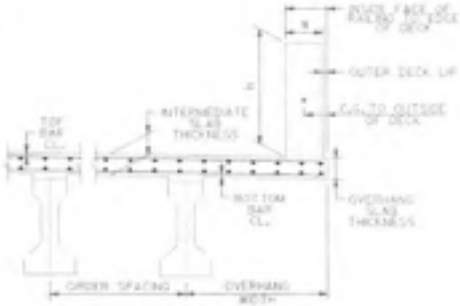
INTERIOR BEAM TYPE: PSC-Type I Mod (TB, PSC, BULB-T)

FASCIA BEAM TYPE: PSC-Type I Mod (TB, PSC, BULB-T)

INTERIOR BEAM TOP FLANGE WIDTH =	14 in.	
FASCIA BEAM TOP FLANGE WIDTH =	14 in.	
INTERMEDIATE SLAB THICKNESS =	7.250 in.	
OVERHANG SLAB THICKNESS =	7.250 in.	
GIRDER SPACING =	5.833 ft.	
NUMBER OF GIRDERS =	5	
OVERHANG WIDTH =	2.500 ft.	
CONCRETE STRENGTH, f'c =	3500 psi.	
STEEL STRENGTH, fy =	60000 psi.	
RAILING HEIGHT (H) =	2.667 ft.	
RAILING WIDTH (W) =	0.750 ft.	
OUTER DECK LIP =	1.500 in.	
INSIDE FACE OF RAILING TO EDGE OF DECK =	1.625 ft.	
C.G. FROM OUTSIDE =	7.955 in.	
TOP BAR CLEARANCE =	2.750 in.	
BOTTOM BAR CLEARANCE =	1.000 in.	
GROOVED DEPTH =	0.250 in.	
DESIGN SPEED =	70.00 mph	(IF CENTRIFUGAL CONSIDERED)
RADIUS =	2880.000 ft.	(IF CENTRIFUGAL CONSIDERED)
WHEEL LOAD =	16 kips	
IMPACT FACTOR =	1.30	
FUTURE WEARING SURFACE =	30.00 psf	
RAILING LOAD =	10.00 kip	AT TOP OF PARAPET



JERSEY BARRIER DETAILS



PARAPET DETAILS

DECK SLOPE = 7.0000 %

INTERMEDIATE SLAB DESIGN

EFFECTIVE SPAN LENGTH = 4.667 ft. *AASHTO 3.24.1.2*

DEAD LOAD

SLAB D.L. = 0.091 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.

TOTAL D.L = 0.121 kips / ft. / lf.

DEAD LOAD MOMENT = 1.3 * (WT DL) * (SPAN)^2 / 10 = 0.342 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD = 16.00 kips

CONT. FACTOR = 0.80
IMPACT = 1.30

LIVE LOAD MOMENT = 2.17 * ((S + 2)/32) * P(LL + I) * 0.8 = 7.523 kip-ft. / lf. *AASHTO 3.24.3.1*

CENTRIFUGAL LOAD *AASHTO 3.10.1*

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * ((S + 2)/32) * P (LL+ I) * 0.8 * C = 0.512 kip-ft. / lf. *AASHTO TABLE 3.22.1A*

TOTAL DESIGN MOMENT (∑ Mu) = 8.377 kip-ft. / lf. = 100.52 k-in. / lf.

FLEXURE STRENGTH *AASHTO 8.16.3.2*

∅ Mn > Mu ∅ = 0.90

∅ Mn = ∅ * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As

d_{top} = 4.188 in. USE 5 BAR As = 0.31 in.^2 / lf.

d_{bot} = 5.688 in. USE 5 BAR As = 0.31 in.^2 / lf.

TOP STEEL

226.125 As - 45.38 As^2 = 100.52 k-in. / lf.

TOP BAR = NO.	5	SPACED AT	7.375 in.	As =	0.50 in.^2 / lf.

∅ Mn = 102.51 k-in. / lf. ≥ ∅ Mu = 100.52 k-in. / lf. OK

BOTTOM STEEL

307.125 As - 45.38 As^2 = 100.52 k-in. / lf.

BOT BAR = NO.	5	SPACED AT	7.375 in.	As =	0.50 in.^2 / lf.

∅ Mn = 143.37 k-in. / lf. ≥ ∅ Mu = 100.52 k-in. / lf. OK

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Span 3 - Type I MOD @ 5'10"

OVERHANG SLAB DESIGN

EFFECTIVE SPAN LENGTH = 2.317 ft. *AASHTO 3.24.5.1*

DEAD LOAD

BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

SLAB D.L. = 0.091 kips / ft. / lf.
ADDITIONAL D.L. = 0.030 kips / ft. / lf.
PARAPET D.L. = 0.405 kips / ft. / lf.

DL MOMENT @ FLANGE:

SLAB MOM = 0.243 kip-ft. / lf.
ADD'L MOM = 0.007 kip-ft. / lf.
PARAPET MOM = 0.670 kip-ft. / lf.

TOTAL MOM = 0.920 kip-ft. / lf. KIP-FT/LF

DL MOMENT @ EDGE OF BARRIER:

SLAB MOM = 0.120 kip-ft. / lf.
ADD'L MOM = 0.000 kip-ft. / lf.
PARAPET MOM = 0.390 kip-ft. / lf.

TOTAL MOM = 0.510 kip-ft. / lf.

DEAD LOAD MOMENT @ FLANGE= 1.3 * TOTAL MOMENT = 1.197 kip-ft. / lf.
D.L. MOMENT @ EDGE OF BARRIER= 1.3 * TOTAL MOMENT = 0.662 kip-ft. / lf.

LIVE LOAD

WHEEL LOAD 16 kips

IMPACT = 1.30
MOM ARM (X)= 0.28 ft.
E = 0.8 * X + 3.75 = 3.97 ft.

LIVE LOAD MOMENT = 2.17 * (P(LL + I) / E) * X = 3.127 kip-ft. / lf. *AASHTO 3.24.5.1.1*

CENTRIFUGAL LOAD

C = 6.68 * S^2/ R = 0.114 FRACTION OF LIVE LOAD

CENTRIFUGAL FORCE MOMENT = 1.3 * (P(LL + I) / E) * X * C = 0.355 kip-ft. / lf.

RAILING LOAD *AASHTO 3.24.5.2*

RAILING LOAD = 10.00 kips

RAILING LOAD @ FLANGE:

MOM ARM (H) = 3.07 ft.
DISTANCE (X) = 1.65 ft.
E = 0.8 * X + 5.00 = 6.32 ft.

RAILING LOAD @ EDGE OF BARRIER:

MOM ARM (H) = 3.07 ft.
DISTANCE (X) = 0.96 ft.
E = 0.8 * X + 5.00 = 5.77 ft.

RAIL MOM @ FLANGE= 2.17 * (P_{rail}/ E) * H = 10.534 kip-ft. / lf.

RAIL MOM @ EDGE OF BARRIER= 2.17 * (P_{rail}/ E) * H = 11.544 kip-ft. / lf.

SUMMARY OF MOMENTS:

DL + LL @ FLANGE = 4.679 kip-ft. / lf.
DL + RAIL @ FLANGE = 11.731 kip-ft. / lf.
DL + RAIL @ BARRIER = 12.207 kip-ft. / lf.

TOTAL DESIGN MOMENT (∅ Mu) = 12.207 KIP-FT / LF = 146.48 k-in / lf.

FLEXURE STRENGTH

AASHTO 8.16.3.2

∅ Mn > Mu ∅ = 0.90

∅ Mn = ∅ * [As * fy * (d - a/2)] where a = As * fy / [0.85 * f'c * b]

a = 1.681 As
d_{top} = 4.188 in. USE 5 BAR As = 0.31 in.^2 / lf.
PROVIDE ADDITIONAL OVERHANG STEEL = 4 BAR As = 0.20 in.^2 / lf.

TOP STEEL

226.129 As - 45.38 As^2 = 146.48 k-in. / lf.

TOP BAR = NO.	5	SPACED AT	7.38 in.	As =	0.50 in.^2 / lf.

∅ Mn =	102.51 k-in. / lf.	<	∅ Mu = 146.48 k-in. / lf.	ADD. REINF. NEEDED!!

ADD'L BAR = NO.	4	SPACED AT	7.38 in.	As =	0.25 in.^2 / lf.

Mn =	156.40 k-in. / lf.	≥	Mu = 146.48 k-in. / lf.	OK

SERVICE LOAD DESIGN OF BRIDGE SLAB

Georgia Department of Transportation 13-MAY-04
Office of Bridge and Structural Design 07:49:26
October 2003

WHEEL LOAD (Kips)	fc (ksi)	fs (ksi)	n	SLAB COVER (in)	FUTURE PAVING (kips/ft^2)	CONTINUITY FACTOR
16.00	1.400	24.000	9	2.750	0.030	0.8

	EFFECTIVE SPAN LENGTH (ft-in)	SLAB THICKNESS MINIMUM (in)	SLAB THICKNESS ACTUAL (in)	SIZE AND SPACING OF MAIN REINFORCEMENT (in)	DISTRUBUTION REINFORCEMENT MIDDLE HALF	DISTRUBUTION REINFORCEMENT OUTER QUARTERS
	3 - 6	6.8150	7.000	# 5 at 8.625	3 -# 4	2 -# 4
	3 - 7	6.8463	7.000	# 5 at 8.375	3 -# 4	2 -# 4
	3 - 8	6.8774	7.000	# 5 at 8.250	3 -# 4	2 -# 4
	3 - 9	6.9083	7.000	# 5 at 8.125	3 -# 4	2 -# 4
	3 - 10	6.9391	7.000	# 5 at 8.000	3 -# 4	2 -# 4
	3 - 11	6.9698	7.000	# 5 at 7.875	4 -# 4	2 -# 4
	4 - 0	7.0018	7.125	# 5 at 8.000	4 -# 4	2 -# 4
	4 - 1	7.0323	7.125	# 5 at 7.875	4 -# 4	2 -# 4
	4 - 2	7.0626	7.125	# 5 at 7.750	4 -# 4	2 -# 4
	4 - 3	7.0927	7.125	# 5 at 7.625	4 -# 4	2 -# 4
	4 - 4	7.1228	7.125	# 5 at 7.500	4 -# 4	2 -# 4
	4 - 5	7.1544	7.250	# 5 at 7.625	4 -# 4	2 -# 4
	4 - 6	7.1843	7.250	# 5 at 7.500	4 -# 4	2 -# 4
S2	4 - 7	7.2140	7.250	# 5 at 7.500	4 -# 4	2 -# 4
S1	4 - 8	7.2436	7.250	# 5 at 7.375	4 -# 4	2 -# 4
S1	4 - 9	7.2751	7.375	# 5 at 7.500	4 -# 4	2 -# 4
	4 - 10	7.3045	7.375	# 5 at 7.375	5 -# 4	4 -# 4
	4 - 11	7.3338	7.375	# 5 at 7.250	5 -# 4	4 -# 4
	5 - 0	7.3630	7.375	# 5 at 7.125	5 -# 4	4 -# 4
	5 - 1	7.3943	7.500	# 5 at 7.250	5 -# 4	4 -# 4
	5 - 2	7.4234	7.500	# 5 at 7.125	5 -# 4	4 -# 4
	5 - 3	7.4524	7.500	# 5 at 7.000	5 -# 4	4 -# 4
	5 - 4	7.4812	7.500	# 5 at 7.000	5 -# 4	4 -# 4
	5 - 5	7.5124	7.625	# 5 at 7.000	5 -# 4	4 -# 4
	5 - 6	7.5412	7.625	# 5 at 7.000	5 -# 4	4 -# 4
	5 - 7	7.5698	7.625	# 5 at 6.875	6 -# 4	4 -# 4
	5 - 8	7.5984	7.625	# 5 at 6.750	6 -# 4	4 -# 4
	5 - 9	7.6295	7.750	# 5 at 6.875	6 -# 4	4 -# 4
	5 - 10	7.6579	7.750	# 5 at 6.750	6 -# 4	4 -# 4
	5 - 11	7.6863	7.750	# 5 at 6.750	6 -# 4	4 -# 4
	6 - 0	7.7145	7.750	# 5 at 6.625	6 -# 4	4 -# 4
	6 - 1	7.7427	7.750	# 5 at 6.500	6 -# 4	4 -# 4
	6 - 2	7.7738	7.875	# 5 at 6.625	6 -# 4	4 -# 4
	6 - 3	7.8019	7.875	# 5 at 6.500	6 -# 4	4 -# 4
	6 - 4	7.8299	7.875	# 5 at 6.500	7 -# 4	4 -# 4
	6 - 5	7.8578	7.875	# 5 at 6.375	7 -# 4	4 -# 4

FALL LINE MAP
Figure 4-01

SECTION IV – CONCRETE AND REINFORCING STEEL

BRIDGE DECK DESIGN No. 4.01

When designing bridge decks, the following criteria shall be applied:

For cast-in-place decks north of the fall line:

1. Specify Class AA concrete except for post-tensioned concrete boxes which shall have Class AA as a minimum, but may require a higher 28-day strength.
2. **Specify 2 ¾" (70 mm) cover to top bar reinforcement for bridge decks on interstate routes, state routes and routes with design year ADT equal to or greater than 2000.**
3. Specify 2 ½" (65 mm) cover to top bar reinforcement for bridge decks on all other routes.

For cast-in-place decks south of the fall line:

1. Specify Class AA concrete except for post-tensioned concrete boxes which shall have Class AA as a minimum, but may require a higher 28-day strength.
2. Specify 2 ¼" (60 mm) cover to top bar reinforcement for bridge decks on interstate routes, state routes and routes with design year ADT equal to or greater than 2000.
3. Specify 2" (50 mm) cover to top bar reinforcement for bridge decks on all other routes.

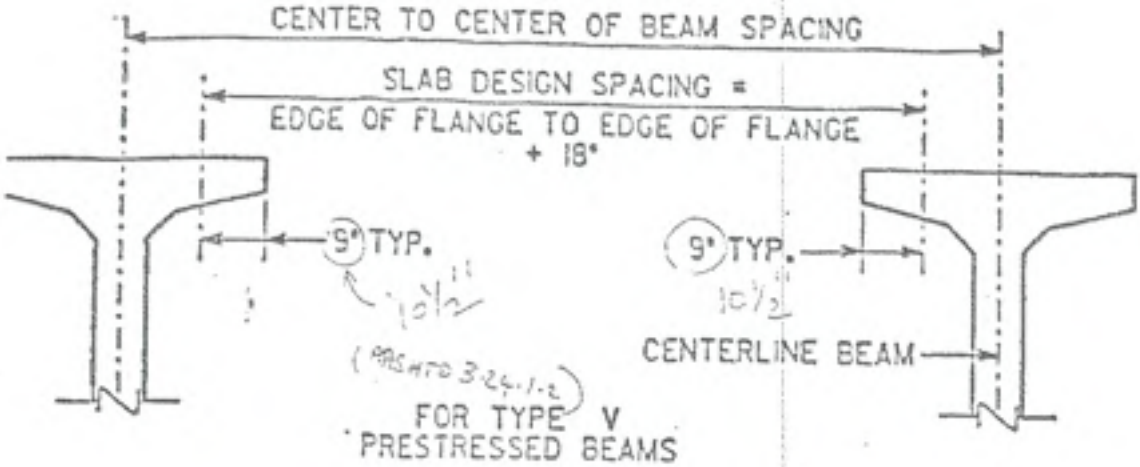
For bridge decks of precast concrete elements, specify 2" cover to top bar reinforcement statewide.

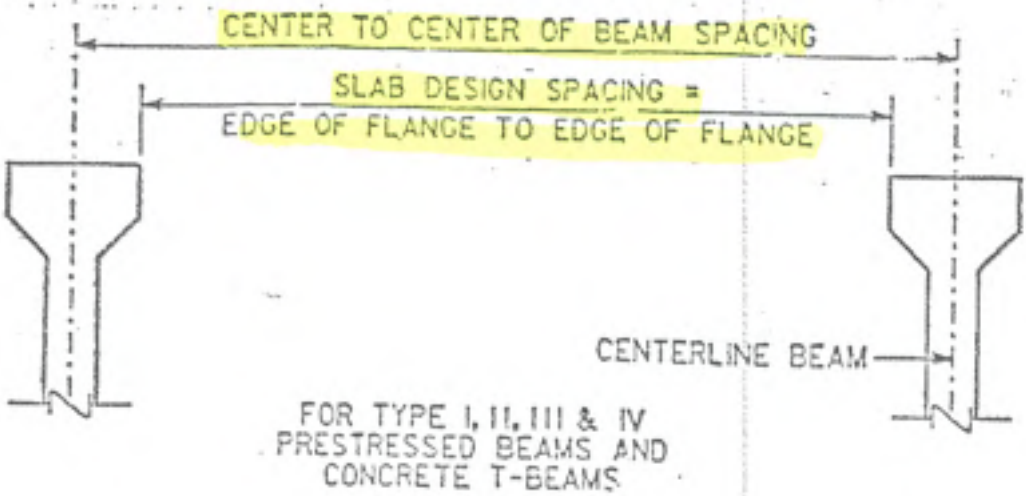
Note that ¼" of concrete thickness may be planed off of the top of cast-in-place decks on interstate routes, state routes and routes with design year ADT equal to or greater than 2000. Therefore, reduce slab thickness accordingly for strength calculations of composite slabs on steel or PSC beams and post-tensioned boxes.

Deck slabs shall be designed by the Service Load method with f_c = 1400 psi (10 MPa), as a rule.

The minimum 28 day strength (f'_c) for the deck concrete shall be 3500 psi (25 MPa). Slabs shall be designed so that the main slab reinforcement is the same in the bottom of the slab as in the top. To achieve this, the effective depth shall be taken as the distance from the bottom of the slab to the centroid of the top main reinforcing steel for both positive and negative moment. Positive and negative moments shall be assumed to be equal and shall be calculated in accordance with the AASHTO Specifications.

See Fig. 4-01 for a location map of the fall line for Georgia.





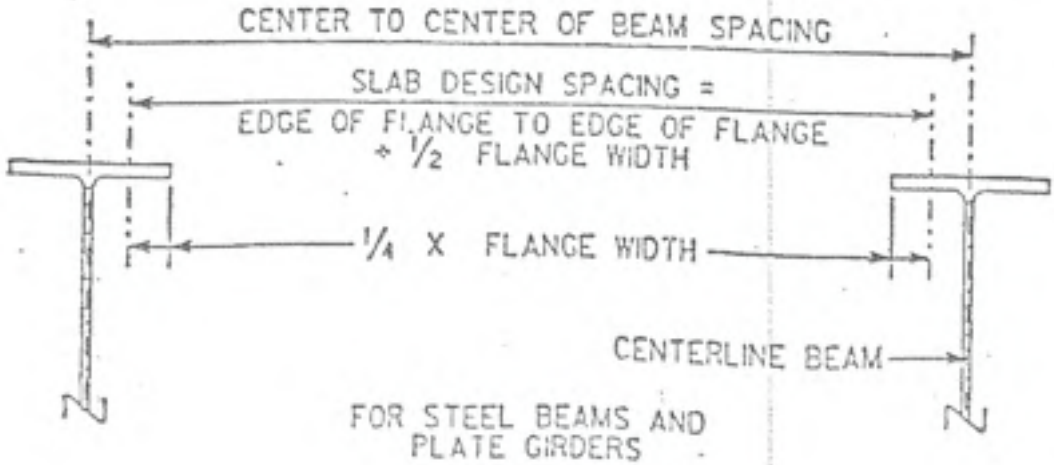


FIG. NO. 1 (cont'd)

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Beam Design Input	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	Excel	2003

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience prior the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not complete and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work activity, a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Beam Design Input calculations are included for spans 1, 2 and span 3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	22	22	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Input - Span 1
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

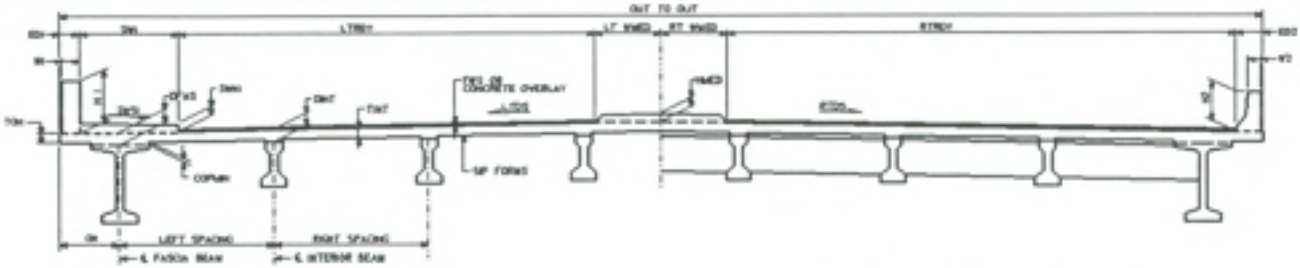
Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft
Span No.: 1

J.B. TRIMBLE, INC.
JBT

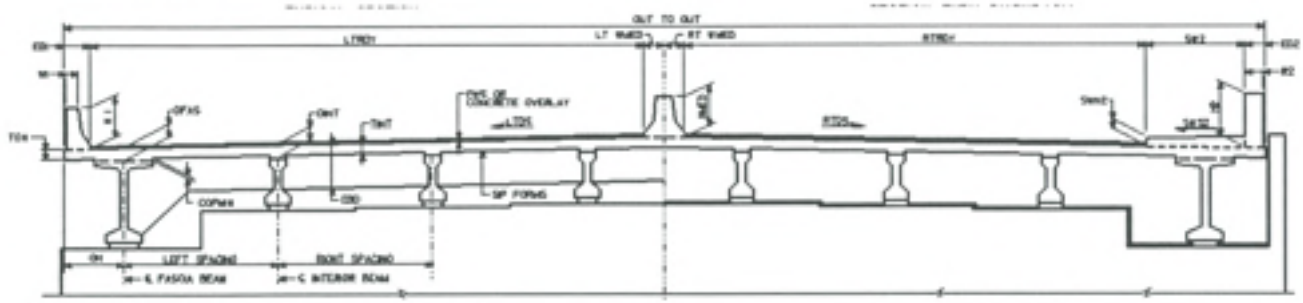
JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

JCR
10-9-09

TYPICAL DECK SECTIONS:



SECTION THRU EDGE BEAM



SECTION THRU ENDWALL

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 258717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft.
Span No.: 1

NON-COMPOSITE DEAD LOADS PER BEAM:

SLAB:

D_{SLT} = 9.0893 in.

T_{SLT} = 7.375 in.
INTEGRAL WEARING SURFACE THICKNESS = 0.25 in.
DESIGN T_{SLT} = 7.125 in.

INT. COP_{MIN} = 0.75 in.
INT. COP_{MAX} = 1.7143 in.

INT. COP. DEPTH DESIGN METHOD: Average Coping

INT. COP_{WIDTH} = 14 in.
AVG. INT. COP DEPTH = 1.23215 in.

SIP FORMS: Yes

INT. $SLAB_{WEIGHT}$ = 0.542 kif
INTEGRAL WEARING $SURFACE_{WEIGHT}$ = 0.018 kif
INT. COP_{WEIGHT} = 0.018 kif
INT. SIP_{WEIGHT} = 0.075 kif
INT. $BEAM_{WEIGHT}$ = 0.346 kif
NON-COMPOSITE DEAD LOAD PER BEAM = 0.981 kif

INTERIOR BEAM PROPERTIES:

INT. BEAM TYPE: Type I Mod.

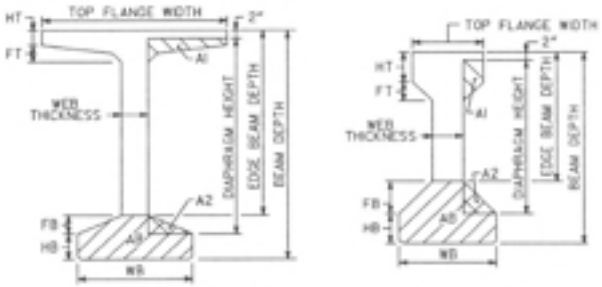
Top Flange Width =	14 in.
Beam Depth =	28 in.
Web Thickness =	8 in.
H_T =	4 in.
F_T =	3 in.
H_B =	5 in.
W_B =	18 in.
F_B =	5 in.
E.B. Depth (no coping) =	18 in.
Diaphragm Height =	21 in.
Cross Sectional Area =	332 in^2
A1 =	10.5 in^2
A2 =	12.5 in^2
AB =	155 in^2
INT. $BEAM_{WEIGHT}$ =	0.346 kif

TYPE OF STRANDS = 0.5 in. dia. low-relax
DRAPED STRANDS ? No

CONCRETE STRENGTHS:

$f'_{C\ BEAM}$ =	5000 psi
$f'_{C\ SLAB}$ =	4500 psi
$f'_{C\ SLAB}$ =	3500 psi
SIT =	0.201 k / in^2
SFB =	0.424 k / in^2

NOTE: FOR FINAL DESIGN f'c IS ROUNDED UP TO 500 PSI INCREMENTS



DEFINITION OF BEAM AREAS FOR EB & DIAPH. CALCS

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

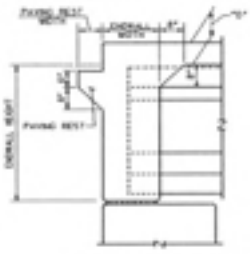
Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft.
Span No.: 1

EW., DIAPH., EDGE BEAM DIMENSIONS & CALCS:

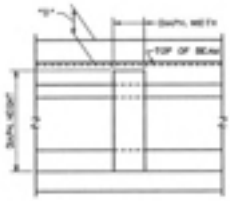
SPAN TYPE: End Span

Endwall 1:

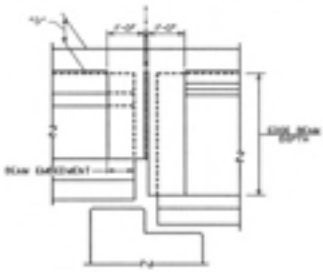
EW. TYPE:	Expansion
INT. EW. WIDTH =	1.50 ft.
INT. EW. HEIGHT =	2.73 ft.
BM. EMBED. FOR EW. =	7 in.
PAV. REST WIDTH =	8 in.
INT. EW. WEIGHT =	4.118 kips
DIAPH. WIDTH =	10 in.
DIAPH. HEIGHT =	21 in.
INT. DIAPH. WEIGHT =	1.099 kips
INT. EB. HEIGHT =	19.7143 in.
INT. EB. WIDTH =	12 in.
BM. EMBED. FOR EB. =	7 in.
INT. EB. WEIGHT =	1.350 kips



SECTION AT ENDWALL



SECTION THRU DIAPHRAGM



SECTION THRU EDGE BEAM

INT. P-LOADS:	LOAD	POSITION	REACTION	MOMENT
EW. =	4.118 kips	0.00 ft.	4.118 kips	0.000 k-ft.
DIAPH. =	1.099 kips	19.79 ft.	0.550 kips	10.878 k-ft.
EB. =	1.350 kips	39.58 ft.	0.000 kips	0.000 k-ft.
	TOTAL POINT DEAD LOAD PER BEAM =		4.667 kips	10.878 k-ft.

DECK SECTION DIMENSIONS & CALCS:

LEFT BARRIER

BARRIER TYPE: Jersey Barrier
FENCING OPTION: None

ED_1 =	1.625 ft.
W_1 =	0.75 ft.
H_1 =	2.667 ft.
LTDS =	7.0000 %

MEDIAN

MEDIAN TYPE: HOV Barrier

RIGHT BARRIER

BARRIER TYPE: None
FENCING OPTION: None

ED_2 =	0.000 ft.
W_2 =	0 ft.
H_2 =	0 ft.
RTDS =	7.0000 %

BRIDGE TYPE =	Bridge Widening
SPAN LENGTH =	39.578 ft.
SKEW ANGLE =	83.203 degrees
LEFT SPACING =	5.875 ft.
RIGHT SPACING =	5.875 ft.
OVERHANG =	2.500 ft.
SPACING TO SET BEAM =	3.625 ft.
NO. OF NEW BEAMS =	5 beams
NO. OF BEAMS IN EXISTING BRIDGE =	7 beams
NO. OF SET BEAMS W/ COMP. LOADS =	0 beams
TOTAL NO. OF BEAMS SUPPORTING WIDENING =	5 beams
NO. OF NEW BAYS =	5 bays

IS MEDIAN BARRIER CENTERED?	No
OFFSET TO LEFT OR RIGHT?	Left
OFFSET DISTANCE =	1 ft.
WIDENED BRIDGE OUT TO OUT =	29.625 ft.
EXISTING BRIDGE OUT TO OUT =	43.625 ft.
FINISHED BRIDGE OUT TO OUT =	73.250 ft.
LT RDWY =	10.688 ft.
RT RDWY =	14.313 ft.
TOTAL WIDENED RDWY =	25.000 ft.

NOTE: BRIDGE WIDENING IS TO ONE SIDE ONLY!

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft.
Span No.: 1

SUPERIMPOSED DEAD LOADS:

LEFT BARRIER
BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

MEDIAN
MEDIAN WEIGHT = 0.472 klf

RIGHT BARRIER
BARRIER WEIGHT = 0.000 klf
FENCING WEIGHT = 0.000 klf

NOTE: BARRIER WEIGHT INCLUDES SIDEWALK WEIGHT, IF PRESENT

FWS DESIGN METHOD: Avg. Beam Sp.

WEIGHT OF FWS = 30 lb/sf

DECK OVERLAY: No
AVG. THICKNESS = 0 in.

NO. OF BEAMS TO DISTRIBUTE BARRIER, FENCING & SW LL = 4 beams

BEAM ON CENTERLINE ? Yes
NO. OF BEAMS UNDER MEDIAN = 4

SUPERIMPOSED LOADS PER BRIDGE:

FWS WEIGHT = 0.750 klf per bridge

DECK OVERLAY WT. = 0.000 klf per bridge

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per bridge

TOTAL SUPERIMPOSED DEAD LOAD = 1.627 klf per bridge

SUPERIMPOSED LOADS PER BEAM:

FWS WEIGHT = 0.176 klf per beam

DECK OVERLAY WT. = 0.000 klf per beam

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per beam

TOTAL SUPERIMPOSED DEAD LOAD = 0.395 klf per beam

COMPOSITE SECTION MODULUS CALC

SPAN LENGTH = 39.58 ft.

BEAM MOMENT OF INERTIA = 26,495 in^4
BEAM Y_{bm} = 12.83 in.
INT. COP_{min} = 0.75 in.
DESIGN T_{int} = 7.125 in.
E_{BM} = 4.29 x 10^6 psi
E_{SLAB} = 3.59 x 10^6 psi
modular ratio = 1.19

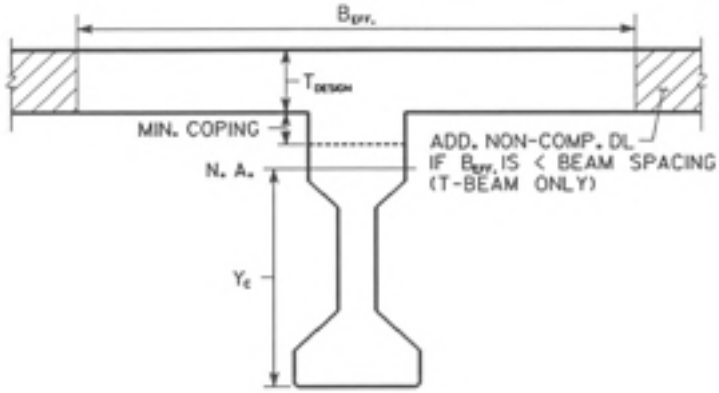
AASHTO 8.10.1.1 - Compression Flange Width

wBM FLANGE =	14	in.
B_{eff} = Bm Spacing =	70.50	in. CONTROLS
B_{eff} = ¼ Span Length =	118.73	in.
B_{eff} = WBM FLANGE + 2[6 tSLAB] =	99.50	in.

Add. Non-Comp. DL (WDLNC) = 0.000 klf (T-Beam Only)

Y_c = 23.77 in.
COMPOSITE MOM. OF INERTIA = 98,870 in^4

COMPOSITE SECTION MODULI:
SECTION MOD. AT TOP OF SLAB = 8,167 in^3
SECTION MOD. AT TOP OF BEAM = 23,368 in^3
SECTION MOD. AT BOT. OF BEAM = 4,160 in^3



BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 258717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft.
Span No.: 1

DISTRIBUTION & DEFLECTION FACTOR CALCS:

DISTRIBUTION FACTOR CALCS:

MOMENT	1.068	WHEEL
	0.534	AXLE
SHEAR	1.319	WHEEL
	0.660	AXLE

DEFLECTION FACTOR CALCS:

NO. OF LANES =	5
NO. OF BEAMS =	12 beams
REDUCTION FACTOR =	0.75
DFD =	0.625

MAX SPACING=	5.875 ft.
MIN SPACING =	5.875 ft.

LIVE LOAD CALCS:

LEFT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_L =	0 ft.	0.00 kips	0.000 k-ft.
LEFT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

RIGHT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_R =	0 ft.	0.00 kips	0.000 k-ft.
RIGHT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

IMPACT FACTOR: 1.30

HS 20 LOADING:

			REACTION	R x DF x I
MIDSPAN:	431.000 k-ft.	TRUCK:	54.987 kips	43.422 kips
MAX:	440.924 k-ft.	LANE:	38.640 kips	31.087 kips

TOTAL LL+I =	43.422 kips	299.251 k-ft.
	MAX TOTAL LL+I =	306.142 k-ft.

1.319

SUMMARY OF DEAD & LIVE LOADINGS:

NON-COMPOSITE DEAD LOADS PER BEAM:

INT. $SLAB_{WEIGHT}$ =	0.542 klf
INT. COP_{WEIGHT} =	0.018 klf
INT. SIP_{WEIGHT} =	0.075 klf
INT. $BEAM_{WEIGHT}$ =	0.346 klf
TOTAL N-COMP. DL =	0.981 klf

SUPERIMPOSED DEAD LOADS PER BEAM:

LEFT BARRIER WEIGHT =	0.101 klf
LEFT FENCING WEIGHT =	0.000 klf
MEDIAN WEIGHT =	0.118 klf
RIGHT BARRIER WEIGHT =	0.000 klf
RIGHT FENCING WEIGHT =	0.000 klf
FWS WEIGHT =	0.176 klf
DECK OVERLAY WT. =	0.000 klf
UTILITY WEIGHT =	0.000 klf
TOTAL SUPERIMPOSED DL =	0.395 klf

LOADING RESULTS

	LOADING	REACTION	MOMENT
TOTAL N-COMP. DL =	0.981 klf	19.408 kips	192.032 k-ft
TOTAL SUPERIMPOSED DL =	0.395 klf	7.826 kips	77.433 k-ft
TOTAL POINT DL =		4.667 kips	10.878 k-ft
TOTAL DL =	**1.376 klf**	**31.901 kips**	**280.343 k-ft**
LEFT SW LL =	0.000 klf	0.000 kips	0.000 k-ft
RIGHT SW LL =	0.000 klf	0.000 kips	0.000 k-ft
TOTAL SW LL =	**0.000 klf**	**0.000 kips**	**0.000 k-ft**
MAX OF TRUCK OR LANE LL+I =		**43.422 kips**	**299.251 k-ft**
TOTAL DL + SW LL + (LL + I) =		**75.323 kips**	**579.594 k-ft.**

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type I Mod. at 5.875ft
Design Span Length: 39.578 ft.
Span No.: 1

SUMMARY OF PROGRAM INPUT:

SIMPLE SPAN PROGRAM INPUT:

	INTERIOR BEAM
LENGTH =	39.578 ft.
Moment Dist. Factor (DFM) =	1.068
End Shear Dist. Factor (DFV) =	1.319
LL Deflection Dist. Factor (DFD) =	0.625
Non. Composite DL ($W_{D,NC}$) =	0.635 klf
Composite DL ($W_{D,C}$) =	0.395 klf
Sidewalk LL ($W_{LL,sw}$) =	0.000 klf
Effective Concrete Width (W) =	70.50 in.
Concrete Slab Thickness (Ts) =	7.125 in.
Minimum Coping (DF) =	0.750 in.
P-LOADS:	
XP1	0.000 ft.
P1	4.118 kips
XP2	19.789 ft.
P2	1.099 kips
XP3	39.578 ft.
P3	1.350 kips

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Input - Span 2
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

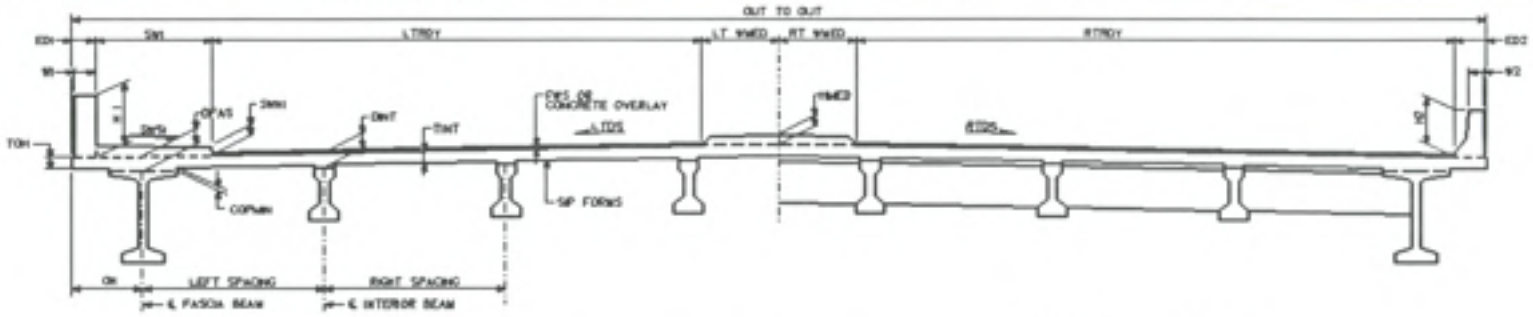
J.B. TRIMBLE, INC.

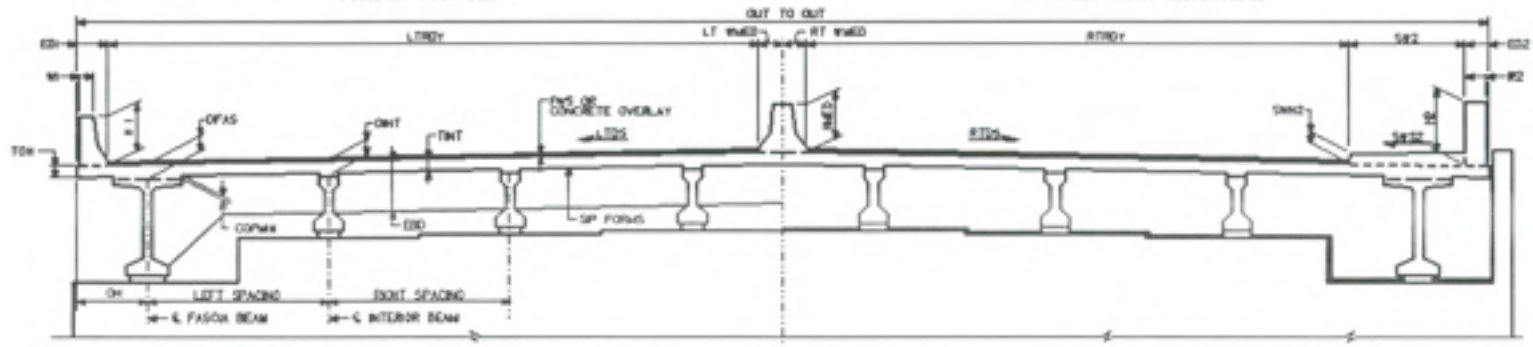
JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

✓ JCR 10-13-2009

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

TYPICAL DECK SECTIONS:





SECTION THRU EDGE BEAM

SECTION THRU ENDWALL

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **256717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

NON-COMPOSITE DEAD LOADS PER BEAM:

SLAB:

D_{INT} =	9.8283 in.
T_{INT} =	7.25 in.
INTEGRAL WEARING SURFACE THICKNESS =	0.25 in.
DESIGN T_{INT} =	7 in.
INT. COP_{MIN} =	0.75 in.
INT. COP_{MAX} =	2.5783 in.
INT. COP. DEPTH DESIGN METHOD:	Average Coping
INT. COP_{WIDTH} =	16 in.
AVG. INT. COP DEPTH =	1.66415 in.
SIP FORMS:	Yes

INT. $SLAB_{WEIGHT}$ =	0.531 klf
INTEGRAL WEARING $SURFACE_{WEIGHT}$ =	0.018 klf
INT. COP_{WEIGHT} =	0.028 klf
INT. SIP_{WEIGHT} =	0.072 klf
INT. $BEAM_{WEIGHT}$ =	0.583 klf
NON-COMPOSITE DEAD LOAD PER BEAM =	1.213 klf

INTERIOR BEAM PROPERTIES:

INT. BEAM TYPE: Type III

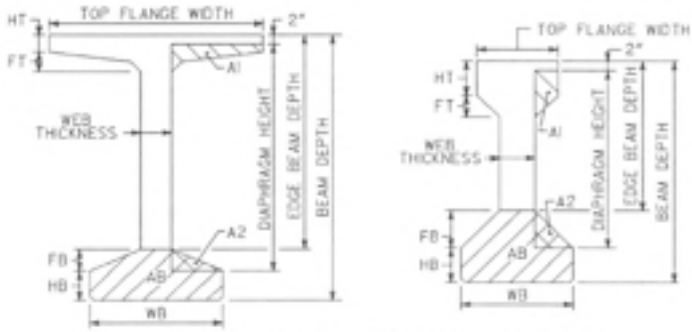
Top Flange Width =	16 in.
Beam Depth =	45 in.
Web Thickness =	7 in.
H_T =	7 in.
F_T =	4.5 in.
H_B =	7 in.
W_B =	22 in.
F_B =	7.5 in.
E.O. Depth (no coping) =	30.5 in.
Diaphragm Height =	36 in.
Cross Sectional Area =	559.5 in^2
A1 =	32.625 in^2
A2 =	28.125 in^2
AB =	262.75 in^2
INT. $BEAM_{WEIGHT}$ =	0.583 klf

TYPE OF STRANDS = 0.5 in. dia. low-relax
DRAPED STRANDS ? Yes

CONCRETE STRENGTHS:

$f'_{c\ BEAM}$ =	7000 psi
$f'_{ci\ BEAM}$ =	5700 psi
$f'_{c\ SLAB}$ =	3500 psi
SIT =	0.226 k / in^2
SFB =	0.502 k / in^2

NOTE: FOR FINAL DESIGN fs IS ROUNDED UP TO 500 PSI INCREMENTS



DEFINITION OF BEAM AREAS FOR EB, & DIAPH. CALCS

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

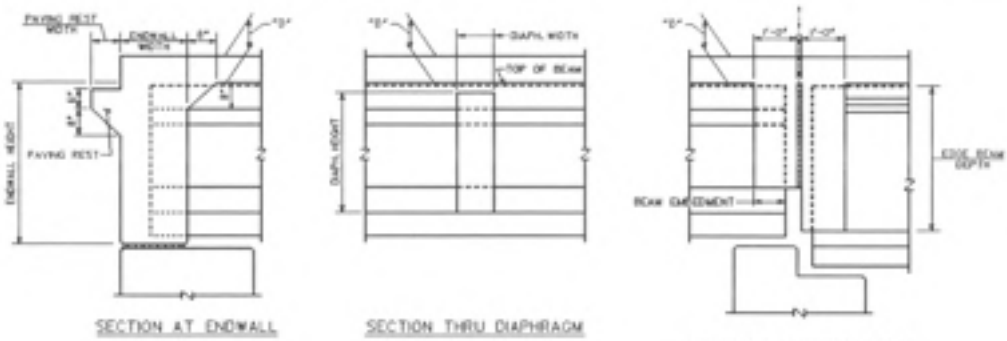
J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

EW, DIAPH., EDGE BEAM DIMENSIONS & CALCS:

SPAN TYPE: Intermediate Span



SECTION AT ENDWALL

SECTION THRU DIAPHRAGM

SECTION THRU EDGE BEAM

DIAPH. WIDTH =	10 in.
DIAPH. HEIGHT =	36 in.
INT. DIAPH. WEIGHT =	1.871 kips
INT. EB. HEIGHT =	33.0783 in.
INT. EB. WIDTH =	12 in.
BM. EMBED. FOR EB. =	7 in.
INT. EB. WEIGHT =	2.265 kips

INT. P-LOADS:	LOAD	POSITION	REACTION	MOMENT
EB. =	2.265 kips	0.00 ft.	2.265 kips	0.000 k-ft.
DIAPH. =	1.871 kips	43.08 ft.	0.936 kips	40.306 k-ft.
EB. =	2.265 kips	86.17 ft.	0.000 kips	0.000 k-ft.
	TOTAL POINT DEAD LOAD PER BEAM =		3.200 kips	40.306 k-ft.

DECK SECTION DIMENSIONS & CALCS:

LEFT BARRIER

BARRIER TYPE: Jersey Barrier
FENCING OPTION: None

ED_1 =	1.625 ft.
W_1 =	0.75 ft.
H_1 =	2.667 ft.
LTDS =	7.0000 %

MEDIAN

MEDIAN TYPE: Hdv Barrier

RIGHT BARRIER

BARRIER TYPE: None
FENCING OPTION: None

ED_2 =	0.000 ft.
W_2 =	0 ft.
H_2 =	0 ft.
RTDS =	7.0000 %

IS MEDIAN BARRIER CENTERED?	No
OFFSET TO LEFT OR RIGHT?	Left
OFFSET DISTANCE =	1 ft.

BRIDGE TYPE =	Bridge Widening
SPAN LENGTH =	86.167 ft.
SKEW ANGLE =	81.865 degrees
LEFT SPACING =	5.854 ft.
RIGHT SPACING =	5.854 ft.
OVERHANG =	2.550 ft.
SPACING TO SET BEAM =	3.658 ft.
NO. OF NEW BEAMS =	5 beams
NO. OF BEAMS IN EXISTING BRIDGE =	7 beams
NO. OF SET BEAMS W/ COMP. LOADS =	0 beams
TOTAL NO. OF BEAMS SUPPORTING WIDENING =	5 beams
NO. OF NEW BAYS =	5 bays

WIDENED BRIDGE OUT TO OUT =	29.625 ft.
EXISTING BRIDGE OUT TO OUT =	43.625 ft.
FINISHED BRIDGE OUT TO OUT =	73.250 ft.
LT ROWY =	10.687 ft.
RT ROWY =	14.312 ft.
TOTAL WIDENED ROWY =	25.000 ft.

NOTE: BRIDGE WIDENING IS TO ONE SIDE ONLY !

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(020)

J.B. TRIMBLE, INC.

JOB NO: 256717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

SUPERIMPOSED DEAD LOADS:

LEFT BARRIER

BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

MEDIAN

MEDIAN WEIGHT = 0.472 klf

RIGHT BARRIER

BARRIER WEIGHT = 0.000 klf
FENCING WEIGHT = 0.000 klf

NOTE: BARRIER WEIGHT INCLUDES SIDEWALK WEIGHT, IF PRESENT

FWS DESIGN METHOD: Avg. Beam Sp.

WEIGHT OF FWS = 30 lb/sf

DECK OVERLAY: No
AVG. THICKNESS = 0 in.

NO. OF BEAMS TO DISTRIBUTE BARRIER, FENCING & SW LL = 4 beams

BEAM ON CENTERLINE ? Yes
NO. OF BEAMS UNDER MEDIAN = 4

SUPERIMPOSED LOADS PER BRIDGE

FWS WEIGHT = 0.750 klf per bridge

DECK OVERLAY WT. = 0.000 klf per bridge

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per bridge

TOTAL SUPERIMPOSED DEAD LOAD = 1.627 klf per bridge

SUPERIMPOSED LOADS PER BEAM

FWS WEIGHT = 0.176 klf per beam

DECK OVERLAY WT. = 0.000 klf per beam

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per beam

TOTAL SUPERIMPOSED DEAD LOAD = 0.395 klf per beam

COMPOSITE SECTION MODULUS CALC:

SPAN LENGTH = 86.17 ft.

BEAM MOMENT OF INERTIA = 125,390 in^4
BEAM Y_{BN} = 20.27 in.
INT. COP_{BN} = 0.75 in.
DESIGN T_{INT} = 7 in.
E_{BM} = 5.07 x 10^6 psi
E_{SLAB} = 3.59 x 10^6 psi
modular ratio = 1.41

AASHTO 8.10.1.1 - Compression Flange Width

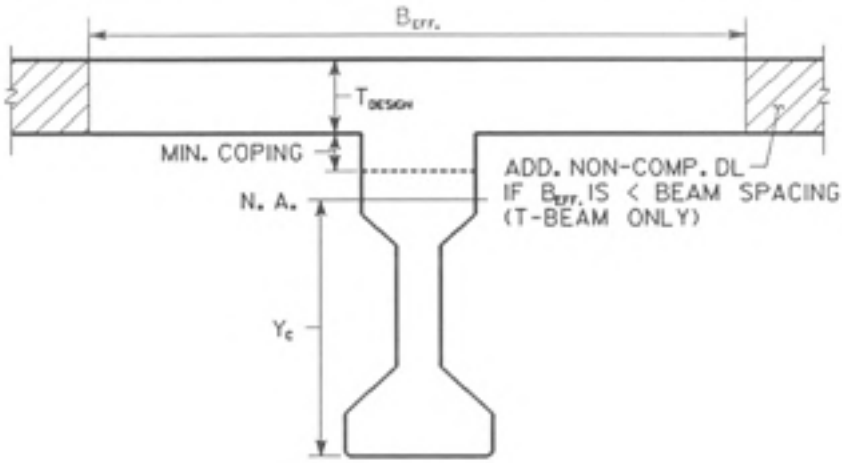
wBM FLANGE = 16 in.
B_{eff} = Bm Spacing = 70.25 **in. CONTROLS**
B_{eff} = ¼ Span Length = 258.50 in.
B_{eff} = WBM FLANGE + 2[6 tSLAB] = 100.00 in.

Add. Non-Comp. DL (WDLNC) = 0.000 klf (T-Beam Only)

Y_C = 31.52 in.
COMPOSITE MOM. OF INERTIA = 308,713 in^4

COMPOSITE SECTION MODULI:

SECTION MOD. AT TOP OF SLAB = 14,539 in^3
SECTION MOD. AT TOP OF BEAM = 22,896 in^3
SECTION MOD. AT BOT. OF BEAM = 9,795 in^3



BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

DISTRIBUTION & DEFLECTION FACTOR CALCS:

DISTRIBUTION FACTOR CALCS:

MOMENT	1.064	WHEEL
	0.532	AXLE
SHEAR	1.317	WHEEL
	0.658	AXLE

DEFLECTION FACTOR CALCS:

NO. OF LANES =	5
NO. OF BEAMS =	12 beams
REDUCTION FACTOR =	0.75
DFD =	0.625

MAX SPACING=	5.854 ft.
MIN SPACING =	5.854 ft.

LIVE LOAD CALCS:

LEFT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_1 =	0 ft.	0.00 kips	0.000 k-ft.
LEFT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

RIGHT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_2 =	0 ft.	0.00 kips	0.000 k-ft.
RIGHT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

IMPACT FACTOR: 1.24

HS 20 LOADING:

			REACTION	R x DF x I
MIDSPAN:	1268.000 k-ft.	TRUCK:	64.186 kips	47.251 kips
MAX:	1272.558 k-ft.	LANE:	53.520 kips	39.320 kips

	REACTION	MOMENT
TOTAL LL+I =	47.251 kips	834.611 k-ft.
	MAX TOTAL LL+I =	**837.611 k-ft.**

SUMMARY OF DEAD & LIVE LOADINGS:

NON-COMPOSITE DEAD LOADS PER BEAM:

INT. $SLAB_{WEIGHT}$ =	0.531 klf
INT. COP_{WEIGHT} =	0.028 klf
INT. SIP_{WEIGHT} =	0.072 klf
INT. $BEAM_{WEIGHT}$ =	0.583 klf
TOTAL N-COMP. DL =	**1.213 klf**

SUPERIMPOSED DEAD LOADS PER BEAM:

LEFT BARRIER WEIGHT =	0.101 klf
LEFT FENCING WEIGHT =	0.000 klf
MEDIAN WEIGHT =	0.118 klf
RIGHT BARRIER WEIGHT =	0.000 klf
RIGHT FENCING WEIGHT =	0.000 klf
FWS WEIGHT =	0.176 klf
DECK OVERLAY WT. =	0.000 klf
UTILITY WEIGHT =	0.000 klf
TOTAL SUPERIMPOSED DL =	**0.395 klf**

LOADING RESULTS

	LOADING	REACTION	MOMENT
TOTAL N-COMP. DL =	1.213 klf	52.278 kips	1126.155 k-ft.
TOTAL SUPERIMPOSED DL =	0.395 klf	17.011 kips	366.446 k-ft.
TOTAL POINT DL =		3.200 kips	40.306 k-ft.
TOTAL DL =	**1.608 klf**	**72.489 kips**	**1532.907 k-ft**
LEFT SW LL =	0.000 klf	0.000 kips	0.000 k-ft
RIGHT SW LL =	0.000 klf	0.000 kips	0.000 k-ft
TOTAL SW LL =	**0.000 klf**	**0.000 kips**	**0.000 k-ft**
MAX OF TRUCK OR LANE LL+I =		**47.251 kips**	**834.611 k-ft**
TOTAL DL + SW LL + (LL + I) =		**119.741 kips**	**2367.518 k-ft.**

Description: Type III at 5.854ft
Span Length: 86.167 ft.
Span No.: 2

SUMMARY OF PROGRAM INPUTS

SIMPLE SPAN PROGRAM INPUT:

	INTERIOR BEAM
LENGTH =	86.167 ft.
Moment Dist. Factor (DFM) =	1.064
End Shear Dist. Factor (DFV) =	1.317
LL Deflection Dist. Factor (DFD) =	0.625
Non- Composite DL (W_{DLNC}) =	0.631 klf
Composite DL (W_{DLC}) =	0.395 klf
Sidewalk LL (W_{sw}) =	0.000 klf
Effective Concrete Width (W_c) =	70.25 in.
Concrete Slab Thickness (T_c) =	7.000 in.
Minimum Coping (DF) =	0.750 in.
P-LOADS:	
XP1	0.000 ft.
P1	2.265 kips
XP2	43.083 ft.
P2	1.871 kips
XP3	86.167 ft.
P3	2.265 kips

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Input - Span 3
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

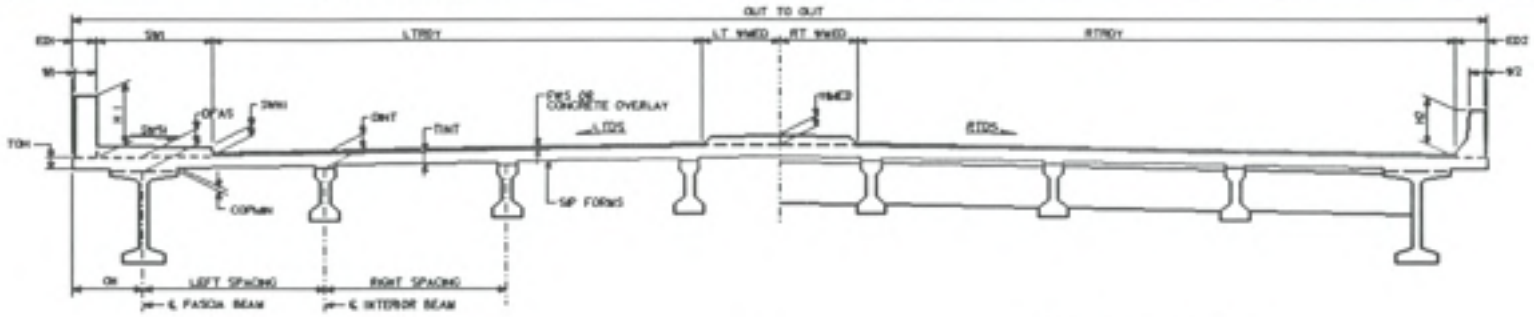
J.B. TRIMBLE, INC.

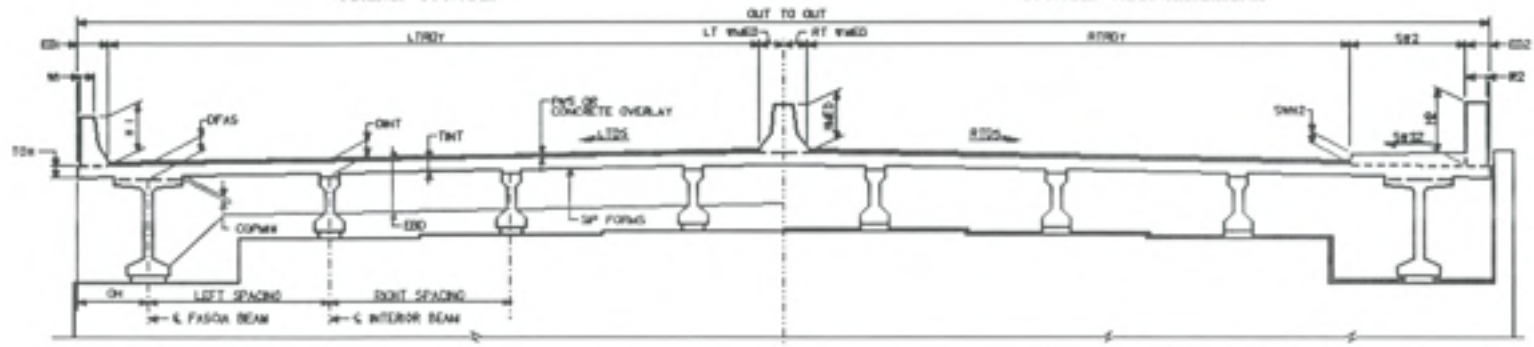
JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

✓ JCR 10-13-2009

Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

TYPICAL DECK SECTIONS:





SECTION THRU EDGE BEAM

SECTION THRU ENDWALL

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

NON-COMPOSITE DEAD LOADS PER BEAM:

SLAB:

D_{INT} = 9.3335 in.

T_{INT} = 7.25 in.
INTEGRAL WEARING SURFACE THICKNESS = 0.25 in.
DESIGN T_{INT} = 7 in.

INT. COP_{MIN} = 0.75 in.
INT. COP_{MAX} = 2.0835 in.

INT. COP. DEPTH DESIGN METHOD: Average Coping

INT. COP_{WIDTH} = 14 in.
AVG. INT. COP DEPTH = 1.41675 in.

SIP FORMS: Yes

INT. $SLAB_{WEIGHT}$ = 0.529 klf

INTEGRAL WEARING $SURFACE_{WEIGHT}$ = 0.018 klf

INT. COP_{WEIGHT} = 0.021 klf

INT. SIP_{WEIGHT} = 0.075 klf

INT. $BEAM_{WEIGHT}$ = 0.346 klf

NON-COMPOSITE DEAD LOAD PER BEAM = 0.970 klf

INTERIOR BEAM PROPERTIES:

INT. BEAM TYPE: Type I Mod.

Top Flange Width = 14 in.
Beam Depth = 28 in.
Web Thickness = 8 in.
H_T = 4 in.
F_T = 3 in.
H_B = 5 in.
W_B = 18 in.
F_B = 5 in.
Edge Beam Depth (no coping) = 18 in.
Diaphragm Height = 21 in.
Cross Sectional Area = 332 in^2
A1 = 10.5 in^2
A2 = 12.5 in^2
AB = 155 in^2
INT. $BEAM_{WEIGHT}$ = 0.346 klf

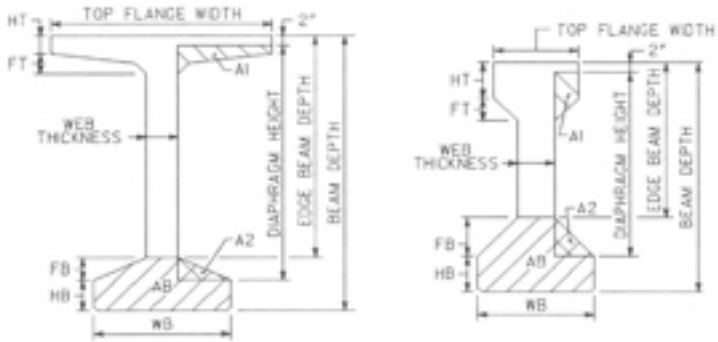
TYPE OF STRANDS = 0.5 in. dia. low-relax
DRAPED STRANDS ? Yes

CONCRETE STRENGTHS:

$f'_{c\ BEAM}$ = 6000 psi
$f'_{c\ DIAPHRAGM}$ = 5200 psi
$f'_{c\ SLAB}$ = 3500 psi

SIT = 0.216 k / in^2
SFB = 0.465 k / in^2

NOTE: FOR FINAL DESIGN fc IS ROUNDED UP TO 500 PSI INCREMENTS



DEFINITION OF BEAM AREAS FOR EB. & DIAPH. CALCS

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

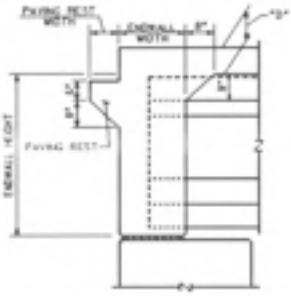
J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

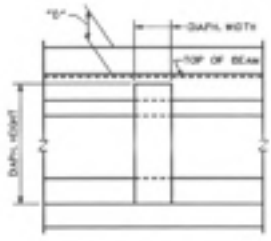
Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

EW, DIAPH, EDGE BEAM DIMENSIONS & CALCS:

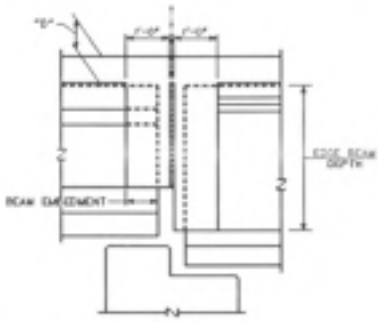
SPAN TYPE:	End Span
	Endwall 1:
EW. TYPE:	Expansion
INT. EW. WIDTH =	1.50 ft.
INT. EW. HEIGHT =	2.76 ft.
BM. EMBED. FOR EW. =	7 in.
PAV. REST WIDTH =	8 in.
INT. EW. WEIGHT =	4.158 kips
DIAPH. WIDTH =	10 in.
DIAPH. HEIGHT =	21 in.
INT. DIAPH. WEIGHT =	1.090 kips
INT. EB. HEIGHT =	20.0835 in.
INT. EB. WIDTH =	12 in.
BM. EMBED. FOR EB. =	7 in.
INT. EB. WEIGHT =	1.377 kips



SECTION AT ENDWALL



SECTION THRU DIAPHRAGM



SECTION THRU EDGE BEAM

INT. P-LOADS:	LOAD	POSITION	REACTION	MOMENT
EW. =	4.158 kips	0.00 ft.	4.158 kips	0.000 k-ft.
DIAPH. =	1.090 kips	25.28 ft.	0.545 kips	13.780 k-ft.
EB. =	1.377 kips	50.56 ft.	0.000 kips	0.000 k-ft.
	TOTAL POINT DEAD LOAD PER BEAM =		4.703 kips	13.780 k-ft.

DECK SECTION DIMENSIONS & CALCS:

LEFT BARRIER

BARRIER TYPE:	Jersey Barrier
FENCING OPTION:	None
ED_L =	1.625 ft.
W_L =	0.75 ft.
H_L =	2.667 ft.
LTDS =	7.0000 %

MEDIAN

MEDIAN TYPE: HOV Barrier

RIGHT BARRIER

BARRIER TYPE:	None
FENCING OPTION:	None
ED_R =	0.000 ft.
W_R =	0 ft.
H_R =	0 ft.
RTDS =	7.0000 %

IS MEDIAN BARRIER CENTERED?	No
OFFSET TO LEFT OR RIGHT?	Left
OFFSET DISTANCE =	1 ft.

BRIDGE TYPE =	Bridge Widening
SPAN LENGTH =	50.557 ft.
SKEW ANGLE =	80.462 degrees
LEFT SPACING =	5.833 ft.
RIGHT SPACING =	5.833 ft.
OVERHANG =	2.700 ft.
SPACING TO SET BEAM =	3.592 ft.
NO. OF NEW BEAMS =	5 beams
NO. OF BEAMS IN EXISTING BRIDGE =	7 beams
NO. OF SET BEAMS W/ COMP. LOADS =	0 beams
TOTAL NO. OF BEAMS SUPPORTING WIDENING =	5 beams
NO. OF NEW BAYS =	5 bays

WIDENED BRIDGE OUT TO OUT =	29.625 ft.
EXISTING BRIDGE OUT TO OUT =	43.625 ft.
FINISHED BRIDGE OUT TO OUT =	73.250 ft.
LT RDWY =	10.688 ft.
RT RDWY =	14.313 ft.
TOTAL WIDENED RDWY =	25.000 ft.

NOTE: BRIDGE WIDENING IS TO ONE SIDE ONLY!

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **256717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

SUPERIMPOSED DEAD LOADS:

LEFT BARRIER
BARRIER WEIGHT = 0.405 klf
FENCING WEIGHT = 0.000 klf

MEDIAN
MEDIAN WEIGHT = 0.472 klf

RIGHT BARRIER
BARRIER WEIGHT = 0.000 klf
FENCING WEIGHT = 0.000 klf

NOTE: BARRIER WEIGHT INCLUDES SIDEWALK WEIGHT, IF PRESENT

FWS DESIGN METHOD: Avg. Beam Sp.

WEIGHT OF FWS = 30 lb/sf

DECK OVERLAY: No
AVG. THICKNESS = 0 in.

NO. OF BEAMS TO DISTRIBUTE BARRIER, FENCING & SW LL = 4 beams

BEAM ON CENTERLINE ? Yes
NO. OF BEAMS UNDER MEDIAN = 4

SUPERIMPOSED LOADS PER BRIDGE

FWS WEIGHT = 0.750 klf per bridge

DECK OVERLAY WT. = 0.000 klf per bridge

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per bridge

TOTAL SUPERIMPOSED DEAD LOAD = 1.627 klf per bridge

SUPERIMPOSED LOADS PER BEAM

FWS WEIGHT = 0.175 klf per beam

DECK OVERLAY WT. = 0.000 klf per beam

UTILITY WEIGHT TO SUPERSTRUCTURE = 0.000 klf per beam

TOTAL SUPERIMPOSED DEAD LOAD = 0.394 klf per beam

COMPOSITE SECTION MODULUS CALC:

SPAN LENGTH = 50.55 ft.

BEAM MOMENT OF INERTIA = 26,495 in^4
BEAM Y_{BN} = 12.83 in.
INT. COP_{MIN} = 0.75 in.
DESIGN T_{INT} = 7 in.
E_{BM} = 4.7 x 10^6 psi
E_{SLAB} = 3.59 x 10^6 psi
modular ratio = 1.31

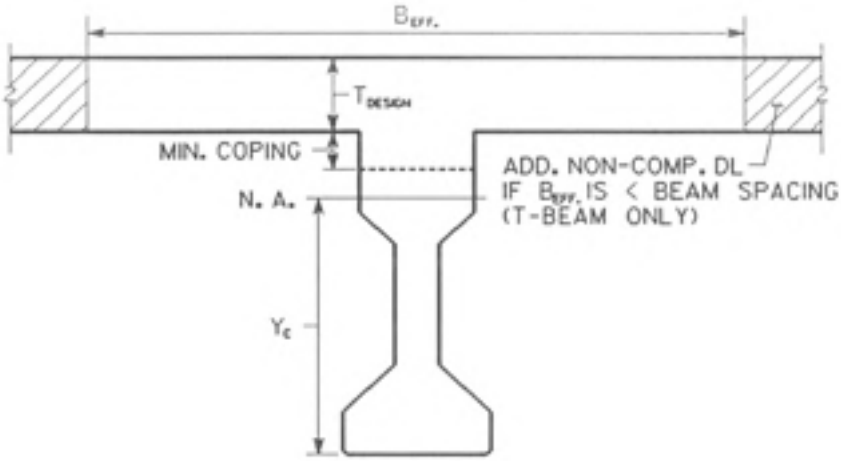
AASHTO 8.10.1.1 - Compression Flange Width

wBM FLANGE =	14	in.
B_{eff} = Brn Spacing =	70.00	in. **CONTROLS**
B_{eff} = ¼ Span Length =	151.67	in.
B_{eff} = WBM FLANGE + 2[6 tSLAB] =	98.00	in.

Add. Non-Comp. DL (WDLNC) = 0.000 klf (T-Beam Only)

Y_c = 23.18 in.
COMPOSITE MOM. OF INERTIA = 94,595 in^4

COMPOSITE SECTION MODULI:
SECTION MOD. AT TOP OF SLAB = 7,526 in^3
SECTION MOD. AT TOP OF BEAM = 19,626 in^3
SECTION MOD. AT BOT. OF BEAM = 4,081 in^3



BRIDGE: I-575 over Towne Lake Parkway
COUNTY: CHEROKEE
P.I. NO: 713640
PROJECT: NH000-0575-01(028)

J.B. TRIMBLE, INC.

JOB NO: 255717
DESIGNED BY: AE
CHECKED BY: JCR

Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

DISTRIBUTION & DEFLECTION FACTOR CALCS:

DISTRIBUTION FACTOR CALCS:

MOMENT	1.061	WHEEL
	0.530	AXLE
SHEAR	1.314	WHEEL
	0.657	AXLE

DEFLECTION FACTOR CALCS:

NO. OF LANES =	5
NO. OF BEAMS =	12 beams
REDUCTION FACTOR =	0.75
DFD =	0.625

MAX SPACING=	5.833 ft.
MIN SPACING =	5.833 ft.

LIVE LOAD CALCS:

LEFT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_1 =	0 ft.	0.00 kips	0.000 k-ft.
LEFT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

RIGHT SIDEWALK LIVE LOAD:

		REACTION	MOMENT
SW_2 =	0 ft.	0.00 kips	0.000 k-ft.
RIGHT SW. LL. =	0.060 kips / ft^2		
SW LL PER BEAM =	0.000 klf		

IMPACT FACTOR: 1.28

HS 20 LOADING:

			REACTION	R x DF x I
MIDSPAN:	629.000 k-ft.	TRUCK:	58.693 kips	45.215 kips
MAX:	636.762 k-ft.	LANE:	42.160 kips	32.975 kips

	REACTION	MOMENT
TOTAL LL+I =	45.215 kips	428.561 k-ft.
	MAX TOTAL LL+I =	**433.850 k-ft.**

SUMMARY OF DEAD & LIVE LOADINGS:

NON-COMPOSITE DEAD LOADS PER BEAM:

INT. $SLAB_{WEIGHT}$ =	0.529 klf
INT. COP_{WEIGHT} =	0.021 klf
INT. SIP_{WEIGHT} =	0.075 klf
INT. $BEAM_{WEIGHT}$ =	0.346 klf
TOTAL N-COMP. DL =	**0.970 klf**

SUPERIMPOSED DEAD LOADS PER BEAM:

LEFT BARRIER WEIGHT =	0.101 klf
LEFT FENCING WEIGHT =	0.000 klf
MEDIAN WEIGHT =	0.118 klf
RIGHT BARRIER WEIGHT =	0.000 klf
RIGHT FENCING WEIGHT =	0.000 klf
FWS WEIGHT =	0.175 klf
DECK OVERLAY WT. =	0.000 klf
UTILITY WEIGHT =	0.000 klf
TOTAL SUPERIMPOSED DL =	**0.394 klf**

LOADING RESULTS

	LOADING	REACTION	MOMENT
TOTAL N-COMP. DL =	0.970 klf	24.515 kips	309.858 k-ft.
TOTAL SUPERIMPOSED DL =	0.394 klf	9.965 kips	125.954 k-ft.
TOTAL POINT DL =		4.703 kips	13.780 k-ft.
TOTAL DL =	**1.364 klf**	**39.183 kips**	**449.592 k-ft.**
LEFT SW LL =	0.000 klf	0.000 kips	0.000 k-ft.
RIGHT SW LL =	0.000 klf	0.000 kips	0.000 k-ft.
TOTAL SW LL =	**0.000 klf**	**0.000 kips**	**0.000 k-ft.**
MAX OF TRUCK OR LANE LL+I =		**45.215 kips**	**428.561 k-ft.**
TOTAL DL + SW LL + (LL + I) =		**84.398 kips**	**878.153 k-ft.**

Description: Type I Mod. at 5.833ft
Span Length: 50.557 ft.
Span No.: 3

SUMMARY OF PROGRAM INPUTS

SIMPLE SPAN PROGRAM INPUT:

	INTERIOR BEAM
LENGTH =	50.557 ft.
Moment Dist. Factor (DFM) =	1.061
End Shear Dist. Factor (DFV) =	1.314
LL Deflection Dist. Factor (DFD) =	0.625
Non- Composite DL (W_{DLNC}) =	0.624 klf
Composite DL (W_{DLC}) =	0.394 klf
Sidewalk LL (W_{LSW}) =	0.000 klf
Effective Concrete Width (W_c) =	70.00 in.
Concrete Slab Thickness (T_c) =	7.000 in.
Minimum Coping (Df) =	0.750 in.
P-LOADS:	
XP1	0.000 ft.
P1	4.158 kips
XP2	25.279 ft.
P2	1.090 kips
XP3	50.557 ft.
P3	1.377 kips

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Beam Design Output	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	GDOT BRPSBM1	06/26/2008

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Beam design ouptput is included for spans 1, 2 and 3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	22	22	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Output - Span 1
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

09-OCT-09
10:19:58

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS OR DESIGN OF SIMPLE SPAN PRESTRESSED BEAMS
REVISED: JUNE 26, 2008

PROB. NO. INT.

✓ JCR
10-9-09

255717 I-575 over Town Lake Parkway SPAN 1

SPAN DATA

D/A	LL CLASS	LL SK.	LENGTH	DFM	DFV	DFD	WDLNC	WDLC	WSWK	F'C	F'C1	NPL	SIT	SFB	SFTE
D	HS20	0 0 0	39.578	1.068	1.319	0.625	0.635	0.395	0.000	5.000	4.500	3	-0.201	-0.424	-0.001

BEAM DATA

BEAM DIMENSIONS								COMPOSITE SLAB			(E X 1,000,000)		STIRRUP	DECK
WT	HT	FT	WS	HB	WB	FB	DB	WF	TF	DF	E BEAM	E SLAB	SIZE	PANEL	FSY
14.00	4.00	3.00	8.00	5.00	18.00	5.00	28.00	70.50	7.125	0.750	4.29	3.59	5	0	60.

STRAND DATA

TYPE	NST	XDIST	ACTUAL NO. OR MAX. NO. OF STRANDS PER ROW																			ASB	AST	DIAM	TCL	BCL	SPAC.
0	2	0.5830	6	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0.1670	0.1670	0.500	2.50	3.00	2.00

RBFPU	BFPU	IBLOSS	FBLOSS	RTFPU	TFPU	ITLOSS	FTLOSS	WTC	LOW LAX	ITLENGTH	FTLENGTH	DLENGTH
.75	270.00	0.00	0.00	.75	270.00	0.00	0.00	.150	1	0.00	0.00	0.00

DEBONDING DATA

DEBOND ACT. # AND LENGTH OR MAX. # AND LENGTH OF STRANDS DEBONDED PER ROW

0 0 .00

0 .00 0 .00

DRAPE DATA

DRAPED	MAX RAISE	HOLD DOWN PT.	ACT. # OR MAX. # OF STRANDS DRAPED PER ROW																		
0	0.00	.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

P-LOADS

XP1	P1	XP2	P2	XP3	P3	XP4	P4	XP5	P5
0.000	4.118	19.789	1.099	39.578	1.350				

PRESTRESSED BEAM DESIGN - OUTPUT DATA FOR PROBLEM NO. INT. 255717 I-575 over Town Lake Parkway

MOMENTS AT SPAN TWENTIETH POINTS - KIP-FEET

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	0.000	12.866	24.377	34.535	43.338	50.786	56.881	61.621	65.006	67.038	67.715
UNIFORM D.L. NON-C.	0.000	23.624	44.760	63.411	79.574	93.251	104.441	113.144	119.361	123.091	124.334
CONCENTRATED P-LOADS	0.000	1.087	2.175	3.262	4.350	5.437	6.524	7.612	8.699	9.787	10.874
UNIFORM D.L. COMP.	0.000	14.695	27.843	39.444	49.499	58.006	64.967	70.381	74.249	76.569	77.342
LIVE LOAD + IMPACT	0.000	70.640	131.388	182.246	223.212	254.288	275.964	291.186	303.718	306.892	300.175
TOTAL D.L. + L.L.	0.000	122.911	230.544	322.897	399.972	461.768	506.777	543.944	571.033	583.376	580.440

STRESSES AT SPAN TWENTIETH POINTS - KIPS PER SQ.IN.

LOADS		BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	TOP	0.000	0.068	0.168	0.237	0.298	0.349	0.391	0.423	0.447	0.461	0.465
	BOT	0.000	-0.075	-0.142	-0.201	-0.252	-0.295	-0.330	-0.358	-0.378	-0.389	-0.393
TOTAL NONCOMP. D.L.	TOP	0.000	0.258	0.490	0.695	0.875	1.027	1.153	1.253	1.327	1.374	1.394
	BOT	0.000	-0.218	-0.414	-0.588	-0.739	-0.868	-0.975	-1.060	-1.122	-1.161	-1.179
TOTAL COMP.D.L.+L.L.	TOP	0.000	0.044	0.083	0.114	0.142	0.163	0.178	0.188	0.197	0.200	0.197
	BOT	0.000	-0.246	-0.459	-0.639	-0.786	-0.900	-0.983	-1.042	-1.090	-1.106	-1.088
TOTAL COMP.+NONCOMP.	TOP	0.000	0.303	0.573	0.811	1.017	1.190	1.331	1.442	1.524	1.574	1.591
	BOT	0.000	-0.464	-0.873	-1.227	-1.526	-1.769	-1.958	-2.102	-2.211	-2.267	-2.267

SHEARS AT SPAN TWENTIETH POINTS - KIPS

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	6.844	6.159	5.475	4.791	4.106	3.422	2.737	2.053	1.369	0.684	0.000
UNIFORM D.L. NON-C.	12.566	11.309	10.053	8.796	7.540	6.283	5.026	3.770	2.513	1.257	0.000
CONCENTRATED P-LOADS	4.668	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549	0.549
UNIFORM D.L. COMP.	7.817	7.035	6.253	5.472	4.690	3.908	3.127	2.345	1.563	0.782	0.000
LIVE LOAD + IMPACT	43.416	35.696	33.197	30.698	28.199	25.700	23.242	21.021	18.799	16.643	14.977
TOTAL D.L. + L.L.	75.310	60.750	55.528	50.306	45.084	39.863	34.682	29.738	24.794	19.915	15.526

BEAM PROPERTIES

* * * * * NON-COMPOSITE BEAM PROPERTIES *							*	* * * * * * * * * * COMPOSITE BEAM PROPERTIES * * * * * * *						
I	YT	YB	ST	SB	A	W	*	I	YT	YB	ST	SB	A	QS
26495.4	15.173	12.827	1746.3	2065.5	332.00	0.346	*	98700.6	4.286	23.714	23028.6	4162.1	752.35	3614.38

STRAND AND MISC. DATA

MAX # STRDS *	ACT # STRDS *	MIN # STRDS *	E @ C.L. *	E @ END *	PS *	ASE *	NS(EACT-EEND) *	BPI *	BPF *	TPI *	TPF
18	12	10	5.411	5.411	0.60%	0.77	0.000	320.375	283.262	64.075	56.652

MOMENTS(K-FT.) AND SHEARS(KIPS), STIRRUP SPACING, STRESSES(KSI) AT SPAN TWENTIETH POINTS

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
ULT. MOMENT REQD.	0.000	221.008	413.581	577.719	713.422	820.689	900.588	959.498	1005.575	1024.372	1014.734
ULT. MOMENT FURN.	118.362	510.181	886.957	1206.828	1206.828	1206.828	1206.828	1206.828	1206.828	1206.828	1206.828
1.2*CRACKING MOMENT	417.899	971.688	930.597	894.184	862.450	835.394	813.017	795.318	782.297	773.955	770.291
DIST. TO N.A.(IN.)	0.200	0.872	1.534	2.109	2.109	2.109	2.109	2.109	2.109	2.109	2.109
MAX STEEL RATIO	0.006	0.026	0.046	0.063	0.063	0.063	0.063	0.063	0.063	0.063	0.063
ULT. COMP. SHEAR	104.232	86.489	80.058	73.627	67.196	60.765	54.424	48.594	42.765	37.077	32.451
ULT. TOTAL SHEAR	135.532	109.913	100.958	92.004	83.050	74.095	65.231	56.878	48.526	40.314	33.165
BEAM SHEAR CAPACITY	61.394	87.686	96.774	108.558	85.432	64.703	50.727	40.583	32.520	27.600	27.600
MIN. STIRRUP AREA	0.627	0.242	0.094	0.080	0.080	0.124	0.153	0.159	0.150	0.121	0.080
STRP.(#5) SPAC.(IN.)	10.500*	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000
PRESTRESS STRESS TOP	-0.007	-0.032	-0.033	-0.033	-0.033	-0.033	-0.033	-0.033	-0.033	-0.033	-0.033
BOT	0.474	2.082	2.165	2.165	2.165	2.165	2.165	2.165	2.165	2.165	2.165
INITIAL STRESSES TOP	-0.007	0.056	0.134	0.204	0.265	0.316	0.358	0.390	0.414	0.427	0.432
BOT	0.474	2.007	2.023	1.964	1.913	1.870	1.835	1.807	1.787	1.776	1.772
FINAL STRESSES TOP	-0.007	0.273	0.544	0.782	0.987	1.161	1.302	1.412	1.494	1.544	1.562
BOT	0.474	1.450	1.041	0.687	0.389	0.145	-0.044	-0.188	-0.297	-0.353	-0.353
FINAL # TOP STRANDS	0.495	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
FINAL # BOT STRANDS	2.475	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000
DEVELOP. # TOP STRDS	0.186	0.815	1.445	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
DEVELOP. # BOT STRDS	0.928	4.076	7.225	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000

* - FOR "ASE" REQUIREMENTS WITHIN A MAXIMUM DISTANCE OF 5.146" (D/4) FROM THE END OF BEAM USE
2 LOCATIONS OF 2-#5 STIRRUPS AT A MAXIMUM SPACING OF 3.146" USING 2" CL. FROM END OF BEAM

DEFLECTIONS(INCHES) AT CENTER LINE OF SPAN

BEAM	WDLNC	P-LOADS	WDLC	INITIAL	FINAL	SIDEWALK	TRUCK	LANE	MILITARY	RAILROAD	PRESTR.	CAMBER
0.168	0.308	0.022	0.052	-0.348	0.093	0.000	0.114	0.072	0.101	0.000	-0.516	-0.636

MAXIMUM, ACTUAL AND MINIMUM ECCENTRICITIES(INCHES)AT SPAN TWENTIETH POINTS

ITEM	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
MAX ECC, SIT= -201	9.432	6.627	6.934	7.251	7.526	7.758	7.948	8.096	8.202	8.265	8.286
MAX ECC, SIB= 2700	60.076	9.283	9.046	9.363	9.638	9.870	10.060	10.208	10.314	10.377	10.398
INITIAL ECCENTRICITY	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411
FINAL ECCENTRICITY	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411	5.411
MIN ECC, SFT= 2000	-36.258	-3.460	-2.071	-0.848	0.208	1.098	1.823	2.391	2.813	3.069	3.160
MIN ECC, SFB= -424	-16.633	-5.976	-3.491	-1.341	0.473	1.950	3.101	3.975	4.640	4.978	4.980

```
*  SPAN  * * * * * * * * * * * * * * * * * ECCENTRICITY PLOT (INCHES) * * * * * * * * * * * * * * * * * *
                                                          1    1    1    1    1    1    1    1    1    1    2    2    2    2    2
* POINTS *0....1....2....3....4....5....6....7....8....9....0....1....2....3....4....5....6....7....8....9....0....1....2....3....4
* 0.00 L *                          +                   *
* 0.05 L *                          +     *
* 0.10 L *                          +       *
* 0.15 L *                          +        *
* 0.20 L *  *                       +          *
* 0.25 L *          *               +           *
* 0.30 L *               *          +            *
* 0.35 L *                    *     +            *
* 0.40 L *                       *  +             *
* 0.45 L *                        * +             *
* 0.50 L *                        * +             *
* * * *      * = MAX. AND MIN. ECCENTRICITY, + = ACTUAL ECCENTRICITY, HOLD-DOWN POINT IS  0.00 FEET FROM CENTER LINE OF SPAN

    STRAND ARRANGEMENT (TOP STRANDS NOT SHOWN)=  2

                  * * * *

                 * * * * * *
```

```
*  SPAN  * * * * * * * * * * * * * * * *STRAND ARRANGEMENT (INCHES) * * * * * * * * * * * * * * * * * * *
                                 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 6
* POINTS *0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0

*  END   *      +   +
*  BRNG  *      +   +

* 0.05 L *      +   +

* 0.10 L *      +   +

* 0.15 L *      +   +

* 0.20 L *      +   +

* 0.25 L *      +   +

* 0.30 L *      +   +

* 0.35 L *      +   +

* 0.40 L *      +   +

* 0.45 L *      +   +

* 0.50 L *      +   +
```

FINAL STRAND ARRANGEMENT AT END

ROW	TOTAL #STRDS	VER DIST-STRAIGHT STRDS	#RAISED STRDS	VER DIST-RAISED STRDS	#DEB 1	DEB LENGTH 1	#DEB 2	DEB LENGTH 2
1	6	3.000	0	0.000	0	0.00L	0	0.00L
2	4	5.000	0	0.000	0	0.00L	0	0.00L
TOP	2	25.500						

INITIAL TRANSFER LENGTH = 2.664 FT

FINAL TRANSFER LENGTH = 2.356 FT

DEVELOPMENT LENGTH = 6.285 FT

LOSSES (KSI)

TOP STRANDS INITIAL LOSSES= 10.659 TOP STRANDS ADDITIONAL LOSSES= 22.223 TOP STRANDS FINAL LOSSES= 32.882

BOT STRANDS INITIAL LOSSES= 10.659 BOT STRANDS ADDITIONAL LOSSES= 22.223 BOT STRANDS FINAL LOSSES= 32.882

TOTAL LOSSES FOR ALL STRANDS= 32.882

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Output - Span 2
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS OR DESIGN OF SIMPLE SPAN PRESTRESSED BEAMS
REVISED: JUNE 26, 2008

PROB. NO. INT.

✓ JCR 10-13-2009

255717 I-575 over Town Lake Parkway (SPAN 2)

SPAN DATA

D/A	LL CLASS	LL SK.	LENGTH	DFM	DFV	DFD	WDLNC	WDLC	WSWK	F'C	F'CI	NFL	SIT	SFB	SFTE
D	HS20	0 0 0	86.166	1.064	1.317	0.625	0.631	0.395	0.000	7.000	5.700	3	-0.226	-0.502	-0.001

BEAM DATA

BEAM DIMENSIONS								* COMPOSITE SLAB			* (E X 1,000,000)		* STIRRUP	DECK	
WT	HT	FT	WS	RB	WB	FB	DB	* WF	TF	DF	* E BEAM	E SLAB	* SIZE	PANEL	FSY
16.00	7.00	4.50	7.00	7.00	22.00	7.50	45.00	70.25	7.000	0.750	5.07	3.59	5	0	60.

STRAND DATA

TYPE	NST	XDIST	ACTUAL NO. OR MAX. NO. OF STRANDS PER ROW	ASB	AST	DIAM	TCL	BCL	SPAC.
0	2	0.5830	10 10 8 6 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0.1670	0.1670	0.500	2.50	3.00	2.00

RBFPU	BFPU	IBLOSS	FBLOSS	RTFPU	TFPU	ITLOSS	FTLOSS	WTC	LOW LAX	ITLENGTH	FTLENGTH	DLENGTH
.75	270.00	0.00	0.00	.75	270.00	0.00	0.00	.150	1	0.00	0.00	0.00

DEBONDING DATA

DEBOND ACT. # AND LENGTH OR MAX. # AND LENGTH OF STRANDS DEBONDED PER ROW

0 0 .00

0 .00 0 .00

DRAPE DATA

DRAPED	MAX RAISE	HOLD DOWN PT.	ACT. # OR MAX. # OF STRANDS DRAPED PER ROW																			
1	0.00	.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0

P-LOADS

XP1	P1	XP2	P2	XP3	P3	XP4	P4	XP5	P5
0.000	2.265	43.083	1.871	86.167	2.265				

PRESTRESSED BEAM DESIGN - OUTPUT DATA FOR PROBLEM NO. INT. 255717 I-575 over Town Lake Parkway

MOMENTS AT SPAN TWENTIETH POINTS - KIP-FEET

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	0.000	102.770	194.721	275.855	346.171	405.669	454.350	492.212	519.257	535.483	540.892
UNIFORM D.L. NON-C.	0.000	111.267	210.821	298.663	374.793	439.210	491.916	532.909	562.189	579.758	585.614
CONCENTRATED P-LOADS	0.000	4.030	8.061	12.091	16.121	20.152	24.182	28.212	32.242	36.273	40.303
UNIFORM D.L. COMP.	0.000	69.652	131.972	186.960	234.617	274.941	307.934	333.594	351.925	362.923	366.589
LIVE LOAD + IMPACT	0.000	171.787	323.164	454.132	564.689	654.836	724.573	777.585	817.556	837.117	836.268
TOTAL D.L. + L.L.	0.000	459.505	868.739	1227.701	1536.391	1794.808	2002.955	2164.513	2283.169	2351.554	2369.666

STRESSES AT SPAN TWENTIETH POINTS - KIPS PER SQ.IN.

LOADS		BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	TOP	0.000	0.243	0.461	0.653	0.819	0.960	1.075	1.165	1.229	1.267	1.280
	BOT	0.000	-0.199	-0.378	-0.535	-0.672	-0.787	-0.882	-0.955	-1.007	-1.039	-1.049
TOTAL NONCOMP. D.L.	TOP	0.000	0.516	0.979	1.388	1.744	2.047	2.296	2.493	2.635	2.725	2.761
	BOT	0.000	-0.423	-0.802	-1.138	-1.430	-1.678	-1.883	-2.044	-2.161	-2.234	-2.264
TOTAL COMP.D.L.+L.L.	TOP	0.000	0.128	0.242	0.341	0.425	0.495	0.549	0.591	0.622	0.639	0.640
	BOT	0.000	-0.296	-0.558	-0.787	-0.981	-1.141	-1.267	-1.363	-1.435	-1.472	-1.476
TOTAL COMP.+NONCOMP.	TOP	0.000	0.645	1.221	1.729	2.170	2.542	2.846	3.084	3.258	3.364	3.401
	BOT	0.000	-0.719	-1.361	-1.925	-2.411	-2.819	-3.150	-3.407	-3.596	-3.707	-3.740

SHEARS AT SPAN TWENTIETH POINTS - KIPS

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	25.109	22.598	20.087	17.577	15.066	12.555	10.044	7.533	5.022	2.511	0.000
UNIFORM D.L. NON-C.	27.185	24.467	21.748	19.030	16.311	13.593	10.874	8.156	5.437	2.719	0.000
CONCENTRATED P-LOADS	3.200	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935	0.935
UNIFORM D.L. COMP.	17.018	15.316	13.614	11.912	10.211	8.509	6.807	5.105	3.404	1.702	0.000
LIVE LOAD + IMPACT	47.249	40.033	37.810	35.575	33.325	31.060	28.779	26.480	24.163	21.825	19.466
TOTAL D.L. + L.L.	119.762	103.349	94.196	85.029	75.848	66.652	57.439	48.209	38.961	29.692	20.401

BEAM PROPERTIES

NON-COMPOSITE BEAM PROPERTIES							COMPOSITE BEAM PROPERTIES						
I	YT	YB	ST	SB	A	W	I	YT	YB	ST	SB	A	QS
125390.3	24.727	20.273	5071.1	6185.0	559.50	0.583	306973.3	13.614	31.386	22549.5	9780.6	907.55	6217.50

STRAND AND MISC. DATA

MAX # STRDS	ACT # STRDS	MIN # STRDS	E @ C.L.	E @ END	PS	ASE	NS(EACT-EEND)	BPI	BPF	TPI	TPF
38	32	26	12.805	10.805	0.964	2.00	64.000	936.885	789.712	42.459	52.647

MOMENTS(K-FT.) AND SHEARS(KIPS), STIRRUP SPACING, STRESSES(KSI) AT SPAN TWENTIETH POINTS

LOADS		BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
ULT. MOMENT REQD.		0.000	746.245	1409.447	1989.607	2486.723	2900.797	3231.828	3487.800	3676.696	3792.549	3805.360
ULT. MOMENT FURN.		465.945	3685.054	4778.596	4802.225	4825.855	4849.486	4873.117	4896.749	4920.382	4944.016	4967.650
1.2*CRACKING MOMENT		1390.076	3403.218	3293.094	3198.687	3119.998	3057.026	3009.771	2978.235	2962.415	2962.313	2977.928
DIST. TO N.A.(IN.)		0.439	3.587	4.692	4.693	4.694	4.695	4.695	4.696	4.697	4.698	4.699
MAX STEEL RATIO		0.009	0.070	0.091	0.091	0.090	0.090	0.090	0.089	0.089	0.089	0.088
ULT. COMP. SHEAR		124.497	106.649	99.622	92.566	85.479	78.359	71.204	64.011	56.778	49.501	42.177
ULT. TOTAL SHEAR		196.641	169.050	155.225	141.370	127.485	113.567	99.613	85.622	71.590	57.515	43.393
BEAM SHEAR CAPACITY		106.509	175.518	193.639	192.048	136.251	102.258	79.046	61.801	48.110	44.887	45.083
MIN. STIRRUP AREA		0.517	0.070	0.070	0.070	0.070	0.108	0.142	0.149	0.140	0.084	0.070
STRP.(#5) SPAC.(IN.)		12.000*	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000
PRESTRESS STRESS	TOP	-0.078	-0.387	-0.426	-0.465	-0.504	-0.543	-0.582	-0.621	-0.659	-0.698	-0.737
	BOT	0.794	3.568	3.600	3.632	3.664	3.696	3.728	3.759	3.791	3.823	3.855
INITIAL STRESSES	TOP	-0.078	-0.144	0.035	0.188	0.315	0.417	0.493	0.544	0.569	0.569	0.543
	BOT	0.794	3.369	3.222	3.097	2.992	2.909	2.846	2.804	2.784	2.784	2.806
FINAL STRESSES	TOP	-0.078	0.318	0.842	1.337	1.745	2.084	2.356	2.561	2.702	2.775	2.780
	BOT	0.794	2.288	1.674	1.137	0.677	0.296	-0.008	-0.238	-0.400	-0.484	-0.490
FINAL # TOP STRANDS		0.533	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
FINAL # BOT STRANDS		7.989	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000
DEVELOP. # TOP STRDS		0.181	1.514	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
DEVELOP. # BOT STRDS		2.708	22.717	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000

* - FOR "ASE" REQUIREMENTS WITHIN A MAXIMUM DISTANCE OF 8.883" (D/4) FROM THE END OF BEAM USE EITHER
4 LOCATIONS OF 2-#5 STIRRUPS AT A MAXIMUM SPACING OF 2.294" OR
3 LOCATIONS OF 2-#6 STIRRUPS AT A MAXIMUM SPACING OF 3.441" USING 2" CL. FROM END OF BEAM

DEFLECTIONS(INCHES) AT CENTER LINE OF SPAN

BEAM	WDLNC	P-LOADS	WDLC	INITIAL	FINAL	SIDEWALK	TRUCK	LANE	MILITARY	RAILROAD	PRESTR.	CAMBER
1.137	1.231	0.068	0.315	-1.418	0.596	0.000	0.386	0.300	0.274	0.000	-2.554	-2.435

MAXIMUM, ACTUAL AND MINIMUM ECCENTRICITIES(INCHES)AT SPAN TWENTIETH POINTS

ITEM	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
MAX ECC, SIT= -226	14.173	11.444	12.549	13.523	14.367	15.082	15.666	16.121	16.446	16.640	16.705
MAX ECC, SIB= 3420	83.242	11.346	12.450	13.424	14.269	14.983	15.568	16.022	16.347	16.542	16.607
INITIAL ECCENTRICITY	10.831	11.029	11.226	11.423	11.621	11.818	12.015	12.213	12.410	12.607	12.805
FINAL ECCENTRICITY	10.831	11.029	11.226	11.423	11.621	11.818	12.015	12.213	12.410	12.607	12.805
MIN ECC, SFT= 2800	-54.235	-3.913	-0.442	2.618	5.268	7.509	9.340	10.773	11.819	12.456	12.683
MIN ECC, SFB= -501	-24.896	-9.459	-4.748	-0.608	2.961	5.959	8.386	10.275	11.660	12.474	12.718

```
*  SPAN  *  *  *  *  *  *  *  *  *  *  *  *  *  *  * ECCENTRICITY PLOT (INCHES) *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
                                                                 1    1    1    1    1    1    1    1    1    1    2    2    2    2    2
* POINTS *0....1....2....3....4....5....6....7....8....9....0....1....2....3....4....5....6....7....8....9....0....1....2....3....4
* 0.00 L *                                                     +                 *
* 0.05 L *                                                      + *
* 0.10 L *                                                       *     *
* 0.15 L *             *                                         +         *
* 0.20 L *                         *                              +            *
* 0.25 L *                                     *                   *               *
* 0.30 L *                                             *            +                 *
* 0.35 L *                                                     *      *                  *
* 0.40 L *                                                        *  *                    *
* 0.45 L *                                                           *+                    *
* 0.50 L *                                                             *                   *
*  *  *  *      * = MAX. AND MIN. ECCENTRICITY, + = ACTUAL ECCENTRICITY, HOLD-DOWN POINT IS  0.00 FEET FROM CENTER LINE OF SPAN

   STRAND ARRANGEMENT (TOP STRANDS NOT SHOWN)=  2

                    R R
              + + + R R + + +
            + + + + R R + + + +
            + + + + R R + + + +
```

```
*  SPAN  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *STRAND ARRANGEMENT (INCHES) *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
                                 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 6
* POINTS *0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0

*  END   *      +   +   +       R   R   R   R
*  BRNG  *      +   +   +       R   R   R   R

* 0.05 L *      +   +   +     R   R   R   R

* 0.10 L *      +   +   +    R   R   R   R

* 0.15 L *      +   +   + R   R   R   R

* 0.20 L *      +   +   +R   R   R   R

* 0.25 L *      +   +   R   R   R   R

* 0.30 L *      +   + R + R   R   R

* 0.35 L *      +   +R  +R   R   R

* 0.40 L *      +  R+  R+  R   R

* 0.45 L *      + R + R + R   R

* 0.50 L *      R   R   R   R
```

FINAL STRAND ARRANGEMENT AT END

ROW	TOTAL #STRDS	VER DIST-STRAIGHT STRDS	#RAISED STRDS	VER DIST-RAISED STRDS	#DEB 1	DEB LENGTH 1	#DEB 2	DEB LENGTH 2
1	10	3.000	2	11.000	0	0.00L	0	0.00L
2	10	5.000	2	13.000	0	0.00L	0	0.00L
3	8	7.000	2	15.000	0	0.00L	0	0.00L
4	2	9.000	2	17.000	0	0.00L	0	0.00L
TOP	2	42.500						

INITIAL TRANSFER LENGTH = 2.597 FT

FINAL TRANSFER LENGTH = 2.189 FT

DEVELOPMENT LENGTH = 6.459 FT

LOSSES (KSI)

TOP STRANDS INITIAL LOSSES= 15.497 TOP STRANDS ADDITIONAL LOSSES= 29.376 TOP STRANDS FINAL LOSSES= 44.873

BOT STRANDS INITIAL LOSSES= 15.497 BOT STRANDS ADDITIONAL LOSSES= 29.376 BOT STRANDS FINAL LOSSES= 44.873

TOTAL LOSSES FOR ALL STRANDS= 44.873

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Beam Design Output - Span 3
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS OR DESIGN OF SIMPLE SPAN PRESTRESSED BEAMS
REVISED: JUNE 26, 2008

PROB. NO. INT.

✓ JCR 10-13-2009

255717 I-575 over Town Lake Parkway (SPAN 3)

SPAN DATA

D/A	LL CLASS	LL SK.	LENGTH	DFM	DFV	DFD	WDLNC	WDLC	WSWK	F'C	F'CI	NPL	SIT	SFR	SFTE
D	HS20	0 0 0	50.557	1.061	1.314	0.625	0.624	0.394	0.000	6.000	5.200	3	-0.216	-0.465	-0.001

BEAM DATA

BEAM DIMENSIONS								* COMPOSITE SLAB			* (E X 1,000,000)		* STIRRUP	DECK	
WT	HT	FT	WS	HB	WB	FB	DB	* WF	TF	DF	* E BEAM	E SLAB	* SIZE	PANEL	FSY
14.00	4.00	3.00	8.00	5.00	18.00	5.00	28.00	70.00	7.000	0.750	4.70	3.59	5	0	60.

STRAND DATA

TYPE	NST	XDIST	ACTUAL NO. OR MAX. NO. OF STRANDS PER ROW																			ASB	AST	DIAM	TCL	BCL	SPAC.
0	2	0.5830	8	6	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0.1670	0.1670	0.500	2.50	3.00	2.00

RBFFU	BFFU	IBLOSS	FBLOSS	RTFFU	TFFU	ITLOSS	FTLOSS	WTC	LOW LAX	ITLENGTH	FTLENGTH	DLENGTH
.75	270.00	0.00	0.00	.75	270.00	0.00	0.00	.150	1	0.00	0.00	0.00

DEBONDING DATA

DEBOND ACT. # AND LENGTH OR MAX. # AND LENGTH OF STRANDS DEBONDED PER ROW

0 0 .00

0 .00 0 .00

DRAPE DATA

DRAPED	MAX RAISE	HOLD DOWN FT.	ACT. # OR MAX. # OF STRANDS DRAPED PER ROW																		
1	0.00	.00	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0

P-LOADS

XP1	P1	XP2	P2	XP3	P3	XP4	P4	XP5	P5
0.000	4.158	25.279	1.090	50.557	1.377				

PRESTRESSED BEAM DESIGN - OUTPUT DATA FOR PROBLEM NO. INT. 255717 I-575 over Town Lake Parkway

MOMENTS AT SPAN TWENTIETH POINTS - KIP-FEET

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	0.000	20.994	39.778	56.352	70.716	82.871	92.815	100.550	106.074	109.389	110.494
UNIFORM D.L. NON-C.	0.000	37.880	71.773	101.678	127.596	149.527	167.470	181.426	191.394	197.375	199.369
CONCENTRATED P-LOADS	0.000	1.378	2.755	4.133	5.511	6.888	8.266	9.644	11.021	12.399	13.777
UNIFORM D.L. COMP.	0.000	23.918	45.318	64.201	80.565	94.413	105.742	114.554	120.848	124.625	125.884
LIVE LOAD + IMPACT	0.000	94.949	177.493	247.631	305.364	350.692	383.614	407.948	427.511	434.668	429.420
TOTAL D.L. + L.L.	0.000	179.118	337.117	473.995	589.752	684.390	757.907	814.121	856.848	878.456	878.943

STRESSES AT SPAN TWENTIETH POINTS - KIPS PER SQ.IN.

LOADS		BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	TOP	0.000	0.144	0.273	0.387	0.486	0.569	0.638	0.691	0.729	0.752	0.759
	BOT	0.000	-0.122	-0.231	-0.327	-0.411	-0.481	-0.539	-0.584	-0.616	-0.636	-0.642
TOTAL NONCOMP. D.L.	TOP	0.000	0.414	0.785	1.114	1.401	1.644	1.845	2.004	2.120	2.193	2.224
	BOT	0.000	-0.350	-0.664	-0.942	-1.184	-1.390	-1.560	-1.694	-1.792	-1.854	-1.880
TOTAL COMP.D.L.+L.L.	TOP	0.000	0.074	0.138	0.193	0.239	0.276	0.303	0.324	0.340	0.347	0.344
	BOT	0.000	-0.349	-0.655	-0.916	-1.134	-1.308	-1.438	-1.536	-1.612	-1.644	-1.632
TOTAL COMP.+NONCOMP.	TOP	0.000	0.488	0.924	1.308	1.640	1.920	2.149	2.328	2.460	2.540	2.568
	BOT	0.000	-0.699	-1.319	-1.859	-2.318	-2.698	-2.998	-3.230	-3.404	-3.498	-3.512

SHEARS AT SPAN TWENTIETH POINTS - KIPS

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
UNIFORM D.L. BEAM	8.742	7.868	6.994	6.120	5.245	4.371	3.497	2.623	1.748	0.874	0.000
UNIFORM D.L. NON-C.	15.774	14.196	12.619	11.042	9.464	7.887	6.310	4.732	3.155	1.577	0.000
CONCENTRATED P-LOADS	4.703	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.545
UNIFORM D.L. COMP.	9.960	8.964	7.968	6.972	5.976	4.980	3.984	2.988	1.992	0.996	0.000
LIVE LOAD + IMPACT	45.216	37.693	35.338	32.980	30.557	28.074	25.592	23.109	20.626	18.144	15.958
TOTAL D.L. + L.L.	84.394	69.256	63.464	57.658	51.787	45.857	39.927	33.997	28.066	22.157	16.503

BEAM PROPERTIES

* * * * * NON-COMPOSITE BEAM PROPERTIES * * * * *							*	* * * * * * * COMPOSITE BEAM PROPERTIES * * * * * * *						
I	YT	YB	ST	SB	A	W	*	I	YT	YB	ST	SB	A	QS
26495.4	15.173	12.827	1746.3	2065.5	332.00	0.346	*	94422.2	4.876	23.124	19365.1	4083.3	706.60	3418.53

STRAND AND MISC. DATA

MAX # STRDS *	ACT # STRDS *	MIN # STRDS *	E @ C.L. *	E @ END *	PS *	ASE *	NS(EACT-EEND) *	BPI *	BPF *	TPI *	TPF
20	20	18	6.177	3.777	1.011	1.24	48.000	559.638	465.427	42.182	51.714

MOMENTS(K-FT.) AND SHEARS(KIPS), STIRRUP SPACING, STRESSES(KSI) AT SPAN TWENTIETH POINTS

LOADS	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
ULT. MOMENT REQD.	0.000	315.146	592.084	830.815	1031.337	1193.651	1317.757	1411.926	1484.424	1518.719	1514.804
ULT. MOMENT FURN.	177.504	918.813	1616.478	1867.507	1885.058	1902.610	1920.163	1937.717	1955.273	1972.830	1990.388
1.2*CRACKING MOMENT	515.839	1218.294	1178.913	1146.796	1121.944	1104.357	1094.033	1090.975	1095.181	1106.652	1125.387
DIST. TO N.A.(IN.)	0.293	1.542	2.753	3.178	3.179	3.180	3.181	3.182	3.183	3.184	3.185
MAX STEEL RATIO	0.009	0.049	0.086	0.098	0.098	0.097	0.096	0.095	0.095	0.094	0.093
ULT. COMP. SHEAR	110.917	93.300	86.925	80.522	73.977	67.302	60.628	53.954	47.280	40.652	34.575
ULT. TOTAL SHEAR	148.901	122.692	113.130	103.540	93.807	83.946	74.085	64.224	54.363	44.547	35.284
BEAM SHEAR CAPACITY	77.771	135.701	149.327	121.273	87.441	66.890	52.959	42.602	34.337	30.408	30.655
MIN. STIRRUP AREA	0.655	0.080	0.080	0.080	0.121	0.189	0.208	0.203	0.182	0.132	0.080
STRP.(#5) SPAC.(IN.)	10.500*	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000	21.000
PRESTRESS STRESS TOP	0.115	0.425	0.342	0.258	0.174	0.091	0.007	-0.076	-0.160	-0.243	-0.327
BOT	0.682	3.097	3.168	3.238	3.309	3.379	3.450	3.521	3.591	3.662	3.733
INITIAL STRESSES TOP	0.115	0.569	0.615	0.645	0.660	0.660	0.645	0.615	0.569	0.509	0.433
BOT	0.682	2.975	2.937	2.911	2.898	2.898	2.911	2.937	2.975	3.026	3.091
FINAL STRESSES TOP	0.115	0.841	1.208	1.522	1.785	1.996	2.155	2.264	2.327	2.338	2.296
BOT	0.682	1.876	1.316	0.835	0.434	0.112	-0.129	-0.302	-0.417	-0.452	-0.408
FINAL # TOP STRANDS	0.542	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
FINAL # BOT STRANDS	4.880	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000
DEVELOP. # TOP STRDS	0.178	0.951	1.723	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000
DEVELOP. # BOT STRDS	1.604	8.557	15.511	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000

* - FOR "ASE" REQUIREMENTS WITHIN A MAXIMUM DISTANCE OF 4.737" (D/4) FROM THE END OF BEAM USE EITHER
3 LOCATIONS OF 2-#5 STIRRUPS AT A MAXIMUM SPACING OF 1.369" OR
2 LOCATIONS OF 2-#6 STIRRUPS AT A MAXIMUM SPACING OF 2.737" USING 2" CL. FROM END OF BEAM

DEFLECTIONS(INCHES) AT CENTER LINE OF SPAN

BEAM	WDLNC	P-LOADS	WDLC	INITIAL	FINAL	SIDEWALK	TRUCK	LANE	MILITARY	RAILROAD	PRESTR.	CAMBER
0.409	0.737	0.041	0.131	-0.840	0.279	0.000	0.252	0.161	0.200	0.000	-1.249	-1.470

MAXIMUM, ACTUAL AND MINIMUM ECCENTRICITIES(INCHES)AT SPAN TWENTIETH POINTS

ITEM	BRNG	0.05 L	0.10 L	0.15 L	0.20 L	0.25 L	0.30 L	0.35 L	0.40 L	0.45 L	0.50 L
MAX ECC, SIT= -216	7.950	6.272	6.634	6.954	7.231	7.466	7.658	7.807	7.913	7.977	7.999
MAX ECC, SIB= 3120	39.745	4.548	4.910	5.230	5.507	5.742	5.934	6.083	6.189	6.253	6.275
INITIAL ECCENTRICITY	3.831	4.066	4.301	4.535	4.770	5.004	5.239	5.474	5.708	5.943	6.177
FINAL ECCENTRICITY	3.831	4.066	4.301	4.535	4.770	5.004	5.239	5.474	5.708	5.943	6.177
MIN ECC, SFT= 2400	-24.633	-1.198	0.274	1.571	2.693	3.639	4.411	5.016	5.461	5.732	5.827
MIN ECC, SFB= -465	-13.072	-5.285	-2.811	-0.656	1.181	2.698	3.897	4.821	5.516	5.892	5.949

```
*  SPAN  *  *  *  *  *  *  *  *  *  *  *  *  *  *  * ECCENTRICITY PLOT (INCHES) *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
                                                                  1    1    1    1    1    1    1    1    1    1    2    2    2    2    2
* POINTS *0....1....2....3....4....5....6....7....8....9....0....1....2....3....4....5....6....7....8....9....0....1....2....3....4
* 0.00 L *                   *                   *
* 0.05 L *                    *  *
* 0.10 L * *                   *  *
* 0.15 L *        *             *  *
* 0.20 L *             *          *   *
* 0.25 L *                 *      *   *
* 0.30 L *                     *   *   *
* 0.35 L *                        * *  *
* 0.40 L *                           *+ *
* 0.45 L *                            *+*
* 0.50 L *                             *+
*  *  *  *      * = MAX. AND MIN. ECCENTRICITY, * = ACTUAL ECCENTRICITY, HOLD-DOWN POINT IS  0.00 FEET FROM CENTER LINE OF SPAN

   STRAND ARRANGEMENT (TOP STRANDS NOT SHOWN)=  2

                  * R R *
                * * R R * *
              * * * R R * * *
```

```
*  SPAN  * * * * * * * * * * * * * * *STRAND ARRANGEMENT (INCHES) * * * * * * * * * * * * * * * * * * * * *
                                     1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5 5 5 5 5 5 5 5 5 5 6
* POINTS *0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0.1.2.3.4.5.6.7.8.9.0

*  END   *     +   +   +      R   R   R
*  BRNG  *     +   +   +      R   R   R

* 0.05 L *     +   +   +    R   R   R

* 0.10 L *     +   +   +   R   R   R

* 0.15 L *     +   +   + R   R   R

* 0.20 L *     +   +  +R   R   R

* 0.25 L *     +   +   R   R   R

* 0.30 L *     +   + R + R   R

* 0.35 L *     +   +R  +R   R

* 0.40 L *     +  R+  R+  R

* 0.45 L *     + R + R + R

* 0.50 L *     R   R   R
```

FINAL STRAND ARRANGEMENT AT END

ROW	TOTAL #STRDS	VER DIST-STRAIGHT STRDS	#RAISED STRDS	VER DIST-RAISED STRDS	#DEB 1	DEB LENGTH 1	#DEB 2	DEB LENGTH 2
1	8	3.000	2	11.000	0	0.00L	0	0.00L
2	6	5.000	2	13.000	0	0.00L	0	0.00L
3	4	7.000	2	15.000	0	0.00L	0	0.00L
TOP	2	25.500						

INITIAL TRANSFER LENGTH = 2.566 FT

FINAL TRANSFER LENGTH = 2.150 FT

DEVELOPMENT LENGTH = 6.544 FT

LOSSES (KSI)

TOP STRANDS INITIAL LOSSES= 16.326 TOP STRANDS ADDITIONAL LOSSES= 31.341 TOP STRANDS FINAL LOSSES= 47.667

BOT STRANDS INITIAL LOSSES= 16.326 BOT STRANDS ADDITIONAL LOSSES= 31.341 BOT STRANDS FINAL LOSSES= 47.667

TOTAL LOSSES FOR ALL STRANDS= 47.667

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Substructure Design Input	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	Excel	2003

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience prior the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not complete and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work activity, a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Substructure Design Input calculations are included for bents 1&4, bent 2, and bent 3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	11	11	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bent Design Input - Bents 1&4
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

END BENT REACTIONS: BENTS 1

APPROACH SLAB LENGTH =	30.00	feet	CAP DEPTH =	2.00	ft
			CAP WIDTH =	3.00	ft
SKEW =	83.67	degrees			
BEAM SPACING =	5.875	feet			
SPACING ALONG SKEW =	5.911	feet			
DEAD LOAD REACTION =	31.901	kips			
DL OF APPROACH =	7.341	kips			
WEIGHT OF CAP =	5.32	kips			
TOTAL DL =	44.56	kips			
LIVE LOAD =	33.40	kips	Pile Type:	**Steel HP**	
TOTAL PILE REACTION =	**77.96**	**kips =**	**39**	**tons**	**Use--> HP10x42**

END BENT REACTIONS: BENT 4

APPROACH SLAB LENGTH =	30.00	feet	CAP DEPTH =	2.00	ft
			CAP WIDTH =	3.00	ft
SKEW =	79.94	degrees			
BEAM SPACING =	5.833	feet			
SPACING ALONG SKEW =	5.925	feet			
DEAD LOAD REACTION =	39.183	kips			
DL OF APPROACH =	7.29	kips			
WEIGHT OF CAP =	5.33	kips			
TOTAL DL =	51.80	kips			
LIVE LOAD =	35.19	kips	Pile Type:	**Steel HP**	
TOTAL PILE REACTION =	**87.00**	**kips =**	**43**	**tons**	**Use--> HP10x42**

WINGWALL LENGTH CALCULATIONS:

BENT	**1**		**4**	
SKEW =	83.67	degrees	79.94	degrees
"D" =	9.089	IN	9.334	IN
BEARING PAD THICKNESS =	2.500	IN	2.500	IN
CAP DEPTH =	2.00	FT	2.00	FT
BEAM DEPTH =	28	IN	28	IN
BERM =	2	FT	2	FT
CAP WIDTH =	3	FT	3	FT
H =	5.30	FT	5.32	FT
WINGWALL HEIGHT USED =	5.83	FT	5.83	FT
THEORETICAL WINGWALL LENGTH =	8.65	FT	8.77	FT
ACTUAL WING WALL LENGTH =	9.00	FT	9.00	FT
NUMBER OF PILES PER WINGWALL =	0		0	

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bent Design Input - Bent 2
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 2 - EXP LT & EXP RT

GENERAL REQUIREMENTS:

Live Load cases: See GDOT Program BRLLCA
Skew Angle: ✓ 82.74 * FROM CL BRIDGE
7.26 * FROM CL BENT

Is Bent Fix "F" or Exp. "E"? E F = Fix E = Exp

Concrete Strength:	✓ 3500	psi	
Rebar Strength:	60000	psi	
Ec =	✓ 3587	ksi	AASHTO 8.7.1
Es =	29000	ksi	AASHTO 8.7.2
Allowable Steel Stress:	✓ 24000	psi	AASHTO 8.15.2.2
n = Ec/Es =	8		AASHTO 8.15.3.4
Cap Bar size:	✓ 11	#	
Stirrup Size:	✓ 5	#	
Column Steel Ratios:	✓ 1	% min.	
	✓ 8	% max.	
Edge of Column to main rebar:	✓ 2.5	in.	

Impact Factor

	Length (ft)	Impact
LEFT SPAN	42.00	1.2994
RIGHT SPAN	88.00	1.2347
	Avg. Impact =	1.2671

Soil Weight ✓ 0.120 kcf

Columns:
TYPE ✓ S (S-SQUARE or RECTANGULAR, C-CIRCULAR, P-PILES)

Pile Spacing: 3.00 ft. MIN ✓ 5 ft. MAX
✓ 1.00 ft. EMBED 1.5 ft. EDGE

Pile Capacity:
TYPE ✓ 14 HP 73
ALLOWABLE LOAD ✓ 192 KIPS = ✓ 96 TONS
UPLIFT ✓ 0 KIPS

WIND ON SUPERSTRUCTURE

AASHTO 3.15.2.1.1

	Left Span	Rigtht Span			
Parapet Height =	32	32	in.		
Beam Height =	✓ 28	✓ 45	in.		
'D' or 'H' Dimension =	10	10	in.		
Beam + Coping + Slab =	3.17	4.58	ft.		
Total Height =	5.83	7.25	ft.		
Span Lengths =	42.00	88.00	ft.	TOTAL	
Wind Force Area =	122.5	319.0	ft.^{2}	✓ 442	ft.^{2}
Height of Cap =	✓ 3.50	✓ 3.50	ft.		
Wind Force Arm =	5.178	ft.			

WIND ON SUBSTRUCTURE:

AASHTO 3.15.2.2

Wind Force =	✓ 0.040	ksf	PARA. & PERP.
Length of Cap =	✓ 27.00	ft.	
Width of Cap =	✓ 3.50	ft.	
CG of Cap ELEV =	✓ 902.91		
Ground Line ELEV=	✓ 885.50		
Depth to Point of Fixity =	2.00		
Pt. of Fixity ELEV =	883.50		
Bot. Cap to Pt. of Fixity =	17.66	ft.	
Design Height of Column =	19.41	ft.	CG Cap to Pt. of Fixity
Exposed Height of Column =	15.66	ft.	
Width of Column =	✓ 3.00	ft.	
Depth of Column =	3.00	ft.	
No. of Columns =	✓ 2	columns	

	PARA.	PERP.	
M_{CAP} =	9.51	73.37	k-ft.
M_{COL} =	18.47	36.95	k-ft.
M_{TOTAL} =	27.98	110.31	k-ft.
P_T =	1.442	5.68	kips

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 2 - EXP LT & EXP RT

WIND ON LIVE LOAD — AASHTO 3.15.2.1.2

Length =	65.00	ft.			
APT = APL =	12.333	ft.	Use-->	12.333	ft.

TRACTION & CENTRIFGUL FORCE: For One lane — AASHTO 3.9 & 3.10

			(SPEED)	70 mph	D	2 (degrees)
LF =	0.000	k	LF =	7.366 k		

TEMPERATURE FORCE: — AASHTO 3.16

Friction Force due to Temperature:

Δ = Temp. Deflection = ALPHA x Length x Change in Temp.

T_{RISE} =	30	* T_{FALL} =	40	* (Fahrenheit)
Material (C or S):	C	ALPHA =	0.000006	/* (Fahrenheit)

Force in Pad = Fs = [G x L x W x Deflection] / (Telas)

	LEFT	RIGHT	
Expansion Length =	42.00	88.00	ft
Δ =	0.121	0.253	in
G = Shear Modulus of Pad =	200	200	psi
L= Length of Pad =	10.00	10.00	in
W = Width of Pad =	18.00	16.00	in
Telas = Bearing Elastomer Depth =	2.500	2.500	in
Fs =	1.74	3.24	KIPS /pad
No. of Beams =	5	5	
Total Temperature Force =	8.71	16.22	kips @ top of seat
	9.49	17.68	kips @ center of cap
P_L =	9.418	17.54	kips
P_T =	1.200	2.23	kips

Difference =	P_L =	8.123	kips	AT CL CAP	
	P_T =	1.035	kips	AT CL CAP	
	P_L =	8.855	kips	AT CL CAP ---->	Use Total Lateral Force
	P_T =	1.128	kips	AT CL CAP	= PL + Equiv. Lateral Force from MDL due to eccentricity

Expansion of Concrete Cap =	**0.00018**	in/in	
Contraction of Concrete Cap =	**0.00044**	in/in	which includes 0.0002 for creep

STREAM FORCE: — AASHTO 3.18.1

100 yr Flood ELEV. =	0.00	ft.	
Point of Fixity =	19.41	ft.	
Bottom of Stream ELEV =	885.50	ft.	
Pt. of Fixity ELEV =	883.50		
V_{AVG} =	0	FPS @ 100 yr. Flood	
K =	1.4	for square ended piers	
$P_{AVG} = K * (V_{AVG})^2$ =	0.00	psf	AASHTO Eq. (3-4)
$P_{MAX} = 2 * P_{AVG}$ =	0.00	psf	

Piers Aligned with streaam flow:

P_S =	0.000	kips
M =	0.00	k/ft.
$P_{CL\ CAP}$ =	0.000	k

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 2 - EXP LT & EXP RT

DEAD LOAD: AASHTO 3.3

LENGTH = 27.00 feet

SKEW = 82.74 degrees

SPAN 1

BEAM	BEAM SPC.	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Add'l DL	DL
1		1.670	1.670	29.134	1.721	30.855
2	5.875	5.915	7.585	29.134	2.200	31.334
3	5.875	5.915	13.500	29.134	2.200	31.334
4	5.875	5.915	19.415	29.134	2.200	31.334
5	5.875	5.915	25.330	29.134	1.721	30.855
		1.670	27.000			
		27.000				
TOTAL						155.7
					CL Brg to CL Bent =	0.9063

L step	Add'l Height	Weight
4.627	1.42	1.721
5.915	1.42	2.200
5.915	1.42	2.200
5.915	1.42	2.200
4.627	1.42	1.721

SPAN 2

BEAM	BEAM SPC.	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Add'l DL	DL
1		1.670	1.670	72.489	0.000	72.489
2	5.854	5.915	7.585	72.489	0.000	72.489
3	5.854	5.915	13.500	72.489	0.000	72.489
4	5.854	5.915	19.415	72.489	0.000	72.489
5	5.854	5.915	25.330	72.489	0.000	72.489
		1.670	27.000			
		27.000				
TOTAL						362.4
					CL Brg to CL Bent =	0.9063
COMBINED LOADS						518.2

COLUMN = 1.500 FT - checking ¼ points on column

	POINT	MEMBER	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Add'l DL	DL	CHECK POINT
5.50	G1	1	3.830	1.670	101.623	1.721	103.344	1
	EC	1	3.080	4.750				2
	EC	2	0.750	6.250				3
	G2	2	1.335	7.585	101.623	2.200	103.823	4
16.00	G3	2	5.915	13.500	101.623	2.200	103.823	5
	G4	2	5.915	19.415	101.623	2.200	103.823	6
	EC	2	1.335	20.750				7
	EC	3	0.750	22.250				8
5.50	G5	3	3.080	25.330	101.623	1.721	103.344	9
				1.670				
			27.000					

ADDITIONAL DL MOMENT DUE TO ECCENTRICITY:

M_{DL} = 187.36 KIP-FT

(EQUIV. LONG FORCE) $F_{DL} = M_{DL} / H_{DESIGN\ OF\ COLUMN}$ = 9.65 KIP

(TOTAL LONG FORCE) $F_L = F_{DL} + P_{L\ TEMP}$ = 18.51 KIP

LIVE LOADS: AASHTO 3.4

	LEFT	RIGHT	
Span Lengths =	42.00	88.00	ft.

LIVE LOAD REACTION	64.24	KIPS	AXLE LOAD NO IMPACT	VERIFY !!!!
	67.60	KIPS	LANE LOAD NO IMPACT	
AVERAGE IMPACT	1.2671			
P-LOAD FOR BRLLCA INPUT	42.827	KIPS		

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bent Design Input - Bent 3
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 3 - FIX LT & EXP RT

GENERAL REQUIREMENTS:

Live Load cases:	See GDOT Program BRLLCA		
Skew Angle:	80.99	* FROM CL BRIDGE	
	9.01	* FROM CL BENT	
Concrete Strength:	3500	psi	
Rebar Strength:	60000	psi	
Ec =	3587	ksi	AASHTO 8.7.1
Es =	29000	ksi	AASHTO 8.7.2
Allowable Steel Stress:	24000	psi	AASHTO 8.15.2.2
n = Ec/Es =	8		AASHTO 8.15.3.4
Cap Bar size:	11	#	
Stirup Size:	5	#	
Column Steel Ratios:	1	% min.	
	8	% max.	
Edge of Column to main rebar:	2.5	in.	

Impact Factor

	Length (ft)	Impact
LEFT SPAN	88.00	1.2347
RIGHT SPAN	53.00	1.2809
	Avg. Impact =	1.2578

Soil Weight 0.120 kcf

Columns:
TYPE S (S-SQUARE or RECTANGULAR, C-CIRCULAR, P-PILES)

Pile Spacing: 3.00 ft. MIN 5 ft. MAX
1.00 ft. EMBED 1.5 ft. EDGE

Pile Capacity:

TYPE	14 HP 73			
ALLOWABLE LOAD	192	KIPS =	96	TONS
UPLIFT	0	KIPS		

WIND ON SUPERSTRUCTURE

AASHTO 3.15.2.1.1

	Left Span	Rigtht Span			
Parapet Height =	32	32	in.		
Beam Height =	45	28	in.		
'D' or 'H' Dimension =	10	10	in.		
Beam + Coping + Slab =	4.58	3.17	ft.		
Total Height =	7.25	5.83	ft.		
Span Lengths =	88.00	53.00	ft.	TOTAL	
Wind Force Area =	319.0	154.6	$ft.^2$	474	$ft.^2$
Height of Cap =	3.50	3.50	ft.		
Wind Force Arm =	5.144	ft.			

WIND ON SUBSTRUCTURE:

AASHTO 3.15.2.2

Wind Force =	0.040	ksf	PARA. & PERP.
Length of Cap =	27.00	ft.	
Width of Cap =	3.50	ft.	
CG of Cap ELEV =	905.05		
Ground Line ELEV=	885.50		
Depth to Point of Fixity =	2.00		
Pt. of Fixity ELEV =	883.50		
Bot. Cap to Pt. of Fixity =	19.80	ft.	
Design Height of Column =	21.55	ft.	CG Cap to Pt. of Fixity
Exposed Height of Column =	17.80	ft.	
Width of Column =	3.00	ft.	
Depth of Column =	3.00	ft.	
No. of Columns =	2	columns	

	PARA.	PERP.	
M_{CAP} =	10.56	81.46	k-ft.
M_{COL} =	23.28	46.56	k-ft.
M_{TOTAL} =	33.84	128.02	k-ft.
P_f =	1.570	5.94	kips

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 3 - FIX LT & EXP RT

WIND ON LIVE LOAD — AASHTO 3.15.2.1.2

Length =	70.50	ft.			
APT = APL =	12.333	ft.	Use-->	12.333	ft.

TRACTION & CENTRIFGUL FORCE: For One lane — AASHTO 3.9 & 3.10

			(SPEED)	70 mph	D	2 (degrees)
LF =	**3.716**	k	LF =	7.429 k		

TEMPERATURE FORCE: — AASHTO 3.16

Friction Force due to Temperature:

Δ = Temp. Deflection = ALPHA x Length x Change in Temp.

T_{RISE} =	30	*	T_{FALL} =	40	* (Fahrenheit)
Material (C or S):	C		ALPHA =	0.000006	/* (Fahrenheit)

Force in Pad = Fs = [G x L x W x Deflection] / (Telas)

	LEFT	RIGHT	
Expansion Length =	0.00	53.00	ft
Δ =	0.000	0.153	in
G = Shear Modulus of Pad =	200	200	psi
L= Length of Pad =	10.00	10.00	in
W = Width of Pad =	16.00	16.00	in
Telas = Bearing Elastomer Depth =	2.500	2.500	in
Fs =	0.00	1.95	KIPS /pad
No. of Beams =	5	5	
Total Temperature Force =	0.00	9.77	kips @ top of seat
	0.00	10.56	kips @ center of cap
P_L =	0.000	10.43	kips
P_T =	0.000	1.65	kips

Difference =	P_L =	10.432	kips	AT CL CAP	
	P_T =	1.654	kips	AT CL CAP	
	P_L =	11.279	kips	AT CL CAP --->	Use Total Lateral Force
	P_T =	1.789	kips	AT CL CAP	= PL + Equiv. Lateral Force from MDL due to eccentricity

Expansion of Concrete Cap =	**0.00018**	in/in	
Contraction of Concrete Cap =	**0.00044**	in/in	which includes 0.0002 for creep

STREAM FORCE: — AASHTO 3.18.1

100 yr Flood ELEV. =	0.00	ft.	
Point of Fixity =	21.55	ft.	
Bottom of Stream ELEV =	885.50	ft.	
Pt. of Fixity ELEV =	883.50		
V_{AVG} =	0	FPS @ 100 yr. Flood	
K =	1.4	for square ended piers	
$P_{AVG} = K * (V_{AVG})^2$ =	0.00	psf	AASHTO Eq. (3-4)
$P_{MAX} = 2 * P_{AVG}$ =	0.00	psf	

Piers Aligned with streaam flow:

P_S =	0.000	kips
M =	0.00	k-ft.
$P_{CL\ CAP}$ =	0.000	k

BRIDGE: **I-575 over Towne Lake Parkway**
COUNTY: **CHEROKEE**
P.I. NO: **713640**
PROJECT: **NH000-0575-01(028)**

J.B. TRIMBLE, INC.

JOB NO: **255717**
DESIGNED BY: **AE**
CHECKED BY: **JCR**

PIER DESIGN CALCULATIONS

BENT 3 - FIX LT & EXP RT

DEAD LOAD: AASHTO 3.3

LENGTH = 27.00 feet

SKEW = 80.99 degrees

SPAN 2

BEAM	BEAM SPC.	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Addl DL	DL
1		1.670	1.670	72.489	0.000	72.489
2	5.875	5.915	7.585	72.489	0.000	72.489
3	5.875	5.915	13.500	72.489	0.000	72.489
4	5.875	5.915	19.415	72.489	0.000	72.489
5	5.875	5.915	25.330	72.489	0.000	72.489
		1.670	27.000			
		27.000			TOTAL	362.4
					CL Brg to CL Bent =	0.9063

SPAN 3

BEAM	BEAM SPC.	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Addl DL	DL
1		1.670	1.670	36.403	1.721	38.124
2	5.833	5.915	7.585	36.403	2.200	38.603
3	5.833	5.915	13.500	36.403	2.200	38.603
4	5.833	5.915	19.415	36.403	2.200	38.603
5	5.833	5.915	25.330	36.403	1.721	38.124
		1.670	27.000			
		27.000			TOTAL	192.1
					CL Brg to CL Bent =	0.9063
						554.5

L step	Addl Height	Weight
4.627	1.42	1.721
5.915	1.42	2.200
5.915	1.42	2.200
5.915	1.42	2.200
4.627	1.42	1.721

COMBINED LOADS

COLUMN = 1.500 FT - checking ¼ points on column

	POINT	MEMBER	DISTANCE BETWEEN	DISTANCE ALONG	R dl	Addl DL	DL	CHECK POINT
	G1	1	3.830	1.670	108.893	1.721	110.613	1
5.50	EC	1	3.080	4.750				2
	EC	2	0.750	6.250				3
	G2	2	1.335	7.585	108.893	2.200	111.092	4
16.00	G3	2	5.915	13.500	108.893	2.200	111.092	5
	G4	2	5.915	19.415	108.893	2.200	111.092	6
	EC	2	1.335	20.750				7
	EC	3	0.750	22.250				8
5.50	G5	3	3.080	25.330	108.893	1.721	110.613	9
				1.670				
			27.000					

ADDITIONAL DL MOMENT DUE TO ECCENTRICITY:

M_{DL} = 154.42 KIP-FT

(EQUIV. LONG FORCE) $F_{EL} = M_{DL} / H_{DESIGN\ OF\ COLUMN}$ = 7.17 KIP

(TOTAL LONG FORCE) $F_L = F_{EL} + P_{L\ TEMP}$ = 18.44 KIP

LIVE LOADS: AASHTO 3.4

	LEFT	RIGHT	
Span Lengths =	88.00	53.00	ft.

LIVE LOAD REACTION	64.80	KIPS	AXLE LOAD NO IMPACT	VERIFY !!!
	71.12	KIPS	LANE LOAD NO IMPACT	
AVERAGE IMPACT	1.2578			
P-LOAD FOR BRLLCA INPUT	44.728	KIPS		

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Live Load Case Output	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	GDOT BRLLCA	06/26/2008

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Live Load Case ouptput is included for bents 2&3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	5	5	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Live Load Case Output - Bent 2
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
SUMMARY OF THE LIVE LOAD CASE PROGRAM
REVISED: JUNE 26, 2008

I-575 OVER TOWNE LAKE PARKWAY - BENT 2

BRIDGE WIDTH	X1	X2	CENTER LINE DISTANCE	# OF BEAMS	REACTION FORCE	MAXIMUM # OF TRUCKS	# OF COLUMNS	COLUMN WIDTH	SKEW ANGLE
40.786	3.625	4.754	20.393	7	42.827	3	0	0.000	0

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
2.500	5.875	5.875	5.875	5.875	4.750	6.666													

	NO. OF TRUCKS	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9	BEAM 10
LL CASE 1	1	34.626	41.916	9.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 2	2	34.626	46.472	51.028	39.182	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 3	3	34.626	46.472	51.028	56.495	35.657	32.684	0.000	0.000	0.000	0.000
LL CASE 4	1	0.000	0.000	0.000	0.000	6.474	45.245	33.935	0.000	0.000	0.000
LL CASE 5	2	0.000	0.000	0.678	42.149	49.012	45.534	33.935	0.000	0.000	0.000
LL CASE 6	3	0.000	30.748	42.594	55.139	49.012	45.534	33.935	0.000	0.000	0.000
LL CASE 7	1	0.000	0.000	21.869	41.916	21.869	0.000	0.000	0.000	0.000	0.000
LL CASE 8	2	9.112	41.916	56.495	41.916	21.869	0.000	0.000	0.000	0.000	0.000
LL CASE 9	3	9.112	41.916	56.495	41.916	54.553	37.712	15.259	0.000	0.000	0.000
LL CASE 10	2	0.000	13.537	41.916	56.495	37.784	21.576	0.000	0.000	0.000	0.000
LL CASE 11	2	34.626	41.916	9.112	0.000	6.474	45.245	33.935	0.000	0.000	0.000
LL CASE 12	3	34.626	46.472	51.028	39.182	6.474	45.245	33.935	0.000	0.000	0.000

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Live Load Case Output - Bent 3
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

GEORGIA DEPARTMENT OF TRANSPORTATION
PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
SUMMARY OF THE LIVE LOAD CASE PROGRAM
REVISED: JUNE 26, 2008

I-575 OVER TOWNE LAKE PARKWAY - BENT 3

BRIDGE WIDTH	X1	X2	CENTER LINE DISTANCE	# OF BEAMS	REACTION FORCE	MAXIMUM # OF TRUCKS	# OF COLUMNS	COLUMN WIDTH	SKEW ANGLE
40.786	3.625	4.754	20.393	7	44.728	3	0	0.000	0

D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20
2.700	5.833	5.833	5.833	5.833	4.750	6.666													

	NO. OF TRUCKS	BEAM 1	BEAM 2	BEAM 3	BEAM 4	BEAM 5	BEAM 6	BEAM 7	BEAM 8	BEAM 9	BEAM 10
LL CASE 1	1	37.635	43.447	8.374	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 2	2	37.635	49.129	51.821	40.327	0.000	0.000	0.000	0.000	0.000	0.000
LL CASE 3	3	37.635	49.129	51.821	58.784	37.166	33.833	0.000	0.000	0.000	0.000
LL CASE 4	1	0.000	0.000	0.000	0.000	7.062	47.167	35.227	0.000	0.000	0.000
LL CASE 5	2	0.000	0.000	1.281	43.447	51.790	47.167	35.227	0.000	0.000	0.000
LL CASE 6	3	0.000	33.234	44.728	56.222	51.790	47.167	35.227	0.000	0.000	0.000
LL CASE 7	1	0.000	0.000	23.004	43.447	23.004	0.000	0.000	0.000	0.000	0.000
LL CASE 8	2	10.229	43.447	58.784	43.447	23.004	0.000	0.000	0.000	0.000	0.000
LL CASE 9	3	10.229	43.447	58.784	43.447	56.743	39.499	16.218	0.000	0.000	0.000
LL CASE 10	2	0.000	15.129	43.447	58.784	39.320	22.232	0.000	0.000	0.000	0.000
LL CASE 11	2	37.635	43.447	8.374	0.000	7.062	47.167	35.227	0.000	0.000	0.000
LL CASE 12	3	37.635	49.129	51.821	40.327	7.062	47.167	35.227	0.000	0.000	0.000

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
Intermediate Bent Design Output	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	X YES ◯ NO	◯	X	GDOT BRPIER	06/26/2008

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Intermediate bent design ouptput is included for bents 2&3.

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	19	19	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bent Design Output - Bent 2
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS AND DESIGN OF PIERS FOR BRIDGES - V 4.2.07 - AASHTO SPECS 1984 INTERIM
REVISED: JUNE 30, 2008
I-575 OVER Towne Lake Parkway - BENT 2

DESIGN DATA

DESIGN OPTIONS	NO. CAN	NO. COL	NO. LLC	SKEW D	ANG M	S	F'C PSI	FC PSI	N	FY PSI	FS PSI	EC KSI	ES KSI	CONC. STRAIN	Z FACT	* MAIN SIZE	* STR SIZ	* CAP MAX TOP	REINFORCING STEEL MAX BOT	MIN SIZE	MIN NO.	* TOP CL.	* MIN S.SP	* CAP DEPTH INCR.	BOT CL.
D D D L	2	2	12	7-15-35			3500.	1400.	8.	60000.	24000.	3587.	29000.	0.0030	170.	11	5	9	10	6	4	2.00	4.00	3.00	2.00

COLUMN REINFORCING STEEL MIN.P	MAX.P	CL.SP.	CLEAR	R MODE	KL COEF	OC	OF	CM	BD1	BD2	IMPACT %	SOIL WT KCF	ALL.S.P. KSF	MIN PL SP	MAX PL SP	EDGE DIST	PILE DEPTH	REBAR CLEAR	ALL.PILE CAPACITY	ALL.PILE UPLIFT	I P
1.00	8.00	2.25	2.500	2	2.00	0.00	0.90	0.00	1.00	0.00	26.71	0.120	0.000	3.00	5.00	1.500	1.000	3.000	192.000	0.000	P

CAP DATA

CN	C	L	A	DE	BC	BE	DH	LH	XB1	XB2	XB3	XB4	XB5	XB6	XB7	XB8
11	C	5.500	0.000	3.500	3.500	3.500	0.000	0.000	3.830	3.080						
12	C	16.000	0.000	3.500	3.500		0.000	0.000	0.750	1.335	5.915	5.915	1.335			
13	C	5.500	0.000	3.500	3.500	3.500	0.000	0.000	0.750	3.080						

COLUMN DATA

CN	P	I	T	S	HT	A	DT	BT	DB	BB	DL	FLEX	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	SLOPE	EP	AP
21	0	C	T		19.410	0.000	3.000	3.000	0.000	0.000	1.750	0.000	2	4	11	0	0	0	7	9	11	0	0	0	0.000	0.000	0.000
22	0	C	T		19.410	0.000	3.000	3.000	0.000	0.000	1.750	0.000	2	4	11	0	0	0	7	9	11	0	0	0	0.000	0.000	0.000

FOOTING DATA

CN	S/P	B	D	T	DEL.B	DEL.D	DEL.T	R.B/D	R.D/B	S.HT.	NP	SYM.	BP	DP	SET.
31	P	6.000	6.000	3.500	0.000	0.000	0.000	1.000	1.000	0.000	4	1	0.000	0.000	0.000
32	P	6.000	6.000	3.500	0.000	0.000	0.000	1.000	1.000	0.000	4	1	0.000	0.000	0.000

GROUP II WIND

SUPERSTRUCTURE AREA* TRANS.	STD. LONG.	WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
442.	442.	1	50	0	44	6	41	12	33	16	17	19	5.178	5.178	1.442	5.683

GROUP III WIND

STD. * WIND	WIND ON SUPERSTRUCTURE INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND	WIND ON LIVE LOAD INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* LENGTHS OF LL TRANS.	LONGI.	* WIND ON LL ARMS APT	APL
1	50	0	44	6	41	12	33	16	17	19	1	100	0	88	12	82	24	66	32	34	38	65.0	65.0	12.333	12.333

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
7.366	0.000	12.333	12.333	0.00018000	0.00044000	1.128	18.507

DEAD LOAD SUPERSTRUCTURE AND LIVE LOAD CASES

I.D.	NL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
D L	0	103.344	0.000	0.000	103.823	103.823	103.823	0.000	0.000	103.344			
LL 1	1	34.626	0.000	0.000	41.915	9.112	0.000	0.000	0.000	0.000			
LL 2	2	34.626	0.000	0.000	46.471	51.027	39.182	0.000	0.000	0.000			
LL 3	3	34.626	0.000	0.000	46.471	51.027	56.495	0.000	0.000	35.657			
LL 4	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.473			
LL 5	2	0.000	0.000	0.000	0.000	0.677	42.149	0.000	0.000	49.012			
LL 6	3	0.000	0.000	0.000	30.747	42.593	55.139	0.000	0.000	49.012			
LL 7	1	0.000	0.000	0.000	0.000	21.869	41.915	0.000	0.000	21.869			
LL 8	2	9.112	0.000	0.000	41.915	56.495	41.915	0.000	0.000	21.869			
LL 9	3	9.112	0.000	0.000	41.915	56.495	41.915	0.000	0.000	54.552			
LL10	2	0.000	0.000	0.000	13.536	41.915	56.495	0.000	0.000	37.784			
LL11	2	34.626	0.000	0.000	41.915	9.112	0.000	0.000	0.000	6.473			
LL12	3	34.626	0.000	0.000	46.471	51.027	39.182	0.000	0.000	6.473			

MEMBER PROPERTIES

COLUMN PROPERTIES

CN	KT KTM	COTB COBT	COTBM COBTM	TLR TRL	TRC TCR	TLC TCL	DFC DFL	KL PDF	FKBR FKUBR	PCBR PCUBR	PCL FLU	UFMT UFMB	EITTB EILTB	PSIT PSIB	RGTB RGL
1	718508.8	0.5000	0.5000	0.6502	1.0000	0.3498	0.3498	0.033230	11.3	129633.9	7318.3	55526.2	191232.8	0.3	10.7
	718508.8	0.5000	0.3562	0.0000	1.0000	0.0000	0.0000	0.5000	23.8	29184.7	17.7	55526.2	191232.8	0.0	10.7
2	718508.8	0.5000	0.5000	0.0000	0.3498	1.0000	0.3498	0.033230	11.3	129633.9	7318.3	55526.2	191232.8	0.3	10.7
	718508.8	0.5000	0.3562	0.6502	0.0000	1.0000	0.6502	0.5000	23.8	29184.7	17.7	55526.2	191232.8	0.0	10.7

CAP PROPERTIES

CN	CO K	RML RMR	COMLR COMRL	FMWT UFEM	FMLP1 FMRP1	FMLP2 FMRP2	FMLP3 FMRP3	FMLP4 FMRP4	FMLP5 FMRP5	FMLP6 FMRP6	FMLP7 FMRP7	FMLP8 FMRP8
2	0.5000	1335431.0	0.1862	39.2000	0.6813	1.5770	2.0000	0.2363	0.0335			
	1614822.5	1335431.0	0.1862	151389.6	0.0335	0.2363	2.0000	1.5770	0.6813			

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

		TRANSVERSE							LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
UNIT F.AT CL.CAP	1	0.565	4.517	0.500	5.188	0.565	0.000	-4.517	0.875	0.500	9.705	9.705
	2	-0.565	4.517	0.500	5.188	-0.565	-4.517	0.000	0.875	0.500	9.705	9.705
EXPANSION OF CAP	1	0.000	42.308	5.329	61.133	0.000	0.000	-42.308	0.000	0.000	0.000	0.000
	2	0.000	-42.308	-5.329	-61.133	0.000	42.308	0.000	0.000	0.000	0.000	0.000
SHRINKAGE OF CAP	1	0.000	-103.420	-13.027	-149.436	0.000	0.000	103.420	0.000	0.000	0.000	0.000
	2	0.000	103.420	13.027	149.436	0.000	-103.420	0.000	0.000	0.000	0.000	0.000
DEAD LOAD TOTAL	1	283.885 307.726	5.419	0.419	2.709	307.726	423.600	-429.019	0.000	0.000	0.000	0.000
	2	283.885 307.726	-5.419	-0.419	-2.709	307.726	429.019	-423.600	0.000	0.000	0.000	0.000
STREAM FLOW	1	0.637	5.096	0.564	5.852	0.637	0.000	-5.096	16.194	9.253	179.610	179.610
	2	-0.637	5.096	0.564	5.852	-0.637	-5.096	0.000	16.194	9.253	179.610	179.610
CENT. FORCE 1 LN	1	9.758	33.009	3.653	37.905	9.758	0.000	-33.009	6.554	0.465	14.774	14.774
	2	-9.758	33.009	3.653	37.905	-9.758	-33.009	0.000	6.554	0.465	14.774	14.774
WIND ON SUBSTR.	1	0.814	6.514	0.721	7.480	0.814	0.000	-6.514	-4.973	-2.842	-55.154	-55.154
	2	-0.814	6.514	0.721	7.480	-0.814	-6.514	0.000	-4.973	-2.842	-55.154	-55.154
GROUP 2 WIND 1 1	1	20.289	105.550	11.682	121.205	20.289	0.000	-105.550	4.701	-1.445	-20.820	-20.820
	2	-20.289	105.550	11.682	121.205	-20.289	-105.550	0.000	4.701	-1.445	-20.820	-20.820
GROUP 2 WIND 1 2	1	20.289	105.550	11.682	121.205	20.289	0.000	-105.550	14.647	4.238	89.487	89.487
	2	-20.289	105.550	11.682	121.205	-20.289	-105.550	0.000	14.647	4.238	89.487	89.487
GROUP 2 WIND 2 1	1	18.249	95.180	10.535	109.297	18.249	0.000	-95.180	-5.572	-2.928	-57.282	-57.282
	2	-18.249	95.180	10.535	109.297	-18.249	-95.180	0.000	-5.572	-2.928	-57.282	-57.282
GROUP 2 WIND 2 2	1	17.654	92.152	10.199	105.820	17.654	0.000	-92.152	22.599	5.386	117.709	117.709
	2	-17.654	92.152	10.199	105.820	-17.654	-92.152	0.000	22.599	5.386	117.709	117.709
GROUP 2 WIND 3 1	1	17.379	90.752	10.044	104.212	17.379	0.000	-90.752	-15.266	-4.327	-91.685	-91.685
	2	-17.379	90.752	10.044	104.212	-17.379	-90.752	0.000	-15.266	-4.327	-91.685	-91.685
GROUP 2 WIND 3 2	1	16.188	84.696	9.374	97.258	16.188	0.000	-84.696	31.131	6.617	147.992	147.992
	2	-16.188	84.696	9.374	97.258	-16.188	-84.696	0.000	31.131	6.617	147.992	147.992
GROUP 2 WIND 4 1	1	14.461	75.915	8.402	87.175	14.461	0.000	-75.915	-22.889	-5.428	-118.739	-118.739
	2	-14.461	75.915	8.402	87.175	-14.461	-75.915	0.000	-22.889	-5.428	-118.739	-118.739
GROUP 2 WIND 4 2	1	12.873	67.841	7.509	77.903	12.873	0.000	-67.841	35.658	7.271	164.060	164.060
	2	-12.873	67.841	7.509	77.903	-12.873	-67.841	0.000	35.658	7.271	164.060	164.060
GROUP 2 WIND 5 1	1	8.378	44.981	4.978	51.652	8.378	0.000	-44.981	-30.541	-6.532	-145.897	-145.897
	2	-8.378	44.981	4.978	51.652	-8.378	-44.981	0.000	-30.541	-6.532	-145.897	-145.897
GROUP 2 WIND 5 2	1	6.493	35.392	3.917	40.642	6.493	0.000	-35.392	37.119	7.482	169.244	169.244
	2	-6.493	35.392	3.917	40.642	-6.493	-35.392	0.000	37.119	7.482	169.244	169.244

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

		TRANSVERSE							LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
GROUP 3 WIND 1 1	1	14.698	60.793	6.729	69.810	14.698	0.000	-60.793	7.194	-0.023	6.791	6.791
	2	-14.698	60.793	6.729	69.810	-14.698	-60.793	0.000	7.194	-0.023	6.791	6.791
GROUP 3 WIND 1 2	1	14.698	60.793	6.729	69.810	14.698	0.000	-60.793	10.178	1.682	39.883	39.883
	2	-14.698	60.793	6.729	69.810	-14.698	-60.793	0.000	10.178	1.682	39.883	39.883
GROUP 3 WIND 2 1	1	13.184	54.632	6.047	62.735	13.184	0.000	-54.632	-2.030	-0.904	-17.993	-17.993
	2	-13.184	54.632	6.047	62.735	-13.184	-54.632	0.000	-2.030	-0.904	-17.993	-17.993
GROUP 3 WIND 2 2	1	12.742	52.833	5.848	60.669	12.742	0.000	-52.833	17.318	2.364	59.066	59.066
	2	-12.742	52.833	5.848	60.669	-12.742	-52.833	0.000	17.318	2.364	59.066	59.066
GROUP 3 WIND 3 1	1	12.538	52.001	5.756	59.714	12.538	0.000	-52.001	-10.734	-1.735	-41.376	-41.376
	2	-12.538	52.001	5.756	59.714	-12.538	-52.001	0.000	-10.734	-1.735	-41.376	-41.376
GROUP 3 WIND 3 2	1	11.654	48.403	5.357	55.582	11.654	0.000	-48.403	24.979	3.096	79.649	79.649
	2	-11.654	48.403	5.357	55.582	-11.654	-48.403	0.000	24.979	3.096	79.649	79.649
GROUP 3 WIND 4 1	1	10.373	43.187	4.780	49.592	10.373	0.000	-43.187	-17.578	-2.389	-59.766	-59.766
	2	-10.373	43.187	4.780	49.592	-10.373	-43.187	0.000	-17.578	-2.389	-59.766	-59.766
GROUP 3 WIND 4 2	1	9.194	38.390	4.249	44.083	9.194	0.000	-38.390	29.044	3.484	90.570	90.570
	2	-9.194	38.390	4.249	44.083	-9.194	-38.390	0.000	29.044	3.484	90.570	90.570
GROUP 3 WIND 5 1	1	5.858	24.808	2.746	28.487	5.858	0.000	-24.808	-24.449	-3.045	-78.225	-78.225
	2	-5.858	24.808	2.746	28.487	-5.858	-24.808	0.000	-24.449	-3.045	-78.225	-78.225
GROUP 3 WIND 5 2	1	4.459	19.111	2.115	21.946	4.459	0.000	-19.111	30.355	3.609	94.094	94.094
	2	-4.459	19.111	2.115	21.946	-4.459	-19.111	0.000	30.355	3.609	94.094	94.094
LIVE LOAD LL 1	1	83.594	-7.386	-0.367	0.264	83.594	132.618	-125.232	0.000	0.000	0.000	0.000
	2	2.059	2.110	0.367	5.012	2.059	-2.110	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	113.419	49.157	4.127	30.939	113.419	132.618	-181.775	0.000	0.000	0.000	0.000
	2	57.887	-57.638	-4.127	-22.458	57.887	57.638	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	96.866	25.478	1.992	13.181	96.866	119.356	-144.834	0.000	0.000	0.000	0.000
	2	104.982	-26.068	-1.992	-12.592	104.982	148.977	-122.910	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	-1.443	-4.981	-0.451	-3.774	-1.443	0.000	4.981	0.000	0.000	0.000	0.000
	2	7.916	6.693	0.451	2.063	7.916	18.099	-24.792	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	-5.335	-21.034	-1.976	-17.311	-5.335	0.000	21.034	0.000	0.000	0.000	0.000
	2	97.173	30.092	1.976	8.253	97.173	157.624	-187.716	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	39.743	34.140	2.266	9.846	39.743	0.000	-34.140	0.000	0.000	0.000	0.000
	2	119.999	-24.508	-2.266	-19.478	119.999	193.453	-168.944	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	11.281	19.721	1.450	8.433	11.281	0.000	-19.721	0.000	0.000	0.000	0.000
	2	74.372	-17.818	-1.450	-10.336	74.372	101.576	-83.758	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	76.432	62.742	4.718	28.841	76.432	34.899	-97.641	0.000	0.000	0.000	0.000
	2	94.874	-59.369	-4.718	-32.214	94.874	143.127	-83.758	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	62.233	33.833	2.197	8.806	62.233	31.409	-65.242	0.000	0.000	0.000	0.000
	2	121.357	-23.020	-2.197	-19.620	121.357	211.060	-188.041	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	31.423	38.307	2.728	14.643	31.423	0.000	-38.307	0.000	0.000	0.000	0.000
	2	118.307	-32.293	-2.728	-20.657	118.307	177.005	-144.713	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	82.151	-12.367	-0.818	-3.510	82.151	132.618	-120.251	0.000	0.000	0.000	0.000
	2	9.975	8.802	0.818	7.074	9.975	15.989	-24.792	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	100.779	39.759	3.308	24.449	100.779	119.356	-159.114	0.000	0.000	0.000	0.000
	2	59.222	-45.851	-3.308	-18.356	59.222	68.163	-22.312	0.000	0.000	0.000	0.000

CAP ANALYSIS AND DESIGN DATA

CAP MOMENTS AND SHEARS

	MOMENTS (KIP-FEET)							**	SHEARS (KIPS)				
POINT	D.L.TOT.	G1 MAX.+	G1 MAX.-	G2 MAX.+	G2 MAX.-	G3 MAX.+	G3 MAX.-	DL T.LT	DL T.RT	G1 + LT	G1 + RT	G1 - LT	G1 - RT
P 1	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.989	-138.336	-3.989	-138.336	-3.989	-213.509
P 2	-440.737	-440.737	-672.270	-440.737	-440.737	-440.737	-579.380	-145.694	-145.694	-145.694	-145.694	-220.867	-220.867
C 1L	-550.680	-550.680	-838.592	-550.680	-550.680	-550.680	-723.082	-147.485		-147.485		-222.658	
C 1R	-557.724	-512.059	-1044.805	-420.509	-701.564	-451.348	-966.091		221.565		404.181		209.982
P 3	-392.222	-355.244	-742.342	-267.871	-522.578	-298.457	-713.822	219.773	219.773	402.389	402.389	208.191	208.191
P 4	-100.954	4.825	-221.837	0.500	-207.306	20.821	-268.107	216.584	81.614	399.200	163.342	205.002	70.032
P 5	340.008	758.986	293.013	340.008	340.008	590.893	311.867	67.485	-67.485	149.212	-63.531	55.903	-142.463
P 6	-100.954	104.294	-232.079	5.398	-202.408	107.806	-237.906	-81.614	-216.584	-77.661	-212.630	-156.593	-391.400
P 7	-392.222	-337.453	-732.777	-261.867	-516.574	-246.148	-667.770	-219.773	-219.773	-215.819	-215.819	-394.589	-394.589
C 2L	-557.724	-499.989	-1015.936	-413.884	-694.940	-407.031	-911.134	-221.565		-217.611		-396.380	
C 2R	-550.680	-550.680	-958.916	-550.680	-550.680	-550.680	-795.133		147.485		254.074		147.485
P 8	-440.737	-440.737	-769.032	-440.737	-440.737	-440.737	-637.321	145.694	145.694	252.283	252.283	145.694	145.694
P 9	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	138.336	3.989	244.926	3.989	138.336	3.989

CAP DESIGN DATA

PT.	M+ UNF. K-FT.	M- UNF. K-FT.	TOP REINFORCE. AS	NO.SIZE	BOT.REINFORCE. AS	NO.SIZE	LEFT STIRRUPS M.SP.	AV/IN	BAR&SPAC	RIGHT STIRRUPS M.SP.	AV/IN	BAR&SPAC	D IN.	FC PSI	PS %	FS/FF RATIO	FS/FZ RATIO
P 1	-2.562	-2.562	1.76	4 # 11	1.76	4 # 11	0.00	0.000	#5@ 0.00	18.98	0.035	#5@17.71	42.00		0.11	0.000	0.006
P 2	-339.029	-445.677	4.04	4 # 11	1.76	4 # 11	18.98	0.035	#5@17.71	18.98	0.035	#5@17.71	42.00		0.25	0.338	1.001
C 1	-407.984	-682.353	6.19	4 # 11	1.76	4 # 11	19.50	0.035	#5@17.71	19.50	0.120	#5@ 5.15	42.00		0.40	0.901	1.223
P 3	-284.677	-493.999	4.47	4 # 11	1.76	4 # 11	18.98	0.125	#5@ 4.96	18.98	0.125	#5@ 4.96	42.00		0.28	0.628	1.110
P 4	-28.933	-161.287	2.34	4 # 11	1.76	4 # 11	18.98	0.123	#5@ 5.03	18.98	0.035	#5@17.71	42.00		0.26	0.303	0.363
P 5	454.533	239.898	1.76	4 # 11	4.58	4 # 11	18.98	0.035	#5@17.71	18.98	0.035	#5@17.71	42.00		0.29	0.616	1.021
P 6	37.979	-138.055	2.08	4 # 11	1.76	4 # 11	18.98	0.035	#5@17.71	18.98	0.119	#5@ 5.20	42.00		0.23	0.336	0.000
P 7	-244.439	-458.575	4.41	4 # 11	1.76	4 # 11	18.98	0.121	#5@ 5.13	18.98	0.121	#5@ 5.13	42.00		0.28	0.617	1.030
C 2	-373.894	-640.079	6.01	4 # 11	1.76	4 # 11	19.50	0.116	#5@ 5.32	19.50	0.045	#5@13.80	42.00		0.39	0.843	1.148
P 8	-339.029	-490.247	4.64	4 # 11	1.76	4 # 11	18.98	0.047	#5@13.06	18.98	0.047	#5@13.06	42.00		0.29	0.479	1.101
P 9	-2.562	-2.562	1.76	4 # 11	1.76	4 # 11	18.98	0.044	#5@14.20	0.00	0.000	#5@ 0.00	42.00		0.11	0.000	0.006

NOTE: *** FS/FZ RATIO EXCEEDS 1.0! ***

COLUMN ANALYSIS AND DESIGN OUTPUT

CRITICAL COLUMN LOADS

CN	T B	GR	LLC	WC	R	E S	C F	S F	PF	MTF	MLF	PM	MTM	MLM	PU	MTU	MLU	PU/PM	B	D
1	T	1	LL 2	0.0			C	S	641.5	206.2	38.1	641.5	212.5	220.8	2233.3	742.3	771.2	3.484	36.00	36.00
1	B	3	LL12	4.2			C	S	578.1	233.3	403.1	578.1	239.0	452.8	1528.5	632.1	1197.4	2.644	36.00	36.00
2	T	1	LL10	0.0			C	S	599.7	15.3	38.1	599.7	184.9	204.5	2272.5	703.6	777.8	3.792	36.00	36.00
2	B	3	LL 9	4.2			C	S	510.8	168.9	403.1	510.8	173.3	446.2	1489.6	505.3	1301.5	2.917	36.00	36.00

COLUMN DESIGN DATA

CN	T B	B FACE 1 NO.SIZE	B FACE 2 NO.SIZE	D FACE 3 NO.SIZE	D FACE 4 NO.SIZE	AS	PS	BD12	BD	SUMPU	SUMPC	DEL.T	DEL.L	CM	R	PHIC
1	T	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.027	1141.	38657.	1.030	1.147	1.000	2	0.70
1	B	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.023	977.	40403.	1.025	1.123	1.000	2	0.70
2	T	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.000	1094.	40230.	1.028	1.136	1.000	2	0.70
2	B	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.000	1008.	40379.	1.026	1.107	1.000	2	0.70

FOOTING 1 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
1	1	LL12	0.0		C	S	414.246	130.199	13.458	219.499	10.510	121.450	36.022	95.123	180.551	-0.591	0.000	-0.220	MAX.P1
1	1	LL12	0.0		C	S	607.794	186.065	19.769	285.349	13.663	171.077	60.020	145.105	256.162	-0.768	0.000	-0.287	MAX.MT
1	1	LL12	0.0		C	S	607.794	186.065	19.769	285.349	13.663	171.077	60.020	145.105	256.162	-0.768	0.000	-0.287	MAX.VT
1	1	LL12	0.0		C	S	607.794	186.065	19.769	285.349	13.663	171.077	60.020	145.105	256.162	-0.768	0.000	-0.287	MAX.VP
1	1	LL12	0.0		C	S	607.794	186.065	19.769	285.349	13.663	171.077	60.020	145.105	256.162	-0.768	0.000	-0.287	MAX.ML
1	1	LL12	0.0		C	S	607.794	186.065	19.769	285.349	13.663	171.077	60.020	145.105	256.162	-0.768	0.000	-0.287	MAX.VL
1	3	LL 9	3.2		C	S	395.480	173.437	17.938	299.148	13.606	122.020	6.430	85.170	200.760	-0.591	0.000	-0.220	MAX.P3

FOOTING 1 ANALYSIS/DESIGN RESULTS

FOOTING SIZE			* BAR REINFORCEMENT STEEL					* SECTION CAPACITIES				
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
6.000	6.000	3.500	0.940	0.00	0 # 0 @	0.000	TOP TRAN	0.000	0.000	0.000	26.625	0.000
				0.00	0 # 0 @	0.000	BOT.LONG	0.000	0.000	0.000	26.625	0.000

NUMBER OF PILES = 4 BP = 1.500 DP = 1.500

FOOTING 2 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
2	1	LL 9	0.0		C	S	376.516	90.001	8.276	219.499	10.510	120.382	41.525	78.130	156.987	4.009	0.000	-0.297	MAX.P1
2	4	LL 3	0.0	S	C	S	472.671	318.479	27.904	285.349	13.663	112.068	9.554	137.598	240.112	6.653	0.000	-0.387	MAX.MT
2	1	LL 9	0.0		C	S	572.891	103.515	9.249	285.349	13.663	180.239	77.725	119.537	222.050	5.931	0.000	-0.387	MAX.VT
2	1	LL 9	0.0		C	S	572.891	103.515	9.249	285.349	13.663	180.239	77.725	119.537	222.050	5.931	0.000	-0.387	MAX.VP
2	1	LL 9	0.0		C	S	572.891	103.515	9.249	285.349	13.663	180.239	77.725	119.537	222.050	7.145	0.000	-0.387	MAX.ML
2	1	LL 9	0.0		C	S	572.891	103.515	9.249	285.349	13.663	180.239	77.725	119.537	222.050	7.145	0.000	-0.387	MAX.VL
2	4	LL 3	0.0	S	C	S	363.593	244.984	21.465	219.499	10.510	86.206	7.349	105.845	184.701	5.118	0.000	-0.297	MAX.P3

FOOTING 2 ANALYSIS/DESIGN RESULTS

FOOTING SIZE			* BAR REINFORCEMENT STEEL					* SECTION CAPACITIES				
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
6.250	6.250	3.500	0.818	0.08	4 # 4 @	18.750	TOP TRAN	15.058	31.681	63.361	26.250	0.000
				0.08	4 # 4 @	18.750	BOT.LONG	15.346	32.284	64.568	26.750	0.000

NUMBER OF PILES = 4 BP = 1.625 DP = 1.625

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bent Design Output - Bent 3
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Sufficient sample calculations representative of the scope and conditions in the design calculation were performed and the results compared to demonstrate the computer program adequacy.

PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS AND DESIGN OF PIERS FOR BRIDGES - V 4.2.07 - AASHTO SPECS 1984 INTERIM
REVISED: JUNE 30, 2008
I-575 OVER Towne Lake Parkway - BENT 3

DESIGN DATA

DESIGN OPTIONS	NO. CAN	NO. COL	NO. LLC	SKEW ANG D M S	F'C PSI	FC PSI	N	FY PSI	FS PSI	EC KSI	ES KSI	CONC. STRAIN	Z FACT	* MAIN SIZE	* STR SIZ	* CAP MAX TOP	MAX BOT	MIN SIZE	MIN NO.	* TOP CL.	* MIN S.SP	* CAP DEPTH INCR.	BOT CL.
D D D L	2	2	12	9-00-38	3500.	1400.	8.	60000.	24000.	3587.	29000.	0.0030	170.	11	5	9	10	6	4	2.00	4.00	3.00	2.00

COLUMN REINFORCING STEEL MIN.P	MAX.P	CL.SP.	CLEAR	R MODE	KL COEF	OC	OF	CM	BD1	BD2	IMPACT %	SOIL WT KCF	ALL.S.P. KSF	MIN PL SP	MAX PL SP	EDGE DIST	PILE DEPTH	REBAR CLEAR	ALL.PILE CAPACITY	ALL.PILE UPLIFT	I P
1.00	8.00	2.25	2.500	2	2.00	0.00	0.90	0.00	1.00	0.00	25.78	0.120	0.000	3.00	5.00	1.500	1.000	3.000	192.000	0.000	P

CAP DATA

CN	C	L	A	DE	BC	BE	DH	LH	XB1	XB2	XB3	XB4	XB5	XB6	XB7	XB8
11	C	5.500	0.000	3.500	3.500	3.500	0.000	0.000	3.830	3.080						
12	C	16.000	0.000	3.500	3.500		0.000	0.000	0.750	1.335	5.915	5.915	1.335			
13	C	5.500	0.000	3.500	3.500	3.500	0.000	0.000	0.750	3.080						

COLUMN DATA

CN	P	I	T	S	HT	A	DT	BT	DB	BB	DL	FLEX	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	SLOPE	EP	AP
21	0	C	T		21.550	0.000	3.000	3.000	0.000	0.000	1.750	0.000	2	4	11	0	0	0	7	9	11	0	0	0	0.000	0.000	0.000
22	0	C	T		21.550	0.000	3.000	3.000	0.000	0.000	1.750	0.000	2	4	11	0	0	0	7	9	11	0	0	0	0.000	0.000	0.000

FOOTING DATA

CN	S/F	B	D	T	DEL.B	DEL.D	DEL.T	R.B/D	R.D/B	S.WT.	NP	SYM.	BP	DP	SET.
31	P	6.000	6.000	3.500	0.000	0.000	0.000	1.000	1.000	0.000	4	1	0.000	0.000	0.000
32	P	6.000	6.000	3.500	0.000	0.000	0.000	1.000	1.000	0.000	4	1	0.000	0.000	0.000

GROUP II WIND

SUPERSTRUCTURE AREA* TRANS.	STD. LONG.	WIND ON SUPERSTRUCTURE INTENSITIES WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
474.	474.	1	50	0	44	6	41	12	33	16	17	19	5.144	5.144	1.570	5.941

GROUP III WIND

STD. * WIND	WIND ON SUPERSTRUCTURE INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND	WIND ON LIVE LOAD INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* LENGTHS OF LL TRANS.	LONGI.	* WIND ON LL ARMS APT	APL
1	50	0	44	6	41	12	33	16	17	19	1	100	0	88	12	82	24	66	32	34	38	70.5	70.5	12.333	12.333

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
7.429	3.716	12.333	12.333	0.00018000	0.00044000	1.789	18.445

DEAD LOAD SUPERSTRUCTURE AND LIVE LOAD CASES

I.D.	NL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
D L	0	110.613	0.000	0.000	111.092	111.092	111.092	0.000	0.000	110.613			
LL 1	1	37.635	0.000	0.000	43.447	8.373	0.000	0.000	0.000	0.000			
LL 2	2	37.635	0.000	0.000	49.129	51.820	40.326	0.000	0.000	0.000			
LL 3	3	37.635	0.000	0.000	49.129	51.820	58.783	0.000	0.000	37.165			
LL 4	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	7.062			
LL 5	2	0.000	0.000	0.000	0.000	1.280	43.447	0.000	0.000	51.790			
LL 6	3	0.000	0.000	0.000	33.233	44.728	56.222	0.000	0.000	51.790			
LL 7	1	0.000	0.000	0.000	0.000	23.004	43.447	0.000	0.000	23.004			
LL 8	2	10.229	0.000	0.000	43.447	58.783	43.447	0.000	0.000	23.004			
LL 9	3	10.229	0.000	0.000	43.447	58.783	43.447	0.000	0.000	56.743			
LL10	2	0.000	0.000	0.000	15.129	43.447	58.783	0.000	0.000	39.319			
LL11	2	37.635	0.000	0.000	43.447	8.373	0.000	0.000	0.000	7.062			
LL12	3	37.635	0.000	0.000	49.129	51.820	40.326	0.000	0.000	7.062			

MEMBER PROPERTIES

COLUMN PROPERTIES

CN	KT KTM	COTB COBT	COTBM COBTM	TLR TRL	TRC TCR	TLC TCL	DFC DFL	KL PDF	FKBR FKUBR	PCBR PCUBR	PCL FLU	UFMT UFMB	EITTB EILTB	PSIT PSIB	RGTB RGL
1	647158.1	0.5000	0.5000	0.6721	1.0000	0.3279	0.3279	0.024281	12.5	104874.1	6035.7	45045.8	191232.8	0.3	10.7
	647158.1	0.5000	0.3661	0.0000	1.0000	0.0000	0.0000	0.5000	26.7	23217.0	19.8	45045.8	191232.8	0.0	10.7
2	647158.1	0.5000	0.5000	0.0000	0.3279	1.0000	0.3279	0.024281	12.5	104874.1	6035.7	45045.8	191232.8	0.3	10.7
	647158.1	0.5000	0.3661	0.6721	0.0000	1.0000	0.6721	0.5000	26.7	23217.0	19.8	45045.8	191232.8	0.0	10.7

CAP PROPERTIES

CN	CO K	KML KMR	COMLR COMRL	FMWT UFEM	FMLP1 FMRP1	FMLP2 FMRP2	FMLP3 FMRP3	FMLP4 FMRP4	FMLP5 FMRP5	FMLP6 FMRP6	FMLP7 FMRP7	FMLP8 FMRP8
2	0.5000	1326618.0	0.1741	39.2000	0.6813	1.5770	2.0000	0.2363	0.0335			
	1614822.5	1326618.0	0.1741	151389.6	0.0335	0.2363	2.0000	1.5770	0.6813			

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

		TRANSVERSE							LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
UNIT F.AT CL.CAP	1	0.631	5.050	0.500	5.725	0.631	0.000	-5.050	0.875	0.500	10.775	10.775
	2	-0.631	5.050	0.500	5.725	-0.631	-5.050	0.000	0.875	0.500	10.775	10.775
EXPANSION OF CAP	1	0.000	36.006	4.011	50.436	0.000	0.000	-36.006	0.000	0.000	0.000	0.000
	2	0.000	-36.006	-4.011	-50.436	0.000	36.006	0.000	0.000	0.000	0.000	0.000
SHRINKAGE OF CAP	1	0.000	-88.015	-9.805	-123.288	0.000	0.000	88.015	0.000	0.000	0.000	0.000
	2	0.000	88.015	9.805	123.288	0.000	-88.015	0.000	0.000	0.000	0.000	0.000
DEAD LOAD TOTAL	1	302.057 328.787	5.066	0.353	2.533	328.787	451.440	-456.506	0.000	0.000	0.000	0.000
	2	302.057 328.787	-5.066	-0.353	-2.533	328.787	456.506	-451.440	0.000	0.000	0.000	0.000
STREAM FLOW	1	1.129	9.035	0.895	10.242	1.129	0.000	-9.035	16.139	9.222	198.745	198.745
	2	-1.129	9.035	0.895	10.242	-1.129	-9.035	0.000	16.139	9.222	198.745	198.745
TRAC. FORCE 1 LN	1	0.816	2.939	0.291	3.332	0.816	0.000	-2.939	-25.843	-1.835	-62.178	-62.178
	2	-0.816	2.939	0.291	3.332	-0.816	-2.939	0.000	-25.843	-1.835	-62.178	-62.178
CENT. FORCE 1 LN	1	10.288	37.055	3.669	42.005	10.288	0.000	-37.055	8.193	0.582	19.711	19.711
	2	-10.288	37.055	3.669	42.005	-10.288	-37.055	0.000	8.193	0.582	19.711	19.711
WIND ON SUBSTR.	1	0.991	7.929	0.785	8.988	0.991	0.000	-7.929	-5.198	-2.970	-64.014	-64.014
	2	-0.991	7.929	0.785	8.988	-0.991	-7.929	0.000	-5.198	-2.970	-64.014	-64.014
GROUP 2 WIND 1 1	1	23.293	126.141	12.489	142.992	23.293	0.000	-126.141	7.596	-1.115	-14.473	-14.473
	2	-23.293	126.141	12.489	142.992	-23.293	-126.141	0.000	7.596	-1.115	-14.473	-14.473
GROUP 2 WIND 1 2	1	23.293	126.141	12.489	142.992	23.293	0.000	-126.141	17.993	4.826	113.556	113.556
	2	-23.293	126.141	12.489	142.992	-23.293	-126.141	0.000	17.993	4.826	113.556	113.556
GROUP 2 WIND 2 1	1	21.041	114.205	11.307	129.461	21.041	0.000	-114.205	-3.621	-2.742	-57.908	-57.908
	2	-21.041	114.205	11.307	129.461	-21.041	-114.205	0.000	-3.621	-2.742	-57.908	-57.908
GROUP 2 WIND 2 2	1	20.193	109.706	10.862	124.361	20.193	0.000	-109.706	26.140	6.008	145.101	145.101
	2	-20.193	109.706	10.862	124.361	-20.193	-109.706	0.000	26.140	6.008	145.101	145.101
GROUP 2 WIND 3 1	1	20.128	109.362	10.828	123.971	20.128	0.000	-109.362	-14.071	-4.258	-98.371	-98.371
	2	-20.128	109.362	10.828	123.971	-20.128	-109.362	0.000	-14.071	-4.258	-98.371	-98.371
GROUP 2 WIND 3 2	1	18.430	100.364	9.937	113.771	18.430	0.000	-100.364	35.055	7.301	179.619	179.619
	2	-18.430	100.364	9.937	113.771	-18.430	-100.364	0.000	35.055	7.301	179.619	179.619
GROUP 2 WIND 4 1	1	16.842	91.947	9.103	104.230	16.842	0.000	-91.947	-22.573	-5.491	-131.291	-131.291
	2	-16.842	91.947	9.103	104.230	-16.842	-91.947	0.000	-22.573	-5.491	-131.291	-131.291
GROUP 2 WIND 4 2	1	14.579	79.950	7.916	90.631	14.579	0.000	-79.950	39.462	7.941	196.686	196.686
	2	-14.579	79.950	7.916	90.631	-14.579	-79.950	0.000	39.462	7.941	196.686	196.686
GROUP 2 WIND 5 1	1	9.918	55.244	5.470	62.624	9.918	0.000	-55.244	-31.509	-6.787	-165.890	-165.890
	2	-9.918	55.244	5.470	62.624	-9.918	-55.244	0.000	-31.509	-6.787	-165.890	-165.890

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

		TRANSVERSE							LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
GROUP 2 WIND 5 2	1	7.230	40.998	4.059	46.475	7.230	0.000	-40.998	40.209	8.049	199.578	199.578
	2	-7.230	40.998	4.059	46.475	-7.230	-40.998	0.000	40.209	8.049	199.578	199.578
GROUP 3 WIND 1 1	1	16.751	73.007	7.228	82.759	16.751	0.000	-73.007	10.054	0.218	14.364	14.364
	2	-16.751	73.007	7.228	82.759	-16.751	-73.007	0.000	10.054	0.218	14.364	14.364
GROUP 3 WIND 1 2	1	16.751	73.007	7.228	82.759	16.751	0.000	-73.007	13.173	2.000	52.773	52.773
	2	-16.751	73.007	7.228	82.759	-16.751	-73.007	0.000	13.173	2.000	52.773	52.773
GROUP 3 WIND 2 1	1	15.089	65.875	6.522	74.675	15.089	0.000	-65.875	-0.128	-0.754	-15.067	-15.067
	2	-15.089	65.875	6.522	74.675	-15.089	-65.875	0.000	-0.128	-0.754	-15.067	-15.067
GROUP 3 WIND 2 2	1	14.463	63.187	6.256	71.628	14.463	0.000	-63.187	20.567	2.706	74.147	74.147
	2	-14.463	63.187	6.256	71.628	-14.463	-63.187	0.000	20.567	2.706	74.147	74.147
GROUP 3 WIND 3 1	1	14.415	62.982	6.236	71.395	14.415	0.000	-62.982	-9.613	-1.660	-42.484	-42.484
	2	-14.415	62.982	6.236	71.395	-14.415	-62.982	0.000	-9.613	-1.660	-42.484	-42.484
GROUP 3 WIND 3 2	1	13.163	57.606	5.703	65.301	13.163	0.000	-57.606	28.659	3.479	97.536	97.536
	2	-13.163	57.606	5.703	65.301	-13.163	-57.606	0.000	28.659	3.479	97.536	97.536
GROUP 3 WIND 4 1	1	11.991	52.577	5.205	59.601	11.991	0.000	-52.577	-17.330	-2.397	-64.790	-64.790
	2	-11.991	52.577	5.205	59.601	-11.991	-52.577	0.000	-17.330	-2.397	-64.790	-64.790
GROUP 3 WIND 4 2	1	10.322	45.409	4.496	51.475	10.322	0.000	-45.409	32.660	3.861	109.100	109.100
	2	-10.322	45.409	4.496	51.475	-10.322	-45.409	0.000	32.660	3.861	109.100	109.100
GROUP 3 WIND 5 1	1	6.883	30.648	3.034	34.742	6.883	0.000	-30.648	-25.441	-3.171	-88.233	-88.233
	2	-6.883	30.648	3.034	34.742	-6.883	-30.648	0.000	-25.441	-3.171	-88.233	-88.233
GROUP 3 WIND 5 2	1	4.900	22.136	2.192	25.093	4.900	0.000	-22.136	33.338	3.925	111.060	111.060
	2	-4.900	22.136	2.192	25.093	-4.900	-22.136	0.000	33.338	3.925	111.060	111.060
LIVE LOAD LL 1	1	88.280	-9.778	-0.493	-0.856	88.280	144.142	-134.364	0.000	0.000	0.000	0.000
	2	1.175	4.400	0.493	6.234	1.175	-4.400	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 2	1	120.018	45.987	3.489	29.208	120.018	144.142	-190.129	0.000	0.000	0.000	0.000
	2	58.892	-54.273	-3.489	-20.922	58.892	54.273	0.000	0.000	0.000	0.000	0.000
LIVE LOAD LL 3	1	102.588	22.904	1.623	12.075	102.588	129.728	-152.632	0.000	0.000	0.000	0.000
	2	108.491	-23.735	-1.623	-11.244	108.491	151.842	-128.108	0.000	0.000	0.000	0.000
LIVE LOAD LL 4	1	-1.585	-5.170	-0.419	-3.855	-1.585	0.000	5.170	0.000	0.000	0.000	0.000
	2	8.647	6.864	0.419	2.162	8.647	20.184	-27.047	0.000	0.000	0.000	0.000
LIVE LOAD LL 5	1	-5.547	-21.075	-1.772	-17.117	-5.547	0.000	21.075	0.000	0.000	0.000	0.000
	2	102.064	29.847	1.772	8.344	102.064	168.509	-198.356	0.000	0.000	0.000	0.000
LIVE LOAD LL 6	1	42.166	33.303	1.990	9.571	42.146	0.000	-33.303	0.000	0.000	0.000	0.000
	2	125.210	-23.863	-1.990	-19.012	125.210	202.383	-178.520	0.000	0.000	0.000	0.000
LIVE LOAD LL 7	1	11.774	19.330	1.280	8.263	11.774	0.000	-19.330	0.000	0.000	0.000	0.000
	2	77.681	-17.461	-1.280	-10.132	77.681	105.566	-88.105	0.000	0.000	0.000	0.000
LIVE LOAD LL 8	1	80.201	60.575	4.110	27.990	80.201	39.177	-99.752	0.000	0.000	0.000	0.000
	2	98.709	-57.512	-4.110	-31.053	98.709	145.617	-88.105	0.000	0.000	0.000	0.000
LIVE LOAD LL 9	1	65.367	32.287	1.898	8.614	65.367	35.259	-67.546	0.000	0.000	0.000	0.000
	2	126.017	-22.248	-1.898	-18.653	126.017	217.841	-195.593	0.000	0.000	0.000	0.000
LIVE LOAD LL10	1	33.489	37.857	2.434	14.605	33.489	0.000	-37.857	0.000	0.000	0.000	0.000
	2	123.189	-32.093	-2.434	-20.370	123.189	182.684	-150.592	0.000	0.000	0.000	0.000
LIVE LOAD LL11	1	86.695	-14.948	-0.912	-4.711	86.695	144.142	-129.194	0.000	0.000	0.000	0.000
	2	9.822	11.264	0.912	8.395	9.822	15.784	-27.047	0.000	0.000	0.000	0.000
LIVE LOAD LL12	1	106.590	36.735	2.763	22.817	106.590	129.728	-166.463	0.000	0.000	0.000	0.000
	2	60.765	-42.668	-2.763	-16.884	60.785	67.011	-24.343	0.000	0.000	0.000	0.000

CAP ANALYSIS AND DESIGN DATA

CAP MOMENTS AND SHEARS

	MOMENTS (KIP-FEET)							**	SHEARS (KIPS)				
POINT	D.L.TOT.	G1 MAX.+	G1 MAX.-	G2 MAX.+	G2 MAX.-	G3 MAX.+	G3 MAX.-	DL T.LT	DL T.RT	G1 + LT	G1 + RT	G1 - LT	G1 - RT
P 1	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.989	-147.786	-3.989	-147.786	-3.989	-229.492
P 2	-469.842	-469.842	-721.496	-469.842	-469.842	-469.842	-620.533	-155.143	-155.143	-155.143	-155.143	-236.849	-236.849
C 1L	-586.872	-586.872	-899.804	-586.872	-586.872	-586.872	-774.257	-156.935		-156.935		-238.641	
C 1R	-593.458	-547.705	-1114.316	-429.475	-769.187	-463.510	-1056.892		235.739		428.103		223.696
P 3	-417.325	-380.604	-793.910	-268.715	-576.579	-302.400	-786.700	233.948	233.948	426.312	426.312	221.905	221.905
P 4	-107.134	11.431	-245.459	14.112	-237.063	41.664	-309.082	230.759	86.339	423.123	172.044	218.716	74.296
P 5	361.775	802.563	311.183	361.775	361.775	625.720	331.481	72.210	-72.210	157.915	-64.691	60.167	-150.031
P 6	-107.134	121.535	-245.398	22.796	-228.379	137.679	-265.750	-86.339	-230.759	-78.820	-223.240	-164.160	-412.840
P 7	-417.325	-341.306	-768.225	-258.071	-565.935	-227.498	-722.805	-233.948	-233.948	-226.429	-226.429	-416.029	-416.029
C 2L	-593.458	-519.636	-1064.391	-417.729	-757.441	-403.338	-981.877	-235.739		-228.220		-417.820	
C 2R	-586.872	-586.872	-1017.502	-586.872	-586.872	-586.872	-844.734		156.935		269.371		156.935
P 8	-469.842	-469.842	-816.146	-469.842	-469.842	-469.842	-677.210	155.143	155.143	267.580	267.580	155.143	155.143
P 9	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	147.786	3.989	260.222	3.989	147.786	3.989

CAP DESIGN DATA

PT.	M+ UNF. K-FT.	M- UNF. K-FT.	TOP REINFORCE. AS	NO.SIZE	BOT.REINFORCE. AS	NO.SIZE	LEFT STIRRUPS M.SP.	AV/IN	BAR&SPAC	RIGHT STIRRUPS M.SP.	AV/IN	BAR&SPAC	D IN.	FC PSI	PS %	FS/FF RATIO	FS/FZ RATIO
P 1	-2.562	-2.562	1.76	4 # 11	1.76	4 # 11	0.00	0.000	#5@ 0.00	18.98	0.036	#5@17.37	42.00		0.11	0.000	0.006
P 2	-361.417	-477.333	4.34	4 # 11	1.76	4 # 11	18.98	0.040	#5@15.70	18.98	0.040	#5@15.70	42.00		0.27	0.376	1.072
C 1	-435.431	-732.052	6.62	5 # 11	1.76	4 # 11	19.50	0.037	#5@16.69	19.50	0.132	#5@ 4.68	42.00		0.43	0.739	0.982
P 3	-304.105	-531.800	4.66	3 # 11	1.76	4 # 11	19.50	0.132	#5@ 4.71	19.50	0.132	#5@ 4.71	42.00		0.28	0.982	1.387
P 4	-27.798	-177.909	2.70	4 # 11	1.76	4 # 11	18.98	0.136	#5@ 4.57	18.98	0.035	#5@17.71	42.00		0.30	0.343	0.400
P 5	481.323	254.985	1.76	4 # 11	4.71	4 # 11	19.50	0.035	#5@17.71	19.50	0.035	#5@17.71	42.00		0.29	0.637	0.863
P 6	47.582	-146.097	2.32	4 # 11	1.76	4 # 11	18.98	0.035	#5@17.71	18.98	0.130	#5@ 4.75	42.00		0.25	0.358	0.000
P 7	-248.353	-482.650	4.63	4 # 11	1.76	4 # 11	18.98	0.132	#5@ 4.70	18.98	0.132	#5@ 4.70	42.00		0.29	0.678	1.084
C 2	-389.145	-674.348	6.32	5 # 11	1.76	4 # 11	19.50	0.127	#5@ 4.87	19.50	0.053	#5@11.79	42.00		0.41	0.684	0.905
P 8	-361.417	-520.931	4.79	4 # 11	1.76	4 # 11	19.50	0.052	#5@11.99	19.50	0.052	#5@11.99	42.00		0.29	0.498	0.934
P 9	-2.562	-2.562	1.76	4 # 11	1.76	4 # 11	18.98	0.052	#5@12.02	0.00	0.000	#5@ 0.00	42.00		0.11	0.000	0.006

NOTE: *** FS/FZ RATIO EXCEEDS 1.0! ***

COLUMN ANALYSIS AND DESIGN OUTPUT

CRITICAL COLUMN LOADS

CN	T B	GR	LLC	NC	R	E S	C F	S F	PF	MTF	MLF	PM	MTM	MLM	PU	MTU	MLU	PU/PM	B	D
1	T	1	LL 2	0.0			C	S	681.4	214.5	42.3	681.4	223.7	244.9	2214.3	729.1	798.3	3.251	36.00	36.00
1	B	3	LL12	4.2			C	S	614.1	248.9	687.6	614.1	257.2	800.7	1074.1	450.3	1401.8	1.750	36.00	36.00
2	T	1	LL10	0.0			C	S	631.9	31.8	42.3	631.9	196.7	224.0	2247.1	701.8	799.2	3.558	36.00	36.00
2	B	3	LL 3	4.2			C	S	520.3	198.1	687.6	520.3	205.0	780.5	956.3	377.2	1436.0	1.839	36.00	36.00

COLUMN DESIGN DATA

CN	T B	B FACE 1 NO.SIZE	B FACE 2 NO.SIZE	D FACE 3 NO.SIZE	D FACE 4 NO.SIZE	AS	PS	BD12	BD	SUMPU	SUMPC	DEL.T	DEL.L	CM	R	PHIC
1	T	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.024	1209.	29394.	1.043	1.198	1.000	2	0.70
1	B	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.020	1038.	32184.	1.033	1.164	1.000	2	0.70
2	T	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.000	1160.	32074.	1.038	1.182	1.000	2	0.70
2	B	4 # 11	4 # 11	2 # 11	2 # 11	18.72	1.444	1.00	0.000	1095.	32161.	1.035	1.135	1.000	2	0.70

FOOTING 1 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
1	3	LL12	3.2		C	S	453.396	200.634	18.267	517.382	19.227	159.794	13.625	79.767	225.936	20.786	0.000	-0.547	MAX.P1
1	1	LL12	0.0		C	S	648.978	203.428	19.268	327.556	14.031	183.830	89.664	157.380	251.546	27.844	0.000	-0.712	MAX.MT
1	3	LL12	4.2		C	S	585.721	242.851	22.178	687.630	25.491	211.838	17.626	97.744	291.956	26.471	0.000	-0.712	MAX.VT
1	3	LL12	4.2		C	S	585.721	242.851	22.178	687.630	25.491	211.838	17.626	97.744	291.956	26.471	0.000	-0.712	MAX.VP
1	3	LL12	4.2		C	S	585.721	242.851	22.178	687.630	25.491	211.838	17.626	97.744	291.956	34.620	0.000	-0.712	MAX.ML
1	3	LL12	4.2		C	S	585.721	242.851	22.178	687.630	25.491	211.838	17.626	97.744	291.956	34.620	0.000	-0.712	MAX.VL
1	3	LL 6	4.2		C	S	399.335	176.277	16.444	528.946	19.609	151.733	2.339	60.797	210.191	18.306	0.000	-0.547	MAX.P3

FOOTING 1 ANALYSIS/DESIGN RESULTS

FOOTING SIZE				* BAR REINFORCEMENT STEEL				* SECTION CAPACITIES				
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
7.000	7.000	3.500	0.941	0.32	12 # 4 @	7.000	TOP TRAN	40.055	31.681	63.361	26.250	0.000
				0.39	14 # 4 @	6.000	BOT.LONG	47.545	32.284	64.568	26.750	0.000

NUMBER OF PILES = 4 BP = 2.000 DP = 2.000

FOOTING 2 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD
2	3	LL 9	4.2		C	S	391.951	148.771	12.648	528.946	19.609	150.319	17.524	60.422	193.217	24.035	-0.016	2.110	MAX.P1
2	3	LL 9	1.2		C	S	501.179	234.072	19.995	614.404	23.072	178.348	23.869	91.437	245.916	32.008	-0.021	2.686	MAX.MT
2	3	LL 6	4.2		C	S	508.703	193.032	16.348	687.630	25.491	195.284	22.651	78.262	250.895	31.188	-0.021	2.737	MAX.VT
2	3	LL10	5.2		C	S	522.281	122.140	9.819	615.658	23.376	200.275	45.281	80.060	235.055	29.784	-0.021	2.828	MAX.VP
2	3	LL 9	5.2		C	S	516.585	159.106	13.448	690.177	25.575	202.468	29.204	75.020	248.284	43.348	-0.021	2.790	MAX.ML
2	3	LL 6	4.2		C	S	508.703	193.032	16.348	687.630	25.491	195.284	22.651	78.262	250.895	42.890	-0.021	2.737	MAX.VL
2	3	LL12	3.2		C	S	337.248	164.003	13.168	517.382	19.227	133.315	3.387	50.074	180.002	21.679	-0.016	1.741	MAX.P3

FOOTING 2 ANALYSIS/DESIGN RESULTS

FOOTING SIZE				* BAR REINFORCEMENT STEEL				* SECTION CAPACITIES				
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
7.500	7.500	3.500	0.805	0.36	14 # 4 @	6.375	TOP TRAN	43.573	31.681	63.361	26.250	0.000
				0.49	19 # 4 @	4.625	BOT.LONG	60.019	32.284	64.568	26.750	0.000

NUMBER OF PILES = 4 BP = 2.250 DP = 2.250

CALCULATION COVER SHEET

PROJECT	JOB NO.	CALC NO.	SHEET
I-75 / I-575 NORTHWEST CORRIDOR	NH000-0575-01(028)	BR#41	1

SUBJECT	DISCIPLINE
References for Design	STRUCTURAL

CALCULATION STATUS DESIGNATION	PRELIMINARY	CONFIRMED	SUPSEDED	VOIDED	INCOMPLETE
					X

COMPUTER PROGRAM/TYPE	SCP	MAINFRAME	PC	PROGRAM	VERSION/RELEASE NO.
	YES NO			NONE	

Note 1: Georgia Department of Transportation (GDOT) terminated Contract Number TOURDPPI60072 for its convenience the completion of all work under that contract and directed that the work with respect to these calculations be discontinued.
(a) These calculations were not completed at the time of GDOT's direction and the information contained herein is not and/or has not been fully verified or checked. These calculations are a work-in-progress and are presented only as such.
(b) Any user is cautioned that the use of these calculations and any related information or calculations, without access to factors and without proper regard for their purpose, could lead to erroneous conclusions.
(c) If any such calculations or any information contained herein is used in future work efforts or any follow on design work a complete confirmation of the information contained herein should be performed prior to any such use.
(d) GTP has no responsibility for the use of this information not under its direct control.

Included Reference Information:

- Roadway information
- Bridge Survey Shots
- Existing Bridge Plans
- Existing Bridge Maintenance Reports
- BFI

NO.	REASON FOR REVISION	TOTAL NO. OF SHEETS	LAST SHEET NO.	BY	CHECKED	APPROVED/ ACCEPTED	DATE
A	As per GDOT's termination for convenience direction	68	68	JCR			11/30/09

RECORD OF REVISIONS

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Roadway Information
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Delta:	7°53'29.9842" Right
Degree of Curvature (Arc):	0°30'09.3404"
Length:	1570.1846
Tangent:	786.3358
Chord:	1568.9437
Middle Ordinate:	27.0231
External:	27.0873
Tangent Direction:	N 9°58'01.6382" E
Radial Direction:	S 80°01'58.3618" E
Chord Direction:	N 13°54'46.6305" E
Radial Direction:	S 72°08'28.3776" E
Tangent Direction:	N 17°51'31.6226" E

Element: Linear

PT	( )	1368+00.0022	1484719.7330	2184384.4046
PI	( )	1384+47.6847	1486288.0224	2184889.7027
Tangential Direction:		N 17°51'31.6226" E		
Tangential Length:		1647.6825		

Element: Linear

PI	( )	1384+47.6847	1486288.0224	2184889.7027
PI	( )	1389+42.8269	1486759.1245	2185042.1119
Tangential Direction:		N 17°55'38.0529" E		
Tangential Length:		495.1422		

Element: Linear

PI	( )	1389+42.8269	1486759.1245	2185042.1119
PI	( )	1420+82.6016	1489747.2331	2186006.1617
Tangential Direction:		N 17°52'52.3028" E		
Tangential Length:		3139.7746		

Element: Linear

PI	( )	1420+82.6016	1489747.2331	2186006.1617
PI	( )	1426+21.8963	1490260.1577	2186172.7362
Tangential Direction:		N 17°59'29.1404" E		
Tangential Length:		539.2947		

Element: Linear

PI	( )	1426+21.8963	1490260.1577	2186172.7362
PC	( )	1433+09.8191	1490915.3065	2186382.5409
Tangential Direction:		N 17°45'25.6894" E		
Tangential Length:		687.9229		

Element: Circular

PC	( )	✓1433+09.8191	✓1490915.3065	✓2186382.5409
PI	( )	1443+73.8216	✓1491928.6175	✓2186707.0435
CC	( )		1491793.6572	2183639.7504
PT	( )	✓1453+48.2366	✓1492909.5117	✓2186294.7963
Radius:		✓2880.0000		
Delta:		40°33'10.8970" Left		
Degree of Curvature (Arc):		1°59'21.9724"		

BR#40
575 o/
Noorday
North
&
BR#41
575 o/
Towne Lk

PROJECT:	NW Corridor
COUNTY:	CHEROKEE
BRIDGE:	40 & 41
DESCRIPTION:	I-575 over Noonday Ck North & Towne Lake Pkwy

VERTICAL GRADE DATA FOR NEW ALIGNMENT:

PVC =	1437+00.	PVI =	1443+90.	PVT =	1450+80.
PVI EL. =	891.55	PVI EL. =	895.87	PVI EL. =	914.08
		VC Length (ft) =	1380.00		

BR 40

ELEVATION COMPARISON

BENT 1R LEFT SIDE

Geomath Rdy EL. =	891.651
Survey EL. =	891.615
DIFFERENCE =	0.036
Dist. to PGL =	6.5269
PGL EL. =	892.0720
PGL STA. =	1437+81.67

BENT 1R RIGHT SIDE

Geomath Rdy EL. =	895.713
Survey EL. =	895.645
DIFFERENCE =	0.068
Dist. to PGL =	57.2121
PGL EL. =	891.6402
PGL STA. =	1437+24.91

BENT 2R LEFT SIDE

Geomath Rdy EL. =	892.210
Survey EL. =	892.287
DIFFERENCE =	-0.077
Dist. to PGL =	6.3993
PGL EL. =	892.7350
PGL STA. =	1438+58.77

BENT 2R RIGHT SIDE

Geomath Rdy EL. =	896.431
Survey EL. =	896.452
DIFFERENCE =	-0.021
Dist. to PGL =	61.0193
PGL EL. =	892.1806
PGL STA. =	1437+88.59

BENT 3R LEFT SIDE

Geomath Rdy EL. =	892.830
Survey EL. =	892.860
DIFFERENCE =	-0.030
Dist. to PGL =	6.4707
PGL EL. =	893.3129
PGL STA. =	1439+20.51

BENT 3R RIGHT SIDE

Geomath Rdy EL. =	897.235
Survey EL. =	897.260
DIFFERENCE =	-0.025
Dist. to PGL =	65.3974
PGL EL. =	892.6622
PGL STA. =	1438+59.71

BENT 4R LEFT SIDE

Geomath Rdy EL. =	893.467
Survey EL. =	893.485
DIFFERENCE =	-0.018
Dist. to PGL =	7.2664
PGL EL. =	893.9936
PGL STA. =	1439+89.94

BENT 4R RIGHT SIDE

Geomath Rdy EL. =	898.094
Survey EL. =	898.049
DIFFERENCE =	0.045
Dist. to PGL =	69.8065
PGL EL. =	893.1583
PGL STA. =	1439+12.05

Cross Slope = 7.0000%

Mean EL. Difference = -0.003

BR 41

ELEVATION COMPARISON

BENT 1R LEFT SIDE

Geomath Rdy EL. =	909.631
Survey EL. =	909.566
DIFFERENCE =	0.065
Dist. to PGL =	6.3103
PGL EL. =	909.0077
PGL STA. =	1448+79.16

BENT 1R RIGHT SIDE

Geomath Rdy EL. =	911.502
Survey EL. =	911.516
DIFFERENCE =	-0.014
Dist. to PGL =	36.2236
PGL EL. =	908.9803
PGL STA. =	1448+74.61

BENT 2R LEFT SIDE

Geomath Rdy EL. =	909.954
Survey EL. =	909.919
DIFFERENCE =	0.035
Dist. to PGL =	5.9572
PGL EL. =	910.0360
PGL STA. =	1449+21.16

BENT 2R RIGHT SIDE

Geomath Rdy EL. =	912.453
Survey EL. =	912.426
DIFFERENCE =	0.027
Dist. to PGL =	35.7543
PGL EL. =	909.9211
PGL STA. =	1449+16.04

BENT 3R LEFT SIDE

Geomath Rdy EL. =	911.826
Survey EL. =	911.878
DIFFERENCE =	-0.052
Dist. to PGL =	5.9049
PGL EL. =	912.2913
PGL STA. =	1450+08.86

BENT 3R RIGHT SIDE

Geomath Rdy EL. =	914.578
Survey EL. =	914.602
DIFFERENCE =	-0.024
Dist. to PGL =	35.7448
PGL EL. =	912.0999
PGL STA. =	1450+02.41

BENT 4R LEFT SIDE

Geomath Rdy EL. =	913.127
Survey EL. =	913.167
DIFFERENCE =	-0.040
Dist. to PGL =	6.4308
PGL EL. =	913.6451
PGL STA. =	1450+61.93

BENT 4R RIGHT SIDE

Geomath Rdy EL. =	915.980
Survey EL. =	915.958
DIFFERENCE =	0.022
Dist. to PGL =	36.6433
PGL EL. =	913.3930
PGL STA. =	1450+54.65

Cross Slope = 7.0000%

Mean EL. Difference = 0.003

Degree of Curvature (Arc):	2°51'53.2403"
Length:	718.1910
Tangent:	363.0047
Chord:	714.3384
Middle Ordinate:	32.1509
External:	32.6762
Tangent Direction:	S 21°27'32.4974" E
Radial Direction:	S 68°32'27.5026" W
Chord Direction:	S 11°10'18.1158" E
Radial Direction:	S 89°06'56.2659" W
Tangent Direction:	S 0°53'03.7341" E

Element: Linear

PT	( )	293+39.3773	1474918.3415	2178583.2832
POE	( )	305+92.5328	1473665.3353	2178602.6251
Tangential Direction:		S 0°53'03.7341" E		
Tangential Length:		1253.1555		

Alignment Name: XR 1280+00 Hawkins Store
Alignment Description: I-575 Hawkins Store Road
Alignment Style: MAIN_P_SIDECL

Element: Linear

		Station	Northing	Easting
POB	( )	346+19.4014	1476189.0826	2182198.5369
POE	( )	353+89.5329	1476184.6832	2182968.6559
Tangential Direction:		S 89°40'21.6972" E		
Tangential Length:		770.1315		

Alignment Name: XR 1449+00 Towne Lake
Alignment Description: I-575 Towne Lake Pkwy
Alignment Style: MAIN_P_SIDECL

Element: Linear

		Station	Northing	Easting
POB	( )	491+04.8011	1492492.6748	2185975.2171
POE	( )	497+98.0939	1492576.4982	2186663.4238
Tangential Direction:		N 83°03'20.1529" E		
Tangential Length:		693.2928		

Trimble, Inc.

Vertical Alignment: Point Profile
Vertical Description: Towne Lake Parkway Point Profile
Vertical Style: Default

Element: Linear

POB	491+04.8011	885.3403
PVI	491+50.0000	885.6466
Tangent Grade:	0.68%	
Tangent Length:	45.1989	

Element: Linear

PVI	491+50.0000	885.6466
PVI	492+00.0000	885.9571
Tangent Grade:	0.62%	
Tangent Length:	50.0000	

Element: Linear

PVI	492+00.0000	885.9571
PVI	492+50.0000	886.1788
Tangent Grade:	0.44%	
Tangent Length:	50.0000	

Element: Linear

PVI	492+50.0000	886.1788
PVI	493+00.0000	886.3983
Tangent Grade:	0.44%	
Tangent Length:	50.0000	

Element: Linear

PVI	493+00.0000	886.3983
PVI	493+50.0000	886.5467
Tangent Grade:	0.30%	
Tangent Length:	50.0000	

Element: Linear

PVI	493+50.0000	886.5467
PVI	494+00.0000	886.6954
Tangent Grade:	0.30%	
Tangent Length:	50.0000	

Element: Linear

PVI	494+00.0000	886.6954
PVI	494+50.0000	886.9474
Tangent Grade:	0.50%	
Tangent Length:	50.0000	

Element: Linear

PVI	494+50.0000	886.9474
PVI	495+00.0000	887.2260
Tangent Grade:	0.56%	
Tangent Length:	50.0000	

Element: Linear

PVI	495+00.0000	887.2260
PVI	495+50.0000	887.5693
Tangent Grade:	0.69%	
Tangent Length:	50.0000	

Element: Linear

PVI	495+50.0000	887.5693
PVI	496+00.0000	888.0387
Tangent Grade:	0.94%	
Tangent Length:	50.0000	

Element: Linear

PVI	496+00.0000	888.0387
PVI	496+50.0000	888.4604
Tangent Grade:	0.84%	
Tangent Length:	50.0000	

Element: Linear

PVI	496+50.0000	888.4604
PVI	497+00.0000	888.7949
Tangent Grade:	0.67%	
Tangent Length:	50.0000	

Element: Linear

PVI	497+00.0000	888.7949
PVI	497+50.0000	889.1145
Tangent Grade:	0.64%	
Tangent Length:	50.0000	

Element: Linear

PVI	497+50.0000	889.1145
POE	497+98.0939	889.1487
Tangent Grade:	0.07%	
Tangent Length:	48.0939	

J.B.Trimble, Inc.

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bridge Survey Shots
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Town Lake Pkwy, Br. 14

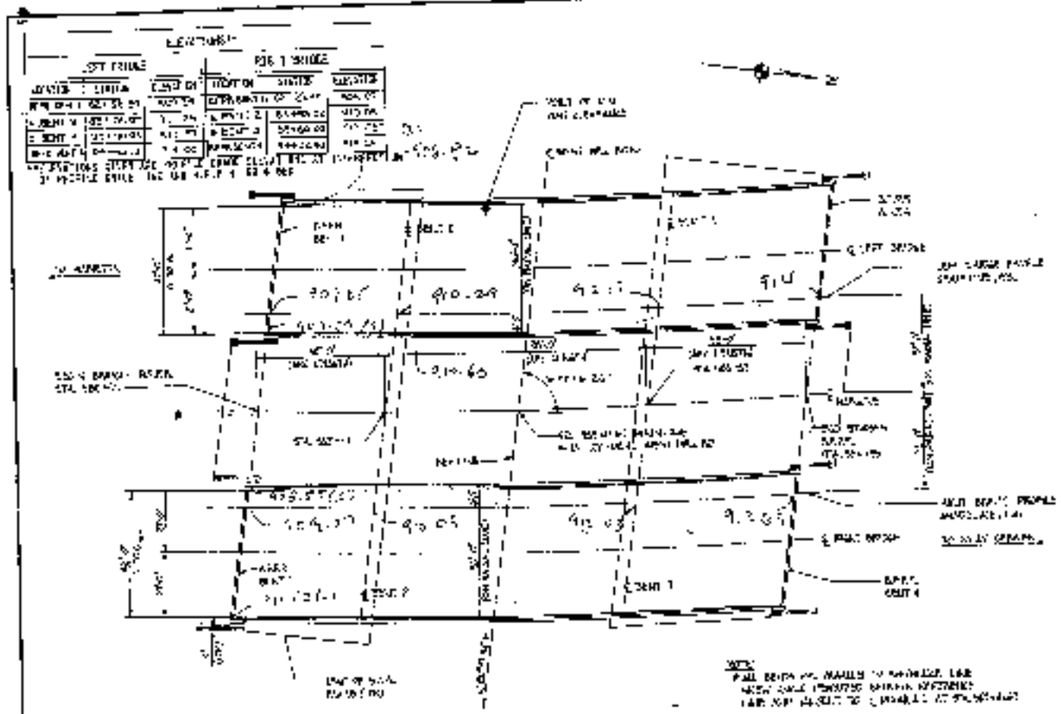
SVXO10582	1492456.213	2186383.327	909.592	BT	1 LT, In
SVXO10589	1492451.175	2186340.274	906.820	BT	1 LT, Out
SVXO10583	1492497.038	2186372.490	910.603	BT	2 LT, In
SVXO10588	1492491.782	2186330.737	907.867	BT	2 LT, Out
SVXO10584	1492581.259	2186349.533	912.928	BT	3 LT, In
SVXO10587	1492576.260	2186307.520	910.204	BT	3 LT, Out
SVXO10586	1492627.252	2186291.641	911.500	BT	4 LT, Out
SVXO10585	1492632.421	2186334.705	914.299	BT	4 LT, In
SVXO10590	1492462.746	2186434.462	908.566	BT	1 RT, In
SVXO10591	1492503.516	2186424.750	909.619	BT	2 RT, In
SVXO10596	1492508.802	2186466.474	912.426	BT	2 RT, Out
SVXO10592	1492587.996	2186401.896	911.878	BT	3 RT, In
SVXO10595	1492593.229	2186443.721	914.602	BT	3 RT, Out
SVXO10593	1492638.616	2186386.315	913.197	BT	4 RT, In
SVXO10594	1492644.214	2186429.618	915.958	BT	4 RT, Out
SVXO10597	1492468.165	2186476.897	911.516	BT	1 RT, Out

CALCULATION SHEET

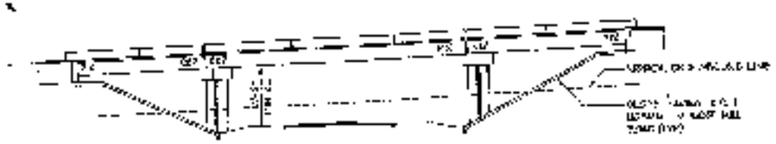
PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Existing Bridge Plans
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.



PLAN

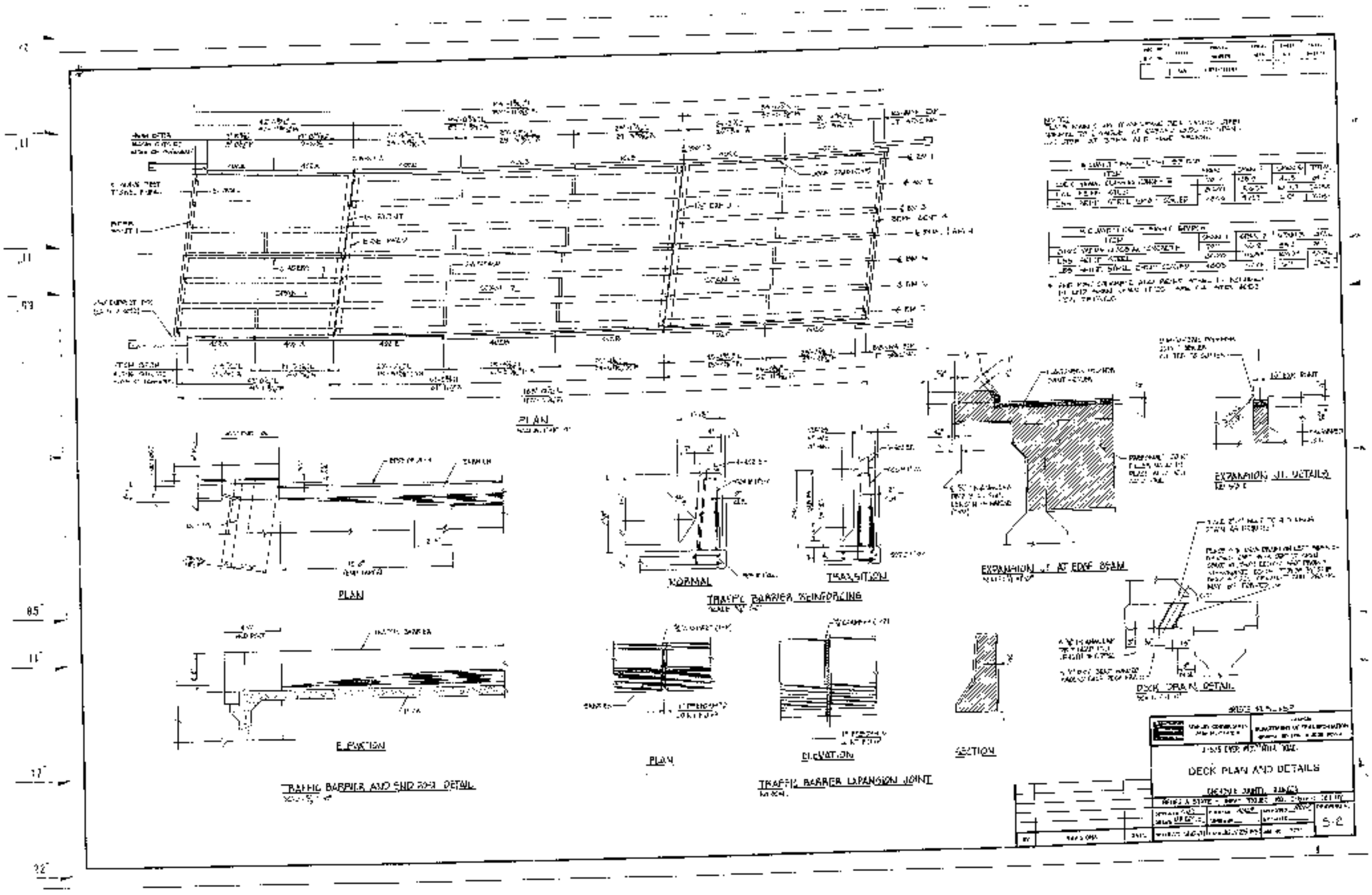


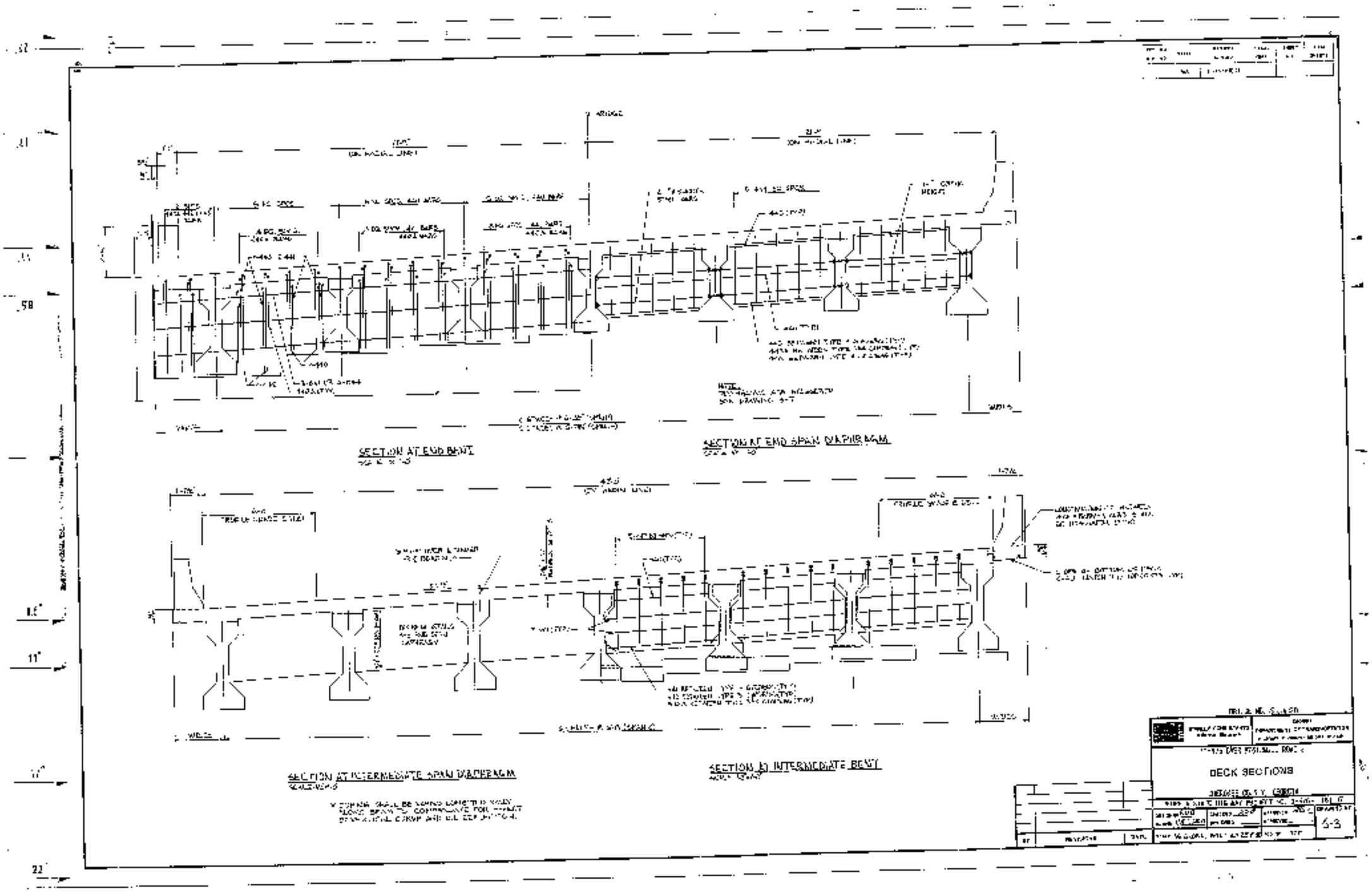
ELEVATION

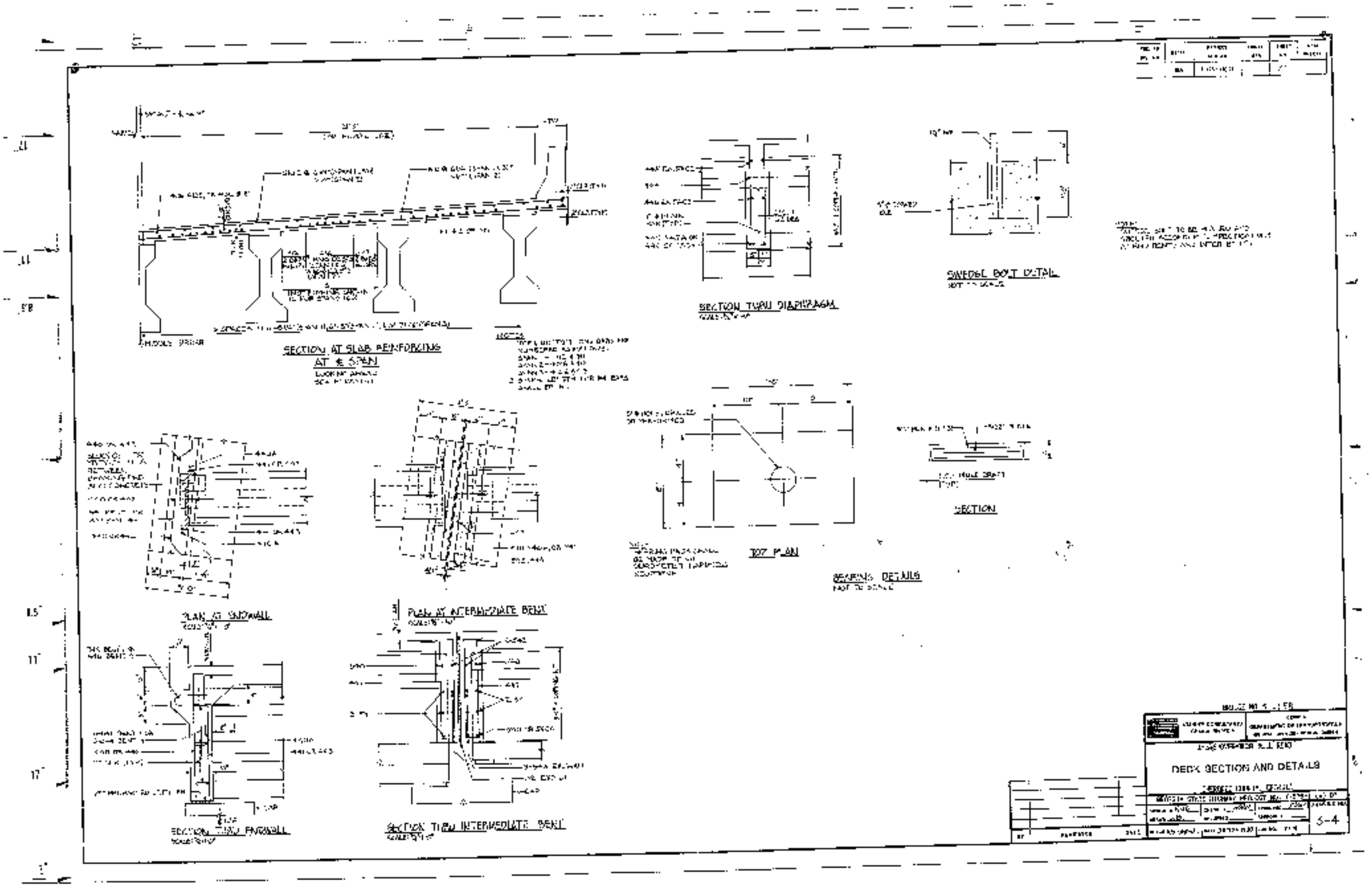
TOWNE LK PKWY

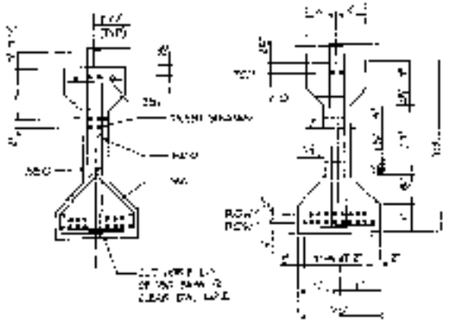
PLAN AND ELEVATION

S-1


PLAN
PLAN
NORMAL
TRANSITION
TRAFFIC BARRIER REINFORCING
EXPANSION JT. AT EDGE BEAM
EXPANSION JT. DETAILS
ELEVATION
TRAFFIC BARRIER AND END POST DETAIL
PLAN
ELEVATION
SECTION
TRAFFIC BARRIER EXPANSION JOINT
DECK DRAIN DETAIL
DECK PLAN AND DETAILS
S-2

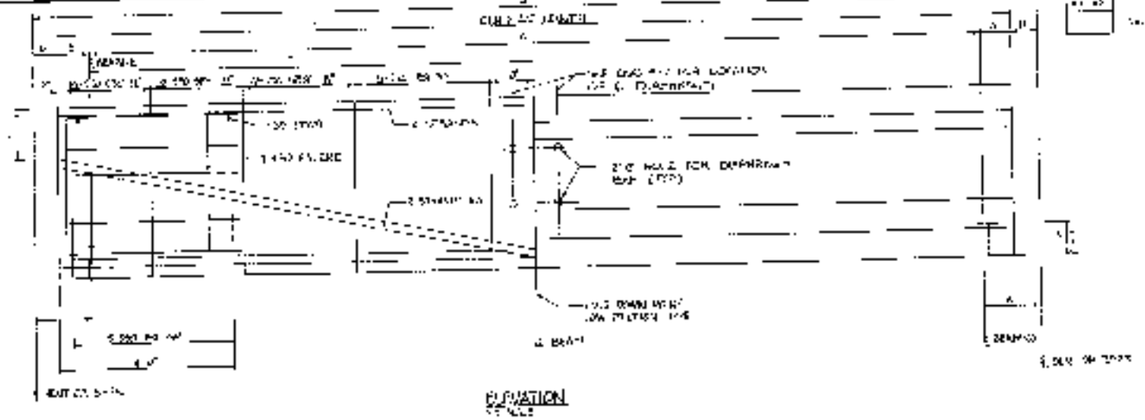

SECTION AT END BENT
SECTION AT END SPAN DIAPHRAGM
SECTION AT INTERMEDIATE SPAN DIAPHRAGM
SECTION AT INTERMEDIATE BENT
DECK SECTIONS
S-3


SECTION AT SLAB REINFORCING
AT ℄ SPAN
SECTION THRU DIAPHRAGM
SWEDGE BOLT DETAIL
PLAN AT SIDEWALL
PLAN AT INTERMEDIATE BENT
TOP PLAN
BEARING DETAILS
SECTION
SECTION THRU SIDEWALL
SECTION THRU INTERMEDIATE BENT
DECK SECTION AND DETAILS
S-4



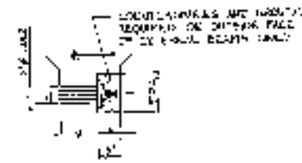
SECTION AT BEAM END

SECTION AT CENTERLINE SPAN

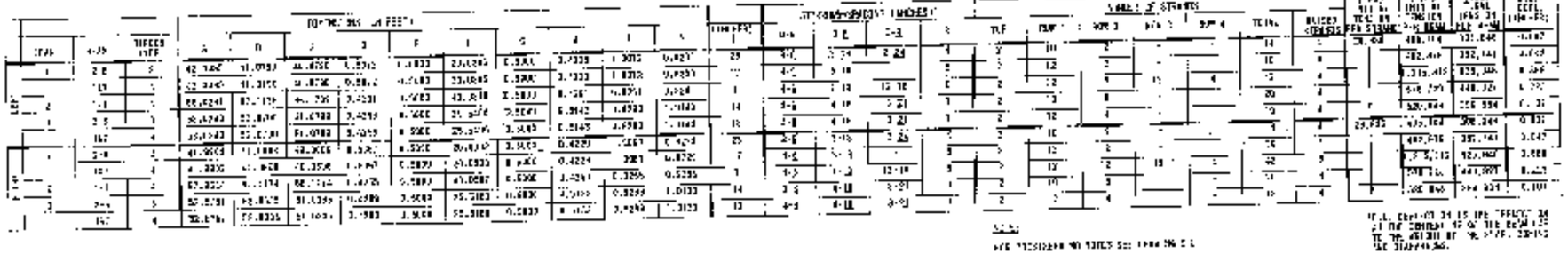


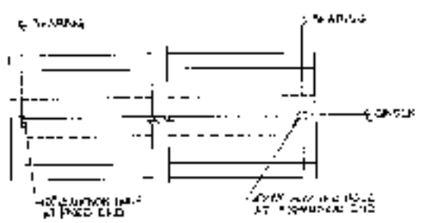
ELEVATION

TYPE 3 GIRDER DETAILS

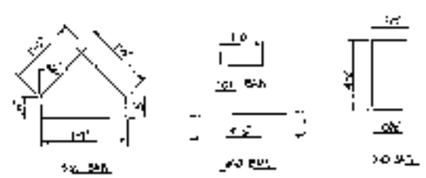


HOLE FOR DIAPHRAGM BARS





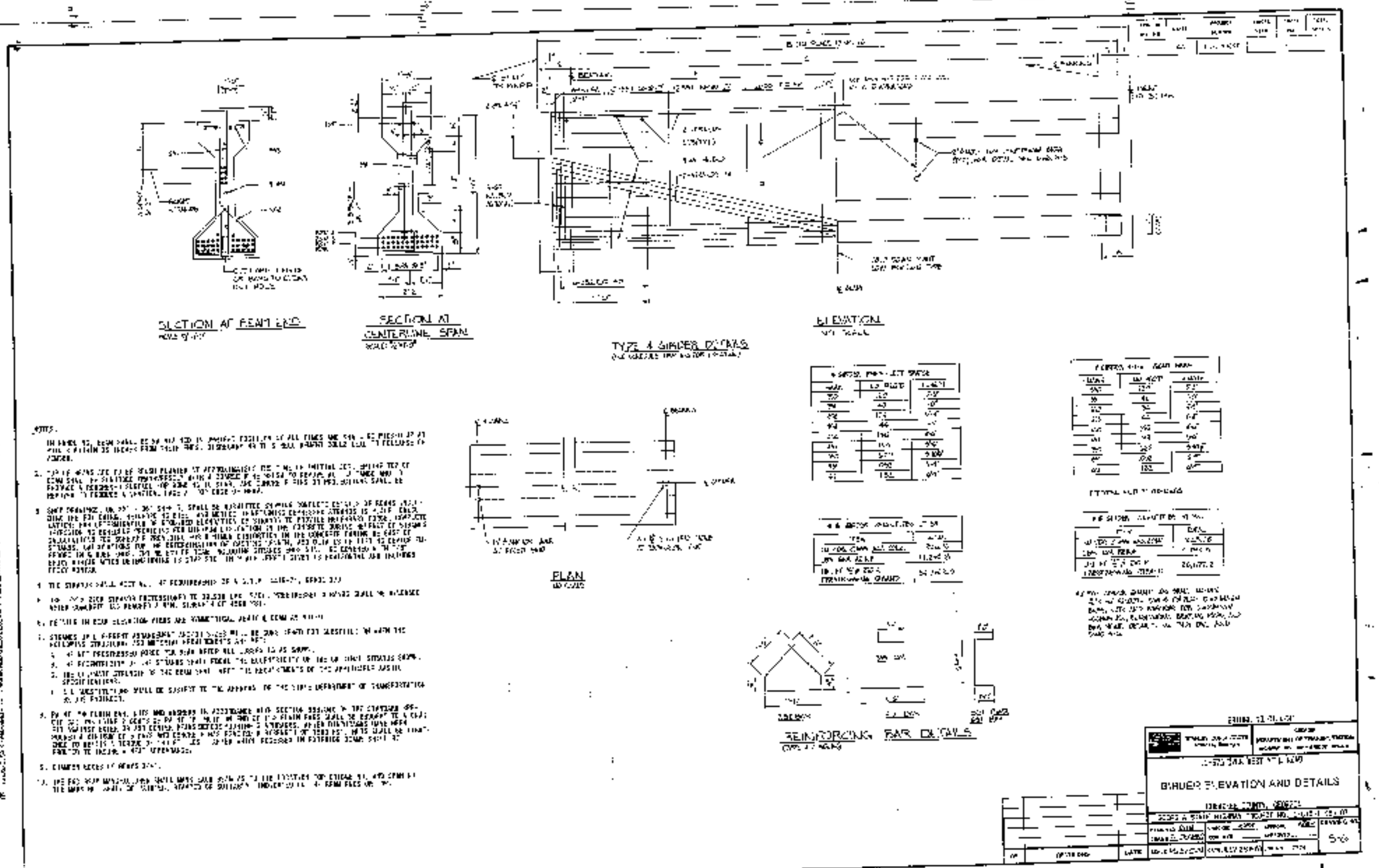
PLAN

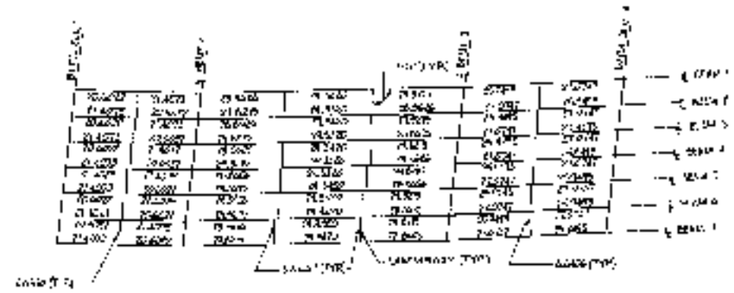


REINFORCING BAR DETAILS

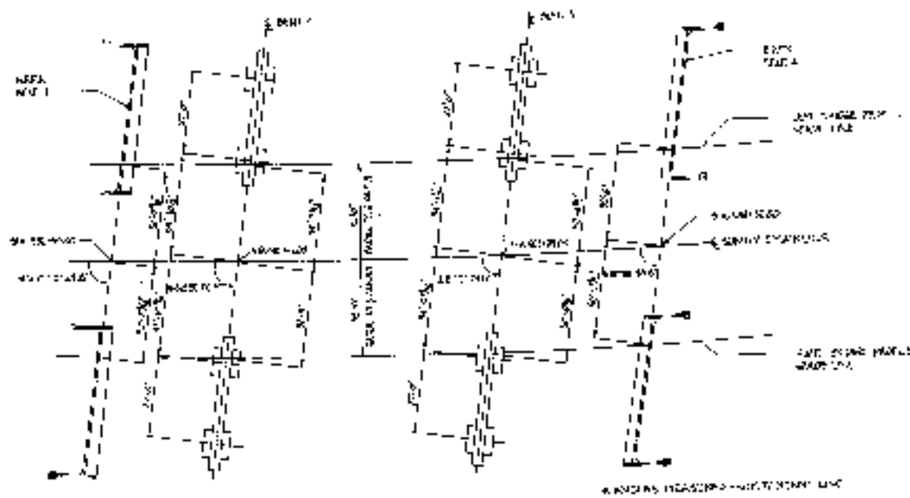
GIRDER ELEVATION AND DETAILS

6-5

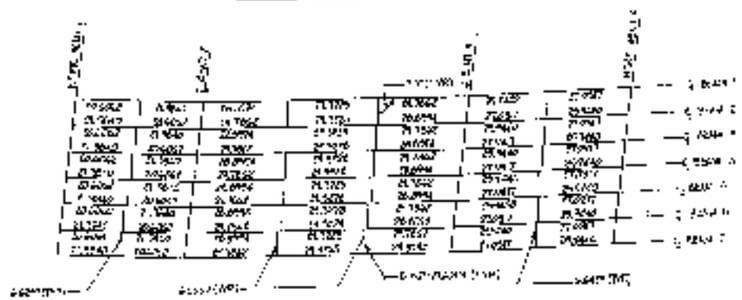

SECTION AT END
SECTION AT CENTERLINE SPAN
TYPE A GIRDER DETAILS
ELEVATION
PLAN
REINFORCING BAR DETAILS
GIRDER ELEVATION AND DETAILS



LEFT BRIDGE BEAM LAYOUT



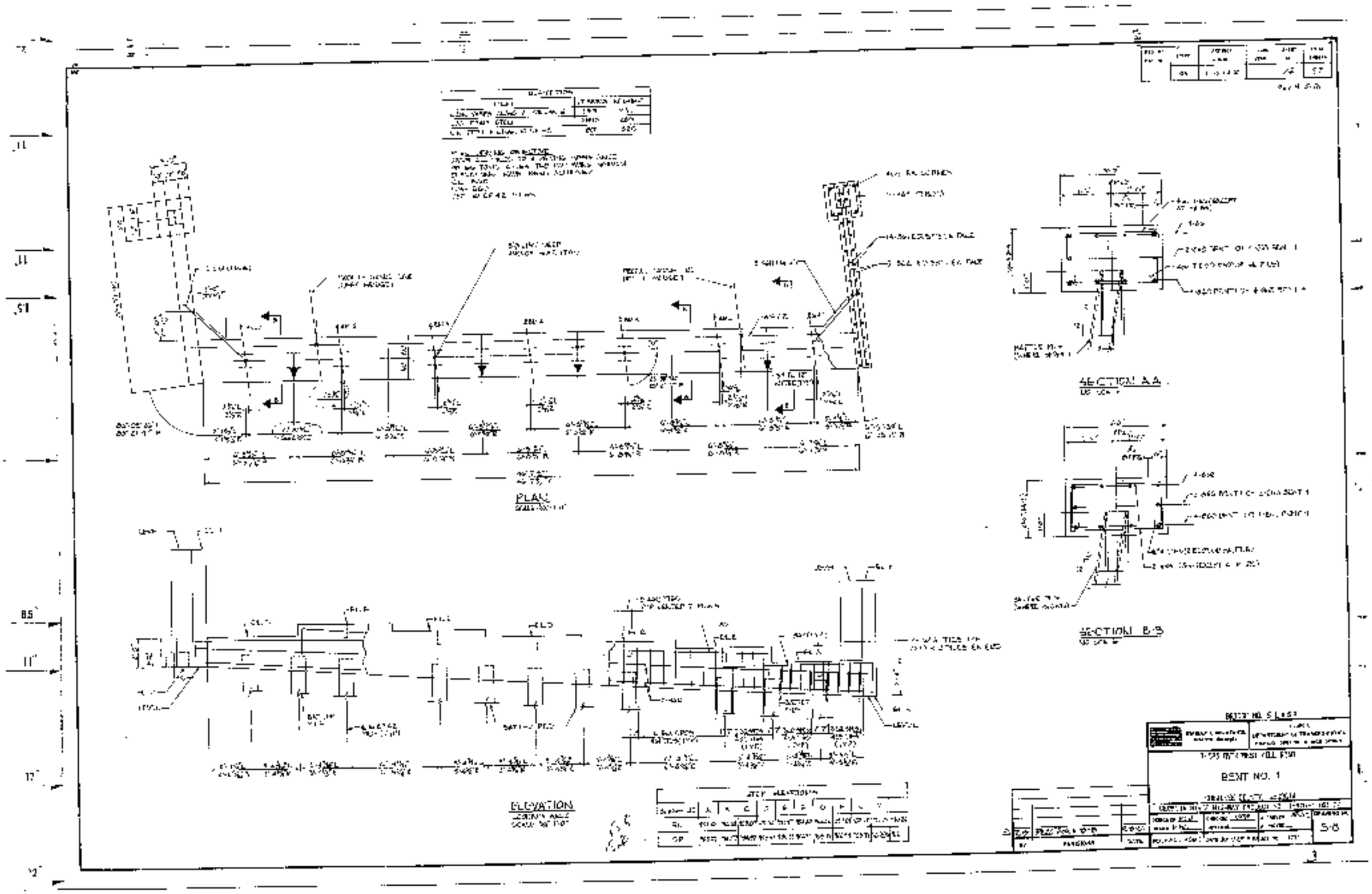
BRIDGE STAKING PLAN

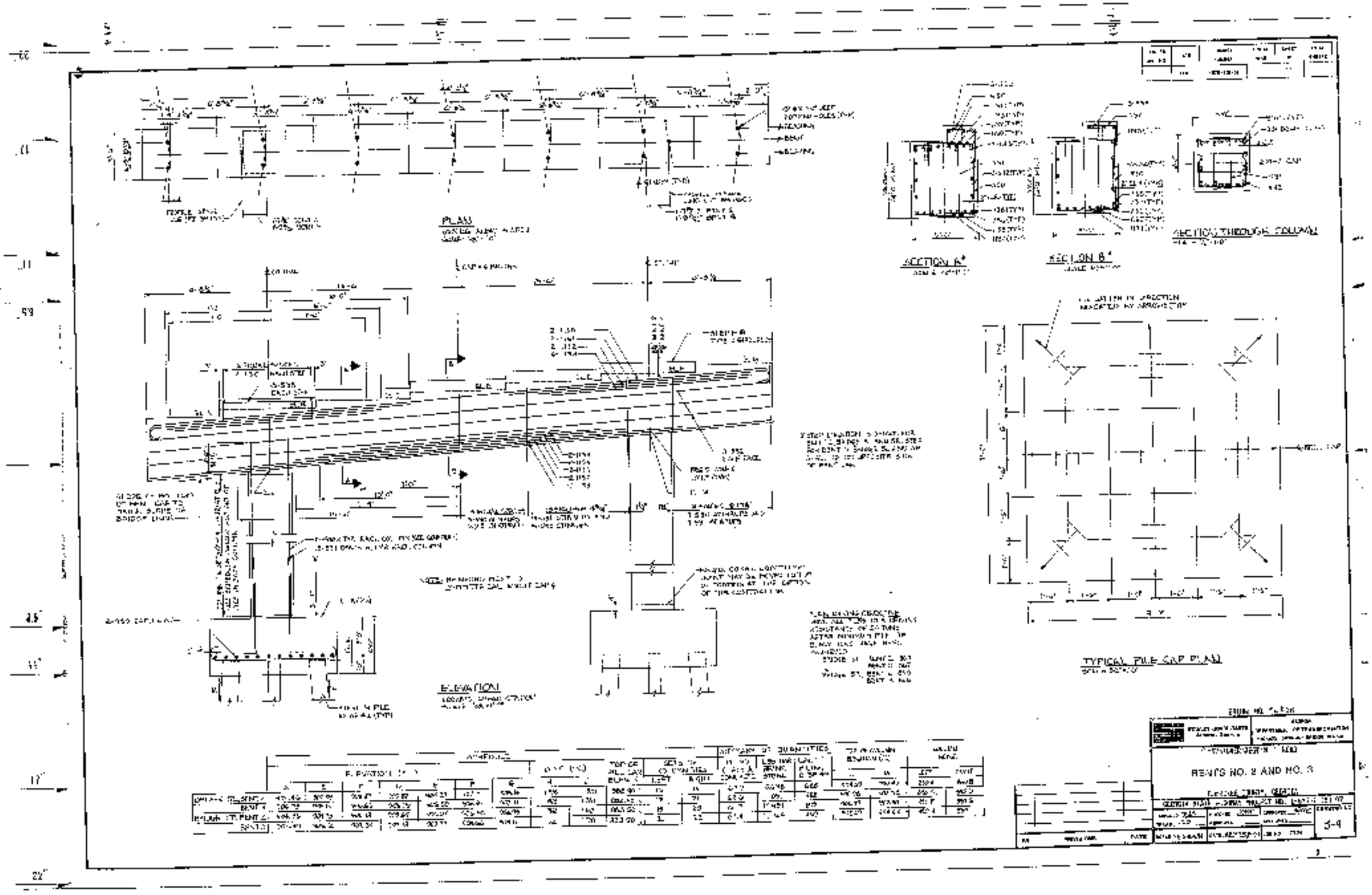


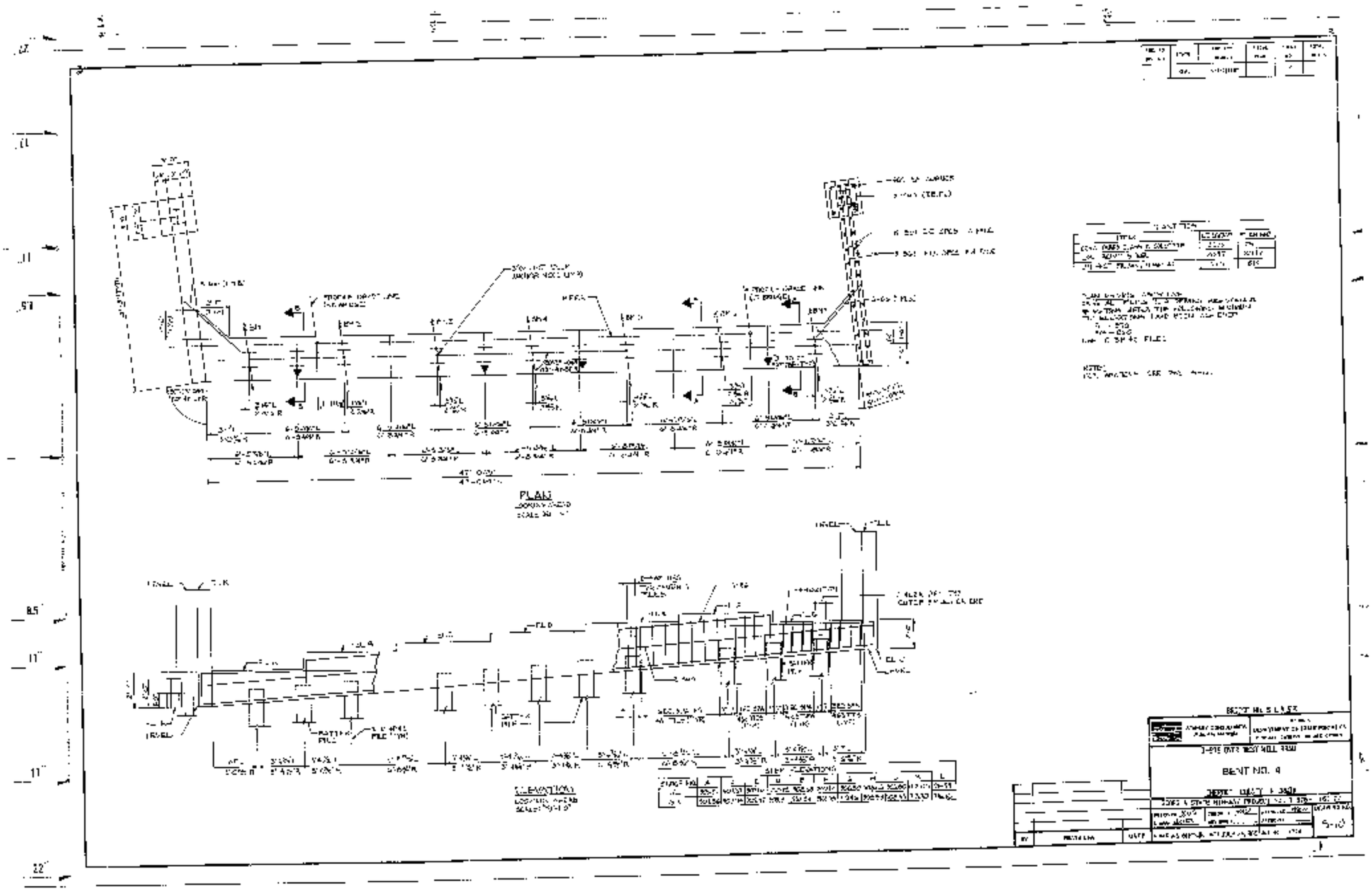
RIGHT BRIDGE BEAM LAYOUT

DIAPHRAGM LAYOUT

5-7


PLAN
ELEVATION
SECTION A-A
SECTION B-B
BENT NO. 1
S-8


PLAN
SECTION A
SECTION B
SECTION THROUGH COLUMN
ELEVATION
TYPICAL PILE CAP PLAN
BENTS NO. 2 AND NO. 3
3-9


PLAN
ELEVATION
BENT NO. 4

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Existing Bridge Maintenance Reports
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

BRIDGE INVENTORY DATA LISTING GEOI A DEPARTMENT OF TRANSPORTATION

Structure ID: 057-0042-0 **Cherokee** SUFF. RATING 68.65

Location & Geography

*	Structure I.D.No:	057-0042-0	
	200 Bridge Information	01	
*	6A Feature Int:	CR 416 TOWN LAKE PKWY	
*	6B Critical Bridge:	0	
*	7A Route Number Carried:	SR00417	
*	7B Facility Carried:	I-575 (NBL)	
*	9 Location:	.7 MI W OF WOODSTOCK	
	2 DOT District:	6	
	207 Year Photo:	2006	
*	91 Inspection Frequency:	24 Date: 03/16/2006	
	92A Fract Crit Insp Freq:	00 Date: 02/01/1901	
	92B Underwater Insp Freq:	00 Date: 02/01/1901	
	92C Other Spc. Insp Freq:	00 Date: 02/01/1901	
*	4 Place Code:	00000	
*	5 Inventory Route (O/U):	1	
	Type:	1	
	Designation:	1	
	Number:	00575	
	Direction:	0	
*	16 Latitude: 34-06.2	MMS Prefix: SR	
*	17 Longitude: 84-31.8	MMS Suffix: 00	MP: 25.00
	98 Border Bridge:	000	%Shared: 00
	99 ID Number:	000000000000000	
*	100 STRAHNET:	1	
	12 Base Highway Network:	1	
	13A LRS Inventory Route:	571041700	
	13B Sub Inventory Route:	0	
*	101 Parallel Structure:	R	
*	102 Direction of Traffic:	1	
*	264 Road Inventory Mile Post:	001.92	
*	208 Inspection Area:	09	Initials: JMC
	Engineer's Initial:	sgm	

* Location I.D. No.: 057-00417D-008.14N

*	104 Highway System:	1	
*	26 Functional Classification:	11	
*	204 Federal Route Type:	I	No.: 05751
	105 Federal Lands Highway:	0	
*	110 Truck Route:	1	
	206 School Bus Route:	0	
	217 Benchmark Elevation:	0000.00	
	218 Datum:	0	
*	19 Bypass Length:	01	
*	20 Toll:	3	
*	21 Maintenance:	01	
*	22 Owner:	01	
*	31 Design Load:	6	
	37 Historical Significance:	5	
	205 Congressional District:	06	
	27 Year Constructed:	1982	
	106 Year Reconstructed:	0000	
	33 Bridge Median:	1	
	34 Skew:	08	
	35 Structure Flared:	0	
	38 Navigation Control:	N	
	213 Special Steel Design:	0	
	267 Type of Paint:	0	
*	42 Type of Service on:	1	
		1	
	214 Movable Bridge:	0	
	203 Type Bridge:	Z-O-O-O	
	259 Pile Encasement:	3	
*	43 Structure Type Main:	5 02	
	45 No. Spans Main:	003	
	44 Structure Type Appr:	0 00	
	46 No. Spans Appr:	0000	
	226 Bridge Curve Horz:	1	Vert: 1
	111 Pier Protection:	0	
	107 Deck Structure Type:	1	
	108 Wearing Surface Type:	1	
	M	0	
	F	1	

Signs & Attachments

	225 Expansion Joint Type:	15	
	242 Deck Drains:	1	
	243 Parapet Location:	0	
	Height:		0.00
	Width:		0.00
	238 Curb:		0.00 0
	239 Handrail:	9	9
*	240 Median Barrier Rail:	0	
	241 Bridge Median Height:		0.00
	Width:		0.00
*	230 Guardrail Loc Dir Rear:	6	
	Fwrd:	0	
	Oppo Dir Rear:	0	
	Fwrd:	0	
	244 Approach Slab:	3	
	224 Retaining Wall:	0	
	233 Posted Speed Limit:	65	
	236 Warning Sign:	0	
	234 Delineator:	1	
	235 Hazard Boards:	0	
	237 Utilities Gas:	00	
	W	00	
	Ele	00	
	Telephone:	00	
	S	00	
	247 Lighting Street:	0	
	Naviagtion:	0	
	Aerial:	0	
*	248 County Continuity No.:	02	

Programming Data

201 Project No.: I-575-1 (6) 07 CT.5
202 Plans Available: 4
249 Prop. Proj. No. 0000000000000000
250 Approval Status: 0000
251 P.I. No.: 0000000
252 Contract Date: 02/01/1901
260 Seismic No.: 00010
75 Type Work: 00 0
94 Bridge Imp. Cost: $ 0
95 Roadway Imp. Cost: $ 0
96 Total Imp Cost: $ 0
76 Imp. Length: 000000
97 Imp. Year: 0000
114 Future ADT: 140610 Year: 2025

Hydraulic Data

215 Waterway Data
Highwater Elev.: 0000.0 Year: 1900
Avg. Streambed Elev.: 0000.0 Freq.: 00
Drainage Area: 00000
Area Of Opening: 000000
113 Scour Critical: N
216 Water Depth: 00.0 Br. Height: 00.0
222 Slope Protection: 4
221 Spur Dikes Rear: 0 Fwrd: 0
219 Fender System: 0
220 Dolphin: 0
223 Culvert Cover: 000
Type: 0
No. Barrels: 0
Width: 0.00 Height: 0.00
Length: 0 Apron: 0
* 265 U/W Insp. Area: 0 Diver: ZZZ

* Location I.D. No.: 057-00417D-008.14N

Measurements

* 29 ADT: 093740 Year: 2005
109 % Trucks: 0
* 28 Lanes On: 02 Under: 04
210 No. Tracks On: 00 Under: 00
* 48 Max. Span Length: 0088
* 49 Structure Length: 183
51 Br. Rwdy. Width: 42.00
52 Deck Width: 45.20
* 47 Tot. Horz. Cl: 42.00
50 Curb/Sdewlk Width: 0.00/0.00
32 Approach Rdwy Width: 038
* 229 Shoulder Width:
Rear Lt: 4.00 Type: 2 Rt: 10.00
Fwrd Lt: 4.00 Type: 2 Rt: 10.00
Pavement Width:
Rear: 24.00 Type: 2
Fwrd: 24.00 Type: 2
Intersection Rear: 1 Fwrd: 1
36 Safety Features Br. Rail: 1
Transition: 1
App. G. Rail: 1
App. Rail End: 1
53 Minimum Cl.Over: 99 ' 99 "
Under: H 17 ' 09 "
* 228 Min. Vertical Cl
Act. Odm Dir: 99 ' 99 "
Oppo. Dir: 99 ' 99 "
Posted Odm. Dir: 00 ' 00 "
Oppo. Dir: 00 ' 00 "
55 Lateral Undercl. Rt: H 8.00
56 Lateral Undercl. Lt: 0.00
* 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
39 Nav Vert Cl: 000 Horz: 0000
116 Nav Vert Cl Closed: 000
245 Deck Thickness Main: 7.60
Deck Thick Approach: 0.00
246 Overlay Thickness: 0.00
212 Year Last Painted: Sup: 0000 Sub: 0000

Ratings

65 Inventory Rating Method: 1
63 Inventory Rating Method: 1
66 Inventory Type: 2 Rating: 21
64 Operating Type: 2 Rating: 34
231 Calculated Loads
H-Modified: 20 0
HS-Modified: 25 0
Type 3: 28 0
Type 3s2: 40 0
Timber: 36 0
Piggyback: 40 0
261 H Inventory Rating: 20
262 H Operating Rating: 28
67 Structural Evaluation: 4
58 Deck Condition: 8
59 Superstructure Condition: 8
* 227 Collision Damage: 0
60A Substructure Condition: 7
60B Scour Condition: N
60C Underwater Condition: N
71 Waterway Adequacy: N
61 Channel Protection Cond: N
68 Deck Geometry: 8
69 UnderClr. Horz/Vert: 4
72 Appr. Alignment: 8
62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
41 Struct Open, Posted, Cl: A
* 103 Temporary Structure: 0
232 Posted Loads H-Modified: 00
HS-Modified: 00
Type 3: 00
Type3s2: 00
Timber: 00
Piggyback: 00
253 Notification Date 02/01/1901
253 Fed Notify Date: 02/01/1901 0

BRIDGE INVENTORY DATA LISTING GEO[A DEPARTMENT OF TRANSPORTATION

Structure ID: 057-0042-0 **Cherokee** SUFF. RATING 68.65

Location & Geography

* Structure I.D.No: 057-0042-0
* 6A Feature Int: SR 417 (I-575) NBL
* 6B Critical Bridge: 0
* 7A Route Number Carried: CR00416
* 7B Facility Carried: TOWN LAKE PKWY
* 9 Location: .7 MI W OF WOODSTOCK
* 91 Inspection Frequency: 00 Date: 02/01/1901
* 4 Place Code: 00000
* 5 Inventory Route (O/U): 2
  Type: 4
  Designation: 1
  Number: 00416
  Direction: 0
* 16 Latitude: 34-06.2 HMMS Prefix:
* 17 Longitud 084-31.8 HMMS Suffix: MP:
* 100 STRAHNET: 0
  12 Base Highway Network: 1
  13A LRS Inventory Route: 572041600
  13B Sub Inventory Route: 0
* 101 Parallel Structure: R
* 102 Direction of Traffic: 2
* 104 Highway System: 0
* 26 Functional Classification: 16
* 204 Federal Route Type: 0 No.:
  105 Federal Lands Highway: 0
* 110 Truck Route: 0
* 19 Bypass Length: 03
* 20 Toll: 3
* 21 Maintenance: 01
* 22 Owner: 01
  27 Year Constructed: 1982
* 42 Type of Service on: 1 Under: 1
* 43 Structure Type Main: 5 02
* 208 Inspection Area: 09 Initials: JMC
* Location I.D. No.: 057-00416X-000.65W
* XReference I.D. No 057-00417D-008.14N

Signs & Attachments

* 240 Median Barrier Rail: 0
* 230 Guardrail Loc Dir Rear: 5
  Fwrd: 5
  Oppo Dir Rear: 0
  Fwrd: 0

Measurements

* 29 ADT: 016900 Year: 1919
* 28 Lanes On: 02 Under: 04
* 48 Max. Span Length: 0088
* 49 Structure Length: 183
* 47 Tot. Horz. Cl: 70.70
* 229 Shoulder Width:
  Rear Lt: 12.00 Type: 2 Rt: 8.00
  Fwrd Lt: 12.00 Type: 2 Rt: 8.00
  Pavement Width:
  Rear: 50.00 Type: 2
  Fwrd: 50.00 Type: 2
  Intersection Rear: 1 Fwrd: 1
* 228 Min. Vertical Cl
  Act. Odm Dir: 17 ' 09 "
  Oppo. Dir: 99 ' 99 "
  Posted Odm. Dir: 00 ' 00 "
  Oppo. Dir: 00 ' 00 "
* 10 Max Min Vert Cl: 18 ' 08 " Dir: 4

Ratings

* 227 Collision Damage: 0

Posting Data

* 103 Temporary Structure: 0
* 248 County Continuity No.: 02

Hydraulic Data

* 265 U/W Insp. Are 0 Diver: ZZZ

GEORGIA DEPARTMENT OF TRANSPORTATION

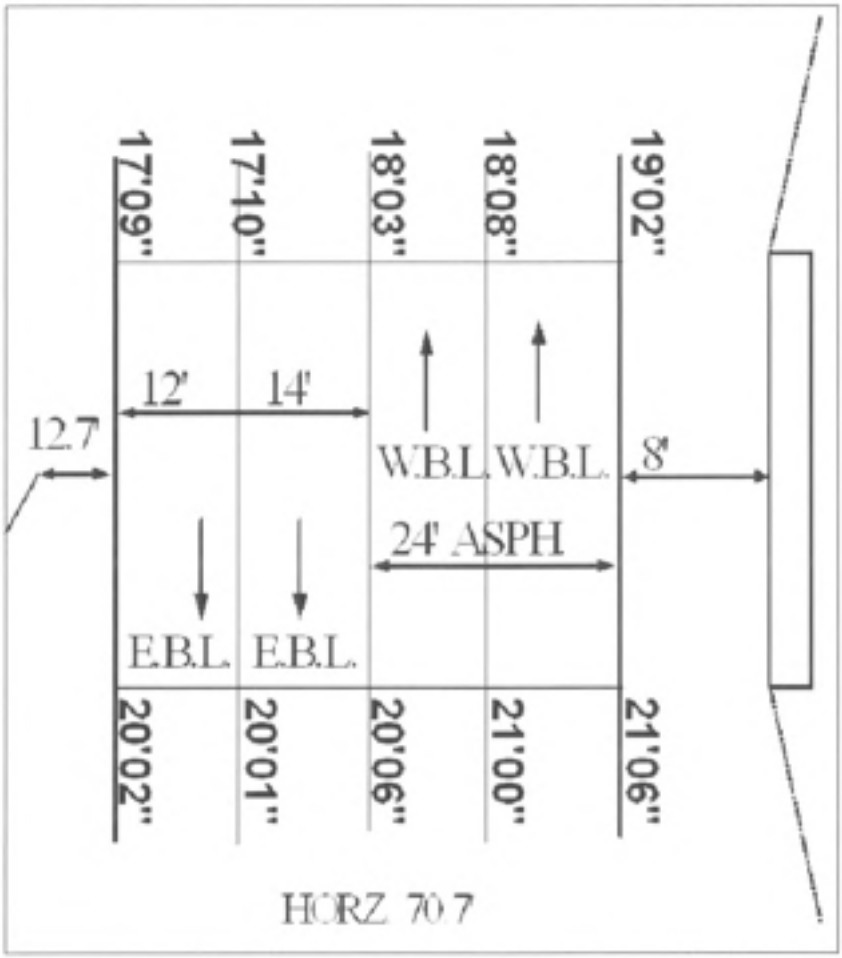
X-Vertical Clearance Report

District: 6 **Inspection Date:** 3/16/2006 **Inspection Area:** 09

Bridge Inspector: Jerry Cooper **Over:** CR 416 TOWN LAKE PKWY

Location ID: 057-00417D-008.14N **County:** Cherokee **Skew:** 08

Structure ID: 057-0042-0 **Road Name:** I-575 (NBL)



XLocationID **057-00416X-000.65W**

XRef ID: 057-0042-0-A

Min Clearance Over:	99-99	**Min Clearance Under:**	17-09	**Clearance Type:**	H
Act Min Vert. Odom:	17-09	**Post Min Vert. Odom:**	00-00		
Act Min Vert. Opp:	99-99	**Post Min Vert. Opp:**	00-00		
Max Min Vert. Clear:	18-08	**Direction:**	West		

Lat Under Cl Right: 8.00 **Left:** 0.00 **Lateral Type:** 4

Rating-Under Cl Horz/Vert: 4 **Total Horizontal Clearance (ft):** 70.70

GEORGIA DEPARTMEN OF TRANSPORTATION

Bridge Component Report

District: 6
Bridge Inspector: Jerry Cooper
Location ID: 057-00417D-008.14N
Structure ID: 057-0042-0

Inspection Date: 3/16/2006
Over: CR 416 TOWN LAKE PKWY
County: Cherokee
Road Name: I-575 (NBL)

Inspection Area: 09

SubStructure Data

Bent#	Type	Foundation	Col	#Cols	Piling	#Piles	Sway	CAP	Remarks
1	A	ZZ		0		0		C	
2	B	ZZ	C	2		0		C	
3	B	ZZ	C	2		0		C	
4	A	ZZ		0		0		C	

SuperStructure Data

Span#	Beam Type	Spacing	Length	#Beams	Remarks
1	Concrete "I" Beam	6.70	41.90	7	P. S. C. Type III
2	Concrete "I" Beam	6.70	88.00	7	P. S. C. Type IV
3	Concrete "I" Beam	6.70	53.00	7	P. S. C. Type III

Bearing Data

Span#	Rear Type Bearing	FWD Type Bearing	Remarks
1	03 - Elastomeric	03 - Elastomeric	
2	03 - Elastomeric	03 - Elastomeric	
3	03 - Elastomeric	03 - Elastomeric	

GEORGIA DEPARTMENT OF TRANSPORTATION

Bridge Inspection Report

District: 6 **Inspection Date:** 3/16/2006 **Inspection Area:** 09
Bridge Inspector: Jerry Cooper **Over:** CR 416 TOWN LAKE PKWY **Bridge Status:** 01
Location ID: 057-00417D-008.14N **County:** Cherokee
Structure ID: 057-0042-0 **Road Name:** I-575 (NBL)

EVALUATION & DEFICIENCIES

SubStructure: **Year Painted:** 0000

Concrete caps at both abutments.
Bents 2, and 3 have a Concrete cap with 2 Concrete columns per bent.
Minor cracks in both abutment caps and in caps at bent 2 & 3.
HS-20 Design

SuperStructure: **Year Painted:** 0000

3 span p.s.c. "I" beam - 7 beams per span.
Span 1 and 3 beams 1 and 7 are type 4, beams 2 thru 6 are type 3.
Span 2 all beams are type 4.
Neoprene bearings.
Minor nick on corner end of beam 7 at bent 3.
HS-20 Design

Deck:

7.6" concrete slab.
Concrete s.i.p. deck forms.
Evazote joints.
The deck surface has very minor cracking.
Sand epoxy has been added to the deck surface.
HS-20 Design

General:

Built in 1982 project # i-575-1 (6) 7 ct.5 .
Hand tools and ladder used.

Condition Rating

Component	Material	Rating
Substructure	Concrete	7
Superstructure	Concrete	8
Deck	Concrete	8

Temp Shored: **No**

Truck Type	Gross/H-Mod	HSMod	Tand	3-S-2	Log	Piggy
Calculated Posting	20	25	28	40	36	40
Posting Required	No	No	No	No	No	No
Existing Posting	00	00	00	00	00	00

Not a School Bus Route.

Structure Does Not Require Posting

BRIDGE INVENTORY DATA LISTING GEOI A DEPARTMENT OF TRANSPORTATION

Structure ID: 057-0043-0 **Cherokee** SUFF. RATING 68.65

Location & Geography

*	Structure I.D.No:	057-0043-0	
	200 Bridge Information	01	
*	6A Feature Int:	CR 416 TOWN LAKE PKWY	
*	6B Critical Bridge:	0	
*	7A Route Number Carried:	SR00417	
*	7B Facility Carried:	I-575 (SBL)	
*	9 Location:	.7 MI W OF WOODSTOCK	
	2 DOT District:	6	
	207 Year Photo:	2006	
*	91 Inspection Frequency:	24	Date: 03/16/2006
	92A Fract Crit Insp Freq:	00	Date: 02/01/1901
	92B Underwater Insp Freq:	00	Date: 02/01/1901
	92C Other Spc. Insp Freq:	00	Date: 02/01/1901
*	4 Place Code:	00000	
*	5 Inventory Route (O/U):	1	
	Type:	1	
	Designation:	1	
	Number:	00575	
	Direction:	0	
*	16 Latitude: 34-06.2	MMS Prefix: SR	
*	17 Longitude: 84-31.8	MMS Suffix: 00	MP: 25.01
	98 Border Bridge:	000	%Shared: 00
	99 ID Number:	000000000000000	
*	100 STRAHNET:	1	
	12 Base Highway Network:	1	
	13A LRS Inventory Route:	571041700	
	13B Sub Inventory Route:	0	
*	101 Parallel Structure:	L	
*	102 Direction of Traffic:	1	
*	264 Road Inventory Mile Post:	001.93	
*	208 Inspection Area:	09	Initials: JMC
	Engineer's Initial:	sgm	

* Location I.D. No.: 057-00417D-008.15N

*	104 Highway System:	1	
*	26 Functional Classification:	11	
*	204 Federal Route Type:	1	No.: 05751
	105 Federal Lands Highway:	0	
*	110 Truck Route:	1	
	206 School Bus Route:	0	
	217 Benchmark Elevation:	0000.00	
	218 Datum:	0	
*	19 Bypass Length:	01	
*	20 Toll:	3	
*	21 Maintenance:	01	
*	22 Owner:	01	
*	31 Design Load:	6	
	37 Historical Significance:	5	
	205 Congressional District:	06	
	27 Year Constructed:	1982	
	106 Year Reconstructed:	0000	
	33 Bridge Median:	1	
	34 Skew:	08	
	35 Structure Flared:	0	
	38 Navigation Control:	N	
	213 Special Steel Design:	0	
	267 Type of Paint:	0	
*	42 Type of Service on:	1	
		1	
	214 Movable Bridge:	0	
	203 Type Bridge:	Z-O-O-O	
	259 Pile Encasement:	3	
*	43 Structure Type Main:	5	02
	45 No. Spans Main:	003	
	44 Structure Type Appr:	0	00
	46 No. Spans Appr:	0000	
	226 Bridge Curve Horz:	1	Vert: 1
	111 Pier Protection:	0	
	107 Deck Structure Type:	1	
	108 Wearing Surface Type:	1	
	Mc	0	
	F	1	

Signs & Attachments

	225 Expansion Joint Type:	15	
	242 Deck Drains:	1	
	243 Parapet Location:	0	
	Height:		0.00
	Width:		0.00
	238 Curb:		0.00 0
	239 Handrail:	9	9
*	240 Median Barrier Rail:	0	
	241 Bridge Median Height:		0.00
	Width:		0.00
*	230 Guardrail Loc Dir Rear:	6	
	Fwrd:	0	
	Oppo Dir Rear:	0	
	Fwrd:	0	
	244 Approach Slab:	3	
	224 Retaining Wall:	0	
	233 Posted Speed Limit:	65	
	236 Warning Sign:	0	
	234 Delineator:	1	
	235 Hazard Boards:	0	
	237 Utilities Gas:	00	
	W	00	
	Ele	00	
	Telephone:	00	
	Sc	00	
	247 Lighting Street:	0	
	Naviagtion:	0	
	Aerial:	0	
*	248 County Continuity No.:	02	

Programming Data

201 Project No.: I-575-1 (6) 07 CT.5
202 Plans Available: 4
249 Prop. Proj. No. 0000000000000000
250 Approval Status: 0000
251 P.I. No.: 0000000
252 Contract Date: 02/01/1901
260 Seismic No.: 00010
75 Type Work: 00 0
94 Bridge Imp. Cost: $ 0
95 Roadway Imp. Cost: $ 0
96 Total Imp Cost: $ 0
76 Imp. Length: 000000
97 Imp. Year: 0000
114 Future ADT: 140610 Year: 2025

Hydraulic Data

215 Waterway Data
Highwater Elev.: 0000.0 Year: 1900
Avg. Streambed Elev.: 0000.0 Freq.: 00
Drainage Area: 00000
Area Of Opening: 000000
113 Scour Critical: N
216 Water Depth: 00.0 Br. Height: 00.0
222 Slope Protection: 4
221 Spur Dikes Rear: 0 Fwrd: 0
219 Fender System: 0
220 Dolphin: 0
223 Culvert Cover: 000
Type: 0
No. Barrels: 0
Width: 0.00 Height: 0.00
Length: 0 Apron: 0
* 265 U/W Insp. Area: 0 Diver: ZZZ

* Location I.D. No.: 057-00417D-008.15N

Measurements

* 29 ADT: 093740 Year: 2005
109 % Trucks: 0
* 28 Lanes On: 02 Under: 04
210 No. Tracks On: 00 Under: 00
* 48 Max. Span Length: 0088
* 49 Structure Length: 190
51 Br. Rwdy. Width: 42.00
52 Deck Width: 45.20
* 47 Tot. Horz. Cl: 42.00
50 Curb/Sdewlk Width: 0.00/0.00
32 Approach Rdwy Width: 038
* 229 Shoulder Width:
Rear Lt: 4.00 Type: 2 Rt: 10.00
Fwrd Lt: 4.00 Type: 2 Rt: 10.00
Pavement Width:
Rear: 24.00 Type: 2
Fwrd: 24.00 Type: 2
Intersection Rear: 1 Fwrd: 1
36 Safety Features Br. Rail: 1
Transition: 1
App. G. Rail: 1
App. Rail End: 1
53 Minimum Cl.Over: 99 ' 99 "
Under: H 16 ' 08 "
* 228 Min. Vertical Cl
Act. Odm Dir: 99 ' 99 "
Oppo. Dir: 99 ' 99 "
Posted Odm. Dir: 00 ' 00 "
Oppo. Dir: 00 ' 00 "
55 Lateral Undercl. Rt: H 8.00
56 Lateral Undercl. Lt: 0.00
* 10 Max Min Vert Cl: 99 ' 99 " Dir: 0
39 Nav Vert Cl: 000 Horz: 0000
116 Nav Vert Cl Closed: 000
245 Deck Thickness Main: 7.60
Deck Thick Approach: 0.00
246 Overlay Thickness: 0.00
212 Year Last Painted: Sup: 0000 Sub: 0000

Ratings

65 Inventory Rating Method: 1
63 Inventory Rating Method: 1
66 Inventory Type: 2 Rating: 21
64 Operating Type: 2 Rating: 35
231 Calculated Loads
H-Modified: 20 0
HS-Modified: 25 0
Type 3: 28 0
Type 3s2: 40 0
Timber: 36 0
Piggyback: 40 0
261 H Inventory Rating: 20
262 H Operating Rating: 28
67 Structural Evaluation: 4
58 Deck Condition: 8
59 Superstructure Condition: 8
* 227 Collision Damage: 0
60A Substructure Condition: 7
60B Scour Condition: N
60C Underwater Condition: N
71 Waterway Adequacy: N
61 Channel Protection Cond: N
68 Deck Geometry: 8
69 UnderClr. Horz/Vert: 4
72 Appr. Alignment: 8
62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
41 Struct Open, Posted, Cl: A
* 103 Temporary Structure: 0
232 Posted Loads H-Modified: 00
HS-Modified: 00
Type 3: 00
Type3s2: 00
Timber: 00
Piggyback: 00
253 Notification Date 02/01/1901
253 Fed Notify Date: 02/01/1901 0

BRIDGE INVENTORY DATA LISTING GEOI A DEPARTMENT OF TRANSPORTATION

Structure ID: 057-0043-0 **Cherokee** SUFF. RATING 68.65

Location & Geography

* Structure I.D.No: 057-0043-0
* 6A Feature Int: SR 417 (I-575) SBL
* 6B Critical Bridge: 0
* 7A Route Number Carried: CR00416
* 7B Facility Carried: TOWN LAKE PKWY
* 9 Location: .7 MI W OF WOODSTOCK
* 91 Inspection Frequency: 00 Date: 02/01/1901
* 4 Place Code: 00000
* 5 Inventory Route (O/U): 2
  Type: 4
  Designation: 1
  Number: 00416
  Direction: 0
* 16 Latitude: 34-06.2 HMMS Prefix:
* 17 Longitud 084-31.8 HMMS Suffix: MP:
* 100 STRAHNET: 0
  12 Base Highway Network: 1
  13A LRS Inventory Route: 572041600
  13B Sub Inventory Route: 0
* 101 Parallel Structure: L
* 102 Direction of Traffic: 2
* 104 Highway System: 0
* 26 Functional Classification: 16
* 204 Federal Route Type: 0 No.:
  105 Federal Lands Highway: 0
* 110 Truck Route: 0
* 19 Bypass Length: 03
* 20 Toll: 3
* 21 Maintenance: 01
* 22 Owner: 01
  27 Year Constructed: 1982
* 42 Type of Service on: 1 Under: 1
* 43 Structure Type Main: 5 02
* 208 Inspection Area: 09 Initials: JMC
* Location I.D. No.: 057-00416X-001.67E
* XReference I.D. No 057-00417D-008.15N

Signs & Attachments

* 240 Median Barrier Rail: 0
* 230 Guardrail Loc Dir Rear: 5
  Fwrd: 5
  Oppo Dir Rear: 0
  Fwrd: 0

Measurements

* 29 ADT: 015640 Year: 1919
* 28 Lanes On: 02 Under: 04
* 48 Max. Span Length: 0088
* 49 Structure Length: 190
* 47 Tot. Horz. Cl: 70.70
* 229 Shoulder Width:
  Rear Lt: 12.00 Type: 2 Rt: 8.00
  Fwrd Lt: 12.00 Type: 2 Rt: 8.00
  Pavement Width:
  Rear: 50.00 Type: 2
  Fwrd: 50.00 Type: 2
  Intersection Rear: 1 Fwrd: 1
* 228 Min. Vertical Cl
  Act. Odm Dir: 16 ' 08 "
  Oppo. Dir: 99 ' 99 "
  Posted Odm. Dir: 00 ' 00 "
  Oppo. Dir: 00 ' 00 "
* 10 Max Min Vert Cl: 17 ' 08 " Dir: 4

Ratings

* 227 Collision Damage: 0

Posting Data

* 103 Temporary Structure: 0
* 248 County Continuity No.: 02

Hydraulic Data

* 265 U/W Insp. Are 0 Diver: ZZZ

GEORGIA DEPARTMENT OF TRANSPORTATION

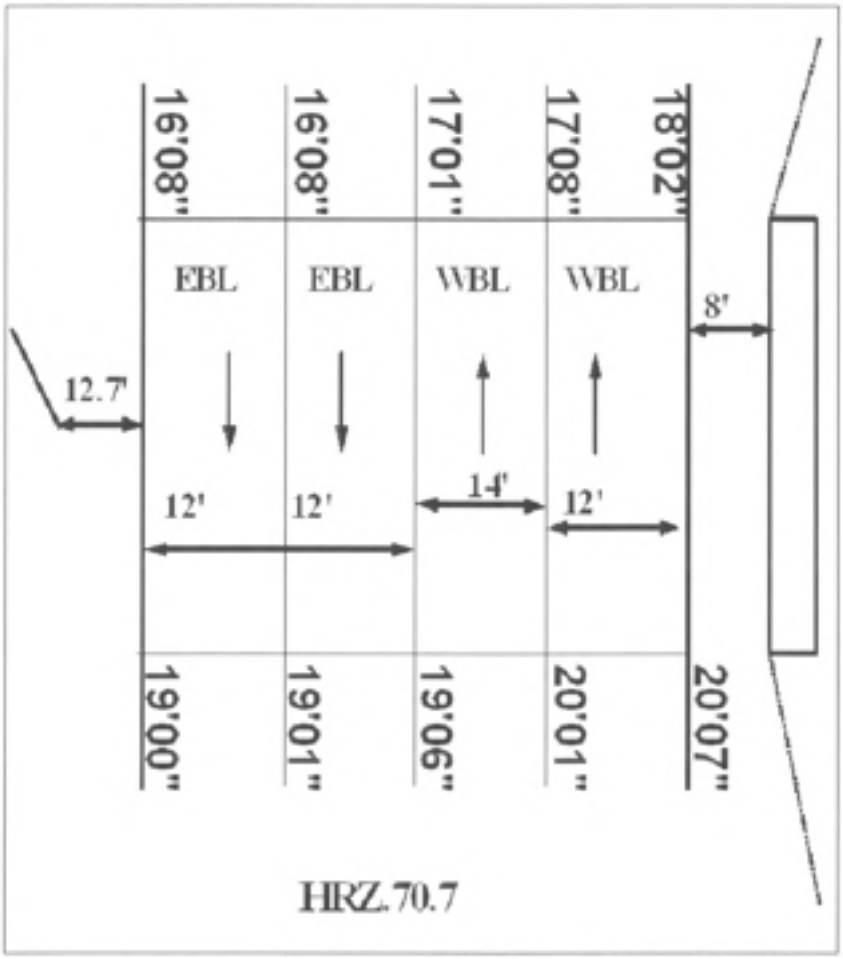
X-Vertical Clearance Report

District: 6 **Inspection Date:** 3/16/2006 **Inspection Area:** 09

Bridge Inspector: Jerry Cooper **Over:** CR 416 TOWN LAKE PKWY

ocation ID: 057-00417D-008.15N **County:** Cherokee **Skew:** 08

Structure ID: 057-0043-0 **Road Name:** I-575 (SBL)



XLocationID **057-00416X-001.67E**

XRef ID: 057-0043-0-A

Min Clearance Over: 99-99 **Min Clearance Under:** 16-08 **Clearance Type:** H

Act Min Vert. Odom: 16-08 **Post Min Vert. Odom:** 00-00

Act Min Vert. Opp: 99-99 **Post Min Vert. Opp:** 00-00

Max Min Vert. Clear: 17-08 **Direction:** West

Lat Under Cl Right: 8.00 **Left:** 0.00 **Lateral Type:** 4

Rating-Under Cl Horz/Vert: 4 **Total Horizontal Clearance (ft):** 70.70

GEORGIA DEPARTMENT OF TRANSPORTATION

Bridge Inspection Report

District: 6 **Inspection Date:** 3/16/2006 **Inspection Area:** 09

Bridge Inspector: Jerry Cooper **Over:** CR 416 TOWN LAKE PKWY **Bridge Status:** 01

Location ID: 057-00417D-008.15N **County:** Cherokee

Structure ID: 057-0043-0 **Road Name:** I-575 (SBL)

EVALUATION & DEFICIENCIES

SubStructure: **Year Painted:** 0000

Concrete caps at both abutments.
Bents 2, and 3 have a Concrete cap on 2 Concrete columns.
All concrete units / caps and 2 columns per bent.
Minor cracks in both abutment caps .
Minor crack in cap at bent 3 forward.
HS-20 Design

SuperStructure: **Year Painted:** 0000

3 span p.s.c. "I" beam - 7 beams per span.
Span 1 and 3 the beam 1 and 7 are type IV, beams 2 thru 6 are type III.
Span 2 all the beams are type IV.
Neoprene bearings.
Minor nick on beam end in span #2 on beam 7 bent 3.
HS-20 Design

Deck:

7.6" concrete slab.
Concrete S.I.P. deck forms.
Evocate joints.
Sand epoxy has been added to the deck surface.
The deck has no problems at the present time and is in good condition.
HS-20 Design

General:

Built in 1982 project # i-575-1 (6) 7 ct.5
Hand tools and ladder used.

Condition Rating

Component	Material	Rating
Substructure	Concrete	7
Superstructure	Concrete	8
Deck	Concrete	8

Temp Shored: **No**

Truck Type	Gross/H-Mod	HSMod	Tand	3-S-2	Log	Piggy
Calculated Posting	20	25	28	40	36	40
Posting Required	No	No	No	No	No	No
Existing Posting	00	00	00	00	00	00

Not a School Bus Route.

Structure Does Not Require Posting

GEORGIA DEPARTMEN OF TRANSPORTATION

Bridge Component Report

District: 6
Bridge Inspector: Jerry Cooper
Location ID: 057-00417D-008.15N
Structure ID: 057-0043-0

Inspection Date: 3/16/2006
Over: CR 416 TOWN LAKE PKWY
County: Cherokee
Road Name: I-575 (SBL)

Inspection Area: 09

SubStructure Data

Bent#	Type	Foundation	Col	#Cols	Piling	#Piles	Sway	CAP	Remarks
1	A	ZZ		0		0		C	
2	B	ZZ	C	2		0		C	
3	B	ZZ	C	2		0		C	
4	A	ZZ		0		0		C	

SuperStructure Data

Span#	Beam Type	Spacing	Length	#Beams	Remarks
1	Concrete "I" Beam	6.70	49.00	7	P. S. C. Type III
2	Concrete "I" Beam	6.70	88.00	7	P. S. C. Type IV
3	Concrete "I" Beam	6.70	53.00	7	P. S. C. Type III

Bearing Data

Span#	Rear Type Bearing	FWD Type Bearing	Remarks
1	03 - Elastomeric	03 - Elastomeric	
2	03 - Elastomeric	03 - Elastomeric	
3	03 - Elastomeric	03 - Elastomeric	

CALCULATION SHEET

PROJECT: I-75 / I-575 NORTHWEST CORRIDOR
JOB NUMBER NH000-0575-01(028)
CALC NO. BR#41

SUBJECT: Bridge Foundation Investigation
BY: JCR DATE: 11/30/2009

SHEET NO.
SHEET REV.

Bridge Foundation Investigation

Project Number: CSNHS-0008-00(256)
P.I. Number: 0008256
I-575 Bridge over Towne Lake Parkway
Cherokee County, Georgia

Prepared for:
Georgia Transportation Partners
Atlanta, Georgia

Document No: ATL-171-30991
Revision: 1
Issue Date: August 22, 2008
Document Status: Issued For Use

Subconsultant to:
Willmer Engineering, Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

Prepared by:
Professional Service Industries, Inc.
95 Chastain Road, Suite 301
Kennesaw, Georgia 30144

psi Information To Build On
Engineering • Consulting • Testing

BRIDGE FOUNDATION INVESTIGATION REPORT
I-575 over Towne Lake Parkway
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cherokee County, Georgia

Document No.: ATL-171-3099I
Revision: 1
Issue Date: August 22, 2008
Document Status: Issued For Use

Prepared For

GEORGIA TRANSPORTATION PARTNERS
Atlanta, Georgia

Prepared By

PROFESSIONAL SERVICE INDUSTRIES, INC.
95 Chastain Road
Suite 301
Kennesaw, Georgia 30144

Subconsultant To

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340-4270

770.939.0089

WILLMER ENGINEERING INC. WE

August 22, 2008

VIA COURIER

Pete M. McMahon, PE
Georgia Transportation Partners
c/o PBS&J, Inc.
5665 New Northside Drive
Suite 400
Atlanta, Georgia 30328

SUBJECT: **Bridge Foundation Investigation Report**
I-575 over Towne Lake Parkway
Northwest Corridor Project
GDOT Project No. CSNHS -0008-00(256), PI No. 0008256
Cherokee County, Georgia
Willmer Project No. ATL-171-3099I

Dear Mr. McMahon:

Willmer Engineering Inc. (Willmer) is pleased to provide this Bridge Foundation Investigation (BFI) report for the proposed widening of I-575 bridge over Towne Lake Parkway in Cherokee County, Georgia. This report was prepared by Professional Service Industries, Inc. (PSI) under a Subconsulting Services Agreement with Willmer, dated December 19, 2006, and in general accordance with our contract with Georgia Transportation Partners (GTP), dated May 12, 2007. The objective of this investigation was to gather sufficient geotechnical information to support the costing plans to be developed by GTP. Additional borings will be performed in the design/build phase of the project to provide additional information as required. This report was prepared in general accordance with Georgia Department of Transportation (GDOT) guidance documents for bridge foundation investigation. This report was revised to incorporate GTP comments dated December 18, 2007, and GDOT comments dated July 18, 2008.

The attached summary presents the site and subsurface conditions along the proposed bridge alignment, and our geotechnical recommendations related to bridge foundation design and construction.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Sujit K. Bhowmik, PhD, PE
Chief Engineer

for James L. Willmer, PE
Executive Vice President/Principal Consultant

SKB/JLW:kas
H:\Sujit Bhowmik\Northwest Corridor Project\-575\WBI Report Cover for PDI Report - 171-3099 I (Towne Lake Parkway) - 082208.doc

Attachments: **Bridge Foundation Investigation**

Figures

Figure 1	Site Location Plan
Figure 2	Boring Location Plan
Figure 3	Generalized Subsurface Profile A-A'
Figure 4	Generalized Subsurface Profile B-B'
Figure 5	Generalized Subsurface Profile C-C'

Appendix I

New Boring Logs – BD-1 through BD-4
Laboratory Test Results
Test Procedures

Appendix II

Existing BFI Report Boring Logs – B-1 through B-8

Revision History:

Revision	Issue Date	Document Status
A	December 12, 2007	Issued for Review
0	January 7, 2008	Issued for Use
1	August 22, 2008	Issued for Use

BRIDGE FOUNDATION INVESTIGATION	
GDOT Project Number	CSNHS-0008-00(256)
Project P.I. Number	0008256
Location	I-575 Bridge over Towne Lake Parkway, Cherokee County, Georgia (see Figure 1)
GENERAL INFORMATION	
Project Description	Current bridge foundation investigation was performed for the proposed widening of I-575 Bridge Over Towne Lake Parkway. The widening involves adding three new parallel bridges, one in the center median and one each on the left and right sides of the existing bridges. The bridges will be three-span, 183 feet long reinforced concrete structures. The design lengths for the three spans from south to north are approximately 42, 88 and 53 feet, respectively. The existing bridges are supported on H-pile bents at the end bents and H-pile footings at the intermediate bents. The existing BFI report and pile driving data dated March 26, 1980 was provided by GDOT. Eight old and four new borings were performed in the existing and current BFI studies, respectively. The subsurface information from the existing borings was incorporated in the current BFI report and recommendations.
Geologic Information	The project alignment is geologically sited within the Piedmont Physiographic Province of Georgia, and is underlain by Biotite Gneiss, Mica Schist, and Amphibolite Formation.
Subsurface Features	Subsurface information for this bridge was obtained from four borings (BD-1 through BD-4) as part of the present study and eight borings (B-1 through B-8) performed by GDOT in year 1980 for the existing bridges. The subsurface condition of the present study generally comprised of silty and clayey sand, and silty clay fill underlain by residuum consisting of silty and clayey sand. The residuum is underlain by hard and partially weathered rock. Groundwater was encountered from Elevations 862 to 880 in the current borings BD-1 through BD-4 performed in October, 2007. Groundwater was encountered from Elevations 883 to 886 in the existing borings B-1 through B-8 performed in March, 1980.

PWR AND AUGER REFUSAL ELEVATIONS (feet)				
Bridge	Bent No.	Reference Boring No.	Top of PWR	Auger Refusal
Left	1	BD-2	867	866
	2	B-3	853	849
	3	B-5	--	861
	4	B-7	863	860
Center	1	BD-1	850	838
	2	B-3	853	849
	3	B-5	--	861
	4	B-8	--	848
Right	1	B 2		839
	2	B-4	862	836
	3	B-6	--	855
	4	BD-3	--	861

MAXIMUM PILE DESIGN LOADS			
Pile Type	Load Transfer (%)		Design Load
	Friction	End Bearing	
H-Piles	20	80	10 BP 42 = 55 Tons
			12 BP 53 = 70 Tons
			14 BP 73 = 96 Tons
			14 BP 89 = 117 Tons

FOUNDATION RECOMMENDATIONS			
Bridge	Bent No.	Pile FTG (Type)	Pile Bent (Type)
Left	1	--	Steel H
	2	Steel H	---
	3	Steel H	--
	4	--	Steel H
Center	1	---	Steel H
	2	Steel H	--
	3	Steel H	--
	4	--	Steel H
Right	1	--	Steel H
	2	Steel H	--
	3	Steel H	--
	4	---	Steel H

PILE TIP ELEVATIONS (feet)				
Bridge	Bent No.	Reference Boring No.	H-Pile Tip Elevations	
			Minimum Tip	Estimated Tip
Left	1	BD-2	866±	866±
	2	B-3	852±	843±
	3	B-5	868±	865±
	4	B-7	868±	859±
Center	1	BD-1	853±	850±
	2	B-3	852±	849±
	3	B-5	868±	865±
	4	B-8	858±	857±
Right	1	B-2	855±	844±
	2	B-4	861±	853±
	3	B-6	859±	854±
	4	BD-3	861±	857±

NOTES: GENERAL	
As-built Information	As-built information should be forwarded to the Geotechnical Engineering Bureau upon completion of the foundation system.

NOTES	
PDO	Driving resistance after Minimum Tip Elevations are achieved.
Waiting Period	We recommend a minimum of 60 days waiting period between the completion of fill placement and beginning of pile installation at Bents 1 and 4 of the left and right bridges where significant amount of fill will be placed for the embankment. Settlement of the embankment should be monitored, and length of waiting period may be increased or decreased based on the settlement monitoring data, at discretion of the project Geotechnical Engineer.
Groundwater	Due to high groundwater elevations near the footing elevations, we recommend that 12 inches of Type II Foundation Backfill Material be set up for use in the footing areas for Bents 2 and 3. The use of this material should be at the direction of the Engineer and may be eliminated on construction if the footing area is dry.
Special Problems	Erratic pile lengths can be expected.

Prepared By

Lauren F. Hill, E.I.T.

Senior Review By

Karl E. Suter, P.E

GEORGIA REGISTERED No. 19002 PROFESSIONAL ENGINEER KARL E. SUTER

FIGURES

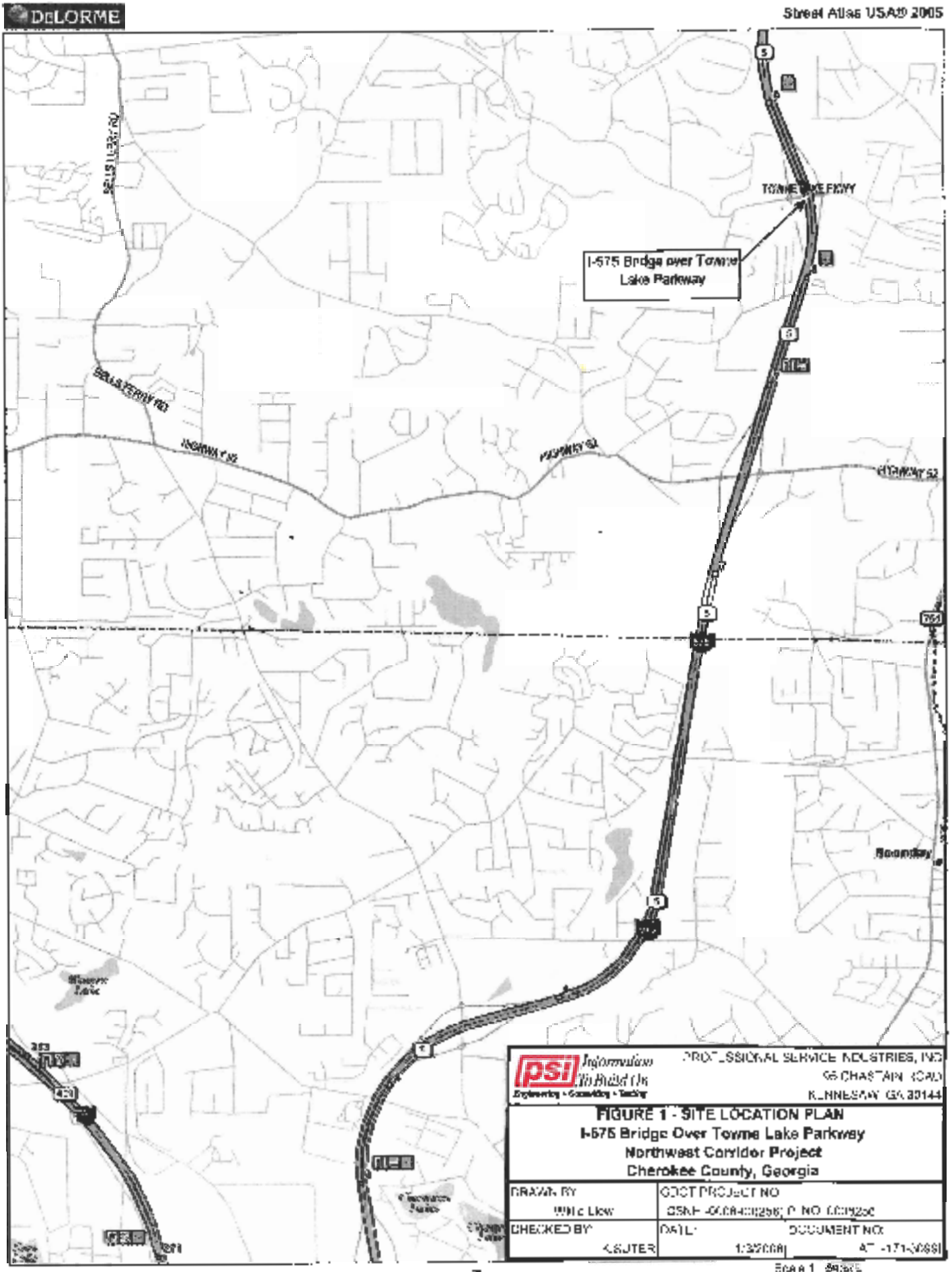
Site Location Plan

Boring Location Plan

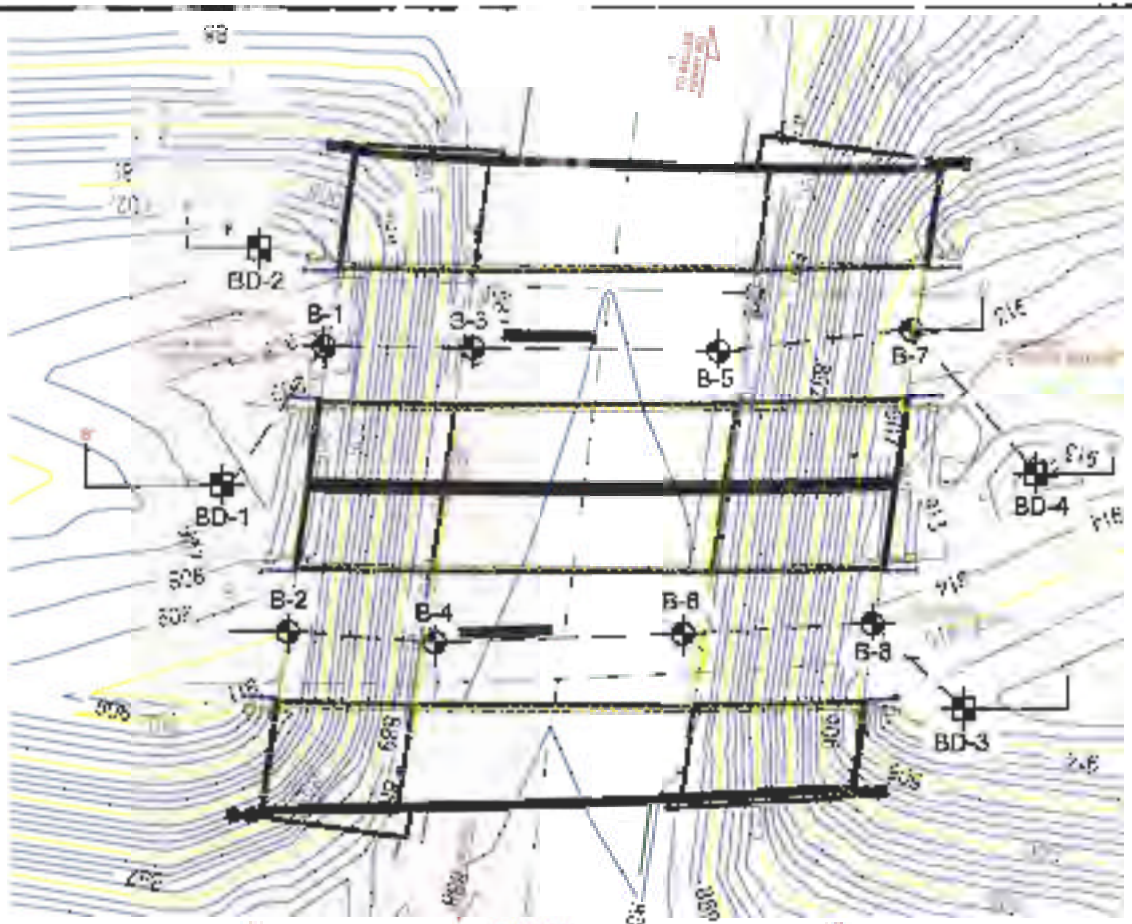
Generalized Subsurface Profile A-A'

Generalized Subsurface Profile B-B'

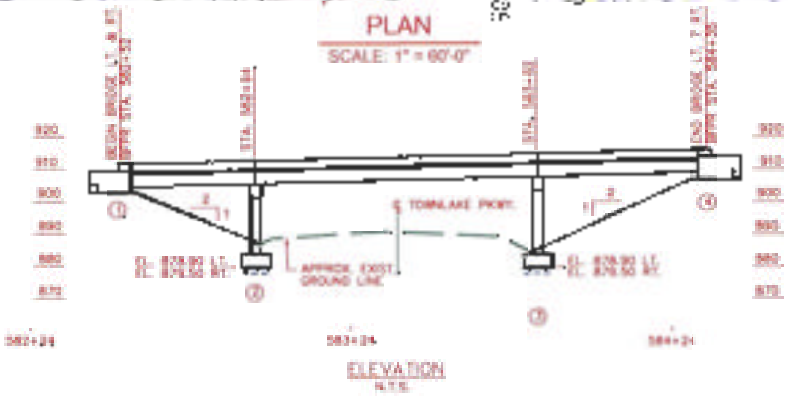
Generalized Subsurface Profile C-C'



Data use subject to license
© 2004 DeLorme. Street Atlas USA® 2005.
www.delorme.com



PLAN
SCALE: 1" = 60'-0"



ELEVATION
N.T.S.

LEGEND:

EXISTING GDOT BFI BORINGS
B 1

NEW BORING LOCATION
BD 1

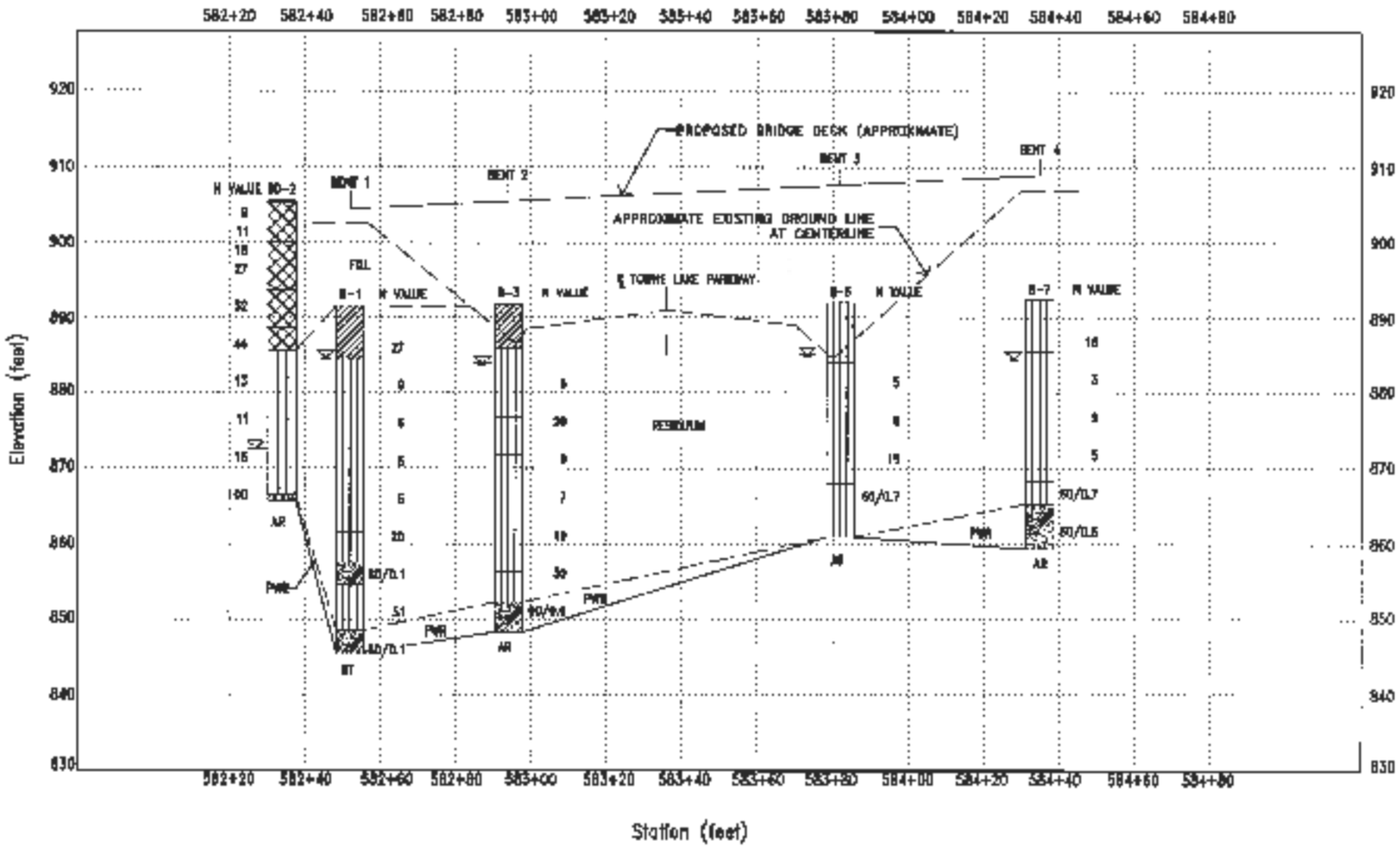
GDOT PROJECT NUMBER
DSNHS-0008 00(256)
PI No. 0008256

SCALE 1" = 50'	
DOC. No. AT-171-3066	
DATE 10/2006	
DRAWN BY WL	
REVIEWED BY KS	

Information To Build On
Engineering • Consulting • Testing

PROFESSIONAL SERVICE INDUSTRIES, INC.
95 CHASTAIN ROAD
KENNESAW, GA 30144

FIGURE 2
BORING LOCATION PLAN
I-575 OVER TOWNE LAKE PARKWAY
NORTHWEST CORRIDOR PROJECT
CHEROKEE COUNTY, GEORGIA
PSI PROJECT No. 475 85000



LEGEND

- ▽ GROUNDWATER TABLE AT TIME OF BORING
- AR AUGER REFUSAL
- BT BORING TERMINATED
- PWR PARTIALLY WEATHERED ROCK

SCALE: 1 INCH = 20' (VERTICAL)
1 INCH = 40' (HORIZONTAL)

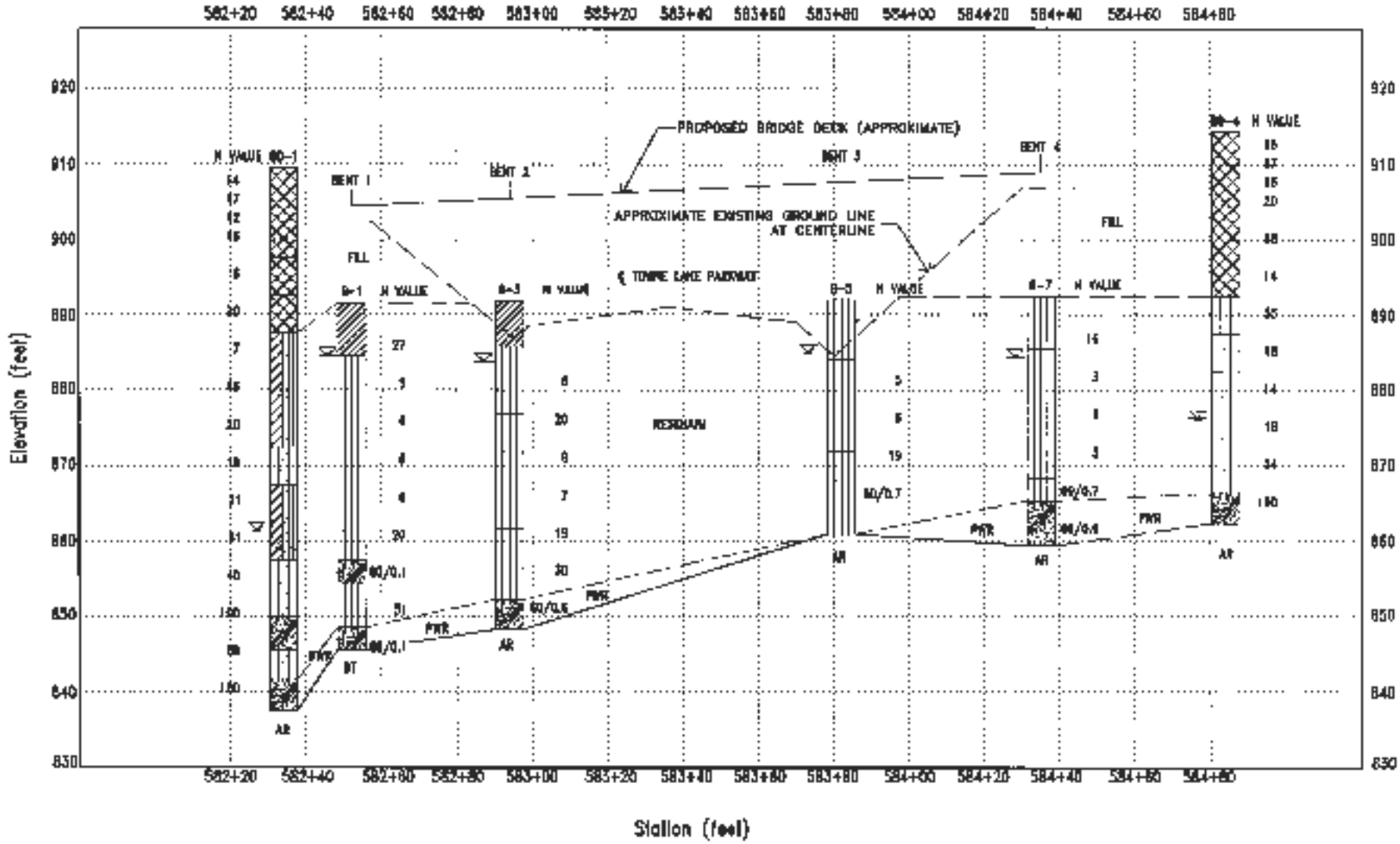
NOTE: BORINGS B-1, B-3, B-5 AND B-7 WERE PERFORMED BY GDOT IN 1980.

psi Information To Build On
Engineering • Consulting • Testing

PROFFESIONAL SERVICE INDUSTRIES, INC
95 CHASTAIN ROAD
KENNESAW, GA 30144

FIGURE 3 - GENERALIZED SUBSURFACE PROFILE A-A'
I-575 Bridge Over Towne Lake Parkway
Northwest Corridor Project
Cherokee County, Georgia

DRAWN BY	GDOT PROJECT NO	
Wife Liew	CSN-[illegible] PI NO. [illegible]	
CHECKED BY	DATE:	DOCUMENT NO
K.SUTER	1/5/2006	ATL 171-3099I



LEGEND:

- GROUNDWATER TABLE AT TIME OF BORING
- AR AUGER REFUSAL
- BT BORING TERMINATED
- PWR PARTIALLY WEATHERED ROCK

SCALE: 1 INCH = 20' (VERTICAL)
1 INCH = 40' (HORIZONTAL)

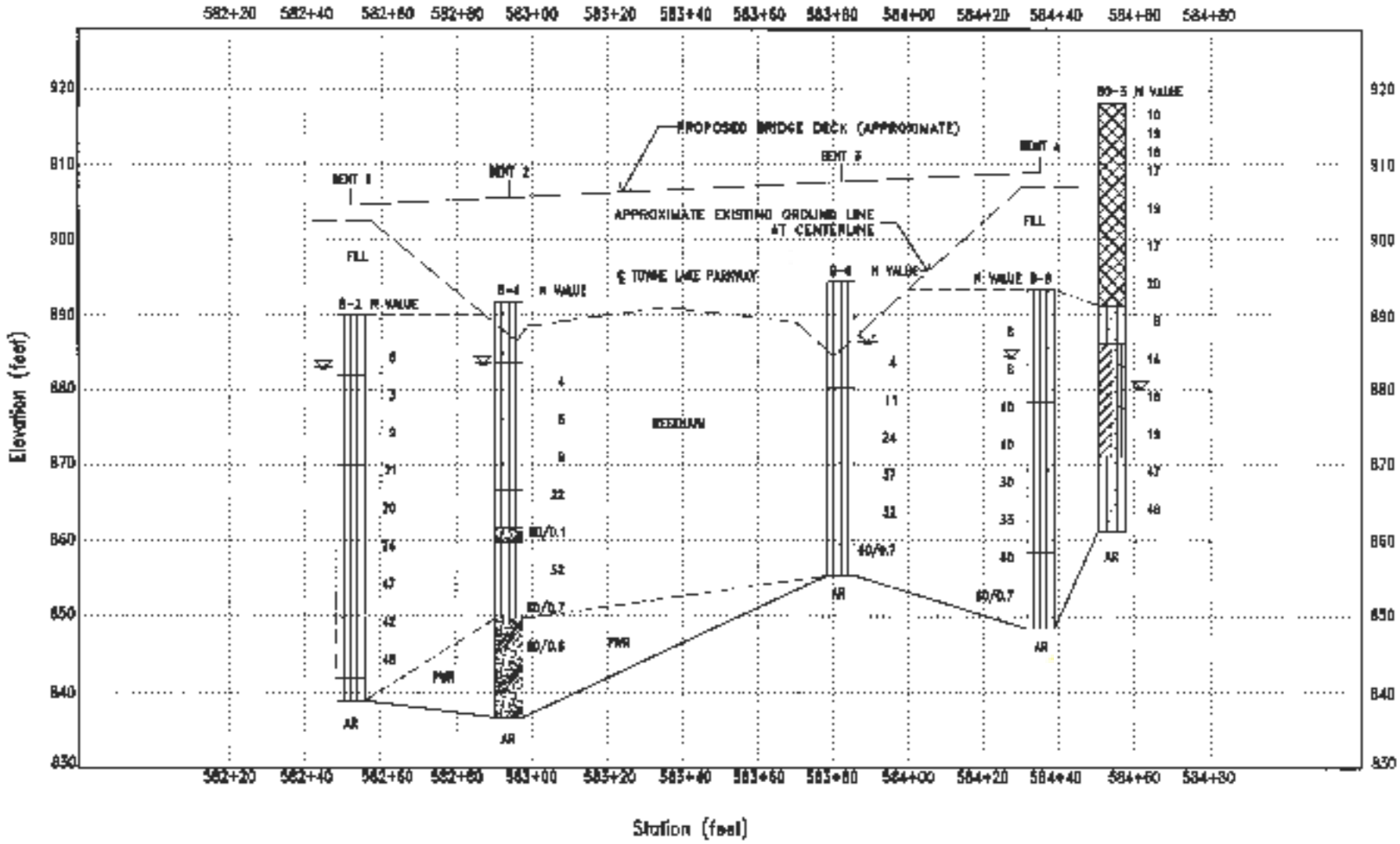
NOTE: BORINGS B-1, B-3, B-5 AND B-7 WERE PERFORMED BY GDOT IN 1980.

psi Information To Build On
Engineering · Consulting · Testing

PROFESSIONAL SERVICE INDUSTRIES, INC.
96 CHASTAIN ROAD
KENNESAW, GA 30144

FIGURE 4 - GENERALIZED SUBSURFACE PROFILE B-B'
I-575 Bridge Over Towne Lake Parkway
Northwest Corridor Project
Cherokee County, Georgia

DRAWN BY:	GDOT PROJECT NO.	
Willie Lew	CENT-4,008-00(258) PI NO. 0008258	
CHECKED BY: K.SUTER	DATE: 1/3/2008	DOCUMENT NO.: ATI-171-30964



LEGEND:

- ▽ GROUNDWATER TABLE AT TIME OF BORING
- AR AUGER REFUSAL
- BT BORING TERMINATED
- PWR PARTIALLY WEATHERED ROCK

SCALE: 1 INCH = 10' (VERTICAL)
1 INCH = 40' (HORIZONTAL)

NOTE: BORINGS B-2, B-4, B-6 AND B-8 WERE PERFORMED BY GDOT IN 1990.

psi Information To Build On
Geoscience • Geoscience • Testing

PROFESSIONAL SERVICE INDUSTRIES, INC
90 CHASTAIN ROAD
KENNESAW, GA 30144

FIGURE 5 - GENERALIZED SUBSURFACE PROFILE C-C'
I-575 Bridge Over Towne Lake Parkway
Northwest Corridor Project
Cherokee County, Georgia

DRAWN BY	GDOT PROJECT NO	
Willie Liew	CSNH-0008-00(258) P. NO. 0008256	
CHECKED BY	DATE	DOCUMENT NO
K SUTER	1/3/2008	ATL-171-30099

APPENDIX I

New Boring Logs - BD 1 through BD-4
Laboratory Test Results
Test Procedures

BORING LOG

PSI No.: **476-65003 (Document No. ATL-171-3099I)**

Client: **Willmer Engineering/Georgia Transportation Partners** - GDOT Project No.: CSNHS-0008-00(256) PI No.: 0008256

Project: **I-575 Bridge Over Towne Lake Parkway Cherokee County, Georgia**

Boring No.: **BD-1** **(1 of 1)** Total Depth: **72.0'** Elev: **910±** Location: **Sta. 582+29 at CL**

Type of Boring: **Hollow Stem Auger** Started: **10/9/07** Completed: **10/9/07** Driller: **Gable Drilling**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL 10 20 30 40 50 60 70 80 90 %MC LL	N
909.4	0.2	Topsoil Thickness = 2 inches		1.0		
		FILL: Medium Dense Tan/Brown Moist Silty SAND (SM)	5-7-7	2.5		14
				3.5		
			7-8-9	5.0		17
				6.0		
			5-5-7	7.5		12
				8.5		
			5-8-8	10.0		16
897.6	12.0					
		FILL: Loose Brown/Red Moist Silty SAND (SM), with rock fragments (Non-Plastic)		13.5		
			3-3-3	15.0		6
892.6	17.0					
		FILL: Very Stiff Red/Tan Moist Sandy Silty CLAY (CL)		18.5		
			4-8-12	20.0		20
887.6	22.0					
		RESIDUUM: Loose to Medium Dense Orange Moist Silty Clayey SAND (SC-SM)		23.5		
			5-2-5	25.0		7
				28.5		
			3-6-10	30.0		6
				33.5		
			7-9-11	35.0		20
872.6	37.0					
		Medium Dense Gray/White Moist Silty SAND (SM)		38.5		
			7-9-10	40.0		19
867.6	42.0					
		Medium Dense to Very Dense Gray/White Wet Silty Clayey SAND (SC-SM)		43.5		
			6-8-13	45.0		21
				48.5		
			15-18-43	50.0		61
857.6	52.0					
		Dense Red/Black/White Wet Silty SAND (SM)		53.5		
			10-17-23	55.0		40
				58.5		
850.1	59.5		22-32-50/5	60.0		100
847.6	62.0	PARTIALLY WEATHERED ROCK: Sampled as Very Dense Gray Wet Silty SAND (SM)				
				63.5		
		Very Dense Wet Gray Silty SAND (SM)	19-28-41	65.0		69
841.6	68.0					
				68.5		
		PARTIALLY WEATHERED ROCK: Sampled as Very Dense Gray Wet Silty SAND (SM)	50/3	70.0		100
837.6	72.0					
		Auger Refusal at 72 feet				
		Groundwater at Time of Drilling = 48 feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N

BORING LOG

PSI No.: 476-65003 (Document No. ATL-171-30991)

Client: Willmer Engineering/Georgia Transportation Partners - GDOT Project No.: CSNHS-0008-00(256) PI No.: 0008256

Project: I-575 Bridge Over Towne Lake Parkway Cherokee County, Georgia

Boring No.: BD-2 (1 of 1) Total Depth: 40.0' Elev: 906± Location: Sta. 582+34, 75' LT CL

Type of Boring: Hollow Stem Auger Started: 10/9/07 Completed: 10/9/07 Driller: Gable Drilling

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N
905.4	0.2	Topsoil Thickness = 2 inches		1.0		
		FILL: Loose to Medium Dense Reddish Brown Moist Silty Clayey SAND (SC-SM)	4-4-5	2.5		9
900.1	5.5		5-5-6	3.5 / 5.0		11
		FILL: Medium Dense Tan Moist Micaceous Silty SAND (SM)	7-9-9	6.0 / 7.5		18
			11-12-15	8.5 / 10.0		27
893.6	12.0	FILL: Dense Brown Moist Micaceous Silty Clayey SAND (SC-SM)	8-13-19	13.5 / 15.0		32
888.6	17.0	FILL: Hard Tan Moist Silty Sandy CLAY (CL)	12-17-27	18.5 / 20.0		44
885.6	20.0	RESIDUUM: Medium Dense Light Brown/Black Wet Silty SAND (SM) (Non-Plastic)	3-6-7	23.5 / 25.0		13
			3-4-7	28.5 / 30.0		11
			5-7-9	33.5 / 35.0		16
866.6	39.0		7-50/5	38.5 / 40.0		100
865.6	40.0	PARTIALLY WEATHERED ROCK: Sampled as Very Dense Black/Orange Wet Silty SAND (SM)				

Auger Refusal at 40 feet

Groundwater at Time of Drilling = 33 feet

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D. (1.375" I.D.) sampler a total of 18 inches in three (6) increments. The sum of the last two increments of penetration is reported the standard penetration resistance, N.

BORING LOG

PSI No.: **476-65003 (Document No. ATL-171-30991)**

Client: **Willmer Engineering/Georgia Transportation Partners** - GDOT Project No.: CSNHS-0008-00(256) PI No.: 0008256

Project: **I-575 Bridge Over Towne Lake Parkway Cherokee County, Georgia**

Boring No.: **BD-3** (1 of 1) | Total Depth: **57.0'** | Elev: **918±** | Location: **Sta. 584+54, 75' RT CL**

Type of Boring: **Hollow Stem Auger** | Started: **10/9/07** | Completed: **10/9/07** | Driller: **Gable Drilling**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / REC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL (10 20 30 40 50 60 70 80 90)	N
918.1	0.2	Topsoil Thickness = 2 inches		1.0		
		FILL: Loose to Medium Dense Tan Moist Silty SAND (SM)	4-5-5	2.5		10
				3.5		
			5-9-10	5.0		19
				6.0		
			5-8-8	7.5		16
				8.5		
			5-7-10	10.0		17
				13.5		
			6-8-11	15.0		19
				18.5		
			8-7-10	20.0		17
896.3	22.0					
		FILL: Very Stiff Reddish Tan Moist Silty Sandy CLAY (CL)		23.5		
			5-8-12	25.0		20
891.3	27.0					
		RESIDUUM: Loose Black/Gold Moist Micaceous Silty SAND (SM)		28.5		
			3-3-5	30.0		6
886.3	32.0					
		Medium Dense Black/Gold/Orange Moist Micaceous Silty Clayey SAND (SC-SM)		33.5		
			5-7-7	35.0		14
				38.5		
			5-7-9	40.0		16
				43.5		
			7-9-10	45.0		19
871.3	47.0					
		Dense Brown/White Moist Micaceous Silty SAND (SM)		48.5		
			17-21-26	50.0		47
				53.5		
			13-19-27	55.0		46
861.3	57.0					
		Auger Refusal at 57 feet				
		Groundwater at Time of Drilling = 38 feet				

*Number of blows required for a 140 lb hammer dropping 30" to drive 2" O.D., 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

BORING LOG

PSI No.: **476-65003 (Document No. ATL-171-30991)**

Client: **Willmer Engineering/Georgia Transportation Partners - GDOT Project No.: CSNHS-0008-00(256) PI No.: 0008756**

Project: **I-575 Bridge Over Towne Lake Parkway Cherokee County, Georgia**

Boring No.: **BD-4 (1 of 1)** Total Depth: **52.0'** Elev: **914±** Location: **Sta. 584+84 at CL**

Type of Boring: **Hollow Stem Auger** Started: **10/9/07** Completed: **10/9/07** Driller: **Gable Drilling**

Elevation	Depth	DESCRIPTION OF MATERIALS (Classification)	* Sample Blows / RBC/RQD	Sample Depth (Feet)	N VALUE (bpf) PL %MC LL 10 20 30 40 50 60 70 80 90	N
914.2	0.2	Topsoil Thickness = 2 inches				
		FILL: Medium Dense Tan Moist Silty SAND (SM)	7-7-8	1.0, 2.5		15
			9-8-9	3.5, 5.0		17
			5-7-9	6.0, 7.5		16
			6-10-10	8.5, 10.0		20
			6-8-10	13.5, 15.0		18
			7-6-8	18.5, 20.0		14
892.4	22.0					
		RESIDUUM: Dense Tan/Black Moist Silty SAND (SM)	13-15-20	23.5, 25.0		35
887.4	27.0					
		Medium Dense Reddish Brown Moist Silty SAND (SM)	3-9-9	28.5, 30.0		18
882.4	32.0					
		Medium Dense Gray/Gold Moist Micaceous Silty SAND (SM) (Non-Plastic)	4-6-8	33.5, 35.0		14
			8-8-10	38.5, 40.0		18
			9-11-13	43.5, 45.0		24
866.4	48.0					
		PARTIALLY WEATHERED ROCK: Sampled as Very Dense Gray/Gold Moist Micaceous Silty SAND (SM)	50/2	48.5, 50.0		100
862.4	52.0	Auger Refusal at 52 feet				

Groundwater at Time of Drilling 38 feet

*Number of blows required to drive a 140 lb hammer dropping 30" to drive 2" O.D. 1.375" I.D. sampler a total of 18 inches in three 6" increments. The sum of the last two increments of penetration is termed the standard penetration resistance, N.

LIQUID AND PLASTIC LIMIT TEST DATA

Client: Willmer Engineering/Georgia Transportation Partners
Project: Northwest Corridor Metro Atlanta: GDOT Project #:CSNHS 0008 00(256); PI #:0008256; Document #:ATL-171-20991
Project Number: (PSI Inc.): 476-6[illegible]003

Sample Data

Source:
Sample No.: [illegible]
Elev. or Depth: 3.5-15.0' **Sample Length(in./cm.):**
Location: I 575 over Towne Lake pkwy
Description: Gray Silty SAND
Water Content: NA **USCS:** SM **AASHTO:**
Testing Remarks: % Passing Sieve #200 = 19.3

Liquid Limit= _____
Plastic Limit= NP
Plasticity Index= NP

LIQUID AND PLASTIC LIMIT TEST DATA

Client: Willmer Engineering/Georgia Transportation Partners
Project: Northwest Corridor Metro Atlanta: GDOT Project #:CSNHS-0008-00(256); PI #:0008256; Document #:ATL-271-30991
Project Number: (PSI Inc.): 476-65[illegible]

Sample Data

Source:
Sample No.: B-2/S 7
Elev. or Depth: 23.5 25.0' **Sample Length(in./cm.):**
Location: I-575 over Towne Lake Pkwy
Description: Tan Silty SAND
Water Content: NA **USCS:** SV **AASHTO:**
Testing Remarks: % Passing Sieve #200 = 25.9

Liquid Limit= _
Plastic Limit= NP
Plasticity Index= NP

LIQUID AND PLASTIC LIMIT TEST DATA

Client: Willmer Engineering/Georgia Transportation Partners
Project: Northwest Corridor Metro Atlanta: GDOT Project #:CSNHS-0008-00(256); DI #:0008256; Document #:AT -171-3000;
Project Number: (PSI Inc.): 476-65003

Sample Data

Source:
Sample No.: B 4/S 5
Elev. or Depth: 33.5-35.0' **Sample Length(in./cm.):**
Location: I-575 over Powers Ferry Pkwy
Description: Brown micaceous Silty SAND
Water Content: NA **USCS:** SM **AASHTO:**
Testing Remarks: % Passing Sieve #200 - 18.4

Liquid Limit= _____
Plastic Limit= NP
Plasticity Index= NP

TEST PROCEDURES

The general field procedures employed by Professional Service Industries, Inc. (PSI) are summarized in the American Society for Testing and Materials (ASTM) Standard D420 which is entitled "Investigating and Sampling Soil and Rock". This recommended practice lists recognized methods for determining soil and rock distribution and groundwater conditions. These methods include geophysical and in-situ methods as well as borings.

Standard Drilling Techniques

To obtain subsurface samples, borings are drilled using one of several alternate techniques depending upon the subsurface conditions. Some of these techniques are:

In Soils:

a) Continuous hollow stem augers.
b) Rotary borings using roller cone bits or drag bits, and water or drilling mud to flush the hole.
c) "Hand" augers.

In Rock:

a) Core drilling with diamond-faced, double or triple tube core barrels.
b) Core boring with roller cone bits.

The drilling method used during this exploration is presented in the following paragraph.

Hollow Stem Augering: A hollow stem augers consists of a hollow steel tube with a continuous exterior spiral flange termed a flight. The auger is turned into the ground, returning the cuttings along the flights. The hollow center permits a variety of sampling and testing tools to be used without removing the auger.

Sampling and Testing in Boreholes

Several techniques are used to obtain samples and data in soils in the field; however the most common methods in this area are:

a) Standard Penetrating Testing
b) Undisturbed Sampling
c) Dynamic Cone Penetrometer Testing
d) Water Level Readings

The procedures utilized for this project are presented below.

Standard Penetration Testing: At regular intervals, the drilling tools are removed and soil samples obtained with a standard 2 inch diameter split tube sampler connected to an A or N-size rod. The sampler is first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140 pound safety hammer falling 30 inches. Generally, the number of hammer blows required to drive the sampler the final 12 inches is designated the "penetration resistance" or "N" value, in blows per foot (bpf).

The split barrel sampler is designed to retain the soil penetrated, so that it may be returned to the surface for observation. Representative portions of the soil samples obtained from each split barrel sample are placed in jars, sealed and transported to our laboratory.

The standard penetration test, when properly evaluated, provides an indication of the soil strength and compressibility. The tests are conducted according to ASTM Standard D1586. The depths and N-values of standard penetration tests are shown on the Boring Logs. Split barrel samples are suitable for visual observation and classification tests but are not sufficiently intact for quantitative laboratory testing.

Water Level Readings: Water table readings are normally taken in the borings and are recorded on the Boring Logs. In sandy soils, these readings indicate the approximate location of the hydrostatic water table at the time of our field exploration. In clayey soils, the rate of water seepage into the borings is low and it is generally not possible to establish the location of the hydrostatic water table through short term water level readings. Also, fluctuation in the water table should be expected with variations in precipitation, surface run-off, evaporation, and other factors. For long-term monitoring of water levels, it is necessary to install piezometers.

The water levels reported on the Boring Logs are determined by field crews immediately after the drilling tools are removed, and several hours after the borings are completed, if possible. The time lag is intended to permit stabilization of the groundwater table which may have been disrupted by the drilling operation.

Occasionally the borings will cave in, preventing water level readings from being obtained or trapping drilling water above the cave-in zone. The cave-in depth is measured and recorded on the Boring Logs.

BORING LOGS

The subsurface conditions encountered during drilling are reported on a field boring log prepared by the Driller. The log contains information concerning the boring method, samples attempted and recovered, indications of the presence of coarse gravel, cobbles, etc., and observations of groundwater. It also contains the driller's interpretation of the soil conditions between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are kept on file in our office.

After the drilling is completed, a geotechnical professional classifies the soil samples and prepares the final Boring Logs which are the basis for our evaluations and recommendations.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our Boring Logs.

The classification system discussed above is primarily qualitative and for detailed soil classification two laboratory tests are necessary; grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D-2487). Each of these

classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior. The soil classification and physical properties are presented in this report.

The table below presents criteria that are typically utilized in the classification and description of soil and rock samples for preparation of the Boring Logs.

Relative Density of Cohesionless Soils From Standard Penetration Test		**Consistency of Cohesive Soils**	
Very Loose	≤ 4 bpf	Very Soft	≤ 2 bpf
Loose	5 - 10 bpf	Soft	3 - 4 bpf
Medium Dense	11 - 30 bpf	Medium Stiff	5 - 8 bpf
Dense	31 - 50 bpf	Stiff	9 - 15 bpf
Very Dense	> 50 bpf	Very Stiff	16 - 30 bpf
		Hard	31 – 50 bpf
(bpf = blows per foot, ASTM D 1586)		Very Hard	> 50 bpf

Relative Hardness of Rock		**Particle Size Identification**	
Very Soft	Hard Rock disintegrates or easily compresses to touch; can be hard to very hard soil.	Boulders	Larger than 12"
Soft	May be broken with fingers.	Cobbles	3" - 12"
		Gravel	
		Coarse	3/4" - 3"
Moderately Soft	May be scratched with a nail. Corners and edges may be broken with fingers.	Fine	4.76mm - 3/4"
		Sand	
		Coarse	2.0 - 4.76 mm
Moderately Hard	Light blow of hammer required to break samples.	Medium	0.42 - 2.00 mm
		Fine	0.42 - 0.074 mm
Hard	Hard blow of hammer required to break sample	Fines (Silt or Clay)	Smaller than 0.074 mm

Rock Continuity		**Relative Quality of Rocks**	
RECOVERY = Total Length of Core / Length of Core Run × 100 %		**RQD** = Total core, counting only pieces > 4" long / Length of Core Run × 100%	
Description	Core Recovery %	Description	RQD %
Incompetent	Less than 40	Very Poor	0 - 25 %
Competent	40 - 70	Poor	26 - 50 %
Fairly Continuous	71 - 90	Fair	51 - 75 %
Continuous	91 - 100	Good	76 - 90 %
		Excellent	91 - 100 %

APPENDIX II

Existing BFI Report Boring Logs – B-1 through B-8

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

GDOT Project No.: CSNHS-0008-30(256)
PROJECT PI No.: 0008256 COUNTY Cherokee DATE 3/19/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO B-1

BENT NO. 1 FOOTING GROUND ELEV 891.57

PROPOSED FOOTING ELEV PARTY CHIEF Spomberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	Ø
	Gr. Elev.												
890	Very Stiff Mtc Sandy Coy												
		1s	27										
W.T.	Loose Mtc Sandy Si*												
880		2s	9										
		3s	6										
		4s	6										
870													
		5s	6										
860	Med. Dense Some	6s	20										
	Very Dense Some	7s	60-1"										
850		8s	51										
		9s	60=1										
	End Boring												
840													
830													

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

GDOT Project No · CSNHS-0008-00(256)
PROJECT PI No · 0008256 COUNTY Cherokee DATE 3/19/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO. B-2

BENT NO. 1 FOOTING GROUND ELEV. 889.90

PROPOSED FOOTING ELEV. PARTY CHIEF Spornberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
890	Gr. Elev.												
	Loose Mtlc Clayey Sandy Silt												
		1s	6										
GW.T.													
880	Very Loose to Loose Mtlc Sandy Silt	2s	3										
		3s	9										
870	Med Dense Sand	4s	21										
		5s	20										
860		6s	24										
	Dense Sand	7s	47										
850		8s	42										
		9s	49										
840	Very Dense Sand												
	Refusal On Rock												
830													

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

PROJECT GDOT Project No. CSNHS 0008-00(258) PI No. 0008258 COUNTY Cherokee DATE 3/19/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO B-3

BENT NO. 2 FOOTING — GROUND ELEV. 891.8

PROPOSED FOOTING ELEV. — PARTY CHIEF Stomberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
	Gr. Elev. 2												
890	Stiff Mtl. Sandy Clay												
GWT	Loose Mtl. Sandy Silt												
880		1s	6										
	Med. Dense Sand W/Quartz Layers	2s	20										
870	Loose Sand	3s	9										
		4s	7										
860	Med. Dense Sand	5s	19										
	Dense Sand	6s	30										
850	Very Dense Sand	7s	50-6										
	Refusal On Rock												
840													
830													

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

PROJECT GDOT Project No. CSNHS-0008-00(258) PI No. 0008258 COUNTY Cherokee DATE 3/18/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO B-4

BENT NO. 2 FOOTING GROUND ELEV. 89.70

PROPOSED FOOTING ELEV. PARTY CHIEF Spornberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. Elev.												
890	Loose Mtlc Clayey Sandy Silt												
G.W.T.													
	Loose Mtlc Sandy Silt	1s	4										
880													
		2s	5										
		3s	9										
870													
		4s	22										
	Med Dense Same												
		5s	60=.1										
860	Very Dense Same												
		6s	52										
		7s	60=.7										
850													
		8s	60=.6										
840													
	Practical Refusal in Weathered Rock												
830													

DOT 49C

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

PROJECT GDOT Project No.: CSNHS-0008-00(256) PI No.: 0008256 COUNTY Cherokee DATE 3/19/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO. B-5

BENT NO. 3 FOOTING GROUND ELEV. 892.02

PROPOSED FOOTING ELEV. PARTY CHIEF Spornberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
	Gr. Elev.												
890	Loose Mtc Clayey Sandy Silt												
G.W.T.													
	Loose Mtc Sandy Silt	1s	5										
880		2s	6										
		3s	19										
870	Med. Dense Some												
	Very Dense Some	4s	80=.7										
860	Refusal On Rock												
850													
840													
830													

DCT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

GDOT Project No.: CSNHS-0006-00(266)

PROJECT PI No.: 0006256 COUNTY Cherokee DATE 3/18/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO. B-6

BENT NO. 3 FOOTING GROUND ELEV. 894.0

PROPOSED FOOTING ELEV. PARTY CHIEF Scomberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
	Gr. Elev.												
	Loose Mtlc Clayey Sand Silt												
890													
G.W.T.		1s	4										
880	Med Dense Mtlc Sandy Silt	2s	11										
		3s	24										
870	Dense Some	4s	37										
		5s	32										
860	Very Dense Some	6s	60=.7'										
	Refusal On Rock												
850													
840													
830													

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

GDOT Project No: CSNHS-0008-00(255)
PROJECT PI No.: 0008256 COUNTY Cherokee DATE 3/19/80

LOCATION I-575 Bridge over Towne Lake Parkway BORING NO. B-7

BENT NO. 4 FOOTING - GROUND ELEV. 892.44

PROPOSED FOOTING ELEV. PARTY CHIEF Spomberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. Elev ?												
890	Med. Dense Mltc Clayey Sandy Silt												
		1s	16										
W.T.	Very Loose to Loose Mltc Sandy Silt												
880		2s	3										
		3s	9										
		4s	5										
870													
	Very Dense Sand	5s	60=7"										
		6s	60=6"										
860	Refusal On Rock?												
850													
840													
830													

DOT 496

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA
GEOTECHNICAL ENGINEERING

BRIDGE SUBSURFACE INVESTIGATION

GDOT Project No. CSNHS-0008-00(256)
PI No.: 0008256

PROJECT _____ **COUNTY** Cherokee **DATE** 3/16/80

LOCATION I-575 Bridge over Towne Lake Parkway **BORING NO** B-8

BENT NO. 4 **FOOTING** _____ **GROUND ELEV.** 893.40'

PROPOSED FOOTING ELEV. _____ **PARTY CHIEF** Spornberger

ELEV	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	φ
	Gr. Elev.												
890	Loose Mtc Clayey Sandy Silt												
G.W.T.		1s	8										
		2s	6										
880		3s	10										
	Loose Mtc Sandy Silt												
		4s	10										
870		5s	30										
	Dense Sand												
		6s	33										
860		7s	60										
	Very Dense Sand												
		8s	60=.7'										
850													
	Refusal On Rock												
840													
830													