



March 2, 2007

Ms. Lisa Myers
Design Review Engineer Manager
Georgia Department of Transportation
#2 Capitol Square, Room 266
Atlanta, GA 30334

RE: Submittal of the final Value Engineering Report
NHS-M001-00(533) Fulton County
PI No.: M001533
PBS&J Project Task Order No. 4

Dear Ms. Myers:

Please find enclosed four (4) hard copies and a CD of our final Value Engineering Report for the I-75/I-85 Milling and Inlaying Project, Fulton County as referenced above.

This Value Engineering Study, which was performed during the period February 20 through February 23, 2007, identified **8 alternative ideas** of which **6 are recommend for implementation**. The VE Team also identified a **Design Suggestion Idea** which is recommended for the Engineer to consider in his final design. We believe that the 6 alternatives recommended may have a significant positive affect on the project.

We trust that you will find this report to be in proper order. It should be noted that the results of this workshop are volatile in that they can be overcome by the events that accompany the expeditious continuance of the design process. Accordingly, we encourage an equally expeditious implementation meeting to design the disposition of the contents of this report.

On behalf of our VE Team, we thank you very much for this opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

PBS&J

A handwritten signature in black ink that reads 'Les M. Thomas'.

Les M. Thomas, P.E., CVS-Life
VE Team Leader

Value Engineering Study Report
I-75/I-85 Milling and Inlay Project,
Fulton County, Georgia

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Executive Summary

Executive Summary

INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE Study during the period of February 20 through 23, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was NHS-M001-00(533) Milling and Inlaying of I-75/I-85 downtown connector. The design is being performed by Parsons, Inc.

PROJECT DESCRIPTION

The project will mill between 4 ¼” to 8 ¼” from the existing downtown connector travel lanes including the gore areas, and portions of each on and off ramp. The existing shoulders will be milled 1 ½” and extended beyond the existing guard rails. In the travel lanes, recycled asphaltic concrete superpave (12.5 mm and 25 mm) will be inlayed with a 1 ¼” PEM surfacing to overlap the shoulders. The shoulders will be inlayed with recycled asphaltic concrete superpave, 12.5 mm.

The expected cost of this construction is approximately \$32,955,887 dollars. More information about this project may be found in the tabbed section of this report entitled *Project Description*.

VALUE ENGINEERING PROCESS

The Value Engineering Team followed the seven step Value Engineering job plan as promulgated by Georgia Department of Transportation. This seven step job plan includes the following:

- Investigation
- Analysis
- Speculation
- Evaluation
- Development
- Recommendation
- Presentation

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last morning of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet that follows, along with the formally developed alternatives and design suggestions can be used as a “score sheet” for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is encouraged to visit the third tabbed section of this report entitled *Study Results* for a review of the details of the developed alternatives. The fourth Tabbed section *Project Description*, includes

information about the project itself and the fifth tabbed section presents the *Value Engineering Process* which goes into more detail about the process of Value Engineering, as used in this workshop.

THE STUDY RESULTS

During the speculation phase the VE team identified **8** ideas that appeared to hold potential for reducing the construction cost, improving the end product and/or reducing the difficulty and time of project construction.

After the evaluation phase was completed, 6 alternative ideas and 1 design suggestion remained for further consideration. These alternative ideas and design suggestion may be found, in their documented form, in the tabbed section of this report entitled *Study Results*. The following *Summary of Alternatives and Design Suggestions* coupled with the documentation of the developed alternatives should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

Study Results

Study Results

Introduction

This section includes the study results presented in the form of fully developed value engineering alternatives that include descriptions of the original design, description of the alternative design configurations, comments on the technical justifications, opportunities and risks associated with the alternatives, sketches, calculations and technical justification for these alternatives. For the most part, these fully developed alternatives represent an array of choices that clearly could have an impact on the eventual cost and performance of the finished project.

The documented alternatives also include a Design Suggestion. As their name implies, these are short write-ups making note of VE perspectives on technical issues and sharing some thoughts for consideration as the design moves forward.

This introductory sheet is followed by a *Creative Idea Listing & Evaluation* table. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward. The enclosed *Summary of Alternatives & Design Suggestions* may also be used as a “score sheet” within the bounds of an implementation meeting.

Cost Calculations

The cost calculations are intended only as a guide to the approximate results that might be expected from implementation of the alternatives. They should be helpful in making clear choices as to the pursuit of individual alternatives.

The composite mark-up of 10% for the construction cost comparisons was derived from the cost estimate for the project. This estimate can be found in the section of this report entitled *Project Description*.

Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION ALTERNATIVE NO.:
Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533 **RI-1**

DESCRIPTION: **SEAL SHOULDERS** SHEET NO.: 1 of 5

Original Design:

The original design calls for the milling and inlay of 1 ½” of pavement and the installation of 16” rumble strips along both the inside and outside shoulders.

Alternative:

This alternative design suggests to use an emulsified asphalt slurry seal along both the inside and outside shoulders in lieu of milling and inlay.

Opportunities:

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays
- Extend the life of the pavement

Risks:

- Increased Life-Cycle Costs

Technical Discussion:

The GDOT shoulder recommendation presented in “addendum” dated May 26, 2006, recommends to mill and inlay the shoulders with a 1 ½” layer of pavement. Milling and inlaying the existing shoulders will also require the installation of new 16 inch rumble strips. During a site visit, the VE Team observed that the existing shoulders appeared to be in very good to excellent condition. Although it is normal construction procedures to replace the shoulders when rehabilitating the main travel lanes, as the existing shoulders are extremely wide in many areas due to the physical bounds of the roadway, it may be reasonable retain and rehab them in place.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 909,708	\$ 0	\$ 909,708
ALTERNATIVE	\$ 138,796	\$ 0	\$ 138,796
SAVINGS	\$ 770,912	\$ 0	\$ 770,912

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

ALTERNATIVE NO.:
RI-1

DESCRIPTION: SEAL SHOULDERS

SHEET NO.: 3 of 5

ORIGINAL ESTIMATE

– RECYCLED ASPH. CONC. 12.5 MM SUPERPAVE, GP2 ONLY

*USE MILLING ASPH. CONC. PUMT., 1 1/2" DEPTH, QUANTITY TO OBTAIN ASPHALT QUANTITY, → 126,178 SY

$$126,178 \text{ SY} \times 165 \text{ LBS/SY} \times 1 \text{ TN}/2000 \text{ LBS} = \boxed{10,410 \text{ TN}}$$

PROPOSED ESTIMATE

– EMULSIFIED ASPHALT SLURRY SEAL

*THIS QUANTITY WILL BE THE SAME AS THE QUANTITY FOR MILLING ASPH. CONC. PUMT., 1 1/2" DEPTH. → $\boxed{126,178 \text{ SY}}$

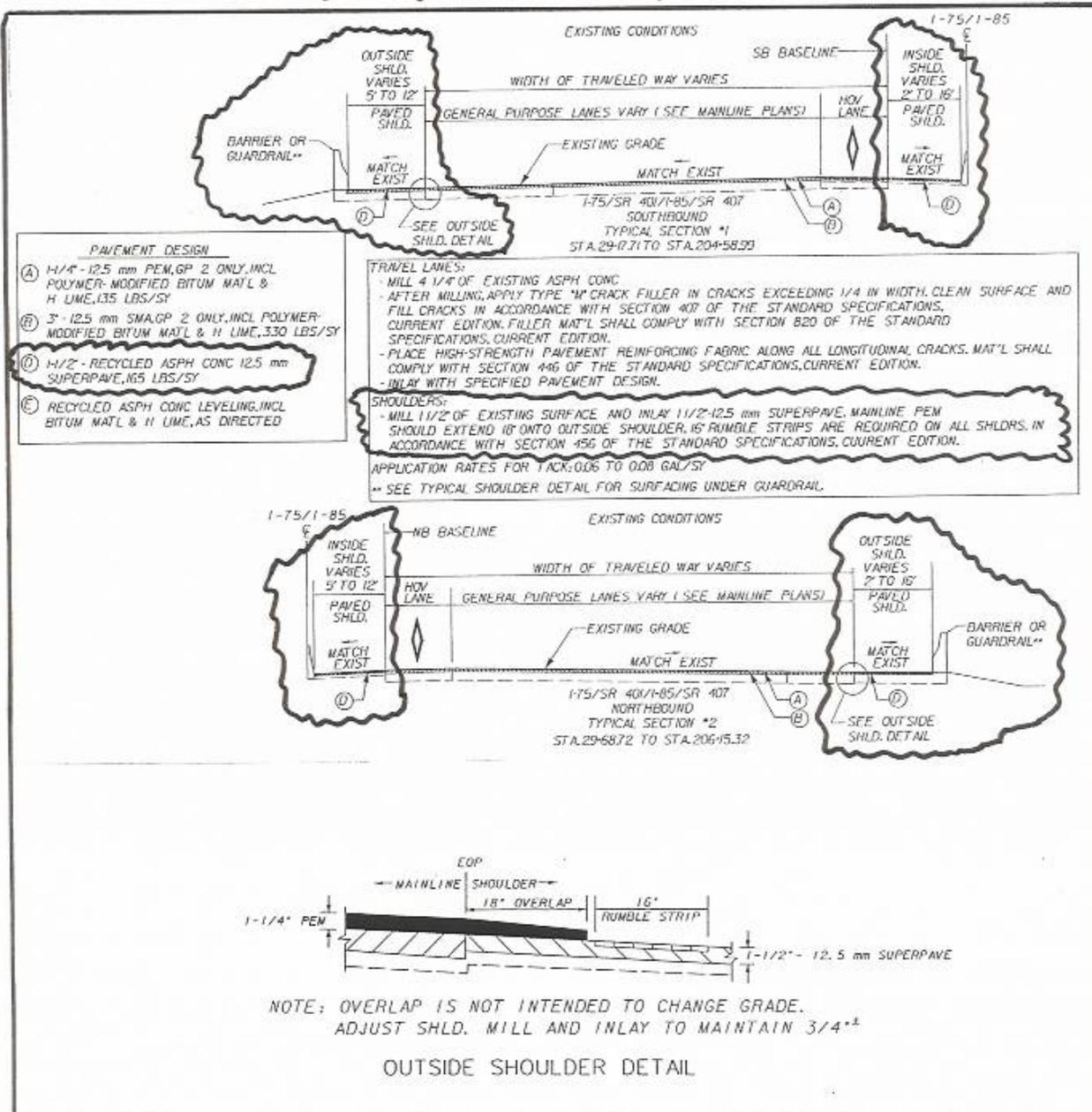
PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

ALTERNATIVE NO.: **RI-1**

DESCRIPTION: **SEAL SHOULDERS**

SHEET NO.: **4 of 5**

ORIGINAL DESIGN



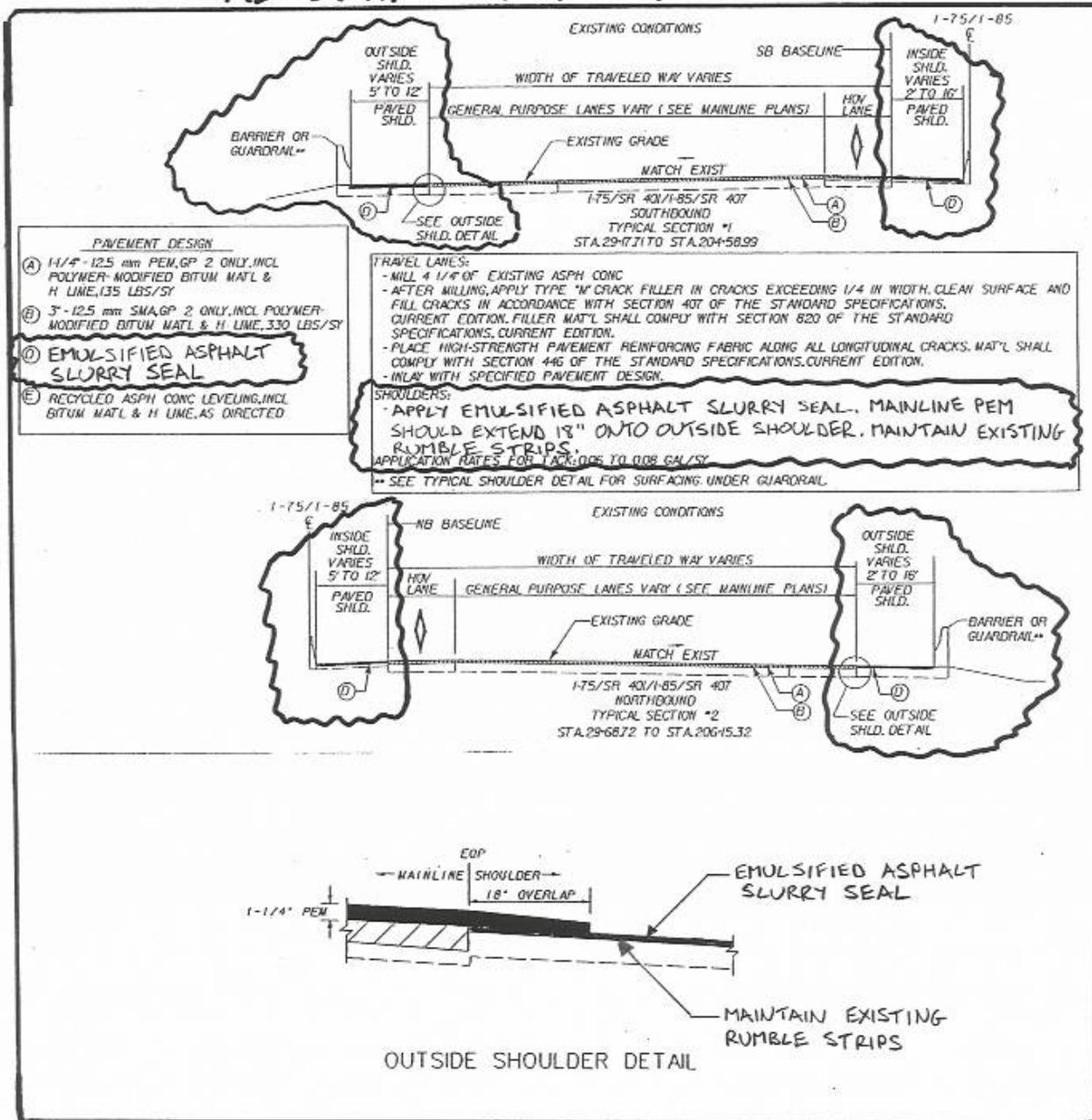
PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

ALTERNATIVE NO.: **RI-1**

DESCRIPTION: **SEAL SHOULDERS**

SHEET NO.: **5 of 5**

ALTERNATIVE DESIGN



Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533	ALTERNATIVE NO.: RI-2
DESCRIPTION: INSTALL CONCRETE BARRIERS IN LIEU OF METAL GUARDRAILS	SHEET NO.: 1 of 4

Original Design:

The original design calls for the removal of all guardrails and guardrail anchors, and the installation of new guardrails and guardrail anchors to current standards. The original design also calls for surfacing under the new guardrails with asphaltic concrete paving.

Alternative:

This alternative design suggests to remove all of the existing guardrails and anchors and to install concrete side barriers in lieu of new guardrails.

Opportunities:

- Reduce project life cycle cost
- Reduce exposure of workers to hazardous traffic conditions

Risks:

- Increased Initial Construction Cost

Technical Discussion:

This alternative idea suggests that it may be more practical and a safety improvement to construct concrete safety barriers along this highway which tend to have a longer life and a greater opportunity to protect the motorist than would the metal guardrails.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 265,110	\$ 865,032	\$ 1,130,142
ALTERNATIVE	\$ 1,091,693	\$ 0	\$ 1,091,693
SAVINGS	\$ 826,583	\$ 0	\$ 38,449

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
Proj. No.: NHS-M001-00(533) - Fulton County - P.I. Number: M001533

ALTERNATIVE NO.: RI-2

DESCRIPTION: INSTALL CONCRETE BARRIER IN LEO OF GUARDRAIL

SHEET NO.: 3 of 4

ORIGINAL ESTIMATE

- RECYCLED ASPH. CONC. 12.5 MM SUPERPAVE, GP 2 ONLY

* USE MILLING OF ASPH. CONC. PUNT, 1 1/2 IN DEPTH, TO BACK CALCULATE THE AREA BEING SURFACED UNDER GUARDRAIL

$$\text{SHOULDER AREA TO BE MILLED} = 126,178 \text{ SY}$$

$$\begin{aligned} 12.5 \text{ MM SUPERPAVE} &= 126,178 \text{ SY} \times 165 \text{ LBS/SY} \times 1 \text{ TN}/2000 \text{ LBS} \\ &= 10,410 \text{ TN} \end{aligned}$$

$$\begin{aligned} 12.5 \text{ MM SUPERPAVE (UNDER GUARDRAIL)} &= 10,851 \text{ TN} - 10,410 \text{ TN} \\ &= \boxed{441 \text{ TN}} \end{aligned}$$

$$441 \text{ TN} \times \frac{2000 \text{ LBS}}{1 \text{ TN}} \times \frac{1 \text{ SY}}{165 \text{ LBS}} = 5345 \text{ SY}$$

- RECYCLED ASPH. CONC. 25 MM SUPERPAVE

$$5345 \text{ SY} \times \frac{220 \text{ LBS}}{1 \text{ SY}} \times \frac{1 \text{ TN}}{2000 \text{ LBS}} = \boxed{588 \text{ TN}}$$

LIFE CYCLE COST WORKSHEET



PROJECT:		NHS-M001-00(533) Milling and Inlay I-75/85 Fulton County <i>Georgia Department of Transportation</i>			ALTERNATIVE NO.	RI-2		
					SHEET NO.	4 of 4		
LIFE CYCLE PERIOD: <u>25</u> years					Guard Rails	Conc Barriers		
INTEREST RATE: <u>4.20%</u> ESCALATION RATE: <u>0.00%</u>					ORIGINAL	PROPOSED		
A. INITIAL COST (Note - escalation shown as 0.0% since using Useful Life (Years) constant dollar LCC analysis)					265,110	1,091,693		
INITIAL COST SAVINGS						(826,583)		
B. RECURRENT COSTS (Annual Expenditures)								
1. Maintenance (20% of Initial Cost -- Spent per year)					53,022			
2. Maintenance (2% of Initial Cost -- Spent per Year)						-		
3.								
4.								
5.								
6.								
Total Annual Costs					53,022	-		
Present Worth Factor					15.2970	15.2970		
Present Worth of RECURRENT COSTS					811,078	-		
C. SINGLE EXPENDITURES				Year	Amount	PW factor	Present Worth	Present Worth
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)						
x		1. Re-build system (25% of original cost)	5	66,278	0.8141	53,954	-	
		2.			1.0000	-	-	
		3.			1.0000	-	-	
		4.			1.0000	-	-	
		5.			1.0000	-	-	
		6.			1.0000	-	-	
		7.			1.0000	-	-	
		8.			1.0000	-	-	
D. SALVAGE VALUE			Year	Amount	PW factor	Present Worth	Present Worth	
		1.			1.0000	-	-	
		2.			1.0000	-	-	
Present Worth of SINGLE EXPENDITURES						53,954	-	
E. Total Recurrent Costs & Single Expenditures (B + C + D)						865,032	-	
RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS							865,032	
TOTAL PRESENT WORTH COST (A + E)					1,130,142	1,091,693		
TOTAL LIFE CYCLE SAVINGS							38,449	

Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION ALTERNATIVE NO.:
Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533 **RI-3**
 DESCRIPTION: **REHABILITATE IN-LIEU OF REMOVE AND REPLACE PAVEMENT IN GORE AREAS** SHEET NO.: 1 of 6

Original Design:

The original design calls for the contractor to mill and inlay the ramp and gore areas from the gore point to the mainline taper as shown on GA. Standard Construction Details R1,R2, R3 or as directed by the engineer

Alternative:

This alternative design suggests retaining the existing pavement in the Gore Areas and applying an emulsified asphalt to correct any oxidation of the existing material.

Opportunities:

- Reduce project initial cost
- Reduce construction time
- Eliminate irregular areas and handwork in paving operation

Risks:

- Increase life cycle cost

Technical Discussion:

This alternative idea suggests that the gore areas, as they are outside the normal travel lanes may have not deteriorated and may still meet current standards for construction.

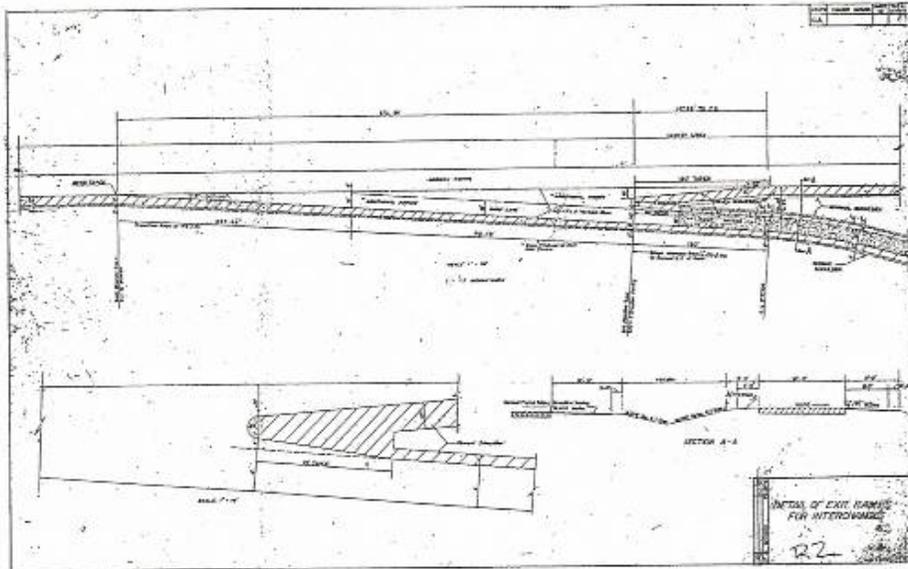
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 19,720,784	\$ 0	\$ 19,720,784
ALTERNATIVE	\$ 18,543,003	\$ 0	\$ 18,543,003
SAVINGS	\$ 1,187,781	\$ 0	\$ 1,187,781

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

ALTERNATIVE NO.: **RI-3**

DESCRIPTION:

SHEET NO.: **3** of **6**



ORIGINAL DESIGN R-2



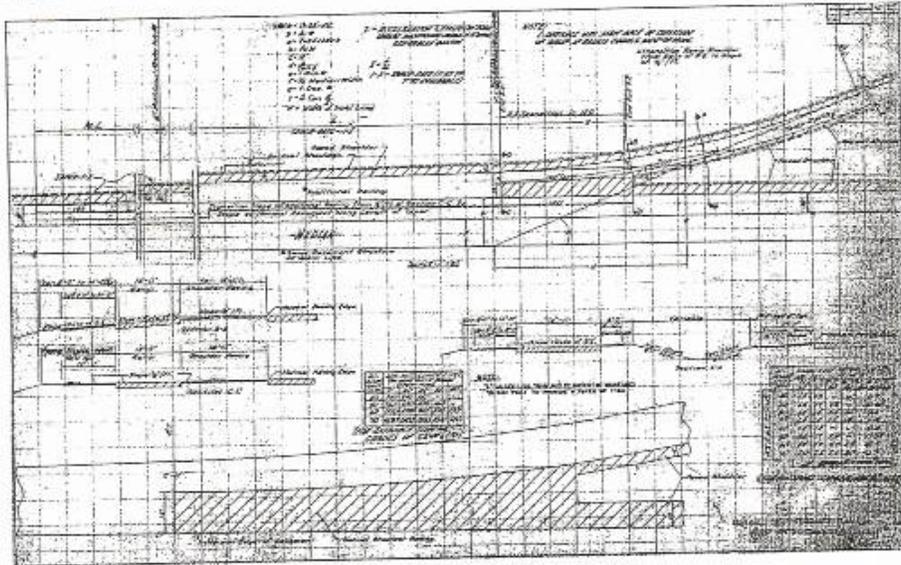
ALTERNATIVE DESIGN R-2

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

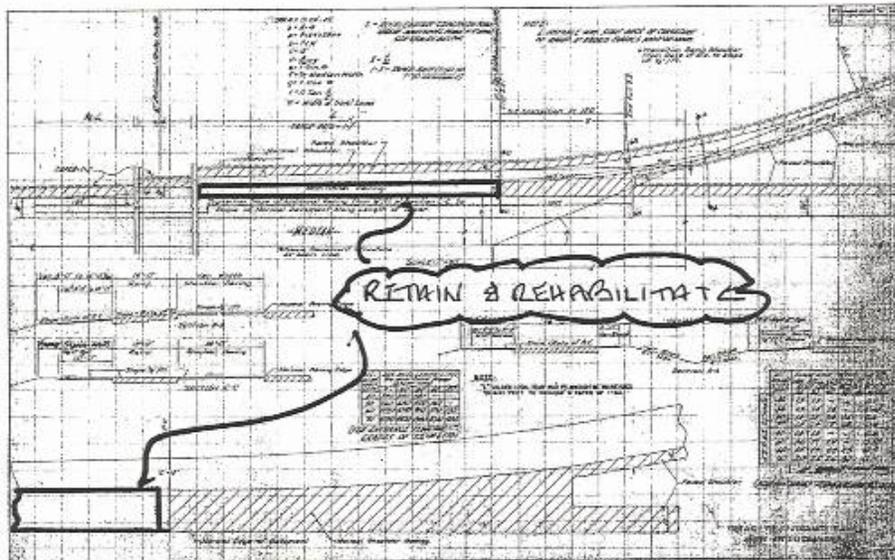
ALTERNATIVE NO.: **RI-3**

DESCRIPTION:

SHEET NO.: **4** of **6**



ORIGINAL DESIGN R-3



ALTERNATIVE DESIGN R-3



COST WORKSHEET

PROJECT:	NHS-M001-00(533) Fulton County	ALTERNATIVE NO.:	RI-3
		SHEET NO.:	5 of 6
P.I. Number: M001533			
DESCRIPTION: <i>Rehabilitate in-lieu of remove and replace pavement in Gore areas.</i>			

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
400-3604 ASPH CONC 12.5mm SMA	TN	62616	117.66	7,367,398	57810	117.66	6,901,924
400-3624 ASPH CONC 12.5mm Perm	TN	35046	109.42	3,840,204	33130	109.42	3,625,084
402-3121 RECYCLED ASPH CONC 25mm	TN	29821	61.84	1,844,130	29038	61.84	1,795,709
422-0217 MILL ASPH CONC 4 1/4"	SY	37989	7.65	2,903,090	35395	7.65	2,707,717
432-0231 MILL ASPH CONC 8 1/4"	SY	132873	14.85	1,973,164	129283	14.85	1,919,552
413- DILUTED EMULSIFIED ASPH TACK COAT	GAL	0	0	0	3495	2.00	6,990
				Sub-total			16,857,276
				Mark-up at			1,792,798
				TOTAL			18,543,003

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: **M001533 – Fulton and Clayton Counties**

ALTERNATIVE NO.:

RI-4 3

DESCRIPTION: **REHABILITATE IN-LIEU OF REMOVE AND REPLACE PAVEMENT IN THE CORE AREA**

SHEET NO.: 6 of 6

AREA OF CURBS

NB

1) UNIVERSITY AVE	$1300 \times \frac{12+10}{2} = 9 = 367 \text{ Sq Yd}$	
2) BASS ST	$1500 \times \frac{10+10}{2} = 7 = 1000 \text{ Sq Yd}$	
3) FULTON ST	$1400 \times \frac{12+10}{2} = 9 = 1167 \text{ Sq Yd}$	
4) I-20	$1700 \times \frac{12+10}{2} = 9 = 1133 \text{ Sq Yd}$	9355 Sq Yd
5) FREEDOM ST	$1600 \times \frac{12+10}{2} = 9 = 1333 \text{ Sq Yd}$	
6) I-76	$2400 \times \frac{10+10}{2} = 9 = 1333 \text{ Sq Yd}$	
7) MLK	$1100 \times \frac{10+10}{2} = 9 = 611 \text{ Sq Yd}$	
8) EOBANON AVE	$700 \times \frac{8+10}{2} = 9 = 311 \text{ Sq Yd}$	
9) ELLIS ST	$1200 \times \frac{8+10}{2} = 9 = 533 \text{ Sq Yd}$	
10) FREEDOM PKWY	$2400 \times \frac{8+10}{2} = 9 = 1067 \text{ Sq Yd}$	
11) W. PEARSON LEC	$400 \times \frac{10+10}{2} = 9 = 222 \text{ Sq Yd}$	
12) WILLIAMS ST	$800 \times \frac{6+8}{2} = 9 = 267 \text{ Sq Yd}$	
13) 10 TH ST	$1600 \times \frac{10+10}{2} = 9 = 889 \text{ Sq Yd}$	
		10733 Sq Yd



MILEAGE OF CURBS

SB

1) 10 TH ST	$700 \times \frac{12+10}{2} = 9 = 467 \text{ Sq Yd}$	
2) BASS AVE	$500 \times \frac{10+10}{2} = 9 = 167 \text{ Sq Yd}$	2212 Sq Yd
3) WILLIAMS ST	$600 \times \frac{12+10}{2} = 9 = 600 \text{ Sq Yd}$	
4) WILLIAMS ST	$1100 \times \frac{12+10}{2} = 9 = 367 \text{ Sq Yd}$	
5) CONANT ST	$1100 \times \frac{12+10}{2} = 9 = 611 \text{ Sq Yd}$	
6) FREEDOM PKWY	$900 \times \frac{8+10}{2} = 9 = 400 \text{ Sq Yd}$	
7) ELLIS ST	$700 \times \frac{10+10}{2} = 9 = 389 \text{ Sq Yd}$	
8) ELLIS ST	$1200 \times \frac{10+10}{2} = 9 = 667 \text{ Sq Yd}$	
9) FREEDOM PKWY	$1500 \times \frac{10+10}{2} = 9 = 1500 \text{ Sq Yd}$	
10) EOBANON AVE	$2800 \times \frac{8+10}{2} = 9 = 1244 \text{ Sq Yd}$	16184
11) MLK	$1700 \times \frac{8+10}{2} = 9 = 756 \text{ Sq Yd}$	
12) I-20	$2500 \times \frac{12+10}{2} = 9 = 1667 \text{ Sq Yd}$	
13) FULTON ST	$2200 \times \frac{12+10}{2} = 9 = 1533 \text{ Sq Yd}$	
14) I-20	$2000 \times \frac{10+10}{2} = 9 = 4044 \text{ Sq Yd}$	
15) CENTRAL AVE	$2400 \times \frac{8+10}{2} = 9 = 1067 \text{ Sq Yd}$	
16) UNIVERSITY BLVD	$900 \times \frac{8+10}{2} = 9 = 300 \text{ Sq Yd}$	
17) UNIVERSITY AVE	$1700 \times \frac{12+10}{2} = 9 = 1417 \text{ Sq Yd}$	16396 Sq Yd



TOTAL AREA OF CURBS TO BE MILLED 4 1/4" = 9355 + 16184 = 25539

TOTAL AREA OF CURBS TO BE MILLED 3 1/4" = 1318 + 2212 = 3530

4 1/4" MILLING DEPTH

400-3604 ASPH CONC 12.5mm SMA
 $25539 \text{ yd}^2 \times 330 \text{ lb/yd}^2 = 2000 = 4214 \text{ T}$
 400-3624 ASPH CONC 12.5mm PSM
 $25539 \text{ yd}^2 \times 135 \text{ lb/yd}^2 = 2000 = 1724 \text{ T}$

3 1/4" MILLING DEPTH

400-3604 ASPH CONC 12.5mm SMA
 $3530 \text{ yd}^2 \times 330 \text{ lb/yd}^2 = 2000 = 592 \text{ T}$
 400-3624 ASPH CONC 12.5mm PSM
 $3530 \text{ yd}^2 \times 135 \text{ lb/yd}^2 = 2000 = 222 \text{ T}$
 402-3121 RECYCLED ASPH CONC 25mm SUPERPAVE
 $3690 \text{ yd}^2 \times 440 \text{ lb/yd}^2 = 2000 = 783 \text{ T}$

413- DOWLED EMULSIFIED ASPH TRAC CONC
 $29129 \text{ yd}^2 \times 0.12 \text{ Gal/yd}^2 = 3495 \text{ Gal}$



Value Analysis Design Alternative

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533	ALTERNATIVE NO.: RI-4
DESCRIPTION: CORE AND TEST SHOULDER AREAS AND REHABILITATE ONLY WHERE NEEDED	SHEET NO.: 1 of 3

Original Design:

The original design calls for the milling and inlay of 1 ½” of pavement and the installation of 16” rumble strips along both the inside and outside shoulders for the entire length of the project.

Alternative:

This alternative design suggests to core and test the existing shoulders and rehabilitate only the areas where the existing pavement does not meet current structural standards.

Opportunities:

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays
- Extend the life of the pavement

Risks:

- Increased Life-Cycle Costs

Technical Discussion:

The GDOT shoulder recommendation presented in “addendum” dated May 26, 2006, recommends to mill and inlay the shoulders with a 1 ½” layer of pavement. Milling and inlaying the existing shoulders will also require the installation of new 16 inch rumble strips. During a site visit, the VE Team observed that the existing shoulders appeared to be in very good to excellent condition. Although it is normal construction procedures to replace the shoulders when rehabilitating the main travel lanes, as the existing shoulders are extremely wide in many areas due to the physical bounds of the roadway, it may be reasonable to test and only repair the areas that do not meet current standards.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 909,708	\$ 0	\$ 909,708
ALTERNATIVE	\$ 181,942	\$ 0	\$ 181,942
SAVINGS	\$ 727,766	\$ 0	\$ 727,766

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton County

ALTERNATIVE NO.:
RI-4

DESCRIPTION: **COPE AND TEST SHOULDER AREAS AND
REHABILITATE ONLY WHERE NEEDED**

SHEET NO.: **2 of 3**

ASSUMPTIONS

* ONLY 20% OF EXISTING SHOULDERS WILL NEED TO BE
REHABILITATED

MILL ASPH. CONC. PVMT. 1 1/2 IN. DEPTH

ORIGINAL → 126,178 SY

ALT. → 126,178 X 0.20 = 25,236 SY

RECYCLED ASPH. CONC. 125 MM SUPERPAVE

ORIGINAL → 10,410 TN

ALT. → 10,410 TN X 0.20 = 2,082 TN

RUMBLE STRIPS

ORIGINAL → 17 GLM

ALT. → 17 GLM X 0.20 = 3.4 GLM

Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533	ALTERNATIVE NO.: RI-5
DESCRIPTION: REMOVE AND REPLACE PEM PAVEMENT ONLY IN GORE AREAS	SHEET NO.: 1 of 6

Original Design:

The original design calls for the contractor to mill and inlay the ramp and gore areas from the gore point to the mainline taper as shown on GA. Standard Construction Details R1,R2, R3 or as directed by the engineer

Alternative:

This alternative design suggests only milling and inlaying the existing PEM from the Gore Areas and not replacing the existing underlying structural asphaltic concrete.

Opportunities:

- Reduce project initial cost
- Reduce construction time
- Eliminate irregular areas and handwork in paving operation

Risks:

- Increase life cycle cost

Technical Discussion:

This alternative idea suggests that the gore areas, as they are outside the normal travel lanes may have not deteriorated and may still meet current structural standards for construction and only require re-surfacing.

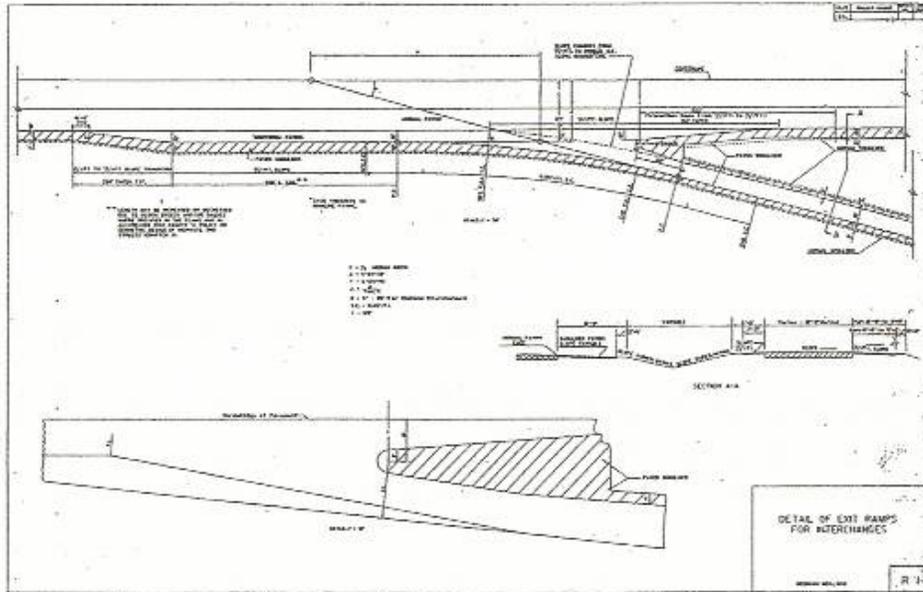
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 17,692,241	\$ 0	\$ 17,692,241
ALTERNATIVE	\$ 16,611,621	\$ 0	\$ 16,611,621
SAVINGS	\$ 1,080,620	\$ 0	\$ 1,080,620

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

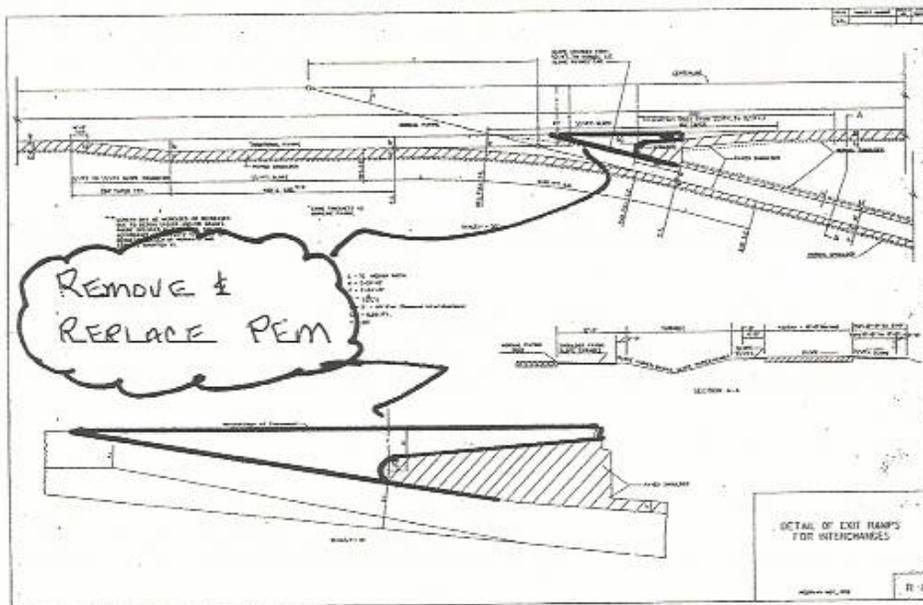
ALTERNATIVE NO.: **RI-5**

DESCRIPTION: **REMOVE AND REPLACE PEM ONLY IN THE GORE AREAS**

SHEET NO.: **2 of 6**



ORIGINAL DESIGN R-1



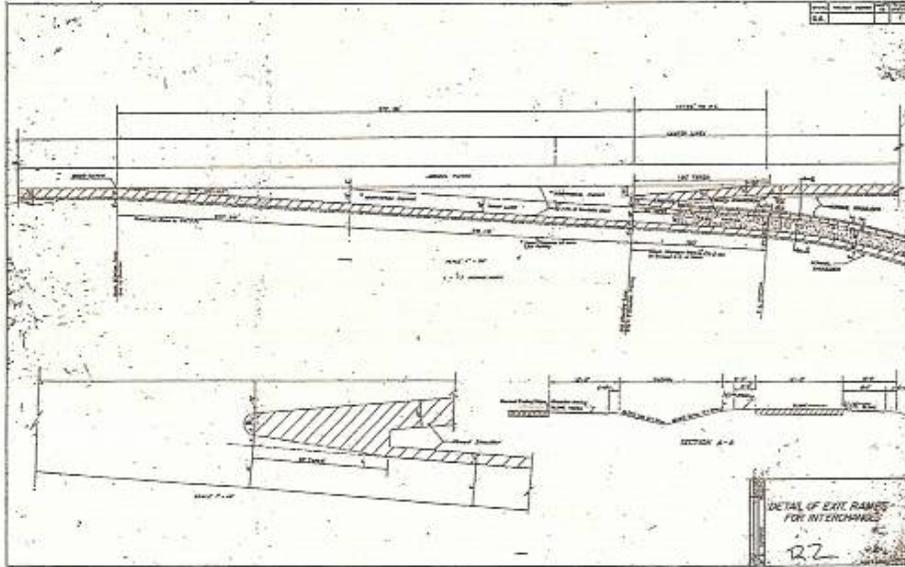
ALTERNATIVE DESIGN R-1

PROJECT: NHS-M001-00(533) – Georgia Department of Transportation
P.I. Number: M001533 – Fulton and Clayton Counties

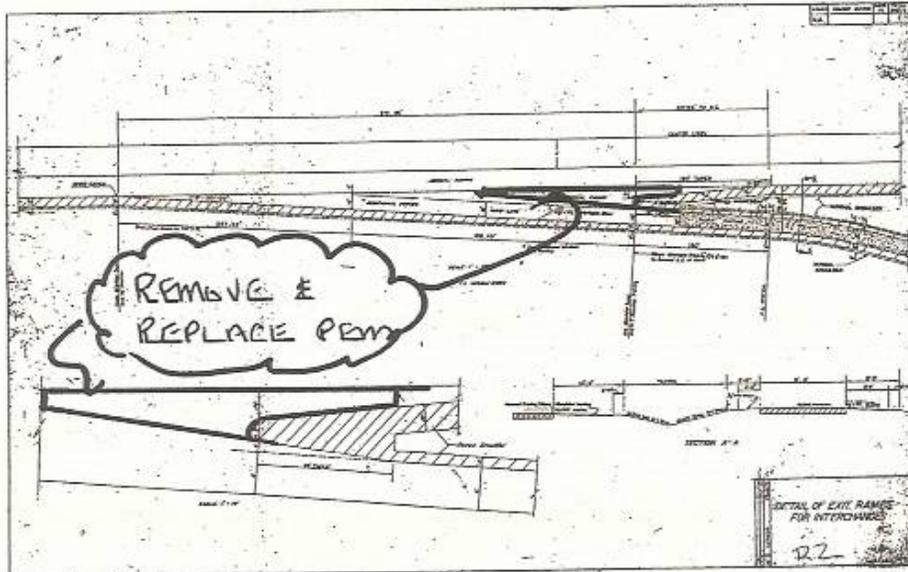
ALTERNATIVE NO.: RI-5

DESCRIPTION: REMOVE AND REPLACE PEM ONLY IN THE GORE AREAS

SHEET NO.: 3 of 6



ORIGINAL DESIGN R-2



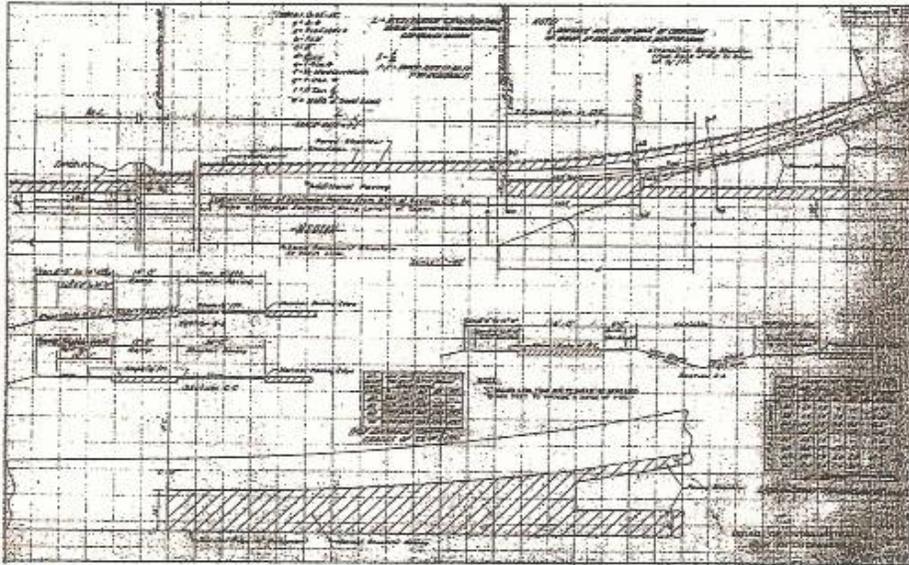
ALTERNATIVE DESIGN R-2

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

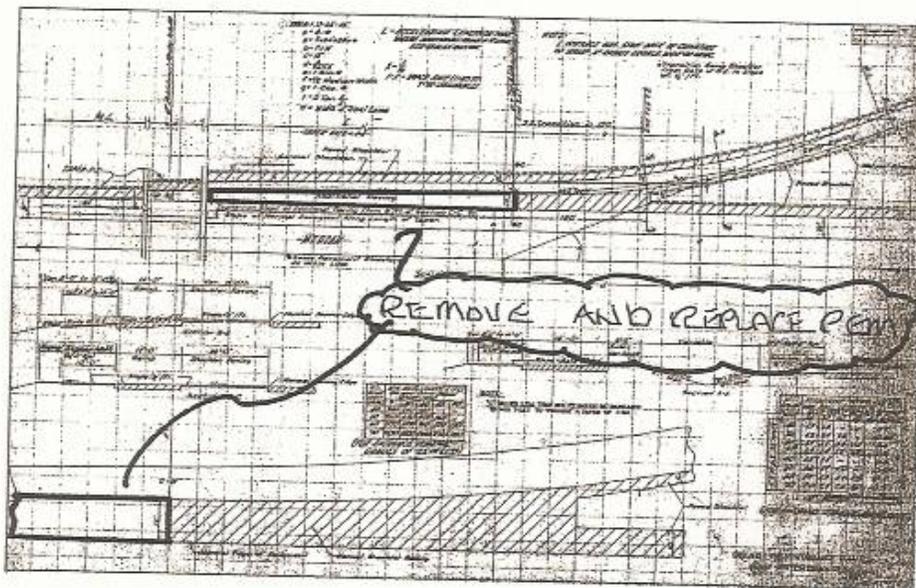
ALTERNATIVE NO.: **RI-5**

DESCRIPTION: **REMOVE AND REPLACE PEM ONLY
IN THE GORE AREAS**

SHEET NO.: **4** of **6**



ORIGINAL DESIGN R-3



ALTERNATIVE DESIGN R-3

PROJECT: **NHS-M001-00(533) – Georgia Department of Transportation**
P.I. Number: M001533 – Fulton and Clayton Counties

ALTERNATIVE NO.:

RI- 5

DESCRIPTION: **REMOVE AND REPLACE PAV ONLY IN THE GORE AREAS**

SHEET NO.: **6 of 6**

AREA OF GORES

NB

1) UNIVERSITY AVE	$1300 \times \frac{12+0}{2} = 9 = 367 \text{ Sq Yd}$
2) BASS ST	$1800 \times \frac{10+0}{2} = 9 = 1000 \text{ Sq Yd}$
3) FULTON ST	$1800 \times \frac{10+0}{2} = 9 = 1167 \text{ Sq Yd}$
4) I-76	$1700 \times \frac{12+0}{2} = 9 = 1133 \text{ Sq Yd}$
5) FULTON ST	$1600 \times \frac{15+0}{2} = 9 = 1333 \text{ Sq Yd}$
6) I-76	$2400 \times \frac{10+0}{2} = 9 = 1333 \text{ Sq Yd}$
7) MLK	$1100 \times \frac{10+0}{2} = 9 = 611 \text{ Sq Yd}$
8) EDWARDS AVE	$700 \times \frac{8+0}{2} = 9 = 311 \text{ Sq Yd}$
9) ELLIS ST	$1200 \times \frac{9+0}{2} = 9 = 533 \text{ Sq Yd}$
10) FREEDOM PLAZA	$2400 \times \frac{8+0}{2} = 9 = 1067 \text{ Sq Yd}$
11) W. PEPPERIDGE	$400 \times \frac{10+0}{2} = 9 = 222 \text{ Sq Yd}$
12) WILLIAMS ST	$800 \times \frac{10+0}{2} = 9 = 267 \text{ Sq Yd}$
13) 10 TH ST	$1600 \times \frac{10+0}{2} = 9 = 833 \text{ Sq Yd}$
	10733 Sq Yd

9355 Sq Yd



Total Area of Gores to be Milled $4 \frac{1}{4}''$
 $9355 + 16184 = 25539$

Total Area of Gores to be Milled $8 \frac{1}{4}''$
 $1378 + 2212 = 3590$

AREA OF GORES

SB

1) 10 TH ST	$700 \times \frac{12+0}{2} = 9 = 467 \text{ Sq Yd}$
2) MARKET AVE	$500 \times \frac{10+0}{2} = 9 = 167 \text{ Sq Yd}$
3) WILLIAMS ST	$800 \times \frac{10+0}{2} = 9 = 600 \text{ Sq Yd}$
4) WILLIAMS ST	$1100 \times \frac{10+0}{2} = 9 = 767 \text{ Sq Yd}$
5) EDWARDS AVE	$1100 \times \frac{10+0}{2} = 9 = 611 \text{ Sq Yd}$
6) FREEDOM PLAZA	$900 \times \frac{8+0}{2} = 9 = 400 \text{ Sq Yd}$
7) ELLIS ST	$700 \times \frac{10+0}{2} = 9 = 389 \text{ Sq Yd}$
8) ELLIS ST	$1200 \times \frac{10+0}{2} = 9 = 667 \text{ Sq Yd}$
9) FREEDOM PLAZA	$1800 \times \frac{10+0}{2} = 9 = 1500 \text{ Sq Yd}$
10) EDWARDS AVE	$2600 \times \frac{8+0}{2} = 9 = 1244 \text{ Sq Yd}$
11) MLK	$1700 \times \frac{10+0}{2} = 9 = 756 \text{ Sq Yd}$
12) I-76	$2500 \times \frac{12+0}{2} = 9 = 1667 \text{ Sq Yd}$
13) FULTON ST	$2200 \times \frac{15+0}{2} = 9 = 1833 \text{ Sq Yd}$
14) I-76	$2000 \times \frac{20+0}{2} = 9 = 4444 \text{ Sq Yd}$
15) CENTRAL AVE	$2400 \times \frac{8+0}{2} = 9 = 1067 \text{ Sq Yd}$
16) ABOLATION CIRC	$400 \times \frac{8+0}{2} = 9 = 500 \text{ Sq Yd}$
17) UNIVERSITY AVE	$1700 \times \frac{16+0}{2} = 9 = 1417 \text{ Sq Yd}$
	16396 Sq Yd

2212 Sq Yd



$4 \frac{1}{4}''$ MILLING DEPTH

460-3604 ASPH CONC 12.5mm SMA
 $25539 \text{ yd}^2 \times 330 \text{ lb/yd}^2 = 2000$ - 4214 TD

$8 \frac{1}{4}''$ MILLING DEPTH

400-3604 ASPH CONC 12.5mm SMA
 $3590 \text{ yd}^2 \times 330 \text{ lb/yd}^2 = 2000$ - 512 TD

402-5121 RECYCLED ASPH CONC 25mm
 $3590 \text{ yd}^2 \times 440 \text{ lb/yd}^2 = 2000$ - 783 TD

$1 \frac{1}{4}''$ MILLING DEPTH FOR PAV REMOVAL

$25539 \text{ yd}^2 + 3590 \text{ yd}^2 = 29129 \text{ yd}^2$



Value Analysis Design Alternative

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533	ALTERNATIVE NO.: RI-6
DESCRIPTION: TEST AND REPAIR/REHABILITATE THE PROJECT BY “LANES”	SHEET NO.: 1 of 1

Original Design:

The project consists of the milling and inlaying of all lanes of the downtown portion of the I-75/I-85 connector. The milling requirement ranging from 4” +/- to 8” +/- is based on results of physical and laboratory testing of the existing asphaltic concrete.

Alternative:

This alternative presumes that if each lane were treated as an individual unit, and individually tested, individually analyzed, and given an individual rehabilitation recommendation that the “by lane” requirements may differ significantly from the recommendations for the average of all the lanes. And if so, that it may be possible to save significant monies by approaching the project in this manner, by lane, as opposed to a blanket approach. While it may appear to be reasonable to do the same rehab work for all lanes in the same general area, it may be of greater value to give special consideration to the difficulty and extra cost associated with repairing center lanes. The estimated cost savings represents only 50% of the 8 ¼” milling in accordance with the analysis of the north bound lanes vs. the south bound lanes; the potential traffic control savings is not included.

Opportunities:

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays
- Extend the life of the pavement
- Increase the structural capacity

Risks:

- Increased testing requirements
- Delay project start
- Additional traffic delays for testing

Technical Discussion:

This alternative idea presumes that the project construction/reconstruction will be performed by milling and inlaying “by individual lanes”. It assumes that work in the” middle lanes” is significantly more difficult, costly and results in greater inconvenience to motorists than does work in the outside lanes. And, it presumes that the quality of the existing pavement varies, as testing has shown to date, and also, as its thickness varies by a factor of “2”. It also presumes that the original pavement was constructed in “lanes” and may therefore be more consistent by lane than by area. Therefore, it may be reasonable to assume that the rehabilitation work required may differ by lanes rather than by the average of a large area.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 986,582	\$ 0	\$ 986,582
ALTERNATIVE	\$ 508,235	\$ 0	\$ 508,235
SAVINGS	\$ 478,346	\$ 0	\$ 478,346

Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION Proj. No.: NHS-M001-00(533) – Fulton County – P.I. Number: M001533	ALTERNATIVE NO.: TI-2
DESCRIPTION: LANE CLOSURE NOTIFICATIONS	SHEET NO.: 1 of 1

Original Design:

At the time of this Value Engineering workshop, the specifics of handling Traffic Control were not yet well defined. The project budget identified slightly over \$9 million for this purpose.

Alternative:

It is suggested that the contractor be required to submit for approval and establish a very comprehensive public notification system that will help drivers avoid areas of lane closures. These notifications will be most effective if placed in strategic positions to give the driving public an adequate understanding of the situation ahead and provide them with a clear picture of what they can do to avoid the paving operations.

Opportunities:

- Improved job site safety
- Reduced negative feedback from driving public
- Fewer conflicts between trucks entering and leaving the site, as opposed to through traffic

Risks:

- Must be accurate and timely signs. This will require frequent service by very competent people
- Cost will be very significant

Technical Discussion:

This is one of those projects that will be remembered for years to come, just like the last time any other major pavement upgrade went on. With an emphasis on safety and driver convenience, the thorough signage effort will help immeasurably to minimize traffic in the work zone and expedite people along their way.

Key points for signage will be outside the perimeter highway as vehicles approach the City from I-20 (East and West), I-85 and I-75 (North and South). Signage should be repetitious in nature so that drivers can see it once, have time to ask the question – “what did that sign say? – seemed to be important” – then, in short order have the same sign again. Helpful would be a visual depiction of the perimeter highway, the three interstates and red for the part of the downtown connector being worked on. If these signs are done in a large enough format, they should serve their key purpose.

This information needs to be linked with special requirements for events happening in the City, e.g., sports events, conventions, etc.

PROJECT DESCRIPTION

This project consists of the Milling and Inlaying of a portion of the I-75/I-85 Downtown Connector, State Route: SR 401/SR 407. Limited earth disturbance will be done on this project. All work will be performed within the existing right of way. Therefore, no additional right of way is required.

This project is rather fully described in the documentation that follows. The current new estimate for the cost of construction totals \$32,995,887.90. This cost estimate is included in the first document noted below as part of the enclosures in this report section.

Please see the following enclosed documents

- Georgia Department of Transportation
 - Plan of Proposed Project No: NHS-M001-00(533), PI NO: M001533, Fulton County, Georgia. This document was transmitted to the VE Team on January 9, 2007.
 - Cover Sheet
 - Index
 - Location Map
 - General Notes
 - Typical Sections
 - Bridge Clearances
 - Guardrail Logs
 - Detailed Estimate
 - Mainline Mapping Sheets
 - Department of Transportation, State of Georgia, Special Provision – **Section 105 – Control of Work**
Section 108 – Prosecution and Progress
Section 149 – Construction Layout
Section 150 – Traffic Control
 - Construction Cost Estimate
 - Design Memorandum – May 26, 2006 – **Shoulder Recommendation Addendum** – reports pavement evaluation results and makes recommendations for the Mill and Inlay on the Downtown Connector. This memo is superseded by the follow-up interdepartmental correspondence on September 27, 2006. This memo’s direction is reflected in the current construction details.

The VE team utilized the supplied project materials noted above, along with the design products from **PARSONS**, and the current standard drawings, details and specifications during the conduct of their work in the VE Study effort.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN OF PROPOSED
PROJECT NO: NHS-M001-00(533)
P.I. NO.: M001533
FULTON COUNTY

FEDERAL ROUTE: I-75/I-85 CONNECTOR
STATE ROUTE: SR 401/SR 407

IS LOCATED: 100% WITHIN CONGRESSIONAL DISTRICT NO. 7

IS LOCATED: 100% WITHIN FULTON COUNTY; COUNTY NO.: 060

MID-POINT COORDINATE (N 1362970.0827, E 2229333.0827) WEST ZONE

COMPLETED PLANS

LENGTH OF PROJECT IN MILES

TOTAL

NET LENGTH OF PROJECT	4.72
NET LENGTH OF EXCEPTIONS	0.00
GROSS LENGTH OF PROJECT	4.72

PRESENT TRAFFIC: 172,000 NB, 158,500 SB

INDEX

1	COVER SHEET
2-4	INDEX
5	LOCATION MAP
6-8	GENERAL NOTES
9-11	TYPICAL SECTIONS
12	BRIDGE CLEARANCES
13	GURDRAIL LOGS
14	DETAILED ESTIMATE
15-30	MAINLINE MAPPING SHEETS

GA. STANDARDS

- GA. STD. 3054 – END POST & END POST GUARDRAIL ATTACHMENT DETAIL (9-02)
- GA. STD. 4010 – “W” BEAM GUARDRAIL (5-99)
- GA. STD. 4011A – POSTS & OFFSET BLOCKS FOR “W” & “T” BEAM GUARDRAIL (12-01)
- GA. STD. 4012C – GUARDRAIL CONNECTION AT BRIDGE END OR CONCRETE BARRIER END (3-0)
- GA. STD. 4012D – GUARDRAIL ANCHORAGE TYPE 1(7-02)
- GA. STD. 4013 – GUARDRAIL ANCHORAGE TYPE 5 & 6 – GUARDRAIL ATTACHMENT TO COLUMNS, PIERS, WALLS (6-98)
- GA. STD. 4022A – LOCATION OF GUARDRAIL IN MEDIANS AND TURNOUTS (3-03)
- GA. STD. 4040 – GUARDRAIL ANCHORAGE TYPE 12 (4-06)
- GA. STD. 4051 – GUARDRAIL LOCATION DETAILS FOR MULTI-LANE DIVIDED HIGHWAYS (10-9)
- GA. STD. 4055 – GUARDRAIL LOCATION AT FIXED OBJECTS IN MEDIAN (7-98)
- GA. STD. 4057 – LOCATION OF CONTINUOUS DOUBLE FACED GUARDRAIL IN MEDIAN (8-99)
- GA. STD. 4270 – “T” BEAM GUARDRAIL (11-99)
- GA. STD. 4360 – REFLECTORIZED GUARDRAIL WASHERS & ANCHORAGE NOSE STRIPING (4-06)
- GA. STD. 9100 – TRAFFIC CONTROL GENERAL NOTES, STANDARD LEGEND & MISCELLANEOUS DETAILS (3-06)
- GA. STD. 9106 – TRAFFIC CONTROL DETAIL FOR LANE CLOSURE ON SIX LANE DIVIDED

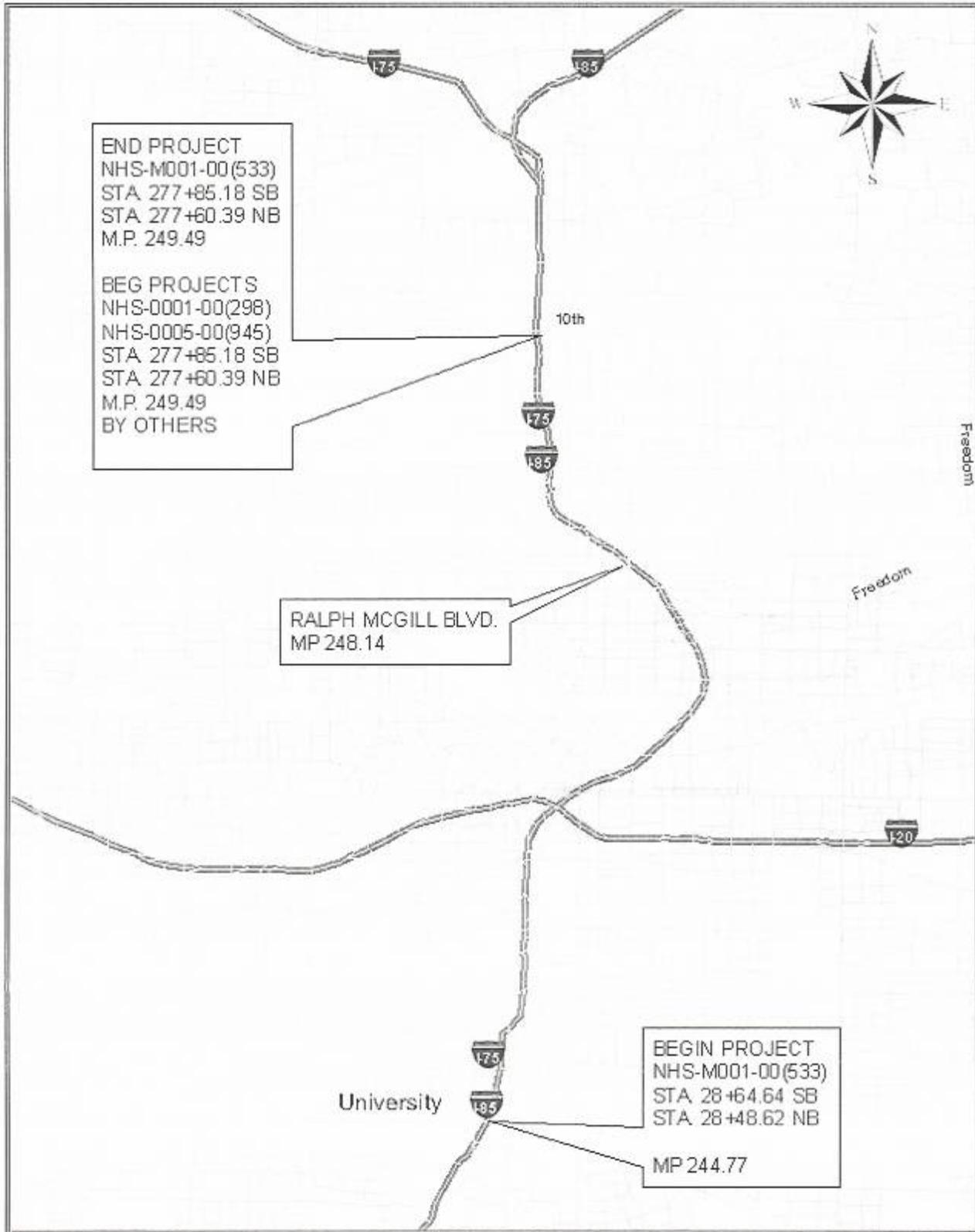
INDEX (Continued) SPECIAL

SPECIAL PROVISION 105 – CONTROL OF WORK

SPECIAL PROVISION 108 – PROSECUTION AND PROGRESS

SPECIAL PROVISION 149 – CONSTRUCTION LAYOUT

SPECIAL PROVISION 150 – TRAFFIC CONTROL



GENERAL NOTES

ALL REFERENCES IN THIS DOCUMENT, WHICH INCLUDES ALL PAPERS, WRITINGS, DOCUMENTS, DRAWINGS, OR PHOTOGRAPHS USED, OR TO BE USED, IN CONNECTION WITH THIS DOCUMENT, TO THE STATE HIGHWAY DEPARTMENT OF GEORGIA, STATE HIGHWAY DEPARTMENT, GEORGIA STATE HIGHWAY DEPARTMENT, HIGHWAY DEPARTMENT, OR DEPARTMENT WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA, AND SHALL BE DEEMED TO MEAN, THE DEPARTMENT OF TRANSPORTATION.

THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS, OR IN ANY WAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF THE BIDDER IS SPECIFICALLY DIRECTED TO SECTIONS 102.04, 102.05, AND 104.03 OF THE SPECIFICATIONS.

BASELINES SHOWN ON THE PLANS ARE FOR REFERENCE ONLY. ESTABLISHMENT OF HORIZONTAL AND VERTICAL CONTROL, AND CONSTRUCTION LAYOUT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AT NO ADDITIONAL COST TO THE DEPARTMENT. THESE CONTROLS AND LAYOUTS SHALL MATCH EXISTING CONDITIONS AND BE USED FOR ALL CONSTRUCTION ACTIVITIES INCLUDING REPLACEMENT/DUPLICATION OF ALL EXISTING PAVEMENT STRIPING AND MARKING UNLESS NOTED OTHERWISE. ACTUAL LIMITS OF WORK MAY BE ADJUSTED BY THE ENGINEER.

THE ATTENTION OF THE CONTRACTOR IS SPECIFICALLY DIRECTED TO SECTION 107.09 OF THE SPECIFICATIONS REGARDING BARRICADES, DANGER, WARNING, AND DETOUR SIGNS.

SELECTED GEORGIA STANDARDS DETAILS HAVE BEEN ADDED TO THE PLANS FOR THE CONTRACTOR'S USE AND INFORMATION. IF LARGER COPIES OF THE GEORGIA STANDARDS ARE DESIRED, THE CONTRACTOR SHALL CONTACT THE D.O.T. AREA ENGINEER.

THE CONTRACTOR SHALL USE FOUR (4) VARIABLE MESSAGE BOARDS ON THIS PROJECT FOR SIGNING ROADWAY WORK. ANY ADDITIONAL MESSAGE BOARDS USED SHALL BE AT THE EXPENSE OF THE CONTRACTOR. COORDINATION OF USAGE SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

LEVELING COURSE TO BE PLACED AS DIRECTED BY THE ENGINEER.

THE REMOVAL OF MILLED ASPHALT IN THE MAINLINE TRAVEL LANES SHALL BE INCLUDED IN THE BID PRICES FOR 432-0217 - MILL ASPH CONC PVMT, 4.25 INCH DEPTH, 432-0231 - MILL ASPH CONC PVMT, 8.25 INCH DEPTH, AND 432-5010 - MILL ASPH CONC PVMT, VARIABLE DEPTH. THE REMOVAL OF ALL EXISTING MATERIAL AND OTHER INCIDENTAL ITEMS INCLUDING IN THE TRAVEL LANES, AND SHOULDER LIMITS TO ATTAIN THE DEPTH FOR PLACEMENT OF NEW MATERIALS SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR 210-0100 - GRADING COMPLETE.

THE CONTRACTOR SHALL RECONSTRUCT THE EARTH SHOULDERS IN ACCORDANCE WITH DETAILS AND NOTES IN THE PLANS. THE RECONSTRUCTION SHALL INCLUDE GRADING, FURNISHING AND PLACEMENT OF BORROW MATERIAL. THE COST OF WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR GRADING COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE REQUIRED EARTHWORK QUANTITIES. RECONSTRUCTION WORK SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 210 OF THE SPECIFICATIONS EXCEPT AS NOTED IN DETAILS.

ALL AREAS THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED AND STABILIZED TO FINAL GRADE. THE COST FOR GRADING SHALL BE INCLUDED IN THE OVERALL PRICE BID FOR GRADING COMPLETE 210-0100 AND THE COST FOR STABILIZATION SHALL BE INCLUDED IN THE OVERALL BID FOR EROSION CONTROL AND GRASSING ITEMS.

11. ALL EXISTING GUARDRAIL COMPONENTS REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR THE PROJECT.
12. ALL EXISTING GUARDRAIL AND GUARDRAIL ANCHOR REMOVAL SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR 210-0100 - GRADING COMPLETE.
13. ALL WORK ON GUARDRAIL SHALL BE COMPLETED NO LATER THAN FOURTEEN (14) DAYS AFTER THE REMOVAL OF THE EXISTING GUARDRAIL. FAILURE TO COMPLETE THIS ACTIVITY SHALL RESULT IN THE ASSESSMENT OF LIQUIDATED DAMAGES AS SET FORTH BY SECTION 108.08.
14. EXPOSED FIXED OBJECTS WITHIN THE CLEAR ZONE SHALL BE TEMPORARILY PROTECTED BY THE USE OF TEMPORARY CONCRETE MEDIAN BARRIER AND TEMPORARY ATTENUATORS. THE COST FOR TEMPORARY ATTENUATORS SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR TRAFFIC CONTROL.
15. GUARDRAIL DELINEATORS, SEE SPECIAL PROVISION 641, ARE REQUIRED IN ADDITION TO THE REFLECTORIZED GUARDRAIL WASHERS FOR ALL NEW GUARDRAIL INSTALLATION AS DETAILED IN GA. STANDARD 4360. COST FOR THE GUARDRAIL DELINEATORS SHALL BE INCLUDED IN THE OVERALL PRICES BID FOR 641-1100 AND 641-1200 PAY ITEMS.
16. THE CONTRACTOR SHALL SURFACE UNDER ALL GUARDRAILS AS DETAILED IN THE PLANS AND AS DIRECTED BY THE ENGINEER. THE COST FOR THIS WORK SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR PAY ITEMS 402-3121 AND 402-3130.
17. NEW GUARDRAIL AND GUARDRAIL ANCHORS SHALL BE INSTALLED AT THE LOCATIONS IDENTIFIED ON THE GUARDRAIL SUMMARY SHEETS IN ACCORDANCE WITH THE CONTRACT AND SPECIFICATIONS.
18. FOR SURFACING UNDER GUARDRAILS THE CONTRACTOR SHALL APPLY SOIL RESIDUAL HERBICIDE IN ACCORDANCE WITH SPECIFICATION 725 AT THE JOINT FACE PRIOR TO APPLICATION OF THE TACK COAT. THE COST OF THIS WORK SHALL BE INCLUDED IN THE OVERALL BID PRICE FOR PAY ITEM 210-0100 – GRADING COMPLETE. ANY OBSTRUCTION ENCOUNTERED DURING THE INSTALLATION OF GUARDRAIL SHALL BE REMOVED BY THE CONTRACTOR. THE COST OF THIS WORK IS TO BE INCLUDED IN THE PRICE BID FOR GRADING COMPLETE 210-0100.
19. AT THE END OF EACH WORKDAY, THE CONTRACTOR SHALL BE REQUIRED TO INSTALL A STANDARD TERMINAL END SECTION ON THE END OF EACH RUN OF GUARDRAIL THAT HAS NOT BEEN COMPLETELY INSTALLED. THIS WORK SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.
20. THE CONTRACTOR SHALL REMOVE, STORE AND RE-INSTALL EXISTING IMPACT ATTENUATORS AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH THE SPECIFICATIONS.
21. THE CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE IN THE MILLING OPERATION SUCH THAT WATER DOES NOT POND ON THE ROADWAY.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL DRAINAGE STRUCTURES WITHIN THE LIMITS OF THE PROJECT THROUGHOUT THE DURATION OF THE PROJECT. ANY DEBRIS THAT GOES IN DRAINAGE STRUCTURES AS A RESULT OF THE CONTRACTOR'S OPERATIONS SHALL BE CLEANED OUT BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE DEPARTMENT.
23. THE CONTRACTOR SHALL GRASS AT ALL ROADSIDE AREAS DISTURBED BY HIS WORK AND AT ALL AREAS OF SURFACING UNDER GUARDRAILS. GRASSING SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 700 OF THE SPECIFICATIONS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY INSTALLING EROSION CONTROL DEVICES AT ALL ROADSIDE AREAS DISTURBED. EROSION CONTROL SHALL BE PERFORMED AND PAID FOR IN ACCORDANCE WITH SECTION 162, 163, 165, AND 171 OF THE SPECIFICATIONS.

TEMPORARY STRIPING IS REQUIRED IN ACCORDANCE WITH SECTION 150.04 OF THE SPECIFICATIONS WITH ALL STRIPING BEING 5 INCHES IN WIDTH. PLACEMENT OF PERMANENT PAVEMENT MARKINGS SHALL BE APPLIED AFTER THE FINAL PAVING OPERATION.

MILLING AND INLAY AT BRIDGE APPROACH SLABS SHALL BE AS DIRECTED BY THE ENGINEER AND IN ACCORDANCE WITH THE CONTRACT.

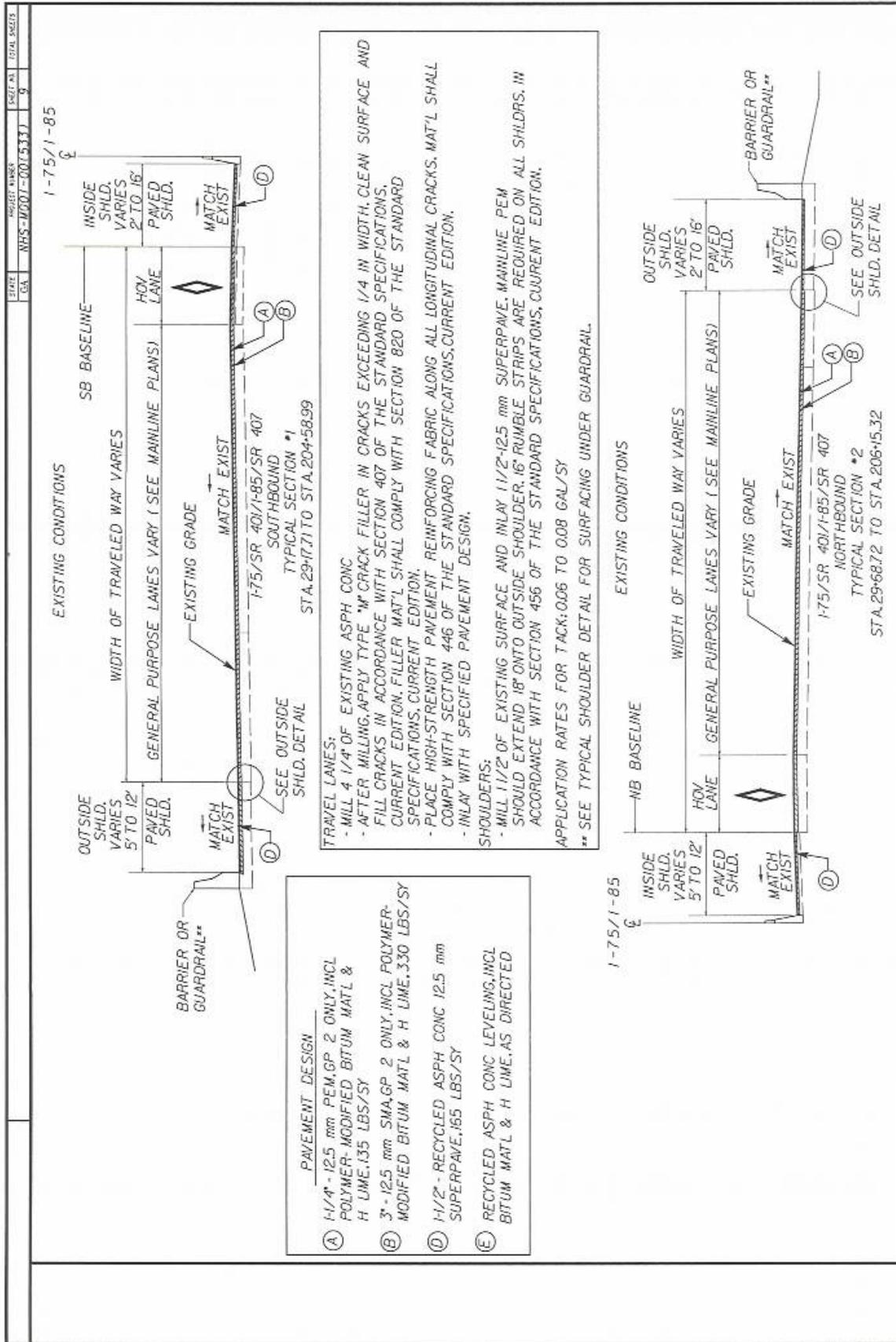
THE CONTRACTOR SHALL MILL AND INLAY AROUND THE ELECTRICAL COMMUNICATION BOXES LOCATED IN THE OUTSIDE SHOULDERS.

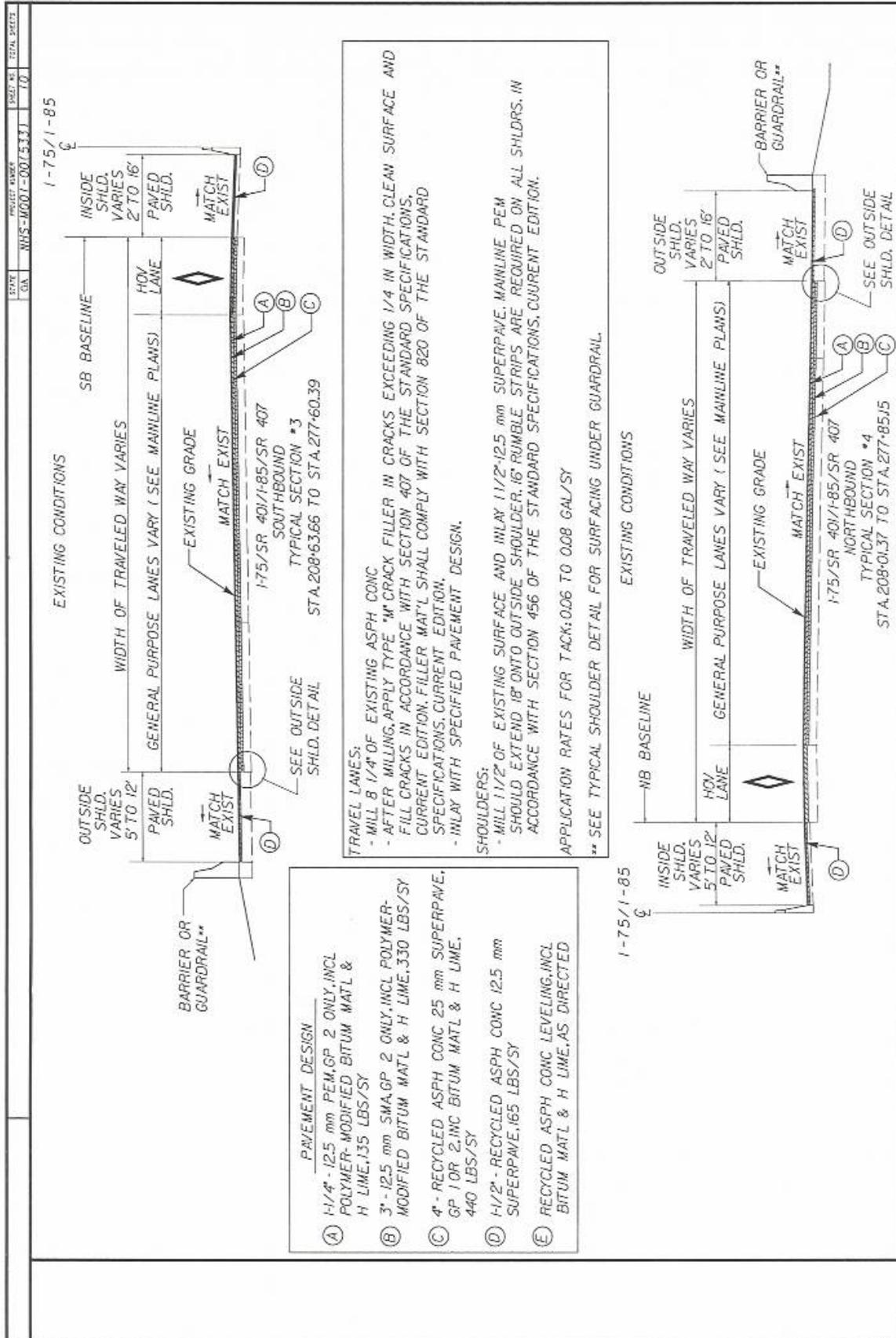
CONTRACTOR SHALL VERIFY ALL BEGIN AND END LOCATIONS FOR GUARDRAIL WITH THE ENGINEER PRIOR TO REMOVAL AND INSTALLATION OF GUARDRAIL.

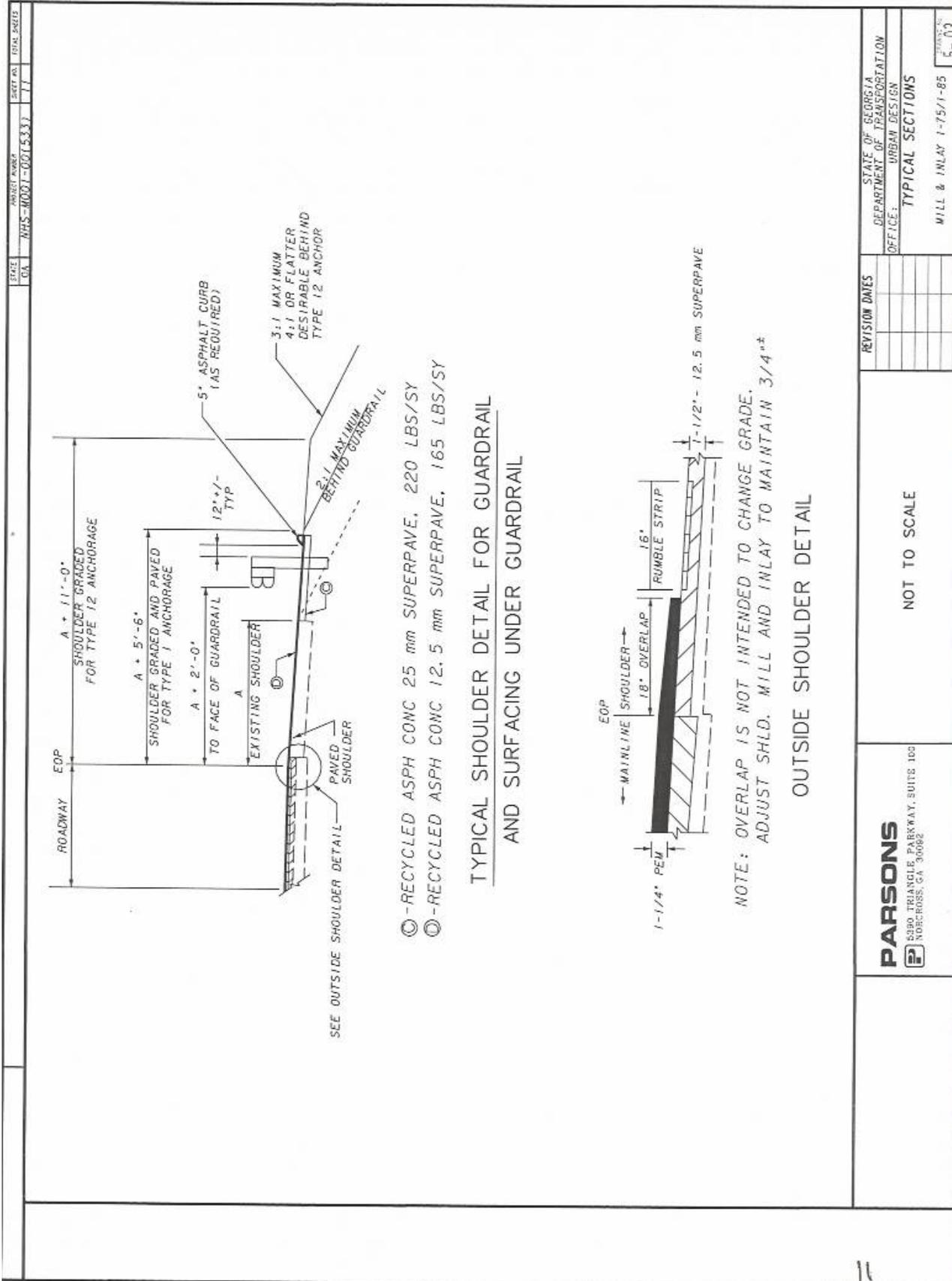
THE CONTRACTOR SHALL MILL AND INLAY THE RAMP AND GORE AREAS FROM THE GORE POINT TO THE MAINLINE TAPER AS SHOWN ON GA. STANDARD CONSTRUCTION DETAILS R1, R2, R3 OR AS DIRECTED BY THE ENGINEER.

ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED AS DEFINED, AND IN ACCORDANCE WITH, SECTION 150 OF THE SPECIFICATIONS, GA. STANDARD 9100 AND GA. STANDARD 9106. THE ATTENTION OF THE CONTRACTOR IS SPECIFICALLY DIRECTED TO SPECIAL PROVISION SECTION 150.11.

THE CONTRACTOR SHALL STAGE ALL ACTIVITIES SUCH THAT RAMP ACCESS IS MAINTAINED AT



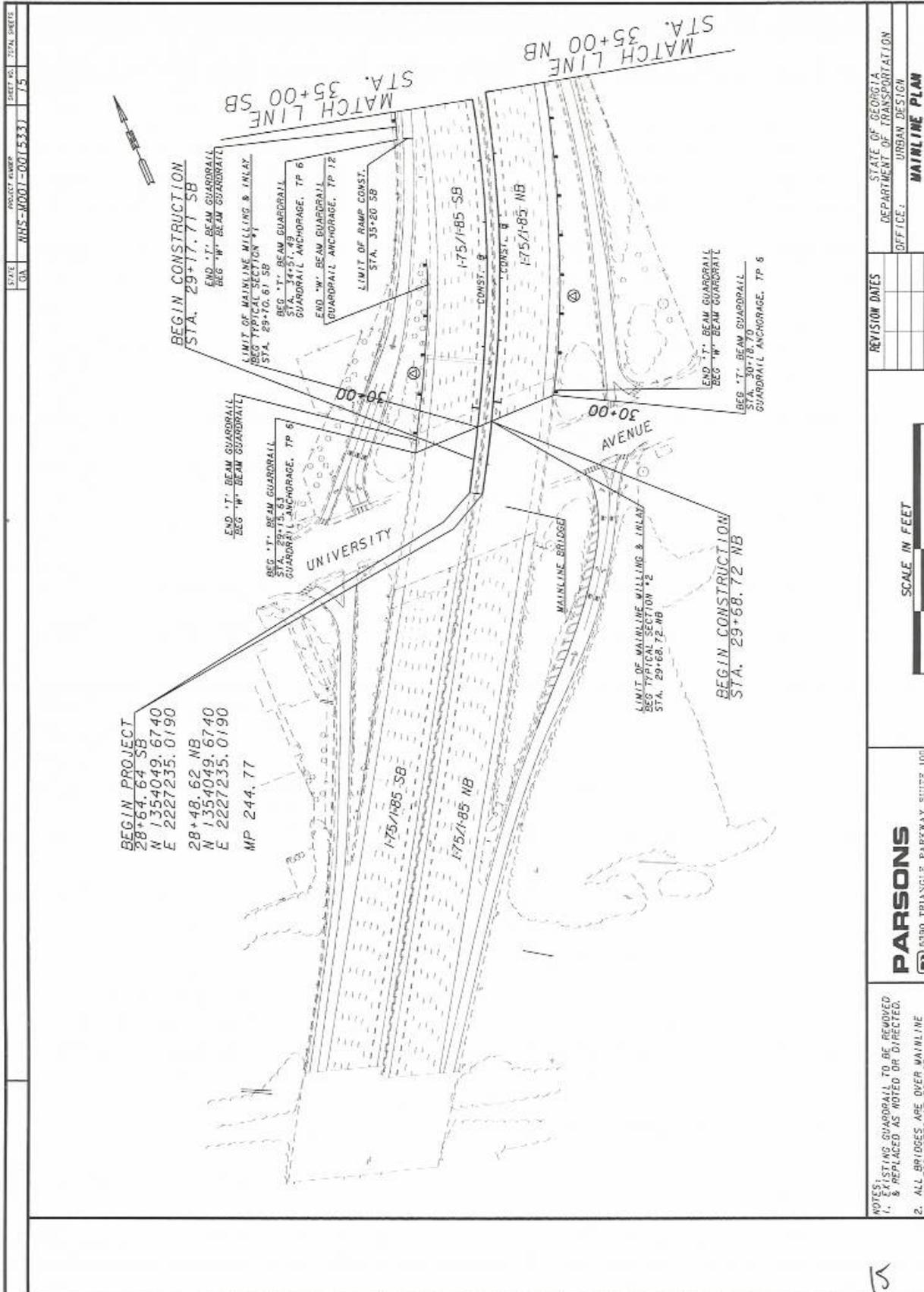




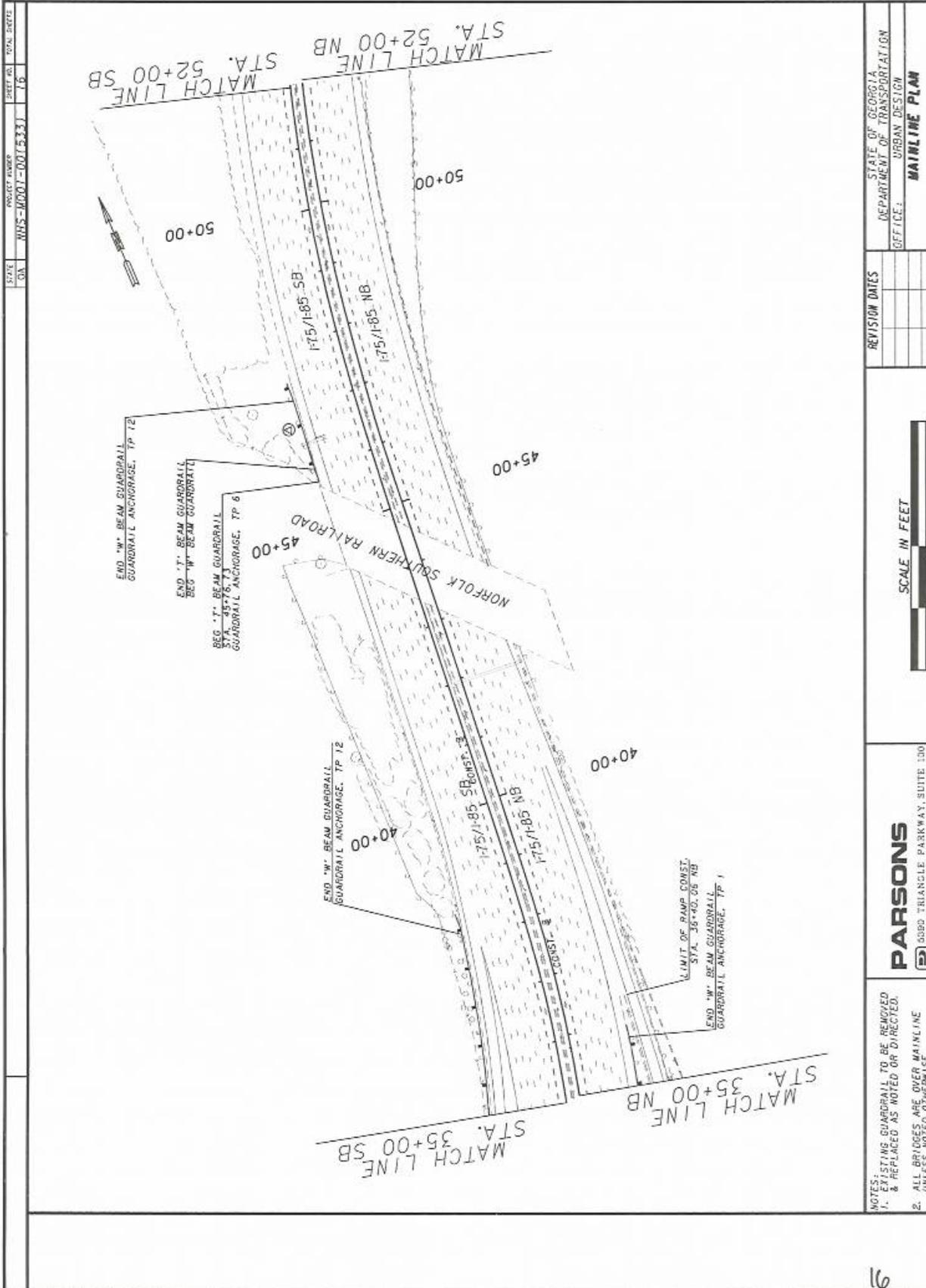
BRIDGE INVENTORY AND MINIMUM CLEARANCE					
NO.	APPROX. STATION	STRUCTURE ID	NAME OF ROAD CARRIED	CLEARANCE I-75/ I-85 NB	CLEARANCE I-75/ I-85 SB
1	45+00	121-0480-0	SOUTHERN RR BRIDGE	17'-01"	16'-10"
2	58+00	121-0056-0	PRYOR ST	24'-11"	20'-05"
3	87+00	121-0668-0	I-75 NB RAMP TO CENTRAL AVE	18'-11"	18'-11"
4	102+00	121-0654-0	FULTON ST	30'-05"	28'-02"
5	107+00	121-0702-0	I-75 NB RAMP TO CENTRAL AVE	SPANS I-75 SB ONLY	33'-11"
6	110+00	121-0656-0	I-20 EB RAMP TO I-75 NB	24'-11"	37'-00"
7	114+50	121-0704-0	I-75 NB RAMP TO I-20 WB	23'-06"	20'-06"
8	115+00	121-0705-0	I-75 SB RAMP TO I-20 EB	17'-09"	19'-07"
9	116+00	121-0658-0	I-20 WB RAMP TO WINDSOR ST	42'-00"	50'-00"
10	118+00	121-0659-0	I-20 WB RAMP TO I-75 SB	33'-02"	37'-04"
11	125+00	121-0708-0	SR 154/MEMORIAL DR	17'-02"	17'-03"
12	134+00	121-0709-0	M.L.K. JR. DR	19'-04"	20'-08"
13	139+00	121-0711-0	UTILITY BRIDGE	26'-03"	26'-00"
14	140+00	121-0714-0	GEORGIA RR BRIDGE	18'-09"	19'-00"
15	144+00	121-0666-0	DECATUR ST	17'-10"	17'-08"
16	182+00	121-0719-0	ELLIS ST / SR 10/FREEDOM PKWY RAMP EB	18'-07"	21'-07"
17	183+00	121-0720-0	I-75 SB RAMP TO FREEDOM PKWY EB	40'-00"	27'-04"
18	185+00	121-0717-0	SR 10/FREEDOM PKWY WB RAMP TO I-75 SB	46'-06"	52'-09"
19	186+00	121-0721-0	SR 10/FREEDOM PKWY WB RAMP TO	19'-02"	29'-08"
20	191+00	121-0722-0	I-75 RAMP TO PIEDMONT AVE/HARRIS ST	SPANS I-75 SB ONLY	18'-11"
21	194+00	121-0724-0	UTILITY BRIDGE	17'-02"	18'-05"
22	197+00	121-0667-0	PIEDMONT AVE./BAKER ST	18'-04"	17'-05"
23	207+00	121-0664-0	RALPH MCGILL BLVD./COURTLAND	18'-04"	18'-02"
24	212+00	121-0644-0	PEACHTREE ST	17'-05"	18'-07"
25	220+00	121-0414-0	W. PEACHTREE ST	15'-03"	16'-00"

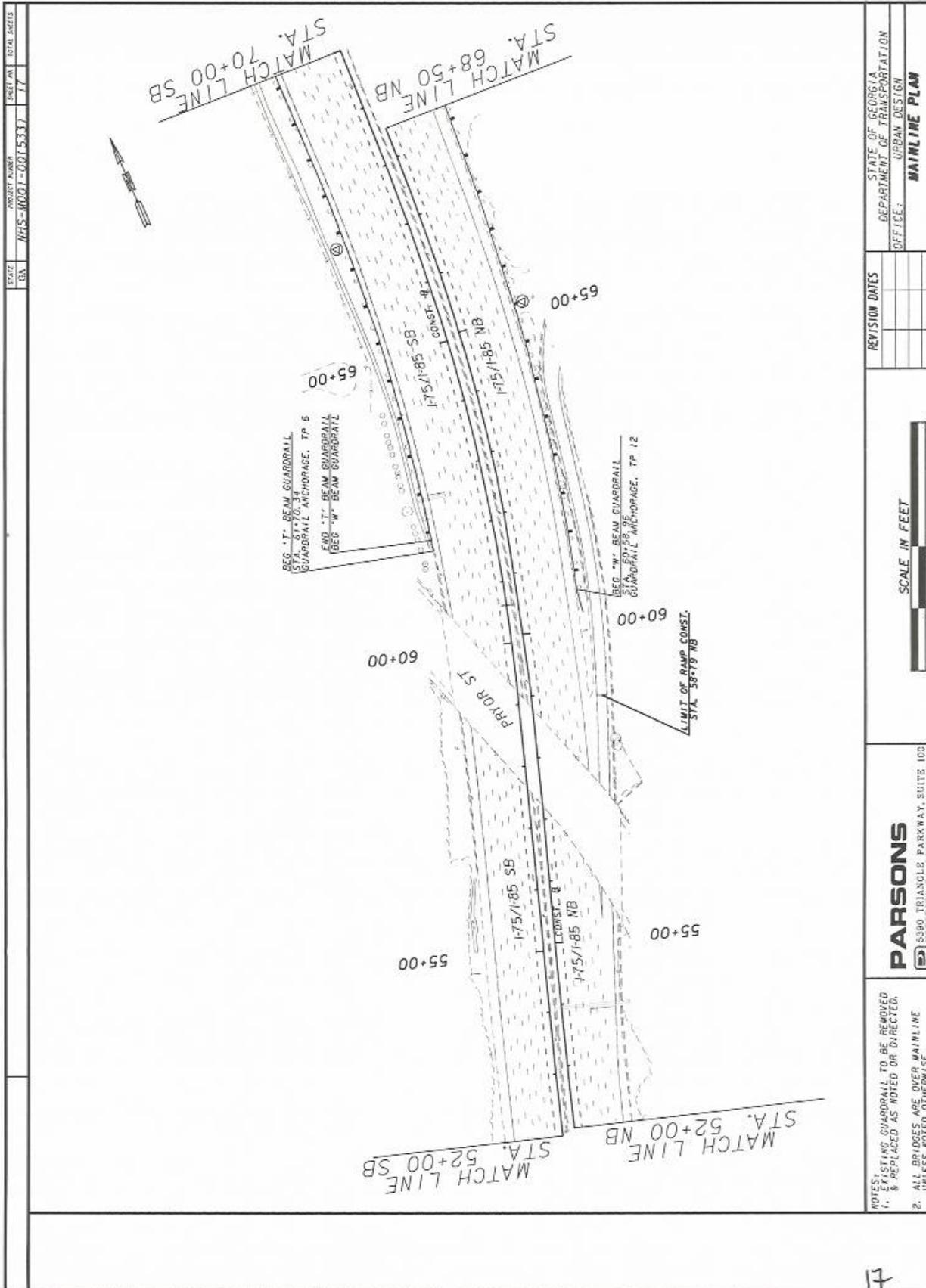
GUARDRAIL LOG: NHS-M001-00(533)									
Right (RT), Left (LT), Median (MED)	Remove existing Guardrail and Anchorage			Required Guardrail			Required Anchors (EA)		
	Begin Station	Length (LF)	Anchors (EA)	Begin Station	"W" Beam (LF)	Bridge End "T" Beam (LF)	TYPE 1	TYPE 6	TYPE 12
NB									
RT	30+00	558.15	2	30+18.70	550	8.15	1	1	1
RT	60+50	1058.15	2	60+58.96	1037.5	20.65		1	1
RT	75+50	150.00	2	75+94.98	150		1		1
RT	82+00	70.65	2	82+03.78	50	20.65		1	1
RT	87+90	95.65	2	87+90.22	75	20.65		1	1
RT	99+50	220.65	2	99+64	200	20.65		1	1
RT	112+56	133.86	2	112+63.27	105.06	20.65		1	1
						8.15		1	
RT	121+00	25.65	2	120+37.03	5	20.65		1	1
RT	175+22	120.65	2	175+13.45	100	20.65		1	1
RT	195+50	208.15	2	192+54.77	187.5	20.65		1	1
RT	219+31	83.15	2	219+30.73	62.5	20.65		1	1
SB									
LT	29+15	282.65	2	29+15.63	262	20.65		1	1
LT	34+51	358.15	2	34+51.49	337.5	20.65		1	1
LT	45+76	133.15	2	45+76.73	112.5	20.65		1	1
LT	61+70	1045.65	2	61+70.34	1025	20.65		1	1
LT	99+68	232.51	2	99+47.53	203.71	20.65		1	
						8.15		1	
RT	107+60	45.65	2	107+58.54	25	20.65		1	1
LT	116+50	245.65	2	116+49.79	225	20.65		1	1
LT	183+90	120.65	2	183+89.88	100	20.65		1	1
RT	184+21	318.26	2	184+20.38	289.46	20.65		1	
						8.15		1	
LT	209+00	216.34	2	209+12.81	187.54	20.65		1	
						8.15		1	
LT	230+00	20	2	229+19.19	25	20.65		1	1
LT	263+00	177.25	2	263+05.64	148.45	20.65		1	
						8.15		1	
TOTALS		5946.27	46		5463.72	482.55	2	27	17

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
TRAFFIC CONTROL			
150-1000	TRAFFIC CONTROL - NHS-M001-00(533)	LS	1
150-9011	TRAFFIC CONTROL - WORKZONE LAW ENFORCEMENT (CONTRACTOR BIDS)	HR	500
632-0003	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	EA	4
ROADWAY ITEMS			
210-0100	GRADING COMPLETE - NJHS-M001-00(533)	LS	1
400-3604	ASPH CONC 12.5 MM SMA, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	TN	62616
400-3624	ASPH CONC 12.5 MM PEM, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	TN	35096
402-1811	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL	TN	2035
402-3121	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	TN	29821
402-3130	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	TN	10851
407-0010	ASPHALT-RUBBER JOINT AND CRACK SEAL, TP W	LF	30000
413-1000	BITUM TACK COAT	GL	90428
432-0206	WILL ASPH CONC PVMT, 1 1/2 IN DEPTH	SY	126178
432-0217	WILL ASPH CONC PVMT, 4 1/4 IN DEPTH	SY	379489
432-0231	WILL ASPH CONC PVMT, 8 1/4 IN DEPTH	SY	132873
432-5010	WILL ASPH CONC PVMT, VARIABLE DEPTH	SY	43890
436-1000	ASPHALTIC CONCRETE CURB -	LF	5000
446-2118	HIGH STRENGTH PVMT REINF FABRIC, 18 IN WIDTH	LF	9091
456-2012	INDENTATION RUMBLE STRIPS - GROUND-IN-PLACE (CONTINUOUS)	GLM	17
610-1050	REW GUARDRAIL IMPACT ATTENUATOR	EA	16
610-1055	REW GUARDRAIL	LF	5951
610-1075	REW GUARDRAIL ANCH, ALL TYPES	EA	46
611-5310	RESET GUARDRAIL IMPACT ATTENUATOR	EA	16
641-1100	GUARDRAIL, TP T	LF	487
641-1200	GUARDRAIL, TP W	LF	5464
641-5001	GUARDRAIL ANCHORAGE, TP 1	EA	2
641-5006	GUARDRAIL ANCHORAGE, TP 6	EA	27
641-5012	GUARDRAIL ANCHORAGE, TP 12	EA	17
PERMANENT EROSION CONTROL ITEMS			
163-0240	WULCH	TN	15
700-6910	PERMANENT GRASSING	AC	1
700-7000	AGRICULTURAL LIME	TN	3
700-7010	LIQUID LIME	GL	3
700-8000	FERTILIZER MIXED GRADE	TN	1
700-8100	FERTILIZER NITROGEN CONTENT	LB	50
TEMPORARY EROSION CONTROL ITEMS			
163-0232	TEMPORARY GRASSING	AC	1
163-0550	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	EA	300
165-0010	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	LF	1000
165-0020	MAINTENANCE OF TEMPORARY SILT FENCE, TP B	LF	1000
165-0030	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	LF	1000
165-0105	MAINTENANCE OF INLET SEDIMENT TRAP	EA	300
171-0010	TEMPORARY SILT FENCE, TYPE A	LF	1000
171-0020	TEMPORARY SILT FENCE, TYPE B	LF	1000
171-0030	TEMPORARY SILT FENCE, TYPE C	LF	1000
SIGNING & MARKING ITEMS			
652-8055	SOLID POLYUREA TRAFFIC STRIPE, 10 IN, WHITE	LM	5
652-8151	SKIP POLYUREA TRAFFIC STRIPE, 5 IN, WHITE	GLM	78
654-1003	RAISED PVMT MARKERS TP 3	EA	5478
657-3054	PREFORMED PLASTIC SKIP PVMT MKG, 5 IN, WHITE, TP PB	GLF	66980
657-3085	PREFORMED PLASTIC SKIP PVMT MKG, 8 IN, CONTRAST (BLACK-WHITE), TP PB	GLF	19725
657-5014	PREFORMED PLASTIC PVMT MKG, WORDS AND/OR SYM, WHITE, TP B	EA	66
657-9210	WET REFLECTIVE PREFORMED SOLID PAVEMENT MARKINGS, 5 INCH WIDE, WHITE	LM	10
657-9211	WET REFLECTIVE PREFORMED SOLID PAVEMENT MARKINGS, 5 INCH WIDE, YELLOW	LM	7

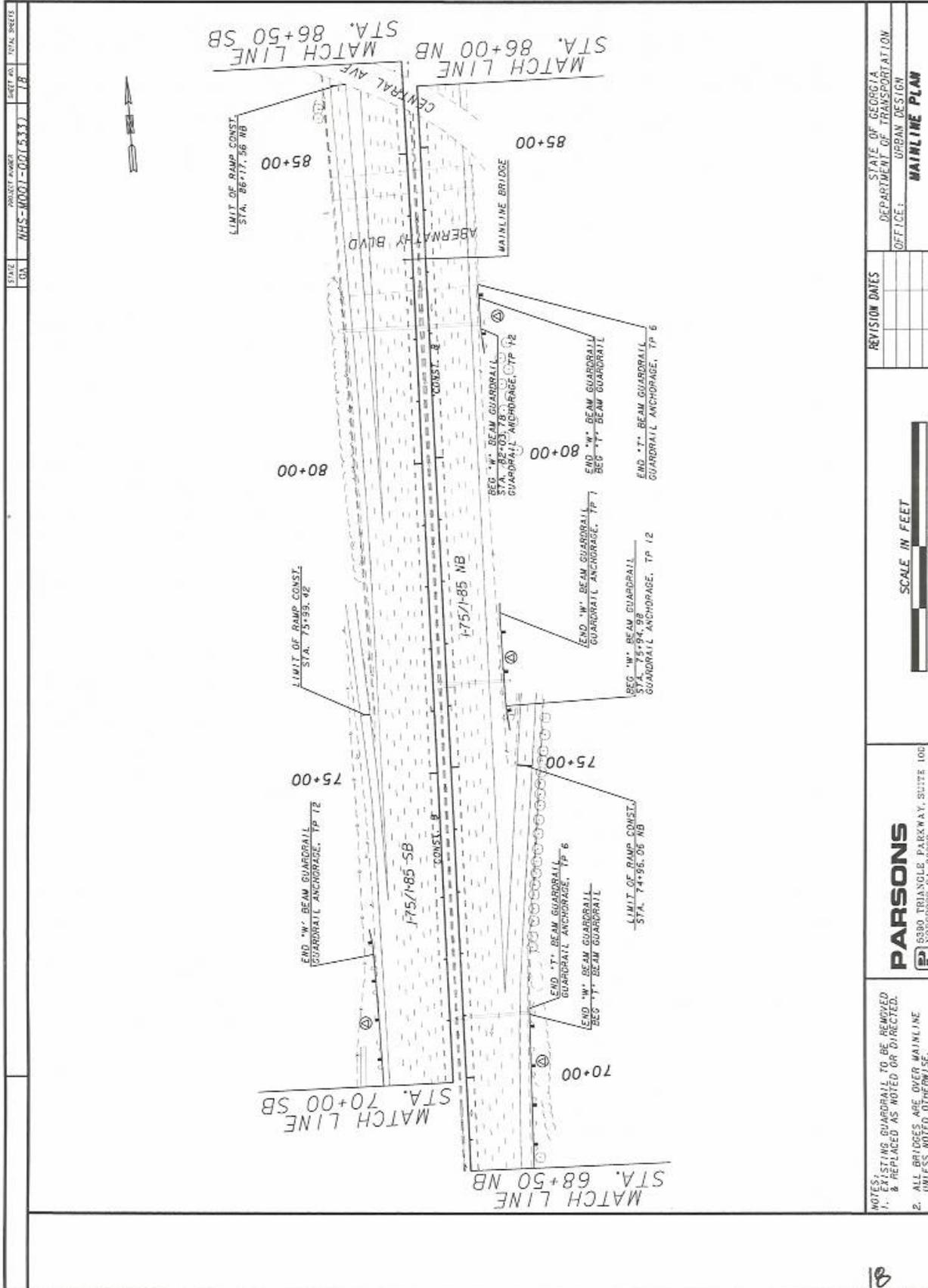


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I-75 I-85 Downtown Connector CD



STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NHS-M001-00(533)	18	18

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN
MAINLINE PLAN

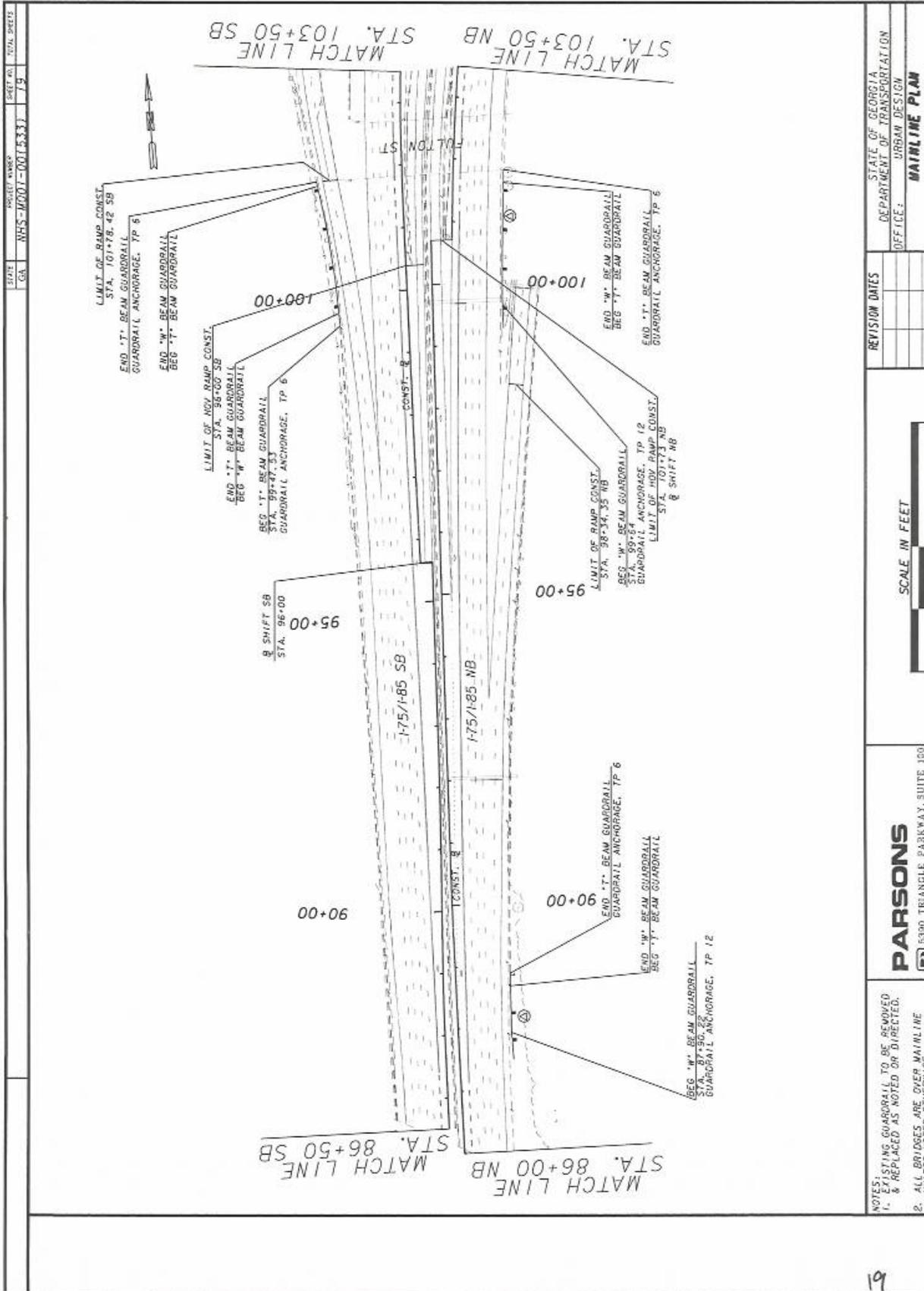
REVISION DATES



PARSONS
 6580 TRIANGLE PARKWAY, SUITE 100
 OVERLAND PARK, KS 66204

- NOTES:
- EXISTING GUARDRAIL TO BE REMOVED & REPLACED AS NOTED OR DIRECTED.
 - ALL BRIDGES ARE OVER MAINLINE UNLESS NOTED OTHERWISE.

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STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

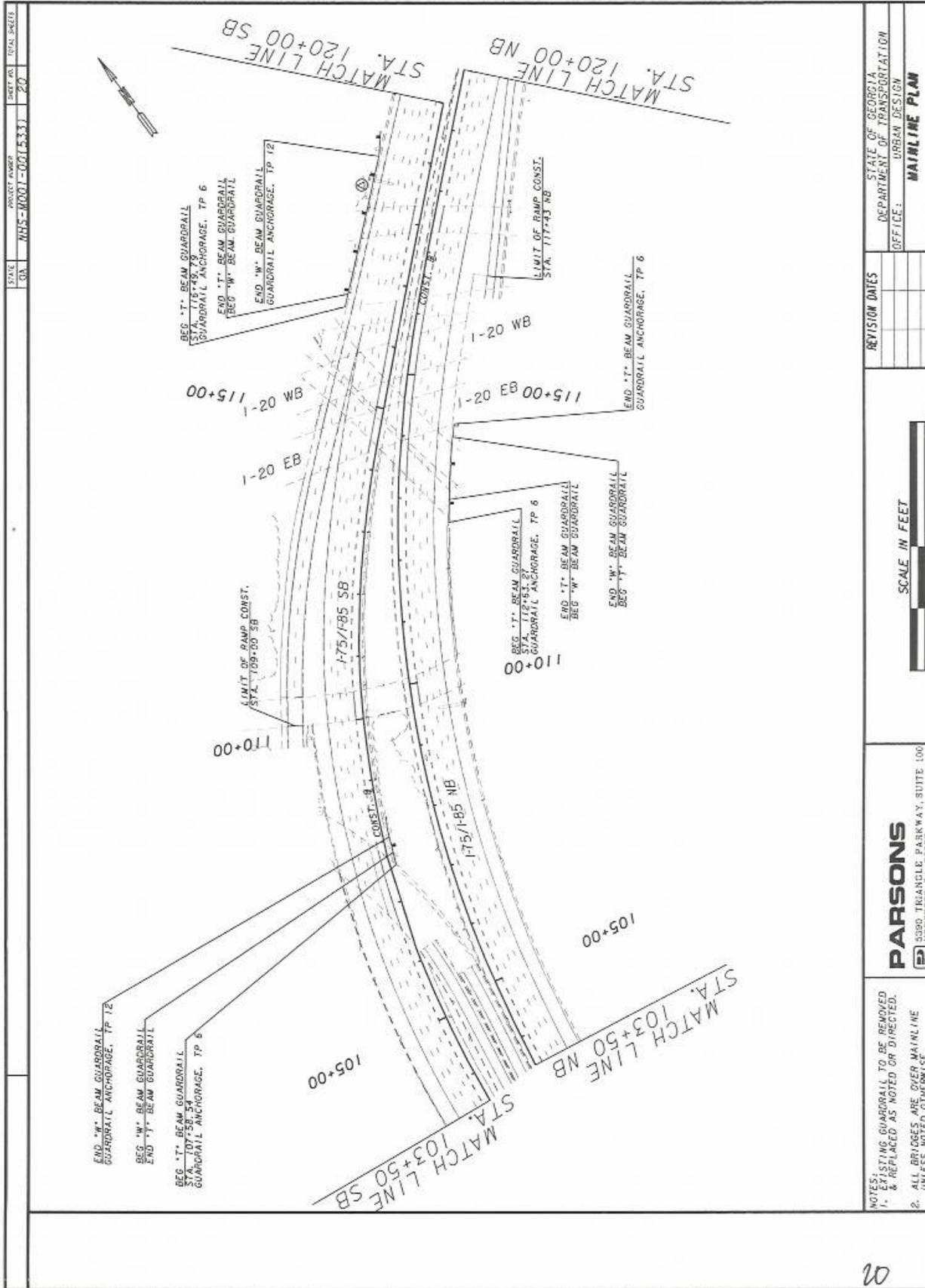
REVISION DATES

SCALE IN FEET

PARSONS
 5300 TRIANGLE PARKWAY, SUITE 100
 DUBLIN, GA 31009

NOTES:
 1. EXISTING GUARDRAIL TO BE REMOVED & REPLACED AS NOTED OR DIRECTED.
 2. ALL BRIDGES ARE OVER MAINLINE UNLESS NOTED OTHERWISE.

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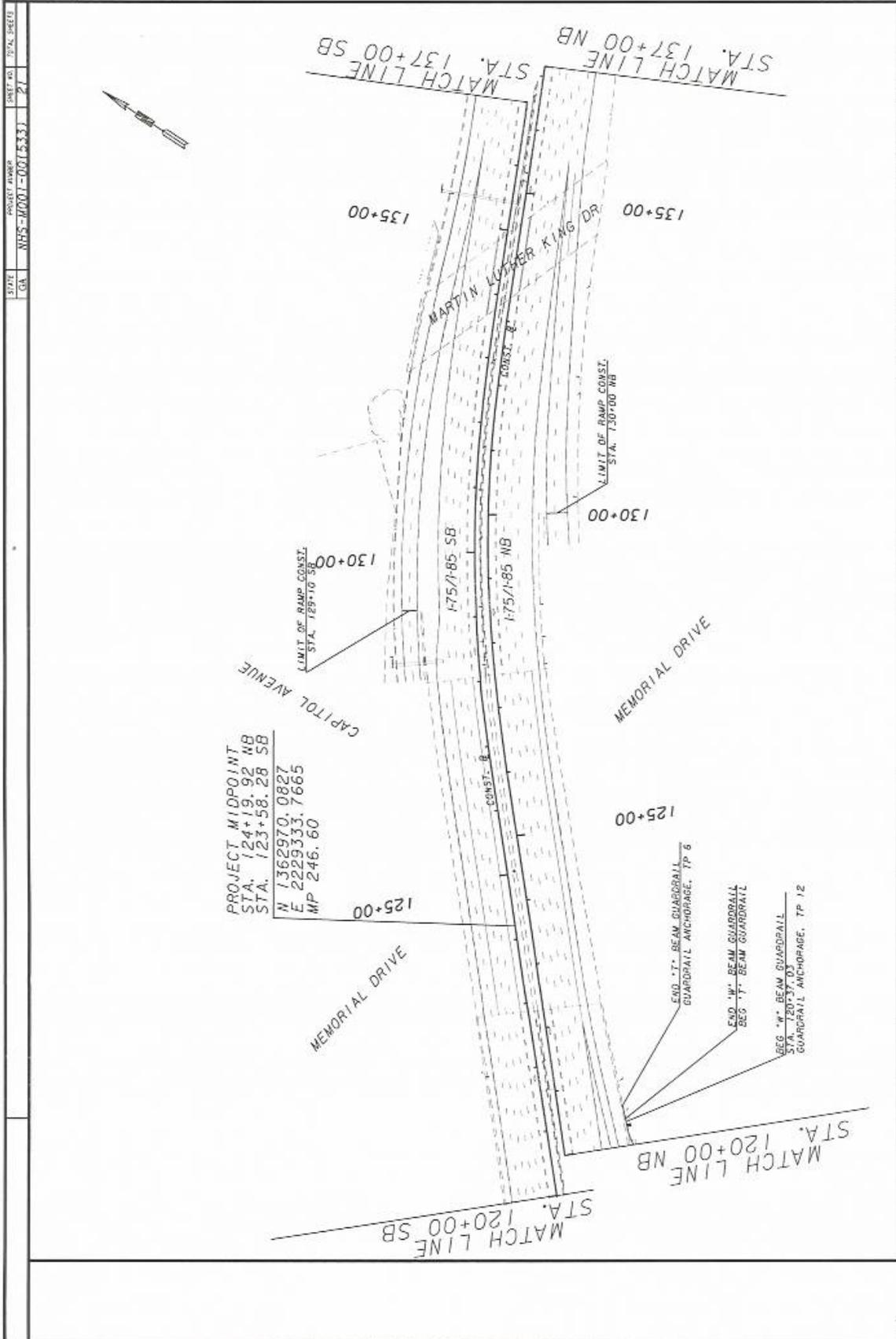
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	NHS-M001-00(533)	20	20

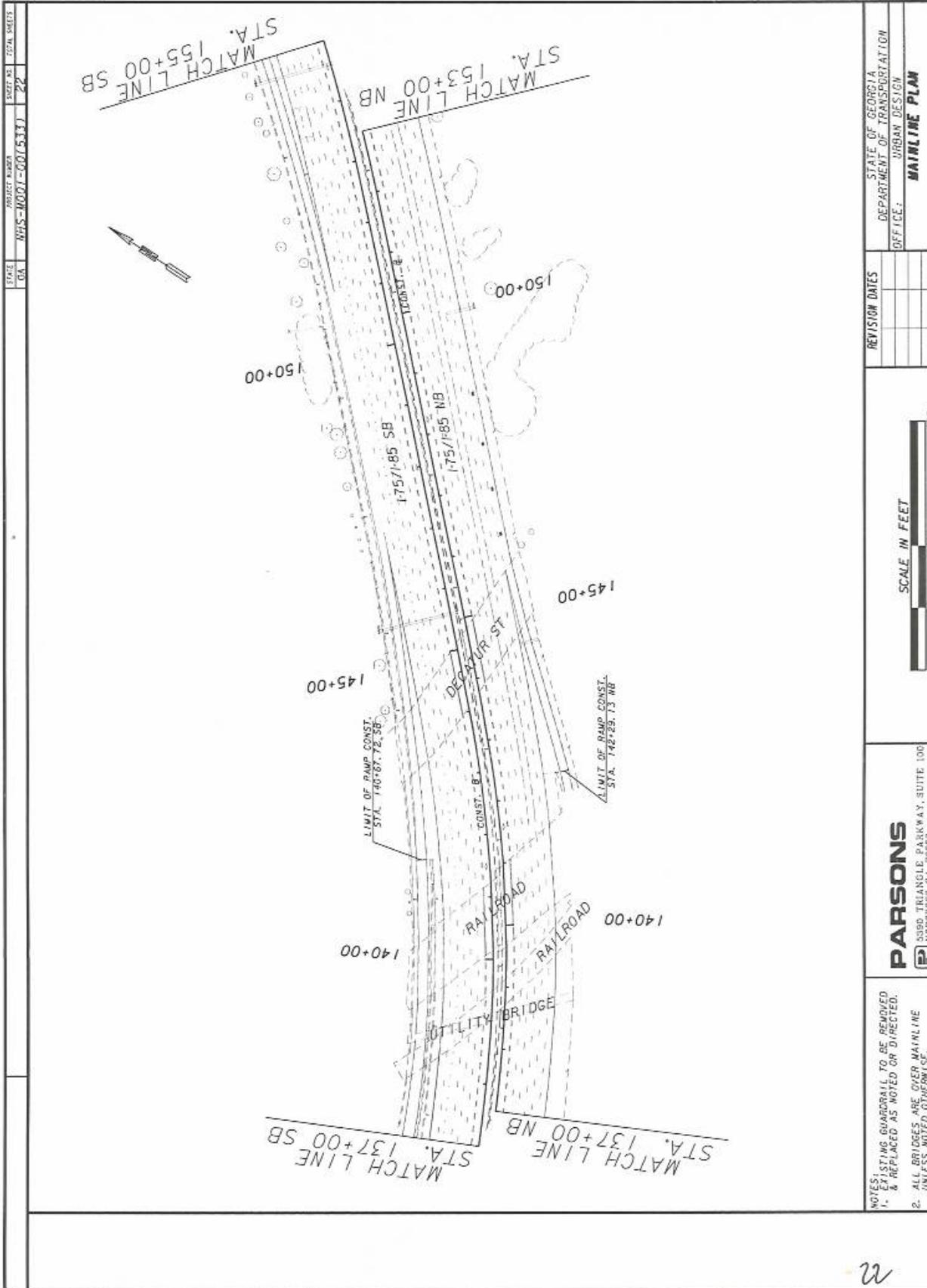
REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE: URBAN DESIGN
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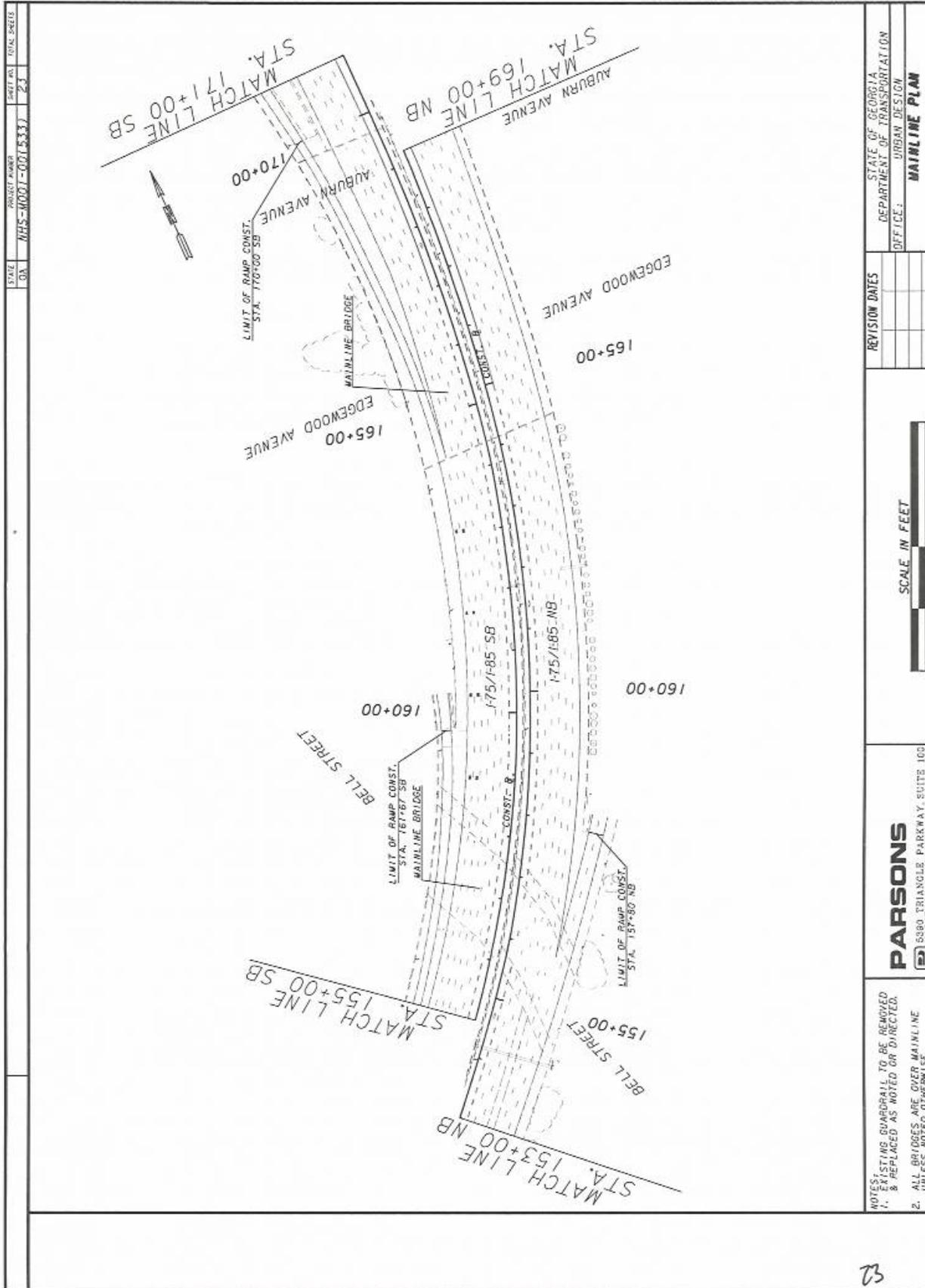
PARSONS
 3500 TINSICLE PARKWAY, SUITE 100
 NORTON, MA 01860

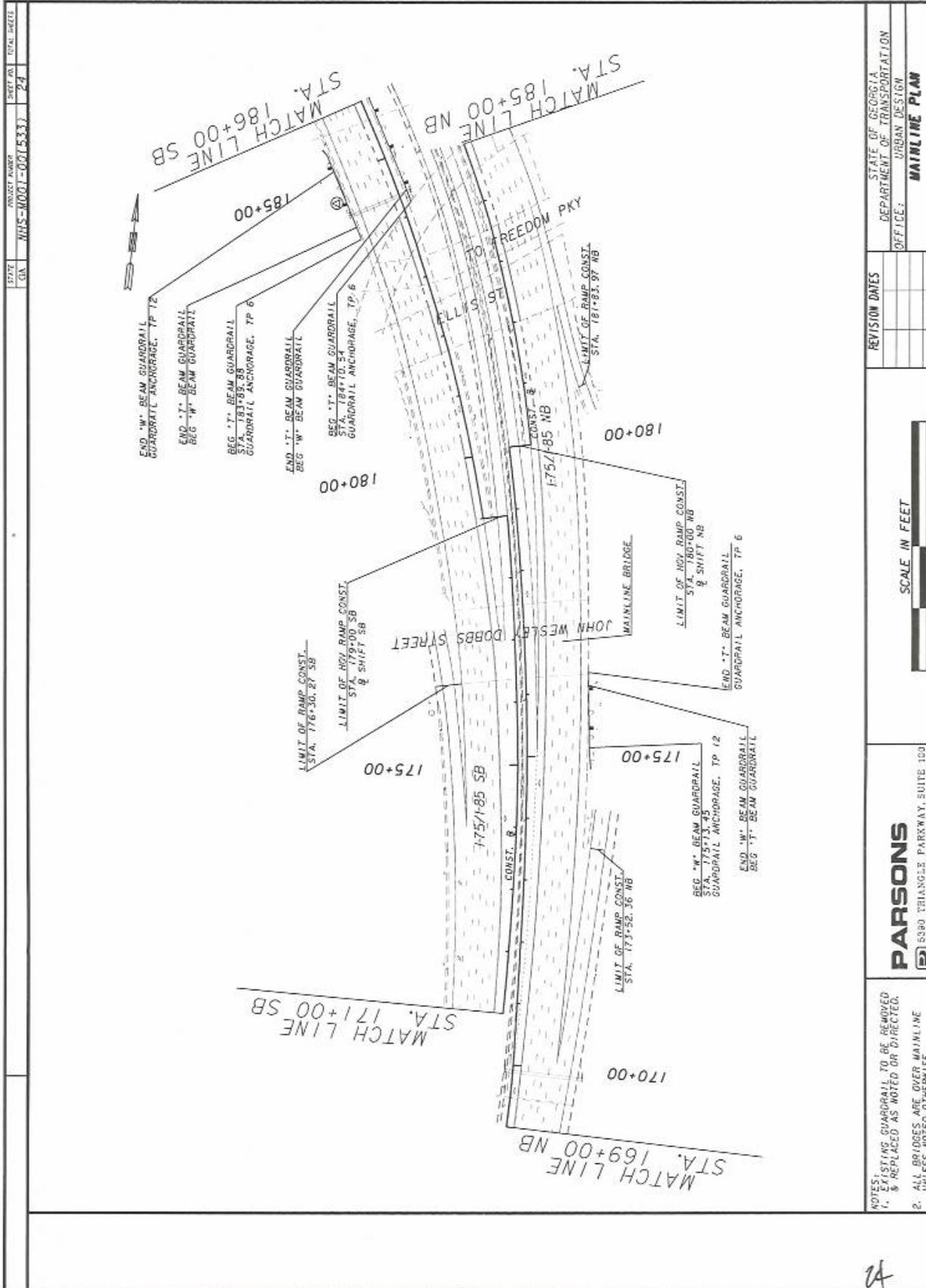
NOTES:
 1. EXISTING GUARDRAIL TO BE REMOVED & REPLACED AS NOTED OR DIRECTED.
 2. ALL BRIDGES ARE OVER MAINLINE UNLESS NOTED OTHERWISE.



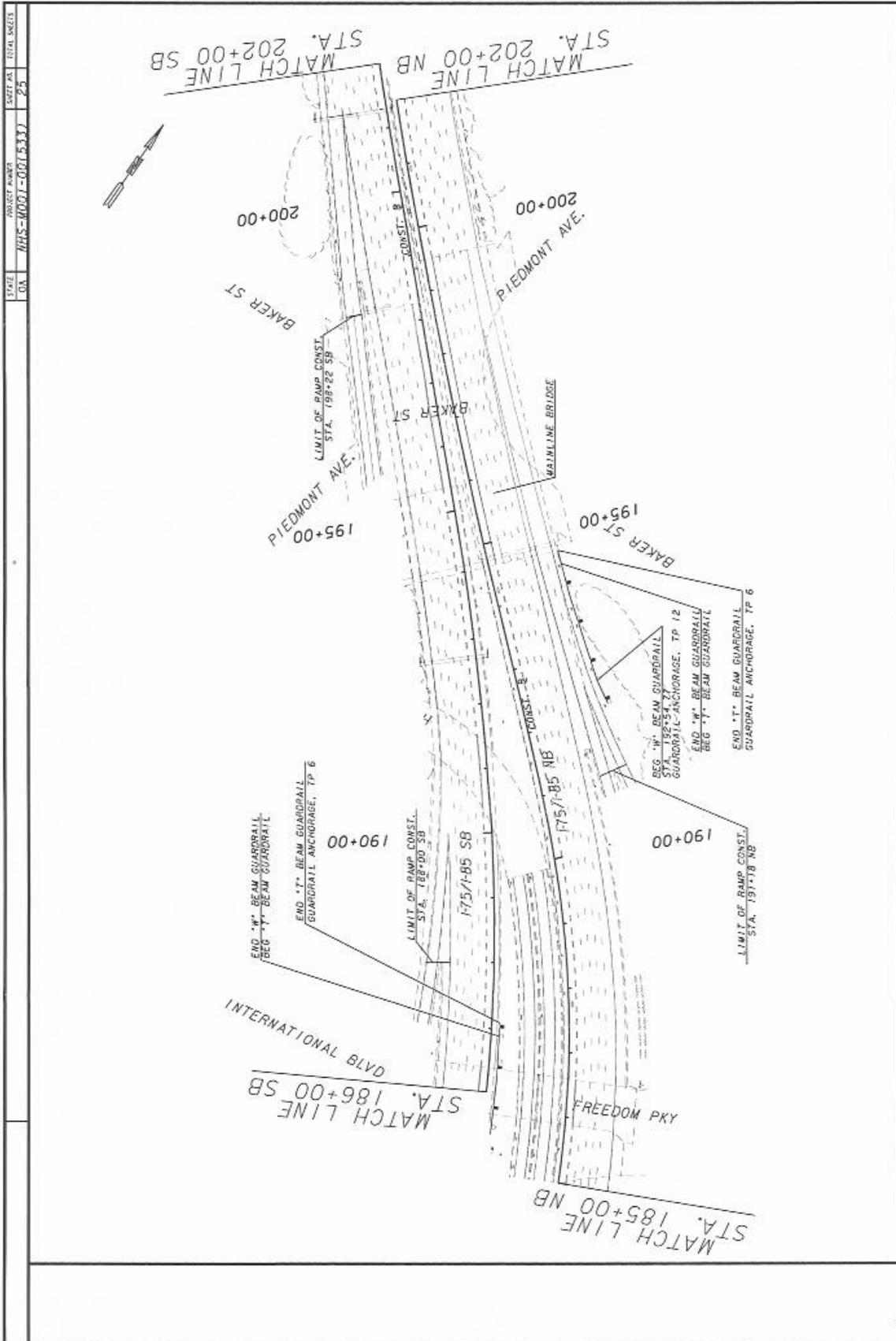


I-75 I-85 Downtown Connector CD

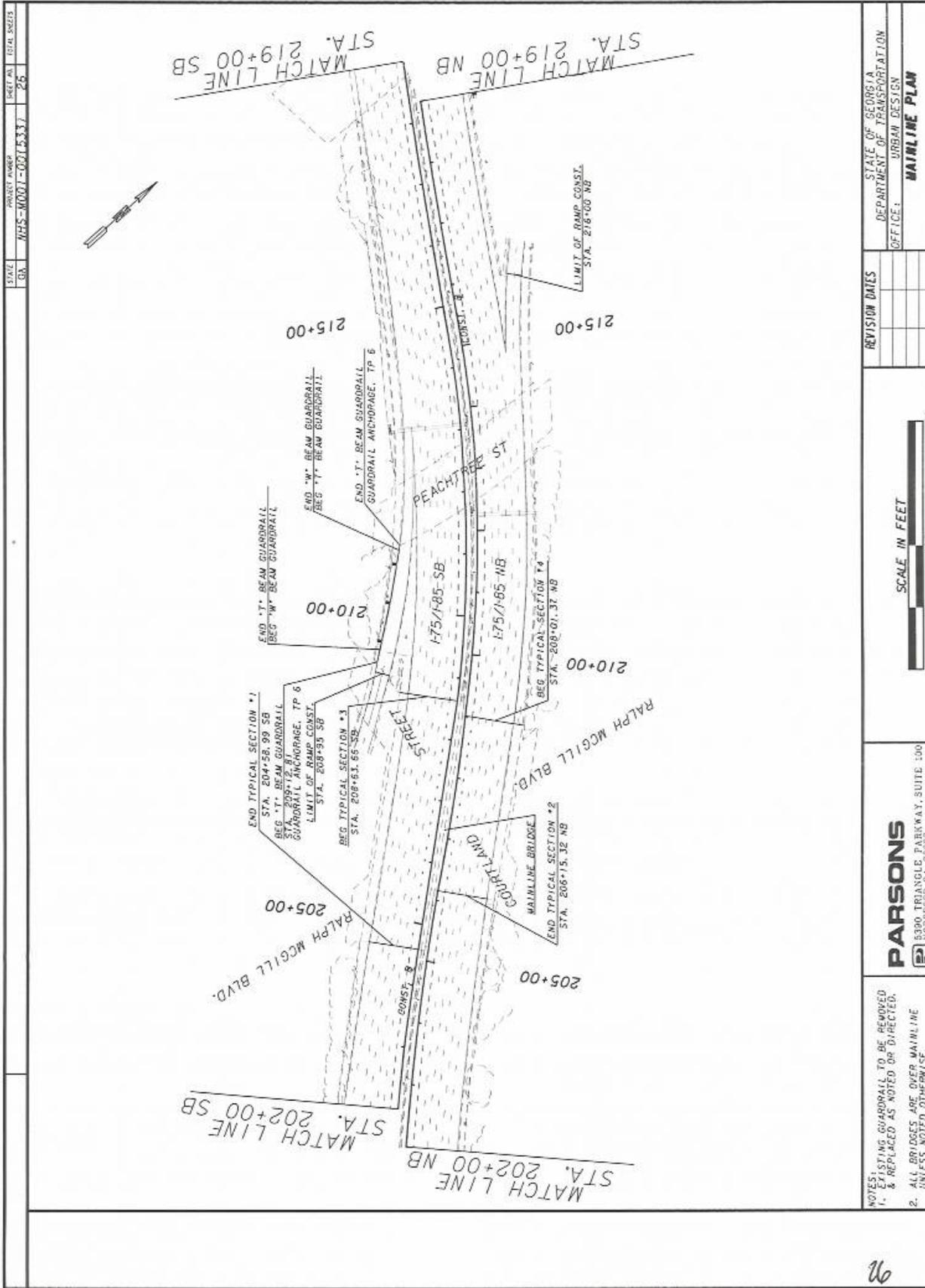




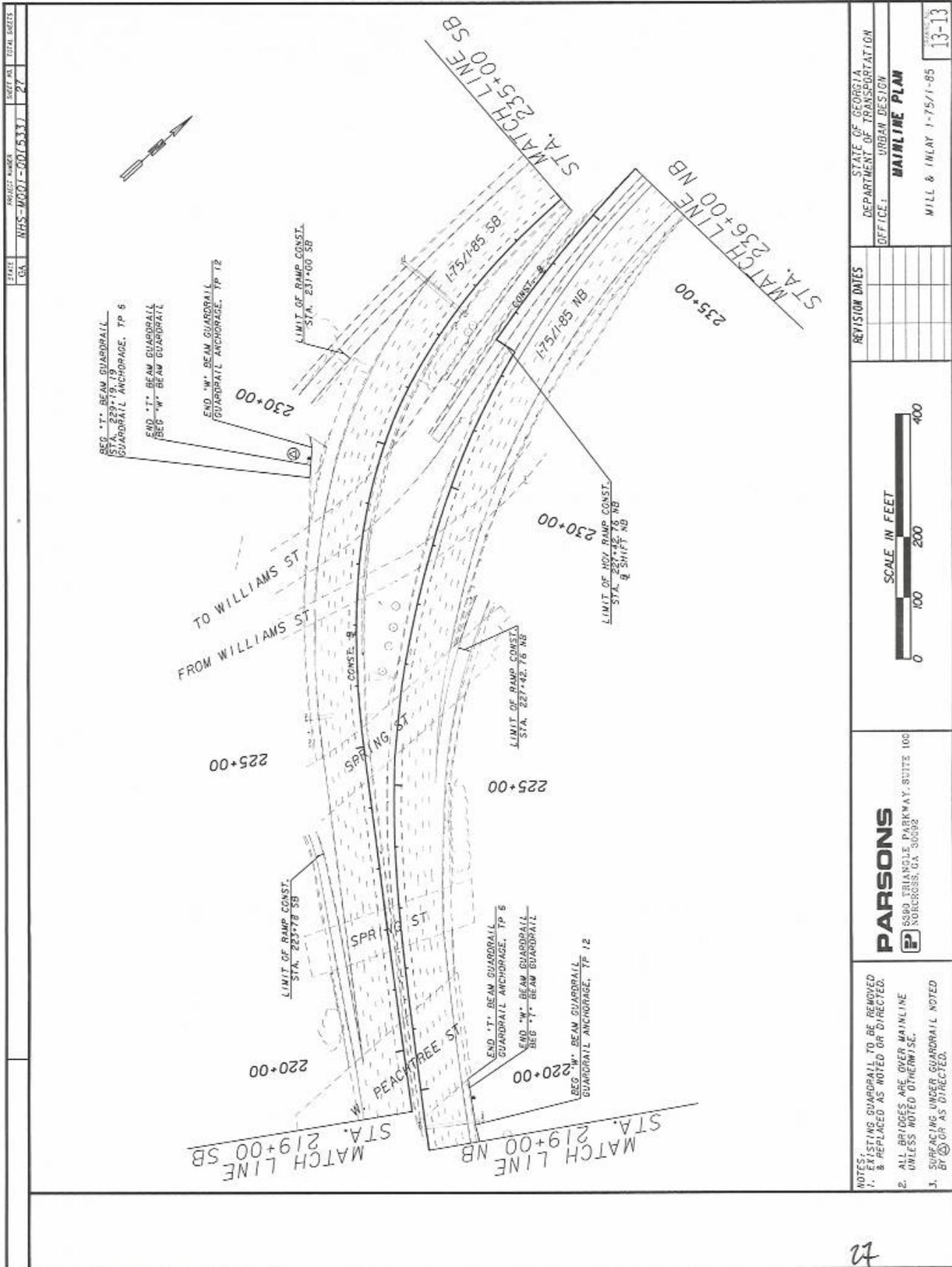
24



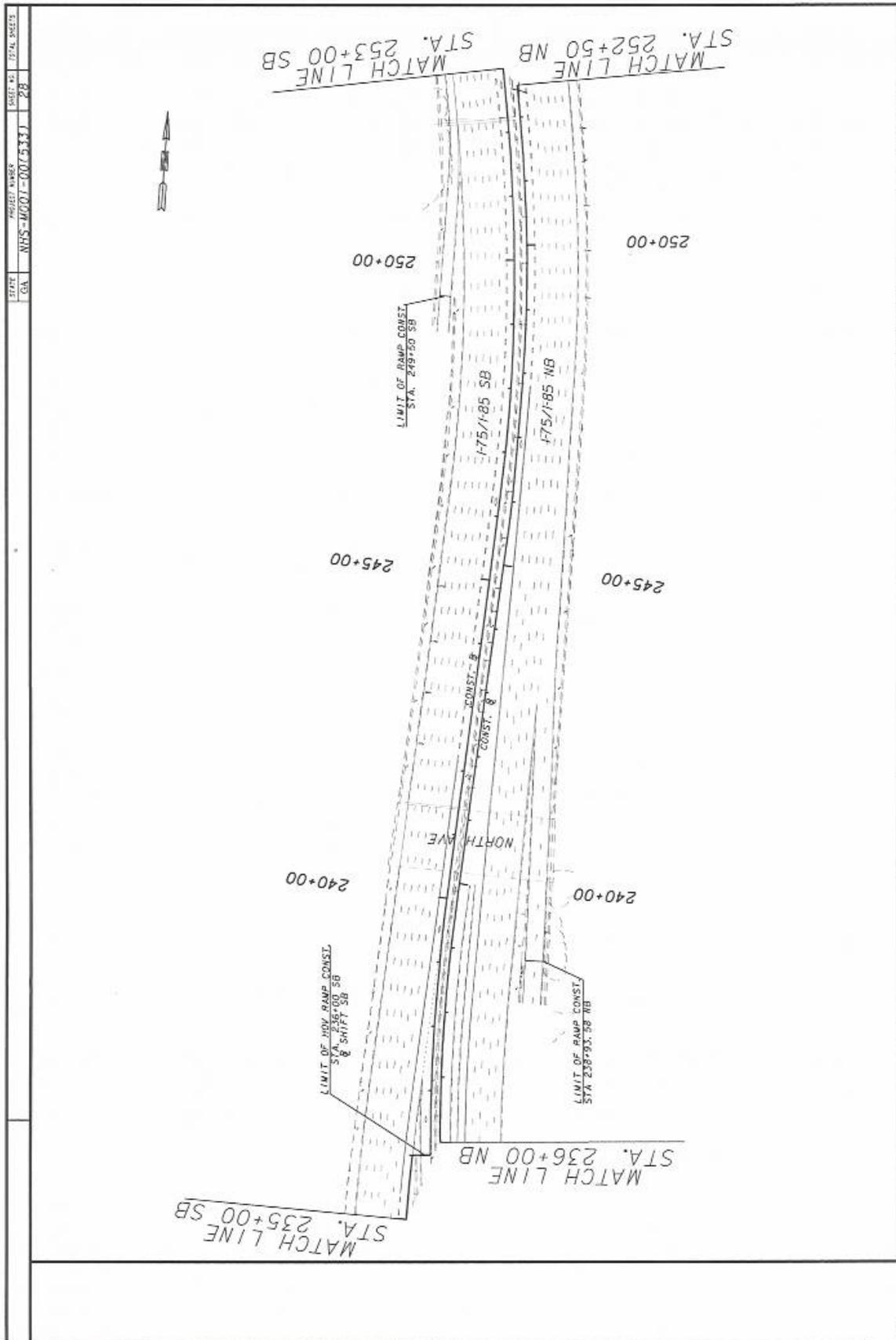
I-75 I-85 Downtown Connector CD

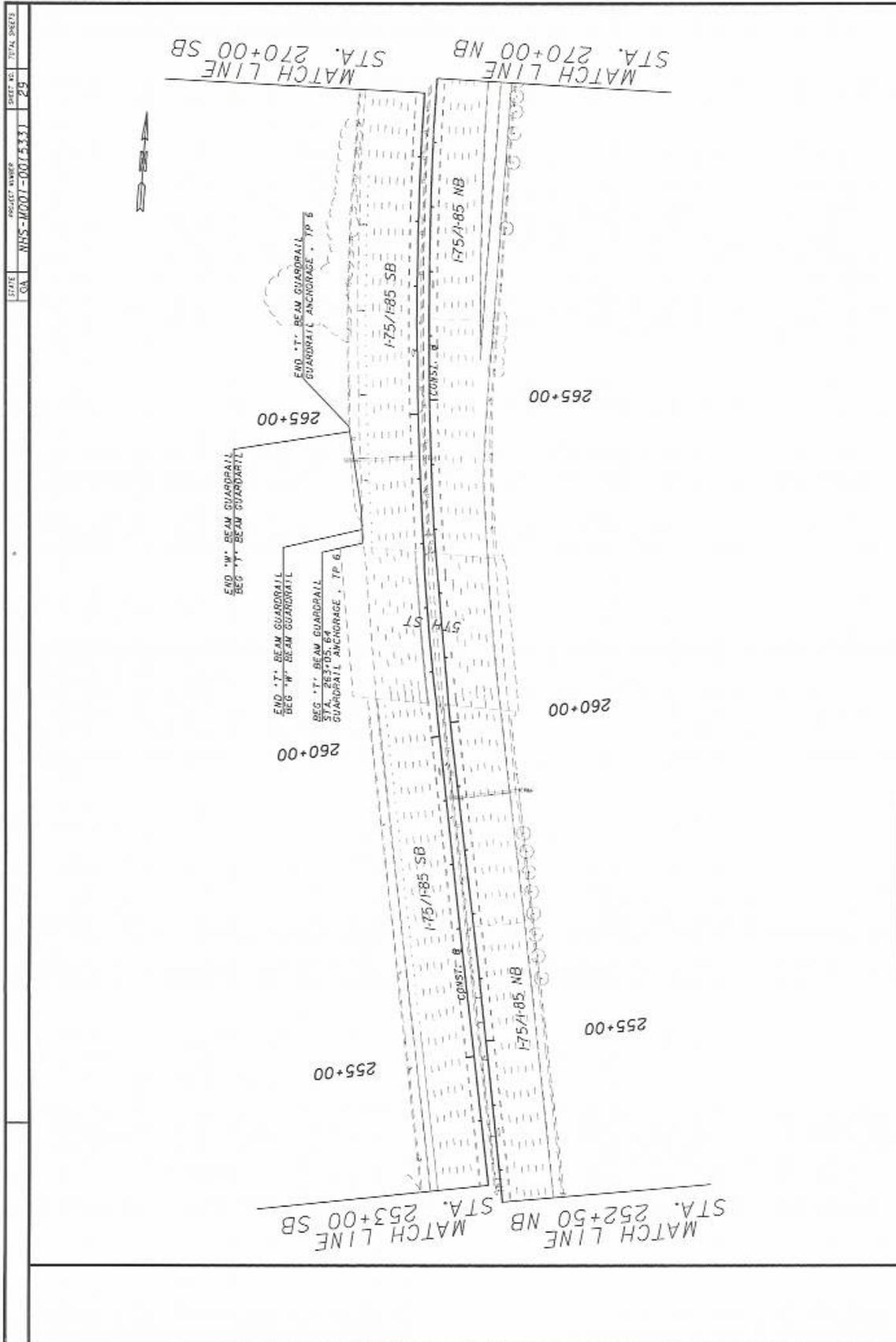


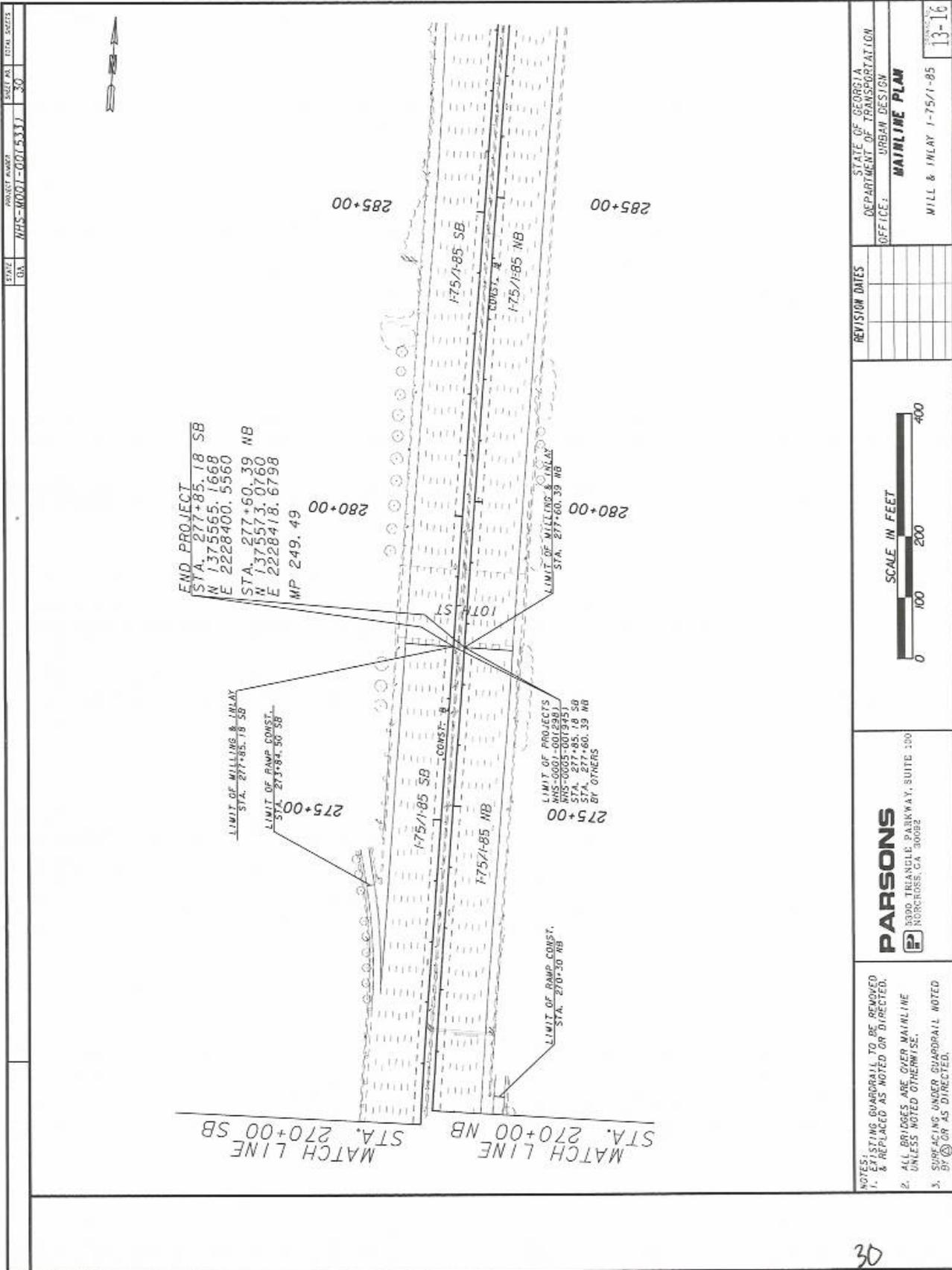
I-75 I-85 Downtown Connector CD



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**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SPECIAL PROVISION

PROJECT NHS-M001-00(533)

COUNTY: FULTON

P.I. No. M0001533

Section 105 – Control of Work

Delete Subsection 105.07 and substitute the following:

105.07 COOPERATION BETWEEN CONTRACTORS

The Department reserves the right at any time to Contract for and perform other or additional work on or near the work covered by the Contract.

When separate contracts are let within the limits of any one Project, each contractor shall conduct his work so as not to interfere with or hinder the progress or completion of The Work being performed by other contractors. Contractors working on the same Project shall cooperate with each other.

Each contractor involved shall assume all liability, financial or otherwise, in connection with his contract and shall protect and save harmless the Department for any and all damages or claims that may arise because of inconvenience, delay or loss experienced by him because of the presence and operations of other contractors working within the limits of the same project.

The contractor shall arrange his work and shall place and dispose of the material being used so as to not interfere with the operations of the other contractors within the limits of the same project. He shall join his work with that of the other in an acceptable manner and shall perform it in proper sequence to that of others.

Also, it is anticipated that another contract will be let or is under construction, including but not limited to, Project NHS-M001-00(298); P.I. No. 0001298, 14th Street at Interstate 75/85, Fulton County.

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SPECIAL PROVISION

PROJECT NHS-M001-00(533)

COUNTY: FULTON

P.I. No. M0001533

Section 108—Prosecution and Progress

108.07 Determination of Contract Time

Add the following:

- H. Early Completion of the Work: If time charges for the overall completion of the work cease on or before <DATE>, the Contractor will be eligible for an incentive payment of <AMOUNT> per Calendar Day beginning the day after Time Charges cease and continuing up to and including the date of <DATE>. The total amount paid as incentive shall not exceed <AMOUNT> (<WRITTEN AMOUNT>).

Time for completion of The Work may be extended as provided in Sub-Section 108.07 E. However, for the purposes of calculating and determining the eligibility for incentive payment, the <DATE> and <DATE> will not be adjusted for any reason, cause or circumstance whatsoever, regardless of fault, save for and except in the instance of a catastrophic natural event (i.e. hurricane) or a declared state emergency.

In the event of a catastrophic natural event (i.e. hurricane) or a declared state emergency, that directly and substantially affects the Contractor's operations on the Project, the Department will extend the <DATE> and <DATE> dates on a day for day basis commensurate with the number of days the Engineer determines the Project was impacted.

The following conditions are precedent to the Contractor's entitlement to any incentive payment:

1. The Contractor shall complete all work on Contract items to the satisfaction of the Engineer such that time charges cease on or before the <DATE> date.
2. The Contractor shall notify the Department in writing, within in 30 days after time charges cease, that the Contractor elects to be paid the incentive payment and such written notice shall constitute a full and complete waiver of any and all claims against the Department arising out of, or in connection with, the Contract, which the Contractor has or may have had, except for claims for adjustments as to the quantities of Contract Items appearing on the Final Statement.

Delete Section 108.08 and substitute the following:

108.08 Failure or Delay in Completing the Work on Time

Time is an essential element of the Contract and any delay in the prosecution of The Work may inconvenience the public, obstruct traffic, or interfere with business. In addition to the aforementioned inconveniences, any delay in completion of The Work will always increase the cost of engineering. For this reason, it is important that The Work be pressed vigorously to completion. Should the Contractor or, in the case of default, Surety fail to complete The Work within the time stipulated in the Contract or within such extra time that may be allowed, charges shall be assessed against any money due or may become due the Contractor.

For each Calendar Day that any work shall remain uncompleted after the Contract Time expires, the sum of <AMOUNT> will deducted from any money due the Contractor, not as penalty, but as liquidated damages; provided however, that the due account shall be taken of any adjustment of the contract time for completion of the work granted under the provisions of Sub-Section 108.07E.

The Department may waive such portions of the liquidated damages as may accrue after the work is in condition for save and convenient use by the traveling public.

A. Liquidated Damages: The amount of such charges is hereby agreed upon as fixed liquidated damages due the Department after the expiration of the time for completion specified in the Contract. The Contractor and the Contractor's Surety shall be liable for liquidated damages in excess of the amount due the Contractor on the final payment.

These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Department and the Contractor due to the uncertainty and impossibility of making a determination as to the actual and consequential damages which are incurred by the Department, the State and the general public as a result of the failure on the part of the Contractor to complete the work on time.

1. DEDUCTION FROM PARTIAL PAYMENTS: Liquidated damages, as they accrue, will be deducted from periodic partial payments.

2. DEDUCTION FROM FINA PAYMENT: The full amount of liquidated damages will be deducted from final payment to the Contractor and/or the Contractor's Surety.

3. NO LIQUIDATED DAMAGES CHARGED FOR DELAY BY THE DEPARTMENT: In case of default of the Contract and the subsequent completion of The Work by the Department as hereinafter provided, the Contractor and the Contractor's Surety shall be liable for liquidated damages under the Contract, but no liquidated damages shall be chargeable for any delay in the final completion of The Work by the Department due to any unreasonable action, negligence, omission of delay by the Department, in any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount shall be presumed. The liquidated damages referred to herein are intended to be cumulative and shall be in addition to every other remedy now or hereafter enforceable by law, in equity, by statute, or under the Contract.

B. No waiver of the Department's Rights: Permitting the Contractor to continue and finish The Work or any part of The Work after the expiration of the time allowed for completion or after an extension of time, shall not operate as a waiver of the rights of the Department under the Contract.

C. For this project, an overall completion date has been established. In addition, the following intermediate contract times have been established:

1. Failure to open the lanes as specified in Sub-Section 150.11 A will result in assessment of liquidated damages at the rate of <AMOUNT> per hour or portion of an hour thereof per site.

2. Failure to follow 150.11 C will result in the assessment of liquidated damages at a rate of <AMOUNT> per calendar day.
3. Failure to complete resetting and placement of the guardrail, as specified in the General Conditions, will result in the assessment of liquidated damages at a rate of <AMOUNT> per calendar day.
4. Failure to re-open each ramp closure, as set forth in the General Conditions, will result in the assessment of liquidated damages at the rate of <AMOUNT> per calendar day.

Liquidated damages specified above are cumulative and are in addition to those specified in Sub-Section 108.08 for failure to complete the overall project.

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SPECIAL PROVISION

PROJECT NHS-M001-00(533)

COUNTY: FULTON

P.I. No. M0001533

Section 149 – Construction I

Add the following TO SUBSECTION 149.3.03:

E. The contractor shall confirm the existing elevation of overhead bridge at any location that has a vertical clearance less than 16'-0", the contractor shall mill the mainline shoulders for a distance of 250 feet each side of the overhead bridge to provide a minimum overhead clearance. Milling will be variable depth to provide

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SPECIAL PROVISION

PROJECT NHS-M001-00(533)

COUNTY: FULTON

P.I. No. M0001533

Section 150 – Traffic Control

Add the following:

150.11 SPECIAL CONDITIONS:

- A. Lane closures, detours, pacing of traffic, moving equipment or material and other activities shall not be allowed on I-75/I-85 except during the hours shown below. “Weekdays” shall be deemed to mean Monday through Thursday.

- I. I-75/I-85 NORTHBOUND
 - a) The following are the allowable times for Single Right Lane to be Closed:
Weekdays 8:00 PM – 5:00 AM
Friday 8:00 PM – Saturday 8:00 AM
Saturday 8:00 PM – Sunday 12:00 NOON
Sunday 8:00 PM – Monday 5:00 AM
 - b) The following are the allowable times for Two Right Lanes to be Closed:
Weekdays 9:00 PM – 5:00 AM
Friday 9:00 PM – Saturday 6:00 AM
Saturday 9:00 PM – Sunday 8:00 AM
Sunday 9:00 PM – Monday 5:00 AM
 - c) The following are the allowable times for Three Right Lanes to be Closed:
Weekdays 11:00 PM – 5:00 AM
Friday 11:00 PM – Saturday 5:00 AM
Sunday 12:00 AM – Sunday 7:00 AM
Sunday 10:00 PM – Monday 4:00 AM
 - d) The following are the allowable times for Four Right Lanes to be Closed:
Weekdays 12:00 AM – 4:00 AM
Saturday 12:00 AM – Saturday 4:00 AM
Sunday 12:00 AM – Sunday 5:00 AM
Monday 12:00 AM – Monday 4:00 AM
 - e) The following are the allowable times for a Single Left Lane and the HOV Lane to be Closed:
Weekdays 8:00 PM – 5:00 AM
Friday 9:00 PM – Saturday 10:00 AM
Saturday 8:00 PM – Sunday 12:00 NOON
Sunday 8:00 PM – Monday 5:00 AM
 - f) The following are the allowable times for Two Left Lanes and the HOV Lane to be Closed:
Weekdays 10:00 PM – 5:00 AM

- Friday 11:00 PM – Saturday 5:00 AM
- Sunday 12:00 AM – Sunday 7:00 AM
- Sunday 9:00 PM – Monday 5:00 AM
- g) The following are the allowable times for Three Left Lanes and the HOV Lane to be Closed
 - Weekdays 12:00 AM – 4:00 AM
 - Saturday 12:00 AM – Saturday 5:00 AM
 - Sunday 12:00 AM – Sunday 5:00 AM
 - Monday 12:00 AM – Monday 4:00 AM

2. I-75/I-85 SOUTHBOUND

- a) The following are the allowable times for Single Right Lane to be Closed:
 - Weekdays 8:00 PM – 5:00 AM
 - Friday 8:00 PM – Saturday 8:00 AM
 - Saturday 8:00 PM – Sunday 12:00 NOON
 - Sunday 8:00 PM – Monday 5:00 AM
- b) The following are the allowable times for Two Right Lanes to be Closed:
 - Weekdays 9:00 PM – 5:00 AM
 - Friday 9:00 PM – Saturday 6:00 AM
 - Saturday 9:00 PM – Sunday 8:00 AM
 - Sunday 9:00 PM – Monday 5:00 AM
- c) The following are the allowable times for Three Right Lanes to be Closed:
 - Weekdays 11:00 PM – 5:00 AM
 - Friday 11:00 PM – Saturday 5:00 AM
 - Sunday 12:00 AM – Sunday 7:00 AM
 - Sunday 10:00 PM – Monday 4:00 AM
- d) The following are the allowable times for Four Right Lanes to be Closed:
 - Weekdays 12:00 AM – 4:00 AM
 - Saturday 12:00 AM – Saturday 4:00 AM
 - Sunday 12:00 AM – Sunday 5:00 AM
 - Monday 12:00 AM – Monday 4:00 AM
- e) The following are the allowable times for a Single Left Lane and the HOV Lane to be Closed:
 - Weekdays 8:00 PM – 5:00 AM
 - Friday 9:00 PM – Saturday 10:00 AM
 - Saturday 9:00 PM – Sunday 12:00 NOON
 - Sunday 9:00 PM – Monday 5:00 AM
- f) The following are the allowable times for Two Left Lanes and the HOV Lane to be Closed:
 - Weekdays 10:00 PM – 5:00 AM
 - Friday 11:00 PM – Saturday 5:00 AM
 - Sunday 12:00 AM – Sunday 7:00 AM
 - Sunday 9:00 PM – Monday 5:00 AM
- g) The following are the allowable times for Three Left Lanes and the HOV Lane to be Closed:
 - Weekdays 12:00 AM – 4:00 AM
 - Saturday 12:00 AM – Saturday 5:00 AM
 - Sunday 12:00 AM – Sunday 5:00 AM
 - Monday 12:00 AM – Monday 4:00 AM
- h) The following are the allowable times for Four Left Lanes and the HOV Lane to be Closed:
 - Weekdays 12:00 AM – 4:00 AM
 - Saturday 12:00 AM – Saturday 4:00 AM
 - Sunday 12:00 AM – Sunday 5:00 AM
 - Monday 12:00 AM – Monday 4:00 AM

B. Failure to reopen lanes by the times specified above will result in the assessment of Liquidated Damages as per Subsection 108.08 of this Contract.

C. Holiday Work Restrictions:

Work that interferes with traffic shall not be allowed during the following holiday periods for the duration of the contract:

Memorial Day: May 25th – May 29th, 2007; May 23rd – May 27th, 2008, inclusive.

July 4th: June 29th – July 5th, 2007; July 3rd – July 7th, 2008, inclusive.

Labor Day: August 31st – September 4th, 2007; August 29th – September 2nd, 2008; September 4th – September 7th, inclusive.

Thanksgiving through New Year: November 21st, 2007 – January 2nd, 2008; November 20th, 2008 – January 2nd, 2009, inclusive.

D. Special Event Restrictions:

Lane closures shall not be allowed during weekends which conflict with the following special events: Tax Free Days in Georgia, Atlanta Braves baseball games, Atlanta Falcons football games, Music Midtown Festival, Georgia Tech football games or Georgia Tech basketball games. Additional restrictive hours may occur prior to and after unforeseen events and the Contractor shall obtain special approval from the Engineer prior to temporary lane closures, detours, pacing of traffic, or other activities that slow traffic.

E. Weekly Meeting with the Engineer

1. All lane closures shall have prior approval of the Engineer. No later than Wednesday of each week preceding the start of each week, the Contractor shall meet with the Engineer and submit in writing his proposed plan of operation, sequence of Work, and methods of providing for safe passage of traffic for the following week.
2. For complete roadway closures, the Contractor shall meet with the Engineer and submit in writing his proposed plan of operation, sequence of work, and methods of providing for the safe passage of traffic including detour routes no less than eight weeks prior to the proposed closure.
3. For submittal requirements concerning major changes to the approved control plan, the Contractor's attention is directed to Sub-section 150.01.G.

F. Workzone Law Enforcement:

Workzone Law Enforcement consists of utilizing a uniformed police officer equipped with a marked patrol vehicle and blue flashing lights to enforce traffic laws in construction work zones and the administration of this service. Payment for Workzone Law Enforcement shall be made only for its utilization in work zones during lane closures, traffic pacing, or other activities that occur within the travel lanes. The Contractor shall be responsible for coordinating and scheduling the utilization of the Workzone Law Enforcement.

Workzone Law Enforcement shall be measured for payment by the hour up to the maximum number of hours included in the contract. The Department will not pay for any Workzone Law Enforcement beyond the number of hours set up in the contract. The cost for utilization above the number of hours set up in the contract shall be included in the Lump Sum price bid for Traffic Control.

The Contractor shall provide a daily work record containing the actual number of hours charged by the police officer, for all hours the Department will be paying. The daily work record shall be compiled on a form provided by the Department, signed by the police officer and signed by the Contractor's Worksite Traffic Control Supervisor attesting that the police officer was utilized during the time recorded.

Payment shall be full compensation for reimbursing the law enforcement agency, and for all other cost incurred by the Contractor in coordinating, scheduling and administering the item Workzone Law Enforcement.

Item no. 150-9011 Traffic Control Workzone Law Enforcement (Contractor Bids)...HRS

For this project, the advance warning signs specified in Subsection 150.03.H shall be portable signs and four (4) of the advance warning signs specified in Subsection 150.03.H.2 shall be changeable message signs. The Contractor shall be required to place and maintain messages on all message boards 24 hours a day, 7 days a week, during the duration of the contract that requires lane closures. Messages shall inform the public of upcoming closures.

Except as noted, all cost for compliance with this Subsection 150.11 shall be included in the Lump Sum price bid for Traffic Control.

All cost for compliance with this section related to message boards shall be included under:
ITEM NO. 632-0003, Changeable Message Signs, portable, type 3...EA

DETAILED ESTIMATE PROJECT NO.: NHS-M001-00(533) P.I. NO.: M001533					
Section TRAFFIC CONTROL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	900000.00	TRAFFIC CONTROL - NHS-M001-00(533)	900000.00
150-9011	500	HR	58.09	TRAFFIC CONTROL - WORKZONE LAW ENFORCEMENT (CONTRACTOR BIDS)	29045.00
632-0003	4	EA	16165.06	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	64676.24
Section Sub Total:					\$9,093,721.24
ROADWAY ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
210-0100	1	LS	100000.00	GRADING COMPLETE - NHS-M001-00(533)	100000.00
400-3604	62616	TM	117.66	ASPH CONC 17.5 MM SMA, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	7367398.56
400-3624	35096	TN	109.42	ASPH CONC 17.5 MM PER, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME	3840204.12
402-1811	2035	TN	72.20	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL	146927.00
402-3121	29821	TN	61.84	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1844130.64
402-3130	10851	TN	58.94	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	639557.94
407-0010	30000	LF	0.44	ASPHALT-RUBBER JOINT AND CRACK SEAL, TP H	13200.00
413-1000	90420	GL	1.84	BITUM TACK COAT	166387.52
432-0208	126178	SY	1.54	MILL ASPH CONC PVMT, 1 1/2 IN DEPTH	194314.12
432-0217	379489	SY	7.65	MILL ASPH CONC PVMT, 4 1/4 IN DEPTH	2903090.85
432-0231	132873	SY	14.85	MILL ASPH CONC PVMT, 8 1/4 IN DEPTH	1973164.05
432-5010	63854	SY	2.43	MILL ASPH CONC PVMT, VARIABLE DEPTH	155165.22
438-1000	5000	LF	10.01	ASPHALTIC CONCRETE CURB	50050.00
446-2118	9091	LF	5.69	HIGH STRENGTH PVMT REINF FABRIC, 10 IN WIDTH	51727.79
456-2012	17	GLM	1125.15	INDENTATION RUMBLE STRIPS - GROUND-IN-PLACE (CONTINUOUS)	19127.55
610-1070	18	EA	504.26	REM GUARDRAIL IMPACT ATTENUATOR	8068.16
610-1055	5951	LF	1.14	REM GUARDRAIL	6784.14
610-1075	46	EA	266.62	REM GUARDRAIL ANCH, ALL TYPES	12264.52
611-5310	18	EA	3000.00	RESET GUARDRAIL IMPACT ATTENUATOR	48000.00
641-1100	487	LF	51.47	GUARDRAIL, TP T	25065.89
641-1200	5464	LF	18.54	GUARDRAIL, TP W	101302.56
641-5001	2	EA	617.35	GUARDRAIL ANCHORAGE, TP 1	1234.70
641-5006	27	EA	563.91	GUARDRAIL ANCHORAGE, TP 6	15225.57
641-5012	17	EA	1871.80	GUARDRAIL ANCHORAGE, TP 12	31820.60
Section Sub Total:					\$19,714,211.70
Section PERMANENT EROSION CONTROL ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0240	15	TN	183.84	MULCH	2757.60
700-6910	1	AC	906.91	PERMANENT GRASSING	906.91
700-7000	3	TN	58.05	AGRICULTURAL LIME	174.15
700-7010	3	GL	19.30	LIQUID LIME	57.90
700-8000	1	TN	348.14	FERTILIZER MIXED GRADE	348.14
700-8100	50	LB	2.04	FERTILIZER NITROGEN CONTENT	102.00
Section Sub Total:					\$4,346.70
Section TEMPORARY EROSION CONTROL ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	1	AC	571.97	TEMPORARY GRASSING	571.97
163-0550	300	EA	308.76	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	92628.00
165-0010	500	LF	0.93	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	465.00
165-0020	500	LF	2.36	MAINTENANCE OF TEMPORARY SILT FENCE, TP B	1180.00
165-0030	500	LF	1.83	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	915.00
165-0105	300	EA	110.84	MAINTENANCE OF INLET SEDIMENT TRAP	33252.00
171-0010	1000	LF	1.80	TEMPORARY SILT FENCE, TYPE A	1800.00
171-0020	1000	LF	4.01	TEMPORARY SILT FENCE, TYPE B	4010.00
171-0030	1000	LF	3.84	TEMPORARY SILT FENCE, TYPE C	3840.00
Section Sub Total:					\$138,661.97
Section SIGNING & MARKING ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
652-8055	5	LM	17050.00	SOLID POLYUREA TRAFFIC STRIPE, 10 IN, WHITE	85250.00
652-8151	78	GLM	3316.00	SKIP POLYUREA TRAFFIC STRIPE, 5 IN, WHITE	258648.00
654-1003	5478	EA	3.78	RAISED PVMT MARKERS TP 3	20706.84
657-3054	66980	GLF	3.63	PREFORMED PLASTIC SKIP PVMT MKG, 5 IN, WHITE, TP PB	243137.40
657-3085	19725	GLF	4.48	PREFORMED PLASTIC SKIP PVMT MKG, 8 IN, CONTRAST (BLACK-WHITE), TP PB	88368.00
657-5014	86	EA	861.70	PREFORMED PLASTIC PVMT MKG, WORDS AND/OR SYM, WHITE, TP B	56672.20
657-9210	10	LM	14880.81	WET REFLECTIVE PREFORMED SOLID RAVERENT MARKINGS, 5 INCH WIDE, WHITE	148808.10
657-9211	7	LM	15309.42	WET REFLECTIVE PREFORMED SOLID RAVERENT MARKINGS, 5 INCH WIDE, YELLOW	107165.94
Section Sub Total:					\$1,008,956.48
SUB-Total Estimated Cost:					\$29,959,898.09
E&C at 10%:					2,995,989.81
Total Estimated Construction Cost:					\$32,955,887.90

NOTE:

OTHER _____
 GROUPS _____
 FILE _____

**Department of Transportation
 State of Georgia**

JORDAN DESK

Interdepartmental Correspondence

File NHS-M001-00(533)
 Clayton & Fulton Counties
 P. I. No. M001533

Office Materials and Research
 Forest Park, Georgia
Date May 26, 2006

From Georgene M. Geary, P.E., State Materials and Research Engineer

To Ben Buchan, P.E., State Urban Design Engineer
 Attention: Albert Shelby, Project Manager

Subject Rehabilitation of SR 401 / I-75 from the SR 407 / I-285 Interchange in Clayton
 County to the SR 403 / I-85 Split in Fulton County
Shoulder Recommendation Addendum

A pavement evaluation was performed for maintenance project NHS-M001-00(533). This recommendation addressed the mainline pavement only. The south end of widening project NHS-0001-00(298), P.I. Number 0001298, ties-in to the north end of maintenance project NHS-M001-00(533), P.I. Number M001533, in Fulton County.

The existing surface layer on I-75 / I-85, within the limits of both projects, consists of ¾ inches of OGFC. The proposed surface layer consists of 1¼ inches of PEM. The manager of project NHS-0001-00(298) has requested a shoulder pavement recommendation.

The outside shoulder surface typically consists of a 1 ½ inch layer of 12.5 mm Superpave mix. We recommend milling the existing outside shoulders 1 ½ inches, and inlaying with 1 ½ inches of 12.5 mm Superpave. The mainline PEM surface course should extend 18 inches onto the outside shoulder. In summary, the following mill and inlay is proposed for the outside shoulders:

Mill and Inlay - Outside Shoulders

Pay Item Number	Material	Course	Thickness (Spread Rate)
402-3130	12.5 mm Superpave	Surface	1 ½ inches 165 lb/ yd ²

NHS-M001-00(533)
May 26, 2006
Page 2 of 2

If additional information is needed please contact Sheila Hines of the Bituminous Construction Branch at 404-363-7531, or A. J. Jubran of the Pavement Management Branch at 404-363-7582.

GMG: JTR: AJJ

cc: file
Sheila Hines, Bituminous Construction Branch Chief
Jan Hilliard, Urban Design

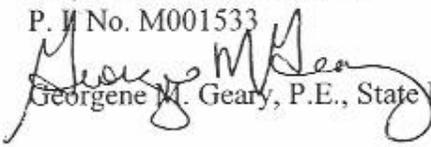
BUCHAN _____
 ROWMAN _____
 RICHARDSON Shelby
 VanMETER _____
 OTHER _____
 GROUPS _____
 P.E. _____

**Department of Transportation
 State of Georgia**



Interdepartmental Correspondence

File NHS-M001-00(533) **Office** Materials and Research
 Clayton & Fulton Counties Forest Park, Georgia
 P. # No. M001533 **Date** February 2, 2006

From  Georgene M. Geary, P.E., State Materials and Research Engineer

To Ben Buchan, P.E., State Urban Design Engineer
 Attention: Albert Shelby, Project Manager

Subject **Pay Item Correction for Preliminary Pavement Design** Recommendations for the Rehabilitation of SR 401 / I-75 From the SR 407 / I-285 Interchange in Clayton County to the SR 403 / I-85 Split in Fulton County

The *Preliminary Pavement Evaluation* reported for this project, included a mill and inlay design.

The table below summarizes the design that was proposed, with corrected pay item numbers.

Mill and Inlay: All Lanes

Pay Item Number	Material	Course	Thickness (Spread Rate)	Design Levels
400-3624	PEM	Surface	1.25 inches 135 lb/ yd ²	N/A
400-3604	12.5 mm SMA	Surface	1.5 inches (165 lbs/yd ²)	N/A
400-3402	19 mm SMA	Binder	2 inches (220 lbs/yd ²)	N/A

If additional information is needed, please contact Moussa Issa of the Pavement Management Branch at 404-363-7620.

GMG: AJJ

Copy: Steve Mathews, Engineering Services
 Sheila Hines, State Bituminous Construction Engineer

BUCHAN _____
BOWMAN _____
RICHARDSON _____
VanMETER _____
OTHER _____
GROUPS _____
FILE Finaly!

**Department of Transportation
State of Georgia**

JAN 25 2006

Interdepartmental Correspondence

File NHS-M001-00(533) Clayton & Fulton Counties P. I. No. M001533
Office Materials and Research Forest Park, Georgia
Date January 18, 2006

From Georgene M. Geary
Georgene M. Geary, P.E., State Materials and Research Engineer

To Ben Buchan, P.E., State Urban Design Engineer
Attention: Albert Shelby, Project Manager

Subject ***Preliminary Pavement Evaluation and Preliminary Pavement Design
Recommendations for the Rehabilitation of SR 401 / I-75***
From the SR 407 / I-285 Interchange in Clayton County
To the SR 403 / I-85 Split in Fulton County

As requested, a ***Preliminary Pavement Evaluation*** has been completed for this project. The results of this work are attached.

Due to the location of the project and the impact of lane closures in this critical part of the city of Atlanta, additional field work is scheduled in the future. This work is expected to compliment our preliminary investigation. Please note that the information that is presented in the attached report is subject to change, based on the findings of the additional field investigation.

If additional information is needed, please contact Moussa Issa of the Pavement Management Branch at 404-363-7620.

GMG: AJJ: MI

Attachments:

- 1. Preliminary Pavement Evaluation M001533PRE
- 2. Strip chart of Core Locations
- 3. Historical Co-PACES Chart
- 4. FWD Testing and Analysis M001533TES

cc: file

Sheila Hines, Bituminous Construction Branch Chief
Jan Hilliard, Urban Design

1.1. PROJECT

SR 401 / I-75 Rehabilitation from SR 407 / I-285 to SR 401 / SR 403 (I-75 / I-85) Split

1. LOCATION / DESCRIPTION

This project is for the rehabilitation and resurfacing of SR 401 / I-75 from the SR 407 / I-285 Interchange in Clayton County to the SR 403 / I-85 split, also known as the Brookwood Interchange, in Fulton County.

This portion of SR 401 / I-75 consists of ten to fourteen 11-foot wide travel lanes of asphaltic concrete, including the HOV lanes. The outside and inside asphalt paved shoulders have variable widths with drains and rumble strips. The base is graded aggregate.

2. PAVEMENT CONDITION SUMMARY

The asphalt concrete pavement is in good to fair condition throughout the project limits.

3. FULL-DEPTH SECTIONS

No full-depth design is being submitted at this time. Limits of deep milling or full-depth reconstruction will be addressed in the final report after the completion of additional work and engineering analysis.

The additional work consists of an Automated Distress Survey, Ground Penetrating Radar (GPR) and seismic testing. The Survey and GPR testing will be performed at normal travel speeds, requiring no lane closures. Seismic testing will require lane closures.

The GPR locates areas of pavement that have moisture damage and structural weaknesses. When questionable areas are identified with the GPR, seismic testing will provide additional information for those areas.

4. OVERLAY SECTIONS

For this portion of SR 401 / I-75, it is recommended to mill and inlay the existing pavement 4 ¼ inches (see also Section 9. Additional Recommendations). The mill and inlay design is summarized as follows:

Mill and inlay: All Lanes

Pay Item Number	Material	Course	Thickness (Spread Rate)	Design Levels
400-3624	PEM	Surface	1.25 inches 135 lb/ yd ²	N/A
400-3130	12.5 mm SMA	Surface	1.5 inches (165 lbs/ yd ²)	N/A
402-3190	19 mm SMA	Binder	2 inches (220 lbs/ yd ²)	N/A

M001533PRE
Jan 18, 2006
Page 2 of 3

5. PAVEMENT DISTRESSES

Except for the following, no other distresses were encountered during the investigation of this project:

- I believe some areas are worse*
- Rutting** Rutting ranged from 0 to 1/8 inch in all lanes throughout the entire project. Maximum rutting was measured in lane 4 of the southbound direction in the vicinity of Milepost 249 ±.
 - Raveling** Surface mix raveling was observed in all lanes throughout the entire project limits.
 - Joint Cracking** Meandering longitudinal cracks were observed along the interface between lanes. Many of these cracks were sealed, but many are still open. The longitudinal cracks are generally more noticeable south of the SR 402 / I-20 interchange in both directions.

6. CORES

Cores were recovered from 77 locations on this project to determine the thickness and condition of the existing pavement sections. The core locations are shown on the attached strip map. No laboratory testing was conducted on these core samples.

7. COPACES

The attached chart illustrates historical Co-PACES ratings for informational purposes.

8. OTHER INFORMATION

- The overlay pavement structure proposed in Section 4 is intended to address the raveling and the pavement joints cracking. This rehabilitation strategy will not require changing the existing profile grade.
- Non-destructive testing, using the Falling Weight Deflectometer (FWD), was carried out to assess the existing pavement structural integrity. Because of traffic control constraints, it was limited in scope, and testing was concurrent with coring. The results of the FWD testing are attached.

9. ADDITIONAL RECOMMENDATIONS

We also recommend the following:

- A crack map showing the existing cracks will be generated after completion of the automated distress survey. The generated crack map will guide the construction personnel in identifying cracks that have filled up with fines and debris as a result of the milling operation.
- All lanes should be milled 4 3/4 inches and inlayed. This removes areas with top-down

Jan 18, 2006
Page 3 of 3

mix cracking and mix raveling.

- After milling, a crack filler (Type M) should be applied in cracks that exceed $\frac{1}{4}$ inch in width along SR 401 / I-75, especially south of the SR 402 / I-20 Interchange. These cracks have resulted from the old construction joints that have reflected up to the existing pavement surface. The filler material to be used shall comply with Section 820 of the Standard Specifications, and this work shall be performed in accordance with Section 407.
- A high-strength pavement reinforcing fabric should be applied along the longitudinal cracks before the inlay operation occurs. Placing this fabric will retard longitudinal cracks that can reflect upwards through the overlay. The fabric shall comply with the requirements of Section 881, and this work shall comply with Sections 413 and 446 of the Standard Specifications.

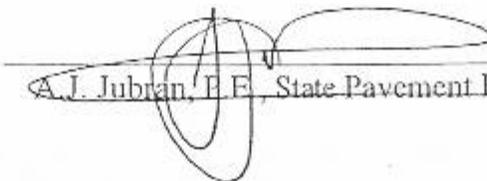
10. HISTORY

- This section of SR 401 / I-75, when originally constructed consisted of four 12-foot wide lanes.
- Through the years, travel lanes were added in both directions to accommodate the increasing traffic demand.
- During the 1980's Freeing the Freeways Campaign, this section was reconstructed full-depth using asphaltic concrete with graded aggregate base.
- The last resurfacing preceded the 1996 Olympics. It consisted of milling, then adding Stone Matrix Asphalt (SMA) Layer and an Open Graded Friction Course (OGFC) to assist in drainage.
- In that year also, individual lanes were narrowed to 11 feet in width to allow the addition of an HOV lane.

Reported By:

Moussa Issa, State Pavement Design Engineer

Reviewed By:


A. J. Jubran, P. E., State Pavement Engineer

Department of Transportation State of Georgia

Interdepartmental Correspondence

File FWD Testing I-75 / I-85 NHS-M001-00(533) Clayton / Fulton P. I. No. M001533	Office Materials and Research Forest Park, Georgia Date January 18, 2006
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From Helga N. Torres, E.I.T., Pavement Test Engineer

To A. J. Jubran, P.E., State Pavement Engineer

Subject **Falling Weight Deflectometer Testing**

Falling Weight Deflectometer (FWD) testing was performed on Interstate 75 / 85 from the Brookwood Interchange, Milepost 250, to the intersection with Lakewood Avenue, Milepost 243. Field testing was completed between June 6, 2005 and June 14, 2005, and the average night temperature during those dates was around 70°F. Lanes 3 and 5 were tested in the southbound direction and only Lane 5 was tested in the northbound direction. FWD deflection measurements were taken at the mileposts, and approximately 500 feet before and after the mileposts due to lane closure constraints. Please note that the FWD data analysis presented below was conducted with a limited set of test points along the Downtown Connector.

The existing pavement was cored and tested with the FWD simultaneously, and FWD deflection measurements were monitored in the field to help identify changes in the pavement structure and strength. Later, the FWD data was analyzed using the Modulus 6.0 and Modtag 3.1.68 back calculation computer programs. For this analysis it was assumed that there is 12 inches of Graded Aggregate Base (GAB) throughout the project. Also the following Poisson Ratio values were used: 0.35 for the Asphaltic Concrete (AC) layer, 0.40 for the GAB layer and 0.42 for the soil layers. The average subgrade modulus back calculated for the top soil layer with the program Modulus was 29 ksi, and 21 ksi with the program Modtag.

Lane 3 in the southbound direction was divided into two segments, Mileposts 250 to 246 with an average AC thickness of 16.4 inches, and Mileposts 246 to 244 with an average AC thickness of 14.8 inches. The average AC moduli values back calculated for this lane are 566 ksi and 643 ksi, with the programs Modulus and Modtag respectively.

Lane 5 in the southbound direction was divided into two segments as well, Mileposts 248 to 245 with an average AC thickness of 15.7 inches, and Milepost 245 to 243 with an average AC thickness of 14 inches. The average AC moduli values back calculated for this lane are 615 ksi and 703 ksi, with the programs Modulus and Modtag respectively.

Lane 5 in the northbound direction was tested from Mileposts 244 to 248 and Mileposts 249 to 250. The average AC thickness between Mileposts 244 and 248 is 15.6 inches and at Milepost 249 is 24 inches. The average AC moduli values back calculated for this lane are 396 ksi and 475 ksi, with the programs Modulus and Modtag respectively. Those results are summarized in Table 1 below.

Table 1

Lane Number	Direction	Beg MP	End MP	Avg AC Thickness	AC Modulus using MODULUS	AC Modulus using MODTAG
3	SB	250	246	16.4	566	643
3	SB	246	244	14.8	566	643
5	SB	248	245	15.7	615	703
5	SB	245	243	14	615	703
5	NB	244	248	15.6	396	475
5	NB	249	250	24	396	475

Figure 1 Backcalculated Moduli (MODULUS): Downtown Connector Southbound, Lane 3

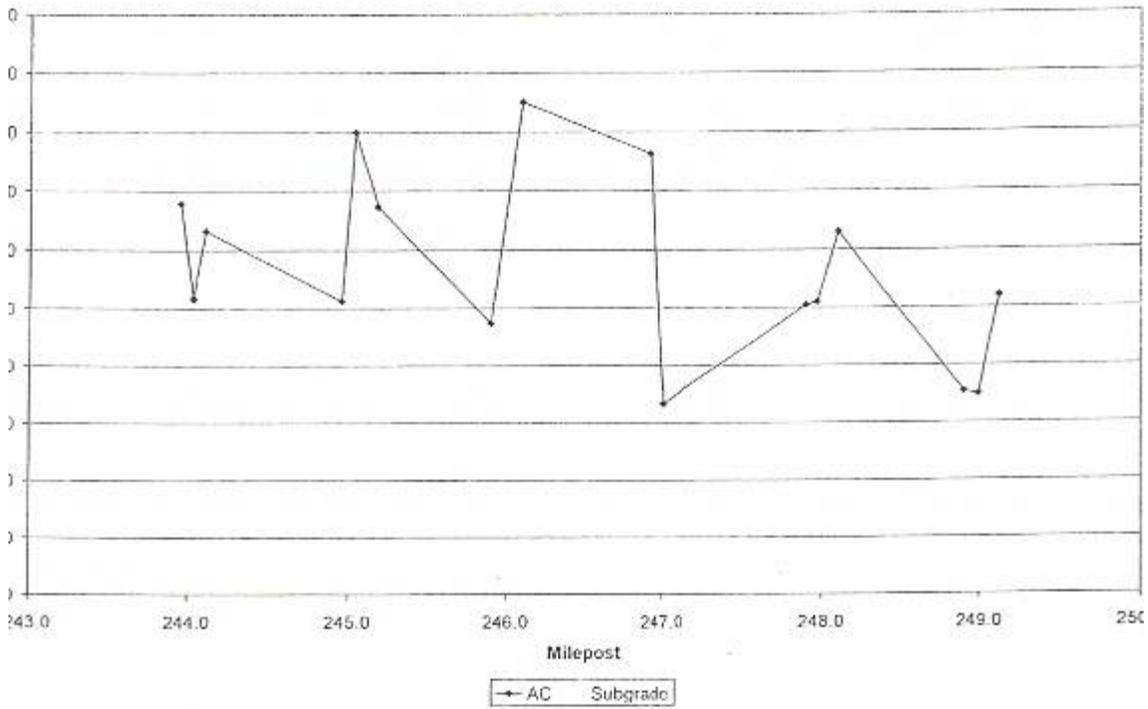
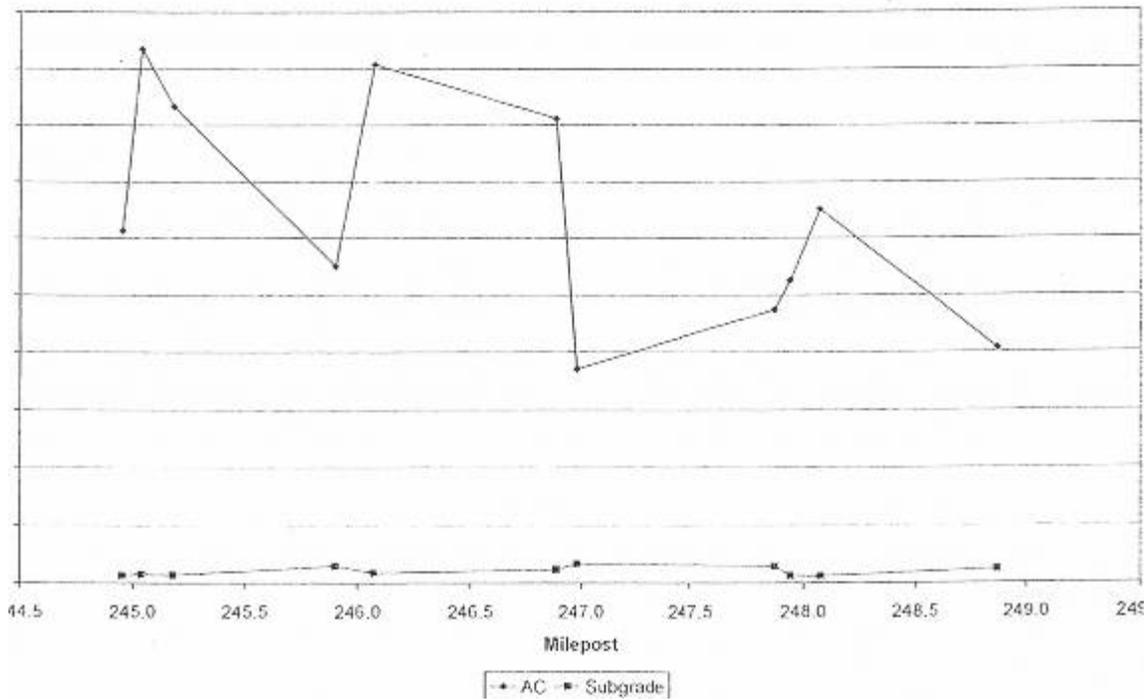


Figure 2 Backcalculated Moduli (MODTAG): Downtown Connector Southbound, Lane 3



M001533TES
January 18, 2006
Page 4 of 5

Figure 3 Backcalculated Moduli (MODULUS): Downtown Connector Southbound, Lane 5

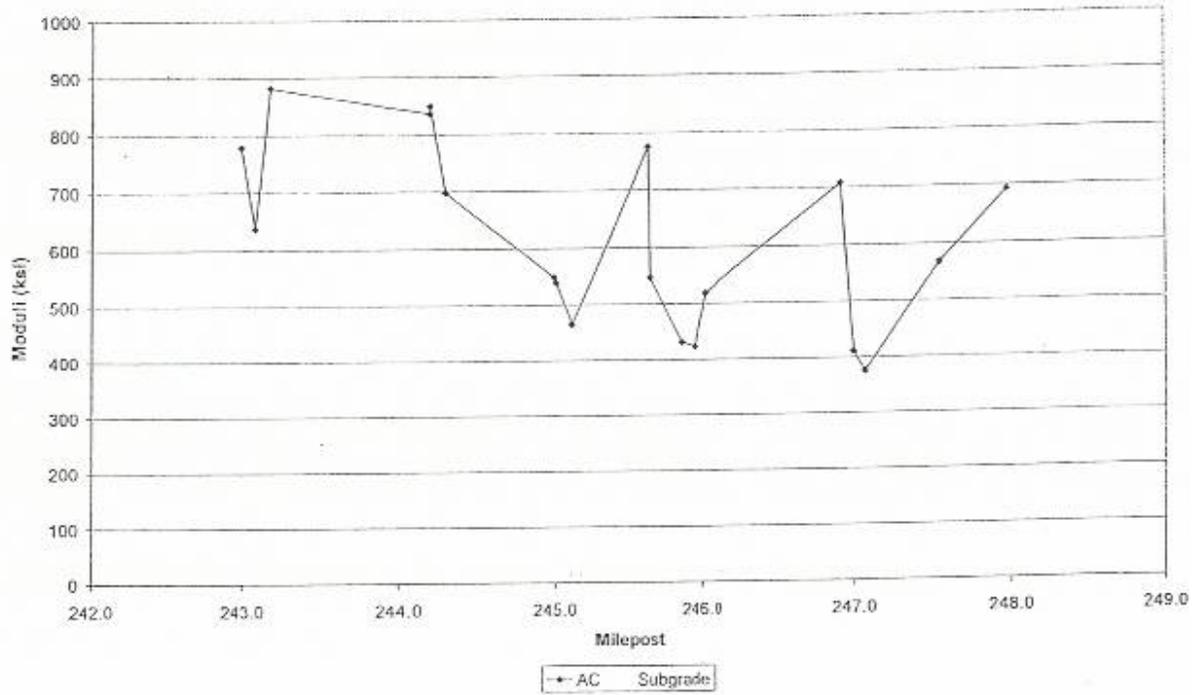


Figure 4 Backcalculated Moduli (MODTAG): Downtown Connector Southbound, Lane 5

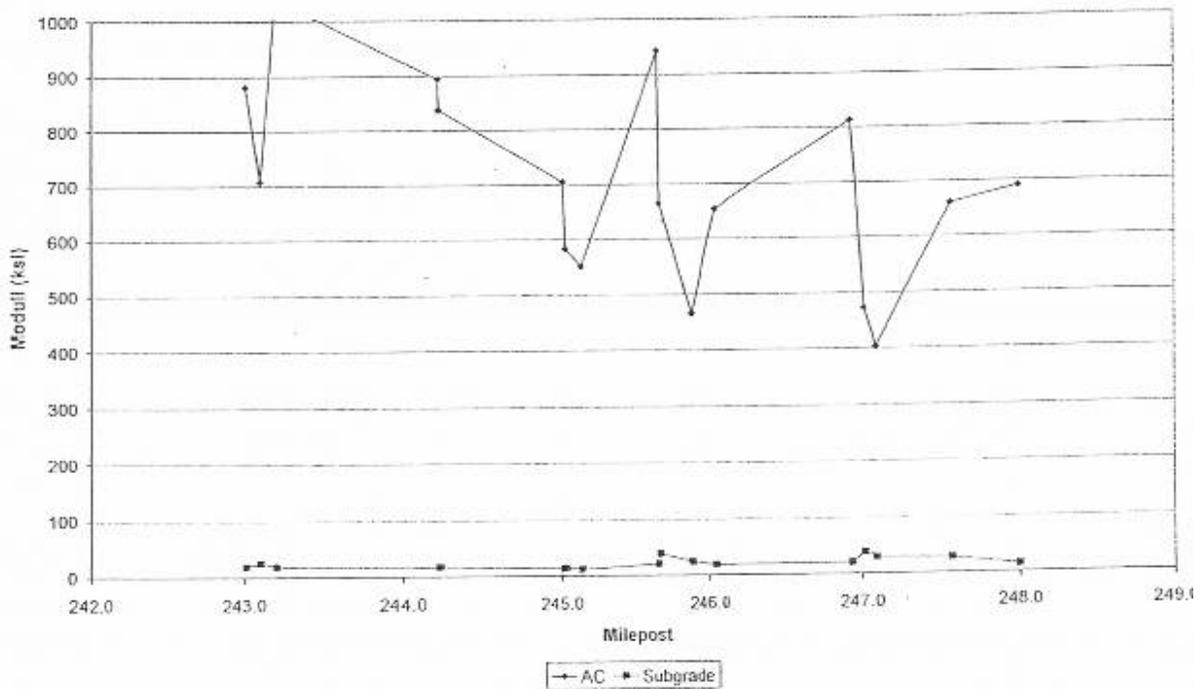


Figure 5 Backcalculated Moduli (MODULUS): Downtown Connector Northbound, Lane 5

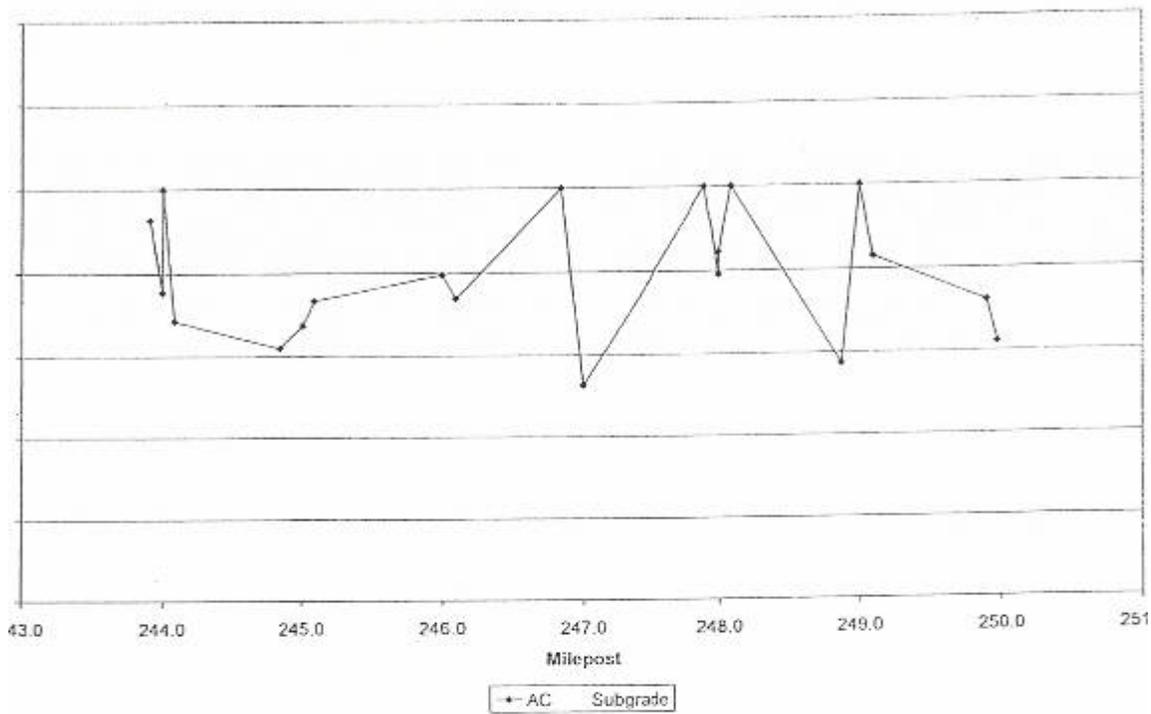
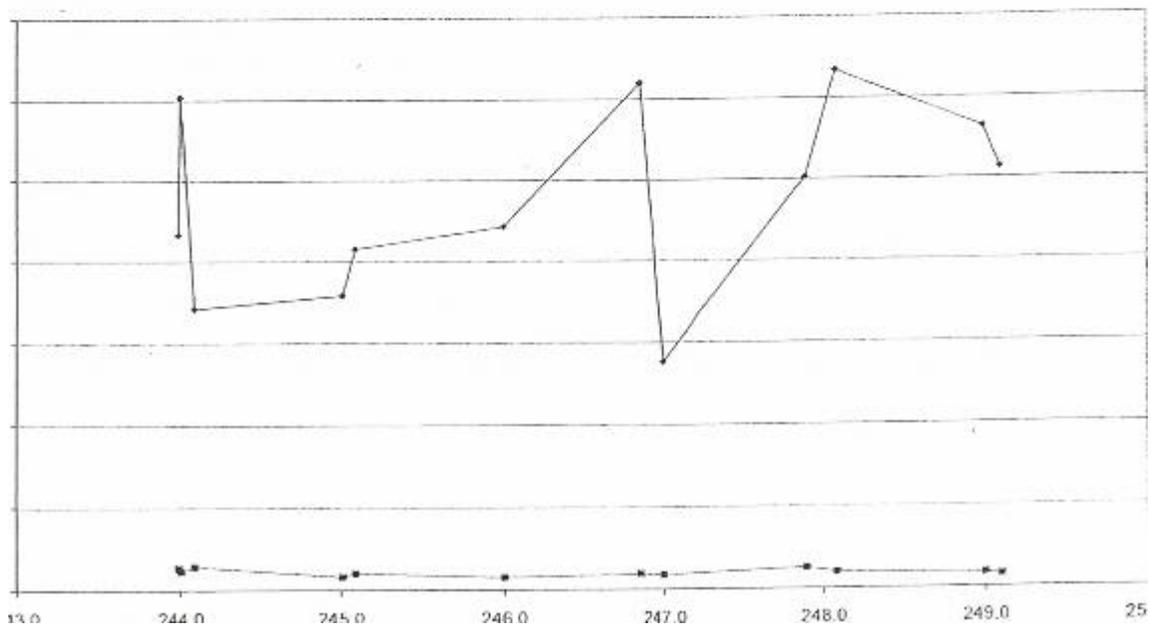
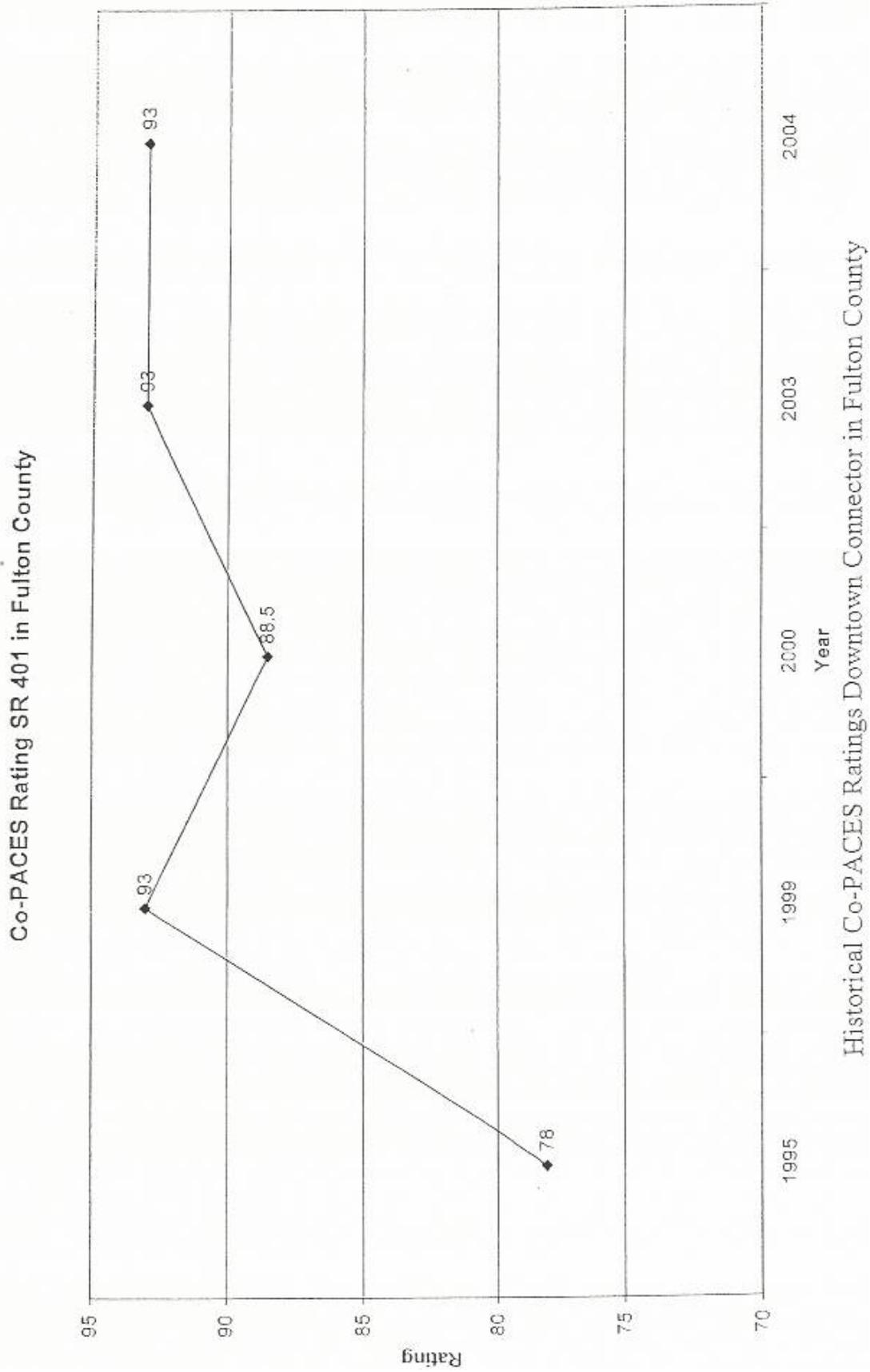


Figure 6 Backcalculated Moduli (MODTAG): Downtown Connector Northbound, Lane 5





DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

INTERDEPARTMENTAL CORRESPONDENCE

FILE NHS-M001-00(533) Fulton County **OFFICE** Materials and Research
PI No. M001533 **DATE** September 27, 2006

FROM Georgene M. Geary, P. E., State Materials and Research Engineer

TO James B. Buchan, P. E., State Urban Design Engineer
Attention: Albert Shelby, Project Manager

SUBJECT Pavement Evaluation Summary – **Final Recommendations**
T Rehabilitation of SR 401 / I-75 From the University Avenue Interchange
North to the I-75 / I-85 Split

The required additional field work noted in the Preliminary Pavement Evaluation dated January 18, 2006 is complete. The final recommendations for this project are attached.

If additional information is needed, please contact A. J. Jubran of the Pavement Management Branch at 404-363-7582.

GMG: JTR: AJJ: SVP

Attachment
Pavement Evaluation Summary

Copy: David Crim, State Maintenance Engineer, Atlanta
Peter Wu, Assistant Materials and Research Engineer, Forest Park
Sheila Hines, State Bituminous Construction Engineer, Forest Park
Bryant Poole, District Engineer, Chamblee
Mark Sanford, Area Engineer, Atlanta

PAVEMENT EVALUATION SUMMARY
Final Recommendations
For
NHS-M001-00(533) Fulton County
PI No. M001533

1. LOCATION / DESCRIPTION

This project is for the rehabilitation and resurfacing of SR 401 / I-75. The project begins at the University Avenue Interchange near MP 244.7 and continues north to the Brookwood Interchange near MP 250.5, where I-75 and I-85 split. This project is located entirely in Fulton County.

2. PAVEMENT CONDITION SUMMARY

The existing pavement is in fair to poor condition. The existing OGFC is raveling and the northern end of the project includes rut susceptible asphalt concrete mixes.

3. OVERLAY SECTIONS

The following sections are recommended:

University Avenue (MP 244.7) to Ralph McGill Blvd (~MP 248.0)

- Mill the existing pavement 4 ¼ inches.
- Clean the pavement surface, as per Section 407 of the Standard Specifications.
- After milling, apply a crack filler (Type M) in cracks that exceed ¼ inch in width. These cracks have resulted from the old construction joints that have reflected up to the surface of the existing pavement. The filler material shall comply with Section 820 of the Standard Specifications. This work should be performed in accordance with Section 407.
- Place a high-strength pavement reinforcing fabric along all longitudinal cracks.
- Inlay the pavement with the following section:

Overlay Design – Mill and Inlay

Pay Item Number	Material	Course	Thickness	Spread Rate
400-3624	12.5 mm PEM	Surface	1.25 inches	135 lbs/yd ²
400-3604	12.5 mm SMA	Surface	3 inches	330 lbs/yd ²

Ralph McGill Blvd (~MP 248.0) to End of Project (MP 250.5)

- Mill the existing pavement 8 ¼ inches to remove areas with above average rutting and rut-susceptible asphalt layers.
- Clean the pavement surface, as per Section 407 of the Standard Specification.
- After milling, apply a crack filler (Type M) in cracks that exceed ¼ inch in width.
- Inlay with the following section without using the pavement reinforcing fabric:

Overlay Design – Deep Mill and Inlay

Pay Item Number	Material	Course	Thickness	Spread Rate
400-3624	12.5 mm PEM	Surface	1.25 inches	135 lbs/yd ²
400-3604	12.5 mm SMA	Surface	3 inches	330 lbs/yd ²
402-3121	25 mm Superpave	Asphalt Base	4 inches	440 lbs/yd ²

4. ADDITIONAL RECOMMENDATIONS

The fabric recommended in *Section 3: Overlay Sections* shall comply with the requirements of Section 881, and this work shall comply with Sections 413 and 446 of the Standard Specifications.

Reported By: Steve V. Pahno

Reviewed By: _____
A. J. Jubran, P. E.

Value Engineering Process

VALUE ENGINEERING PROCESS

Introduction

This report summarizes the analysis and conclusions by the PBS&J Value Engineering team as they performed a VE study during the period of February 20-23, 2007 in Atlanta, Georgia, for the Georgia Department of Transportation.

The Value Engineering workshop team and its leadership were provided by PBS&J. This team consisted of the following:

Charles McDuff, P.E., CVS-Life	Certified Value Specialist/VE Team Leader
Les Thomas, P.E., CVS-Life	Certified Value Specialist/Assistant Team Leader
Chris Carbuto, P.E.	Highway Design Engineer
Gary King	Highway Construction Specialist

The Value Engineering team followed the seven step Value Engineering job plan as promulgated by SAVE International. This seven step job plan includes the following:

- **Investigation/Information Phase** – during this phase of the team’s work, the team received a briefing from the designers and project delivery team representatives of the Georgia Department of Transportation (GDOT). This briefing included discussions of the design intent behind the project, the cost concerns, and was followed by a tour of the existing facilities. In the working session that followed, the VE team developed cost models from the cost data provided by the designers and familiarized themselves with the construction drawings and other data that was available to the team. Some of the representative project information (concept report, cost estimate, and special provisions) may be found in the tabbed section of this report entitled ***Project Description***. Following this current narrative the reader will also find a cost model done in the Pareto fashion, i.e., identifying the highest costs down to the lowest costs for the larger construction cost elements. This cost model, developed by the VE team, was used by the VE team to help focus their week of work. The headings on the Pareto Chart also were used as headings for creative phase activities.

- **Analysis Phase** – during this phase the team determined the “**Functions**” of the project. This was accomplished by reviewing the project from the simplest format in asking the questions of “What is the project supposed to do?”, and “How is it supposed to accomplish this purpose? In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis which distinguishes a Value Engineering effort from a potentially damaging cost cutting exercise. The important functions of the project were identified as follows:
 - **Project Objective/Goals**
 - **Extend Pavement Life**
 - **Improve Safety**

 - **Project Basic Functions**
 - **Remove deteriorated pavement**
 - **Install structural pavement**

- **Install wearing course pavement**
 - **Mark Pavement**
 - **Protect motorists**
 - **Redirect traffic**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
 - Reduce construction and life cycle costs
 - Improve roadway operations
 - Reduce the time of construction
 - Clarify risks and opportunities associated with the project and acts to mitigate risks and to act on opportunities.

This brainstorming session initially identified numerous ideas that were then evaluated in the Judgment phase. The reader will find the creative worksheets enclosed. These same work sheets were also used to record the results of the Judgment/Evaluation Phase.

- **Evaluation Phase** – Once the Team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Evaluation or Judgment Phase. The team reflected back on the project constraints and objectives shared with the team by the owner’s representatives, in the kick-off meeting on the first day of the workshop. From that guidance, the team selected ideas that they believed would improve the project by a vote process. Following that selection process, the team used the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:
 - Construction Cost Savings
 - Maintainability
 - Ability to Implement the Idea
 - General Acceptability of the Alternatives
 - Constructability

Based on these measurement sticks, the VE Team evaluated the alternatives and graded them from 5 (Excellent) down to 1 (Poor). Other notes about the alternatives are annotated at the bottom of the enclosed creative and evaluation sheets.

- **Development Phase** – During this phase, the VE Team developed each of the selected design alternatives. This effort included a detailed explanation of the idea with sketches as appropriate to clarify the idea from the original concept, advantages and disadvantages, a technical explanation and an estimation of the cost and resultant savings if implemented. (see the tabbed section – Study Results)
- **Recommendation Phase** – During this phase the VE Team reviews the alternative ideas to confirm which ones are appropriate for the project, have an opportunity for success and which will improve the value of the project if implemented.

- **Presentation Phase** – As noted earlier, the team made an informal “out-briefing” on the last day of the workshop, designed to inform the Owners and the Designers of the initial findings of the VE workshop. This written report is intended to formalize those findings.

The VE team is enclosing a copy of the attendance sheets so that the reader can be informed about who participated in the workshop proceedings. The cost model developed in the information phase is also enclosed.

CREATIVE IDEA LISTING & EVALUATION



PROJECT: NHS-M001-00(533) Fulton County
P.I. Number: M001533

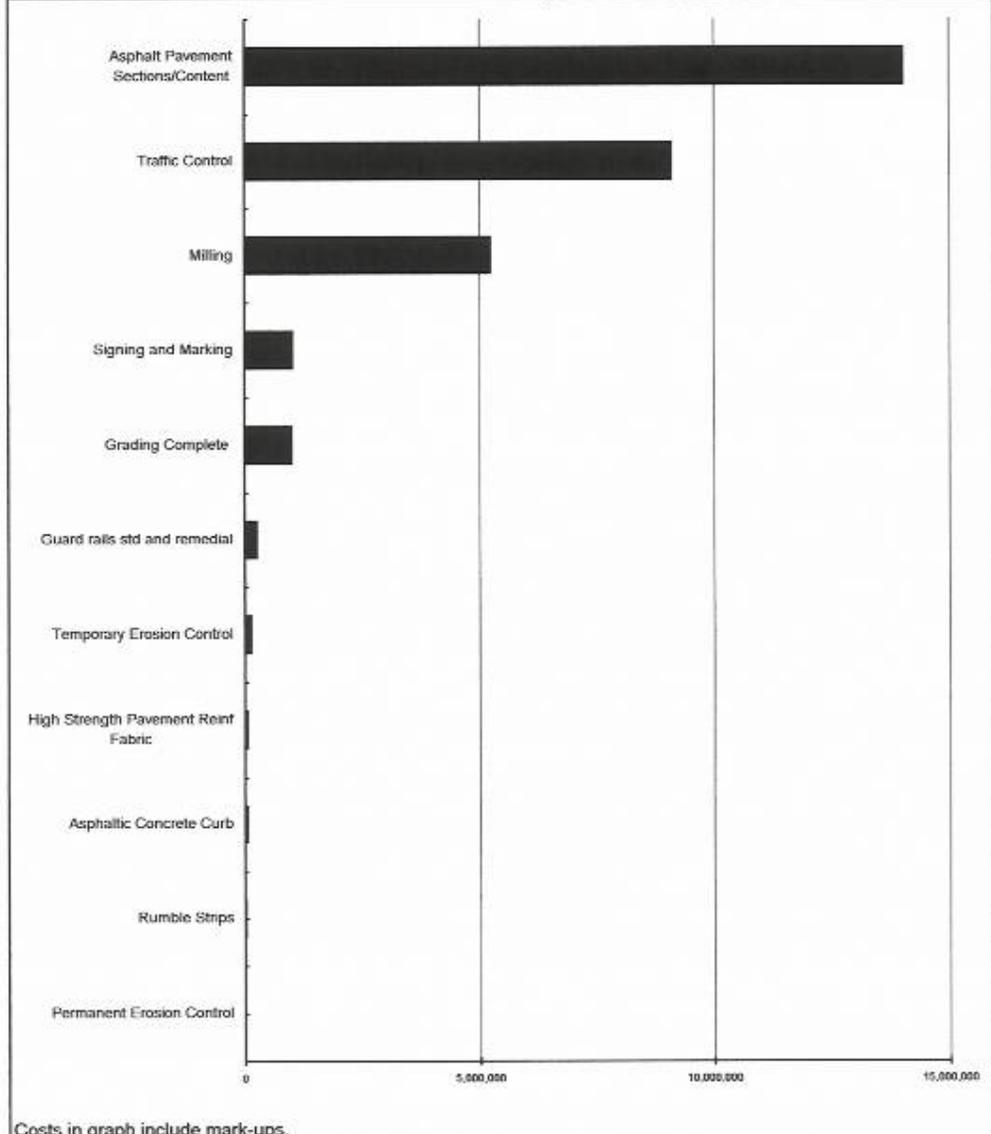
SHEET NO.: 1 of 1

NO.	IDEA DESCRIPTION	RATING
RI-1	Seal Shoulders in-lieu of replacing	4
RI-2	Use Cast-In-Place Concrete barriers in-lieu of metal guard rails	3
RI-3	Rehabilitate pavement in-lieu of remove and replace in Gore Areas	4
RI-4	Core and Test shoulder areas and rehabilitate only where needed.	4
RI-5	In Gore Areas, remove and replace only the PEM	5
RI-6	Test and repair/rehabilitate the project area by "Lanes"	5
TC-1	Extend Lane Closure time periods	1
TC-2	Require the contractor to post notices of lane closures on I-75/I-85 north and south and on I-20 east and west Outside of I-285.	DS
TC-3	In isolated areas, route traffic to the other side of the "wall" to maintain traffic in both directions.	1
	RI = Roadway Improvement Ideas	
	TC = Traffic Control Ideas	

Rating: 1→2 = Generally not acceptable; 3 = Little Opportunity for Positive Change; 4→5 = Most likely to be Developed;
 DS = Design Suggestion; ABD = Already Being Done

PARETO CHART - COST HISTOGRAM

PROJECT: Downtown Connector Milling and Resurfacing			
Fulton County, Georgia			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Asphalt Pavement Sections/Content	14,017,803	45.42%	45.42%
Traffic Control	9,093,721	29.47%	74.89%
Milling	5,225,733	16.93%	91.83%
Signing and Marking	1,008,956	3.27%	95.10%
Grading Complete	1,000,000	3.24%	98.34%
Guard rails std and remedial	249,759	0.81%	99.14%
Temporary Erosion Control	138,661	0.45%	99.59%
High Strength Pavement Reinf Fabric	51,727	0.17%	99.76%
Asphaltic Concrete Curb	50,050	0.16%	99.92%
Rumble Strips	19,127	0.06%	99.99%
Permanent Erosion Control	4,346	0.01%	100.00%
Subtotal	\$ 30,859,883	100.00%	
E & C Rate @ 10% INCL.	\$ 3,085,988		
TOTAL	\$ 33,945,871	Comp Mark-up: 10%	



DESIGNER'S PRESENTATION MEETING PARTICIPANTS				
Project: Georgia Department of Transportation NHS-M001-00(533)		Milling & Inlaying PI No. : M001533		Date: 20 February 2007
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE	
Lisa Myers	GDOT - Engineering Services	lisa.myers@dot.state.ga.us	404-651-7468	
Chris Carbuto	PBS&J	ctcarbuto@pbsj.com	704-522-7275	
Gary King	PBS&J	gking@pbsj.com	770-933-0280	
Tom Gandolfi	PARSONS	thomas.gandolfi@parsons.com	678-969-2307	
Ronald Wishon	Eng. Services	ron.wishon@dot.state.ga.us	404-651-7470	
Jimmy Pruitt	PBS&J	jpruitt@pbsj.com	404-276-4383	
Brian Summers	GDOT -- Engineering Services	david.acree@dot.state.ga.us	404-656-5180	
Les Thomas	PBS&J	L.ThomasPE@aol.com	678-677-6420	
Charles McDuff	PBS&J	crmcduff@pbsj.com	919-538-6820	
Travis McDonald	GDOT Urban	travismcdonald@dot.state.ga.us	404-656-5447	
Michael Lankford	GDOT, D7, Area 3	michael.lankford@dot.state.ga.us	404-624-2440	
Nabil Vaad	GDOT - OTS&D	m.nabil.vaad@dot.state.ga.us	404-635-8126	
Nicoe Alexander	GDOT - OCD	nicoe.alexander@dot.state.ga.us	404-463-6135	
Simin Rahab	GDOT	simin.rahab@dot.state.ga.us	404-326-5510	

VE TEAM PRESENTATION			
MEETING PARTICIPANTS			
Project: Georgia Department of Transportation		Milling & Inlaying	Date: 23 February 2007
NHS-M001-00(533)	Fulton County	PI No. : M001533	
NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers	GDOT - Engineering Services	lisa.myers@dot.state.ga.us	404-651-7468
Chris Carbuto	PBS&J	ctcarbuto@pbsj.com	704-522-7275
Gary King	PBS&J	grking@pbsj.com	770-933-0280
Ronald Wishon	Eng. Services	ron.wishon@dot.state.ga.us	404-651-7470
Brian Summers	GDOT -- Engineering Services	david.acree@dot.state.ga.us	404-656-5180
Les Thomas	PBS&J	LThomasPE@aol.com	678-677-6420
Charles McDuff	PBS&J	crmcduff@pbsj.com	919-538-6820
Albert Shelby	GDOT - Urban	albert.shelby@dot.state.ga.us	404-656-5440
Simin Vahab	GDOT	simin.vahab@dot.state.ga.us	404-326-5510



