



SR 3/US 41/COBB PARKWAY WIDENING FROM PACES MILL ROAD TO AKERS MILL ROAD

STP00-0001-05(047), P.I. No. 721152

Cobb County, GA

Value Engineering Study Report

March 2011

Designer



Moreland Altobelli
Associates, Inc.

Value Engineering Consultant





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Mr. Matthew J. Sanders, AVS
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600 West Peachtree Street
Atlanta, Georgia 30308

Re: SR 3/US 41/Cobb Parkway Widening
From Paces Mill Road to Akers Mill Road
STP00-0001-05(047), P.I. No. 721152, Cobb County, GA
Value Engineering Study Report

Dear Mr. Sanders:

ARCADIS, formerly Lewis & Zimmerman Associates, is pleased to submit two hard copies and one electronic copy of the referenced value engineering study report documenting the study that took place February 21-24, 2011. The objective of the VE effort was to identify opportunities to reduce commercial impacts, improve functionality, and reduce labor and material requirements.

The VE workshop team developed 18 ideas with identifiable cost avoidance potential. Of particular interest are 3 alternatives which, combined, save up to 46 commercial parking spaces. Another alternative reduces the height of a 30 ft. tall, 918 ft. long mechanically stabilized earth wall (Wall No. 2) by 8 ft. and saves \$334,000 (Alt. No. W-2). And an alternative that recommends an underground detention system in lieu of a 0.60 acre above ground detention basin at Sta. 83+00 LT to save \$258,000 (Alt. No. D-1).

We thank you and the Moreland Altobelli Associates, Inc. design team for your assistance during the course of the VE team's work. Please do not hesitate to call if you or any reviewers have questions regarding the information presented in this report.

Sincerely yours,

ARCADIS

A handwritten signature in black ink that reads "Stephen G. Havens".

Stephen G. Havens, PE, CVS
Senior Project Manager

Attachment

Date:
March 7, 2011

Contact:
Stephen Havens

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SECTION ONE - EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) study report documents the events and results of the VE study conducted by ARCADIS U.S., Inc. for Cobb County, Georgia and the Georgia Department of Transportation (GDOT). The subject of the study was the SR 3/US 41 Cobb Parkway Widening from Paces Mill Road to Akers Mill Road project (STP00-0001-05(047), P.I. No. 721152), being designed by Moreland Altobelli Associates, Inc. The workshop was performed February 21-24, 2011 in the GDOT Central Office, Atlanta, GA using the 85% design documents as the basis of the study.

Comprising the VE team were a highway design engineer, a structural engineer, a construction/cost specialist, and a Certified Value Specialist team leader from LZA. The team used the following six-phase VE Job Plan to guide its deliberations:

- Information Gathering Phase
- Function Identification and Analysis Phase
- Creative Idea Generation Phase
- Evaluation/Judgment Phase
- Alternative Development Phase
- Presentation of Results Phase

PROJECT DESCRIPTION

This project will widen and reconstruct US 41 to a 6-lane urban facility with 11-ft.-wide through lanes and turn lanes, a 26-ft.-wide raised median, a 12 ft. multi-use path on the west side of US 41, and a 5-ft.-wide sidewalk on the east side of US 41 from just south of Paces Mill Road (Sta. 65+84.64) to the US 41/Akers Mill Road intersection (Sta. 121+98.25) in Cobb County. The length of the project is approximately 0.84 miles.

Normal and superelevated sections along SR3/US 41/Cobb Parkway include urban shoulders and a raised median with type 7 curb face the length of the project. A closed, piped drainage system will be installed with curb inlets and longitudinal reinforced concrete storm water pipes. The project includes a new detention basin between Sta. 82+09 LT and Sta. 84+52 LT.

As part of the project, eight retaining walls will be constructed at the following locations along the route:

- Wall No. 1: Sta. 73+00 LT to Sta. 77+41 LT
- Wall No. 2: Sta. 77+92 RT to Sta. 87+06 RT
- Wall No. 3: Sta. 77+89 LT to Sta. 79+65 LT
- Wall No. 4: Sta. 90+15 RT to Sta. 91+04 RT
- Wall No. 5: Sta. 98+40 RT to Sta. 101+56 RT
- Wall No. 6: Sta. 104+87 LT to Sta. 106+62 LT

- Wall No. 7: Sta. 114+95 RT to Sta. 111+54 RT
- Wall No. 8: Sta. 118+48 LT to Sta. 119+08 LT

Traffic signals will be replaced at all existing signalized intersections and a new traffic signal will be installed at the access drive at Sta. 111+90 to improve access to Cumberland Festival and Akers Mill Square.

The estimated total cost of construction for the project is \$7,795,147 based upon the Detailed Cost Estimate dated January 25, 2011. The estimated right-of-way cost is \$17,140,000 and the estimated reimbursable utilities cost was not available at the start of the VE workshop. This is a FY 2015 project with a goal to accelerate the project to FY 2013. The estimated duration for construction is 24 months.

CONCERNS AND OBJECTIVES

This project is being developed to maintain the current level of service (LOS) and enhance safety by providing additional capacity. A secondary purpose of the project is to improve bicycle and pedestrian access to and from the high-density residential and commercial developments throughout the project area. The proposed multi-use path will connect to the Chattahoochee River Natural Recreational Area along the Chattahoochee River, which serves as a primary recreation destination. Balancing the needs of the local businesses with the need to widen this section of SR 3/US 41/Cobb Parkway and providing multi-modal connectivity will require careful coordination between GDOT, Cobb County, and the design team.

To assist GDOT achieve its project goals in a cost-effective manner, it convened this VE study. The study team was tasked with identifying specific ideas that will enhance the value of the design by resolving issues, improving functionality, reducing material and labor requirements, or a combination of the three.

RESULTS OF THE STUDY

Research of the ideas identified resulted in the development of 18 VE alternatives and 1 design suggestion that address GDOT's project value objectives. Each alternative is identified with an Alternative Number (Alt. No.) that uses a letter prefix to indicate which project element is being addressed. The alternatives are developed independently so that some are mutually exclusive or interrelated and therefore the total savings achievable will have to be ascertained once implementation decisions are made. All alternatives are summarized on the following Summary of VE Alternatives worksheets and detailed in Section Two of the report. The alternatives with the greatest potential impact on the project are highlighted below.

Three alternatives are recommended that save commercial parking spaces. The current plan shows 22 parking spaces being eliminated from the commercial parking lot on the left side near Sta. 74+50 LT. Alt. No. R-13 recommends reducing the right turn lane and shoulder width from Sta. 73+16 LT to Sta. 75+94 LT to save 11 of the 22 commercial parking spaces and save \$162,000. The disadvantage is that this requires reducing the width of the multi-use trail from 12-ft.-wide to 10-ft.-wide, reducing the 6-ft.-wide grass strip to 2-1/2-ft.-wide, and reducing the right turn lane from 12-ft.-wide to 11-ft.-wide at this location. The current plan also shows 22 parking spaces being eliminated from a strip

mall located at approximately Sta. 80+00 LT. Alt. No. R-6 recommends shifting the alignment to the right beginning from Sta. 75+58 +/- to Sta. 88+45 +/- . Shifting the alignment by up to 10 ft. saves all 22 spaces and \$359,000 by eliminating Wall No. 3 from Sta. 77+89 LT to Sta. 79+65 LT. The disadvantage is that this idea also requires increasing the length and height of Wall No. 2 (Sta. 77+92 to Sta. 87+06) by 50 ft. (Sta. 77+42 to Sta. 77+92) and 2 ft. respectively. The 6-ft.-wide grass strip is also replaced with a narrower 2-1/2-ft.-wide stamped concrete strip on the left side in this area. Finally, the current plan shows an additional 13 commercial parking spaces being eliminated near Sta. 116+50 LT. Alt. W-7 recommends providing a new gravity wall from Sta. 116+00 LT to Sta. 117+00 LT to save all 13 parking spaces and save \$98,000.

Two alternatives are recommended to improve traffic operations at select right turn lanes. The current plan provides a 380 ft. right turn lane with a 50 ft. taper for the access drive at Sta. 117+46 RT. Alt. No. R-7 recommends providing a 175 ft. right turn lane with a 100 ft. taper to save \$149,000. The alternative design meets the requirements specified in GDOT Driveway Encroachment Manual and storage should not be a problem since only 20 cars are estimated to use this access drive during design year 2030 peak hour. The current plan also maintains the existing geometry from Sta. 119+00 RT to Sta. 122+00 RT which includes a short right turn lane onto Akers Mill Road which is only 70-ft.-long with a 189-ft.-long taper for 290 vehicles per hour turning right. Since SR 3/US 41 has four other lanes approaching this intersection, Alt No. R-14 recommends converting the existing fourth lane to a right turn only lane to provide for much more capacity for right turns and save \$25,000. This would also allow for a free right turn from Akers Mill Road onto SR 3/US 41 into the fourth lane on the opposite side of the intersection. It is important to note that the current right turn lane is so short that the queue of through traffic prevents turning vehicles from accessing the right turn. This alternative design would also eliminate the required right-of-way and easement along this right turn lane.

Two alternatives are recommended to reduce maintenance (mowing costs) and right-of-way requirements for the length of the project. The current plan includes 6-ft.-wide grass strips along both sides of the roadway for the length of the project. Alt. No. R-4 recommends providing 2-1/2-ft.-wide stamped concrete strips adjacent to the multi-use trail on the left side the length of the project to save mowing costs and right-of-way and save \$206,000 in initial costs. Alt. No. R-5 recommends providing 2-ft.-wide stamped concrete strips adjacent to the 5-ft.-wide sidewalks on the right side the length of the project to save mowing costs and right-of-way and saves \$193,000 in initial cost. Stamped concrete strips are commonly used throughout the greater Atlanta urban areas and provide additional paved surface width for pedestrians and maintenance vehicles along the multi-use trail.

The current plan shows Wall No. 2 (Sta. 77+92 to Sta. 87+06) approximately 35 ft. west of the existing right-of-way boundary creating the need for 30 ft. high walls or greater from Sta. 80+00 to Sta. 87+06. Alt No. W-2 recommends shifting Wall No. 2 approximately 22 ft. closer to the right-of-way boundary and providing a 2:1 slope with guardrail to reduce the wall height by 8 ft., eliminate the need for traffic barrier and handrail, and save \$334,000. Three additional drainage structures and 550 ft. of 18 in. rigid concrete pipe are included to drain to structure B-6.

Opportunities exist to reduce material and labor requirements on the retaining wall plans. Wall No. 1 (Sta. 73+00 LT to Sta. 77+41 LT), Wall No. 3 (Sta. 77+89 LT to Sta. 79+65 LT), and Wall No. 6 (Sta. 104+87 LT to Sta. 106+62 LT), all located on the multi-use trail (left) side, include traffic barriers and handrails. Since all three of the walls are outside the clear zone, Alt. No. W-8 recommends replacing the Type H Traffic Barrier from the top of each wall with wall coping and a 42-in.-high pipe handrail to save \$82,000. Additionally, Alt. No. W-3 and Alt No. W-4 recommend

gravity walls be used in lieu of a mechanically stabilized earth wall for Wall No. 6 and a parapet wall for Wall No. 7 to provide additional savings in material and labor requirements.

The current plan includes a 0.60 acre above ground sediment detention basin at Sta. 83+00 LT requiring 16,000 sf of construction and maintenance easement. Alt. No. D-1 recommends installing an underground detention system to eliminate liability concerns and reduce right-of-way requirements by enabling certain types of commercial development in the future such as surface parking and save \$258,000. Ongoing maintenance costs were assumed to be similar.

Each of the alternatives should be given careful consideration for the potential cost savings and/or value improvement that they offer compared to the tradeoffs.

ARCADIS **SUMMARY OF POTENTIAL COST SAVINGS**

SR 3/US 41/COBB PKWY WIDENING						
PROJECT: FROM PACES MILL RD. TO AKERS MILL RD. Cobb County, Georgia						
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS		
				INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
	ROADWAY (R)					
R-1	Use a 1-½ inch overlay in lieu of a 3-½ inch overlay on existing pavement	\$66,000	\$0	\$66,000		\$66,000
R-2	Provide a 10-ft.-wide multi-use trail in lieu of 12-ft.-wide the length of the project	\$48,000	\$0	\$48,000		\$48,000
R-3	Provide a 5-in.-thick concrete section in lieu of 4-in.-thick for the multi-use trail	\$171,000	\$218,000	(\$47,000)	\$67,000	\$20,000
R-4	Provide a 2-1/2-ft.-wide stamped concrete strip in lieu of a 6-ft.-wide grass strip on the left shoulder the length of the project	\$245,000	\$39,000	\$206,000	\$56,000	\$262,000
R-5	Provide a 2-ft.-wide stamped concrete strip in lieu of a 6-ft.-wide grass strip on the right shoulder the length of the project	\$224,000	\$31,000	\$193,000	\$56,000	\$249,000
R-6	Save 22 commercial parking spaces near Sta 78+50 LT by shifting the alignment from Sta. 75+58 +/- to Sta. 88+45 +/- further to the right and eliminating Wall No. 3 (Sta. 77+89 LT to Sta. 79+65 LT)	\$470,000	\$113,000	\$357,000		\$357,000
R-7	Provide a 175 ft. right turn lane to the access drive at Sta. 117+46 RT	\$149,000	\$0	\$149,000		\$149,000
R-10	Slope the sidewalk and grass strip to the outside at Sta. 98+14 RT	DESIGN SUGGESTION				
R-11	Provide a 2-1/2-ft.-wide stamped concrete strip and 10-ft.-wide multi-use trail at all right turn lanes on the left side shoulder	\$152,000	\$13,000	\$139,000		\$139,000
R-12	Provide 2-ft.-wide stamped concrete in lieu of a 6-ft.-wide grass strip at all right turn lanes on the right side shoulder	\$120,000	\$12,000	\$108,000		\$108,000

ARCADIS SUMMARY OF POTENTIAL COST SAVINGS

SR 3/US 41/COBB PKWY WIDENING						
PROJECT: FROM PACES MILL RD. TO AKERS MILL RD.						
Cobb County, Georgia						
				PRESENT WORTH OF COST SAVINGS		
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
ROADWAY (R) (continued)						
R-13	Save eleven commercial parking spaces near Sta. 74+50 LT by reducing the widths of the right turn lane, the multi-use trail, and the grass strip between Sta. 73+16 LT and Sta. 75+94 LT	\$200,000	\$39,000	\$161,000		\$161,000
R-14	Eliminate the short right turn lane at Akers Mill Rd. (Sta. 119+00 RT to Sta. 122+00 RT) by making the 4th lane a right turn lane	\$29,000	\$4,000	\$25,000		\$25,000
RETAINING WALLS (W)						
W-2	Reduce the height of Wall No. 2 (Sta. 80+00 RT to Sta. 87+06 RT) by shifting the wall closer to the existing right-of-way boundary and grading the slope	\$468,000	\$134,000	\$334,000		\$334,000
W-3	Use a gravity wall with handrail in lieu of an MSE wall for Wall No. 6 (Sta. 104+87 LT to 106+62 LT)	\$86,000	\$30,000	\$56,000		\$56,000
W-4	Use a gravity wall with handrail in lieu of a parapet retaining wall for Wall No. 7 (Sta. 114+95 RT to Sta. 116+54 RT)	\$81,000	\$49,000	\$32,000		\$32,000
W-7	Provide a gravity wall from Sta. 116+00 LT to Sta. 117+00 LT to save parking spaces	\$121,000	\$23,000	\$98,000		\$98,000
W-8	Remove the Type H Traffic Barrier and provide a 42 in. pipe handrail on top of Wall Nos. 1, 3, and 6	\$154,000	\$72,000	\$82,000		\$82,000
DRAINAGE (D)						
D-1	Provide underground detention in lieu of an above ground detention basin at Sta. 83+00 LT	\$564,000	\$306,000	\$258,000		\$258,000
D-2	Use additional cross-drains to reduce longitudinal drain pipe requirements	\$39,000	\$9,000	\$30,000		\$30,000

SECTION TWO - STUDY RESULTS

INTRODUCTION

The results of this value engineering study conducted on the SR 3/US 41/Cobb Parkway Widening from Paces Mill Road to Akers Mill Road project portray the benefits that can be realized by Cobb County and GDOT. The results will directly affect the project's design and require coordination by GDOT and the design team to determine the disposition of each alternative.

During the study, many ideas for potential value enhancement were conceived and evaluated by the team for technical feasibility, applicability to the project, and the ability to meet the owner's project value objectives. Research performed on those ideas considered to have potential to enhance the value of the project resulted in the development of individual alternatives identifying specific changes to the project as a whole, or individual elements that comprise the project. These may be in the form of VE alternatives (accompanied by cost estimates) or design suggestions (without cost estimates). For each alternative developed, the following information has been provided:

- A summary of the original design;
- A description of the proposed change to the project;
- Sketches and design calculations, if appropriate;
- A capital cost comparison and life cycle discounted present worth cost comparison of the alternative and original design, if appropriate;
- A descriptive evaluation of the advantages and disadvantages of selecting the alternative; and
- A brief narrative to compare the original design and the proposed change and provide a rationale for implementing the change into the project.

The capital cost comparisons for each alternative use unit quantities from the Detailed Cost Estimate prepared by GDOT, dated January 25, 2011. If unit quantities were not available, GDOT databases were consulted.

Each design suggestion contains the same information as the VE alternatives, except that no cost information is usually included. Design suggestions are presented to bring attention to areas of the design that, in the opinion of the VE team, should be changed for reasons other than cost. Examples of these reasons include improved facility operation, ease of maintenance, ease of construction, safer working conditions, reduction in project risk, etc. In addition, some ideas cannot be quantified in terms of cost with the design information provided; these are also presented as design suggestions and are intended to improve the quality of the project.

Each alternative developed is identified with an alternative number (Alt. No.) that can be tracked through the value analysis process and facilitate referencing between the Creative Idea Listing and Evaluation worksheets, the alternatives, and the Summary of Potential Cost Savings table. The Alt. No. includes a prefix that refers to one of the major project elements listed below:

PROJECT ELEMENT	PREFIX
Roadway	R
Retaining Walls	W
Drainage	D

A Summary of each alternative and design suggestion is provided on the Summary of Potential Cost Savings table. The table is divided into project elements for the reviewer's convenience and is used to divide this section. The complete documentation of the developed alternatives follows the Summary of Potential Cost Savings table.

KEY ISSUES

This project is being developed to maintain the current level of service (LOS) and enhance safety by providing additional capacity. A secondary purpose of the project is to improve bicycle and pedestrian access to and from the high-density residential and commercial developments throughout the project area. The proposed multi-use path will connect to the Chattahoochee River Natural Recreational Area along the Chattahoochee River, which serves as a primary recreation destination. Balancing the needs of the local businesses with the need to widen this section of SR 3/US 41/Cobb Parkway and provide multi-modal connectivity will require careful coordination between GDOT, Cobb County, and the design team. The following project issues were identified during the design overview held February 21, 2011:

- Over 60% of the project cost is right-of-way. Since the goal is to accelerate this FY 2015 project forward to FY 2013, and since the Right-of-Way Plans have already been approved, any recommended changes or reductions to the Right-of-Way Plans that would delay the project schedule will most likely not be considered
- Right-of-way is extremely limited in several locations along the left side of the project and may require taking commercial parking spaces at three locations which include:
 - 22 commercial parking spaces from Sta. 75+58 LT to Sta. 88+45 LT
 - 22 commercial parking spaces from Sta. 73+16 LT to Sta. 75+94 LT
 - 13 commercial parking spaces from Sta. 116+00 LT to Sta. 117+00 LT
- Portions of Wall No. 2 from Sta. 77+92.62 RT to Sta. 87+06.75 RT to the left of an existing residential apartment complex will be over 30 ft. high
- An undesirable 25% grade is required for access to the movie theater parking area at Sta. 98+25 RT
- A new detention basin at Sta. 83+00 LT will require a significant amount of right-of-way

STUDY OBJECTIVES

To assist Cobb County and GDOT achieve their project goals in a cost-effective manner, the VE study was convened. The study team was tasked with identifying specific ideas that will enhance the value of the design by resolving issues, improving functionality, reducing material and labor requirements, or a combination of the three.

RESULTS OF THE STUDY

Research of the ideas identified as having potential to enhance the project's value resulted in the development of 18 VE alternatives and 1 design suggestion for consideration by the project team. These alternatives and design suggestions address the key issues described above and are detailed in the remainder of this section of the report. The alternatives with the greatest potential to impact the project are highlighted below:

Three alternatives will save commercial parking spaces. The current plan shows 22 parking spaces being eliminated from the commercial parking lot on the left side near Sta. 74+50 LT. Alt. No. R-13 recommends reducing the right turn lane and shoulder width from Sta. 73+16 LT to Sta. 75+94 LT to save 11 of the 22 commercial parking spaces and save \$162,000. The disadvantage is that this requires reducing the width of the multi-use trail from 12 ft. to 10 ft., reducing the 6-ft.-wide grass strip to 2-1/2-ft.-wide, and reducing the right turn lane from 12 ft. wide to 11 ft. wide at this location. Second, the current plan also shows 22 parking spaces being eliminated from a strip mall located at approximately Sta. 80+00 LT. Alt. No. R-6 recommends shifting the alignment to the right beginning from Sta. 75+58 +/- to Sta. 88+45 +/- . Shifting the alignment by up to 10 ft. saves all 22 spaces and \$359,000 by eliminating the need for Wall No. 3 from Sta. 77+89 LT to Sta. 79+65 LT. The disadvantage is that this idea also requires increasing the length and height of Wall No. 2 (Sta. 77+92 to Sta. 87+06) by 50 ft. (Sta. 77+42 to Sta. 77+92) and 2 ft. respectively. The 6-ft.-wide grass strip is also replaced with a narrower 2-1/2-ft.-wide stamped concrete strip on the left side in this area. Finally, the current plan shows an additional 13 commercial parking spaces being eliminated near Sta. 116+50 LT. Alt. No. W-7 recommends providing a new gravity wall from Sta. 116+00 LT to Sta. 117+00 LT to save all 13 parking spaces and save \$98,000.

Two alternatives are recommended to improve traffic operations at select right turn lanes. The current plan provides a 380 ft. right turn lane with a 50 ft. taper for the access drive at Sta. 117+46 RT. Alt. No. R-7 recommends providing a 175 ft. right turn lane with a 100 ft. taper to save \$149,000. The alternative design meets the requirements specified in GDOT Driveway Encroachment Manual and storage should not be a problem since only 20 cars are estimated to use this access drive during design year 2030 peak hour. The current plan also maintains the existing geometry from Sta. 119+00 RT to Sta. 122+00 RT which includes a short right turn lane onto Akers Mill Road which is only 70-ft.-long with a 189-ft.-long taper for 290 vehicles per hour turning right. Since SR 3/US 41 has four other lanes approaching this intersection, Alt No. R-14 recommends converting the existing fourth lane to the right turn only lane to provide much more capacity for right turns and save \$25,000. This would also allow for a free right turn from Akers Mill Road onto SR 3/US 41 into the fourth lane on the opposite side of the intersection. It is important to note that the current right turn lane is so short that the queue of through traffic prevents turning vehicles from accessing the right turn lanes. The alternative design would also eliminate the required right-of-way and easement along this right turn lane.

Two alternatives are recommended to reduce maintenance (mowing costs) and right-of-way requirements for the length of the project. The current plan includes 6-ft.-wide grass strips along both sides of the roadway for the length of the project. Alt. No. R-4 recommends providing 2-1/2-ft.-wide stamped concrete strips adjacent to the multi-use trail on the left side for the length of the project to save mowing costs and right-of-way and save \$206,000 in initial cost. Alt. No. R-5 recommends providing 2-ft.-wide stamped concrete strips adjacent to the 5-ft.-wide sidewalks on the right side for the length of the project to save mowing costs and right-of-way and save \$193,000 in initial cost. Stamped concrete strips are commonly used throughout the greater Atlanta urban areas and provide additional paved surface width for pedestrians and maintenance vehicles along the multi-use trail.

The current plan shows Wall No. 2 (Sta. 77+92 to Sta. 87+06) approximately 35 ft. west of the existing right-of-way boundary creating the need for 30 ft. high walls or greater from Sta. 80+00 to Sta. 87+06. Alt No. W-2 recommends shifting Wall No. 2 approximately 22 ft. closer to the right-of-way boundary and providing a 2:1 slope with guardrail to reduce the wall height 8 ft., eliminating the need for traffic barrier and handrail, and saving \$334,000. Three additional drainage structures and 550 ft. of 18 in. rigid concrete pipe are included to drain to structure B-6.

Opportunities exist to reduce material and labor requirements on the retaining wall plans. Wall No. 1 (Sta. 73+00 LT to Sta. 77+41 LT), Wall No. 3 (Sta. 77+89 LT to Sta. 79+65 LT), and Wall No. 6 (Sta. 104+87 LT to Sta. 106+62 LT) are all located on the multi-use trail (left) side and include traffic barriers and handrails. Since all three of the walls are outside the clear zone, Alt. No. W-8 recommends replacing the Type H Traffic Barrier from the top of each wall with wall coping and a 42 in. pipe handrail to save \$82,000. Additionally, Alt. No. W-3 and Alt No. W-4 recommend gravity walls be used in lieu of an mechanically stabilized earth wall for Wall No. 6 and a parapet wall for Wall No. 7 to provide additional savings in material and labor.

The current plan includes a 0.60 acre above ground sediment detention basin at Sta. 83+00 LT requiring a 16,000 sf construction and maintenance easement. Alt. No. D-1 recommends providing an underground detention system to eliminate liability concerns and reduce right-of-way requirements by enabling certain types of commercial development in the future such as surface parking and save \$258,000. Ongoing maintenance costs were assumed to be similar.

Each of the alternatives should be given careful consideration for the potential cost savings and/or value improvement that they offer compared to the tradeoffs.

EVALUATION OF ALTERNATIVES AND DESIGN SUGGESTIONS

When reviewing the study results, the project team should consider each part of an alternative or design suggestion on its own merit. There may be a tendency to disregard an alternative because of a concern about one part of it. Each area within an alternative or design suggestion that is acceptable should be considered for use in the final design, even if the entire alternative or design suggestion is not implemented. Variations of these alternatives and design suggestions by the owner or designer are encouraged.

All alternatives and design suggestions were developed independently of each other to provide a broad range of options to consider for implementation. Therefore, some of them are “mutually exclusive,” so acceptance of one may preclude the acceptance of another. In addition, some of the alternatives may be interrelated, so acceptance of one or more may not yield the total of the cost savings shown for each alternative. Design suggestions could also be interrelated thus precluding a part of one or more suggestions from being implemented if another design suggestion is also implemented.

Cobb County and GDOT should evaluate all alternatives carefully in order to select the combination of ideas with the greatest beneficial impact on the project. Once this has been accomplished, the total cost savings resulting from the VE study can be calculated based on implementing a revised, all-inclusive design solution.

ARCADIS **SUMMARY OF POTENTIAL COST SAVINGS**

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD. <i>Cobb County, Georgia</i>						
		PRESENT WORTH OF COST SAVINGS				
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
	ROADWAY (R)					
R-1	Use a 1-½ inch overlay in lieu of a 3-½ inch overlay on existing pavement	\$66,000	\$0	\$66,000		\$66,000
R-2	Provide a 10-ft.-wide multi-use trail in lieu of 12-ft.-wide the length of the project	\$48,000	\$0	\$48,000		\$48,000
R-3	Provide a 5-in.-thick concrete section in lieu of 4-in.-thick for the multi-use trail	\$171,000	\$218,000	(\$47,000)	\$67,000	\$20,000
R-4	Provide a 2-1/2-ft.-wide stamped concrete strip in lieu of a 6-ft.-wide grass strip on the left shoulder the length of the project	\$245,000	\$39,000	\$206,000	\$56,000	\$262,000
R-5	Provide a 2-ft.-wide stamped concrete strip in lieu of a 6-ft.-wide grass strip on the right shoulder the length of the project	\$224,000	\$31,000	\$193,000	\$56,000	\$249,000
R-6	Save 22 commercial parking spaces near Sta 78+50 LT by shifting the alignment from Sta. 75+58 +/- to Sta. 88+45 +/- further to the right and eliminating Wall No. 3 (Sta. 77+89 LT to Sta. 79+65 LT)	\$470,000	\$113,000	\$357,000		\$357,000
R-7	Provide a 175 ft. right turn lane to the access drive at Sta. 117+46 RT	\$149,000	\$0	\$149,000		\$149,000
R-10	Slope the sidewalk and grass strip to the outside at Sta. 98+14 RT	DESIGN SUGGESTION				
R-11	Provide a 2-1/2-ft.-wide stamped concrete strip and 10-ft.-wide multi-use trail at all right turn lanes on the left side shoulder	\$152,000	\$13,000	\$139,000		\$139,000
R-12	Provide 2-ft.-wide stamped concrete in lieu of a 6-ft.-wide grass strip at all right turn lanes on the right side shoulder	\$120,000	\$12,000	\$108,000		\$108,000

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

ALTERNATIVE NO.:
R-1

**DESCRIPTION: USE A 1½ INCH OVERLAY IN LIEU OF A 3½ INCH
OVERLAY ON EXISTING PAVEMENT**

SHEET NO.: 1 of 3

ORIGINAL DESIGN: (sketch attached)

The current design provides a 3-1/2 inch overlay on the existing pavement of SR 3/US 41.

ALTERNATIVE: (sketch attached)

Provide a 1-1/2 inch overlay on the existing pavement of SR 3/US 41.

ADVANTAGES:

- Less asphaltic pavement required
- Less construction time required

DISADVANTAGES:

- Thinner existing pavement section

DISCUSSION:

Since the existing pavement is being retained and appears in good condition (per the VE team's field site visit), an asphaltic surface course overlay with asphalt leveling should be adequate until a future maintenance overlay for the entire roadway is needed. This reduces the asphaltic quantity and reduces the project cost. It would also reduce the construction time due not requiring the additional 19mm asphalt mix over the existing pavement

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 66,000	—	\$ 66,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 66,000	—	\$ 66,000

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-1

SHEET NO.: **2 of 3**

Original Design Asphaltic Pavement saved 220#/SY of 19mm Superpave Asphaltic concrete:

5,900 ft. (length of existing pavement for Paces Mill Road & SR 3/US 41) x 70 ft. width / (9sf/sy) = 45,900 SY

SY19mm: 220#/SY x Ton/2,000# x \$58.51/Ton = \$1.44/SY

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING
 FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-2

DESCRIPTION: PROVIDE A 10-FT.-WIDE MULTI-USE TRAIL IN LIEU OF
 A 12-FT.-WIDE TRAIL

SHEET NO.: 1 of 4

ORIGINAL DESIGN:

The original design provides a 12-ft.-wide multi-use trail along the length of the project on the west side of SR 3/US 41.

ALTERNATIVE:

Provide a 10-ft.-wide multi-use trail along the length of the project on the west side of SR 3/US 41.

ADVANTAGES:

- Reduces the square yard of multi-use trail required
- Reduces construction time
- Reduces earthwork excavation quantity
- Reduces overall section width requirements

DISADVANTAGES:

- Heavy use may warrant a 12 ft. width
- May not match adjacent project multi-use trail width

DISCUSSION:

AASHTO recommends a minimum of 10 feet width for multi-use trails and it may be necessary to provide this width to save commercial parking spaces in the following areas:

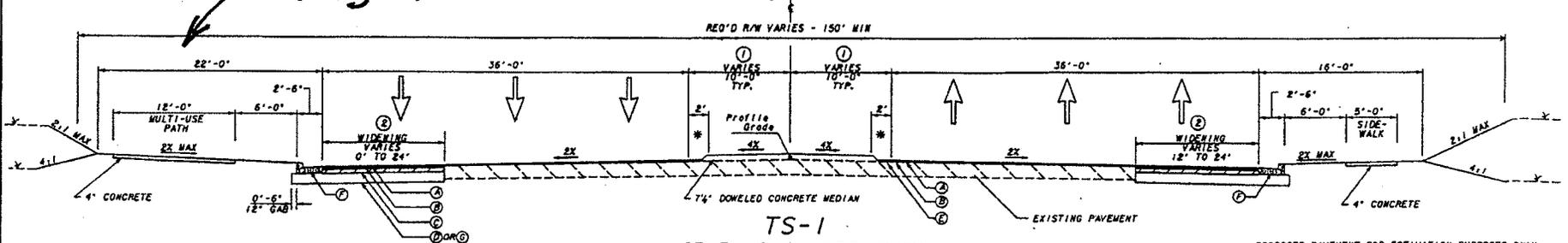
- Sta. 73+00 LT to Sta. 82+00 LT (Between Paces Mill Road and the Detention Pond)
- Sta. 115+00 LT to Sta. 122+00 (Between Wilmer MCF & JG JR K.R., C.I. and Akers Mill Road)

The cost savings represents the reduced cost of material and labor to provide the narrower width multi-use trail. No right-of way savings is included.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 48,000	—	\$ 48,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 48,000	—	\$ 48,000

Original & Alternative

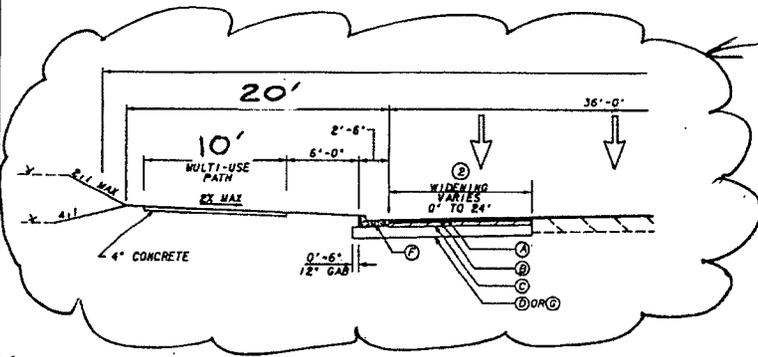
Original Shoulder w/ 12' Multi Use Trail



TS-1
SR 3/US 41/COBB PKWY
NORMAL SECTION
(SEE PLANS FOR LOCATION)

- PROPOSED PAVEMENT FOR ESTIMATION PURPOSES ONLY
- ① ASPHALTIC CONC. 12.5mm SUPERPAVE (165 100/SY)
 - ② ASPHALTIC CONC. 19mm SUPERPAVE (220 100/SY)
 - ③ ASPHALTIC CONC. 25mm SUPERPAVE (770 100/SY)
 - ④ GRADED AGGREGATE BASE (12')
 - ⑤ VARIABLE DEPTH LEVELING AS REQUIRED
 - ⑥ 8"x30" CONCRETE CURB & GUTTER, TYPE 2
 - ⑦ GRADED AGGREGATE BASE (16') AT
STA 76+00 TO 80+00 RT
STA 107+00 TO 109+00 LT & RT
STA 115+00 TO 117+00 LT & RT

Alternative Shoulder
w/ 10' Multi Use Trail



MA Moreland Algeboli
Associates, Inc.
(770) 263-5945

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUPERVISED BY:

N.T.S.

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN
TYPICAL SECTIONS

DRAWING NO.
5-01

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **R-2**

SHEET NO.: **3 of 4**

Length of Multi-Use trail is = 4500 ft. required under the Original design

Area of Multi-Use Trail saved under the Alternate R-2 design = $[4,500 \text{ ft.} (12 \text{ ft.} - 10 \text{ ft.})] / 9 \text{ sf/sy} = 1,000 \text{ SY}$

Earthwork saved: $(5,600 \text{ ft.} \times 2 \text{ ft.} \times 7 \text{ ft. avg.}) / 27 \text{ cf/cy} = 3,000 \text{ +/- CY}$

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

ALTERNATIVE NO.:
R-3

**DESCRIPTION: PROVIDE 5-IN.-THICK CONCRETE SECTION IN LIEU OF
4-IN.-THICK FOR THE MULTI-USE TRAIL**

SHEET NO.: 1 of 3

ORIGINAL DESIGN:

The original design uses a 4-in.-thick, concrete multi-use trail on the left shoulder.

ALTERNATIVE:

Provide a 5-in.-thick concrete multi-use trail on the left shoulder.

ADVANTAGES:

- Thicker, pavement section therefore stronger to support maintenance vehicles, mowers, pickup trucks, etc.
- Longer life cycle than 4 inch thick concrete section
- Less maintenance for repairs due to cracking

DISADVANTAGES:

- Higher initial cost

DISCUSSION:

In addition to bicyclists and pedestrians, the multi-use trail will be used for maintenance vehicles maintaining the trail. Therefore, it is recommended to use at least a 5-in.-thick concrete section to support these loads. It is the practice to use pickup trucks, mowing equipment, and utility owner's vehicles to repair and maintain their facilities. The extra thickness will increase the life and reduce the number of repairs for the trail. The life cycle costs are about equal for the two options.

Area of multi-use trail = (4,500 ft. x 12 ft.) / 9 sf/sy = 6,000 sy

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 171,000	\$ 47,000	\$ 218,000
ALTERNATIVE	\$ 218,000	\$ 0	\$ 218,000
SAVINGS (Original minus Alternative)	\$ (47,000)	\$ 47,000	\$ 0

LIFE CYCLE COST WORKSHEET

PROJECT:		SR 3/US 41 COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>				ALTERNATIVE NO.: R-3	
						SHEET NO.: 3 of 3	
LIFE CYCLE PERIOD:		25 years					
INTEREST RATE:		3.00%		ESCALATION RATE:			
A. INITIAL COST				ORIGINAL		PROPOSED	
				171,000		218,000	
Useful Life (Years)							
				INITIAL COST SAVINGS		(47,000)	
B. RECURRENT COSTS (Annual Expenditures)							
1. Maintenance							
2. Operating							
3. Energy							
4.							
5. test							
6.							
				Total Annual Costs		-	
				Present Worth Factor		17.4131	
				Present Worth of RECURRENT COSTS		-	
C. SINGLE EXPENDITURES							
		Year		Amount		PW factor	
		Present Worth		Present Worth			
		<small>< Put "x" in appropriate box (original design or proposed design)</small>					
ORIG	PROP						
x		1.		6	17,100	0.8375	14,321
x		2.		11	17,100	0.7224	12,353
x		3.		16	17,100	0.6232	10,656
x		4.		21	17,100	0.5375	9,192
							-
							-
							-
							-
							-
D. SALVAGE VALUE							
				Year		Amount	
				Present Worth		Present Worth	
		1.				(1.0000)	-
		2.				(1.0000)	-
				Present Worth of SINGLE EXPENDITURES		46,522	
E. Total Recurrent Costs & Single Expenditures (B + C + D)						46,522	
				RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		46,522	
				TOTAL PRESENT WORTH COST (A + E)		217,522	
				TOTAL LIFE CYCLE SAVINGS		(478)	

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

ALTERNATIVE NO.:
R-4

**DESCRIPTION: PROVIDE A 2-1/2-FT.-WIDE STAMPED CONCRETE STRIP
IN LIEU OF A 6-FT.-WIDE GRASS STRIP ON THE LEFT
SHOULDER THE LENGTH OF THE PROJECT**

SHEET NO.: 1 of 5

ORIGINAL DESIGN: (sketch attached)

The original design includes a 6-ft.-wide grass strip between the back of curb and the 12-ft.-wide concrete multi-use trail on the left shoulder.

ALTERNATIVE: (sketch attached)

Use a 2-1/2-ft.-wide stamped concrete strip between the back of curb and the 12-ft.-wide concrete multi-use trail on the left shoulder.

ADVANTAGES:

- Reduces section width
- Reduces earthwork quantity
- Reduces construction time
- Reduces maintenance cost for mowing
- Provides 2-1/2 ft. more of "trail" for pedestrians

DISADVANTAGES:

- Narrower shoulder
- Less green space

DISCUSSION:

A 2-1/2 -ft.-wide stamped concrete strip adjacent to a 12-ft.-wide multi-use trail is adequate to meet the ADA requirement for crossing curb-cut type driveways since 8 ft. of the 12 ft. trail will be outside of the curb-cut valley gutter. It is important to note that at this time there does not appear to be any "dust-pan" or curb-cut type driveways that infringe on the ADA requirement of a 2 % cross-slope on the construction plans. The removal of the 6-ft.-wide grass strip will eliminate the need for maintenance mowing of grass. It will also reduce the earthwork requirement since the shoulder will be 3-1/2 ft. narrower. It is important to point out that this narrower shoulder will not affect the clear zone requirements since the plans already include guardrail along the 2:1 slopes, and everywhere else the roadway is either in a cut section or there are right turn lanes providing an additional 12 ft. of clear-zone. The stamped concrete provides 2-1/2 ft. additional paved surface width for pedestrians and maintenance vehicles along the trail.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 245,000	\$ 56,000	\$ 301,000
ALTERNATIVE	\$ 39,000	\$ 0	\$ 39,000
SAVINGS (Original minus Alternative)	\$ 206,000	\$ 56,000	\$ 262,000

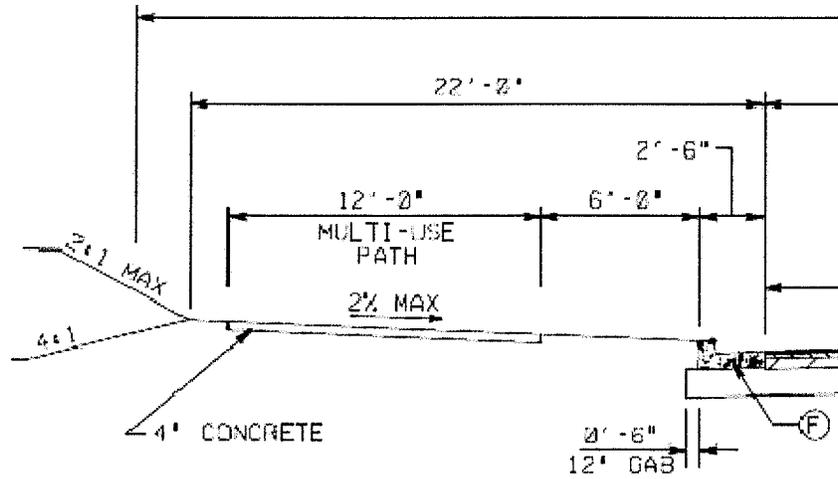
PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

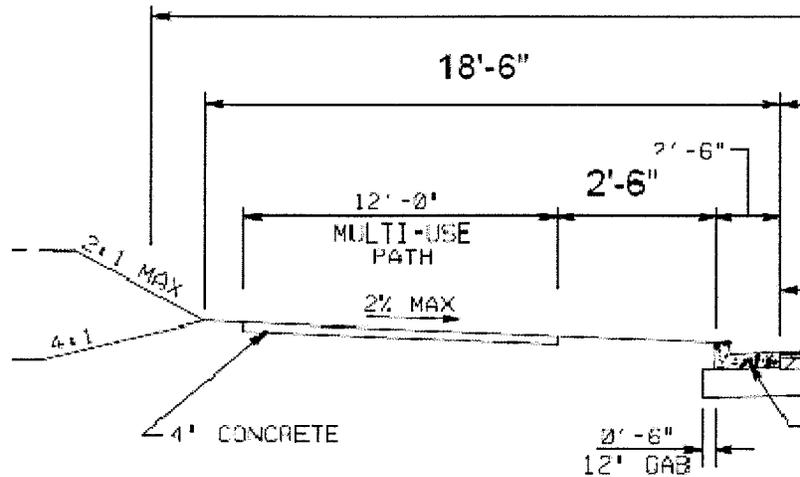
R-4

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 5**



Original Design – 22'-0" shoulder with 6'-0" grass strip



Alternative Design – 18'-6" shoulder with 2'-6" stamped concrete

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-4

SHEET NO.: **3 of 5**

Additional Alternate cost for 2-1/2 ft. stamped concrete strip on left side:

$$(4,500\text{-ft} \times 2\text{-}1/2\text{-ft}) / 9\text{sf/sy} = 1,250 \text{ SY}$$

Original cost saved (maintenance saved) for moving 6 ft. grass strip:

$$(4,500 \text{ ft.} \times 6 \text{ ft.}) / 9\text{sf/sy} = 3,000 \text{ SY mowing saved on left side.}$$

$$\text{R/W saved} = 3,600 \text{ ft.} \times 3.5 \text{ ft.} = 12,600 \text{ SF}$$

$$\text{Save earthwork } (4,500 \text{ ft.} \times 3\text{-}1/2 \text{ ft.} \times 7 \text{ ft.}) / 27\text{cf/cy} = 4,100 \text{ CY}$$

Annual Maintenance Costs:

$$\text{Mowing Grass } (\$50/\text{hr} \times 4 \text{ hrs/mow} \times 16 \text{ mows/year}) = 3,200/\text{year}$$

LIFE CYCLE COST WORKSHEET

PROJECT:		SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>				ALTERNATIVE NO.: R-4 SHEET NO.: 5 of 5	
LIFE CYCLE PERIOD:		25 years					
INTEREST RATE:		3.00%		ESCALATION RATE:			
A. INITIAL COST				245,000		39,000	
Useful Life (Years)							
INITIAL COST SAVINGS						206,000	
B. RECURRENT COSTS (Annual Expenditures)							
1. Maintenance				3,200			
2. Operating							
3. Energy							
4.							
5. test							
6.							
Total Annual Costs				3,200		-	
Present Worth Factor				17.4131		17.4131	
Present Worth of RECURRENT COSTS				55,722		-	
C. SINGLE EXPENDITURES				Year		Amount	
				PW factor		Present Worth	
				Present Worth		Present Worth	
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
		1.			1.0000	-	-
		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		Present Worth	
		1.			(1.0000)	-	-
		2.			(1.0000)	-	-
Present Worth of SINGLE EXPENDITURES						-	
E. Total Recurrent Costs & Single Expenditures (B + C + D)						55,722	
RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS						55,722	
TOTAL PRESENT WORTH COST (A + E)						300,722	
TOTAL LIFE CYCLE SAVINGS						261,722	

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

ALTERNATIVE NO.:
R-5

**DESCRIPTION: PROVIDE 2-FT.-WIDE STAMPED CONCRETE IN LIEU OF
6-FT.-WIDE GRASS STRIP ON THE RIGHT SHOULDER
FOR THE ENTIRE LENGTH OF PROJECT**

SHEET NO.: 1 of 5

ORIGINAL DESIGN: (sketch attached)

The original design uses a 6-ft.-wide grass strip between the back of curb and the 5-ft.-wide concrete sidewalk on the right shoulder.

ALTERNATIVE: (sketch attached)

Use a 2-ft.-wide stamped concrete strip between the back of curb and the 5-ft.-wide concrete sidewalk on the right shoulder.

ADVANTAGES:

- Reduces earthwork quantity
- Reduces construction time
- Reduces maintenance cost for mowing
- Provides 2 ft. additional width of sidewalk for pedestrians

DISADVANTAGES:

- Narrower shoulder
- Reduces green space
- Requires changing the Right-of-Way Plan

DISCUSSION:

A 2 ft. grass strip adjacent to a 5-ft.-wide sidewalk is adequate to meet the ADA requirement for crossing “street-type” driveways since the driveway radii are with curb and gutter and not a curb cut with valley gutter. It is important to note that at this time there does not appear to be any “dust-pan” or curb-cut type driveways that infringe on the ADA requirement of a 2 % cross-slope in the construction plans. The removal of the 6 ft. grass strip will eliminate the need for maintenance mowing of grass. It will also reduce the earthwork requirement since the shoulder will be 4 ft. narrower. It is important to point out that this narrower shoulder will not affect the clear zone requirements since the plans already include guardrail along the 2:1 slopes, and everywhere else the roadway is either in a cut section or there are right turn lanes providing an additional 12 ft. of clear-zone. The stamped concrete will provide 2 ft. additional width of pavement for pedestrians along the sidewalk.

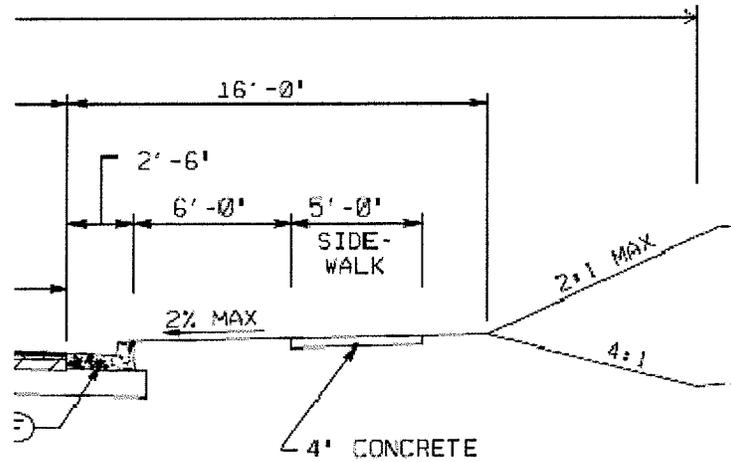
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 224,000	\$ 56,000	\$ 280,000
ALTERNATIVE	\$ 31,000	\$ 0	\$ 31,000
SAVINGS (Original minus Alternative)	\$ 193,000	\$ 56,000	\$ 249,000

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

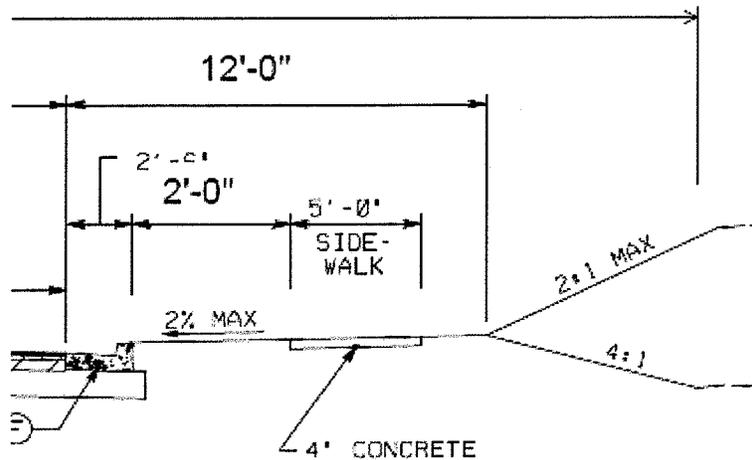
ALTERNATIVE NO.: **R-5**

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 5**



Original Design – 16'-0" shoulder with 6'-0" grass strip



Alternative Design – 12'-0" shoulder with 2'-0" stamped concrete

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-5

SHEET NO.: **3 of 5**

Additional Alternate cost for 2-ft stamped concrete strip on left side:

$$(4,500\text{-ft} \times 2\text{-ft}) / 9\text{sf/sy} = 1,000 \text{ SY}$$

Original cost saved (maintenance saved) for moving 6-ft grass strip:

$$(4,500\text{-ft} \times 6\text{-ft}) / 9\text{sf/sy} = 3,000 \text{ SY mowing saved on left side.}$$

$$\text{R/W saved} = 2,800 \text{ ft.} \times 4 \text{ ft.} = 11,200 \text{ SF}$$

$$\text{Save earthwork } (4,500\text{-ft} \times 4\text{-ft} \times 7\text{-ft}) / 27\text{cf/cy} = 4,700 \text{ CY}$$

LIFE CYCLE COST WORKSHEET

PROJECT:		SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>			ALTERNATIVE NO.: R-5 SHEET NO.: 5 of 5			
LIFE CYCLE PERIOD: 25 years								
INTEREST RATE: 3.00%					ESCALATION RATE:		ORIGINAL	
A. INITIAL COST					224,000		31,000	
Useful Life (Years)								
INITIAL COST SAVINGS							193,000	
B. RECURRENT COSTS (Annual Expenditures)								
1. Maintenance					3,200			
2. Operating								
3. Energy								
4.								
5. test								
6.								
Total Annual Costs					3,200		-	
Present Worth Factor					17.4131		17.4131	
Present Worth of RECURRENT COSTS					55,722		-	
C. SINGLE EXPENDITURES			Year	Amount	PW factor	Present Worth	Present Worth	
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)						
		1.			1.0000	-	-	
		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						-	-	
E. Total Recurrent Costs & Single Expenditures (B + C + D)					55,722		-	
RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS							55,722	
TOTAL PRESENT WORTH COST (A + E)					279,722		31,000	
TOTAL LIFE CYCLE SAVINGS							248,722	

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY. WIDENING FROM PACES MILL RD. TO AKERS MILL RD. <i>Cobb County, Georgia</i>	ALTERNATIVE NO.: R-6
DESCRIPTION: SAVE 22 COMMERCIAL PARKING SPACES NEAR STA. 78+50 LT BY SHIFTING THE ALIGNMENT FROM STA. 75+58 +/- TO STA. 88+45 +/- FURTHER TO THE RIGHT AND ELIMINATING WALL NO. 3 (STA. 77+89 LT TO STA. 79+65 LT)	SHEET NO.: 1 of 5

ORIGINAL DESIGN: (sketch attached)

The original design proposes widening SR 3/US 41 symmetrically along this stretch of the roadway resulting in the loss of approximately 22 commercial parking spaces between Sta. 75+58 LT and Sta. 88+45 LT.

ALTERNATIVE: (sketch attached)

Shift the alignment further east up to 10 ft. beginning at Sta. 75+58 +/- and ending at Sta. 88+45 +/- and eliminate Wall No. 3 on the left side. Use two compound curves (one on each end) to accomplish the alignment shift.

ADVANTAGES:

- Eliminates Wall No. 3
- Saves approximately 22 commercial parking spaces
- Reduces right-of-way requirements at the proposed detention pond location (Sta. 83+00 LT)
- Reduces excavation at detention pond location (Sta. 83+00 LT)

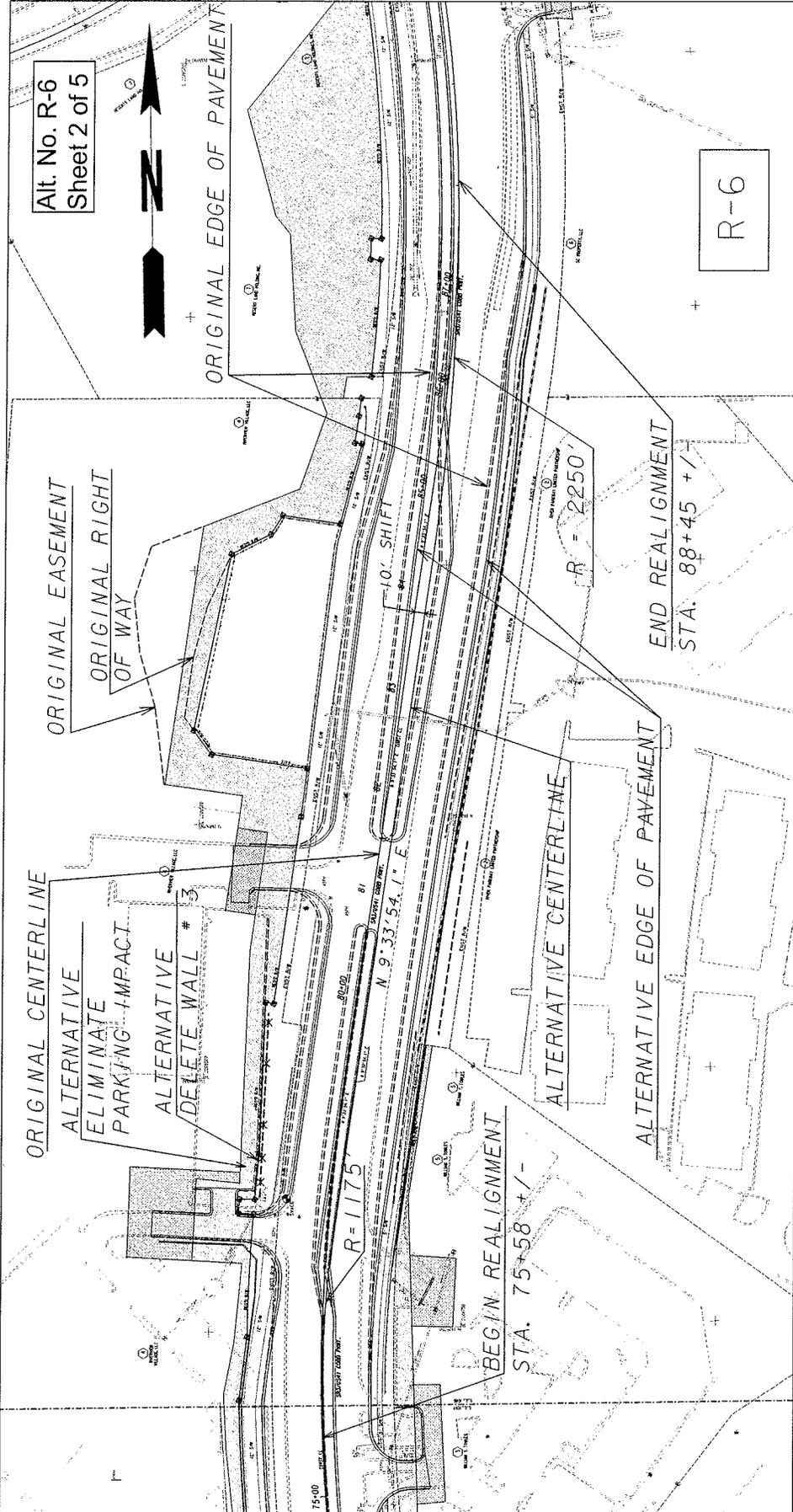
DISADVANTAGES:

- Replaces 6 ft. grass strip with 2½ ft stamped concrete strip
- Increases length of Wall No. 2 by approximately fifty feet
- Requires revision of approved ROW plans

DISCUSSION:

This alternate involves shifting the SR 3/US 41/Cobb Parkway alignment to save parking spaces on Parcel 4. A narrower, 2½-ft.-wide stamped concrete strip will also be required instead of a 6-ft.-wide grass strips from Sta. 75+58 LT to Sta. 88 +45 LT to further minimize the parking impacts. In the process, Wall No. 3 is eliminated and the required right-of-way and required easement for the proposed detention pond is also reduced.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 470,000	—	\$ 470,000
ALTERNATIVE	\$ 113,000	—	\$ 113,000
SAVINGS (Original minus Alternative)	\$ 357,000	—	\$ 357,000



Alt. No. R-6
Sheet 2 of 5



R-6

ORIGINAL CENTERLINE

ALTERNATIVE
ELIMINATE
PARKING IMPACT

ALTERNATIVE
DELETE WALL # 3

ORIGINAL EASEMENT
ORIGINAL RIGHT
OF WAY

ORIGINAL EDGE OF PAVEMENT

R=1175

N 9°33'54" E

10' SHIFT

ALTERNATIVE CENTERLINE

ALTERNATIVE EDGE OF PAVEMENT

BEG. REALIGNMENT
STA. 75+58 +/-

END REALIGNMENT
STA. 88+45 +/-

R = 2250

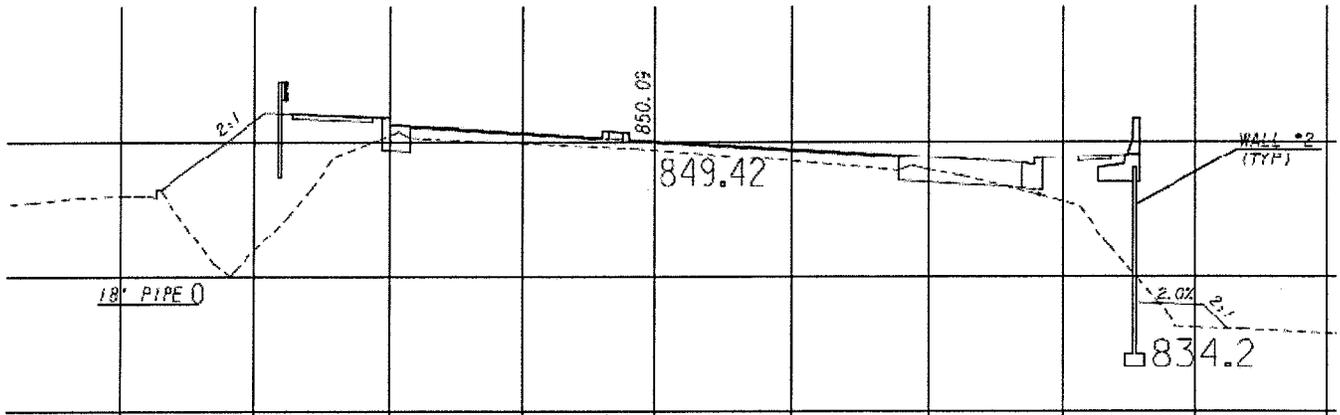
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PROJECT: **SR 3/US 41 COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-6

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **3 of 5**



Cross Section Showing Alternative Alignment at Sta. 78+00
Includes 2-1/2-ft. wide stamped concrete strip on left shoulder
Eliminates Wall No. 3 from left side
Increases height of Wall #2 by 2 ft.

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-6

SHEET NO.: **4 of 5**

Original Cost Saved

Wall # 3

MSE Wall: 1102 sf x \$41.61/sf = \$45,854.22
Traffic Barrier: 94 lf x \$177.37/lf = \$16,672.78
Galvanized Steel Pipe HRail: 89 lf x \$55.92/lf = \$4,976.88

Right of Way and Parking

Parking Spaces between Sta. 78+00 LT +/- to Sta. 80+50 +/- LT (Parcel 4)
22 spaces x \$5,000/space x 1.75 ROW Markup = \$192,500

Right of Way Easement Saving at Detention Pond Location (Sta. 83+00 +/- LT)
8,500 sf of Permanent Easement x \$8/sf x 1.75 ROW Markup = \$119,000
1,940 sf of proposed ROW x \$15/sf x 1.75 ROW Markup = \$50,925

Reduced Excavation at Detention Pond Location (Between Sta. 82+50 LT to Sta. 84+50 LT)

900 sf. Avg. area x 200 lf/27 x \$6/cy = \$ 40,000.00

Alternate Cost Added

Wall # 2

MSE Wall 10-20 ft = 450 sf x \$40.93/sf = \$18,418.50
MSE Wall 20-30 ft = 260 sf x \$41.03/sf = \$10,667.80
MSE Wall 30+ ft = 1050 sf x \$58.08/sf = \$60,984.00

Leveling

(220 ft. length x 73 ft. avg. width)/9 x (2 in. avg. thickness x 110 lb/sy) /2,000 x \$60.51/Tn = \$ 11,877.44

Stamped Concrete

1,300 lf x 2-1/2 ft /9 = 361 sy, say 370 sy

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>	ALTERNATIVE NO.: R-7
DESCRIPTION: PROVIDE A 175 FT. RIGHT TURN LANE TO THE ACCESS DRIVE AT STA. 117+46 RT	SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design proposes a right turn lane for the access drive at Sta. 117+46 RT, which is 380 ft. in length with a 50 ft. painted taper.

ALTERNATIVE: (sketch attached)

Provide a 175-ft.-long right turn lane with 100 ft. taper for the access drive at Sta. 117+46 RT.

ADVANTAGES:

- Reduces right-of-way requirements
- Saves two commercial parking spaces
- Reduces pavement widening

DISADVANTAGES:

- None identified

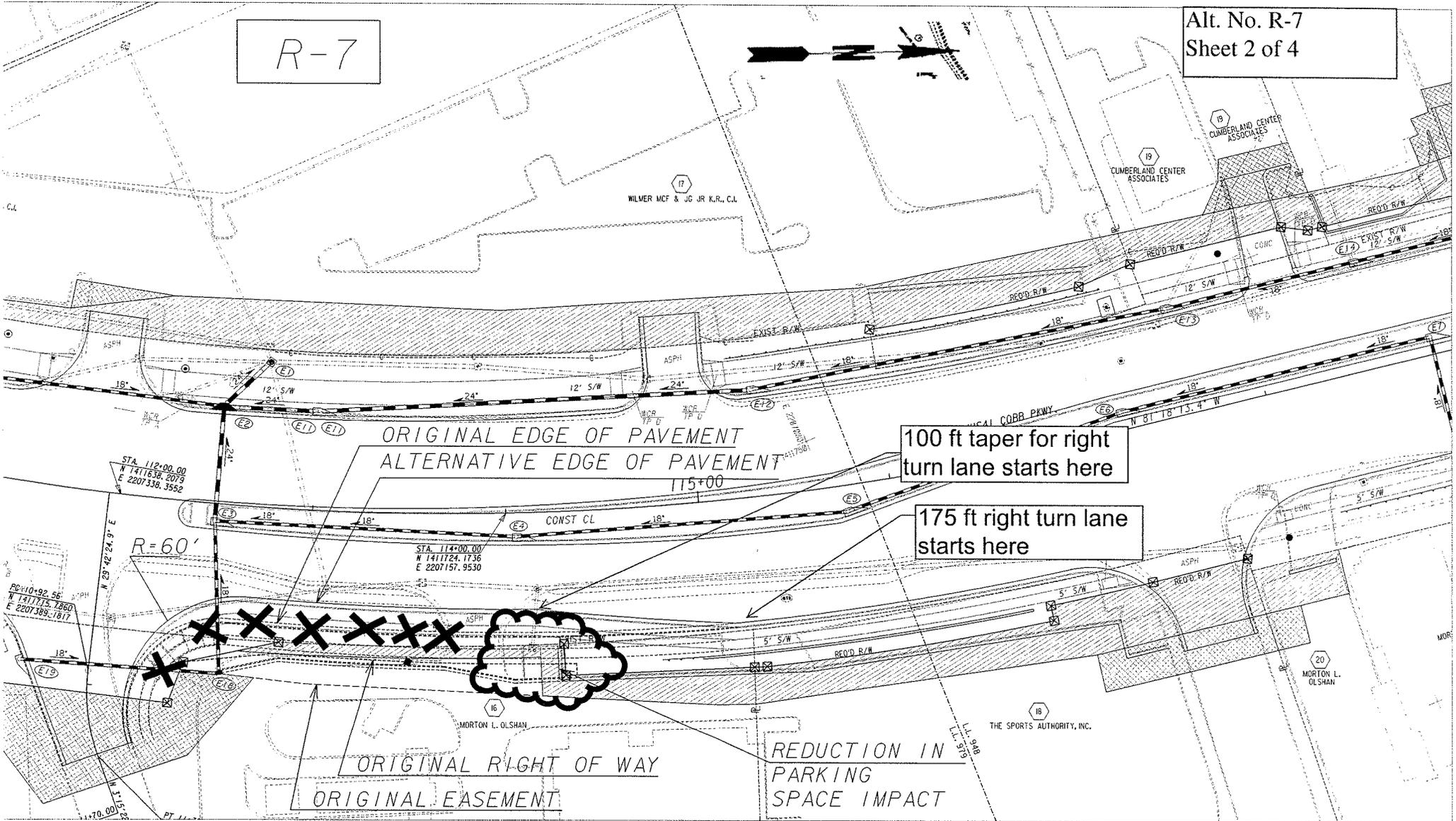
DISCUSSION:

The alternative design meets the requirements specified in the GDOT Driveway Encroachment Manual. Storage should not be a problem here since only 20 cars are estimated to be using this access drive during design year 2030 peak hour.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 149,000	—	\$ 149,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 149,000	—	\$ 149,000

R-7

Alt. No. R-7
Sheet 2 of 4



100 ft taper for right turn lane starts here

175 ft right turn lane starts here

ORIGINAL RIGHT OF WAY
ORIGINAL EASEMENT

REDUCTION IN
PARKING
SPACE IMPACT

ALT. NO.
R-7
Sht. 2 of 4

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-7

SHEET NO.: **3 of 4**

Original Cost Saved:

Right-of-Way and Parking

Parking Spaces

$$2 \text{ spaces} \times \$5,000/\text{space} \times 1.75 \text{ ROW Markup} = \$17,500$$

Right of Way Easement Savings

$$2,475 \text{ sf. of Permanent Easement} \times \$13/\text{sf} \times 1.75 \text{ ROW Markup} = \$56,306.00$$

$$1,350 \text{ sf. of proposed ROW} \times \$25/\text{sf} \times 1.75 \text{ ROW Markup} = \$59,062.50$$

Pavement and Curb & Gutter

Full Depth Pavement

$$325 \text{ sy.} \times \$44.01/\text{sy} = \$14,303.25$$

30" Curb and Gutter

$$160 \text{ lf.} \times \$9.04/\text{lf} = \$1,446.40$$

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING
 FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-10

DESCRIPTION: SLOPE THE SIDEWALK AND GRASS STRIP TO THE
 OUTSIDE AT STA. 98+14 RT

SHEET NO.: 1 of 2

ORIGINAL DESIGN: (sketch attached)

The original design shows the sidewalk and grass strip sloped to the inside at the access drive into the movie theater at Sta. 98+14 RT.

ALTERNATIVE: (sketch attached)

Slope the sidewalk and grass strip to the outside at Sta. 98+14 RT.

ADVANTAGES:

- Flattens the driveway grade at Sta. 98+14 RT

DISADVANTAGES:

- Drainage from this area will run off into the parking area in lieu of being captured within the closed pipe drainage system

DISCUSSION:

Sloping the sidewalk and grass strip to the outside at Sta. 98+14 RT will flatten the driveway grade at the entry to the movie theater parking area.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE			
SAVINGS (Original minus Alternative)			
DESIGN SUGGESTION			

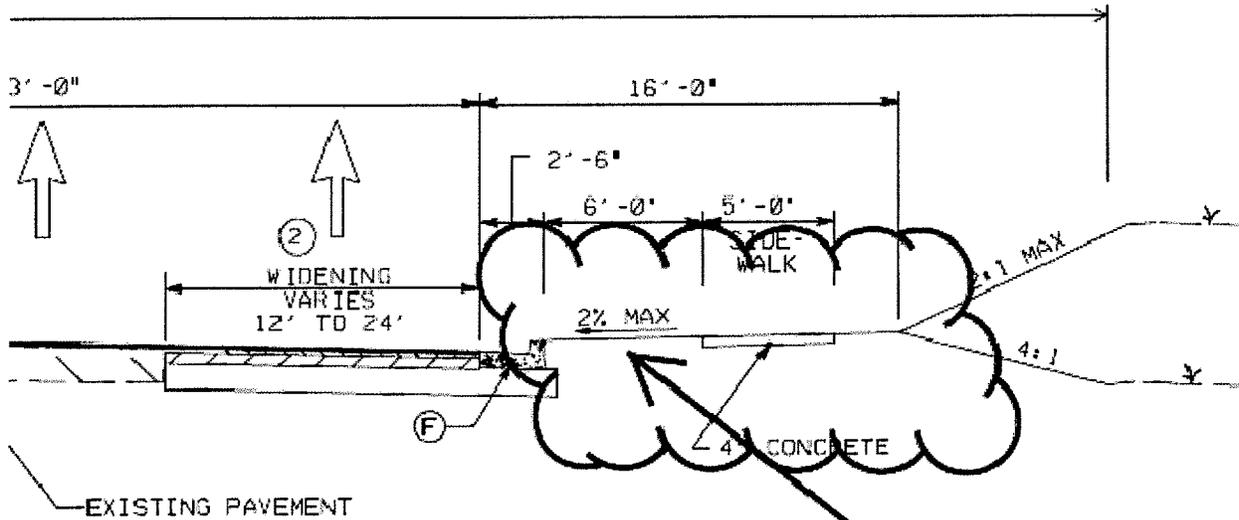
PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-10

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 2**



Slope sidewalk and 6 ft. grass strip to outside at Sta. 98+14 RT

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-11

DESCRIPTION: PROVIDE A 2½-FT.-WIDE STAMPED CONCRETE STRIP AND 10-FT.-WIDE MULTI-USE TRAIL AT ALL RIGHT TURN LANES ON THE LEFT SHOULDER IN LIEU OF A 6-FT.-WIDE GRASS STRIP AND 12-FT.-WIDE MULTI-USE TRAIL

SHEET NO.: 1 of 3

ORIGINAL DESIGN:

The original design uses a 6-ft.-wide grass strip adjacent to a 12-ft.-wide multi-use trail on the left shoulder for the entire length of project.

ALTERNATIVE: (sketch attached)

Provide a 2-1/2-ft.-wide stamped concrete strip adjacent to a 10-ft.-wide multi-use trail on the left shoulder at right turn lanes only.

ADVANTAGES:

- Reduces impacts to commercial property

DISADVANTAGES:

- Narrower multi-use trail at right turns along the left shoulder

DISCUSSION:

Providing a narrower multi-use trail and 2-1/2-ft.-wide stamped concrete strip adjacent to right turn lanes will reduce impacts to commercial property.

Since approaching intersections are already creating an interruption to bikers and pedestrians traveling along the multi-use trail, and since the 2-1/2-ft.-wide stamped concrete strip continues to provide users with 12 ft. of paved surface, this change in width should not produce adverse effects.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 152,000	—	\$ 152,000
ALTERNATIVE	\$ 13,000	—	\$ 13,000
SAVINGS (Original minus Alternative)	\$ 139,000	—	\$ 139,000

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **R-11**

SHEET NO.: **2 of 3**

Original design construction quantities saved: Area of concrete multi-use trail saved using 10 ft. in lieu of 12 ft. at right turns on the left side of the roadway =

at Paces Mill Road [(320 ft. x 2 ft.) + (100 ft. x 1 ft.)] +

at Sta. 82+00 LT [(300 ft. x 2 ft.) + (100 ft. x 1 ft.)] +

at Cumberland Boulevard West [(400 ft. x 2 ft.) + (100 ft. x 1 ft.)] +

at Riverwood Parkway west (350 ft. x 2 ft.) +

at Sta. 109+00 LT [(150 ft. x 2 ft.) + (100 ft. x 1 ft.)] = Total 3,440 SF/9sf/sy = **383 SY** concrete sidewalk type pavement

Original Earthwork saved: (1,720 ft. x 5-1/2 ft. x 7 ft. avg.)/27sf/cy = 2,450 CY (shoulder 5-1/2 ft. narrower)

Original R/W saved: (1,100 ft. x 5-1/2 ft.) = 6,000 SF

Alternate Cost:

2½ ft. stamped concrete (2-1/2 ft. x 1,510 ft.)/9sf/sy = 420 SY

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING
 FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-12

DESCRIPTION: PROVIDE 2-FT.-WIDE STAMPED CONCRETE IN LIEU OF
 6-FT.-WIDE GRASS STRIPS AT ALL RIGHT TURN LANES
 ON THE RIGHT SIDE SHOULDER

SHEET NO.: 1 of 3

ORIGINAL DESIGN: (sketch attached)

The original design uses a 6-ft.-wide grass strip between the back of curb and the 5-ft.-wide concrete sidewalk on the right shoulder.

ALTERNATIVE: (sketch attached)

Use a 2-ft.-wide stamped concrete strip between the back of curb and the 5-ft.-wide concrete sidewalk on the right side shoulder at all right turn lanes

ADVANTAGES:

- Reduces impacts to commercial property

DISADVANTAGES:

- Provides less green space

DISCUSSION:

Providing a 2-ft.-wide stamped concrete strip adjacent to right turn lanes on the right shoulder will reduce impacts to commercial property.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 120,000		\$ 120,000
ALTERNATIVE	\$ 12,000	—	\$ 12,000
SAVINGS (Original minus Alternative)	\$ 108,000	—	\$ 108,000

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-12

SHEET NO.: **2 of 3**

Original design construction quantities saved at right turn lanes on the right side of the roadway:

Original Earthwork saved: $(1,700' \times 4' \times 7' \text{ avg.})/27\text{sf/cy} = 1,760 \text{ CY}$ (shoulder 4' narrower)

Original R/W saved: $(1,300' \times 4') = 5,200 \text{ SF}$

Alternate additional Cost:

2 ft. stamped concrete $(2' \times 1,700')/9\text{sf/sy} = 378 \text{ SY}$

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>	ALTERNATIVE NO.: R-13
DESCRIPTION: SAVE ELEVEN COMMERCIAL PARKING SPACES NEAR STA. 74+50 LT BY REDUCING THE WIDTHS OF THE RIGHT TURN LANE, THE MULTI-USE TRAIL, AND THE GRASS STRIP BETWEEN STA. 73+16 LT AND STA. 75+94 LT	SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design uses a 12-ft.-wide right turn lane, a 6-ft.-wide grass strip and a 12-ft.-wide multi-use trail between Sta. 73+16 LT and Sta. 75+94 LT. A mechanically stabilized earth (MSE) wall is used to minimize additional impacts to the parking at this location. Approximately 22 parking spaces are being impacted.

ALTERNATIVE: (sketch attached)

Provide an 11-ft.-wide right turn lane, 2-1/2-ft.-wide stamped concrete, and 10-ft.-wide multi-use trail between Sta. 73+16 LT and Sta. 75+94 LT. Shift the proposed MSE wall closer to the roadway. With this shift, parking spaces angled at 45 degrees and retain 11 parking spaces.

ADVANTAGES:

- Reduces 11 parking space impacts
- Reduces right-of-way requirements
- Reduces pavement widening

DISADVANTAGES:

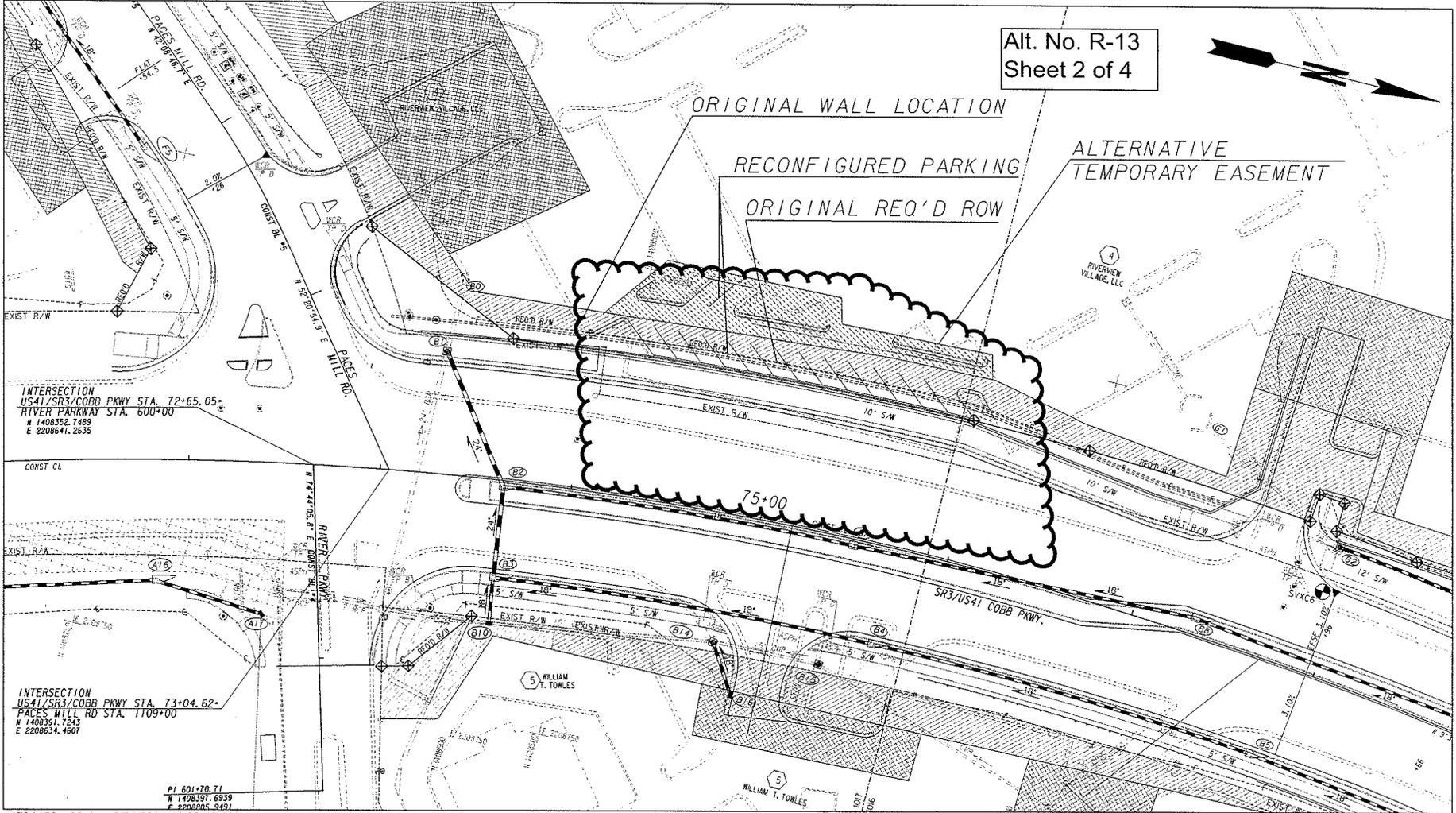
- Reduces trail and beauty strip widths
- Provides narrower right turn lane
- Requires changes to the Right-of-Way Plan

DISCUSSION:

Reducing the right turn lane width as well as reducing the width of the urban shoulder will save 11 parking spaces in the adjacent commercial parking lot. Since the through lanes are already 11 ft. lanes, the alternative right turn lanes will match the through lanes.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$200,000	—	\$200,000
ALTERNATIVE	39,000	—	39,000
SAVINGS (Original minus Alternative)	\$161,000	—	\$161,000

Alt. No. R-13
Sheet 2 of 4



INTERSECTION
US41/SR3/COBB PKWY STA. 72+65.05
RIVER PARKWAY STA. 600+00
N 1408352.7489
E 2208647.2635

INTERSECTION
US41/SR3/COBB PKWY STA. 73+04.62
PACES MILL RD STA. 1109+00
N 1408391.7243
E 2208634.4607

PI 601+70.71
N 1408397.6939
E 2208606.8451

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CALCULATIONS

PROJECT: **SR 3/US 41 COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD**
Cobb County, Georgia

ALTERNATIVE NO.:

R-13

SHEET NO.: **3 of 4**

Original Cost Saved

Right of Way and Parking

Parking Spaces

$$11 \text{ spaces} \times \$5,000/\text{space} \times 1.75 \text{ ROW Markup} = \$96,250$$

Right of Way Savings

$$2,300 \text{ sf. of proposed ROW} \times \$25/\text{sf} \times 1.75 \text{ ROW Markup} = \$100,625.00$$

Pavement and trail

Full Depth Pavement (at right turn lane)

$$31 \text{ sy.} \times \$44.01/\text{sy} = \$1,364.31$$

Multi-use trail (at right turn lane)

$$62 \text{ sy.} \times \$28.43/\text{sy} = \$1,762.66$$

Alternative Cost

Easement

$$3,700 \text{ sf. of temporary easement} \times \$5/\text{sf.} \times 1.75 \text{ ROW Markup} = \$32,375$$

Pavement, stamped concrete and Curb & Gutter

Full Depth Pavement (at parking lot to reconstruct curb and gutter)

$$40 \text{ sy.} \times \$44.01/\text{sy} = \$1,760.40$$

24" Curb and Gutter

$$220 \text{ lf.} \times \$9.04/\text{lf} = \$1,988.80$$

2-1/2 feet stamped concrete

$$77.5 \text{ sy.} \times \$31/\text{sy} = \$2,403.00$$

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:
R-14

DESCRIPTION: ELIMINATE THE SHORT RIGHT TURN LANE AT AKERS
MILL ROAD BY MAKING THE FOURTH LANE A RIGHT
TURN LANE

SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design provides a short right turn lane on SR 3/US 41 at Akers Mill Rd.

ALTERNATIVE: (sketch attached)

Eliminate the short right turn lane on SR 3/US 41 onto Akers Mill Road by making the outside fourth lane a right turn lane.

ADVANTAGES:

- Reduces asphalt paving quantity
- Reduces the construction time
- Reduces the property impacts

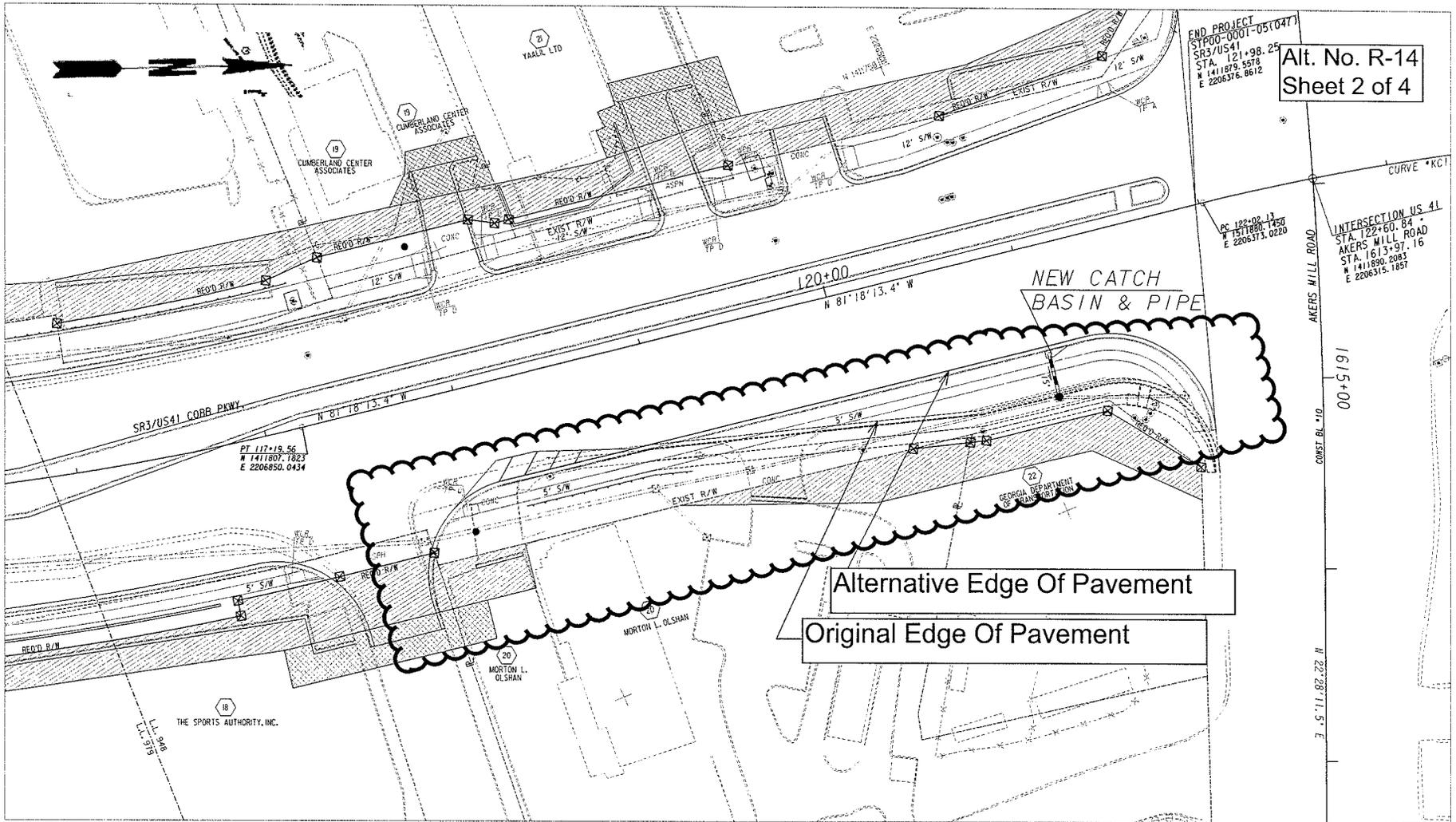
DISADVANTAGES:

- None identified

DISCUSSION:

The current design uses a short existing right turn lane which is only 70-ft.-long with a 189-ft.-long taper for 290 vehicles per hour turning right. Since SR 3/US 41 has four other lanes approaching this intersection, converting the fourth lane to the right turn only lane would provide for much more capacity for right turns. This would also allow for a free right turn from Akers Mill Road onto SR 3/US 41 into the fourth lane on the opposite side of the intersection. It is important to note that the current right turn lane is so short that the queue through traffic prevents turning vehicles from accessing the right turn lane. The alternative design would eliminate the required right-of-way and easement along the right turn lane.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 29,000	—	\$ 29,000
ALTERNATIVE	\$ 4,000	—	\$ 4,000
SAVINGS (Original minus Alternative)	\$ 25,000	—	\$ 25,000



Alt. No. R-14
Sheet 2 of 4

Alternative Edge Of Pavement
Original Edge Of Pavement

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

R-14

SHEET NO.: **3 of 4**

Original construction items saved:

Overlay pavement (3 ½ inches) saved = (70' x 12') x (180' x 12'/2) = 1,920 SF = 214 SY

Easement saved (Parcel 20) = 2,300 SF

Overlay of Mainline Unit Cost (\$/SF):

12.5mm: 165#/SY x Ton/2,000# x SY/9SF x \$62.14/Ton = \$0.57/SF

19mm: 220#/SY x Ton/2,000# x SY/9SF x \$58.51/Ton = \$0.72/SF

Leveling: 140#/SY (average) x Ton/2,000# x SY/9SF x \$60.51/Ton = \$0.47/SF

Total Overlay Unit Cost = \$1.76/SF or \$15.84/SY

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>	ALTERNATIVE NO.: W-2
DESCRIPTION: REDUCE THE HEIGHT OF WALL NO. 2 BY SHIFTING THE WALL CLOSER TO THE EXISTING RIGHT-OF-WAY BOUNDARY AND GRADING THE SLOPE 2:1	SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design shows Wall No. 2 approximately 35 ft. west of the existing right-of-way boundary creating the need for 30 ft. high walls or greater from Sta. 80+00 to Sta. 87+06.

ALTERNATIVE: (sketch attached)

Shift the location of Wall No. 2 approximately 22 ft. closer to the existing right-of-way boundary and use a 2:1 slope with guardrail to reduce the wall height approximately 8 ft. Add 3 additional drainage structures and 550 ft. of 18 in. rigid concrete pipe to drain to structure B-6. Remove the traffic barrier and pipe handrail.

ADVANTAGES:

- Reduces wall height
- Stays within existing right-of-way

DISADVANTAGES:

- May be more difficult to access Wall No. 2 for future maintenance

DISCUSSION:

Shifting Wall No. 2 closer to the existing right-of-way boundary reduces the wall height, eliminates the need for a traffic barrier, and remains within the existing right-of-way boundary.

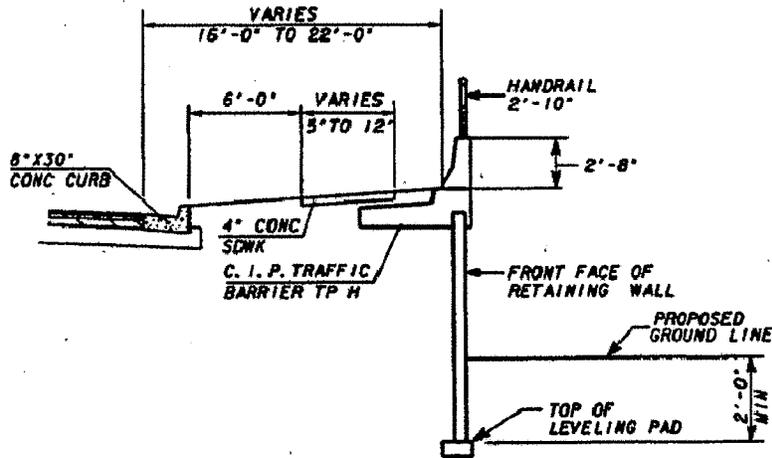
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 468,000	—	\$ 468,000
ALTERNATIVE	\$ 134,000	—	\$ 134,000
SAVINGS (Original minus Alternative)	\$ 334,000	—	\$ 334,000

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **W-2**

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 4**

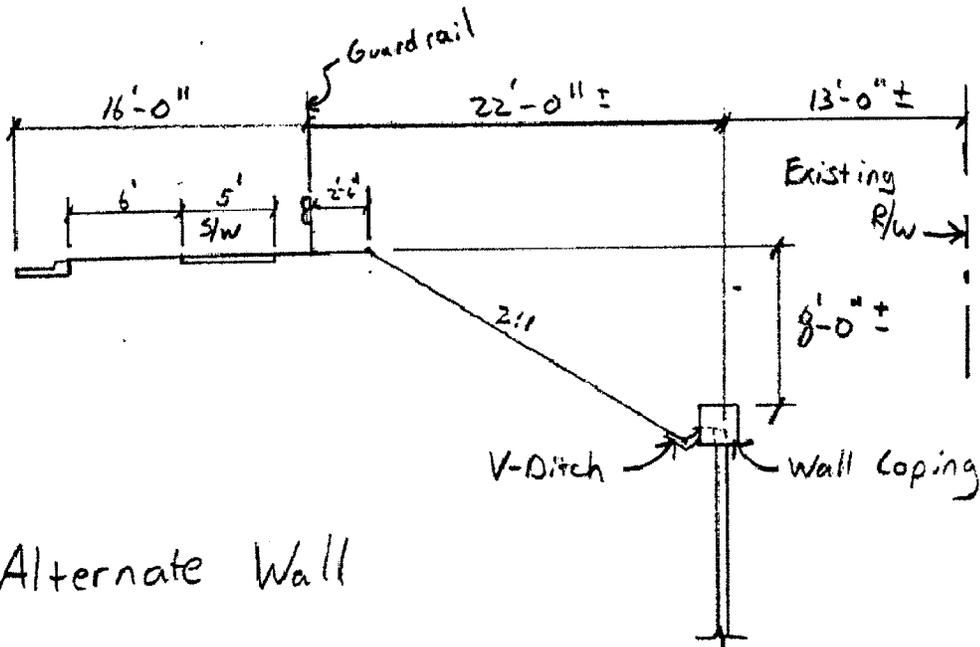


FILL WALL DETAIL

SEE PLANS FOR LOCATIONS

Original Wall

Sta. 80+00 - Sta. 87+06



Alternate Wall

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **W-2**

SHEET NO.: **3 of 4**

Wall Lengths

Wall height 30+ => Sta. 80+00 - Sta. 86+00 = 600 ft.
Wall height 10 ft.-20 ft. => Sta. 86+00 - Sta. 87+06 = 106 ft.
Total Length = 706 ft.

Wall Volume

Wall height 30+ => 600 ft. x 8 ft. = 4800 SF
Wall height 10 ft.-20 ft. => 106 ft. x 8 ft. = 848 SF

Wall Coping Volume

Say 2 ft. x 2 ft. x 706 ft. = 2824 CF = 104.6 CY

Wall Turn at Sta. 79+56

Say 22 ft. x 25 ft. = 550 SF

Additional Wall Fill

Say (22 ft. x 22 ft. x 706 ft.)/2 = 170,852 cf = 6,327.85 CY

Drainage

Add 3 additional Structures and 550 ft. of 18 in. pipe to connect to Structure B-6.

V Ditch = 2 ft. x 706 ft. = 1412 SF = 157 SY

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD <i>Cobb County, Georgia</i>	ALTERNATIVE NO.: W-3
DESCRIPTION: USE A GRAVITY WALL WITH HANDRAIL IN LIEU OF A MECHANICALLY STABILIZED EARTH WALL FOR RETAINING WALL NO. 6 (STA. 104+87 LT TO STA. 106+62 LT)	SHEET NO.: 1 of 5

ORIGINAL DESIGN: (sketch attached)

Mechanically stabilized earth (MSE) Wall No.6 is provided from Sta. 104+87 LT to Sta. 106+62 LT (175 ft.). The average wall height is 8.33 ft.

ALTERNATIVE: (sketch attached)

Use a gravity wall per GDOT Standard 9031L in place of an MSE wall for Wall No. 6. Add a 42 in. pipe handrail to the top of the gravity wall in lieu of the cast-in-place concrete traffic barrier.

ADVANTAGES:

- Reduces wall height
- Reduces earthwork requirements
- Eliminates traffic barrier outside the clear zone

DISADVANTAGES:

- None identified

DISCUSSION:

The existing ground line is high in the area of Wall No. 6. Using a gravity wall reduces the average wall height requirement from 8.33 ft. to 4 ft. The earthwork requirements are also reduced. In addition, since Wall No. 6 is outside the clear zone, a traffic barrier is not required and can be replaced by a 42 in. handrail.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 86,000	—	\$ 86,000
ALTERNATIVE	\$ 30,000	—	\$ 30,000
SAVINGS (Original minus Alternative)	\$ 56,000	—	\$ 56,000

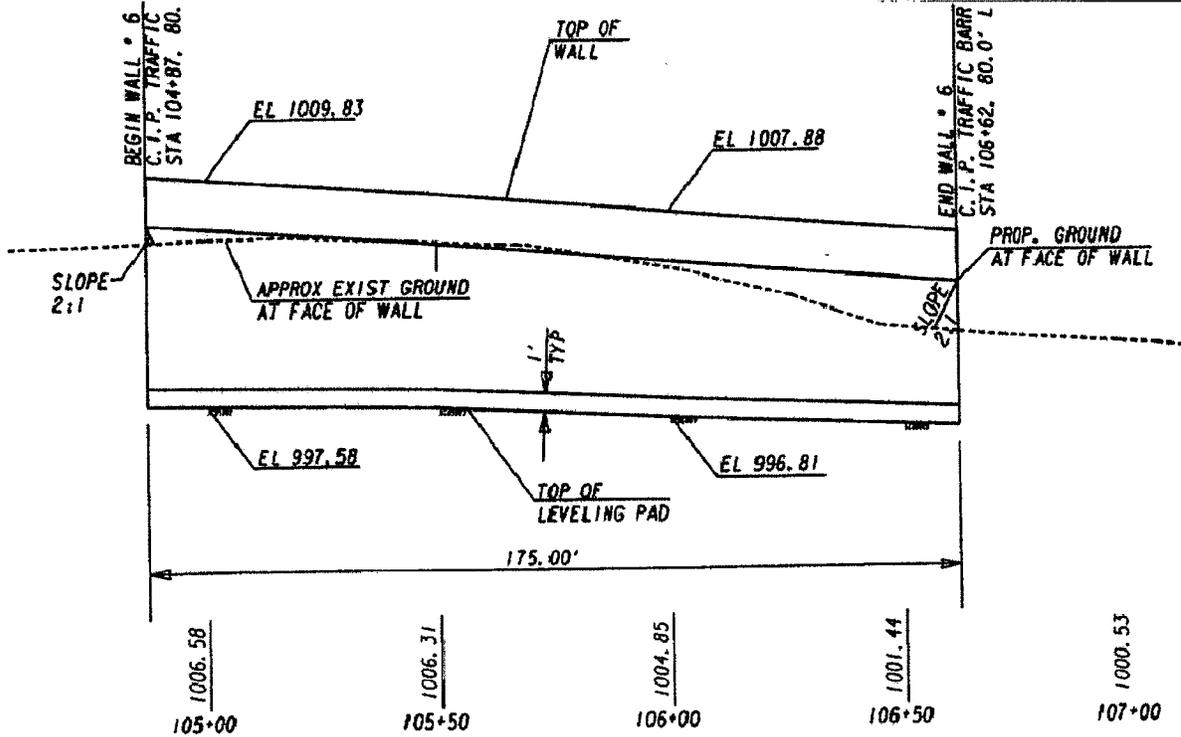
PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

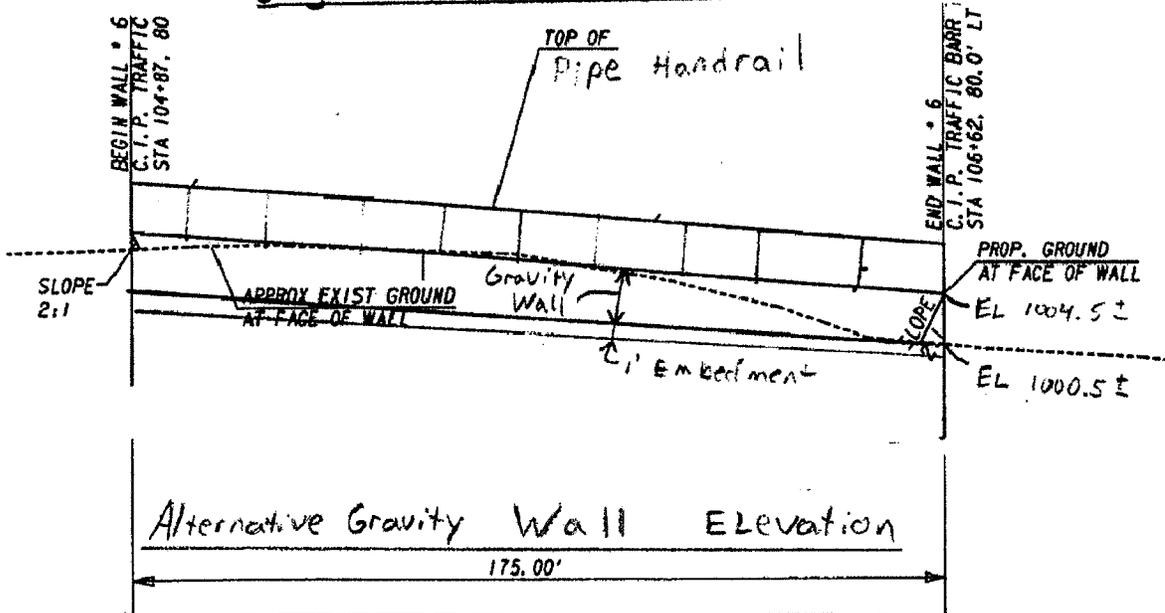
W-3

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 5**



Original MSE Wall Elevation



Alternative Gravity Wall Elevation

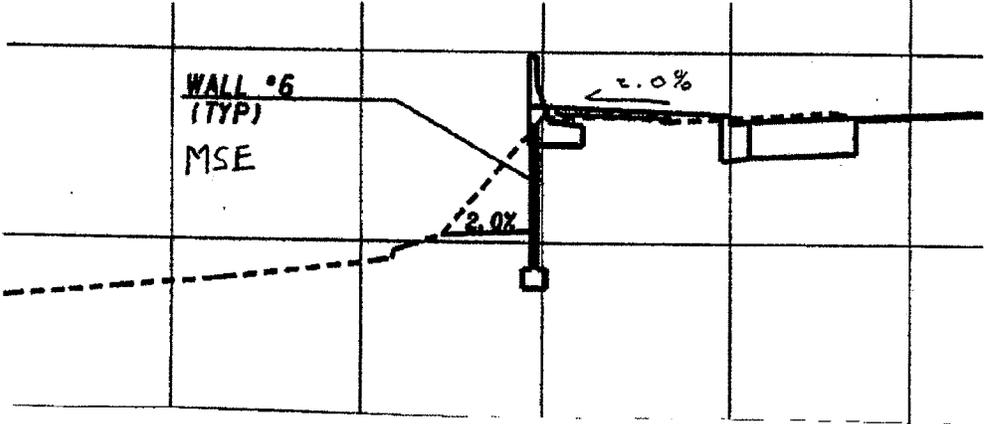
PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

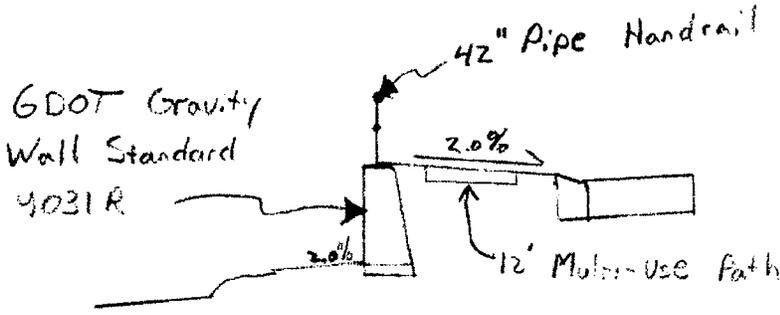
W-3

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **3 of 5**



Original Design



Alternate Design

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

W-3

SHEET NO.: **4 of 5**

Wall No. 6

Slope multi-use path 2% down from gutter:

$$18 \text{ ft.} \times 2\% = 0.36 \text{ ft.} \times 2 \text{ (to slope it down from gutter)} = 0.72 \text{ ft. (8.64 in.)}$$

Gravity Wall Volume

$$\text{Height (say)} = \text{El } 1004.5 - \text{El } 1000.5 = 4.0 \text{ ft.} - 0.72 \text{ ft. (2\% slope)} = 3.28 \text{ ft. say } 3.5 \text{ ft.}$$

$$\text{Height} \Rightarrow 3.5 \text{ ft. (wall height)} + 1 \text{ ft. (embedment)} = 4.5 \text{ ft. Say } 5 \text{ ft.}$$

$$\text{Width} = (8 \text{ in.} + (5 \text{ ft.} / 2 + 8 \text{ in.})) / 2 = 1.92 \text{ ft.}$$

$$\text{Length} = 175 \text{ ft.}$$

$$\text{Volume} = 1.92 \text{ ft.} \times 5 \text{ ft.} \times 175 \text{ ft.} = 1677 \text{ CF} / 27 = 62.1 \text{ CY Concrete}$$

VALUE ENGINEERING ALTERNATIVE

PROJECT: SR 3/US 41/COBB PKWY WIDENING FROM PACES MILL RD. TO AKERS MILL RD Cobb County, Georgia	ALTERNATIVE NO.: W-4
DESCRIPTION: USE A GRAVITY WALL WITH A HANDRAIL IN LIEU OF A PARAPET RETAINING WALL, TYPE P2 FOR WALL NO. 7	SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

Wall No.7 extends provided from Sta. 114+95 RT to Sta. 116+54 RT and is a GDOT Parapet Retaining Wall, Type P2. The average wall height is 6.24 ft.

ALTERNATIVE: (sketch attached)

Use a gravity wall in place of the GDOT P2 Wall. Add a 42 in. pipe handrail to the top of the gravity wall per GDOT Standard 9031R.

ADVANTAGES:

- Reduces material and labor requirements
- Reduces earthwork requirements
- Replaces traffic barrier with less costly handrail for convenience and improved aesthetics

DISADVANTAGES:

- None identified

DISCUSSION:

A 6 ft. high gravity wall can be used in this application to save material and labor requirements. The earthwork requirements are also reduced. Also, since Wall No. 7 is outside of the clear zone, a traffic barrier is not required.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 81,000	—	\$ 81,000
ALTERNATIVE	\$ 49,000	—	\$ 49,000
SAVINGS (Original minus Alternative)	\$ 32,000	—	\$ 32,000

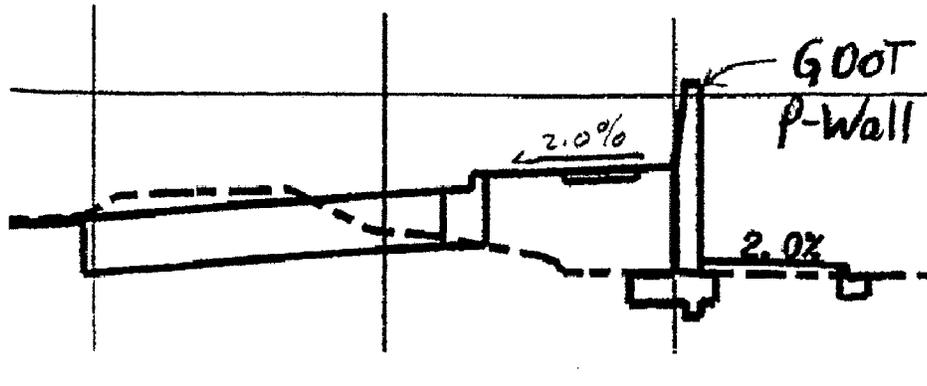
PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

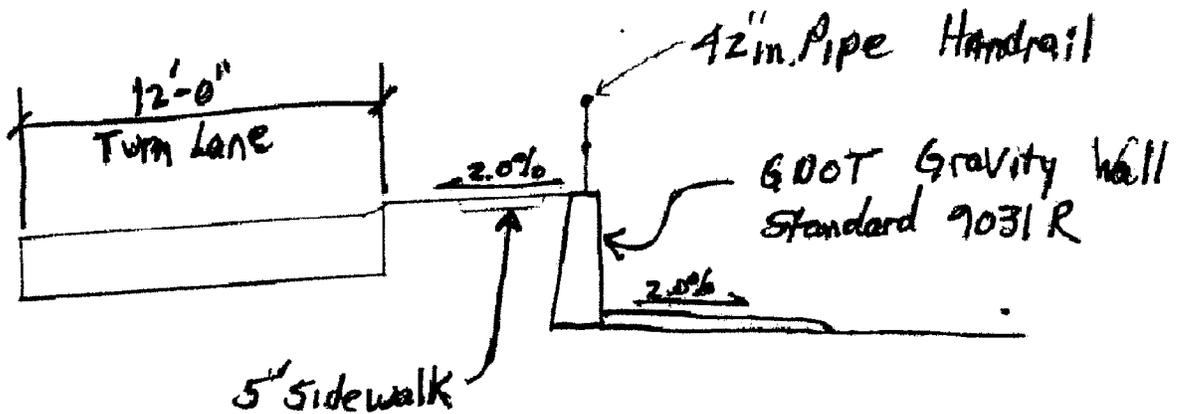
W-4

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

SHEET NO.: **2 of 4**



Original Design



Alternate Design

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

W-4

SHEET NO.: **3 of 4**

Wall No. 7

Parapet Retaining Wall – Type P2

Height (say) = El 1012.74 - El 1003.83 – 2.67 ft. (Traffic Barrier) = 6.24 ft. Type P2 Wall

Gravity Wall

Volume

Height (say) = El 1012.74 - El 1003.83 – 2.67 ft. (Traffic Barrier) = 6.24 ft

Height => 6.24 ft. (Wall Height) + 1 ft. (Wall Embedment) = 7.24 ft.

Width = (8 in. + (7.24/2 ft. + 8 in.))/2 = 2.5 ft.

Length = 173.15 ft.

Volume = 2.5 ft. width x 7.24 ft. height x 173.15 ft. length = 3134 CF x CY/27CF = 116 CY Concrete

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

**ALTERNATIVE NO.:
W-7**

**DESCRIPTION: PROVIDE A GRAVITY WALL FROM STA. 116+00 TO STA.
117+00 TO SAVE PARKING SPACES**

SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design includes guardrail with a 2:1 slope and curb and gutter from Sta. 116+00 to Sta. 117+00 and takes 13 parking spaces.

ALTERNATIVE: (sketch attached)

Use a gravity wall to retain the 13 parking spaces.

ADVANTAGES:

- Saves 13 parking spaces
- Removes guardrail
- Removes curb and gutter

DISADVANTAGES:

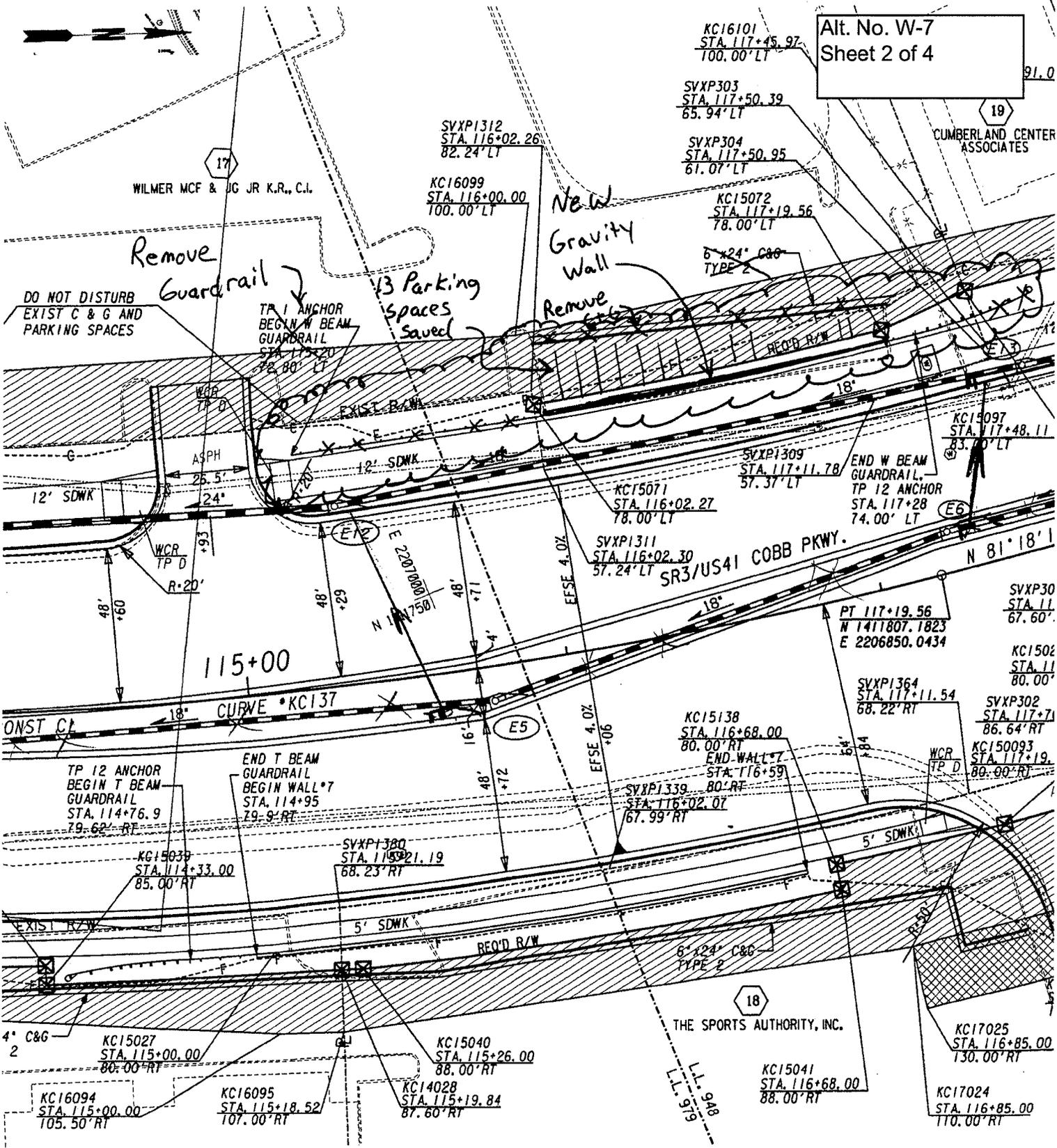
- Requires changing the Right-of-Way plans

DISCUSSION:

The original section uses small 2:1 slopes and curb and gutter with guardrail that eliminates 13 parking spaces. The location of the guardrail is outside the clear zone, therefore in order to save parking spaces, use a gravity wall to remove the 2:1 slope. A 42 in. pipe handrail has been added on the gravity wall for pedestrian and bicyclist safety.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 121,000	—	\$ 121,000
ALTERNATIVE	\$ 23,000	—	\$ 23,000
SAVINGS (Original minus Alternative)	\$ 98,000	—	\$ 98,000

Alt. No. W-7
Sheet 2 of 4



BLA
ELA

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Associates, Inc.
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REVISION DATES	

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

W-7

SHEET NO.: **3 of 4**

Sta. 116+05 (approximate) to 116+50 (approximate)

Gravity Wall Volume

Length = Sta. 116+50 – Sta. 116+05 = 45.0 ft. (Say)

Height (say) = El 1008.0-El 1004.0 = 4.0 ft. (Say)

Height => 4.0 ft.+1 ft. = 5.0 ft. (Say)

Width = (8 in.+(4.0 ft./2 +8 in.))/2 = 1.67 ft.

Volume = 1.67 ft. x 5.0 ft. x 45 ft. = 375.75 CF = 13.92 CY Concrete

2 in. Dia. Pipe Handrail – 42 in. High

Length = 45.0 ft.

Cost = \$41.92 x 42 in./34 in. = \$51.78 (for 42 in. Bicycle Rail)

Sta. 116+50 (approximate) to 117+15 (approximate)

Gravity Wall Volume

Length = Sta. 117+15 – Sta. 116+50 = 65.0 ft. (Say)

Height (say) = El 1010.50-El 1005.0 = 5.5 ft. (Say)

Height => 5.5 ft.+1 ft. = 6.5 ft. (Say)

Width = (8 in.+(6.5 ft./2 +8 in.))/2 = 2.29 ft.

Volume = 2.29 ft. x 6.5 ft. x 65 ft. = 967.5 CF = 35.83 CY Concrete

2 in. Dia. Pipe Handrail – 42 in. High

Length = 65.0 ft.

Cost = \$41.92 x 42 in./34 in. = \$51.78 (for 42 in. Bicycle Rail)

Total Class B Concrete Retaining Wall = 13.92 CY + 35.83 CY = 49.75 CY

2 in. Dia. Pipe Handrail – 42 in. High – Length = 65 ft. + 45 ft.=110 ft.

Parking Spaces

13 Parking Spaces saved

Cost per parking space = \$5000.00 x 1.75 (Markup) = \$8750.00

Guardrail

Length = 117+65 – 115+20 = 245 ft

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

**ALTERNATIVE NO.:
W-8**

**DESCRIPTION: REMOVE THE TYPE H TRAFFIC BARRIER AND PROVIDE
A 42 IN. PIPE HANDRAIL ON TOP OF WALL NOS. 1, 3,
AND 6**

SHEET NO.: 1 of 4

ORIGINAL DESIGN: (sketch attached)

The original design includes Type H Traffic Barrier on top of Wall Nos. 1, 3, and 6 with a 34 in. pipe handrail on top of the barrier.

ALTERNATIVE: (sketch attached)

Outside the clear zone remove the Type H Traffic Barrier. Add a wall coping with a 42 in. pipe handrail on the wall coping on top of Wall Nos. 1, 3, and 6.

ADVANTAGES:

- Removes Type H Traffic Barrier outside the clear zone

DISADVANTAGES:

- None identified

DISCUSSION:

Outside the clear zone, a traffic barrier is not required. Adding a 42 in. pipe handrail on top of the coping is adequate for pedestrians' and bicyclists' safety.

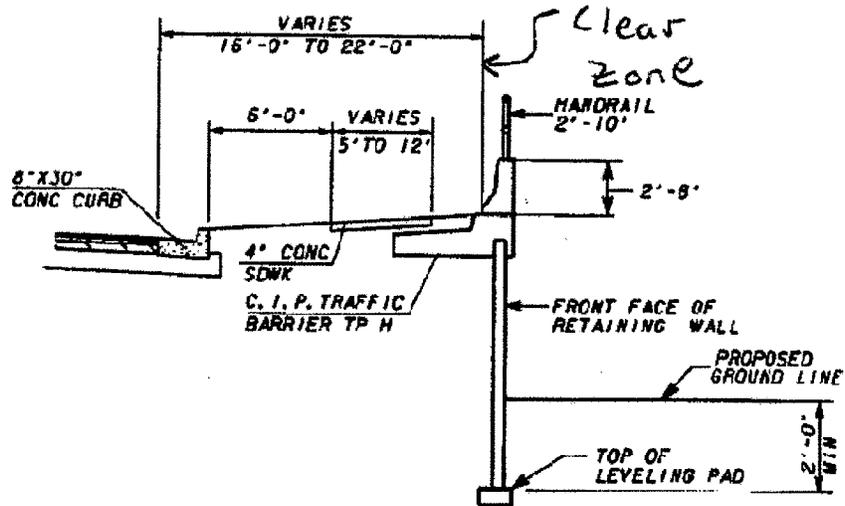
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 154,000	—	\$ 154,000
ALTERNATIVE	\$ 72,000	—	\$ 72,000
SAVINGS (Original minus Alternative)	\$ 82,000	—	\$ 82,000

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **W-8**

ORIGINAL DESIGN ALTERNATIVE DESIGN BOTH

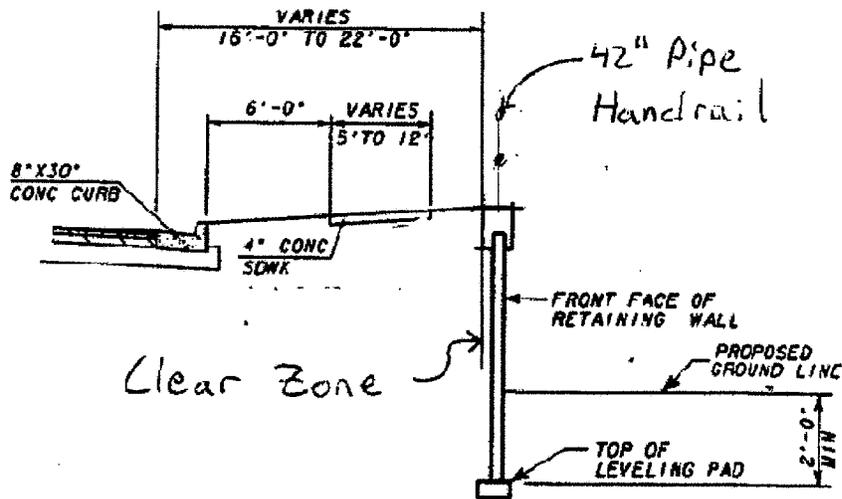
SHEET NO.: **2 of 4**



FILL WALL DETAIL

SEE PLANS FOR LOCATIONS

Original Wall Detail w/Traffic Barrier



FILL WALL DETAIL

SEE PLANS FOR LOCATIONS

Alternative Wall Detail with 42 in. Pipe Handrail

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.: **W-8**

SHEET NO.: **3 of 4**

Wall Lengths

Wall No. 1 Sta. 76+50 – Sta. 73+00	= 350 ft.
Wall No. 3 Sta. 79+65 – Sta. 77+89	= 176 ft.
Wall No. 6 Sta. 106+62 – Sta. 104+87	= <u>175 ft.</u>
Total Length	= 702 ft.

Wall Coping Volume

Say 2 ft. x 2 ft. x 702 ft. = 2808 CF = 104 CY

42" Pipe Handrail Cost

\$41.92 x 42 in./34 in. (cost from 34 in. to 42 in.) = \$51.78

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

**ALTERNATIVE NO.:
D-1**

**DESCRIPTION: PROVIDE UNDERGROUND DETENTION IN LIEU OF AN
ABOVE GROUND DETENTION BASIN AT STA. 83+00 LT**

SHEET NO.: 1 of 5

ORIGINAL DESIGN: (sketch attached)

The current design proposes a large above ground sediment detention basin at Sta. 83+00 LT.

ALTERNATIVE: (sketch attached)

Provide an underground detention system in lieu of the above ground sediment detention basin.

ADVANTAGES:

- Less right-of-way damages
- Removes liability for large deep basin

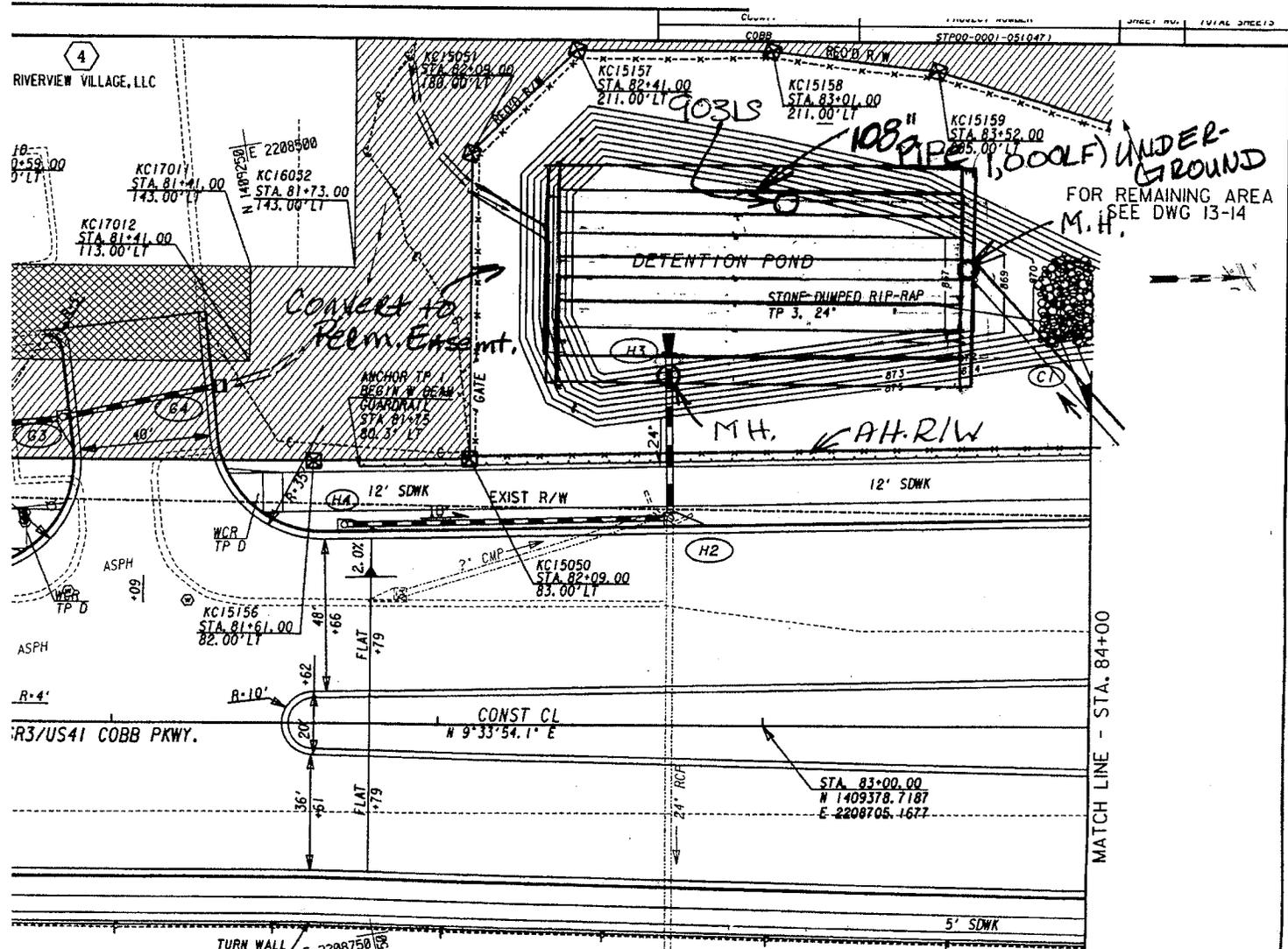
DISADVANTAGES:

- Requires a greater amount of underground drainage pipe

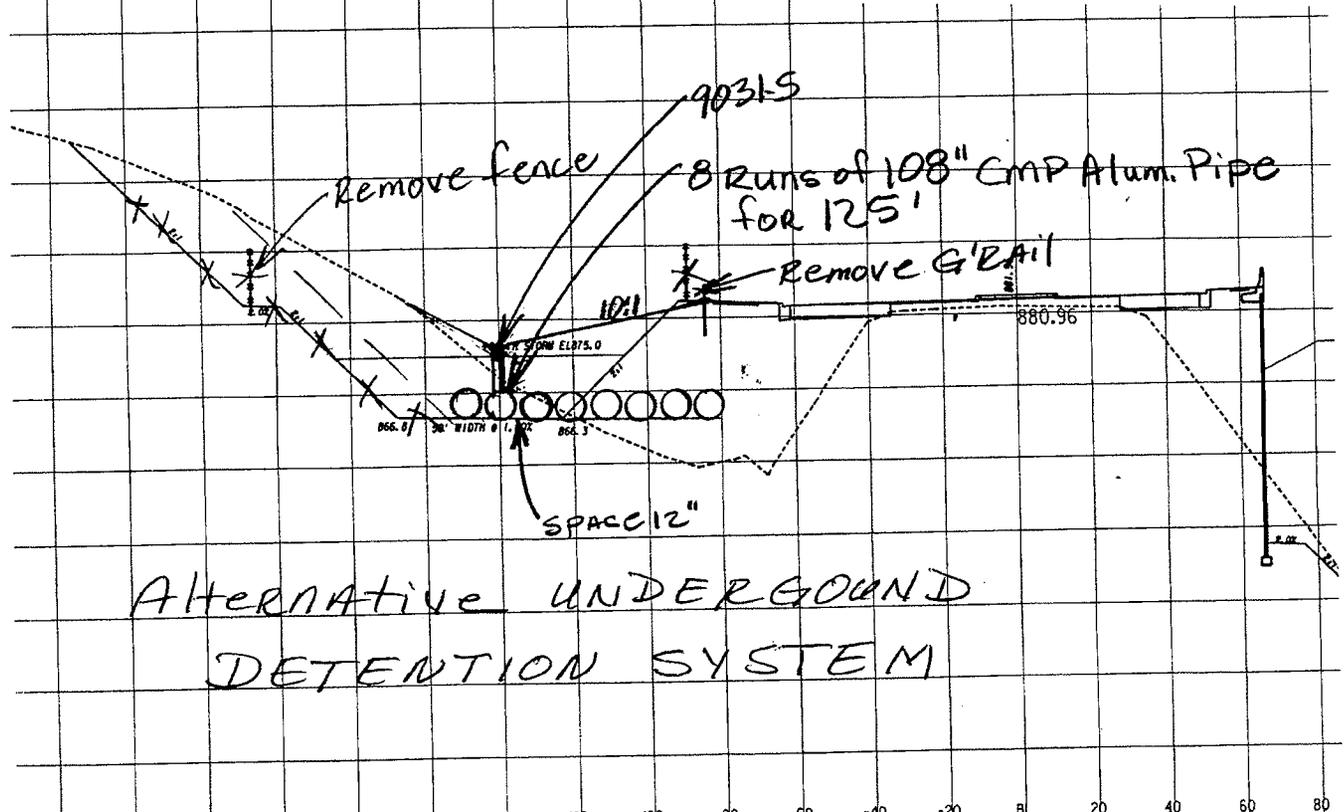
DISCUSSION:

The current detention design damages a large portion of Parcel 4 for commercial development because it requires approximately 0.60 acres of additional right-of-way and 16,000 SF of construction and maintenance easement. The underground detention will allow certain types of commercial development such as parking. The underground system would eliminate the need for maintenance of the above ground sediment basin.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 564,000	—	\$ 564,000
ALTERNATIVE	\$ 306,000		\$ 306,000
SAVINGS (Original minus Alternative)	\$ 258,000	—	\$ 258,000



ALT. NO.
D-1
SMT. 2 of 5



ALTERNATIVE UNDERGROUND
DETENTION SYSTEM

-260 -240 -220 -200 -180 -160 -140 -120 -100 -80 -60 -40 -20 BL 20 40 60 80

MA Moreland Altobelli Associates, Inc.
(770) 263-5945

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUPERVISED BY:

SCALE: 1" = 1'

ALT. NO.
D-1
Sht. 3 of 5

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

D-1

SHEET NO.: **4 of 5**

Capacity of proposed Sediment Detention Basin = $7' \times 150' \text{ avg.} \times 61' \text{ avg.} = 64,000 \text{ cf}$

Alternative design would propose using 96 inch CMP Alumin. Pipe for underground detention system.

Alternative Design Recommendation: Use Aluminized Steel Tp 2 Pipe which has a 100 year durability life.

108 inch has an area of $\pi \times R^2 = \pi \times 4.5^2 = 64 \text{ sf}$

Length of underground 96 inch pipe required = $64,000 \text{ cf} / 64 \text{ sf} = 1000 \pm \text{ LF of pipe}$

Cost of 96 inch alumin. pipe = $\$200/\text{LF} + \$100/\text{LF}$ (for installation) = $\$300/\text{LF}$

A 9031S drop inlet

Original costs saved:

R/W that could be changed to permanent easement which could be use commercially for parking with a special encroachment = $24,000 \text{ sf}$ (at 50% of R/W cost) = $\$15/\text{sf} \times 50\% = \$7.5/\text{sf}$

Construction easement that would be eliminated/saved = $15,000 \text{ sf}$ (from parcel 4)

8-ft chain link saved = 650 LF and also two (2) gates.

Earthwork saved = $1,650 \text{ CY}$

VALUE ENGINEERING ALTERNATIVE

**PROJECT: SR 3/US 41/COBB PKWY WIDENING
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia**

**ALTERNATIVE NO.:
D-2**

**DESCRIPTION: USE ADDITIONAL CROSS-DRAIN PIPE TO REDUCE THE
LONGITUDINAL DRAIN PIPE REQUIREMENTS**

SHEET NO.: 1 of 8

ORIGINAL DESIGN: (sketch attached)

The current drainage design uses two parallel longitudinal storm drain pipe systems from approximately Sta. 84+00 to Sta. 119+00.

ALTERNATIVE: (sketch attached)

Use several cross-drain pipes in lieu of longitudinal storm drain pipe to drain the closed drainage system.

ADVANTAGES:

- Reduces storm drain pipe required
- Reduces construction time
- Reduces pipe to maintain in the median

DISADVANTAGES:

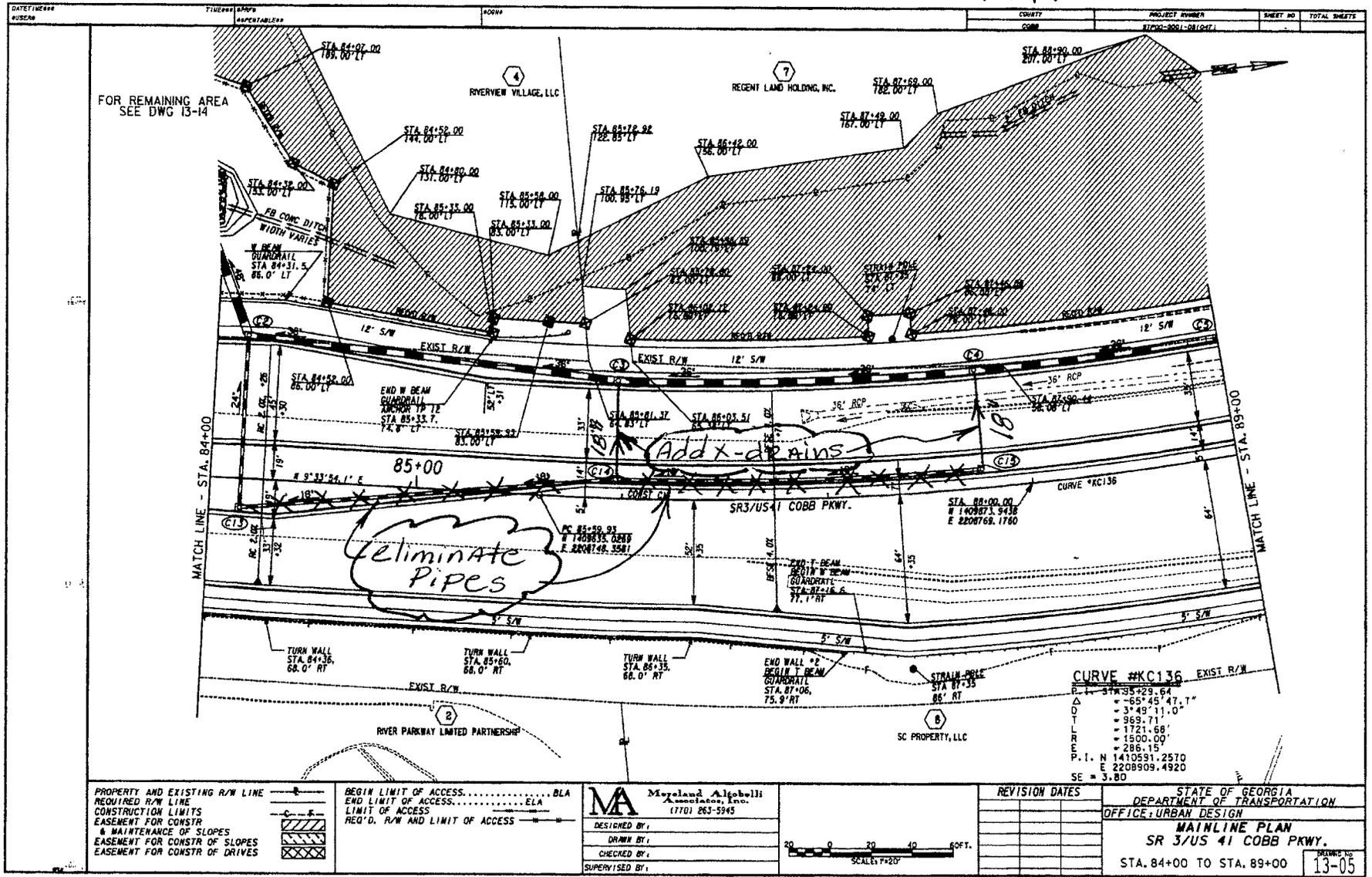
- Additional pavement cuts under traffic required

DISCUSSION:

There are several long parallel runs of longitudinal pipe that could be drained into one system by using cross-drain pipes for structures in the median or located on the opposite side of the roadway. Since there would be one system under the alternate design, a portion of the pipe would increase in size.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 39,000	—	\$ 39,000
ALTERNATIVE	\$ 9,000	—	\$ 9,000
SAVINGS (Original minus Alternative)	\$ 30,000	—	\$ 30,000

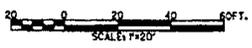
SHEET
2/8
A.H.D-2



PROPERTY AND EXISTING R/W LINE
 REQUIRED R/W LINE
 CONSTRUCTION LIMITS
 EASEMENT FOR CONSTR
 & MAINTENANCE OF SLOPES
 EASEMENT FOR CONSTR OF SLOPES
 EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS B.L.A.
 END LIMIT OF ACCESS E.L.A.
 LIMIT OF ACCESS
 REQ'D. R/W AND LIMIT OF ACCESS

MA Maryland Algebelli Associates, Inc.
 (770) 263-5945
 DESIGNED BY:
 DRAWN BY:
 CHECKED BY:
 SUPERVISED BY:



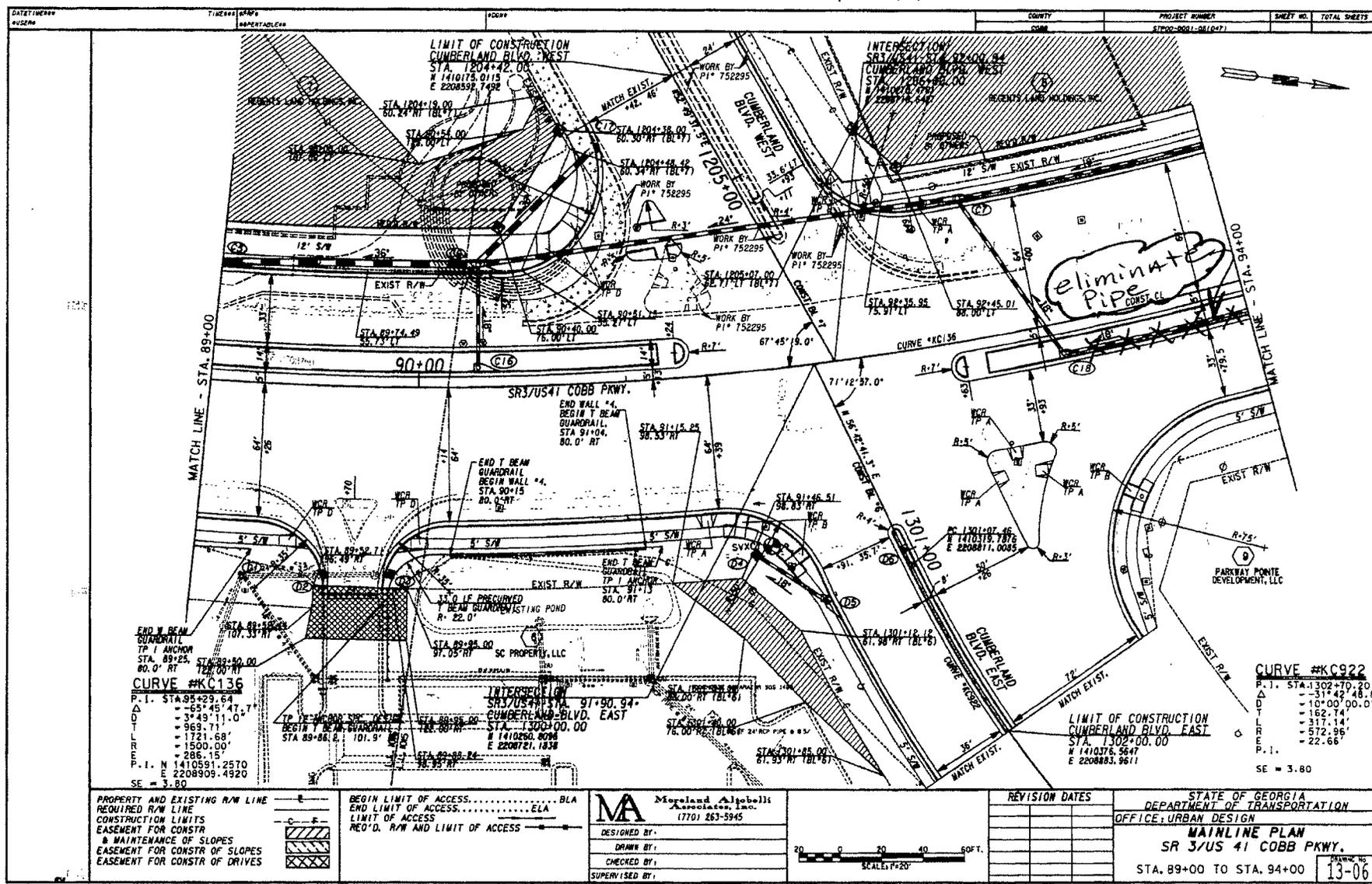
REVISION DATES	

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN
MAINLINE PLAN
 SR 3/US 41 COBB PKWY.
 STA. 84+00 TO STA. 89+00
 DRAWING NO. 13-05

A.C.T. NO.
D-2
Sht. 2 of 8

SHEET
3/8

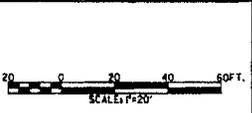
A.H. D-2



PROPERTY AND EXISTING R/W LINE
REQUIRED R/W LINE
CONSTRUCTION LIMITS
EASEMENT FOR CONSTR
& MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA
END LIMIT OF ACCESS.....ELA
LIMIT OF ACCESS
REQ'D. R/W AND LIMIT OF ACCESS

MA Michael A. Mabbitt
Associates, Inc.
(770) 263-5945
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUPERVISED BY:



REVISION DATES

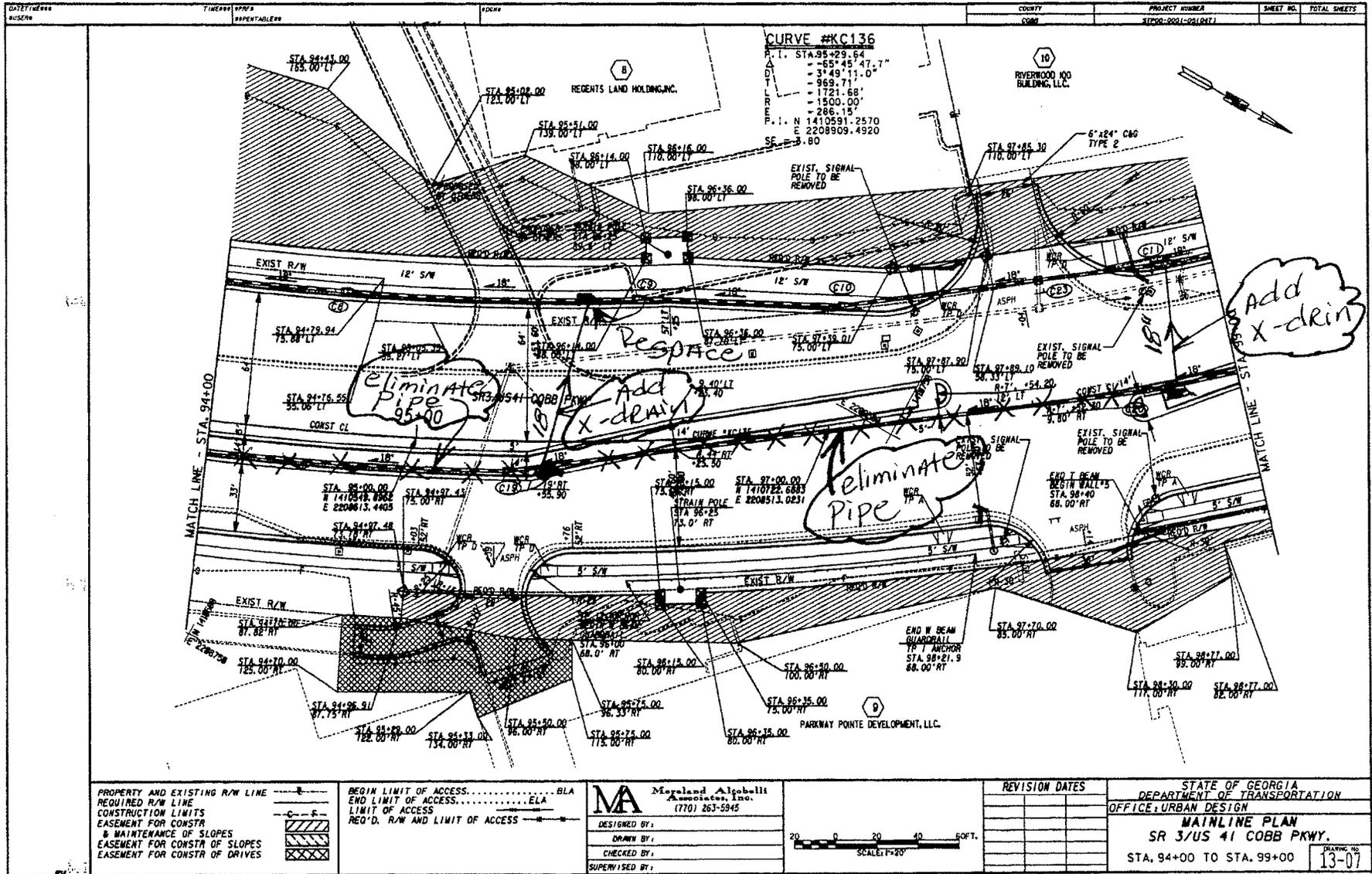
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN
MAINLINE PLAN
SR 3/US 41 COBB PKWY.
STA. 89+00 TO STA. 94+00
DRAWING NO. 13-06

CURVE #KC922
P.I. STA. 1302+70.20
Δ = 31° 42' 48.8"
D = 10° 00' 00.0"
T = 162.74'
L = 317.14'
R = 572.96'
P.L. = 22.66'
SE = 3.80

ALT. NO.
D-2
SM 3.018

SHEET
4/8

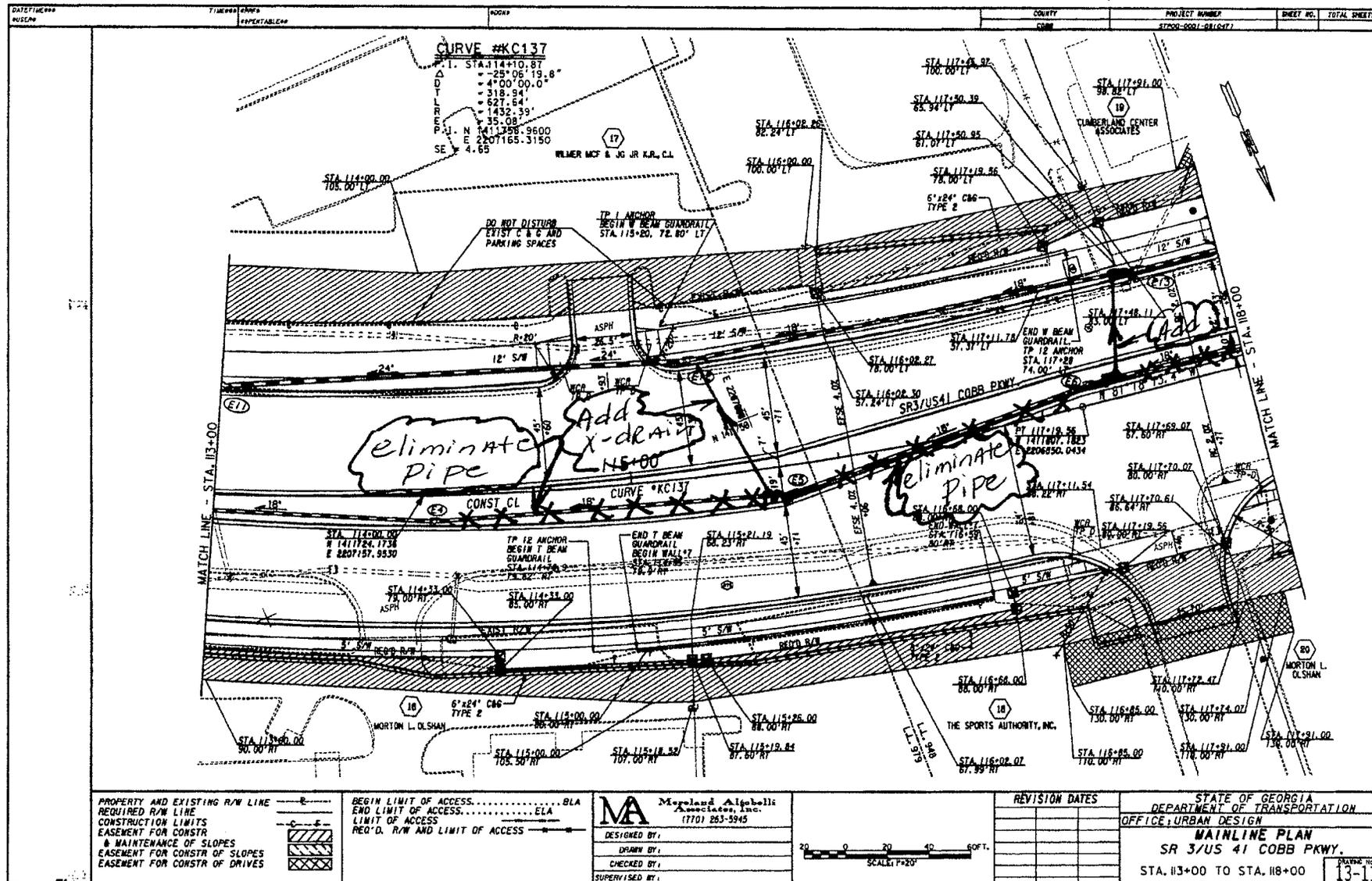
ALT. D-2



ALT. NO.
D-2
Sht. 4 of 8

SHEET 5/8

AH. D-2



PROPERTY AND EXISTING R/W LINE
 REQUIRED R/W LINE
 CONSTRUCTION LIMITS
 EASEMENT FOR CONSTR
 & MAINTENANCE OF SLOPES
 EASEMENT FOR CONSTR OF SLOPES
 EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA
 END LIMIT OF ACCESS.....ELA
 LIMIT OF ACCESS
 REQ'D. R/W AND LIMIT OF ACCESS

MA Megland Alibelli
 Associates, Inc.
 (770) 253-5945
 DESIGNED BY:
 DRAWN BY:
 CHECKED BY:
 SUPERVISED BY:



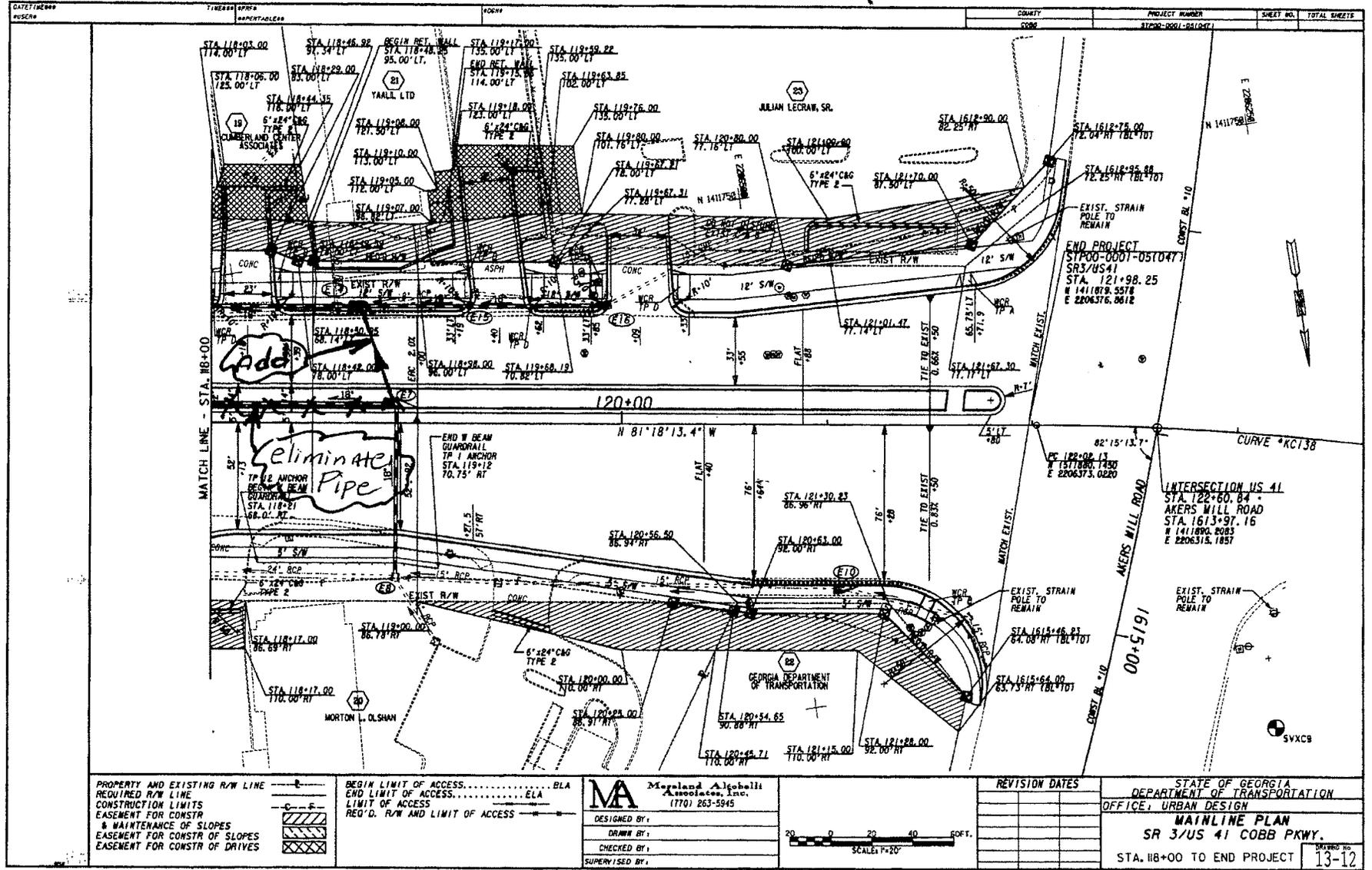
REVISION DATES	

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN
MAINLINE PLAN
 SR 3/US 41 COBB PKWY.
 STA. 113+00 TO STA. 118+00
 DRAWING NO. 13-11

ACT. NO.
 D-2
 SH. 5.0.FB

SHEET
6/8

Alt. D-2

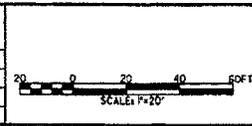


PROPERTY AND EXISTING R/W LINE	—
REQUIRED R/W LINE	—
CONSTRUCTION LIMITS	—
EASEMENT FOR CONSTR	—
& MAINTENANCE OF SLOPES	—
EASEMENT FOR CONSTR OF SLOPES	—
EASEMENT FOR CONSTR OF DRIVES	—

BEGIN LIMIT OF ACCESS BLA
END LIMIT OF ACCESS ELA
LIMIT OF ACCESS
REQ'D. R/W AND LIMIT OF ACCESS

MA Michael A. Magallon Associates, Inc.
(770) 263-5945

DESIGNED BY: _____
DRAWN BY: _____
CHECKED BY: _____
SUPERVISED BY: _____



REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.

STATIONING: STA. 118+00 TO END PROJECT

DRAWING NO. 13-12

Alt. No.
D-2
Sat. 6 of 8

CALCULATIONS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD
Cobb County, Georgia

ALTERNATIVE NO.:

D-2

SHEET NO.: **7 of 8**

Alternate Design: Additional pipe for cross-drains = 370 LF of 18 in. storm-drain pipe

Increase pipe size from 18 in. to 24in. = 310 LF

Increase pipe size from 24 in. to 30in. = 50 LF $(\$48.19 - \$35.63) = +\$12.56$

Original/Current Design Savings:

18 in. storm pipe saved = 1,370 LF

Decrease cross-drain size from 24 in. to 18 in. = 150 LF $(\$35.63 - \$27.37) = -\$8.26$

SECTION THREE - PROJECT DESCRIPTION

Project STP00-0001-05(047), P.I. No. 721152, SR 3/US 41/Cobb Parkway Widening from Paces Mill Road to Akers Mill Road is necessary to provide additional capacity along US 41 and preserve the efficient and safe movement of traffic through this urban principal arterial. Traffic analyses conducted along this corridor for design year (2030) traffic conditions indicate that all major intersections would operate at failing levels of service during the AM and PM peak hours. Additional turn lanes at intersections, along with additional through lanes, will help to reduce the risk of rear-end and angle collisions at intersections.

A secondary purpose of the project is to improve bicycle and pedestrian access to and from the high-density residential and commercial developments throughout the project area. This section of US 41 is currently designated as a bicycle route by Cobb County and is part of an extensive network of existing and planned multi-use paths. Additionally, the proposed multi-use path will connect to the Chattahoochee River Natural Recreational Area along the Chattahoochee River, which serves as a primary recreation destination.

This project is one of three widening projects being planned for US 41/Cobb Parkway/Northside Parkway and picks up immediately after P.I. No. 720125, SR 3/US 41/Northside Parkway and Cobb Parkway over the Chattahoochee River in Fulton and Cobb Counties, better known as the “Bridge Project.” The existing roadway consists of four lanes with a variable width, two-way left turn lane and right turn lanes at most major intersections.

This project will widen and reconstruct US 41 to a 6-lane urban facility with 11-ft.-wide through lanes and turn lanes, a 26-ft.-wide raised median, a 12-ft. multi-use path on the west side of US 41, and a 5-ft.-wide sidewalk on the east side of US 41 from just south of Paces Mill Road (Sta. 65+84.64) to the US 41/Akers Mill Road intersection (Sta. 121+98.25) in Cobb County. The length of the project is approximately 0.84 miles.

The project includes turn lanes at the following intersections along SR 3/US 41/Cobb Parkway:

Northbound SR 3/US 41/Cobb Parkway

- One right turn lane and one left turn lane at Paces Mill Road
- One left turn lane at the access drive at Sta. 81+20 RT
- One right turn lane and dual left turn lanes at Cumberland Boulevard
- One left turn lane at the access drive at Sta. 98+10 RT
- One right turn lane and one left turn lane at Riverwood Parkway
- One right turn lane at the access drive at Sta. 108+70 RT
- One right turn lane and one left turn lane at the access drive at Sta. 111+90 RT
- One right turn lane into the right-in/right-out access drive at Sta. 117+50 RT
- An additional through lane and one right turn lane at Akers Mill Road

Southbound SR 3/US 41/Cobb Parkway

- One right turn lane and one left turn lane at Paces Mill Road
- One right turn lane into the right-in/right-out at Chattahoochee NRA Drive West
- One right turn lane at the access drive at Sta. 81+20 LT
- One right turn lane and dual left turn lanes at Cumberland Boulevard
- One left turn lane at the access drive at Sta. 98+10 LT
- One right turn lane and one left turn lane at Riverwood Parkway
- One right turn lane at the access drive at Sta. 108+20 LT
- One left turn lane at the access drive at Sta. 111+90 LT

Traffic signals will be replaced at all existing signalized intersections along SR 3/US 41/Cobb Parkway and a new traffic signal will be installed at the access drive at Sta. 111+90 to improve access to Cumberland Festival and Akers Mill Square.

The project includes eight retaining walls at the following locations along SR 3/US 41/Cobb Pkwy:

- Wall No. 1: Sta. 73+00 LT to Sta. 77+41 LT
- Wall No. 2: Sta. 77+92 RT to Sta. 87+06 RT
- Wall No. 3: Sta. 77+89 LT to Sta. 79+65 LT
- Wall No. 4: Sta. 90+15 RT to Sta. 91+04 RT
- Wall No. 5: Sta. 98+40 RT to Sta. 101+56 RT
- Wall No. 6: Sta. 104+87 LT to Sta. 106+62 LT
- Wall No. 7: Sta. 114+95 RT to Sta. 111+54 RT
- Wall No. 8: Sta. 118+48 LT to Sta. 119+08 LT

Normal and superelevated sections along SR3/US 41/Cobb Parkway include urban shoulders and 26-ft.-wide raised median with type 7 curb face the length of the project. A closed, piped drainage system will be installed with curb inlets and longitudinal reinforced concrete storm water pipes. The project includes a new detention pond between Sta. 82+09 LT and Sta. 84+52 LT.

A design variance will likely be required due to the signal spacing being less than 660 ft. for signals located at Sta. 91+90, Sta. 98+04, and Sta. 104+08.

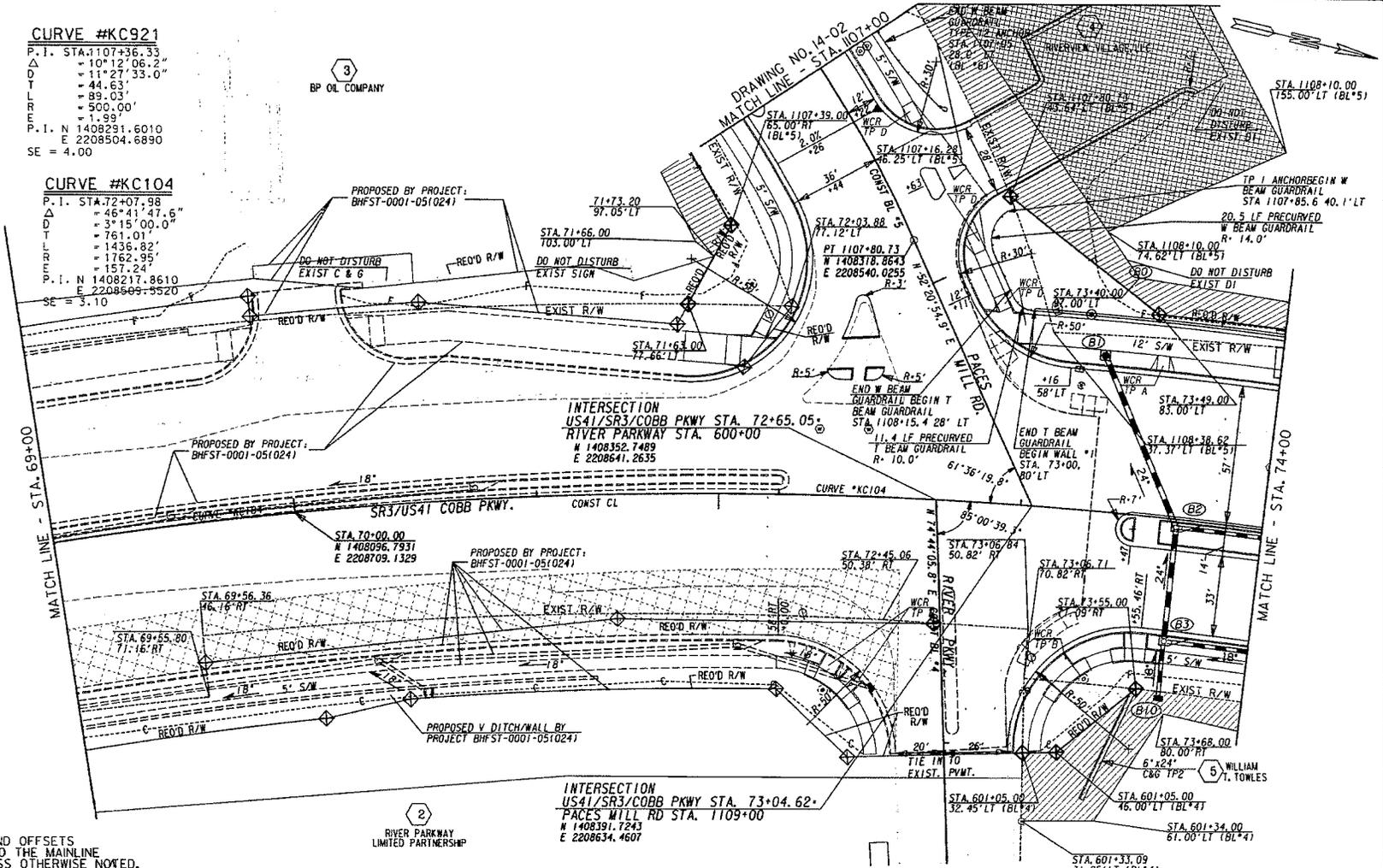
The estimated total cost of construction for the project is \$7,795,147 based upon the Detailed Cost Estimate for STP00-0001-05(047) dated January 25, 2011. The estimated right-of-way cost is \$17,140,000 and the estimated reimbursable utilities cost was not available at the start of the VE workshop. This is a FY 2015 project with a goal to accelerate the project to FY 2013. The estimated duration for construction is 24 months.

Selected project drawings follow.

CURVE #KC921
P.I. STA. 1107+36.33
Δ = 10° 12' 06.2"
D T = 11° 27' 33.0"
L = 44.63'
R = 89.03'
E = 500.00'
P.I. N 1408291.6010
E 2208504.6890
SE = 4.00

BP OIL COMPANY

CURVE #KC104
P.I. STA. 72+07.98
Δ = 48° 41' 49.6"
D T = 3° 15' 00.0"
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E = 1762.95'
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E 2208509.5520
SE = 3.10



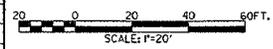
NOTE:
ALL STATIONS AND OFFSETS
ARE REFERRED TO THE MAINLINE
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EASEMENT FOR CONSTR OF SLOPES	—
EASEMENT FOR CONSTR OF DRIVES	—

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W/LL & OVERLAY CONSTRUCTION

MA Moreland Alogelli Associates, Inc.
(770) 263-5945

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SUPERVISED BY:



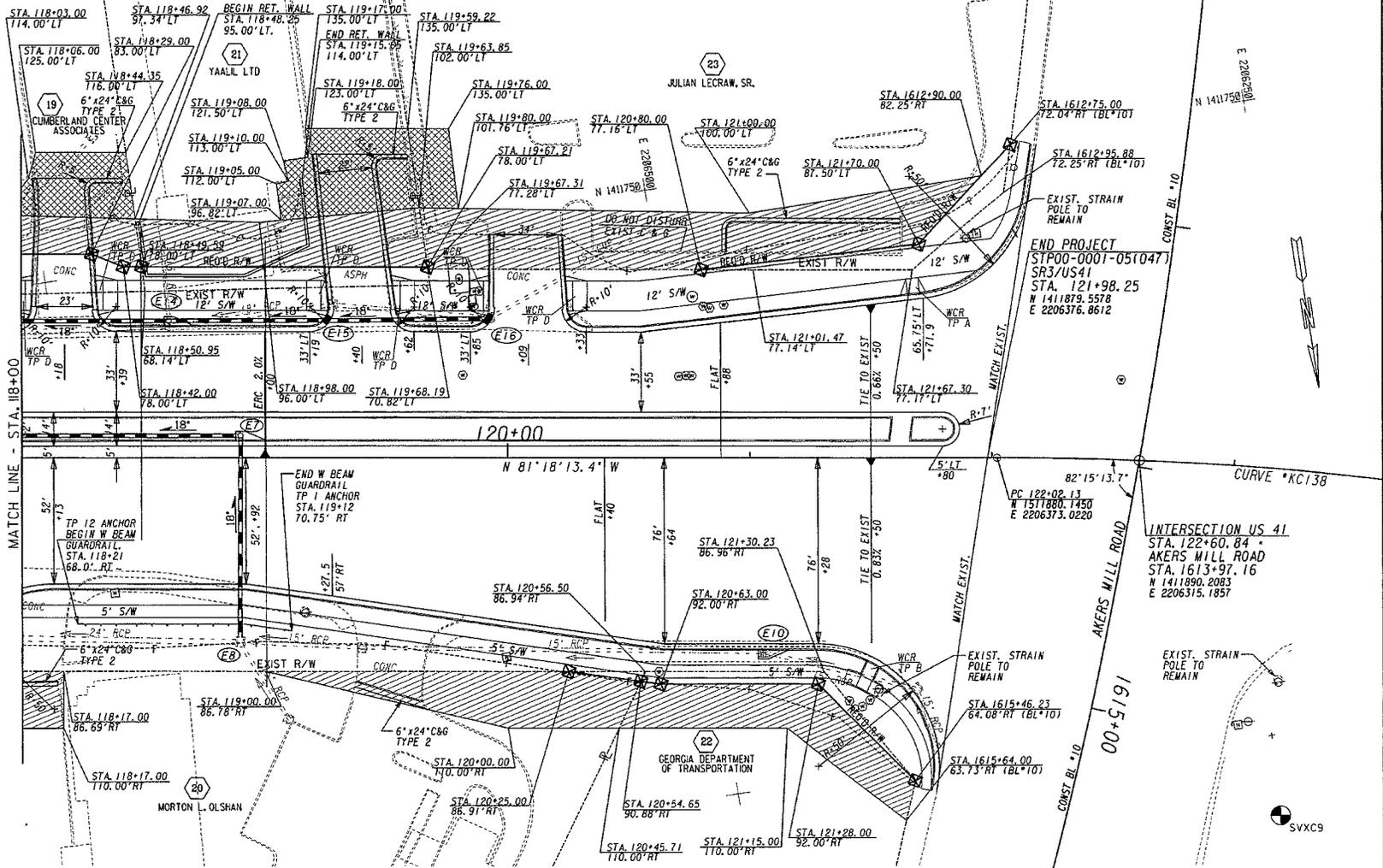
REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.

STA. 69+00 TO STA. 74+00

DATE: 12-13-02



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MA Moreland Algobelli
 Associates, Inc.
 (770) 263-5945

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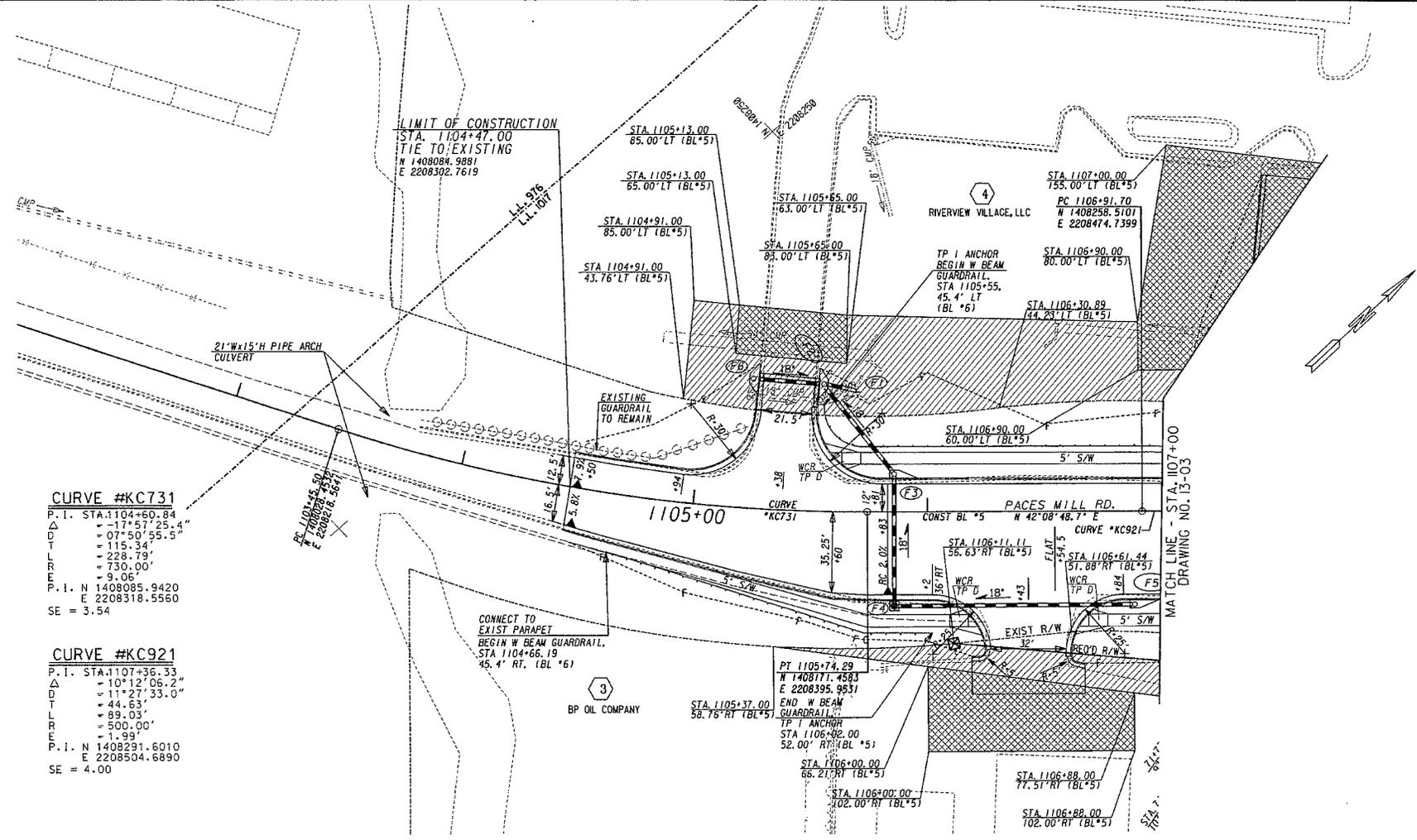
REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
 SR 3/US 41 COBB PKWY.

STA. 118+00 TO END PROJECT

DRAWING NO: 13-12



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SE = 4.00

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(770) 263-5945

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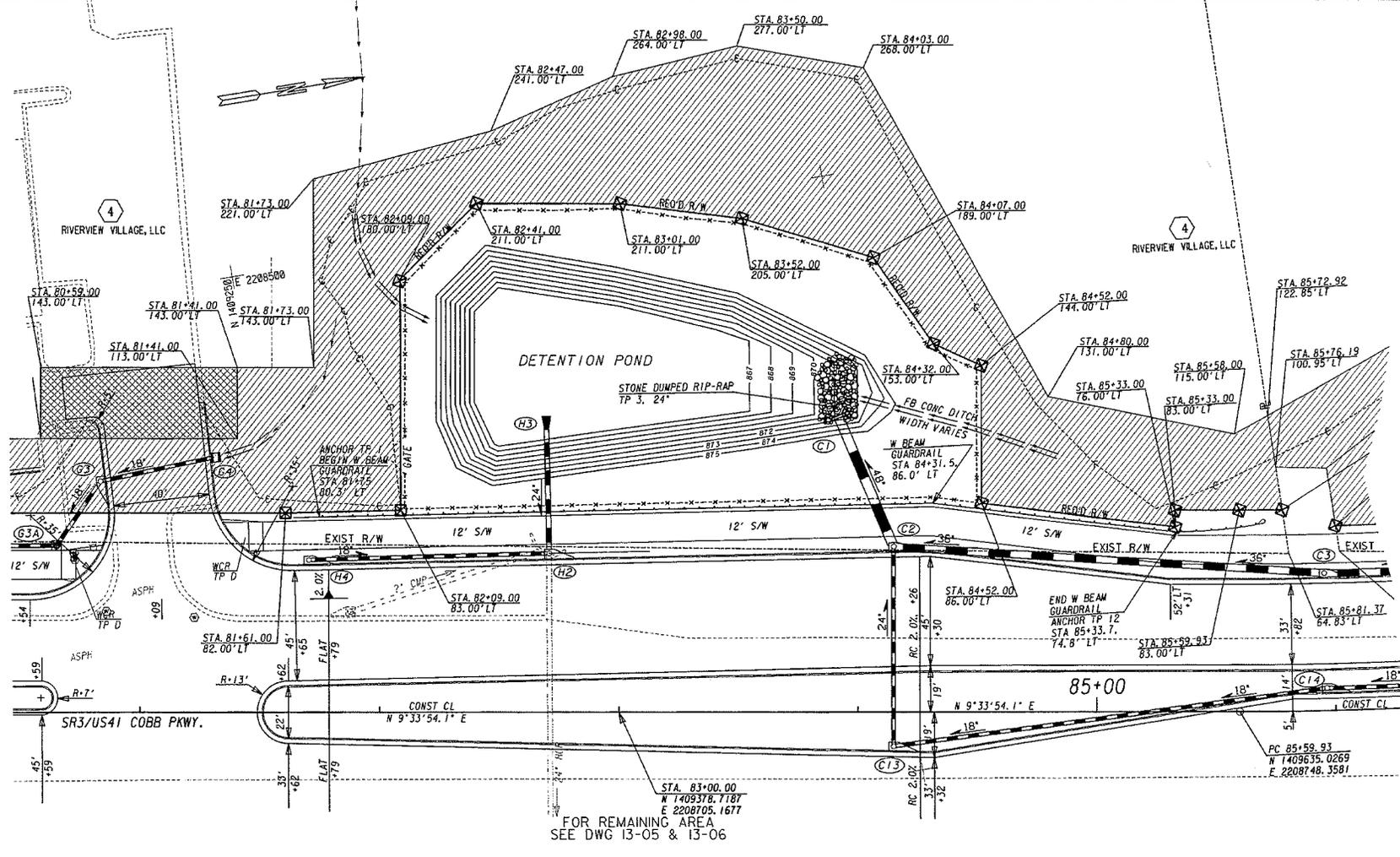
REVISION DATES	

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

CROSSROAD PLAN
PACES MILL RD.

STA104+50 TO STA.107+00

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FOR REMAINING AREA
SEE DWG 13-05 & 13-06

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MA Morganti Associates, Inc.
 17701 263-5945

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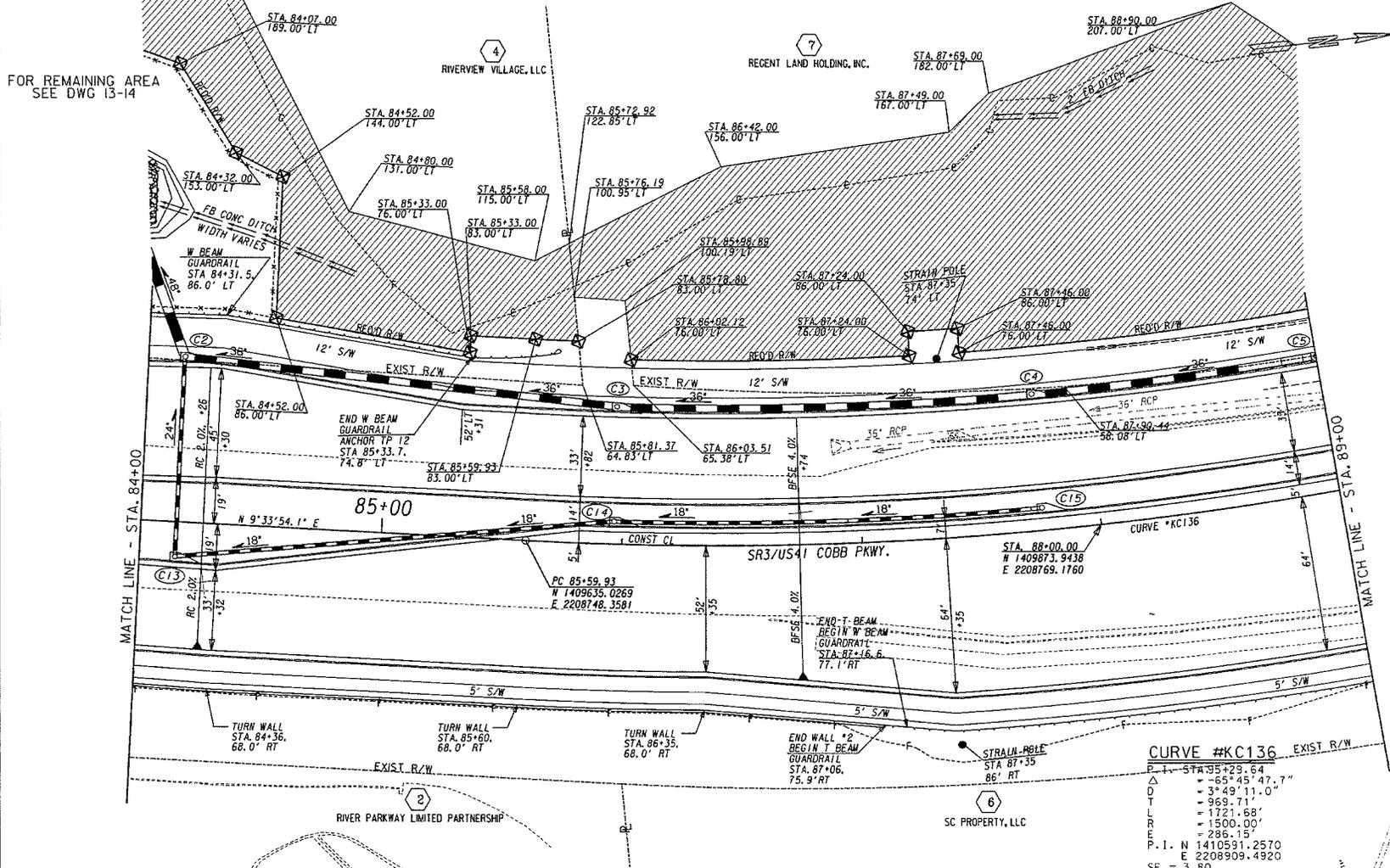


REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
 SR 3/US 41 COBB PKWY.
 DETENTION POND

DATE: 04/15/14
 DRAWING NO: 13-04A

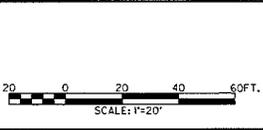


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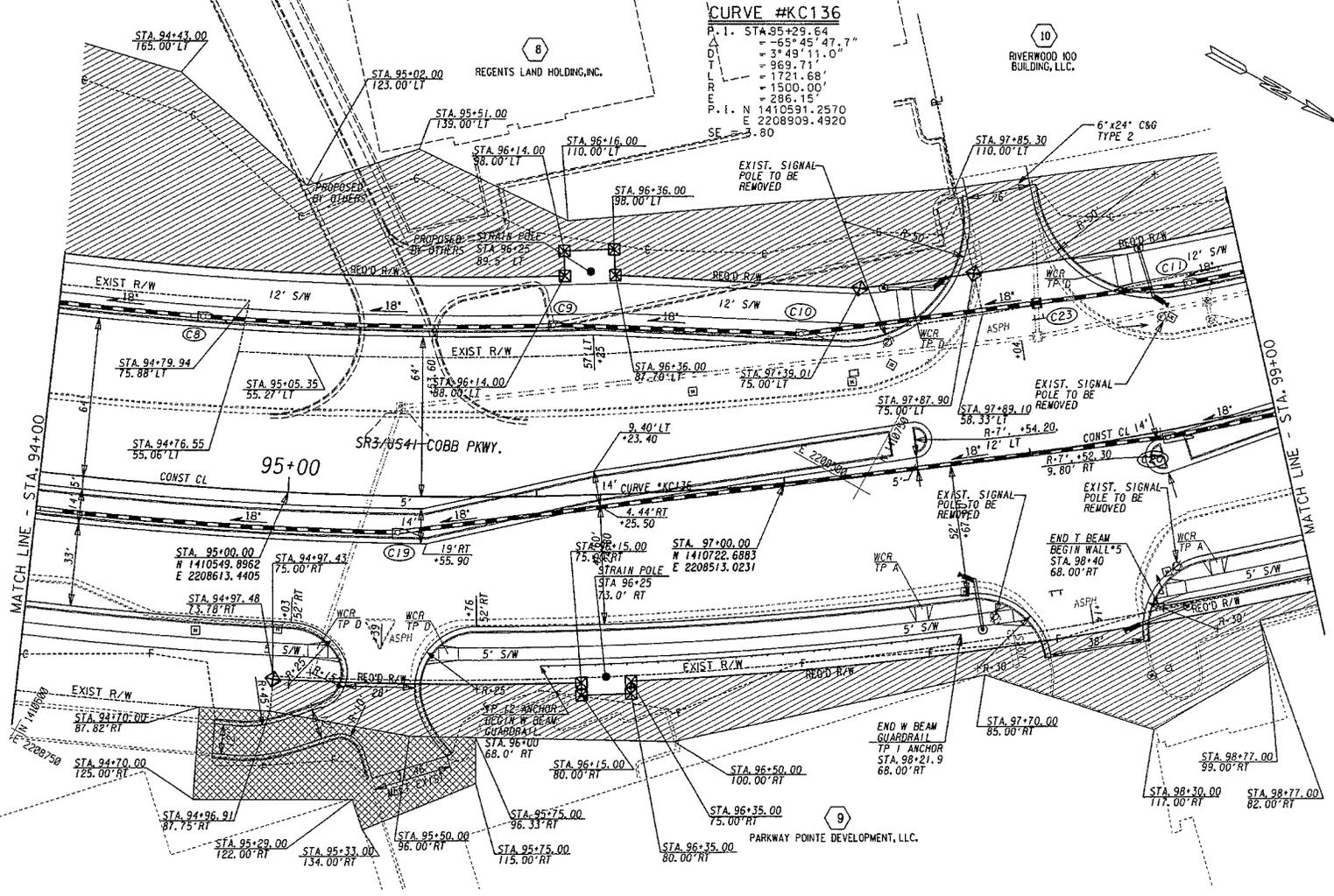
REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
 SR 3/US 41 COBB PKWY.

STA. 84+00 TO STA. 89+00

DRAWING NO. 13-05

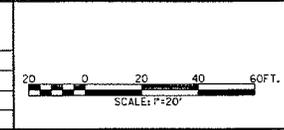


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MA Mossland Algebelli Associates, Inc.
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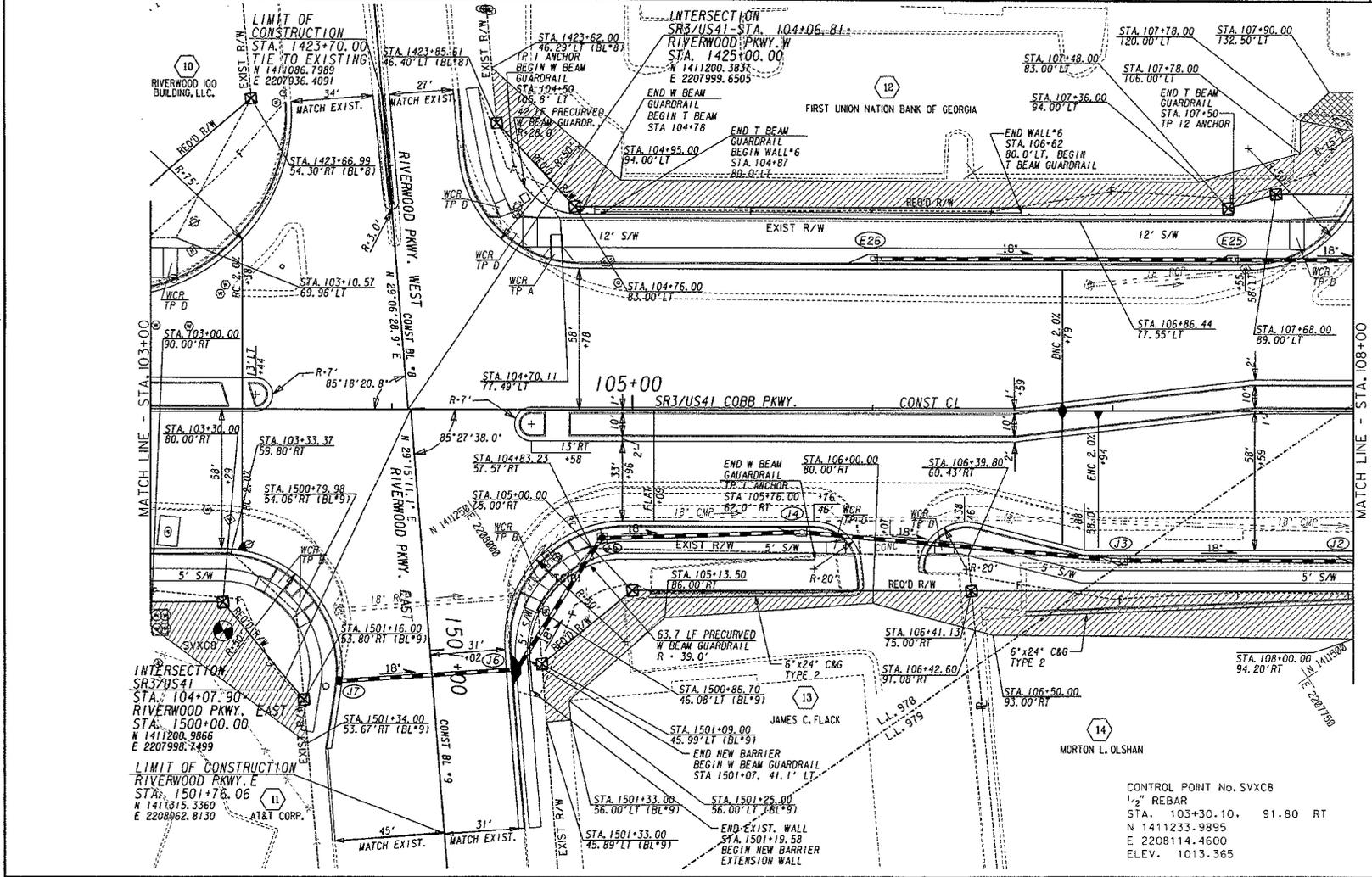


REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
 SR 3/US 41 COBB PKWY.
 STA. 94+00 TO STA. 99+00

DRAWING NO. 13-07



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MA Moreland Alibelli Associates, Inc.
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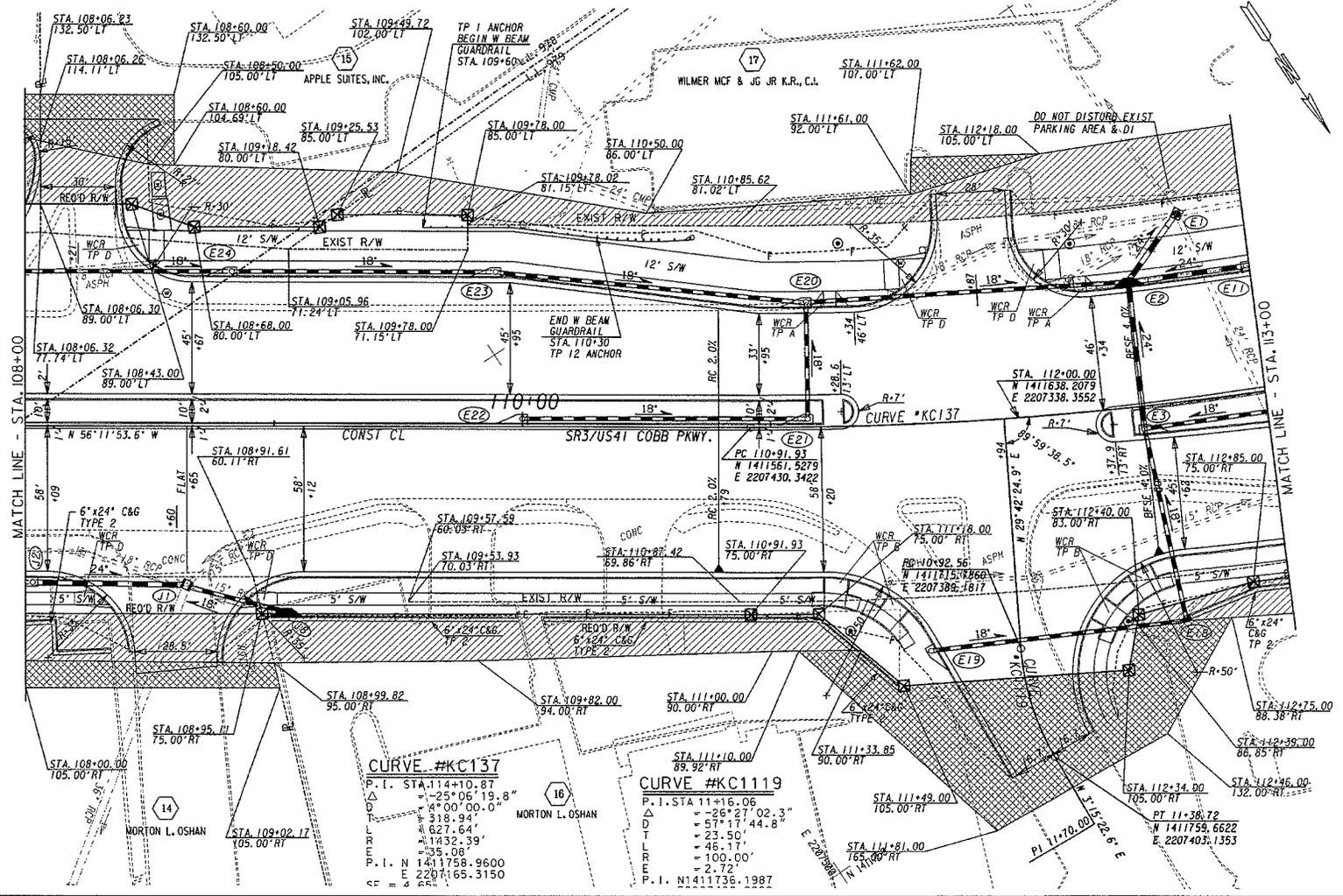
REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.

STA. 103+00 TO STA. 108+00

DRAWING NO. **13-09**



PROPERTY AND EXISTING R/W LINE
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MA Maryland Alibelli Associates, Inc.
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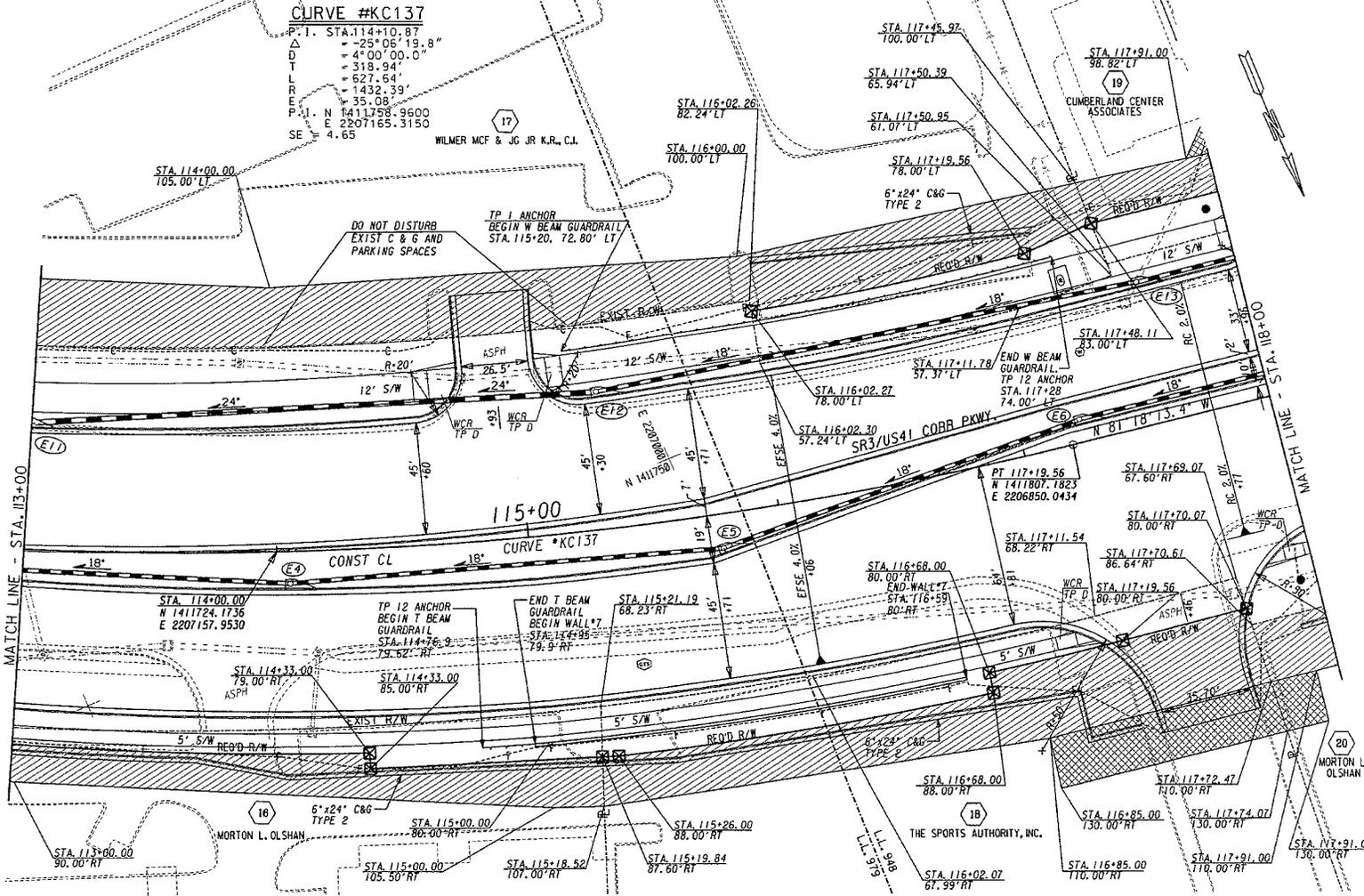


REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.
 STA. 108+00 TO STA. 113+00

DRAWING NO. 13-10

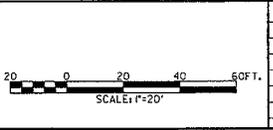


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REVISION DATES

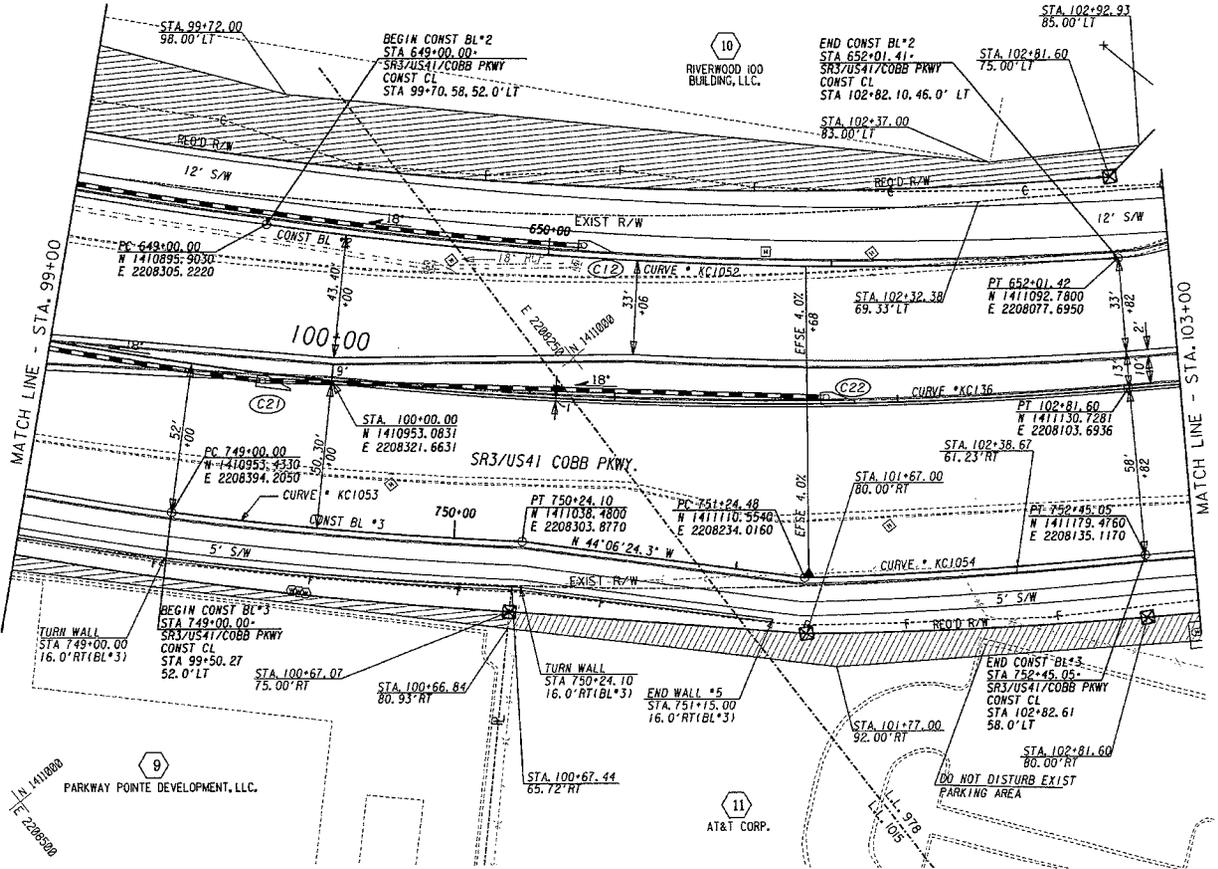
STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.
 STA. 113+00 TO STA. 118+00

DRAWING NO. **13-11**

DATE/TIME/ISSUE	TIME/ISSUE	APP/REV	EDG/REV	COUNTY	PROJECT NUMBER	SHEET NO	TOTAL SHEETS
USERS	**PENTABLES*			COBB	STP00-0001-08(047)		

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L = 969.71'	L = 62.09'	L = 60.32'	L = 151.26'
R = 1721.68'	R = 124.10'	R = 120.58'	R = 301.42'
E = 1500.00'	E = 1507.94'	E = 1519.94'	E = 1451.28'
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P.I. N 1410991.2570	P.I. N 1410997.8160	P.I. N 1411146.9775	P.I. N 1411006.1982
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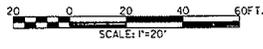


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MA Moreland Altabelli Associates, Inc.
 (770) 263-5945

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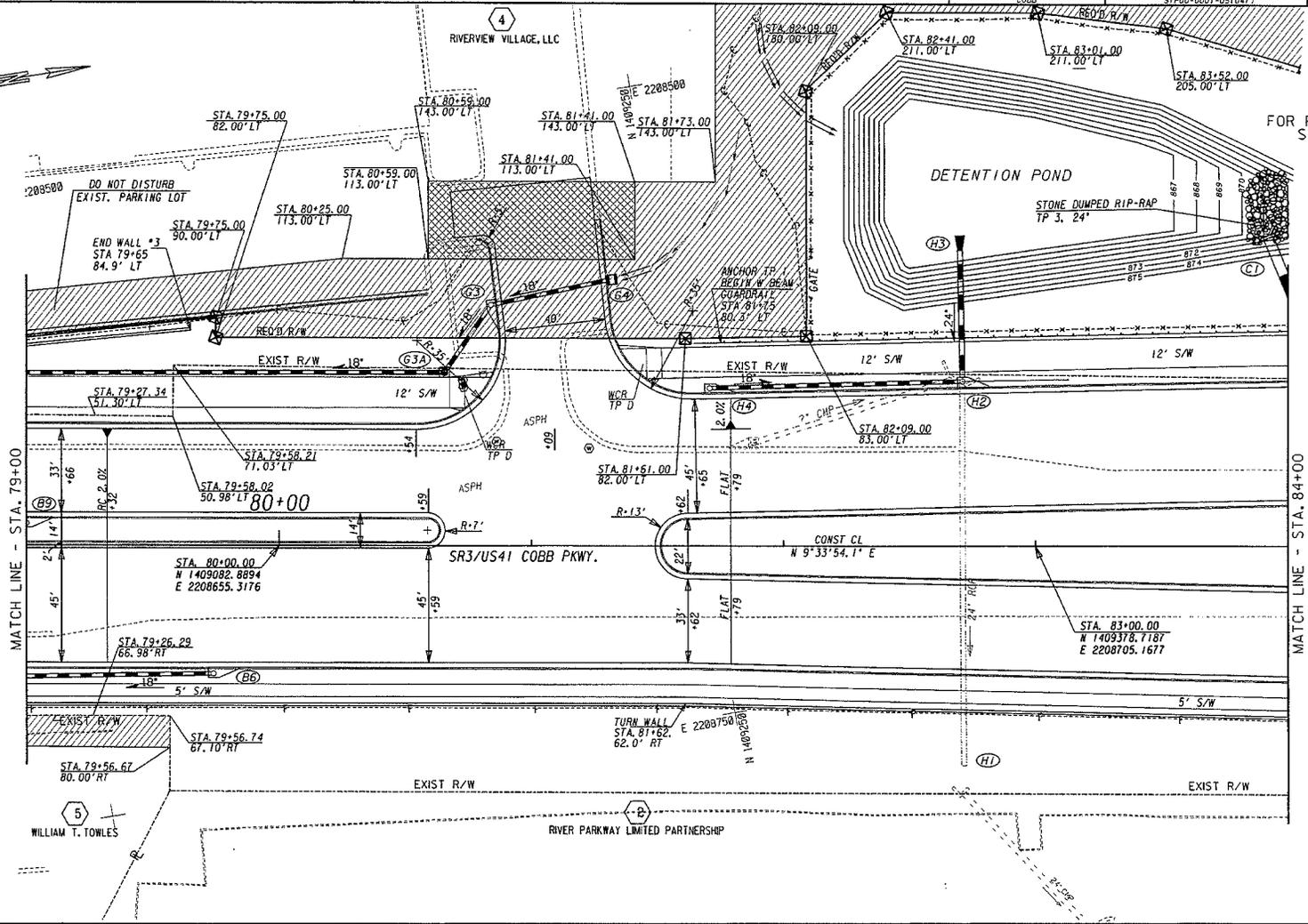


REVISION DATES

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
 SR 3/US 41 COBB PKWY.
 STA. 99+00 TO STA. 103+00

DRAWING NO
13-08



MATCH LINE - STA. 79+00

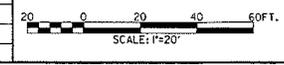
MATCH LINE - STA. 84+00

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REVISION DATES	

STATE OF GEORGIA
 DEPARTMENT OF TRANSPORTATION
 OFFICE: URBAN DESIGN

MAINLINE PLAN
SR 3/US 41 COBB PKWY.

STA. 79+00 TO STA. 84+00

DRAWING NO.
13-04

DATE PLOTTED: 11/14/2014 10:58:58 AM

SECTION FOUR - VALUE ANALYSIS AND CONCLUSIONS

INTRODUCTION

This section describes the value analysis (VA) procedure used during the VE study conducted for Cobb County and GDOT by ARCADIS U.S., Inc. on the SR 3/US 41 Cobb Parkway Widening from Paces Mill Road to Akers Mill Road in Cobb County, GA. The workshop was performed as the design neared the 60% completion stage. Moreland Altobelli Associates, Inc., the designers, and GDOT have provided information for the VE team to use as the basis of the study.

A systematic approach was used in the VE study and the key procedures involved were organized into three distinct parts: 1) preparation; 2) VE workshop; and 3) post-study. A Task Flow Diagram that outlines each of the procedures included in the VE study is attached for reference.

Following this description of the VA procedure, separate narratives and supporting documentation identify the following:

- VE workshop participants
- Economic data
- Cost model
- Function analysis
- Creative ideas and evaluations

PREPARATION EFFORT

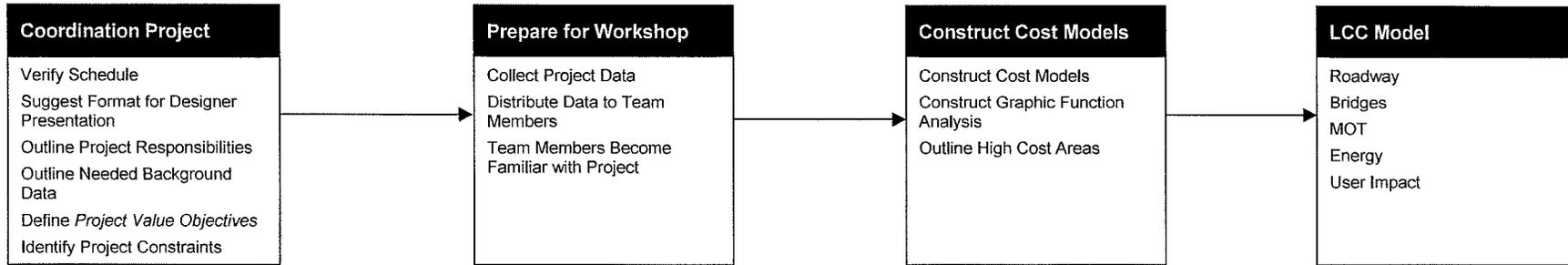
Preparation for the workshop consisted of scheduling workshop participants and tasks and gathering necessary project documents for team members to review before attending the workshop. Documents such as those listed below were used as the basis for generating VE alternatives and for determining the cost implications of the selected VE alternatives:

- Plan and Profile of Proposed SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Cobb County, STP00-0001-05(047), P.I. No. 721152, prepared by Moreland Altobelli Associates, Inc., dated February 22, 2011
- Revised Project Concept Report Approval, SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Project No. STP00-0001-05(047), P.I. No. 721152, prepared by GDOT, dated February 2, 2005
- Detailed Right-of-Way Cost Estimate Worksheets, SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Project No. STP00-0001-05(047), P.I. No. 721152, prepared by GDOT, dated January 20, 2011
- Detailed Cost Estimate, SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Project No. STP00-0001-05(047), P.I. No. 721152, prepared by GDOT, dated January 25, 2011
- VE Study Constraints Form, SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Cobb County, STP00-0001-05(047), P.I. No. 721152, prepared by GDOT

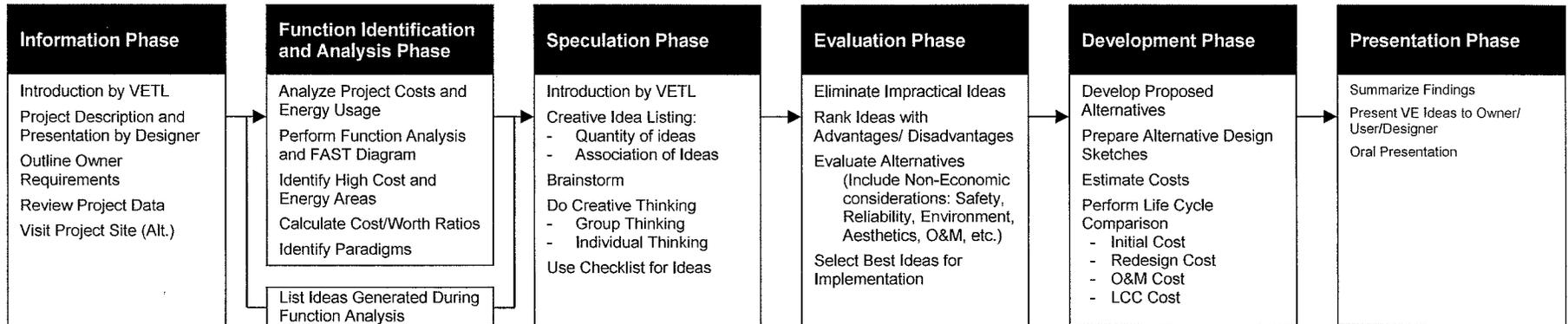


Value Engineering Study Task Flow Diagram

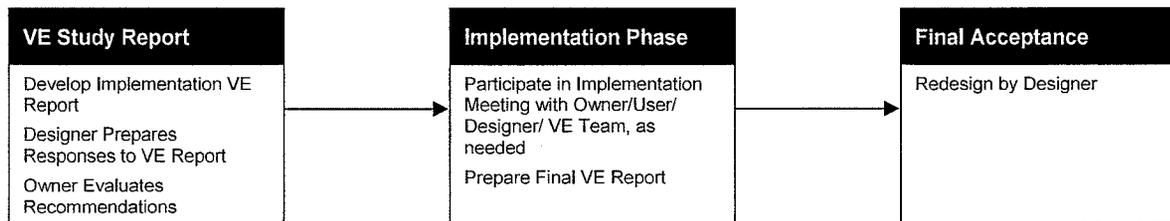
Preparation Effort



Workshop Effort



Post-Workshop Effort



- EA/FONSI Reevaluation, SR 3/US 41 Cobb Pkwy Widening from Paces Mill Road to Akers Mill Road, Cobb County, STP00-0001-05(047), P.I. No. 721152,, prepared by GDOT, dated January 24, 2011
- Item Mean Summary for January 2010 to December 2010, prepared by GDOT
- A Policy on Geometric Design of Highways and Streets, 2004, AASHTO
- GDOT Standard Specifications, Construction of Transportation Systems, 2001 Edition
- GDOT Design Policy Manual, Revised June 11, 2010
- GDOT Traffic Signal Design Guidelines, Revision: 1.2, November 2003
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO, July 2004
- Guide for the Development of Bicycle Facilities, 1999, AASHTO
- Manual on Uniform Traffic Control Devices for Streets and Highways, AASHTO, 2009 Edition
- GDOT Bridge and Structures Design Policy Manual, Office of Bridge and Structure Design, Revised June 2010
- Roadside Design Guide, 2002, AASHTO

VALUE ENGINEERING WORKSHOP EFFORT

The VE workshop was a 3-1/2 day effort beginning with an orientation/kickoff meeting on Monday, February 21, 2011 and concluding with the final VE Presentation on Thursday, February 24, 2011. During the workshop, the VE Job Plan was followed in compliance with the U.S. Federal Highway Administration guidelines for conducting a VE study. The Job Plan guided the search for alternatives to mitigate or eliminate high-cost drivers, secondary functions providing little or no value, and potential project risks. Alternatives to specifically address the owner's project concerns and enhance value by improving operations, reducing maintenance requirements, enhancing constructability, and providing missing functions were also considered. The Job Plan includes six phases:

- Information Phase
- Function Identification and Analysis Phase
- Creative Phase
- Evaluation Phase
- Development Phase
- Presentation Phase

Information Phase

At the beginning of the study, the decisions that have influenced the project's design and proposed construction methods have to be reviewed and understood. For this reason, the workshop began with a presentation of the project by Moreland Altobelli Associates, Inc. and GDOT to the VE team. The presentation highlighted the information provided in the documentation reviewed by the VE team before the workshop and expanded on it to include a history of the project's development and any underlying influences that caused the design to develop to its current state. During this presentation, VE team members were given the opportunity to ask questions and obtain clarification about the information provided.

Function Identification and Analysis Phase

Having gained some information on the project, the VE team proceeded to define the functions provided by the project, identifying the costs to provide these functions, and determining whether the value provided by the functions has been optimized. Function analysis is a means of evaluating a project to see if the expenditures actually perform the requirements of the project or if there are

disproportionate amounts of money spent on support functions. Elements performing support functions add cost to the project but have a relatively low worth to the basic function.

Function is defined as the intended use of a physical or process element. The team attempted to identify functions in the simplest manner using measurable noun/verb word combinations. To accomplish this, the team first looked at the project in its entirety and randomly listed its functions, which were recorded on Random Function Analysis Worksheets (provided in the Function Identification and Analysis section). After identifying the functions, the team classified the functions according to the following:

<u>Abbreviation</u>	<u>Type of Function</u>	<u>Definition</u>
HO	Higher Order	The primary reason the project is being considered or project goal.
B	Basic	A function that must occur for the project to meet its higher order functions.
S	Secondary	A function that occurs because of the concept or process selected and may or may not be necessary.
RS	Required Secondary	A secondary function that may not be necessary to perform the basic function but must be included to satisfy other requirements or the project cannot proceed.
G	Goal	Secondary goal of the project.
O	Objective	Criteria to be met.
LO	Lower Order	A function that serves as a project input.

Higher order and basic functions provide value, while secondary functions tend to reduce value. The goal of the next job phase is to reduce the impact of secondary functions and thereby enhance project value.

To further clarify the impact of the various functions, the team assigned costs to provide the functions or group of functions indicated by a specific project element using the cost estimate and cost model. Where possible, they seek to find the lowest cost to perform the function. This is accomplished using published data from other sources or team knowledge obtained from working on other similar projects to establish cost goals and then comparing them to the current costs. The team also used the cost model to seek out the areas where most of the project funds are being applied. Because of the absolute magnitude of these high-cost elements or functions, they also became initial targets for value enhancement.

Overall, these exercises stimulated the VE team members to focus on apparently low value areas and initially channel their creative idea development in these places.

Creative Phase

This VE study phase involved the creation and listing of ideas. Creative idea worksheets were organized by project element. During this phase, the VE team developed as many ideas as possible to provide the necessary functions within the project at a lower cost to the owner, or to improve the quality of the project. Judgment of the ideas was restricted at this point. The VE team was looking for a large quantity of ideas and association of ideas.

GDOT may wish to review the creative list since it may contain ideas that can be further evaluated for potential use in the design.

Evaluation Phase

During this phase of the workshop, the VE team judged the ideas generated during the creative phase. Advantages and disadvantages of each idea were discussed to find the best ideas for development. Ideas found to be irrelevant or not worthy of additional study were discarded. Those that represented the greatest potential for cost savings or improved functionality were then developed further.

Each idea or alternative was compared with the present design in terms of how well it met the design intent. Advantages and disadvantages were discussed, and each team member rated the ideas on a scale of one to five, with the best ideas rated 4 or 5. Only those ideas rated 4 or 5 were developed into alternatives. In cases where there was little cost impact but an improvement to the project was anticipated, the designation DS, for design suggestion, was used. The design team should review this listing for possible incorporation of ideas into the project.

The creative listing was re-evaluated frequently during the process of developing alternatives. As the relationship between creative ideas became more clearly defined, their importance and ratings may have changed, or they may have been combined into a single alternative. For these reasons, some of the originally high-rated items may not have been developed into alternatives.

Development Phase

During the development phase, each highly rated idea was expanded into a workable solution. The development consisted of a description of the alternative, life cycle cost comparisons, where applicable, and a descriptive evaluation of the advantages and disadvantages of the proposed alternatives. Each alternative was written with a brief narrative to compare the original design to the proposed change. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The VE alternatives are included in Section Two.

Design suggestions include the same information as the alternatives except that no cost analysis is performed. They too are included in Section Two.

Presentation Phase

The goals of the last phase of the workshop were to summarize the results of the study, to prepare draft Summary of Potential Cost Saving worksheets to hand out at the presentation, and to present the key VE alternatives and design suggestions to GDOT and the designer. The presentation was held on Thursday, February 24, 2011, at the GDOT Headquarters office in Atlanta, Georgia. The purpose of the meeting was to provide the attendees with an overview of the suggestions for value enhancement resulting from the VE study and afford them the opportunity to ask questions to clarify specific aspects of the alternatives presented. Draft copies of the Summary of Potential Cost Savings worksheets were given to the owner and design team to facilitate a timely review and speedy implementation of the selected ideas.

POST-WORKSHOP EFFORT

The post-workshop portion of the VE study included the preparation of this report. Personnel from the GDOT design team will analyze each alternative and prepare a short response, recommending incorporation of the alternative into the project, offering modifications before implementation, or presenting reasons for rejection. ARCADIS is available at your convenience as you review the alternatives. Please do not hesitate to call on us for clarification or further information as you consider an implementation approach.

VALUE ENGINEERING WORKSHOP PARTICIPANTS

The VE team was organized to provide specific expertise on the unique project elements involved. Team members consisted of a multidisciplinary group with highway design and construction experience and a working knowledge of VE procedures. The VE team included the following professionals:

Shamir Poudel, PE	Highway Design	ARCADIS U.S., Inc.
Joe Leoni, PE	Construction/Cost Estimating	ARCADIS U.S., Inc.
Michael Moilanen, PE	Structures Design	ARCADIS U.S., Inc.
Stephen G. Havens, PE, CVS	VE Team Leader	ARCADIS U.S., Inc.

OWNER/DESIGNER PRESENTATION

Representatives from GDOT and Moreland Altobelli Associates, Inc. presented an overview of the project on Monday, February 21, 2011. The purpose of this meeting, in addition to being an integral part of the Information Gathering Phase of the VE study, was to bring the VE team “up-to-speed” regarding the overall project. Additionally, the meeting afforded the design team the opportunity to highlight in greater detail, those areas of the project requiring additional or special attention.

VALUE ENGINEERING TEAM PRESENTATION

A presentation was conducted by the VE team on Thursday, February 24, 2011, at the GDOT Headquarters office in Atlanta, Georgia to review VE alternatives with the owner and representatives from the design team. Copies of the Draft Summary of Potential Cost Savings worksheet were provided to the attendees.

A copy of the meeting participants is attached for reference.

GDOT VE STUDY SIGN-IN SHEET

Meeting
Days

Project No.: STP00-0001-05(047) P.I. No. 721152

County: Cobb

Date: Feb. 21-24, 2011

IN-BRIEF	OUT-BRIEF	NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
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✓		David Richardson		GDOT Roadway	404-631-1705	drichardson@dot.ga.gov

ECONOMIC DATA

The comparisons of life cycle costs between the VE alternatives and the current design solutions were performed on the basis of discounted present worth. To accomplish this, the VE team developed economic criteria to use in its calculations based on information gathered from GDOT and the design team. The following parameters were used when calculating discounted present worth:

Year of Analysis:	2011
Construction Start Date:	2013
Construction Completion:	2015
Planning Period (n):	25
Discount Rate:	3%

COST MODEL

The VE team prepared a Pareto Chart, or Cost Histogram, for the project that follows this page. This Cost Histogram displays the major construction elements identified in the cost estimate prepared by the designer in descending order of magnitude and thus identifies the high cost areas in the project. The high cost elements provide the VE team with one focus for its work during the study.

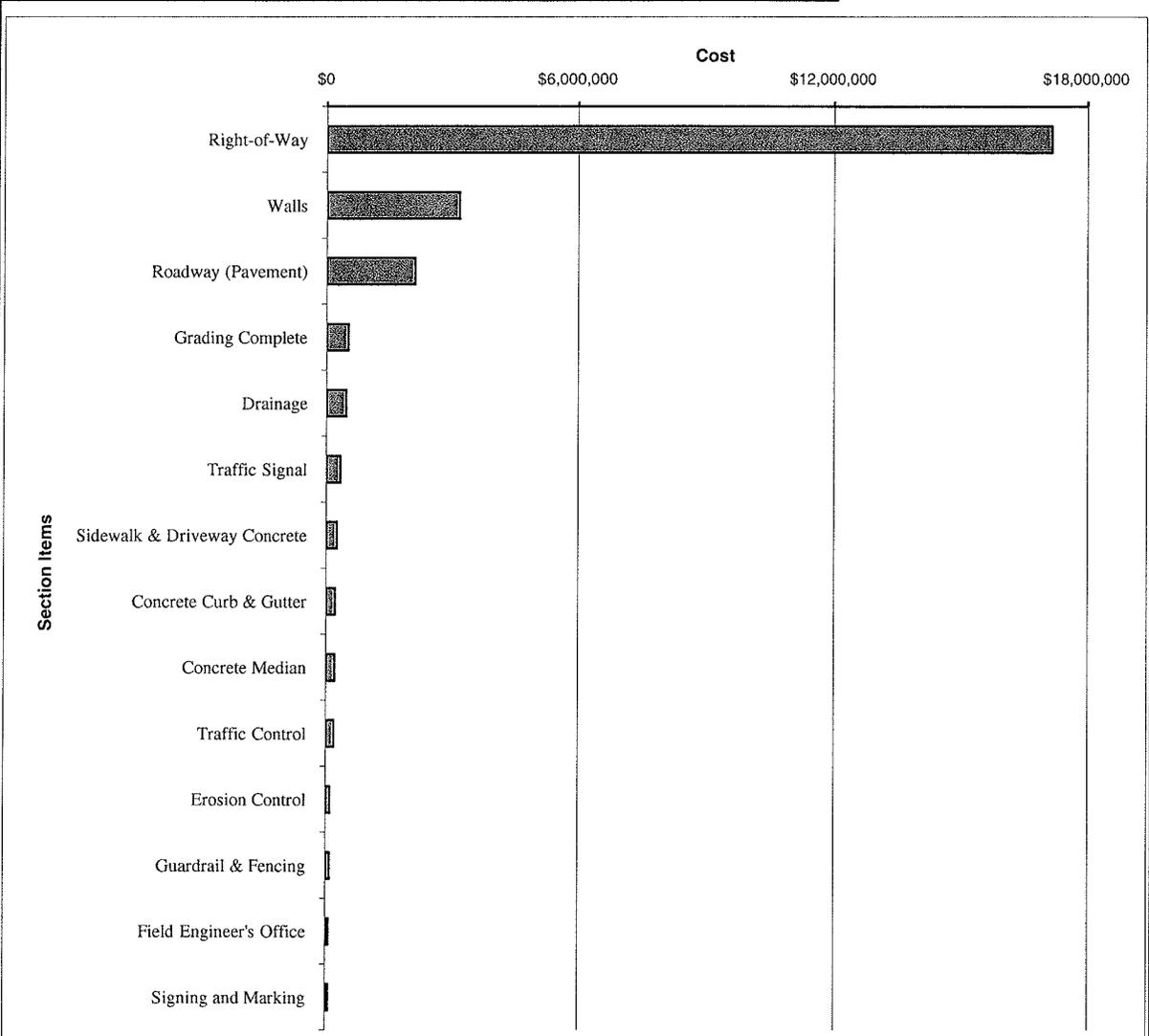
The project elements contributing most to the cost of the project include:

- Right-of-Way
- Walls
- Roadway (Pavement)
- Grading Complete
- Drainage

COST HISTOGRAM ARCADIS

Project: **SR 3/US 41/COBB PKWY WIDENING**
FROM PACES MILL RD. TO AKERS MILL RD.
Cobb County, Georgia

Project No. STP00-0001-05(047) P.I. Number 721152	COST	PERCENT	CUM. PERCENT
Right-of-Way	17,140,000	68.74%	68.74%
Walls 90%	3,190,207	12.79%	81.53%
Roadway (Pavement)	2,126,264	8.53%	90.06%
Grading Complete	520,000	2.09%	92.14%
Drainage	464,855	1.86%	94.01%
Traffic Signal	332,194	1.33%	95.34%
Sidewalk & Driveway Concrete	248,894	1.00%	96.34%
Concrete Curb & Gutter	208,088	0.83%	97.17%
Concrete Median	201,119	0.81%	97.98%
Traffic Control	191,419	0.77%	98.75%
Erosion Control	98,497	0.40%	99.14%
Guardrail & Fencing	90,069	0.36%	99.50%
Field Engineer's Office	63,083	0.25%	99.76%
Signing and Marking	60,457	0.24%	100.00%
Construction Subtotal	\$ 24,935,147	100.00%	
GRAND TOTAL	\$ 24,935,147		



Costs in graph are not marked-up.

FUNCTION ANALYSIS

A function analysis was performed to (1) understand the project purpose and need, (2) define the requirements for each project element, (3) ensure a complete and thorough understanding by the VE team of the basic functions needed to attain the given project purpose and need, (4) identify other goals, and (5) identify secondary functions that should be addressed by the VE team. The Random Function Analysis worksheet completed by the team for the project in its entirety and the various elements follow.

The functions with the greatest potential to add value to the project include the following:

- Retain Earth
- Add Lanes
- Widen Shoulders
- Improve Alignment
- Catch/Convey Stormwater

These functions became the initial areas of focus for value enhancement.

As indicated in the cost model, right-of-way cost represents over 68% of the project. However, since the right-of-way plans are already approved, and the goal is to accelerate this FY 2015 project to FY 2013, any recommended changes to the right-of-way plans that would delay the project schedule will most likely not be considered.

RANDOM FUNCTION ANALYSIS

PROJECT: **SR 3/US 41/COBB PKWY WIDENING** SHEET NO.: 1 of 2
FROM PACES MILL RD. TO AKERS MILL RD.
Cobb County, Georgia

DESCRIPTION	FUNCTION		
	VERB	NOUN	KIND
Project Functions	Maintain	LOS	HO
	Enhance	Safety	HO
	Increase	Capacity	B
	Accommodate	Bicyclists	B
	Accommodate	Pedestrians	B
	Reduce	Delays	B
	Improve	Mobility	G
	Improve	Connectivity	G
	Reduce	Conflicts	B
	Reduce	Crashes	B
	Accommodate	Businesses	B
Right-of-Way \$17.1M	Acquire	Right-of-Way	B
Walls \$3.2M	Retain	Earth	B
Roadway (Pavement) Functions \$2.1M	Extend	Service Life	B
	Add	Lanes	B
	Raise	Median	B
	Widen	Shoulders	B
	Support	Vehicles	B
Grading Functions \$0.5M	Match	Profile/Elevations	B
Drainage Functions \$0.5M	Convey	Stormwater	B
	Catch	Stormwater	RS

Function defined as:	Action Verb Measurable Noun	Kind:	B = Basic S = Secondary RS = Required Secondary	HO = Higher Order LO = Lower Order G = Goal
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CREATIVE IDEA LISTING AND EVALUATION OF IDEAS

During the Creativity Phase, numerous ideas were generated using conventional brainstorming techniques. These ideas were recorded and are shown with their corresponding ranking on the attached Creative Idea Listing Worksheets. For the convenience of tracking an idea through the VA process, the ideas were grouped according to the following categories and numbered in the order in which they were conceived. The following letter prefixes were used to identify the categories.

PROJECT ELEMENT	PREFIX
Roadway	R
Walls	W
Drainage	D

Creative Idea Evaluation

After discussing each idea, the team evaluated the ideas by consensus. The evaluations produced ten ideas rated 4 or 5 to research and develop into formal VE alternatives and two ideas to develop as design suggestions to be included in Section Two of the report. Highly rated ideas that were not developed further may have been combined with another related idea or discarded as a result of additional research indicating the concept as not being cost effective or technically feasible. The reader is encouraged to review the Creative Idea Listing and Evaluation worksheet since it may suggest additional ideas that can be applied to the design.

