



*STP-209-1(2) Roadway and BHF-209-1(3) Bridge  
Widening of SR 74 From SR 85 to*

*Cooper Circle*

*P.I. Nos. 322355 and 322357*

*Fayette County, Georgia*

**Value Engineering Study Report**

Preliminary Design Stage

February 2007

*Design Team*



Mulkey Engineers & Consultants

*Value Engineering Consultants*



Lewis & Zimmerman Associates, Inc.



Lewis & Zimmerman Associates, Inc.

Taking the Chance out of Change

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March 1, 2007

Ms. Lisa L. Myers  
Design Review Engineer Manager  
State of Georgia Department of Transportation, General Office  
No. 2 Capitol Square, Room 266  
Atlanta, Georgia 30334-1002

re: Project Number STP-209-1(2) and BHF-209-1(3) P. I. Nos. 322355 and 322357  
Widening of SR 74 from SR 85 to Cooper Circle, Fayette County  
Value Engineering Study Report

Dear Ms. Myers:

Lewis & Zimmerman Associates, Inc. is pleased to submit four hard copies and one CD-ROM of the referenced report. The report contains 17 alternatives that could be used to reduce the project cost and five design suggestions that will improve the value of the project by enhancing safety, reducing future disturbance to the public, and improving constructability. Specific project elements that are driving the project cost and constructability and are addressed in the report include the amount of pavement being provided, the amount of curb, gutter and sidewalk being provided, and the need to relocate two 20-in. diameter water transmission lines.

We thank you for your hospitality and for providing the information necessary for the VE team to generate creative, alternative solutions for this project.

We are available to answer any questions you may have as you review this report and determine implementation.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.

Howard B. Greenfield, PE, CWS  
Vice President

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## **EXECUTIVE SUMMARY**

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### **INTRODUCTION**

This value engineering (VE) study report summarizes the events and results of the VE study conducted by Lewis & Zimmerman Associates, Inc. for the Georgia Department of Transportation (GDOT). The subject of the study was the widening of SR 74 from SR 85 to Cooper Circle in Fayette County, GA. (STP-209-1(2) Roadway and BHF-209-1(3) Bridge). The study was conducted February 12–15, 2007 in GDOT's Atlanta Headquarters using the approximately 50% complete design drawings prepared for GDOT by Mulkey Engineers & Consultants.

The study team comprised a multidisciplinary group of design and construction specialists and a Certified Value Specialist facilitator who used the following VE Job Plan to guide the team's deliberations:

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

### **PROJECT DESCRIPTION**

This project expands SR 74 from a two-lane road to a 3.38-mile, four-lane, divided roadway. The project begins north of SR 85 where Padgett Road is realigned to match up with SR 74 south of SR 85. Starting at SR 85, a 24-ft. wide raised median and two 12-ft. wide travel lanes are added to the west of existing SR 74. At major intersections with cross streets, left turn lanes are added in the median. Several minor roads and driveways are provided with right-in/right-out access to the divided highway. U-turns are provided at strategic locations.

At about Millstone Drive, the roadway expansion occurs to the left and right of the existing two-lane road moving back to the west at Lodge Trail. The existing roadway curve starting at the school driveway is flattened. Opposite the school driveway, a new entrance is provided for the daycare center on the west side of the road. Redwine Road is realigned to intersect SR 74 at a 90-degree angle. Rockaway Road, which currently intersects SR 74 at a large skew angle, is relocated to line up with Holly Grove Road on the east side. The road is then totally realigned to the east to cross directly over Flat Creek with a new bridge that will accommodate four lanes and a raised median.

New entrances off SR 74 are provided to the water treatment plant and Gimme Shelter, Inc. The road widening at this point will be to the east. New entrances with left turn lanes to a soccer field complex on the west side and a proposed baseball field complex on the east side will be provided. The expansion will end at Cooper Circle.

Included in the project are the following features:

- Curb, gutter and sidewalks at selected locations along SR 74
- Relocation of two 20-in. diameter water lines from the water treatment plant
- An 8-ft. x 10-ft. concrete box culvert for golf carts to cross under the road
- Three signalized intersections
- Storm water detention ponds
- Silt ponds
- Buried storm water pipes at the curb and gutter sections and drainage ditches at other locations

The designer's estimated cost of the project is approximately \$31 million which includes about \$7 million for obtaining a 150-ft. wide right-of-way throughout the length of the project plus other land to accommodate the project requirements.

## **CONCERNS AND OBJECTIVES**

The cost of the project has been rising due to project development issues and the cost of construction materials, and GDOT desires to optimize the value it receives for the funds expended on this project. To control costs and enhance value, GDOT engaged this VE study with the objective of identifying specific opportunities to reduce cost and improve the performance of the completed project.

## **RESULTS OF THE STUDY**

The VE team developed 17 alternatives with cost-reduction opportunities and five design suggestions that will enhance the project in terms of constructability, avoiding future costs and disruptions to motorists, or enhancing safety. The Summary of Potential Cost Savings table summarizes each alternative and design suggestion developed. Note that some alternatives are mutually exclusive or interrelated so that the total cost savings that can be achieved is dependent on the combination of alternatives selected for implementation. The narrative below highlights some of the more significant findings of the team.

Moving the twin 20-inch diameter water transmission lines presents high risks because of the tie-in requirements and the ability to get the work accomplished so that it does not substantially impede the roadway work. Thus, Alternative Number (Alt. No.) 1 suggests moving the roadway alignment so that the existing water lines do not have to be relocated. This saves coordination aggravation as well as \$1.65 million in project costs.

Two ways to reduce the amount of highway realignment necessary are to use 11-ft. wide lanes in lieu of 12-ft. wide lanes as proposed in Alt. No. 26, and to reduce the width of the gutters from 24-in. to 12-in. as proposed in Alt. No. 2. Each alternative reduces the roadway cross-section by four ft., and the combination of the two reduces the roadway cross-section by eight ft., which may be sufficient to retain the east edge of the current roadway alignment for a majority of the project and not move the water lines.

The pavement section is the largest construction item on the project. One way to reduce the amount of pavement is to limit the length of the left turn lanes. Left turn lanes run for about 80% of the project's length. Many can be shortened because of the low traffic volumes anticipated in the design year. These opportunities are described in Alt. Nos. 12, 14, 15, 17, 22, 27 and 29.

Another expensive item in the project is curb, gutter and sidewalks. There appears to be several potential areas where they may not be needed based on the current and proposed development as illustrated in Alt. Nos. 18 and 19.

The retaining wall proposed along the edge of the daycare center property is intended to avoid taking parking spaces. This wall can be eliminated by providing parking spaces to replace those taken to perform the construction. This saves significant costs and construction time as shown in Alt. No. 8.



# SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

PRESENT WORTH OF COST SAVINGS

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
	<b>GENERAL</b>					
1	Move alignment to avoid a part of the water line relocation	\$ 1,650,000	\$ -	\$ 1,650,000		\$ 1,650,000
2	Reduce the width of the gutter from 24" to 12"	641,297	386,915	254,382		254,382
3	Install underground conduits for a future traffic signal where the baseball field and soccer field driveways intersect with SR 74	Design Suggestion				
4	Use mitered corners for right-of-way at signalized intersections (current and future)	Design Suggestion				
6	Align southbound through lane of SR 74 with Padgett Road	Design Suggestion				
8	Delete retaining wall in front of the daycare center and provide additional parking	203,286	24,894	178,392		178,392
9	Advance utility relocation of 20" diameter water mains	Design Suggestion				
11	Retain the retention pond and buy the entire property in lieu of adding a buried storm water line to Whitewater Creek	631,373	441,705	189,668		189,668
12	Reduce the length of the left/U-turn lane at Lodge Trail	48,686	9,340	39,346		39,346
14	Reduce the length of the left/U-turn lanes at Rockaway Road	66,755	18,700	48,055		48,055
15	Reduce the length of the left turn lanes leading to the soccer field entrance	56,026	14,006	42,020		42,020
17	Delete the U-turn at the center entrance to the soccer field at station 240+00 and improve the down station entrance to the soccer field	31,765	9,152	22,613		22,613
18	Delete the sidewalk adjacent to the soccer fields from station 220+00 to 243+85	191,415	71,629	119,786		119,786
19	Where curb, gutter and sidewalk are provided on both sides of the road delete it on one side	417,275	223,654	193,621		193,621
21	Delete the bike lane between Redwine Road and Rockaway Road and provide a multiuse pavement section	145,904	50,281	95,623		95,623



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## STUDY RESULTS

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### GENERAL

The results are the major feature of this value engineering study since they portray the benefits that can be realized by GDOT, the users and Mulkey Engineers & Consultants, the designer. The results will directly affect the project design and will require coordination between 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 merit, applicability to the project, implementability considering the project's status, and the ability to meet GDOT'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 are in the form of VE alternatives (accompanied by cost estimates) or design suggestions (typically without cost estimates). For each alternative developed, the following information is 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 (where 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 used unit quantities contained in the project cost estimate prepared by the designers, whenever possible. If unit quantities were not available, published databases, such as the one produced by RS Means, or team member or owner databases were consulted. A markup of 10% for engineering and construction services during construction was used to generate an all-inclusive project cost for the construction items being compared.

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 or design suggestion developed is identified with an alternative number (Alt. No.) that can be tracked through the value engineering process, thus facilitating 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 a major project element listed below:

<b>PROJECT ELEMENT</b>	<b>PREFIX</b>
General	None
Bridge	B

Summaries of the alternatives and design suggestions are provided on the Summary of Potential Cost Savings tables. The tables are divided into project elements and are used to divide the results section. The complete documentation of the developed alternatives and design suggestions follow each of the Summary of Potential Cost Savings tables.

### **KEY ISSUES**

The cost of the project is rising due to the need to accommodate additional project scope and the fact that construction material prices are rising at a rate not previously anticipated. In addition, GDOT would like to optimize the value it receives from a performance and needs standpoint for the funds expended on the project.

### **STUDY OBJECTIVES**

GDOT engaged this VE study with the objective of identifying specific means for reducing the project cost and enhancing the performance of the completed project.

### **RESULTS OF THE STUDY**

Research of the ideas identified as having potential for enhancing the value of the project resulted in the development of 17 alternatives and five design suggestions for consideration by GDOT and the design team. These alternatives and design suggestions address the key issues described above, specifically cost and performance measures such as safety, disruption to the public, and appropriateness of the design to meet future traffic conditions.

The costs of the project are being driven by relocation of the water lines, the amount of pavement being installed, and the use of curb, gutter and sidewalks. Several alternatives developed by the VE team address each of these issues as described below.

Moving the twin 20-inch diameter water transmission lines presents high risks because of the tie-in requirements and the ability to get the work accomplished so that it does not substantially impede the roadway work. Thus, Alternative Number (Alt. No.) 1 suggests moving the roadway alignment so that the existing water lines do not have to be relocated. This saves coordination aggravation as well as \$1.65 million in project costs.

Two ways to reduce the amount of highway realignment necessary are to use 11-ft. wide lanes in lieu of 12-ft. wide lanes as proposed in Alt. No. 26, and to reduce the width of the gutters from 24-in. to 12-in. as proposed in Alt. No. 2. Each alternative reduces the roadway cross-section by four ft., and the combination of the two reduces the roadway cross-section by eight ft., which may be sufficient to retain the east edge of the current roadway alignment for a majority of the project and not move the water lines.

The pavement section is the largest construction item on the project. One way to reduce the amount of pavement is to limit the length of the left turn lanes. Left turn lanes run for about 80% of the project's length. Many can be shortened because of the low traffic volumes anticipated in the design year. These opportunities are described in Alt. Nos. 12, 14, 15, 17, 22, 27 and 29.

Another expensive item in the project is curb, gutter and sidewalks. There appears to be several potential areas where they may not be needed based on the current and proposed development as illustrated in Alt. Nos. 18 and 19.

## **EVALUATION OF ALTERNATIVES AND DESIGN SUGGESTIONS**

When reviewing the study results, each part of an alternative or design suggestion should be considered 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 GDOT or the design team 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.

All alternatives should be carefully reviewed 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.



# SUMMARY OF POTENTIAL COST SAVINGS

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*Georgia Department of Transportation*

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15	Reduce the length of the left turn lanes leading to the soccer field entrance	56,026	14,006	42,020		42,020
17	Delete the U-turn at the center entrance to the soccer field at station 240+00 and improve the down station entrance to the soccer field	31,765	9,152	22,613		22,613
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19	Where curb, gutter and sidewalk are provided on both sides of the road delete it on one side	417,275	223,654	193,621		193,621
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# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **1**

DESCRIPTION: **SHIFT ALIGNMENT TO AVOID WATER LINES**

SHEET NO.: **1 of 16**

ORIGINAL DESIGN: (Sketch attached)

The current design assumes that the water lines are inexpensive and easy to relocate. The lines are trunk lines from the Peachtree City Water Treatment Plant. An effort has been made to avoid these lines outside of the station limits below.

ALTERNATIVE: (Sketch attached)

Shift the project alignment from Sta. 135+00± to Sta. 205+00± to avoid the water lines. The required shift is approximately 10 ft.

ADVANTAGES:

- Reduces cost
- Reduces construction time
- Reduces delays due to utility relocations
- Reduces amount of line requiring relocation, possibly completely eliminating the relocation

DISADVANTAGES:

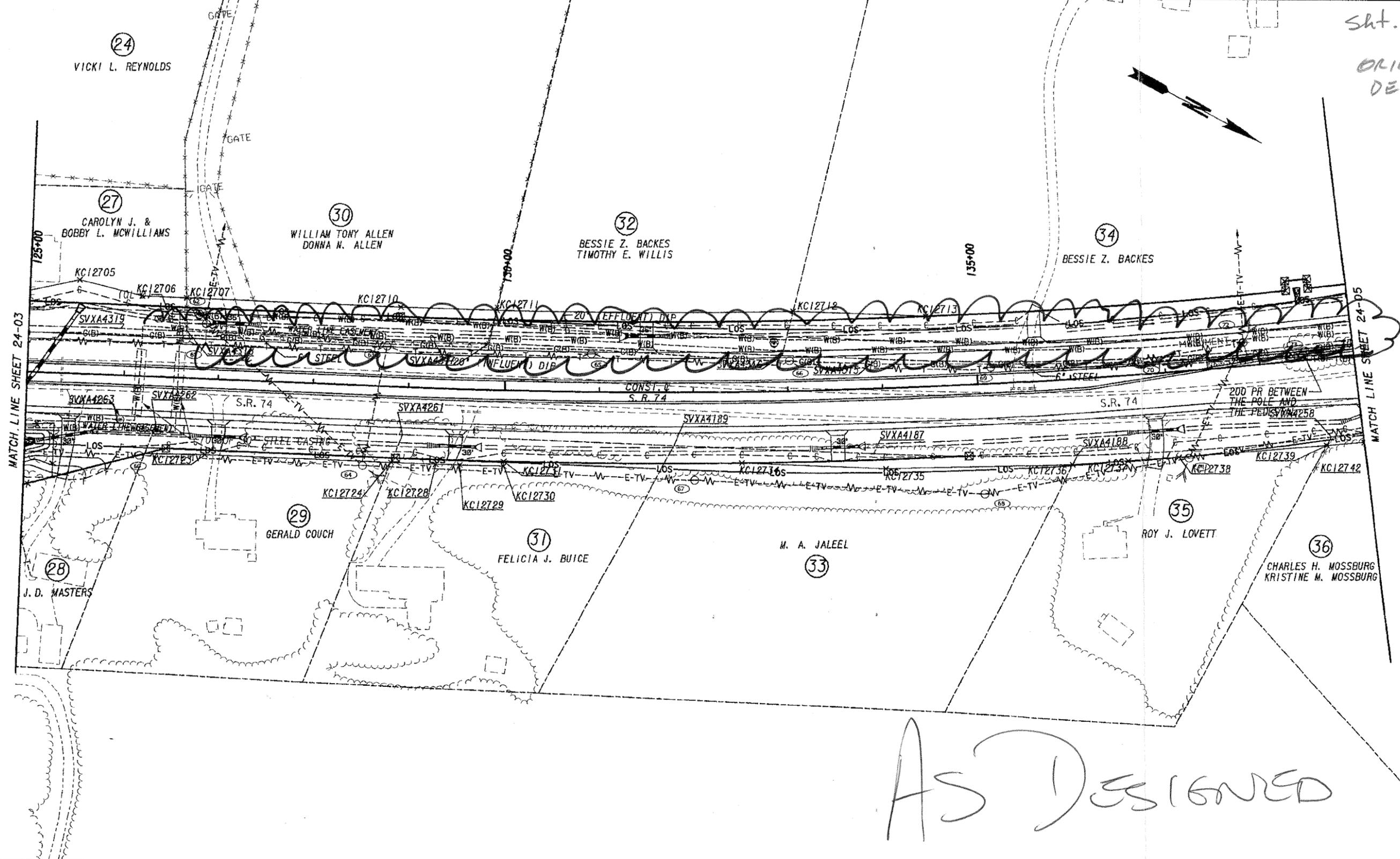
- Requires major redesign
- Requires major adjustments to the right-of-way

DISCUSSION:

With housing distances from the road often exceeding 100 ft., there does not appear to be a valid reason why the horizontal alignment can not be shifted to avoid the water lines. The right-of-way costs would not appreciably change, but amounts would be shifted from one side to the other.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>1,650,000</b>	—	\$ <b>1,650,000</b>
ALTERNATIVE	\$ <b>0</b>	—	\$ <b>0</b>
SAVINGS (Original minus Alternative)	\$ <b>1,650,000</b>	—	\$ <b>1,650,000</b>

Sht. 2 of 16 ORIGINAL DESIGN

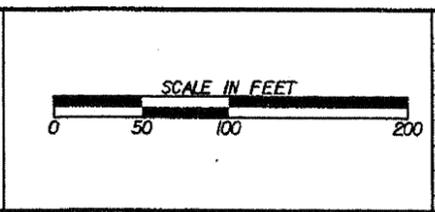


AS DESIGNED

PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

<b>TBE PROJECT NUMBER</b> GA-095-004-11
<b>TBE CONTACT</b> RANDY W. SANBORN, P. E.

**TBE GROUP**  
PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678.421.0080



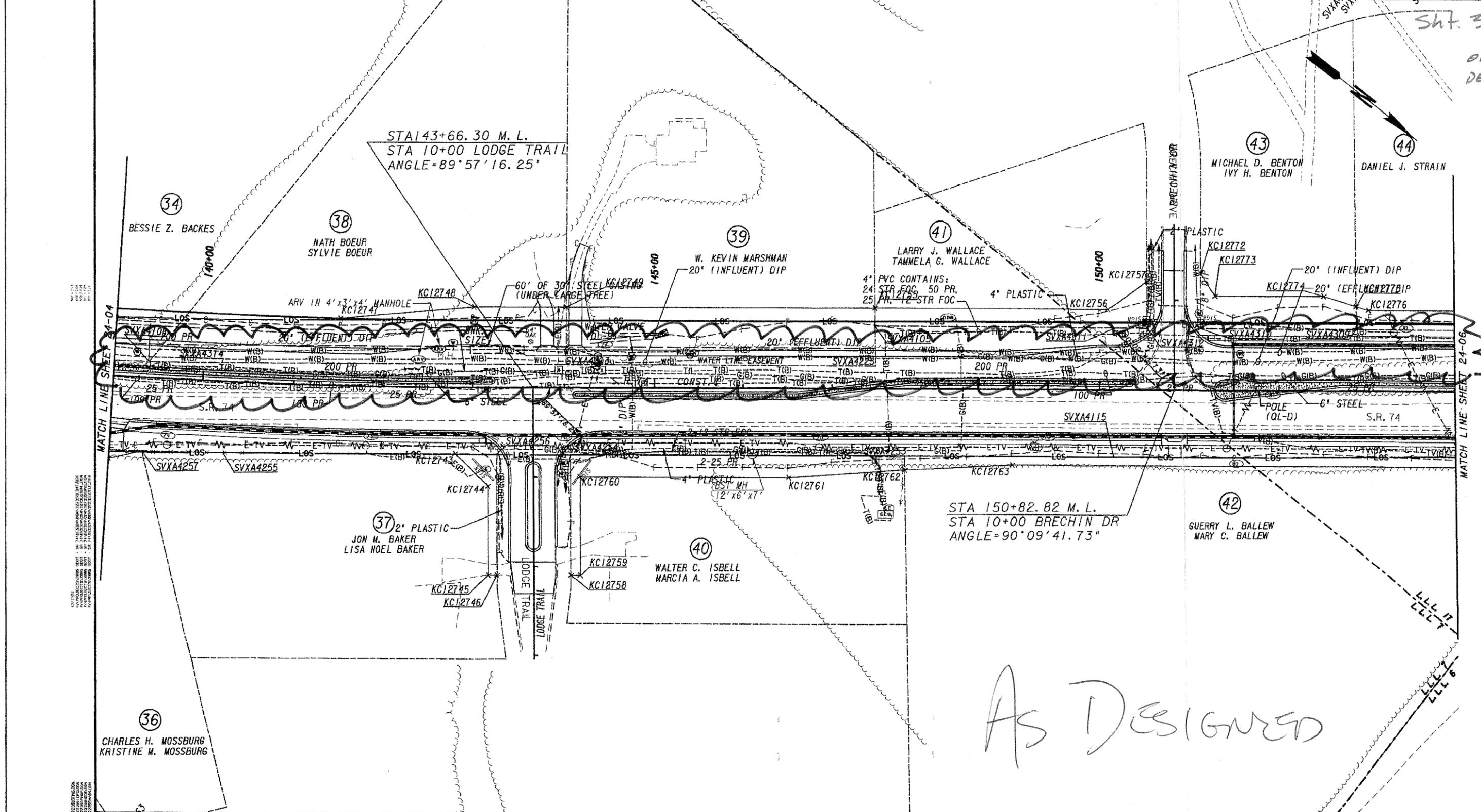
REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING NO.  
24-04

ALTERNATIVE #1

Sht. 3 of 16  
ORIGINAL DESIGN

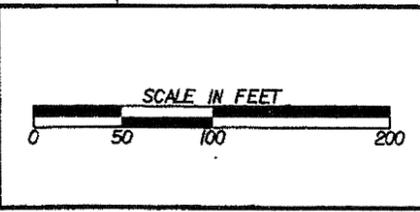


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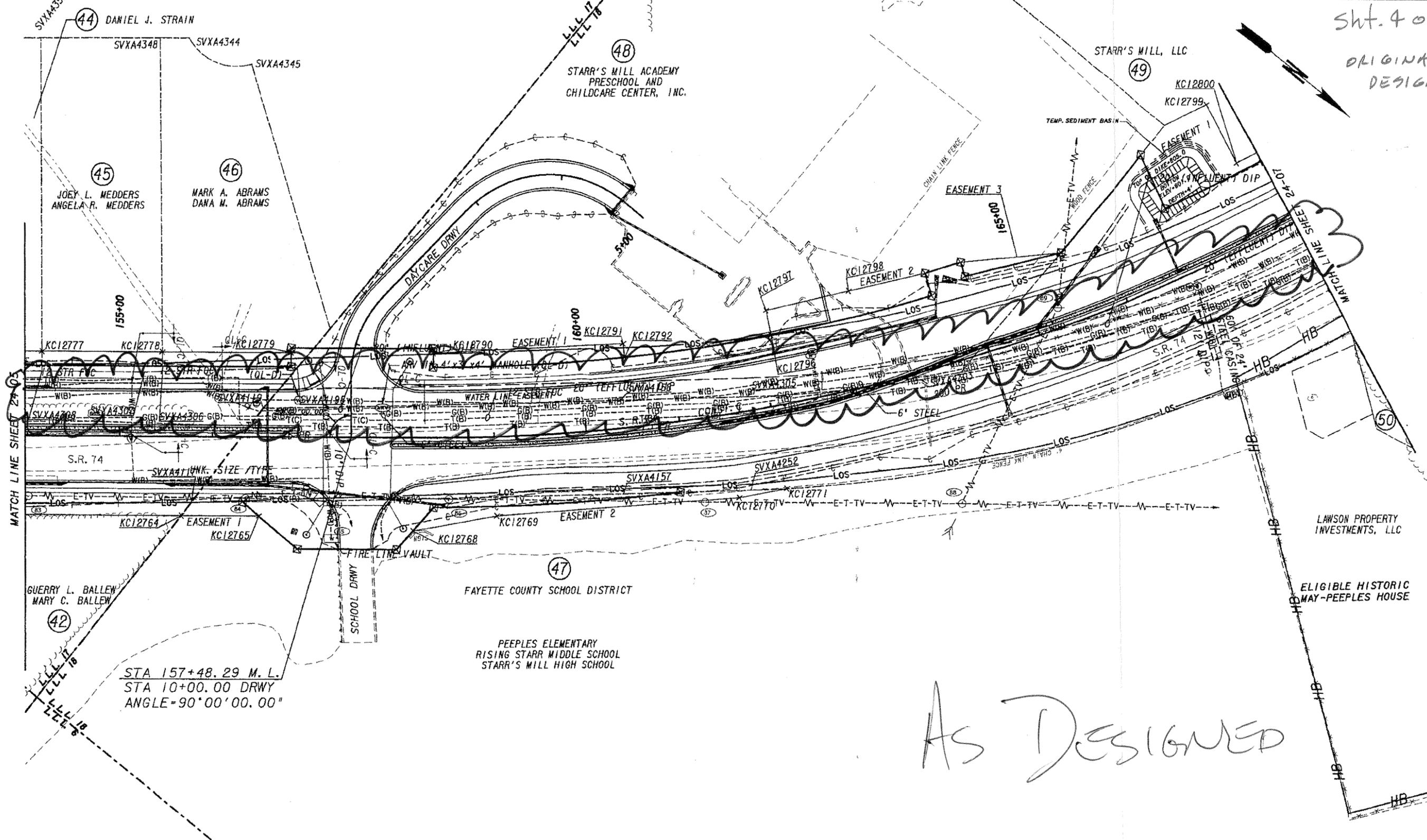
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STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING No. 24-05

ALTERNATIVE #1

Sht. 4 of 16  
ORIGINAL DESIGN



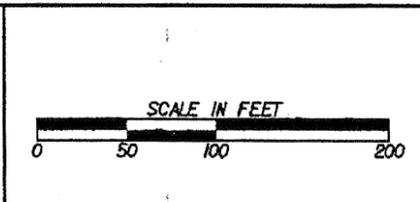
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STA 157+48.29 M. L.  
STA 10+00.00 DRWY  
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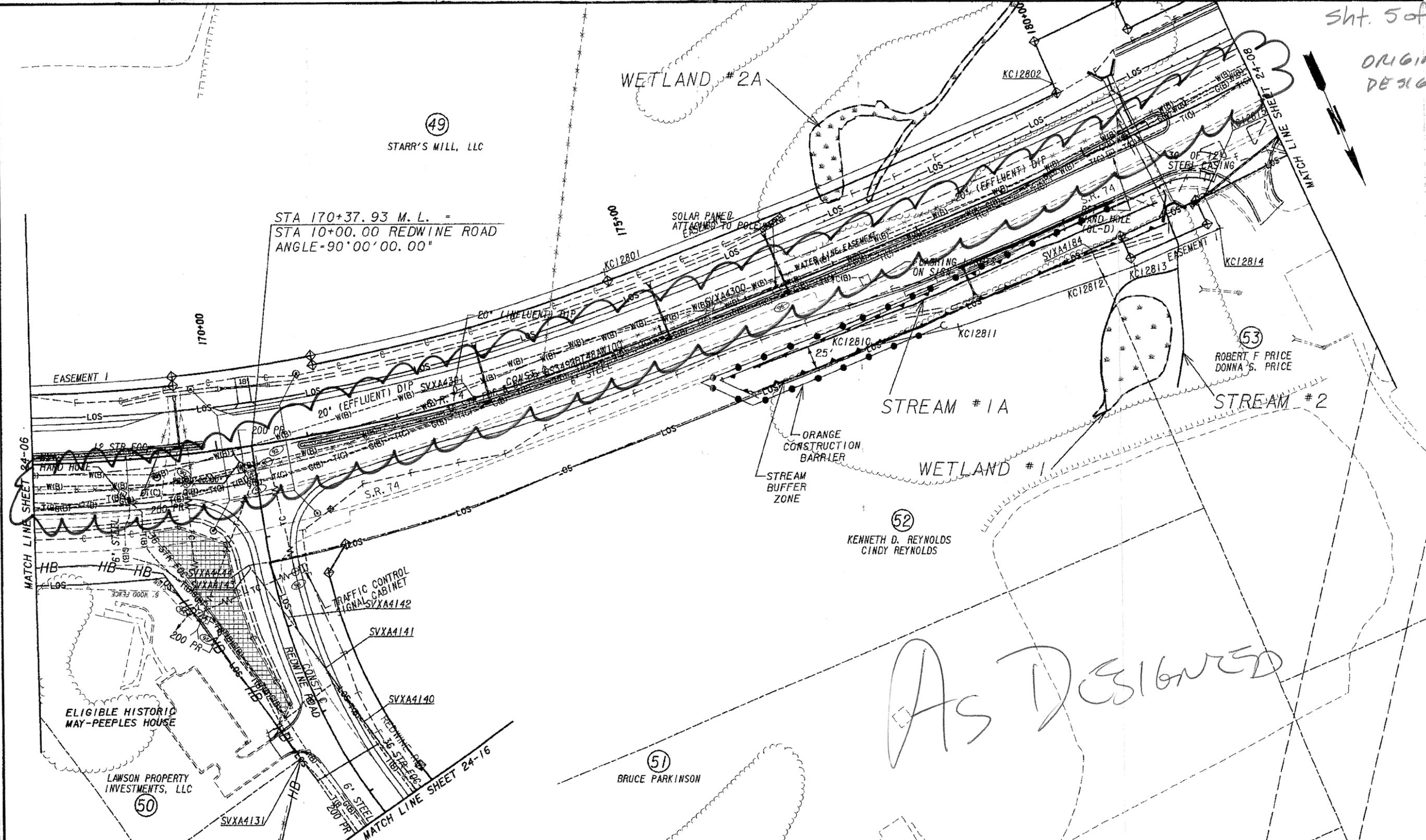
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**24-06**

ALTERNATIVE #1

Sht. 5 of 16  
ORIGINAL DESIGN

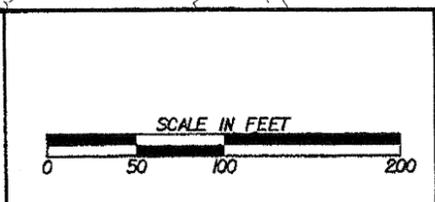


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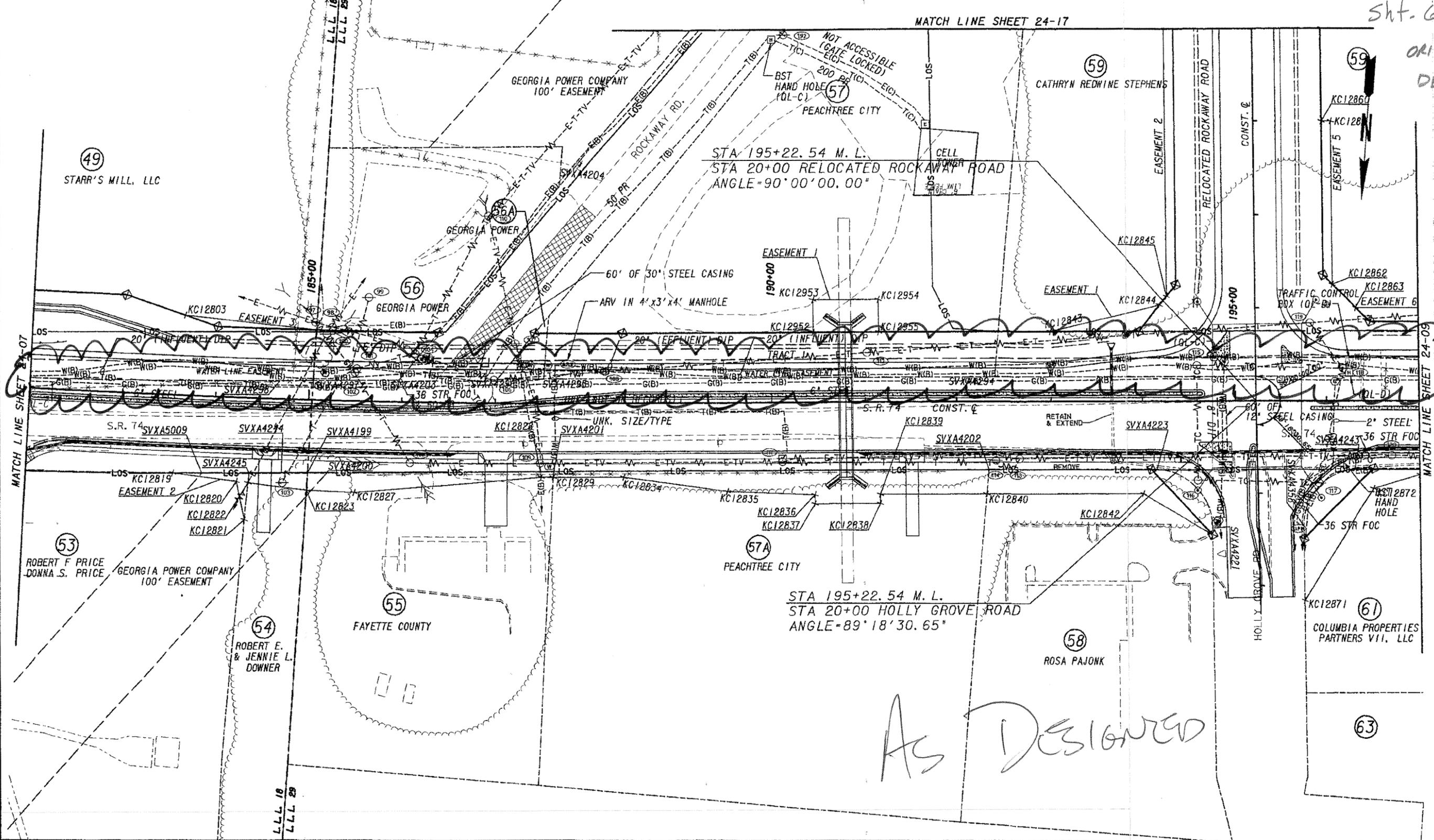


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**UTILITY PLANS**

DRAWING No.  
24-07

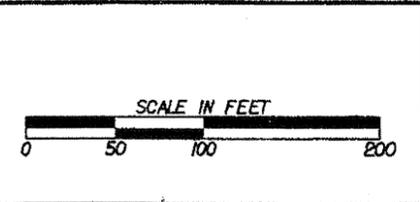
Sht. 6 of 16 ORIGINAL DESIGN



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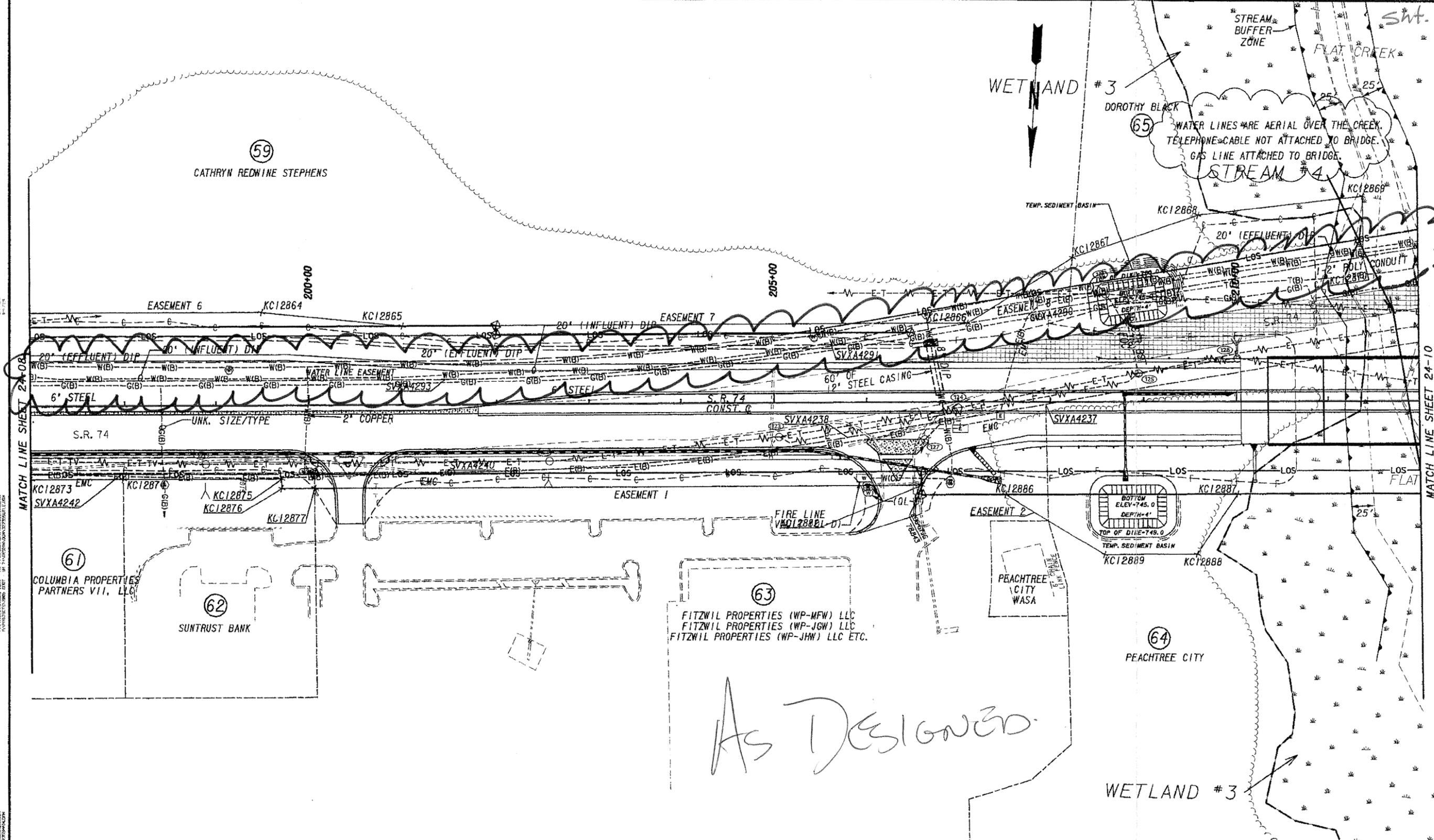


REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING No. 24-08

Sht. 7 of 16  
ORIGINAL DESIGN

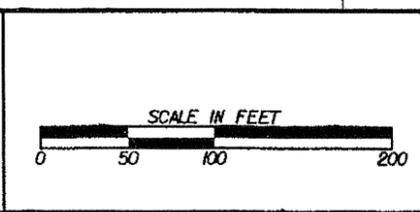


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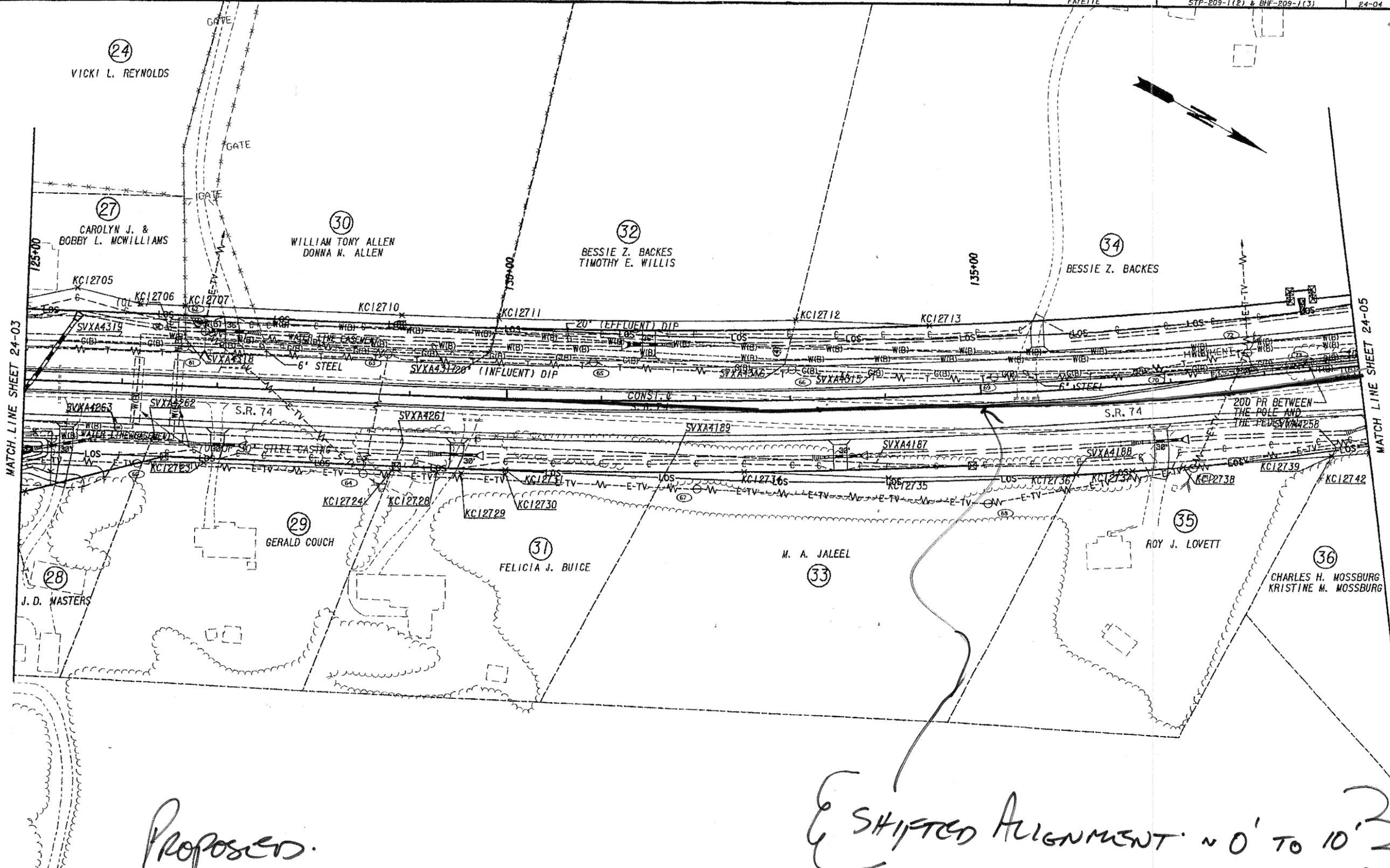
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STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING No.  
24-09

ALTERNATIVE #1

Sht. 8 of 16  
ALTERNATIVE DESIGN



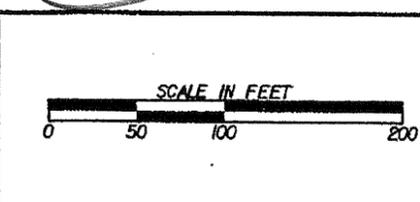
Proposed.

SHIFTED ALIGNMENT ~ 0' TO 10' 3

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 SUITE J, NORCROSS GA 30092-4302  
 TELEPHONE: 678.421.0080



REVISION DATES	

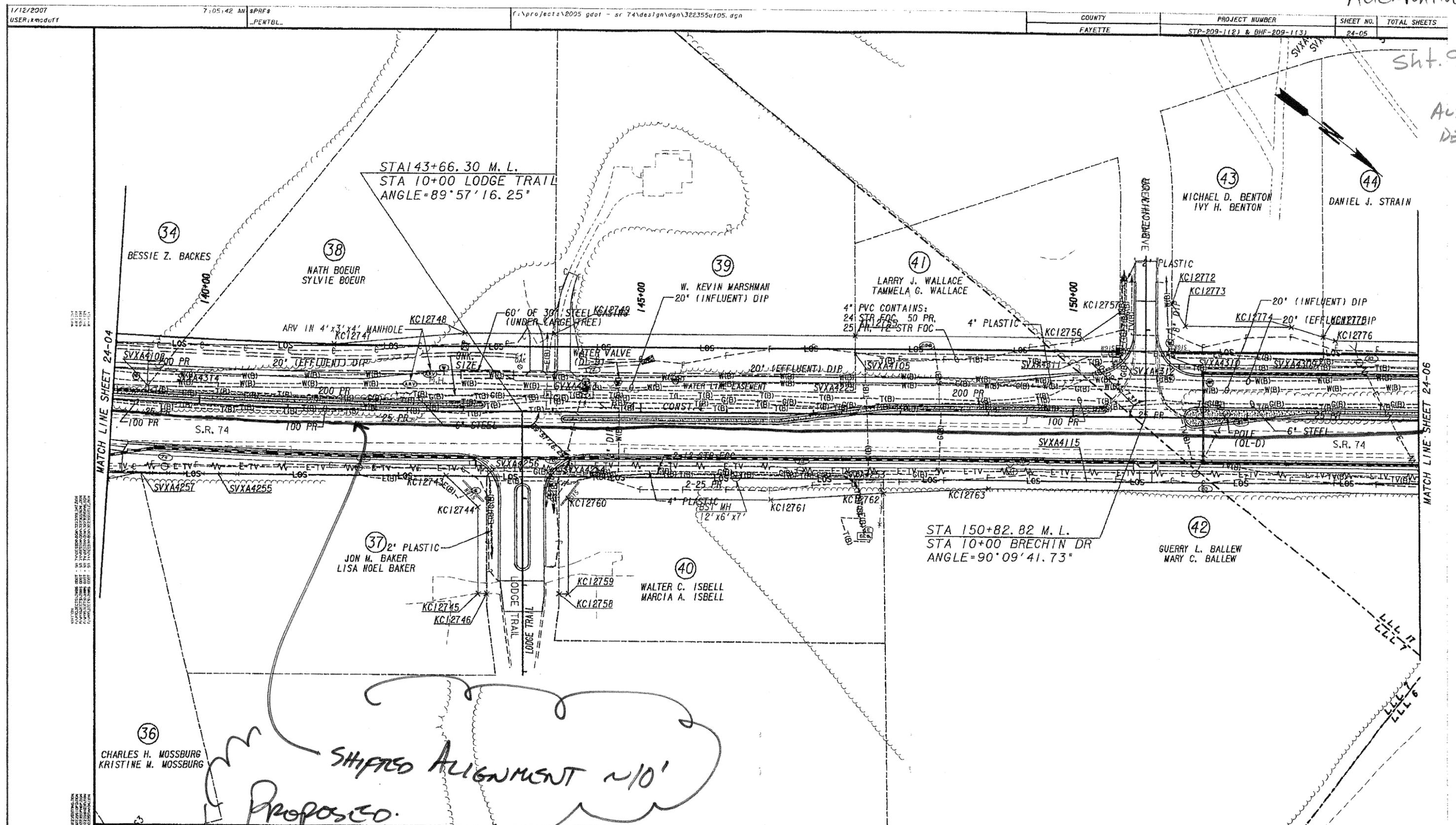
STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING NO.  
24-04

ALTERNATIVE #1

Sht. 9 of 16

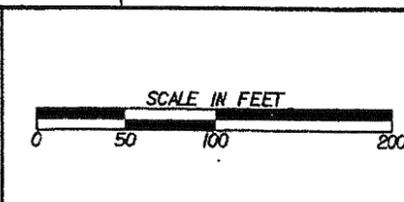
ALTERNATIVE DESIGN



PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

TBE PROJECT NUMBER GA-095-004-11
TBE CONTACT RANDY W. SANBORN, P. E.

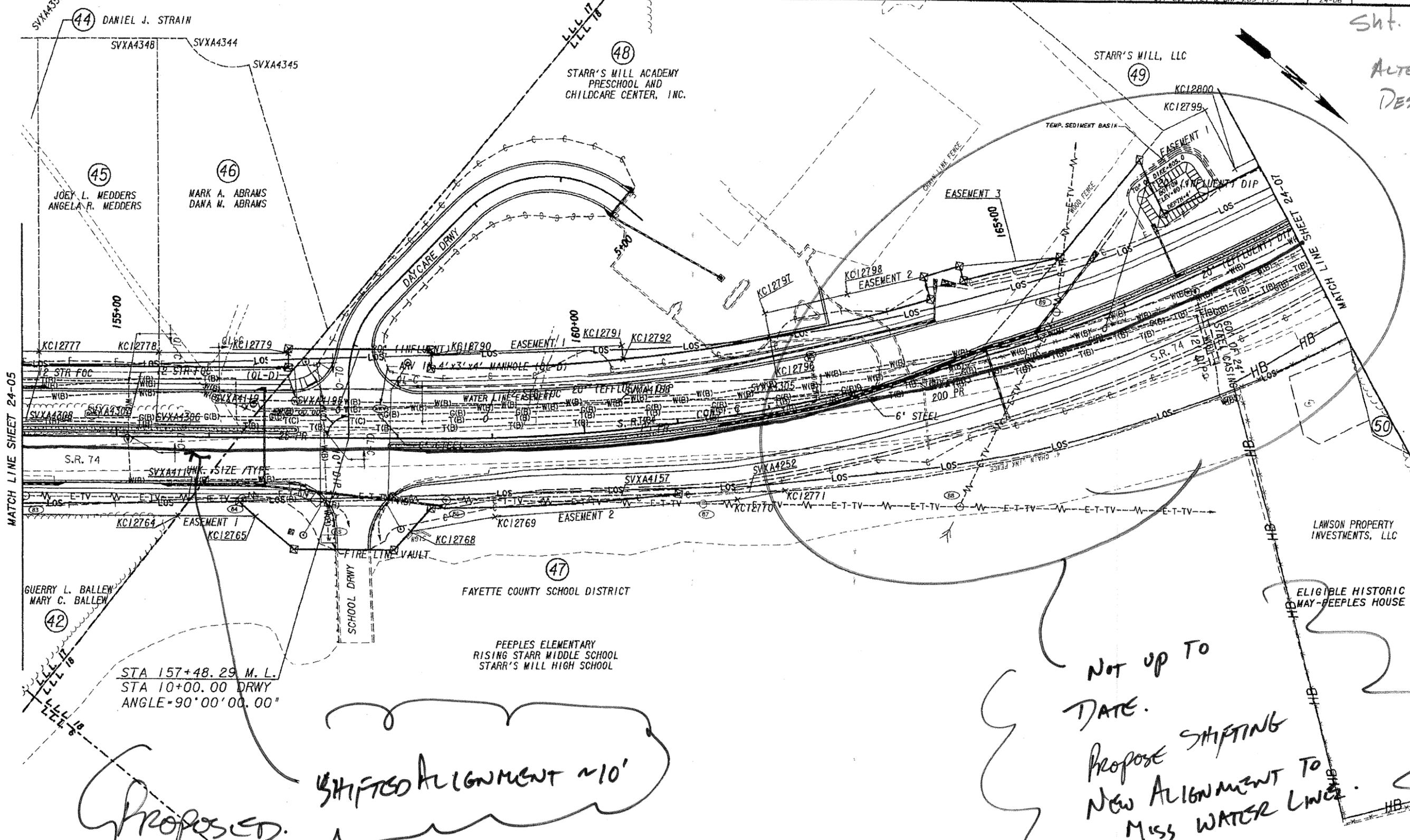
**TBE GROUP**  
 PEACHTREE CORPORATE CENTER  
 6649 PEACHTREE INDUSTRIAL BLVD.  
 SUITE J, NORCROSS GA 30092-4302  
 TELEPHONE: 678.421.0080



REVISION DATES	

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING NO. 24-05



STA 157+48.29 M.L.  
STA 10+00.00 DRWY  
ANGLE=90°00'00.00"

SHIFTED ALIGNMENT ~10'

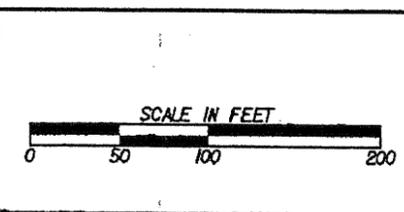
Proposed

NOT UP TO DATE.  
Propose SHIFTING New ALIGNMENT TO MISS WATER LINE.

PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

<b>TBE PROJECT NUMBER</b> GA-095-004-11
<b>TBE CONTACT</b> RANDY W. SANBORN, P.E.

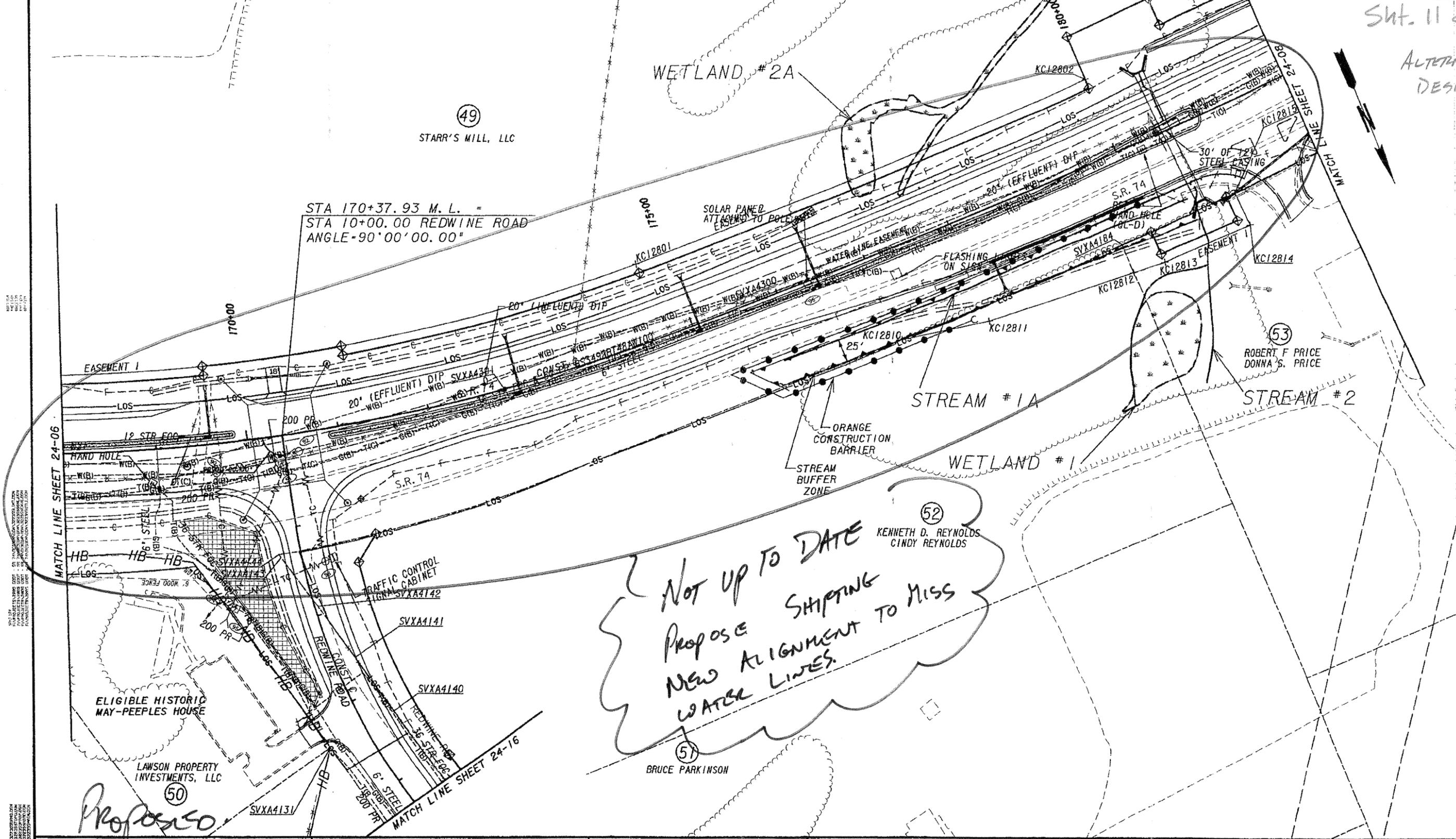
**TBE GROUP**  
PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678.421.0080



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

1/12/2007 USER: kmcduff	7:05:48 AM _PENTBL	f:\projects\2005\gdol - sr 74\design\gn\322355\ut07.dgn	COUNTY FAYETTE	PROJECT NUMBER STP-209-1(2) & BHF-209-1(3)	SHEET NO. 24-07	TOTAL SHEETS
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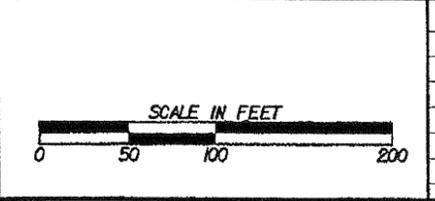


Not up to date  
Propose shifting  
new alignment to miss  
water lines.

PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

TBE PROJECT NUMBER 6A-095-004-11
TBE CONTACT RANDY W. SANBORN, P.E.

**TBE GROUP**  
PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678.421.0080



REVISION DATES	

STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE: UTILITIES, BRENT D'ANGELO, PE UTILITY PLANS
DRAWING No. 24-07

1/12/2007  
USER: kmcduff

7:05:51 AM SPRFS  
PENTBL

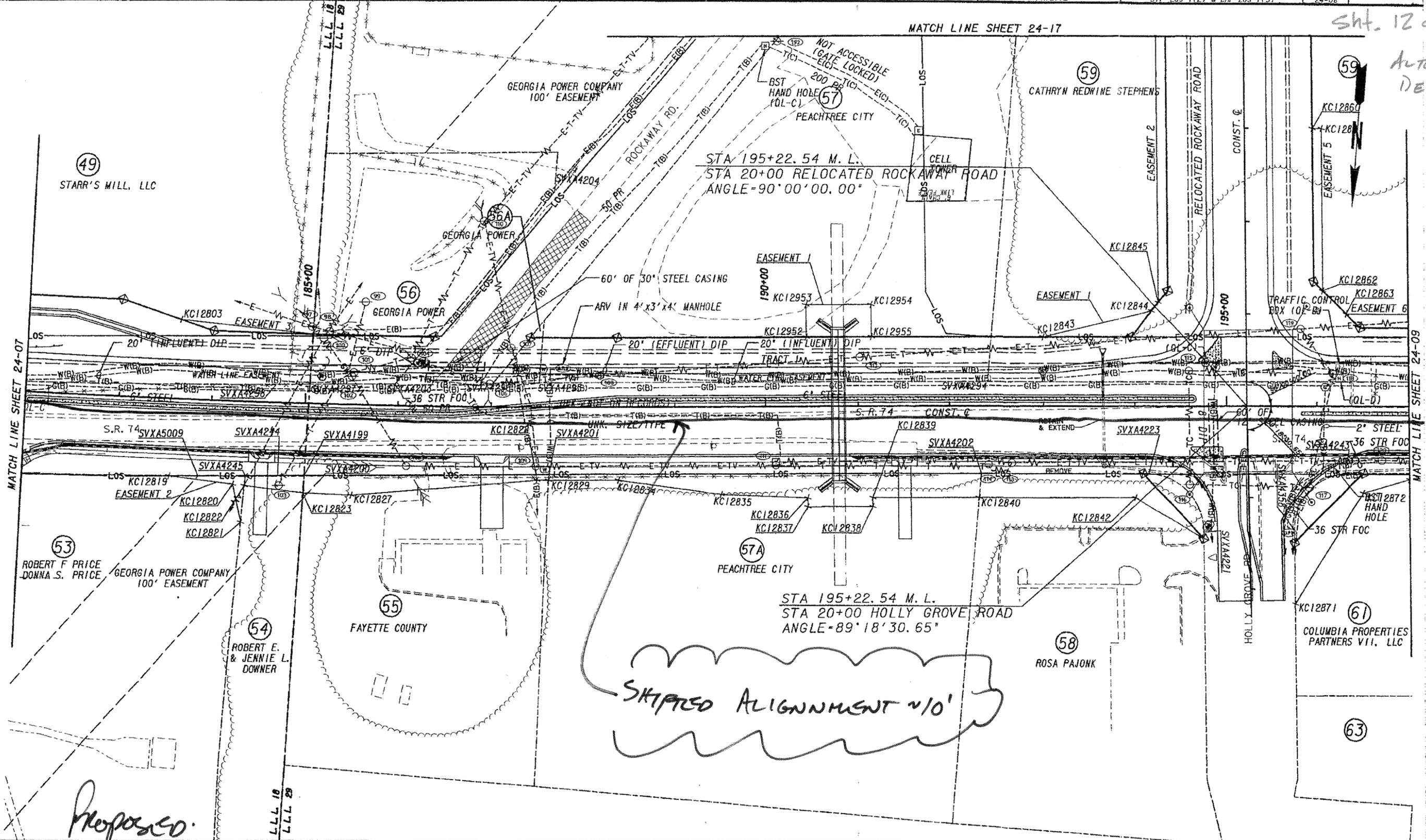
F:\projects\2005 gdc1 - sr 74\design\sgn\322355uf08.dgn

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
FAYETTE	STP-209-1(2) & BHF-209-1(3)	24-08	

MATCH LINE SHEET 24-17

MATCH LINE SHEET 24-07

MATCH LINE SHEET 24-09

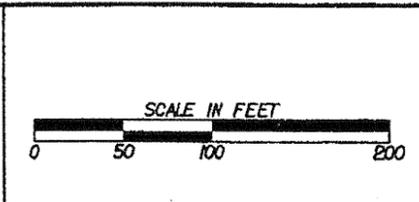


*Proposed*

PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

<b>TBE PROJECT NUMBER</b> GA-095-004-11
<b>TBE CONTACT</b> RANDY W. SANBORN, P.E.

**TBE GROUP**  
PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678.421.0080

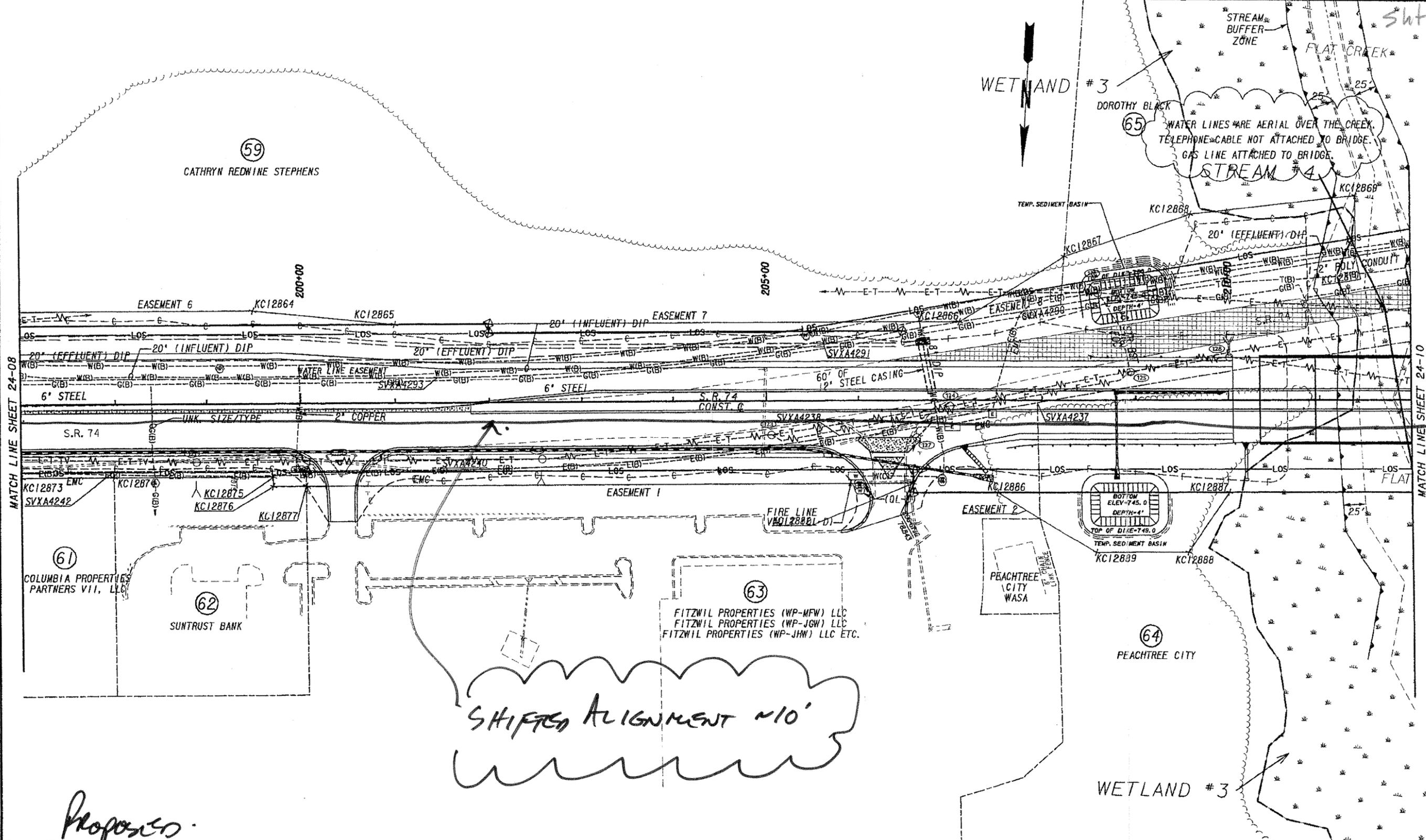


REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING NO.  
24-08

Sht. 13 of 16 ALTERNATIVE DESIGN



PLAN RELEASE

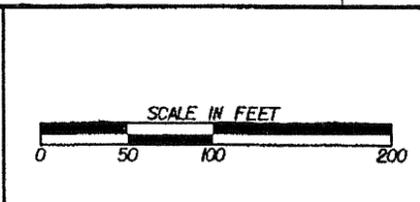
DRAWN BY	DATE	CHECKED BY	DATE

TBE PROJECT NUMBER  
GA-095-004-11

TBE CONTACT  
RANDY W. SANBORN, P. E.

**TBE GROUP**

PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678-421-0080



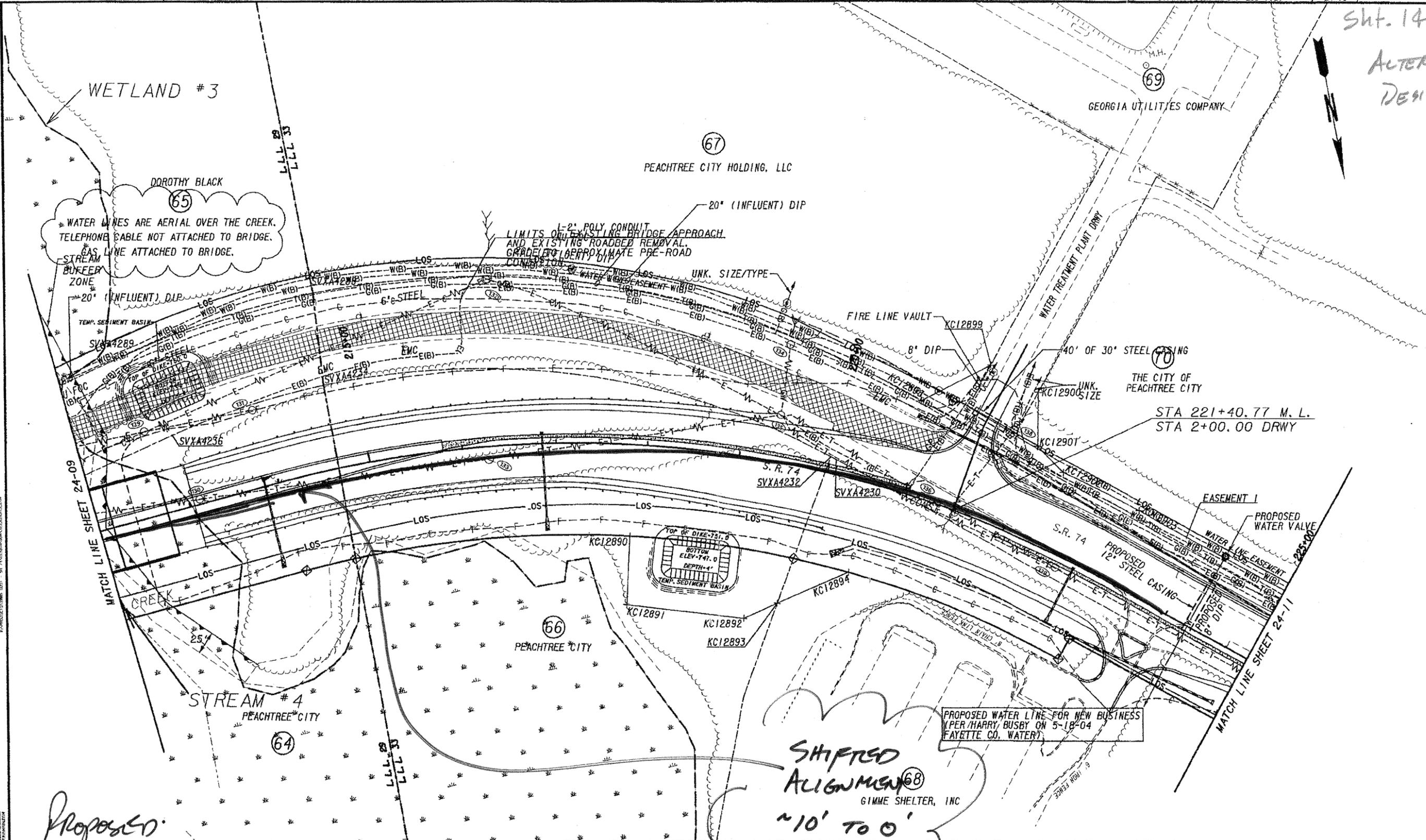
REVISION DATES

NO.	DATE	DESCRIPTION

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

ALTERNATIVE #1

Sht. 14 of 16  
ALTERNATIVE  
DESIGN



Proposed

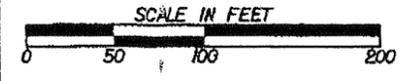
SHIFTED ALIGNMENT  
~10' TO 0'

PROPOSED WATER LINE FOR NEW BUSINESS  
(PER HARRY BUSBY ON 5-18-04  
FAYETTE CO. WATER)

PLAN RELEASE			
DRAWN BY	DATE	CHECKED BY	DATE

<b>TBE PROJECT NUMBER</b> GA-095-004-11
<b>TBE CONTACT</b> RANDY W. SANBORN, P. E.

**TBE GROUP**  
PEACHTREE CORPORATE CENTER  
6649 PEACHTREE INDUSTRIAL BLVD.  
SUITE J, NORCROSS GA 30092-4302  
TELEPHONE: 678.421.0080



REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: UTILITIES, BRENT D'ANGELO, PE  
**UTILITY PLANS**

DRAWING No.  
24-10

ALTERNATIVE #1  
Sht. 15 of 16**Myers, Lisa**

---

**From:** Gore, Kerry  
**Sent:** Tuesday, February 13, 2007 2:51 PM  
**To:** Myers, Lisa; Brigman, Terry  
**Subject:** RE: VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

Lisa,

The water authority's consultant is currently working up an estimated cost for the work in order to facilitate a PE agreement. I don't have the information at hand but I will give you an estimated cost of \$1,500,000. We will roughly have approx 16,000' of line to move.

Thanks  
Kerry

---

**From:** Myers, Lisa  
**Sent:** Tuesday, February 13, 2007 2:44 PM  
**To:** Gore, Kerry; Brigman, Terry  
**Subject:** VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

I am in the middle of a VE Study on the above project. One of the recommendations involves relocating two 20 inch water lines that run throughout the projects. They appear to be the main supply lines for the area. Do you have a cost per foot to relocate these? Or any cost that might be useful to the VE Team? And of course, I need this information soon – the VE Study ends Thursday morning!

I would appreciate any thing you can give me!

Thanks!

**Lisa Myers**

*Design Review Engineer Manager/VE Coordinator*

*GA DOT - Engineering Services  
#2 Capitol Square Room 266  
Atlanta, GA 30334*

404-651-7468

2/13/2007



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **2**  
*Georgia Department of Transportation*

DESCRIPTION: **REDUCE THE GUTTER WIDTH FROM 24 IN. TO 12 IN.** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

30-in. wide concrete curb and gutter sections with 24-in. gutters are used throughout the project.

ALTERNATIVE: (Sketch attached)

Use 18-in. wide concrete curb and gutter sections with 12-in. gutters.

ADVANTAGES:

- Reduces cost
- Reduces extent of cut and fill required

DISADVANTAGES:

- Increases stormwater encroachment on pavement under heavy rain conditions

DISCUSSION:

12-in. gutters are used extensively around the country for similar types of roads. It is not necessary to have more than a one-ft. offset to a curb for safety reasons, and significant costs are saved.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>641,297</b>	—	\$ <b>641,297</b>
ALTERNATIVE	\$ <b>386,915</b>	—	\$ <b>386,915</b>
SAVINGS (Original minus Alternative)	\$ <b>254,382</b>	—	\$ <b>254,382</b>

# SKETCHES



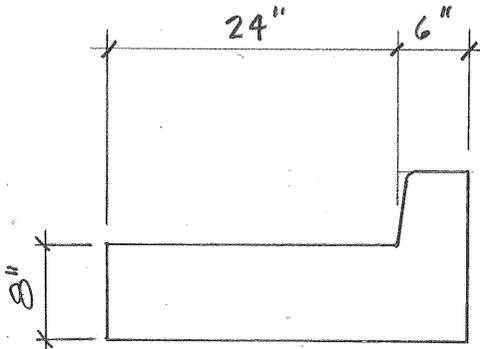
PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.:

AS DESIGNED     ALTERNATIVE

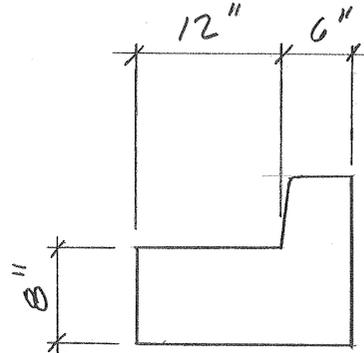
SHEET NO.: **2**  
**2** of **3**

## AS DESIGNED



TP 2    \$ 17.00 /ft  
TP 7    \$ 12.67 /ft

## ALTERNATIVE



TP 2' = \$ 12.04 /ft  
TP 7' = \$ 7.71 /ft



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **3**  
*Georgia Department of Transportation*

DESCRIPTION: **PROVIDE CONDUITS BELOW THE PAVEMENT AT THE** SHEET NO.: **1 of 1**  
**BASEBALL AND SOCCER FIELD ENTRANCES OFF OF SR**  
**74**

**ORIGINAL DESIGN:**

No provisions are being made for a future traffic signal that could be installed where opposing entrances to the baseball and soccer field complexes intersect with SR 74.

**ALTERNATIVE:**

Provide the underground conduits necessary to support a future traffic signal at this location as part of this construction contract.

**ADVANTAGES:**

- Avoids removing pavement at a later date to install conduits for traffic signal wires
- Avoids future disruptions to traffic during signal installation

**DISADVANTAGES:**

- Slightly increases cost

**DISCUSSION:**

This alternative suggests investment a small sum of money now to avoid disrupting traffic and breaking up relatively new pavement when the new traffic light is needed once the baseball field complex is constructed.

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

**DESIGN SUGGESTION**

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **4**  
*Georgia Department of Transportation*

DESCRIPTION: **PROVIDE 50-FT. RIGHT-OF-WAY MITERS AT ALL SIGNALS** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

The size of the right-of-way miters varies throughout the project.

ALTERNATIVE: (Sketch attached)

Measure 50 ft. from the right-of-way intersection point back to a 45° corner miter point. Miter the sidewalk in a similar fashion where sidewalk is used.

**ADVANTAGES:**

- Allows for easy access and maintenance of signal poles within the right-of-way limits
- Provides better ADA access
- Provides more pedestrian storage capacity
- Required by GDOT traffic and safety

**DISADVANTAGES:**

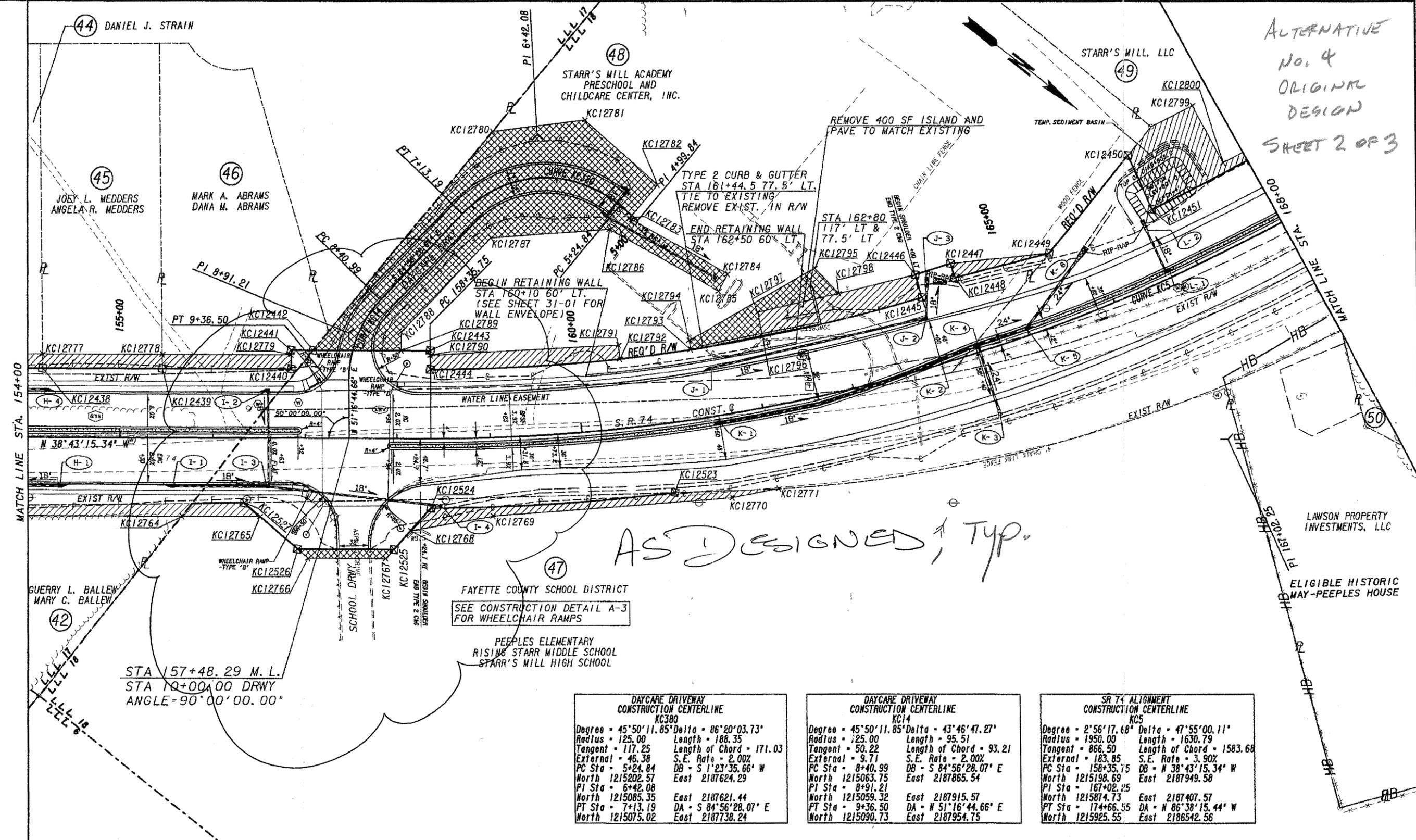
- Requires additional right-of-way
- Requires more pavement where sidewalk is provided

**DISCUSSION:**

This is required by current standard practice at GDOT and provides room for maintenance.

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

ALTERNATIVE  
No. 4  
ORIGINAL  
DESIGN  
SHEET 2 OF 3



DAYCARE DRIVEWAY CONSTRUCTION CENTERLINE KC380

Degree = 45° 50' 11.85"	Delta = 86° 20' 03.73"
Radius = 125.00	Length = 188.35
Tangent = 117.25	Length of Chord = 171.03
External = 46.38	S.E. Rate = 2.00%
PC Sta = 5+24.84	DB = S 1° 23' 35.66" W
North 1215202.57	East 2187624.29
PI Sta = 6+42.08	
North 1215085.35	East 2187621.44
PT Sta = 7+13.19	DA = S 84° 56' 28.07" E
North 1215075.02	East 2187738.24

DAYCARE DRIVEWAY CONSTRUCTION CENTERLINE KC14

Degree = 45° 50' 11.85"	Delta = 43° 46' 47.27"
Radius = 125.00	Length = 95.51
Tangent = 50.22	Length of Chord = 93.21
External = 9.71	S.E. Rate = 2.00%
PC Sta = 8+40.99	DB = S 84° 56' 28.07" E
North 1215063.75	East 2187865.54
PI Sta = 8+91.21	
North 1215059.32	East 2187915.57
PT Sta = 9+36.50	DA = N 51° 16' 44.66" E
North 1215090.73	East 2187954.75

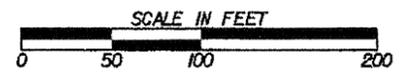
SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC5

Degree = 2° 56' 17.68"	Delta = 47° 55' 00.11"
Radius = 1950.00	Length = 1630.79
Tangent = 866.50	Length of Chord = 1583.68
External = 183.85	S.E. Rate = 3.90%
PC Sta = 158+35.75	DB = N 38° 43' 15.34" W
North 1215198.69	East 2187949.58
PI Sta = 167+02.25	
North 1215874.73	East 2187407.57
PT Sta = 174+66.35	DA = N 86° 38' 15.44" W
North 1215925.55	East 2186542.56

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

---	R
---	C
---	F
---	E
---	S
---	D

**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511



REVISION DATES


STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**MAINLINE PLAN**

DRAWING No.  
**13-06**

# SKETCHES



PROJECT:

WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE  
Georgia Department of Transportation

ALTERNATIVE NO.:

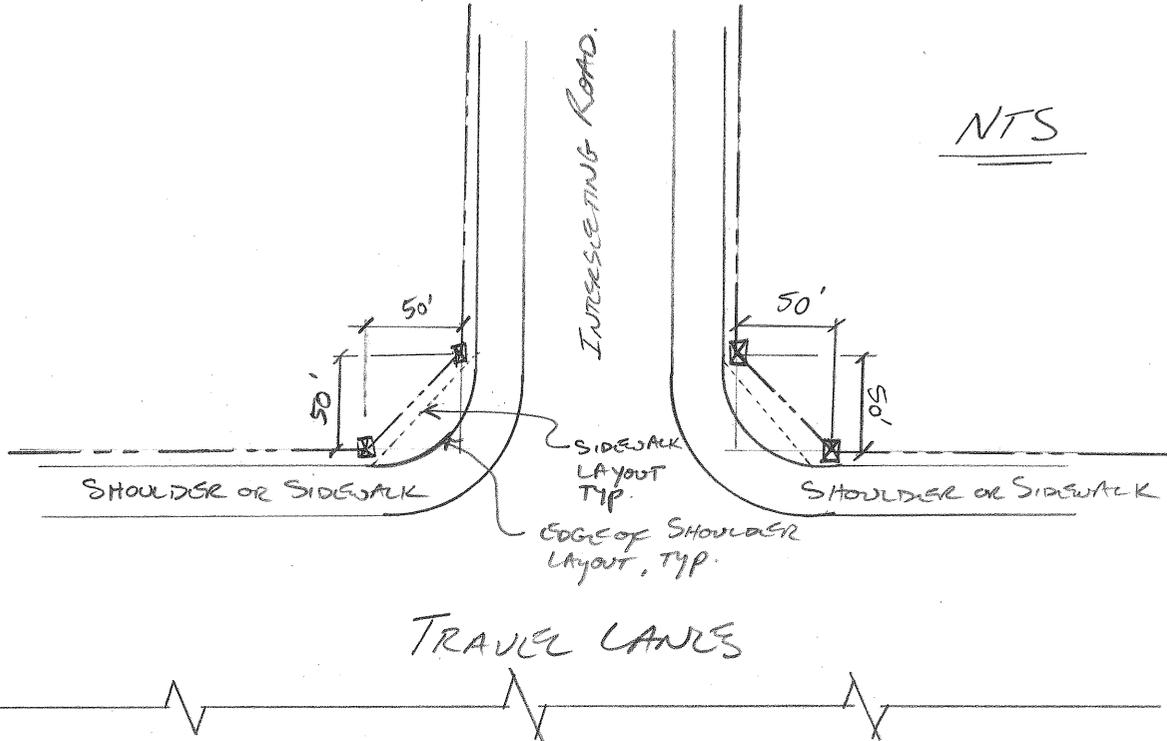
4

AS DESIGNED

ALTERNATIVE

SHEET NO.:

3 of 3



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **6**  
*Georgia Department of Transportation*

DESCRIPTION: **ALIGN SOUTHBOUND THROUGH LANE OF SR 74 WITH PADGETT ROAD** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

There is a striped out area between the left turn lane at SR 85 and the through southbound lane.

ALTERNATIVE: (Sketch attached)

Stripe out the area between the through southbound lane and the right turn lane at SR 85.

ADVANTAGES:

- Aligns southbound traffic through the intersection
- Increases safety

DISADVANTAGES:

- None apparent

DISCUSSION:

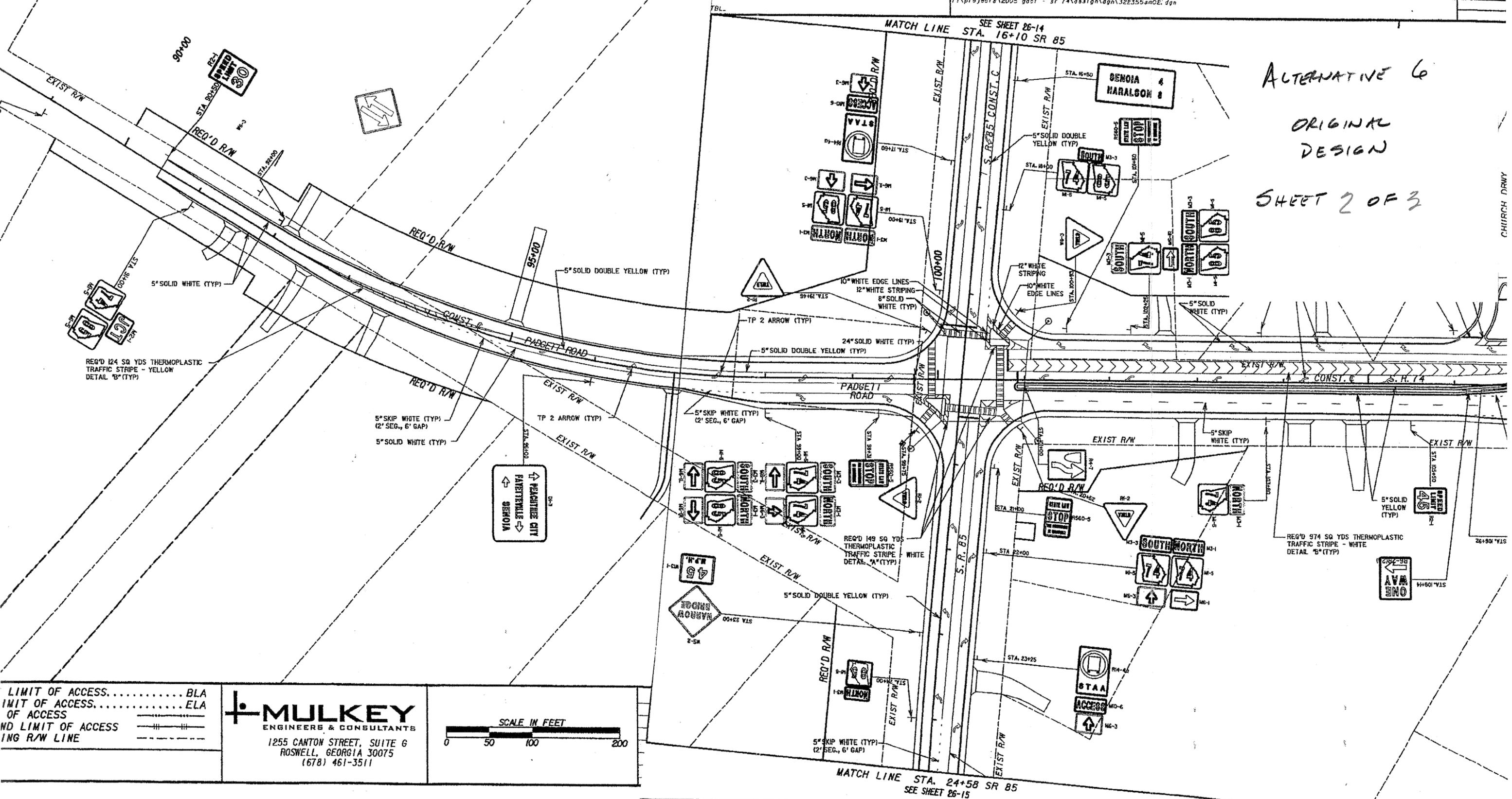
Southbound traffic going from SR 74 to Padgett Road has to jog left through the intersection to continue south on Padgett Road. This alternative makes this movement straight. The striped out area in the original design may be to allow double left turn lanes to SR 85 northbound.

When SR 85 is widened to four lanes, if that is the case, the Padgett Road side of the intersection can be modified at the time of the SR 85 project to maintain the alignment.

This alternative provides no cost savings since the same amount of paving and striping is required.

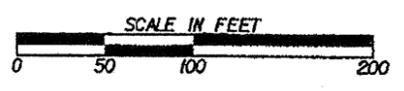
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE	<b>DESIGN SUGGESTION</b>		
SAVINGS (Original minus Alternative)			

ALTERNATIVE 6  
 ORIGINAL  
 DESIGN  
 SHEET 2 OF 3



LIMIT OF ACCESS.....BLA  
 LIMIT OF ACCESS.....ELA  
 END LIMIT OF ACCESS  
 EXISTING R/W LINE

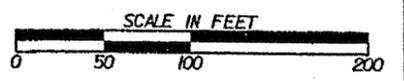
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511



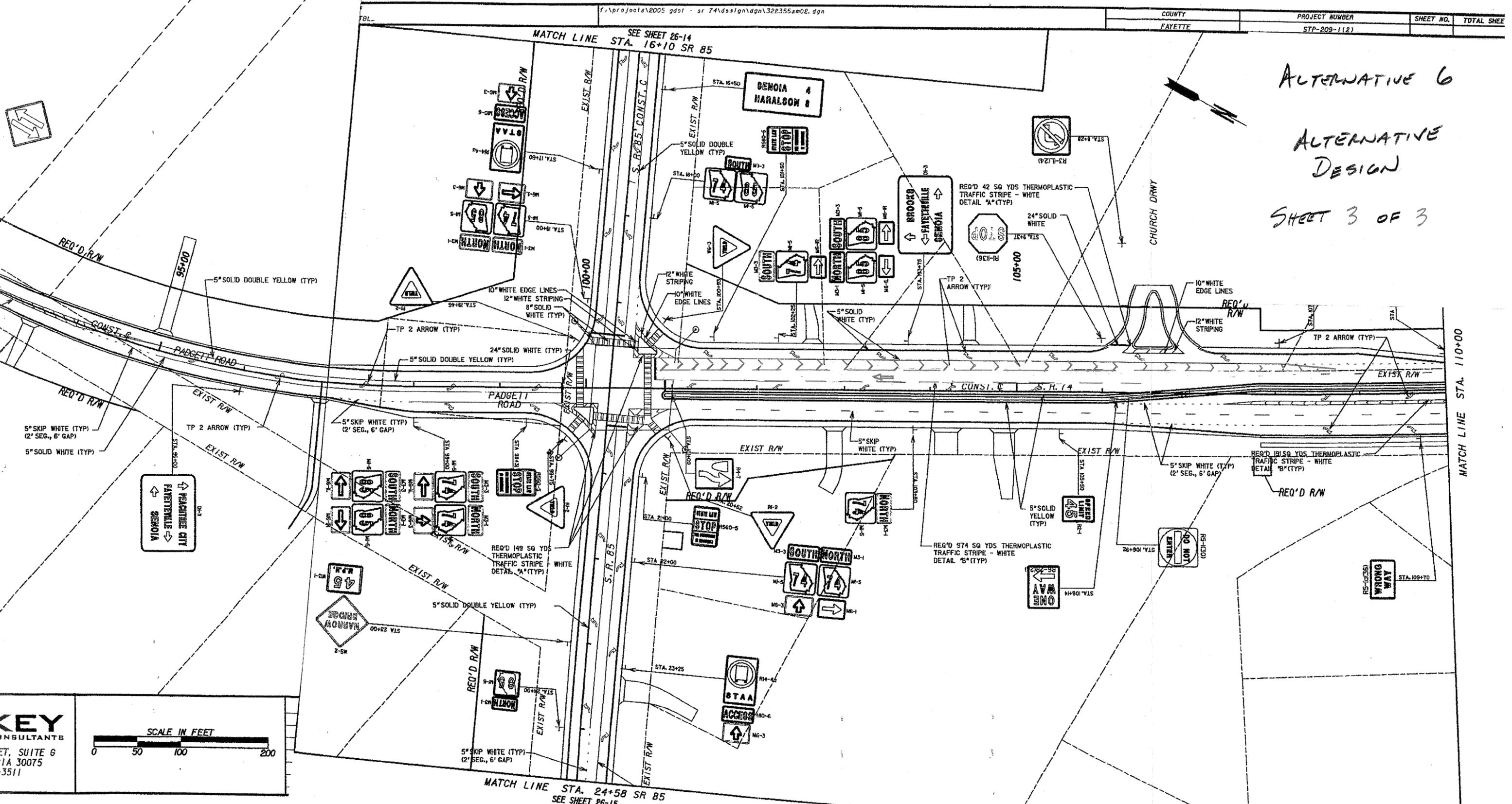
EXISTING R/W LINE  
 LIMIT OF ACCESS  
 LIMITS OF SLOPES  
 CONSTRUCTION  
 EASEMENT FOR CONSTRUCTION OF SLOPES  
 EASEMENT FOR CONSTRUCTION OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA  
 END LIMIT OF ACCESS.....ELA  
 LIMIT OF ACCESS  
 R/W AND LIMIT OF ACCESS  
 EXISTING R/W LINE

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511



ALTERNATIVE 6  
ALTERNATIVE DESIGN  
SHEET 3 OF 3



**KEY**  
CONSULTANTS  
SUITE 6  
LA 30075  
3511

SCALE IN FEET  
0 50 100 200

EXISTING R/W LINE	---	BEGIN LIMIT OF ACCESS.....	BLA
LINE	---	END LIMIT OF ACCESS.....	ELA
LIMITS	---	LIMIT OF ACCESS	---
CONSTR	---	R/W AND LIMIT OF ACCESS	---
EASEMENT FOR CONSTR OF SLOPES	---	EXISTING R/W LINE	---
EASEMENT FOR CONSTR OF DRIVES	---		

**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511

SCALE IN FEET  
0 50 100 200

REVISION DATES


STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**SIGNING AND MARKING PLANS**

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **8**  
*Georgia Department of Transportation*

DESCRIPTION: **ELIMINATE THE RETAINING WALL AND PROVIDE** SHEET NO.: **1 of 9**  
**ADDITIONAL DAYCARE PARKING**

ORIGINAL DESIGN: (Sketch attached)

The retaining wall from Sta. 160+10 to Sta. 162+50 keeps fill out of the daycare parking lot.

ALTERNATIVE: (Sketch attached)

Replace the retaining wall with a 2:1 fill slope and provide five additional parking spaces.

ADVANTAGES:

- More economical
- Removes the retaining wall from the view of the daycare

DISADVANTAGES:

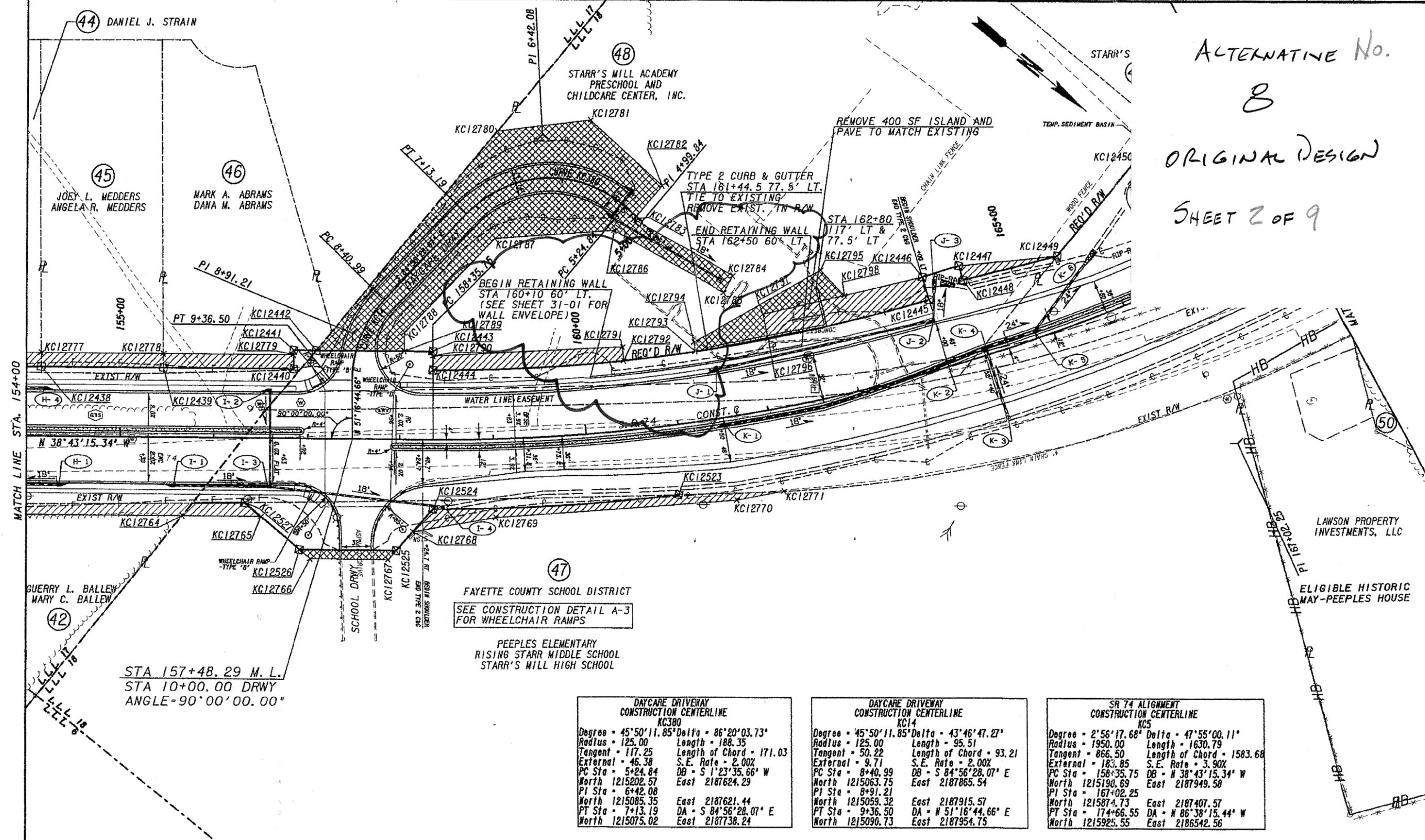
- None apparent

DISCUSSION:

Constructing a fill slope in lieu of the wall has virtually no effect on the daycare parking. Providing five additional parking spaces compensates for any loss at a net savings. A minimal amount of slope easement would be needed.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 203,286	—	\$ 203,286
ALTERNATIVE	\$ 24,894	—	\$ 24,894
SAVINGS (Original minus Alternative)	\$ 178,392	—	\$ 178,392

ALTERNATIVE No. 8 ORIGINAL DESIGN SHEET 2 OF 9



SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMP

**DAYCARE DRIVEWAY CONSTRUCTION CENTERLINE KC380**

Degree = 45°50'11.85"	Delta = 86°20'03.73"
Radius = 125.00	Length = 188.35
Tangent = 117.25	Length of Chord = 171.03
External = 46.38	S.E. Rate = 2.00%
PC Sta = 5+24.84	DB = S 1°23'35.66" W
North 1215202.57	East 2187624.29
PI Sta = 6+42.08	
North 1215085.35	East 2187621.44
PT Sta = 7+13.19	DA = S 84°56'28.07" E
North 1215075.02	East 2187738.24

**DAYCARE DRIVEWAY CONSTRUCTION CENTERLINE KC14**

Degree = 45°50'11.85"	Delta = 43°46'47.27"
Radius = 125.00	Length = 95.51
Tangent = 50.22	Length of Chord = 93.21
External = 9.71	S.E. Rate = 2.00%
PC Sta = 8+40.99	DB = S 84°56'28.07" E
North 1215063.75	East 2187865.54
PI Sta = 8+91.21	
North 1215059.32	East 2187915.57
PT Sta = 9+36.50	DA = N 51°16'44.66" E
North 1215090.73	East 2187954.75

**SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC5**

Degree = 2°56'17.68"	Delta = 47°55'00.11"
Radius = 1950.00	Length = 1630.79
Tangent = 866.50	Length of Chord = 1583.68
External = 183.85	S.E. Rate = 3.90%
PC Sta = 158+35.75	DB = N 38°43'15.34" W
North 1215198.69	East 2187949.58
PI Sta = 167+02.25	
North 1215874.73	East 2187407.57
PT Sta = 174+66.55	DA = N 86°38'15.44" W
North 1215925.55	East 2186542.56

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

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511

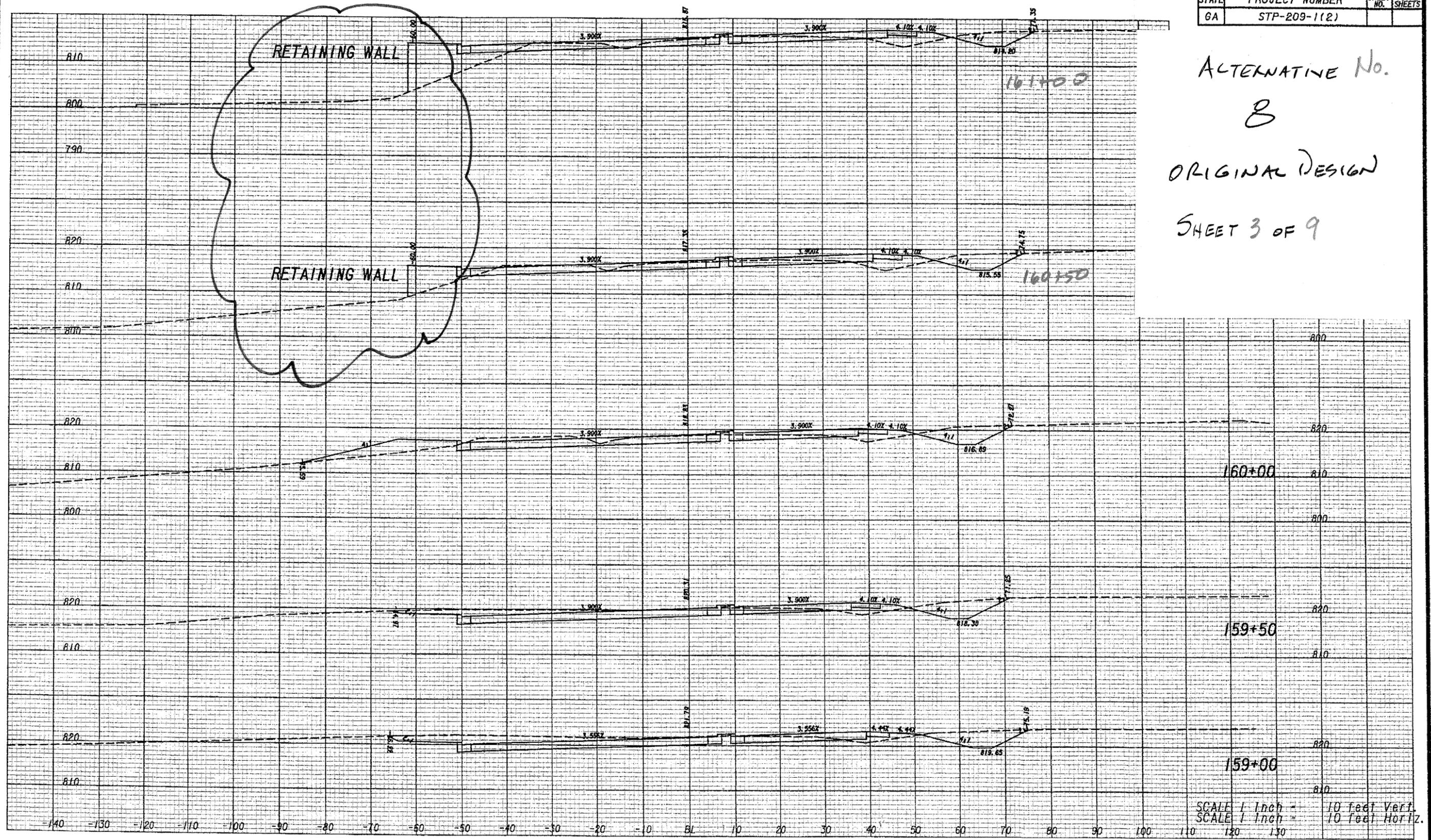


REVISION DATES


STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: **MAINLINE PLAN**

DRAWING No. 13-06

ALTERNATIVE No.  
**8**  
 ORIGINAL DESIGN  
 SHEET 3 OF 9



SCALE 1 Inch = 10 feet Vert.  
 SCALE 1 Inch = 10 feet Horiz.

\*\*\*\*\*DGN SPECIFIC CAVI DINGS\*\*\*\*\*  
 \*\*\*\*\*SYTIME\*\*\*\*\*

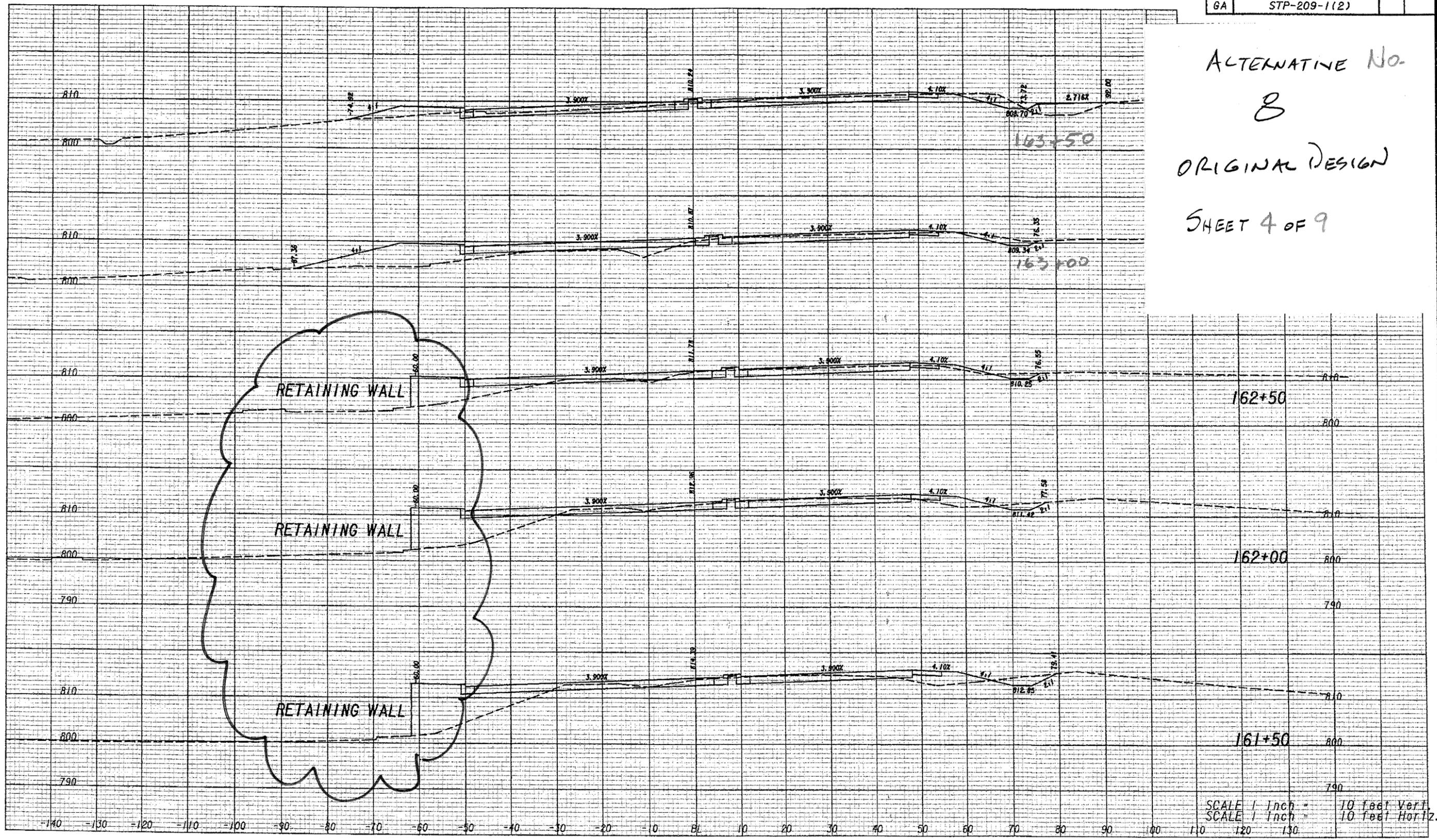
**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511

SCALE  
 1 INCH = 10' HORIZONTAL  
 1 INCH = 10' VERTICAL

DATE	REVISIONS	DATE	REVISIONS

GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 MAINLINE CROSS SECTIONS  
 PROJECT: STP-209-1(2)  
 COUNTY: FAYETTE  
 DATE:   
 DRAWING NUMBER  
**23-26**

ALTERNATIVE No.  
8  
ORIGINAL DESIGN  
SHEET 4 OF 9



SCALE 1 Inch = 10 feet Vert.  
SCALE 1 Inch = 10 feet Horiz.

\*\*\*\*\*DGN SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511

SCALE  
1 INCH = 10' HORIZONTAL  
1 INCH = 10' VERTICAL

DATE	REVISIONS	DATE	REVISIONS

GEORGIA  
DEPARTMENT OF TRANSPORTATION  
MAINLINE CROSS SECTIONS  
PROJECT: STP-209-1(2)  
COUNTY: FAYETTE  
DATE: DRAWING NUMBER  
23-27

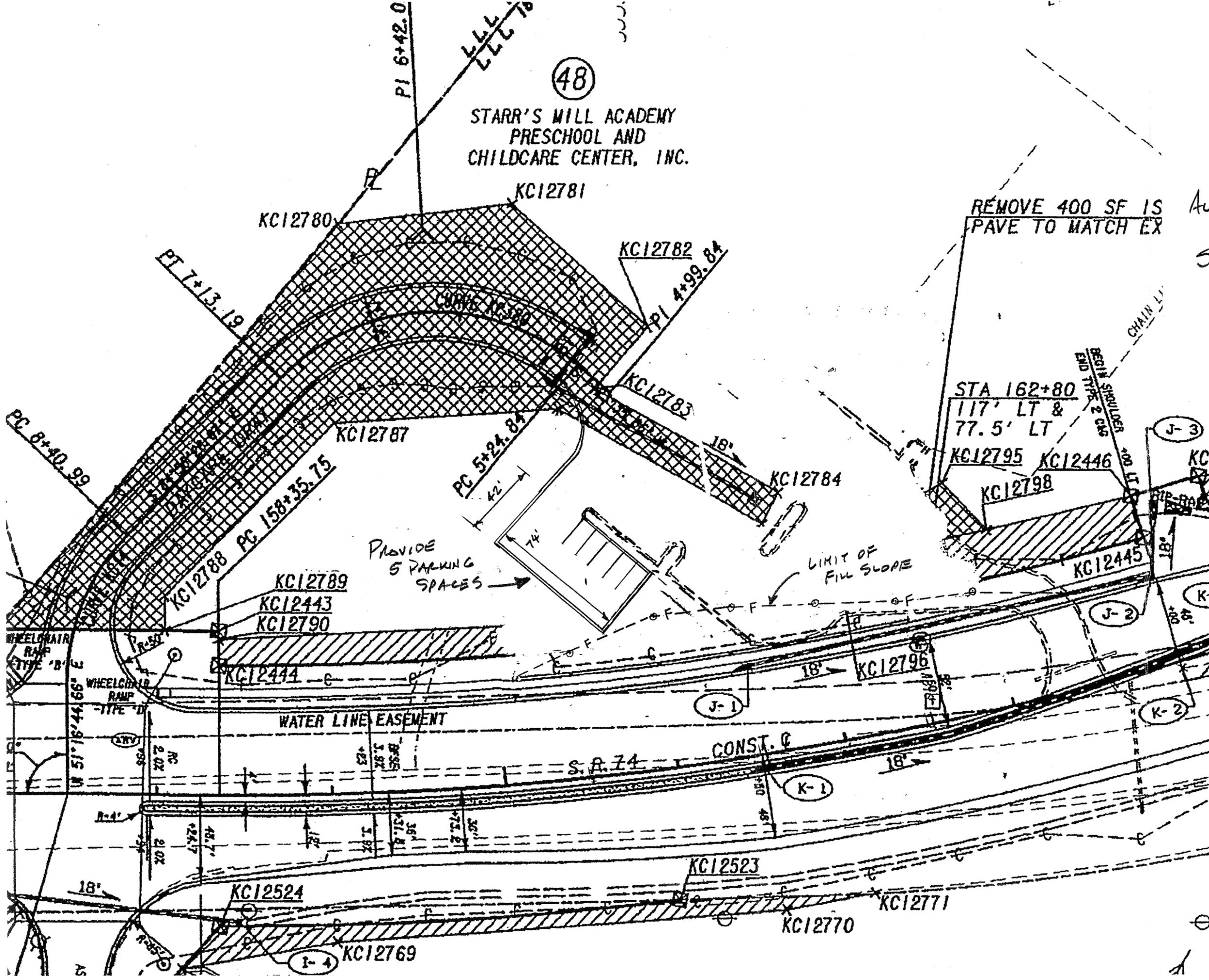
(48)

STARR'S MILL ACADEMY  
PRESCHOOL AND  
CHILDCARE CENTER, INC.

ALTERNATIVE No.  
8

ALTERNATIVE DESIGN

SHEET 5 OF 9



REMOVE 400 SF IS  
PAVE TO MATCH EX

STA 162+80  
117' LT &  
77.5' LT

PROVIDE  
5 PARKING  
SPACES

LIMIT OF  
FILL SLOPE

WATER LINE EASEMENT

CONST. C

S.A. 74

KC12524

KC12523

KC12771

KC12770

KC12769

KC12444

KC12443  
KC12790

KC12789

KC12788  
KC12787

KC12783

KC12782

KC12781

KC12795

KC12798

KC12446

KC12445

J-3

J-2

J-1

K-1

K-2

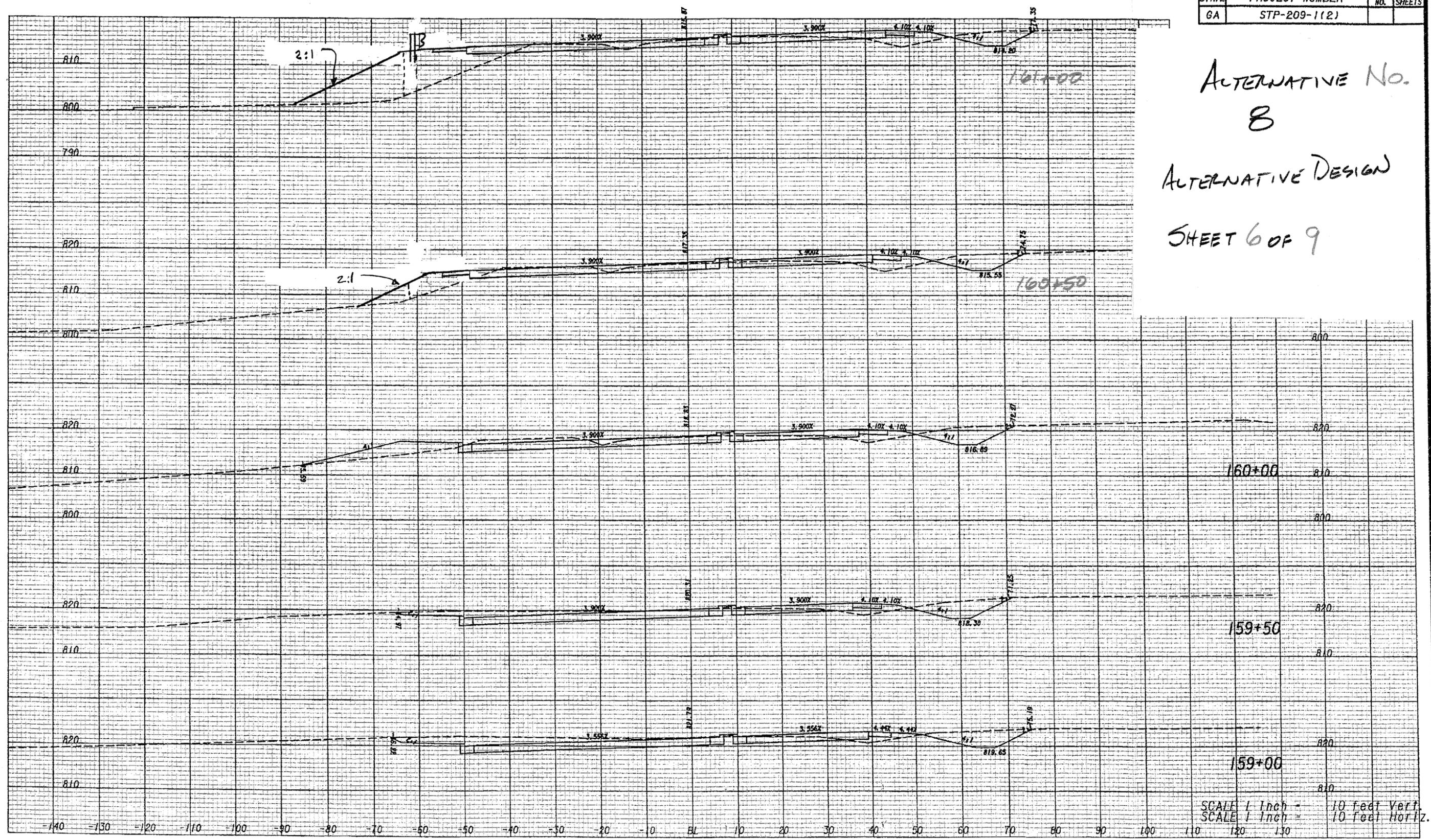
K-

I-4

AS

⊙

ALTERNATIVE No.  
8  
ALTERNATIVE DESIGN  
SHEET 6 OF 9



SCALE 1 Inch = 10 feet Vert.  
SCALE 1 Inch = 10 feet Horiz.

\*\*\*\*\*DGN SPECIFIC CATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

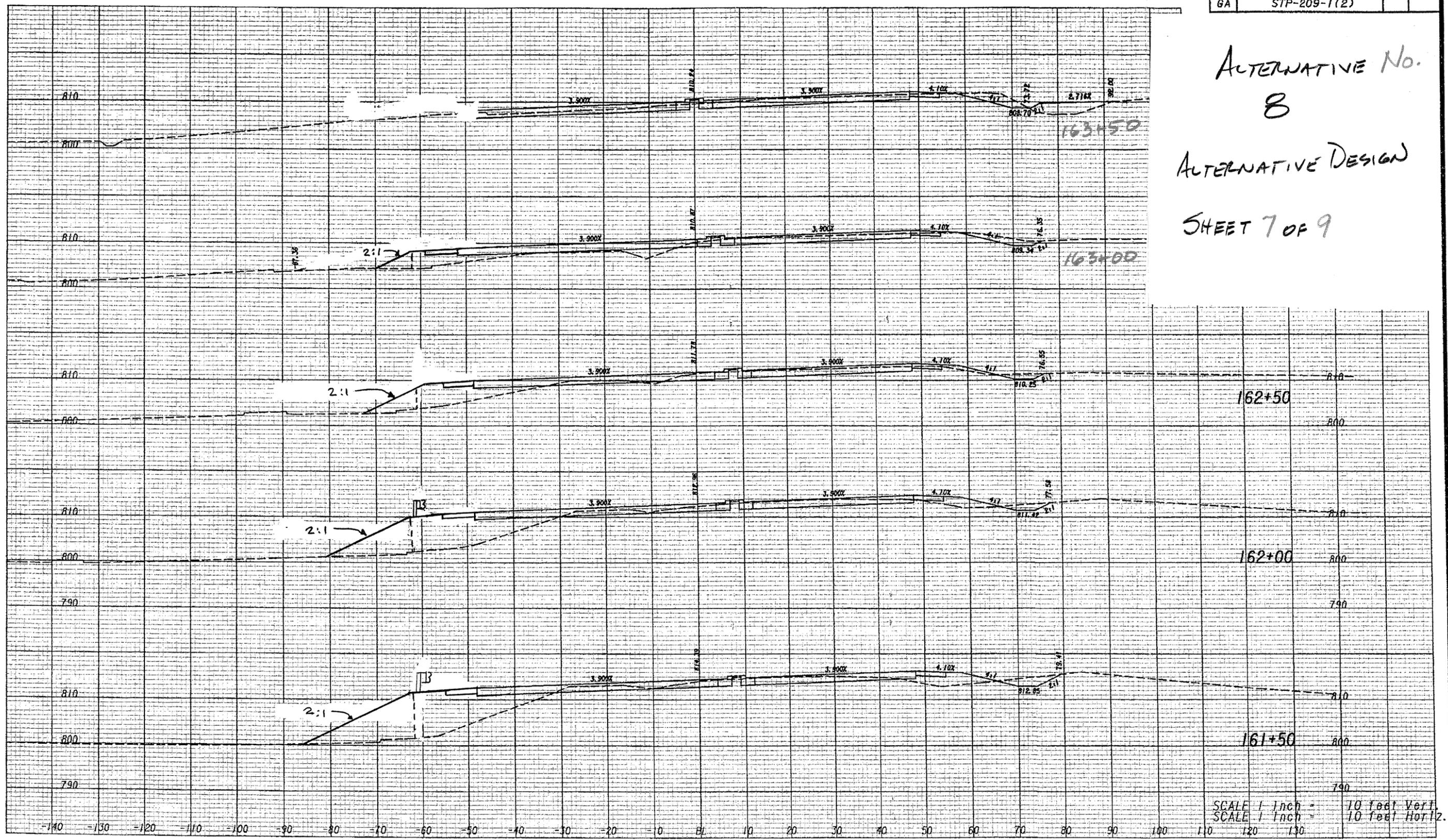
**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511

SCALE  
1 INCH = 10' HORIZONTAL  
1 INCH = 10' VERTICAL

DATE	REVISIONS	DATE	REVISIONS

GEORGIA  
DEPARTMENT OF TRANSPORTATION  
MAINLINE CROSS SECTIONS  
PROJECT: STP-209-1(2)  
COUNTY: FAYETTE  
DATE: DRAWING NUMBER  
23-26

ALTERNATIVE No.  
8  
ALTERNATIVE DESIGN  
SHEET 7 OF 9



SCALE 1 inch = 10 feet Vert.  
SCALE 1 inch = 10 feet Horiz.

\*\*\*\*\*SPECIFICATION\*\*\*\*\*  
\*\*\*\*\*SYTIME\*\*\*\*\*

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ENGINEERS & CONSULTANTS  
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SCALE  
1 INCH = 10' HORIZONTAL  
1 INCH = 10' VERTICAL

DATE	REVISIONS	DATE	REVISIONS

GEORGIA  
DEPARTMENT OF TRANSPORTATION  
MAINLINE CROSS SECTIONS  
PROJECT: STP-209-1(2)  
COUNTY: FAYETTE  
DATE: DRAWING NUMBER  
23-27

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 8

SHEET NO.: 8 of 9

## ORIGINAL DESIGN REQUIRES:

RETAINING WALL

$$600 \text{ FT OF SIDEWALK} = 600(5)/9 = 333 \text{ SY}$$

600 FT OF CURB & GUTTER

## ALTERNATIVE DESIGN REQUIRES:

245 FT OF CURB & GUTTER

$$42 \times 74/9 = 345 \text{ SY OF PARKING LOT PAVEMENT}$$

PARKING LOT PAVEMENT: 3" GAB  
3" ASPH. PAVEMENT

$$\text{QUANTITY FOR ASPHALT} = 345(1.25)/3 = 28.75 \text{ CY}$$

$$\text{WT} = 28.75(27)(150)/2000 = 58 \text{ TONS}$$

150 FT OF TYPE W GUARDRAIL, 1 TYPE 12 ANCHORAGE

## ADDITIONAL FILL FOR ALTERNATIVE:

STATION	AREA	VOLUME (cu)
160+00	0	550
+50	22	3850
161+00	132	6600
+50	132	5225
162+00	81	2650
+50	25	775
163+00	16	400
+50	0	

$$\Sigma = 20150$$

$$\div 27 = 746 \text{ CY}$$

USE \$55/TON FOR ASPHALT

\$6/SY FOR GAB

\$12/CY FOR FILL

\$17/LF FOR CURB & GUTTER

\$35/SY SIDEWALK

\$17/LF GUARDRAIL

\$1704 EACH TYPE 12 ANCHORAGE



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **9**  
*Georgia Department of Transportation*

DESCRIPTION: **ADVANCE THE RELOCATION OF THE 20-IN. WATER LINES** SHEET NO.: **1 of 1**

**ORIGINAL DESIGN:**

Two 20-in. water lines originating at the Peach Tree City Water Treatment Plant (Sta. 221+40) crossing the project at Sta. 126+50 and extending past construction limits at Sta. 109+50 require relocation.

**ALTERNATIVE:**

Relocate the water lines prior to the roadway construction. This could also be done with a special provision limiting the roadway work until the utility is relocated.

**ADVANTAGES:**

- Avoids contractor delays
- Alleviates contract change orders
- Prevents accidental damage
- Reduces contractor risk

**DISADVANTAGES:**

- Delays the letting of the main contract
- May result in budget/county financial balancing issues with the project being pushed into another fiscal year

**DISCUSSION:**

The water lines appear to be main distributors and will require a lengthy relocation timeframe. Delays such as these are easily converted into large financial claims by the contractors. It would be best to move the water lines prior to the start of other construction.

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

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **11**

DESCRIPTION: **RESHAPE THE DETENTION POND AT STA. 123+00**

SHEET NO.: **1 of 8**

ORIGINAL DESIGN: (Sketch attached)

The detention pond is positioned to affect three properties with no visibility barrier for adjacent properties. The proposed solution by the designers is to run 60-in. pipes to SR 85 and White Water Creek.

ALTERNATIVE: (Sketch attached)

Contain the entire permanent detention basin within property #25. Adjust the drains to match the new location and place the trees along the property border as a visual screen. Provide access via the existing driveway to the property.

**ADVANTAGES:**

- Eliminates a complicated closed drain system
- Reduces maintenance of the drainage system
- Right-of-way face is from one property only
- Reduces required borrow on the project

**DISADVANTAGES:**

- Displaces one family
- Detention basin remains

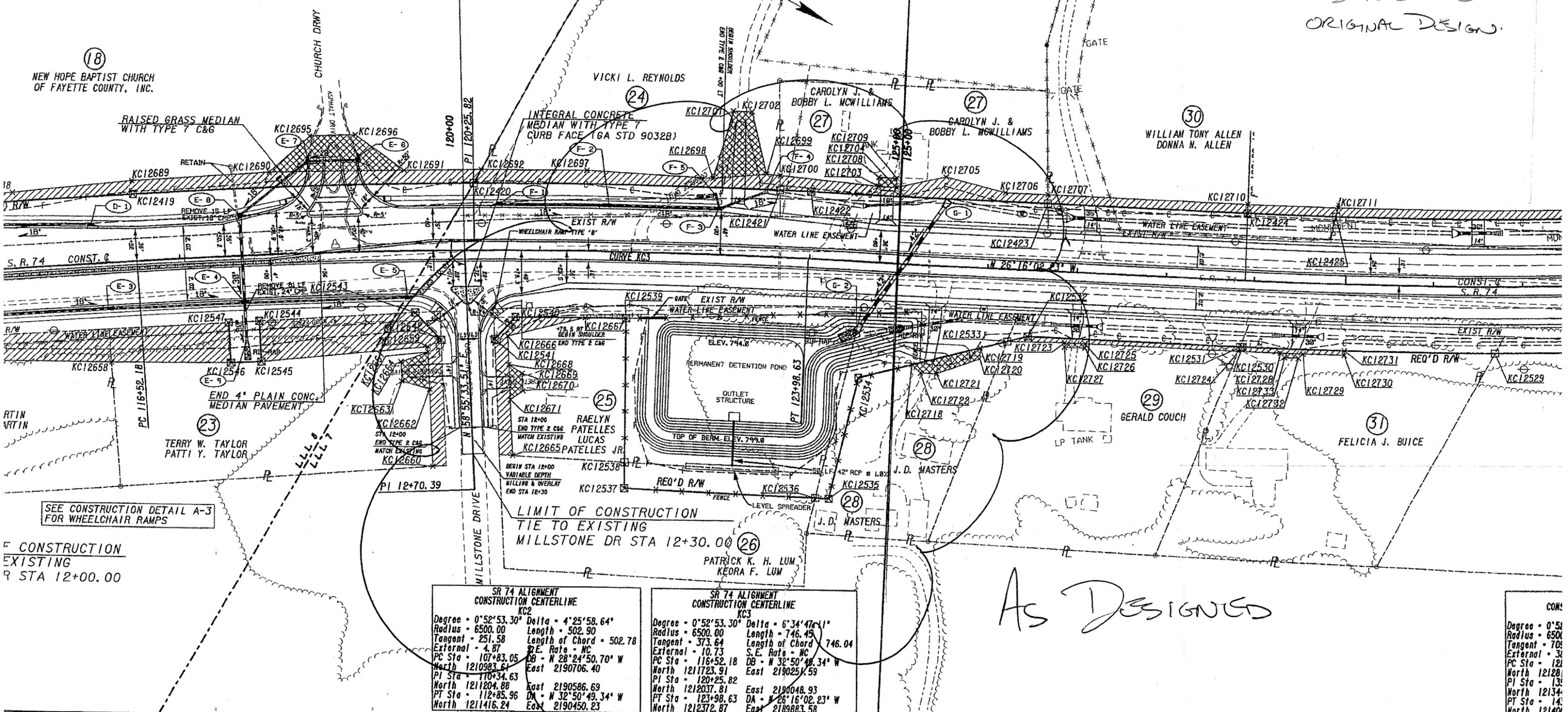
**DISCUSSION:**

The detention pond could be designed to fit inside the limits of property #25. As it stands, more than 2/3 of this property is being purchased for this project. This eliminates any need for right-of-way from property #26 and drastically reduces the needs from property #28.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>631,373</b>	—	\$ <b>631,373</b>
ALTERNATIVE	\$ <b>441,705</b>	—	\$ <b>441,705</b>
SAVINGS (Original minus Alternative)	\$ <b>189,668</b>	—	\$ <b>189,668</b>

STA 120+14.38 M. L.  
 STA 10+00 MILLSTONE DR.  
 ANGLE=91°25'10.81"

ALTERNATIVE II  
 Sht. 2 of 8  
 ORIGINAL DESIGN



SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMPS

F CONSTRUCTION  
 EXISTING  
 R STA 12+00.00

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC2

Degree - 0°52'53.30"	Delta - 4°25'58.64"
Radius - 6500.00	Length - 502.90
Tangent - 251.58	Length of Chord - 502.78
External - 4.87	S.E. Rate - NC
PC Sta - 107+83.05	DB - N 28°24'50.70" W
North 1210983.64	East 2190706.40
PI Sta - 110+34.63	
North 1211204.88	East 2190586.69
PT Sta - 112+85.96	DA - N 32°50'49.34" W
North 1211416.24	East 2190450.23

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC3

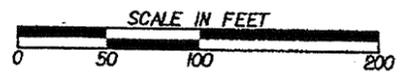
Degree - 0°52'53.30"	Delta - 6°34'47.11"
Radius - 6500.00	Length - 746.45
Tangent - 373.64	Length of Chord - 746.04
External - 10.73	S.E. Rate - NC
PC Sta - 116+52.18	DB - N 32°50'49.34" W
North 1211723.91	East 2190251.59
PI Sta - 120+25.82	
North 1212037.81	East 2190048.93
PT Sta - 123+98.63	DA - N 26°16'02.23" W
North 1212372.87	East 2189883.58

CONSTRUCTION CENTERLINE

Degree - 0°52'53.30"	Delta - 6°34'47.11"
Radius - 6500.00	Length - 746.45
Tangent - 373.64	Length of Chord - 746.04
External - 10.73	S.E. Rate - NC
PC Sta - 116+52.18	DB - N 32°50'49.34" W
North 1211723.91	East 2190251.59
PI Sta - 120+25.82	
North 1212037.81	East 2190048.93
PT Sta - 123+98.63	DA - N 26°16'02.23" W
North 1212372.87	East 2189883.58

As Designed

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511



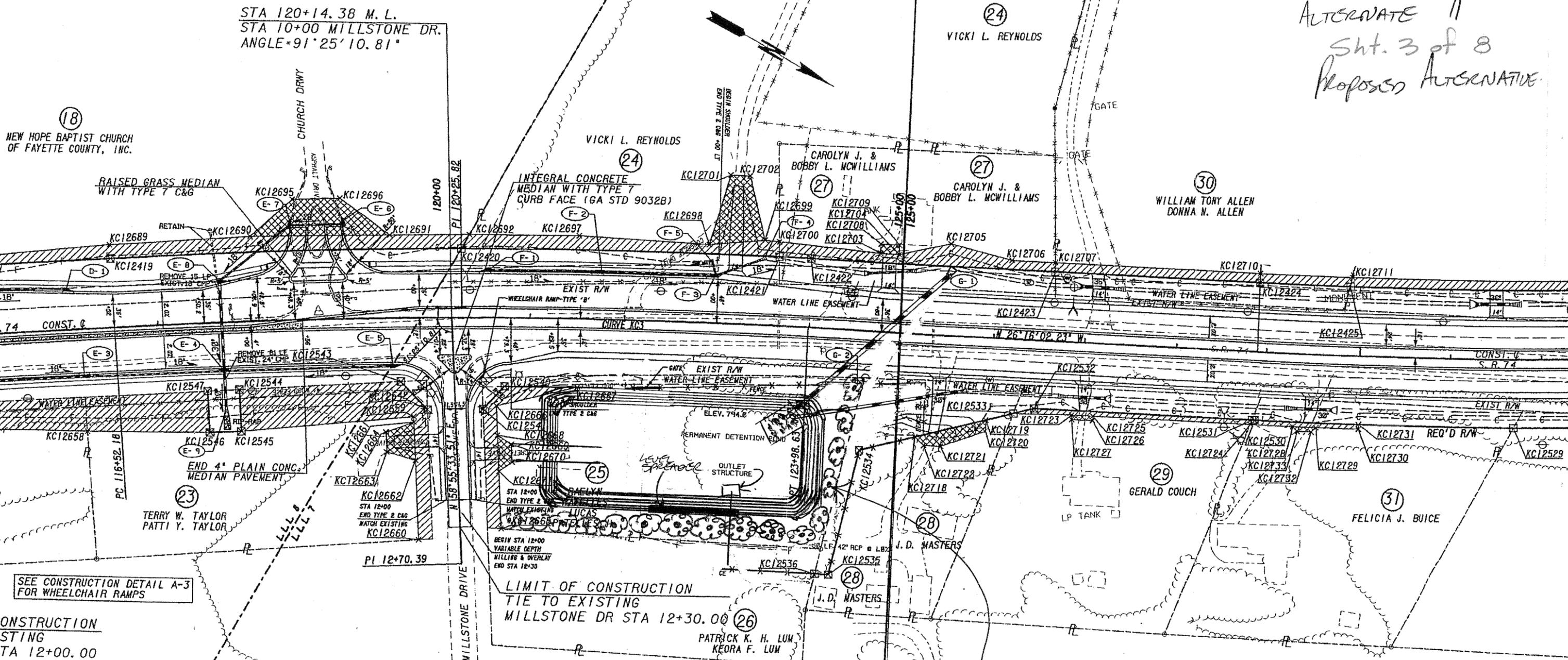
REVISION DATES


STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION  
 OFFICE: **MAINLINE PLAN**

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

**MULKEY**  
 ENGINEERS & CONS  
 1255 CANTON STREET,  
 ROSWELL, GEORGIA  
 (678) 461-3511

ALTERNATE 11  
Sht. 3 of 8  
Proposed ALTERNATE



(18) NEW HOPE BAPTIST CHURCH OF FAYETTE COUNTY, INC.

(24) VICKI L. REYNOLDS

(27) CAROLYN J. & BOBBY L. MCWILLIAMS

(30) WILLIAM TONY ALLEN  
DONNA N. ALLEN

(23) TERRY W. TAYLOR  
PATTI Y. TAYLOR

(25) LUCAS

(29) GERALD COUCH

(31) FELICIA J. BUICE

(26) PATRICK K. H. LUM  
KEORA F. LUM

SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMPS

LAYLAND CYPRESS?

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC2

Degree - 0°52'53.30"	Delta - 4°25'58.64"
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North 1211416.24	East 2190450.23

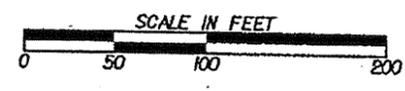
SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC3

Degree - 0°52'53.30"	Delta - 6°34'47.11"
Radius - 6500.00	Length - 746.45
Tangent - 373.64	Length of Chord - 746.04
External - 10.73	S.E. Rate - NC
PC Sta - 116+52.18	DB - N 32°50'49.34" W
North 1211723.91	East 2190251.59
PI Sta - 120+25.82	
North 1212037.81	East 2190048.93
PT Sta - 123+98.63	DA - N 26°16'02.23" W
North 1212372.87	East 2189883.58

CONS

Degree - 0°52'
Radius - 6500
Tangent - 709
External - 38
PC Sta - 128
North 121281
PI Sta - 135
North 121344
PT Sta - 143
North 121400

**MULKEY**  
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ROSWELL, GEORGIA 30075  
(678) 461-3511



REVISION DATES


STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION  
OFFICE: **MAINLINE PLAN**

PROPERTY AND EXISTING R/W LINE — R —  
REQUIRED R/W LINE — C — F —  
CONSTRUCTION LIMITS — C — F —  
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES [Hatched Box]  
EASEMENT FOR CONSTR OF SLOPES [Hatched Box]  
EASEMENT FOR CONSTR OF DRIVES [Cross-hatched Box]

**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 11

SHEET NO.: 4 of 8

$$\text{VOLUME OF EARTHWORK} = 280' \times 100' \times \sim 8' \times \frac{1^{\text{CYD}}}{27^{\text{cu ft}}} = 8295 \text{ CY}$$

USE 8300 CY

$$\text{LENGTH OF PIPE PROPOSED BY DESIGN} = \left[ \overset{\text{STA}}{(100+25)} + \overset{\text{STA}}{(125+100)} \right] + \left[ \overset{\text{STA}}{(30+100)} - \overset{\text{STA}}{(20+100)} \right]$$

$$\approx 3475 \text{ LF}$$

USE 3500 LF

42" + 30" Pipe  
 AREA  $\sim 2100 \text{ in}^2$

USE 60" Pipe  
 AREA  $\sim 2800 \text{ in}^2$

ATTACHMENT #11  
Sht. 5 of 8**Myers, Lisa**

**From:** Milligan, Jerry  
**Sent:** Wednesday, February 14, 2007 10:45 AM  
**To:** Myers, Lisa  
**Subject:** RE: VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

Lisa, I got an email back from Carol Perry ( R/W Team Manager who has the project ) and she said they have not purchased anything yet, they are still in the pre-acquisition phase. The land values are as follows: Residential: \$23,110 per acre for 5-10 acre tracts; \$65,000 to \$75,000 for lot \*  
 Commercial: \$ \$ 300,000 per acre for small tracts and \$ 100,000 to \$ 150,000 per acre for larger tracts.

Industrial: \$50,000 - \$ 75,000 per acre  
 Agricultural/Residential: \$ \$20,000 -\$ 50,000 per acre

Jerry

**From:** Myers, Lisa  
**Sent:** Wednesday, February 14, 2007 8:51 AM  
**To:** Milligan, Jerry  
**Subject:** RE: VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

Thanks. I have been trying to find some information in T-rex, or Traqs or active reporting, but I can't get it to work.

**Lisa Myers**

*Design Review Engineer Manager/ VE Coordinator*

*GA DOT - Engineering Services  
 #2 Capitol Square Room 266  
 Atlanta, GA 30334*

404-651-7468

**From:** Milligan, Jerry  
**Sent:** Wednesday, February 14, 2007 8:42 AM  
**To:** Myers, Lisa  
**Subject:** RE: VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

Lisa, I am trying to get an answer from the R/W Team Manager that has that project. Jerry

**From:** Myers, Lisa  
**Sent:** Wednesday, February 14, 2007 8:32 AM  
**To:** Milligan, Jerry  
**Cc:** Pegram, Vinesha C.  
**Subject:** RE: VE Study for STP-209-1(2) & BHF-209-1(3) Fayette PI Nos. 322355 & 322357

No he didn't. We only got right of way drawings. Vinesha said that there are no appraisals yet. Is this correct? They still need some costs for these parcels so they can figure out a savings. Do you have this information.

**Lisa Myers**

*Design Review Engineer Manager/ VE Coordinator*

*GA DOT - Engineering Services  
 #2 Capitol Square Room 266  
 Atlanta, GA 30334*

2/14/2007

PARCEL 22 REQ'D R/W KC120

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX4154	72.89 R	112+65.49	S. R. 74
ARC LENGTH	22.746		
CHORD BEAR	N 32°07'23.65" W		
LNTH CHORD	22.746		
RADIUS	9176.711		
DEGREE	0° 37' 21"		
KC12548	23.55 L	112+98.00	S. R. 74
KC12549	30.23 L	10+95.00	Manor Drive
REDD R/W	0.006		
REDD EASMT	248.50		
REDD R/W	0.006		
REDD EASMT	1.4		
REMAINDER	1.4		

PARCEL 22 REQ'D EASMT. KC172

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12548	73.15 R	112+88.00	S. R. 74
ARC LENGTH	61.971		
CHORD BEAR	N 38°23'07.93" W		
LNTH CHORD	61.971		
RADIUS	9176.711		
DEGREE	0° 37' 21"		
SVX4159	266.35	113+49.27	S. R. 74
SVX4160	74.90 R	112+34.36.96" W	S. R. 74
KC12658	112.00 R	116+15.81 E	S. R. 74
KC12657	106.54 S	S 29°47'20.35" E	S. R. 74
KC12656	120.00 R	S 54°30'54.42" E	S. R. 74
KC12655	100.00 R	S 44°00.00" E	S. R. 74
KC12654	107.87 R	S 22°09'43.66" E	S. R. 74
KC12653	14.00 L	S 52°00'02.16" E	Manor Drive
KC12652	45.00 L	S 57°10'58.99" E	Manor Drive
KC12651	30.23 L	S 56°51'50.94" W	Manor Drive
KC12549	30.23 L	112+98.00	S. R. 74
REDD EASMT	12816.88		
REDD R/W	0.296		

PARCEL 23 TRACT 1 REQ'D R/W KC121

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12547	74.80 R	117+50.00	S. R. 74
KC12544	74.36 R	117+84.00	S. R. 74
KC12545	120.00 R	N 58°03'54.97" E	S. R. 74
KC12546	120.00 R	S 51°50'05.07" E	S. R. 74
KC12547	74.80 R	117+50.00	S. R. 74
REDD R/W	1521.10		
REDD R/W	0.035		
REMAINDER	1.4		

PARCEL 23 TRACT 2 REQ'D R/W KC122

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12543	68.42 R	119+58.00	S. R. 74
ARC LENGTH	27.470		
CHORD BEAR	N 32°14'31.90" W		
LNTH CHORD	27.470		
RADIUS	6016.629		
DEGREE	0° 37' 21"		
SVX4100	68.36 R	119+85.74	S. R. 74
KC12542	30.23 R	N 58°36'06.39" E	Willstone Drive
KC12702	41.97 R	S 18°03'32.37" W	S. R. 74
REDD R/W	443.87		
REDD R/W	0.010		
REMAINDER	1.4		

PARCEL 23 EASEMENT 1 REQ'D EASMT. KC173

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX4268	74.90 R	116+16.62	S. R. 74
KC12547	133.25 R	N 32°34'36.97" W	S. R. 74
KC12546	45.20 R	N 58°03'54.97" E	S. R. 74
KC12545	120.00 R	S 51°50'05.07" E	S. R. 74
KC12544	132.67 S	S 29°47'20.35" E	S. R. 74
KC12658	112.00 R	116+15.81 E	S. R. 74
SVX4268	74.90 R	116+16.62	S. R. 74
REDD EASMT	5466.30		
REDD EASMT	0.125		

PARCEL 23 EASEMENT 2 REQ'D EASMT. KC174

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12544	74.36 R	117+84.00	S. R. 74
SVX4267	150.74 R	N 32°34'36.97" W	S. R. 74
ARC LENGTH	21.402		
CHORD BEAR	N 32°08'29.62" W		
LNTH CHORD	21.402		
RADIUS	6016.629		
DEGREE	0° 37' 21"		
KC12543	69.42 R	119+58.00	S. R. 74
KC12542	41.97 R	N 18°03'50.37" E	Willstone Drive
SVX4370	140.08 R	N 58°58'08.39" E	Willstone Drive
KC12660	132.67 S	S 29°47'20.35" E	Willstone Drive
KC12659	45.00 R	117+07.00	Willstone Drive
KC12658	132.67 S	S 29°47'20.35" E	Willstone Drive
KC12655	120.00 R	117+84.00	S. R. 74
KC12654	45.64 S	S 58°18'53.59" W	S. R. 74
REDD EASMT	3971.95		
REDD EASMT	0.229		

PARCEL 23 TRACT 3 REQ'D DMY. EASMT. KC175

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12661	45.00 R	11+13.00	Willstone Drive
KC12662	45.00 R	11+55.00	Willstone Drive
KC12663	75.00 R	11+00.00	Willstone Drive
KC12664	75.00 R	11+23.00	Willstone Drive
KC12661	45.00 R	11+13.00	Willstone Drive

PARCEL 24 REQ'D R/W KC89

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX4110	32.27 L	120+00.32	S. R. 74
KC12420	75.00 L	N 88°42'10.41" W	S. R. 74
ARC LENGTH	142.257		
CHORD BEAR	N 29°03'46.62" W		
LNTH CHORD	142.257		
RADIUS	6425.000		
DEGREE	0° 32' 17"		
KC12421	75.00 L	123+64.10	S. R. 74
SVX4431	295.63	N 60°56'43.49" E	S. R. 74
SVX4432	45.40 L	123+65.37	S. R. 74
ARC LENGTH	367.479		
CHORD BEAR	S 30°13'00.97" E		
LNTH CHORD	367.479		
RADIUS	6116.629		
DEGREE	0° 36' 12"		
SVX4410	32.27 L	120+00.32	S. R. 74
REDD R/W	12705.59		
REDD R/W	0.292		
REMAINDER	1.2		

PARCEL 24 REQ'D DMY. EASMT. KC188

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12698	85.00 L	122+90.00	S. R. 74
KC12701	160.00 L	123+10.00	S. R. 74
KC12702	160.00 L	123+30.00	S. R. 74
KC12699	92.00 L	123+48.00	S. R. 74
KC12698	85.00 L	122+90.00	S. R. 74

PARCEL 24 REQ'D EASMT. KC187

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12420	75.00 L	120+25.75	S. R. 74
KC12692	90.00 L	N 88°42'10.41" W	S. R. 74
KC12697	118.03 L	N 26°57'41.58" W	S. R. 74
KC12698	90.00 L	121+51.00	S. R. 74
KC12699	140.96 R	N 25°48'17.24" W	S. R. 74
KC12699	85.00 L	122+90.00	S. R. 74
KC12699	85.00 L	N 33°45'38.62" W	S. R. 74
KC12699	92.00 L	123+48.00	S. R. 74
KC12700	91.00 L	N 22°59'05.89" W	S. R. 74
KC12421	75.00 L	123+64.10	S. R. 74
ARC LENGTH	142.257		
CHORD BEAR	N 29°03'46.62" W		
LNTH CHORD	142.257		
RADIUS	6425.000		
DEGREE	0° 32' 17"		
KC12420	75.00 L	120+25.75	S. R. 74
REDD EASMT	4991.77		
REDD EASMT	0.105		

PARCEL 25 REQ'D R/W KC123

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX4160	66.07 R	120+46.33	S. R. 74
ARC LENGTH	412.303		
CHORD BEAR	N 29°34'31.71" W		
LNTH CHORD	412.303		
RADIUS	6116.629		
DEGREE	0° 37' 21"		
SVX4265	134.30 R	124+61.90	S. R. 74
SVX4172	242.18 R	N 75°08'32.63" E	S. R. 74
KC12538	237.54 R	N 24°23.46	S. R. 74
KC12539	75.00 S	S 67°56'15.87" W	S. R. 74
KC12539	75.00 R	121+95.00	S. R. 74
ARC LENGTH	121.581		
CHORD BEAR	S 28°35'15.71" E		
LNTH CHORD	121.579		
RADIUS	6425.000		
DEGREE	0° 37' 30"		
KC12540	75.00 R	120+72.00	S. R. 74
KC12541	34.98 S	S 75°12'57.70" E	S. R. 74
KC12541	29.97 L	11+01.00	Willstone Drive
SVX4160	66.07 R	S 58°36'08.33" W	S. R. 74
REDD R/W	4687.08		
REDD R/W	1.075		
REMAINDER	1.4		

PARCEL 25 REQ'D EASMT. KC176

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12540	75.00 R	120+72.00	S. R. 74
ARC LENGTH	171.000		
CHORD BEAR	N 28°48'09.70" W		
LNTH CHORD	171.000		
RADIUS	6425.000		
DEGREE	0° 37' 30"		
KC12665	75.00 R	121+50.00	S. R. 74
KC12666	80.01 L	S 42°56'26.94" E	Willstone Drive
KC12665	45.00 L	N 58°58'53.51" E	Willstone Drive
KC12665	45.00 L	121+30.00	Willstone Drive
SVX4161	29.95 L	S 25°51'40.84" E	Willstone Drive
KC12541	29.97 L	S 58°36'08.33" W	Willstone Drive
KC12541	29.97 L	11+01.00	Willstone Drive
KC12540	75.00 R	N 75°12'57.70" W	S. R. 74
REDD EASMT	2986.76		
REDD EASMT	0.069		

PARCEL 25 REQ'D DMY. EASMT. KC177

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12668	45.00 L	11+30.00	Willstone Drive
KC12669	60.00 L	11+40.00	Willstone Drive
KC12670	60.00 L	11+60.00	Willstone Drive
KC12671	45.00 L	11+70.00	Willstone Drive
KC12668	45.00 L	11+30.00	Willstone Drive

PARCEL 26 REQ'D R/W KC124

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12538	237.54 R	121+95.00	S. R. 74
SVX4172	242.18 R	N 25°51'40.84" W	S. R. 74
ARC LENGTH	28.19		
CHORD BEAR	N 75°08'32.63" E		
LNTH CHORD	28.19		
RADIUS	104+17.85		
DEGREE	0° 37' 21"		
KC12537	267.00 R	121+95.00	S. R. 74
KC12538	237.54 R	S 81°55'15.87" W	S. R. 74
REDD R/W	6236.31		
REDD R/W	0.141		
REMAINDER	1.4		

PARCEL 27 REQ'D EASMT. KC195

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX4431	295.63	123+65.37	S. R. 74
KC12421	75.00 L	S 60°56'43.49" W	S. R. 74
ARC LENGTH	34.934		
CHORD BEAR	N 26°25'10.19" W		
LNTH CHORD	34.934		
RADIUS	6516.000		
DEGREE	0° 36' 12"		
KC12423	265.25	123+98.63	S. R. 74
SVX4432	45.40 L	N 26°16'02.23" W	S. R. 74
SVX4431	295.63	N 60°56'43.49" E	S. R. 74
ARC LENGTH	70.16		
CHORD BEAR	S 27°25'09.22" E		
LNTH CHORD	70.16		
RADIUS	6116.629		
DEGREE	0° 36' 12"		
SVX4432	45.40 L	123+65.37	S. R. 74
REDD R/W	12865.60		
REDD R/W	0.181		
REMAINDER	1.4		

PARCEL 27 REQ'D DMY. EASMT. KC190

PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
KC12421	75.00 L	123+64.10	S. R. 74
KC12700	91.00 L	S 60°56'43.49" W	S. R. 74
KC12703	85.00 L	N 23°15'00.07" W	S. R. 74
KC12704	85.00 L	124+75.00	S. R. 74
KC12705	85.00 L	N 26°16'02.23" W	S. R. 74
KC12706	85.00 L	N 14°17'38.15" W	S. R. 74
KC12707			

PARCEL 28	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14265	51.71 R	124+61.90	S.R. 74
ARC LENGTH	133.10		
CHORD BEAR	N 26° 58' 36.52" W		
LATH CHORD	133.10		
RADIUS	6016.829		
DEGREE	0° 57' 8"		
SVX14265	50.06 R	125+95.07	S.R. 74
SVX14265	40.42 R	N 26° 20' 33.42" W	S.R. 74
SVX14262	33.31 R	N 26° 20' 33.42" W	S.R. 74
KC12533	81.73 R	N 43° 01' 22.93" W	S.R. 74
KC12534	170.92 R	S 47° 01' 22.93" E	S.R. 74
KC12534	131.00 R	N 26° 16' 02.23" E	S.R. 74
KC12535	141.79 R	N 26° 16' 02.23" E	S.R. 74
KC12536	15.15 R	S 26° 16' 54.74" E	S.R. 74
KC12536	28.39 R	S 75° 08' 32.81" W	S.R. 74
SVX14772	242.18 R	N 24° 47' 05"	S.R. 74
SVX14265	196.30 R	S 72° 00' 32.63" W	S.R. 74
REQ'D R/W	1181.36 SF		
REQ'D R/W	0.275 ACRES		
REMAINDER	- 0.06 ACRES		

PARCEL 28	REQ'D D.W.M.Y. E.A.S.M.T.	KC195
PNT	OFFSET/DIST	STATION/BEARING
KC12178	114.14 R	125+00.000000
KC12179	80.66 R	125+00.000000
KC12120	103.00 R	124+95.000000
KC12121	122.00 R	124+95.000000
KC12122	122.00 R	125+00.000000
KC12178	113.24 R	125+20.000000

PARCEL 29	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14262	50.01 R	126+35.49	S.R. 74
SVX14261	250.82 R	N 26° 20' 33.42" W	S.R. 74
SVX14261	69.92 R	N 43° 31' 41.70" E	S.R. 74
KC12531	20.92 R	128+86.32	S.R. 74
KC12532	239.32 R	S 26° 16' 02.23" E	S.R. 74
KC12532	23.00 R	126+47.00	S.R. 74
KC12533	81.73 R	N 43° 01' 22.93" W	S.R. 74
SVX14262	50.01 R	126+35.49	S.R. 74
REQ'D R/W	6398.78 SF		
REQ'D R/W	0.163 ACRES		
REMAINDER	- 0.14 ACRES		

PARCEL 29	REQ'D D.W.M.Y. E.A.S.M.T.	KC196
PNT	OFFSET/DIST	STATION/BEARING
KC12533	81.73 R	126+35.49
KC12532	81.13 R	N 43° 01' 22.93" W
KC12531	75.00 R	N 26° 16' 02.23" W
KC12531	75.00 R	N 26° 16' 02.23" W
KC12724	80.00 R	128+86.32
KC12723	195.52 R	S 26° 16' 02.23" E
KC12533	81.73 R	N 43° 01' 22.93" W
REQ'D R/W	1284.21 SF	
REQ'D R/W	0.029 ACRES	

PARCEL 29	REQ'D D.W.M.Y. E.A.S.M.T.	KC196
PNT	OFFSET/DIST	STATION/BEARING
KC12723	80.00 R	126+89.00
KC12723	80.00 R	127+12.00
KC12726	85.00 R	127+12.00
KC12727	85.00 R	126+89.00
KC12723	80.00 R	126+89.00

PARCEL 30	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14318	50.03 L	126+63.89	S.R. 74
KC12423	75.00 L	S 26° 16' 02.23" W	S.R. 74
KC12424	75.00 L	N 26° 16' 02.23" W	S.R. 74
ARC LENGTH	97.51		
CHORD BEAR	N 26° 42' 07.78" W		
LATH CHORD	97.51		
RADIUS	6425.000		
DEGREE	0° 53' 30"		
KC12425	75.00 L	129+87.86	S.R. 74
SVX14317	49.78 L	N 75° 14' 02.95" E	S.R. 74
SVX14318	316.46 L	126+63.10	S.R. 74
SVX14318	50.03 L	S 26° 16' 02.23" W	S.R. 74
REQ'D R/W	7937.46 SF		
REQ'D R/W	0.182 ACRES		
REMAINDER	- 0.99 ACRES		

PARCEL 30	REQ'D E.A.S.M.T.	KC191
PNT	OFFSET/DIST	STATION/BEARING
KC12423	75.00 L	126+63.89
KC12707	10.01 L	S 60° 54' 49" W
KC12710	225.60 L	N 26° 16' 02.23" W
KC12710	85.00 L	S 26° 16' 02.23" W
KC12711	99.78 L	N 26° 42' 07.78" E
KC12711	85.00 L	N 75° 14' 02.95" E
KC12425	75.00 L	129+87.86
ARC LENGTH	10.34	
CHORD BEAR	N 26° 42' 07.78" E	
LATH CHORD	97.51	
RADIUS	6425.000	
DEGREE	0° 53' 30"	
KC12424	75.00 L	128+89.19
KC12423	225.30 L	S 26° 16' 02.23" E
REQ'D E.A.S.M.T.	3653.85 SF	
REQ'D E.A.S.M.T.	0.075 ACRES	

PARCEL 31	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14261	49.67 R	128+95.39	S.R. 74
SVX14189	295.51 R	N 26° 16' 02.23" W	S.R. 74
KC12529	53.79 R	N 89° 35' 20.71" E	S.R. 74
ARC LENGTH	281.968		
CHORD BEAR	S 29° 29' 45.05" E		
LATH CHORD	281.968		
RADIUS	6425.000		
DEGREE	0° 52' 17"		
KC12530	75.00 R	128+89.19	
KC12530	27.87 R	S 26° 16' 02.23" E	
KC12531	75.00 R	128+86.32	
SVX14261	49.67 R	N 89° 35' 20.71" E	
REQ'D R/W	6876.49 SF		
REQ'D R/W	0.153 ACRES		
REMAINDER	- 0.15 ACRES		

PARCEL 31	REQ'D E.A.S.M.T.	KC198
PNT	OFFSET/DIST	STATION/BEARING
KC12531	75.00 R	128+86.32
KC12530	75.00 R	N 26° 16' 02.23" W
ARC LENGTH	112.092	
CHORD BEAR	N 26° 45' 20.45" W	
LATH CHORD	112.092	
RADIUS	6578.000	
DEGREE	0° 52' 17"	
KC12731	75.00 R	130+00.00
KC12730	80.00 R	N 62° 45' 21.33" E
KC12729	45.35 R	S 27° 02' 44.88" E
KC12728	80.00 R	N 26° 14' 14.02" E
KC12728	80.00 R	129+30.00
KC12724	80.00 R	128+84.56
KC12724	80.00 R	S 83° 34' 41.70" W
KC12531	75.00 R	128+86.32
REQ'D E.A.S.M.T.	576.91 SF	
REQ'D E.A.S.M.T.	0.013 ACRES	

PARCEL 31	REQ'D D.W.M.Y. E.A.S.M.T.	KC199
PNT	OFFSET/DIST	STATION/BEARING
KC12728	80.00 R	129+30.00
KC12729	80.00 R	129+55.00
KC12730	85.00 R	129+50.00
KC12731	85.00 R	129+15.00
KC12728	80.00 R	129+30.00

PARCEL 32	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14317	49.78 L	129+87.86	S.R. 74
KC12425	75.00 L	S 75° 14' 02.95" W	
ARC LENGTH	315.302		
CHORD BEAR	N 26° 35' 02.37" W		
LATH CHORD	315.302		
RADIUS	6425.000		
DEGREE	0° 53' 30"		
KC12426	75.00 L	133+04.82	
SVX14316	38.28 L	N 75° 20' 42.72" E	
SVX14317	310.51 L	132+94.73	
REQ'D R/W	49.78 L	129+87.86	
REQ'D R/W	8314.57 SF		
REQ'D R/W	0.214 ACRES		
REMAINDER	- 0.78 ACRES		

PARCEL 32	REQ'D E.A.S.M.T.	KC192
PNT	OFFSET/DIST	STATION/BEARING
KC12425	75.00 L	129+87.86
ARC LENGTH	10.34	
CHORD BEAR	N 26° 16' 02.23" W	
LATH CHORD	97.51	
RADIUS	6425.000	
DEGREE	0° 53' 30"	
KC12711	85.00 L	129+90.00
SVX14316	38.28 L	N 75° 20' 42.72" E
SVX14317	310.51 L	132+94.73
REQ'D R/W	49.78 L	129+87.86
REQ'D R/W	8314.57 SF	
REQ'D R/W	0.214 ACRES	
REMAINDER	- 0.78 ACRES	

PARCEL 33	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14189	55.79 R	131+78.56	S.R. 74
SVX14187	211.15 R	N 26° 20' 33.42" W	
ARC LENGTH	101.314		
CHORD BEAR	N 27° 18' 20.75" W		
LATH CHORD	101.309		
RADIUS	3013.575		
DEGREE	0° 53' 35"		
KC12712	85.00 L	133+04.82	
SVX14189	55.79 R	131+78.56	
CHORD BEAR	N 26° 20' 33.42" W		
LATH CHORD	101.309		
RADIUS	3013.575		
DEGREE	0° 53' 30"		
KC12529	75.00 R	134+87.34	
ARC LENGTH	321.052		
CHORD BEAR	S 30° 07' 55.63" E		
LATH CHORD	321.052		
RADIUS	6578.000		
DEGREE	0° 52' 17"		
KC12715	75.00 R	131+67.94	
KC12529	80.00 R	N 89° 35' 20.71" W	
SVX14189	55.79 R	131+78.56	
REQ'D R/W	8753.82 SF		
REQ'D R/W	0.254 ACRES		
REMAINDER	- 0.01 ACRES		

PARCEL 33	REQ'D D.W.M.Y. E.A.S.M.T.	KC200
PNT	OFFSET/DIST	STATION/BEARING
KC12734	75.00 R	132+50.00
ARC LENGTH	240.076	
CHORD BEAR	N 30° 29' 37.66" W	
LATH CHORD	240.083	
RADIUS	6575.000	
DEGREE	0° 53' 37"	
KC12528	75.00 R	134+87.34
ARC LENGTH	115.703	
CHORD BEAR	N 29° 27' 07.62" W	
LATH CHORD	115.696	
RADIUS	3013.575	
DEGREE	1° 54' 41"	
SVX14188	80.40 R	136+01.54
CHORD BEAR	N 89° 07' 17.54" E	
LATH CHORD	80.40 R	135+95.70
SVX14188	80.40 R	S 30° 11' 18.70" E
KC12735	85.00 R	134+00.00
KC12735	152.17 R	S 26° 20' 28.30" E
KC12734	75.00 R	132+50.00
REQ'D E.A.S.M.T.	2817.58 SF	
REQ'D E.A.S.M.T.	0.065 ACRES	

PARCEL 34	REQ'D R/W	STATION/BEARING	ALIGNMENT
PNT	OFFSET/DIST	STATION/BEARING	ALIGNMENT
SVX14316	38.28 L	132+94.73	S.R. 74
KC12426	75.00 L	S 75° 20' 42.72" E	
ARC LENGTH	525.00		
CHORD BEAR	N 32° 15' 19.45" W		
LATH CHORD	524.909		
RADIUS	6425.000		
DEGREE	0° 53' 30"		
KC12427	75.00 L	138+36.00	
KC12428	85.00 L	S 55° 23' 12.50" W	
KC12429	85.00 L	138+36.00	
KC12429	10.00 L	N 34° 43' 00.30" W	
SVX14317	75.00 L	139+60.00	
ARC LENGTH	10.34		
CHORD BEAR	N 26° 16' 02.23" W		
LATH CHORD	97.51		
RADIUS	6425.000		
DEGREE	0° 53' 30"		
KC12430	75.00 L	139+60.00	
SVX14316	38.28 L	132+94.73	
CHORD BEAR	N 32° 15' 19.45" W		
LATH CHORD	524.909		
RADIUS	6425.000		
DEGREE	0° 53' 30"		
SVX14315	31.41 L	133+04.82	
SVX14316	38.28 L	S 26° 20' 33.42" E	
REQ'D R/W	14988.94 SF		
REQ'D R/W	0.803 ACRES		
REMAINDER	- 0.14 ACRES		

PARCEL 34	REQ'D E.A.S.M.T.	KC193
PNT	OFFSET/DIST	STATION/BEARING
KC12428	75.00 L	133+04.82
KC12712	10.34 L	S 75° 20' 42.72" W
KC12713		



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **12**  
*Georgia Department of Transportation*

DESCRIPTION: **REDUCE THE LENGTH OF THE U TURN LANE AT LODGE TRAIL** SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

Going northbound towards Lodge Trail, the length of the left U turn lane is 521 ft. (excludes taper) that can accommodate roughly 21 cars to turn to seven private residential driveways

ALTERNATIVE: (Sketch attached)

Reduce the length of the left U turn lane to 100 ft. to accommodate four vehicles. This is more than the two-car minimum recommended in the 2004 edition of AASHTO.

ADVANTAGES:

- Reduces construction cost

DISADVANTAGES:

- Reduces storage length

DISCUSSION:

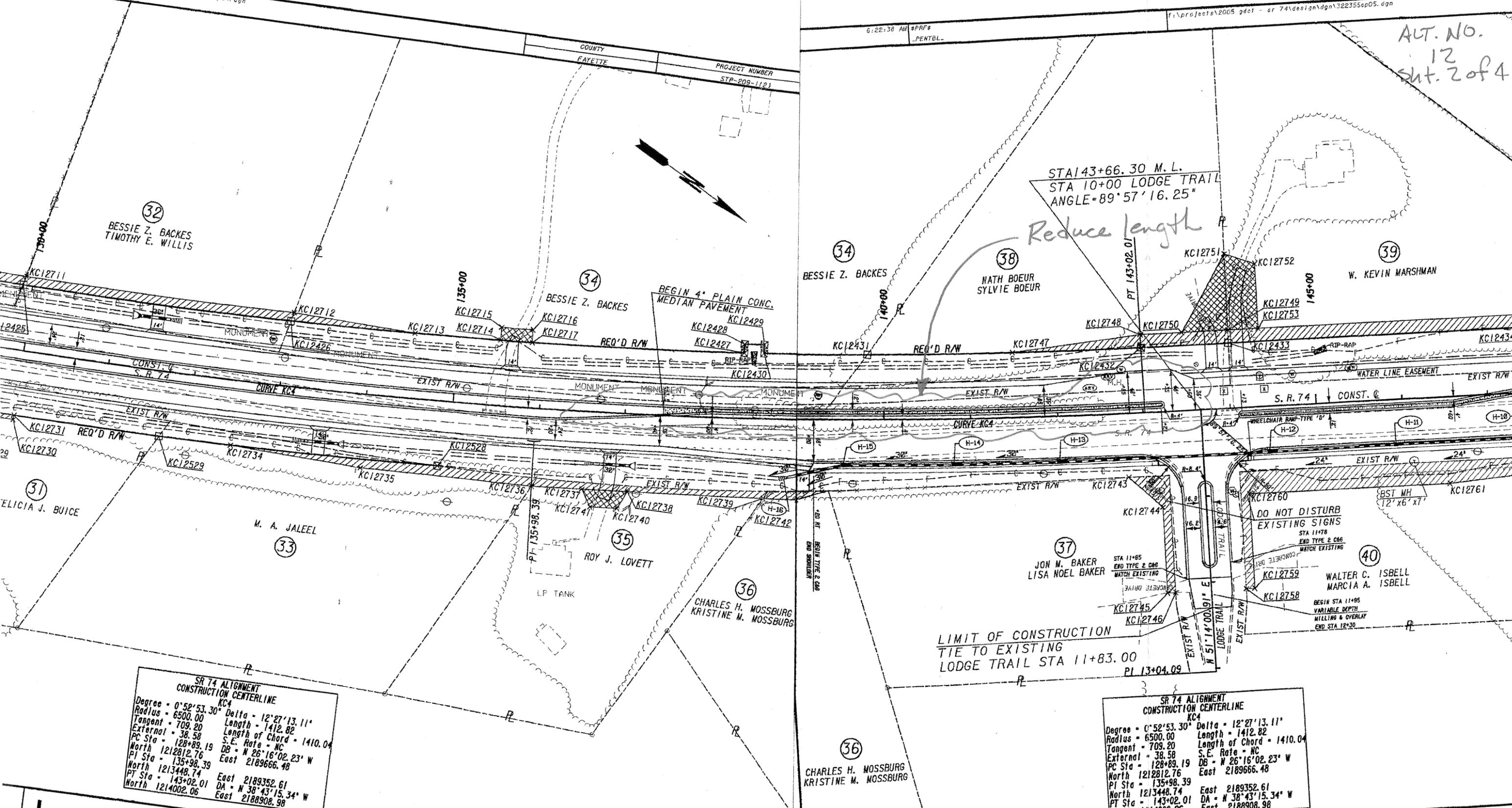
The long left turn lane provided at this intersection is unnecessary considering the projected traffic volumes.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 48,686	—	\$ 48,686
ALTERNATIVE	\$ 9,340	—	\$ 9,340
SAVINGS (Original minus Alternative)	\$ 39,346	—	\$ 39,346

COUNTY  
FAYETTE

PROJECT NUMBER  
STP-209-11(2)

ALT. NO.  
12  
Sht. 2 of 4



SR 74 ALIGNMENT  
CONSTRUCTION CENTERLINE  
KC4

Degree = 0°52'53.30"	Delta = 12°27'13.11"
Radius = 6500.00	Length = 1412.82
Tangent = 709.20	Length of Chord = 1410.04
External = 38.58	S.E. Rate = NC
PC Sta = 128+89.19	DB = N 26°16'02.23" W
North 1212812.76	East 2189666.48
PI Sta = 135+98.39	
North 1213448.74	East 2189352.61
PT Sta = 143+02.01	DA = N 38°43'15.34" W
North 1214002.06	East 2188908.98

SR 74 ALIGNMENT  
CONSTRUCTION CENTERLINE  
KC4

Degree = 0°52'53.30"	Delta = 12°27'13.11"
Radius = 6500.00	Length = 1412.82
Tangent = 709.20	Length of Chord = 1410.04
External = 38.58	S.E. Rate = NC
PC Sta = 128+89.19	DB = N 26°16'02.23" W
North 1212812.76	East 2189666.48
PI Sta = 135+98.39	
North 1213448.74	East 2189352.61
PT Sta = 143+02.01	DA = N 38°43'15.34" W
North 1214002.06	East 2188908.98

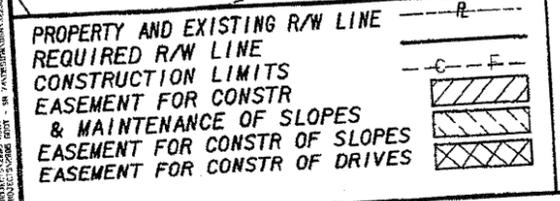
**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE G  
ROSWELL, GEORGIA 30075  
(678) 461-3511



REVISION DATES


STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:

MAINLINE PLAN



**MULKEY**  
ENGINEERS & CONSULTANT  
1255 CANTON STREET, SUITE G  
ROSWELL, GEORGIA 30075  
(678) 461-3511

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 12

SHEET NO.: 3 of 4

## PAVEMENT

12.5 mm Superpave 165 lbs/sy = 0.0825 T/sy for 1.5"  
At \$46.16/T,  $0.0825 \times 46.16 = \$3.80/sy$

19 mm Superpave 440 lbs/sy = 0.22 T/sy for 4"  
At \$60/T,  $0.22 \times 60 = \$13.20/sy$

25 mm Superpave 550 lbs/sy = 0.275 T/sy for 5"  
At \$65/T,  $0.275 \times 65 = \$17.88/sy$

12" G.A.B. - \$17/sy

Bitum Tack Coat : 0.07 Gal/sy

At \$1.75/Gal,  $0.07 \times 1.75 = \$0.12/sy$

Total Cost of Pavement / sy :

$$3.81 + 13.20 + 17.87 + 17.00 + 0.12 = \$52/sy$$

## SHOULDER

12.5 mm Superpave : \$3.80/sy for 1.5" thickness

19 mm Superpave : \$6.60/sy for 2" thickness

6" G.A.B. : \$11.00/sy

Bitum Tack Coat : \$0.10/sy

Total Cost of Shoulder / sy :

$$3.80 + 6.60 + 11.00 + 0.10 = \$21.50/sy$$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **14**

DESCRIPTION: **REDUCE THE LENGTH OF THE U TURN LANE AT  
 ROCKAWAY ROAD**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

Going northbound and approaching the intersection of Holly Grove Road, the left turn lane to the relocated Rockaway Road is designed to have 715 feet of storage length, enough to store at least 28 cars.

ALTERNATIVE: (Sketch attached)

Since this will be a signalized intersection, a storage length of 200 ft. to hold eight vehicles should suffice. This is more than the two-car minimum recommended in the 2004 edition of AASHTO.

ADVANTAGES:

- Reduces construction cost

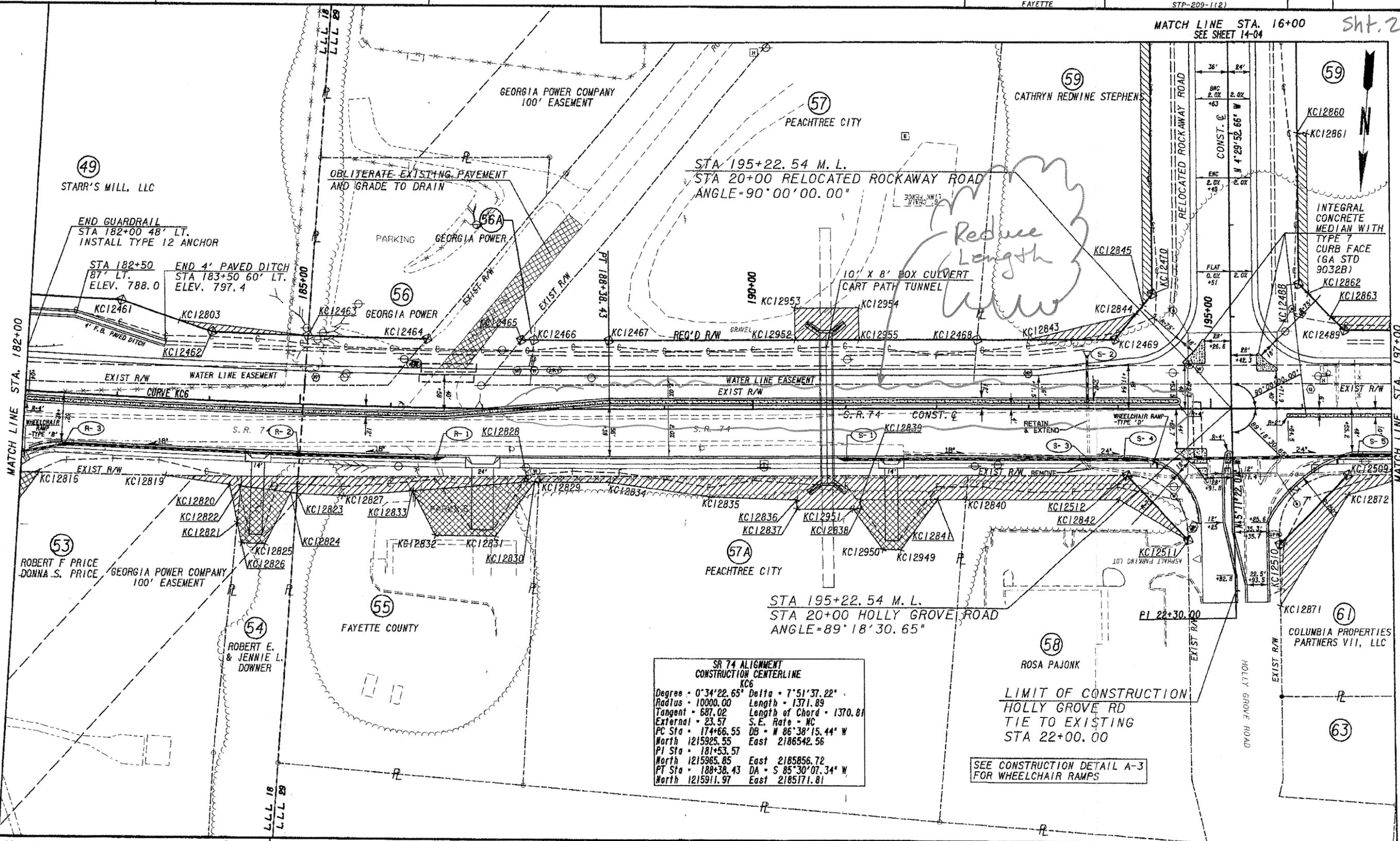
DISADVANTAGES:

- Reduces storage length

DISCUSSION:

The long left turn lane provided at this intersection is unnecessary considering the projected traffic volumes.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>66,755</b>	—	\$ <b>66,755</b>
ALTERNATIVE	\$ <b>18,700</b>	—	\$ <b>18,700</b>
SAVINGS (Original minus Alternative)	\$ <b>48,055</b>	—	\$ <b>48,055</b>



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	▧

**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE 6  
ROSWELL, GEORGIA 30075  
(678) 461-3511



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: **MAINLINE PLAN**  
DRAWING No. 13-08

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 14

SHEET NO.: 3 of 4

## PAVEMENT

12.5 mm Superpave 165 lbs/sy = 0.0825 T/sy for 1.5"  
At \$46.16/T,  $0.0825 \times 46.16 = \$3.80/sy$

19 mm Superpave 440 lbs/sy = 0.22 T/sy for 4"  
At \$60/T,  $0.22 \times 60 = \$13.20/sy$

25 mm Superpave 550 lbs/sy = 0.275 T/sy for 5"  
At \$65/T,  $0.275 \times 65 = \$17.88/sy$

12" G.A.B. - \$17/sy

Bitum Tack Coat : 0.07 Gal/sy

At \$1.75/Gal,  $0.07 \times 1.75 = \$0.12/sy$

Total Cost of Pavement / sy :

$$3.81 + 13.20 + 17.87 + 17.00 + 0.12 = \$52/sy$$

## SHOULDER

12.5 mm Superpave : \$3.80/sy for 1.5" thickness

19 mm Superpave : \$6.60/sy for 2" thickness

6" G.A.B. : \$11.00/sy

Bitum Tack Coat : \$0.10/sy

Total Cost of Shoulder / sy :

$$3.80 + 6.60 + 11.00 + 0.10 = \$21.50/sy$$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **15**

DESCRIPTION: **REDUCE THE LENGTH OF THE NORTHBOUND LEFT  
 TURN AND U TURN LANE AT THE SOCCER FIELD AT  
 STA. 239+30±**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

Going westbound on SR 74, the four-way intersection at the soccer field driveway has the left turn lane with a storage length of 600 ft., enough to store 24 cars.

ALTERNATIVE: (Sketch attached)

Provide 150 ft. of storage length, enough to hold six cars. This is more than the two-car minimum recommended in the 2004 edition of AASHTO.

ADVANTAGES:

- Reduces construction cost

DISADVANTAGES:

- Reduces storage length

DISCUSSION:

The long left turn lane to allow U turns at this location is unnecessary considering the number of potential users within a short time period.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>56,026</b>	—	\$ <b>56,026</b>
ALTERNATIVE	\$ <b>14,006</b>	—	\$ <b>14,006</b>
SAVINGS (Original minus Alternative)	\$ <b>42,020</b>	—	\$ <b>42,020</b>

ALT. NO.  
15  
Sht 2 of 4

Soccer Field

Reduce length  
of left turn lane

70  
THE CITY OF PEACHTREE CITY

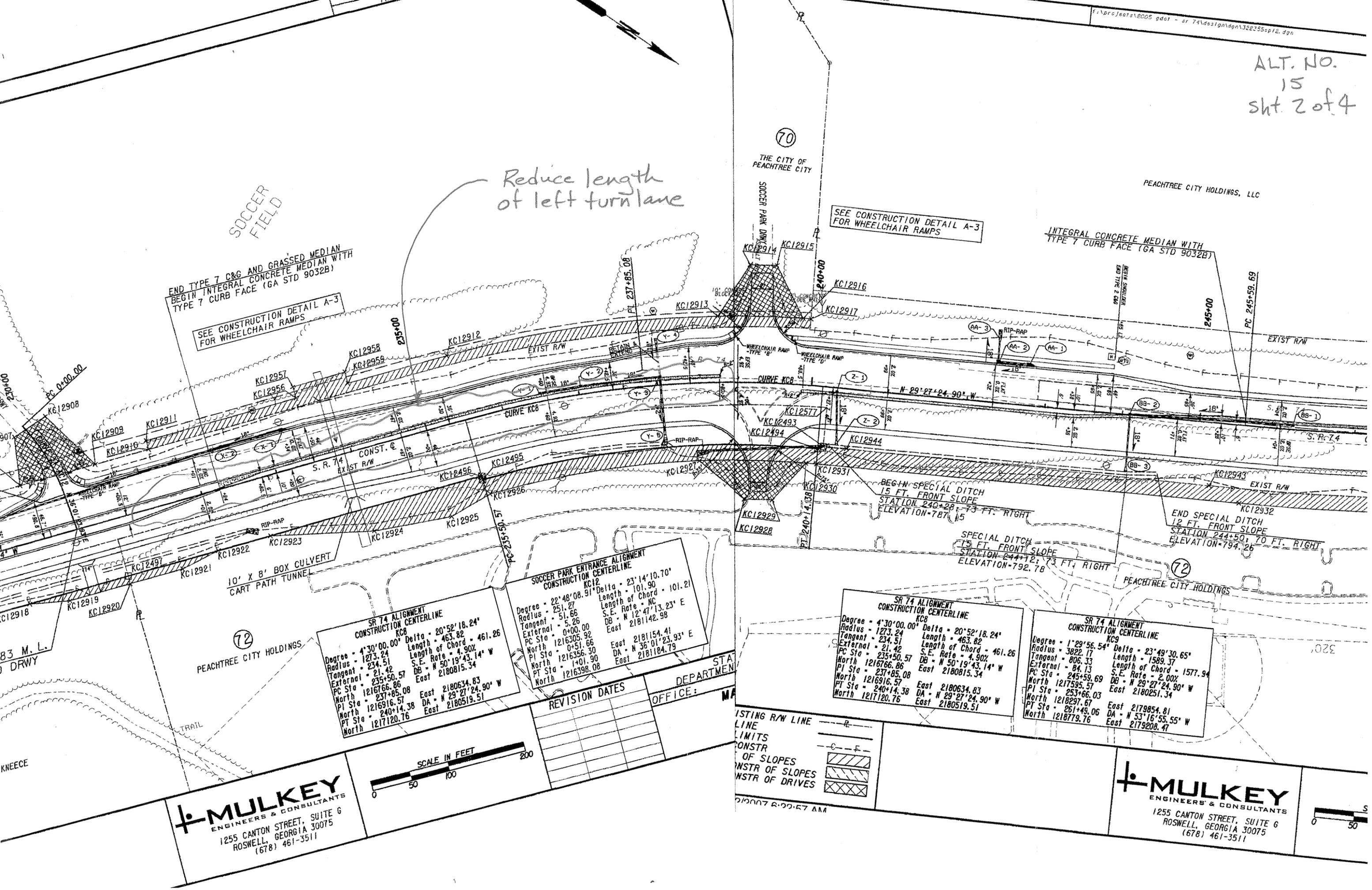
PEACHTREE CITY HOLDINGS, LLC

END TYPE 7 C&G AND GRASSED MEDIAN  
BEGIN INTEGRAL CONCRETE MEDIAN WITH  
TYPE 7 CURB FACE (GA STD 9032B)

SEE CONSTRUCTION DETAIL A-3  
FOR WHEELCHAIR RAMPS

SEE CONSTRUCTION DETAIL A-3  
FOR WHEELCHAIR RAMPS

INTEGRAL CONCRETE MEDIAN WITH  
TYPE 7 CURB FACE (GA STD 9032B)



10' X 8' BOX CULVERT  
CART PATH TUNNEL

BEGIN SPECIAL DITCH  
15 FT. FRONT SLOPE  
STATION 240+08.73 FT. RIGHT  
ELEVATION=787.15

END SPECIAL DITCH  
12 FT. FRONT SLOPE  
STATION 244+50.70 FT. RIGHT  
ELEVATION=794.26

SPECIAL DITCH  
15 FT. FRONT SLOPE  
STATION 244+12.73 FT. RIGHT  
ELEVATION=792.78

SR 74 ALIGNMENT  
CONSTRUCTION CENTERLINE  
KCB  
Degree - 4°30'00.00" Delta - 20°52'18.24"  
Radius - 1273.24 Length of Chord - 461.26  
Tangent - 234.51 Length of Chord - 463.82  
External - 21.42 S.E. Rate = 4.90%  
PC Sta = 235+50.57 DB = N 50°19'43.14" W  
North 1216766.86 East 2180815.34  
PI Sta = 237+85.08 East 2180634.83  
North 1216916.57 DA = N 29°27'24.90" W  
PT Sta = 240+14.38 East 2180519.51  
North 1217120.76

SOCCER PARK ENTRANCE ALIGNMENT  
CONSTRUCTION CENTERLINE  
KCB  
Degree - 22°48'08.91" Delta - 23°14'10.70"  
Radius - 251.27 Length of Chord - 101.21  
Tangent - 51.66 S.E. Rate = NC  
External - 5.26 DB = N 12°47'13.23" E  
PC Sta = 0+00.00 East 2181142.98  
North 1216305.92 East 2181154.41  
PI Sta = 0+51.66 DA = N 36°01'23.93" E  
North 1216356.30 East 2181184.79  
PT Sta = 1+01.90 East 2181184.79  
North 1216398.08

SR 74 ALIGNMENT  
CONSTRUCTION CENTERLINE  
KCB  
Degree - 4°30'00.00" Delta - 20°52'18.24"  
Radius - 1273.24 Length of Chord - 461.26  
Tangent - 234.51 Length of Chord - 463.82  
External - 21.42 S.E. Rate = 4.90%  
PC Sta = 235+50.57 DB = N 50°19'43.14" W  
North 1216766.86 East 2180815.34  
PI Sta = 237+85.08 East 2180634.83  
North 1216916.57 DA = N 29°27'24.90" W  
PT Sta = 240+14.38 East 2180519.51  
North 1217120.76

SR 74 ALIGNMENT  
CONSTRUCTION CENTERLINE  
KCB  
Degree - 1°29'56.54" Delta - 23°49'30.65"  
Radius - 3822.17 Length of Chord - 1589.37  
Tangent - 806.33 Length of Chord - 1577.94  
External - 84.13 S.E. Rate = 2.00%  
PC Sta = 245+59.69 DB = N 29°27'24.90" W  
North 1217595.57 East 2180251.34  
PI Sta = 253+66.03 East 2179854.81  
North 1218297.67 DA = N 53°16'55.55" W  
PT Sta = 261+49.06 East 2179208.47  
North 1218779.76

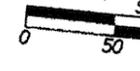
REVISION DATES

OFFICE: MA



**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE G  
ROSWELL, GEORGIA 30075  
(678) 461-3511

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# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 15

SHEET NO.: 3 of 4

## PAVEMENT

12.5 mm Superpave 165 lbs/sy = 0.0825 T/sy for 1.5"  
 At \$46.16/T,  $0.0825 \times 46.16 = \$3.80/sy$

19 mm Superpave 440 lbs/sy = 0.22 T/sy for 4"  
 At \$60/T,  $0.22 \times 60 = \$13.20/sy$

25 mm Superpave 550 lbs/sy = 0.275 T/sy for 5"  
 At \$65/T,  $0.275 \times 65 = \$17.88/sy$

12" G.A.B. - \$17/sy

Bitum Tack Coat : 0.07 Gal/sy

At \$1.75/Gal,  $0.07 \times 1.75 = \$0.12/sy$

Total Cost of Pavement / sy :

$$3.81 + 13.20 + 17.87 + 17.00 + 0.12 = \$52/sy$$

## SHOULDER

12.5 mm Superpave : \$3.80/sy for 1.5" thickness

19 mm Superpave : \$6.60/sy for 2" thickness

6" G.A.B. : \$11.00/sy

Bitum Tack Coat : \$0.10/sy

Total Cost of Shoulder / sy :

$$3.80 + 6.60 + 11.00 + 0.10 = \$21.50/sy$$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **17**  
*Georgia Department of Transportation*

DESCRIPTION: **ELIMINATE THE NORTHBOUND U TURN AT STA. 250+00 AND IMPROVE THE SOUTHERN MOST ENTRANCE TO THE BASEBALL FIELD COMPLEX** SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

Going southbound at Sta. 240+100, a left turn lane with a storage length of 350 ft. and a taper of 133 ft. is provided. The entrance to the baseball field complex is 24 ft. wide with no island or striping at the intersection.

ALTERNATIVE: (Sketch attached)

Eliminate the U turn lane and expansion of the left shoulder at the center entrance to the proposed baseball field complex (Sta. 250+00). Expand the southern most entry to the baseball field complex parking area (Sta. 240+00) to be the same as the center entry.

ADVANTAGES:

- Reduces cost
- Improves traffic flow
- Increases safety

DISADVANTAGES:

- None apparent

DISCUSSION:

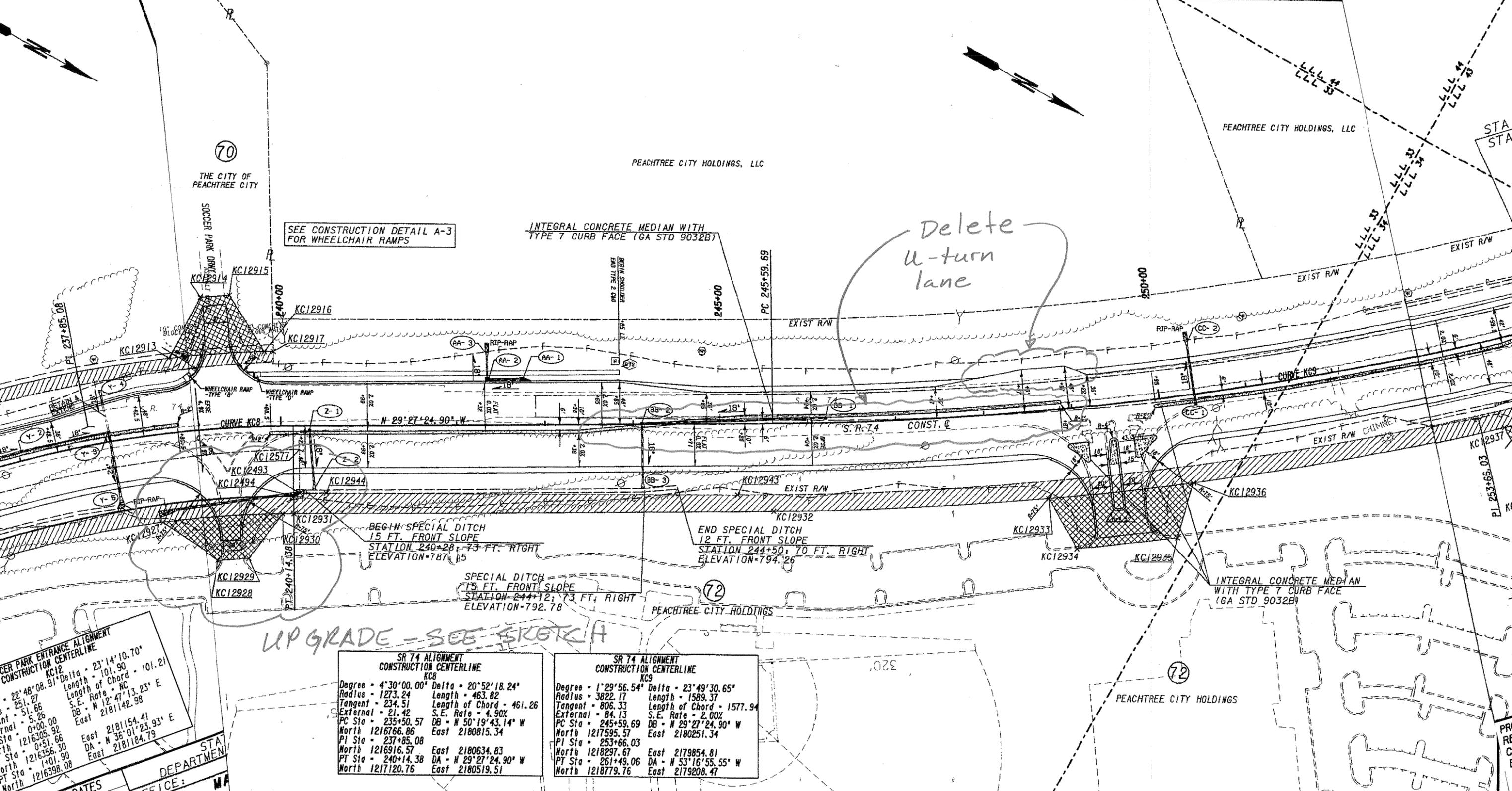
The northbound U turn at Sta. 250+00 will primarily be used by traffic exiting the baseball field complex at Sta. 240+00. Since a left turn can be made to SR 74 southbound from the baseball field complex, the U turn is redundant. The exit from the baseball complex at Sta. 240+00 should be widened from the original design to separate left and right turning traffic.

Since a left turn lane to the baseball field complex is already proposed 1,000 ft. away (at Sta. 250+00), this left turn lane can be eliminated. A triangular striped island should be provided. The entrance width should be increased to 36 ft., providing a left turn lane onto SR 74.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>31,765</b>	—	\$ <b>31,765</b>
ALTERNATIVE	\$ <b>9,152</b>	—	\$ <b>9,152</b>
SAVINGS (Original minus Alternative)	\$ <b>22,613</b>	—	\$ <b>22,613</b>

SHEET NO.	TOTAL SHEETS

6:22:59 AM SPRFS	F:\projects\2005\pdot - cr 74\design\dgn\32355\p12.dgn	COUNTY FAYETTE	PROJECT NUMBER STP-209-1(2)
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**SOCCER PARK ENTRANCE ALIGNMENT CONSTRUCTION CENTERLINE**

Delta - 23°14'10.70"	Length - 101.90
S.E. Rate - 101.21	Length of Chord - 101.21
DB - N 12°47'13.23" E	East 2181142.98
DA - N 36°01'23.93" E	East 2181154.41
PC Sta - 0+00.00	DA - N 36°01'23.93" E
North Sta - 1216305.92	East 2181184.79
PI Sta - 0+51.66	
North Sta - 1216356.30	
PT Sta - 1+01.90	
North Sta - 1216398.08	

**SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC8**

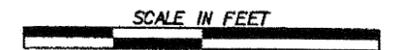
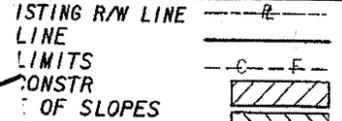
Degree - 4°30'00.00"	Delta - 20°52'18.24"
Radius - 1273.24	Length - 463.82
Tangent - 234.51	Length of Chord - 461.26
External - 21.42	S.E. Rate - 4.90%
PC Sta - 235+50.57	DB - N 50°19'43.14" W
North 1216766.86	East 2180815.34
PI Sta - 237+85.08	
North 1216916.57	East 2180634.83
PT Sta - 240+14.38	DA - N 29°27'24.90" W
North 1217120.76	East 2180519.51

**SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC9**

Degree - 1°29'56.54"	Delta - 23°49'30.65"
Radius - 3822.17	Length - 1589.37
Tangent - 806.33	Length of Chord - 1577.94
External - 84.13	S.E. Rate - 2.00%
PC Sta - 245+59.69	DB - N 29°27'24.90" W
North 1217595.57	East 2180251.34
PI Sta - 253+66.03	
North 1218297.67	East 2179854.81
PT Sta - 261+49.06	DA - N 53°16'55.55" W
North 1218779.76	East 2179208.47

REVISION DATES

NO.	DATE	DESCRIPTION



REVISION DATES

NO.	DATE	DESCRIPTION

PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

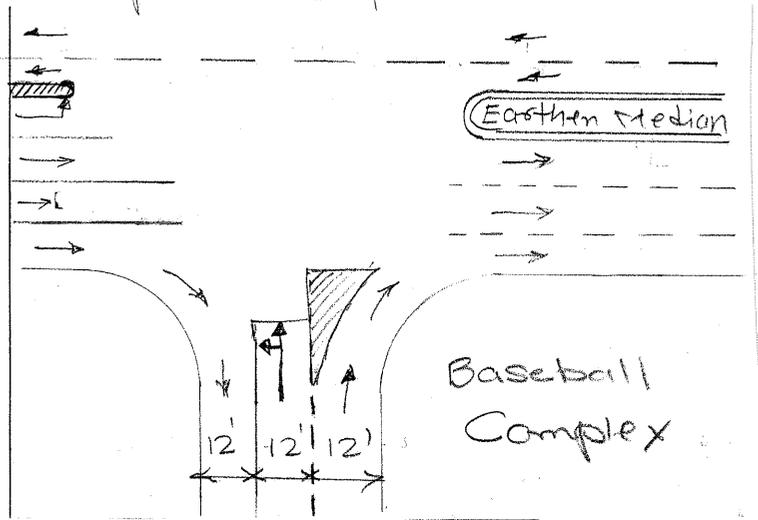
ALTERNATIVE NO.:

17

AS DESIGNED     ALTERNATIVE

SHEET NO.:

3 of 5



# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 17

SHEET NO.: 4 of 5

## PAVEMENT

12.5 mm Superpave 165 lbs/sy = 0.0825 T/sy for 1.5"  
At \$46.16/T,  $0.0825 \times 46.16 = \$3.81$ /sy

19 mm Superpave 440 lbs/sy = 0.22 T/sy for 4"  
At \$60/T,  $0.22 \times 60 = \$13.20$ /sy

25 mm Superpave 550 lbs/sy = 0.275 T/sy for 5"  
At \$65/T,  $0.275 \times 65 = \$17.88$ /sy

12" G.A.B. -\$17/sy

Bitum Tack Coat : 0.07 Gal/sy

At \$1.75/Gal,  $0.07 \times 1.75 = \$0.12$ /sy

Total Cost of Pavement / sy :

$$3.81 + 13.20 + 17.87 + 17.00 + 0.12 = \$52/\text{sy}$$

## SHOULDER

12.5 mm Superpave : \$3.80/sy for 1.5" thickness

19 mm Superpave : \$6.60/sy for 2" thickness

6" G.A.B. : \$11.00/sy

Bitum Tack Coat : \$0.10/sy

Total Cost of Shoulder / sy :

$$3.80 + 6.60 + 11.00 + 0.10 = \$21.50/\text{sy}$$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **18**  
*Georgia Department of Transportation*

DESCRIPTION: **ELIMINATE THE SIDWALK ADJACENT TO THE SOCCER** SHEET NO.: **1 of 6**  
**FIELDS**

ORIGINAL DESIGN: (Sketch attached)

Curb and gutter and a sidewalk are provided on the south side of the road, the left side looking up to the Sta. starting at the Water Treatment Plant driveway and proceeding up to the Sta. past the soccer fields.

ALTERNATIVE: (Sketch attached)

Eliminate the curb and gutter and sidewalk and add shoulder pavement in this area. Use earthen ditches along the south side of the road, drains under the driveways, and concrete flumes if necessary.

ADVANTAGES:

- Reduces cost
- Reduces construction time
- Reduces maintenance
- Eliminates the drainage piping

DISADVANTAGES:

- Requires people to walk in the parking lots

DISCUSSION:

There is no apparent reason for people to have to use the sidewalk in this area. The soccer field parking lots will be used by those desiring to travel between fields. No sidewalks are provided on the other side of the road where a baseball field complex is to be constructed.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>191,415</b>	—	\$ <b>191,415</b>
ALTERNATIVE	\$ <b>71,629</b>	—	\$ <b>71,629</b>
SAVINGS (Original minus Alternative)	\$ <b>119,786</b>	—	\$ <b>119,786</b>

NOTE \*1: END INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B)  
BEGIN TYPE 7 C&G AND GRASSED MEDIAN

WATER TREATMENT PLANT DRIVEWAY CONSTRUCTION CENTERLINE KC17  
Degree = 28°38'52.40" Delta = 8°44'34.30"  
Radius = 200.00 Length = 30.52  
Tangent = 15.29 Length of Chord = 30.49  
External = 0.58 S.E. Rate = NC  
PC Sta = 0+90.67 DB = N 39°47'14.55" E  
North 1215785.29 East 2181850.25  
PI Sta = 1+05.96  
North 1215797.04 East 2181860.03  
PT Sta = 1+21.19 DA = N 31°02'40.25" E  
North 1215810.14 East 2181867.92

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC7  
Degree = 4°48'53.18" Delta = 44°10'09.52"  
Radius = 1190.00 Length = 917.37  
Tangent = 482.84 Length of Chord = 894.82  
External = 94.22 S.E. Rate = 5.00%  
PC Sta = 214+02.57 DB = S 85°30'07.34" W  
North 1215710.88 East 2182615.57  
PI Sta = 218+85.41  
North 1215673.02 East 2182134.22  
PT Sta = 223+19.94 DA = N 50°19'43.14" W  
North 1215981.25 East 2181762.57

WETLAND #3

DOROTHY BLACK

PEACHTREE CITY HOLDING, LLC

GEORGIA UTILITIES COMPANY

SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMPS

THE CITY OF PEACHTREE CITY

STA 221+40.77 M.L.  
STA 2+00.00 DRWY

RAISED GRASS MEDIAN WITH TYPE 7 C&G

Take Out Sidewalk

REMOVE EXIST BRIDGE APPROACH FILL AND GRADE TO APPROX. ORIGINAL GROUND AS DIRECTED BY ENGINEER

OBLITERATE EXISTING PAVEMENT AND GRADE TO DRAIN

END TYPE 7 C&G AND GRASSED MEDIAN  
BEGIN INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B)

LIMITS OF EXISTING BRIDGE APPROACH AND EXISTING ROADBED REMOVAL. GRADE TO APPROXIMATE PRE-ROAD CONDITION.

END GUARDRAIL  
STA 218+98.48' LT.  
TYPE 12 ANCHOR (GA STD 4040 & 4052)

BEGIN TYPE 2 C&G END SHOULDER (LT)

STREAM BUFFER ZONE

FOR GUARDRAIL CONNECTIONS AT BRIDGE SEE GA STD 4012-C & 4052

TEMP. SEDIMENT BASIN

MATCH LINE STA. 212+00

STREAM #4 PEACHTREE CITY

END BRIDGE BEGIN 30' APPROACH SLAB GA STD 9017R STA 212+75

END GUARDRAIL STA 219+98.560' RT. TYPE 12 ANCHOR (GA STD 4012D & 4052)

REVISION DATES

STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION

OFFICE: MAINLINE PLAN

MULKEY ENGINEERS & CONSULTANTS

1255 CANTON STREET, SUITE 6 ROSWELL, GEORGIA 30075 (678) 461-3511



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	---

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
FAYETTE	STP-209-1(2)		

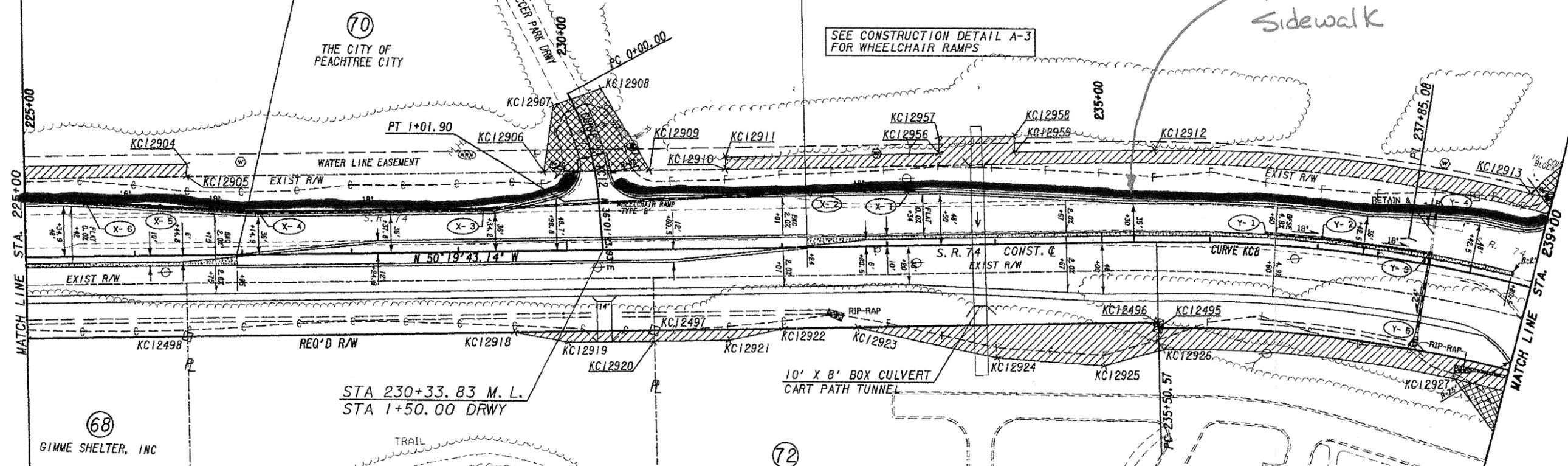


END INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B)  
BEGIN TYPE 7 C&G AND GRASSED MEDIAN

END TYPE 7 C&G AND GRASSED MEDIAN  
BEGIN INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B)

SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMPS

Take out Sidewalk



SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC8

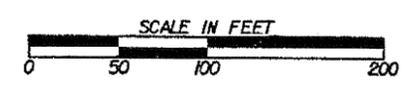
Degree - 4°30'00.00"	Delta - 20°52'18.24"
Radius - 1273.24	Length - 463.82
Tangent - 234.51	Length of Chord - 461.26
External - 21.42	S.E. Rate - 4.90%
PC Sta - 235+50.57	DB - N 50°19'43.14" W
North 1216766.86	East 2180815.34
PI Sta - 237+85.08	
North 1216916.57	East 2180634.83
PT Sta - 240+14.38	DA - N 29°27'24.90" W
North 1217120.76	East 2180519.51

SOCCER PARK ENTRANCE ALIGNMENT CONSTRUCTION CENTERLINE KC12

Degree - 22°48'08.91"	Delta - 23°14'10.70"
Radius - 251.27	Length - 101.90
Tangent - 51.66	Length of Chord - 101.21
External - 5.26	S.E. Rate - NC
PC Sta - 0+00.00	DB - N 12°47'13.23" E
North 1216305.92	East 2181142.98
PI Sta - 0+51.66	
North 1216356.30	East 2181154.41
PT Sta - 1+01.90	DA - N 36°01'23.93" E
North 1216398.08	East 2181184.79

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	▧

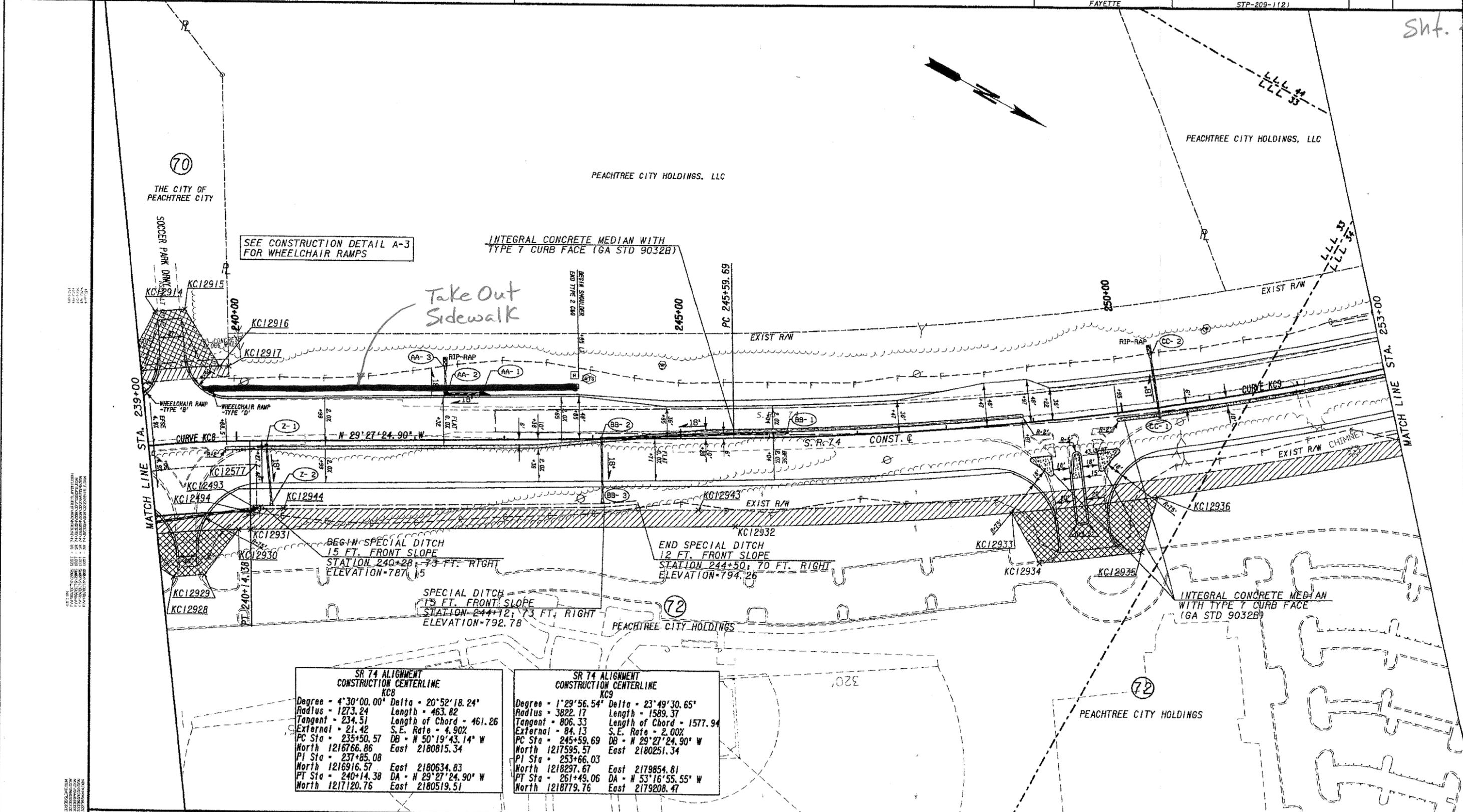
**MULKEY**  
ENGINEERS & CONSULTANTS  
1255 CANTON STREET, SUITE G  
ROSWELL, GEORGIA 30075  
(678) 461-3511



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**MAINLINE PLAN**

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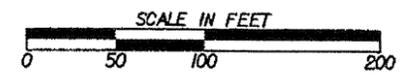


SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC8	
Degree - 4°30'00.00"	Delta - 20°52'18.24"
Radius - 1273.24	Length - 463.82
Tangent - 234.51	Length of Chord - 461.26
External - 21.42	S.E. Rate - 4.90%
PC Sta - 235+50.57	DB - N 50°19'43.14" W
North 1216766.86	East 2180815.34
PI Sta - 237+85.08	
North 1216916.57	East 2180634.83
PT Sta - 240+14.38	DA - N 29°27'24.90" W
North 1217120.76	East 2180519.51

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC9	
Degree - 1°29'56.54"	Delta - 23°49'30.65"
Radius - 3822.17	Length - 1589.37
Tangent - 806.33	Length of Chord - 1577.94
External - 84.13	S.E. Rate - 2.00%
PC Sta - 245+59.69	DB - N 29°27'24.90" W
North 1217595.57	East 2180251.34
PI Sta - 253+66.03	
North 1218297.67	East 2179854.81
PT Sta - 261+49.06	DA - N 53°16'55.55" W
North 1218779.76	East 2179208.47

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	▧

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REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: **MAINLINE PLAN**

DRAWING No. **13 -12**



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

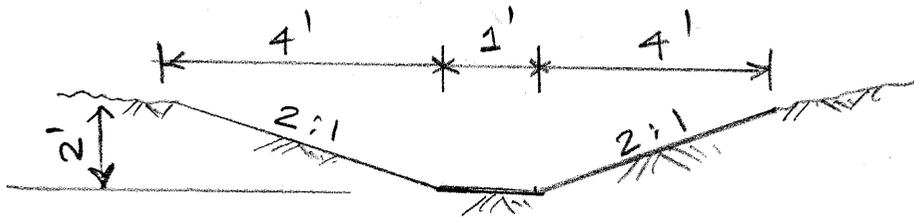
ALTERNATIVE NO.:

18

AS DESIGNED     ALTERNATIVE

SHEET NO.:

5 of 6



Earthen Ditch



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **19**  
*Georgia Department of Transportation*

DESCRIPTION: **WHERE CURB, GUTTER AND SIDEWALK ARE PROVIDED ON BOTH SIDES OF THE ROAD, ELIMINATE THE SIDEWALK ON ONE SIDE** SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (Sketch attached)

Curb, gutter and sidewalk are provided on both sides of the road from approximately Sta. 150+20 to 194+80.

ALTERNATIVE: (Sketch attached)

Eliminate the curb, gutter and sidewalk on the south side of the road along this section of the roadway. Provide an earthen ditch and storm drain lines under the driveways.

ADVANTAGES:

- Reduces cost
- Reduces construction time
- Eliminates drainage piping and maintenance

DISADVANTAGES:

- Eliminates an “urban segment” of the roadway

DISCUSSION:

This section of the roadway is currently not developed on the left side except for the daycare center and some residences at the beginning of the segment. Thus, there is no place to walk to, and the sidewalk is not needed. Those desiring to walk can cross over and use the sidewalk on the other side of the street. When the area develops, the developer could be required to add sidewalks.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 417,275	—	\$ 417,275
ALTERNATIVE	\$ 223,654	—	\$ 223,654
SAVINGS (Original minus Alternative)	\$ 193,621	—	\$ 193,621

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **21**  
*Georgia Department of Transportation*

DESCRIPTION: **ELIMINATE THE BIKE LANES AND PROVIDE A MULTI-USE WALKWAY** SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

A 4-ft. bike lane is provided from Red Wine Road to Rockaway Road immediately adjacent to the travel lane on each side of SR 74. There is also a 5-ft. sidewalk on each side.

ALTERNATIVE: (Sketch attached)

Eliminate both bike lanes and increase the sidewalk width to 10 ft. on one side for use as a multi-use path.

ADVANTAGES:

- Reduces cost
- Separates bike and vehicular traffic

DISADVANTAGES:

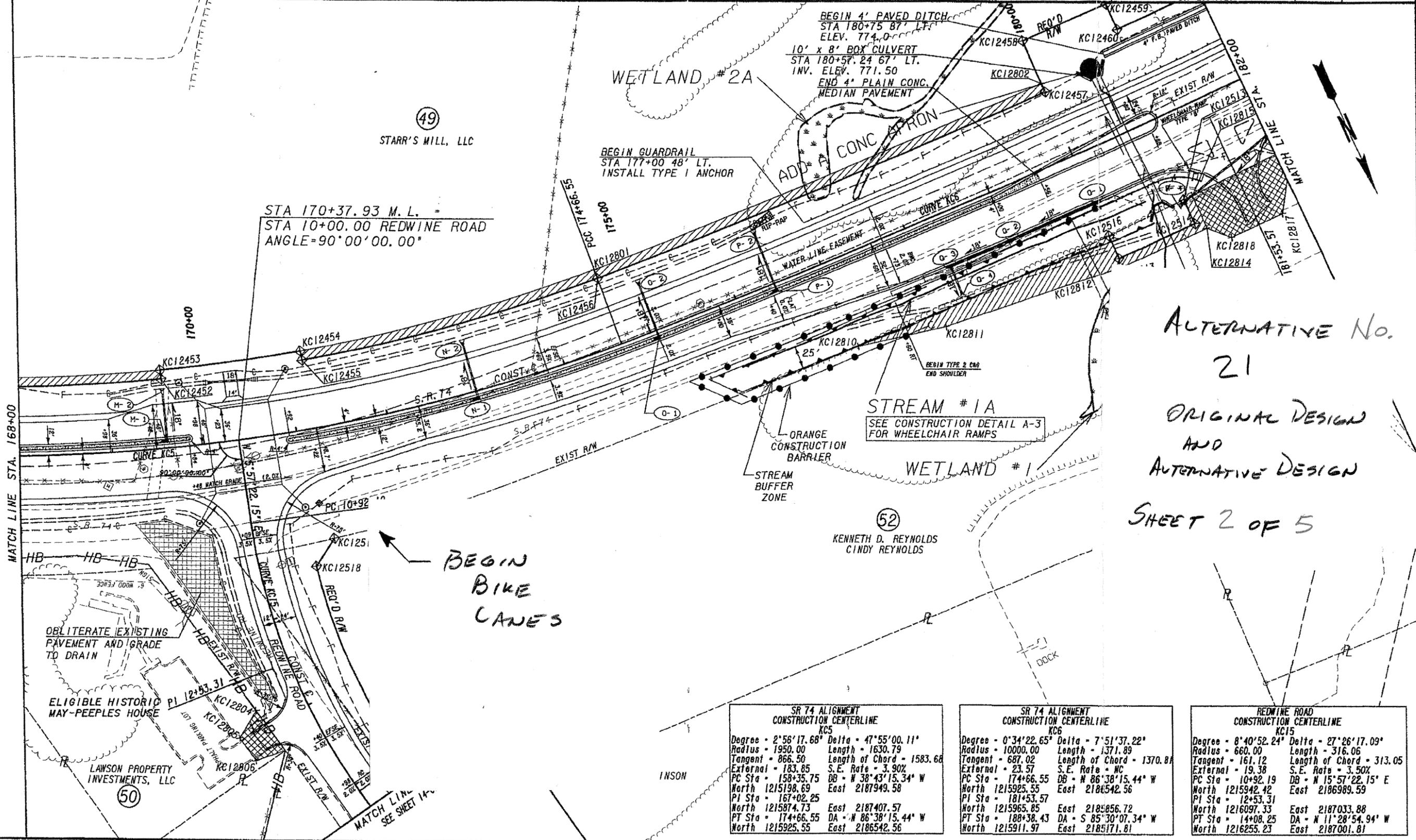
- Faster bicyclists may ride in the road
- Mixture of pedestrian and bicycle traffic on the multi-use path

DISCUSSION:

The state bike route comes in at Rockaway Road, goes south on SR 74, and continues east on Red Wine Road, causing bicyclists to cross SR 74 by making a left turn across incoming traffic. A separate multi-use path allows bicyclists to ride from Red Wine to Rockaway, then cross SR 74 at a signalized intersection.

Bicycle lanes go from Sta. 171+00 to Sta. 194+50. Since there is curb and gutter along both sides of SR 74, the multi-use path can be placed on either side. If the multi-use path is located on the left side (looking ahead) of SR 74, the water line would not have to be relocated, resulting in additional savings since the road can be shifted to the right.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 145,904	—	\$ 145,904
ALTERNATIVE	\$ 50,281	—	\$ 50,281
SAVINGS (Original minus Alternative)	\$ 95,623	—	\$ 95,623



ALTERNATIVE No.  
21  
ORIGINAL DESIGN  
AND  
ALTERNATIVE DESIGN  
SHEET 2 OF 5

BEGIN  
BIKE  
LANES

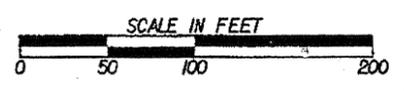
SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KCS	
Degree - 2°56'17.68"	Delta - 47°55'00.11"
Radius - 1950.00	Length - 1630.79
Tangent - 866.50	Length of Chord - 1583.68
External - 183.85	S.E. Rate - 3.90%
PC Sta - 158+35.75	DB - N 38°43'15.34" W
North 1215198.69	East 2187949.58
PI Sta - 167+02.25	East 2187407.57
North 1215874.73	DA - N 86°38'15.44" W
PT Sta - 174+66.55	East 2186542.56
North 1215925.55	East 2186542.56

SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KCB	
Degree - 0°34'22.65"	Delta - 7°51'37.22"
Radius - 10000.00	Length - 1371.89
Tangent - 687.02	Length of Chord - 1370.81
External - 23.57	S.E. Rate - NC
PC Sta - 174+66.55	DB - N 86°38'15.44" W
North 1215925.55	East 2186542.56
PI Sta - 181+53.57	East 2186856.72
North 1215965.85	DA - S 85°30'07.34" W
PT Sta - 188+38.43	East 2185171.81
North 1215911.97	East 2185171.81

REDWINE ROAD CONSTRUCTION CENTERLINE KC15	
Degree - 8°40'52.24"	Delta - 27°26'17.09"
Radius - 660.00	Length - 316.06
Tangent - 161.12	Length of Chord - 313.05
External - 19.38	S.E. Rate - 3.50%
PC Sta - 10+92.19	DB - N 15°57'22.15" E
North 1215942.42	East 2186989.59
PI Sta - 12+53.31	East 2187033.88
North 1216097.33	DA - N 11°28'54.94" W
PT Sta - 14+08.25	East 2187001.81
North 1216255.23	East 2187001.81

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	▨

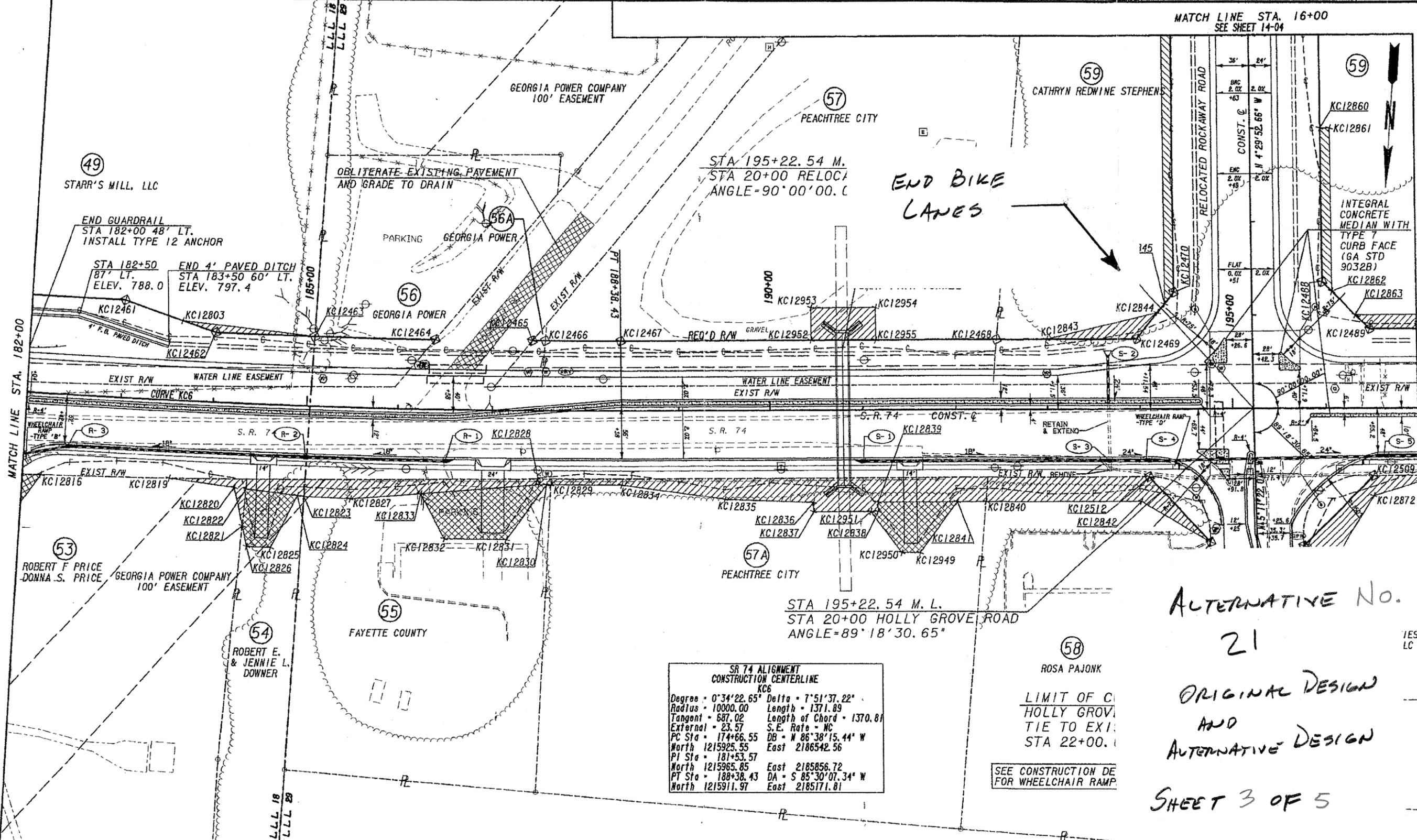
**MULKEY**  
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ROSWELL, GEORGIA 30075  
(678) 461-3511



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STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**MAINLINE PLAN**

DRAWING NO.  
**13 -07**



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	▧

**MULKEY**  
 ENGINEERS & CONSULTANTS  
 1255 CANTON STREET, SUITE 6  
 ROSWELL, GEORGIA 30075  
 (678) 461-3511



REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
**MAINLINE PLAN**

DRAWING No.  
**13 -08**

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 21

SHEET NO.: 4 of 5

## ORIGINAL DESIGN:

REMOVE 4' OF BICYCLE LANE ON EACH SIDE  
OF SR 74 FOR 2350 FT.

$$\text{AREA} = 2(4)(2350)/9 = 2089 \text{ SY}$$

$$\begin{aligned} \text{DELETE FILL } 3' \text{ WIDE} \times 4' \text{ HIGH} \times 2350' \\ = 3(4)(2350)/27 = 1044 \text{ CY} \end{aligned}$$

## ALTERNATIVE DESIGN:

INCREASE SIDEWALK WIDTH FROM 5' TO 10'  
ON ONE SIDE OF SR 74

$$\text{AREA} = 5(2350)/9 = 1306 \text{ SY}$$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **22**

DESCRIPTION: **ELIMINATE THE ENTRANCE TO THE BASEBALL  
 FIELDS AND UPGRADE THE ENTRANCE AT STA.240+00**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

A two-lane entrance is show at Sta. 240+00. The width is 24 ft. At Sta. 250+00, the entrance to the baseball fields is 54 ft wide with concrete islands channeling the traffic. Both entrances have left turn lanes on SR 74.

ALTERNATIVE: (Sketch attached)

Eliminate the entrance at Sta. 250+00. This will also eliminate the left turn lane on SR 74. Upgrade the entrance to the baseball fields at Sta. 240+00. The upgraded entrance should mirror the entrance at Sta. 250+00. A right turn lane between the two entrances will also become unnecessary.

ADVANTAGES:

- Reduces cost
- Smoother traffic flow
- Increases safety

DISADVANTAGES:

- Reduces ingress/egress from the baseball fields
- Increases left or U turn run to 1,000 ft.

DISCUSSION:

Calculations show a cost savings as a result of eliminating the left turn lane at Sta. 250+00 and removing the entrance at Sta. 240+00. Since the entrance at 240+00 is proposed to be exactly the same as the entrance at 250+00, no calculation is shown for the elimination of entrance at 250+00.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>203,972</b>	—	\$ <b>203,972</b>
ALTERNATIVE	\$ <b>5,049</b>	—	\$ <b>5,049</b>
SAVINGS (Original minus Alternative)	\$ <b>198,923</b>	—	\$ <b>198,923</b>

ALT. NO. 22  
Sht. 2 of 4

STA 254+66.10 M.L.  
STA 0+00.00 DRWY

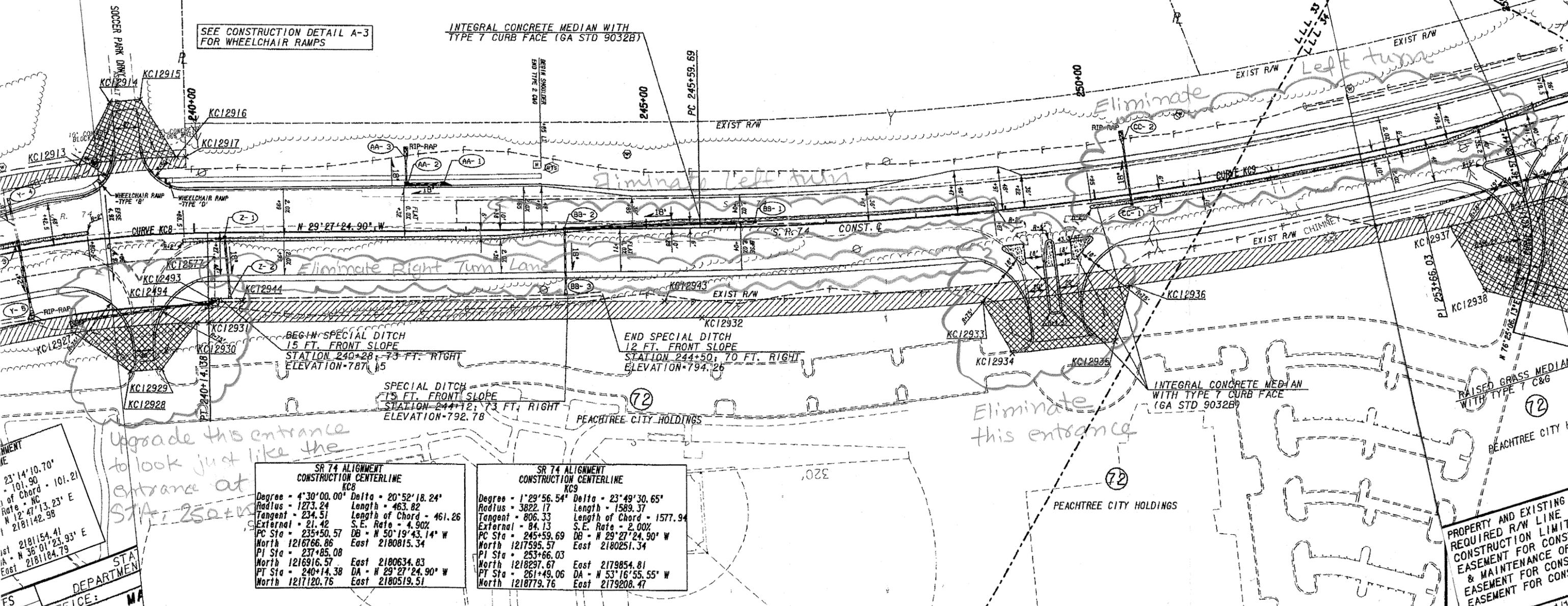
PEACHTREE CITY HOLDINGS, LLC

PEACHTREE CITY HOLDINGS, LLC

70  
THE CITY OF PEACHTREE CITY

SEE CONSTRUCTION DETAIL A-3 FOR WHEELCHAIR RAMPS

INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B)



SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC8

Degree - 4°30'00.00"	Delta - 20°52'18.24"
Radius - 1273.24	Length - 463.82
Tangent - 234.51	Length of Chord - 461.26
External - 21.42	S.E. Rate - 4.90%
PC Sta - 235+50.57	DB - N 50°19'43.14" W
North 1216766.86	East 2180815.34
PI Sta - 237+85.08	
North 1216916.57	East 2180634.83
PT Sta - 240+14.38	DA - N 29°27'24.90" W
North 1217120.76	East 2180519.51

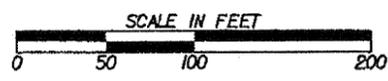
SR 74 ALIGNMENT CONSTRUCTION CENTERLINE KC9

Degree - 1°29'56.54"	Delta - 23°49'30.65"
Radius - 3822.17	Length - 1589.37
Tangent - 806.33	Length of Chord - 1577.94
External - 84.13	S.E. Rate - 2.00%
PC Sta - 245+59.69	DB - N 29°27'24.90" W
North 1217595.57	East 2180251.34
PI Sta - 253+66.03	
North 1218297.67	East 2179854.81
PT Sta - 261+49.06	DA - N 53°16'55.55" W
North 1218779.76	East 2179208.47

Upgrade this entrance to look just like the entrance at STA 250+00

Eliminate this entrance

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REVISION DATES


STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**MAINLINE PLAN**

DRAWING No.  
**13 -12**

PROPERTY AND EXISTING R/W LINE  
REQUIRED R/W LINE  
CONSTRUCTION LIMITS  
& MAINTENANCE OF  
EASEMENT FOR CONST  
EASEMENT FOR CONST

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: 22

SHEET NO.: 3 of 4

## PAVEMENT

12.5 mm Superpave 165 lbs/sy = 0.0825 T/sy for 1.5"  
 At \$46.16/T,  $0.0825 \times 46.16 = \$3.80/sy$

19 mm Superpave 440 lbs/sy = 0.22 T/sy for 4"  
 At \$60/T,  $0.22 \times 60 = \$13.20/sy$

25 mm Superpave 550 lbs/sy = 0.275 T/sy for 5"  
 At \$65/T,  $0.275 \times 65 = \$17.88/sy$

12" G.A.B. -\$17/sy

Bitum Tack Coat : 0.07 Gal/sy

At \$1.75/Gal,  $0.07 \times 1.75 = \$0.12/sy$

Total Cost of Pavement / sy :

$$3.81 + 13.20 + 17.87 + 17.00 + 0.12 = \$52/sy$$

## SHOULDER

12.5 mm Superpave : \$3.80/sy for 1.5" thickness

19 mm Superpave : \$6.60/sy for 2" thickness

6" G.A.B. : \$11.00/sy

Bitum Tack Coat : \$0.10/sy

Total Cost of Shoulder / sy :

$$3.80 + 6.60 + 11.00 + 0.10 = \$21.50/sy$$

# COST WORKSHEET



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIR.**

ALTERNATIVE NO. 22

*Georgia Department of Transportation*

SHEET NO. 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
<i>Two</i>							
<u>Pavement: (Left turn)</u>		SY					
Original:							
$\left[ \frac{400 \times 12}{9} + \frac{120 \times 12 \frac{1}{2}}{9} \right] 2$		1,227	52	63,787			
Proposed:					-	-	-
<u>Pavement: (Right turn)</u>		SY					
Original: $1000 \times 12$		1,333	52	69,333			
Proposed:					-	-	-
<u>Pavement: (Entrance)</u>		SY					
$\left[ \frac{75 \times 75 - \pi(75)^2}{4} \right] \frac{2}{9}$		588	52	30,589			
+ $(120 \times 24) / 9$							
<u>Curb &amp; Gutter (Entrance)</u>		LF	326	17	5,542		
$2 \left( \frac{2 \times \pi \times 75}{4} \right) + 45 \times 2$							
Continue C&G where		LF					
Entrance is removed							
90 + 180					270	17	4,590
<i>Two</i>							
<u>Conc. Median (Left turn)</u>		SY					
$\left[ \frac{400 \times 4}{9} + \frac{120 \times 4}{9} \right] 2$		462	35	16,178			
Sub-total				185,429			4,590
Mark-up at 10 %				18,543			459
TOTAL				203,972			5,049

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **26**  
*Georgia Department of Transportation*

DESCRIPTION: **USE 11-FT. WIDE LANES IN LIEU OF 12-FT. WIDE LANES** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

Twelve-ft. wide lanes for SR 74 are used throughout the project.

ALTERNATIVE: (Sketch attached)

Use 11-ft. wide lanes for SR 74. Where an extra left turn lane is used, increase the paved median width by one ft.

ADVANTAGES:

- Reduces cost
- Reduces driving speeds especially in urban sections
- Reduces width of road construction
- Reduces construction time

DISADVANTAGES:

- None apparent

DISCUSSION:

There are few trucks using this roadway, thus, 11-ft. wide lanes will provide adequate service in this environment and significantly reduce the project cost.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>563,895</b>	—	\$ <b>563,895</b>
ALTERNATIVE	\$ <b>51,332</b>	—	\$ <b>51,332</b>
SAVINGS (Original minus Alternative)	\$ <b>512,563</b>	—	\$ <b>512,563</b>





# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **27**  
*Georgia Department of Transportation*

DESCRIPTION: **SHORTEN THE NORTHBOUND LEFT TURN AT THE** SHEET NO.: **1 of 2**  
**WATER TREATMENT PLANT AT STA. 221+00**

**ORIGINAL DESIGN:**

A storage length of 450 ft., enough for 18 vehicles, is provided for the left turn to the water treatment plant.

**ALTERNATIVE:**

Provide a length of 50 ft., enough for two vehicles. See 2004 edition of AASHTO, page 715. This is the minimum amount of storage.

**ADVANTAGES:**

- Reduces cost

**DISADVANTAGES:**

- None apparent

**DISCUSSION:**

The water treatment plant for Peachtree City is going to have negligible traffic, especially from the northbound side of SR 74.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 42,020	—	\$ 42,020
ALTERNATIVE	\$ 4,669	—	\$ 4,669
SAVINGS (Original minus Alternative)	\$ 37,351	—	\$ 37,351



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **28**  
*Georgia Department of Transportation*

DESCRIPTION: **USE 11-FT. LANES AND ONE-FT. GUTTERS TO AVOID** SHEET NO.: **1 of 2**  
**THE RELOCATION OF THE WATER LINE**

**ORIGINAL DESIGN:**

The original design uses 12-ft. lanes and 2-ft. gutters for the curb and gutter section. To install the new roadway, two 20-in. diameter, 8000 ft. long water lines must be relocated outside the pavement boundaries.

**ALTERNATIVE:**

Use 11-ft. travel lanes and one-ft. gutters to narrow the total width of the pavement section and do not relocate the water lines.

**ADVANTAGES:**

- Reduces cost
- Avoids relocation of water lines

**DISADVANTAGES:**

- May require minor shifts in alignment
- Right-of-way purchases may decrease on one side and increase on the other
- Requires some redesign

**DISCUSSION:**

The water lines are near the edge of the proposed lanes. The alternative design moves the travel way enough in most locations to avoid relocating the water lines. In some locations, the alignment would be shifted by as much as two ft. to clear the water lines. Any changes in the right-of-way would be reductions on one side and equal increases on the other. This alternative allows the contractor to go to work on the road widening as soon as he gets a notice to proceed without having to wait for the water line relocation work to be completed. It also allows the contractor to avoid having to deal with the utility owner.

See Alt. Nos. 1, 2 and 26 for sketches and calculations related to this alternative.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,975,712	—	\$ 2,975,712
ALTERNATIVE	\$ 482,072	—	\$ 482,072
SAVINGS (Original minus Alternative)	\$ 2,493,640	—	\$ 2,493,640



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **29**  
*Georgia Department of Transportation*

DESCRIPTION: **REDUCE THE LEFT TURN LANE GOING SOUTHBOUND** SHEET NO.: **1 of 3**  
**AT THE INTERSECTION WITH REDWINE ROAD**

ORIGINAL DESIGN:

808 ft. of left turn lane is provided for vehicles to go to Red Wine Road.

ALTERNATIVE:

Reduce the storage length of the left turn lane to 250 ft.

ADVANTAGES:

- Reduces cost

DISADVANTAGES:

- Reduces storage of vehicles

DISCUSSION:

The original design provides enough left turn storage to accommodate 32 vehicles. This alternative design provides enough to store 10 vehicles, which is more than the two required per the 2004 edition of AASHTO.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ <b>75,449</b>	—	\$ <b>75,449</b>
ALTERNATIVE	\$ <b>23,334</b>	—	\$ <b>23,334</b>
SAVINGS (Original minus Alternative)	\$ <b>52,105</b>	—	\$ <b>52,105</b>





# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE** ALTERNATIVE NO.: **30**  
*Georgia Department of Transportation*

DESCRIPTION: **SHIFT THE ENTRANCE TO GIMME SHELTER FROM STA. 224+00 TO STA. 221+40.77 TO THE LEFT** SHEET NO.: **1 of 2**

ORIGINAL DESIGN: (Sketch attached)

The entrance to Gimme Shelter, Inc. does not align with the entrance to the water treatment plant. There is no median opening on SR 74 at this location, so left turns are not possible.

ALTERNATIVE: (Sketch attached)

Remove the grass median from the driveway and shift the entrance from its present location to Sta. 221+40.77 on SR 74 so that it aligns with the intersection of the water treatment plant. The present entrance will have to be closed.

ADVANTAGES:

- Allows a left turn onto SR 74 from Gimme Shelter
- Smoother traffic flow
- Increases safety

DISADVANTAGES:

- Increases cost slightly

DISCUSSION:

This design suggestion may involve upgrading the Gimme Shelter entrance to better accommodate traffic by having a dedicated left turn lane and corresponding striping.

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

END INTEGRAL CONCRETE MEDIAN WITH TYPE 7 CURB FACE (GA STD 9032B) BEGIN TYPE 7 C&G AND GRASSED MEDIAN

67

PEACHTREE CITY HOLDING, LLC

**WATER TREATMENT PLANT DRIVEWAY CONSTRUCTION CENTERLINE**  
 KC17  
 Degree = 28°38'52.40" Delta = 8°44'34.30"  
 Radius = 200.00 Length = 30.52  
 Tangent = 15.29 Length of Chord = 30.49  
 External = 0.58 S.E. Rate = NC  
 PC Sta = 0+90.67 DB = N 39°47'14.55" E  
 North 1215785.29 East 2181850.25  
 PI Sta = 1+05.96  
 North 1215797.04 East 2181860.03  
 PT Sta = 1+21.19 DA = N 31°02'40.25" E  
 North 1215810.14 East 2181867.92

GEORGIA UTILITIES COMPANY

69

PARKING

ENTRANCE

APPROACH TO ROAD

END GUARDRAIL  
 STA 218+98.48' LT.  
 TYPE 12 ANCHOR  
 (GA STD 4040 & 4052)

BEGIN TYPE 2 C&G  
 END SHOULDER (LT)

SEE CONSTRUCTION DETAIL A-3  
 FOR WHEELCHAIR RAMPS

70

THE CITY OF PEACHTREE CITY

STA 221+40.77 M. L.  
 STA 2+00.00 DRWY

Remove  
 RAISED GRASS MEDIAN  
 WITH TYPE 7 C&G

S. R. 74

WHEELCHAIR RAMP TYPE 'B'

CURVE KC17

KC12901

KC12902

KC12903

KC12904

KC12905

KC12906

KC12907

KC12908

KC12909

KC12910

KC12911

KC12912

KC12913

END GUARDRAIL  
 STA 219+98.15 60' RT.  
 TYPE 11 ANCHOR  
 (GA STD 4012D & 4052)

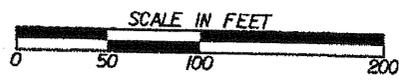
Shift the  
 Entrance to 68  
 GIMME SHELTER, INC  
 STA. 221+40.77

SHEET 2 of 2

Alternative : 30

KEY CONSULTANTS

1000 PEACHTREE STREET, SUITE 6  
 ATLANTA, GEORGIA 30075  
 404-521-3511



REVISION DATES

NO.	DATE	DESCRIPTION

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:

MAINLINE PLAN

DRAWING NO. 13-10

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE**  
*Georgia Department of Transportation*

ALTERNATIVE NO.: **B-1**

DESCRIPTION: **USE TYPE II BEAMS IN BRIDGE END SPANS**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN:

Type III pre-stressed concrete beams are at about 8 ft. center-to-center in 60-ft. end spans.

ALTERNATIVE:

Use Type II pre-stressed concrete beams at 8 ft. center-to-center in end spans.

ADVANTAGES:

- More economical
- Lighter beams to set

DISADVANTAGES:

- Requires a thicker deck
- Toes of slopes are slightly closer together

DISCUSSION:

Type II beams are structurally adequate for a 60-ft. span (design beam length will be about 57'-9"). Type II beams are considerably cheaper and are easier to set since they are lighter. Reducing the beam depth will raise the end bents by about 9-in., causing the toes of the end rolls to move about 1'-6" closer to the creek on this end. According to the hydraulic study, the floodway width is 155 ft. and the original design provided 165 ft. from toe to toe. The alternative design will provide 162 feet, which is acceptable.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 576,106	—	\$ 576,106
ALTERNATIVE	\$ 551,594	—	\$ 551,594
SAVINGS (Original minus Alternative)	\$ 24,512	—	\$ 24,512

# CALCULATIONS



PROJECT: WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE

ALTERNATIVE NO.: B-1

SHEET NO.: 2 of 3

THE END SPANS ARE 60'-0". THE BEARING TO BEARING LENGTH (DECK LENGTH) WILL BE 57'-9" AND THE BEAM LENGTH WILL BE 59'-1" (57'-9" PLUS 8" ON EACH END). BECAUSE THE TOP FLANGE OF THE TYPE II BEAM IS NARROWER, A THICKER DECK WILL BE REQUIRED.

FROM THE GA DOT BRIDGE DECK DESIGN CHARTS, THESE ARE THE DECK DESIGN PARAMETERS:

BEAM SIZE	TYPE II	TYPE III
SLAB DESIGN SPAN	7'-0"	6'-8"
DECK t	8 1/8"	8"
MAIN BARS	#5 @ 6' 4"	#5 @ 6' 3/8"
DISTRIBUTION BARS	11-#4	11-#4

← NO DIFFERENCE

## QUANTITIES:

BEAMS 2 SPANS X 59.0833 X 12 BEAMS = 1418 LF

DECK CONC I:  $2(60)(95.25)(8.125/12)/27 = 287$  CY TYPE II

$2(60)(95.25)(8/12)/27 = 282$  CY TYPE III

MAIN BARS ARE  $95.25 - .25 + 2 = 97'$  LONG (INCLUDING 2' LAP)

NUMBER OF BARS =  $60(12)/6.25 = 115.2 \rightarrow 117$  BARS, TYPE II

$= 60(12)/6.575 = 112.9 \rightarrow 114$  BARS TYPE III

BAR QUANTITY:  $2(117)(2)(1.043) = 488\#$  TYPE II

$2(114)(2)(1.043) = 476\#$  TYPE III



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## PROJECT DESCRIPTION

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This project involves the expansion of 3.38 miles of SR 74 in Fayette County, GA from two lanes to a divided, four-lane highway. The typical section provides four 12-ft. wide lanes separated by a raised 20-ft. median with 2-ft. wide gutters on each side and rural shoulders consisting of a 6.5-ft. paved area and 3.5-ft. graded area. Right turn/deceleration lanes that currently have curb and gutter will be replaced with curb and gutter. The design speed is 45 miles per hour. At selected locations along the alignment, curb, gutter and sidewalks are provided along the outside edge of the roadway.

The project begins north of SR 85 where Padgett Road is realigned to match up with SR 74 south of SR 85. Starting at SR 85, a 24-ft. wide raised median and two 12-ft. wide travel lanes are added to the left (west) of existing SR 74. At about 2,000 feet to the north in the vicinity of Millstone Drive, the roadway expansion occurs to the left and right of the existing two-lane road moving back to the west about 1200 ft. north at Lodge Trail. The existing roadway curve starting at the school driveway is flattened. Opposite the school driveway, a new entrance is provided for the daycare center on the west side of the road. Redwine Road is realigned to intersect SR 74 at a 90-degree angle. Rockaway Road, which currently intersects SR 74 at a large skew angle, is relocated to line up with Holly Grove Road on the right side.

The alignment shifts completely to the left of the existing around Redwine Road to avoid impacts to an eligible historic resource located at the northeast corner of the intersection of SR 74 and Redwine Road. The alignment then continues widening to the left using the existing roadway as the westbound lanes until just before Flat Creek. At this point, the alignment shifts onto a new location to the right of existing SR 74 and uses a new bridge that will accommodate four lanes and a raised median to cross Flat Creek.

The bridge will be a 3-span structure with 60-ft. end spans and a 120-ft. center span using pre-cast, pre-stressed concrete beams support on center bents consisting of a cast-in-place concrete bent beam and concrete columns sitting on concrete caissons to rock. The deck will be cast-in-place concrete with barriers at the perimeter. H-pile supported cast-in-place concrete abutments will be used at the end of the bridge. The existing bridge will be removed.

Upon crossing the creek, the alignment shifts back to widening to the right side to use the existing roadway and to avoid impacts to the Peachtree City Baseball and Soccer Complex located on the west side of SR 74. The alignment continues widening to the right until Cooper Circle where it ties to Project STP-209-1(1), P.I. No. 322350.

At major intersections with cross streets, left turn lanes are added in the median and right turn lanes are added on the outside. Left turn lanes are provided at the following locations:

- Padgett Road
- Manor Drive/Church Driveway
- Lodge Trail – also a left turn lane for a U-turn for northbound traffic
- Brechin Drive
- School Driveway/Daycare Center Driveway

- Redwine Road – also a left turn lane for a U-turn for northbound traffic
- Price Property
- Relocated Rockaway Road/Holly Grove Road
- Water Treatment Plant Driveway
- Soccer Park Driveway/Future South Baseball Field Complex Entrance
- Center Future South Baseball Field Complex Entrance – also a left turn lane for a U-turn for northbound traffic
- Cooper Loop Road/Georgia Power Company Entrance

The median will be paved with concrete in areas where the left turn lanes cut into it. Several minor roads and driveways are provided with right-in/right-out access to the divided highway. U-turns are provided at strategic locations to accommodate those who need to go in the opposite direction.

New entrances off SR 74 are provided to the water treatment plant and Gimme Shelter, Inc. The road widening at this point will be to the east. New entrances with left turn lanes to a soccer field complex on the west side and a proposed baseball field complex on the east side will be provided. Three signalized intersections will be provided:

- SR 74 and SR 85
- SR 74 and Redwine Road
- SR 74 and Holly Grove Road

A future signalized intersection may be provided at the opposing entrances to the soccer and baseball field complexes.

To construct the project, two 20-in. diameter water lines on the left side of the road from the water treatment plant to SR 85 must be relocated outside the pavement section.

As part of the project, Peachtree City will pay for the installation of an 8-ft. x 10-ft. concrete box culvert for golf carts to cross under the road near relocated Rockaway Road.

Buried storm water pipes with curb inlets at the curb and gutter sections and drainage ditches with culverts under driveways at other locations will be used to convey storm water. A detention pond with an overflow to an existing drainage ditch leading to Whitewater Creek is proposed for the northeast corner of the Millstone Drive and SR 74 intersection. Consideration is being given to eliminate this detention pond and run buried pipes along the east side of SR 74 to SR 85 and then along the south side of SR 85 east to Whitewater Creek, which will add cost to the project. Several temporary sedimentation basins will be constructed along the length of the project for erosion control during construction.

The designer's estimated cost of the project is approximately \$31 million which includes about \$7 million for obtaining a 150-ft. wide right-of-way throughout the length of the project plus other land to accommodate the project requirements.

A project location map is provided on the following page.



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## VALUE ANALYSIS AND CONCLUSION

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### INTRODUCTION

This section describes the procedures used during the value engineering (VE) study. The workshop was performed February 12–15, 2007 at GDOT Headquarters in Atlanta, GA. Mulkey Engineers & Consultants is assisting GDOT with the development of the project and provided information for the VE team to use as the basis of the study.

A systematic approach was used in the VE study. The key steps taken were organized into three distinct parts: 1) pre-study preparation; 2) VE orientation/kickoff meeting and workshop; and 3) post-study reporting and implementation. A task flow diagram, which outlines each of the procedures included in the VE study, is attached for reference.

In the sections following the VE procedures, separate narratives and supporting documentation identify the following:

- Value Engineering Workshop Participants
- Economic Data used in the workshop
- Cost Model(s) developed for use in the workshop
- Function Analysis performed by the team
- Creative Ideas and Evaluation of the ideas performed by the team

### PREPARATION EFFORT

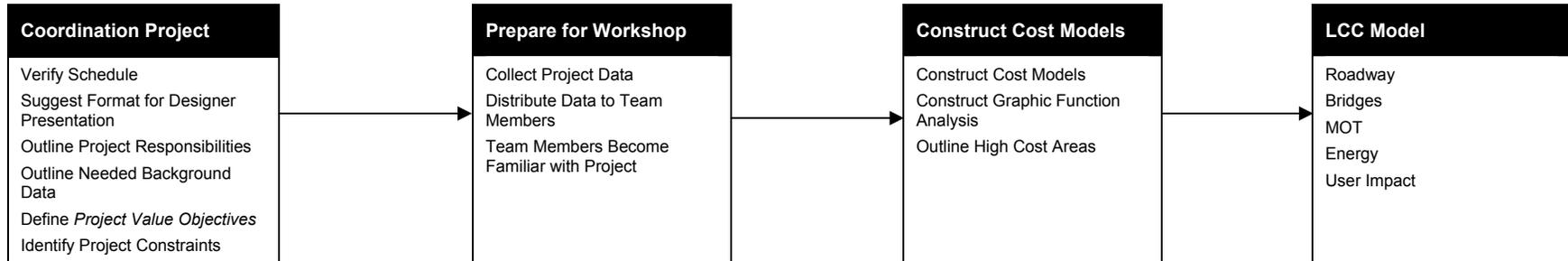
A workshop format was used to conduct the study. Pre-study preparation for the workshop consisted of scheduling study participants and tasks and gathering necessary project documents to distribute to team members for review prior to attending the workshop. Throughout the study, the following documents were used as the basis for generating alternative approaches for achieving project functions and for determining the cost implications of the alternatives that have potential for enhancing the value of the project.

- Preliminary Drawings STP-209-1(2) & BHF-209-1(3) Widening of SR 74 from SR 85 to Cooper Circle, P.I. Nos. 322355 & 322357, dated 1/13/2007, prepared by Mulkey Engineers & Consultants
- Concept Validation Report STP-209-1(2) & BHF-209-1(3) Widening of SR 74 from SR 85 to Cooper Circle, P.I. Nos. 322355 & 322357, December 2005, prepared by Mulkey Engineers & Consultants
- Preliminary Cost Estimate SR 74 From SR 85 to Cooper Circle, dated December 19, 2005, prepared by Mulkey Engineers & Consultants
- Detailed Estimate Report for file “STP-209-1(2),” dated 12/7/2006, prepared by Mulkey Engineers & Consultants

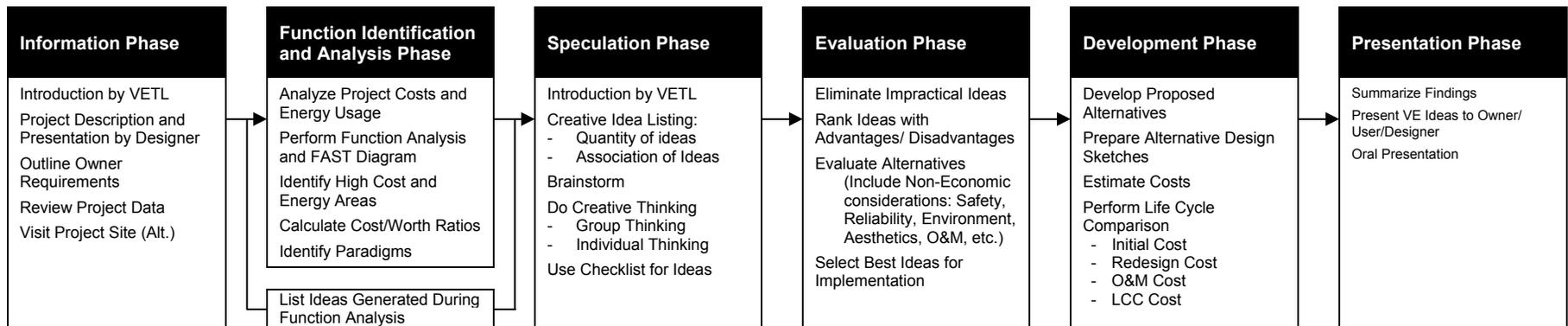


# Value Engineering Study Task Flow Diagram

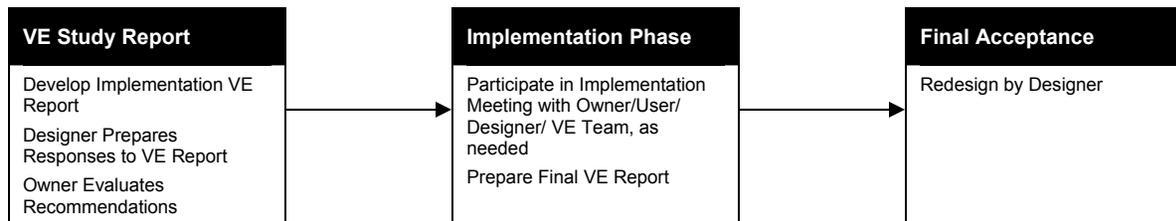
## Preparation Effort



## Workshop Effort



## Post-Workshop Effort



- Detailed Estimate Report for file “BHF-209-1(3),” dated 12/7/2006, prepared by Mulkey Engineers & Consultants
- Preliminary Bridge Plans for SR 74 Over Flat Creek, dated 2/6/2007, prepared by J.B. Trimble, Inc.

Information relating to the project’s purpose and need, GDOT concerns, project stakeholder concerns, design criteria, project constraints, funding sources and availability, regulatory agency approval requirements, and the project’s schedule and costs are very important as they provide the VE team with insight as to how the project has progressed to its current state.

Project cost data provided by the designers was used by the VE team as the basis for a comparative analysis with other similar projects. To prepare for this exercise, the VE Team Leader used the cost estimate prepared by the designers to develop a cost model for the project. The model (described in the Cost Model section of this report) was used to distribute the total project cost among the various elements or functions comprising the project. The VE team used this data to identify the high cost elements or functions that drive the project and the elements or functions providing little or no value so that the team could effectively use its time and focus on reducing or eliminating the impact of those elements.

## **VALUE ENGINEERING WORKSHOP EFFORT**

The VE workshop effort consisted of a four-day workshop beginning with an orientation/kickoff meeting on Monday, February 12, 2007 and concluding with the final VE presentation on Thursday, February 15, 2007. During the workshop, the VE Job Plan was followed in compliance with GDOT and FHWA guidelines for the conduct of a VE study. The job plan guided the search for alternatives to mitigate or eliminate high cost drivers, support functions providing little or no value, and potential project risk elements. Alternatives to specifically address GDOT’s concerns and enhance value by improving operations, reducing maintenance requirements, enhancing constructability, and providing missing or less than optimum functionality were also entertained. The Job Plan includes six phases:

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

### **Information Gathering Phase**

At the beginning of the study, the decisions that have influenced the project’s design and proposed construction methods had to be reviewed and understood. For this reason, GDOT and the design team sent information (described above) to the VE team prior to the study and, following a short orientation session, the workshop was kicked off with a presentation of the project to the team. The presentation highlighted the information provided in the written documentation and expanded on that information 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 clarifications of the information provided.

## Function Identification and Analysis Phase

Having gained some information on the project, the VE team proceeded to further enhance its project knowledge by defining the functions provided, 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 determine if the expenditures actually perform the requirements of the project, or if there are disproportionate amounts of money spent on support functions. The elements performing support functions add cost to the final product, but have a relatively low worth to the basic function.

Function is defined as the “intended use” of a physical or process element. In the VE process, the team attempted to identify functions in the simplest manner using active verb/measurable noun word combinations. Sometimes modifying adjectives were used with the noun to clarify the definition. 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). Then the individual function(s) were identified for the major components of the project depicted on the cost model.

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 the 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
R/S	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 meet
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. Thus, the team works in future phases to reduce the impact of secondary functions and thus enhance project value.

To further clarify the impact of the various functions, the team assigned costs to provide the functions or group of functions provided by a specific project element using the cost estimate and cost model. Where possible they seek to benchmark the costs for providing functions, i.e., finding the lowest cost, or worth, to perform the function, 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. By identifying the cost and worth of a function or group of functions, cost/worth ratios were calculated. Cost/worth ratios greater than 1 indicated that less than optimum value was being provided. Those project functions or elements with high cost/worth ratios became prime targets for value improvement.

As well as looking at areas with high cost/worth ratios, the team 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 too 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 Idea Generation Phase**

This VE study phase involved the creation and listing of ideas. Starting with the functions or project elements with high cost/worth ratios, a high absolute cost compared to other elements in the project, and secondary functions providing little or no value, the VE team generated as many ideas as possible to provide the necessary functions at a lower total life cycle cost, or to improve the quality of the project. Ideas for improving operation and maintenance, reducing project risk, and simplifying constructibility were also encouraged. At this stage of the process, the VE team was looking for a large quantity of ideas and free association of ideas. Creative Idea Listing worksheets were generated and organized by the function or project element being addressed.

GDOT and the design team may wish to review these creative lists since they may contain ideas that were not pursued by the VE team but can be further evaluated for potential use in the design.

### **Evaluation/Judgment Phase**

Since the goal of the Creative Idea Generation Phase was to conceive as many creative ideas as possible without regard for technical merit or applicability to respond to the project goals, this phase of the workshop focused on identifying those ideas that respond to the project value objectives and are worthy of additional research and development before being presented to the owner. The selection process consisted of evaluating the ideas originated during the Creative Idea Generation phase based on GDOT's value objectives identified through conversations.

Based on the team's understanding of GDOT's value objectives, each idea was compared with the present design concept, and the advantages and disadvantages of each idea were discussed. How well an idea met the design criteria was also reviewed. Based on the results of these reviews, the VE team rated the idea by consensus using a scale of 1 to 5, with 4 or 5 indicating an idea with the greatest potential to be technically sound and provide cost savings or improvements in other areas of the project, 3 indicating an idea that provides marginal value but could be used if the project was having budget problems, 2 indicating an idea with a major technical flaw, and 1 indicating an idea that does not respond to project requirements. Generally, ideas rated 4 and 5 were pursued in the next phase and presented to GDOT during the presentation phase.

The team also used the designation "DS" to indicate a Design Suggestion, which is an idea that may not have specific quantifiable cost savings, but may reduce project risk, improve constructability, help to minimize claims, enhance operability, ease maintenance, reduce schedule time or enhance project value in other ways. Design suggestions could also increase a project's cost but provide value in areas not currently addressed. These are also developed in the next phase of the VE process.

## **Development Phase**

In this phase, each highly-rated idea was expanded into a workable solution designated as a Value Engineering Alternative. The development consisted of describing the current design and the alternative solution, preparing a life cycle cost comparison where applicable, describing the advantages and disadvantages of the proposed alternative solution, and writing a brief narrative to compare the original design to the proposed change and provide a rationale for implementing the idea into the design. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The Value Engineering Alternatives are included in the section of this report entitled Study Results.

Design suggestions include the same information as the alternatives except that no cost analysis is performed. They too are included in the section of this report entitled Study Results.

## **Presentation Phase**

The last phase of the workshop involved summarizing the results of the study and preparing 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 design team. The purpose of the presentation 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. Procedures for implementing the results of the study were discussed and arrangements were made for the reviewers of the VE report to contact the VE team in order to obtain further clarifications, if necessary. Draft copies of the Summary of Potential Cost Savings worksheets and the developed Value Engineering Alternatives and Design Suggestions were given to GDOT and the design team to facilitate a timely review and speedy implementation of the selected ideas.

## **POST STUDY PROCEDURES**

The post-study portion of the VE study consisted of the preparation of this Value Engineering Study Report. Personnel from GDOT and the 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. LZA 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.

Upon completing their reviews, GDOT and the designers will meet and, by consensus, select those Value Engineering Alternatives and Design Suggestions that provide good value to incorporate into the project.

## VALUE ENGINEERING WORKSHOP PARTICIPANTS

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

<b><u>Participant</u></b>	<b><u>Specialization</u></b>	<b><u>Affiliation</u></b>
J. Daniel Hood, PE	Highway Design	HNTB Corporation
Paresh Parikh, PE	Cost/Constructability	Delon Hampton & Associates
John Tiernan, PE	Bridge Engineer	ARCADIS US, Inc.
Howard B. Greenfield, PE, CVS	VE Team Leader	Lewis & Zimmerman Associates

### DESIGNER'S PRESENTATION

An overview of the project was presented on Monday, February 12, 2007, by representatives from GDOT and the Mulkey Engineers & Consultants design team. 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 specifics. Additionally, the meeting afforded GDOT and the designers the opportunity to highlight in greater detail those areas of the project requiring additional or special attention. An attendance list for the meeting entitled Designer's Presentation Meeting Participants is attached.

### VALUE ENGINEERING TEAM'S FORMAL ORAL PRESENTATION

A formal oral VE presentation was conducted on Thursday, February 15, 2007 at GDOT Headquarters to review VE alternatives with GDOT and representatives from the design team. Copies of the Draft Summary of Potential Cost Savings and Value Engineering Alternatives and Design Suggestions were provided to the attendees. An attendance list for the meeting entitled VE Team Presentation Meeting Participants is attached.

# VE TEAM PRESENTATION

## MEETING PARTICIPANTS



PROJECT: <b>WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE</b> <i>Georgia Department of Transportation</i>		DATE: <b>FEBRUARY 15, 2007</b>
NAME & E-MAIL (PLEASE PRINT)	ORGANIZATION/TITLE	PHONE/FAX
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VINESHA PEBIRAM em GDOT1000	GDOT 1000 EMPLOYEE # 00684767	ph 404-463-2888 fx
JOHN TIERNAN em john.tiernan@arcadis-us.com	ARCADIS	ph 770-431-8666 fx X630
Craig Sewell em Craig.sewell@dot.state.ga.us	District 3 Areas GDOT AAE-C	ph 678 332-8989 8341 fx
Steve Gaston em steve.gaston@dot.state.ga.us	GDOT Bridge	ph 404-656-5197 fx
Ken McDuff em kmcduff@mulkeyinc.com	Mulkey Engineers	ph 678-461-3511 fx 678-461-3494
Paresh J. Parikh em pparikh@delonhampton.com sgero@mulkeyinc.com	Delon Hampton & Associates	ph 404-524-8030 fx 404-524-2575
em Scott Gero	Mulkey Engineers	ph 678-795-3608 fx 678-461-3494
Lisa L. Myers em lisa.myers@dot.state.ga.us	GA DOT Engineering Services Design Review Engineer Manager	ph 404-651-7408 fx
em		ph fx
em		ph fx

## VE STUDY SIGN-IN SHEET

Project No.: STP-209-1(2) & BHF-209-1(3) County: Fayette PI No.: 322355 & 322357

Date: 2/12-15/07

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
Lisa L. Myers	00244168	Engineering Services	404-651-7468	lisa.myers@dot.state.ga.us
KEN CRABTREE	00240867	Dist Const. - Thomasston	706-646-5572	
DAN HOAD	HNTB	HNTB Corp.	404-946-5700	JHoot@HNTB.com
PARESH PARIKH	DHA	DHA Atlanta	404-524-8030	pparikh@delonhampton.com
HOWARD GREENFIELD	LEA	LEA	301-934-9590	hgreenfield@lza.com
Amber Perkins	00850268	OEL	404-699-3473	Amber.Perkins@dot.State.ga.us
JOHN TIERNAN	Arcadis	ARCADIS	770-431-8666	john.tiernan@arcadis-us.com
KEN WERHO	00258268	DOT-TSD-DESIGN REVIEW	404-635-8144	Ken.WERHO@DOT.STATE.GA.US
MARK SANFORD	00218600	DOT Dist. 3 Areas	4-624-2435	
VINESHA PERAM	00644767	G-DOT-OED	404-463-2888	
Scott Gero		Mulkey	678-795-3608	sgero@mulkeyinc.com
Ken McDuff		Mulkey	678-795-3612	Kmcduff@mulkeyinc.com
Stanley Hild	00232993	OCD	4-656-6109	
Steve Gaston	00352939	GDOT - Bridge	4-656-5197	steve.gaston@dot.state.ga.us
Moussa Issa	00362948	G-DOT - Road Design		moussa.issa@dot.state.ga.us
Row Wiseman	00208180	OES	1-7470	
Jerry MILLIGAN		G-DOT R/W	770 986 1541	

## ECONOMIC DATA

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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 its design team. The following parameters were used when calculating discounted present worth.

Year of Analysis:	2007
Construction Start Date:	2008
Construction Completion Date:	2010
Planning Period (n):	20

## **COST MODEL**

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The VE team leader 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 and provides the VE team with a focus for its work during the study. For this project, three of the construction items represent about 77% of the project costs. They are:

- Pavement Structure
- Erosion Control
- New Bridge

### **NOTES ON THE COST ESTIMATE**

In reviewing the cost estimate prepared by the designers over the course of the VE study, the VE observed that the following prices used in the cost estimate appear to be below current prices:

<u>Item</u>	<u>Price in Estimate</u>	<u>Proposed Price</u>
Bridge	\$75.00/square ft.	\$90.00/square ft.
Borrow	\$4.50/cubic yd.	\$12.00/cubic yd.
Water Line	\$835,000	\$1,500,000
Curb & Gutter 8" x 30" TP 7	\$12.67/linear ft.	\$15.58/linear ft.
Traffic Signals	\$44,000/intersection	\$90,000/intersection
Maintenance of Traffic	\$225,000	\$600,000

Changing the pricing could result in \$2 – \$3 million increase in the cost of the project.

## FUNCTION ANALYSIS

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Function Analysis of the project 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 function(s) needed to attain the given project purpose and need, (4) identify other public goals, and (5) identify secondary functions that should be addressed by the VE team. The Random Function Analysis worksheets completed by the team for the project in its entirety and the various elements follow.

The results of the Function Analysis are as follows:

- The project need and purpose are justified
- Adding pavement to increase capacity and enhance safety is driving the project's cost

## CREATIVE IDEA LISTING AND EVALUATION OF IDEAS

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During the creative phase, numerous ideas were generated for the project using conventional brainstorming techniques as recorded on the following pages. For the convenience of tracking an idea through the VE process, the ideas were grouped into the following categories and numbered according to the order in which they were conceived. The following letter prefixes were used to identify the categories:

CATEGORY	PREFIX
General	None
Bridge	B

### Creative Idea Evaluation

The ideas were then ranked on a qualitative scale of 1 to 5 on how well the VE team believed the idea met the project purpose and need criteria. To assist the team in evaluating the creative ideas, the advantages and disadvantages of each new idea compared to the existing design solution, were discussed based on conversations with GDOT that identified the following as its top value objectives:

- Saves Costs
- Improves Safety
- Reduces Future Disruption
- Improves Traffic Flow
- Constructability
- Reduces Construction Risk
- Satisfies a Need

After discussing each idea, the team then evaluated the ideas by consensus. This produced 17 ideas evaluated as 4s and 5s to carry forward and research and develop into formal Value Engineering Alternatives and five ideas to develop as Design Suggestions to be included in the Study Results section of the report. When this is not the case, an idea may have been combined with another related idea or discarded, as a result of the additional research that indicated the concept as not being cost-effective or technically feasible. Reviewing the Creative Idea Listing and Evaluation worksheets is encouraged since they may suggest additional ideas that can be applied to the design.

# CREATIVE IDEA LISTING



PROJECT: <b>WIDENING OF SR 74 FROM SR 85 TO COOPER CIRCLE</b> <i>Georgia Department of Transportation</i>	SHEET NO.: <b>1 of 2</b>
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NO.	IDEA DESCRIPTION	RATING
<b>GENERAL</b>		
1	Move the alignment to avoid utility relocations	4
2	Reduce the width of the gutters	4
3	Put in conduits for a future signal at the soccer fields	DS
4	Put in 50-ft. mitres at the signals	DS
5	Run pipe straight to the stream and delete the detention pond	4
6	Line up Paget Road with SR 74	DS
7	Use curb and gutter throughout the project	1
8	Eliminate the retaining wall and construct replacement parking	4
9	Use an advanced contractor for the relocation of the water line	DS
10	Connect Rockaway Road directly to SR 74 with a 90 degree $\pm$ tee and use dual connected signals	2
11	Buy out the property where the detention pond is located	4
12	Reduce the length of the left U turn lane at the lodge trail	4
13	Reduce the median near the bridge	3
14	Reduce the length of the left turn lanes at Rockaway Road	4
15	Reduce the length of the left turn lane at the soccer fields	4
16	Remove the curb, gutter and sidewalks from Sta. 220+00 to Sta. 243+85	4
17	Eliminate the U turn at the soccer field Sta. 240 and improve the entrance on the left	4
18	Eliminate the sidewalks at the soccer field	See others
19	Eliminate the curb and gutter on one side, and keep a 5-ft. sidewalk	4
20	Eliminate the curb and gutter on one side and widen the sidewalk on the other side to 10 ft.	3
21	Eliminate the bike lane between Redwine and Rockaway Roads and provide a multi-use walk	4
22	Eliminate one entrance to the baseball fields and upgrade the left entrance	4
23	Drop the profile grade at the north side of the bridge	3
24	Use a 2:1 side slope with a guardrail at selected locations	2
25	Reduce the length of the ditch runs for erosion control and eliminate the sedimentation basins	4
26	Use 11-ft. wide lanes	4

Rating: 1→2 = Not to be developed    3→4 = Varying degrees of development potential    5 = Most likely to be developed  
 DS = Design suggestion    ABD = Already being done

