



# Widening and Reconstruction of SR 53 from SR 211/Tanner's Mill Road to I-85

STP00-0065-03(055), P.I. No. 132860

Jackson and Hall Counties

## Value Engineering Study Report

May 2010

*Designer*

 **Heath & Lineback Engineers, Inc.**

The logo for Heath & Lineback Engineers, Inc. consists of a stylized "H" and "L" in a teal color, with an ampersand "&" between them.

*Value Engineering Consultant*

*Lewis & Zimmerman Associates*





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Value Engineering Specialist  
Georgia Department of Transportation - Engineering Services  
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600 West Peachtree Street  
Atlanta, Georgia 30308

Re: Widening and Reconstruction of SR 53 From SR 211/Tanner's Mill Road  
to I-85, STP00-0065-03(055), P.I. No. 132860 Jackson and Hall Counties  
Value Engineering Study Report

Date:  
May 24, 2010

Dear Mr. Sanders:

Contact:  
Howard Greenfield

Lewis & Zimmerman Associates, Inc., an ARCADIS company, is pleased to submit two hard copies and one electronic copy of the referenced value engineering (VE) study report documenting the study that took place May 11-14, 2010. The objective of the VE effort was to identify opportunities to enhance the value of the project and avoid right-of-way costs.

Phone:  
301.984.9590 x 20

Email:  
hgreenfield@lza.com

The VE team developed 15 alternatives with identifiable cost saving potential. Most address the cost of the right-of-way showing how significant reductions can be achieved in a variety of ways. If three recommended alternatives are implemented consecutively, then the typical section throughout the project will be converted from a partial 32-ft.-wide depressed median to a 20-ft.-wide raised median throughout its length. This along with some minor horizontal alignment adjustments will avoid numerous right-of-way acquisitions and over \$5 million in project costs.

Our ref:  
LZ083357.0000

We thank you for your assistance during the course of the VE team's work. Please do not hesitate to call upon us if you or any of the reviewers have questions regarding the information presented in this report.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.  
an ARCADIS company

A handwritten signature in black ink, appearing to read 'Howard B. Greenfield'.

Howard B. Greenfield, PE, CVS  
Vice President

Attachment

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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. (LZA) for the Georgia Department of Transportation (GDOT). The subject of the study was the Widening and Reconstruction of SR 53 from SR 211/Tanner's Mill Road to I-85, STP00-0065-03(055), P.I. No. 132860, being designed for GDOT by Heath & Lineback Engineers, Incorporated. The study was performed May 11-14, 2010 in the GDOT Central Office, Atlanta, GA using the draft concept documents as the basis of the study.

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

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

### PROJECT DESCRIPTION

This project is being developed to increase the connectivity to I-85 from Gainesville and I-985, reduce congestion, and reduce accidents in this section of SR 53. The project starts at SR 211/Tanner's Mill Road and ends at the intersection of the southbound ramps to and from I-85 with SR 53, a distance of approximately 5.5 miles. The existing two-lane road is to be reconstructed and widened to a four-lane divided highway with improved horizontal and vertical geometry. A portion of the improved roadway will be on a new alignment starting at Atlanta Roadway, approximate Station 110+00 and continuing east to approximate Station 192+00, a distance of about 1.55 miles.

At the beginning of the project, existing SR 53 is a four-lane divided highway with a 20-ft.-wide raised grass median. SR 53 will be widened to a four-lane divided highway with a typical section consisting of two 12-ft.-wide travel lanes in each direction, a 32-ft.-wide depressed median, and 10-ft.-wide rural shoulders with 6.5 ft. of paving. This section continues through the new alignment and then back on the existing alignment until about 1,200 ft. west of the Ednaville Road intersection. At this point the road transition to an urban typical section with two 12-ft.-wide travel lanes in each direction, a 20-ft.-wide raised concrete median with 30-in.-wide concrete curb and gutter, and a 12-ft.-wide outside shoulder with 30-in.-wide concrete curb and gutter section, and a 5-ft.-wide concrete sidewalk set back 2 ft. from the back of the curb on each side of the road.

As part of the project, Chardonay Trace will be relocated to intersect with SR 53 opposite where Oak Drive intersects SR 53 and a traffic signal will be added. Another signal will be added at the

intersection of SR 3 and Ednaville Road. Where the realigned SR 53 intersects New Liberty Church Road, New Liberty Church Road will be improved to allow the grades to match.

Also included in the project is an approximately 900-ft.-long concrete retaining wall to protect a longitudinal stream along the left side of the expanded roadway near the beginning of the project. Additionally, one concrete box culvert will be extended and three new concrete box culverts will be constructed along the new alignment of SR 53. The vertical alignment of the existing roadway will be modified where necessary to maintain a maximum 5% grade.

The estimated total project cost is \$70 million, including \$34.4 million for construction, \$2.5 million for utilities, and \$30.1 million for right-of-way acquisitions.

## **CONCERNS AND OBJECTIVES**

Since this project is in the draft conceptual stage, the Project Concept Report has not yet been approved. The environmental document also has not been completed. The current cost estimate shows that the right-of-way acquisition requirements dominate this project. GDOT desires to develop a project that meets its purpose and need in a cost-effective manner. To assist with this goal, GDOT convened this VE study. The objective of the study was to identify opportunities to modify the current concept and reduce its cost without negatively impacting need and purpose. Thus the VE team was tasked with generating specific changes to the current design and discussing how the project will benefit from their implementation.

## **RESULTS OF THE STUDY**

The VE team generated 15 alternatives that will maintain the functionality of the project while reducing the costs of construction and right-of-way. Most of the alternatives seek to reduce the right-of-way acquisition requirements and limit the number of relocations. All of the alternatives, identified with an alternative number (Alt. No.) for tracking purposes, are summarized on the following Summary of Potential Cost Savings table and detailed in Section Two of the report. Note that some of the alternatives are interrelated or mutually exclusive so that the total potential cost savings is dependent upon the combination of alternatives selected for implementation. The following highlights those alternatives with the greatest potential to add value to the project.

The key issue in this project is the right-of-way which includes 13 residential and 8 commercial acquisitions. Thus the VE team focused on reducing the right-of-way impacts. Three alternatives maximize how this can be accomplished: Alt. Nos. ROW-1, ROW-8 and ROW-11. In each alternative, the typical section is made narrower by converting from a 32-ft.-wide depressed median to a raised 20-ft.-wide grassed median, which will match the existing typical section that the new project ties into at the beginning of the project and the median used at the end of the project.

In addition to narrowing the median, Alt. Nos. ROW-1 and ROW-8 employ an urban typical section with curb and gutter on the outside and the alignments are shifted slightly. The purpose of making these adjustments is to reduce the width of the required right-of-way and shift it so that fewer acquisitions are required without impacting the historical property at the Ednaville Road intersection. The net effect of these changes is a reduction of nine acquisitions and over \$5 million in cost avoidance, part of which is due to a significant reduction in earthwork.

If it is necessary to reduce the speed limit from 55 mph to 45 mph in order to implement the 20-ft.-raised median, it should be a benefit because it will reduce the potential for accidents. The current design speed limit in these areas is 55 miles per hour (mph). However, the speed limit leading up to this section at the beginning of the project is 45 mph and the speed limit in the part of the project where there is an urban typical section, i.e., curb and gutter on both sides of each travelway, is also 45 mph. Part of the roadway affected by the change passes between the Atlanta Roadway and another race track, which will probably require a slowing of the traffic anyway. Thus  
There is also the potential to eliminate the retaining wall by shifting the alignment at the beginning of the project to the right, away from the longitudinal stream as shown in Alt. No. RW-3. This alternative can be combined with Alt. No. ROW-11.

Judicious implementation of the VE alternatives presented could avoid approximately \$7 million in project costs.



# SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: <b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); P.I. No. 132860</i>						
PRESENT WORTH OF COST SAVINGS						
ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
<b>RIGHT-OF-WAY</b>						
ROW-1	Narrow the typical section from a 32-ft.-wide depressed median to a 20-ft.-wide raised median and shift the alignment to the left from approximate Station 224+00 to Ednaville Road	\$3,045,000	\$449,000	\$2,596,000		\$2,596,000
ROW-2	Move the alignment to the left at the New Liberty Church Road intersection up to the new intersection with existing SR 53	\$1,181,000	\$0	\$1,181,000		\$1,181,000
ROW-3	Realign Chardonay Trace so that it intersects SR 53 about 1,100 ft. north of the intersection with the I-85 southbound	\$593,000	\$0	\$593,000		\$593,000
ROW-6	Reduce the width of the typical section for Chardonay Trace	\$333,000	\$0	\$333,000		\$333,000
ROW-8	Move the alignment to the left at New Liberty Church Road and at the Old SR 53 tie-in to reduce displacements (Station 156+30 to Station 222+30) and use a 20-ft.-wide median with urban shoulders (curb and gutter) throughout this section of roadway	\$3,030,000	\$760,000	\$2,270,000		\$2,270,000
ROW-9	Reduce the extent of improvements at New Cut Road and Ednaville Road	\$468,000	\$0	\$468,000		\$468,000
ROW-11	Narrow the typical section using a 20-ft.-wide raised median in lieu of a 32-ft.-wide depressed median from the beginning of the project to New Liberty Church Road	\$847,000	\$262,000	\$585,000		\$585,000





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## STUDY RESULTS

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### GENERAL

The results of this value engineering study conducted on the Widening and Reconstruction of SR 53 from SR 211/Tanner's Mill Road to I-85, STP00-0065-03(065), P.I. No. 132860, portray the benefits that can be realized by GDOT, the owner, Hall and Jackson Counties, the users and Heath & Lineback Engineers, Inc., the designer. The results will directly affect the project's design and will require coordination between GDOT and the design team to determine the disposition of each alternative.

During the conduct of the study, many ideas for potential value enhance 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 the owner's project value objectives. Research performed on those ideas considered to have potential to enhance the value of the project resulted in the development of individual alternatives identifying specific changes to the project as a whole, or individual elements that comprise the project. 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 data bases, such as the one produced by the RS Means Company, or team member or owner data bases were consulted. A composite markup of 9% was used to generate an all-inclusive cost for the construction items being compared and a composite markup of 148% was used to generate an all-inclusive right-of-way cost, as described in the Value Analysis and Conclusions section of the report.

Each alternative or design suggestion developed is identified with an alternative number (Alt. No.) track it through the value analysis process and 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>
Right-of-Way	ROW
Pavement	P
Earthwork	E
Retaining Wall	RW
Median	M
Sidewalks	S

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

### **KEY ISSUES**

This project is being developed to improve mobility along the SR 53 corridor and improve access to Jackson County and the heavily travelled I-85 corridor. The project will reduce accident potential by improving existing substandard horizontal and vertical roadway geometry, side street intersections, and driveway accesses that cause frequent stops in traffic flow along the existing two-lane roadway. Since this project is in the draft conceptual stage, the Project Concept Report has not yet been approved. The environmental document also has not been completed and the current cost estimate shows that the right-of-way acquisition costs dominate this project.

### **STUDY OBJECTIVES**

To assist GDOT in achieving its project goals in a cost-effective manner, it convened this VE study. The study team was tasked with identifying specific changes to the current design that will enhance its value by improving functionality, saving cost or a combination of the two.

### **RESULTS OF THE STUDY**

Research of the ideas identified as having potential for enhancing the value of the project resulted in the development of 15 alternatives for consideration by the owner and designer. These alternatives address the key issues described above and are detailed in the remainder of this section of the report. The alternatives with the greatest potential to add value to the project are highlighted below.

As noted above, the most significant cost driver in this project is the right-of-way which includes 13 residential and 8 commercial acquisitions. Thus the VE team focused on reducing the right-of-way impacts. Three alternatives maximize how this can be accomplished: Alt. Nos. ROW-1, ROW-8 and ROW-11. In each alternative, the typical section is made narrower by converting from a 32-ft.-wide depressed median to a raised 20-ft.-wide grassed median, which will match the existing typical section that the new project ties into at the beginning of the project and the median used at the end of the project.

In addition to narrowing the median, Alt. Nos. ROW-1 and ROW-8 employ an urban typical section with curb and gutter on the outside is also employed and the alignments are shifted slightly. The purpose of making these adjustments is to reduce the width of the required right-of-way and move it so that fewer acquisitions are required without impacting the historical property at the Ednaville Road intersection. The net effect of these changes is a reduction of 9 acquisitions and over \$5 million in cost savings, part of which is due to a significant reduction in earthwork.

If it is necessary to reduce the speed limit in this part of the roadway from 55 mph to 45 mph in order to implement the 20-ft.-raised median, it should be a benefit because it will reduce the potential for accidents. The current design speed limit in these areas is 55 miles per hour (mph). However, the speed limit leading up to this section at the beginning of the project is 45 mph and the speed limit in the part of the project where there is an urban typical section, i.e., curb and gutter on both sides of each travelway, is also 45 mph. Part of the roadway affected by the change passes between the Atlanta Roadway and another race track, which will probably require a slowing of the traffic anyway.

There is also the potential to eliminate the retaining wall by shifting the alignment at the beginning of the project to the right, away from the longitudinal stream as shown in Alt. No. RW-3. This alternative can be combined with Alt. No. ROW-11.

Judicious implementation of the VE alternatives presented could avoid approximately \$7 million in project costs.

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

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

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

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



# SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); P.I. No. 132860*

PRESENT WORTH OF COST SAVINGS

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
<b>RIGHT-OF-WAY</b>						
ROW-1	Narrow the typical section from a 32-ft.-wide depressed median to a 20-ft.-wide raised median and shift the alignment to the left from approximate Station 224+00 to Ednaville Road	\$3,045,000	\$449,000	\$2,596,000		\$2,596,000
ROW-2	Move the alignment to the left at the New Liberty Church Road intersection up to the new intersection with existing SR 53	\$1,181,000	\$0	\$1,181,000		\$1,181,000
ROW-3	Realign Chardonay Trace so that it intersects SR 53 about 1,100 ft. north of the intersection with the I-85 southbound	\$593,000	\$0	\$593,000		\$593,000
ROW-6	Reduce the width of the typical section for Chardonay Trace	\$333,000	\$0	\$333,000		\$333,000
ROW-8	Move the alignment to the left at New Liberty Church Road and at the Old SR 53 tie-in to reduce displacements (Station 156+30 to Station 222+30) and use a 20-ft.-wide median with urban shoulders (curb and gutter) throughout this section of roadway	\$3,030,000	\$760,000	\$2,270,000		\$2,270,000
ROW-9	Reduce the extent of improvements at New Cut Road and Ednaville Road	\$468,000	\$0	\$468,000		\$468,000
ROW-11	Narrow the typical section using a 20-ft.-wide raised median in lieu of a 32-ft.-wide depressed median from the beginning of the project to New Liberty Church Road	\$847,000	\$262,000	\$585,000		\$585,000

# VALUE ENGINEERING ALTERNATIVE



<b>PROJECT:</b> WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85 STP00-0065-03(055); PI No.132860 Hall and Jackson Counties, GA	ALTERNATIVE NO.:  <b>ROW-1</b>
<b>DESCRIPTION:</b> NARROW THE MEDIAN FROM A 32-FT.-WIDE DEPRESSED MEDIAN TO A 20-FT.-WIDE RAISED GRASS MEDIAN AND SHIFT THE ALIGNMENT TO THE LEFT FROM STATION 225+00 TO STATION 260+00	SHEET NO.: 1 of 9

**ORIGINAL DESIGN:** (sketch attached)

The current conceptional design uses a 32-ft.-wide depressed grassed median with rural shoulders for most of the length of the project.

**ALTERNATIVE:** (sketch attached)

Use a 20-ft.- wide urban raised median in lieu of the 32-ft.-wide depressed median and use 12-ft.-wide urban shoulders with curb and gutter from Sta. 225+00 to Sta. 260+00. Also shift the alignment to the left from Sta. 225+00 to Sta. 283+00 to avoid displacements.

**ADVANTAGES:**

- Reduces right-of-way width and impacts
- Reduces right-of-way requirements
- Reduces unclassified excavation requirements

**DISADVANTAGES:**

- Increases longitudinal drainage requirements

**DISCUSSION:**

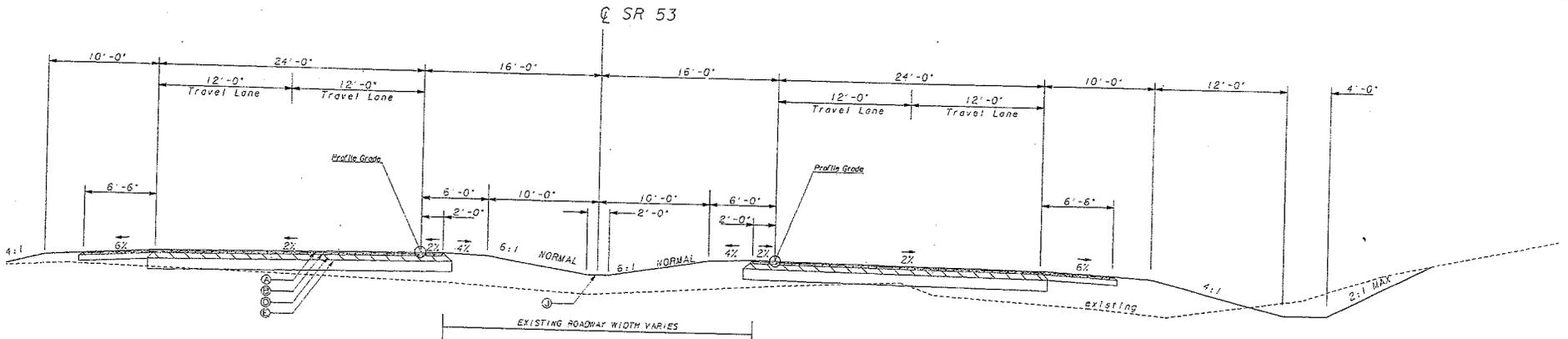
Narrowing the typical section will avoid a large amount of right-of-way acquisition at the expense of some additional construction requirements for curb and gutter and longitudinal drainage. The alternate design for this section of project will avoid right-of-way because most of it is in a cut section and this reduces the cut and the width of the construction. To accomplish this, the 45 mile per hour section of roadway would have to be extended 3,000 ft. The horizontal alignment would also be shifted 25 ft. and 35 ft. to the left to avoid five current displacements.

The parcels/residents saved were checked for driveway profiles that were deemed feasible (they varied from 10% to 14% grades). A retaining wall is required from Station 283+00 to Station 286+00 RT to save parking for the Wendell Butler property.

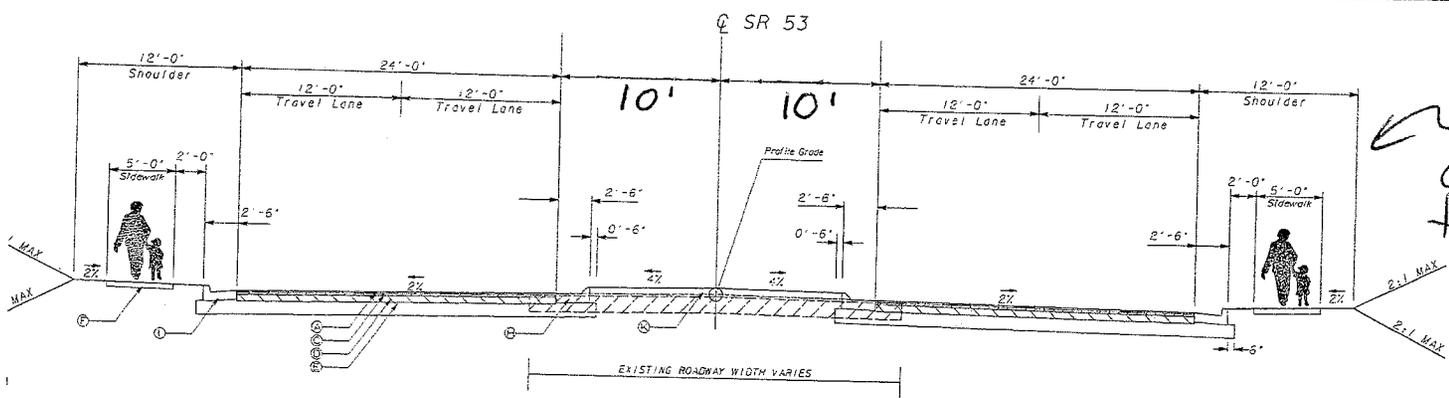
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,045,000	—	\$ 3,045,000
ALTERNATIVE	\$ 449,000	—	\$ 449,000
SAVINGS (Original minus Alternative)	\$ 2,596,000	—	\$ 2,596,000

# Sketch ALT. ROW-1 2/9

SPRFE -PENYBLL	J:\2006007\132660\ dgn\132860\y01.dgn GRNPLN	STATE GA	PROJECT NUMBER STP00-0065-03(055)	SHEET NO. 2	TOTAL SHEETS 156
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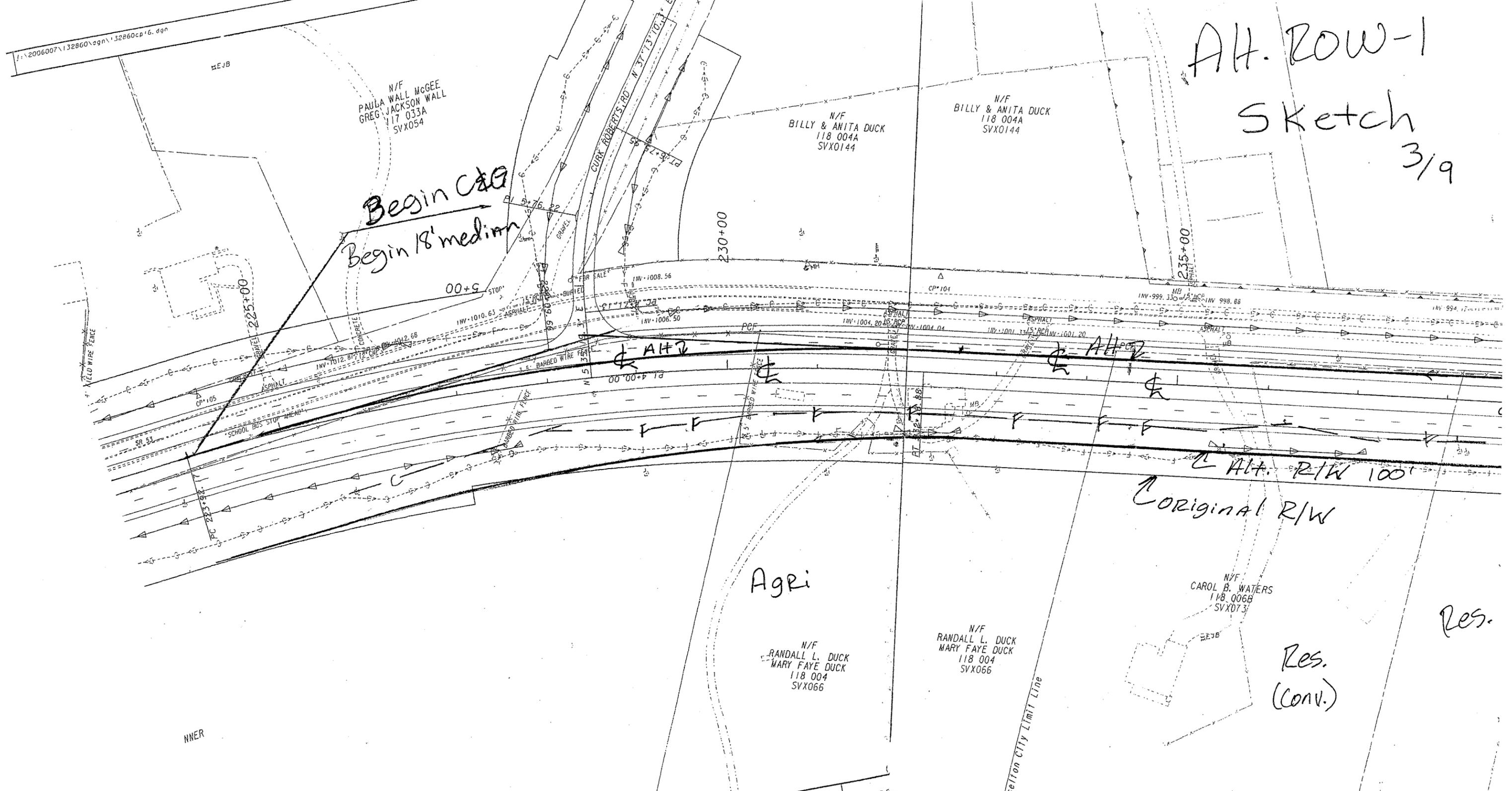
Original TYPICAL SECTION (225+00-260+00)



TYPICAL SECTION  
Alternate ROW-1  
(225+00-260+00)

URBAN  
outside shoulders  
from  
(225+00-260+00)

Alt. ROW-1  
Sketch  
3/9



Begin C&G  
Begin 18' median

Alt

Alt

Alt. R/W 100'

Original R/W

Agri

Res.

Res.  
(Conv.)

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5393

REVISION DATES	OFFICINE

BEGIN LIMIT OF ACCESS.....BLA  
END LIMIT OF ACCESS.....ELA  
LIMIT OF ACCESS.....  
REQ'D R/W & LIMIT OF ACCESS.....  
ESA - HISTORICAL BOUNDARY.....

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5393

Alt. - Row-1  
 AH. Row-1 Sketch

4/a

N/F  
 JAUNITA R. DUCK  
 118 005  
 SVX0143

N/F  
 JUANITA DUCK  
 118 011  
 SVX0142

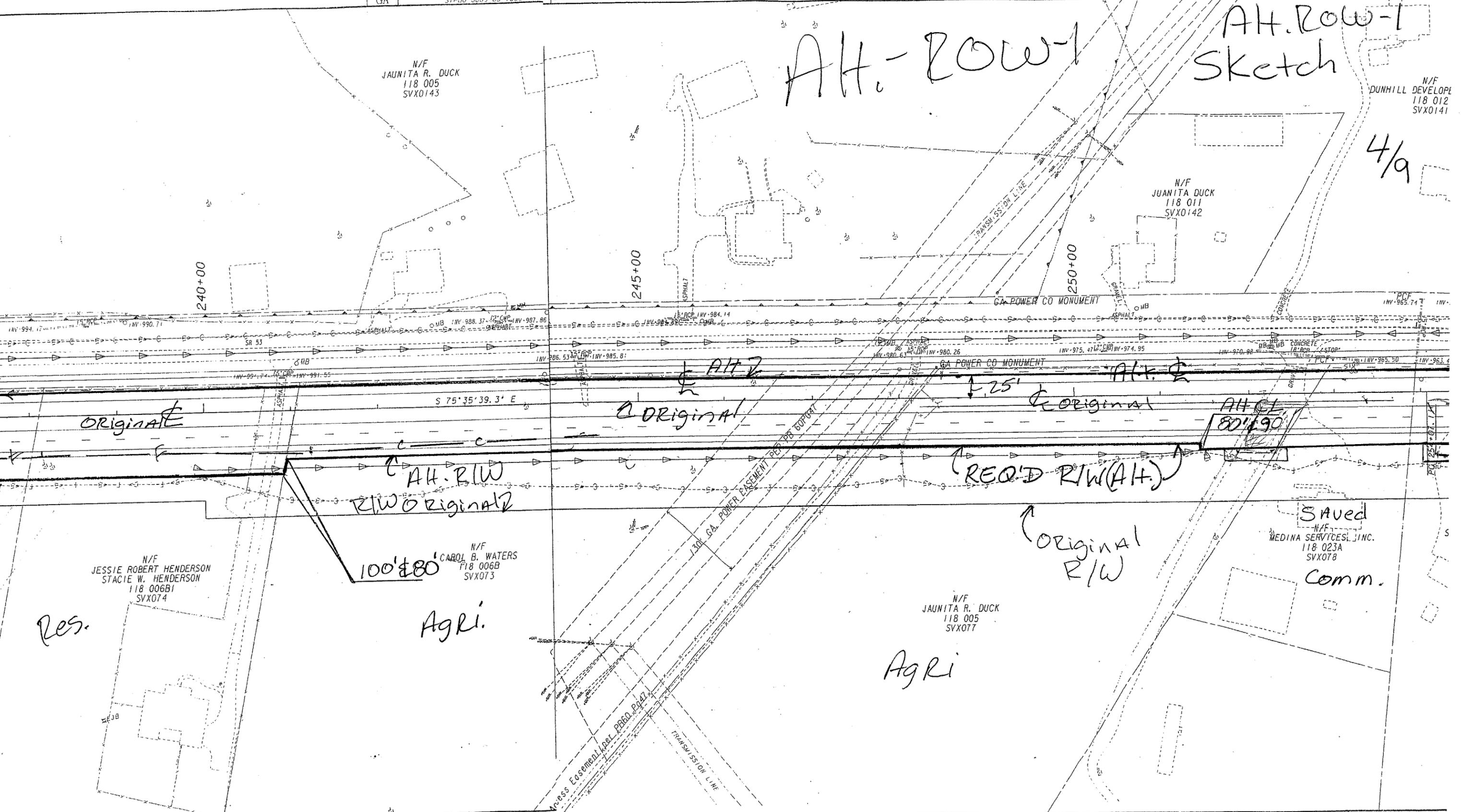
N/F  
 DUNHILL DEVELOPE  
 118 012  
 SVX0141

N/F  
 JESSIE ROBERT HENDERSON  
 STACIE W. HENDERSON  
 118 006B1  
 SVX074

N/F  
 CAROL B. WATERS  
 P18 006B  
 SVX073

N/F  
 JAUNITA R. DUCK  
 118 005  
 SVX077

SAVED  
 N/F  
 MEDINA SERVICES, INC.  
 118 023A  
 SVX078



back Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30066-5393



REVISION DATES

STATE OF  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: **MAINLINE**  
 SR 53 WIDENING FROM  
 SR 211 TO I-85

LEGEND:  
 — P — BEGIN LIMIT OF ACCESS.....BLA  
 — E — END LIMIT OF ACCESS.....ELA  
 — C — F — LIMIT OF ACCESS  
 — H — H — REQ'D R/W & LIMIT OF ACCESS  
 — X — X — ESA - HISTORICAL BOUNDARY

**Heath & Lineback Engineers**  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30066-5393

SCALE IN FEET

REVISION DATES

Alt. ROW-1  
Sketch  
ROW-1 5/9



REVISION DATES	DEPARTMENT

BEGIN LIMIT OF ACCESS.....BLA  
 END LIMIT OF ACCESS.....ELA  
 LIMIT OF ACCESS  
 REQ'D R/W & LIMIT OF ACCESS  
 ESA - HISTORICAL BOUNDARY

**Heath & Lineback Engineers**  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARTIN, MISSISSIPPI 39264-4303

REVISION DATES

BEGIN LIMIT OF ACCESS.....BLA  
 END LIMIT OF ACCESS.....ELA  
 LIMIT OF ACCESS  
 REQ'D R/W & LIMIT OF ACCESS  
 MA - HISTORICAL BOUNDARY





PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
STP00-0065-03(055); PI No.132860  
Hall and Jackson Counties, GA

ALTERNATIVE NO.:

**ROW-1**

SHEET NO.: 7 of 9

**Original Costs saved:**

**Unclass. Excavation saved = 27,000CY by using curb & gutter to remove rural ditches**

**Total Improvements Saved: \$597,000** (Improvements from Jackson County Tax Assessors on-line)

**Medina services Inc** = \$130,000 improvements saved

**Samuel J. Parks** = \$50,000 improvements

**Bobby Dean Thrash 2** = \$300,000 improvements saved

**Clyde Butler** = \$46,000 improvement saved

Frances Harrison = \$71,000 improvement saved

Total Commercial Land saved: 36,950sf

**Medina services Inc** = land saved commercial (60' x 170') = 10,200 sf

**Bobby Dean Thrash 2** = 175' x 35' = 6,125 sf commercial

Hometown Community Bank = (200' x 25') = 5,000sf Commercial

Wendell Butler (282+00 LT) = (450' x 25') = 11,250sf Commercial

Executive Enterprises = (175' x 25') = 4,375sf commercial

Total Residential land saved: 71,375sf

**Samuel J. Parks** = (210' x 60') + (160' x 30') = 17,400sf Residential

**Parks Premier Enterprises** = 14,000sf Residential

**Bobby Dean Thrash 1** = (325' x 25') = 8,125sf Residential

**Clyde Butler** = 150' x 65' = 9,750 sf Residential

Carol Waters = (385' x 30') = 11,550 sf Residential

Jessie & Stacie Henderson = (210' x 30') + (85' x 50') = 10,550sf Residential

Total Agricultural land saved : 84,825sf

Delk Road Partnership (land only) = (325' x 35') = 11,375sf Agr.

Juanita Duck = (470' x 65') = 30,550sf Agr.

Randall L. Duck = (400' x 25') = 10,000sf Agri.

Carol Waters = (470' x 70') = 32,900sf Agri.

See next Cals. sheet



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-1**

SHEET NO.: **8 of 9**

**Additional cost for Alternate design:**

Additional R/W: Delk Road partnership = 28,550sf Agricultural

Additional curb & gutter Tp7 = (3,600' x 2 sides) = 7,200 lf

Additional curb & gutter Tp2 = (3,600' x 2 sides) = 7,200 lf

Additional catch basins = 30 each; Additional 18" storm drain pipe = 2,600 lf;

Additional 24" storm drain pipe = 1,100 lf; 12 flared end sections

Gravity Retaining Walls =  $[400' \times 4' \text{ avg.} \times (((4'/2 + .67') + .67')/2)]/27\text{cf/cy} = 99\text{cy}$

# COST WORKSHEET



PROJECT:	<b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); PI No. 132860</i>  <i>Hall and Jackson Counties, GA</i>	ALTERNATIVE NO.:  <div style="text-align: right;"><b>ROW-1</b></div> SHEET NO.: <span style="float: right;"><b>9 of 9</b></span>
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PROJECT ITEM		ORIGINAL ESTIMATE			ALTERNATIVE ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
original costs saved							
Unclassified Excavation	CY	27,000.00	3.18	85,860			
Construction Markup	%	9.0%	85,860.00	7,727			
R/W saved:							
Improvements saved See Cals	Total	1	597,000.00	597,000			
Commercial Relocation Saved	Each	2	40,000.00	80,000			
Residential Relocation	Each	3	30,000.00	90,000			
Commercial Land	SF	36,950	8.00	295,600			
Residential Land	SF	71,375	1.25	89,219			
Agricultural Land	SF	84,825	0.45	38,171			
R/W markup	%	148%	1,189,990	1,761,185			
Alternate Costs							
Curb & gutter Tp 2	LF				7,200	11.40	82,080
Curb & gutter Tp 7	LF				7,200	10.75	77,400
Catch Basins Gp 1	EA				30	2,100.00	63,000
Storm Drain Pipe 18"	LF				2,600	29.26	76,076
Storm Drain Pipe 24"	LF				1,100	35.55	39,105
Flared End Section	EA				12	500.00	6,000
Class "B" Concrete - Wall	CY				99	397.72	39,374
Construction Markup	%				9.0%	383,035.00	34,473
Additional R/W	SF				28,550	0.45	12,848
R/W markup	%				148%	12,848.00	19,015
<b>Subtotal</b>				3,044,762			449,371
<b>Markup (%) at</b>				included			Included
<b>TOTAL</b>				3,044,762			449,371
<b>TOTAL (ROUNDED)</b>				3,045,000			449,000

# VALUE ENGINEERING ALTERNATIVE



**PROJECT:** **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:  
**ROW-2**

**DESCRIPTION:** **MOVE THE ALIGNMENT LEFT AT NEW LIBERTY  
CHURCH ROAD AND AT THE OLD SR 53 TIE-IN TO  
REDUCE DISPLACEMENTS**

SHEET NO.: 1 of 10

**ORIGINAL DESIGN:** (sketch attached)

The original design requires four displacements at New Liberty Church Road and five at the Old SR 53 tie-in.

**ALTERNATIVE:** (sketch attached)

Shift the alignment slightly to the left to reduce the number of displacements.

**ADVANTAGES:**

- Reduces right-of-way requirements
- Reduces right-of-way acquisition time

**DISADVANTAGES:**

- None apparent

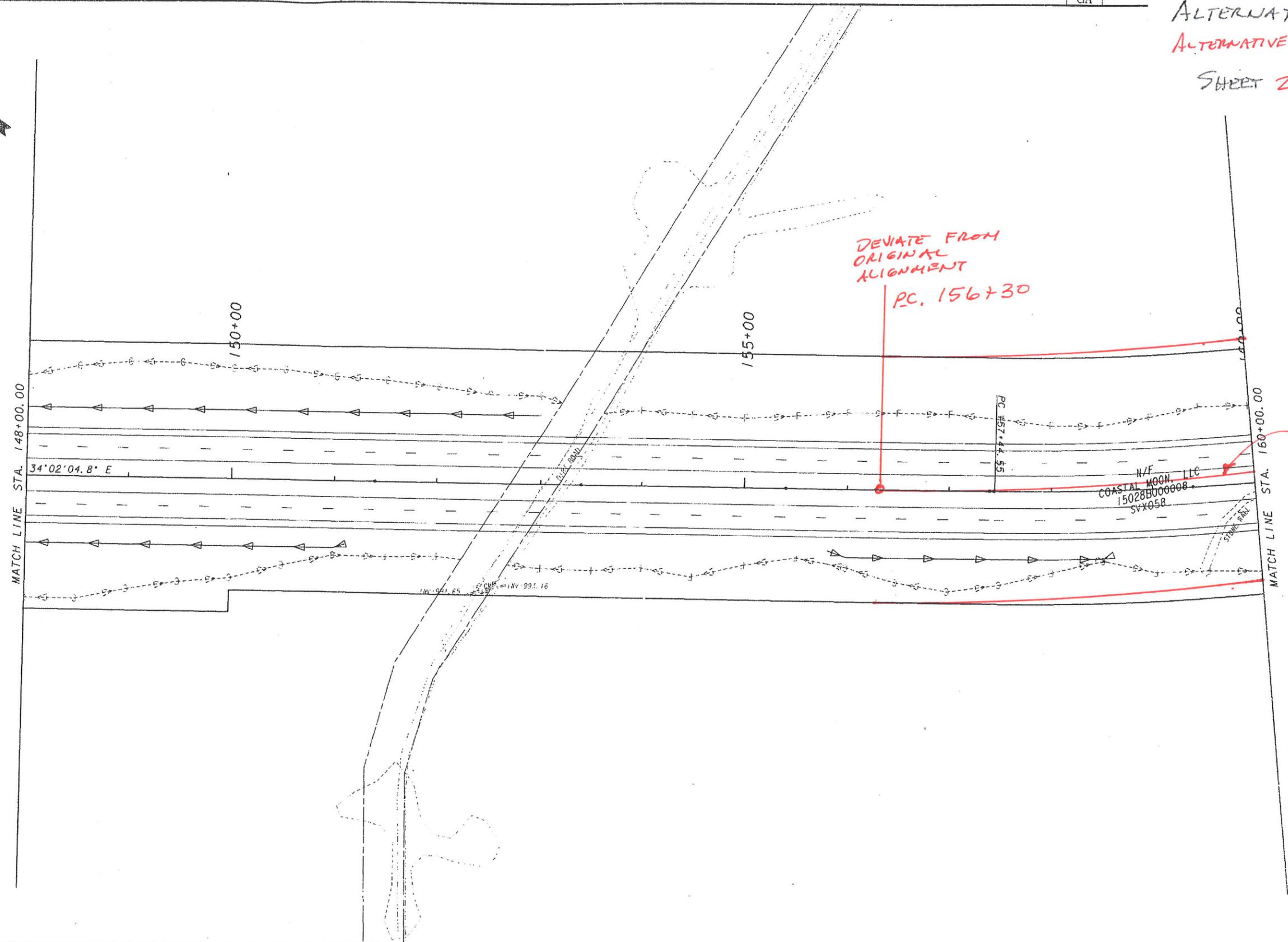
**DISCUSSION:**

At New Liberty Church Road, there are four displacements, two on the left side of SR 53 and two on the right side. Shifting the road to the left will not require any additional displacements on the left, but will save one on the right.

At the Old SR 53 tie-in, there is one displacement on the left side of SR 53 and four on the right side. Much of the property on the left side is already GDOT right-of-way since this is where the current SR 53 is located. Shifting the alignment to the left will save three displacements on the right side.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,181,000	—	\$ 1,181,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 1,181,000	—	\$ 1,181,000

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 2 OF 10



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

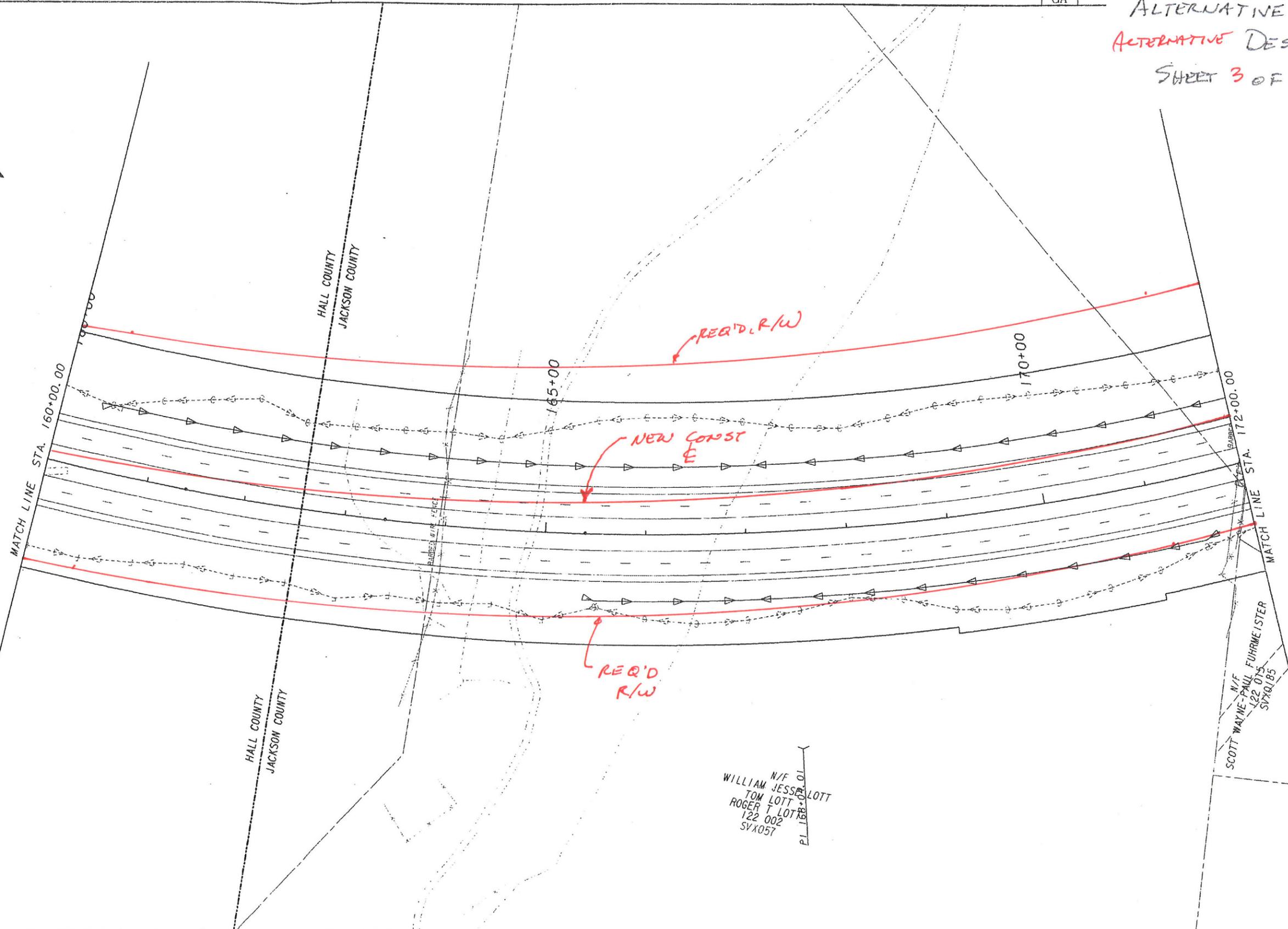
BEGIN LIMIT OF ACCESS.....BLA  
END LIMIT OF ACCESS.....ELA  
LIMIT OF ACCESS  
REQ'D R/W & LIMIT OF ACCESS  
ESA - HISTORICAL BOUNDARY

**Heath & Linebeck Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES

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

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 3 OF 10



SECTION  
REVISION  
DATE  
BY

SECTION  
REVISION  
DATE  
BY

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

BEGIN LIMIT OF ACCESS.....BLA	— B —
END LIMIT OF ACCESS.....ELA	— E —
LIMIT OF ACCESS	— L —
REQ'D R/W & LIMIT OF ACCESS	— R —
ESA - HISTORICAL BOUNDARY	— H —

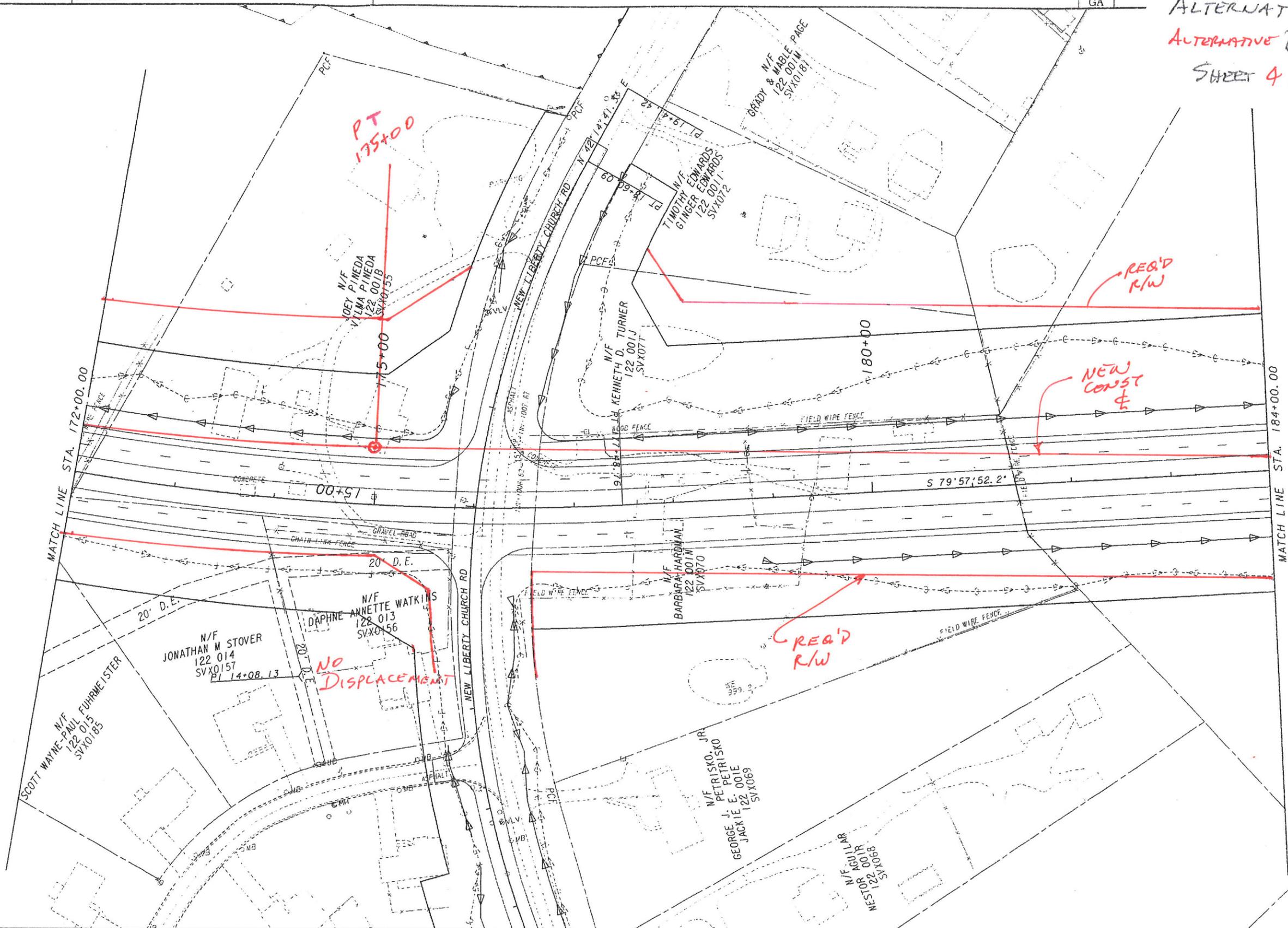
**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5393

SCALE IN FEET

REVISION	DATE

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

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 4 OF 10



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

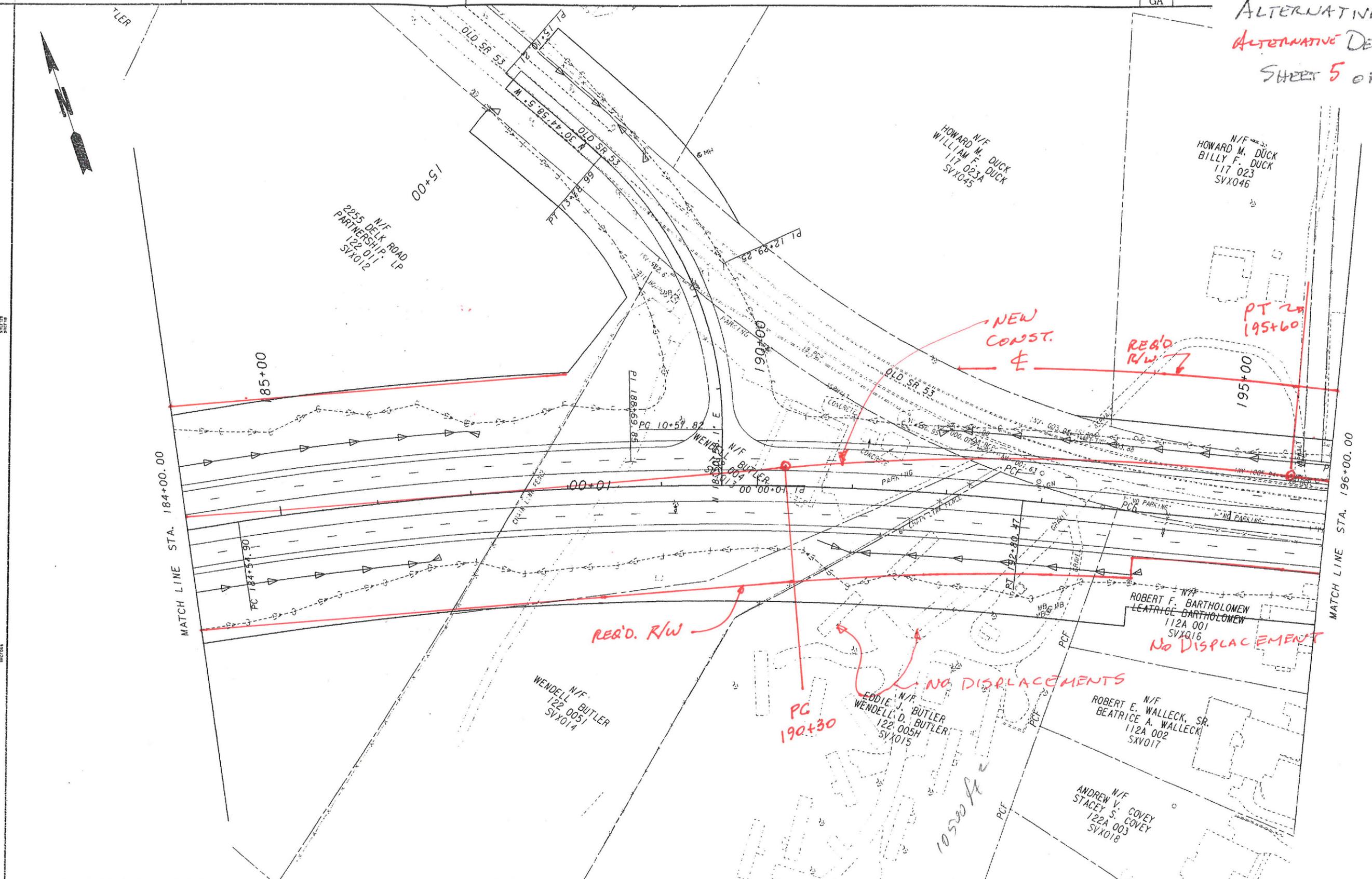
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REQ'D R/W & LIMIT OF ACCESS  
ESA - HISTORICAL BOUNDARY

**Heath & Linebeck Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES	

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

ALTERNATIVE Row-2  
ALTERNATIVE DESIGN  
SHEET 5 OF 10



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

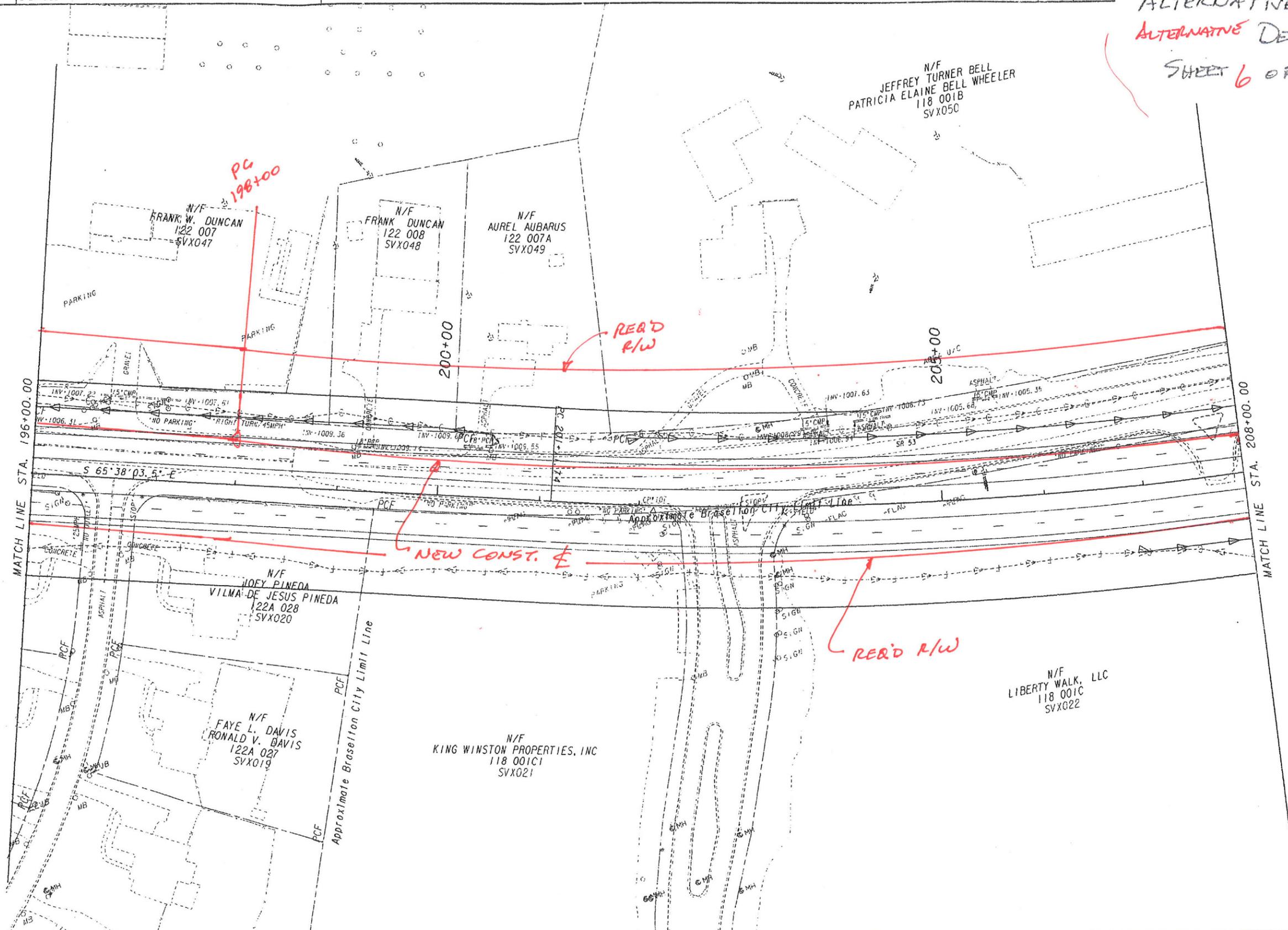
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LIMIT OF ACCESS	— L —
REQ'D R/W & LIMIT OF ACCESS	— R —
ESA - HISTORICAL BOUNDARY	— H —

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INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES

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

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 6 OF 10



PROPERTY AND EXISTING R/W LINE	
REQUIRED R/W LINE	
CONSTRUCTION LIMITS	
EASEMENT FOR CONSTR	

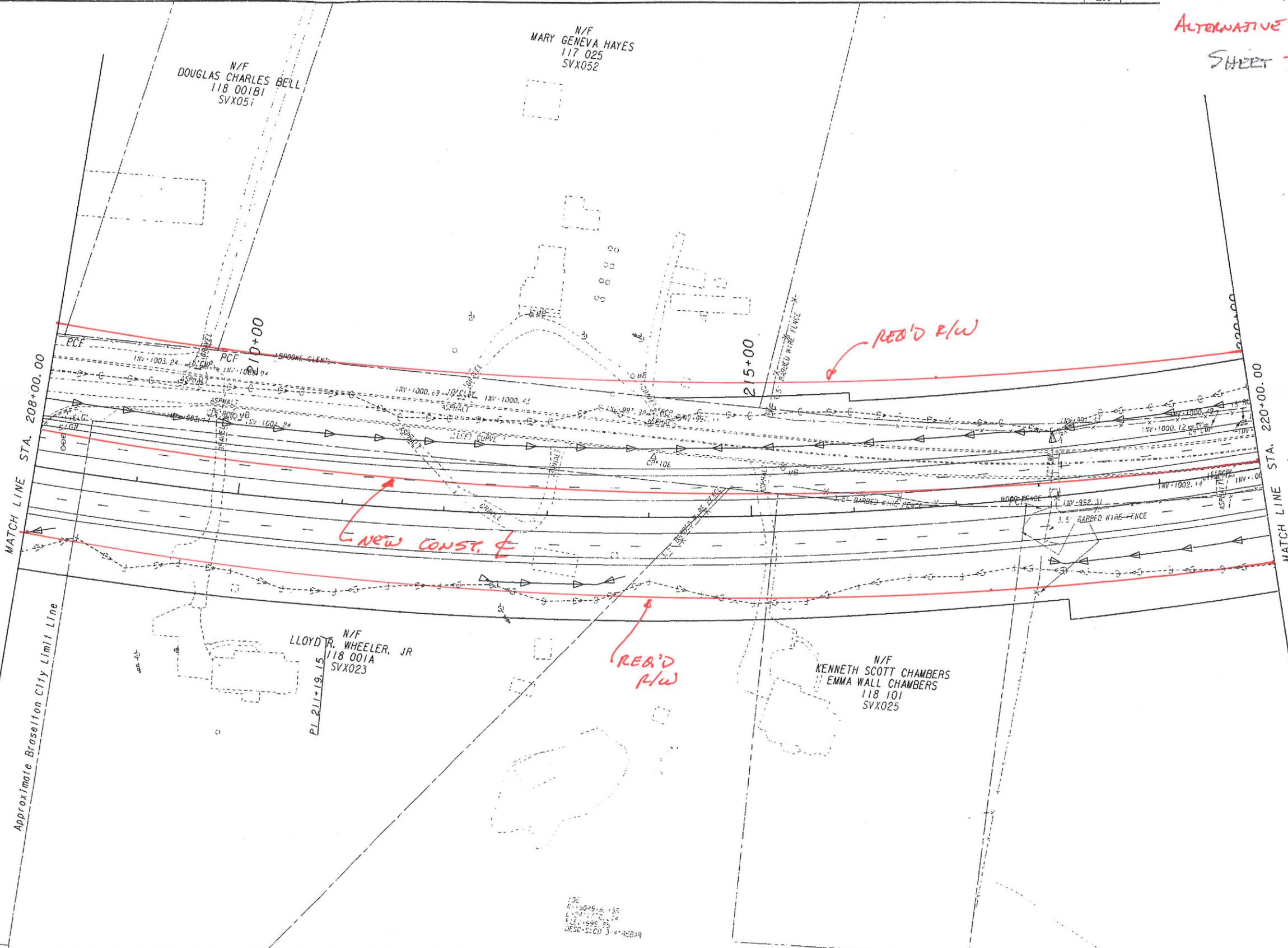
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END LIMIT OF ACCESS.....	ELA
LIMIT OF ACCESS	
REQ'D R/W & LIMIT OF ACCESS	
ESA - HISTORICAL BOUNDARY	

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REVISION DATES

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

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 7 OF 10



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

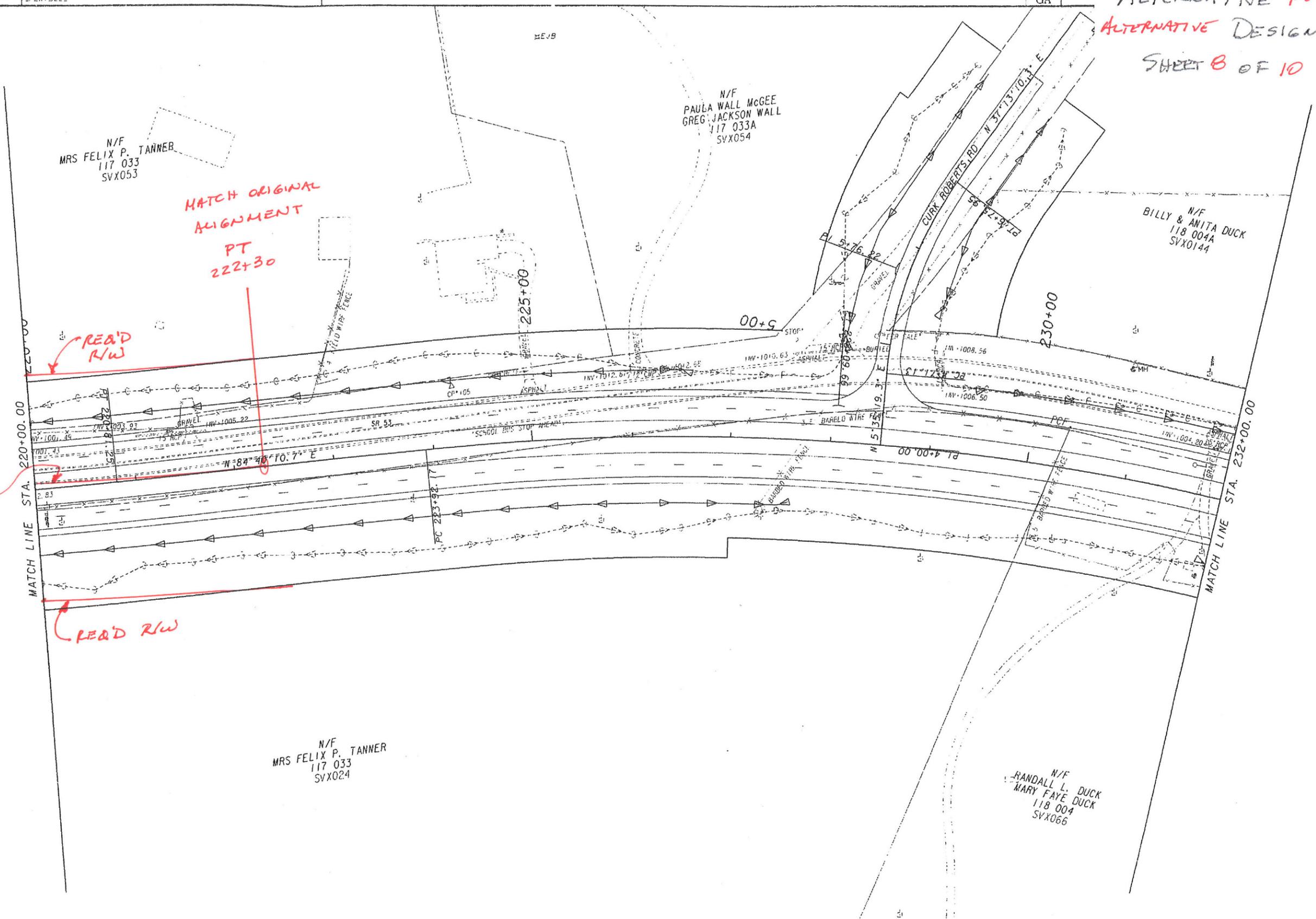
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END LIMIT OF ACCESS.....	ELA
LIMIT OF ACCESS	
REQ'D R/W & LIMIT OF ACCESS	
ESA - HISTORICAL BOUNDARY	

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION	DATE

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

ALTERNATIVE ROW-2  
ALTERNATIVE DESIGN  
SHEET 8 OF 10



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

BEGIN LIMIT OF ACCESS.....BLA  
END LIMIT OF ACCESS.....ELA  
LIMIT OF ACCESS  
REQ'D R/W & LIMIT OF ACCESS  
ESA - HISTORICAL BOUNDARY

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5203

REVISION DATES	

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

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.: **ROW-2**

SHEET NO.: **9 of 10**

One total take is saved at New Liberty Church Road. Parcel SVX0156 (Jackson County parcel 122-013) can remain with this realignment. This parcel has a value of \$130,390 according to the Jackson County Assessor's Office.

At the Old SR 53 tie-in, 3 mobile homes are to be relocated on Parcel SVX015 (Jackson County parcel 122-005H). With the realignment, only one of these mobile homes must be relocated. Also, 10,500 SF less right-of-way will be purchased. Parcel SVX016, which is a total take in the original plans, now can remain. This parcel (Jackson County parcel 122A-001, incorrectly labeled 112A-001 in the plans) has a value of \$232,664.

On the rest of the realignment, the same amount of right-of-way is needed, but some of it may be on the other side of the highway.



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-3**

DESCRIPTION: **REALIGN CHARDONNAY TRACE FROM OPPOSITE OAK DRIVE TO 1,000 FT. WEST OF THE SR 53/I-85 RAMPS INTERSECTION**

SHEET NO.: 1 of 6

**ORIGINAL DESIGN:** (sketch attached)

The original design includes constructing 1,400 feet of road from existing Chardonay Trace to the intersection of SR 53 and Oak Drive, and acquiring and demolishing the RPM Truck Trailer Services property. Besides acquiring property from Mr. Braselton, a very small right-of-way from the adjoining shopping center will also be acquired. A traffic light will also be installed at the SR 53/Oak Drive and relocated Chardonay Trace intersection.

**ALTERNATIVE:** (sketch attached)

Construct approximately 900 feet of road from existing Chardonay Trace to the intersection of SR 53 and the entrance to the proposed shopping center about 1,100 feet west of the intersection of SR 53 and the I-85 ramps. Install a traffic signal. Modify the proposed shopping center intersection to align properly with this alternate route. Make the existing Chardonay Trace a right-in/right-out. Provide an entrance to this road from the Pilot Truck stop. Design the radius of curvature of this alternate alignment at 160 ft. with a 4% superelevation. Install a 25 mph speed sign limit. Acquire all of the rights-of-way from one property owner, Mr. Braselton. Install a stop sign at the intersection of Oak Drive and SR 53.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces cost and construction time
- Reduces drainage infrastructure due to the reduction in pavement and storm water
- Little disruption to the existing businesses
- Only one property owner to deal with
- Easier access to go east on SR 53 for the users of the Pilot Truck stop

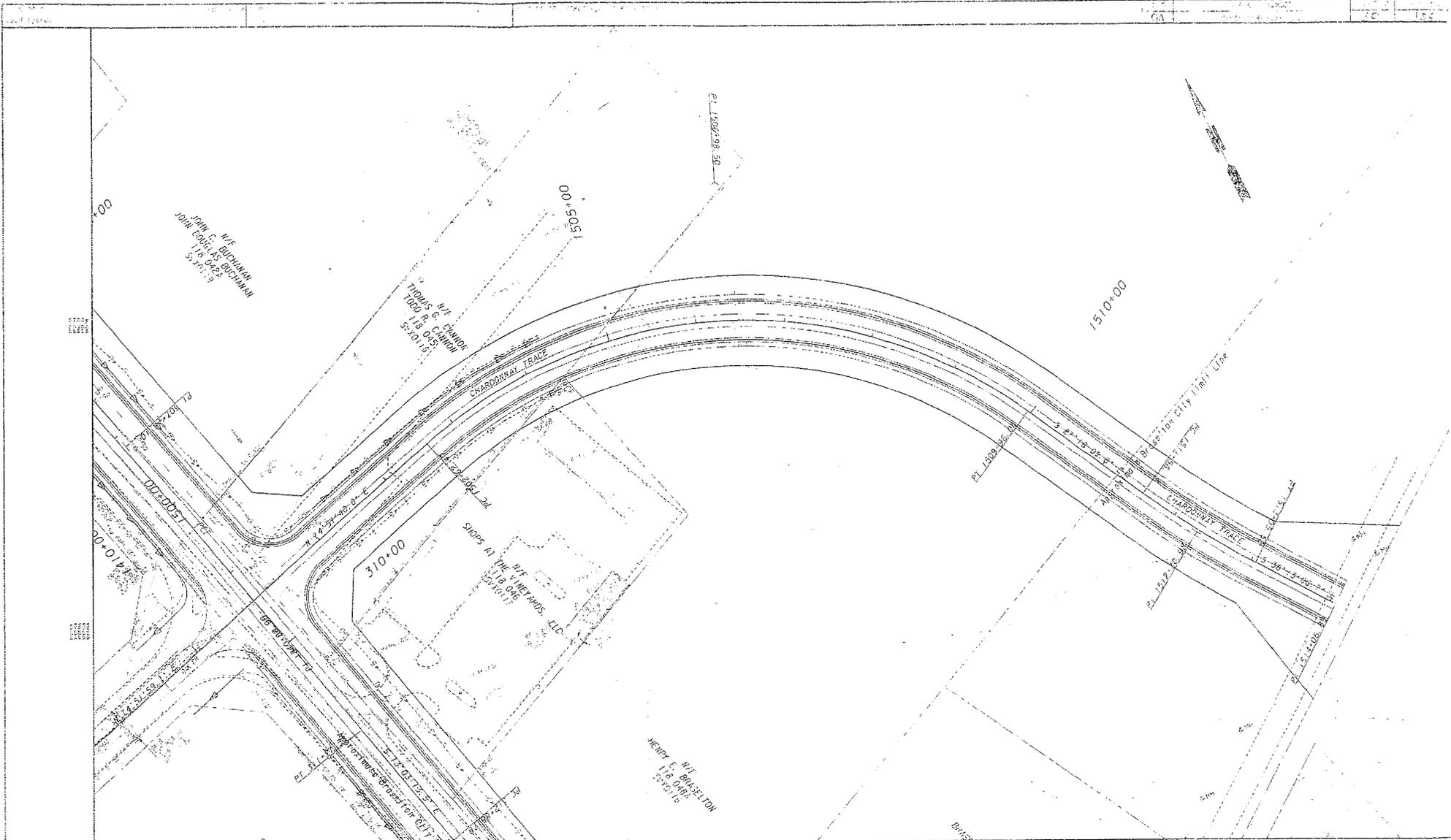
**DISADVANTAGES:**

- Sharper radius of curvature on Chardonay Trace
- 25 mph speed limit required on Chardonay Trace
- No common intersection with Oak Drive

**DISCUSSION:**

Per exhibit 3-15, page 147 of 2004 AASHTO guide on Geometric Design of Highways and Streets, for a curve with a 160 ft. radius, vehicles cannot go more than 25 miles per hour. Therefore, two such signs as shown on the alternate sketch will be required to avoid potential accidents. Since this roadway is short in length, such a speed limit will actually be advantageous.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 593,000	—	\$ 593,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 593,000	—	\$ 593,000



PROPERTY AND EXISTING R/W LINE  
 REQUIRED R/W LINE  
 CONSTRUCTION LIMITS  
 EASEMENT FOR CONSTR

BEGIN LIMIT OF ACCESS.....BLA  
 END LIMIT OF ACCESS.....ELA  
 LIMIT OF ACCESS  
 REQ'D R/W & LIMIT OF ACCESS  
 CSA HISTORICAL BOUNDARY

Heath & Linebeck Engineers  
 INCORPORATED  
 2380 CANTON ROAD, BUCKLEHEAD, TN 37024

REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 CROSSROAD PLAN  
 CHARONWAY TRAC

**ORIGINAL DESIGN**  
**ROW-3 Sheet 2 of 6**

25 MPH  
SPEED LIMIT SIGN

RAISED CONCRETE  
ISLAND

25 MPH SPEED LIMIT  
SIGN  
INSTALL  
TRAFFIC LIGHT

SLIGHTLY  
MODIFY  
EXISTING  
SHOPPING  
CENTER  
INTERSECTION

NO  
MEDIAN  
OPENING  
HERE

ALTERNATE DESIGN  
ROW-3 SHEET 3 of 6

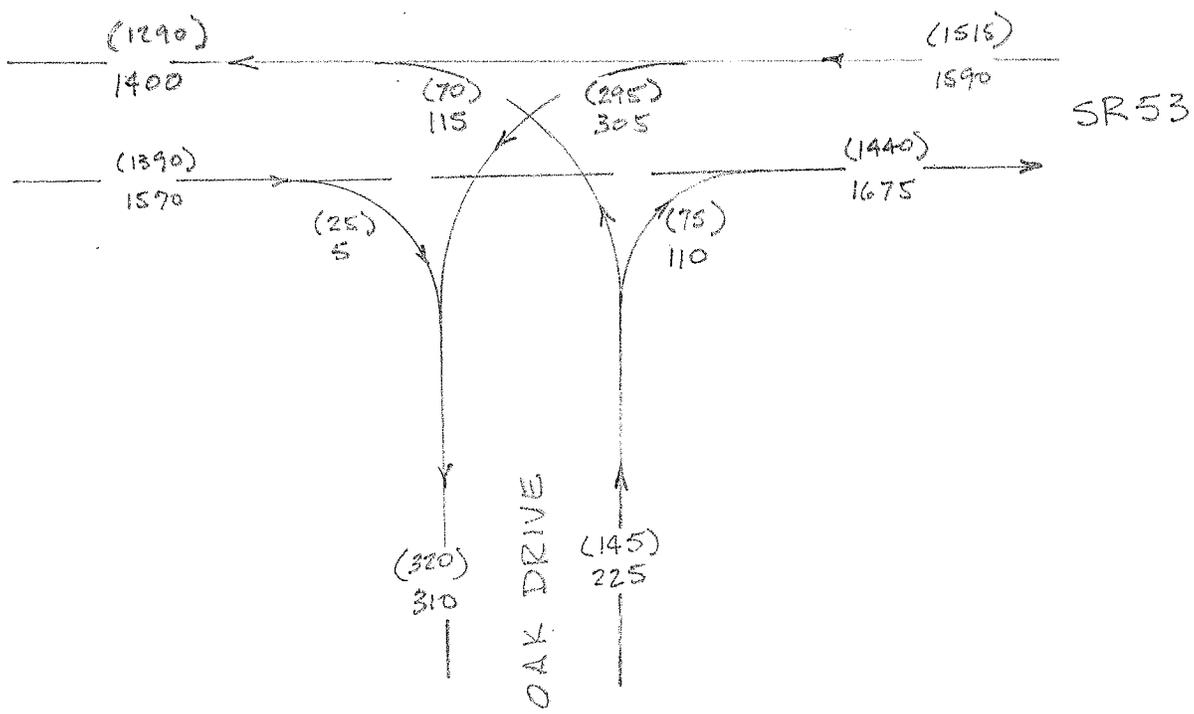
PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
STP00-0065-03(055); PI No.132860  
Hall and Jackson Counties, GA

ALTERNATIVE NO.:  
**ROW-3**

AS DESIGNED  ALTERNATIVE

SHEET NO.: **4 of 6**

No signal @ SR53/OAK DR.



2033 AM DHV = (000)  
2033 PM DHV = 000

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-3**

SHEET NO.:

**5 of 6**

## Chardonnay Trace Section Full Depth Pavement Unit Cost (\$/SY):

12.5mm:	165#/SY x Ton/2,000# x \$85/Ton	=	\$7.01/SY
19.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
25.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
<u>10" GAB: 0.83ft x 147#/CF x Ton/2,000# x 9SF/SY x \$14.97/Ton = \$8.22/SY</u>			
<b>Total Pavement Unit Cost = \$33.93/SY</b>			

As designed roadway length – 1,400'; Alternate design of roadway length – 900'; Roadway width – 38'  
Roadway area saved: (1,400' – 900') x 38'/9 = 2,111 sy.  
Fuel cost adjustment is about \$12/sy.

### As designed Rights-of-way area to be acquired:

Roadway area – 900' x 100' / 43,560 = 2.066 acres (another 500' of roadway falls within property to be acquired)  
Acquired property – 3.43 acres (from the property records the value of this property is \$196,479)

### Rights-of-way area to be acquired under alternate design:

Roadway area – 900' x 100' / 43,560 = 2.066 acres

Raised concrete island will be constructed under either design; hence the net effect will be zero



# VALUE ENGINEERING ALTERNATIVE



<b>PROJECT:</b> <b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); PI No.132860</i> <i>Hall and Jackson Counties, GA</i>	<b>ALTERNATIVE NO.:</b>  <b>ROW-6</b>
<b>DESCRIPTION:</b> <b>ELIMINATE CENTER LANE ON CHARDONNAY TRACE</b>	<b>SHEET NO.:</b> <b>1 of 4</b>

**ORIGINAL DESIGN:** (sketch attached)

The original design includes constructing one 14-foot center lane flanked on both sides by 12-ft.-wide lanes, 30-in-wide curb and gutter and 5-ft.-wide sidewalks.

**ALTERNATIVE:** (sketch attached)

Eliminate the center lane and construct two 12-ft.-wide lanes, 30-in.-wide curb and gutter and 5-ft.-wide sidewalks.

**ADVANTAGES:**

- Reduces cost and construction time
- Reduces drainage infrastructure due to the reduction in pavement and storm water
- Reduces disruption to existing businesses

**DISADVANTAGES:**

- None apparent

**DISCUSSION:**

Since the gutter width is two feet wide, the effective travel width in each direction per the alternate design will be 14 feet. So even after eliminating the center lane, the effective travel width is 28 ft. for the entire roadway which is sufficient when considering that the maximum traffic for the design year 2033 is only 1,075 vehicles per day (vpd). Also there are currently no driveways attaching to the road which would require left turns from and to this extra lane. It should be noted that the current traffic on the two-lane SR53 at this intersection is 9,525 vpd.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	\$ 333,000	—	\$ 333,000
<b>ALTERNATIVE</b>	\$ 0	—	\$ 0
<b>SAVINGS (Original minus Alternative)</b>	\$ 333,000	—	\$ 333,000



# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-6**

SHEET NO.:

**3 of 4**

## Chardonnay Trace Section Full Depth Pavement Unit Cost (\$/SY):

12.5mm:	165#/SY x Ton/2,000# x \$85/Ton	=	\$7.01/SY
19.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
25.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
10" GAB:	$0.83\text{ft} \times 147\text{\#/CF} \times \text{Ton}/2,000\# \times 9\text{SF/SY} \times \$14.97/\text{Ton}$	=	$\$8.22/\text{SY}$
<b>Total Pavement Unit Cost =</b>			<b>\$33.93/SY</b>

Roadway length – 1,400'; Center lane width – 14'

Roadway area saved:  $1,400' \times 14'/9 = 2,178$  sy.

Fuel adjustment is about \$12/sy

As designed Rights-of-way area to be acquired:

Roadway area –  $900' \times 100' = 90,000$  sf (another 500' of roadway falls within property to be acquired)

Rights-of-way area to be acquired under alternate design:

Roadway area –  $900' \times 86' = 77,400$  sf

Net Rights-of-way area saved:  $90,000 - 77,400 = 12,600$  square feet of property



# VALUE ENGINEERING ALTERNATIVE



**PROJECT:** **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-8**

**DESCRIPTION:** **MOVE THE ALIGNMENT TO THE LEFT AT NEW LIBERTY  
CHURCH ROAD AND AT THE OLD SR 53 TIE-IN AND USE A  
20-FT.-WIDE MEDIAN WITH URBAN SHOULDERS (CURB  
AND GUTTER) THROUGHOUT THIS SECTION OF  
ROADWAY TO REDUCE DISPLACEMENTS (STATION  
156+30 TO STATION 222+30)**

SHEET NO.: 1 of 12

**ORIGINAL DESIGN:** (sketch attached)

The original design requires four displacements at New Liberty Church Road and five displacements at the Old SR 53 tie-in.

**ALTERNATIVE:** (sketch attached)

Shift the alignment slightly to the left and use a 20-ft.-raised grass median urban typical section from Station 156+30 to Station 222+30 in order to reduce the number of right-of-way displacements.

**ADVANTAGES:**

- Reduces the number of right-of-way acquisitions
- Reduces right-of-way acquisition time

**DISADVANTAGES:**

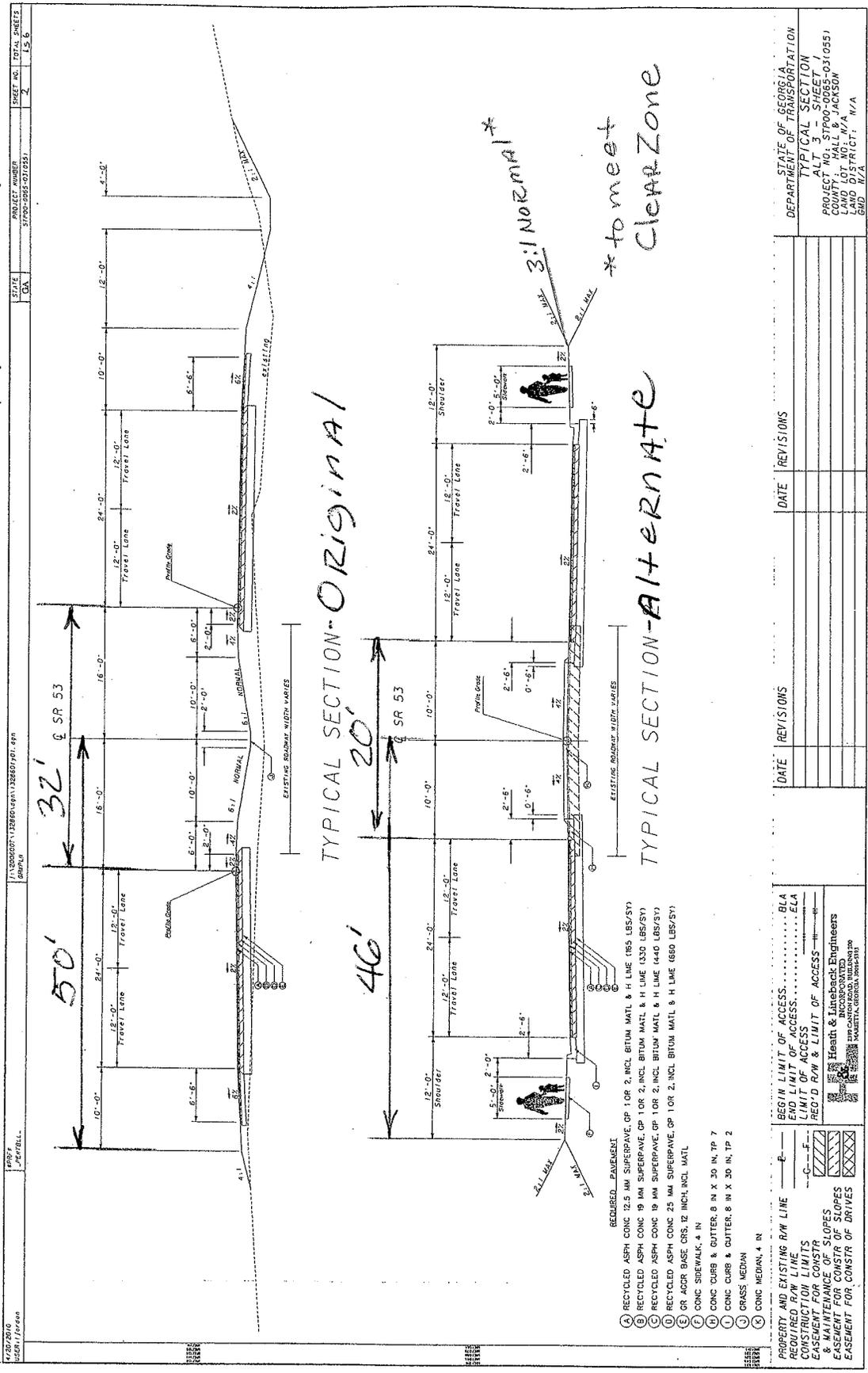
- Adds to construction labor and material requirements

**DISCUSSION:**

At New Liberty Church Road, there are four displacements, two on the left side of SR 53 and two on the right side. Shifting the road to the left will not require any additional displacements on the left, but will save one displacement on the right side. At the Old SR 53 tie-in, there is one displacement on the left side of SR 53 and four displacements on the right side. Much of the property on the left side is already GDOT right-of-way since that is where the current SR 53 is located. Shifting the alignment to the left will save three displacements on the south.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,030,000	—	\$ 3,030,000
ALTERNATIVE	\$ 760,000	—	\$ 760,000
SAVINGS (Original minus Alternative)	\$ 2,270,000	—	\$ 2,270,000

ALT. NO.  
ROW-3  
Sht 2 of 12



TYPICAL SECTION - ORIGINAL

TYPICAL SECTION - ALTERNATE

- REQUIRED PAVEMENT
- (A) RECYCLED ASPH CONC 12.5 MM SUPERPAVE, OP 1 OR 2, INCL BITUM MATL & H LIME (185 LBS/STY)
  - (B) RECYCLED ASPH CONC 19 MM SUPERPAVE, OP 1 OR 2, INCL BITUM MATL & H LIME (330 LBS/STY)
  - (C) RECYCLED ASPH CONC 19 MM SUPERPAVE, OP 1 OR 2, INCL BITUM MATL & H LIME (440 LBS/STY)
  - (D) RECYCLED ASPH CONC 25 MM SUPERPAVE, OP 1 OR 2, INCL BITUM MATL & H LIME (660 LBS/STY)
  - (E) OR ACOR BASE CRS, 12 INCH, INCL MATL
  - (F) CONC SIDEWALK, 4 IN
  - (G) CONC CURB & GUTTER, 8 IN X 30 IN, TP 7
  - (H) CONC CURB & GUTTER, 8 IN X 30 IN, TP 2
  - (I) GRASS MEDIAN
  - (J) CONC MEDIAN, 4 IN

PROPERTY AND EXISTING ROW LINE	---
REQUIRED ROW LINE	—E—
CONSTRUCTION LIMITS	---C---F---
EASEMENT FOR CONSTR	
& MAINTENANCE OF SLOPES	
EASEMENT FOR CONSTR OF SLOPES	
EASEMENT FOR CONSTR OF UNIVES	

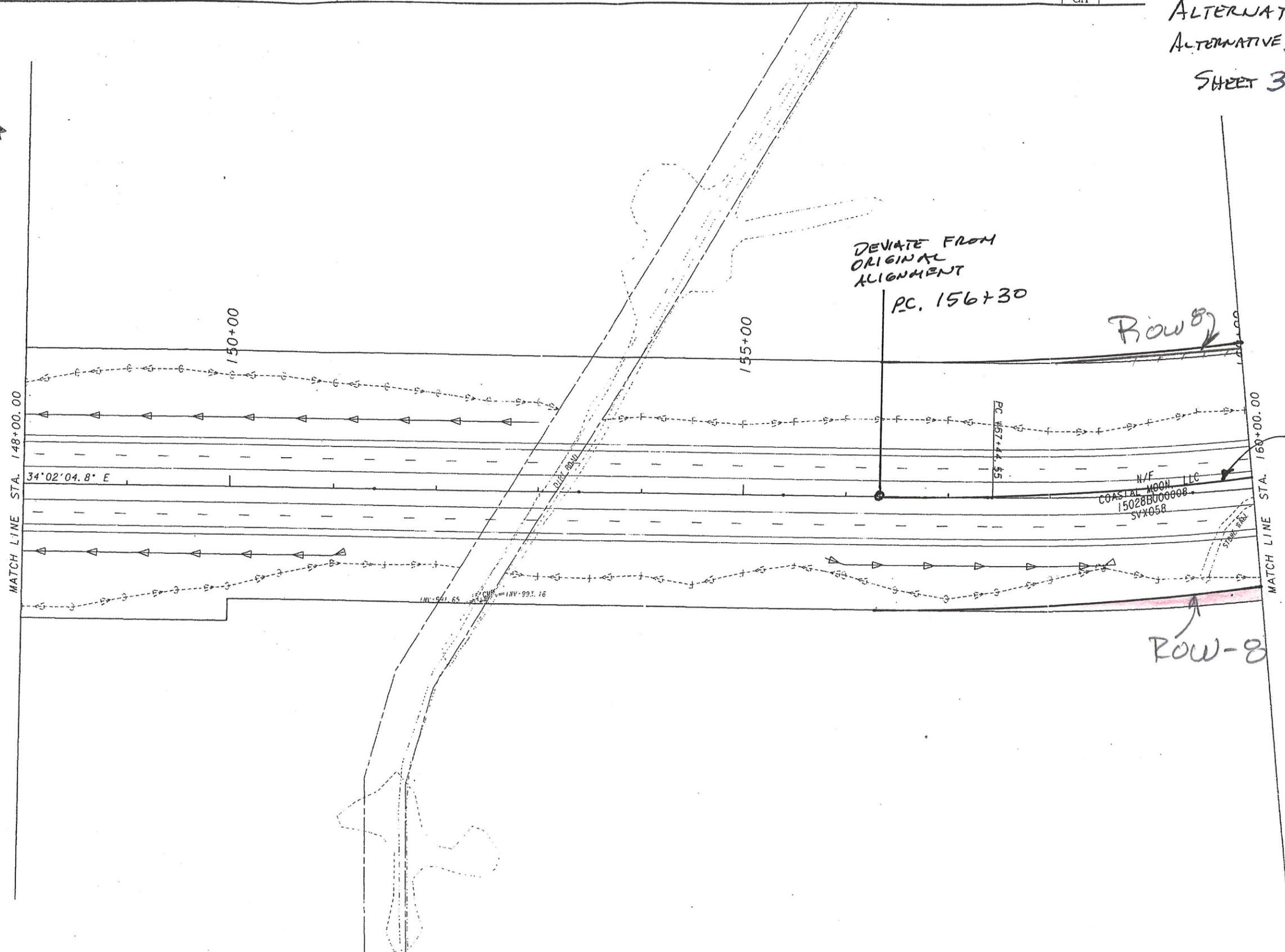
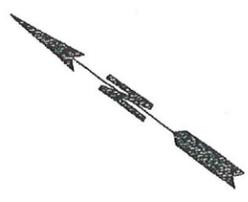
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 END LIMIT OF ACCESS.....ELA  
 LIMIT OF ACCESS.....ELA  
 REQ'D ROW & LIMIT OF ACCESS.....

Health & Lineback Engineers  
 INCORPORATED  
 1000 W. WASHINGTON ST.  
 ATLANTA, GEORGIA, 30303

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 TYPICAL SECTION  
 ALT 3 - SHEET 1  
 PROJECT NO. ST700-0065-03(055)  
 LAND LOT NO. JACKSON  
 DISTRICT: N/A  
 GMD: N/A

1/13/2007 11:28:40-4pm 132860701.dgn	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1/13/2007 11:28:40-4pm 132860701.dgn	GA	ST700-0065-03(055)	2	6

ALTERNATIVE ROW-8  
ALTERNATIVE DESIGN  
SHEET 3 OF 12



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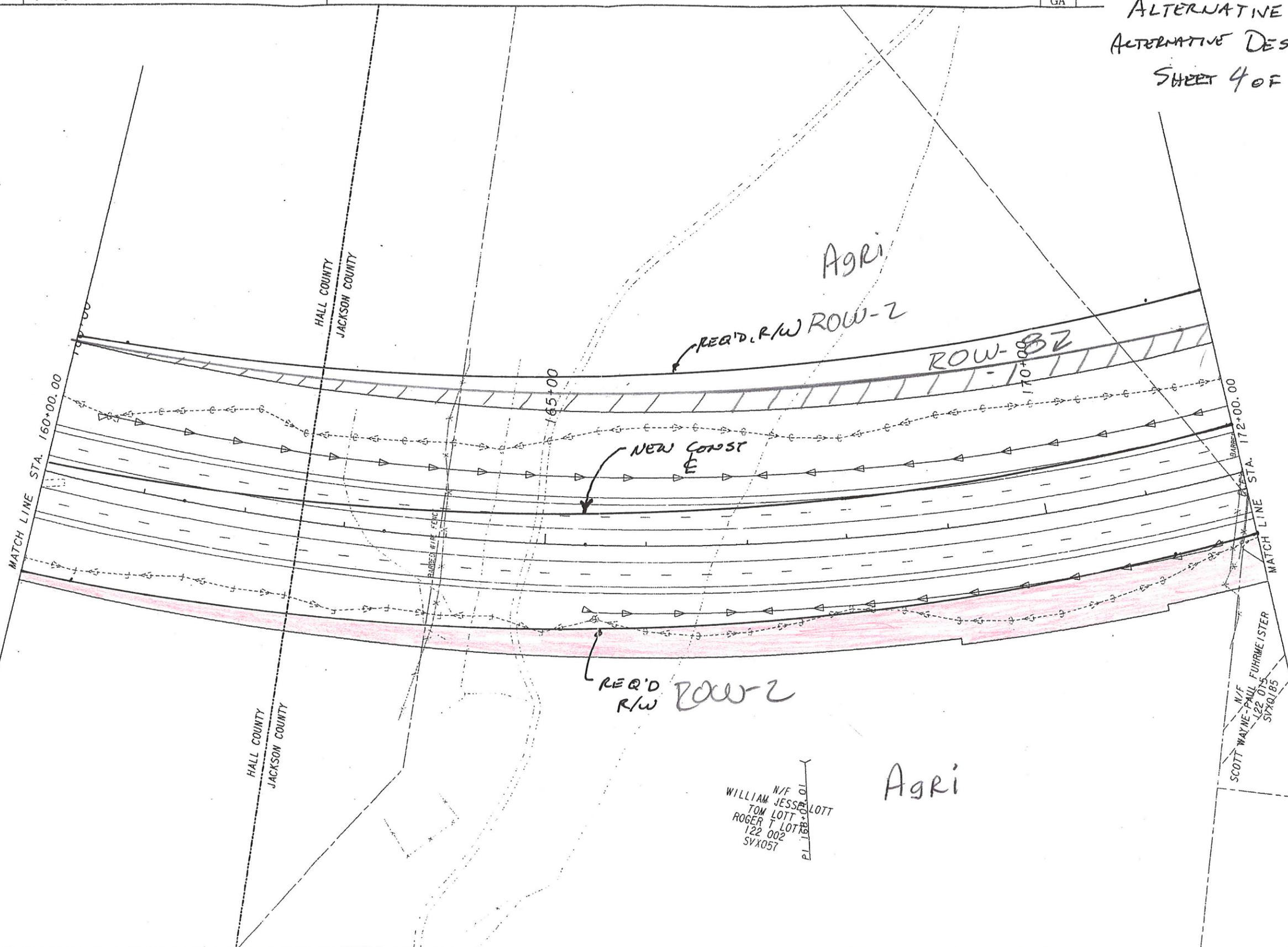
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REQUIRED R/W LINE	———	END LIMIT OF ACCESS.....ELA
CONSTRUCTION LIMITS	———	LIMIT OF ACCESS
EASEMENT FOR CONSTR	//////	REQ'D R/W & LIMIT OF ACCESS

Heath & Lineback Engineers  
INCORPORATED

REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
MAIN INF PLAN

ALTERNATIVE ROW-8  
ALTERNATIVE DESIGN  
SHEET 4 OF 12



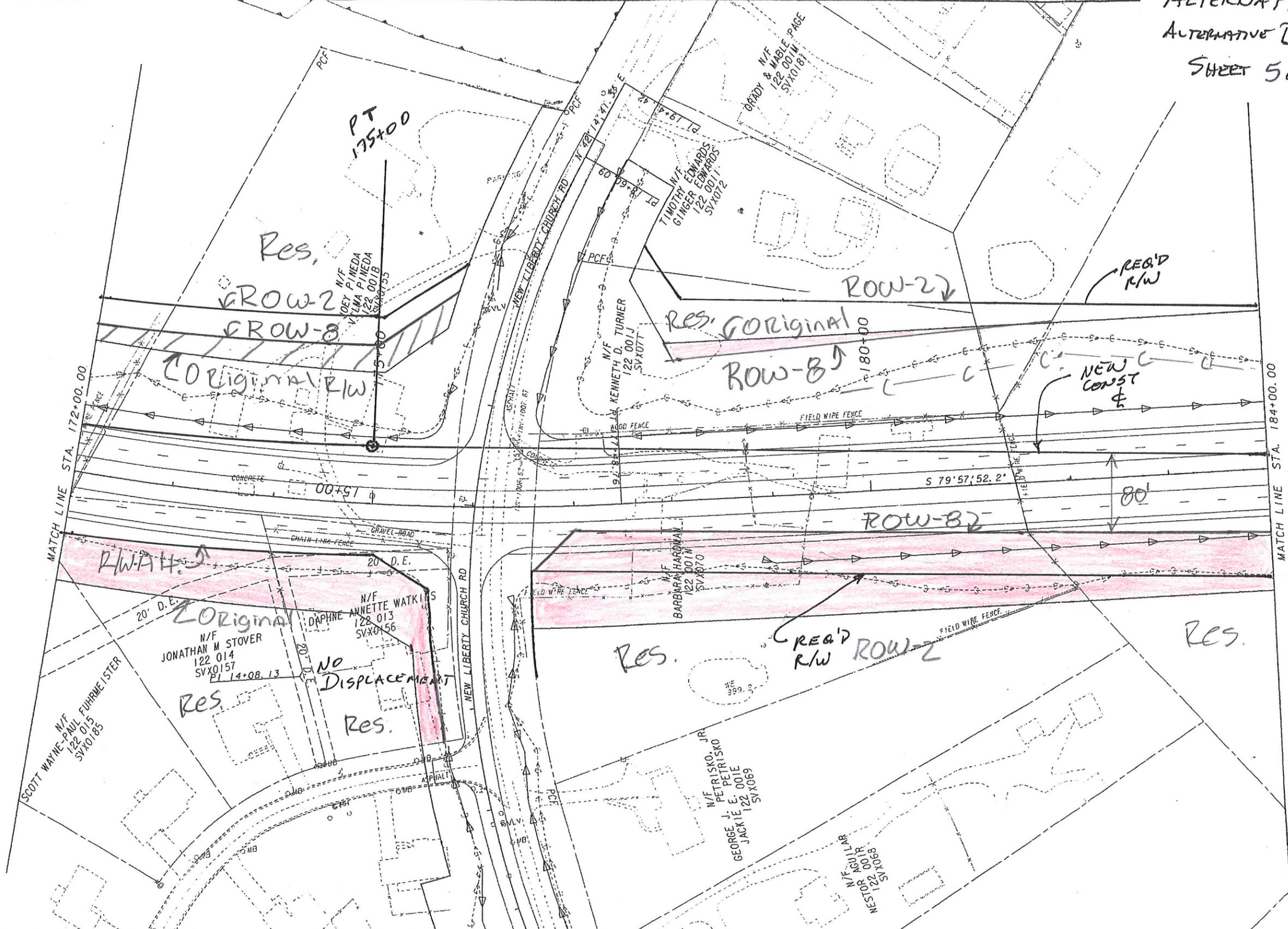
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REQUIRED R/W LINE	———	END LIMIT OF ACCESS.....	ELA
CONSTRUCTION LIMITS	———	LIMIT OF ACCESS	———
EASEMENT FOR CONSTR	//////	REQ'D R/W & LIMIT OF ACCESS	———

Heath & Lineback Engineers  
INCORPORATED

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
MAINLINE PLAN

ALTERNATIVE ROW-8  
ALTERNATIVE DESIGN  
SHEET 5 OF 12



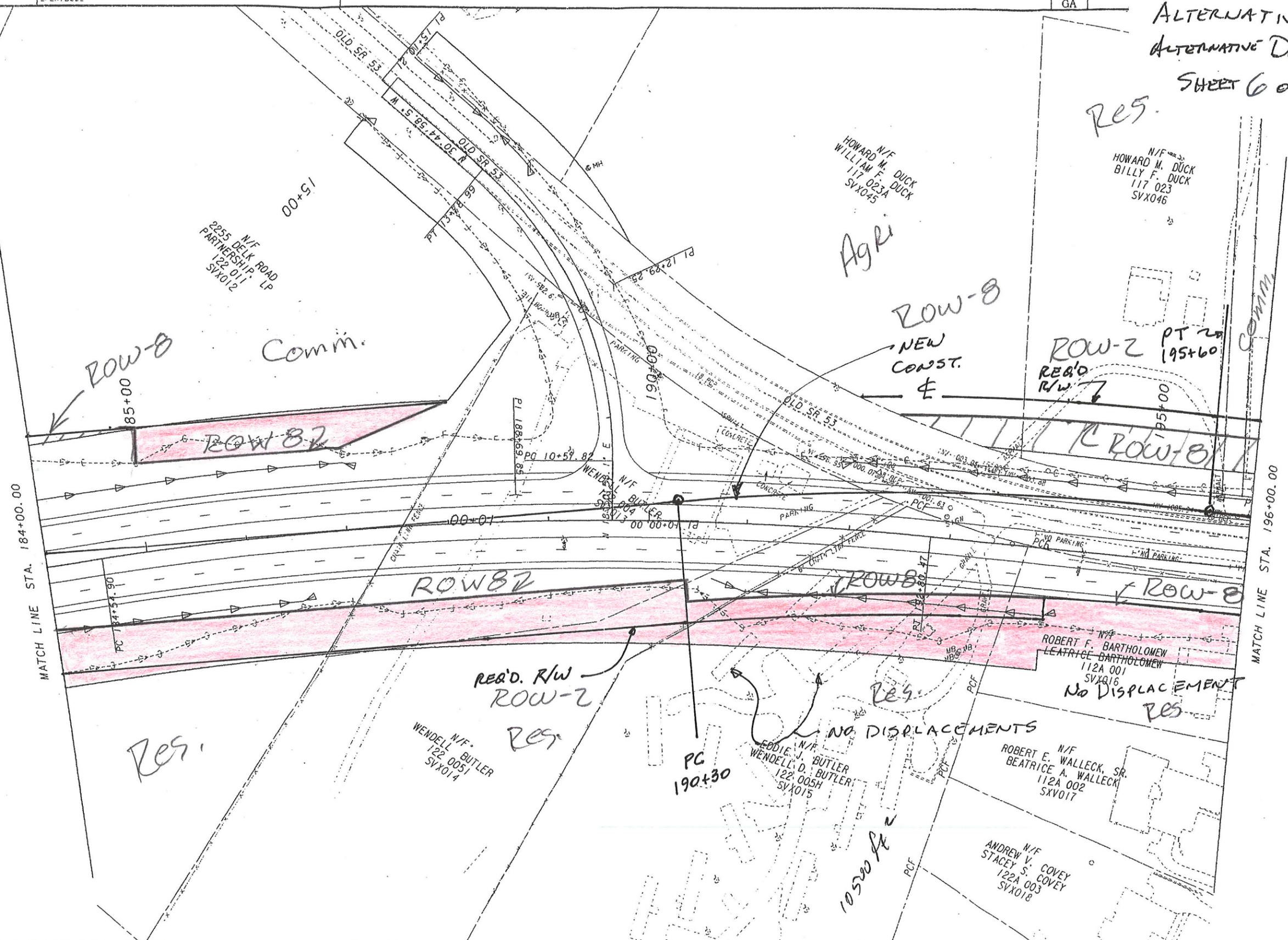
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 SECTION 15  
 SECTION 16  
 SECTION 17  
 SECTION 18  
 SECTION 19  
 SECTION 20

PROPERTY AND EXISTING R/W LINE	— P —	BEGIN LIMIT OF ACCESS.....	BLA
REQUIRED R/W LINE	— R —	END LIMIT OF ACCESS.....	ELA
CONSTRUCTION LIMITS	— C —	LIMIT OF ACCESS	— L —
EASEMENT FOR CONSTR	— E —	REQ'D R/W & LIMIT OF ACCESS	— R —

Heath & Lineback Engineers  
INCORPORATED

REVISION DATES	

# ALTERNATIVE ROW- ALTERNATIVE DESIGN SHEET 6 OF 12



PROPERTY AND EXISTING R/W LINE	— P —
REQUIRED R/W LINE	— G —
CONSTRUCTION LIMITS	— F —
FASTMENT FOR CONSTR	

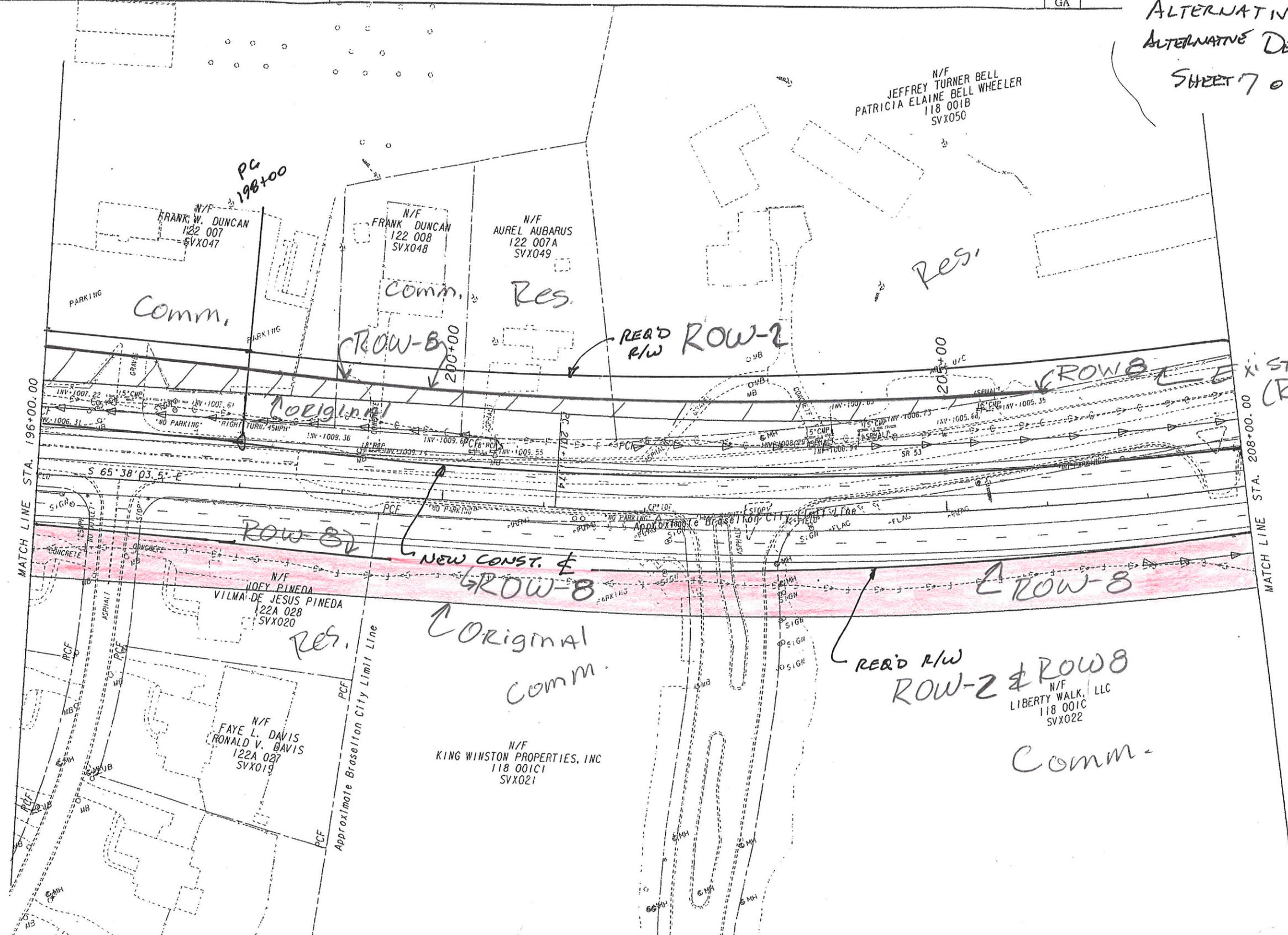
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END LIMIT OF ACCESS.....	ELA
LIMIT OF ACCESS	— — — — —
REQ'D R/W & LIMIT OF ACCESS	— H —

**Heath & Lineback Engineers**  
INCORPORATED

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
MAINLINE PLAN

ALTERNATIVE ROW -  
ALTERNATIVE DESIGN  
SHEET 7 OF 12

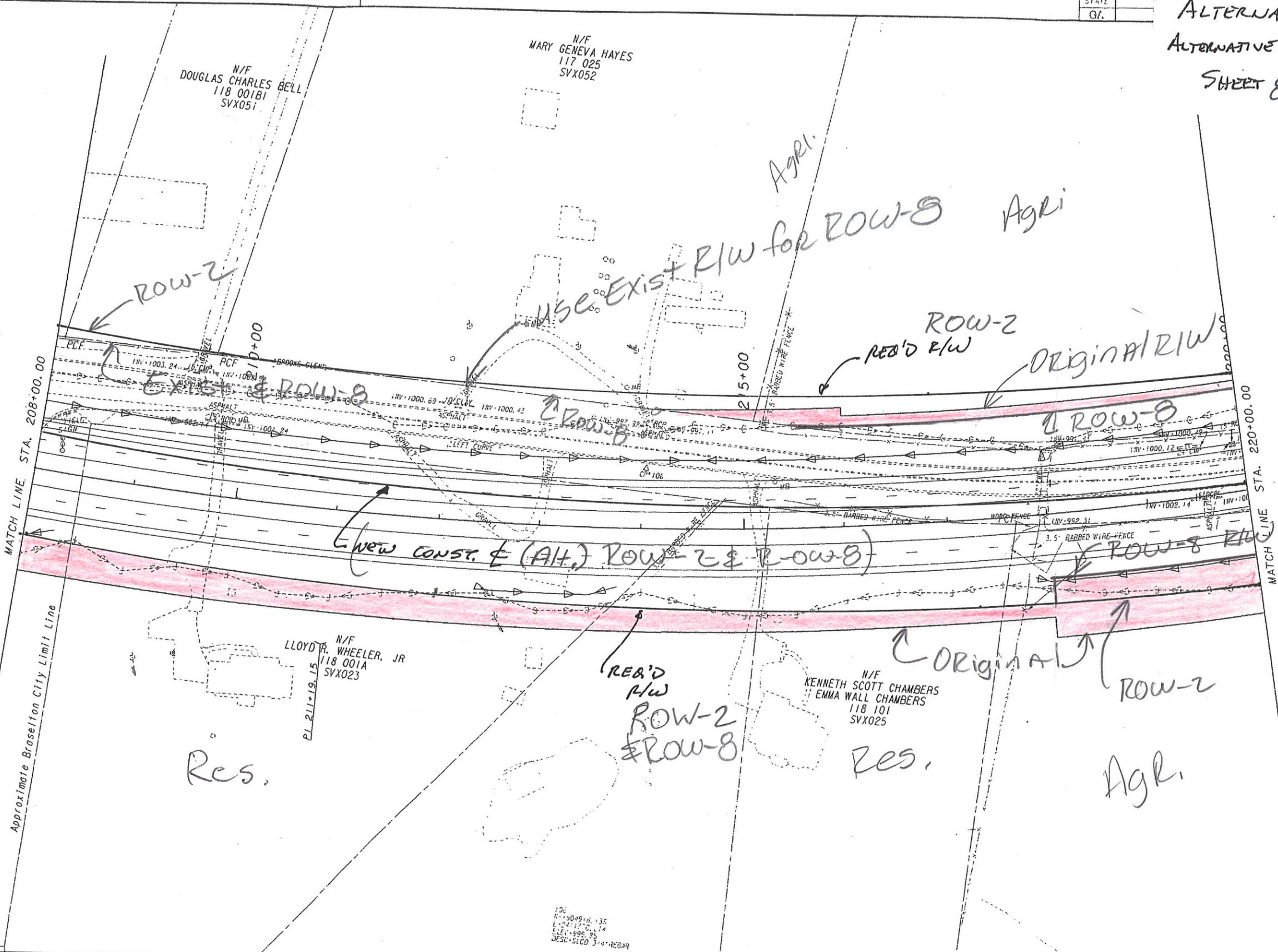


MATCH LINE STA. 196+00.00

MATCH LINE STA. 208+00.00

<p>PROPERTY AND EXISTING R/W LINE ——— P ———                  REQUIRED R/W LINE ——— R ———                  CONSTRUCTION LIMITS ——— C ———                  EASEMENT FOR CONSTR ——— E ———</p>	<p>BEGIN LIMIT OF ACCESS.....BLA                  END LIMIT OF ACCESS.....ELA                  LIMIT OF ACCESS ——— L ———                  REQ'D R/W &amp; LIMIT OF ACCESS ——— H ———</p>	<p><b>Heath &amp; Lineback Engineers</b> INCORPORATED</p>	<p>REVISION DATES</p> <table border="1"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>							<p>STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE: <b>MAINTENANCE</b></p>

ALTERNATIVE ROW.  
ALTERNATIVE DESIGN  
SHEET 8 OF 12



MATCH LINE STA. 208+00.00

MATCH LINE STA. 220+00.00

Approximate Braselton City Limit Line

N/F  
DOUGLAS CHARLES BELL  
118 001B1  
SVX051

N/F  
MARY GENEVA HAYES  
117 025  
SVX052

N/F  
LLOYD R. WHEELER, JR  
118 001A  
SVX023

N/F  
KENNETH SCOTT CHAMBERS  
EMMA WALL CHAMBERS  
118 101  
SVX025

Res.

RES'D  
R/W  
ROW-2  
& ROW-8

Res.

ROW-2  
Agri.

Use EXIST R/W for ROW-8 Agri

NEW CONST. & (ALT.) ROW-2 & ROW-8

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

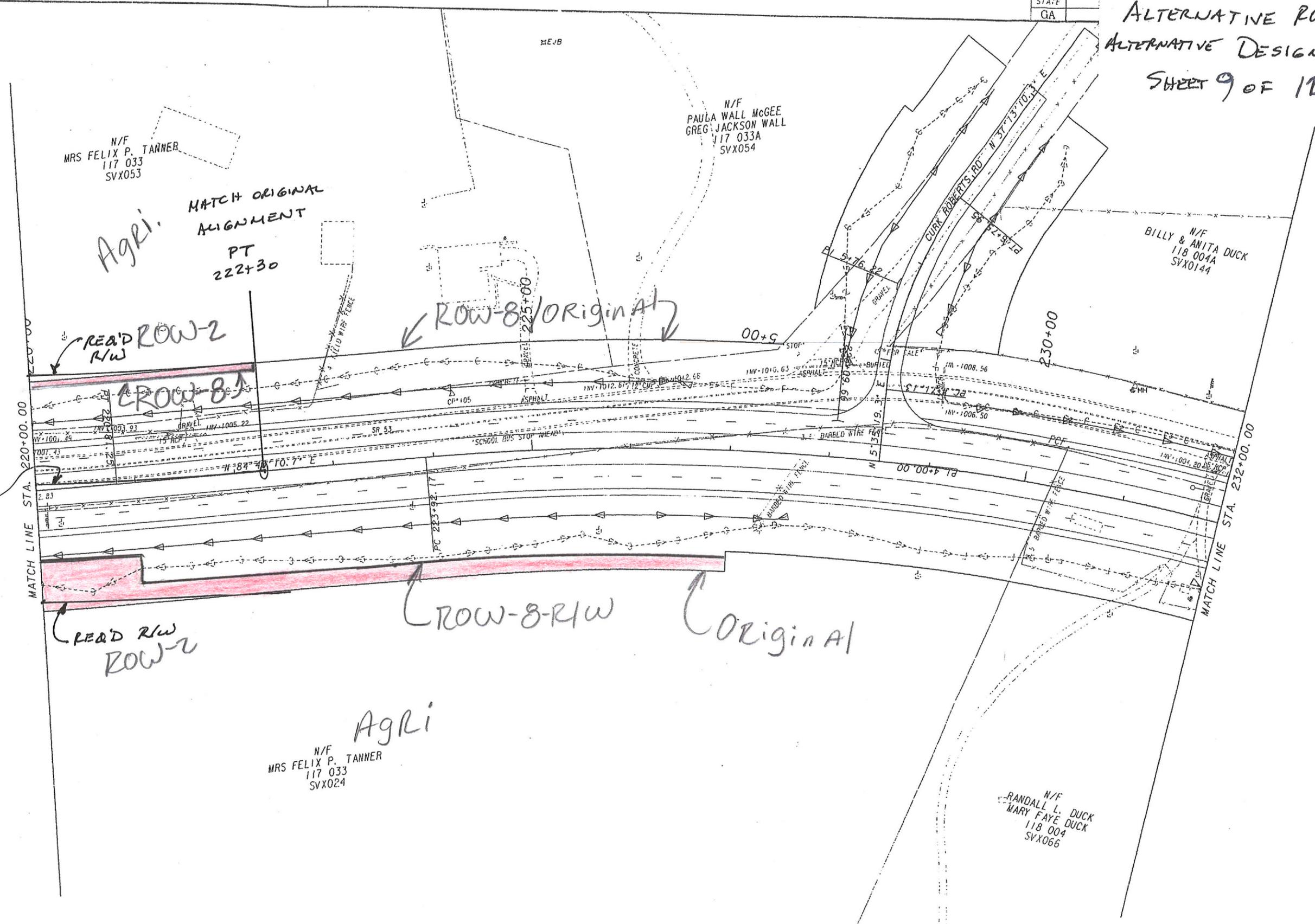
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END LIMIT OF ACCESS.....	ELA
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REQ'D R/W & LIMIT OF ACCESS	
ESA - HISTORICAL BOUNDARY	

**Heath & Linesback Engineers**  
INCORPORATED

REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: \_\_\_\_\_  
MAIN LINE PLAN

ALTERNATIVE ROW-  
ALTERNATIVE DESIGN  
SHEET 9 OF 12



PROPERTY AND EXISTING R/W LINE	— P —	BEGIN LIMIT OF ACCESS..... BLA
REQUIRED R/W LINE	— R —	END LIMIT OF ACCESS..... ELA
CONSTRUCTION LIMITS	— C —	LIMIT OF ACCESS
EASEMENT FOR CONSTR	— E —	REQ'D R/W & LIMIT OF ACCESS
& MAINTENANCE OF SLOPES	— S —	ESA - HISTORICAL BOUNDARY

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION	DATE

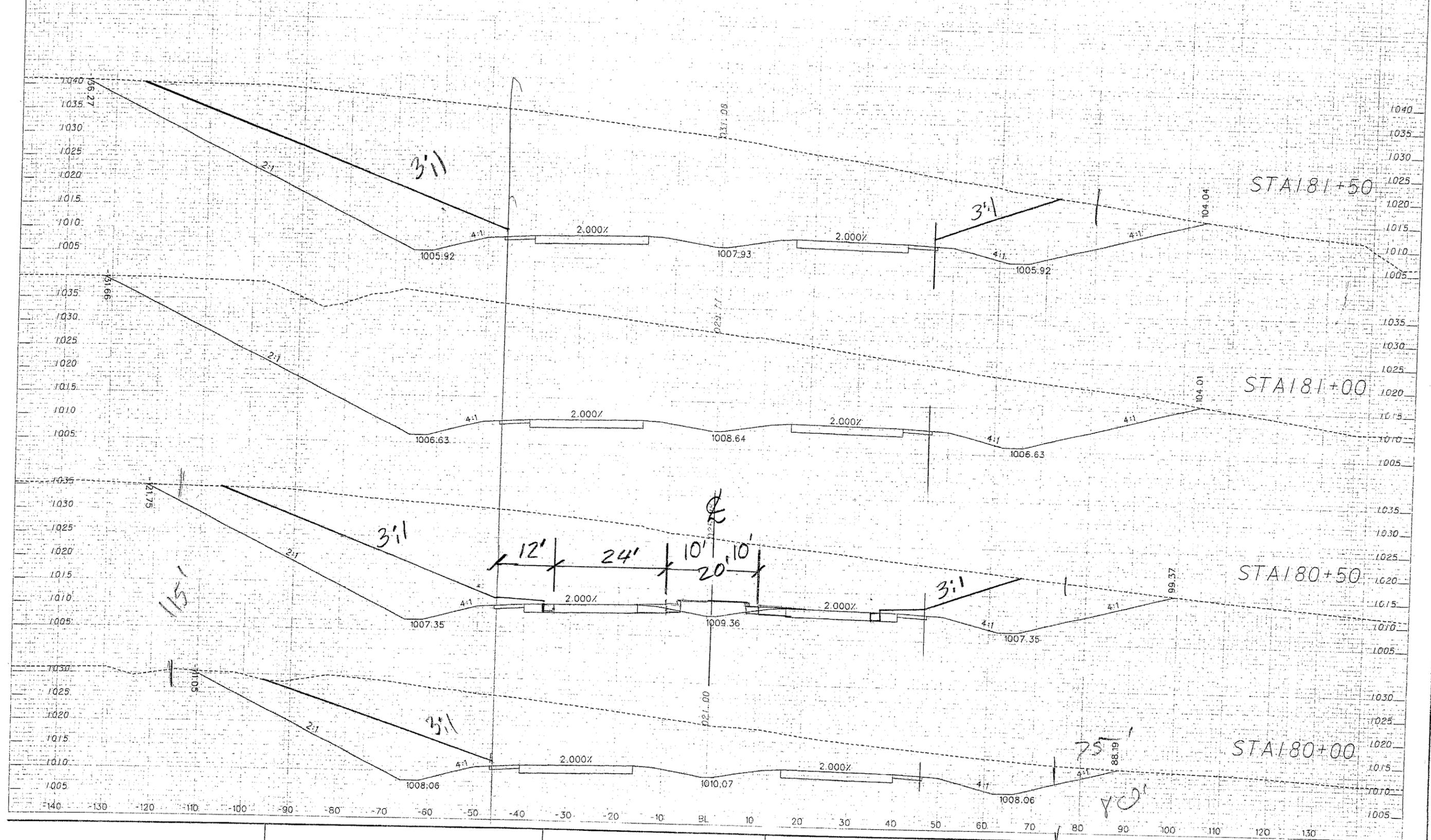
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
MAINLINE PLAN

ALT. NO.  
ROW-8  
Sht. 10 of 12

1:16:15 PM SPRFS  
PCNTBL

11-20060071-22660 rd study loc 71 sheets 27

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-006E-031055	116	156



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-2395

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-8**

SHEET NO.: **11 of 12**

One total take is saved at New Liberty Church Road. Parcel SVX0156 (Jackson County parcel 122-013) can remain with this realignment. This parcel has a value of \$130,390 according to the Jackson County Assessor's Office.

At the Old SR 53 tie-in, 3 mobile homes are to be relocated on Parcel SVX015 (Jackson County parcel 122-005H). With the realignment, only one of these mobile homes must be relocated.

Parcel SVX016, which is a total take in the original plans, now can remain. This parcel (Jackson County parcel 122A-001, incorrectly labeled 112A-001 in the plans) has a value of \$232,664.

**Land Saved:**

Agricultural land saved = 50,750 sf

Residential land saved = 176,770 sf

Commercial land saved = 50,500 sf

Earthwork saved = 55,000 CY

**Additional cost for Alternate design:**

Additional curb & gutter Tp7 = (6,600' x 2 sides) = 13,200 lf

Additional curb & gutter Tp2 = (6,600' x 2 sides) = 13,200 lf

Additional catch basins = 50 each; Additional 18" storm drain pipe = 3,800 lf;

Additional 24" storm drain pipe = 2,200 lf; 18 flared end sections

Additional Agricultural R/W required = 37,600 sf

Additional Residential land required = 16,050 sf

Additional Commercial land saved = 11,300 sf

# COST WORKSHEET



PROJECT:	<b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); PI No. 132860</i>  <i>Hall and Jackson Counties, GA</i>	ALTERNATIVE NO.:  <div style="text-align: right;"><b>ROW-8</b></div> SHEET NO.: <span style="float: right;"><b>12 of 12</b></span>
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PROJECT ITEM		ORIGINAL ESTIMATE			ALTERNATIVE ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Mobile Home Relocation	EA	2	10,000.00	20,000			
Parcel SVX0156	EA	1	130,390.00	130,390			
Parcel SVX016	EA	1	232,664.00	232,664			
Residential Relocation	EA	2	40,000.00	80,000			
Agricultural Land saved	SF	50,750	0.45	22,838			
Residential land saved	SF	176,770	1.25	220,963			
Commercial land saved	SF	50,500	8.00	404,000			
R/W Markup	%	148%	1,110,855	1,644,065			
Construction cost saved:							
Unclassified excavation	CY	56,000	3.18	178,080			
Fuel adjustment for earthwork	CY	56,000	1.33	74,480			
Construction Markup	%	9%	252,560.00	22,730			
Alternate Costs							
Curb & gutter Tp 2	LF				13,200	11.40	150,480
Curb & gutter Tp 7	LF				13,200	10.75	141,900
Catch Basins Gp 1	EA				50	2,100.00	105,000
Storm Drain Pipe 18"	LF				3,800	29.26	111,188
Storm Drain Pipe 24"	LF				2,200	35.55	78,210
Flared End Section	EA				18	500.00	9,000
Construction Markup	%				9.0%	586,778.00	52,810
Additional Agricultural R/W	SF				37,600	0.45	16,920
Additional Residential R/W	SF				16,050	1.25	20,063
Additional Commercial R/W	SF				11,300	0.45	5,085
R/W markup	%				148%	47,153.00	69,786
<b>Subtotal</b>				3,030,210			760,442
<b>Markup (%) at</b>				Included			Included
<b>TOTAL</b>				3,030,210			760,442
<b>TOTAL (ROUNDED)</b>				3,030,000			760,000

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-9**

DESCRIPTION: **REDUCE IMPROVMENTS ON NEW CUT ROAD AND  
EDNAVILLE ROAD**

SHEET NO.: **1 of 5**

**ORIGINAL DESIGN:** (sketch attached)

The original design calls for constructing 1,400 feet of new road on New Cut Road and Ednaville Road and providing about an 80-degree skew intersection with SR 53.

**ALTERNATIVE:** (sketch attached)

Keep the existing intersection of Ednaville Road with SR 53, which is at a skew of approximately 85 degrees. Also keep the existing intersection of New Cut Road with SR 53, which is at a skew of approximately 70 degrees. Install curb returns and stripe the islands.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces cost and construction time
- Less disruption to existing property owners
- Skew angle at Ednaville Road/SR53 intersection is increased

**DISADVANTAGES:**

- Sharper skew angle at New Cut Road/SR53 intersection

**DISCUSSION:**

Per page 400, 428 and 581 of 2004 AASHTO guide on Geometric Design of Highways and Streets, a minimum 60-degree angle is required at the intersection. Leaving the New Cut Road intersection with SR 53 as is (about 70 degrees), provides substantial reduction in cost and disruption to the existing owners. Leaving the Ednaville Road intersection with SR53 as is (about 85 degrees) will actually be an improvement from the as-designed 80-degree skew angle. Since the pavement section has not been given for these two side roads, it is assumed that the section would be the same as that of Chardonay Trace.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 468,000	—	\$ 468,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 468,000	—	\$ 468,000

N/F  
ELK ROAD PARTNERSHIP, L.P.  
118 014  
SVX0137

N/F  
HOMETOWN WALK, LLC  
118 014C  
SVX0136

N/F  
BOBBY THRASH  
118 14A  
SVX086

N/F  
CAROLYN SUE PRESLEY  
CLOVIA JEANIE BANKS  
JOY LAQUITA TURPIN  
STACY RAY BUFFINGTON  
SHARON STEPHANIE MCDONALD  
118 025C  
SVX087

N/F  
KWAN BUM CHUNG  
JULIA EUN SIL LEE  
118 025B  
SVX088

N/F  
KWAN BUM CHUNG  
JULIA EUN SIL LEE  
118 025B  
SVX088

N/F  
CAROLYN SUE PRESLEY  
CLOVIA JEANIE BANKS  
JOY LAQUITA TURPIN  
STACY RAY BUFFINGTON  
SHARON STEPHANIE MCDONALD  
118 025C  
SVX087

N/F  
LARRY TIMS  
118 029  
SVX090

N/F  
BILLY GENE HOLDER  
118 028  
SVX089

# ROW-9 ORIGINAL DESIGN SHEET 2 of 5

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



# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**ROW-9**

SHEET NO.:

**4 of 5**

New Cut Road and Ednaville Road Section Full Depth Pavement Unit Cost (\$/SY):

12.5mm:	165#/SY x Ton/2,000# x \$85/Ton	=	\$7.01/SY
19.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
25.0mm:	220#/SY x Ton/2,000# x \$85/Ton	=	\$9.35/SY
<u>10" GAB: 0.83ft x 147#/CF x Ton/2,000# x 9SF/SY x \$14.97/Ton = \$8.22/SY</u>			
<b>Total Pavement Unit Cost = \$33.93/SY</b>			

As designed roadway length – 1,400'; Alternate design of roadway length – 100'; Roadway width – 24'  
Roadway area saved:  $(1,400' - 100') \times 24' / 9 = 3,467$  sy.  
Pavement adjoining to the curb returns will be the same under as designed as well as alternates.  
Fuel cost adjustment is about \$12/sy.

As designed Rights-of-way area to be acquired:

On Ednaville Road – 10,200 sf. (R/W from 3 within properties to be acquired is not included)

On New Cut Road – 18,250 sf

Total area of R/W to be acquired = 28,450 sf.

Property owned by Bobby Thrash and Billy Gene Holder will need to be acquired under either design.

Therefore they are not included here.

Value of property owned by Larry Tims - \$83,194 (from the property records)

Additional Right-of-way area to be acquired under alternate design: None

Net Rights-of-way area to be acquired: 28,450 sf of residential area and 0.8 acre of Larry Tims' property.



# VALUE ENGINEERING ALTERNATIVE



**PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
STP00-0065-03(055); PI No.132860  
Hall and Jackson Counties, GA

ALTERNATIVE NO.:

**ROW-11**

**DESCRIPTION: USE A 20-FT.-WIDE RAISED GRASSED MEDIAN IN LIEU OF  
A 32-FT.-WIDE DEPRESSED MEDIAN FROM THE  
BEGINNING OF THE PROJECT TO NEW LIBERTY  
CHURCH ROAD**

SHEET NO.: 1 of 25

**ORIGINAL DESIGN:** (sketch attached)

The current design has a 32-ft.-wide depressed median from the beginning of the project to Ednaville Road where it transitions to a 20-ft.-wide raised concrete median.

**ALTERNATIVE:** (sketch attached)

Hold the existing right edge right-of-way line and use a 20-ft.-wide raised grassed median from the beginning of the project to New Liberty Church Road. Move the left right-of-way line 12 ft. to the right.

**ADVANTAGES:**

- Reduces excavation quantity by approximately 61,000 cubic yards
- Reduces fill quantity by approximately 22,000 cubic yards
- Reduces construction time
- Reduces amount of right-of-way to acquire
- Reduces the amount of trees that will have to be removed
- Reduces amount of grass to maintain within the right-of-way
- Moves edge of right-of-way away from longitudinal stream

**DISADVANTAGES:**

- None apparent

**DISCUSSION:**

The newly constructed section of SR 53 to the north of this project has a 20-ft.-wide raised grass median. This alternative proposes to maintain this section up to Ednaville Road. By doing so a significant amount of excavation and backfill can be avoided and the right-of-way can be reduced by a minimum of 10 ft. Both result in a cost savings for the project. This alternative will possibly allow a reduction in the amount of retaining wall needed to avoid impacts to the longitudinal stream at the beginning of the project. See Alt. No. RW-1 to see the potential impact to the retaining wall.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 849,000	—	\$ 849,000
ALTERNATIVE	\$ 262,000	—	\$ 262,000
SAVINGS (Original minus Alternative)	\$ 587,000	—	\$ 587,000

# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:  
**ROW-11**

DESCRIPTION: **USE A 20-FT.-WIDE RAISED GRASSED MEDIAN IN LIEU OF  
A 32-FT.-WIDE DEPRESSED MEDIAN FROM THE  
BEGINNING OF THE PROJECT TO NEW LIBERTY  
CHURCH ROAD**

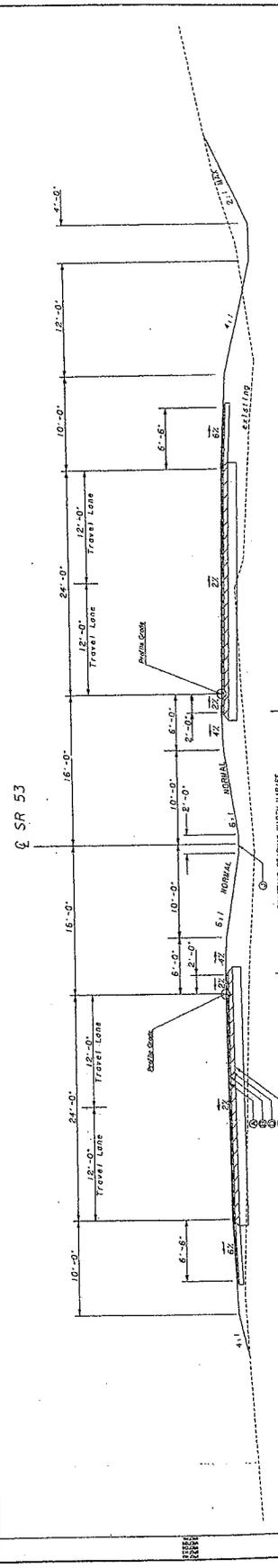
SHEET NO.: **2 of 25**

## DISCUSSION:

The current design speed limit in this area is 55 mile per hour (mph). However, the speed limit leading up to this section at the beginning of the project is 45 mph and the speed limit at the end of the project where there is an urban typical section, i.e., curb and gutter on both sides of each travelway, is also 45 mph. Part of the roadway affected by this change passes between the Atlanta Roadway and another race track, which will probably require a slowing of the traffic to allow traffic to enter these facilities. Thus if it is necessary to reduce the speed limit in this part of the roadway from 55 mph to 45 mph in order to implement the 20-ft.-raised median, it should be a benefit because it will reduce the potential for accidents. However, because this alternative maintains rural shoulders, it may not be necessary to reduce the speed limit and use other traffic control measures during race track events.

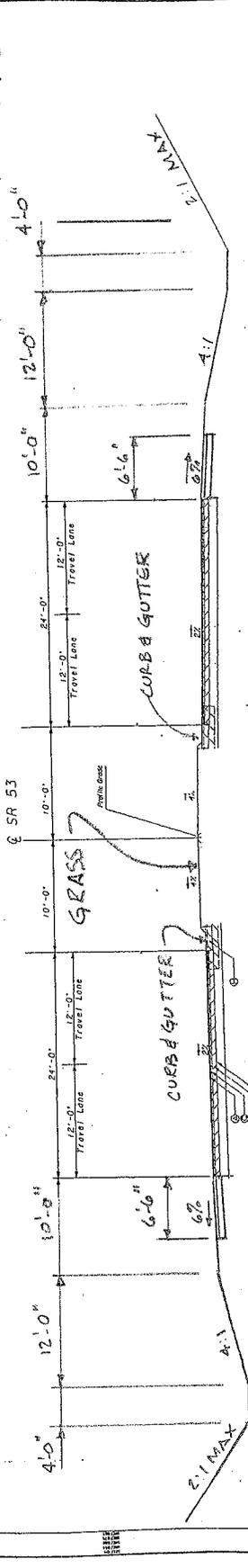
ALT. NO.  
ROW-11  
Sht. 3 of 25

STATE	CA	PROJECT NUMBER	SR09-005-01(055)	SHEET NO.	TOTAL SHEETS
				2	15 6



TYPICAL SECTION AS DESIGNED

HOLD ROW LINE ON THIS SIDE



TYPICAL SECTION ALTERNATIVE

- REQUIRED PAVEMENT
- (A) RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LINE (165 LBS/SY)
  - (B) RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LINE (330 LBS/SY)
  - (C) RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LINE (440 LBS/SY)
  - (D) RECYCLED ASPH CONC 23 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LINE (660 LBS/SY)
  - (E) GR AGR BASE CRS, 12 INCH, INCL MATL
  - (F) CONC SIDEWALK, 4 IN
  - (G) CONC CURB & GUTTER, 8 IN X 30 IN, TP 7
  - (H) CONC CURB & GUTTER, 8 IN X 30 IN, TP 2
  - (I) CONC MEDIAN, 4 IN
  - (J) GRASS MEDIAN, 4 IN

STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION	TYPICAL SECTION ALT 3 - SHEET 1
PROJECT NO. STP00-0085-01(055)	CONTRACT NO. L1111 JACKSON
LAND DISTRICT, N/A	EMD N/A

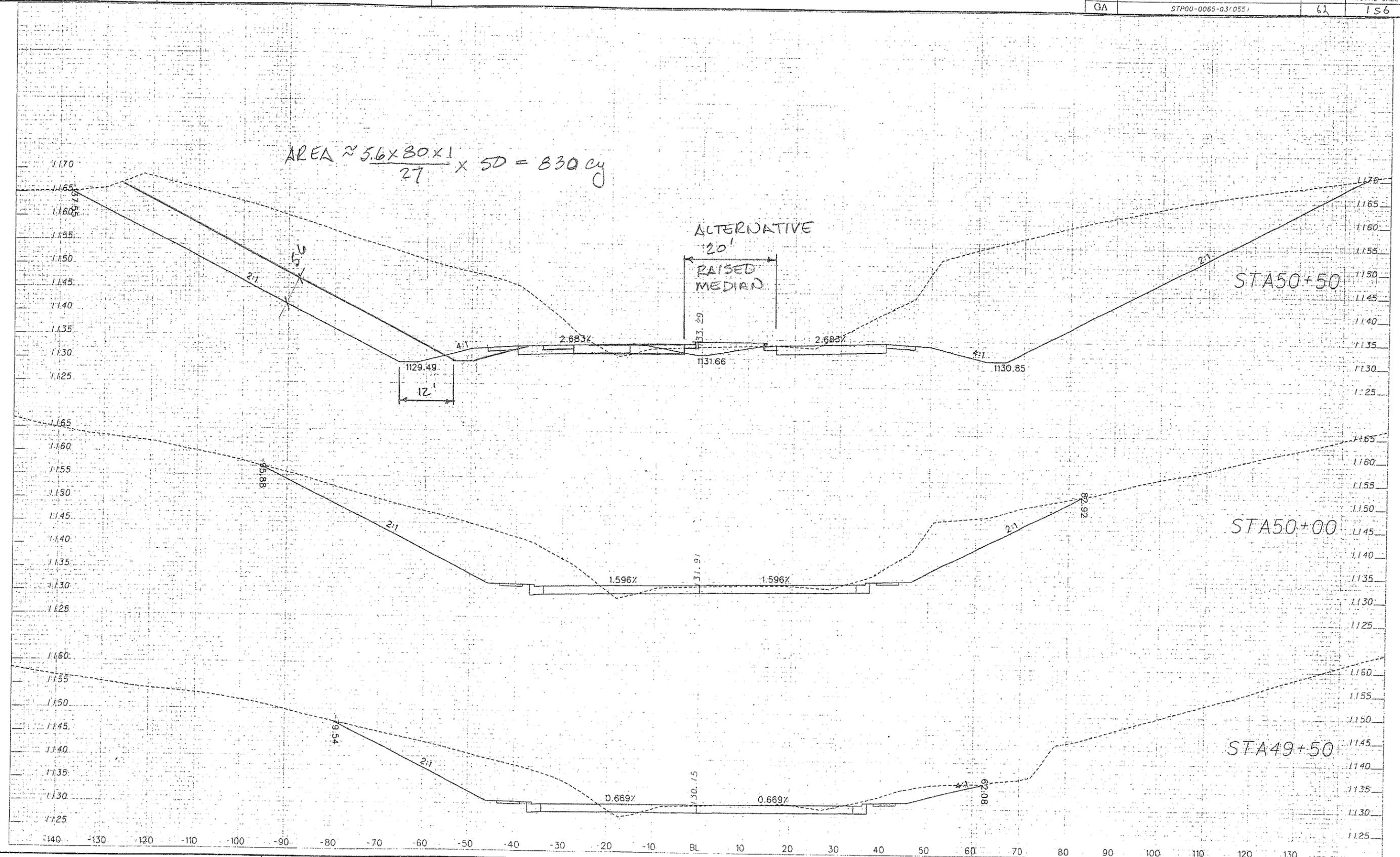
  

DATE	REVISIONS

BEGIN LIMIT OF ACCESS	BLA
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RED'D ROW & LIMIT OF ACCESS	RLA

Heath & Lineback Engineers  
1000 WOODLARK DR  
DUBLIN, GEORGIA 31009

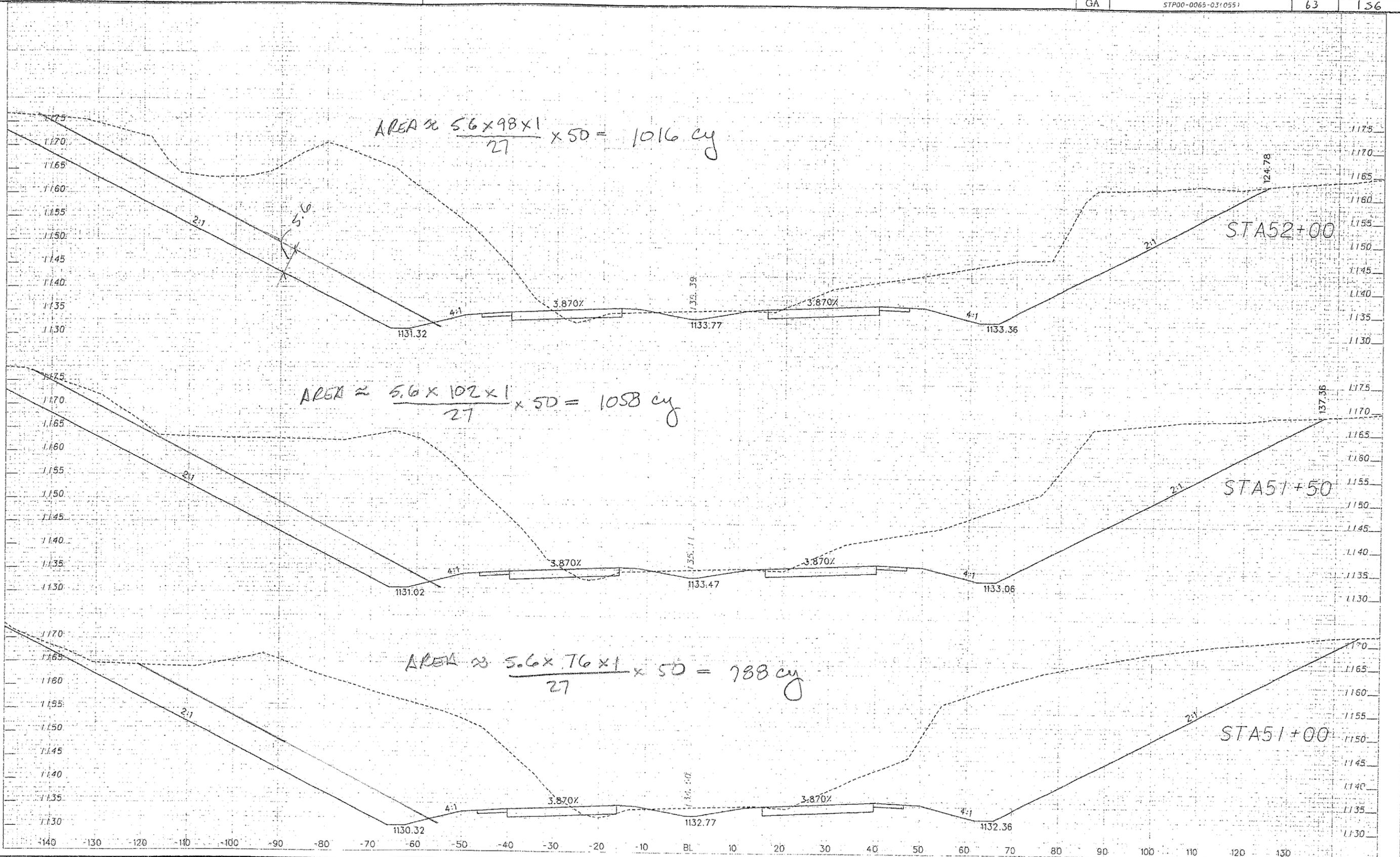


SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 300  
MARIETTA, GEORGIA 30066

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS



SCALE: 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

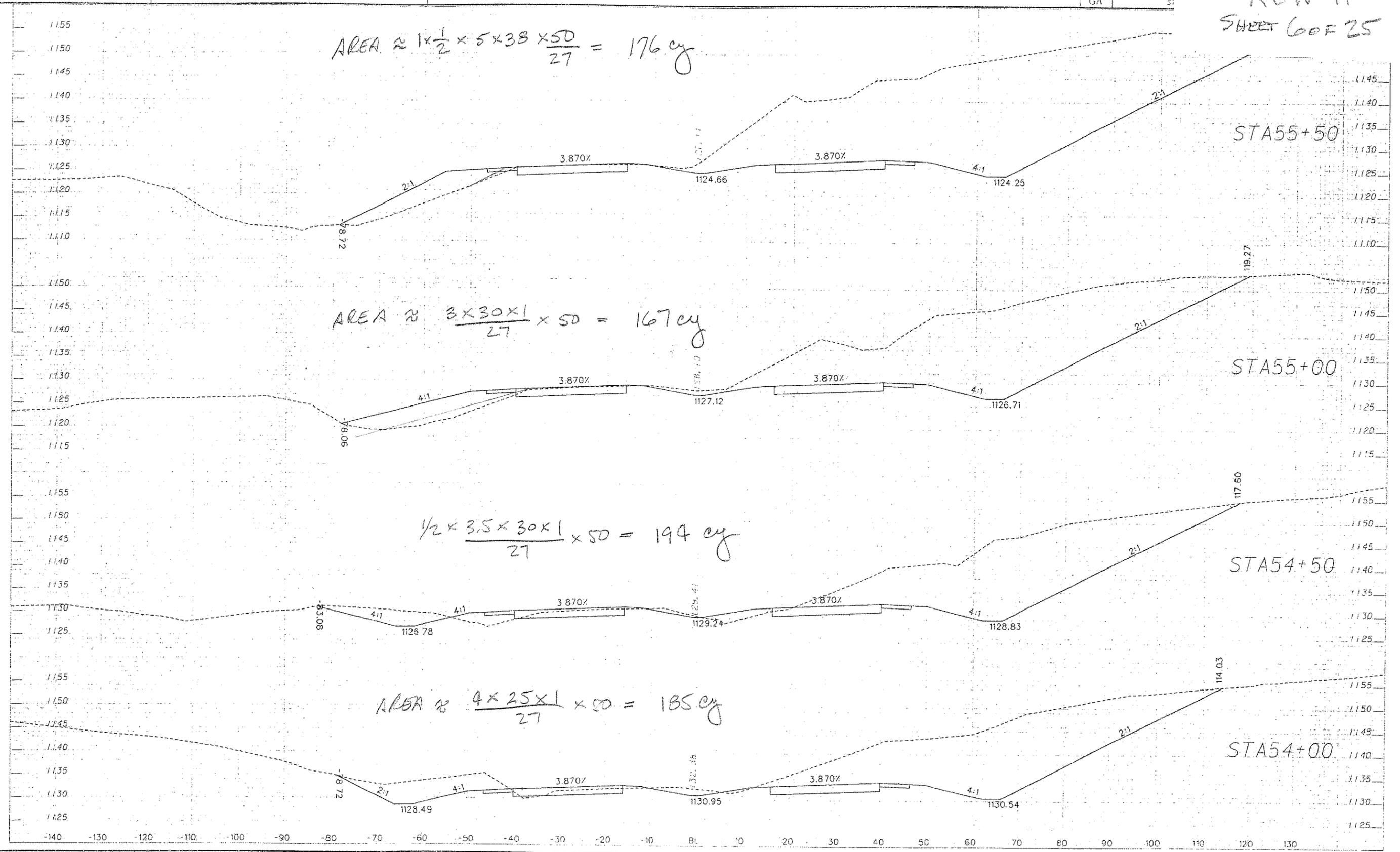
REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE No.  
ROW-11  
SHEET 6 OF 25

4/20/2010  
USER: jordan

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GA 57



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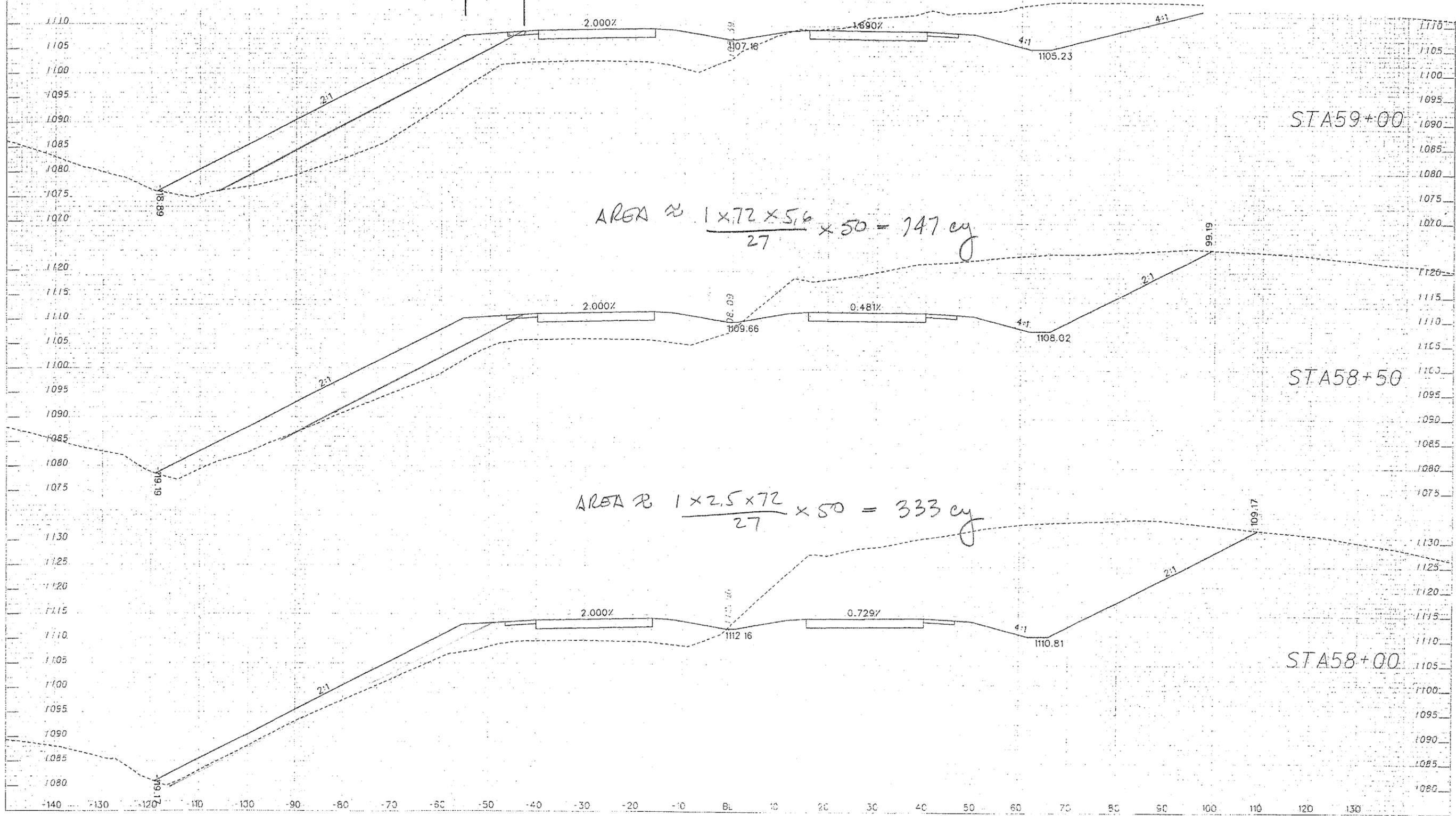
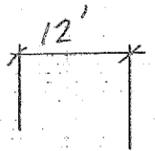
SCALE: 1" = 10'	<b>Heath &amp; Lineback Engineers</b> INCORPORATED 2398 CANTON ROAD, BUILDING 200 ATLANTA, GEORGIA 30329	REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION
			OFFICE: EARTHWORK CROSS SECTIONS

ALTERNATIVE No.  
 ROW-11  
 SHEET 7 OF 25

$$AREA \approx \frac{1 \times 72 \times 5.6}{27} \times 50 = 747 \text{ cy}$$

$$AREA \approx \frac{1 \times 72 \times 5.6}{27} \times 50 = 747 \text{ cy}$$

$$AREA \approx \frac{1 \times 2.5 \times 72}{27} \times 50 = 333 \text{ cy}$$



STA 59+00

STA 58+50

STA 58+00

SCALE : 1" = 10'

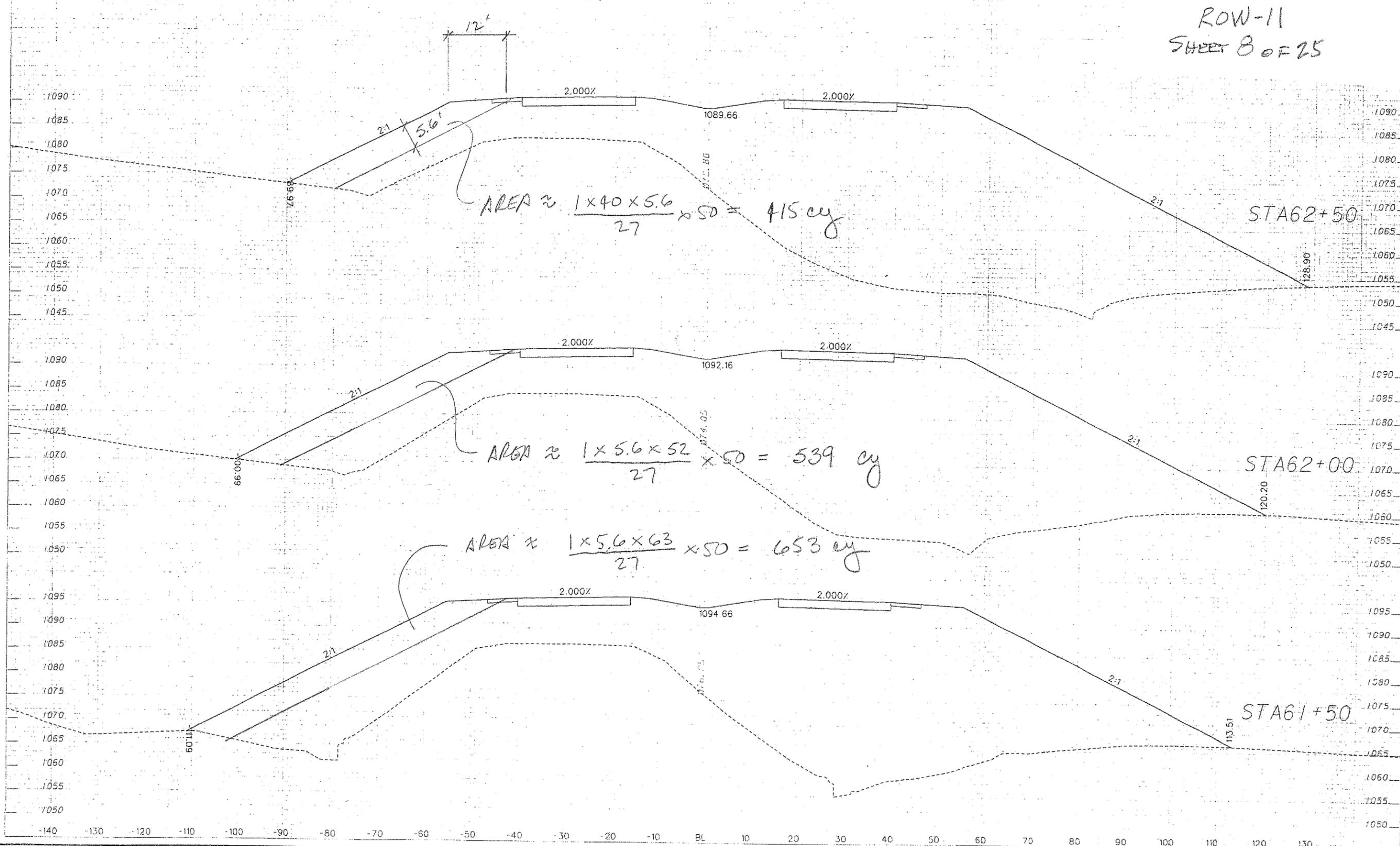
Heath & Lineback Engineers  
 INCORPORATED  
 2590 CANTON ROAD, BUILDING 104  
 MARIETTA, GEORGIA 30066-5593

REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 EARTHWORK CROSS SECTIONS

ALTERNATIVE No.  
ROW-11  
SHEET 8 OF 25

LEFTS



RIGHTS

RIGHTS

SCALE: 1" = 10'

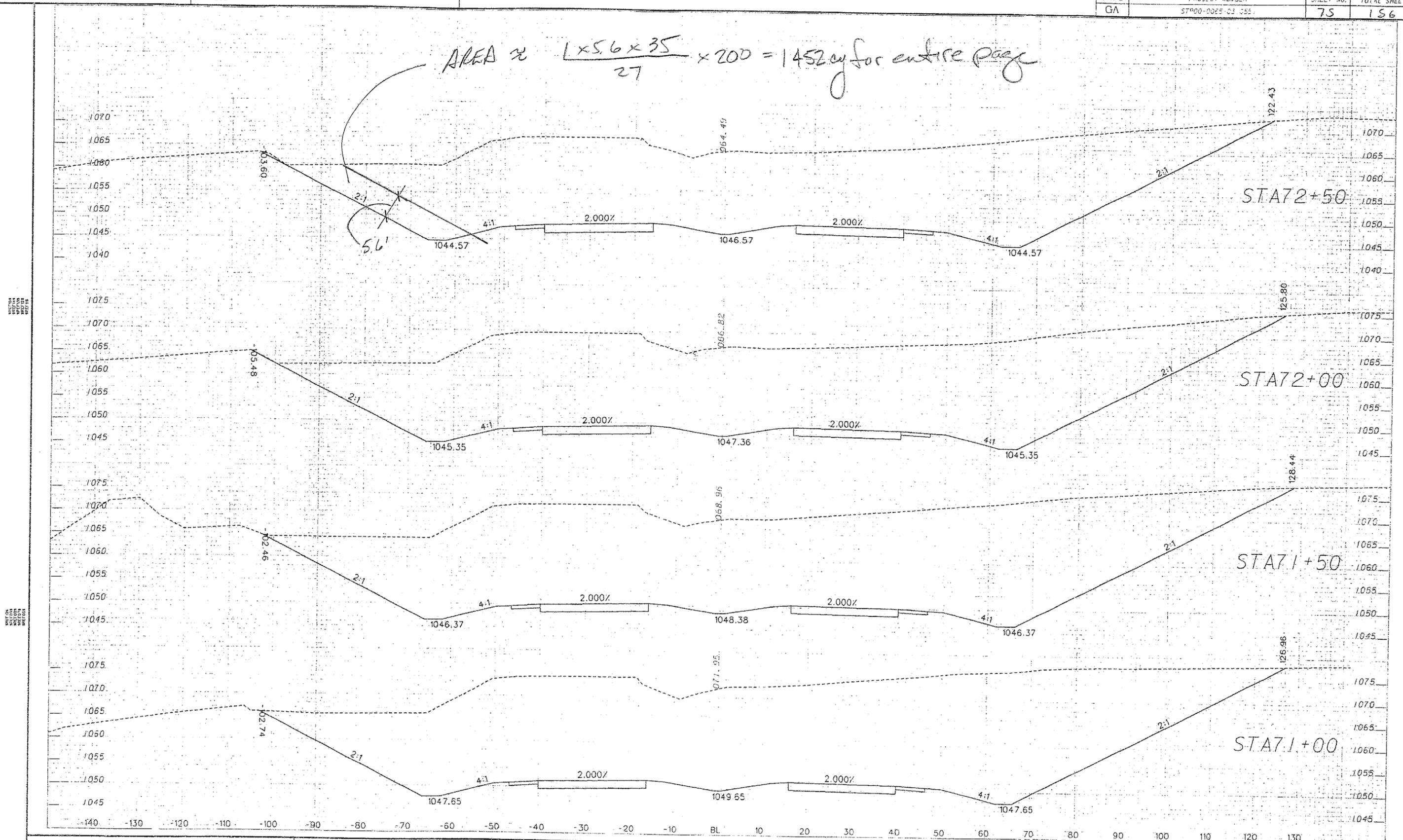
Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS



AREA =  $\frac{1 \times 5.6 \times 35}{27} \times 200 = 1452 \text{ cy for entire page}$



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

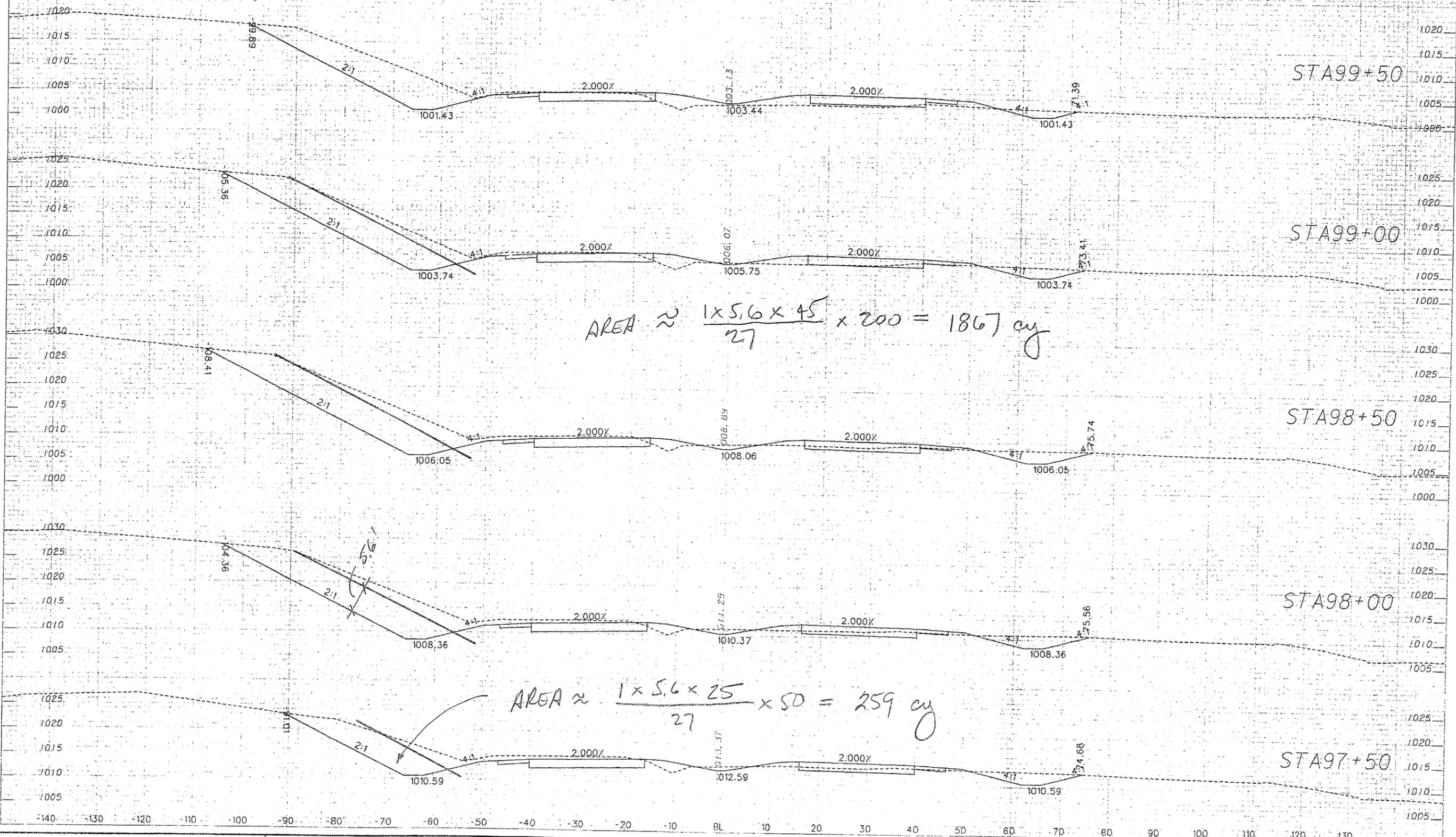
ALT. NO.  
ROW-11  
Sht. 11 of 25

4/20/2010  
USER: jordan

1:6.12 PW SPRFS  
FENTBLL

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-031055	84	156



SCALE : 1" = 10'

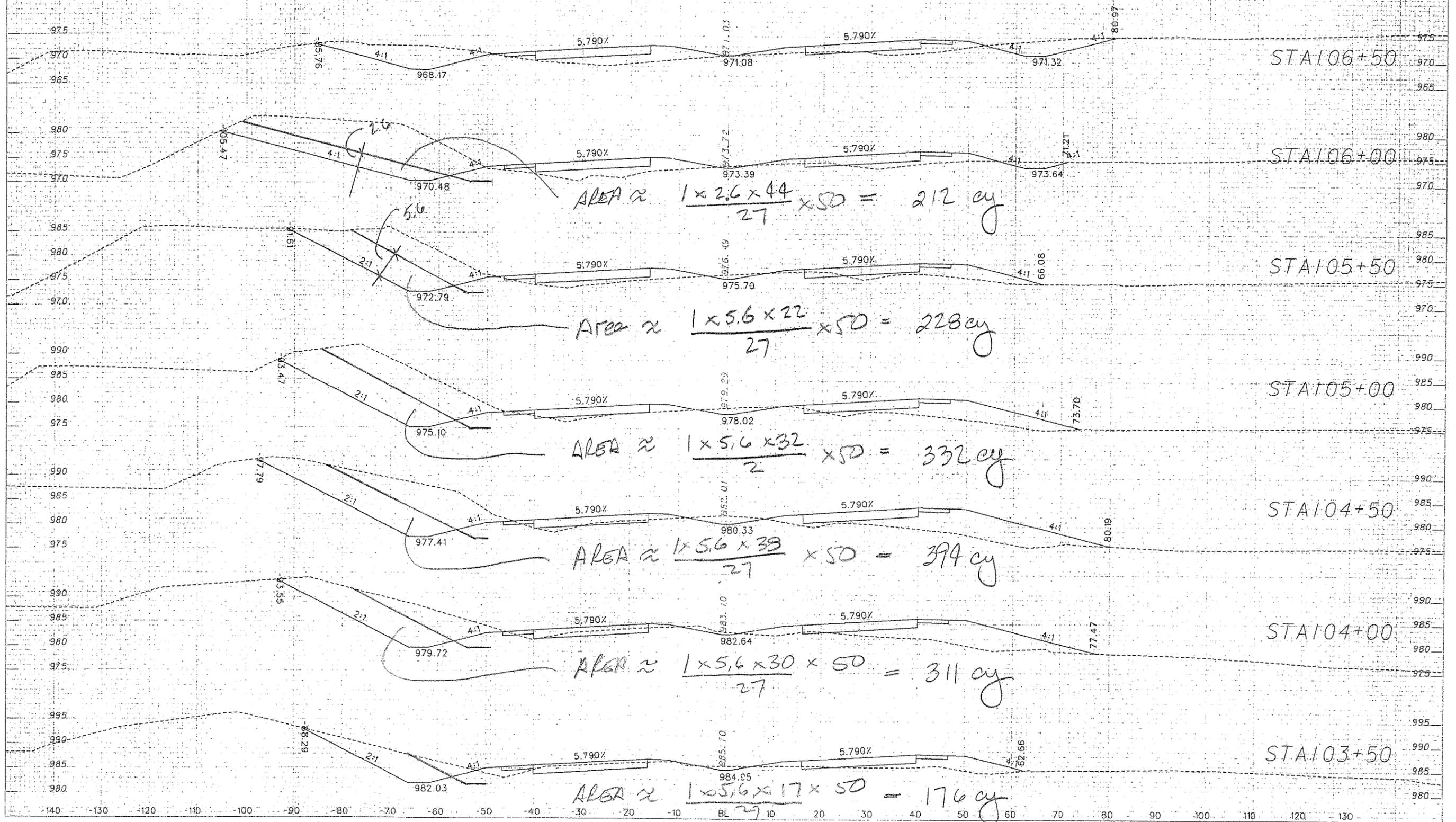
Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ACT. NO.  
ROW-11  
Sht 12 of 25

TOTAL FOR SHEET 1653



SCALE = 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066

REVISION DATES	

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALT. NO.  
ROW-11  
Sht. 13 of 25

4/20/2010  
USER: jordan

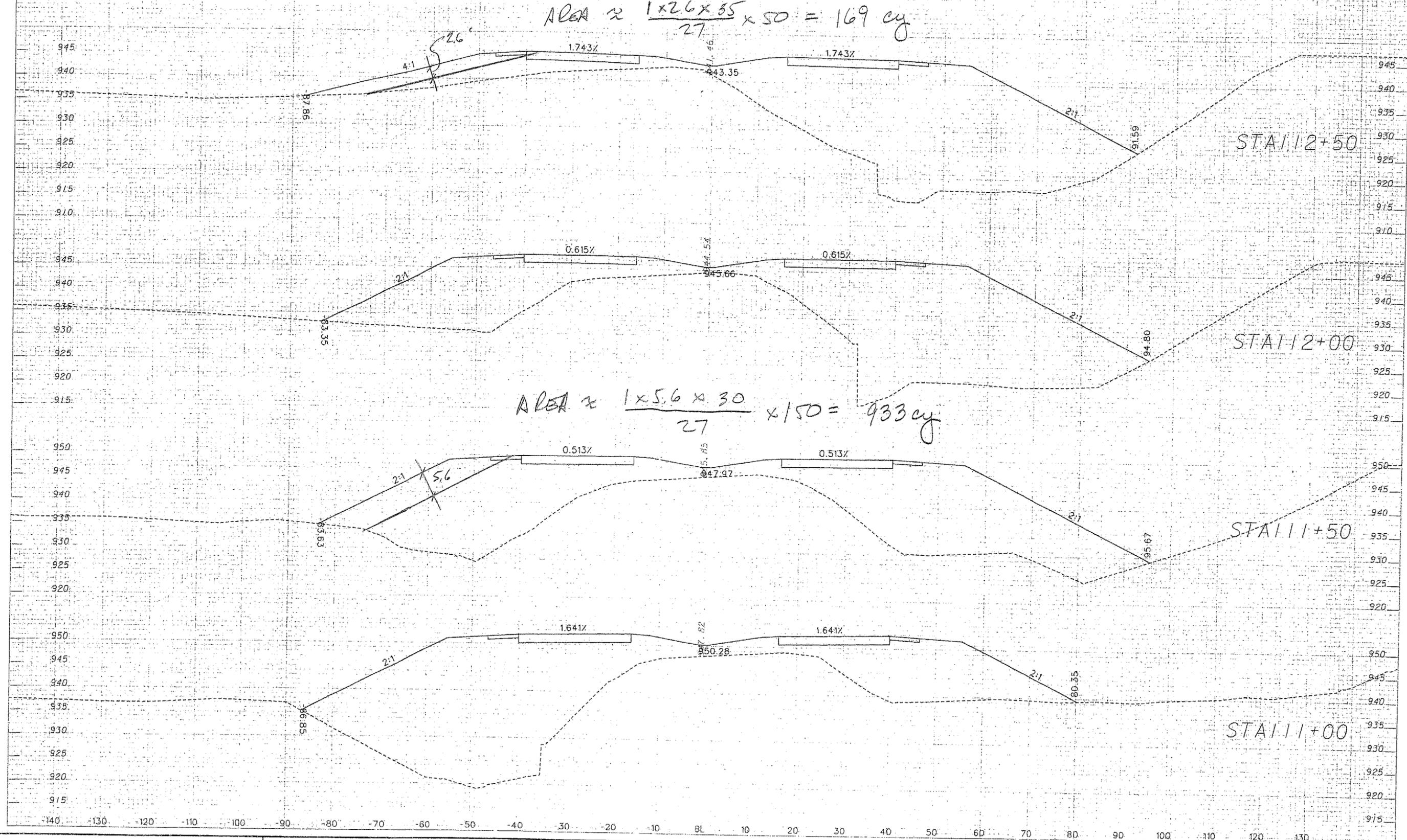
16:13 DV APPS  
PERTBLL

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-0310551	89	156

AREA  $\approx \frac{1 \times 26 \times 35}{27} \times 50 = 169 \text{ cy}$

AREA  $\approx \frac{1 \times 5.6 \times 30}{27} \times 150 = 933 \text{ cy}$



11+00  
11+50  
12+00  
12+50

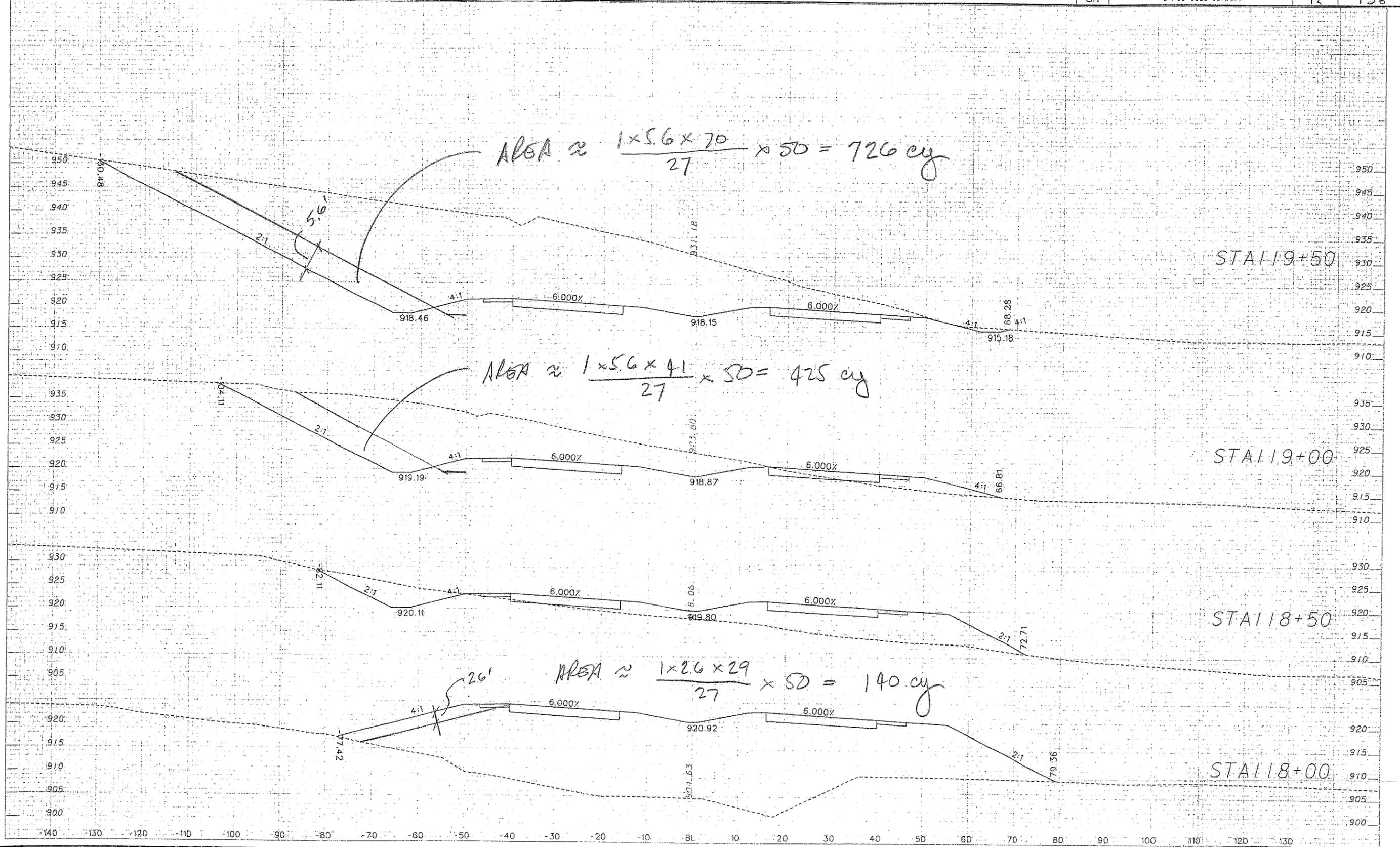
REVISION DATES

SCALE 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALT. NO.  
ROW-11  
Sht. 14 of 25



BEFORE  
EXISTING  
PROPOSED

BEFORE  
EXISTING  
PROPOSED

SCALE : 1" = 10'

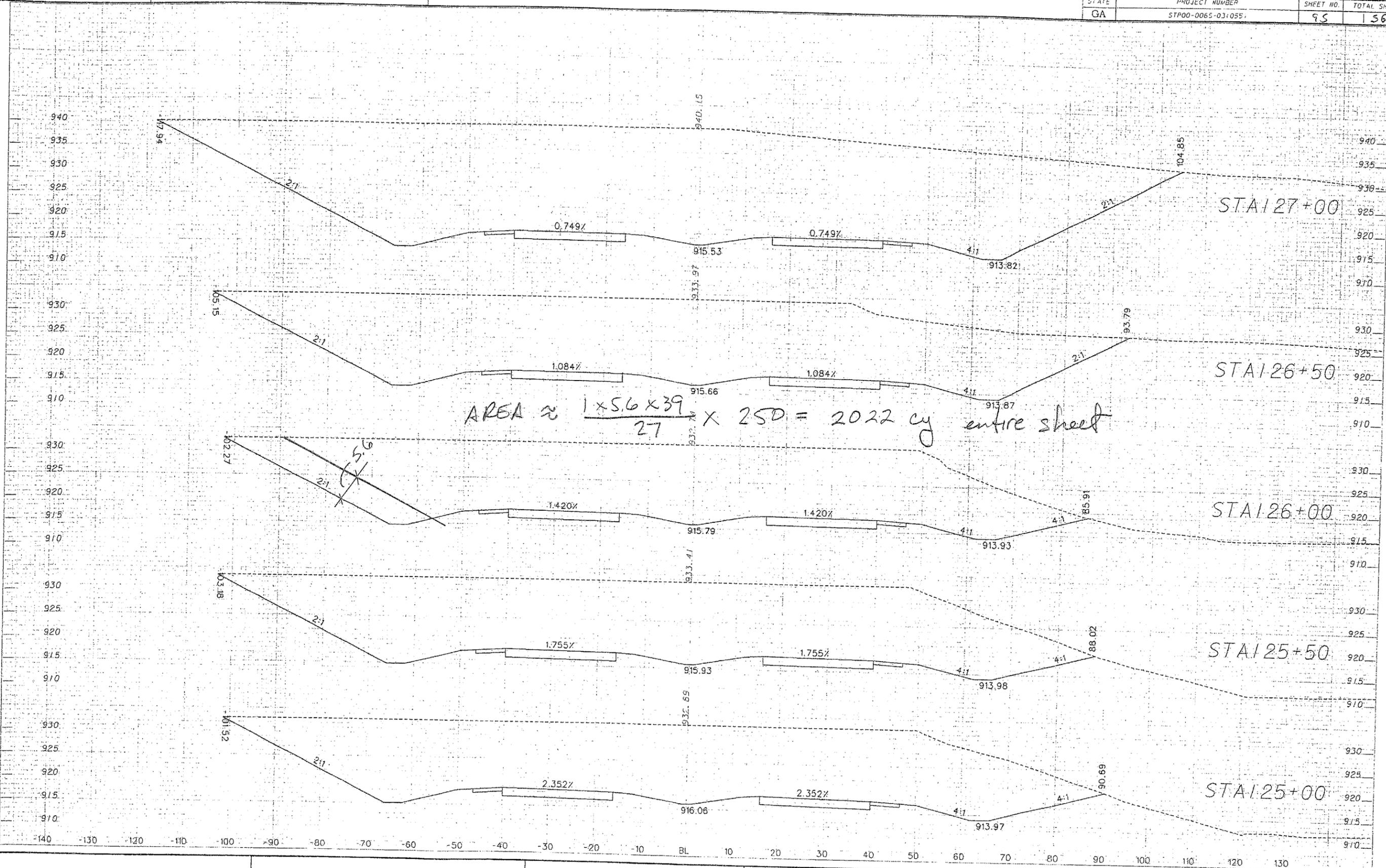
Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ACT. NO.  
ROW-11  
Sht. 15 of 25

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-031055	95	136



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2300 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION	DATE

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

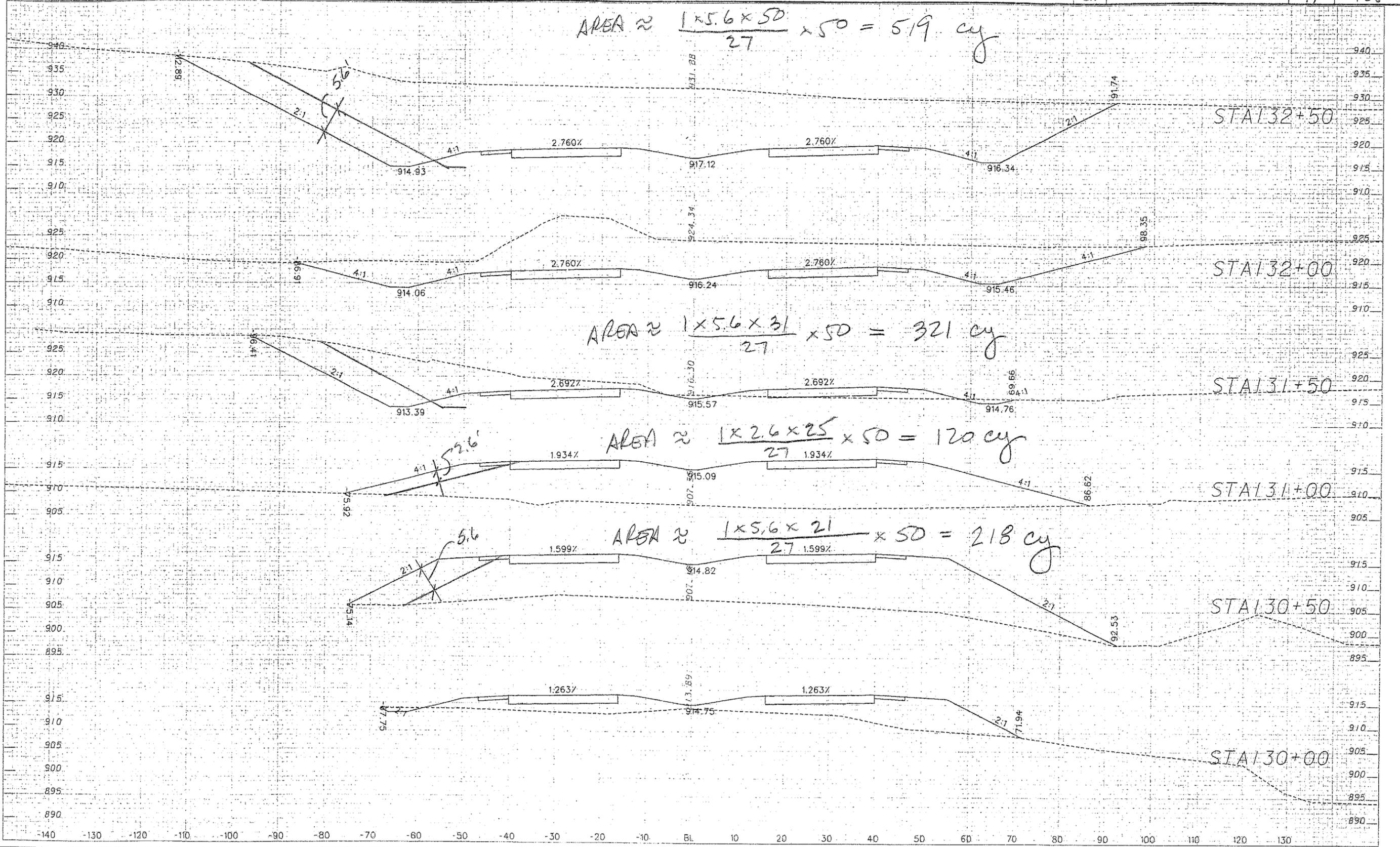
ALT. NO.  
ROW-11  
Sht. 16 of 25

4/20/2010  
USER: jordan

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00 0065 93(055)	97	156



SCALE : 1" = 10'

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5191

REVISION	DATE

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**EARTHWORK CROSS SECTIONS**

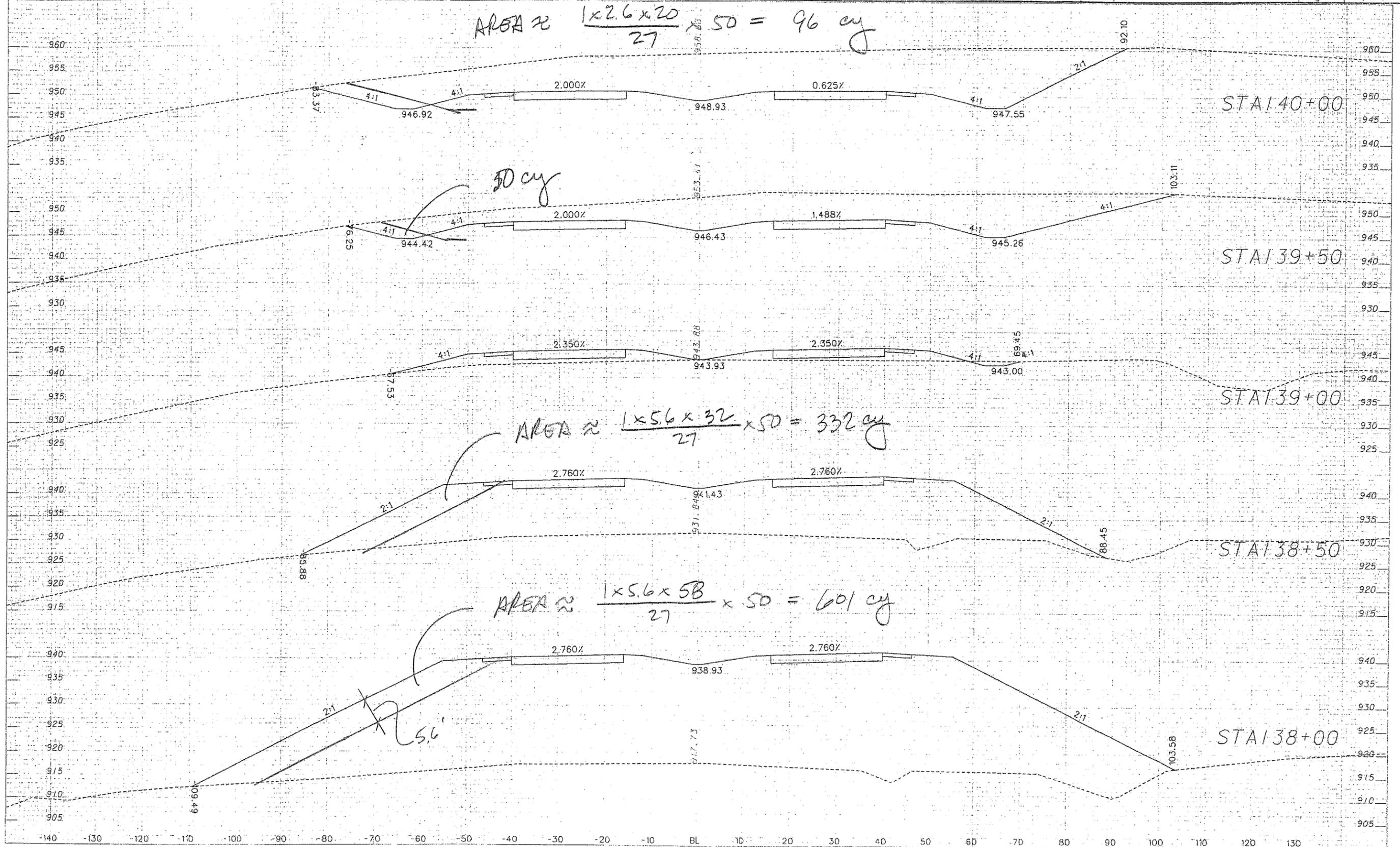
ALT. NO =  
ROW-11  
Sht. 17 of 25

4/20/2010  
USER: jorjan

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-03.055	101	156

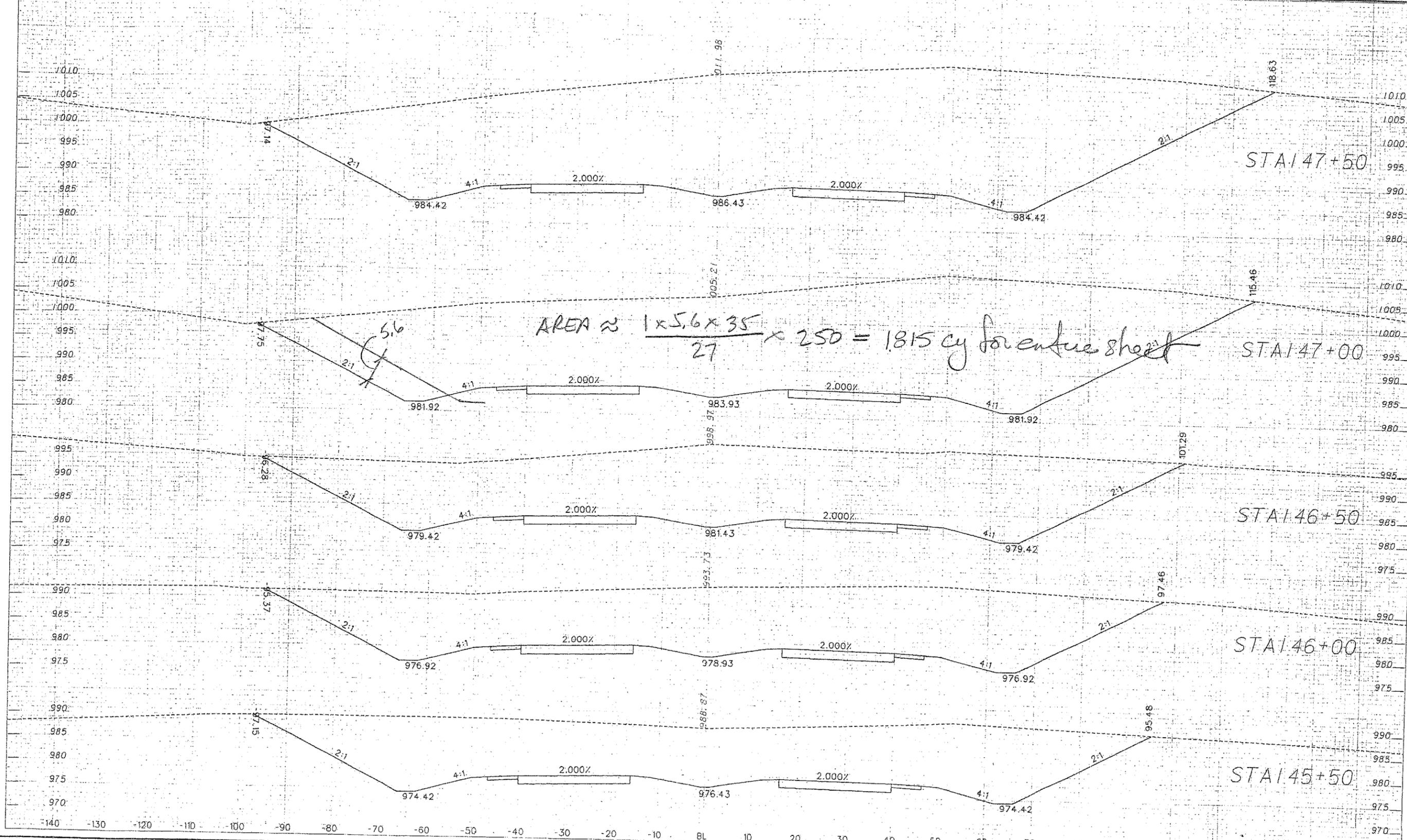


SCALE : 1" = 10'

<p>Heath &amp; Lineback Engineers INCORPORATED 2390 CANTON ROAD, BUILDING 200 MARIETTA, GEORGIA 30066-5293</p>	REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
**EARTHWORK CROSS SECTIONS**

ALT. NO.  
ROW-11  
Sht. 13 of 25



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GA 30067

REVISION DATES

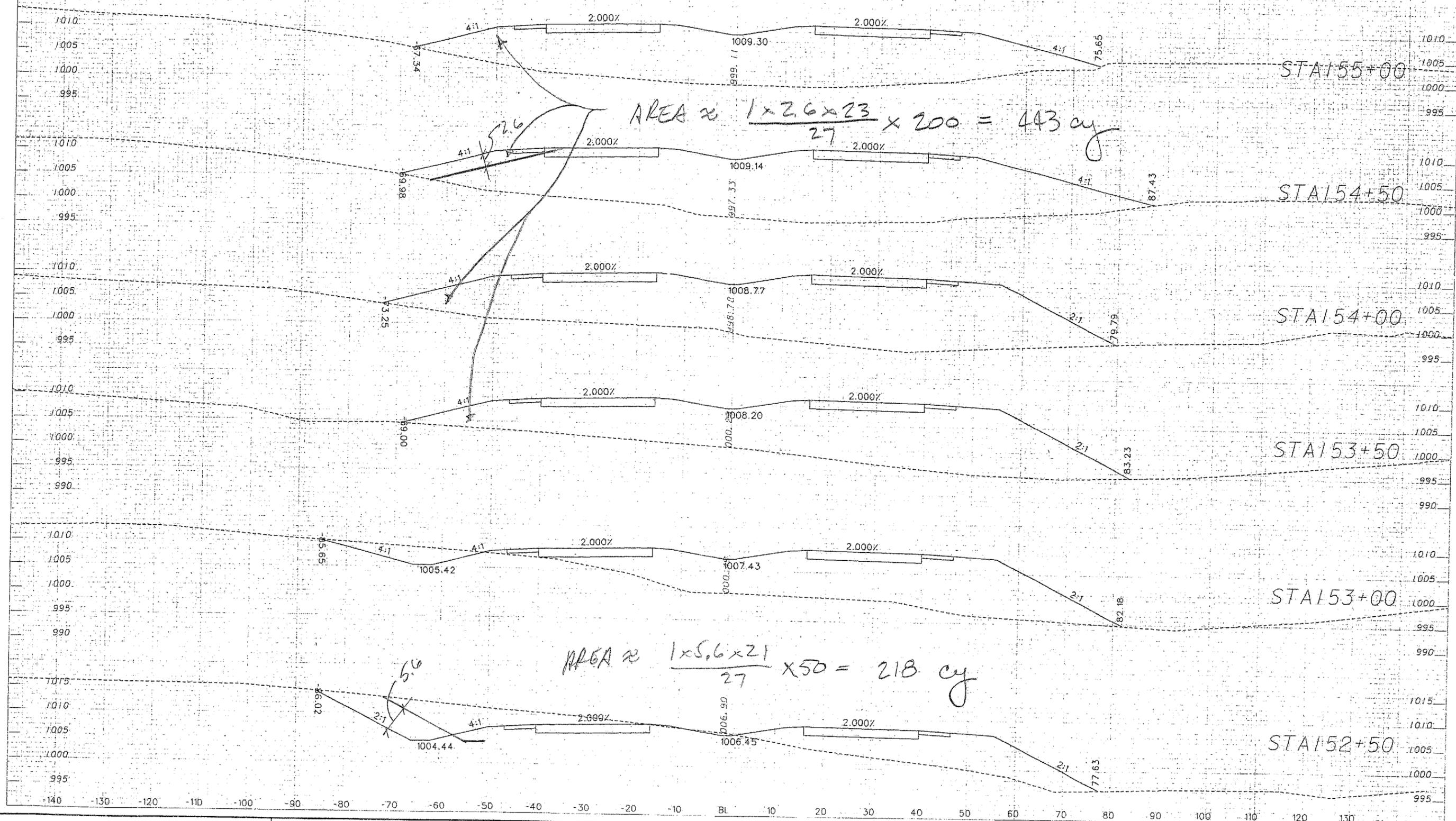
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALT. NO.  
ROW-11  
SHT. 19 of 25

4/20/2010  
USER: j Jordan

11:20:07:132850' ve S'udl' r02' xs sheets.dgn

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-03:055	107	136



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2590 CANTON ROAD BUILDING 200

REVISION DATES

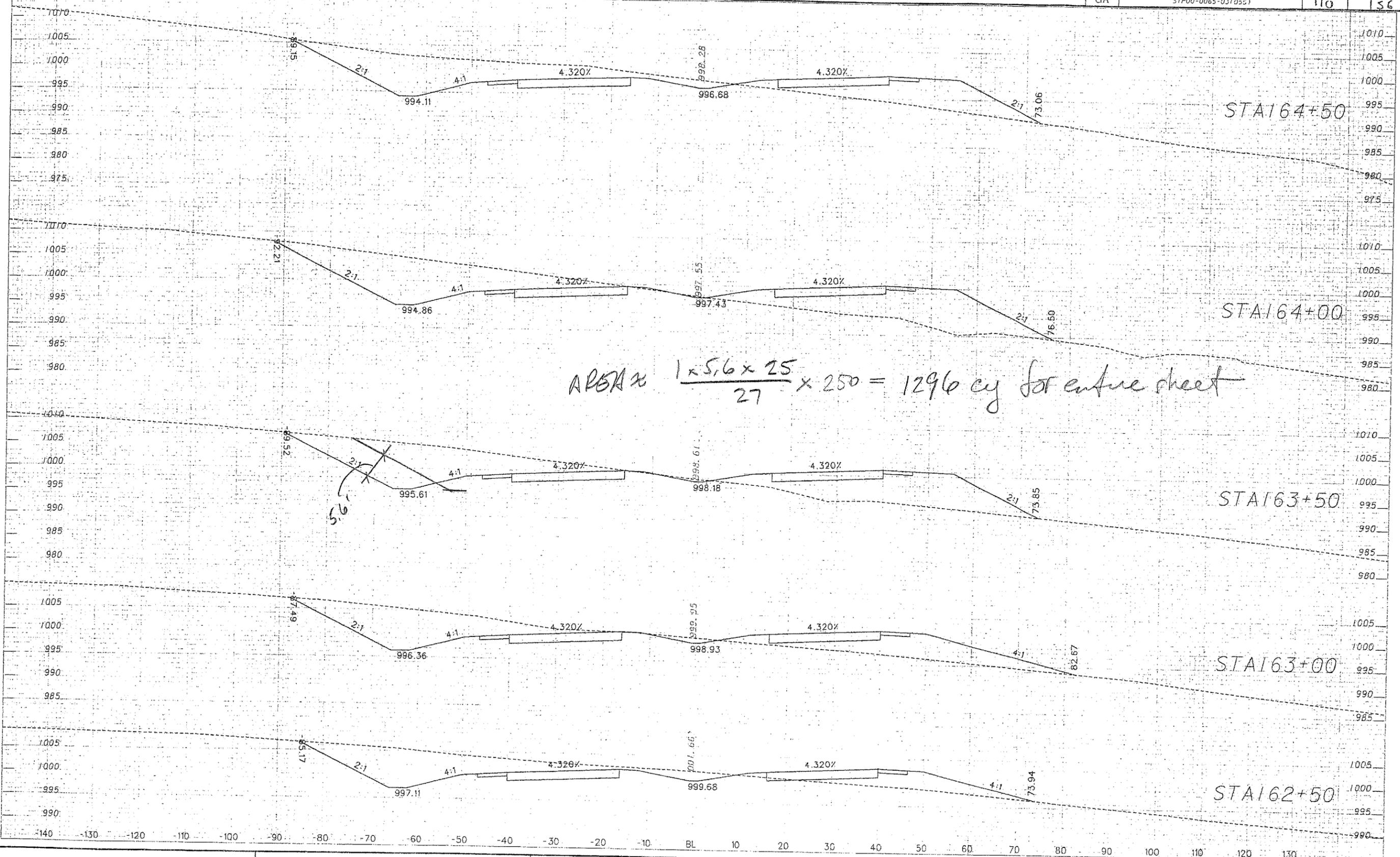
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALT. 110-  
RDW-11  
Sht. 20 of 25

4/20/2010  
USER: j Jordan

11615 PVE EPRFS  
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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-03(055)	110	136



AREA =  $\frac{1 \times 5.6 \times 25}{27} \times 250 = 1296$  cy for entire sheet

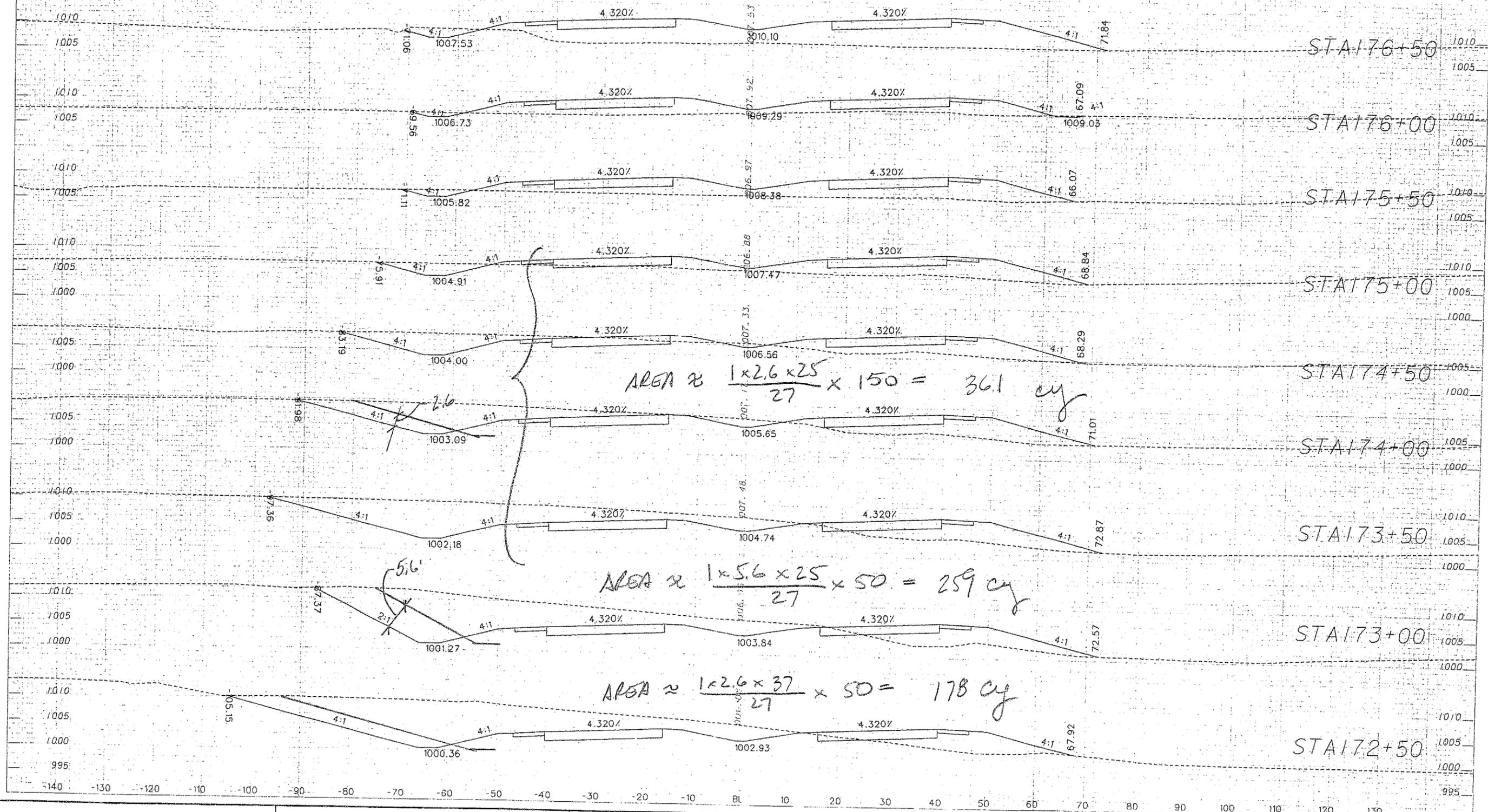
SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION	DATE

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0065-0310551	114	156



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2399 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5203

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS



SUBJECT:

JOB NO:

BY:

DATE:

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DATE:

ROW-11

PAGE

SHEET

22/25

EXCAVATION SAVINGS

STA.	50+25	TO	50+75	830	ey 0		
	50+75	TO	51+25	788			
	51+25	TO	51+75	1058			
	51+75	TO	52+25	1016			
	52+25	TO	52+75	964			
	52+75	TO	53+25	850			
	53+25	TO	53+75	653			
	53+75	TO	54+25	185			
	54+25	TO	54+75	194		<u>6538</u>	450'
	64+25	TO	64+75	228			
	64+75	TO	65+25	301			
	65+25	TO	65+75	384			
	65+75	TO	66+25	384			
	66+25	TO	66+75	373			
	66+75	TO	67+25	415			
	67+25	TO	67+75	415			
	67+75	TO	68+25	415			
	68+25	TO	68+75	446			
	68+75	TO	70+75	1784			
	70+75	TO	72+75	1452			
	72+75	TO	75+75	1867			
	75+75	TO	77+25	622		<u>9086</u>	
	77+25	TO	78+75	534			
	78+75	TO	80+25	173			
	80+25	TO	85+75	—			
	85+75	TO	87+25	1111			
	87+25	TO	88+25	299			
	88+25	TO	89+75	560			
	89+75	TO	97+25	—			
	97+25	TO	97+75	259			
	97+75	TO	99+75	1867			
	99+75	TO	101+75	—			
	101+75	TO	102+25	259			
	102+25	TO	102+75	—			
	102+75	TO	103+25	290			
	103+25	TO	106+75	1653			
	106+75	TO	108+25	—		<u>7005</u>	
						22629	

## EXCAVATION SAVINGS (CONTINUED)

FROM PREVIOUS SHEET

22629 cy

STR.	108+75	TO	110+75	1535	
	114+75	TO	115+25	144	
	115+25	TO	116+25	519	
	118+75	TO	119+25	425	
	119+25	TO	119+75	726	
	119+75	TO	120+25	716	
	120+25	TO	120+75	788	
	120+75	TO	121+25	1058	
	121+25	TO	124+75	5982	
	124+75	TO	127+25	2022	
	127+25	TO	129+25	2281	
	129+25	TO	129+75	187	
	131+25	TO	131+75	321	
	132+25	TO	132+75	519	
	132+75	TO	134+75	2696	19,919
	134+75	TO	135+25	415	
	139+25	TO	139+75	50	
	139+75	TO	140+25	96	
	140+25	TO	142+75	1389	
	142+75	TO	145+25	1970	
	145+25	TO	147+75	1815	
	147+75	TO	149+75	1950	
	149+75	TO	150+75	933	
	150+75	TO	151+25	415	
	151+25	TO	151+75	332	
	151+75	TO	152+25	290	
	152+25	TO	152+75	218	
	161+25	TO	162+25	241	10144
	162+25	TO	164+75	1296	
	164+75	TO	166+75	2074	
	166+75	TO	169+25	2074	
	169+25	TO	172+25	2738	
	172+25	TO	172+75	178	
	172+75	TO	173+25	259	
	173+25	TO	175+25	361	8980

61642 cy

## FILL SAVINGS

STA.		TO			
	54+75	TO	55+25	167	cy
	55+25	TO	55+75	176	
	57+75	TO	58+25	333	
	58+25	TO	58+75	747	
	58+75	TO	59+25	747	
	59+25	TO	59+75	674	
	59+75	TO	60+25	674	
	60+25	TO	60+75	674	
	60+75	TO	61+25	674	
	61+25	TO	61+75	653	
	61+75	TO	62+25	539	
	62+25	TO	62+75	415	
	62+75	TO	63+25	301	
	63+25	TO	63+75	107	
	63+75	TO	64+25		

6881 950 ft

	108+25	TO	109+75	363
	108+75	TO	110+75	1535
	110+75	TO	112+25	933
	112+25	TO	112+75	169
	112+75	TO	114+25	
	117+25	TO	117+50	280
	117+75	TO	118+25	140
	130+25	TO	130+75	218
	130+75	TO	131+25	120
	135+75	TO	136+25	259
	136+25	TO	136+75	404
	136+75	TO	137+25	519
	137+25	TO	137+75	726
	137+75	TO	138+25	601
	138+25	TO	138+75	332
	153+25	TO	155+25	443
	155+25	TO	159+25	963
	159+25	TO	160+75	361

8366  
15,247 cy





# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-1**

DESCRIPTION: **RAISE THE PROFILE FROM STATION 111+75 TO 157+00 TO  
REDUCE THE AMOUNT OF EXCAVATION**

SHEET NO.: 1 of 10

**ORIGINAL DESIGN:**

The original profile requires approximately 30 feet of cut at Station 149+00.

**ALTERNATIVE:** (sketch attached)

Raise the profile about 14 feet at Station 121+00 and about 3 feet from Station 138+00 to 149+00, substantially reducing the amount of excavation that is required.

**ADVANTAGES:**

- Reduces excavation requirements
- Reduces construction time

**DISADVANTAGES:**

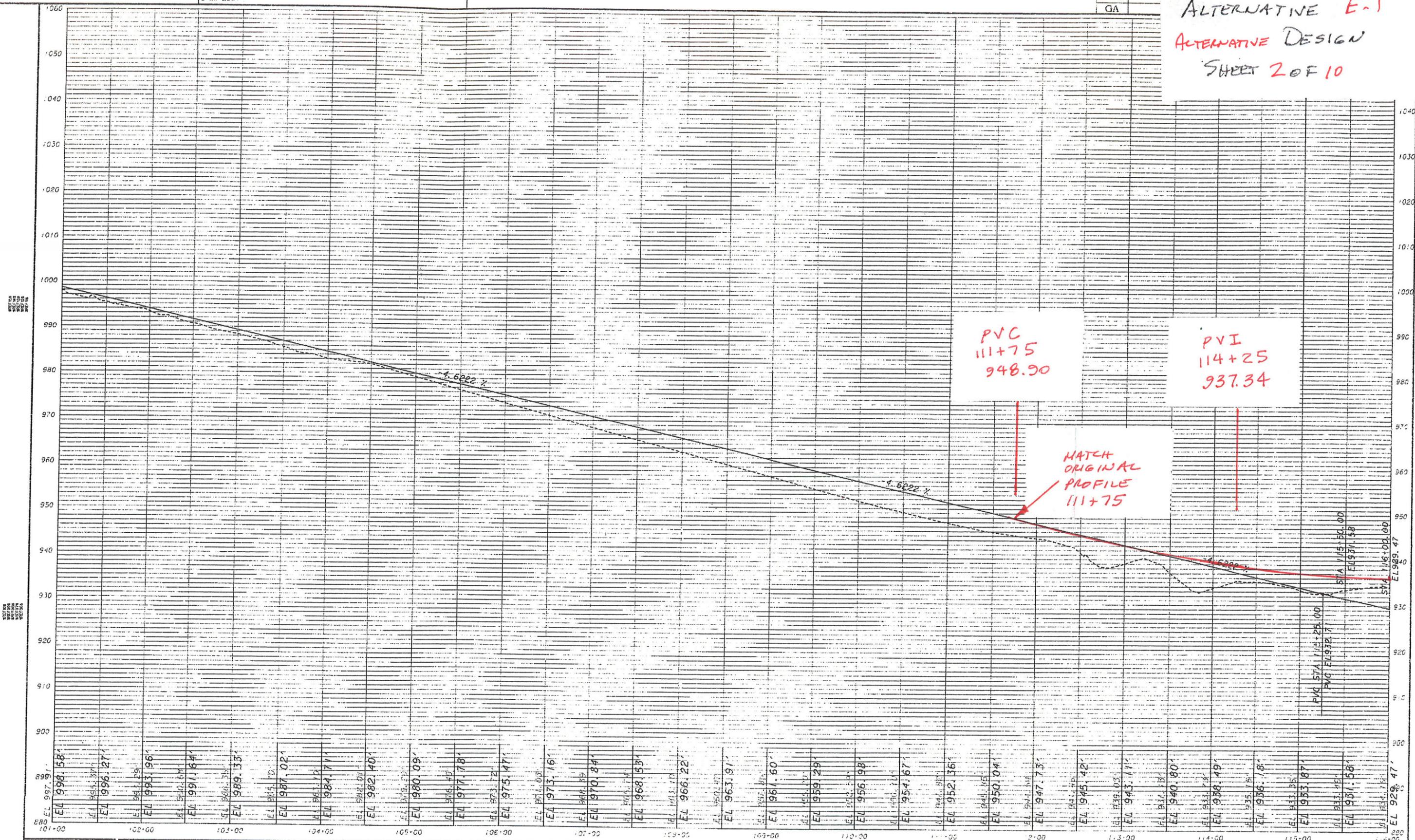
- Increases culvert lengths

**DISCUSSION:**

This project is a waste project, so reducing the amount of excavation not only reduces the time and work required for the excavation, but also reduces the amount of material to be hauled off the project. The amount that the profile was raised at Station 137+00 was limited to avoid increasing the stream encroachment to over 300 feet. The box culverts at Stations 117+00 and 130+50 will also have to be lengthened.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 769,000	—	\$ 769,000
ALTERNATIVE	\$ 90,000	—	\$ 90,000
SAVINGS (Original minus Alternative)	\$ 679,000	—	\$ 679,000

ALTERNATIVE E-1  
ALTERNATIVE DESIGN  
SHEET 2 OF 10



EL 997.99	EL 998.58	EL 999.17	EL 999.76	EL 1000.35	EL 1000.94	EL 1001.53	EL 1002.12	EL 1002.71	EL 1003.30	EL 1003.89	EL 1004.48	EL 1005.07	EL 1005.66	EL 1006.25	EL 1006.84	EL 1007.43	EL 1008.02	EL 1008.61	EL 1009.20	EL 1009.79	EL 1010.38	EL 1010.97	EL 1011.56	EL 1012.15	EL 1012.74	EL 1013.33	EL 1013.92	EL 1014.51	EL 1015.10	EL 1015.69	EL 1016.28	EL 1016.87	EL 1017.46	EL 1018.05	EL 1018.64	EL 1019.23	EL 1019.82	EL 1020.41	EL 1021.00	EL 1021.59	EL 1022.18	EL 1022.77	EL 1023.36	EL 1023.95	EL 1024.54	EL 1025.13	EL 1025.72	EL 1026.31	EL 1026.90	EL 1027.49	EL 1028.08	EL 1028.67	EL 1029.26	EL 1029.85	EL 1030.44	EL 1031.03	EL 1031.62	EL 1032.21	EL 1032.80	EL 1033.39	EL 1033.98	EL 1034.57	EL 1035.16	EL 1035.75	EL 1036.34	EL 1036.93	EL 1037.52	EL 1038.11	EL 1038.70	EL 1039.29	EL 1039.88	EL 1040.47	EL 1041.06	EL 1041.65	EL 1042.24	EL 1042.83	EL 1043.42	EL 1044.01	EL 1044.60	EL 1045.19	EL 1045.78	EL 1046.37	EL 1046.96	EL 1047.55	EL 1048.14	EL 1048.73	EL 1049.32	EL 1049.91	EL 1050.50	EL 1051.09	EL 1051.68	EL 1052.27	EL 1052.86	EL 1053.45	EL 1054.04	EL 1054.63	EL 1055.22	EL 1055.81	EL 1056.40	EL 1056.99	EL 1057.58	EL 1058.17	EL 1058.76	EL 1059.35	EL 1059.94	EL 1060.53	EL 1061.12	EL 1061.71	EL 1062.30	EL 1062.89	EL 1063.48	EL 1064.07	EL 1064.66	EL 1065.25	EL 1065.84	EL 1066.43	EL 1067.02	EL 1067.61	EL 1068.20	EL 1068.79	EL 1069.38	EL 1069.97	EL 1070.56	EL 1071.15	EL 1071.74	EL 1072.33	EL 1072.92	EL 1073.51	EL 1074.10	EL 1074.69	EL 1075.28	EL 1075.87	EL 1076.46	EL 1077.05	EL 1077.64	EL 1078.23	EL 1078.82	EL 1079.41	EL 1080.00	EL 1080.59	EL 1081.18	EL 1081.77	EL 1082.36	EL 1082.95	EL 1083.54	EL 1084.13	EL 1084.72	EL 1085.31	EL 1085.90	EL 1086.49	EL 1087.08	EL 1087.67	EL 1088.26	EL 1088.85	EL 1089.44	EL 1090.03	EL 1090.62	EL 1091.21	EL 1091.80	EL 1092.39	EL 1092.98	EL 1093.57	EL 1094.16	EL 1094.75	EL 1095.34	EL 1095.93	EL 1096.52	EL 1097.11	EL 1097.70	EL 1098.29	EL 1098.88	EL 1099.47	EL 1100.06	EL 1100.65	EL 1101.24	EL 1101.83	EL 1102.42	EL 1103.01	EL 1103.60	EL 1104.19	EL 1104.78	EL 1105.37	EL 1105.96	EL 1106.55	EL 1107.14	EL 1107.73	EL 1108.32	EL 1108.91	EL 1109.50	EL 1110.09	EL 1110.68	EL 1111.27	EL 1111.86	EL 1112.45	EL 1113.04	EL 1113.63	EL 1114.22	EL 1114.81	EL 1115.40	EL 1115.99	EL 1116.58	EL 1117.17	EL 1117.76	EL 1118.35	EL 1118.94	EL 1119.53	EL 1120.12	EL 1120.71	EL 1121.30	EL 1121.89	EL 1122.48	EL 1123.07	EL 1123.66	EL 1124.25	EL 1124.84	EL 1125.43	EL 1126.02	EL 1126.61	EL 1127.20	EL 1127.79	EL 1128.38	EL 1128.97	EL 1129.56	EL 1130.15	EL 1130.74	EL 1131.33	EL 1131.92	EL 1132.51	EL 1133.10	EL 1133.69	EL 1134.28	EL 1134.87	EL 1135.46	EL 1136.05	EL 1136.64	EL 1137.23	EL 1137.82	EL 1138.41	EL 1139.00	EL 1139.59	EL 1140.18	EL 1140.77	EL 1141.36	EL 1141.95	EL 1142.54	EL 1143.13	EL 1143.72	EL 1144.31	EL 1144.90	EL 1145.49	EL 1146.08	EL 1146.67	EL 1147.26	EL 1147.85	EL 1148.44	EL 1149.03	EL 1149.62	EL 1150.21	EL 1150.80	EL 1151.39	EL 1151.98	EL 1152.57	EL 1153.16	EL 1153.75	EL 1154.34	EL 1154.93	EL 1155.52	EL 1156.11	EL 1156.70	EL 1157.29	EL 1157.88	EL 1158.47	EL 1159.06	EL 1159.65	EL 1160.24	EL 1160.83	EL 1161.42	EL 1162.01	EL 1162.60	EL 1163.19	EL 1163.78	EL 1164.37	EL 1164.96	EL 1165.55	EL 1166.14	EL 1166.73	EL 1167.32	EL 1167.91	EL 1168.50	EL 1169.09	EL 1169.68	EL 1170.27	EL 1170.86	EL 1171.45	EL 1172.04	EL 1172.63	EL 1173.22	EL 1173.81	EL 1174.40	EL 1174.99	EL 1175.58	EL 1176.17	EL 1176.76	EL 1177.35	EL 1177.94	EL 1178.53	EL 1179.12	EL 1179.71	EL 1180.30	EL 1180.89	EL 1181.48	EL 1182.07	EL 1182.66	EL 1183.25	EL 1183.84	EL 1184.43	EL 1185.02	EL 1185.61	EL 1186.20	EL 1186.79	EL 1187.38	EL 1187.97	EL 1188.56	EL 1189.15	EL 1189.74	EL 1190.33	EL 1190.92	EL 1191.51	EL 1192.10	EL 1192.69	EL 1193.28	EL 1193.87	EL 1194.46	EL 1195.05	EL 1195.64	EL 1196.23	EL 1196.82	EL 1197.41	EL 1198.00	EL 1198.59	EL 1199.18	EL 1199.77	EL 1200.36	EL 1200.95	EL 1201.54	EL 1202.13	EL 1202.72	EL 1203.31	EL 1203.90	EL 1204.49	EL 1205.08	EL 1205.67	EL 1206.26	EL 1206.85	EL 1207.44	EL 1208.03	EL 1208.62	EL 1209.21	EL 1209.80	EL 1210.39	EL 1210.98	EL 1211.57	EL 1212.16	EL 1212.75	EL 1213.34	EL 1213.93	EL 1214.52	EL 1215.11	EL 1215.70	EL 1216.29	EL 1216.88	EL 1217.47	EL 1218.06	EL 1218.65	EL 1219.24	EL 1219.83	EL 1220.42	EL 1221.01	EL 1221.60	EL 1222.19	EL 1222.78	EL 1223.37	EL 1223.96	EL 1224.55	EL 1225.14	EL 1225.73	EL 1226.32	EL 1226.91	EL 1227.50	EL 1228.09	EL 1228.68	EL 1229.27	EL 1229.86	EL 1230.45	EL 1231.04	EL 1231.63	EL 1232.22	EL 1232.81	EL 1233.40	EL 1233.99	EL 1234.58	EL 1235.17	EL 1235.76	EL 1236.35	EL 1236.94	EL 1237.53	EL 1238.12	EL 1238.71	EL 1239.30	EL 1239.89	EL 1240.48	EL 1241.07	EL 1241.66	EL 1242.25	EL 1242.84	EL 1243.43	EL 1244.02	EL 1244.61	EL 1245.20	EL 1245.79	EL 1246.38	EL 1246.97	EL 1247.56	EL 1248.15	EL 1248.74	EL 1249.33	EL 1249.92	EL 1250.51	EL 1251.10	EL 1251.69	EL 1252.28	EL 1252.87	EL 1253.46	EL 1254.05	EL 1254.64	EL 1255.23	EL 1255.82	EL 1256.41	EL 1257.00	EL 1257.59	EL 1258.18	EL 1258.77	EL 1259.36	EL 1259.95	EL 1260.54	EL 1261.13	EL 1261.72	EL 1262.31	EL 1262.90	EL 1263.49	EL 1264.08	EL 1264.67	EL 1265.26	EL 1265.85	EL 1266.44	EL 1267.03	EL 1267.62	EL 1268.21	EL 1268.80	EL 1269.39	EL 1269.98	EL 1270.57	EL 1271.16	EL 1271.75	EL 1272.34	EL 1272.93	EL 1273.52	EL 1274.11	EL 1274.70	EL 1275.29	EL 1275.88	EL 1276.47	EL 1277.06	EL 1277.65	EL 1278.24	EL 1278.83	EL 1279.42	EL 1280.01	EL 1280.60	EL 1281.19	EL 1281.78	EL 1282.37	EL 1282.96	EL 1283.55	EL 1284.14	EL 1284.73	EL 1285.32	EL 1285.91	EL 1286.50	EL 1287.09	EL 1287.68	EL 1288.27	EL 1288.86	EL 1289.45	EL 1290.04	EL 1290.63	EL 1291.22	EL 1291.81	EL 1292.40	EL 1292.99	EL 1293.58	EL 1294.17	EL 1294.76	EL 1295.35	EL 1295.94	EL 1296.53	EL 1297.12	EL 1297.71	EL 1298.30	EL 1298.89	EL 1299.48	EL 1300.07	EL 1300.66	EL 1301.25	EL 1301.84	EL 1302.43	EL 1303.02	EL 1303.61	EL 1304.20	EL 1304.79	EL 1305.38	EL 1305.97	EL 1306.56	EL 1307.15	EL 1307.74	EL 1308.33	EL 1308.92	EL 1309.51	EL 1310.10	EL 1310.69	EL 1311.28	EL 1311.87	EL 1312.46	EL 1313.05	EL 1313.64	EL 1314.23	EL 1314.82	EL 1315.41	EL 1316.00	EL 1316.59	EL 1317.18	EL 1317.77	EL 1318.36	EL 1318.95	EL 1319.54	EL 1320.13	EL 1320.72	EL 1321.31	EL 1321.90	EL 1322.49	EL 1323.08	EL 1323.67	EL 1324.26	EL 1324.85	EL 1325.44	EL 1326.03	EL 1326.62	EL 1327.21	EL 1327.80	EL 1328.39	EL 1328.98	EL 1329.57	EL 1330.16	EL 1330.75	EL 1331.34	EL 1331.93	EL 1332.52	EL 1333.11	EL 1333.70	EL 1334.29	EL 1334.88	EL 1335.47	EL 1336.06	EL 1336.65	EL 1337.24	EL 1337.83	EL 1338.42	EL 1339.01	EL 1339.60	EL 1340.19	EL 1340.78	EL 1341.37	EL 1341.96	EL 1342.55	EL 1343.14	EL 1343.73	EL 1344.32	EL 1344.91	EL 1345.50	EL 1346.09	EL 1346.68	EL 1347.27	EL 1347.86	EL 1348.45	EL 1349.04	EL 1349.63	EL 1350.22	EL 1350.81	EL 1351.40	EL 1351.99	EL 1352.58	EL 1353.17	EL 1353.76	EL 1354.35	EL 1354.94	EL 1355.53	EL 1356.12	EL 1356.71	EL 1357.30	EL 1357.89	EL 1358.48	EL 1359.07	EL 1359.66	EL 1360.25	EL 1360.84	EL 1361.43	EL 1362.02	EL 1362.61	EL 1363.20	EL 1363.79	EL 1364.38	EL 1364.97	EL 1365.56	EL 1366.15	EL 1366.74	EL 1367.33	EL 1367.92	EL 1368.51	EL 1369.10	EL 1369.69	EL 1370.28	EL 1370.87	EL 1371.46	EL 1372.05	EL 1372.64	EL 1373.23	EL 1373.82	EL 1374.41	EL 1375.00	EL 1375.59	EL 1376.18	EL 1376.77	EL 1377.36	EL 1377.95	EL 1378.54	EL 1379.13	EL 1379.72	EL 1380.31	EL 1380.90	EL 1381.49	EL 1382.08	EL 1382.67	EL 1383.26	EL 1383.85	EL 1384.44	EL 1385.03	EL 1385.62	EL 1386.21	EL 1386.80	EL 1387.39	EL 1387.98	EL 1388.57	EL 1389.16	EL 1389.75	EL 1390.34	EL 1390.93	EL 1391.52	EL 1392.11	EL 1392.70	EL 1393.29	EL 1393.88	EL 1394.47	EL 1395.06	EL 1395.65	EL 1396.24	EL 1396.83	EL 1397.42	EL 1398.01	EL 1398.60	EL 1399.19	EL 1399.78	EL 1400.37	EL 1400.96	EL 1401.55	EL 1402.14	EL 1402.73	EL 1403.32	EL 1403.91	EL 1404.50	EL 1405.09	EL 1405.68	EL 1406.27	EL 1406.86	EL 1407.45	EL 1408.04	EL 1408.63	EL 1409.22	EL 1409.81	EL 1410.40	EL 1410.99	EL 1411.58	EL 1412.17	EL 1412.76	EL 1413.35	EL 1413.94	EL 1414.53	EL 1415.12	EL 1415.71	EL 1416.30	EL 1416.89	EL 1417.48	EL 1418.07	EL 1418.66	EL 1419.25	EL 1419.84	EL 1420.43	EL 1421.02	EL 1421.61	EL 1422.20	EL 1422.79	EL 1423.38	EL 1423.97	EL 1424.56	EL 1425.15	EL 1425.74	EL 1426.33	EL 1426.92	EL 1427.51	EL 1428.10	EL 1428.69	EL 1429.28	EL 1429.87	EL 1430.46	EL 1431.05	EL 1431.64	EL 1432.23	EL 1432.82	EL 1433.41	EL 1434.00	EL 1434.59	EL 1435.18	EL 1435.77	EL 1436.36	EL 1436.95	EL 1437.54	EL 1438.13	EL 1438.72	EL 1439.31	EL 1439.90	EL 1440.49	EL 1441.08	EL 1441.67	EL 1442.26	EL 1442.85	EL 1443.44	EL 1444.03	EL 1444.62	EL 1445.21	EL 1445.80	EL 1446.39	EL 1446.98	EL 1447.57	EL 1448.16	EL 1448.75	EL 1449.34	EL 1449.93	EL 1450.52	EL 1451.11	EL 1451.70	EL 1452.29	EL 1452.88	EL 1453.47	EL 1454.06	EL 1454.65	EL 1455.24	EL 1455.83	EL 1456.42	EL 1457.01	EL 1457.60	EL 1458.19	EL 1458.78	EL 1459.37	EL 1459.96	EL 1460.55	EL 1461.14	EL 1461.73	EL 1462.32	EL 1462.91	EL 1463.50	EL 146
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# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-1**

SHEET NO.: **6 of 10**

Station	Old P/G	New P/G	P/G Change	Area	Volume
111+75	948.89	948.90	0.01	0	0
112+00	947.73	947.77	0.04	0	0
112+50	945.42	945.66	0.24	0	0
113+00	943.11	943.75	0.64	0	0
113+50	940.80	942.04	1.24	0	48
114+00	938.49	940.54	2.05	52	134
114+50	936.18	939.23	3.05	93	253
115+00	933.87	938.13	4.26	180	722
115+50	931.58	937.23	5.65	600	1472
116+00	929.47	936.53	7.06	990	1139
116+50	927.55	936.03	8.48	240	111
116+75	926.84	935.86	10.03	0	0
117+00	925.83	935.71	11.39	0	0
117+50	924.32	935.42	12.43	0	0
118+00	922.99	935.12	13.25	0	69
118+50	921.87	934.82	13.87	75	1069
119+00	920.95	934.53	14.31	1080	4000
119+50	920.22	934.23	14.54	3240	5222
120+00	919.69	933.94	14.58	2400	6019
120+50	919.36	933.64	14.44	4100	8463
121+00	919.20	933.34	14.27	5040	7805
121+50	919.07	933.05	14.12	3389	5721
122+00	918.93	932.75	13.95	2790	5137
122+50	918.80	932.46	13.79	2758	5078
123+00	918.67	932.16	13.63	2726	5017
123+50	918.53	931.86	13.46	2692	4956
124+00	918.40	931.57	13.30	2660	4896
124+50	918.27	931.27	13.14	2628	4837
125+00	918.13	930.98	12.98	2596	4776
125+50	918.00	930.68	12.81	2562	4715
126+00	917.87	930.38	12.65	2530	4540

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-1**

SHEET NO.: 7 of 10

Station	Old P/G	New P/G	P/G Change	Area	Volume
126+50	917.73	930.09	12.49	2373	4706
127+00	917.60	929.79	12.32	2710	4988
127+50	917.47	929.50	12.17	2677	4719
128+00	917.33	929.30	12.10	2420	4322
128+50	917.20	928.90	11.83	2248	4028
129+00	917.07	928.61	11.68	2102	2428
129+50	916.93	928.31	11.48	520	481
130+00	916.83	928.02	11.13	0	0
130+50	916.89	927.72	10.55	0	0
131+00	917.17	927.42	9.78	0	583
131+50	917.64	927.24	9.60	630	1583
132+00	918.32	927.26	8.94	1080	2460
132+50	919.20	927.50	8.30	1577	2918
133+00	920.28	927.96	7.68	1574	2767
133+50	921.56	928.63	7.07	1414	2388
134+00	923.05	929.52	6.47	1165	1841
134+50	924.74	930.62	5.88	823	1216
135+00	926.63	931.94	5.31	490	454
135+50	928.73	933.47	4.74	0	0
136+00	931.03	935.22	4.19	0	0
136+50	933.50	937.18	3.68	0	0
137+00	936.00	939.36	3.36	0	0
137+50	938.50	941.75	3.25	0	0
138+00	941.00	944.25	3.25	0	0
138+50	943.50	946.75	3.25	0	0
139+00	946.00	949.25	3.25	0	452
139+50	948.50	951.75	3.25	488	948
140+00	951.00	954.25	3.25	536	1008
140+50	953.50	956.75	3.25	553	1054
141+00	956.00	959.25	3.25	585	1083
141+50	958.50	961.75	3.25	585	1083

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-1**

SHEET NO.: **8 of 10**

Station	Old P/G	New P/G	P/G Change	Area	Volume
142+00	961.00	964.25	3.25	585	1114
142+50	963.50	966.75	3.25	618	1129
143+00	966.00	969.25	3.25	601	1098
143+50	968.50	971.75	3.25	585	1083
144+00	971.00	974.25	3.25	585	1083
144+50	973.50	976.75	3.25	585	1083
145+00	976.00	979.25	3.25	585	1083
145+50	978.50	981.75	3.25	585	1083
146+00	981.00	984.25	3.25	585	1083
146+50	983.50	986.75	3.25	585	1144
147+00	986.00	989.25	3.25	650	1219
147+50	988.50	991.75	3.25	666	1233
148+00	991.00	994.25	3.25	666	1248
148+50	993.50	996.75	3.25	682	631
148+75	994.75	998.00	3.25	682	621
149+00	996.00	999.22	3.22	660	1202
149+50	998.40	1001.51	3.11	638	1115
150+00	1000.59	1003.57	2.98	566	995
150+50	1002.59	1005.42	2.83	509	894
151+00	1004.37	1007.06	2.69	457	868
151+50	1005.96	1008.47	2.51	480	815
152+00	1007.34	1009.67	2.33	400	593
152+50	1008.52	1010.66	2.14	240	222
153+00	1009.50	1011.42	1.92	0	0
153+50	1010.27	1011.97	1.70	0	0
154+00	1010.84	1012.31	1.47	0	0
154+50	1011.21	1012.42	1.21	0	0
155+00	1011.37	1012.32	0.95	0	0
155+50	1011.34	1012.01	0.67	0	0
156+00	1011.09	1011.47	0.38	0	0
156+25	1010.87	1011.13	0.26	0	0

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-1**

SHEET NO.: **9 of 10**

Station	Old P/G	New P/G	P/G Change	Area	Volume
156+50	1010.65	1010.75	0.10	0	0
157+00	1010.00	1010.00	0.00	0	0
Total					156350

Culvert at Station 117+80  
Profile raised by 13.6 feet. Skew angle 70.  
Culvert must be lengthened by  $2(13.6)(2)/\sin 70 = 58$  feet  
Use 1.5 CY per foot,  $1.5(58) = 87$  CY  
For reinforcing steel, use  $130 \text{ \#/CY} = 130(87) = 11310 \text{ \#}$

Culvert at Station 130+60  
Profile raised by 10.5 feet. Skew angle 85.  
Culvert must be lengthened by  $2(10.5)(2)/\sin 85 = 42$  feet  
Use 1.5 CY per foot,  $1.5(42) = 63$  CY  
For reinforcing steel, use  $130 \text{ \#/CY} = 130(63) = 8190 \text{ \#}$

Culvert at Station 137+00  
Profile raised by 3.4 feet. Skew angle 65.  
Culvert must be lengthened by  $2(3.4)(2)/\sin 65 = 15$  feet  
Use 2.6 CY per foot,  $2.6(15) = 39$  CY  
For reinforcing steel, use  $130 \text{ \#/CY} = 130(39) = 5070 \text{ \#}$

Culvert totals: Concrete 189 CY; Reinforcing steel 24570 #



# VALUE ENGINEERING ALTERNATIVE



PROJECT:	<b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); PI No.132860</i> <i>Hall and Jackson Counties, GA</i>	ALTERNATIVE NO.:
		<b>E-2</b>
DESCRIPTION:	<b>RAISE THE PROFILE FROM STATION 63+00 TO 78+50 TO REDUCE THE AMOUNT OF EXCAVATION</b>	SHEET NO.: 1 of 13

**ORIGINAL DESIGN:**

The original SR 53 profile requires more than 22 feet of cut at Station 70+00.

**ALTERNATIVE:** (sketch attached)

Raise the profile about 10.3 feet at Station 71+00, substantially reducing the amount of excavation that is required.

**ADVANTAGES:**

- Reduces excavation requirements
- Reduces construction time

**DISADVANTAGES:**

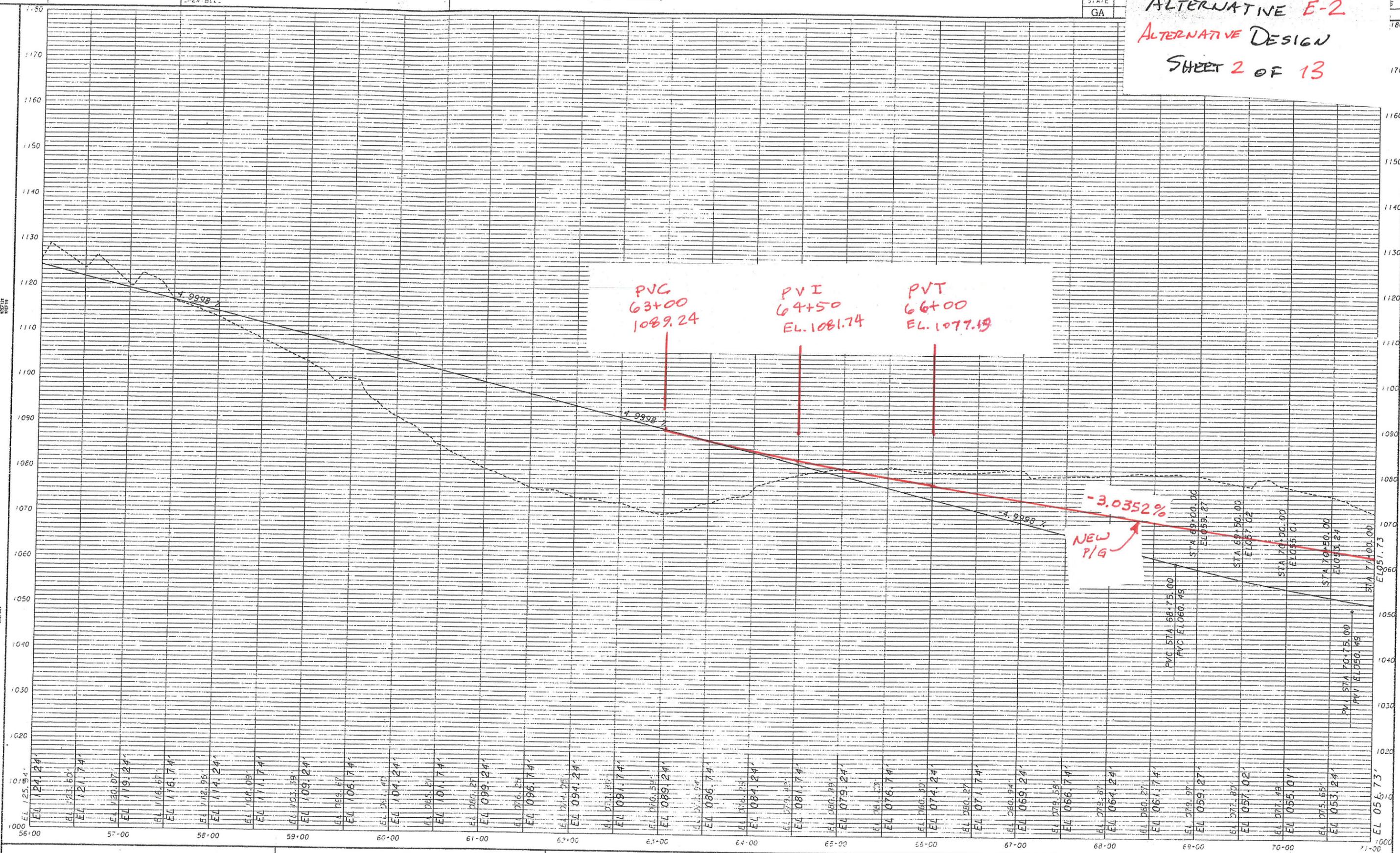
- None apparent

**DISCUSSION:**

This project is a waste project, so reducing the amount of excavation not only reduces the time and work required for the excavation, but also reduces the amount of material to be hauled off the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 266,000	—	\$ 266,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 266,000	—	\$ 266,000

ALTERNATIVE E-2  
 ALTERNATIVE DESIGN  
 SHEET 2 OF 13



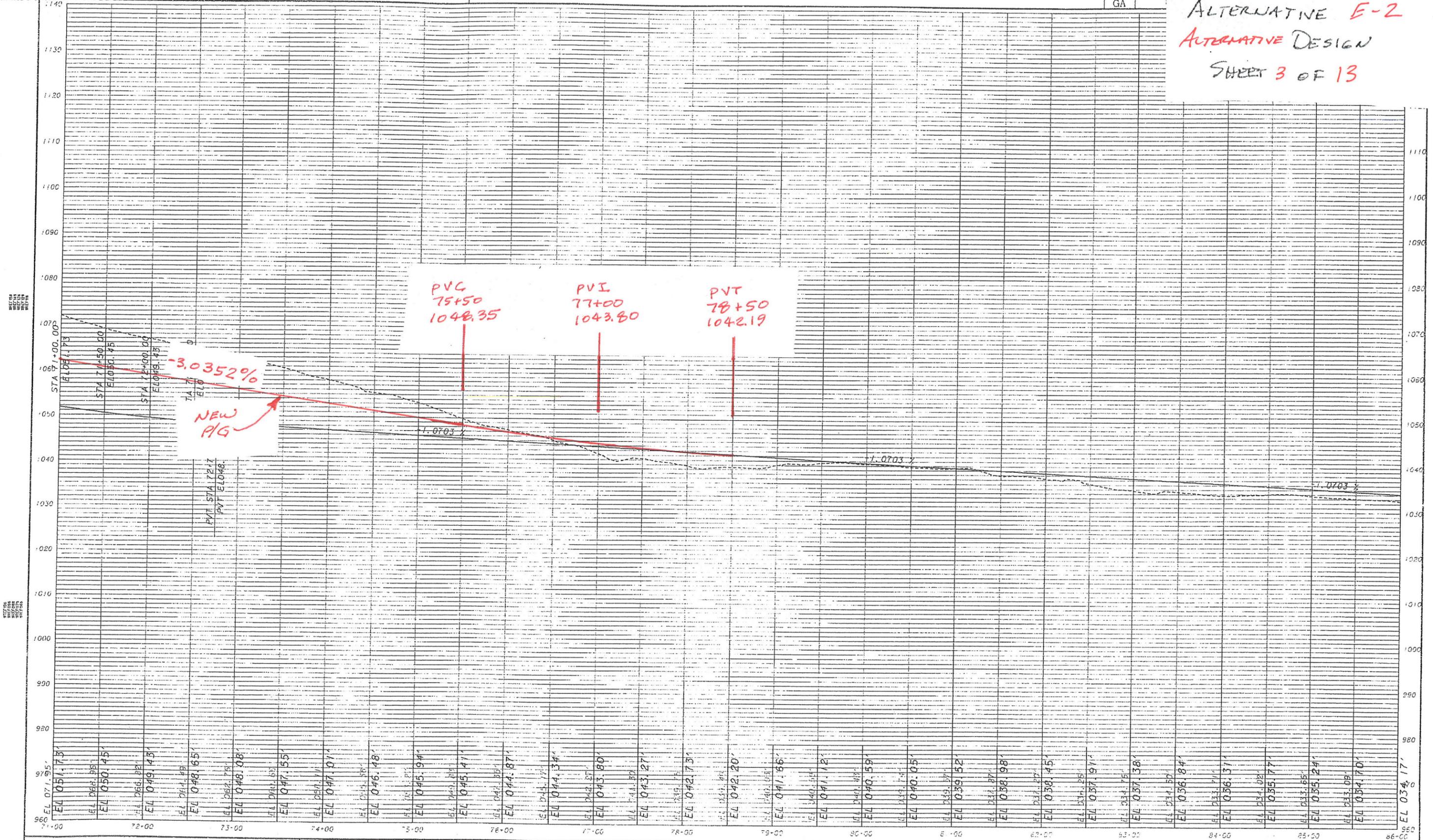
VERT. DATUM = NGVD 88  
 VERT. SCALE: 1" = 10'

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BLDG. DRG 200

REVISION	DATE

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 MAINLINE PROFILE

ALTERNATIVE E-2  
ALTERNATIVE DESIGN  
SHEET 3 OF 13



THE STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 DIVISION OF HIGHWAYS  
 DIVISION OF HIGHWAYS

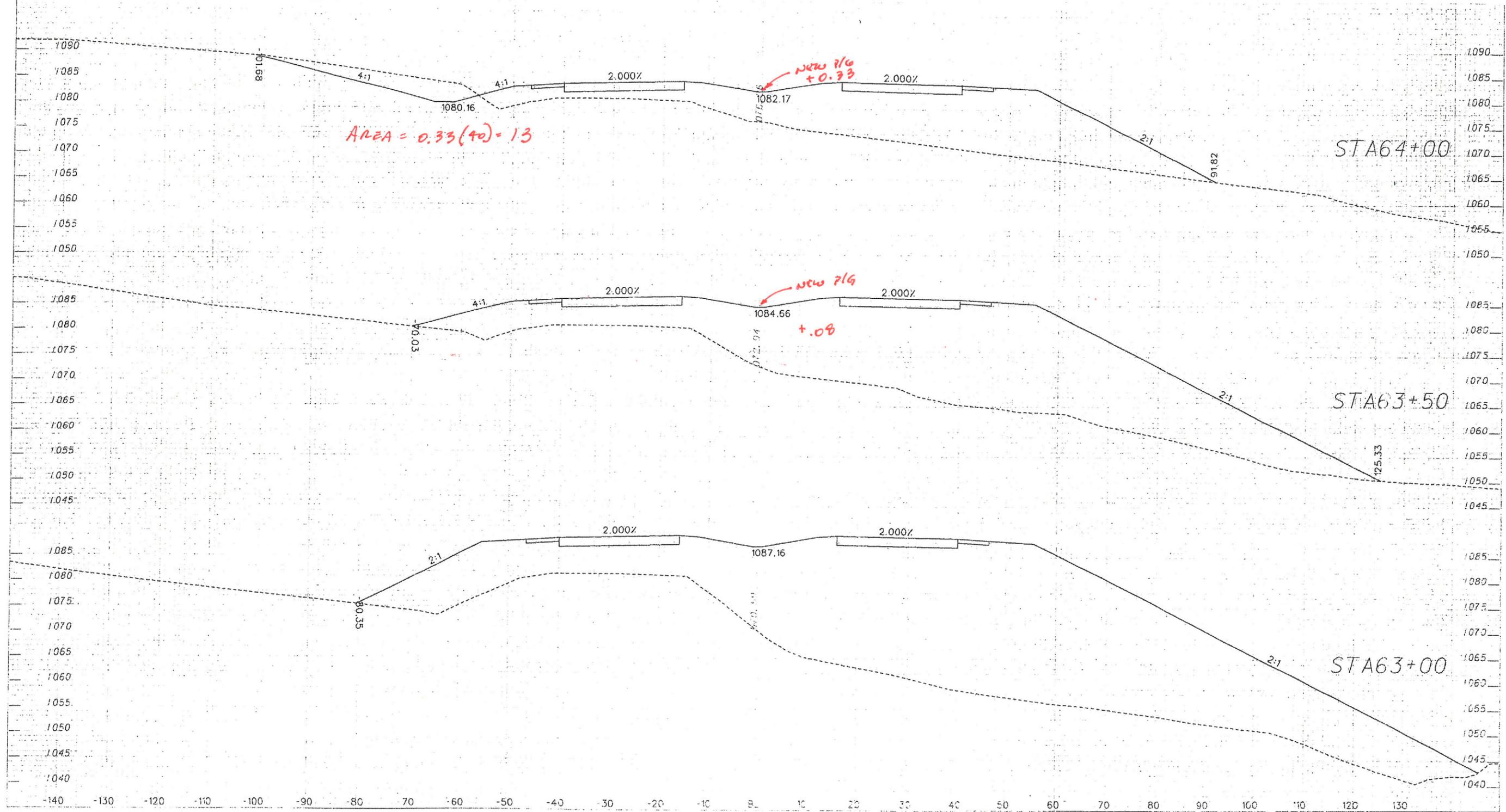
VERT. DATUM = NGVD 88  
 VERT. SCALE: 1" = 10'

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200

REVISION	DATE	DESCRIPTION

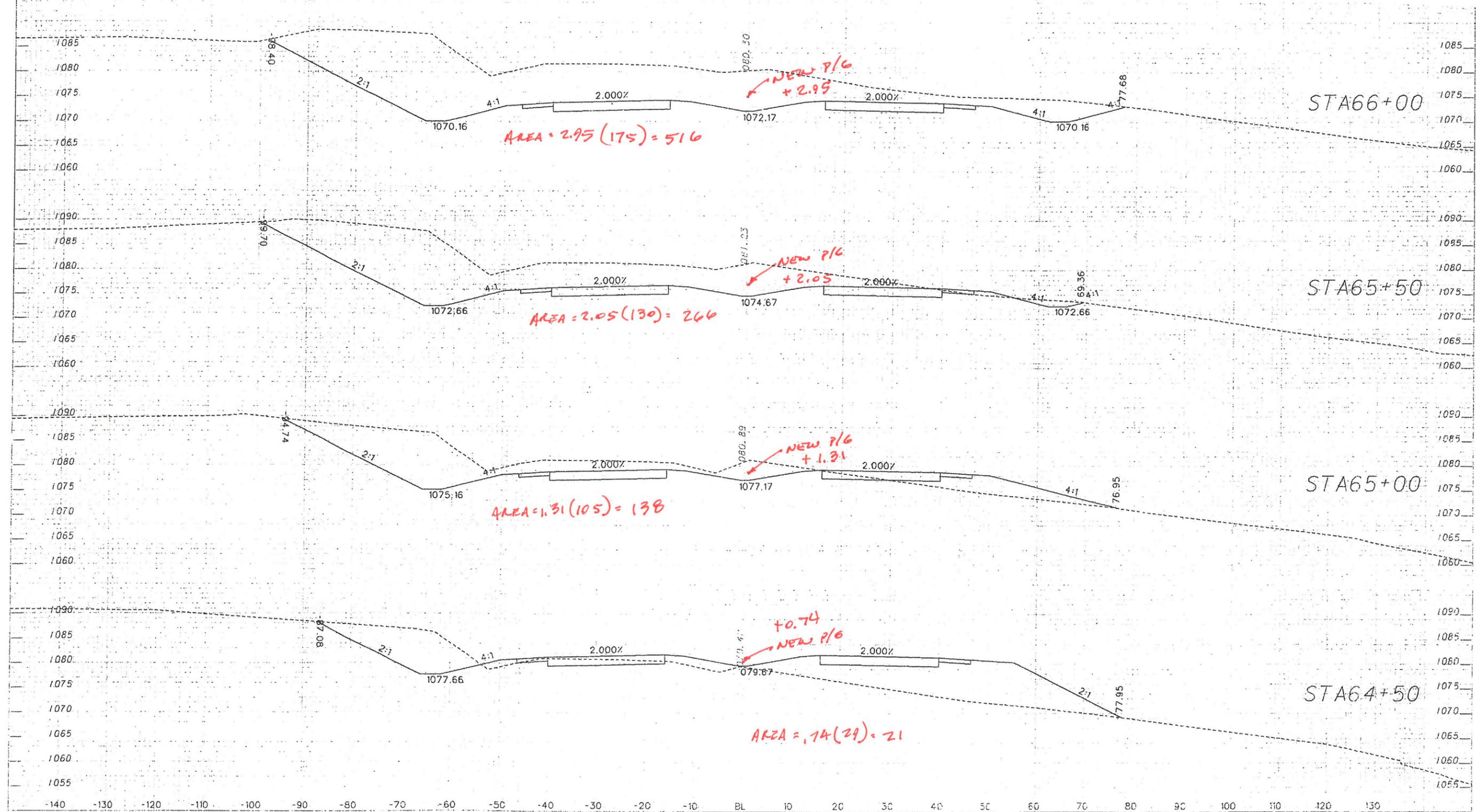
STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: MAINLINE PROFILE

ALTERNATIVE E-2  
 ALTERNATIVE DESIGN  
 SHEET 4 OF 13



REVISION DATES

ALTERNATIVE E-2  
ALTERNATIVE DESIGN  
SHEET 5 OF 13



SCALE: 1" = 10'

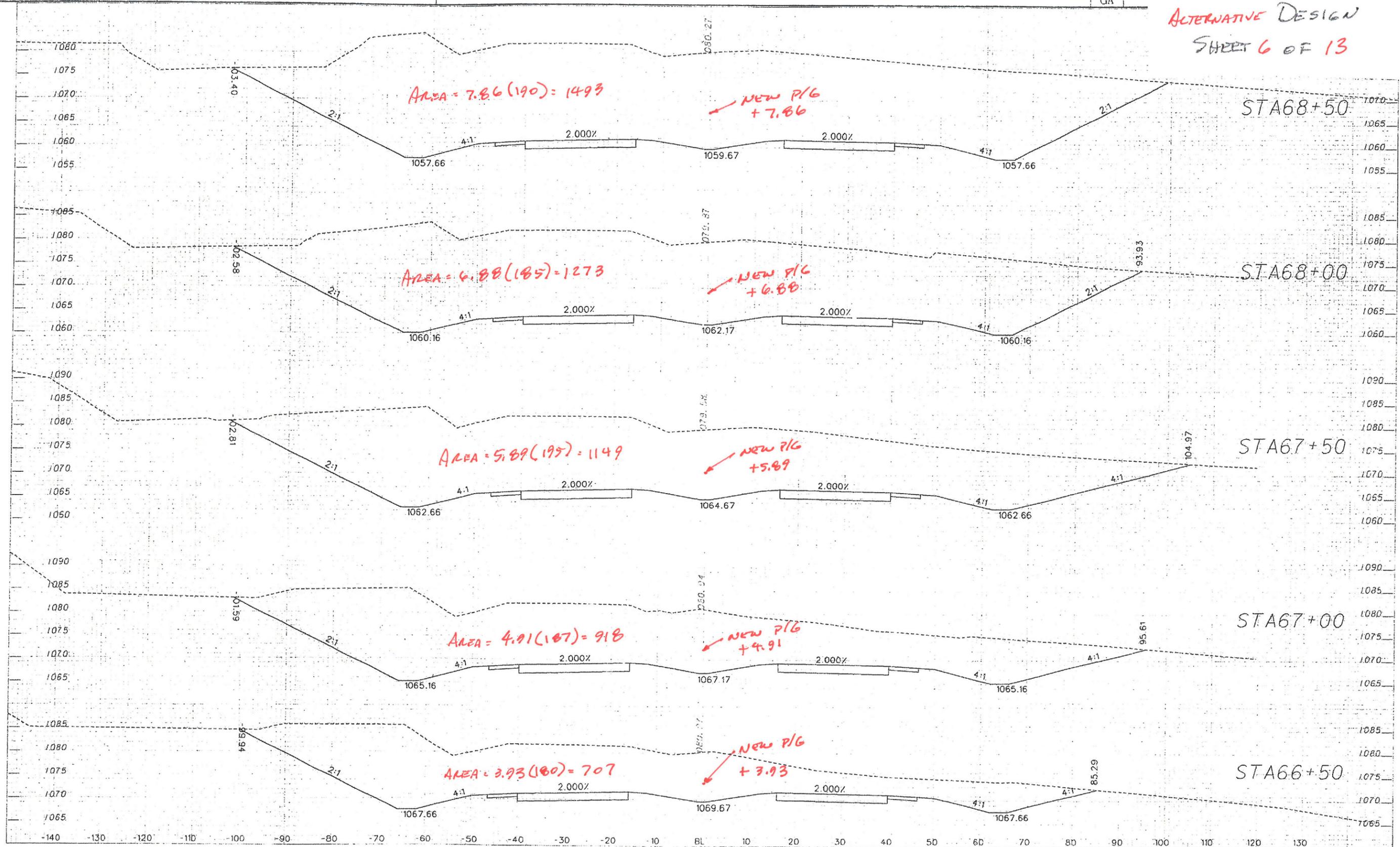
Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066

REVISION	DATE

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE E-2  
 ALTERNATIVE DESIGN  
 SHEET 6 OF 13

STAFF  
 GA



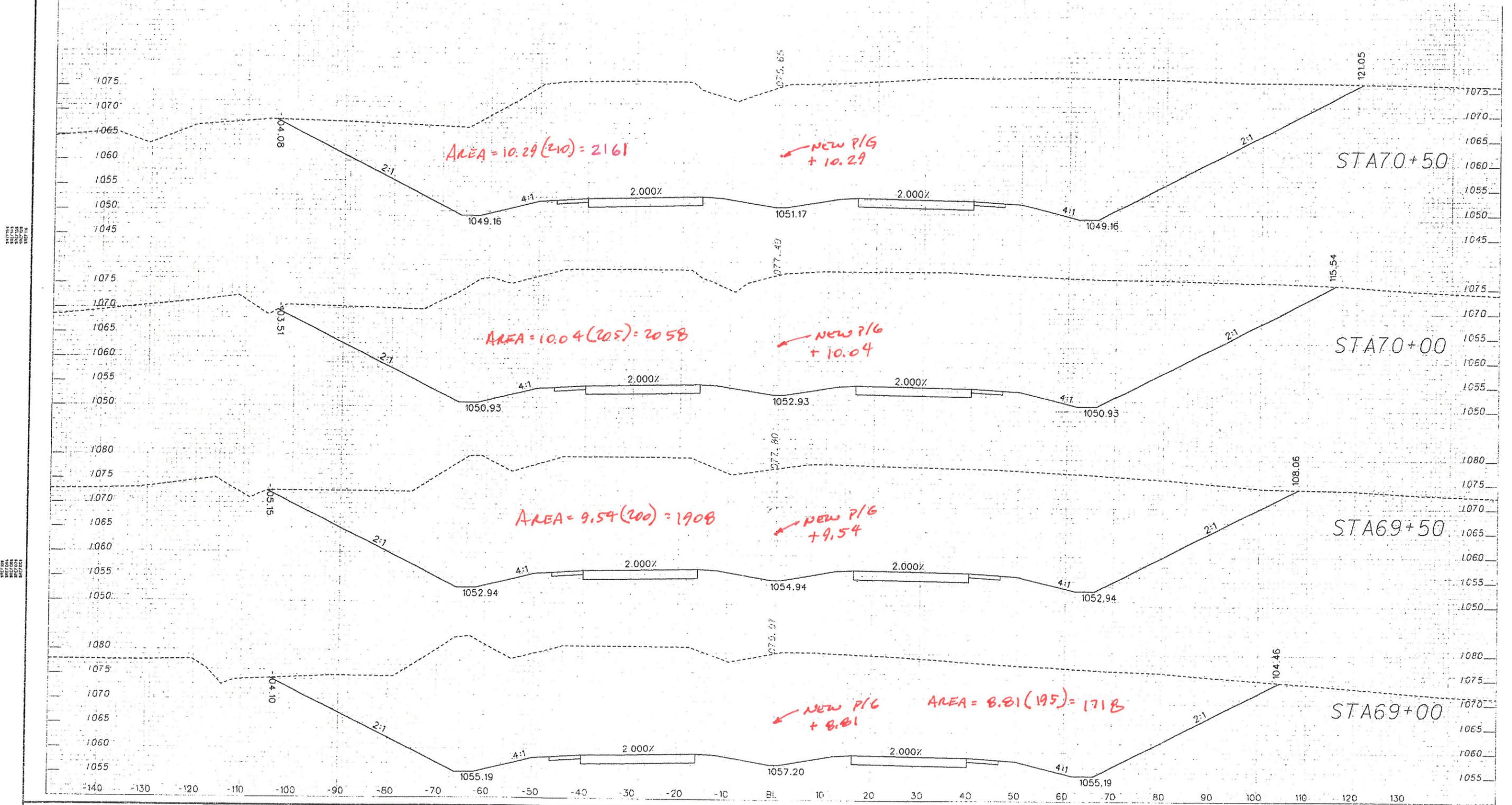
SCALE : 1" = 10'

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30066-5305

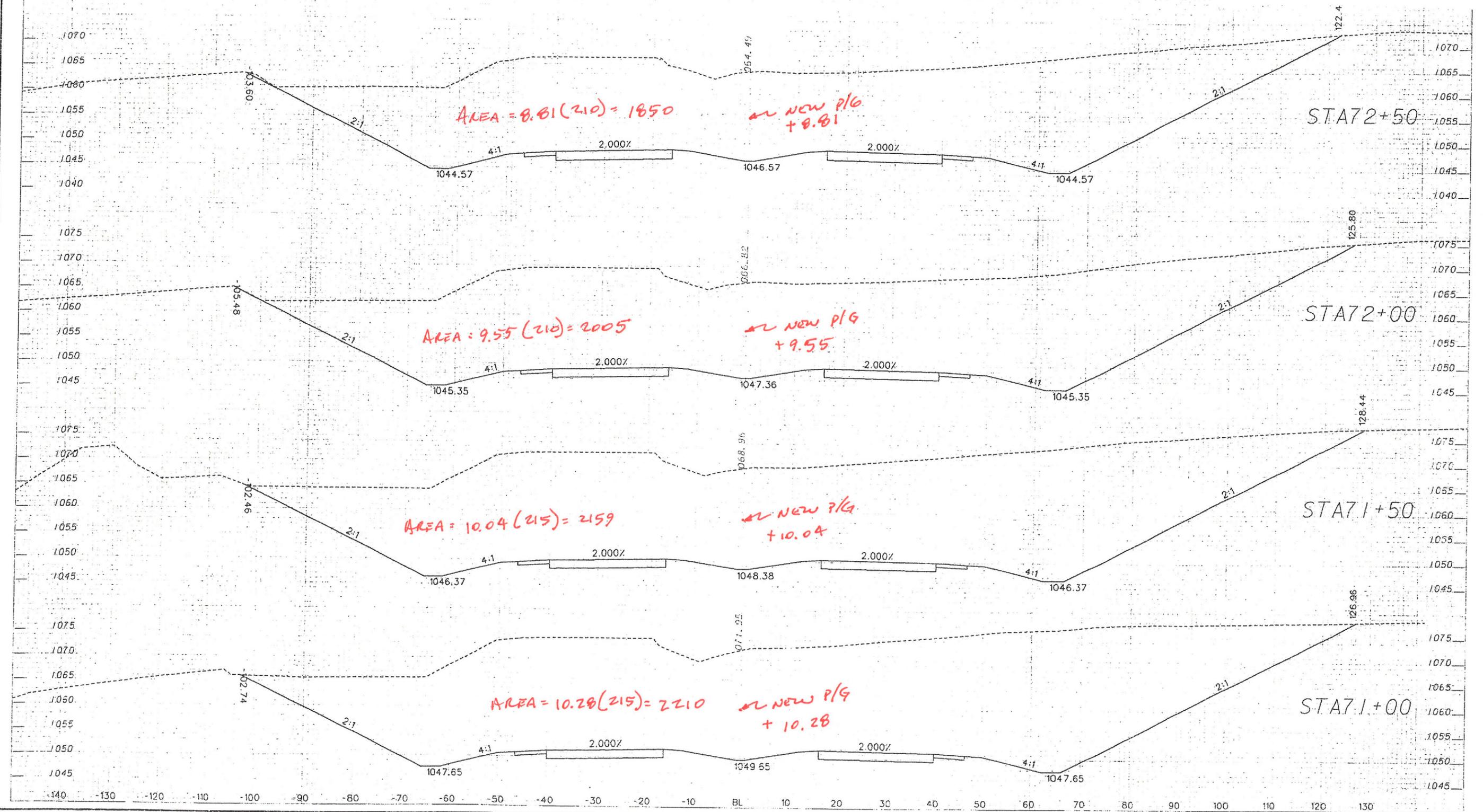
REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 EARTHWORK CROSS SECTIONS

ALTERNATIVE E-2  
ALTERNATIVE DESIGN  
SHEET 7 OF 13



ALTERNATIVE E-2  
ALTERNATIVE DESIGN  
SHEET 8 OF 13



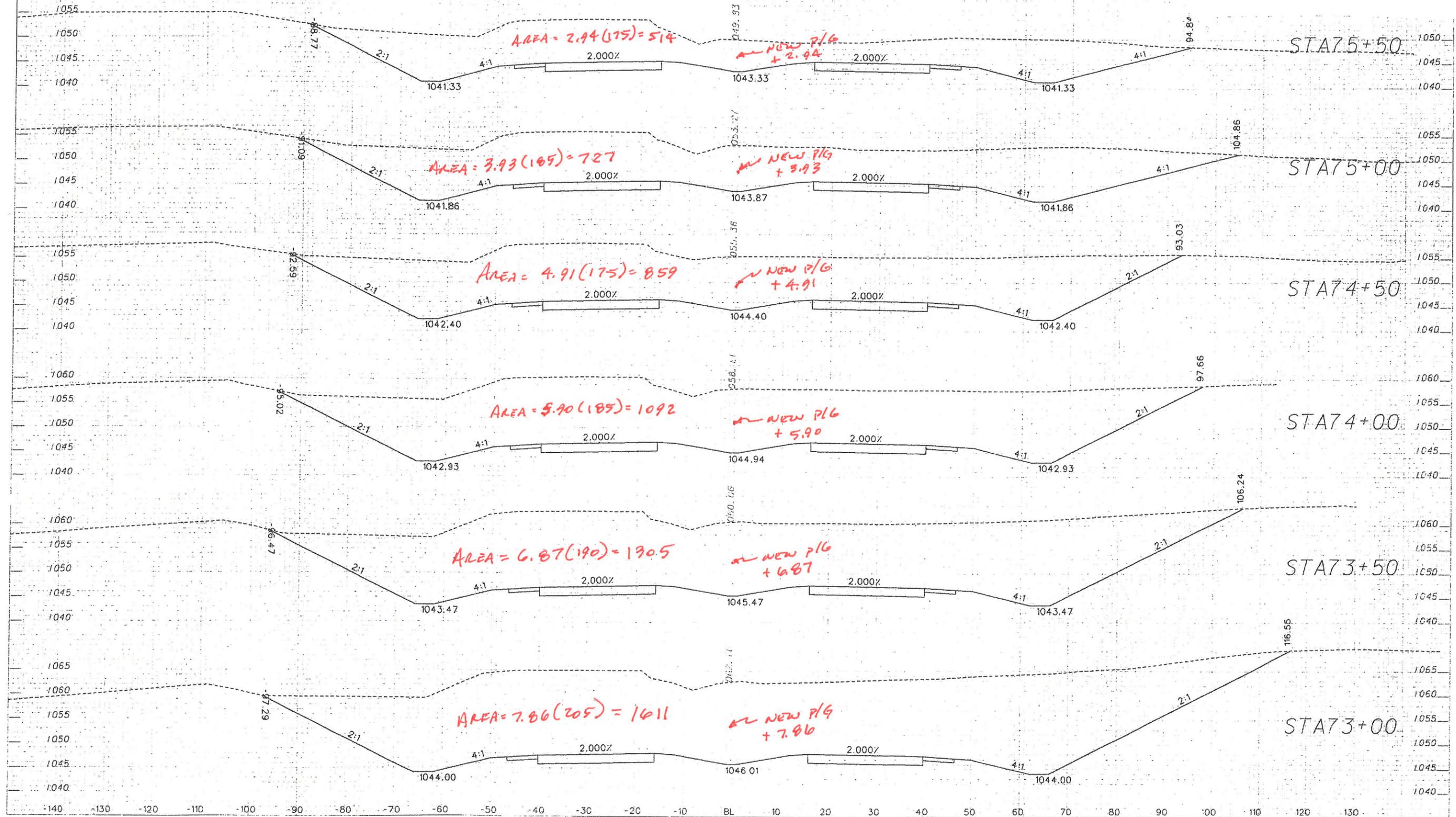
SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE E-2  
ALTERNATIVE DESIGN  
SHEET 9 OF 13



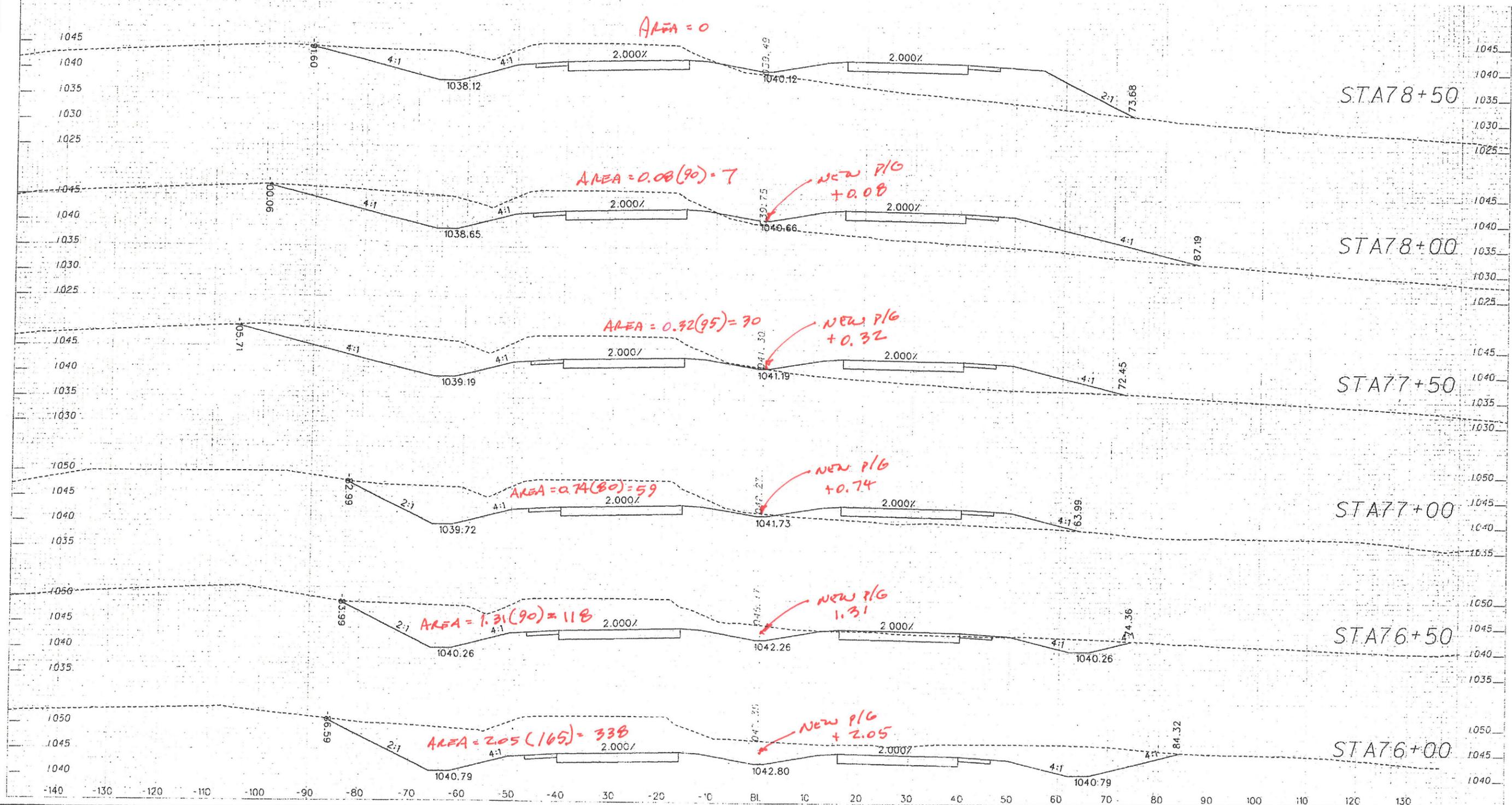
SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2590 CANTON ROAD, BUILDING 100  
MARIETTA, GEORGIA 30066-5307

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: 101  
EARTHWORK CROSS SECTIONS

ALTERNATIVE E-2  
 ALTERNATIVE DESIGN  
 SHEET 10 OF 13



SCALE : 1" = 10'

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BETH DING 200  
 MARIETTA, GEORGIA 30066-5501

REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 EARTHWORK CROSS SECTIONS

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No. 132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-2**

SHEET NO.: **11 of 13**

Station	Old P/G	New P/G	P/G Change	Area	Volume
63+00	1089.24	1089.24	0.00	0 SF	0 CY
63+50	1086.74	1086.82	+0.08	0	12
64+00	1084.24	1084.57	+0.33	13	31
64+50	1081.74	1082.48	+0.74	21	147
65+00	1079.24	1080.55	+1.31	138	374
65+50	1076.74	1078.79	+2.05	266	724
66+00	1074.24	1077.19	+2.95	516	1132
66+50	1071.74	1075.67	+3.93	707	1505
67+00	1069.24	1074.15	+4.91	918	1914
67+50	1066.74	1072.63	+5.89	1149	2243
68+00	1064.24	1071.12	+6.88	1273	2561
68+50	1061.74	1069.60	+7.86	1493	2973
69+00	1059.27	1068.08	+8.81	1718	3357
69+50	1057.02	1066.56	+9.54	1908	3672
70+00	1055.01	1065.05	+10.04	2058	3906
70+50	1053.24	1063.53	+10.29	2161	4047
71+00	1051.73	1062.01	+10.28	2210	4045
71+50	1050.45	1060.49	+10.04	2159	3856
72+00	1049.43	1058.98	+9.55	2005	

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**E-2**

SHEET NO.: **12 of 13**

Station	Old P/G	New P/G	P/G Change	Area	Volume
72+00	1049.43	1058.98	+9.55	2005 SF	3569
72+50	1048.65	1057.46	+8.81	1850	3204
73+00	1048.08	1055.94	+7.86	1611	2700
73+50	1047.55	1054.42	+6.87	1305	2219
74+00	1047.01	1052.91	+5.90	1092	1806
74+50	1046.48	1051.39	+4.91	859	1469
75+00	1045.94	1049.87	+3.93	727	1149
75+50	1045.41	1048.35	+2.94	514	789
76+00	1044.87	1046.92	+2.05	338	422
76+50	1044.34	1045.65	+1.31	118	164
77+00	1043.80	1044.54	+0.74	59	82
77+50	1043.27	1043.59	+0.32	30	34
78+00	1042.73	1042.81	+0.08	7	6
78+50	1042.20	1042.19	-0.01	0	

Total Volume = 54,112 CY



# VALUE ENGINEERING ALTERNATIVE



**PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**RW-1**

**DESCRIPTION: USE AN URBAN TYPICAL SECTION FROM THE  
BEGINNING OF THE PROJECT TO STATION 65+00 TO  
REDUCE THE EXTENT OF THE RETAINING WALL**

SHEET NO.: 1 of 18

**ORIGINAL DESIGN:** (sketch attached)

The typical section transitions from matching the existing section of SR 53 at SR 211 (a 20-ft.-wide raised grassed median) to a rural typical section with a 32-ft.-wide depressed median at approximately Station 46+00.

**ALTERNATIVE:** (sketch attached)

Continue the existing typical section from SR 211 to Station 65+00 to reduce the length and height of the retaining wall.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces wall construction time

**DISADVANTAGES:**

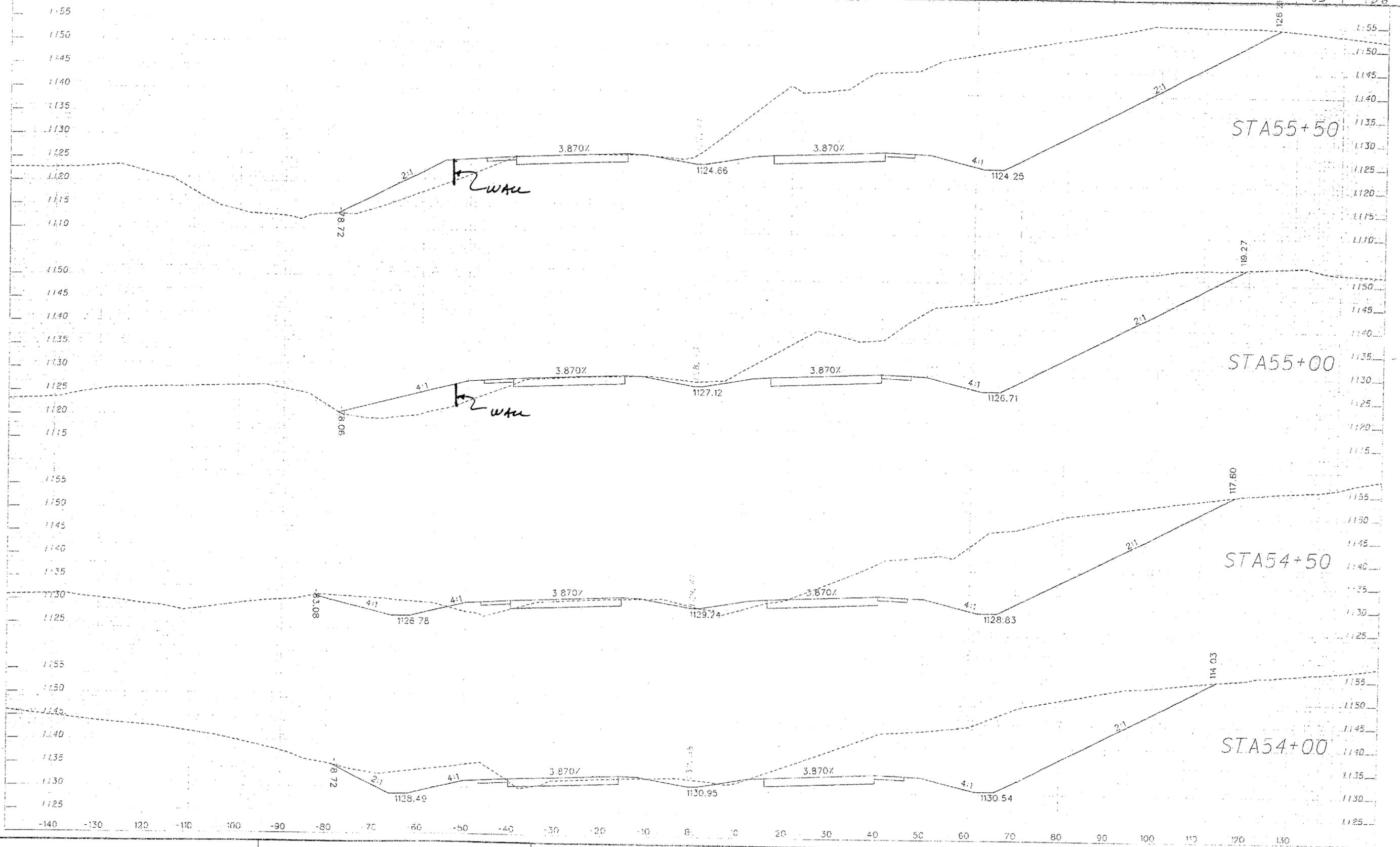
- None apparent

**DISCUSSION:**

The original design proposes to transition from the existing typical section of SR 53 at SR 211 to the rural typical section ending at approximately Station 46+00. By extending the section that exists at SR 211, the width of the typical section is reduced. By holding the right edge of the travelway, the left limit of the typical section is moved to the right, reducing the required length and height of the retaining wall.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 532,000	—	\$ 532,000
ALTERNATIVE	\$ 296,000	—	\$ 296,000
SAVINGS (Original minus Alternative)	\$ 236,000	—	\$ 236,000

GA	PROJECT NUMBER 37100-0065-03-RFD	SHEET NO. 65	TOTAL SHEETS 86
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PERMITS AND REGULATIONS  
 CONSULT LOCAL AGENCIES  
 FOR ALL APPLICABLE  
 REGULATIONS

SCALE: 1" = 10'

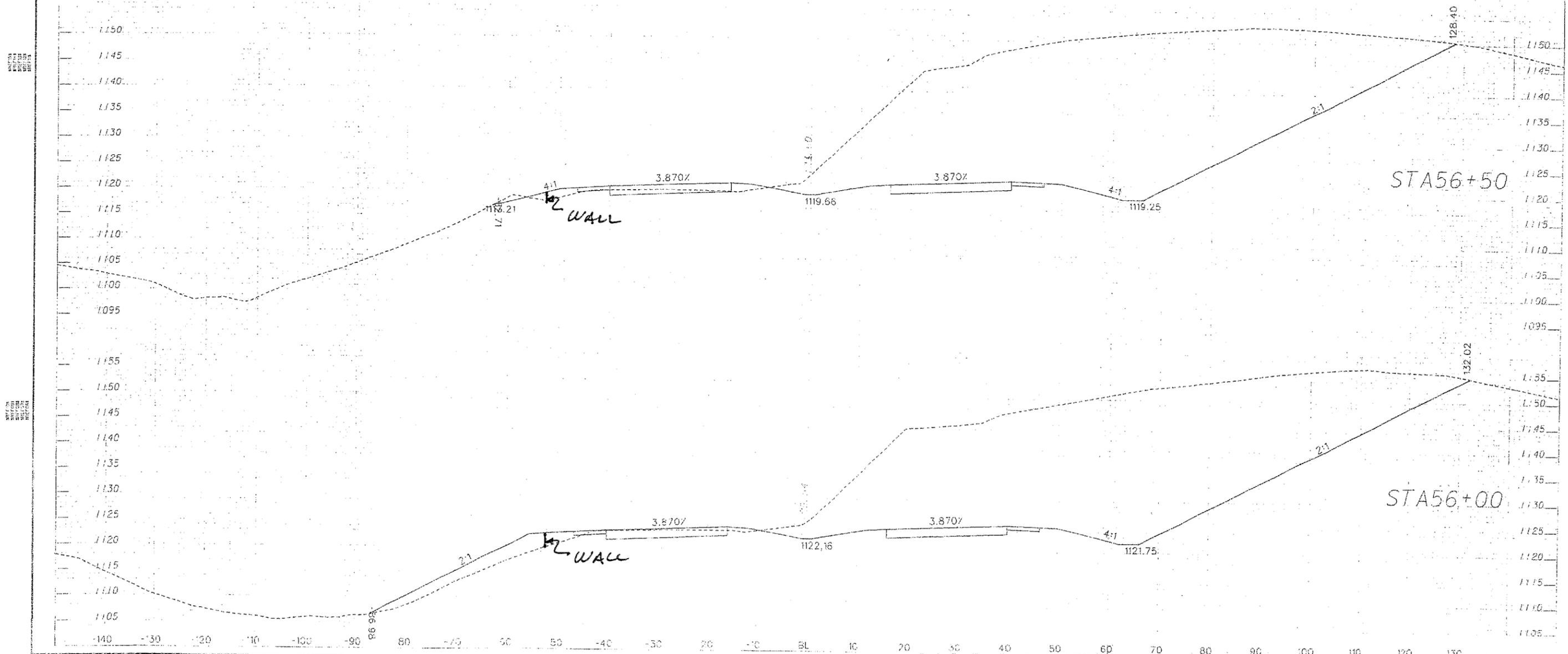
Heath & Lineback Engineers  
 INCORPORATED  
 2590 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30066-5391

REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 EARTHWORK CROSS SECTIONS 107

ALTERNATIVE RW-1  
ORIGINAL DESIGN  
SHEET 3 OF 18

4.20/20.0	PROJ. NO.	PROJ. NAME	SHEET NO.	TOTAL SHEETS
USER: jg	GA	GA	66	136

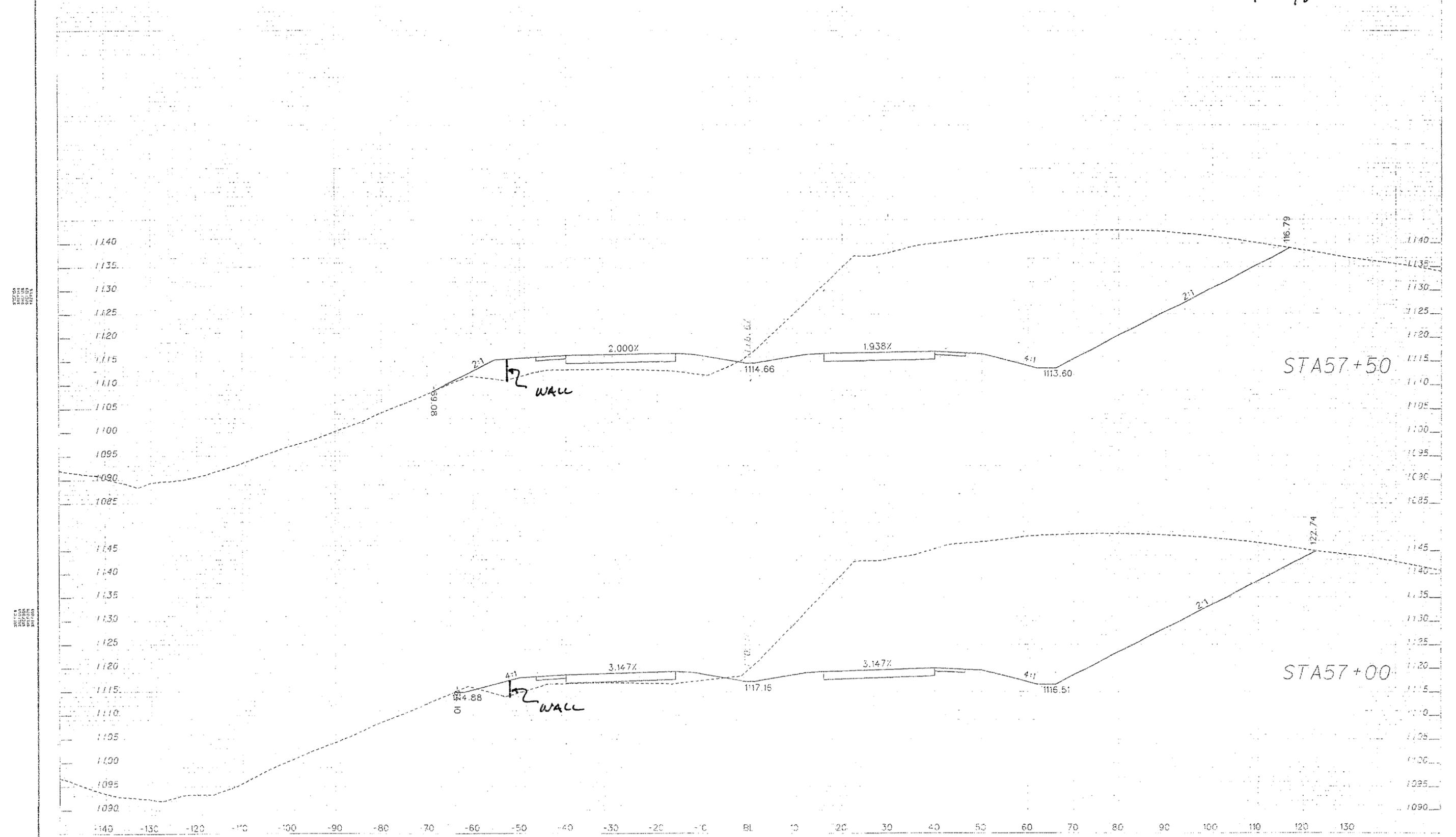


SCALE: 1" = 10'	<p>Heath &amp; Lineback Engineers INCORPORATED 2390 CANTON ROAD, BUILDING 200 CANTON, GA 30115</p>	REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION
			OFFICE: EARTHWORK CROSS SECTIONS 108

ALTERNATIVE RW-1  
ORIGINAL DESIGN

PROJECT NO.	PROJECT NAME	SHEET NO.	TOTAL SHEETS
GA	17-00-0060-03(05)	67	50

SHEET 4 OF 18



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 109

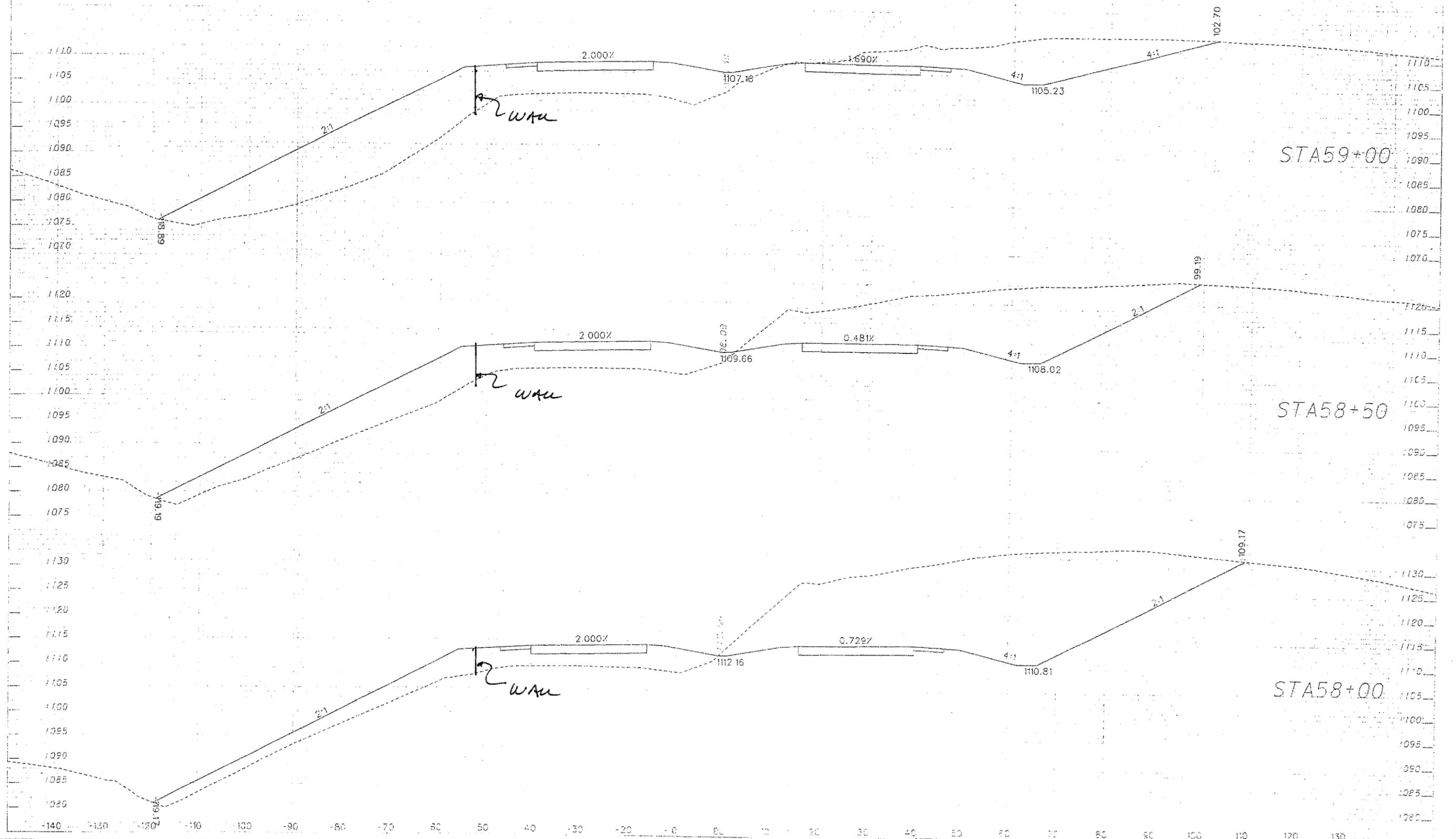
Heath & Lineback Engineers  
INCORPORATED  
2290 CANTON ROAD, R.D. 10, DUNWOODY, GA 30328

SCALE 1" = 10'

ALTERNATIVE RW-1  
ORIGINAL DESIGN

PROJECT	DATE	SHEET NO.	TOTAL SHEETS
GA		68	150

SHEET 5 OF 18



STA 59+00

STA 58+50

STA 58+00

WALL

WALL

WALL

SCALE: 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BLDG 100  
MARIETTA, GEORGIA 30066-7592

REVISION	DATE

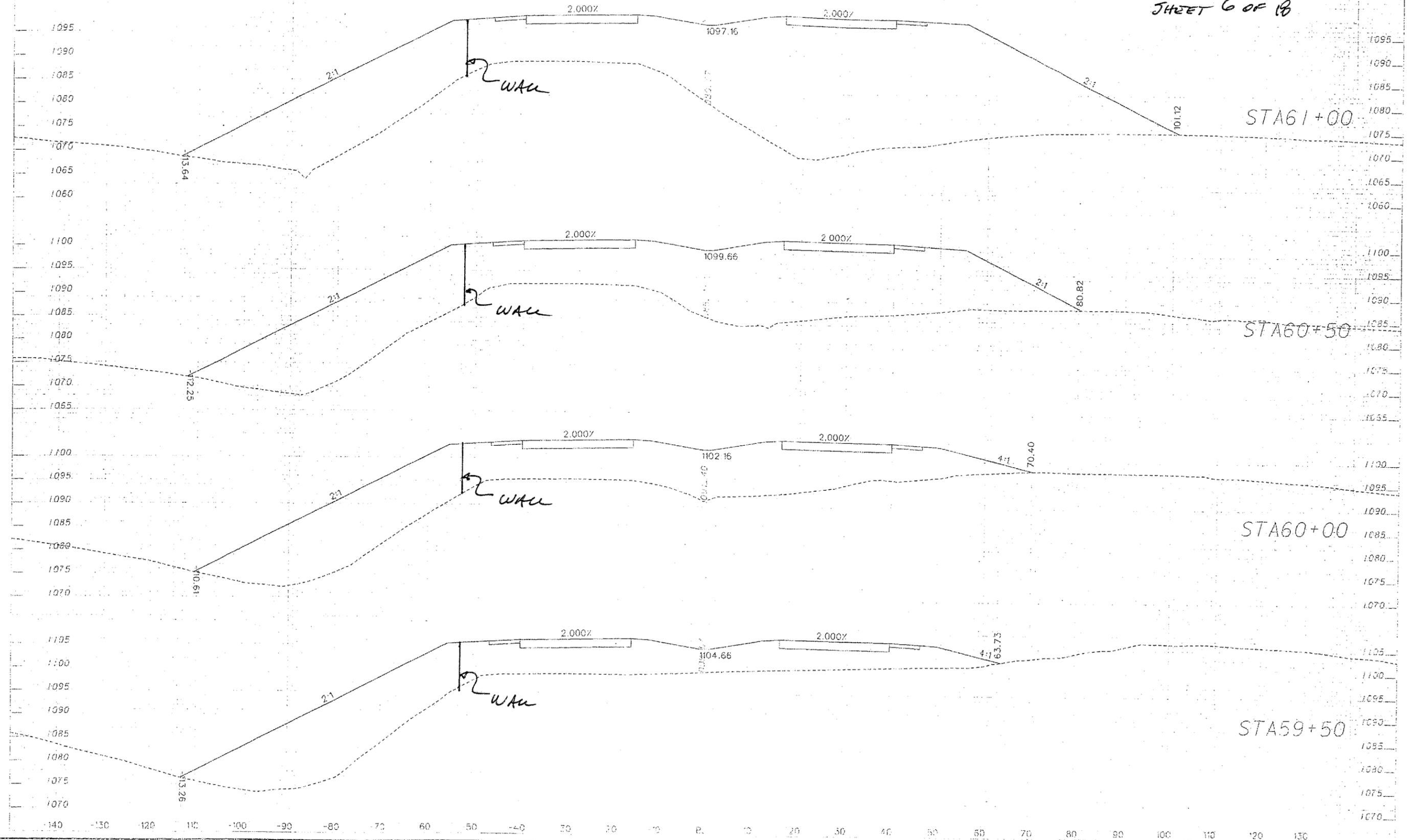
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-1  
ORIGINAL DESIGN

4/30/2019  
USER: jford

STATE	FED. AID DIST. NO.	SHEET NO.	TOTAL SHEETS
GA	01100-0000-13-115	69	156

SHEET 6 OF 18



SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
209 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5097

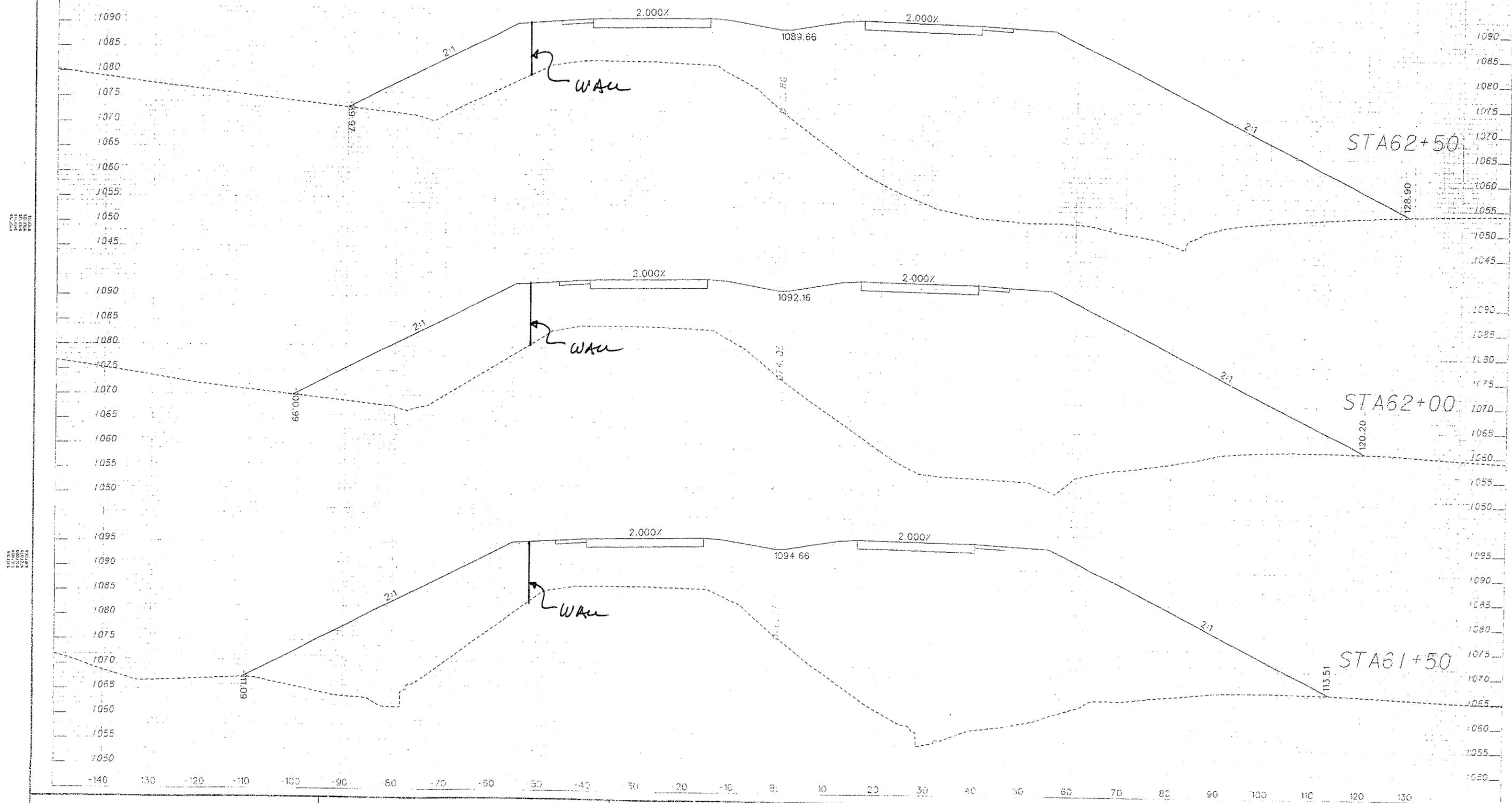
REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 111

ALTERNATIVE RW-1  
ORIGINAL DESIGN

DATE: 10/18	PROJECT: 10000000	PROJECT NO: 10000000	SHEET NO: 70	TOTAL SHEETS: 156
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SHEET 7 OF 18



REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 112

Heath & Lineback Engineers  
INCORPORATED  
2590 CANTON SQUARE, BUILDING 300

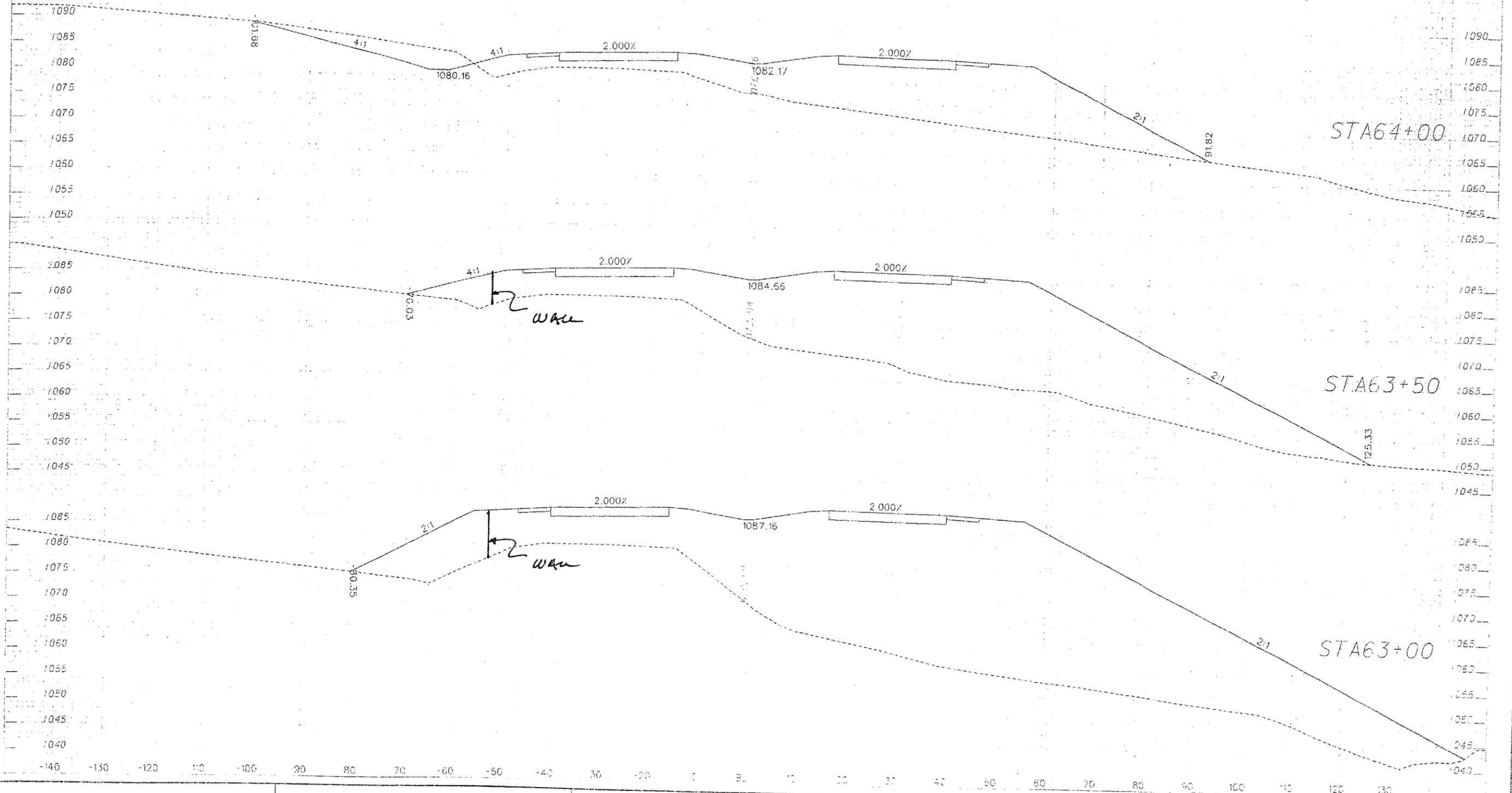
SCALE: 1" = 10'

ALTERNATIVE RW-1  
ORIGINAL DESIGN

4:30-25:0  
USERS: jordan

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	57155-1000-25-100	71	156

SHEET 8 OF 18



SECTION  
EARTHWORK  
SECTION  
EARTHWORK

SECTION  
EARTHWORK  
SECTION  
EARTHWORK

REVISION DATES

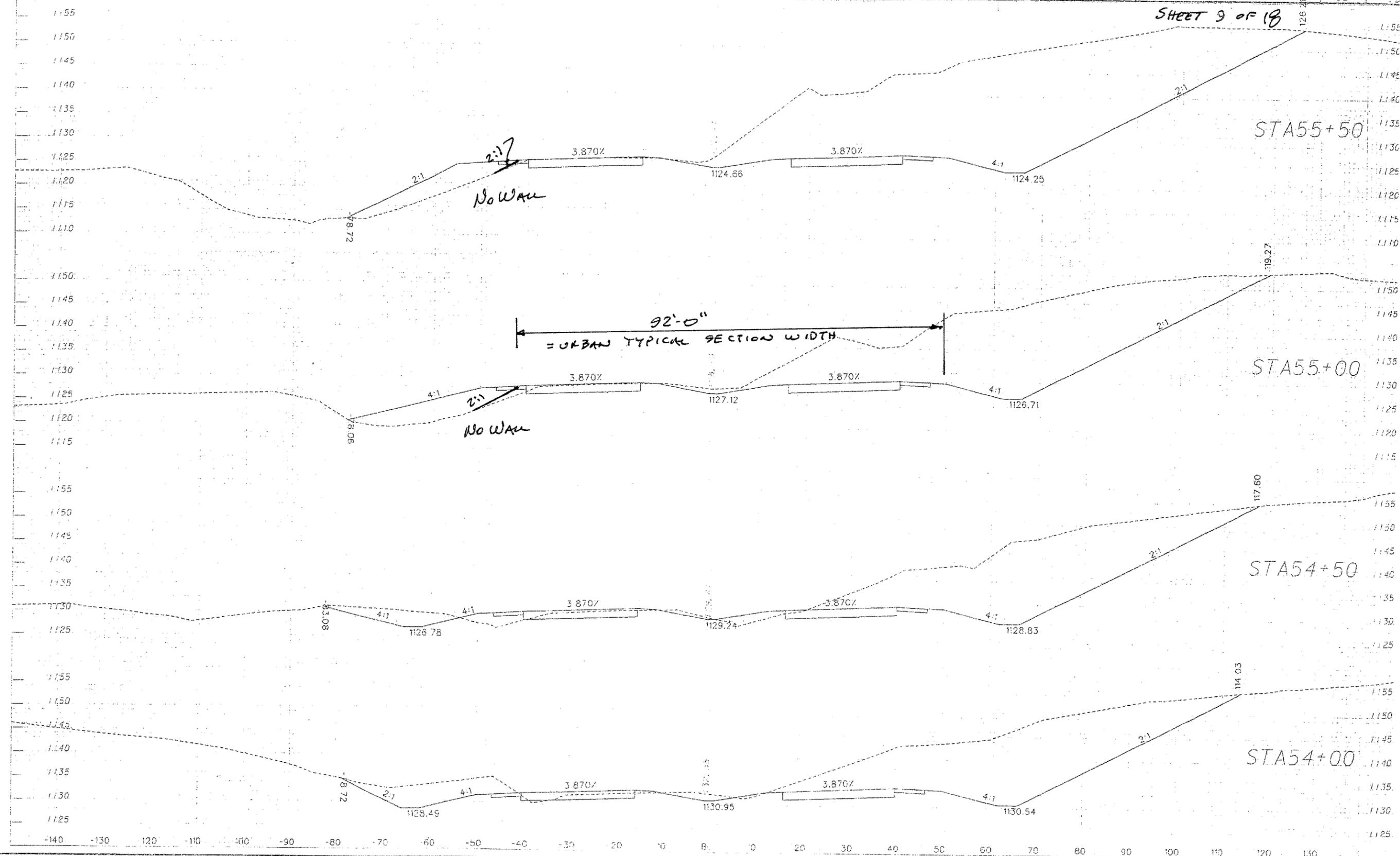
Heath & Lineback Engineers  
INCORPORATED  
399 CANTON ROAD, RICHMOND, GA 31803

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 113

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

DATE	PROJECT NUMBER	SHEET NO.	TOTAL
GA	57700 5065 03 775	65	8

SHEET 9 OF 18



SEE PLAN FOR  
 EXISTING  
 UTILITIES  
 AND  
 OBSTRUCTIONS  
 TO BE  
 REMOVED

SCALE 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2590 CANTON ROAD, BUILDING NO.  
MARIETTA, GEORGIA 30066-7301

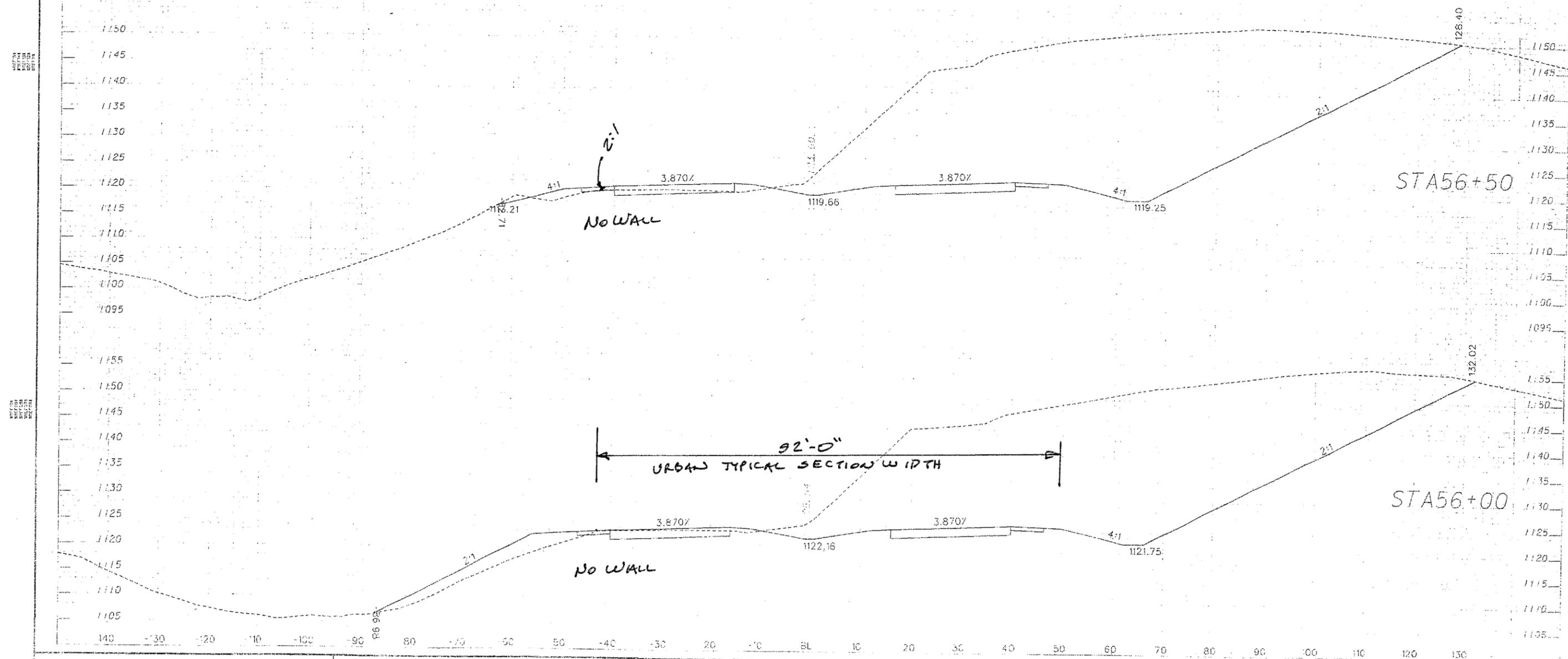
REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTION 114

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

GA	PROJECT NUMBER 2000-0044 13 150	SHEET NO. 66	TOTAL SHEETS 186
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SHEET 10 OF 18



REVISION DATES

SCALE: 1" = 10'

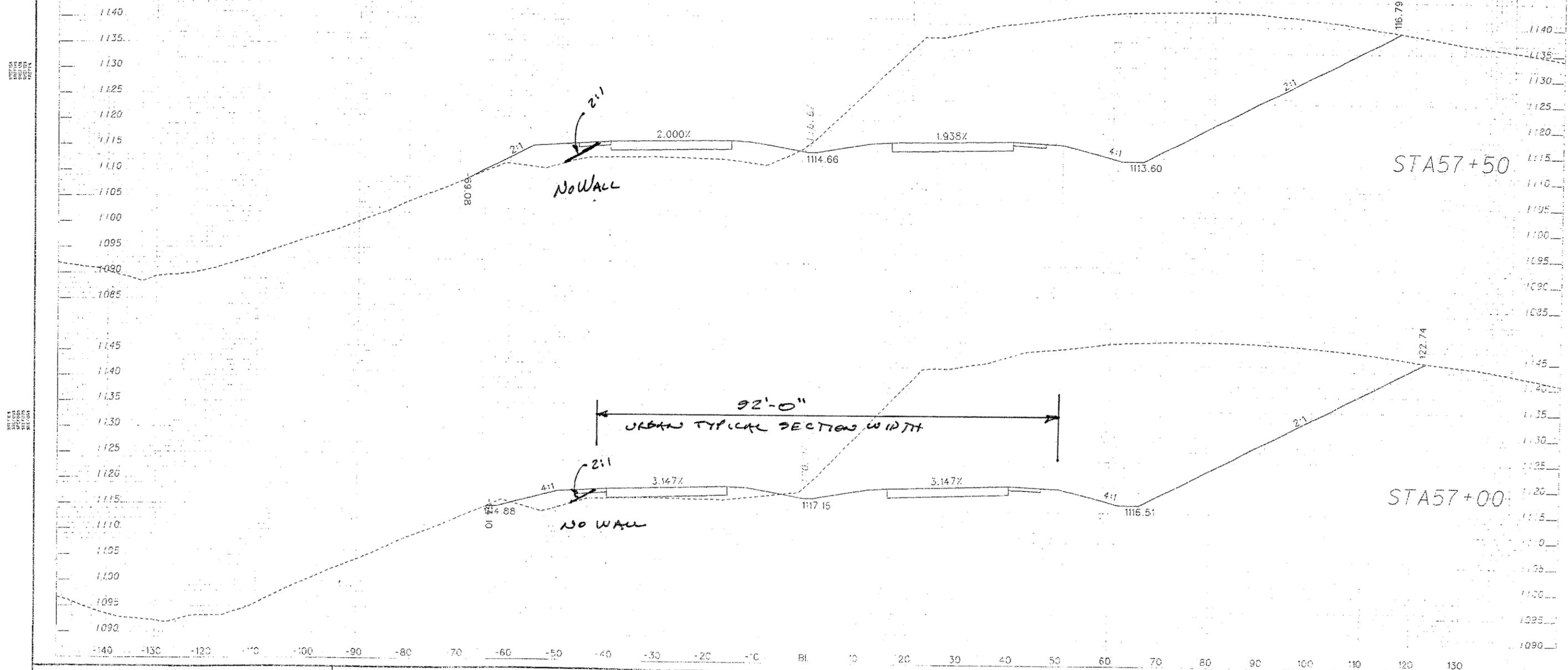
Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 260  
ATLANTA, GA 30346

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 115

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	2010-0000-15-155	67	156

SHEET 11 OF 18



REVISION DATES

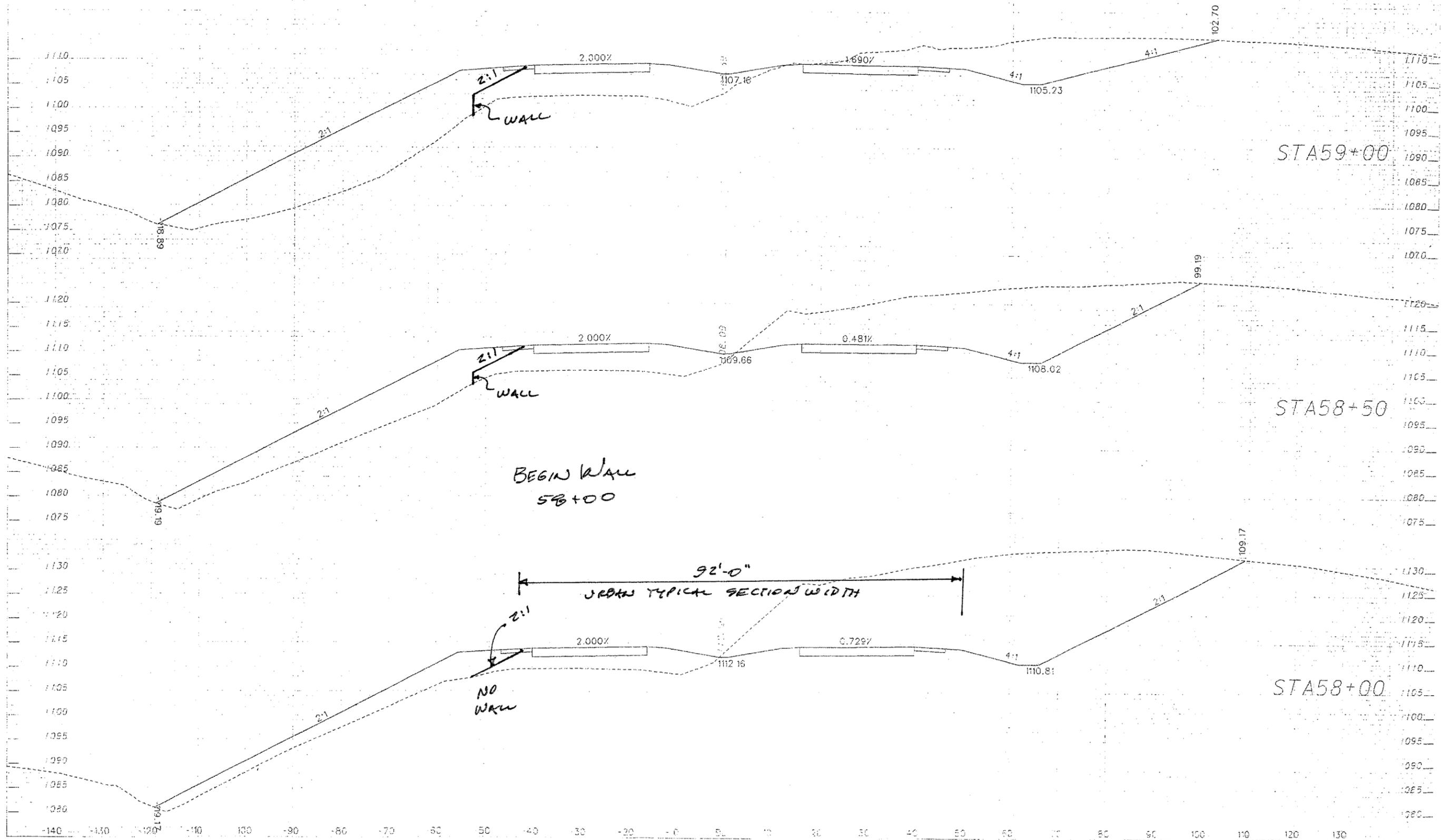
Heath & Lineback Engineers  
INCORPORATED  
2300 CANTON ROAD, BUILDING 200

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 116

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

GA	STAGE SHEET NO.	SHEET NO.	TOTAL SHEETS
		68	156

SHEET 12 OF 18



EXISTING GROUND

PROPOSED GRADE

SCALE: 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2300 CANTON ROAD, DUBLING, GA  
MARIETTA, GEORGIA 30066-7507

REVISION DATES

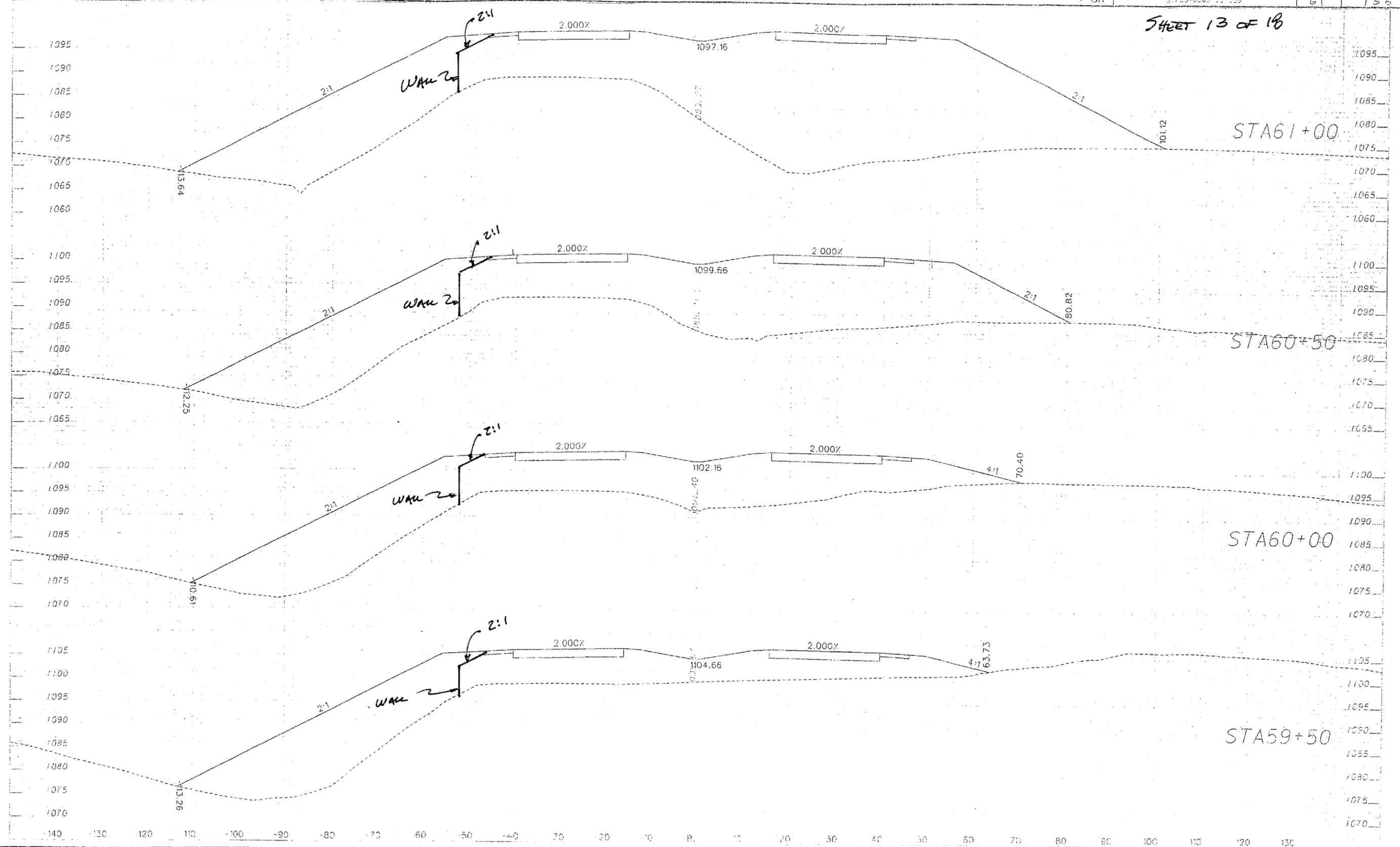
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTION 119

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

4/20/2013  
USER: jrcat

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	SR02-0065 13 125	69	156

SHEET 13 OF 18



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SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2595 EASTON ROAD, BUILDING 205  
MARIETTA, GEORGIA 30066-5905

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 118

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

GA	PROJECT NUMBER STP00 0616 21 0001	SHEET NO 79	TOTAL S. 156
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SHEET 14 OF 18



REVISION DATES

Heath & Lineback Engineers  
INCORPORATED  
2000 VANTON ROAD, BUILDING 300

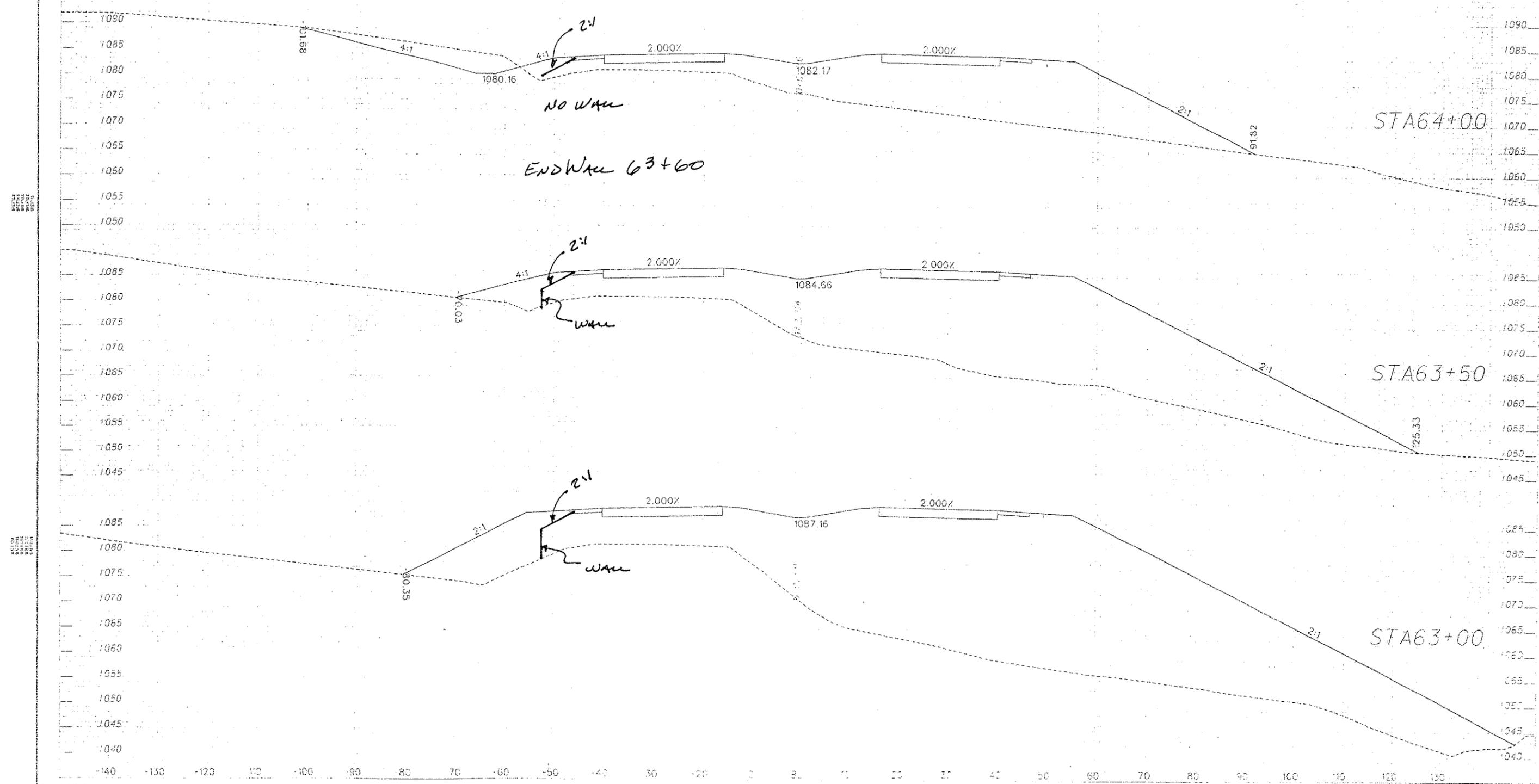
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE

EARTHWORK CROSS SECTION 10119

ALTERNATIVE RW-1  
ALTERNATIVE DESIGN

PROJECT NUMBER: 51700-0000-25 205  
SHEET NO.: 71  
TOTAL SHEETS: 56

SHEET 15 OF 18



REVISION DATES

Heath & Lineback Engineers  
INCORPORATED  
1390 CANTON ROAD, BUCKINGHAM, GA

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 120

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**RW-1**

SHEET NO.: **16 of 18**

Station	Original Design Height*	Original Design Area	Alt. Design Height*	Alt. Design Area
55+00	9	450	0	0
55+50	9	400	0	0
56+00	7	325	0	0
56+50	6	325	0	0
57+00	7	375	0	0
57+50	8	425	0	0
58+00	9	500	0	150
58+50	11	625	6	350
59+00	14	700	8	450
59+50	14	700	10	550
60+00	14	775	12	625
60+50	17	825	13	625
61+00	16	825	12	625
61+50	17	850	13	675
62+00	17	800	14	625
62+50	15	700	11	525
63+00	13	575	10	425
63+50	10		7	

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**RW-1**

SHEET NO.: **17 of 18**

Station	Original Design Height*	Original Design Area	Alt. Design Height*	Alt. Design Area
63+60	0	250	0	175
Area Totals		10,425 SF		5,800 SF

\* Includes average 4' penetration below ground line due to 2:1 slopes

Alternative area proportion =  $5800/10425 = 55.6\%$



# VALUE ENGINEERING ALTERNATIVE



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:  
**RW-2**

DESCRIPTION: **USE MECHANICALLY STABILIZED EMBANKMENT WALL  
IN LIEU OF A CAST-IN-PLACE CONCRETE RETAINING  
WALL**

SHEET NO.: **1 of 5**

**ORIGINAL DESIGN:** (sketch attached)

The original design calls for a cast-in-place concrete retaining wall from Station 55+00 to Station 63+60.

**ALTERNATIVE:** (sketch attached X)

Use a Mechanically Stabilized Embankment (MSE) wall in lieu of the cast-in-place concrete wall.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces construction time

**DISADVANTAGES:**

- None apparent

**DISCUSSION:**

MSE walls are typically more economical and take less time to construct than cast-in-place reinforced concrete retaining walls. This wall has a maximum height of about 17 feet, so it is certainly in the economical height range for MSE walls.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 532,000	—	\$ 532,000
ALTERNATIVE	\$ 390,000	—	\$ 390,000
SAVINGS (Original minus Alternative)	\$ 142,000	—	\$ 142,000

# SKETCHES

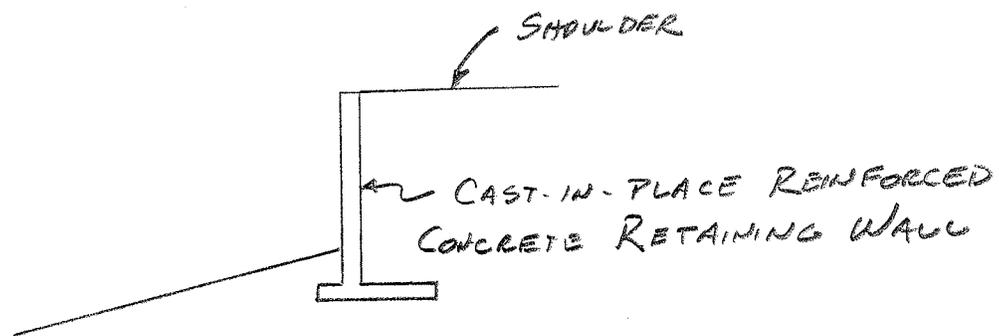
PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85  
STP00-0065-03(055); PI No. 132860  
Hall and Jackson Counties, GA

ALTERNATIVE NO.:

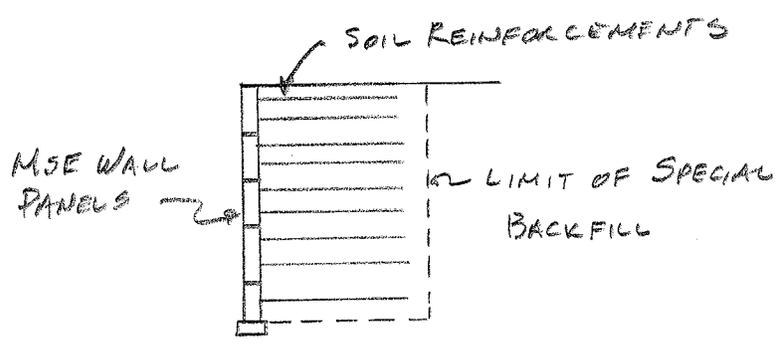
RW-2

AS DESIGNED     ALTERNATIVE

SHEET NO.: 2 of 5



AS DESIGNED     ALTERNATIVE



# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.: RW-2

SHEET NO.: 3 of 5

Station	Height*	Area
55+00	9	450
55+50	9	400
56+00	7	325
56+50	6	325
57+00	7	375
57+50	8	425
58+00	9	500
58+50	11	625
59+00	14	700
59+50	14	700
60+00	14	775
60+50	17	825
61+00	16	825
61+50	17	850
62+00	17	800
62+50	15	700
63+00	13	575
63+50	10	

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.: RW-2

SHEET NO.: **4 of 5**

Station	Height*	Area
63+60	0	250
Area Totals		10,425 SF

\* Includes average 4' penetration below ground line due to 2:1 slopes

Unit cost for MSE Walls 10 – 20' height = \$34.29



# VALUE ENGINEERING ALTERNATIVE



**PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:  
**RW-3**

**DESCRIPTION: REALIGN THE ROADWAY TO THE RIGHT IN THE AREA  
OF THE RETAINING WALL TO ELIMINATE THE WALL**

SHEET NO.: 1 of 25

**ORIGINAL DESIGN:** (sketch attached)

The original design calls for a retaining wall from Station 55+00 to Station 63+60.

**ALTERNATIVE:** (sketch attached)

Shift the SR 53 alignment to the right to eliminate the retaining wall.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces construction time
- No future wall maintenance required

**DISADVANTAGES:**

- None apparent

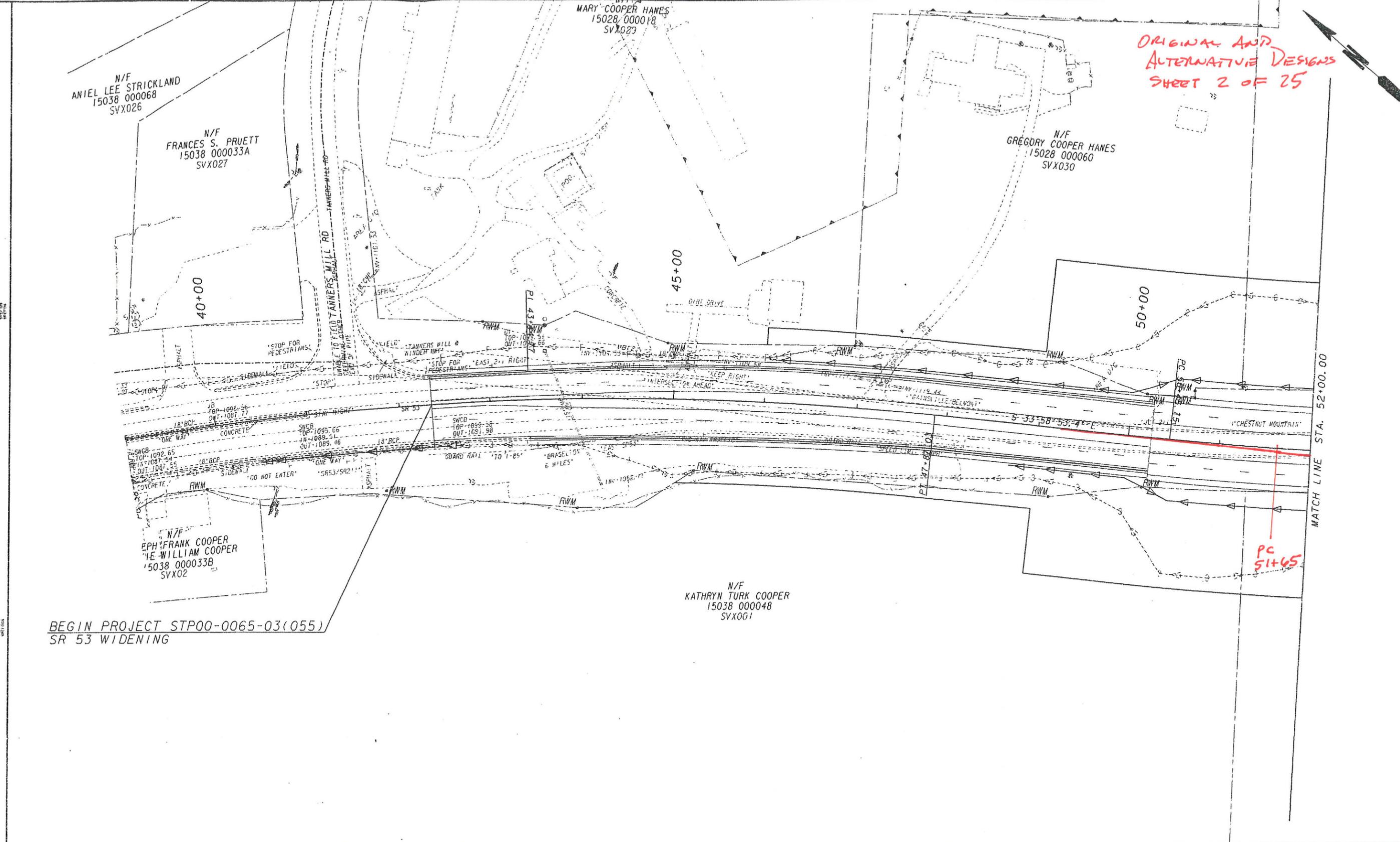
**DISCUSSION:**

The retaining wall is required to avoid a longitudinal stream encroachment on the left side of the roadway. By shifting to the right, this encroachment can be avoided and the wall is not required. The amount of right-of-way is the same for either option.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 532,000	—	\$ 532,000
ALTERNATIVE	\$ 21,000	—	\$ 21,000
SAVINGS (Original minus Alternative)	\$ 511,000	—	\$ 511,000

1/2010  
Jordan

5:41:03 PM  
REV:ELL



BEGIN PROJECT STP00-0065-03(055)  
SR 53 WIDENING

PROPERTY AND EXISTING R/W LINE	— e —	BEGIN LIMIT OF ACCESS.....	BLA
REQUIRED R/W LINE	— c —	END LIMIT OF ACCESS.....	ELA
CONSTRUCTION LIMITS	— c —	LIMIT OF ACCESS	— o —
EASEMENT FOR CONSTR	— c —	REQ'D R/W & LIMIT OF ACCESS	— h —
MAINTENANCE OF SLOPES	— c —	FSA - HISTORICAL BOUNDARY	— a —

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION	DATE

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

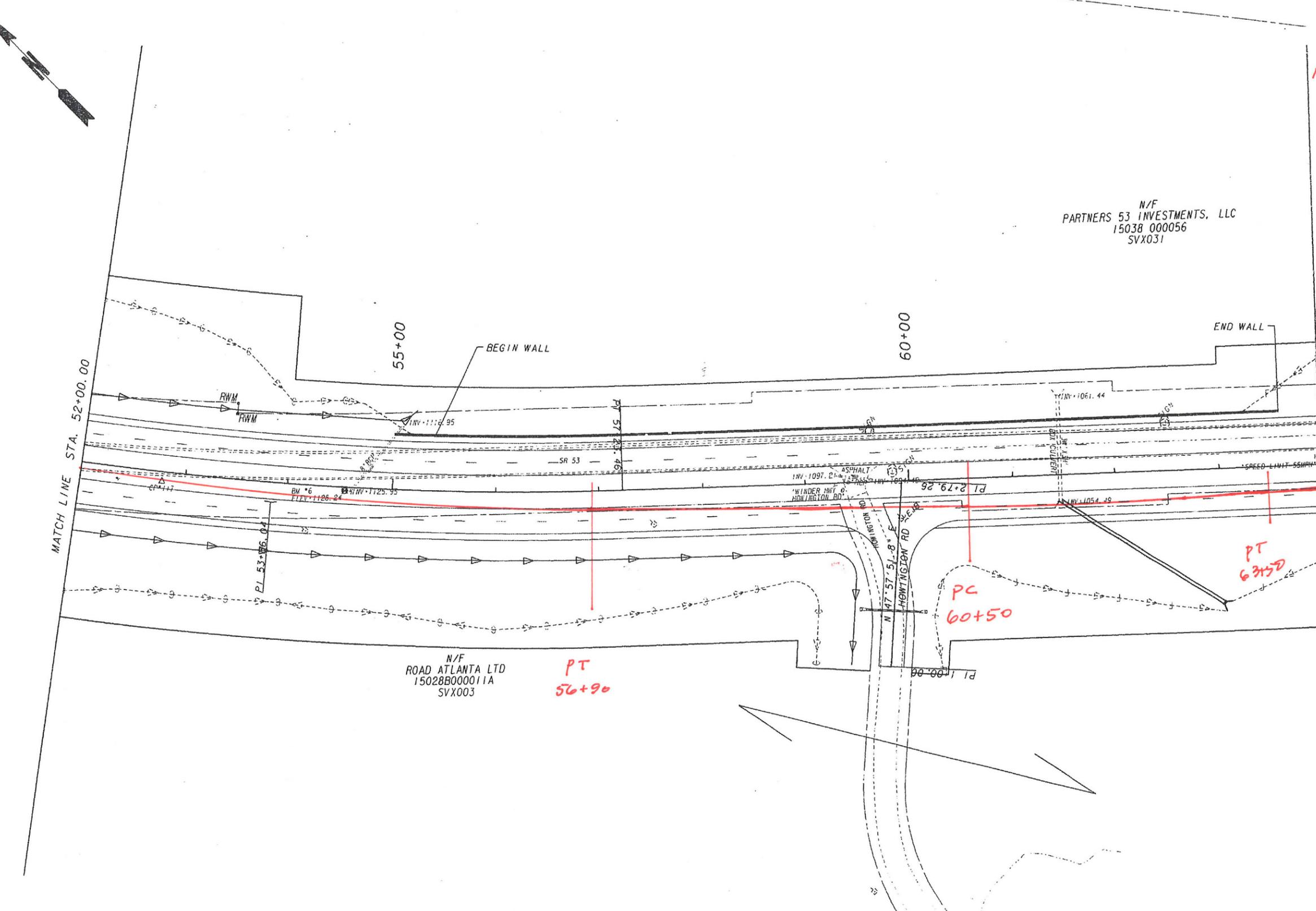
ALTERNATIVE RW-3  
ORIGINAL AND  
ALTERNATIVE DESIGNS  
SHEET 3 OF 25

N/F  
PARTNERS 53 INVESTMENTS, LLC  
15038 000056  
SVX031

N/F  
ROAD ATLANTA LTD  
15028B000011A  
SVX003

MATCH LINE STA. 52+00.00

MATCH LINE STA. 64+00.00



PROPERTY AND EXISTING R/W LINE	— P —	BEGIN LIMIT OF ACCESS.....	BLA
REQUIRED R/W LINE	— C —	END LIMIT OF ACCESS.....	ELA
CONSTRUCTION LIMITS	— F —	LIMIT OF ACCESS	— o —
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES	▨	REQ'D R/W & LIMIT OF ACCESS	— III —
		ESA - HISTORICAL BOUNDARY	— ▲ —

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-3101

REVISION DATES

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

ALTERNATIVE RW-3  
ORIGINAL AND  
ALTERNATIVE DESIGNS  
SHEET 4 OF 25

N/F  
PARTNERS 53 INVESTMENTS, LLC  
15038 000056  
SVX031

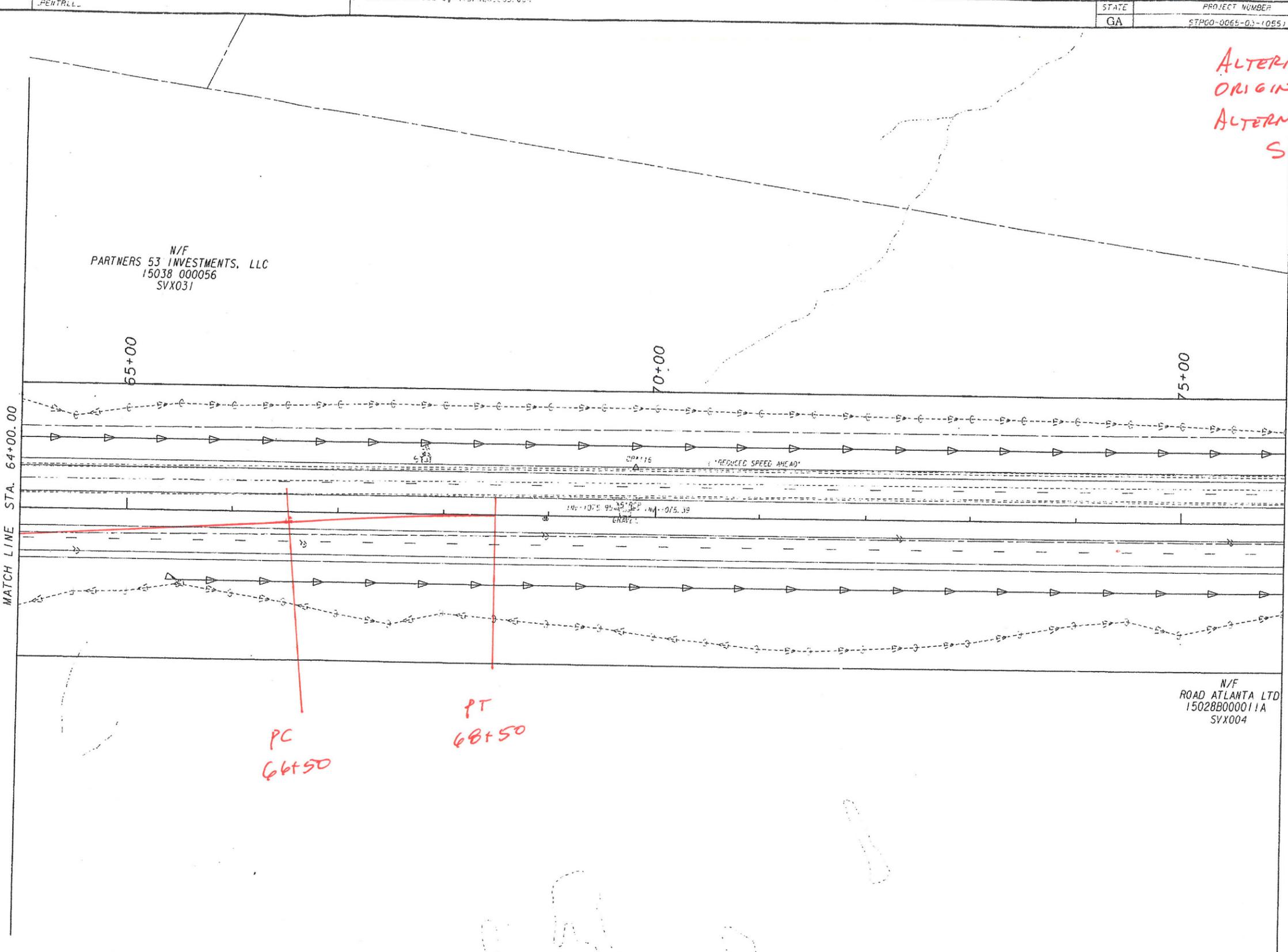
65+00

70+00

75+00

MATCH LINE STA. 64+00.00

MATCH LINE STA. 76+00.00



N/F  
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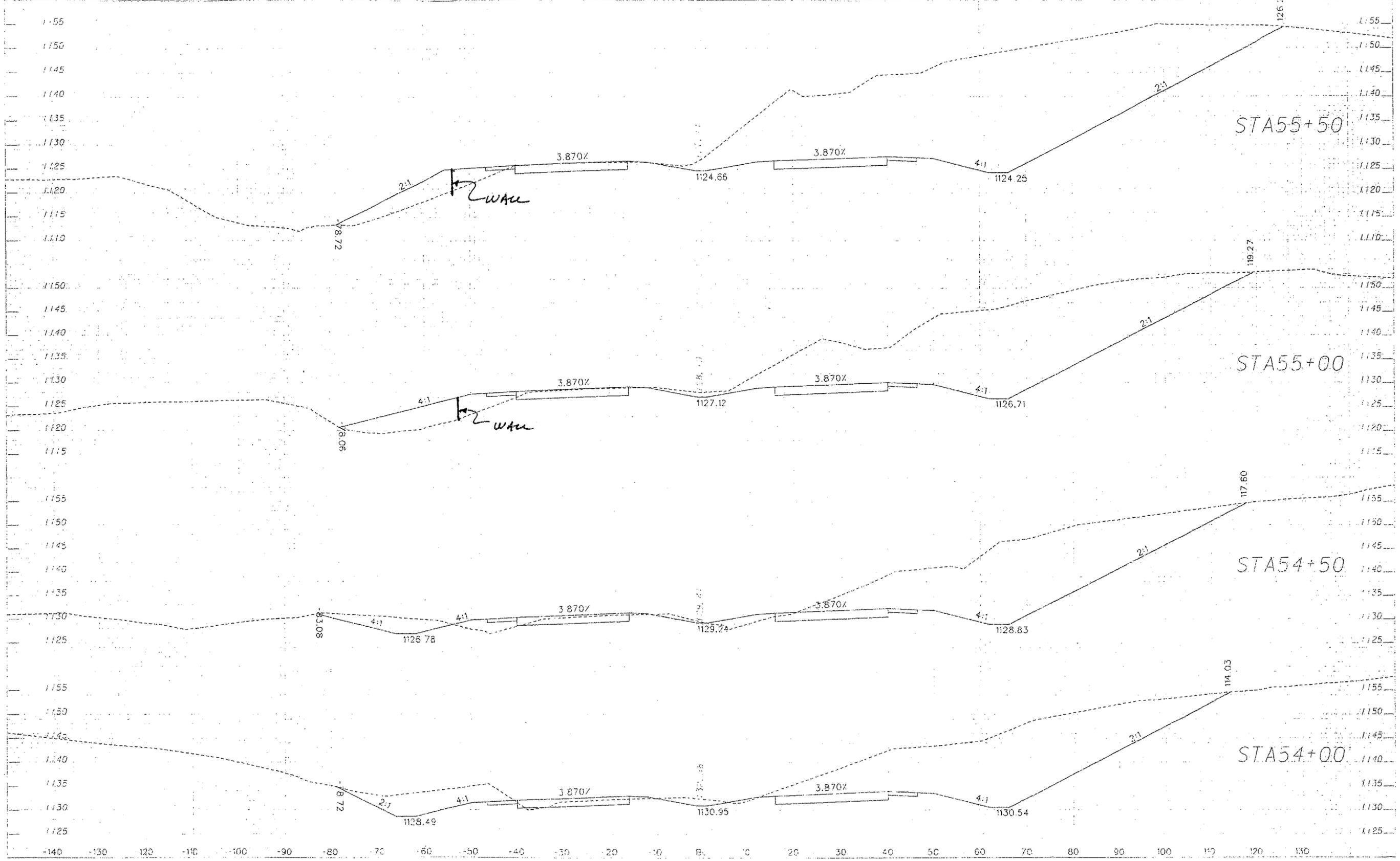
PC  
66+50  
PT  
68+50

PROPERTY AND EXISTING R/W LINE	— F —	BEGIN LIMIT OF ACCESS.....BLA
REQUIRED R/W LINE	— C — F —	END LIMIT OF ACCESS.....ELA
CONSTRUCTION LIMITS	— O — F —	LIMIT OF ACCESS
EASEMENT FOR CONSTR	▨	REQ'D R/W & LIMIT OF ACCESS
& MAINTENANCE OF SLOPES	▨	ESA - HISTORICAL BOUNDARY
EASEMENT FOR CONSTR OF SLOPES	▨	

**Heath & Lineback Engineers**  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION
	OFFICE: MAINLINE PLAN

ALTERNATIVE RW-3  
ORIGINAL DESIGN  
SHEET 5 OF 25



BEFORE CONSTRUCTION

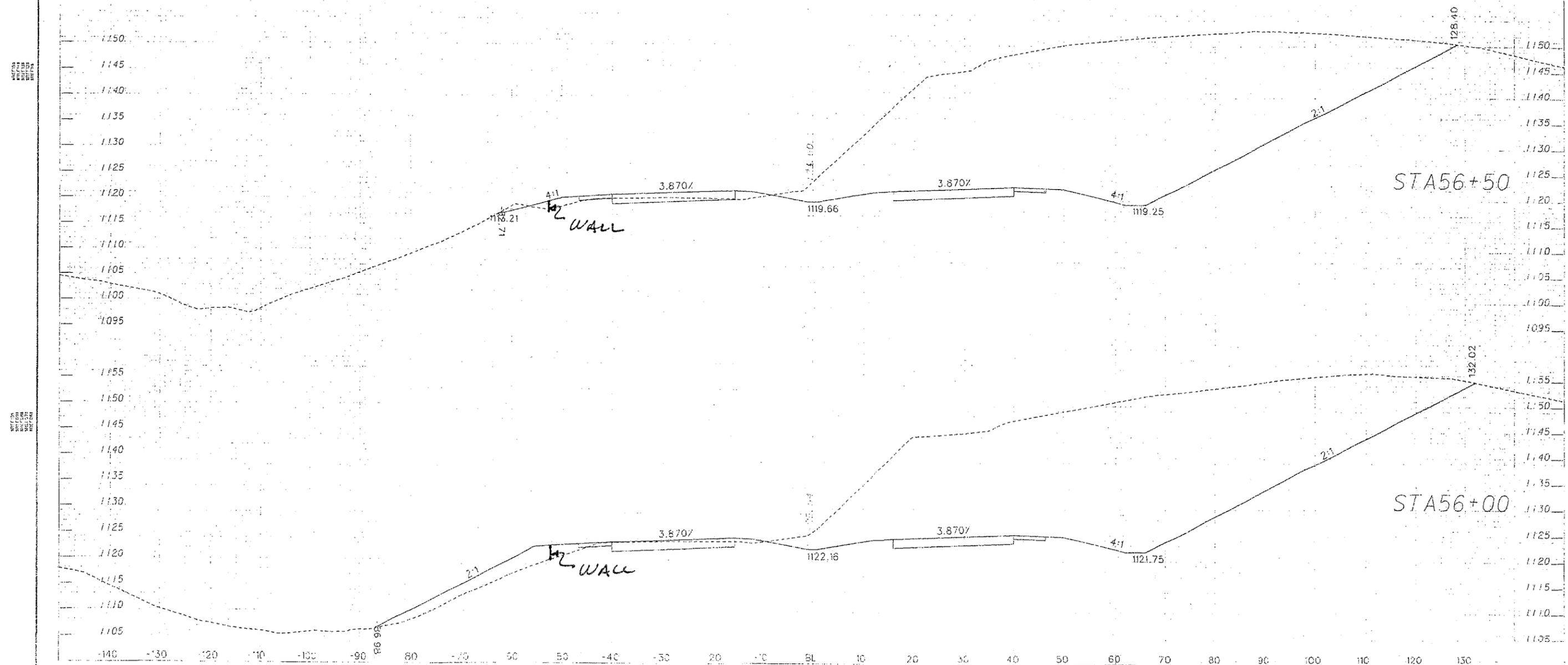
AFTER CONSTRUCTION

REVISION DATES

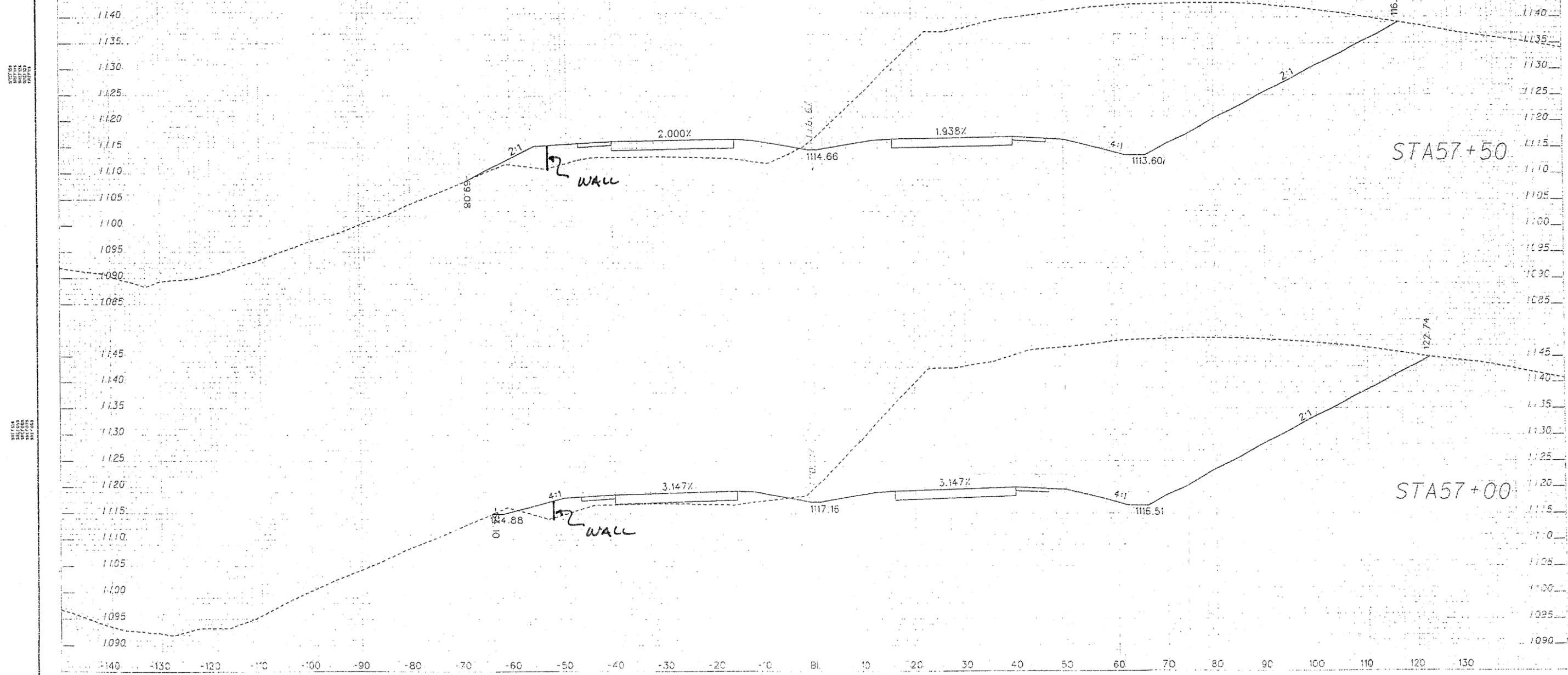
Heath & Lineback Engineers  
INCORPORATED  
2200 CAMDEN ROAD, BLDG. 305

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 133

4.20-20.0	PROJECT NO.	PROJECT NAME	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
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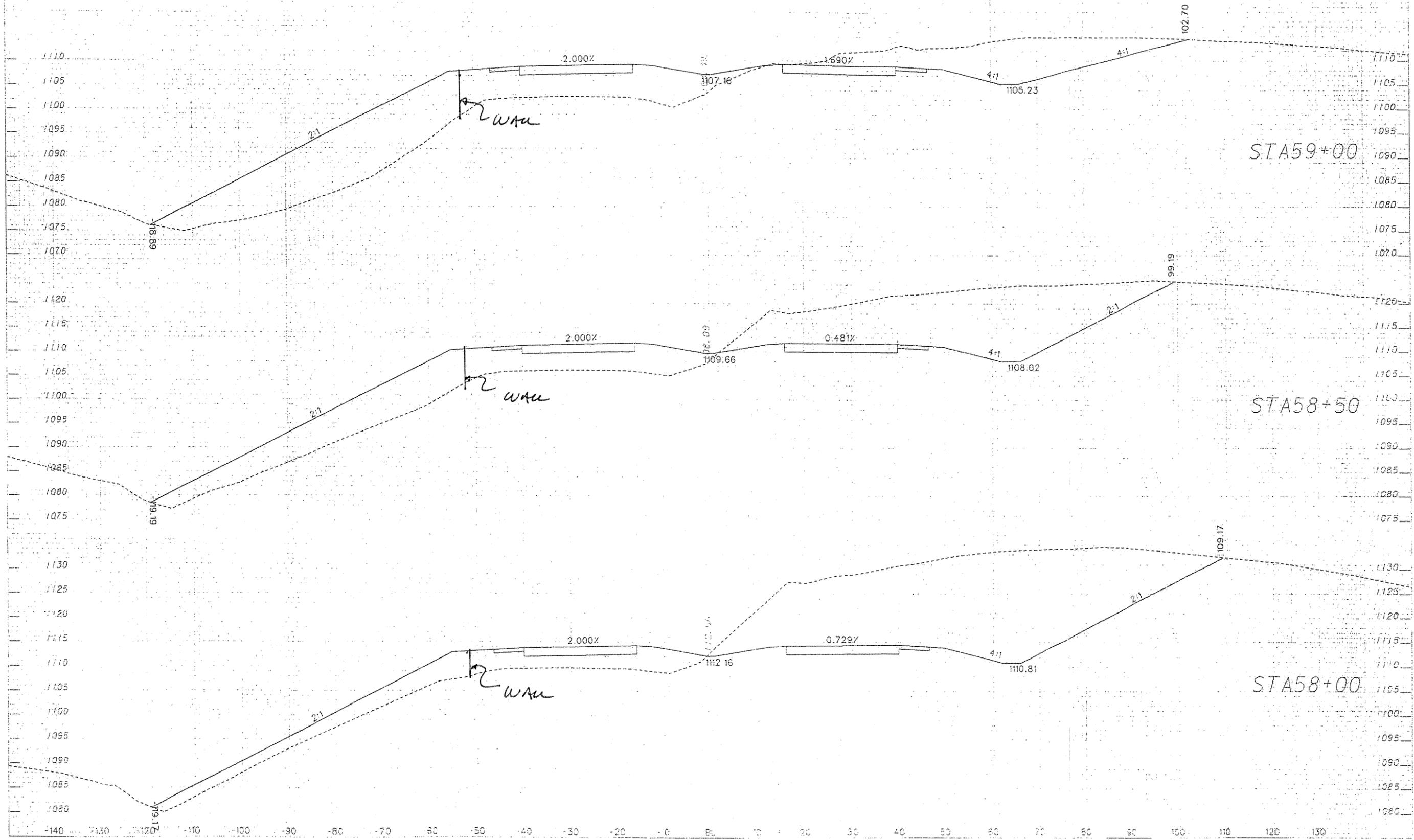


REVISION DATES



REVISION DATES

SHEET 8 OF 25



4/25/2010  
USER: jordan

VERTICAL CURVE  
DATA  
TABLE

VERTICAL CURVE  
DATA  
TABLE

REVISION DATES

Heath & Lineback Engineers  
INCORPORATED

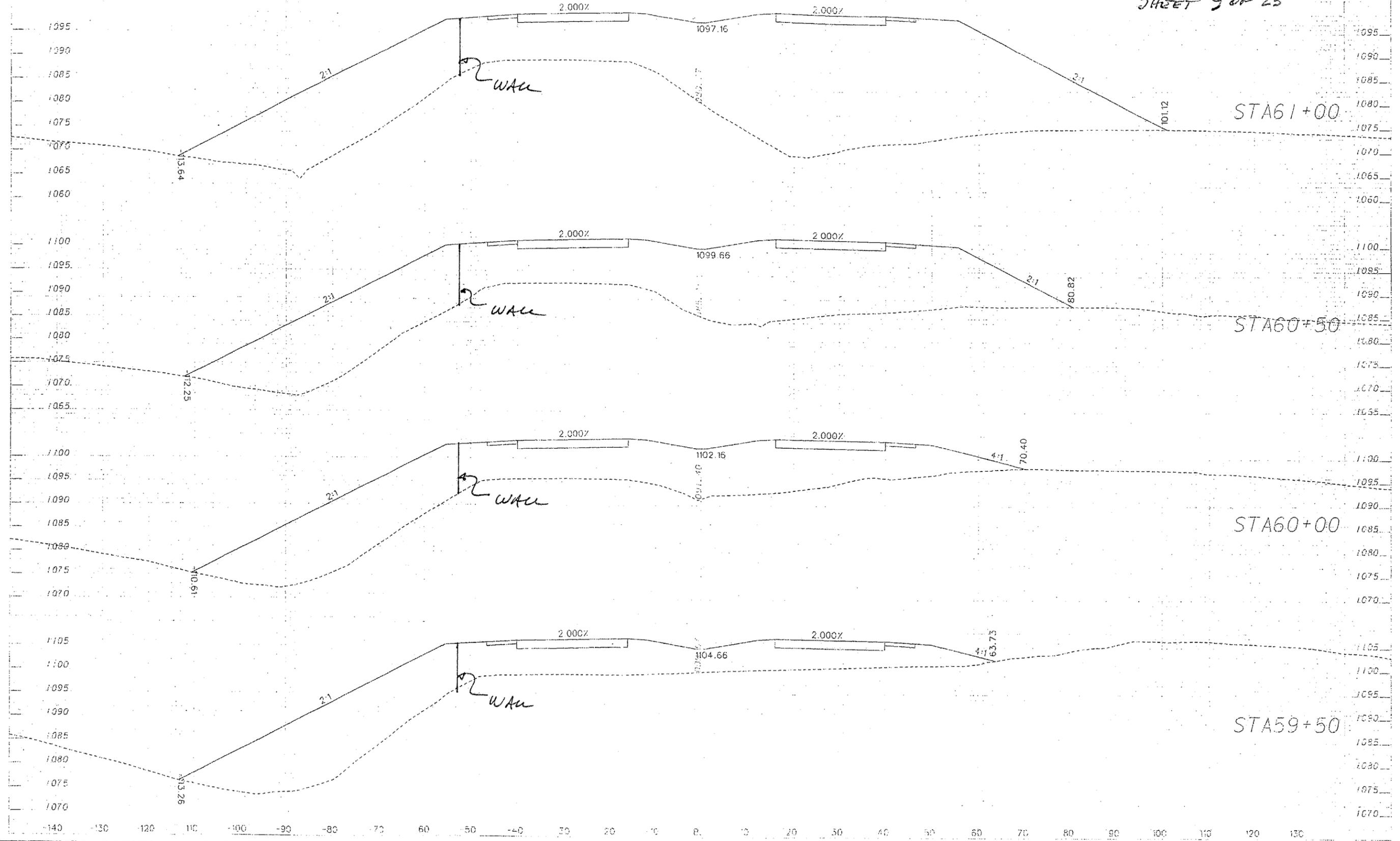
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS 136

ALTERNATIVE RW-3  
ORIGINAL DESIGN

4/20/2019  
USER: jford

STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
GA	07-03-0062-13-025	69	156

SHEET 9 OF 25



EXISTING GRADE

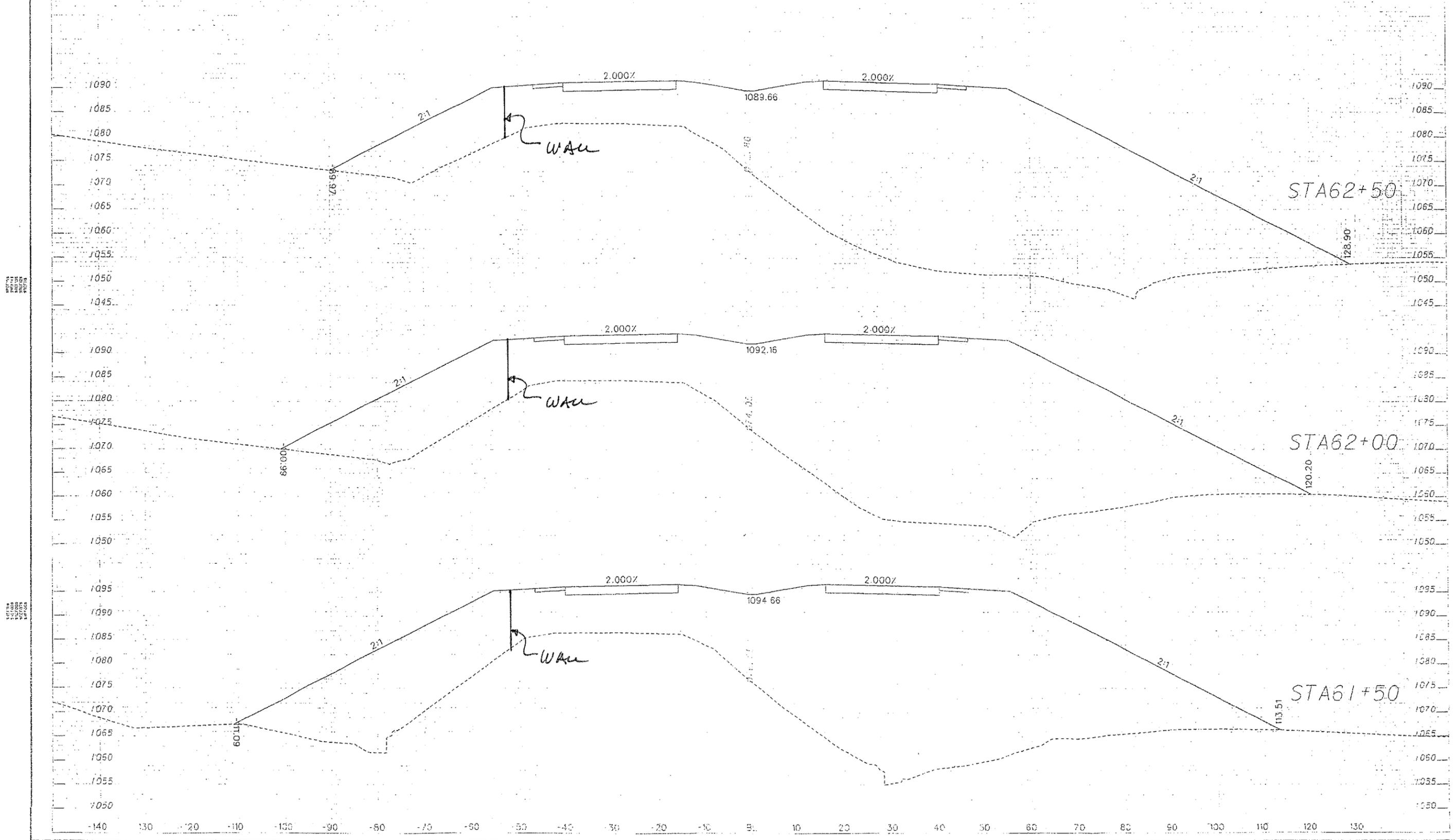
PROPOSED GRADE

REVISION DATES

Heath & Lineback Engineers  
INCORPORATED

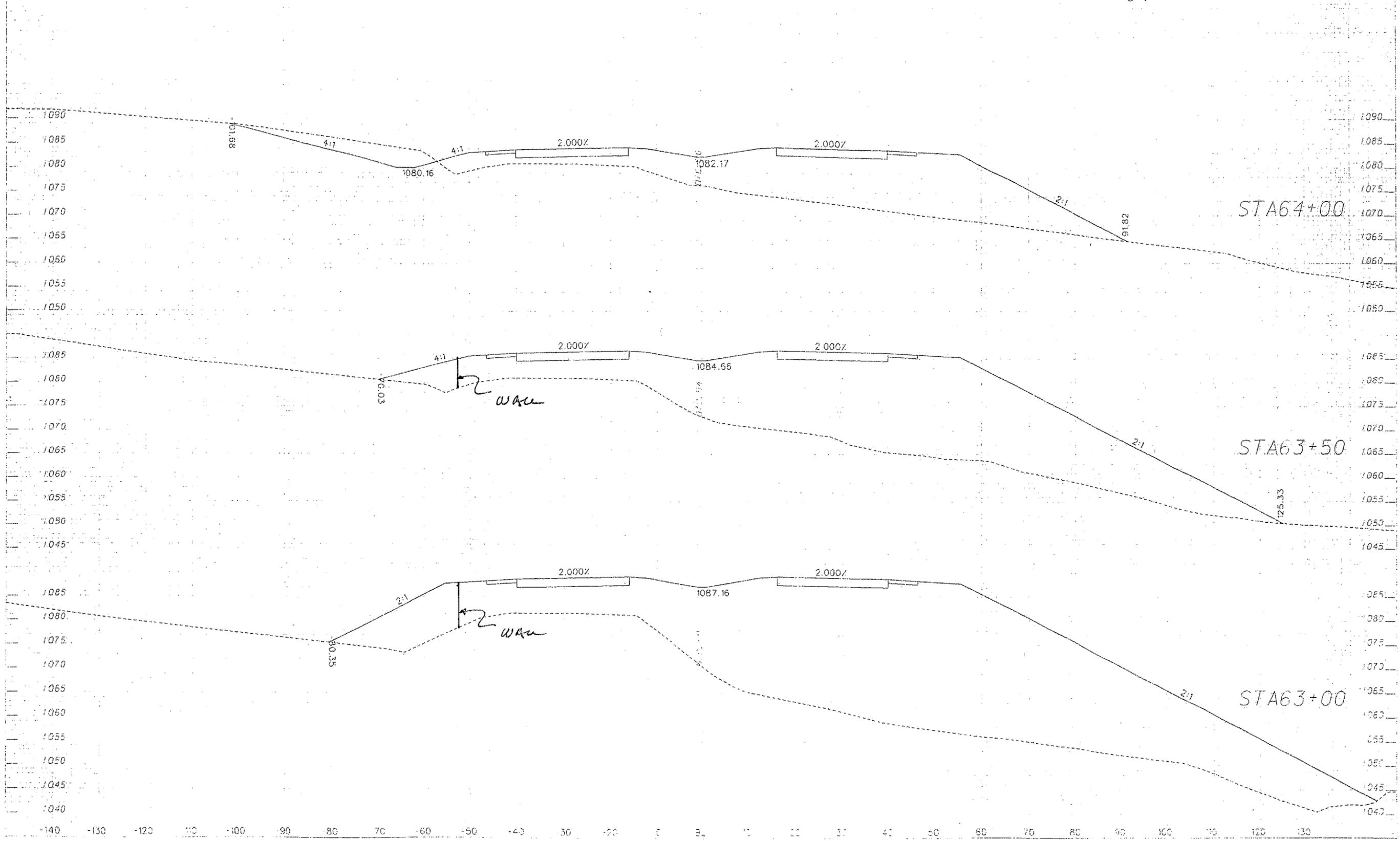
STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

SHEET 10 OF 25



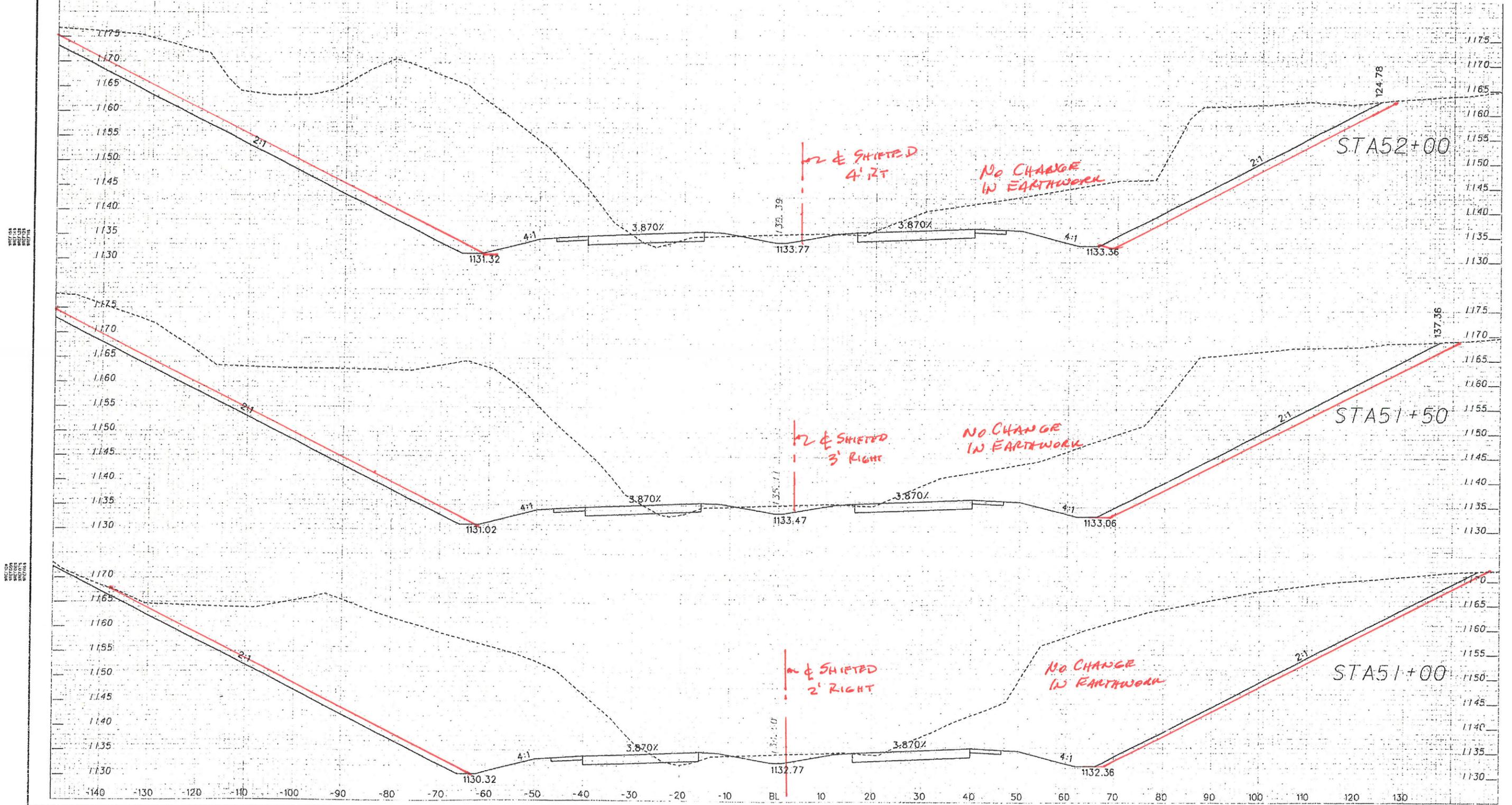
REVISION DATES

SHEET 11 OF 25

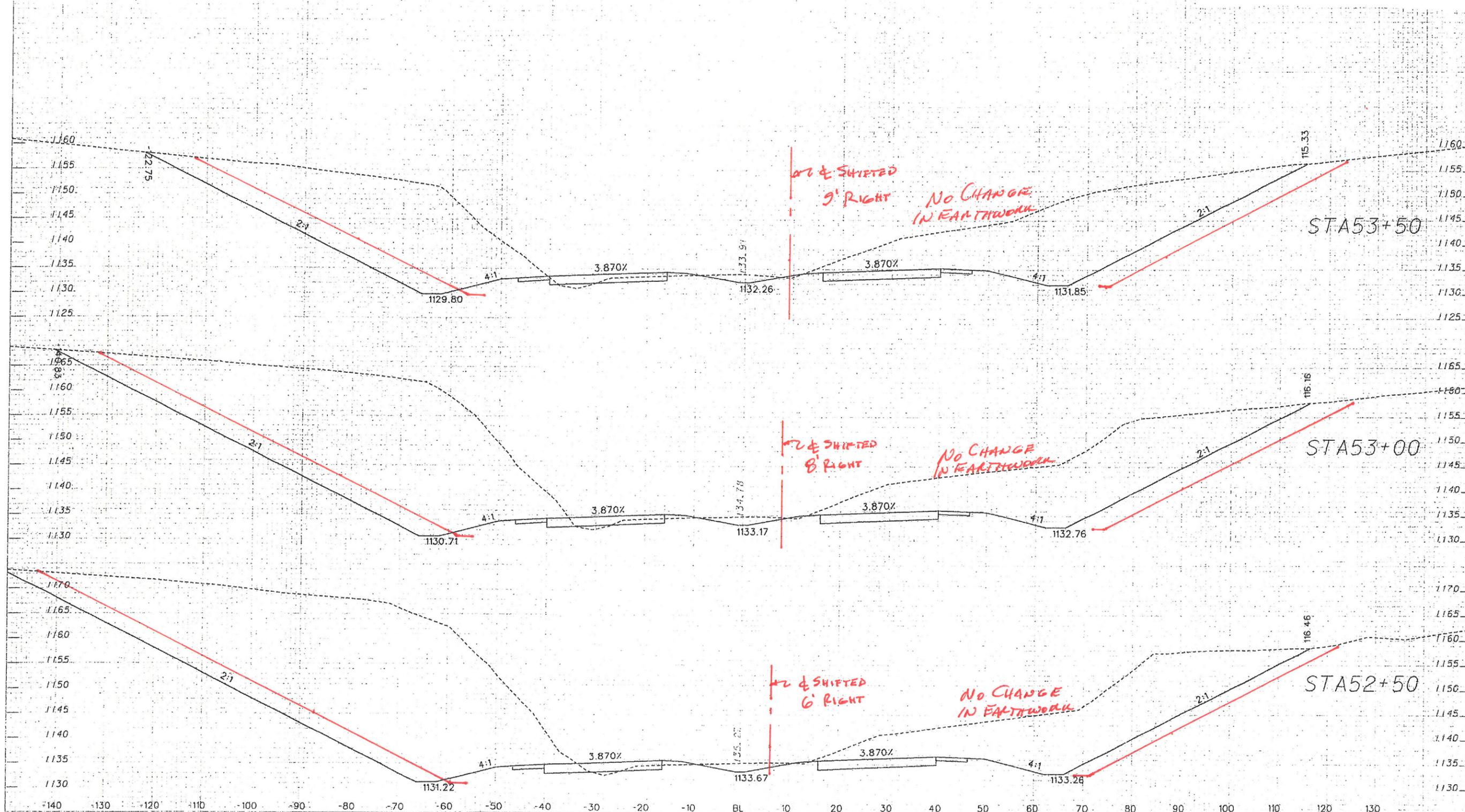


REVISION DATES

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 12 OF 25



ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 13 OF 25



SCALE • 1" = 10'

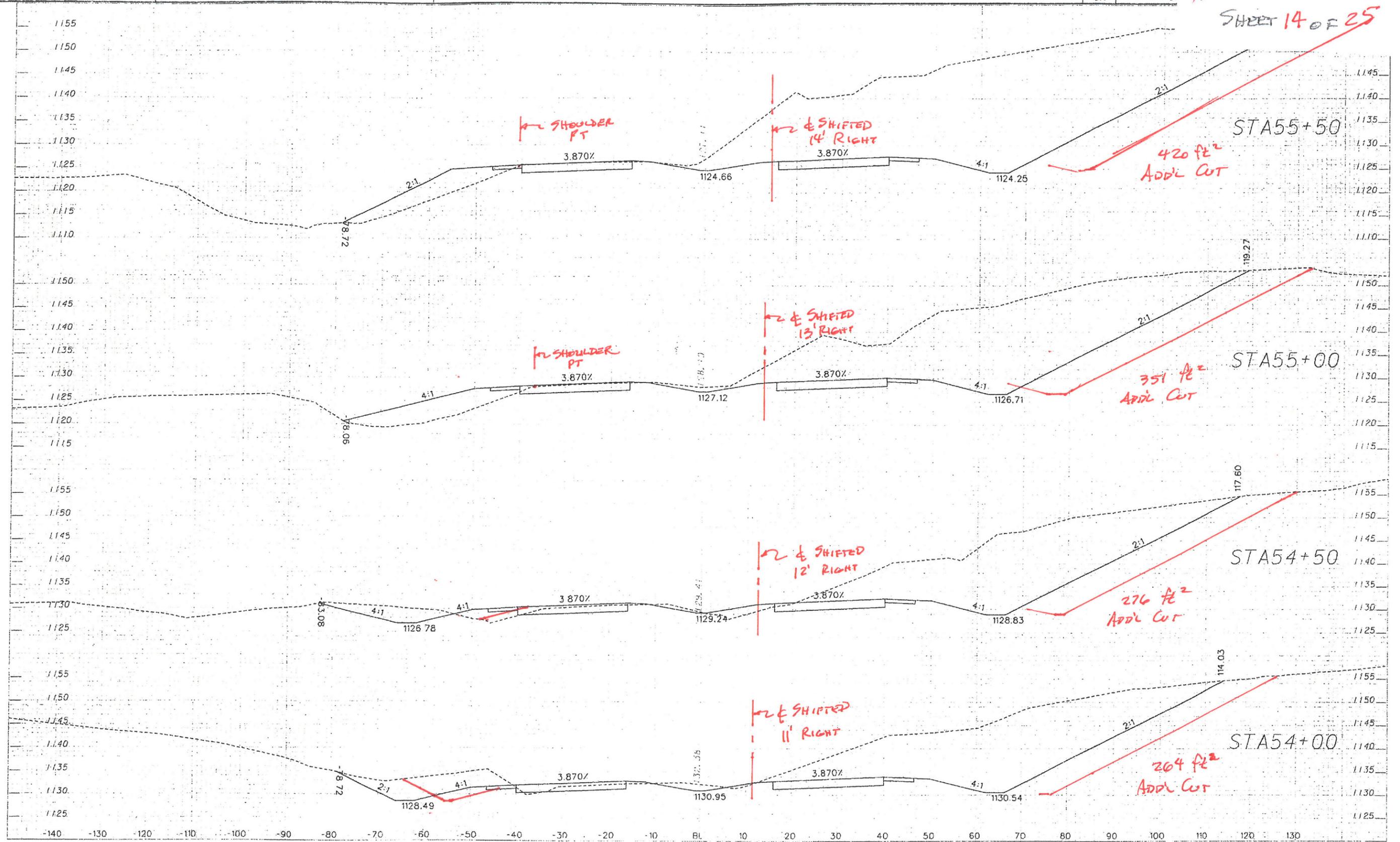
Heath & Lineback Engineers  
INCORPORATED  
2590 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30067

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: 141  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-3  
 ALTERNATIVE DESIGN  
 SHEET 14 OF 25

STATE  
 GA



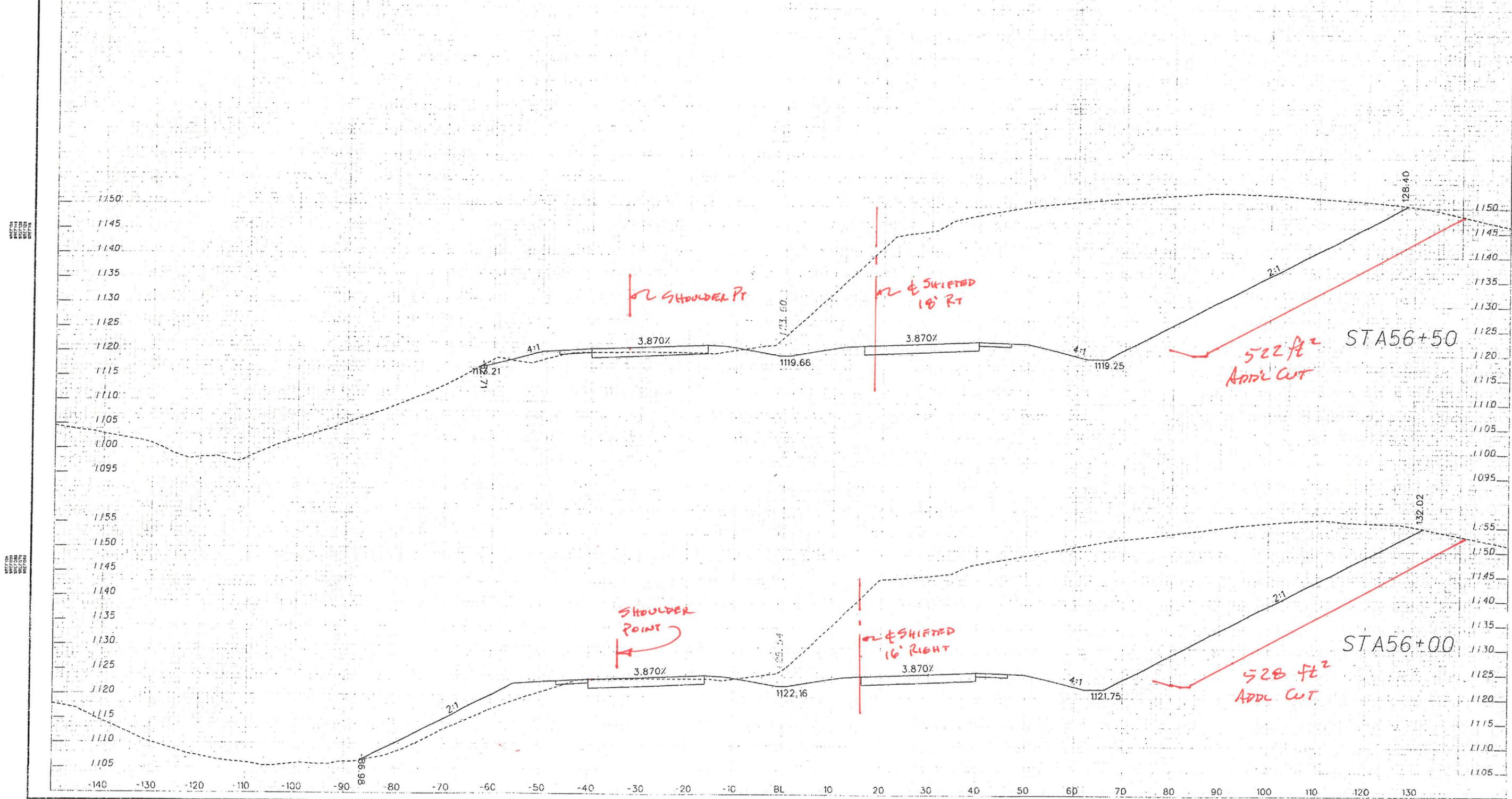
REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE:  
 EARTHWORK CROSS SECTIONS

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30067

SCALE = 1" = 10'

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 15 OF 25



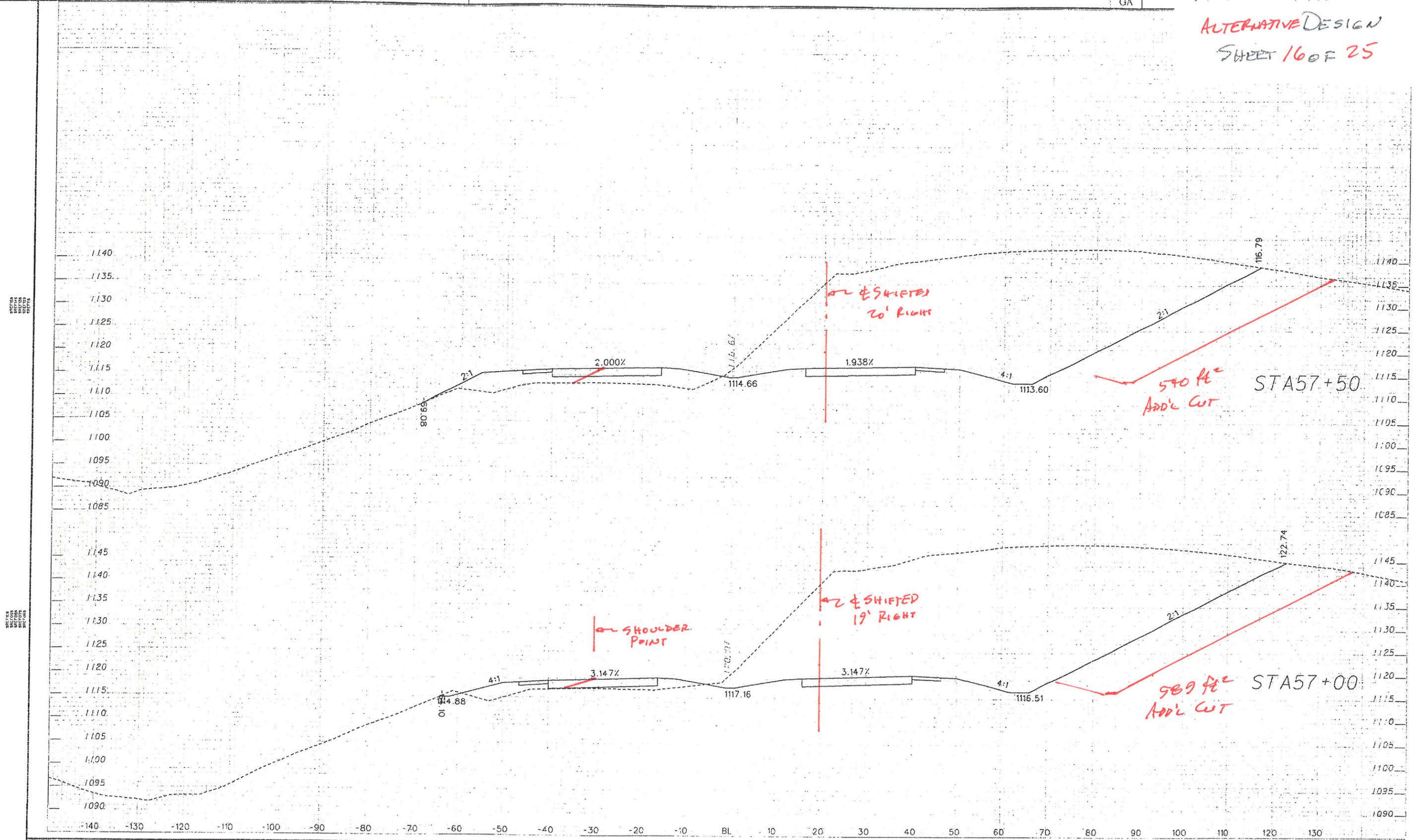
SCALE • 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

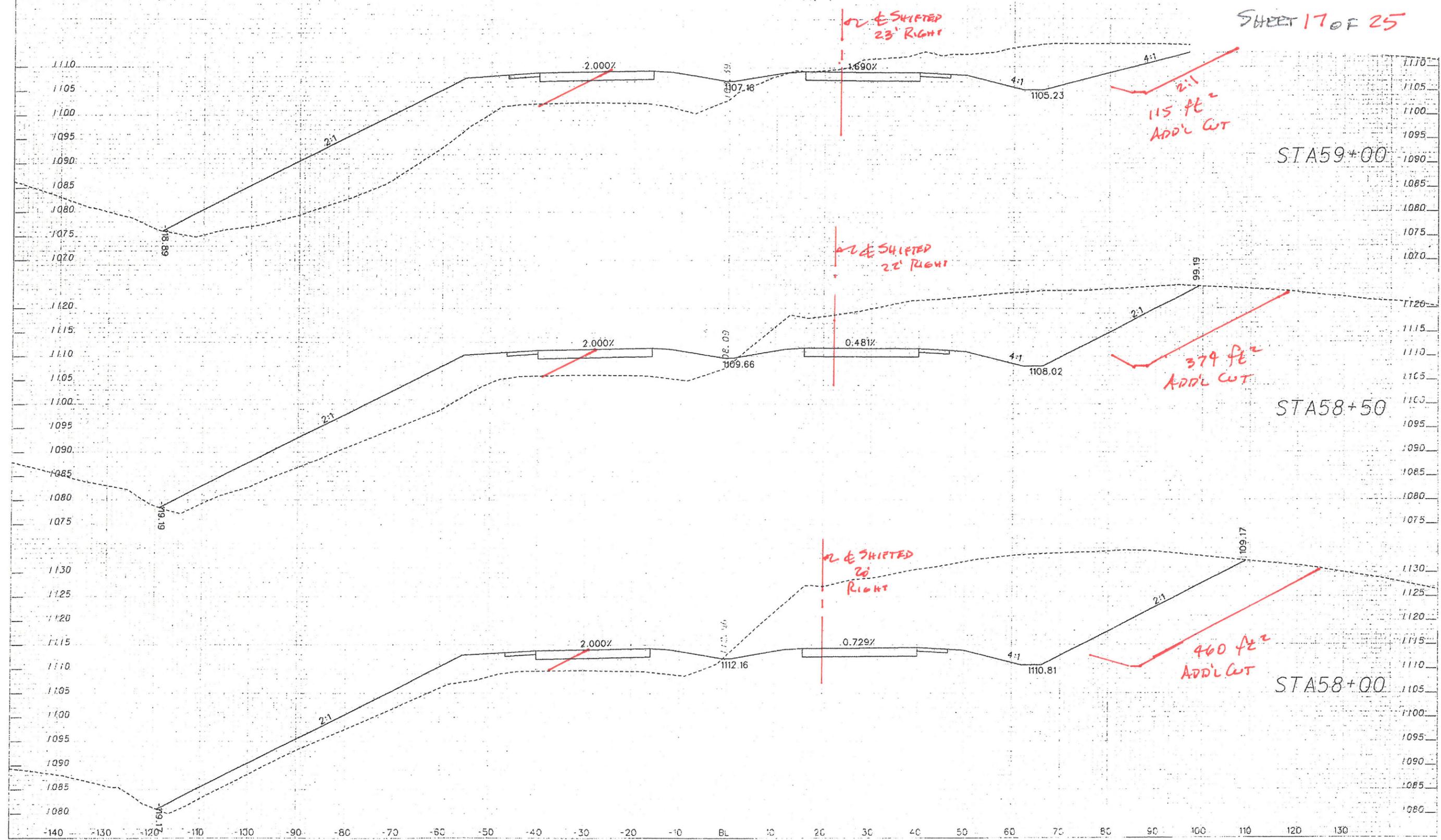
REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION 143  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 16 OF 25



ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 17 OF 25



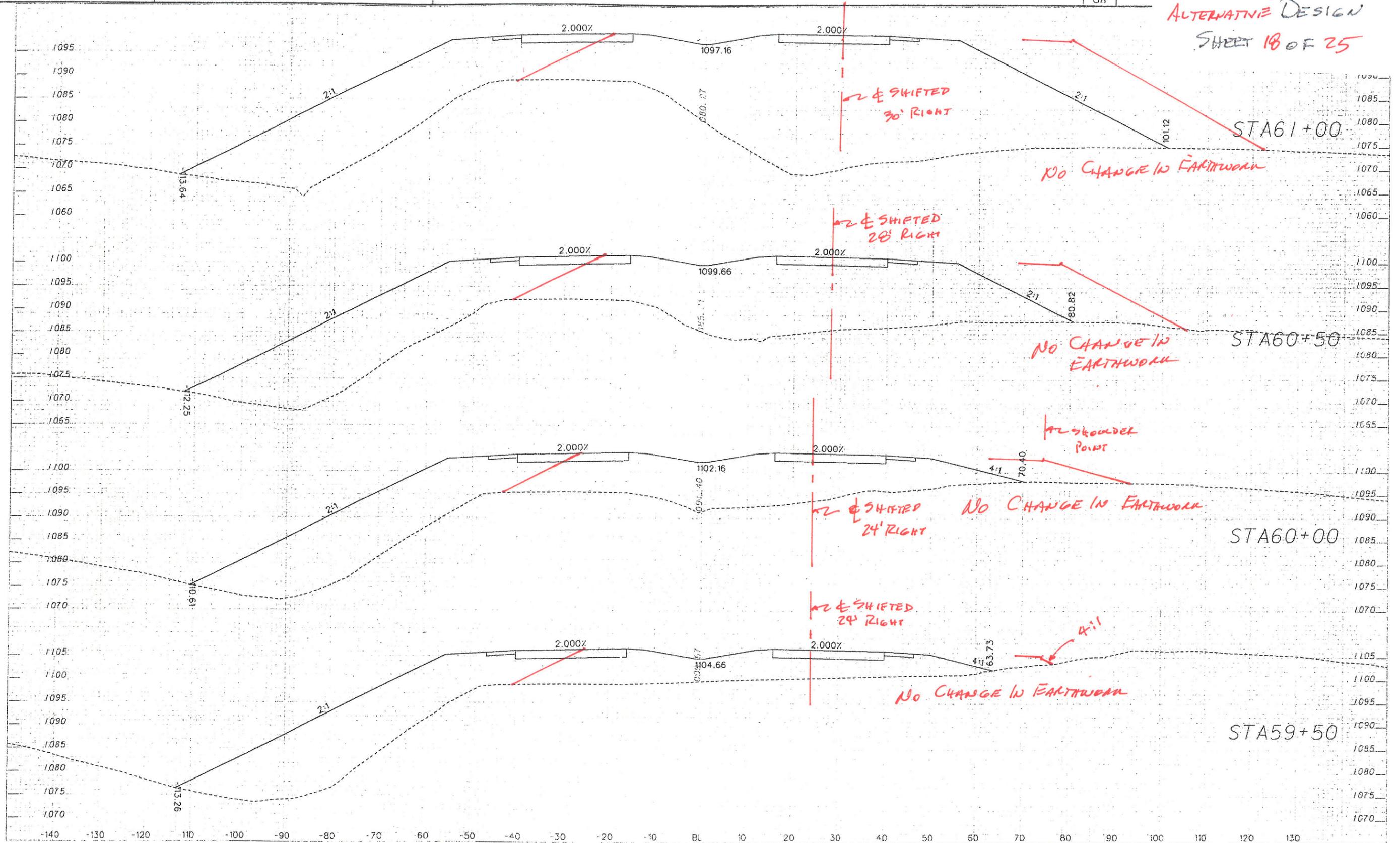
SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, SUITE 200  
MARIETTA, GEORGIA 30066-5193

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: 145  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 18 OF 25



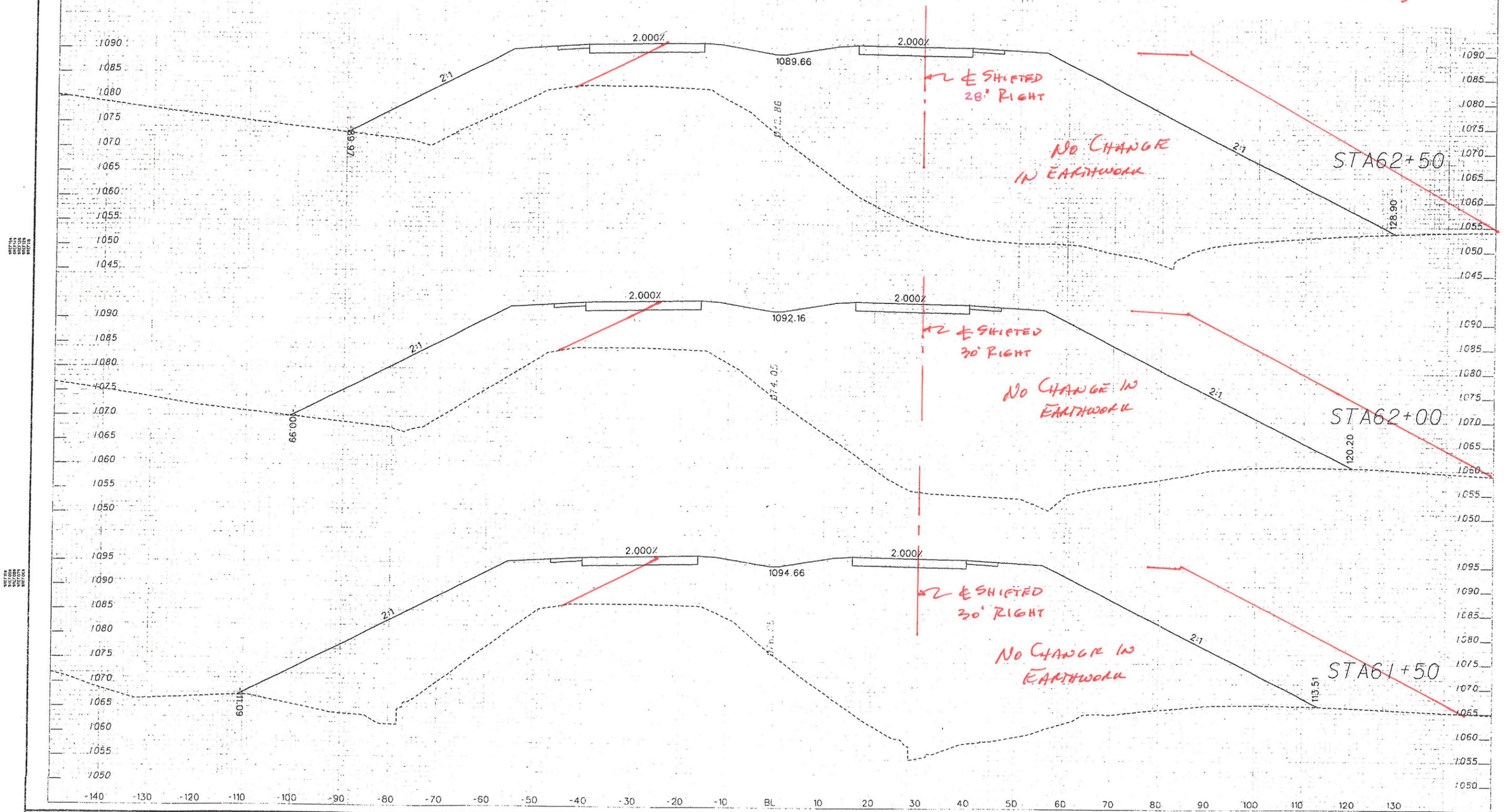
SCALE : 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
MARIETTA, GEORGIA 30066-5393

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: 146  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 19 OF 25



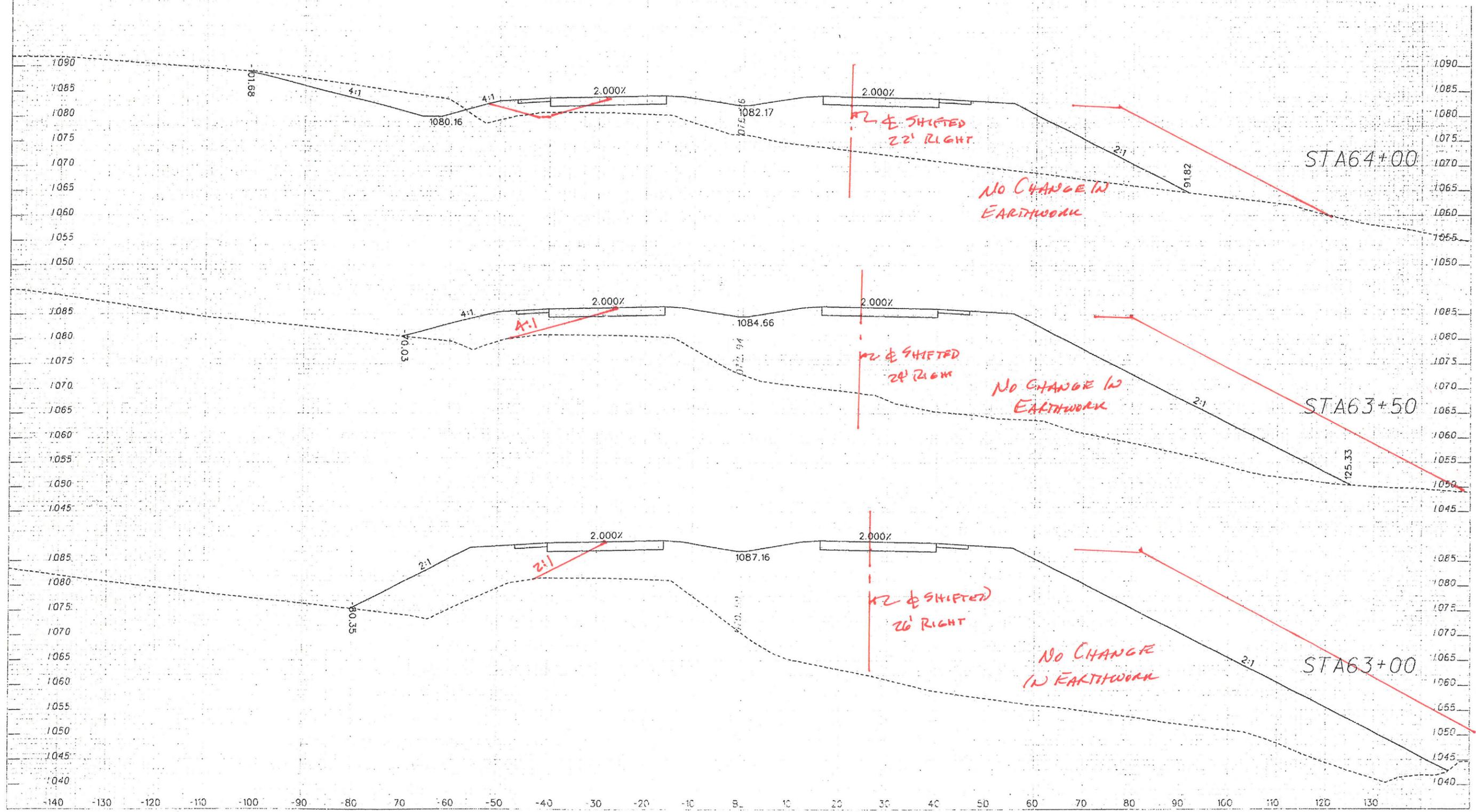
SCALE: 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION 147  
OFFICE:  
EARTHWORK CROSS SECTIONS

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 20 OF 25

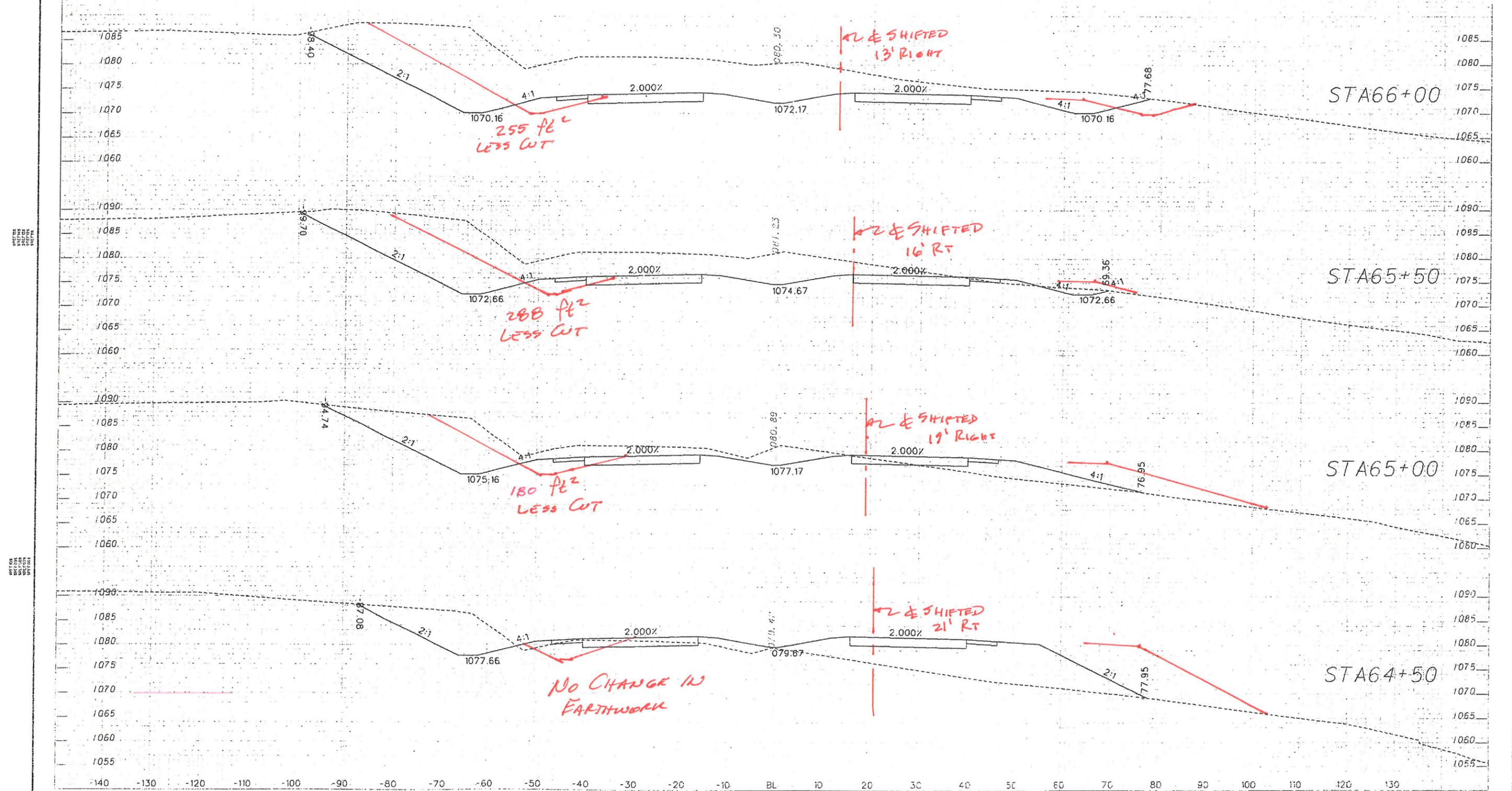


REVISION DATES

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE:  
EARTHWORK CROSS SECTIONS

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200

ALTERNATIVE RW-3  
ALTERNATIVE DESIGN  
SHEET 21 OF 25



VERTICAL CURVE DATA

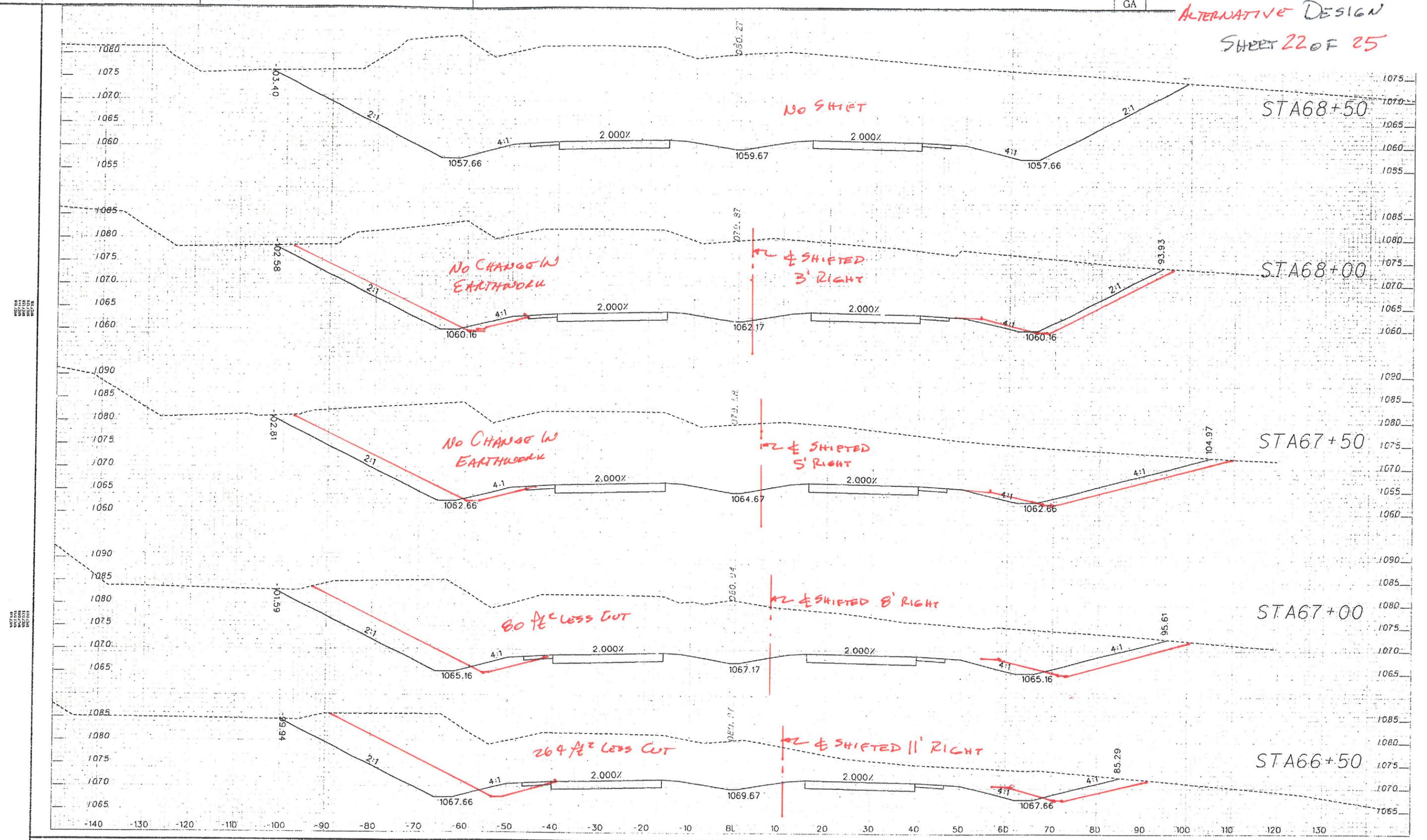
VERTICAL CURVE DATA

SCALE: 1" = 10'

Heath & Lineback Engineers  
INCORPORATED  
2390 CANTON ROAD, BUILDING 200  
ALPHARETTA, GEORGIA 30201

NO.	DATE	DESCRIPTION

STATE OF GEORGIA  
DEPARTMENT OF TRANSPORTATION  
OFFICE: 149  
**EARTHWORK CROSS SECTIONS**



SCALE : 1" = 10'

Heath & Lineback Engineers  
 INCORPORATED  
 2390 CANTON ROAD, BUILDING 200  
 MARIETTA, GEORGIA 30066-5305

REVISION DATES

STATE OF GEORGIA  
 DEPARTMENT OF TRANSPORTATION  
 OFFICE: 156  
 EARTHWORK CROSS SECTIONS

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.: RW-3

SHEET NO.: 23 of 25

Station	Area (ft <sup>2</sup> )	Volume (ft <sup>3</sup> )
54+00	264	
		13,500
54+50	276	
		15,675
55+00	351	
		19,275
55+50	420	
		23,700
56+00	528	
		26,250
56+50	522	
		27,775
57+00	589	
		28,225
57+50	540	
		25,000
58+00	460	
		20,850
58+50	374	
		12,225
59+00	115	
		2,875
59+50	0	
		0
64+50	0	
		-4,500
65+00	-180	
		-11,700
65+50	-288	
		-13,575
66+00	-255	
		-12,975
66+50	-264	
		-8,600
67+00	-80	

# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.: RW-3

SHEET NO.: **24 of 25**

Station	Area	Volume
67+50	0	-2,000
Volume Total		162,000 ft <sup>3</sup> = 6,000 CY

Unit cost for Unclassified Excavation = \$3.18/CY





# VALUE ENGINEERING ALTERNATIVE



**PROJECT:** **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

**ALTERNATIVE NO.:**  
**P-2**

**DESCRIPTION:** **CONSTRUCT A 4-FT.-WIDE PAVED SHOULDER IN LIEU OF  
A 6.5-FT.-WIDE PAVED SHOULDER**

**SHEET NO.:** 1 of 4

**ORIGINAL DESIGN:** (sketch attached)

The original design calls for the construction of 6.5-ft.-wide paved shoulders on both sides of the road and grass along the remaining 3.5 ft. of shoulder.

**ALTERNATIVE:** (sketch attached)

Construct 4-ft.-wide paved shoulders on both sides of the road. Grass the remaining 6 ft. of shoulder.

**ADVANTAGES:**

- Reduces labor and material requirements
- Reduces cost and construction time
- Reduces drainage infrastructure due to the reduction in pavement and storm water runoff

**DISADVANTAGES:**

- Vehicles parking and driving on the shoulder will have their right wheels on the grass shoulder

**DISCUSSION:**

The shoulder is to be used only for emergency purposes. Substantial labor and material can be saved by reducing the width of the paved shoulder. Four-ft.-wide paved shoulders are routinely used on roads in Georgia.

<b>COST SUMMARY</b>	<b>INITIAL COST</b>	<b>PRESENT WORTH RECURRING COSTS</b>	<b>PRESENT WORTH LIFE-CYCLE COST</b>
<b>ORIGINAL DESIGN</b>	<b>\$ 1,174,000</b>	<b>—</b>	<b>\$ 1,174,000</b>
<b>ALTERNATIVE</b>	<b>\$ 724,000</b>	<b>—</b>	<b>\$ 724,000</b>
<b>SAVINGS (Original minus Alternative)</b>	<b>\$ 450,000</b>	<b>—</b>	<b>\$ 450,000</b>

# SKETCHES



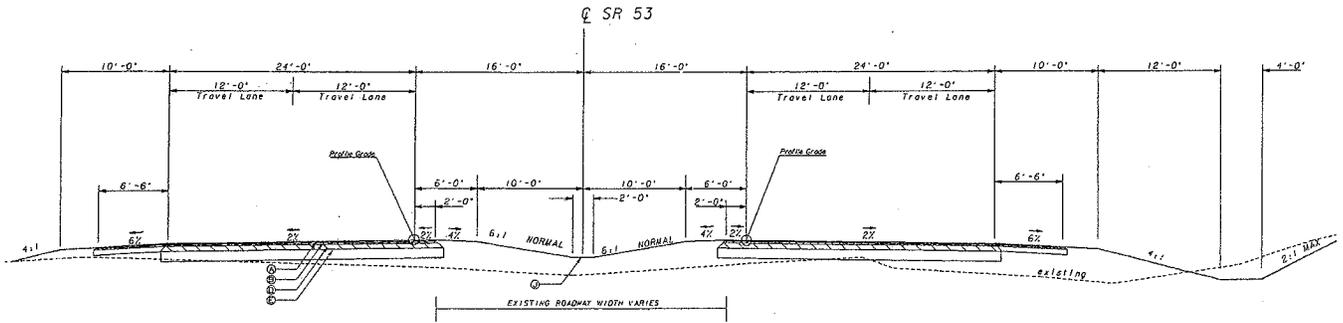
PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85**  
 STP00-0065-03(055); PI No.132860  
 Hall and Jackson Counties, GA

ALTERNATIVE NO.:

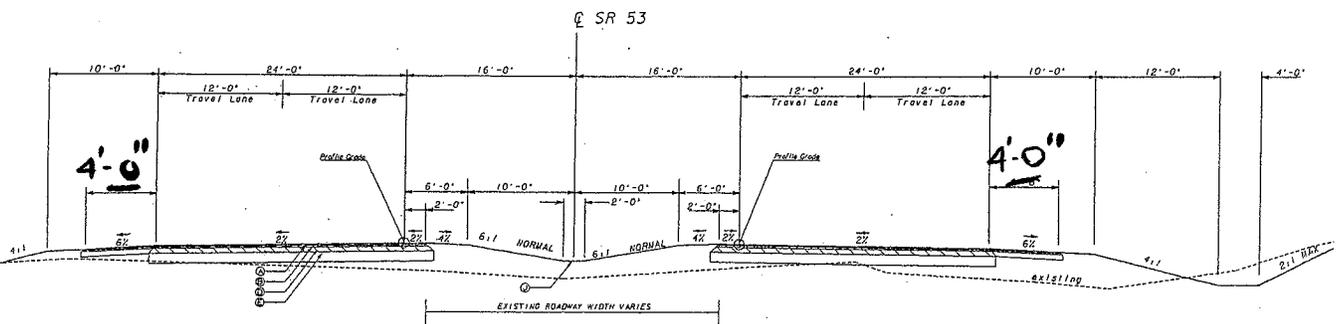
**P-2**

AS DESIGNED     ALTERNATIVE

SHEET NO.: **2 of 4**



AS DESIGNED     ALTERNATIVE



# CALCULATIONS



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
*STP00-0065-03(055); PI No.132860*  
*Hall and Jackson Counties, GA*

ALTERNATIVE NO.:

**P-2**

SHEET NO.:

**3 of 4**

Paved Shoulder Unit Cost (\$/SY):

$$12.5\text{mm: } 165\#/SY \times \text{Ton}/2,000\# \times \$85/\text{Ton} = \$7.01/SY$$

$$19.0\text{mm: } 330\#/SY \times \text{Ton}/2,000\# \times \$85/\text{Ton} = \$14.03/SY$$

$$6'' \text{ GAB: } 0.5\text{ft} \times 147\#/CF \times \text{Ton}/2,000\# \times 9\text{SF}/SY \times \$14.97/\text{Ton} = \$4.96/SY$$

$$\text{Total Pavement Unit Cost} = \$26.00/SY$$

The paved shoulder will be from STA. 40+00 to STA. 273+00 for a total length of 23,300 feet.  
Fuel adjustment is about \$6/sy

As designed paved shoulder width is 6.5'. Total width from both sides will be 13'.  
Paved shoulder area:  $23,300 \times 13/9 = 33,656$  sy.

Alternate design of paved shoulder calls for the width to be 4 feet. Total width from both sides will be 8'.  
Paved shoulder area:  $23,300 \times 8/9 = 20,711$  sy.

Additional grass to be applied will be 2.5' (6.5' - 4.0') on both sides of the road for a total of 5 feet.  
Additional grass area:  $23,300 \times 5/43,560 = 2.675$  acres.



# VALUE ENGINEERING ALTERNATIVE



**PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNERS MILL ROAD TO I-85**  
STP00-0065-03(055); PI No.132860  
Hall and Jackson Counties, GA

ALTERNATIVE NO.:

**M-1**

**DESCRIPTION: USE A RAISED GRASS MEDIAN IN LIEU OF A RAISED  
CONCRETE MEDIAN**

SHEET NO.: 1 of 2

**ORIGINAL DESIGN:** (sketch attached)

The original design calls for a raised concrete median for widened SR 53 from the I-85 southbound ramp intersection with SR 53 to approximately Station 260+50 north of the Ednaville Road intersection.

**ALTERNATIVE:** (sketch attached)

Used a raised grass median.

**ADVANTAGES:**

- Matches the median north of the beginning of the project
- Provides more green space and reduces the amount of storm water runoff

**DISADVANTAGES:**

- Grass must be maintained

**DISCUSSION:**

Using a grassed median provides more green space and reduces the storm water runoff as well as saves labor and material requirements.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 337,000	—	\$ 337,000
ALTERNATIVE	\$ 3,000	—	\$ 3,000
SAVINGS (Original minus Alternative)	\$ 334,000	—	\$ 334,000



# VALUE ENGINEERING ALTERNATIVE



PROJECT: <b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85</b> <i>STP00-0065-03(055); PI No.132860</i> <i>Hall and Jackson Counties, GA</i>	ALTERNATIVE NO.: <b>S-1</b>
DESCRIPTION: <b>DELETE THE SIDEWALK FROM CHARDONNAY TRACE NORTH TO STATION 260+50</b>	SHEET NO.: <b>1 of 3</b>

**ORIGINAL DESIGN:** (sketch attached)

The original design provides 5-ft.-wide sidewalks on both sides of SR 53 from the relocated Chardonnay Trace intersection to approximately station 260+50 north of Ednaville Road.

**ALTERNATIVE:** (sketch attached)

Delete the sidewalks but retain the 12-ft.-wide shoulders and allow the sidewalks to be added when the area develops.

**ADVANTAGES:**

- Reduces construction time and materials
- Developers can easily add the sidewalks when development occurs along this stretch of road

**DISADVANTAGES:**

- None apparent

**DISCUSSION:**

At present, there is very little development along this stretch of roadway. In fact, much of the existing development will be removed because of the right-of-way acquisitions needed to build the new roadway. Thus the sidewalks can be eliminated until such time that the area develops and there is potential pedestrian traffic.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 136,000	—	\$ 136,000
ALTERNATIVE	\$ 0	—	\$ 0
SAVINGS (Original minus Alternative)	\$ 136,000	—	\$ 136,000





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## PROJECT DESCRIPTION

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The Reconstruction and Widening of SR 53 from SR 211/Tanner's Mill Road to I-85, STP00-0065-03(055), P.I. No. 132860 includes the SR 53/Winder Highway corridor between the southbound ramps to and from I-85 in Jackson County and SR 211/Tanner's Mill Road in Hall County for a distance of approximately 5.5 miles. The purpose of the project is to enhance the connectivity to I-85 and to correct the existing substandard horizontal and vertical geometry of the two-lane road. The improvements to the corridor will enhance the connectivity of I-985 and Gainesville to the west and I-85 and Winder to the east. The widening will also increase the capacity in this stretch of roadway to reduce congestion due to traffic at side streets, driveways and shopping center accesses.

To achieve these goals, the existing two-lane road will be converted to a four-lane divided highway with some of SR 53 placed on a new alignment. The new alignment will start at Road Atlanta, approximate Station 110+00 and end at approximate Station 192+00, a distance of approximately 1.55 miles. Existing SR 53 will be tied into relocated SR 53 with T-intersections at both ends. Where the relocated SR 53 crosses New Liberty Church Road, New Liberty Church Road will be reconstructed to allow the grades to match at the intersection. Other side streets including Ednaville Road and Johnson Drive will also be improved to allow their grades to match the grades of the reconstructed SR 53.

Existing Chardonnay Trace will be relocated so that it intersects SR 53 opposite Oak Drive and the intersection will be signalized. Relocated Chardonnay Trace will be a three-lane section with one 12-ft.-wide travel lane in each direction and a 14-ft.-wide common center turn lane. The Ednaville Road intersection with SR 53 will also be signalized due to traffic volumes.

The widening of SR 53 will start at SR 211 where the existing four-lane divided highway with a 20-ft.-wide raised median typical section will expand to a four-lane divided highway with a typical section consisting of two 12-ft.-wide travel lanes in each direction, a 32-ft.-wide depressed median, and 10-ft.-wide shoulders with 6.5 ft. of paving on each side. This section will continue to approximate station 260+00, located approximately 1,200 ft. west of New Liberty Church Road, where the roadway will narrow to an urban typical section. This typical section will consist of a 20-ft.-wide raised concrete median with 30-in.-wide concrete curbs and gutters, 30-in.-wide concrete curb and gutter on the outside, and 12-ft.-wide shoulders with 5-ft.-wide concrete sidewalks set back 2 ft. from the back of the curb on each side. The urban section will continue to the I-85 southbound ramps intersection.

The vertical alignment of the new road will be modified to maintain a maximum grade of 5%. At the beginning of the project, an approximate 900-ft.-long concrete retaining wall will be constructed on the left side of the road to avoid impacts to a longitudinal stream. One existing concrete box culvert will be extended and three new concrete box culverts will be added along the new alignment of SR 53.

Some utilities will have to be relocated and right-of-way will have to be acquired throughout the length of the project. This includes the relocation of 14 residences, 11 commercial establishments, and 3 mobile homes.

The estimated cost of the project is:

Construction	\$34.4 million
Utilities	\$ 2.5 million
Right-of-Way	<u>\$33.1 million</u>
Total Project	\$70.0 million

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## VALUE ANALYSIS AND CONCLUSIONS

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### GENERAL

This section describes the value methodology followed during the value engineering study on the SR Widening and Reconstruction of SR 53 from SR 211/Tanners Mill Road to I-85, STP00-0065-03(055), Hall and Jackson Counties, P.I. No. 132860, project for the GDOT. The workshop was performed at the conceptual design completion stage. Heath & Lineback Engineers Incorporated has been selected by GDOT to assist with the development of the project and has provided information for the VE team to use as the basis of the study.

A systematic approach was used in the VE study, which was divided into three parts: (1) Preparation Effort, (2) Workshop Effort, and (3) Post-Workshop Effort. A task flow diagram outlining each of the procedures included in the VE study is attached for reference.

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

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

### PREPARATION EFFORT

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

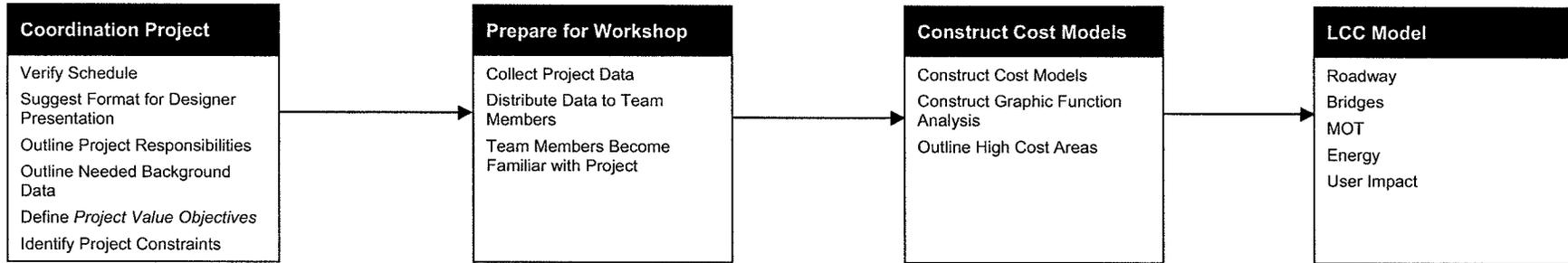
- Earthwork Class Table, dated May 11, 2010, prepared by Heath & Lineback Engineers Incorporated
- Draft of Project Concept Report, Project Number: STP00-0065-03(055); County: Hall & Jackson; P.I. Number: 132860; Federal Route Number: N/A; State Route Number: 53; Widening and Reconstruction of SR 53 from SR 211/Tanners Mill Road to I-85; not dated; prepared by Heath & Lineback Engineers Incorporated
- VE Study Constraints prepared by Otis Clark of GDOT
- Estimate Report for file "132860 Alt 3\_2010-01-12," dated 1/22/2010, prepared by Heath & Lineback Engineers Incorporated

Information relating to the project's purpose and need, owner concerns, project stakeholder concerns, design criteria, project constraints, funding sources and availability, regulatory agency approval

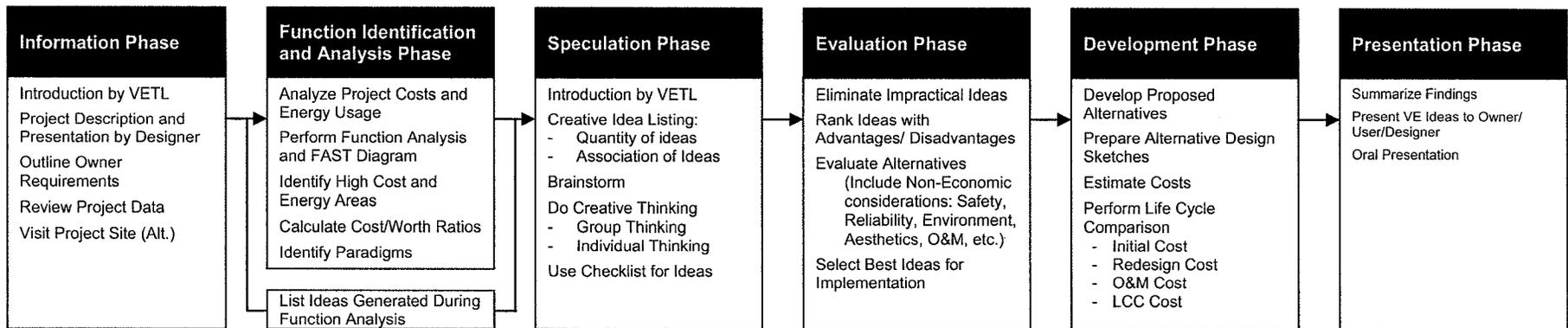


# Value Engineering Study Task Flow Diagram

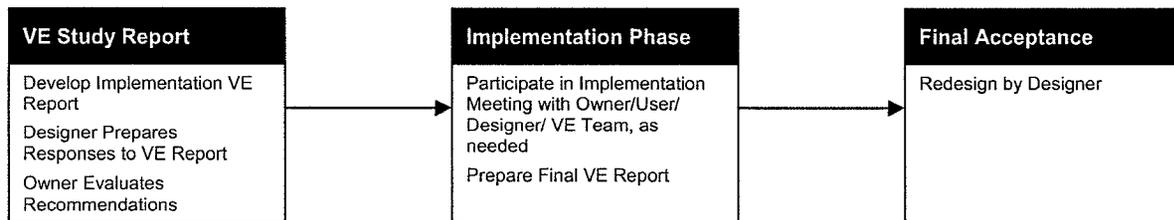
## Preparation Effort



## Workshop Effort



## Post-Workshop Effort



requirements, and the project's schedule and costs is very important as it provides the VE team with insight about how the project has progressed to its current state.

Project cost information provided by the designers is used by the VE team as the basis for a comparative analysis with similar projects. To prepare for this exercise, the VE team leader used the cost estimate prepared by Heath & Lineback Engineers Incorporated to develop a cost model for the project. The model was used to distribute the total project cost among the various elements of the project. The VE team used this model to identify the high-cost elements that drive the project and the element providing little or no value so that the team could focus on reducing or eliminating their impact.

## **VALUE ENGINEERING WORKSHOP EFFORT**

The VE workshop was a three and one-half-day effort beginning with an orientation/kickoff meeting on Tuesday, May 11, 2010, and concluding with the final VE Presentation on Friday, May 14, 2010. During the workshop, the VE Job Plan was followed in compliance with the U.S. Federal Highway Administration guidelines for conducting a VE study. The Job Plan guided the search for alternatives to mitigate or eliminate high-cost drivers, secondary functions providing little or no value, and potential project risks. Alternatives to specifically address the owner's project concerns and enhance value by improving operations, reducing maintenance requirements, enhancing constructability, and providing missing functions were also considered. The Job Plan includes six phases:

- Information Phase
- Function Identification and Analysis Phase
- Creative/Speculation Phase
- Evaluation of Creative Ideas Phase
- Alternative Development Phase
- Presentation Phase

### **Information Phase**

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

### **Function Identification and Analysis Phase**

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

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

Function is defined as the intended use of a physical or process element. The team attempted to identify functions in the simplest manner using measurable noun/verb word combinations. To accomplish this, the team first looked at the project in its entirety and randomly listed its functions, which were recorded on Random Function Analysis Worksheets (provided in the Function Identification and Analysis section). Then the individual function(s) of the major components of the project depicted on the cost models were identified.

After identifying the functions, the team classified the functions according to the following:

<u>Abbreviation</u>	<u>Type of Function</u>	<u>Definition</u>
HO	Higher Order	The primary reason the project is being considered or project goal.
B	Basic	A function that must occur for the project to meet its higher order functions.
S	Secondary	A function that occurs because of the concept or process selected and may or may not be necessary.
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 met
LO	Lower Order	A function that serves as a project input.

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

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

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

## **Creative/Speculation 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 and using the classic brainstorming technique, the VE team began to generate 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 constructability 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. A Creative Idea Listing worksheet was generated and organized by the function or project element being addressed.

GDOT and the Heath & Lineback Engineers Incorporated 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 Phase**

Since the goal of the Creative/Speculation Phase was to conceive as many ideas as possible without regard for technical merit or applicability to the project goals, the Evaluation Phase focused on identifying those ideas that do 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 the VE team evaluating the ideas originated during the Creative/Speculation Phase based on GDOT's value objectives identified through conversations during the opening presentation. Based on the team's understanding of the owner'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 5 or 4 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 are pursued in the next phase and presented to the owner 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 VE 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 VE alternatives are included in Section Two of this report.

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

### **Presentation Phase**

The goals of the last phase of the workshop were to summarize the results of the study, to prepare draft Summary of Potential Cost Savings worksheets to hand out at the presentation, and to present the key VE alternatives and design suggestions to GDOT and the Heath & Lineback Engineers Incorporated design team. The presentation was held on Friday, May 14, 2010, at the GDOT Headquarters office in Atlanta, Georgia. The purpose of the meeting was to provide the attendees with an overview of the suggestions for value enhancement resulting from the VE study and afford them the opportunity to ask questions to clarify specific aspects of the alternatives presented. 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 were given to the owner and design team to facilitate a timely review and speedy implementation of the selected ideas.

### **POST-WORKSHOP EFFORT**

The post-workshop portion of the VE study consisted of the preparation of this VE Study Report. Personnel from GDOT and the Heath & Lineback Engineers Incorporated 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 will decide which alternatives to implement.

## VALUE ENGINEERING WORKSHOP PARTICIPANTS

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The VE team was organized to provide specific expertise in the unique project elements involved with the Widening and Reconstruction of SR 53 from SR 211/Tanners Mill Road to I-85 project. The multidisciplinary team comprised professionals with highway design and construction experience and a working knowledge of VE procedures. The following lists the VE team members:

<b><u>Participant</u></b>	<b><u>Specialization</u></b>	<b><u>Affiliation</u></b>
Joe Leoni, PE	Highway Design	ARCADIS U.S., Inc.
John Tiernan, PE	Bridge/Structural Engineering	ARCADIS U.S., Inc.
Paresh J. Parikh	Constructability	Delon Hampton Associates
Howard B. Greenfield, PE, CVS	VE Team Leader	Lewis & Zimmerman Associates

### DESIGNER'S PRESENTATION

An overview of the project was presented on Tuesday, May 11, 2010, by representatives from GDOT and the Heath & Lineback Engineers design team. The purpose of this meeting, in addition to being an integral part of the Information Phase of the VE study, was to bring the VE team up-to-speed regarding the overall project specifics. Additionally, the meeting afforded the owner and design team the opportunity to highlight in greater detail those areas of the project requiring additional or special attention. An attendance list for the meeting is attached.

### VALUE ENGINEERING TEAM'S PRESENTATION

A VE presentation was conducted by the VE team on Friday, May 14, 2010, at the GDOT Headquarters office in Atlanta, Georgia to review VE alternatives with the owner and representatives from the design team. Copies of the Draft Summary of Potential Cost Savings worksheet were provided to the attendees. Attendees checked off their names on the attendance list from the opening presentation.

## VE STUDY SIGN-IN SHEET

Project No.: STP00-0065-03(055) County: Hall/Jackson PI No.:132860 Date: May 11-14, 2010

1	4	NAME	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
	<input checked="" type="checkbox"/>	Lisa L. Myers	Engineering Services	404-631-1770	lmyers@dot.ga.gov
	<input checked="" type="checkbox"/>	Matt Sanders	Engineering Services	404-631-1752	msanders@dot.ga.gov
	<input checked="" type="checkbox"/>	Ken Werho	Traffic Operations	404-635-8144	kwerho@dot.ga.gov
	<input checked="" type="checkbox"/>	Howard Greenfield	Lewis & Zimmerman	301-984-9590	hgreenfield@lza.com
	<input checked="" type="checkbox"/>	Paresh J. Parikh	Delon Hampton	404-524-3030	pparikh@delonhampton.com
	<input checked="" type="checkbox"/>	Joe Leoni	ARCADIS	770-431-8666	Joe.leoni@arcadis-us.com
	<input checked="" type="checkbox"/>	Mark Holmberg	Heath & Lineback	770-424-1668	mholmberg@heath-lineback.com
	<input checked="" type="checkbox"/>	Brandon Bailey	Heath & Lineback	770-424-1668	bbailey@heath-lineback.com
	<input checked="" type="checkbox"/>	John Tiernan	ARCADIS	770.381.8666	jtiernan@arcadis-us.com
	<input checked="" type="checkbox"/>	Stanley Hall	OPD/GDOT	404-631-1560	sthill@dot.ga.gov
	<input checked="" type="checkbox"/>	Otis Clark	OPD/GODT	404-631-1577	oclark@dot.ga.gov
	<input checked="" type="checkbox"/>	Sam Pugh	OES/GDOT	404-631-1167	spugh@dot.ga.gov
	<input checked="" type="checkbox"/>	Bill Duvall	Bridge Design	404-631-1883	bduvall@dot.ga.gov

Check all that apply      11 Attended Project Overview (Day 1)      9 Attended Project Presentation (Day 4)

## 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 the design team. The following parameters were used when calculating discounted present worth:

Year of Analysis:	2010
Construction Start Date:	July 8, 2015
Construction Completion Date:	2018
Planning Period (n):	20
Discount Rate (i):	3%

When computing capital costs for construction, direct material, labor and equipment costs are marked up using a composite markup of 9% that includes:

Engineering and Inspection	5%
Construction Contingency	4%

When computing capital costs for right-of-way, land, improvements, relocation, and damage costs are marked up using a composite markup of 148% that includes:

Scheduling Contingency	55%
Administration/Court Cost	60%

## **COST MODEL**

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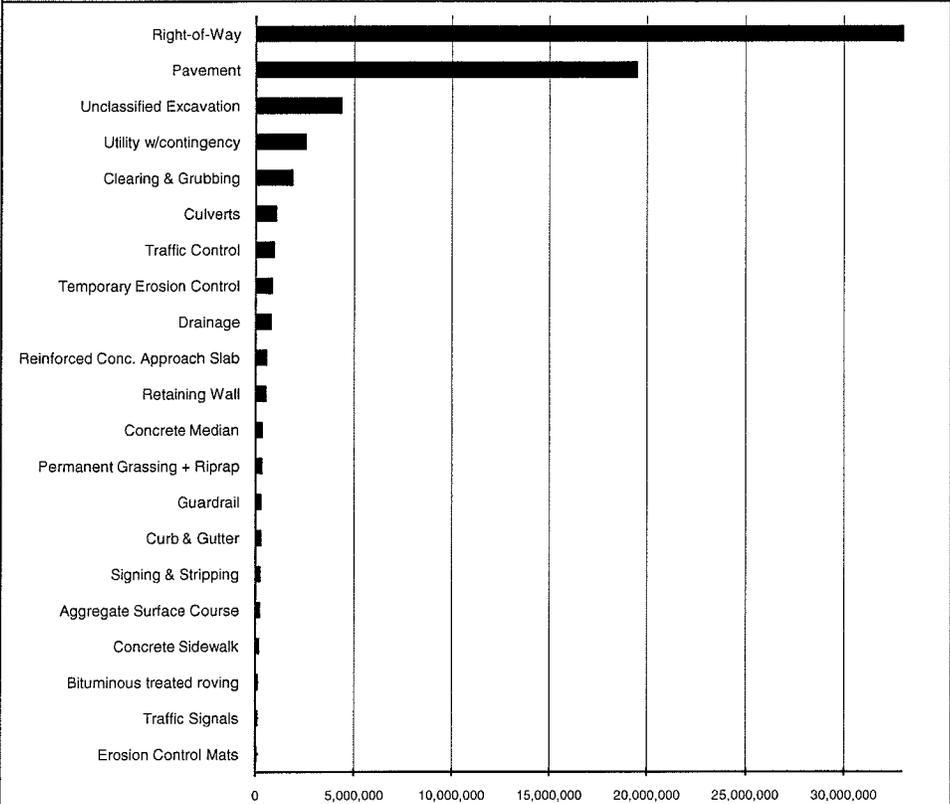
The VE team prepared a Pareto Chart, or Cost Histogram, for the project that follows this page. This Cost Histogram displays the major construction elements identified in the cost estimate prepared by the designer in descending order of magnitude and thus identifies the high cost areas in the project.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

The right-of-way cost is \$33.0 million compared to the project's construction cost of approximately \$34.4 million. Thus the team focused its efforts on reducing the right-of-way cost. With respect to the construction costs, pavement and unclassified excavation are the real cost drivers of the project.

# COST HISTOGRAM

**PROJECT: WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNERS MILL ROAD TO I-85**

PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Right-of-Way	33,022,750	48.79%	48.79%
Pavement	19,482,706	28.78%	77.57%
Unclassified Excavation	4,320,171	6.38%	83.96%
Utility w/contingency	2,507,227	3.70%	87.66%
Clearing & Grubbing	1,842,344	2.72%	90.38%
Culverts	1,016,363	1.50%	91.88%
Traffic Control	920,463	1.36%	93.24%
Temporary Erosion Control	822,701	1.22%	94.46%
Drainage	760,119	1.12%	95.58%
Reinforced Conc. Approach Slab	531,375	0.79%	96.37%
Retaining Wall	501,665	0.74%	97.11%
Concrete Median	309,092	0.46%	97.56%
Permanent Grassing + Riprap	291,494	0.43%	97.99%
Guardrail	256,991	0.38%	98.37%
Curb & Gutter	256,469	0.38%	98.75%
Signing & Stripping	224,592	0.33%	99.09%
Aggregate Surface Course	205,560	0.30%	99.39%
Concrete Sidewalk	174,686	0.26%	99.65%
Bituminous treated roving	97,270	0.14%	99.79%
Traffic Signals	88,166	0.13%	99.92%
Erosion Control Mats	53,580	0.08%	100.00%
<b>Subtotal</b>	<b>\$ 67,685,784</b>	<b>100.00%</b>	
<b>Construction Engineering &amp; Inspection @ 5.00%</b>	<b>\$ 1,268,413</b>		
<b>Construction Contingency @ 4.00%</b>	<b>\$ 1,014,730</b>		
<b>TOTAL</b>	<b>\$ 69,968,927</b>	<b>Comp Mark-up:</b>	<b>3%</b>



Costs in graph are not marked-up.

## FUNCTION ANALYSIS

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A function analysis was performed to (1) understand the project purpose and need, (2) define the requirements for each project element, (3) ensure a complete and thorough understanding by the VE team of the basic 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 worksheet completed by the team for the project in its entirety and the various elements follow.

# RANDOM FUNCTION ANALYSIS



PROJECT: <b>WIDENING AND RECONSTRUCTION OF SR 53 FROM SR 211/TANNER'S MILL ROAD TO I-85</b> <i>STP00-0065-03(055); P.I. No. 132860</i> <i>Jackson and Hall Counties, GA</i>	SHEET NO.: <b>1 of 1</b>
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DESCRIPTION	FUNCTION		
	VERB	NOUN	KIND
<b>PROJECT</b>	Increase	Capacity	HO
	Promote	Growth	HO
	Reduce	Accidents	HO
<b>RIGHT-OF-WAY</b> \$\$\$	Create	Space	B
	Improve	Geometry	B
<b>MEDIAN</b>	Control	Access	B
<b>PAVEMENT</b> \$\$\$	Add	Lanes	B
	Support	Traffic	B
<b>SIGNALS</b>	Assign	Vehicle Right-of-Way	B
<b>EARTHWORK</b> \$	Establish	Connection	B
	Create	Space	B
<b>UTILITIES</b>	Clear	Path	S
<b>CLEARING AND GRUBBING</b>	Clear	Path	R/S
<b>CULVERTS</b>	Convey	Storm Water	R/S
<b>TRAFFIC CONTROL</b>	Maintain	Existing Traffic	R/S
<b>TEMPORARY EROSION CONTROL</b>	Prevent	Pollution	R/S
<b>DRAINAGE</b>	Convey	Storm Water	R/S
<b>RETAINING WALL</b>	Prevent	Stream Impacts	S
<b>CONCRETE MEDIAN</b>	Reduce	Maintenance	S
<b>PERMANENT GRASSING</b>	Prevent	Erosion	R/S
	Provide	Aesthetics	S

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

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

<b>PROJECT ELEMENT</b>	<b>PREFIX</b>
Right-of-Way	ROW
Pavement	P
Earthwork	E
Sidewalk	S
Median	M
Retaining Walls	RW

The ideas were 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 the owner's value objectives for the project. The following are the top value objectives for this project:

- Impacts to Historic Properties and Stream
- Meets Need and Purpose
- Reduces Costs
- Improves Operations
- Maintains safety
- Reduces Impact to Right-of-Way
- Eases construction

After discussing each idea, the team evaluated the ideas by consensus. This produced 15 ideas rated 4 or 5 to research and develop into formal VE alternatives to be included in the Section Two of the report. Highly rated ideas that were not developed further may have been combined with another related idea or discarded as a result of additional research indicating the concept as not being cost effective or technically feasible. The reader is encouraged to review the Creative Idea Listing and Evaluation worksheet since it may suggest additional ideas that can be applied to the design.

# CREATIVE IDEA LISTING



PROJECT: **WIDENING AND RECONSTRUCTION OF SR 53 FROM  
SR 211/TANNER'S MILL ROAD TO I-85**  
STP00-0065-03(055); P.I. No. 132860  
Jackson and Hall Counties, GA

SHEET NO.: **1 of 2**

NO.	IDEA DESCRIPTION	RATING
<b>SIDEWALKS (S)</b>		
S-1	Delete sidewalks from Chardonnay Trace north, retain 12-ft.-wide shoulder	5
S-2	Use asphalt in lieu of concrete for sidewalk	3
<b>RIGHT-OF-WAY (ROW)</b>		
ROW-1	Narrow typical section from STA 230+00 to Ednaville Road from 32-ft.-wide median to 20-ft.-wide median	5
ROW-2	Move alignment north at New Liberty Church Road	5
ROW-3	Realign Chardonnay Trace	4
ROW-4	Encroach on historic property at Ednaville Road and save properties on the other side of the road	2
ROW-5	Shift alignment at the intersection of new SR 53 and existing SR 53	Combine w/ROW-2
ROW-6	Reduce typical section of Chardonnay Trace	5
ROW-7	Reduce amount of improvements on New Liberty Church Road	5
ROW-8	Narrow the median from Ednaville Road to New Liberty Church Road	5
ROW-9	Reduce extent of improvements at New Cut Road and Ednaville Road	4
ROW-10	Change typical section at beginning of project to reduce earthwork and right-of-way	See RW-1
ROW-11	Use a raised median section throughout the entire project	Combine w/ROW-1/ ROW-2 and ROW-8
<b>MEDIAN (M)</b>		
M-1	Use grassed median in lieu of raised concrete median	5
M-2	Use and 18-ft.-wide median in lieu of 20-ft.-wide median throughout the project	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

