DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: CSSTP-0007-00(217) Walton/Newton
P. I. No.: 0007217
Social Circle Bypass

OFFICE: Engineering Services

DATE: May 21, 2008

FROM: Brian K. Summers, P.E., Project Review Engineer BKW

TO: Babs Abubakari, P.E., State Consultant Design and Program Delivery Engineer

SUBJECT: IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT No.	Description	Savings PW & LCC	Implement	Comments
ROADWAY (RD)				
RD-1	Use 2' Paved Shoulders instead of 6.5' Paved Shoulders	$622,651	No	This no longer applies since VE Alternative "RD-13" will be implemented.
RD-4	Use CONSPAN Structure in lieu of bridges	$617,902	No	Results in additional Environmental impacts to an Endangered Species (Altamaha Shiner) in addition to impacts associated with Stream Relocation.
RD-7	Use existing Solo Plant Access Road	$219,588	No	From a horizontal alignment standpoint, the Solo Access Road does not tie directly to the North Bypass that is currently open to traffic. It would be even harder to make this tie in from a vertical alignment standpoint. Would result in excessive vertical grades as well as a significant increase in the Embankment quantity.

ALT No.	Description	Savings PW & LCC	Implement	Comments
ROADWAY (RD) - continued				
RD-8	Modify vertical profile grade to reduce the "Cut"	$699,252 (proposed) $412,800 (actual)	Yes	This should be done. The actual savings is based on a more detailed evaluation of the profile and considers additional costs for the bridge based on the revised profile.
RD-13	Use 4' Paved Shoulders instead of 6.5' Paved Shoulders	$164,348	Yes	This will match the paved shoulders currently in place on S.R. 11 at the beginning of the project.

A meeting was held on May 21, 2008 to discuss the above recommendations. Eric Seckinger, Joe Wheeler, and Sara Scheu with RSH, Stanley Hill, and Vinesha Pegram with Consultant Design, and Brian Summers and Ron Wishon with Engineering Services were in attendance.

The results above reflect the consensus of those in attendance and those who provided input.

Approved: _____ **Date:** 5/20/08
Gerald M. Ross, P. E., Chief Engineer

BKS/REW

Attachments

c: Gus Shanine
Todd Long
Babs Abubakari
Stanley Hill
Vinesha Pegram
James Magnus
Randy Davis
Kelly Hairston
Kesha Walker
Rusty Merritt
Emmanuella Myrthil
Patrick Allen
Lisa Myers

Preconstruction Status Report By PI Number

Print Date: 05/21/2008

PROJ ID	COUNTY	DESCRIPTION	MGMT. ROW DATE	SCHED DATE	MGMT. LET DATE
0007217	Newton, Walton	SOCIAL CIRCLE BYPASS FROM EAST HIGHTOWER TRAIL TO SR 11	Mar-09	May-10	Oct-10

CSSTP-0007-00(217) *FIELD DIST:* 1, 2
TIP #: WA-020 *TWIN:* *US:*
MPO: Not Urban *EST DATE:* 10/26/2007
MODEL YR: *2020*
PROJ MGR: Pegram, Vinesha *PROJ LENGTH:* 2.80
PROG TYPE: New Construction *TYPE WORK:* Roadway Project
CONCEPT: NL 4U *LET RESP:* DOT Congressional Districts: 8, 7

Phase	Approved	Proposed	Cost	Fund	Status
PE	2005	2005	2,746,067.41	Q25	AUTHORIZED
ROW	2009	2009	2,653,000.00	L250	PRECST
ROW	2009	2009	3,000,000.00	LY10S	PRECST
CST	2010	2010	16,329,000.00	L250	PRECST

SCHED START	SCHED FINISH	ACTIVITY	ACTUAL START	ACT/EST FINISH	PCT	DISTRICT COMMENTS
		Define Project Concept	2/8/2005	3/26/2007	100	
		Concept Meeting	7/20/2007	7/20/2007	100	
		Concept Submittal and Review	9/15/2007	9/15/2007	100	
		Receive Preconstruction Concept Approval	10/3/2007	10/17/2007	100	
		Management Concept Approval Complete	**10/17/2007**	**10/26/2007**	**100**	
5/28/2008	6/3/2008	Value Engineering Study	7/20/2007		96	
		Public Information Open House Held	5/4/2006	5/4/2006	100	
5/23/2008	2/13/2009	Environmental Approval	4/19/2006		74	
12/8/2008	1/2/2009	Pub Hear Held/Com Resp (EA/FONSI, GEPA)			0	
		Field Surveys/SDE	9/13/2007	11/26/2007	100	
5/23/2008	**2/27/2009**	**Preliminary Plans**	**9/6/2007**		48	
5/23/2008	6/27/2008	Underground Storage Tanks			0	
7/21/2008	10/3/2008	404 Permit Obtainment			0	
3/16/2009	3/16/2009	PFPR Inspection			0	
4/21/2009	5/11/2009	R/W Plans Preparation			0	
6/16/2009	**6/19/2009**	**R/W Plans Final Approval**			**0**	
4/21/2009	4/23/2009	L & D Report Development and Approval			0	
6/22/2009	3/15/2010	R/W Acquisition			0	
9/10/2009	9/23/2009	Stake R/W			0	
5/23/2008	6/3/2008	Soil Survey			0	
4/24/2009	**12/24/2009**	**Final Design**			0	
12/28/2009	12/28/2009	FFPR Inspection			0	
1/11/2010	1/22/2010	FFPR Response			0	

BIKE PROVISIONS INCLUDED?: Y *MEASUREMENT SYSTEM:* *CONSULTANT:* T *UT EST:*

Bridge: NO BRIDGE REQUIRED
Design: VCP:compltg erosion cntrl and staging 4-1-08 (RSH) (TrnKy)
EIS: DraftEA|NotApvd|NotonSchedROW|Upd3-14-08|EM
LGPA: NOTIFICATION LETTER SENT TO NEWTON|WALTON|SOCIAL CIRCLE 2-16-05
Planning: The NE GA Reg'l Bike/Ped Plan requires a bikeable shoulder be included in new construction projects (pg 35)
Prog. Develop: RW STIP AMENDMENT #5 11-07
Programming: #1 6-05|#2 1-06|#3 1-08
Traffic Op: SEND PFPR PLANS FOR REVIEW 6-18-07 $
Utility: OCD SUE; NEED 2ND SUBMISSION PLANS 09/27/07
EMG: TURNKEY PROJECT

R/W INFORMATION:
PREL PARCEL CT: *TOTAL PARCEL CT:* *ACQUIRED BY:* DOT *ACQ MGR:*
UNDER-REVIEW CT: *RELEASED CT:* *OPT-PEND CT:* *DEEDS CT:* *COND-PEND CT:* *COND-FILED CT:*
RW CERT DT: *ACQUIRED CT:* *RELOCATION CT:*

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENTAL CORRESPONDENCE

FILE: CSSTP-0007-00(217), Walton/Newton County
P.I. No. 0007217
Social Circle Bypass
SR 11 to E. Hightower Trail

OFFICE: Consultant Design

DATE: May 7, 2008

FROM: Mohammed (Babs) Abubakari, P.E.
State Program Delivery & Consultant Design Engineer

TO: Brian Summers, P.E. Project Review Engineer
Attn: Lisa Myers

SUBJECT: **Value Engineering Study Responses**

Reference is made to the recommendations that were contained in the Value Engineering Study Report dated March 12, 2008 for the above referenced project. Our responses and recommendations are as follows:

1. **Value Engineering Alternative No. RD – 1** – Use 2' Paved Shoulder instead of the 6.5' Paved Shoulder. **(Cost Savings of $622,651).**

Recommendation

Approval of the VE Alternative No. RD – 1 is not recommended.

- The Social Circle Bypass has been classified as a Rural Minor Arterial. Based on the GDOT Design Policy Manual (Rev. May 21, 2007) Table 6.3: "GDOT Design Standards for Arterial Roadways," a 10-foot shoulder (6.5-foot paved) is required on this roadway.

- Furthermore, in the AASHTO Geometric Design of Highways and Streets (Green Book) 2004, Exhibit 7-3 "Minimum Width of Traveled Way and Usable Shoulder for Rural Arterials" states that for the Project's traffic design volume of 11,370 in the design year (2031), the usable shoulder should be at least 8 feet in width. It states that "usable shoulders on arterials should be paved."

- Given the industrial nature of the developments in the area, including the Solo Cup Plant, Robert Standridge property and the Social Circle Cargo facility, truck traffic will always be significant. The current estimate of percent trucks is 12%, and as traffic volumes grow it will be important to include the wider paved shoulders to provide safe operations at the 65 mph design speed.

- The existing SR 11, where this alignment begins currently has a 4' paved shoulder; therefore reducing the paved shoulder width to narrower than the existing is not recommended. The project intersects East Hightower Trail near the northern terminus, which is a designated state bike route. Wider shoulders are recommended to provide continuity with that facility.

2. **Value Engineering Alternative No. RD – 4** – Use Conspan in-lieu of bridges at the first two stream crossings (STA 165+00 and STA 185+00). **(Cost Savings of $617,902).**

Recommendation

Approval of the VE Alternative No. RD – 4 is not recommended.

- The potential cost savings mentioned in this alternative are $617,902 but do not appear to consider issues that were considered when the original hydraulics studies were performed. These issues include existing topography and environmental concerns since these features cause the project to violate stream buffers due to construction fill limits. Both of these issues were factors in the decision to use bridges and not culverts. The proposed CONSPAN culverts would encounter the same issues as cast-in-place culverts at these locations.

- Additional environmental impacts enhance the need for bridges over culverts in these locations. This area is a habitat for the endangered Altamaha Shiner. Culvert construction could negatively impact this habitat, while bridge construction would make habitat changes negligible.

- Alternative RD-4 is very similar to the original concept proposal to use multiple cell box culvert structures. The culverts were feasible based on hydraulic modeling and would create no adverse impacts upstream of each site. The problem at these locations is that the streams meander through the crossing locations. Due to the curvature of each stream the culverts that were analyzed only considered a tangent segment of the stream that could be interpolated through the curvature at the crossing. The tangent segment length is considerably shorter than the length needed to carry a 2:1 slope to existing ground so long, high wing walls are needed. The CONSPAN culverts would encounter this same problem. While it is possible to construct the culverts to follow the stream meander, it is not recommended due to the possibility of performance issues. The original models that were developed also did not take this curvature into account. The performance issues with curved culverts are predominantly maintenance related. The biggest issue is the accelerated rate of silt build up in the culvert which requires more frequent maintenance thereby increasing costs.

- In order for the CONSPAN culverts to achieve the cost savings that are stated in the VE report the streams would require relocation to be able to achieve the 180 foot and 160 foot lengths of culvert at each location. This involves relocating the stream channel and allows the culvert to be constructed using fill and no wing walls. The disadvantage to this alternative is that it would require individual permits for the sites

and not the nationwide permit as is currently planned. This could significantly delay the project schedule and is not recommended.

- The original culvert cost including the wing walls was $1.95 Million. Using the cost developed in the VE study for the CONSPAN culvert ($700,000) and the total length of culvert (340 feet) the culvert cost is $2,060/ LF. The original culvert length that was possible was only 60 feet at each location to fit the stream curvature. The actual cost to use the CONSPAN culverts and MSE wing walls is as follows:

- ***Total original cost:*** ***$1,950,000***
- ***-Original Culvert Cost :*** ***- $ 322,000***
- ***CONSPAN : $2,060/ft x 120 ft=*** ***+ $247,200***
- ***New Cost:*** ***$1,875,200***
- ***10% Mark-up:*** ***+$187,520***
- ***Total:*** ***$2,062,720***

- Much of this cost is to construct the MSE walls at fill heights of 20 to 25 feet. These costs are on the order of $871,000 according to the original culvert estimate. This cost does not include the right of way costs that were originally included in the culvert estimates of approximately $52,000 and is purely the construction costs. By comparison, the estimated VE bridge cost at $1,712,700 is $350,000 less than the revised CONSPAN cost.

- The recommendation *is to use bridges at these locations.*

3. **Value Engineering Alternative No. RD – 7** – Use existing Solo Access Road. **(Cost Savings of $219,588).**

Recommendation

Approval of the VE Alternative No. RD – 7 is not recommended.

- From a horizontal standpoint, only a small portion of the Solo Access Road could be used as part of the mainline bypass alignment. Due to limited right of way on the north bypass and existing industrial buildings that limit the availability of additional right of way, the proposed alignment needs to tie directly across from the north bypass. The Solo Access Road horizontal alignment does not tie in close enough to the existing bypass to provide a continuous movement.

- Vertically it is even more difficult to tie in to the existing Solo Access Road. The elevation of the profile where the new alignment crosses the existing Thurman Baccus Road is approximately 754' and the Solo Cup Access Road elevation is approximately 806'. The distance between the two points is approximately 1000', which would require a grade of 5.2% while the maximum grade for this facility is only 4.0% per GDOT Design Manual Chapter 4 Table 4.5.

- The amount of embankment required would increase dramatically since the higher profile required to meet the Solo Cup Road elevation would be over a low lying area.

4. **Value Engineering Alternative No. RD – 8** – Re-align vertical to reduce "cut". **(Cost Savings of $699,252).**

Recommendation

Approval of the VE Alternative No. RD – 8 is recommended.

- RS&H has closely examined realigning the profile to reduce the overall volume of earthwork. Through our profile optimization we have been able to save approximately $582,000 in earthwork cost.

- A portion of the savings would be reduced from the required additional length of bridges associated with the revised profile. The revised bridge cost estimates are $898,000 for bridge one and $1,065,300 for bridge two. The original cost estimates were $966,900 for bridge one and $965,000 for bridge two.

- The overall cost savings for implementing this alternative is approximately $412,800.

5. **Value Engineering Alternative No. RD – 13** – Use 4' paved shoulders. **(Cost Savings of $164,348).**

Recommendation

Approval of the VE Alternative No. RD – 13 is not recommended.

- The Social Circle Bypass has been classified as a Rural Minor Arterial. Based on the GDOT Design Policy Manual (Rev. May 21, 2007) Table 6.3: "GDOT Design Standards for Arterial Roadways," a 10-foot shoulder (6.5-foot paved) is required on this roadway.

- Furthermore, in the AASHTO Geometric Design of Highways and Streets (Green Book) 2004, Exhibit 7-3 "Minimum Width of Traveled Way and Usable Shoulder for Rural Arterials" states that for the Project's traffic design volume, the usable shoulder should be at least 8 feet in width. It states that "usable shoulders on arterials should be paved."

- Given the industrial nature of the developments in the area, including the Solo Cup Plant, Robert Standridge property and the Social Circle Cargo facility, truck traffic will always be significant. The current estimate of percent trucks is 12%, and as traffic volumes grow it will be important to include the wider paved shoulders to provide safe operations at the 65 mph design speed.

- The project intersects East Hightower Trail near the northern terminus, which is a designated state bike route. Wider shoulders are recommended to provide continuity with that facility.

Table 6.3. GDOT Design Standards for Arterial Roadways

Item No.	Item	Rural				Urban[1]	
		Two-Lane		Four-Lane			
1	Design Speed (mph)[2]	50	60	60	70	40	50
2	Level of Service	B	B	B	B	C[3]	C[3]
3	Number of Travel Lanes	2	2	4	4	2 min-4 typ.	2 min-4 typ.
4	Width of Travel Lanes	12-ft.	12-ft.	12-ft.	12-ft.	12-ft.	12-ft.
5	Overall Width of Shoulders						
	Outside	10-ft.	10-ft.	10-ft.	10-ft.	n/a	n/a
	Median[4]	n/a	n/a	6-ft.	6-ft.	6-ft.	6-ft.
6	Width of Paved Shoulders						
	Outside	6.5-ft.	6.5-ft.	6.5-ft.	6.5-ft.	n/a	n/a
	Median	n/a	n/a		2-ft.	2-ft.	2-ft.
7	Width of Median (ft)						
	Depressed	n/a	n/a	32-44-ft.	32-44-ft.	n/a	n/a
	Raised	n/a	n/a	20-24-ft.	20-24-ft.	Turn Lane[5] plus 8-12-ft.	Turn Lane[5] plus 8-12-ft.
	Flush	n/a	n/a	14-ft.	14-ft.	14-ft.	14-ft.
8	Sidewalks						
	Width of Sidewalk	n/a	n/a	n/a	n/a	5-ft.	5-ft.
	Sidewalk Offset from Curb	n/a	n/a	n/a	n/a	6-ft.	6-ft.
9	Width of Bike Lane[6]	n/a	n/a	n/a	n/a	4-ft.	4-ft.
10	Fore Slope – Ratio	4:1	4:1	4:1	4:1	2:1 max.	4:1
11	Back Slope – Ratio	2:1 max.	2:1 max.	2:1 max.	2:1 max.	2:1 max.	2:1 max.
12	Pavement Cross Slope	0.02-ft./ft.	0.02-ft./ft.	0.02-ft./ft.	0.02-ft./ft.	0.02-ft./ft.	0.02-ft./ft.
13	Stopping Sight Distance[7]	425-ft.	570-ft.	570-ft.	730-ft.	305-ft.	425-ft.
14	Maximum Superelevation	0.06-ft./ft.	0.06-ft./ft.	0.06-ft./ft.	0.08-ft./ft.	0.04-ft./ft.	0.06-ft./ft.
15	Minimum Radius						
	Without Superelevation (+ .02)[8]	5,700-ft.	8,060-ft.	8,060-ft.	10,700-ft.	3,220-ft.	5,700-ft.
	Without Superelevation (+ .02)[8]	7,870-ft.	11,100-ft.	11,100-ft.	14,500-ft.	4,770-ft.	7,870-ft.
16	Minimum Radius (With Superelev.)	833-ft.	1,330-ft.	1,330-ft.	1,810-ft.	533-ft.	833-ft.
17	Maximum Grade (%)						
	Level	4%	3%	3%	3%	7%	6%
	Rolling	5%	4%	4%	4%	8%	7%
	Mountainous	7%	6%	6%	5%	10%	9%
18	Minimum Vertical Clearance (ft)[9]	16.75-17.5	16.75-17.5	16.75-17.5	16.75-17.5	14.5	14.5
19	Minimum Horizontal Clearance (ft)						
	From Edge of Travel Lane[10]	26	36	26	36	N/A	N/A
	Outside (From Back of Curb)	n/a	n/a	n/a	n/a	6 typ. – 15	6 typ. – 15
	Median (From Back of Curb)	n/a	n/a	n/a	n/a	4 typ. – 15	4 typ. – 15
20	Minimum Width of Right of Way (ft)[11]	As needed	As needed	As needed	As needed	As needed	As needed

Notes:
[1] Applies to curbed sections only unless stated otherwise. Use rural standards for uncurbed sections.
[2] See current AASHTO Green Book, Chapter 7, Design Speed. Also see notes 6, 7, and 8 below for design speeds not shown
[3] LOS D is permissible in heavily developed areas.
[4] Applies to uncurbed sections.
[5] GDOT prefers the use of 24-ft. raised median if there are minimal impacts associated with a wider median.
[6] Values shown are for the given design speed. For other design speeds, refer to current AASHTO *Green Book*, Chapter 3.
[7] Values shown are for the given design speed. For other design speeds, see current AASHTO *Green Book*, Chapter 3.
[8] Values shown are for the given design speed. For other design speeds, see **Chapter 4** of this Manual.
[9] Minimum values are for vehicular clearances. Please refer to GDOT *Bridge and Structures Policy Manual* for further information, clearances at other facilities and limitations.
[10] Minimum horizontal clearance equals to clear zone plus 4-ft. typical ditch.
[11] Please refer to **Section 6.10**, of this Manual for determination of width of required right-of-way

Widths

The logical approach to determining appropriate lane and shoulder widths is to provide a width related to the traffic demands. Exhibit 7-3 provides values for the width of traveled way and usable shoulder that should be considered for the volumes indicated. Regardless of weather conditions, shoulders should be usable at all times. On high-volume highways, shoulders should generally be paved, but because of economic constraints, paved shoulders may not always be practical. As a minimum, 0.6 m [2 ft] of the shoulder width should be paved to provide for pavement support, wide vehicles, collision avoidance, and additional pavement width for bicyclists. The shoulder should be constructed to a uniform width for relatively long stretches of roadway. For additional information concerning shoulders, refer to Chapter 4.

Metric					US Customary				
Design speed (km/h)	Minimum width of traveled way (m)[a] for specified design volume (veh/day) under 400	400 to 1500	1500 to 2000	over 2000	Design speed (mph)	Minimum width of traveled way (ft)[a] for specified design volume (veh/day) under 400	400 to 1500	1500 to 2000	over 2000
60	6.6	6.6	6.6	7.2	40	22	22	22	24
70	6.6	6.6	6.6	7.2	45	22	22	22	24
80	6.6	6.6	7.2	7.2	50	22	22	24	24
90	6.6	6.6	7.2	7.2	55	22	22	24	24
100	7.2	7.2	7.2	7.2	60	24	24	24	24
110	7.2	7.2	7.2	7.2	65	24	24	24	24
120	7.2	7.2	7.2	7.2	70	24	24	24	24
130	7.2	7.2	7.2	7.2	75	24	24	24	24
All speeds	Width of usable shoulder (m)[b] 1.2	1.8	1.8	2.4	All speeds	Width of usable shoulder (ft)[b] 4	6	6	8

[a] On roadways to be reconstructed, an existing 6.6-m [22-ft] traveled way may be retained where alignment and safety records are satisfactory.

[b] Usable shoulders on arterials should be paved; however, where volumes are low or a narrow section is needed to reduce construction impacts, the paved shoulder may be reduced to 0.6 m [2 ft].

Exhibit 7-3. Minimum Width of Traveled Way and Usable Shoulder for Rural Arterials

Horizontal Clearance to Obstructions

A clear unobstructed roadside is highly desirable. Where fixed objects or nontraversable slopes fall within the clear roadside zones discussed in the section on "Horizontal Clearance to Obstructions" in Chapter 4, refer to AASHTO *Roadside Design Guide* (3) for guidance in selecting the appropriate treatment. Utilities and trees that will grow to 100 mm [4 in] or more in diameter should be located near the right-of-way line and should be outside the selected clear zone.

ATTACHMENT 2

Estimate Report for file "SCB Culvert 1: triple 8x7"

Section MSE Walls

Item Number	Quantity	Units	Unit Price	Item Description	Cost
627-1000	161	SF	54.72	MSE WALL FACE, 0 - 10 FT HT, WALL NO - 1	8809.92
627-1000	188	SF	54.72	MSE WALL FACE, 0 - 10 FT HT, WALL NO - 2	10287.36
627-1010	1047	SF	55.35	MSE WALL FACE, 10 - 20 FT HT, WALL NO - 1	57951.45
627-1010	979	SF	55.35	MSE WALL FACE, 10 - 20 FT HT, WALL NO - 2	54187.65
627-1020	2834	SF	58.36	MSE WALL FACE, 20 - 30 FT HT, WALL NO - 1	165392.24
627-1020	2851	SF	58.36	MSE WALL FACE, 20 - 30 FT HT, WALL NO - 2	166384.36
				Section Sub Total:	**$463,012.98**

Section Paving

Item Number	Quantity	Units	Unit Price	Item Description	Cost
310-1101	689	TN	22.31	GR AGGR BASE CRS, INCL MATL	15371.59
402-3121	170	TN	64.37	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	10942.90
402-3130	85	TN	65.30	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	5550.50
402-3190	142	TN	63.58	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	9028.36
				Section Sub Total:	**$40,893.35**

Section Culvert

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	212	CY	639.12	CLASS A CONCRETE	135493.44
511-1000	22585	LB	0.92	BAR REINF STEEL	20778.20
				Section Sub Total:	**$156,271.64**

Section Earthwork

Item Number	Quantity	Units	Unit Price	Item Description	Cost
206-0002	37163	CY	6.76	BORROW EXCAV, INCL MATL	251221.88
				Section Sub Total:	**$251,221.88**

Total Estimated Cost: $911,399.85

Subtotal Construction Cost	**$911,399.85**
E&C Rate 0.0 %	$0.00
Inflation Rate 0.0 % @ 0.0 Years	$0.00
Total Construction Cost	**$911,399.85**
Right Of Way	$13,243.00
ReImb. Utilities	$0.00
Grand Total Project Cost	**$924,642.85**

ATTACHMENT 2

Estimate Report for file "SCB Culvert 2: triple 8x6"

Section MSE Walls

Item Number	Quantity	Units	Unit Price	Item Description	Cost
627-1000	279	SF	54.72	MSE WALL FACE, 0 - 10 FT HT, WALL NO - 1	15266.88
627-1000	128	SF	54.72	MSE WALL FACE, 0 - 10 FT HT, WALL NO - 2	7004.16
627-1010	1040	SF	55.35	MSE WALL FACE, 10 - 20 FT HT, WALL NO - 1	57564.00
627-1010	1590	SF	55.35	MSE WALL FACE, 10 - 20 FT HT, WALL NO - 2	88006.50
627-1020	2330	SF	58.36	MSE WALL FACE, 20 - 30 FT HT, WALL NO - 1	135978.80
627-1020	1790	SF	58.36	MSE WALL FACE, 20 - 30 FT HT, WALL NO - 2	104464.40
				Section Sub Total:	**$408,284.74**

Section Paving

Item Number	Quantity	Units	Unit Price	Item Description	Cost
310-1101	827	TN	22.31	GR AGGR BASE CRS, INCL MATL	18450.37
402-3121	204	TN	64.37	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	13131.48
402-3130	102	TN	65.30	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	6660.60
402-3190	170	TN	63.58	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	10808.60
				Section Sub Total:	**$49,051.05**

Section Culvert

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	223	CY	647.10	CLASS A CONCRETE	144303.30
511-1000	24319	LB	0.91	BAR REINF STEEL	22130.29
				Section Sub Total:	**$166,433.59**

Section Earthwork

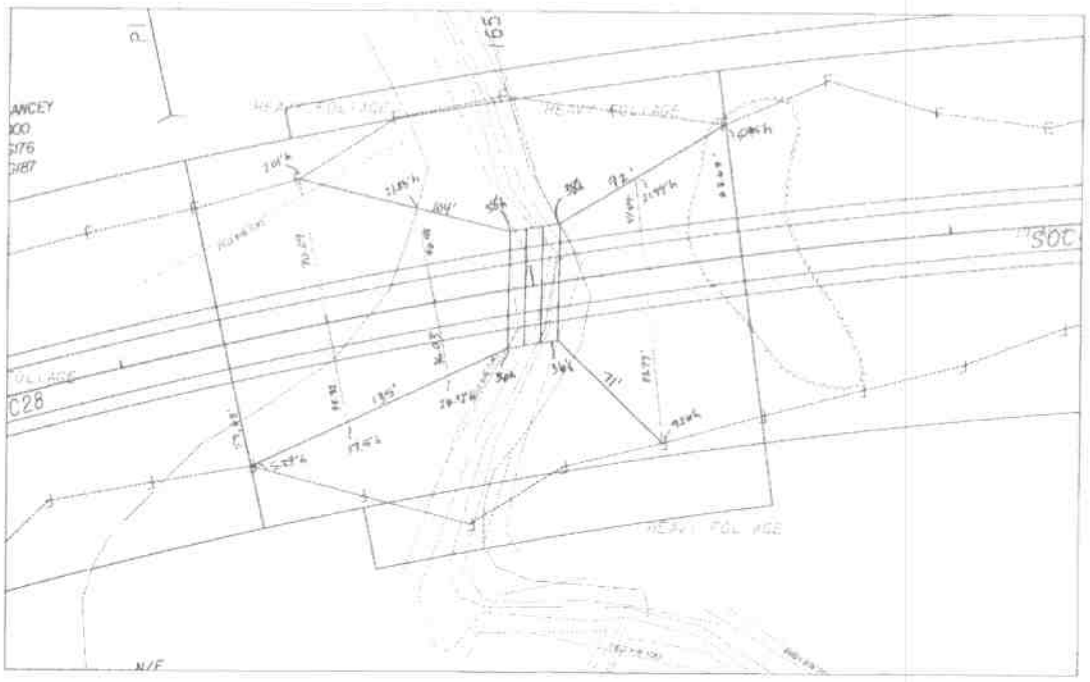
Item Number	Quantity	Units	Unit Price	Item Description	Cost
206-0002	60734	CY	6.76	BORROW EXCAV, INCL MATL	410561.84
				Section Sub Total:	**$410,561.84**

Total Estimated Cost: $1,034,331.22

Subtotal Construction Cost	**$1,034,331.22**
E&C Rate 0.0 %	$0.00
Inflation Rate 0.0 % @ 0.0 Years	$0.00
Total Construction Cost	**$1,034,331.22**
Right Of Way	$29,238.00
ReImb. Utilities	$0.00
Grand Total Project Cost	**$1,063,569.22**

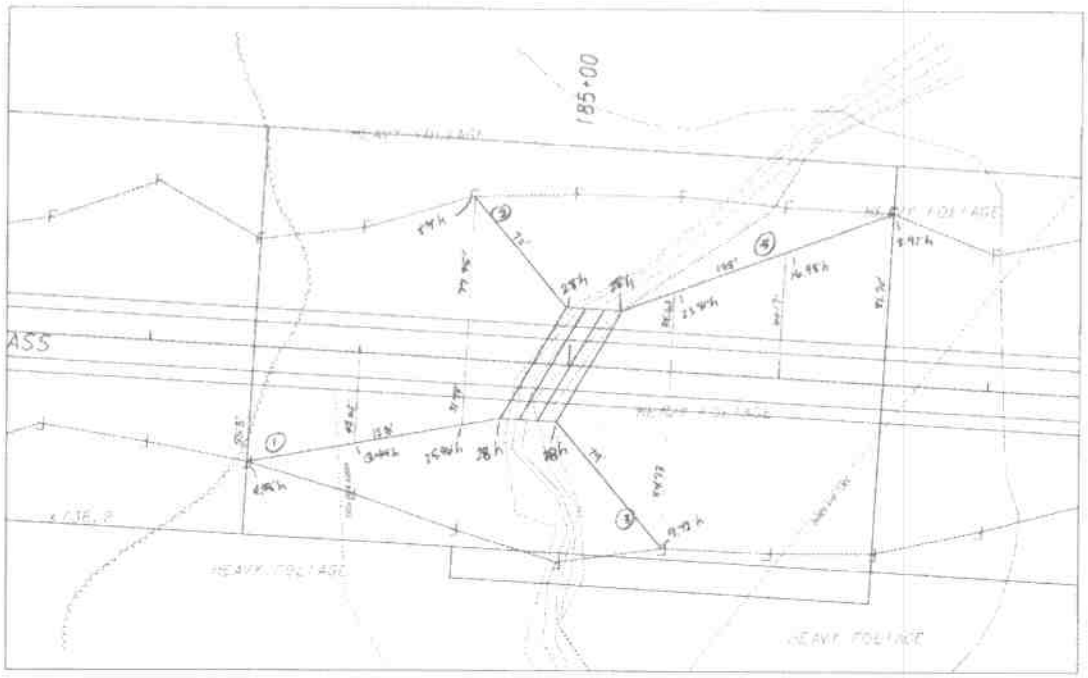
ATTACHMENT 2

* Culvert #1
triple 8x7

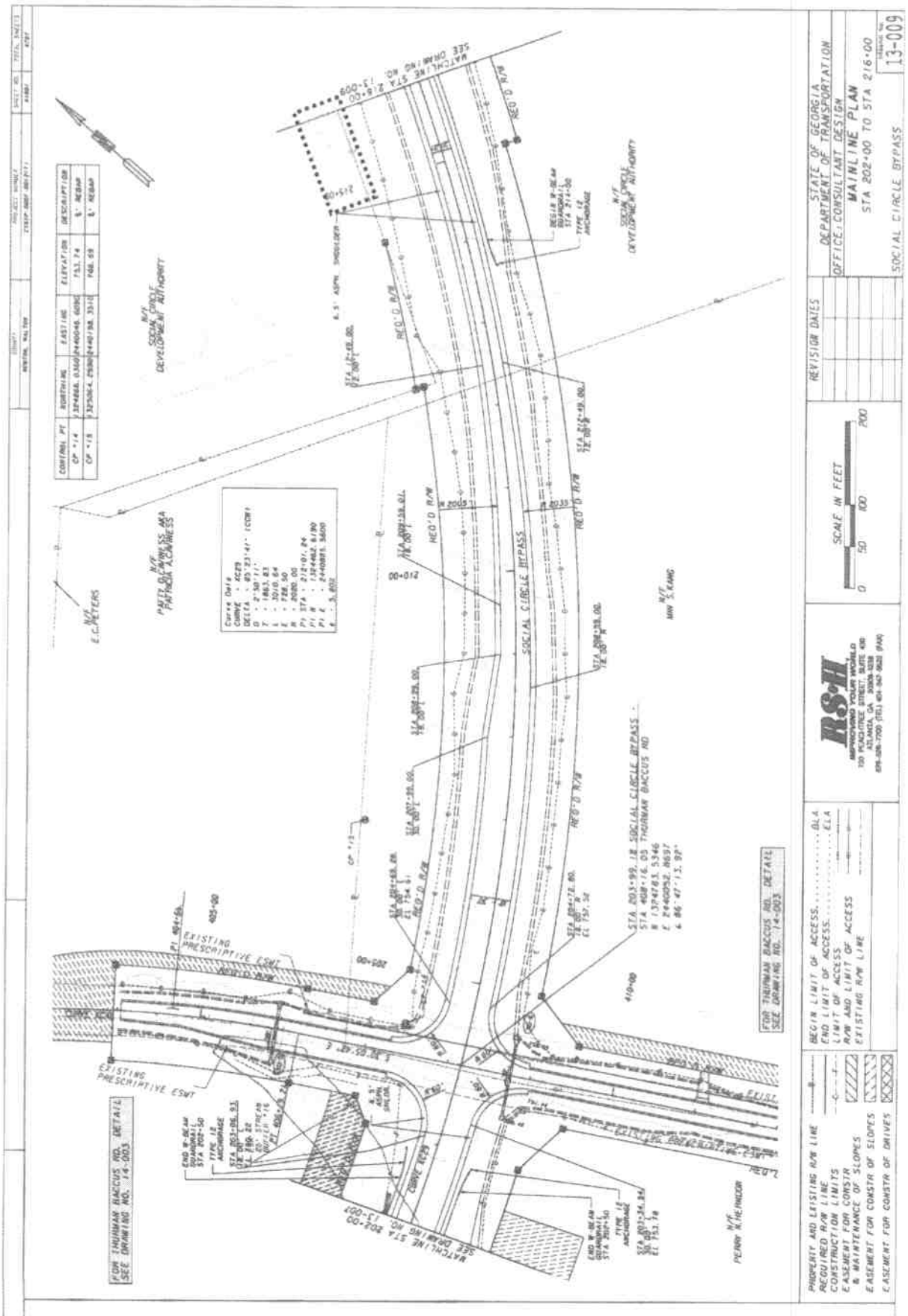


ATTACHMENT 2

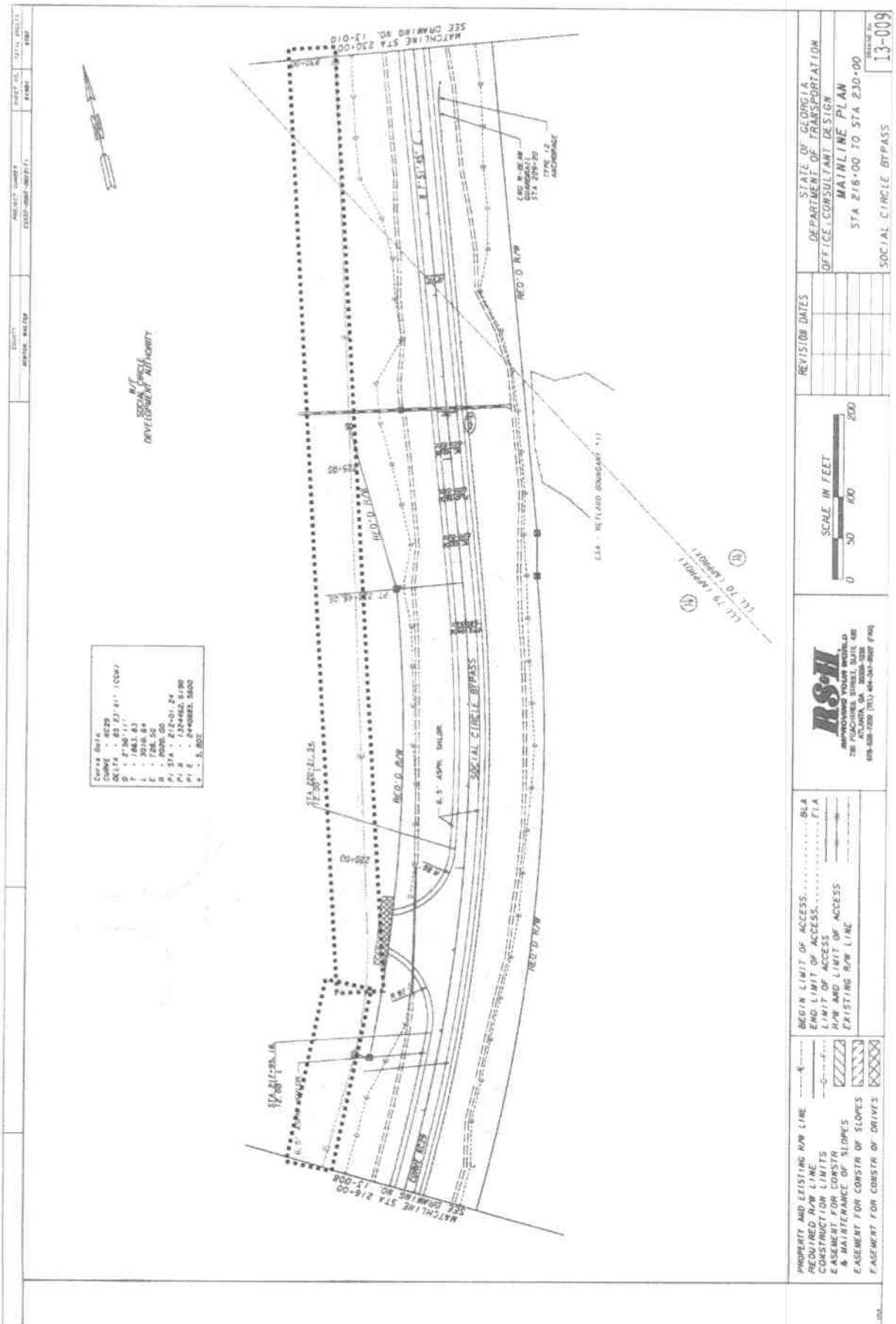
* Culvert #2
triple 8'x6'



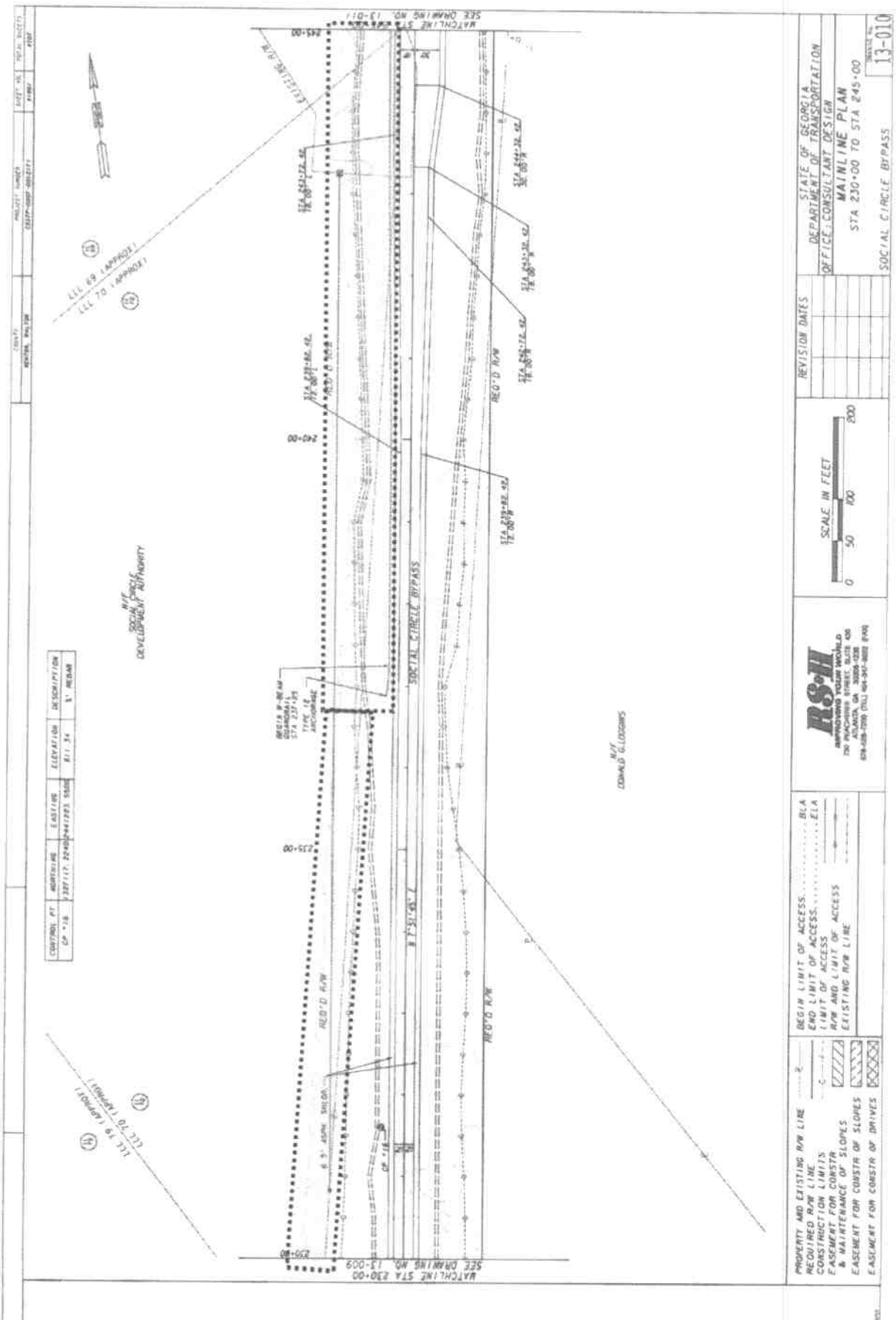
ATTACHMENT 3



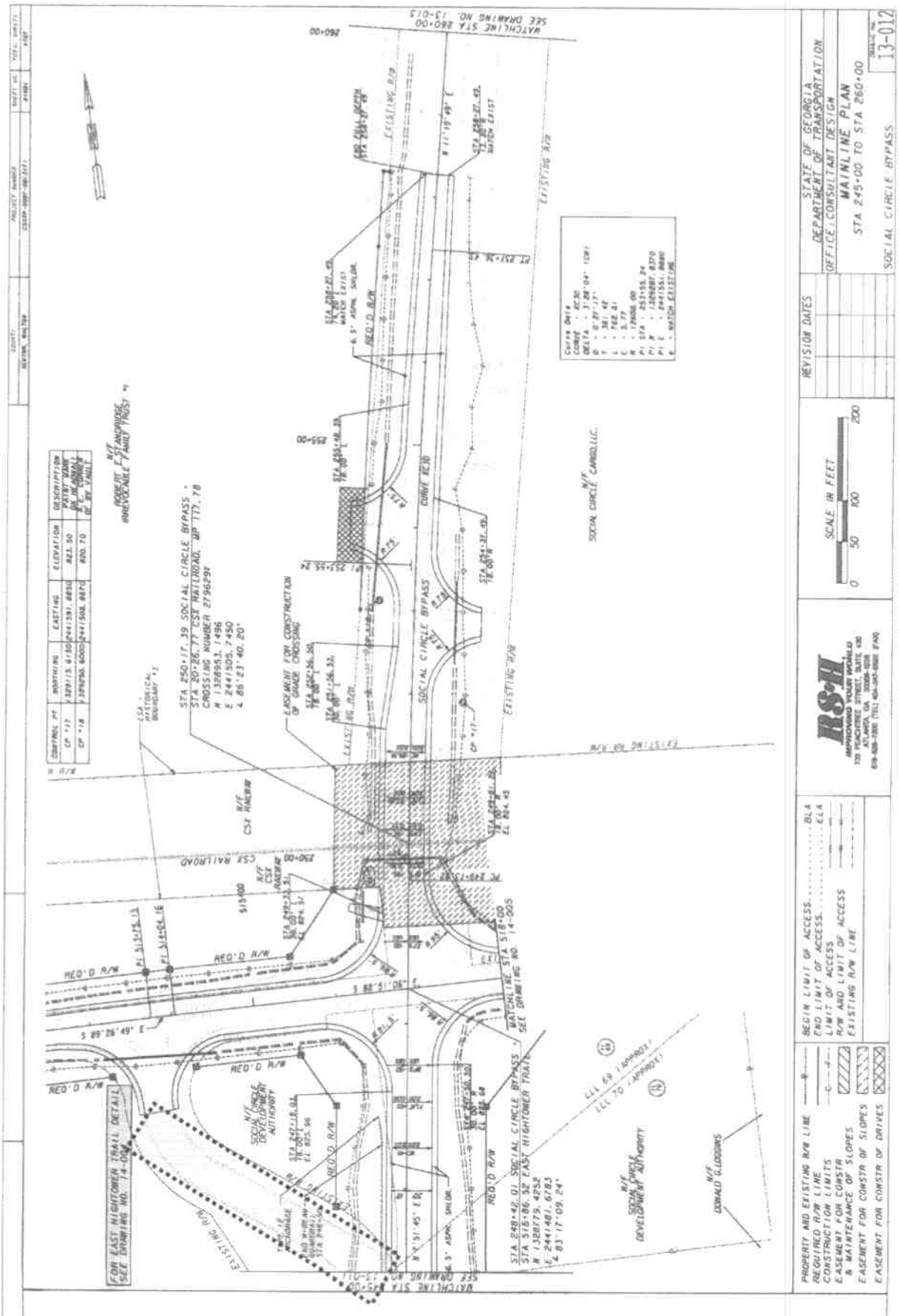
ATTACHMENT 3



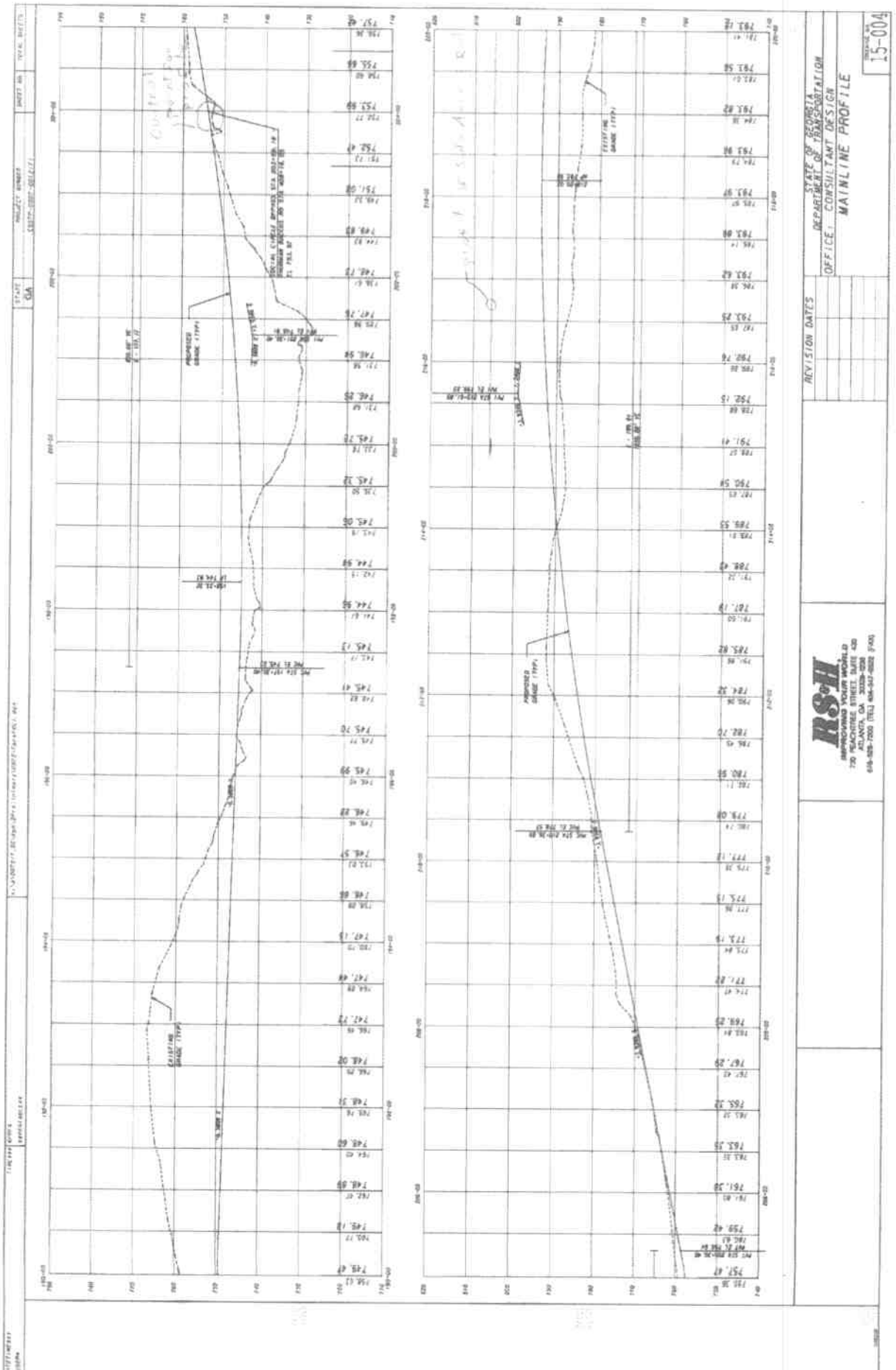
ATTACHMENT 3



ATTACHMENT 3



ATTACHMENT 3



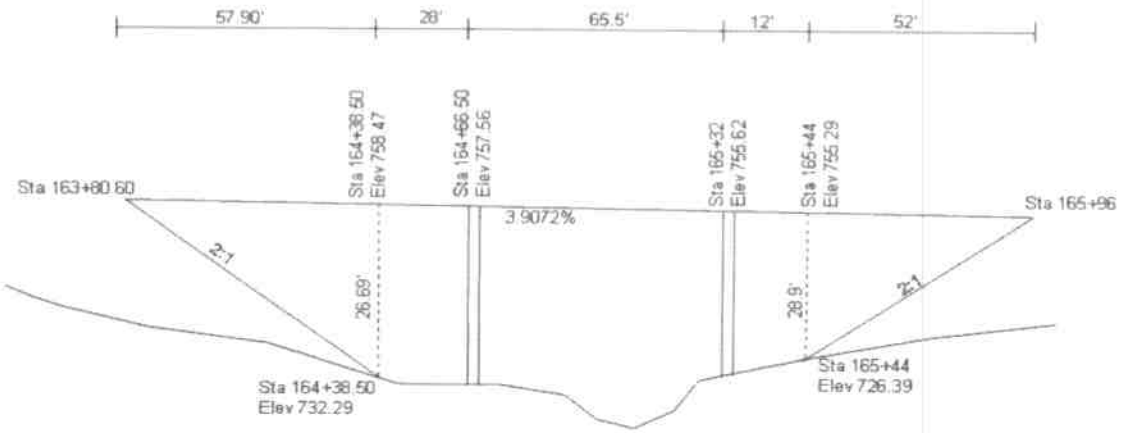
ATTACHMENT 3

Table 4.5. Maximum Vertical Grades

Type of Terrain	Maximum Grade (%) for Specified Design Speed (mph)													
	15	20	25	30	35	40	45	50	55	60	65	70	75	80
Industrial Roadways														
Level	-	-	4	4	4	4	3	3	3	3	-	-	-	-
Rolling	-	-	5	5	5	5	4	4	4	4	-	-	-	-
Mountainous	-	-	6	6	6	6	5	5	5	5	-	-	-	-
Local Rural Roads														
Level	9	8	7	7	7	7	7	6	6	5	-	-	-	-
Rolling	12	11	11	10	10	10	9	8	7	6	-	-	-	-
Mountainous	17	16	15	14	13	12	11	10	10	-	-	-	-	-
Local Urban Streets														
Level	12	11	11	10	10	9	9	8	8	-	-	-	-	-
Rolling	14	13	12	11	11	10	10	9	-	-	-	-	-	-
Mountainous	17	16	15	14	13	12	11	-	-	-	-	-	-	-
Rural Collectors														
Level	-	7	7	7	7	7	7	6	6	5	-	-	-	-
Rolling	-	10	10	9	9	8	8	7	7	6	-	-	-	-
Mountainous	-	12	11	10	10	10	10	9	9	8	-	-	-	-
Urban Collectors														
Level	-	9	9	9	9	9	8	7	7	6	-	-	-	-
Rolling	-	12	12	11	10	10	9	8	8	7	-	-		-
Mountainous	-	14	13	12	12	12	11	10	10	9	-	-		-
Rural Arterials														
Level	-	-	-	-	-	5	5	4	4	3	3	3	3	3
Rolling	-	-	-	-	-	6	6	5	5	4	4	4	4	4
Mountainous	-	-	-	-	-	8	7	7	6	6	5	5	5	5
Urban Arterials														
Level	-	-	-	8	7	7	6	6	5	5	-	-	-	-
Rolling	-	-	-	9	8	8	7	7	6	6	-	-	-	-
Mountainous	-	-	-	11	10	10	9	9	8	8	-	-	-	-
Rural and Urban Freeways (Limited Access Facilities)														
Level	-	-	-	-	-	-	-	4	4	3	3	3	3	3
Rolling	-	-	-	-	-	-	-	5	5	4	4	4	4	4
Mountainous	-	-	-	-	-	-	-	6	6	6	5	5	-	-

ATTACHMENT 4

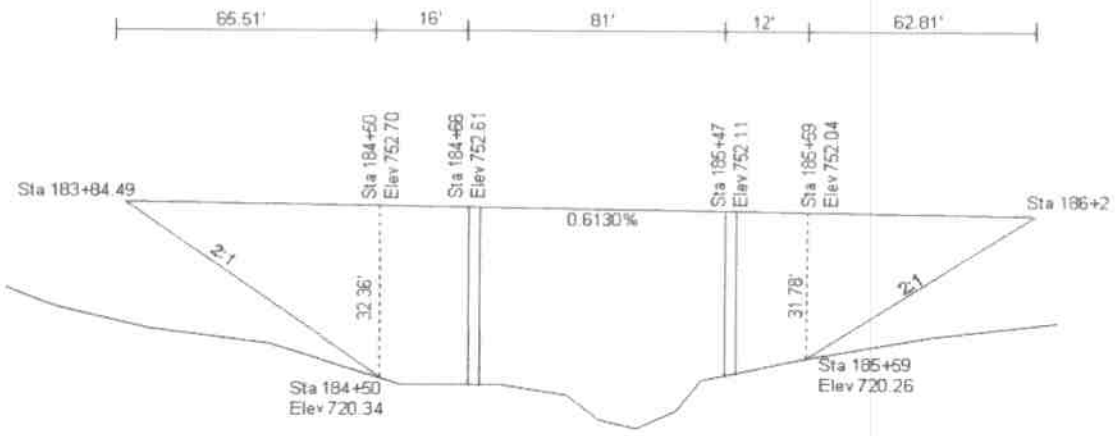
Bridge #1 **(KC 111- original profile revised slightly)**
~sta 165+00



Bridge cost:	**$95 /sf**
Bridge length:	**215.4 ft**
Bridge Width*:	**47.25 ft**
Total cost =	**$966,876.75**
original bridge cost estimate=	**$898,000.00**
cost difference=	*$68,876.75*

*width used by ARCADIS in original estimates

Bridge #2 (KC111- original profile revised slightly)
~sta 185+00



Bridge cost:	**$95 /sf**
Bridge length:	**237.32 ft**
Bridge Width*:	**47.25 ft**
Total cost =	**$1,065,270.15**
original bridge cost estimate=	**$965,000.00**
cost difference=	*$100,270.15*

*width used by ARCADIS in original estimates

ATTACHMENT 4

KC1 (original profile)
excavation= 276,106cy
embankment= 173,194cy
net= 104,915cy out
KC11 (raised bridges, raised around Solo property)
excavation= 214,512 cy
embankment= 261,343cy
net= 46,831 fill
KC111 (originally profile adjusted around bridges)
excavation= 227,348cy
embankment= 188,037cy
net= 38,311cy cut