

VALUE ENGINEERING REPORT

East Hiram Parkway
Project No.: MSL-0004-00(688) Paulding County
PI No.: 0004688

December 12, 2007

OWNER:



Georgia Department of Transportation
No.2 Capitol Square
Atlanta, GA 30334
(404.651.7468)

VALUE ENGINEERING CONSULTANT:



MACTEC Engineering and Consulting, Inc.
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144
(770.421.3346)

East Hiram Parkway
Project No.: MSL-0004-00(688) Paulding County
PI No.: 0004688

VALUE ENGINEERING REPORT

TABLE OF CONTENTS

Executive Summary	1
Introduction.....	1
Considerations.....	1
Results Obtained	1
Recommendation Highlights	2
Summary of Potential Cost Savings	5
Study Identification	8
VE Team Members	8
Project Description.....	8
Kickoff Meeting.....	9
Project Vicinity Map.....	11
Project Location Map	12
Construction Cost Estimate.....	13
Right of Way Cost Estimate	16
Value Engineering Recommendations	18
Appendix	
Cost Model / Distribution	
Information Phase - Function Analysis	
Creative Phase / Idea Evaluation	
Meeting Attendees	

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

VALUE ENGINEERING REPORT

East Hiram Parkway
Project No.: MSL-0004-00(688) Paulding County
PI No.: 0004688

Introduction

This report summarizes the results of a value engineering (VE) study conducted on the new East Hiram Parkway located southeast of the City of Hiram approximately 25 miles northwest of Atlanta. The project consists of a new 2.7 mile divided highway starting at CR 92 and West Hiram Parkway and extending northeasterly to US 278 Cleburne Parkway / Poplar Springs Road. The estimated construction cost including Right of Way is \$37.1 million. The design is currently 60% complete with the EIS in the final stages of approval and a scheduled let date of January, 2009. The project is being designed by Jacobs / Carter Burgess and J.B. Trimble of Atlanta. The VE study was conducted on November 13-16, 2007 at the GDOT offices in downtown Atlanta using a four person VE team.

This report presents the Team's recommendations and all back-up information for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. Lastly, the **Appendix** includes a complete record of the Team's activities and findings as well as the meeting attendees sign in sheet. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

Considerations

The VE team was instructed that one constraint exists: There is a large farm that is essentially intact and has been in the same family for over 100 years. Because of the Farm Preservation Act, the State is prohibited from taking property from this individual.

The project does have wetland mitigation to be accomplished that may not be able to be satisfied in this basin. This would result in the bridges increasing in length to span the wetlands. This is currently under investigation.

Results Obtained

The VE Team generated 25 ideas and presented fifteen recommendations for consideration by GDOT. The recommendations involve changes to bridge span length, reducing the width of median, building on one side only, reducing the size of the paved shoulder, reducing the travel lane width and optimizing the profile. These have the potential to reduce project costs by as much as \$4.6 million while continuing to provide the required functionality.

A brief presentation of these recommendations was conducted on November 16th with the following in attendance: GDOT design team, Paulding County DOT staff, Todd Long, GDOT Director of Preconstruction, Jeff VanDyke of Carter Burgess, Steve Tiedemann of J.B. Trimble, George Obaranec of MACTEC; and the VE Team: Dave Wohlscheid, Greg Grant, Tom Gandolfi and Paul Butler.

Recommendation Highlights

A-1 Reduce median to 8 feet throughout the project

This idea is to reduce the width of the median to 8 feet from the 20 feet proposed. The median would flair out at the intersections where turn lanes are required.

Potential savings is \$1,140,000

A-2 Reduce the width of the travel lanes to 11 feet from the 12 feet proposed.

The VE team felt this was reasonable given the traffic projections, the 45 mph speed limit and the number of signalized intersections proposed for this project. Savings shown is for road pavement only, the bridge savings are tabulated separately.

Potential savings is \$588,000.

A-4 Optimize the profile.

The VE team was informed at the presentation this project is in a borrow situation on the order of 500,000 CY. Four areas of the project were evaluated resulting in a reduction in fill height and corresponding right of way reduction resulting in the savings shown below.

Savings potential if implemented is \$929,400.

B-1 Reconfigure span 1 and 2 of Bridge #1

The VE team investigated this in an attempt to lower the profile and to save grading and R/W costs. However, it was determined this is not the critical elevation and therefore does not control the critical profile. Span 2 has an existing 140 foot span resulting in large beam sizes. Reducing this to 2-70 foot spans resulted in substantial savings.

Proposed savings is \$501,000.

B-4 Narrow lanes on Bridge #1 to 11 feet from 12 feet proposed in the original design.

Refer to the discussion under A-2

Proposed savings in the bridge deck of Bridge #1 is \$310,000.

C-1 Build two lanes on one side only.

This concept is to build a two lane rural section without a median along the original west bound alignment. This concept will tie into the original concept 4 lane urban section. Right of way will be purchased for the 4 lane build out as in the original concept. This idea was evaluated because of the marginal traffic projections justifying the 4 lane section. If needed, 10-15 years in the future, the project could be expanded at that time. The capital expense could perhaps be totally or partially funded by developers if that was driving the need to expand.

Potential savings is \$6,780,000

C-1.1 Build three lanes on one side only and use a striped median

This is a modification of C-1 where an additional lane is included to aid in the ease of future maintenance of traffic and expansion should it become necessary. It would be shown as a striped median at this time but could also serve as left turn lanes at intersections.

Potential savings for this item is \$3,200,000

C-3 Reduce the paved portion of the shoulder width in the rural section

The typical section shows an outside shoulder consisting of a paved 6.5 foot shoulder followed by a 3.5 foot section to the grade break. The proposed change shows a 4.0 foot paved length with a 6.0 foot graded aggregate base section to the break. This shoulder section matches the existing section at Bill Carruth Parkway and provides adequate room for vehicles to access the shoulder in case of an emergency as well as a paved surface for bicycles to ride on.

Potential savings is \$85,000

E-1 For Bridge #3, reduce span 2 and add a crash wall to accommodate the future 3rd track

This concept shows a savings with the alternate design concept, but this could be increased substantially if the potential for a third future track could be eliminated. This is highly unusual when only one track exists and perhaps checking again with the railroad would be appropriate.

Potential savings is \$58,000

E-2 Use vertical abutments (MSE walls) and eliminate the end spans of Bridge #3

This concept is to use MSE walls and eliminate the end spans thus shortening the bridge length substantially. The pavement section and MSE walls are less costly than the bridge unit costs.

Potential savings is \$417,000

E-3 Use the Urban Section on Bridge #3

The urban section includes a sidewalk on the bridge and appears to be reasonable for the Angham Road area. This results in a narrower bridge and thus savings in construction costs.

Potential savings is \$188,000

E-4 Reduce lane width on Bridge #3 to 11 feet

Refer to the discussion under A-2

Proposed savings is \$85,000

G-1 Use 2 span bridge in lieu of single span for Bridge # 2

Two 40 foot spans allow for the use of T beams that are more economical and much shallower allowing for a lower profile.

Proposed savings is \$241,000

G-2 Use 11 foot lanes on Bridge #2

Refer to the discussion under A-2

Potential savings \$35,000

G-2.1 Use a two span bridge and 11 foot lanes

This idea combines the previous two for Bridge #2.

Proposed combined savings is \$266,000

East Hiram Parkway
SUMMARY OF POTENTIAL COST SAVINGS

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
A	Right of Way						
A-1	Reduce median width to 8 feet	28,270,000	27,130,000	1,140,000	-0-	1,140,000	1,140,000
A-2	Use 11 foot wide travel lanes	588,000	-0-	588,000	-0-	588,000	588,000
A-4	Optimize profile	929,400	-0-	929,400	-0-	929,400	929,400
B	Bridge #1						
B-1	Reconfigure span 1 & span 2 to lower profile	6,325,000	5,824,000	501,000	-0-	501,000	501,000
B-4	Narrow lanes on bridge	6,325,000	6,015,000	310,000	-0-	310,000	310,000
C	AC Pavement						
C-1	Build 2 lanes on one side only	16,970,000	10,190,000	6,780,000	-0-	6,780,000	-0-
C-1.1	Build three lanes on one side only and stripe a median	17,160,000	13,960,000	3,200,000	-0-	3,200,000	-0-
C-3	Reduce paved shoulder width but retain overall 10 foot width to the break point	100,900	15,900	85,000	-0-	85,000	85,000

**East Hiram Parkway
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
D	Grading						
	No ideas developed						
E	Bridge #3						
E-1	Reduce span 2 and add crash wall to accommodate future 3 rd track	1,947,000	1,889,000	58,000	-0-	58,000	58,000
E-2	Use vertical abutments and eliminate end spans of the bridge	1,947,000	1,530,000	417,000	-0-	417,000	417,000
E-3	Use urban section on bridge for this particular area	1,947,000	1,759,000	188,000	-0-	188,000	188,000
E-4	Reduce lane width on bridge to 11 feet in lieu of 12 feet	1,947,000	1,862,000	85,000	-0-	85,000	85,000
F	Storm Drainage						
	No ideas developed						

East Hiram Parkway
SUMMARY OF POTENTIAL COST SAVINGS

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL PRESENT WORTH SAVINGS	Maximum Savings in Combination with other VE proposals
G	Bridge #2						
G-1	Use 2 span bridge instead of a single span	803,000	562,000	241,000	-0-	241,000	-0-
G-2	Use 11 foot lanes on bridge	803,000	768,000	35,000	-0-	35,000	-0-
G2.1	Use 11 foot lanes on bridge and two spans	803,000	537,000	266,000	-0-	266,000	266,000
	TOTAL POTENTIAL SAVINGS						\$4,567,000

STUDY IDENTIFICATION

STUDY IDENTIFICATION

Project: East Hiram Parkway	Dates: November 13-16, 2007
Location: GDOT Offices - Atlanta	

VE Team Members

Name:	Discipline:	Organization:	Telephone:
David Wohlscheid	VE Team Leader	MACTEC	703-471-8383
Tom Gandolfi	Highway Design	Parsons Transportation Group	678-969-2307
Greg Grant	Structural – Bridges	Wolverton	770-447-8999
Paul Butler	Construction	S.L. King	404-832-4866

Project Description

The East Hiram Parkway is a new four lane divided facility located approximately 25 miles northwest of Atlanta. It is located east of the city of Hiram in Paulding County. It begins at the intersection of SR 92 and West Hiram Parkway and extends east northeast 2.7 miles to the intersection of US 278 at Poplar Springs Road. The purpose of the facility is to improve traffic conditions on US 278/SR 6 and SR 92 including local and through traffic circulation by providing a facility that would adequately serve current and future travel demand, and provide the public with a safer driving environment.

The project will include a total of six at grade intersections. The Parkway itself will require a four lane divided typical section based on the 2007 and 2027 traffic projections along the corridor. The intersection at SR 92 will require a traffic signal by opening year. The intersection of US 278 and East Hiram Parkway will require dual left turn lanes on the westbound approach of US 278. The northbound approach of East Hiram Parkway will require a free flow right turn lane onto eastbound US 278. This free flow will require an acceleration lane on US 278. The design speed is 45 mph as shown in the concept report.

Ultimately, US 278 will require widening to six lanes and Poplar Springs Road will require widening to four lanes prior to 2027. In addition, SR 92 and West Hiram Parkway will require widening to four lanes by 2027. The intersection of SR 92 at East Hiram Parkway will require dual left turn lanes on the northbound, southbound and westbound approaches to the intersection.

It is being proposed that East Hiram Parkway be constructed for the 2027 lane configuration with future lanes at SR 92 and US 278 being striped out in the opening year. Additional 2027 lane requirements on SR 92, West Hiram Parkway, US 278, and Poplar Springs are included with planned improvements to these particular routes, and are included in the Paulding County Transportation Improvement Plan (TIP).

The design proposes four 12 foot lanes with 10 foot rural shoulders, 20 foot raised median from SR 92 to Rosedale Lane, and four 12 foot lanes with 16 foot urban (curb and gutter) shoulders, 20 foot raised median from Rosedale Lane to SR 278/SR 6. Partial limited access is proposed for the first part and controlled access by permit is proposed for the latter section. Major structures include a bridge over Gray's Mill Creek (Bridge #1), one over a tributary to Mill Creek just north of Arnold Road (Bridge #2) and a bridge over the Norfolk Southern Railroad (Bridge #3). A culvert will be used for the crossing of the GDOT Edna to Rockmart Rail Line (Silver Comet Trail)

Five of the six project intersections will include signalization. They are SR 92, Arnold Road, Angham Road, Rosedale Lane and US 278. Pool Road will be stop controlled.

The current project estimate is \$37.1 million. Please refer to the Cost Distribution Model in Appendix A for more details and an item breakdown.

Kick off Meeting/Design Presentation

In addition to the VE Team, the following personnel attended this meeting which was held at the outset of the VE study:

Lisa Myers	GDOT Engineering Services
Ron Wishon	GDOT Engineering Services
Eugene Hopkins	GDOT Road Design Project Manager
Ken Werno	GDOT TS&D Design Review
Joe King	GDOT Bridge Design
Brent Story	GDOT-State Road Design Engineer
Kenny Beckworth	GDOT Asst. District Construction Engineer Paulding
Larry Bowman	GDOT Environmental
Erica Parish	Paulding County DOT
Jacob Hughes	Paulding County DOT
George Obaranec	MACTEC, Inc.
Jeff VanDyke	Carter & Burgess Project Manager
Steve Tiedemann	J.B.Trimble Project Manager

The VE Team appreciated the project overview given by Jeff VanDyke and Steve Tiedemann. Highlights included:

- The project is a County Bond project and will be partially funded by Paulding County. It is officially referred to as a local government project. The designer is under contract with the County, and the State DOT reviews the design.
- The EIS is currently in the final stages of review and approval should be forthcoming soon.
- There is a possibility that two of the bridges may get longer to span areas of wetlands as mitigation sites may not be available in this area.
- Preliminary Right of Way estimates were recently completed and right of way negotiations are scheduled to begin January 2008. The contract is scheduled to be let in January, 2009.
- The project is divided into two sections (1) The southern/western section is a rural section and includes two 24 foot travel ways (four 12-foot lanes) divided by a 20 foot raised

median. The section is thinned down to an 8 foot median at the two bridge locations. Two 10 foot shoulders (6.5 feet paved) are included on both sides; and (2) the northern/eastern section, an urban section with two 24 foot travel ways with a 20 foot raised median, curb and gutter and sidewalks and urban shoulders on both sides.

- When completed the project will serve stabilized background growth only with no real improvement to traffic conditions.
- Bridge #1 is 600+ feet long and spans the Mill Creek floodplain as the stream bed is undefined in this area.
- Three traffic signals will be added under this contract in addition to the two existing signals at the project termini.
- The Silver Comet Trail will be routed under the project in a 12 x 12-foot box culvert.
- The project is currently in a borrow condition requiring approximately 500,000 CY.

The following presents the project vicinity and location maps (the latter obtained from Carter & Burgess information presented to the VE team for the VE Study) and project cost information used in this VE effort to present a more complete project description.

Figure 1
Project Vicinity Map



County Map of Georgia

Figure 2
Project Location Map



Estimate Report for file "MSL-0004-00(688)"

Section Roadway					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	200000.00	TRAFFIC CONTROL - MSL-0004-00(688)	200000.00
153-1300	1	EA	76829.70	FIELD ENGINEERS OFFICE TP 3	76829.70
210-0100	1	LS	3500000.00	GRADING COMPLETE - MSL-0004-00(688)	3500000.00
310-1101	7400	TN	25.00	GR AGGR BASE CRS, INCL MATL	185000.00
318-3000	300	TN	30.00	AGGR SURF CRS	9000.00
402-1811	180	TN	80.00	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL	14400.00
402-3121	36200	TN	80.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	2896000.00
402-3130	12700	TN	80.00	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	1016000.00
402-3190	14600	TN	80.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1168000.00
413-1000	15800	GL	2.50	BITUM TACK COAT	39500.00
433-1200	1758	SY	201.46	REINF CONC APPROACH SLAB, INCL SLOPED EDGE	354166.68
441-0104	7240	SY	33.67	CONC SIDEWALK, 4 IN	243770.80
441-0301	5	EA	2172.56	CONC SPILLWAY, TP 1	10862.80
441-0740	1300	SY	31.64	CONCRETE MEDIAN, 4 IN	41132.00
441-4020	220	SY	44.07	CONC VALLEY GUTTER, 6 IN	9695.40
441-4030	800	SY	53.05	CONC VALLEY GUTTER, 8 IN	42440.00
441-6222	27272	LF	19.04	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	519258.88
441-6740	24270	LF	15.02	CONC CURB & GUTTER, 8 IN X 30 IN, TP 7	364535.40
500-3200	1	CY	394.64	CLASS B CONCRETE	394.64
500-3800	10	CY	764.37	CLASS A CONCRETE, INCL REINF STEEL	7643.70
550-1180	3465	LF	45.96	STORM DRAIN PIPE, 18 IN, H 1-10	159251.40
550-1181	330	LF	57.32	STORM DRAIN PIPE, 18 IN, H 10-15	18915.60
550-1182	209	LF	79.53	STORM DRAIN PIPE, 18 IN, H 15-20	16621.77
550-1184	62	LF	68.00	STORM DRAIN PIPE, 18 IN, H 25-30	4216.00
550-1240	132	LF	54.17	STORM DRAIN PIPE, 24 IN, H 1-10	7150.44
550-1242	169	LF	62.99	STORM DRAIN PIPE, 24 IN, H 15-20	10645.31
550-1300	742	LF	70.50	STORM DRAIN PIPE, 30 IN, H 1-10	52311.00
550-1301	137	LF	82.23	STORM DRAIN PIPE, 30 IN, H 10-15	11265.51
550-1360	529	LF	86.79	STORM DRAIN PIPE, 36 IN, H 1-10	45911.91
550-1362	176	LF	91.66	STORM DRAIN PIPE, 36 IN, H 15-20	16132.16
550-1421	181	LF	96.76	STORM DRAIN PIPE, 42 IN, H 10-15	17513.56
550-1424	230	LF	165.00	STORM DRAIN PIPE, 42 IN, H 25-30	37950.00
550-1482	165	LF	159.89	STORM DRAIN PIPE, 48 IN, H 15-20	26381.85
550-2180	900	LF	32.87	SIDE DRAIN PIPE, 18 IN, H 1-10	29583.00
550-3418	16	EA	593.02	SAFETY END SECTION 18 IN, SIDE DRAIN, 4:1 SLOPE	9488.32
550-3618	16	EA	659.02	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	10544.32
550-4218	20	EA	672.20	FLARED END SECTION 18 IN, STORM DRAIN	13444.00
550-4224	2	EA	781.26	FLARED END SECTION 24 IN, STORM DRAIN	1562.52
550-4230	1	EA	951.12	FLARED END SECTION 30 IN, STORM DRAIN	951.12
550-4236	8	EA	1252.70	FLARED END SECTION 36 IN, STORM DRAIN	10021.60
550-4248	4	EA	2200.00	FLARED END SECTION 48 IN, STORM DRAIN	8800.00
576-1018	220	LF	33.79	SLOPE DRAIN PIPE, 18 IN	7433.80
634-1200	150	EA	99.53	RIGHT OF WAY MARKERS	14929.50
641-1100	228	LF	46.34	GUARDRAIL, TP T	10565.52
641-1200	9425	LF	16.93	GUARDRAIL, TP W	159565.25
641-5001	7	EA	634.44	GUARDRAIL ANCHORAGE, TP 1	4441.08
641-5012	8	EA	1801.20	GUARDRAIL ANCHORAGE, TP 12	14409.60
668-1100	35	EA	2784.43	CATCH BASIN, GP 1	97455.05
668-1110	140	LF	285.46	CATCH BASIN, GP 1, ADDL DEPTH	39964.40
668-2100	6	EA	3987.53	DROP INLET, GP 1	23925.18
Section Sub Total:					\$11,579,980.77

Section Permanent Erosion Control					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
603-2024	200	SY	54.20	STN DUMPED RIP RAP, TP 1, 24 IN	10840.00
603-2181	600	SY	45.21	STN DUMPED RIP RAP, TP 3, 18 IN	27126.00
603-7000	800	SY	4.71	PLASTIC FILTER FABRIC	3768.00
700-6910	49	AC	1023.43	PERMANENT GRASSING	50148.07
700-7000	98	TN	59.64	AGRICULTURAL LIME	5844.72
700-7010	122	GL	22.32	LIQUID LIME	2723.04

700-8000	66	TN	292.83	FERTILIZER MIXED GRADE	19326.78
700-8100	2440	LB	2.31	FERTILIZER NITROGEN CONTENT	5636.40
713-0300	2300	SY	1.92	COCONUT FIBER BLANKET, WATERWAYS	4416.00
715-2200	500	SY	2.46	BITUMINOUS TREATED ROVING, WATERWAYS	1230.00
Section Sub Total:					\$131,059.01

Section Temporary Erosion Control

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	24	AC	679.69	TEMPORARY GRASSING	16312.56
163-0240	665	TN	161.07	MULCH	107111.55
163-0300	10	EA	1655.76	CONSTRUCTION EXIT	16557.60
163-0501	1	EA	764.08	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	764.08
163-0503	3	EA	529.93	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	1589.79
163-0520	250	LF	17.42	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	4355.00
163-0530	700	LF	4.20	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	2940.00
163-0550	26	EA	282.90	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	7355.40
165-0010	2500	LF	0.78	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	1950.00
165-0030	4000	LF	1.64	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	6560.00
165-0070	350	LF	1.86	MAINTENANCE OF BALED STRAW EROSION CHECK	651.00
165-0085	1	EA	170.84	MAINTENANCE OF SILT CONTROL GATE, TP 1	170.84
165-0087	3	EA	169.84	MAINTENANCE OF SILT CONTROL GATE, TP 3	509.52
165-0101	10	EA	607.78	MAINTENANCE OF CONSTRUCTION EXIT	6077.80
165-0105	26	EA	96.97	MAINTENANCE OF INLET SEDIMENT TRAP	2521.22
167-1000	2	EA	1278.47	WATER QUALITY MONITORING AND SAMPLING	2556.94
167-1500	24	MO	944.75	WATER QUALITY INSPECTIONS	22674.00
171-0010	5000	LF	1.63	TEMPORARY SILT FENCE, TYPE A	8150.00
171-0030	8000	LF	3.83	TEMPORARY SILT FENCE, TYPE C	30640.00
Section Sub Total:					\$239,447.30

Section Signing & Marking

Item Number	Quantity	Units	Unit Price	Item Description	Cost
999-9999	1	Lump Sum	150000.00	Lump Sum Signing & Marking	150000.00
Section Sub Total:					\$150,000.00

Section Signals

Item Number	Quantity	Units	Unit Price	Item Description	Cost
647-1000	1	LS	110000.00	TRAFFIC SIGNAL INSTALLATION NO - 2 - ARNOLD ROAD	110000.00
647-1000	1	LS	50000.00	TRAFFIC SIGNAL INSTALLATION NO - 1 - ADJUST SR 92	50000.00
647-1000	1	LS	100000.00	TRAFFIC SIGNAL INSTALLATION NO - 5 - ADJUST US 278	100000.00
647-1000	1	LS	110000.00	TRAFFIC SIGNAL INSTALLATION NO - 3 - ANGHAM ROAD	110000.00
647-1000	1	LS	110000.00	TRAFFIC SIGNAL INSTALLATION NO - 4 - ROSEDALE LANE	110000.00
Section Sub Total:					\$480,000.00

Section Bridge Culvert No. 1

Item Number	Quantity	Units	Unit Price	Item Description	Cost
999-9999	1	Lump Sum	350000.00	CONSPAN Bridge Culvert	350000.00
Section Sub Total:					\$350,000.00

Section Bridge No. 1

Item Number	Quantity	Units	Unit Price	Item Description	Cost
999-9999	1	Lump Sum	5750000.00	Bridge No. 1	5750000.00
Section Sub Total:					\$5,750,000.00

Section Bridge No. 2					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
999-9999	1	Lump Sum	730000.00	Bridge No. 2	730000.00
Section Sub Total:					\$730,000.00

Section Bridge No. 3					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
999-9999	1	Lump Sum	1770000.00	Bridge No. 3	1770000.00
Section Sub Total:					\$1,770,000.00

Total Estimated Cost: \$21,180,487.08

Subtotal Construction Cost	\$21,180,487.08
E&C Rate 10.0 %	\$2,118,048.71
Inflation Rate 0.0 % @ 0.0 Years	\$0.00
<hr/>	
Total Construction Cost	\$23,298,535.79
Right Of Way	\$0.00
ReImb. Utilities	\$0.00
<hr/>	
Grand Total Project Cost	\$23,298,535.79

Paulding County Land Sales

<u>Highest & Best Use</u>	<u>Size (acres)</u>	<u>Value/ac</u>	<u>Sales price</u>
Small Tract Residential	Lot (.459)	49,019	22,500
	Lot (.46)	65,217	30,000
	Lot (.46)	78,260	36,000
Agricultural / Residential	2.78	28,741	79,900
	1.9	36,789	69,900
Commercial	4.0	86,405	345,618
	51.0	43,137	2,200,000
	2.0	155,000	310,000
	2.448	183,824	450,000
Industrial			

VE RECOMMENDATIONS

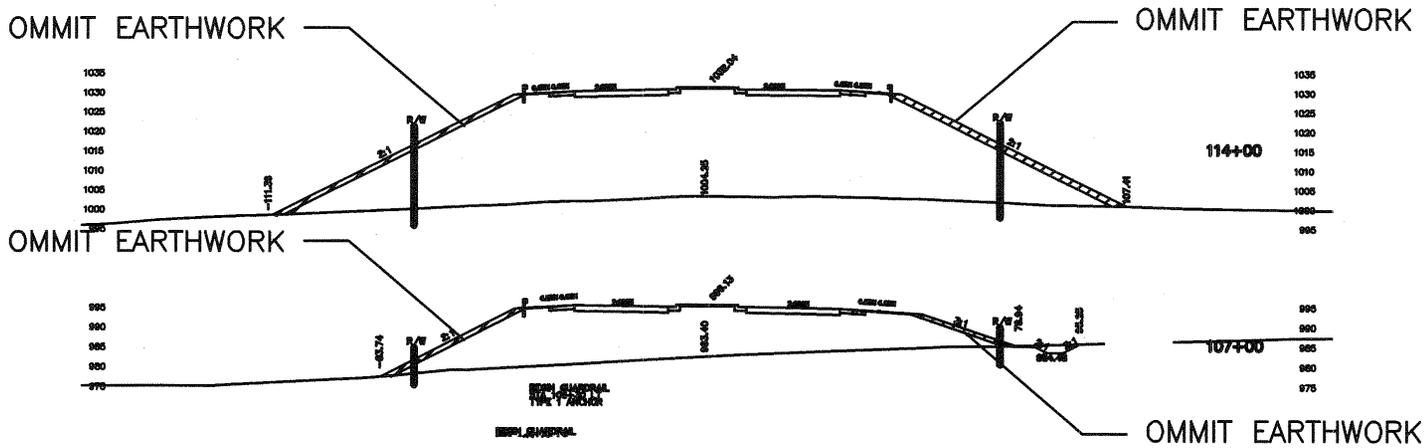
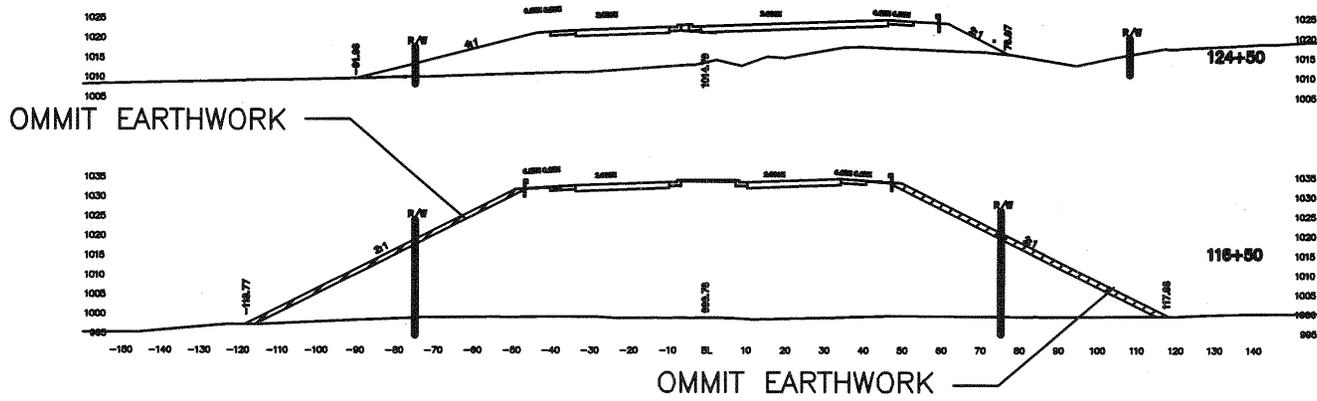
CALCULATIONS

East Hiram Parkway

ITEM N^o: A-1
CLIENT: GDOT
Sheet 1a of 6

Proposed Stationing of Median changes:

Sta 29+00 – 38+00	8 foot median
Sta 38+00 – 41+00	taper to 20 foot for left turn lane
Sta 50+00 – 53+00	taper to 20 foot for left turn lane
Sta 53+00 – 91+00	8 foot median
Sta 91+00 – 94+00	taper to 20 foot for left turn lane
Sta 104+00 - 107+00	taper to 20 foot for left turn lane
Sta 107+00 – 118+00	8 foot median
Sta 118+00 – 121+00	taper to 20 foot for left turn lane



ANALYZED CROSS SECTIONS

A-1
Pg 3/6

A-1
Pg 4/6

COMPOSITE EARTHWORK %						ROW	
MEDIAN WIDTH	STATION	OLD AREA	NEW AREA	%	Length*%	WIDTH LF	AVG. L X W SF
8	1100	15.0	15.0	100%		0	
					290		0
8	1390	15.0	15.0	100%		0	
					198		1260
20	1600	12.0	10.6	88%		12	
					177		2400
20	1800	12.0	10.6	88%		12	
					133		1800
X SECTION	1950	12.0	10.6	88%		12	
					94		600
8	2050	16.1	16.1	100%		0	
					750		0
8	2800	16.1	16.1	100%		0	
					49		0
X SECTION	2850	16.1	15.6	97%		0	
					242		1500
20	3100	16.1	15.6	97%		12	
					940		11640
20	4070	16.1	15.6	97%		12	
					177		1080
8	4250	16.1	16.1	100%		0	
					600		0
8	4850	16.1	16.1	100%		0	
					177		1080
20	5030	16.1	15.6	97%		12	
					809		20040
X SECTION	6700	4.4	0.0	0%		12	
					92		2400
X SECTION	6900	21.3	19.7	92%		12	
					2345		30420
20	9435	21.3	19.7	92%		12	
					77		480
8	9515	21.3	21.3	100%		0	
					485		0
X SECTION	10000	5.9	5.9	100%		0	
					225		0
8	10225	5.9	5.9	100%		0	
					175		1080
20	10405	16.6	15.6	94%		12	
					277		3540
X SECTION	10700	16.6	15.6	94%		12	
					638		8400
X SECTION	11400	46.7	41.3	88%		12	
					228		3000
X SECTION	11650	59.3	55.8	94%		12	
					416		5304
20	12092	59.3	55.8	94%		12	

					175		1080
8	12272	10.6	10.6	100%		0	
					178		0
X SECTION	12450	10.6	10.6	100%		0	
							0
8	12886					0	
							1080
20	13066					12	
							7728
20	13710					12	
							1080
8	13890						
TOTAL L*% =					9948		
COMPOSITE % =					88%		
REDUCED ROW							106992
\$3.34/SF						=	\$357,353

COST WORKSHEET

PROJECT: East Hiram Parkway 8 FOOT WIDE MEDIAN THROUGHOUT	ITEM No: A-1 CLIENT: GDOT Sheet 6 of 6
---	--

CONSTRUCTION ELEMENT			ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	NO	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
GR AGGR BASE COURSE		TN		25.00			25.00	
25 MM SUPERPAVE		TN		80.00			80.00	
12.5 MM SUPERPAVE		TN		80.00			80.00	
19 MM SUPERPAVE		TN		80.00			80.00	
TACK COAT		GL		2.50			2.50	
CONCRETE MEDIAN		SY		31.64			31.64	
CONCRETE C&G		LF		17.03			17.03	
18" STORM DRAIN PIPE	11	LF	590	45.96	27,116	546	45.96	25,094
18" STORM DRAIN PIPE (10-15)	4	LF	242	57.53	13,922	226	57.53	13,002
18" STORM DRAIN PIPE (15-20)	3	LF	209	79.53	16,622	197	79.53	15,667
18" STORM DRAIN PIPE (25-30)	1	LF	62	68.00	4,216	58	68.00	3,944
24" STORM DRAIN PIPE (15-20)	1	LF	110	62.99	6,929	106	62.99	6,677
36" STORM DRAIN PIPE	5	LF	267	86.79	23,173	247	86.79	21,437
36" STORM DRAIN PIPE (15-20)	2	LF	146	91.66	13,382	138	91.66	12,649
42" STORM DRAIN PIPE	1	LF	66	96.76	6,386	62	96.76	5,999
42" STORM DRAIN PIPE (30'-35)	1	LF	150	165.00	24,750	146	165.00	24,090
18" STORM FLARED END SECTION		EA		672.20			672.20	
36" STORM FLARED END SECTION		EA		1,252.70			1,252.70	
CATCH BASIN, GP1		EA		2,784.43			2,784.43	
CATCH BASIN, GP1, ADD DEPTH		LF		285.46			285.46	
RIP RAP, TP3, 18 IN		SY		45.21			45.21	
BRIDGE #1 (100% ASSUMED)		LS	1	5750000	5,750,000	1	5750000	5,750,000
BRIDGE #2 (SUBTRACT \$100/SF)		LS	1	730000	730,000	1	714000	714,000
BRIDGE #3 (SUBTRACT \$100/SF)		LS	1	1770000	1,770,000	1	1537200	1,537,200
GRADING (88% ASSUMED)		LS	1	3500000	3,500,000	1	3080000	3,080,000
RIGHT OF WAY (MINUS \$357,353)		LS	1	13813224	13,813,224	1	13455871	13,455,871
SUBTOTAL					25,699,721			24,665,631
Markup @ 10.00%					2,569,972			2,466,563
TOTAL					28,269,693			27,132,194
TOTAL ROUNDED					28,270,000			27,130,000

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.: A-2	PAGE No.: 1 of 4	CREATIVE IDEA: Utilize 11 ft wide travel lanes
-------------------------	----------------------------	--

Comp By: TG Date: 11/14/07 Checked By: DW Date: 11/14/07

Original Concept:

Lane widths as shown in VE Plan set are 12 ft. Nominal section is 4 lanes. The lane width establishes both the amount of pavement and impacts the required ROW. Minor impact to earthwork is not considered.

Proposed Change:

Utilize 11 ft lane widths.

Justification:

Given apparent low traffic volumes for 2 lane facility, percentage of trucks, speed limit of 45 mph, shoulders and /or 2 ft gutters the 11 ft lane widths should be considered. Although not applicable in all cases, given the circumstances the 11 foot width is an acceptable alternative to implement.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	588,000		
- Proposed	-0-		
- Savings	588,000		588,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			588,000

CALCULATIONS

East Hiram Parkway

ITEM N^o: A-2
CLIENT: GDOT
Sheet 4 of 4

Refer to Typical Sections in VE plan set

Project Length = 2.706 miles

Lane reduction = 1 ft

Number of lanes = 4 (nominal)

Pavement area reduced = $2.706 \times 5280 \times 1 \times 4 = 57,150 \text{ sf}$

Max reduction in footprint = same as pavement area

ROW reduced = **57,150 sf**

ASSUME:

AC = 0.00611 tons/ inch thickness/ SF

GAB = 0.00617 tons /inch thickness / SF

Given Spread Rates:

a) 12.5 mm AC = 1.5" thick x 0.00611 = 0.00917 tons/ SF

b) 19 mm AC = 2" thick x 0.00611 = 0.01222 tons/ SF

c) 25 mm AC = 5" thick x 0.00611 = 0.03056 tons/ SF

d) GAB = 12" thick x 0.00617 = 0.07407 tons/ SF

Tons

a) 12.5 mm AC = 0.00917 tons/ SF x 57,150 = 524 ton

b) 19 mm AC = 0.01222 tons/ SF x 57,150 = 698 ton

c) 25 mm AC = 0.03056 tons/ SF x 57,150 = 1,747 ton

d) GAB = 0.07407 tons/ SF x 57,150 = 4,233 ton

Estimated ROW unit cost (from Terrell, Hundley & Carroll):

$\$2,788,463 / 2,896,046 \text{ sf} = \$0.96/ \text{ SF}$ (land only)

ROW mark-up multiplier = 3.472

Adjusted ROW unit cost = $\$3.34/ \text{ SF}$

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:	PAGE No.:	CREATIVE IDEA:
A-4	1 of 7	Optimize Profile

Comp By: TG Date: 11/14/07 Checked By: DCW Date: 11/15/07

Original Concept:

The Profile as shown on the current Plan set required approx 500,000 cy of borrow per information given to the VE team at the kickoff presentation by the design team. The profile establishes the amount of borrow material and impacts the required ROW.

Proposed Change:

Profile modified as shown on attached sketches to reduce fill heights with some increase to cut areas west of the railroad.

Justification:

Lower fill heights will reduce overall borrow quantity and reduce footprint of project that in turn will reduce ROW requirements and result in a more balanced project.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	929,400		
- Proposed	-0-		
- Savings	929,400		929,400
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			929,400

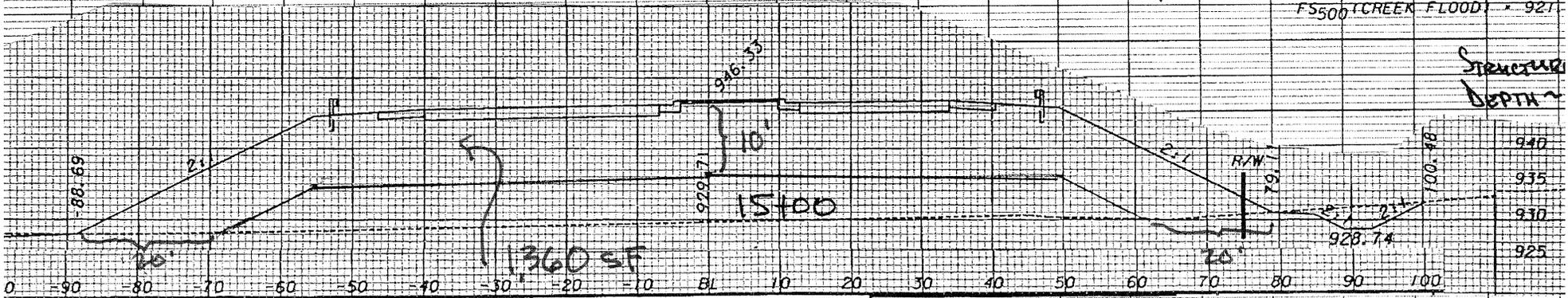
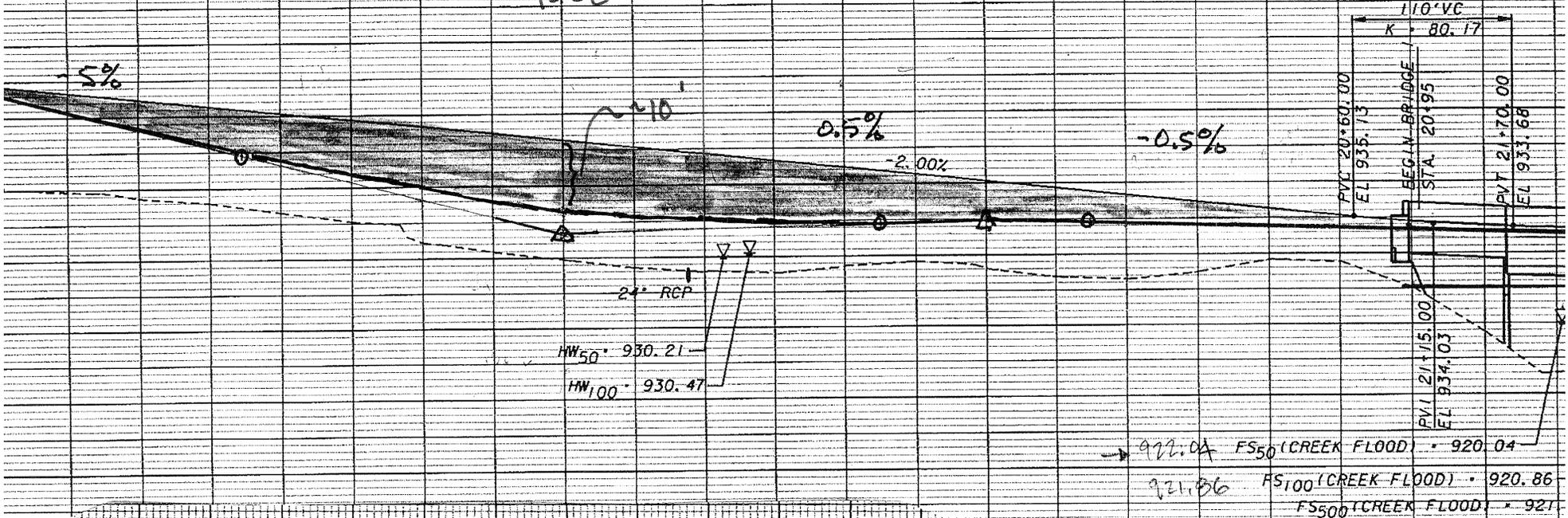
FULL DEPTH CONSTRUCTION
D.S. = 45 MPH

PA 193+14
199+77.28
VRRUTH PKWY
(P SECTIONS)

A-4
Pg 2 of 7

SK-1

FR
2100
1100
1000



954.33	959.67	953.33	936.72	952.33	937.98	951.33	936.60	950.33	935.24	949.33	952.20	948.33	930.66	947.33	929.71	946.33	926.55	945.33	927.95	944.33	927.71	943.33	926.57	942.33	929.12	941.33	926.09	940.33	926.67	939.33	926.92	938.33	927.46	937.33	929.13	936.33	926.76	935.33	925.18	934.43	916.76	933.84	913.01
--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

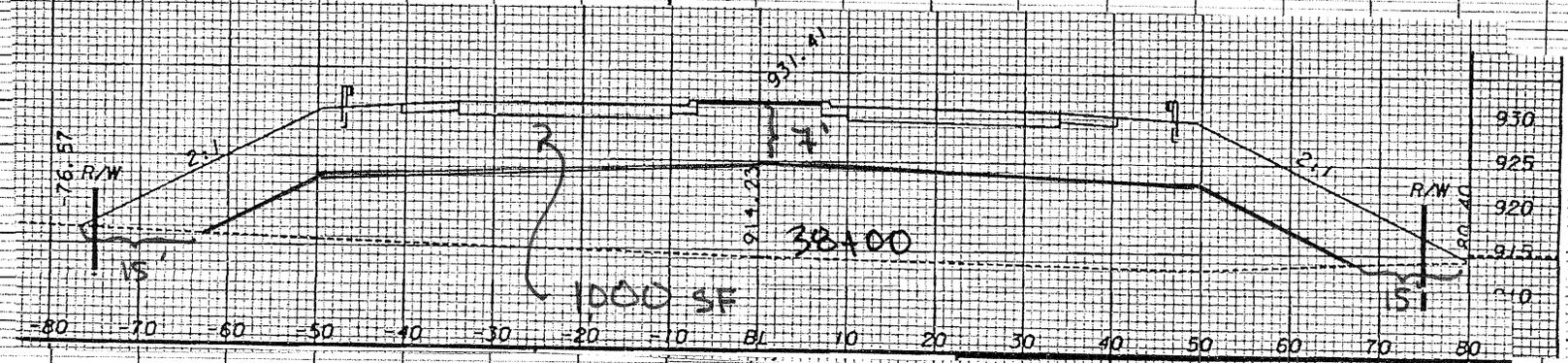
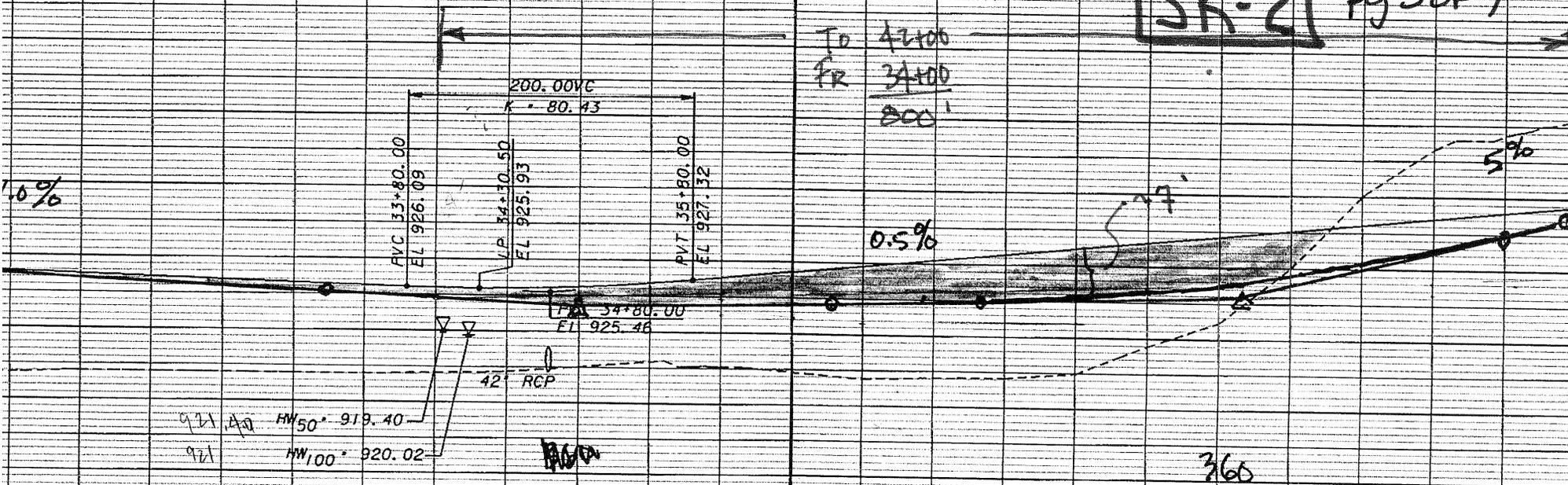
12+00 14+00 16+00 18+00 20+00 22+

REVISION DATES	DEPARTMENT
	OFFICE: ROAD DE

J.B. TRIMBLE, INC.

SCALE - 1" = 50' HORIZ

SK-2 A-4
Pg 3 of 7



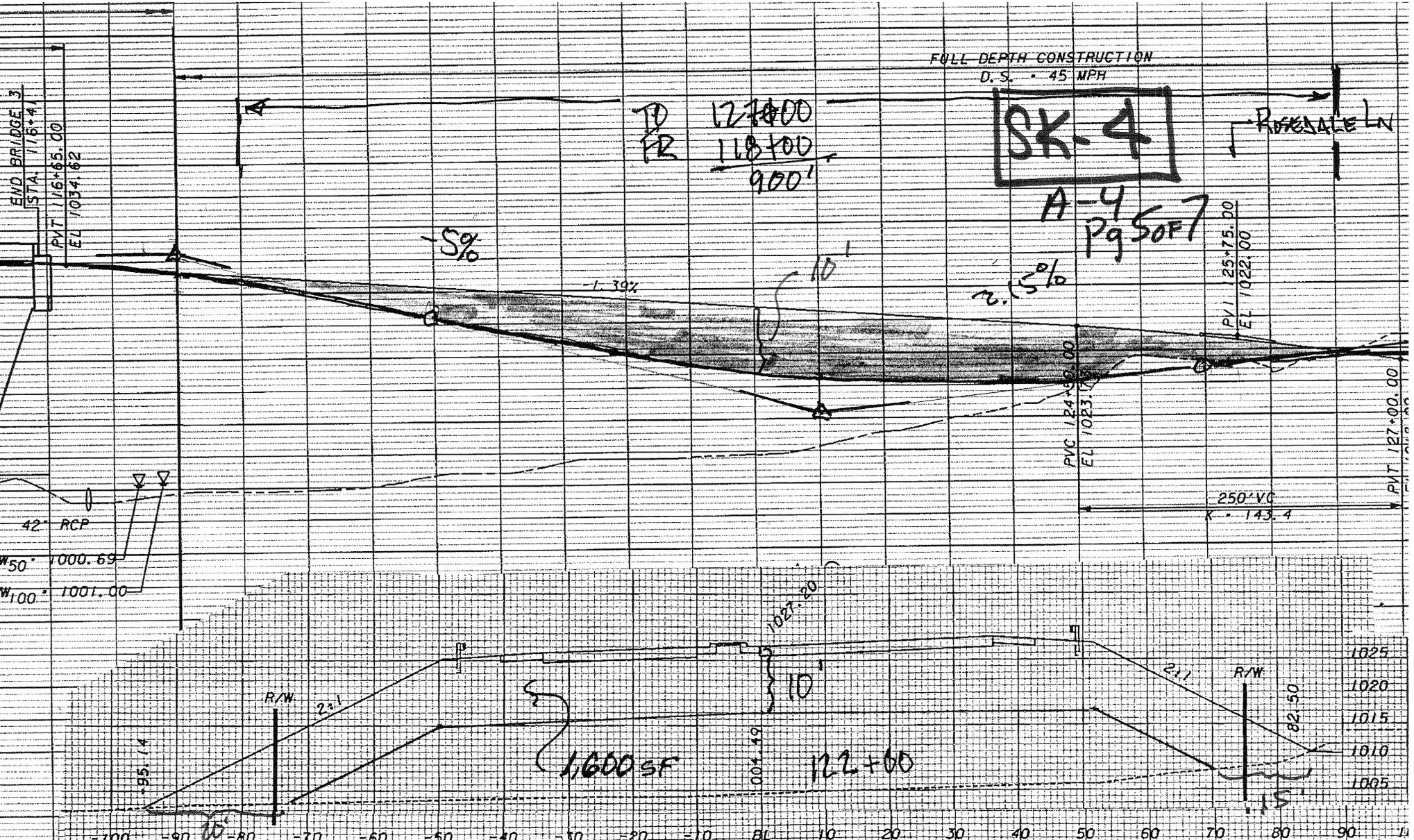
927.85	911.00	927.53	914.00	927.22	914.00	926.90	914.00	926.59	914.00	926.28	914.14	925.99	914.39	925.95	915.09	926.23	915.65	926.02	915.16	927.69	914.65	928.02	913.64	929.55	914.09	930.48	914.25	931.41	914.91	932.34	916.07	933.27	922.25	934.20	929.95	935.13	940.05	936.06	946.60	936.99	946.61	937.91	950.61
32+00					34+00					36+00					38+00					40+00					42+00																		

REVISION DATES	STATE OF GEORGIA DEPARTMENT OF TRANSP. OFFICE: ROAD DESIGN
	MAINLINE PROFILE
	EAST HIRAM PARKWAY

1" = 50' HORIZ.

15-02





FULL DEPTH CONSTRUCTION
D.S. - 45 MPH

SK-4

A-4
Pg 50 of 7

TD
FR
121+00
118+00
900'

ROSENDALE LN

-5%

-1.39%

~1.5%

PVI 125+75.00
EL 1022.00

PVC 124+50.00
EL 1023.00

250' VC
K = 143.4

PVI 127+00.00

42" RCP
HW 50' 1000.69
HW 100' 1001.00

R/W
2:1
-95.14

1600 SF

10'
1027.20
1004.49
122+00

R/W
2:1
82.50
15'

1025
1020
1015
1010
1005

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80 90 100

999.43	999.54	1000.00	1001.71	1002.00	1003.53	1004.00	1004.19	1004.49	1005.72	1007.02	1009.76	1011.57	1014.79	1019.24	1016.24	1017.01	1019.00	1022.00
118+00	120+00	122+00	124+00	126+00														

5.21
2.76
4.81
2.07
4.13
2.32

JBT J.B. TRIMBLE, INC.
6445 Powers Ferry Road,
Suite 100
Atlanta, GA 30339

SCALE : 1" = 50' HORI.

15-09

CALCULATIONS**East Hiram Parkway**ITEM N^o: A-4
CLIENT: GDOT
Sheet 7 of 7**Refer to SK-1**

Sta 11+00 to 21+00; Length = 1000 ft

Max reduction in fill ht = 10 ft

Max reduction in area = 1,360 sf (at cross section 15+00)

Earthwork volume reduced = $(1360 \times 1000/2)/27 = \mathbf{25,185 \text{ cy}}$

Max reduction in footprint = 20 ft (per side)

ROW reduced = $20 \times 2 \times 1000/2 = \mathbf{20,000 \text{ sf}}$ **Refer to SK-2**

Sta 34+00 to 42+00; Length = 800 ft

Max reduction in fill ht = 7 ft

Max reduction in area = 1000 sf (at cross section 38+00)

Earthwork volume reduced = $(1000 \times 800/2)/27 = \mathbf{14,815 \text{ cy}}$

Max reduction in footprint = 15 ft (per side)

ROW reduced = $15 \times 2 \times 800/2 = \mathbf{12,000 \text{ sf}}$ **Refer to SK-3**

Sta 65+00 to 84+00; Length = 1900 ft

Max reduction in fill ht = 10 ft

Max reduction in area = 1,280 sf (at cross section 73+00)

Earthwork volume reduced = $(1280 \times 1900/2)/27 = \mathbf{45,035 \text{ cy}}$

Max reduction in footprint = 20 ft (per side)

ROW reduced = $20 \times 2 \times 1900/2 = \mathbf{38,000 \text{ sf}}$ **Refer to SK-4**

Sta 118+00 to 127+00; Length = 900 ft

Max reduction in fill ht = 10 ft

Max reduction in area = 1,600 sf (at cross section 122+00)

Earthwork volume reduced = $(1600 \times 900/2)/27 = \mathbf{26,665 \text{ cy}}$

Max reduction in footprint = 20 ft/15 ft (lt/rt side)

ROW reduced = $(20 + 15) \times 900/2 = \mathbf{15,750 \text{ sf}}$ **Total Earthwork volume reduced = 111,700 cubic yards****Total ROW reduced = 85,750 square feet****Estimated ROW unit cost (from Terrell, Hundley & Carroll):**

\$2,788,463/2,896,046 sf = \$0.96/ SF (land only)

ROW mark-up multiplier = 3.472

Adjusted ROW unit cost = \$3.34/ SF

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

B-1

PAGE No.:

1 of 5

CREATIVE IDEA:

Reconfigure Span 1 & Span 2 to lower Profile

Comp By: G Grant

Date: 11/13/07

Checked By: DCW

Date: 11/14/07

Original Concept:

- Original Concept shown on Preliminary Layout has a 70 foot end span and a span 2 of 140 feet long. The remainder of the bridge is 40 foot RCDG (T-Beam) spans on pile bents.
- The length of Span 2 is determined by 10 foot setbacks of bents from the top of bank (per GDOT policy) for the meandering channel of Mill Creek as it passes under East Hiram Parkway.
- 72” deep bulb T beams are required for the 140 foot span.
- Because of this span length, bents 2 & 3 must be multi-column concrete intermediate bents.
- Rather than add an intermediate pile bent between bents 1 & 2 and use 2 spans of 40 foot RCDG beams, the designer chose to utilize the intermediate concrete bent and have an end span of 70 feet.

Proposed Change:

Replace span 2 with (2) – 70 foot spans and add a concrete intermediate bent between the original concept bents 2 & 3. This bent will have concrete columns placed so as to maintain the 10 foot offset from the top of banks and be perpendicular to the centerline of the roadway. Structure depth will be 3’-9” for the AASHTO Type III span.

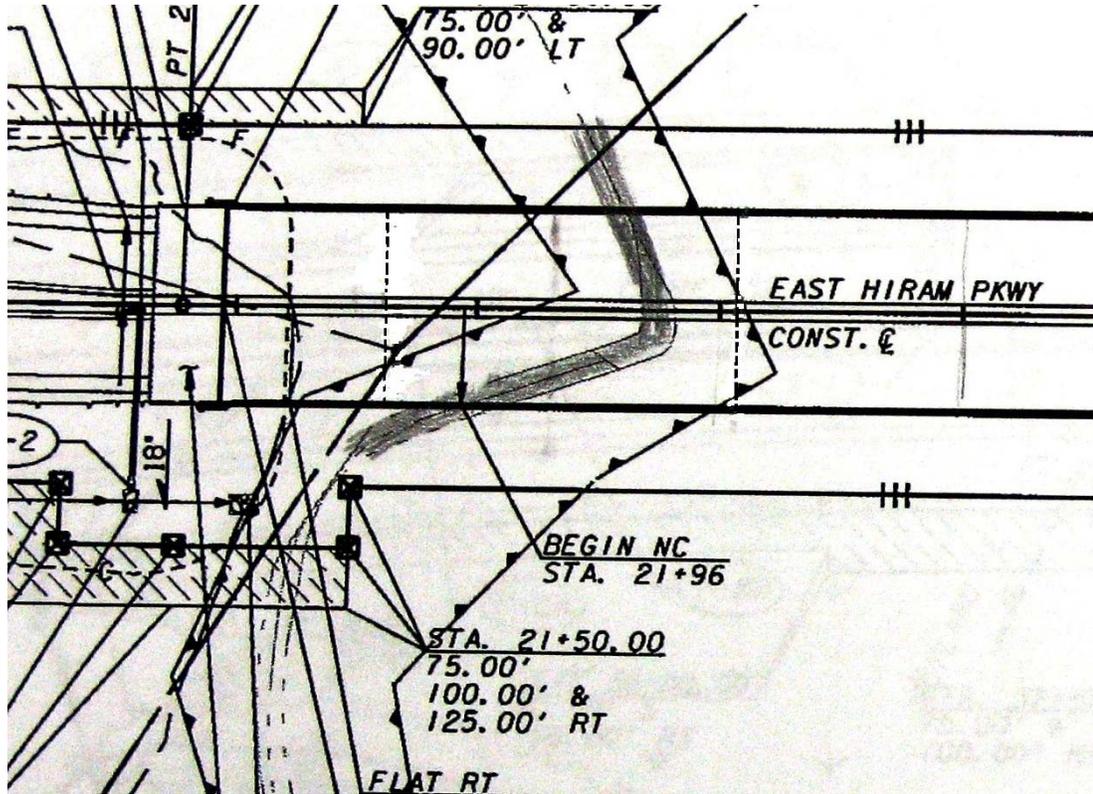
Justification:

Allows for lowering the profile grade to save cost of grading, earthwork and ROW

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	6,325,000		
- Proposed	5,824,000		
- Savings	501,000		501,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			501,000

East Hiram Parkway

ITEM N^o: B-1
CLIENT: GDOT
Sheet 2 of 5

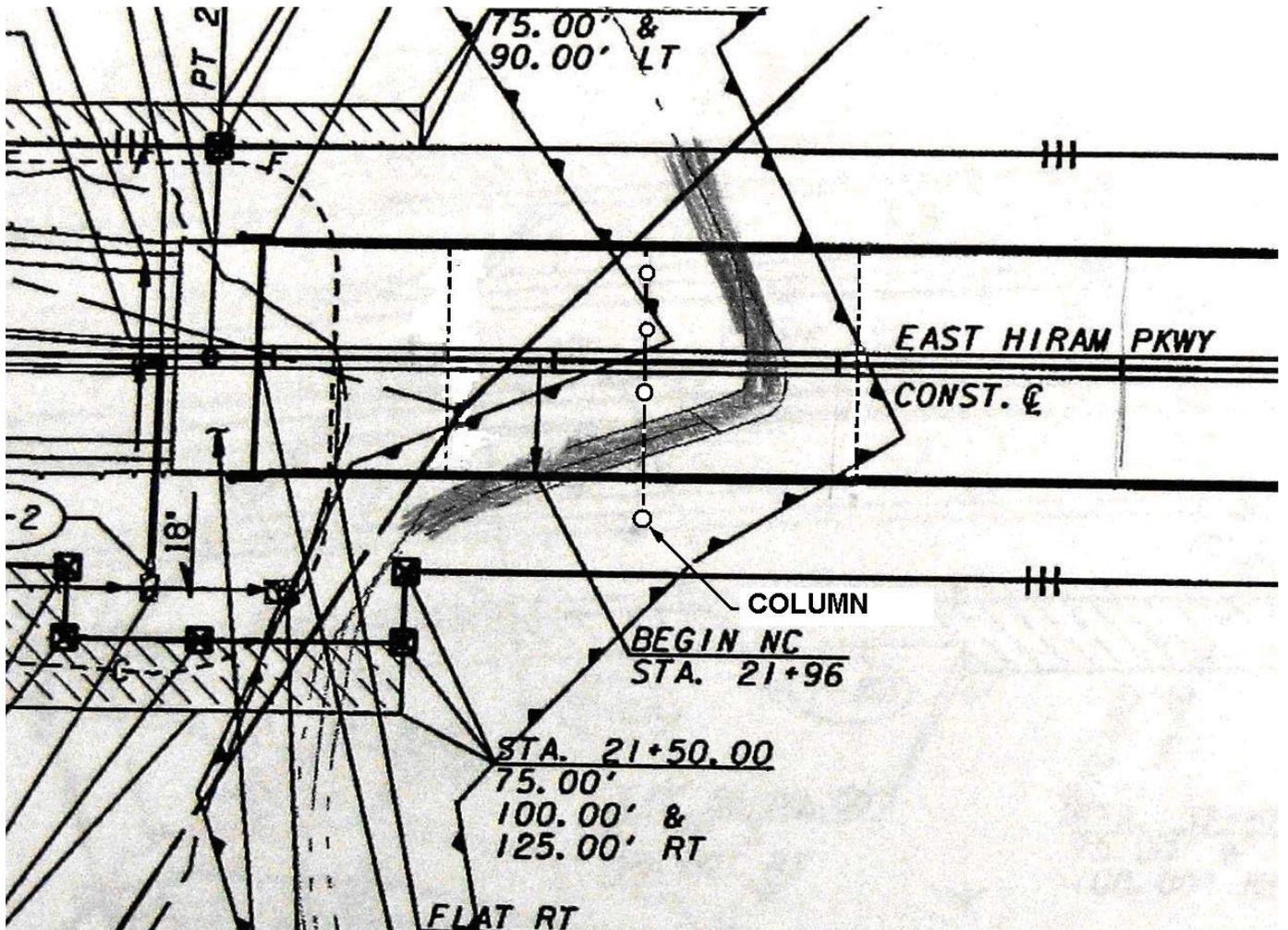


ORIGINAL CONCEPT

SKETCH

East Hiram Parkway

ITEM N^o: B-1
CLIENT: GDOT
Sheet 3 of 5



PROPOSED CONCEPT

COST WORKSHEET

PROJECT: East Hiram Parkway					ITEM No: B-1		
					CLIENT: GDOT		
					Sheet 4 of 5		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/UNIT	TOTAL COST	No. UNITS	COST/UNIT	TOTAL COST
Bridge Construction Cost							
ORIGINAL CONCEPT							
RCDG Portion							
Spans 3 - Span 14	SFT	39960	80.00	3,196,800			
AASHTO Type III Span							
Span 1	SFT	5827.5	120.00	699,300			
140 ft bulb T span							
Span 2	SFT	11655	159.06	1,853,894			
Misc				0			
PROPOSED CONCEPT							
RCDG Portion							
Spans 3 - Span 14	SFT				39960	80.00	3,196,800
AASHTO Type III Span							
Span 1, 2 & 2A	SFT				17482.5	120.00	2,097,900
Misc							0
NOTE:							
COST PER SQUARE FOOT OF BRIDGE PER TYPE OF SUPERSTRUCTURE ARE EDUCATED GUESSES. ORIGINAL CONCEPT IS EQUAL TO SQUARE FOOT COST GIVEN IN THE COST ESTIMATE.							
SUBTOTAL				5,749,994			5,294,700
Markup @ 10.00%				574,999			529,470
TOTAL				6,324,993			5,824,170
TOTAL ROUNDED				6,325,000			5,824,000

CALCULATIONS**East Hiram Parkway**

ITEM N^o: B-1
CLIENT: GDOT
Sheet 5 of 5

Deck Elevation at Bent 3 (original concept) = 932.84

Original concept structure depth = 6' beam + 1' slab and coping

Bottom of beam elevation = 932.84 – 7 ft = 925.84

50 yr abnormal flood elev. = 922.69 + 2 ft = 924.69 OK

100 yr abnormal flood elev. = 923.64 + 1 ft = 924.64 OK (1.2 ft additional above min.)

Cross slope = 40 ft x .02 ft/ft = 0.8 ft

0.35 ft “extra”

Check at bent 15

PGL elev 929.82 – 2.75 structure depth – 0.8 se = 926.27 OK > 924.69

926.27 – 924.64 = 1.58 ft “extra” above minimum

Deck Elevation at Bent 3 (original concept) = bent 4 proposed = 932.84

Original concept structure depth = 3.75' beam + 1' slab and coping

Bottom of beam elevation = 932.84 – 4.75 ft = 928.09

50 yr abnormal flood elev. = 922.69 + 2 ft = 924.69 OK (3.40 ft additional above)

100 yr abnormal flood elev. = 923.64 + 1 ft = 924.64 OK (3.45 ft additional above)

Check at bent 15 (bent 16 in proposed)

PGL elev. 929.82 – 2.75 structure depth – 0.8 se = 926.27 OK > 924.69

926.27 – 924.69 = 1.58 ft “extra” above minimum

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.: B-4	PAGE No.: 1 of 4	CREATIVE IDEA: Narrow Lanes on Bridge to 11 feet
Comp By: GG	Date: 11/13/07	Checked By: DCW Date: 11/14/07

Original Concept:

Original concept uses 4 – 12 foot lanes.

Proposed Change:

Reduce lanes to 11 foot wide.

Justification:

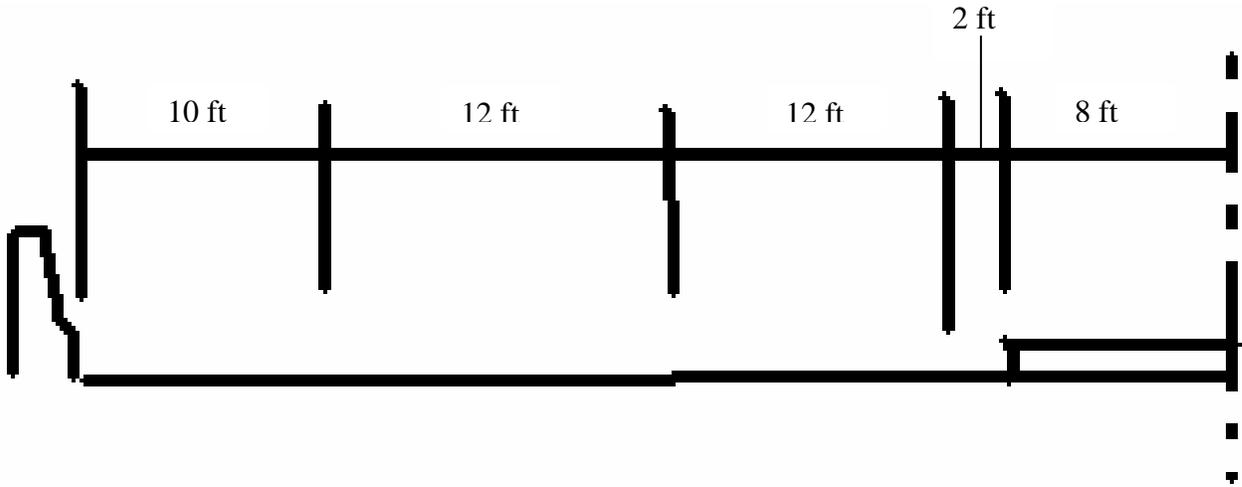
Roadway is 45 mph design speed. Reducing lane width is deemed acceptable by current design practice and will not require a design variance.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	6,325,000		
- Proposed	6,015,000		
- Savings	310,000		310,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			310,000

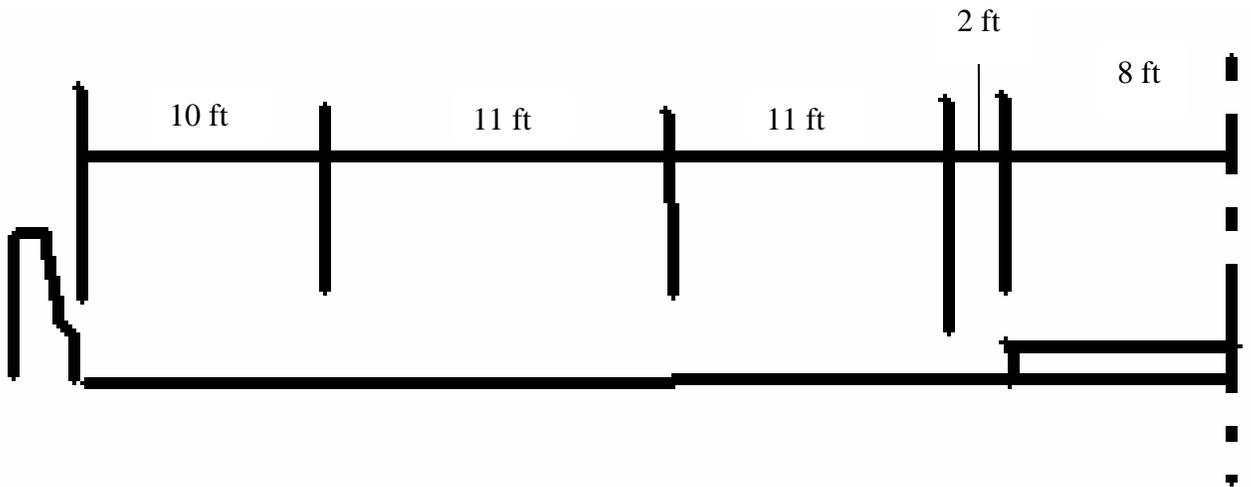
SKETCH

East Hiram Parkway

ITEM N^o: B-4
CLIENT: GDOT
Sheet 2 of 4



ORIGINAL CONCEPT



PROPOSED CONCEPT

CALCULATIONS

East Hiram Parkway

ITEM N^o: B-4
CLIENT: GDOT
Sheet 4 of 4

From Detailed Construction Cost Estimate:

Bridge 1 = \$5,750,000 x 1.1 = \$6,325,000

$\$6,325,000 / (83.25 \text{ ft wide} \times 690 \text{ ft long}) = \$110.11 / \text{sq ft}$

Savings for proposed = 4 lanes x 1 foot per lane = 4 ft

Savings = 4 ft x 690 ft long = 2,760 SF saved

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-1	1 of 9	Build on One side Only

Comp By: PB Date: 11/14/07 Checked By: DCW Date: 11/15/07

Original Concept:

Build 4 lanes with 8' to 20' median.

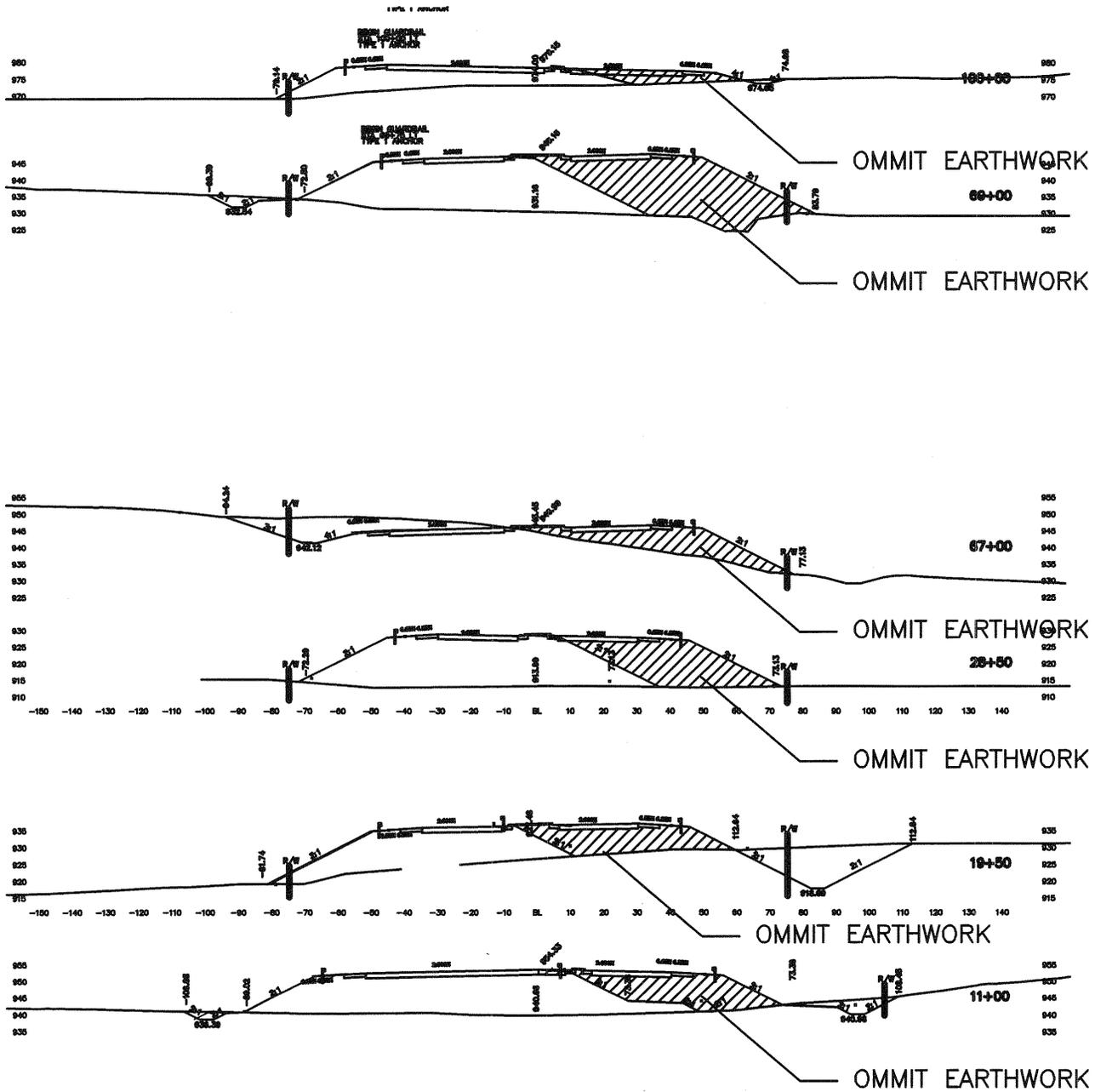
Proposed Change:

Build 2-lane rural section without median along original westbound alignment. 2-lane rural section will tie into original concept 4-lane urban section. Right of way will be purchased as required for original 4-lane with median concept.

Justification:

Reduce grading, pavement, drainage, bridge, and curb & gutter costs, and wetlands mitigation. Future widening to be reserved as funds are available and as traffic demands or development warrant additional lanes.

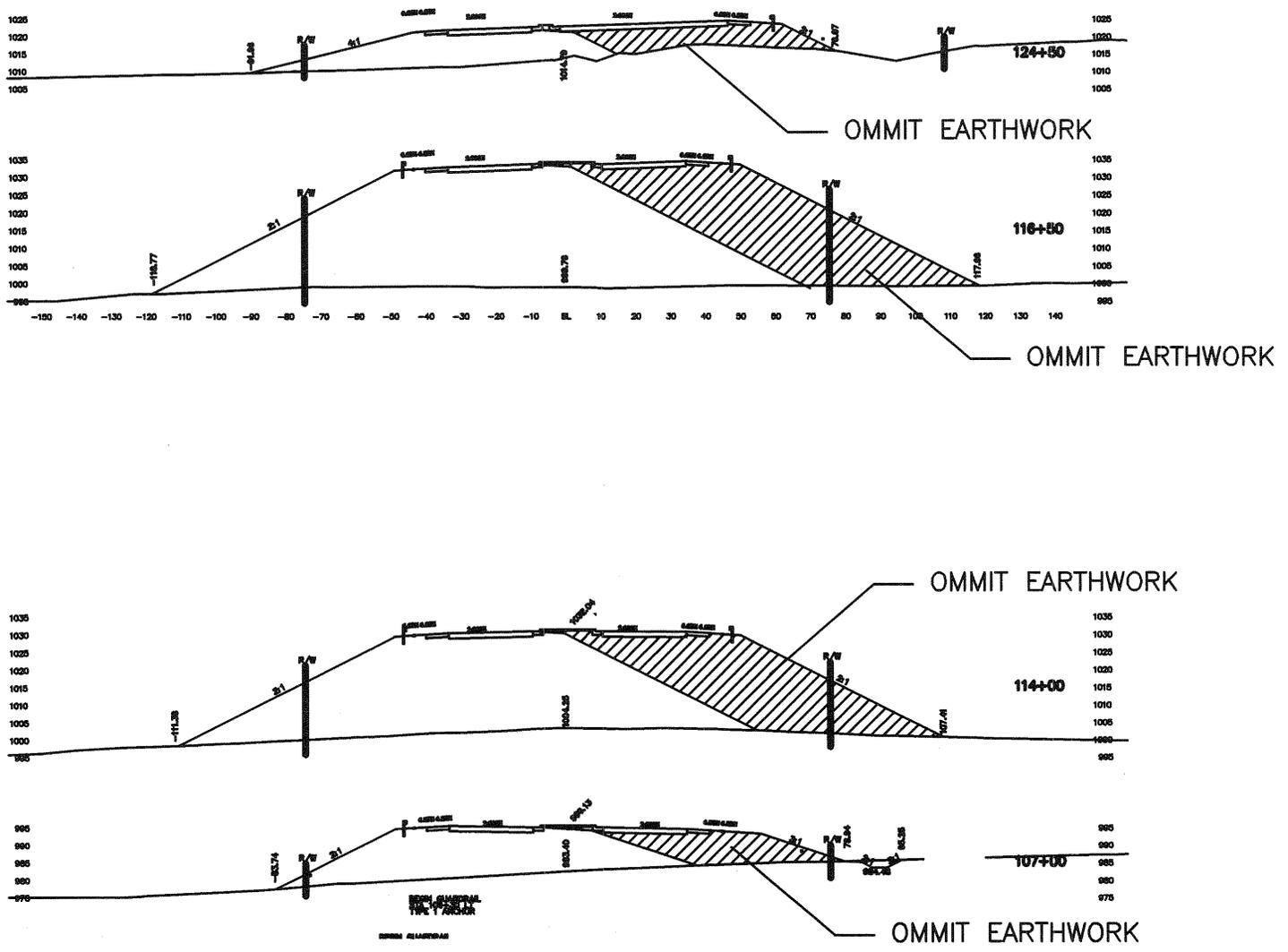
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	\$16,970,000		
- Proposed	\$10,190,000		
- Savings	\$6,780,000		6,780,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			6,780,000



ANALYZED CROSS SECTIONS

C-1
Pg 2 of 9

ANALYZED CROSS SECTIONS



C-1
Pg 3 of 9

COST WORKSHEET

PROJECT: Two Lane Road Only	East Hiram Parkway	ITEM No: C-1
		CLIENT: GDOT
		Sheet 4 of 9

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
GR AGGR BASE COURSE	TN	4653	25.00	116,325	2327	25.00	58,163
25 MM SUPERPAVE	TN	23267	80.00	1,861,360	11634	80.00	930,680
12.5 MM SUPERPAVE	TN	6,980	80.00	558,400	3490	80.00	279,200
19 MM SUPERPAVE	TN	9,307	80.00	744,560	4654	80.00	372,280
TACK COAT	GL	10,153	2.50	25,383	5077	2.50	12,691
CONCRETE MEDIAN	SY	828	31.64	26,198	0	31.64	
CONCRETE C&G	LF	5,108	17.03	86,996	22544	17.03	383,924
18" STORM DRAIN PIPE	LF	590.0	45.96	27,116	0	45.96	
18" STORM DRAIN PIPE (10-15)	LF	242	57.53	13,922	0	57.53	
18" STORM DRAIN PIPE (15-20)	LF	209	79.53	16,622	0	79.53	
18" STORM DRAIN PIPE (25-30)	LF	62	68.00	4,216	0	68.00	
24" STORM DRAIN PIPE (15-20)	LF	110	62.99	6,929	0	62.99	
36" STORM DRAIN PIPE (15-20)	LF	267	86.79	23,173	0	86.79	
36" STORM DRAIN PIPE (15-20)	LF	146	91.66	13,382	0	91.66	
42" STORM DRAIN PIPE	LF	66	96.76	6,386	0	96.76	
42" STORM DRAIN PIPE (30'-35)	LF	150	165.00	24,750	0	165.00	
18" STORM DR.FLARED E.S.	EA	17	672.20	11,427	-	672.20	
36" STORM DRAIN Flared E.S.	EA	2	1,252.70	2,505	-	1,252.70	
CATCH BASIN, GP1	EA	20	2,784.43	55,689	-	2,784.43	
CATCH BASIN, GP1, ADD DEPTH	LF	102	285.46	29,117	-	285.46	
RIP RAP, TP3, 18 IN	SY	600	45.21	27,126	500	45.21	
BRIDGE #1 (60% ASSUMED)	LS	1.0	5750000	5,750,000	1	3,450,000	3,450,000
BRIDGE #2 (60% ASSUMED)	LS	1	730000	730,000	1	438,000	438,000
BRIDGE #3 (60% ASSUMED)	LS	1	1770000	1,770,000	1	1,062,000	1,062,000
GRADING (65% ASSUMED)	LS	1	3,500,000	3,500,000	1	2,275,000	2,275,000
SUBTOTAL				15,431,583			9,261,938
Markup @ 10.00%				1,543,158			926,194
TOTAL				16,974,741			10,188,132
TOTAL ROUNDED				16,970,000			10,190,000

BACK UP CALCULATIONS

Item C-1 + C-1.1

CONTINUATION

East Hiram Parkway

ITEM N^o:
CLIENT: GDOT
Sheet 5 of 9

LF
Depth

LF	Depth	STRUCTURES	NOTES
5-20	70	(FES) B1-B2 & RIPRAP TYPE 3, 18" (1033D @ 12)	A-1 A-2 = ?
5-26	70	(FES) C-1 C2 & RIPRAP TYPE 3, 18" (1033D @ 11)	
5-35	61	(FES) D1-D2 & R " " " (1033D @ 6)	
5-35	60	(FES) E1-E2 " " " " (1033D @ 7)	
	41	F2-F3 (1033D @ 6)	F1-F2 = ?
	97	F2A-F2B (1034D @ 6)	
6-18	59	(FES) G1-G2 & RIPRAP TYPE 3 18" (1033D @ 6)	
	46	(FES) H1+H2 & " " " " 1033D	
	46	(FES) I1-I2 & " " " " 1033D	
	48	(FES) J1+J2 " " " " (1033D)	KEEP K1-K2
	52	(FES) L1-L2 " " " " (1033D)	KEEP M1-M2
		M2-M3 ?	
10-15	62	(FES) N1-N2 & " " " " 1033D @ 7	KEEP O1-O2
	69	(FES) Q1-Q2 & " " " " (1033 @ 4)	P1-P2 = ?
*154		R1-R2 (36") " " " " 1033D	R2-R3 = ?
	50	(FES) S1-S2 " " " " 1033D	KEEP T1-T2
	73	(FES) U1-U2 " " " " 1033D	
*156		(FES) V1+V2 (36") " " " " 1033D	V2-V3 = ?
	54	(FES) W1-W2 & RIPRAP TYPE 3, 18" 1033D	
(15-20)*	89	(FES) X1-X2 (36") (1033D @ 15)	X2-X3 = ?
(15-30)	63	(FES) Y1-Y2 " " " " (1033D @ 21)	Y1-Y2 = ?
(15-20)	68	(FES) A1-AA2 " " " " (1032 @ 12)	
	64	(FES) B1-B2 " " " " (1032 @ 4)	

CALCULATIONS

East Hiram Parkway

ITEM N^o: C-1
 CLIENT: GDOT
 Sheet 6 of 9

TALLY OF SHEET 1

18" @ 1-10' = 41 + 47 + 46 + 46 + 48 + 52 + 62 + 50 + 73 + 54 + 67 = 590

18" @ 10'-15 = 61 + 60 + 59 + 62 = 242

18" @ 15'-20 = 70 + 71 + 68 = 209

18 @ 25-30 = 62 =

36" @ = 154 + 56 = 210

36 @ (15'-20) = 89 =

18" FES = 17

36" FS = 2

10330 = 8 + 11 = 19 + 1

10330 @ - 12 + 14 + 6 + 7 + 6 + 6 + 7 + 4 + 21 + 12 + 11 + 6 = 102

~~10340 @ 6 = 6~~

TYPE 3, 18IN RIP-RAP = 500 SY

12 MEDIAN STRIPE

8.99 + 8.99 + 15 + 15 PER 15' = 47

USING CURB LENGTHS ∴ 22599 LF

1503 SECTIONS X 47 = 70638 LF

X-SECTION COMPARISON STATIONING

11100	69 + 50	} SEE SHEET 4
20 + 00	100 + 00	
28 + 00	107 + 00	
67 + 00	114 + 00	
	116 + 50	
	125 + 00	

CALCULATIONS

East Hiram Parkway

ITEM N^o: C-1
 CLIENT: GDOT
 Sheet 7 of 9

$CTG (10+30 \text{ TO } 95+00) \times 2 = 3410 \text{ YPR } 2^{\circ} \text{ OR TRPET}$
 $(46+00 \text{ TO } 98+65) \times 2 = 5265 \times 2 = 10530$
 $(99+25 \text{ TO } 125+22) \times 2 = 2597 \times 2 = 5194$
 $(126+36 \text{ TO } 139+30) \times 2 \text{ URBAN}$
 $(140+80 \text{ TO } 147+50) \times 2$

22544 LF

BRIDGES 60% (6323A I) = ~~3793.8K~~
 (803K) II = ~~481.8K~~
 (1947) III = ~~1168.2K~~

MAINLINE ROADWAY PAVEMENT $6980 \text{ TN} \div 2$ 12.5mm (3990)
 $9307 \text{ TN} \div 2$ 19mm (4653.5)
 $23267 \text{ TN} \div 2$ 22mm (11633.5)
 $4653 \text{ TN} \div 2$ GRASS (2326.5)
 $10153 \text{ GAL} \div 2$ TACK COAT (5076.5)

CONCRETE MEDIAN
 10+86 - 14+07 132 SY
 41+06 - 45+02 130
 46+00 - 49+66 175
 95+38 - 98+67 132
 99+71 - 103+01 130
 121+96 - 125+23 129

 828 SY

CALCULATIONS

East Hiram Parkway

ITEM N^o: C-1
 CLIENT: GDOT
 Sheet 8 of 9

	OLD		NEW	
11 + 00	15.0	693	11.5	77% loss
20 + 00	12.0	680	7.8	81%
28 + 50	16.0	2280	9.5	60%
66 + 50			0	0
67 + 50 OK	8.4	0	0	0
69 + 00	21.3	1205	11.7	55%
100 + 00	5.9	651	5.5	93%
107 + 00	16.6	508	11.9	72%
112 + 00	46.7	165	30.7	66%
116 + 50	59.3	589	43.3	73%
124 + 50	10.6		7.0	66%
11				
<u>113.5</u>				≈ 69%
1				

CALCULATIONS

East Hiram Parkway

ITEM N^o: C-1
 CLIENT: GDOT
 Sheet 9 of 9

CROSS DRAINS	65% LF ASSUMED	80%
A1-A2	169 LF 24" (15'-20') ≈ 110 LF	135 LF
F1-F2	101 LF 42" ≈ 66 LF	81 LF
P1-P2	109 LF 36" ≈ 71 LF	87 LF
R2-R3	132 LF 36" ≈ 86 LF	106 LF
V2-V3	78 LF 36" ≈ 51 LF	62 LF
X2-X3	87 LF 36" (15'-20') ≈ 57 LF	70 LF
Y1-Y2	230 LF 42" (30'-35') ≈ 150 LF	184 LF

@ .8

36" @ 65%
 $71 + 86 + 51 = 208 \text{ LF}$

36" @ 80%
 $87 + 106 + 62 = 255 \text{ LF}$

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:	PAGE No.:	CREATIVE IDEA:
C-1.1	1 of 2	Build three lanes on one side only and use a striped median

Comp By: Paul Butler Date: 11/14/07 Checked By: DCW Date: 11/15/07

Original Concept:

Build 4 lanes with 8' to 20' median.

Proposed Change:

Build 3 Lanes with a striped median (3rd lane) along original westbound alignment. 2-lane rural section will tie into original concept 4-lane urban section. Right of way will be purchased as required for original 4-lane with median concept.

Justification:

Reduce grading, pavement, drainage, bridge, and curb & gutter costs, and wetlands mitigation. This proposal will improve future constructability if the additional lanes are constructed.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	\$17,160,000		
- Proposed	\$13,960,000		
- Savings	\$3,200,000		3,200,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			3,200,000

COST WORKSHEET							
PROJECT: East Hiram Parkway 2 Lane with Striped Median					ITEM No: C-1.1 CLIENT: GDOT Sheet 2 of 2		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
GR AGGR BASE COURSE	TN	4653	25.00	116,325	3490	25.00	87,244
25 MM SUPERPAVE	TN	23267	80.00	1,861,360	17450	80.00	1,396,020
12.5 MM SUPERPAVE	TN	6,980	80.00	558,400	5235	80.00	418,800
19 MM SUPERPAVE	TN	9,307	80.00	744,560	6980	80.00	558,420
TACK COAT	GL	10,153	2.50	25,383	7615	2.50	19,037
CONCRETE MEDIAN	SY	828	31.64	26,198	0	31.64	
CONCRETE C&G	LF	5,108	17.03	86,996	22544	17.03	383,924
18" STORM DRAIN PIPE	LF	590.0	45.96	27,116	0	45.96	
18" STORM DRAIN PIPE (10-15)	LF	242	57.53	13,922	0	57.53	
18" STORM DRAIN PIPE (15-20)	LF	209	79.53	16,622	0	79.53	
18" STORM DRAIN PIPE (25-30)	LF	62	68.00	4,216	0	68.00	
24" STORM DRAIN PIPE (15-20)	LF	135	62.99	8,504		62.99	
36" STORM DRAIN PIPE	LF	465	86.79	40,357	0	86.79	
36" STORM DRAIN PIPE (15-20)	LF	159	91.66	14,574	0	91.66	
42" STORM DRAIN PIPE	LF	81	96.76	63,435	0	96.76	
42" STORM DRAIN PIPE (30'-35)	LF	184	165.00	118,366	0	165.00	
18" STORM DRAIN FLARED E.S.	EA	17	672.20	11,427	-	672.20	
36" STORM DRAIN FLARED E.S.	EA	2	1,252.70	2,505	-	1252.70	
CATCH BASIN, GP1	EA	20	2,784.43	55,689	-	2784.43	
CATCH BASIN, GP1, ADD DEPTH	LF	102	285.46	29,117	-	285.46	
RIP RAP, TP3, 18 IN	SY	600	45.21	27,126	500	45.21	
BRIDGE #1	LS	1.0	5,750,000	5,750,000	1	4,600,000	4,600,000
BRIDGE #2	LS	1	730000	730,000	1	584,000	584,000
BRIDGE #3	LS	1	1770000	1,770,000	1	1,416,000	1,416,000
GRADING (80% ASSUMED)	LS	1	3,500,000	3,500,000	1	2,800,000	2,800,000
STRIPED MEDIAN 8"	LF	0	6.00		70638	6.00	423,828
SUBTOTAL				15,602,198			12,687,273
Markup @ 10.00%				1,560,220			1,268,727
TOTAL				17,162,418			13,956,000
TOTAL ROUNDED				17,160,000			13,960,000

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

C-3

PAGE No.:

1 of 5

CREATIVE IDEA:

Reduce the paved shoulder width in the rural typical section

Comp By: DW Date: 11/14/07 Checked By: TG Date: 11/14/07

Original Concept:

The typical rural section indicates a 6 foot 6 inch paved outside shoulder and a 3 foot 6 inch graded shoulder to the break.

Proposed Change:

Use a 4 foot paved shoulder and a 6 foot graded shoulder to the break to match the existing section at Bill Carruth Parkway. The paving is replaced with graded aggregate base material (could be graded earthwork at an additional savings).

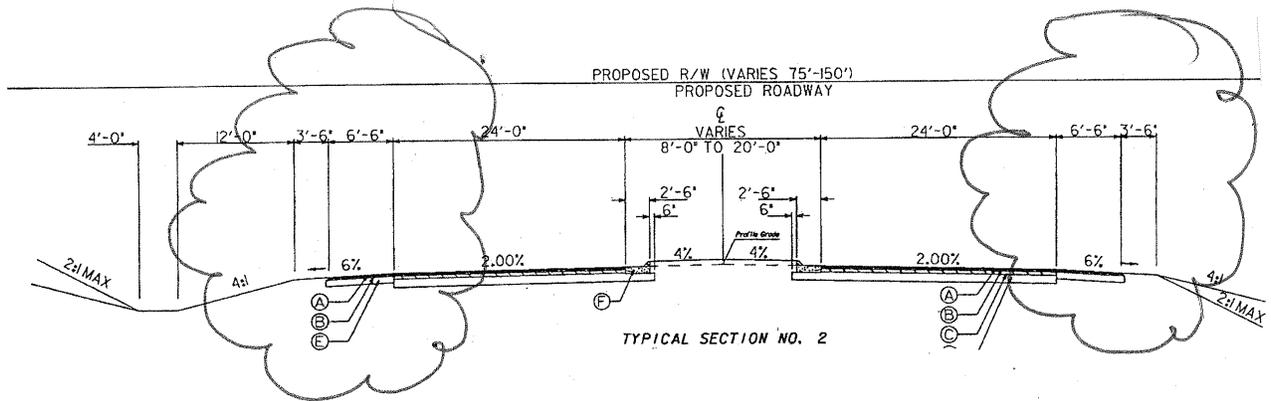
Justification:

Both options have a total shoulder width of 10 feet to the break to allow vehicles to clear the pavement in an emergency and still have one pair of wheels on a paved section of shoulder.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	100,900		
- Proposed	15,900		
- Savings	85,000		85,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			85,000

East Hiram Parkway

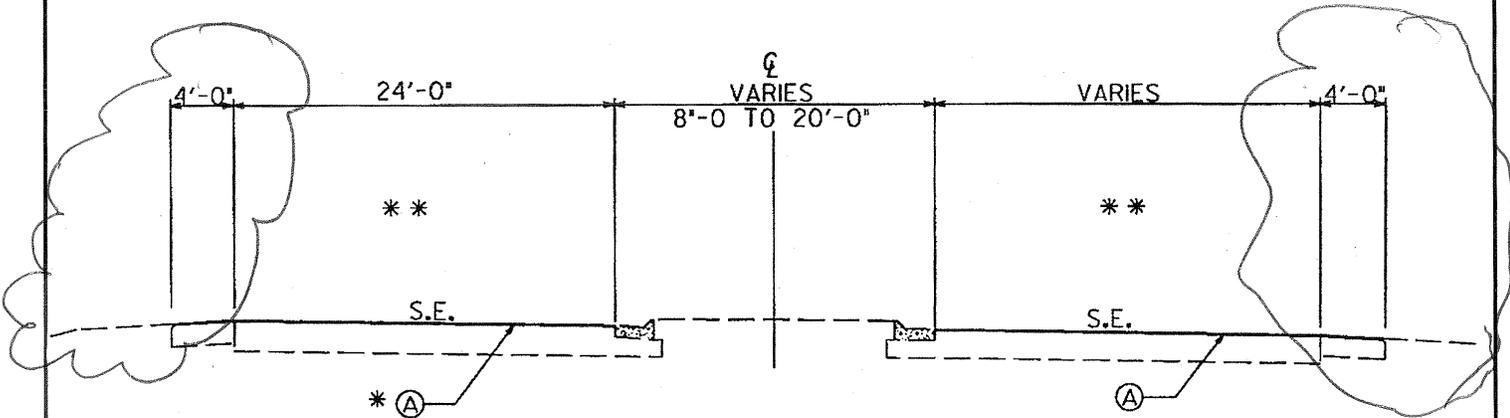
ITEM N^o: C-3
CLIENT: GDOT
Sheet 2 of 5



ORIGINAL CONCEPT

East Hiram Parkway

ITEM N^o: C-3
CLIENT: GDOT
Sheet 3 of 5



TYPICAL SECTION NO. 1
SUPERELEVATION SECTION

APPLIES: BILL CARRUTH PKWY STA. 193+14 TO STA. 199+17

PROPOSED CHANGE

CALCULATIONS**East Hiram Parkway**

ITEM N^o: C-3
 CLIENT: GDOT
 Sheet 5 of 5

Pavement cost for shoulders = 385#/SY = 42.8#/SF X \$80/2,000 # = \$1.71 / SF

GAB cost = 4,000#/CY X 1/27 = 148#/ CF X 6/12 inches = 74#/SF shoulder X \$25/2,000# = \$0.93/SF X 3.5 inches/12 inches = \$.27/SF to replace pavement area

Total length of shoulders in the rural section:

Sta at Rosedale where section changes to urban = 125+00	
	-10+00 (Sta at beginning)
	<u>115+00</u>
	-7+70 (length Bridge 1+2)
	<u>10,730 LF shoulders</u>

Total area:

2.5 + 2.5 = 5.0 LF shoulder per LF roadway = 53,650 SF saved

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.: E-1	PAGE No.: 1 of 5	CREATIVE IDEA: Reduce Span 2 and add crash wall to accommodate future 3 rd track
-------------------------	----------------------------	---

Comp By: GG Date: 11/13/07 Checked By: DCW Date: 11/14/07

Original Concept:

Original concept allows for 3 tracks in the center span with 15 ft separation between tracks and 26 foot side clearance to bents 2 and 3 to eliminate the need for crash walls.

25 feet horizontal clearance is the minimum.

Proposed Change:

Build span 2 to accommodate the existing track and one proposed future track without the need for crash walls. Size the center span to allow for a future 3rd track, but the addition of the 3rd track would require a crash wall at bent 2.

18 feet is the minimum required for double track, but will require a crash wall.

Use 19 feet for consistency with increasing the 25 ft min. clear to 26 ft.

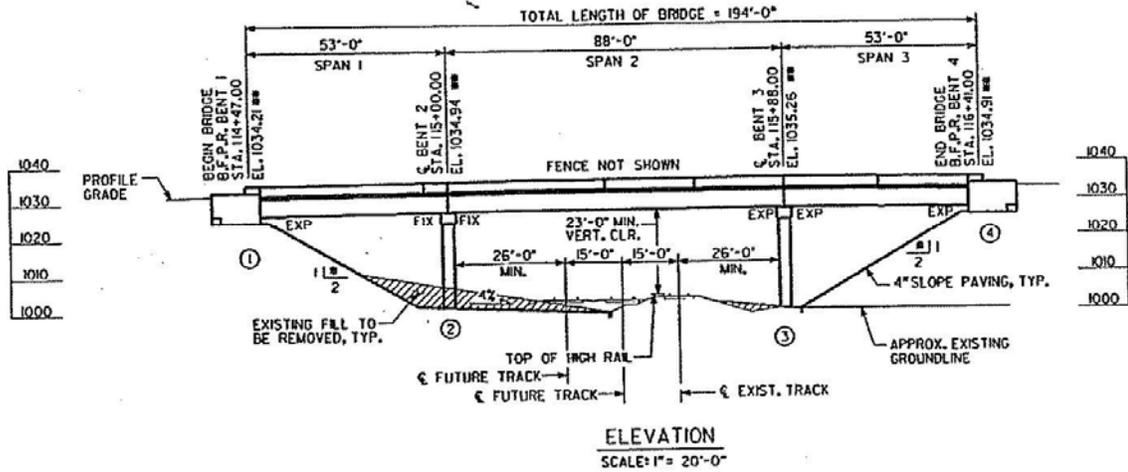
Justification:

The addition of the 2nd track is highly likely, however adding a 3rd track is less likely. The recommended design allows for the 3rd track, but requires a crash wall be added.

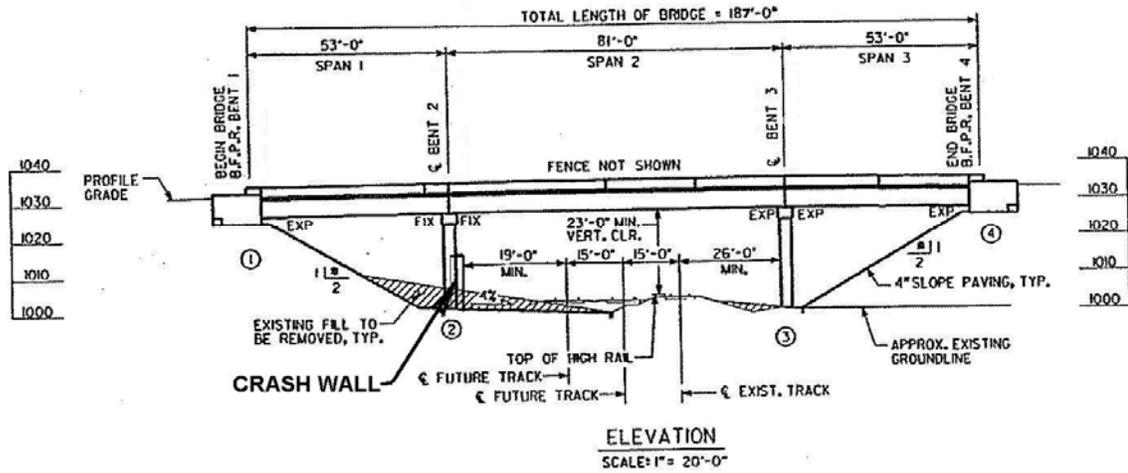
LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,947,000		
- Proposed	1,889,000		
- Savings	58,000		58,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			58,000

East Hiram Parkway

ITEM N^o: E-1
 CLIENT: GDOT
 Sheet 2 of 5



ORIGINAL CONCEPT



PROPOSED CONCEPT

CALCULATIONS**East Hiram Parkway**ITEM N^o: E-1
CLIENT: GDOT
Sheet 4 of 5**Original Concept**

Span 2 for the original concept is 88 ft long to accommodate the following:

$$26' \text{ clear} + 15 \text{ ft offset (track 3 to 2)} + 15 \text{ ft offset (track 2 to 1)} + 26' \text{ clear} = 82 \text{ ft}$$

$$\text{Skew of bent 2} = 86.1422 \text{ degrees}$$

$$\text{Normal length between bent 2 \& 3 is: } 88 \text{ ft} \times \sin(86.1422) = 87.80 \text{ ft}$$

$$87.80 - 2 \times 3.5 \text{ ft cap} / 2 = 84.3 > 82 \text{ ft OK}$$

Proposed Concept

Normal length between bent 2 & 3 is:

Case 1: 2 tracks that do not need a crash wall.

$$26' \text{ clear} + 15 \text{ ft offset (track 2 to 1)} + 26' \text{ clear} = 67 \text{ ft}$$

Case 2: add the third track but require a wall

$$2' - 0'' \text{ crash wall (exclude } 6'' \text{ from } 2' - 6'' \text{ required because it is inside the column face)} + 19' \text{ clear} + 15 \text{ ft offset (track 3 to 2)} + 15 \text{ ft offset (track 2 to 1)} + 26' \text{ clear} = 76 \text{ ft}$$

$$\text{Add in } 2 \times 3.5 \text{ ft caps} / 2 = 80.5 \text{ ft}$$

$$\text{Skew of bent 2} = 86.1422 \text{ degrees}$$

$$80.5 \text{ ft} / \sin(86.1422) = 80.68 \text{ ft}$$

$$\text{Say Span 2} = 81 \text{ ft}$$

$$\text{Reduces length of bridge by } 88 - 81 = 7 \text{ ft}$$

CALCULATIONS

East Hiram Parkway

ITEM N^o: E-1
CLIENT: GDOT
Sheet 5 of 5

Crash wall

10 ft high above rail + 4.75 ft to bottom of ditch + 2 ft to top of ftg + 2 foot for possible drop in footing = 18.75

Doesn't make sense to build a crash wall this large.

Build solid wall piers.

Increase cost of bridge by cost of add'l concrete

Approximately 91.25 ft wide x 3.5 ft wide x (23 ft high + 4.75 + 2 ft embedment + 2 ft extra)
= 10,149 ft³ = 375 yd³

Regular bent would be 3.5 ft wide x 91.25 ft long x 3.5 ft deep + 4 columns x 31.75 ft high x 3 ft x 3 ft = 2,261 ft³ = 84 yd³

375 - 84 = 291 yd =

\$574.82/yd³ (class A) x 291 = \$155,776

Rebar = 175 #/yd³ x 291 yd³ x \$0.94/lb = \$47,870

Approx \$200K/ wall pier

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

E-2

PAGE No.:

1 of 5

CREATIVE IDEA:

Use vertical abutments and eliminate end spans of the bridge

Comp By: G Grant

Date: 11/14/07

Checked By: DCW

Date: 11/15/07

Original Concept:

Original Concept is a 3 span bridge. Main span over tracks with 2:1 end slope for end spans

Proposed Change:

Eliminate end spans and use vertical abutments comprised of MSE walls with steel H piles supporting concrete caps

Justification:

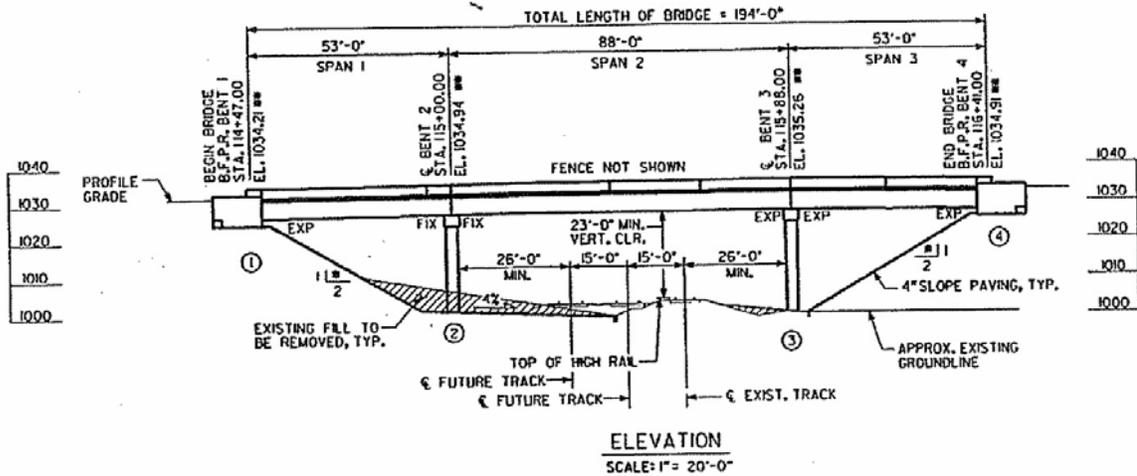
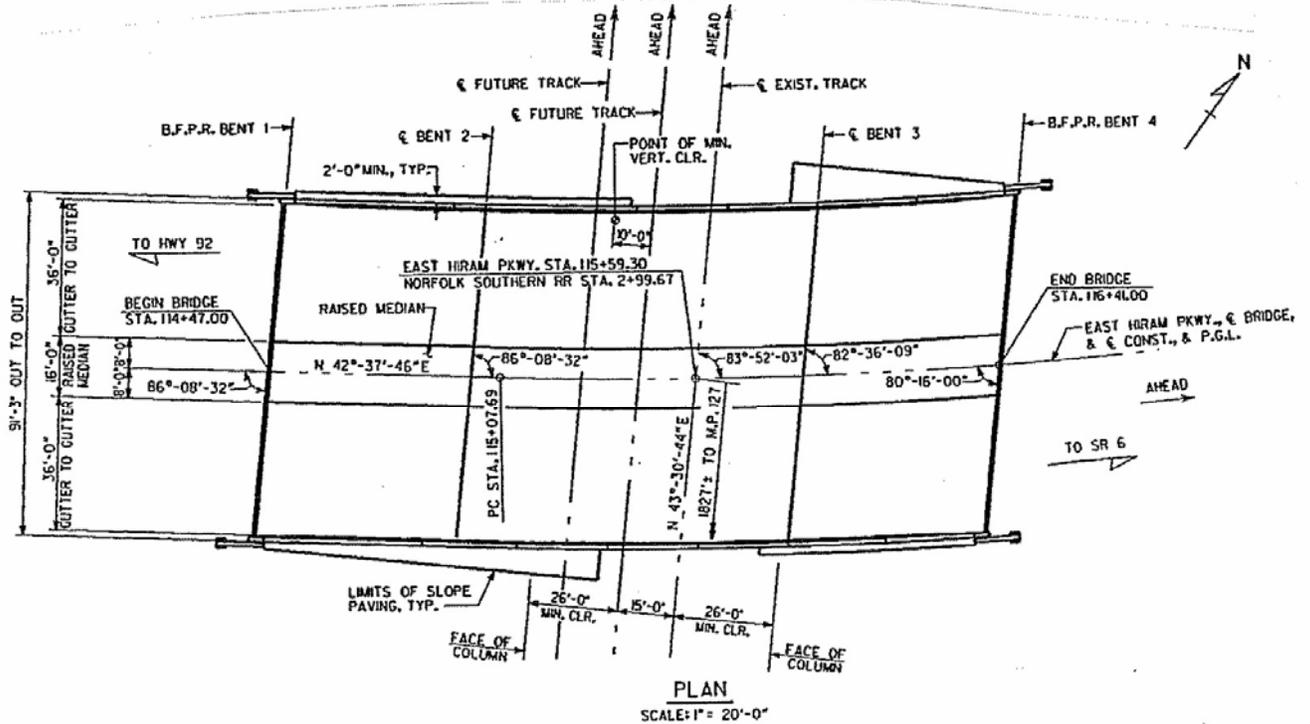
GDOT bridge has previously submitted these type bridges and received railroad approval (spoke to Ron Grimes – GDOT Bridge)

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,947,000		
- Proposed	1,530,000		
- Savings	417,000		417,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			417,000

SKETCH

East Hiram Parkway

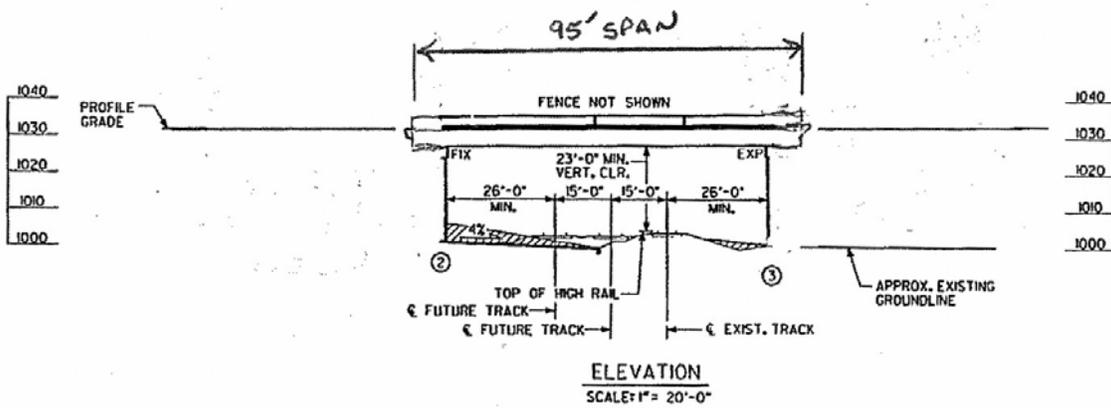
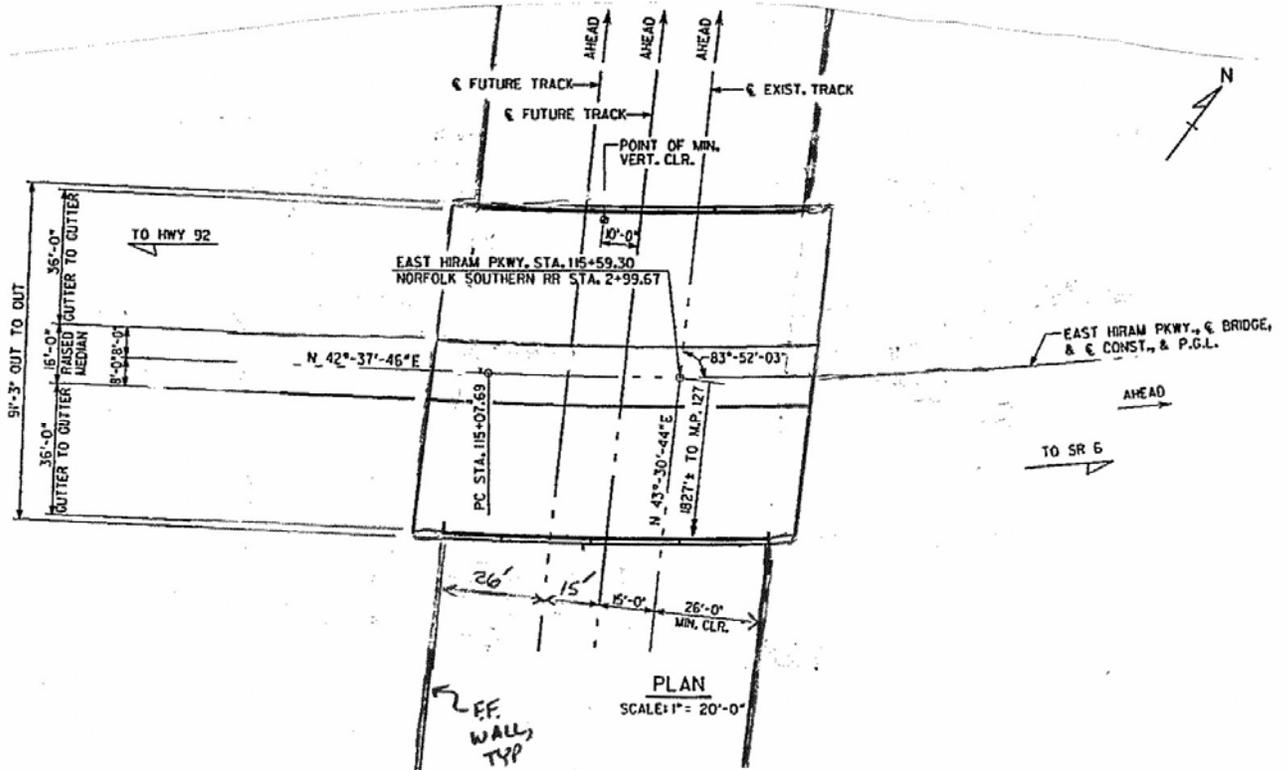
ITEM N^o: E-2
 CLIENT: GDOT
 Sheet 2 of 5



ORIGINAL CONCEPT

East Hiram Parkway

ITEM N^o: E-2
 CLIENT: GDOT
 Sheet 3 of 5



PROPOSED CONCEPT

COST WORKSHEET

PROJECT: East Hiram Parkway	ITEM No: E-2
	CLIENT: GDOT
	Sheet 4 of 5

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
ITEM	UNITS	No. UNITS	COST/ UNIT	TOTAL COST	No. UNITS	COST/ UNIT	TOTAL COST
Bridge Construction Cost							
Original	SFT	17702.5	100	1,770,000			
Proposed	SFT				8668.75	95	823,415
Reinforced Earth Wall at Bent 1	FT2				5702	45.00	256,590
Reinforced Earth Wall at Bent 1	FT2				5702	45.00	256,590
Pavement section - see A-2 for unit costs calcs.	FT2				9034.25	6.01	54,296
SUBTOTAL				1,770,000			1,390,891
Markup @ 10.00%				177,000			139,089
TOTAL				1,947,000			1,529,980
TOTAL ROUNDED				1,947,000			1,530,000

CALCULATIONS

East Hiram Parkway

ITEM N^o: E-2
CLIENT: GDOT
Sheet 5 of 5

Center span required for vertical abutments

$(6 \text{ ft (BFPR to ff wall)} + 26 \text{ ft clear} + 15 \text{ ft track offset} + 15 \text{ ft track offset} + 26 \text{ ft clear} + 6 \text{ ft (BFPR to ff wall)}) / \sin 86.1422 = 94.2135$

Say 95 ft span

54 inch Bulb T still works

Wall Area

slab & coping = 1.0 ft
beam = 4.5 ft
clear = 23 ft
ditch = 4.75 ft
embedment = 2.0 ft

=====
35.25 ft

Area = 91.25 ft of bridge width * 31.25 ft high + 2 * (35.25 ft high * 35.25*2 long) / 2
Area = 5702 ft²

One wall = 5702 * \$45/sq ft (backfill & wall facing) = \$256,590 each wall

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.: E-3	PAGE No.: 1 of 4	CREATIVE IDEA: Use Urban Section on the Bridge
-------------------------	----------------------------	--

Comp By: GG Date: 11/14/07 Checked By: DCW Date: 11/15/07

Original Concept:

Original Concept has rural shoulders on the bridge

Proposed Change:

Use sidewalk on bridge as part of an extension of the urban section through the area

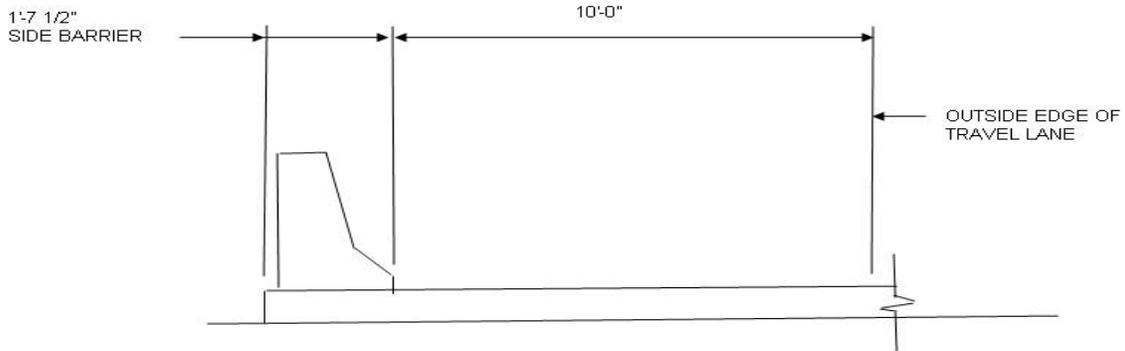
Justification:

Extension of sidewalk and urban section is reasonable to Angham Road. Narrower Bridge will reduce cost.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,947,000		
- Proposed	1,759,000		
- Savings	188,000		188,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			188,000

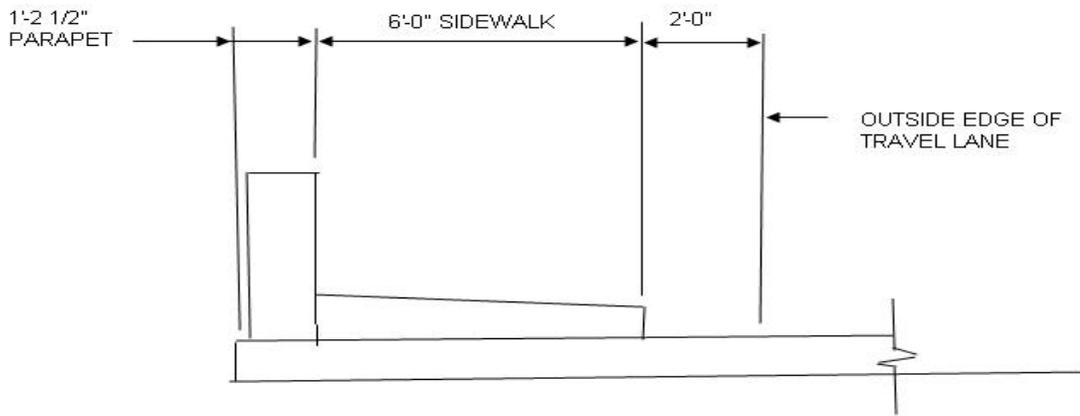
East Hiram Parkway

ITEM N^o: E-3
CLIENT: GDOT
Sheet 2 of 4



RURAL SHOULDER DETAIL

ORIGINAL CONCEPT



URBAN SHOULDER DETAIL

PROPOSED CONCEPT

CALCULATIONS

East Hiram Parkway

ITEM N^o: E-3
CLIENT: GDOT
Sheet 4 of 4

Original Concept Bridge is 91'-3" wide

Consisting of a 16 foot raised median

2 x 2 ft gutters

4 x 12 foot lanes

2 x 10 foot shoulders

2 x 1.625 ft side barriers

=====

91.25 ft

Proposed concept =

Consisting of a 16 foot raised median

2 x 2 ft gutters

4 x 12 foot lanes

2 x 6 foot shoulders

2 x 1.2083 ft side barriers

=====

82.4166

Difference = $91.25 - 82.42 = 8.8333$ ft

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.: E-4 Similar to B-4	PAGE No.: 1 of 4	CREATIVE IDEA: Reduce Lane Width on the Bridge from 12 ft to 11 ft
---	----------------------------	--

Comp By: G Grant Date: 11/14/07 Checked By: DCW Date: 11/15/07

Original Concept:

Original Concept has 4 – 12 ft lanes on the bridge

Proposed Change:

Use 11 foot lanes on bridge

Justification:

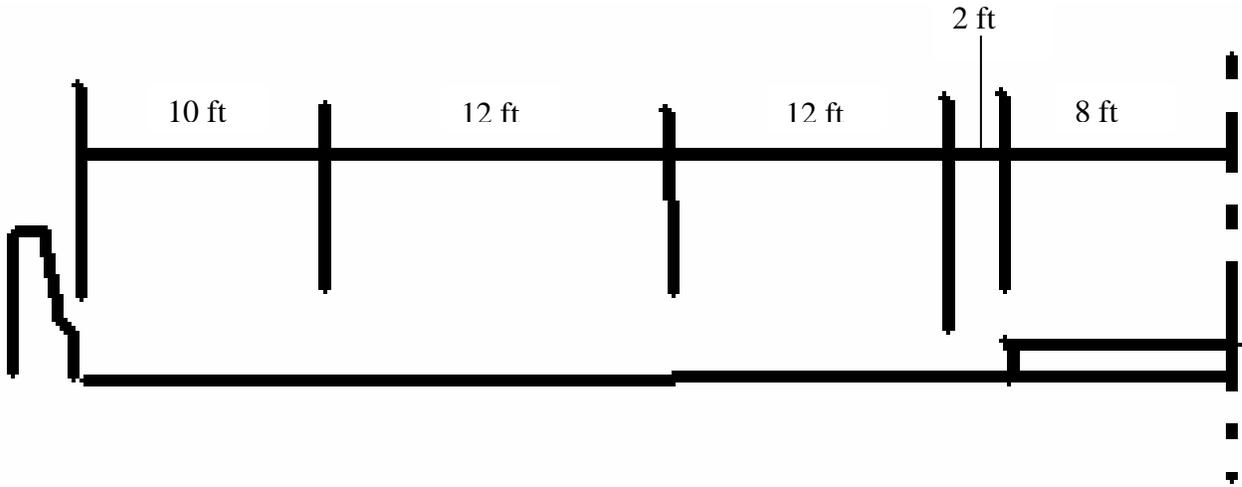
It is reasonable to reduce the width of lanes for this type of facility.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	1,947,000		
- Proposed	1,862,000		
- Savings	85,000		85,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			85,000

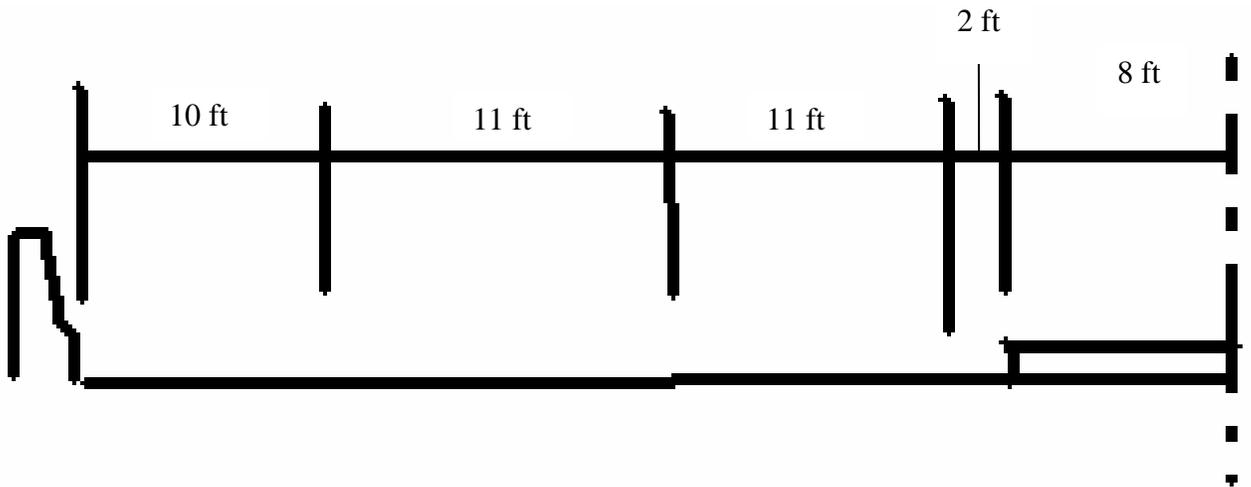
SKETCH

East Hiram Parkway

ITEM N^o: E-4
CLIENT: GDOT
Sheet 2 of 4



ORIGINAL CONCEPT



PROPOSED CONCEPT

CALCULATIONS

East Hiram Parkway

ITEM N^o: E-4
CLIENT: GDOT
Sheet 4 of 4

Original Concept Bridge is 91'-3" wide

4 x 12 foot lanes

Proposed concept =

4 x 11foot lanes

Difference = $91.25 - 4 \text{ feet} = 87.25 \text{ ft}$

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

G-1

PAGE No.:

1 of 4

CREATIVE IDEA:

Use 2 span bridge instead of single span

Comp By: G Grant

Date: 11/14/07

Checked By: DCW

Date: 11/15/07

Original Concept:

Original concept calls for a single span 80 foot long on spill through abutments.

Proposed Change:

Use 2 spans of 40 foot RCDG (T Beams) with a pile intermediate bent

Justification:

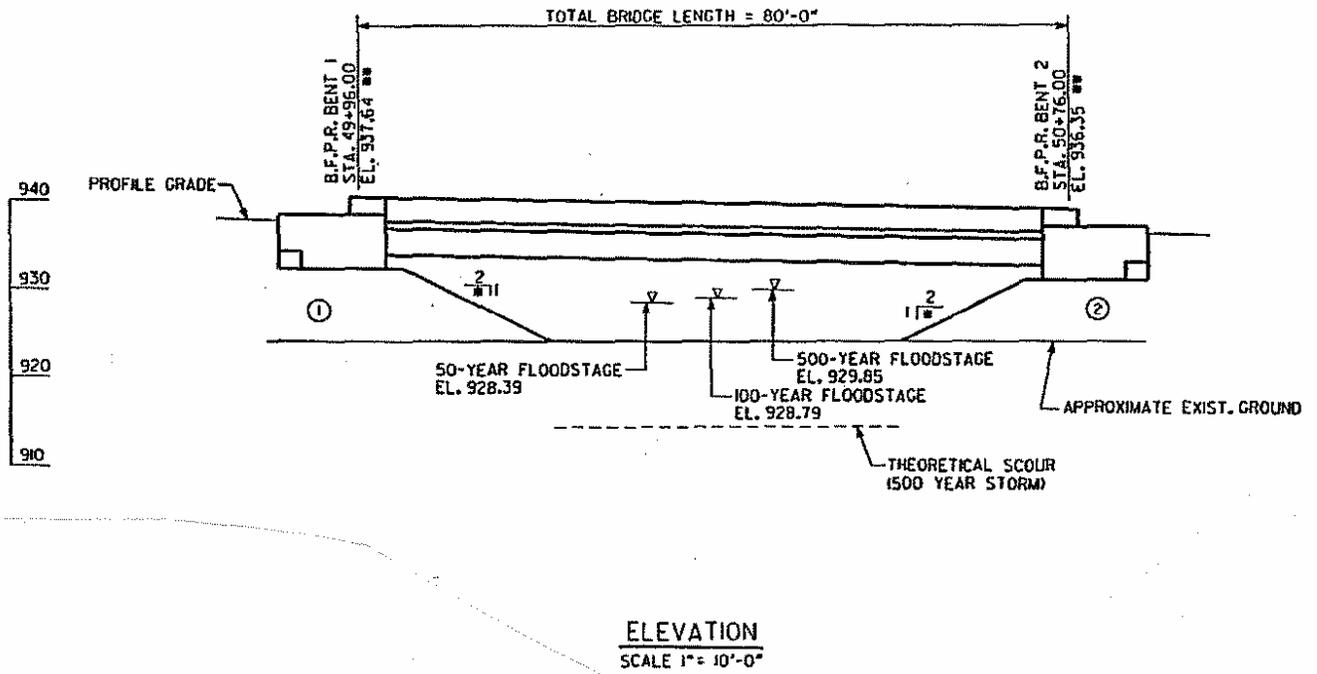
Stream channel is not defined so there is no channel to avoid. Shallower structure depth may allow designer to lower grade.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	803,000		
- Proposed	562,000		
- Savings	241,000		241,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			241,000

SKETCH

East Hiram Parkway

ITEM N^o: G-1
CLIENT: GDOT
Sheet 2 of 4

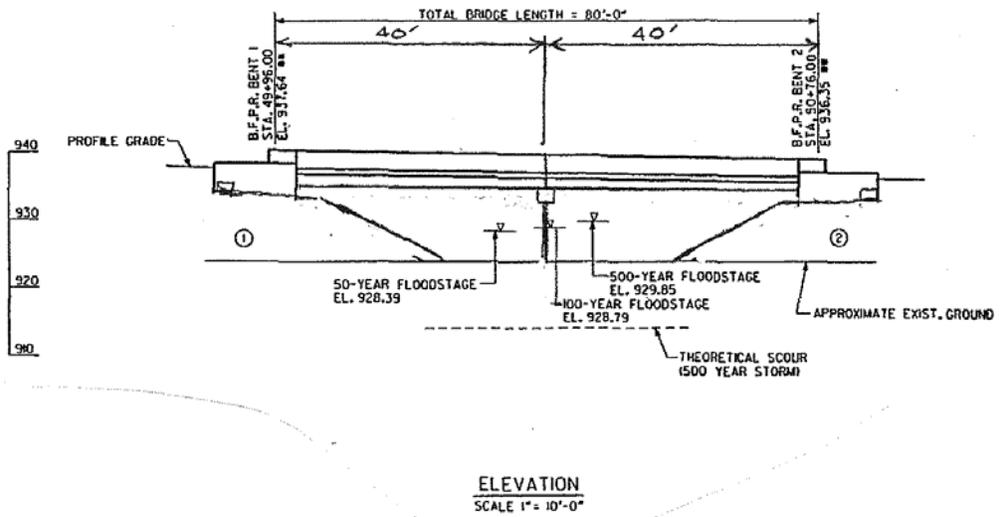
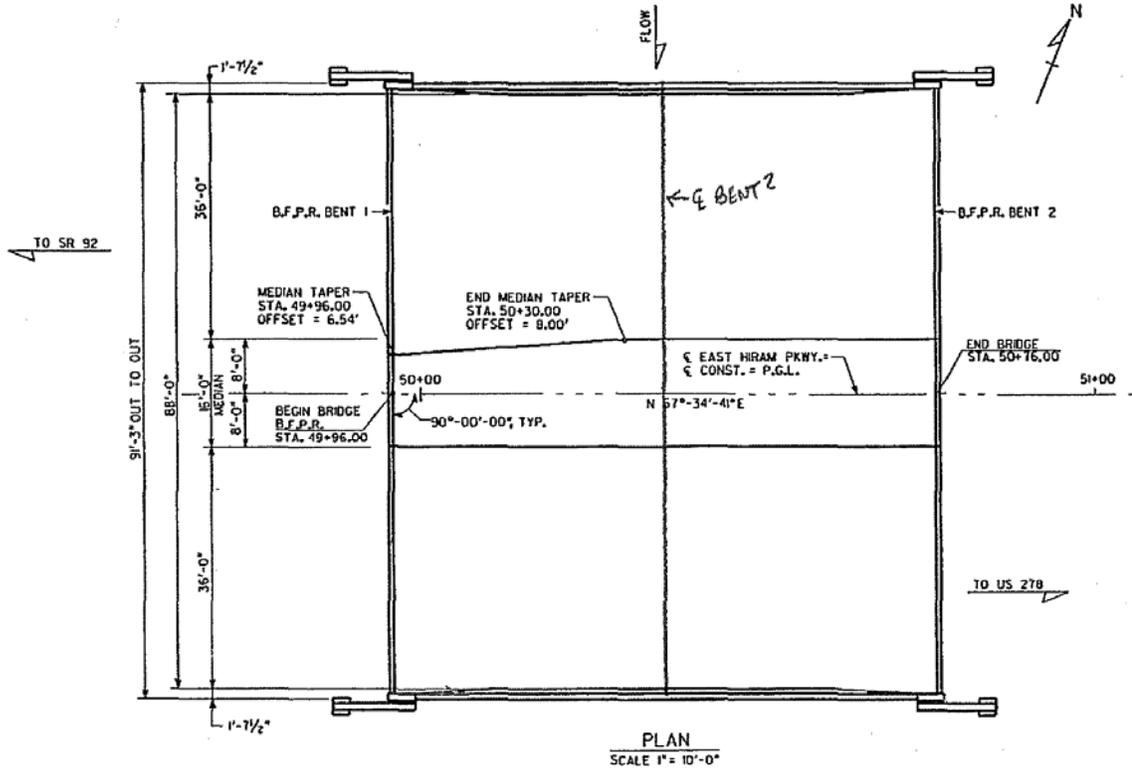


ORIGINAL CONCEPT

SKETCH

East Hiram Parkway

ITEM N^o: G-1
 CLIENT: GDOT
 Sheet 3 of 4



PROPOSED CONCEPT

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

G-2

PAGE No.:

1 of 4

CREATIVE IDEA:

Use 11 foot lanes on the bridge

Comp By: G Grant

Date: 11/14/07

Checked By: DCW

Date: 11/15/07

Original Concept:

Original concept calls for 4 x 12 foot lanes on the bridge.

Proposed Change:

Use 11 foot lanes

Justification:

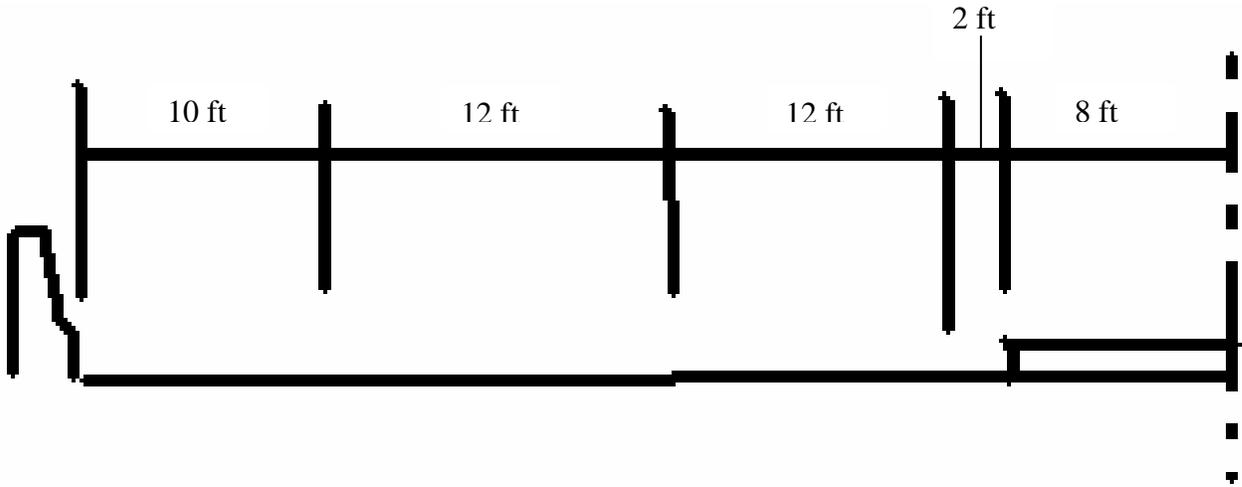
Eleven foot lanes are acceptable for use on this type facility.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	803,000		
- Proposed	768,000		
- Savings	35,000		35,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			35,000

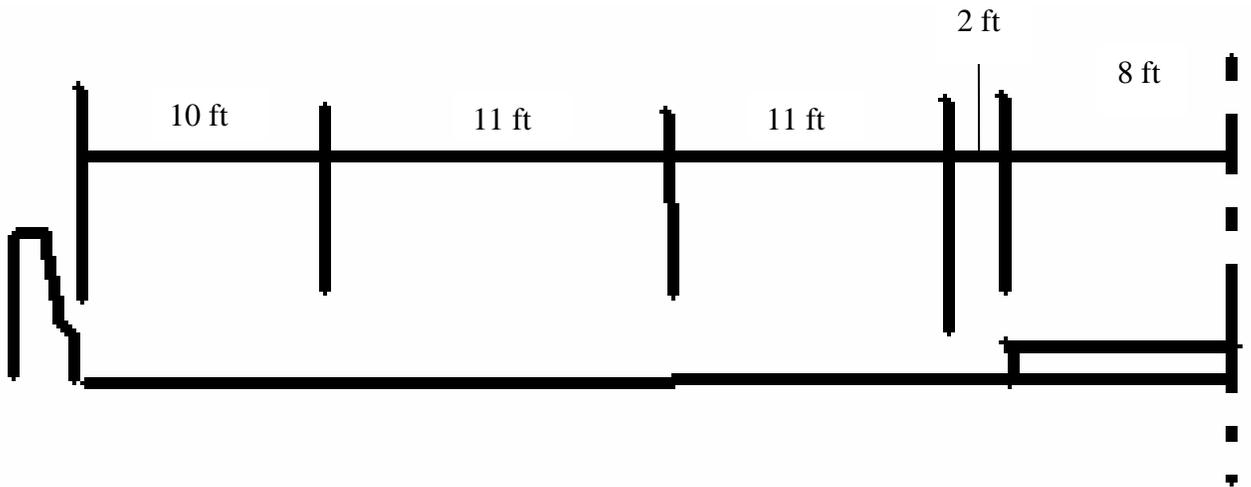
SKETCH

East Hiram Parkway

ITEM N^o: G-2
CLIENT: GDOT
Sheet 2 of 4



ORIGINAL CONCEPT



PROPOSED CONCEPT

CALCULATIONS

East Hiram Parkway

ITEM N^o: G-2
CLIENT: GDOT
Sheet 4 of 4

Original Concept Bridge is 91'-3" wide

4 x 12 foot lanes

Proposed concept =

4 x 11foot lanes

Difference = 91.25 – 4 feet = 87.25 ft

DEVELOPMENT AND RECOMMENDATION PHASE

East Hiram Parkway

IDEA No.:

PAGE No.:

CREATIVE IDEA:

G-2.1

1 of 4

Use 11 foot lanes on the bridge and 2 spans

Comp By: GG

Date: 11/14/07

Checked By: DCW Date: 11/15/07

Original Concept:

Original concept calls for 4 x 12 foot lanes on the bridge and a simple span bridge

Proposed Change:

Use 11 foot lanes and 2 spans of 40 feet

Justification:

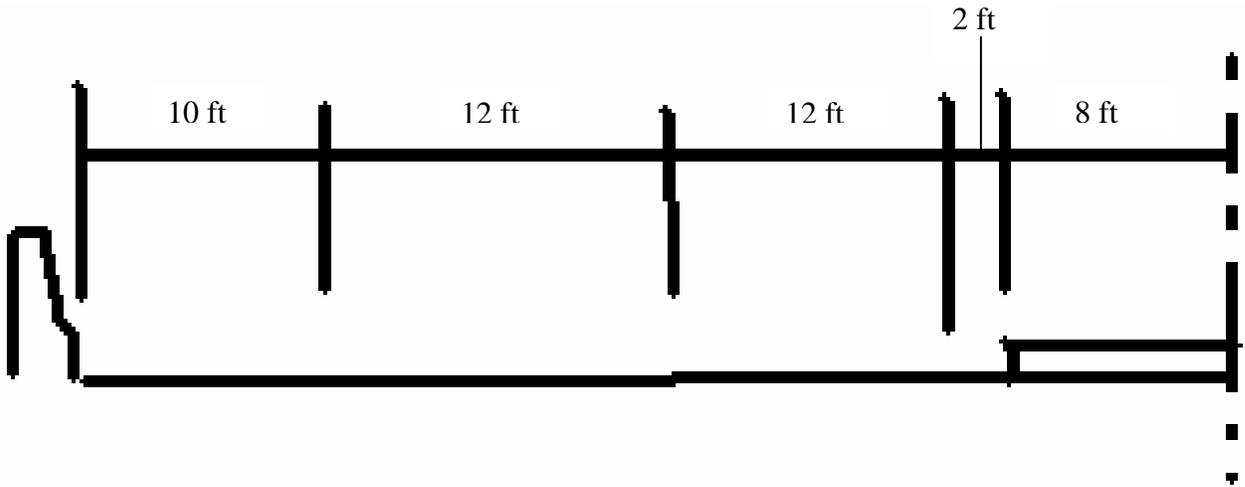
Eleven foot lanes are acceptable for use on this type facility. Stream is not defined and an intermediate bent is acceptable.

LIFE CYCLE COST SUMMARY	CAPITAL COST	FUTURE COST	PRESENT WORTH
INITIAL COST - Original	803,000		
- Proposed	537,000		
- Savings	266,000		266,000
FUTURE COST - Savings		N/A	-0-
TOTAL PRESENT WORTH SAVINGS			266,000

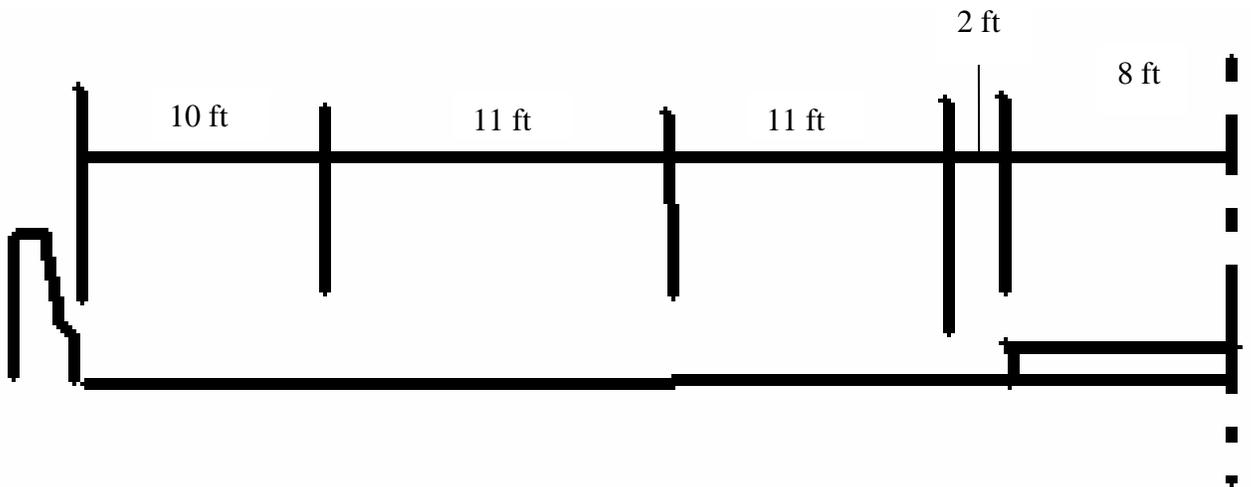
SKETCH

East Hiram Parkway

ITEM N^o: G-2.1
CLIENT: GDOT
Sheet 2 of 4



ORIGINAL CONCEPT



PROPOSED CONCEPT

CALCULATIONS

East Hiram Parkway

ITEM N^o: G-2.1

CLIENT: GDOT

Sheet 4 of 4

Original Concept Bridge is 91'-3" wide

4 x 12 foot lanes

Proposed concept =

4 x 11 foot lanes

Difference = $91.25 - 4 \text{ feet} = 87.25 \text{ ft}$

APPENDIX

INFORMATION PHASE		FUNCTION ANALYSIS					
<i>East Hiram Parkway</i>							
System: New Roadway							
Function: Improve LOS							
ITEM No.	DESCRIPTION	FUNCTION			INITIAL DOLLARS (x 1,000)		
		Verb	Noun	Kind*	Cost	% of Total	Worth
A	Right of way	Store	Project	S	13,813	37	12,800
B	Bridge #1	Span	Flood Plain	B	6,323	17	6,323
C	AC pavement	Support	Traffic	B	5,647	15	2,800
D	Grading	Achieve	Grade	S	3,850	10	3,300
E	Bridge #3	Span	Railroad	B	1,947	5	1,947
F	Storm drainage	Transfer	Objects	S	1,796	5	1,796
G	Bridge #2	Span	Wetlands	B	803	2	600
H	Signalization	Control	Traffic	S	528	1	528
I	Concrete approach slab	Prevents	Settlement	S	435	1	435
J	Erosion control	Contains	Sediment	S	408	1	408
K	Culvert #1	Transfers	Objects	S	385	1	385
	TOTAL				35,935	95	32,322

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
East Hiram Parkway			
NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Right of Way		
A-1	Reduce median width to 8 feet		✓
A-2	Reduce width of travel lanes		✓
A-3	Reduce shoulder width	Space needed to allow vehicle to clear pavement in case of emergency. See C-3	X
A-4	Optimize profile to balance cut and fill		✓
A-5	Revise back slopes to 2:1	Most are already 2:1. Others are not cost effective when guardrail added.	X
A-6	Reduce ditch width from 4 feet to 2 feet	No hydraulic data available	X
A-7	Extend the use of curb and gutter to Angham road	Not cost effective when sidewalk included and ROW added.	X
B	Bridge #1		
B-1	Reconfigure span 1 and span 2 to lower the profile		✓
B-2	Reduce shoulder width	SeeA-3	X
B-3	Use urban section on bridge	Not appropriate for urban section	X
B-4	Narrow lanes on bridge		✓

NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
C	AC Pavement		
C-1	Build on one side only		✓
C-2	Reduce lane widths		See A-2
C-3	Reduced paved shoulder width		✓
C-4	Reduce extent of side road improvement	Appear to be adequate with few changes possible.	X
D	Grading		
D-1	Use more guardrail and increase slopes to 2:1	Not cost effective as most slopes are already 2:1	X
E	Bridge #3		
E-1	Reduce span #2, use a crash wall		✓
E-2	Evaluate 2:1 versus vertical abutments		✓
E-3	Use urban section on bridge		✓
E-4	Narrow lanes on bridge		✓
F	Storm Drainage		
	No ideas generated		

NO.	CREATIVE IDEA	COMMENTS	IDEA RATING
G	Bridge #2		
G-1	Use a 2 span bridge		✓
G-2	Narrow lanes on bridge		✓
G-2.1	Use both G-1 and G-2		✓
H	Other		
H-1	Evaluate urban typical section for improvements and reduction in ROW if possible	12 foot needed for multipurpose use if added in future (10 ft. plus 2 ft. buffer)	X

VE STUDY SIGN-IN SHEET

Project No.: MSL-004-00(688)

County: Paulding

PI No.: 0004688

Date: Nov. 13-16, 2007

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
Lisa L. Myers	00244168	Engineering Services	404-651-7468	lisa.myers@dot.state.ga.us
DAVID WOHLSCHIED		VMAC TEC-TEAM FACILITIES	770-217-0808	PCWOHLSCHIED@VMACTEC.COM
TOM GANDOLFI		PARSONS	678-969-2307	thomas.gandolfi@parsons.com
GREG GRANT		WOLVERTON	770-447-8999	greg.grant@wolverton-assoc.com
GEORGE OBARANER		MACEZ	770-421-3346	GOBARANER@MACEZ.COM
Paul Butler		S.L. King	(404) 832-4866	pbutler@slking.com
KEN WERHO	00258268	GDOT TRSD DESIGN REV.	404-635-8144	KEN.WERHO@DOT.STATE.GA.US
Jeff Vandylte		Carter & Burgess	404-249-7550	jeff.vandylte@c-b.com
EUGENE HOPKINS	00363168	GDOT ROAD DESIGN	404-656-5449	eugene.hopkins@dot.state.ga.us
RON WISHON	00208180	GDOT - ENG. SRVCS	404-651-7470	ron.wishon@dot.state.ga.us
Joe King	00343482	GDOT - Bridge Design	404-656-5195	joe.king@dot.state.ga.us
Kenny Beckwith	00284109	GDOT	770-387-3609	
Brent Stomy	00285686	GDOT - Road Design	404-656-5366	brent.stomy@dot.state.ga.us
Erica Parish		PCDOT	770-445-4759	eparish@paulding.gov
Jacobs Hughes		PCDOT	11	jhughes@paulding.gov
STEVE STIEDEMANN		JB TRIMBLE	678-662-1933	STIEDEMANN@JBTRIMBLE.COM
LARRY BOWMAN	00901426	OEL	404-699-4441	LARRY.BOWMAN@dot.state.ga.us

