APPENDIX P
COST ESTIMATES AND PRELIMINARY IMPACTS MATRIX

COST ESTIMATES

COST ESTIMATE - ALTERNATE 1A

KY 377 tie south of ky 799 (Big Perry Rd.) to Plank Lane - 12' offset CL to CL

			1A			
			KY 377 Tie (Sta 424+99) to KY 377 Tie (Sta 660+00)		ALTERNATE 1A TOTALS	
Mainline Length (miles)			4.45		4.45	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$4,400,000**		**$4,400,000**
Highway:	Mile	$650,000		$2,900,000		
Geotech:	%	50%		$1,500,000		
Right of Way				**$3,800,000**		**$3,800,000**
Utilities		2%	1	**$300,000**		**$300,000**
Construction				**$13,900,000**		**$13,900,000**
MOT		1.5%		$153,000		
Drainage		3.0%		$306,000		
Earthwork						
Cut (CY)	CY	$3.50		$0		
	CY	$5.00	321,641	$1,608,000		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0		
Roadway	SY	$60	109,671	$6,580,000		
Structures						
Bridges	SF	$120	4,700	$564,000		
Culvert	CF	$15	96,000	$1,440,000		
Mobilization	%	3%		$319,530		
Demobilization	%	1.5%		$159,765		
Contingency	%	25%		$2,782,574		
Environmental In-Lieu Fees				**$2,100,000**		**$2,100,000**
Wetlands	Acre	$15,000	1	$14,250		
Wooded	Acre	$3,150	14	$42,525		
Waste Area ROW	Acre	$3,000	1	$3,000		
Waste Area Stream In Lieu	LF	**	147	$74,179		
Stream In Lieu	LF	**	3,478	$1,970,294		
***Maintenance Costs	MI	$2,000,000	0.00	**$0**		**$0**
TOTAL:				**$24,500,000**		**$24,500,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 1A – 4.45 miles - From KY 377 tie south of KY 799 (Big Perry Rd.) to Plank Lane at Station 660+00

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 1B

KY 377 tie south of ky 799 (Big Perry Rd.) to Plank Lane

			1B			
			KY 377 Tie (Sta 424+99) to KY 377 Tie (Sta 660+00)		ALTERNATE 1B TOTALS	
Mainline Length (miles)			4.45		4.45	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$4,400,000**		**$4,400,000**
Highway:	Mile	$650,000		$2,900,000		
Geotech:	%	50%		$1,500,000		
Right of Way				**$4,300,000**		**$4,300,000**
Utilities		2%	1	**$300,000**		**$300,000**
Construction				**$13,700,000**		**$13,700,000**
MOT		1.5%		$151,000		
Drainage		3.0%		$302,000		
Earthwork						
Cut (CY)	CY	$3.50		$0		
	CY	$5.00	236,899	$1,184,000		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0		
Roadway	SY	$60	109,671	$6,580,000		
Structures						
Bridges	SF	$120	4,700	$564,000		
Culvert	CF	$15	115,200	$1,728,000		
Mobilization	%	3%		$315,270		
Demobilization	%	1.5%		$157,635		
Contingency	%	25%		$2,745,476		
Environmental In-Lieu Fees				**$2,100,000**		**$2,100,000**
Wetlands	Acre	$15,000	1	$14,250		
Wooded	Acre	$3,150	14	$42,525		
Waste Area ROW	Acre	$3,000	0.44	$1,320		
Waste Area Stream In Lieu	LF	**	65	$33,024		
Stream In Lieu	LF	**	3,478	$1,970,294		
***Maintenance Costs	MI	$2,000,000	0.00	**$0**		**$0**
TOTAL:				**$24,800,000**		**$24,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 1B – 4.45 miles - From KY 377 tie south of KY 799 (Big Perry Rd.) to Plank Lane at Station 660+00

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 2A

KY 377 tie at Plank Lane to 0.4 miles south of Kinder Branch Road - 12' offset CL to CL

			2A			
			KY 377 Tie (Sta 660+00) to KY 377 Tie (Sta 722+00)		**ALTERNATE 2A TOTALS**	
Mainline Length (miles)			1.17		1.17	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,200,000**		**$1,200,000**
Highway:	Mile	$650,000		$800,000		
Geotech:	%	50%		$400,000		
Right of Way				**$1,100,000**		**$1,100,000**
Utilities		2%	1	**$100,000**		**$100,000**
Construction				**$3,400,000**		**$3,400,000**
MOT		1.5%		$37,000		
Drainage		3.0%		$75,000		
Earthwork						
Cut (CY)	CY	$3.50		$0		
	CY	$5.00	53,557	$268,000		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0		
Roadway	SY	$60	28,933	$1,736,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	32,000	$480,000		
Mobilization	%	3%		$77,880		
Demobilization	%	1.5%		$38,940		
Contingency	%	25%		$678,205		
Environmental In-Lieu Fees				**$400,000**		**$400,000**
Wetlands	Acre	$15,000	0.2	$3,000		
Wooded	Acre	$3,150	5.0	$15,750		
Waste Area ROW	Acre	$3,000	0.15	$450		
Waste Area Stream In Lieu	LF	**	22	$11,183		
Stream In Lieu	LF	**	250	$398,335		
***Maintenance Costs	MI	$2,000,000	0.00	**$0**		**$0**
TOTAL:				**$6,200,000**		**$6,200,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 2A – 1.17 miles - From KY 377 tie at Plank Lane to 0.4 miles south of Kinder Brtanch Road at Station 722+00

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 2B

KY 377 tie at Plank Lane to 0.4 miles south of Kinder Branch Road

			2B		
			KY 377 Tie (Sta 660+00) to KY 377 Tie (Sta 722+00)		ALTERNATE 2B TOTALS
Mainline Length (miles)			1.17		1.17
	Unit	Unit Cost	Quantity	Cost	Quantity / Cost
Design				**$1,200,000**	**$1,200,000**
Highway:	Mile	$650,000		$800,000	
Geotech:	%	50%		$400,000	
Right of Way				**$1,100,000**	**$1,100,000**
Utilities		2%	1	**$100,000**	**$100,000**
Construction				**$3,500,000**	**$3,500,000**
MOT		1.5%		$38,000	
Drainage		3.0%		$76,000	
Earthwork					
Embankment (CY)	CY	$3.50		$0	
	CY	$5.00	43,698	$218,000	
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0	
Roadway	SY	$60	28,933	$1,736,000	
Structures					
Bridges	SF	$120	0	$0	
Culvert	CF	$15	38,400	$576,000	
Mobilization	%	3%		$79,320	
Demobilization	%	1.5%		$39,660	
Contingency	%	25%		$690,745	
Environmental In-Lieu Fees				**$400,000**	**$400,000**
Wetlands	Acre	$15,000	0.20	$3,000	
Wooded	Acre	$3,150	5.00	$15,750	
Waste Area ROW	Acre	$3,000	0.15	$0	
Waste Area Stream In Lieu	LF	**	22	$11,183	
Stream In Lieu	LF	**	250	$398,335	
***Maintenance Costs	MI	$2,000,000	0.00	**$0**	**$0**
TOTAL:				**$6,300,000**	**$6,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 2B – 1.17 miles - From KY 377 tie at Plank Lane to 0.4 miles south of Kinder Brtanch Road at Station 722+00

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3A

From KY 377 tie-in in Rowan County along existing KY 377 to ALT. 3D-1 split

			3A-1a		3A-1b		3A-2			
			KY 377 Tie (Sta 100+00) to ALT 3D-1 split (Sta 145+11)		**ALT 3D-1 split (Sta 145+11) to ALT 3A-2 (Sta 223+68)**		**KY 377 Tie (Sta 300+00) to KY 344 Tie (Sta 637+12)**		**ALTERNATE 3A TOTALS**	
Mainline Length (miles)			0.85		1.49		6.38		8.72	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$900,000**		**$1,500,000**		**$6,300,000**		**$8,700,000**
Highway:	Mile	$650,000		$600,000		$1,000,000		$4,200,000		
Geotech:	%	50%		$300,000		$500,000		$2,100,000		
Right of Way				**$109,000**		**$191,000**		**$2,700,000**		**$3,000,000**
Utilities		2%	1	**$100,000**	1	**$400,000**	1	**$700,000**		**$4,200,000**
Texas Gas Crossing	EA	$1,000,000					3	**$3,000,000**		
Construction				**$3,100,000**		**$20,200,000**		**$33,000,000**		**$56,300,000**
MOT		1.5%		$34,000		$222,000		$363,000		
Drainage		3.0%		$68,000		$444,000		$725,000		
Earthwork										
Cut (CY)	CY	$3.50		$0		$0		$0		
	CY	$5.00	45,911	$230,000	1,686,037	$8,430,000	1,591,760	$7,959,000		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0	0.0	$0	0.0	$0		
Roadway	SY	$60	23,158	$1,389,000	40,331	$2,420,000	173,055	$10,383,000		
Structures										
Bridges	SF	$120		$0	32,900	$3,948,000	0	$0		
Culvert	CF	$15	43,200	$648,000		$0	388,800	$5,832,000		
Mobilization	%	3%		$71,070		$463,920		$757,860		
Demobilization	%	1.5%		$35,535		$231,960		$378,930		
Contingency	%	25%		$618,901		$4,039,970		$6,599,698		
Environmental In-Lieu Fees				**$500,000**		**$3,200,000**		**$6,100,000**		**$9,800,000**
Wetlands	Acre	$15,000	0.5	$7,500	0.0	$0	0.4	$6,000		
Wooded	Acre	$3,150	1.05	$3,308	68.00	$214,200	73.00	230,000		
Waste Area ROW	Acre	$3,000	0.87	$3,000	0.12	$400	6.58	$20,000		
Waste Area Stream In Lieu	LF	**	127	65,002	18	9,136	961	$489,939		
Stream In Lieu	LF	**	460	393,388	5,918	2,959,498	8,177	$5,399,631		
***Maintenance Costs	MI	$2,000,000	0.0	**$0**	1.4	**$2,800,000**	0.0	**$0**		**$2,800,000**
TOTAL:				**$4,709,000**		**$28,291,000**		**$51,800,000**		**$84,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 3A – 8.72 miles - From KY 377 tie-in in Rowan County along exist. KY 377 to KY 377 tie-in at Briary Creek Road (MP 7.2).

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3B

From KY 377 tie-in in Rowan Co. along exist. KY 377 to ALT. 3D-1 split

			3B-1a		3B-1b		3B-2			
			KY 377 Tie (Sta 100+00) to ALT 3D-1 split (Sta 145+00)		**ALT 3D-1 split (Sta 145+00) to ALT 3B-2 (Sta 184+59)**		**KY 377 Tie (Sta 300+00) to KY 344 Tie (Sta 681+18)**		**ALTERNATE 3B TOTALS**	
Mainline Length (miles)			0.85		0.75		7.22		8.82	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$900,000**		**$800,000**		**$7,100,000**		**$8,800,000**
Highway:	Mile	$650,000		$600,000		$500,000		$4,700,000		
Geotech:	%	50%		$300,000		$300,000		$2,400,000		
Right of Way				**$700,000**		**$500,000**		**$1,000,000**		**$2,200,000**
Utilities		2%	1	**$100,000**	1	**$200,000**	1	**$1,000,000**		**$10,300,000**
Texas Gas Crossing	EA	$3,000,000					3	**$9,000,000**		
Construction				**$3,200,000**		**$9,600,000**		**$49,200,000**		**$62,000,000**
MOT		1.5%		$36,000		$105,000		$540,000		
Drainage		3.0%		$72,000		$210,000		$1,081,000		
Earthwork										
Cut (CY)	CY	$3.50		$0		$0	3,892,488	$13,624,000		
	CY	$5.00	44,570	$223,000	911,165	$4,556,000		$0		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0	0.0	$0	0.0	$0		
Roadway	SY	$60	23,100	$1,386,000	20,322	$1,219,000	195,667	$11,740,000		
Structures										
Bridges	SF	$120	3,760	$451,200	10,340	$1,240,800	56,400	$6,768,000		
Culvert	CF	$15	21,600	$324,000		$0	259,200	$3,888,000		
Mobilization	%	3%		$74,766		$219,924		$1,129,230		
Demobilization	%	1.5%		$37,383		$109,962		$564,615		
Contingency	%	25%		$651,087		$1,915,172		$9,833,711		
Environmental In-Lieu Fees				**$900,000**		**$1,200,000**		**$11,500,000**		**$13,600,000**
Wetlands	Acre	$15,000	0.50	$7,500	0	$0	3	$45,000		
Wooded	Acre	$3,150	3	$10,080	8	$25,200	77	$241,000		
Waste Area ROW	Acre	$3,000	0.12	$358	3.87	$11,614	5.46	$16,394		
Waste Area Stream In Lieu	LF	**	17	8,895	565	288,261	798	$406,892		
Stream In Lieu	LF	**	1,260	876,900	1,709	831,359	15,155	$10,834,985		
***Maintenance Costs	MI	$2,000,000	0.00	**$0**	0.20	**$400,000**	7.21	**$14,420,000**		**$14,820,000**
TOTAL:				**$5,800,000**		**$12,700,000**		**$93,220,000**		**$111,720,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 3B – 8.82 miles - From KY 377 tie-in in Rowan County along exist. KY 377 to the Rowan/Lewis County line then up Thurman Branch back to KY 377 then to KY 377 tie-in north of Briary Creek Road (MP 7.5).

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
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COST ESTIMATE - ALTERNATE 3D-1

Green 1 Alternative

			3D-1		
			From Ex. KY 377 (Sta 100+00) to 3D-2 (Sta 234+40)		**ALTERNATE 3D-1 TOTALS**
Mainline Length (miles)			2.55		2.55
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$2,600,000**		**$2,600,000**
Highway:	Mile	$650,000		$1,654,545		
Geotech:	%	50%		$900,000		
Right of Way				**$400,000**		**$400,000**
Utilities		2%	1	**$800,000**		**$800,000**
		8%		$0		$0
Construction				**$37,600,000**		**$37,600,000**
MOT		5.0%		$1,331,000		
Drainage		3%		$799,000		
Earthwork						
Cut (CY)	CY	$3.50	6,300,000	$22,050,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	62,720	$3,763,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	54,000	$810,000		
Mobilization	%	3%		$862,590		
Demobilization	%	1.5%		$431,295		
Contingency	%	25%		$7,511,721		
Environmental In-Lieu Fees				**$4,900,000**		**$4,900,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	28	$90,000		
Waste Area ROW	Acre	$3,000	34.0	$100,000		
Waste Area Stream In Lieu	LF	**	4,962	$2,530,634		
Stream In Lieu	LF	**	3,432	$2,135,124		
***Maintenance Costs	MI	$2,000,000	2.6	**$5,260,000**		**$5,260,000**
TOTAL:				**$51,560,000**		**$51,560,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
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COST ESTIMATE - ALTERNATE 3D-2

Green 2 Alternative

			3D-2			
			From 3D-1 (Sta 234+40) to 3d-3 (Sta 314+98)		ALTERNATE 3D-2 TOTALS	
Mainline Length (miles)			1.53		1.53	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,500,000**		**$1,500,000**
Highway:	Mile	$650,000		$991,989		
Geotech	%	50%		$500,000		
Right of Way				$200,000		**$200,000**
Utilities		5%	1	**$300,000**		**$300,000**
		10%		$0		$0
Construction				**$6,000,000**		**$6,000,000**
MOT		1.5%		$66,000		
Drainage		3.0%		$133,000		
Earthwork						
Cut (CY)	CY	$5.00	400,000	$2,000,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	37,604	$2,256,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$138,510		
Demobilization	%	1.5%		$69,255		
Contingency	%	25%		$1,154,250		
Environmental In-Lieu Fees				**$1,400,000**		**$1,400,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	1.8	$5,500		
Waste Area Stream In Lieu	LF	**	266	$135,540		
Stream In Lieu	LF	**	1,416	$1,255,992		
***Maintenance Costs	MI	$2,000,000	2.9	**$5,780,000**		**$5,780,000**
Total:				**$15,180,000**		**$15,180,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%	No Data
Ephemeral	$347.00	
Perennial	$887.00	
Intermittent	$651.00	

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3D-3

Green 3 Alternative

			3D-3		
			From 3D-2 (Sta 314+98) to 3d-4 (Sta 498+54)		ALTERNATE 3D-3 TOTALS
Mainline Length (miles)			3.48		3.48
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$3,500,000**		**$3,500,000**
Highway:	Mile	$650,000		$2,259,735		
Geotech	%	50%		$1,200,000		
Right of Way				$500,000		**$500,000**
Utilities		5%	1	**$700,000**		**$9,700,000**
Texas Gas Crossing	EA	$3,000,000	3	**$9,000,000**		
Construction				**$12,700,000**		**$12,700,000**
MOT		1.5%		$140,000		
Drainage		3.0%		$281,000		
Earthwork						
Cut (CY)	CY	$5.00	650,000	$3,250,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	85,661	$5,140,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	64,800	$972,000		
Mobilization	%	3%		$293,490		
Demobilization	%	1.5%		$146,745		
Contingency	%	25%		$2,445,750		
Environmental In-Lieu Fees				**$3,100,000**		**$3,100,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	2.7	$8,000		
Waste Area Stream In Lieu	LF	**	392	$199,722		
Stream In Lieu	LF	**	3,230	$2,865,010		
***Maintenance Costs	MI	$2,000,000	4.0	**$8,020,000**		**$8,020,000**
Total:				**$37,520,000**		**$37,520,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

** Avg. Cost/Foot with 20%

Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3D-4

Green 4 Alternative

3D-4

			From ALT 3D-3 (Sta 498+54) to ALT 4A (Sta 532+65)		ALTERNATE 3D-3 TOTALS	
Mainline Length (miles)			0.65		0.65	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$800,000**		**$800,000**
Highway:	Mile	$650,000		$419,915		
Geotech	%	50%		$300,000		
Right of Way				$100,000		**$100,000**
Utilities		5%	1	**$600,000**		**$600,000**
		10%		$0		
Construction				**$10,100,000**		**$10,100,000**
MOT		1.5%		$112,000		
Drainage		3.0%		$224,000		
Earthwork						
Cut (CY)	CY	$5.00	925,000	$4,625,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	15,918	$955,000		
Structures						
Bridges	SF	$120	12,900	$1,548,000		
Culvert	CF	$15	21,600	$324,000		
Mobilization	%	3%		$233,640		
Demobilization	%	1.5%		$116,820		
Contingency	%	25%		$1,947,000		
Environmental In-Lieu Fees				**$1,400,000**		**$1,400,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	6	$20,000		
Waste Area ROW	Acre	$3,000	4.9	$14,828		
Waste Area Stream In Lieu	LF	**	722	$368,020		
Stream In Lieu	LF	**	1,357	$954,179		
***Maintenance Costs	MI	$2,000,000	1.2	**$2,420,000**		**$2,420,000**
Total:				**$15,420,000**		**$15,420,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

** Avg. Cost/Foot with 20%

Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4A

KY 377 tie south of Briery Creek Rd. to KY 344 tie south of Kinniconick

			4A			
			KY 377 Tie (Sta 100+00) to KY 344 Tie (Sta 287+18)		ALTERNATE 4A TOTALS	
Mainline Length (miles)			3.55		3.55	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$3,600,000**		**$3,600,000**
Highway:	Mile	$650,000		$2,400,000		
Geotech:	%	50%		$1,200,000		
Right of Way				**$700,000**		**$700,000**
Utilities		2%	1	**$600,000**		**$600,000**
Construction				**$25,600,000**		**$25,600,000**
MOT		1.5%		$282,000		
Drainage		3.0%		$563,000		
Earthwork						
Cut (CY)	CY	$3.50	2,611,344	$9,140,000		
	CY	$5.00		$0		
*Ohio/Sunbury Shale	LS	$500,000	0.5	$250,000		
Roadway	SY	$60	96,086	$5,765,000		
Structures						
Bridges	SF	$120	11,280	$1,353,600		
Culvert	CF	$15	151,200	$2,268,000		
Mobilization	%	3%		$588,648		
Demobilization	%	1.5%		$294,324		
Contingency	%	25%		$5,126,143		
Environmental In-Lieu Fees				**$3,700,000**		**$3,700,000**
Wetlands	Acre	$15,000	3	$45,000		
Wooded	Acre	$3,150	32	$100,000		
Waste Area ROW	Acre	$3,000	10	$30,085		
Waste Area Stream In Lieu	LF	**	1,464	$746,713		
Stream In Lieu	LF	**	4,150	$2,797,406		
***Maintenance Costs	MI	$2,000,000	1.15	**$2,300,000**		**$2,300,000**
TOTAL:				**$36,500,000**		**$36,500,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 4A – 3.55 miles - From KY 377 tie-in south of Briery Creek Rd. along existing KY 377 to KY 344 tie south of Kinniconick

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4B

KY 377 tie south of Briery Creek Rd. to KY 344 tie south of Kinniconick

			4B		
			KY 377 Tie (Sta 100+00) to KY 344 Tie (Sta 285+80)		**ALTERNATE 4B TOTALS**
Mainline Length (miles)			3.52		3.52
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$3,500,000**		**$3,500,000**
Highway:	Mile	$650,000		$2,300,000		
Geotech:	%	50%		$1,200,000		
Right of Way				**$600,000**		**$600,000**
Utilities		2%	1	**$600,000**		**$600,000**
Construction				**$27,200,000**		**$27,200,000**
MOT		1.5%		$299,000		
Drainage		3.0%		$598,000		
Earthwork						
Cut (CY)	CY	$3.50	2,439,765	$8,539,000		
	CY	$5.00		$0		
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0		
Roadway	SY	$60	95,377	$5,723,000		
Structures						
Bridges	SF	$120	31,020	$3,722,400		
Culvert	CF	$15	129,600	$1,944,000		
Mobilization	%	3%		$624,762		
Demobilization	%	1.5%		$312,381		
Contingency	%	25%		$5,440,636		
Environmental In-Lieu Fees				**$3,600,000**		**$3,600,000**
Wetlands	Acre	$15,000		$0		
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	9	$30,000		
Waste Area Stream In Lieu	LF	**	1,354	$690,287		
Stream In Lieu	LF	**	4,046	$2,903,690		
***Maintenance Costs	MI	$2,000,000	2.90	**$5,800,000**		**$5,800,000**
TOTAL:				**$41,300,000**		**$41,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 4B – 3.52 miles - From KY 377 tie-in south of Briery Creek Rd. along existing KY 377 then off existing KY 344 to KY 344 tie south of Kinniconick

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5A>5A-2>5C-1>5B1-1>5B2

KY 344 in Kinniconick to existing KY 59 at Fuller Branch along KY 59 to 0.7 miles south of Rock Run Rd west to and along Dry Run Creek to KY 9 in Vanceburg

			5A		5A-2		5C-1		5B1-1		5B2		
			KY 344 Tie (Sta 96+16) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to S. Connector (Sta 297+95)**		**S. Connector (Sta 297+95) to ALT 5B2 (Sta 340+52)**		**ALT 5B2 at Dry Run (Sta 333+47) to KY 9 (Sta 407+46)**		**ALTERNATE 5A>5A-2>5C-1>5B1-1>5B2 TOTALS**	
Mainline Length (miles)			2.18		0.50		1.15		0.81		1.40		6.04	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$2,300,000**		**$600,000**		**$1,200,000**		**$900,000**		**$1,500,000**		**$6,500,000**
Highway:	Mile	$650,000		$1,500,000		$400,000		$800,000		$600,000		$1,000,000		
Geotech:	%	50%		$800,000		$200,000		$400,000		$300,000		$500,000		
Right of Way				**$300,000**		**$300,000**		**$1,000,000**		**$100,000**		**$600,000**		**$2,300,000**
Utilities		2%	1	**$500,000**	1	**$100,000**	1	**$200,000**	1	**$200,000**	1	**$200,000**		**$1,200,000**
Construction				**$21,000,000**		**$2,600,000**		**$9,300,000**		**$12,300,000**		**$9,600,000**		**$54,800,000**
MOT		1.5%		$231,000		$29,000		$101,000		$134,000		$105,000		
Drainage		3.0%		$461,000		$57,000		$203,000		$268,000		$209,000		
Earthwork														
Cut (CY)	CY	$3.50	2,203,000	$7,711,000		$0	0	$0	0	$0	0	$0		
5B2 estimated fill also	CY	$5.00		$0	207,700	$1,039,000	746,865	$3,734,000	1,386,572	$6,933,000	580,000	$2,900,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	1	$500,000	0.1	$50,000	1	$500,000		
Roadway	SY	$60	55,153	$3,309,000	14,476	$869,000	31,139	$1,868,000	21,853	$1,311,000	37,982	$2,279,000		
Structures														
Bridges	SF	$120	33,840	$4,060,800	0	$0	0	$0	0	$0	0	$0		
Culvert	CF	$15	20,000	$300,000	0	$0	43,200	$648,000	43,200	$648,000	86,400	$1,296,000		
Mobilization	%	3%		$482,184		$59,820		$211,620		$280,320		$218,670		
Demobilization	%	1.5%		$241,092		$29,910		$105,810		$140,160		$109,335		
Contingency	%	25%		$4,199,019		$520,933		$1,842,858		$2,441,120		$1,904,251		
Environmental In-Lieu Fees				**$2,000,000**		**$1,500,000**		**$2,300,000**		**$1,000,000**		**$3,500,000**		**$10,300,000**
Wetlands	Acre	$15,000	2	$30,000	0	$0	0	$0	0	$0	0	$0		
Wooded	Acre	$3,150	20	$63,000	11	$34,650	35	110,250	24	$75,600	35	110,250		
Waste Area ROW	Acre	$3,000	6.0	$18,000	1.0	$3,000	4	$11,826	2.0	$6,000	0.00	$0		
Waste Area Stream In Lieu	LF	**	1,000	$360,000	350	$252,000	576	293,533	950	$342,000	0	0		
Stream In Lieu	LF	**	1,866	$1,498,586	1,304	$1,121,956	2,338	1,857,806	1,354	$568,638	3,889	3,368,123		
***Maintenance Costs	MI	$0	2.1	$4,200,000	0.0	$0	0.0	$0	0.9	$1,800,000	1.1	$2,140,000		**$8,140,000**
TOTAL:				**$30,300,000**		**$5,100,000**		**$14,000,000**		**$16,300,000**		**$17,540,000**		**$83,240,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5A>5A-2>5C-1>5B1-1>5B2 – 6.07 miles - From KY 344 south of Kinniconick crossing Kinniconick Creek twice to existing KY 59 at Fuller Branch to along KY 59 to 0.7 miles south of Rock Run Road west to and along Dry Run Creek to existing KY 59 at MP 23.0 south if intersection with KY 9.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5B

KY 344 tie south of Kinniconick crossing Kinniconick Creek twice to Axehandle Branch over the ridge to Dry Run Creek to existing KY 59 at MP 23 south of intersection with KY 9

			5A		5A-2		5B1		5B2			
			KY 344 Tie (Sta 96+16) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to KY 9 (Sta 333+47)**		**ALT 5B2 at Dry Run (Sta 333+47) to KY 9 (Sta 407+46)**		**ALTERNATE 5B TOTALS**	
Mainline Length (miles)			2.18		0.50		1.82		1.40		5.90	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$2,300,000**		**$600,000**		**$1,800,000**		**$1,500,000**		**$6,200,000**
Highway:	Mile	$650,000		$1,500,000		$400,000		$1,200,000		$1,000,000		
Geotech:	%	50%		$800,000		$200,000		$600,000		$500,000		
Right of Way				**$300,000**		**$300,000**		**$800,000**		**$600,000**		**$2,000,000**
Utilities		2%	1	**$500,000**	1	**$100,000**	1	**$400,000**	1	**$200,000**		**$1,200,000**
Construction				**$21,000,000**		**$2,700,000**		**$15,500,000**		**$9,600,000**		**$48,800,000**
MOT		1.5%		$231,000		$29,000		$170,000		$105,000		
Drainage		3.0%		$461,000		$57,000		$340,000		$209,000		
Earthwork												
Cut (CY)	CY	$3.50	2,203,000	$7,711,000		$0	2,222,962	$7,780,000	0	$0		
5B-2 estimated fill	CY	$5.00		$0	207,700	$1,039,000		$0	580,000	$2,900,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	0	$0	1	$500,000		
Roadway	SY	$60	55,153	$3,309,000	14,476	$869,000	48,346	$2,901,000	37,982	$2,279,000		
Structures												
Bridges	SF	$120	33,840	$4,060,800	0	$0	0	$0	0	$0		
Culvert	CF	$15	20,000	$300,000	0	$0	43,200	$648,000	86,400	$1,296,000		
Mobilization	%	3%		$482,184		$59,820		$355,170		$218,670		
Demobilization	%	1.5%		$241,092		$29,910		$177,585		$109,335		
Contingency	%	25%		$4,199,019		$520,933		$3,092,939		$1,904,251		
Environmental In-Lieu Fees				**$2,000,000**		**$1,400,000**		**$2,400,000**		**$3,500,000**		**$9,300,000**
Wetlands	Acre	$15,000	2	$30,000	0	$0	0	$0	0	$0		
Wooded	Acre	$3,150	20	$63,000	11	$34,650	68	$324,450	35	110,250		
Waste Area ROW	Acre	$3,000	6	$18,000	1	$3,000	3	$9,000	0.00	$0		
Waste Area Stream In Lieu	LF	**	1,000	$347,000	350	$228,000	600	$208,000	0	0		
Stream In Lieu	LF	**	1,866	$1,498,586	1,304	$1,121,956	8,387	$1,857,806	3,889	$3,368,123		
***Maintenance Costs	MI	$2,000,000	2.1	**$4,200,000**	0.0	**$0**	2.1	**$4,200,000**	1.1	$2,140,000		**$10,540,000**
TOTAL:				**$30,300,000**		**$5,100,000**		**$25,100,000**		**$17,540,000**		**$78,040,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5B – 5.90 miles - From KY 344 tie-in south of Kinniconick crossing Kinniconick Creek twice to existing KY 59 at Fuller Branch to Axehandle Branch over the ridge to Dry Run Creek to existing KY 59 at MP 23.0 south if intersection with KY 9.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5B-1

KY 344 in Kinniconick along existing KY 59 to south of Velma Lane westward to ridge then down Pollitt Lane hollow to KY 9 at Shelton Lane

			5A		5A-2		5C-1		5B1-1		5B1-2		
			KY 344 Tie (Sta 96+16) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to S. Connector (Sta 297+95)**		**S. Connector (Sta 297+95) to ALT 5B2 (Sta 340+52)**		**KY 59 Tie (Sta 340+52) to KY 9 (Sta 455+49)**		**ALTERNATE 5B-1 TOTALS**	
Mainline Length (miles)			2.18		0.50		1.15		0.81		2.17		6.81	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
										0				
Design				**$2,300,000**		**$600,000**	0	**$1,200,000**		**$900,000**		**$2,300,000**		**$7,300,000**
Highway:	Mile	$650,000		$1,500,000		$400,000	0	$800,000		$600,000		$1,500,000		
Geotech:	%	50%		$800,000		$200,000	0	$400,000		$300,000		$800,000		
Right of Way				**$300,000**		**$300,000**	0	**$1,000,000**		**$100,000**		**$900,000**		**$2,600,000**
Utilities		2%	1	**$500,000**	1	**$100,000**	1	**$200,000**	1	**$200,000**	1	**$400,000**		**$1,400,000**
Construction				**$21,000,000**		**$2,700,000**	0	**$9,300,000**		**$12,300,000**		**$20,000,000**		**$65,300,000**
MOT		1.5%		$231,000		$29,000	$0	$101,000		$134,000		$220,000		
Drainage		3.0%		$461,000		$57,000	0	$203,000		$268,000		$439,000		
Earthwork														
Cut (CY)	CY	$3.50	2,203,000	$7,711,000		$0					3,052,393	$10,683,000		
	CY	$5.00		$0	207,700	$1,039,000	746,865	$3,734,000	1,386,572	$6,933,000		$0		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	1	$500,000	0.1	$50,000	1	$450,000		
Roadway	SY	$60	55,153	$3,309,000	14,476	$869,000	31,139	$1,868,000	21,853	$1,311,000	52,947	$3,177,000		
Structures														
Bridges	SF	$120	33,840	$4,060,800	0	$0	0	$0	0	$0	0	$0		
Culvert	CF	$15	20,000	$300,000	0	$0	43,200	$648,000	43,200	$648,000	21,600	$324,000		
Mobilization	%	3%		$482,184		$59,820	0	$211,620		$280,320		$458,790		
Demobilization	%	1.5%		$241,092		$29,910	0	$105,810		$140,160		$229,395		
Contingency	%	25%		$4,199,019		$520,933	0	$1,842,858		$2,441,120		$3,995,296		
Environmental In-Lieu Fees				**$2,000,000**		**$1,400,000**		**$2,300,000**		**$1,000,000**		**$7,300,000**		**$14,000,000**
Wetlands	Acre	$15,000	2	$30,000	0	$0	0	$0	0	$0	0	$0		
Wooded	Acre	$3,150	20	$63,000	11	$34,650	35	$110,250	24	$75,600	110	$346,500		
Waste Area ROW	Acre	$3,000	6	$18,000	1	$3,000	2	$6,000	2	$6,000	0	$0		
Waste Area Stream In Lieu	LF	**	1,000	$347,000	350	$228,000	576	$293,533	950	$342,000	0	0		
Stream In Lieu	LF	**	1,866	$1,498,586	1,304	$1,121,956	2,338	$1,857,806	1,354	$568,638	10,472	$6,927,512		
***Maintenance Costs	MI	$2,000,000	2.1	$4,200,000	0.0	$0	0.0	$0	0.9	**$1,800,000**	1.4	**$2,780,000**		**$8,780,000**
TOTAL:				**$30,300,000**		**$5,100,000**		**$14,000,000**	0.0	**$16,300,000**		**$33,680,000**		**$99,380,000**
			5B-1		5B-2									

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5B-1 – 6.84 miles - From KY 344 tie-in south of Kinniconick crossing Kinniconick Creek twice to existing KY 59 at Fuller Branch and along existing KY 59 to south of Velma Lane westward over Dry Run Creek then along Dry Run Creek over ridge then down Pollitt Lane hollow to KY 9 at Shelton Lane.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5C

KY 344 tie-in south of Kinniconick crossing the Kinniconick Creek twice to existing KY 59 at Fuller Branch and along KY 59 to MP 23.0 south of intersection with KY 9

			5A		5A-2		5C-1		5C-2		
			KY 344 Tie (Sta 96+16) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to S. Connector (Sta 297+95)**		**KY 59 Tie (Sta 297+95) to N of KY 9 (Sta 407+46)**		**ALTERNATE 5C TOTALS**	
Mainline Length (miles)			2.18		0.50		1.15		2.07		5.90	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
							0	$0				
Design				**$2,300,000**		**$600,000**	0	**$1,200,000**		**$2,100,000**		**$6,200,000**
Highway:	Mile	$650,000		$1,500,000		$400,000	0	$800,000		$1,400,000		
Geotech:	%	50%		$800,000		$200,000	0	$400,000		$700,000		
							0	$0				
Right of Way				**$300,000**		**$300,000**	0	**$1,000,000**		**$1,600,000**		**$3,200,000**
Utilities		2%	1	**$500,000**	1	**$100,000**	1	**$200,000**		**$0**		**$2,100,000**
		8%		**$0**		**$0**	0	$0	1	**$1,300,000**		
Construction				**$21,000,000**		**$2,700,000**	0	**$9,300,000**		**$16,200,000**		**$49,200,000**
MOT (1.5% 5A & 5A-2)		5.0%		$231,000		$29,000	0	$101,000		$600,000		
Drainage		3.0%		$461,000		$57,000	0	$203,000		$300,000		
Earthwork												
Cut (CY)	CY	$3.50	2,203,000	$7,711,000		$0			1,765,557	$6,179,000		
	CY	$5.00		$0	207,700	$1,039,000	746,865	$3,734,000		$0		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	1	$500,000	1	$500,000		
Roadway	SY	$60	55,153	$3,309,000	14,476	$869,000	31,139	$1,868,000	48,732	$2,924,000		
Rolled Curb & Gutter	LF	$70					0	$0	16,848	$1,179,000		
Structures												
Bridges	SF	$120	33,840	$4,060,800	0	$0	0	$0	0	$0		
Culvert	CF	$15	20,000	$300,000	0	$0	43,200	$648,000	43,200	$648,000		
Mobilization	%	3%		$482,184		$59,820	0	$211,620		$369,900		
Demobilization	%	1.5%		$241,092		$29,910	0	$105,810		$184,950		
Contingency	%	25%		$4,199,019		$520,933	0	$1,842,858		$3,221,213		
Environmental In-Lieu Fees				**$2,000,000**		**$1,400,000**		**$2,300,000**		**$3,800,000**		**$9,500,000**
Wetlands	Acre	$15,000	2	$30,000	0	$0	0	$0	1	$10,000		
Wooded	Acre	$3,150	20	$63,000	11	$34,650	35	$110,250	65	$203,175		
Waste Area ROW	Acre	$3,000	6	$18,000	1	$3,000	2	$6,000	8	$24,174		
Waste Area Stream In Lieu	LF	**	1,000	$347,000	350	$228,000	576	$293,533	97,467	$583,204		
Stream In Lieu	LF	**	1,866	$1,498,586	1,304	$1,121,956	2,338	$1,857,806	3,898	$2,881,770		
***Maintenance Costs	MI	$2,000,000	2.1	**$4,200,000**	0.0	**$0**	0	$0	0.2	**$400,000**		**$4,600,000**
TOTAL:				**$30,300,000**		**$5,100,000**		**$14,000,000**		**$25,400,000**		**$74,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5C – 6.17 miles - From KY 344 tie-in south of Kinniconick crossing Kinniconick Creek twice to existing KY 59 at Fuller Branch and along existing KY 59 to MP 23.0 south of intersection with KY 9.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - NORTH CONNECTOR

Connector between Alternatives 5B and 5C - Option 1

			NORTH CONNECTOR TOTALS	
Mainline Length (miles)			0.73	
	Unit	Unit Cost	Quantity	Cost
Design				**$800,000**
Highway:	Mile	$650,000		$500,000
Geotech:	%	50%		$300,000
Right of Way				**$200,000**
Utilities		2%	1	**$100,000**
Construction				**$4,500,000**
MOT		1.5%		$49,000
Drainage		3.0%		$97,000
Earthwork				
Cut (CY)	CY	$5	358,351	$1,792,000
*Ohio/Sunbury Shale	LS	$500,000	0.1	$50,000
Roadway	SY	$60	17,864	$1,072,000
Structures				
Bridges	SF	$120		$0
Culvert	CF	$15	21,600	$324,000
Mobilization	%	3%		$101,520
Demobilization	%	1.5%		$50,760
Contingency	%	25%		$884,070
Environmental In-Lieu Fees				**$1,500,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	20	$63,000
Waste Area ROW	Acre	$3,000	0	$0
Waste Area Stream In Lieu	LF	**	0	$0
Stream In Lieu	LF	**	2,970	$1,395,998
***Maintenance Costs	MI	$2,000,000		**$0**
TOTAL:				**$7,100,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:

Waste Area ROW (acres) = 185,000 cu yards of excess/acre

Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor

1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 1 - VANCEBURG HILL
MP 20.6 to MP 22.1 - 45mph C&G w/Passing Lanes

			SPOT IMPROVEMENT 1 TOTALS	
Mainline Length (miles)			1.54	
	Unit	Unit Cost	Quantity	Cost
Design				**$1,700,000**
Highway:	Mile	$650,000		$1,100,000
Geotech:	%	50%		$600,000
Right of Way				**$500,000**
Utilities		8%	1	**$1,300,000**
Construction				**$16,200,000**
MOT		5.0%		$574,000
Drainage		3.0%		$344,000
Earthwork				
Cut (CY)	CY	$5	1,683,755	$8,419,000
*Ohio/Sunbury Shale	LS	$500,000	0.1	$50,000
Roadway	SY	$60	25,782	$1,547,000
Rolled Curb & Gutter	LF	$70	16,286	$1,140,000
Structures				
Bridges	SF	$120	0	
Culvert	CF	$15	21,600	$324,000
Mobilization	%	3%		$371,940
Demobilization	%	1.5%		$185,970
Contingency	%	25%		$3,238,978
Environmental In-Lieu Fees				**$1,900,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	52	$163,800
Waste Area ROW	Acre	$3,000	5	$15,000
Waste Area Stream In Lieu	LF	**	400	$260,000
Stream In Lieu	LF	**	1,912	$1,414,380
***Maintenance Costs	MI	$2,000,000		$0
TOTAL:				**$21,600,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 2 - LESLIE/CHESTNUT ST.
MP 22.3 to MP 22.8 - 45mph C&G

			SPOT IMPROVEMENT 2 TOTALS	
Mainline Length (miles)			0.55	
	Unit	Unit Cost	Quantity	Cost
Design				**$600,000**
Highway:	Mile	$650,000		$400,000
Geotech:	%	50%		$200,000
Right of Way				**$1,100,000**
Utilities		8%	1	**$300,000**
Construction				**$3,400,000**
MOT		5.0%		$120,000
Drainage		3.0%		$72,000
Earthwork				
Cut (CY)	CY	$5	200,924	$1,005,000
*Ohio/Sunbury Shale	LS	$500,000	1	$500,000
Roadway	SY	$60	8,151	$489,000
Rolled Curb & Gutter	LF	$70	5,822	$408,000
Structures				
Bridges	SF	$120	0	
Culvert	CF	$15	0	$0
Mobilization	%	3%		$77,820
Demobilization	%	1.5%		$38,910
Contingency	%	25%		$677,683
Environmental In-Lieu Fees				**$900,000**
Wetlands	Acre	$15,000	1	$15,000
Wooded	Acre	$3,150	9	$28,350
Waste Area ROW	Acre	$3,000	2	$6,000
Waste Area Stream In Lieu	LF	**	450	$156,000
Stream In Lieu	LF	**	851	$680,317
***Maintenance Costs	MI	$2,000,000		$0
TOTAL:				**$6,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 3 - FULLER BRANCH

KY 59 - FULLER BRANCH - MP 18.6 to MP 18.9 - 45mph

			SPOT IMPROVEMENT 3 TOTALS	
Mainline Length (miles)			0.37	
	Unit	Unit Cost	Quantity	Cost
Design				**$500,000**
Highway:	Mile	$650,000		$300,000
Geotech:	%	50%		$200,000
Right of Way				**$200,000**
Utilities		2%	1	**$100,000**
Construction				**$1,000,000**
MOT		5.0%		$35,000
Drainage		3.0%		$21,000
Earthwork				
Fill (CY)	CY	$5	1,700	$9,000
*Ohio/Sunbury Shale	LS	$500,000		$0
Roadway	SY	$60	9,877	$593,000
Structures				
Bridges	SF	$120	804	$96,000
Culvert	CF	$15	0	$0
Mobilization	%	3%		$22,620
Demobilization	%	1.5%		$11,310
Contingency	%	25%		$196,983
Environmental In-Lieu Fees				**$700,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	1	$3,150
Waste Area ROW	Acre	$3,000	0	$0
Waste Area Stream In Lieu	LF	**	666,711	0
Stream In Lieu	LF	**	861	$666,711
***Maintenance Costs	MI	$2,000,000		$0
TOTAL:				**$2,500,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 4 - KY 59/KY 344 INTERSECT.

KY 344 - KY 59 Intersection MP 18.0 to MP 18.5 - 45mph

			SPOT IMPROVEMENT 4 TOTALS	
Mainline Length (miles)			0.56	
	Unit	Unit Cost	Quantity	Cost
Design				**$600,000**
Highway:	Mile	$650,000		$400,000
Geotech:	%	50%		$200,000
Right of Way				**$250,000**
Utilities		2%	1	**$300,000**
Construction				**$14,500,000**
MOT		5.0%		$512,000
Drainage		3.0%		$307,000
Earthwork				
Fill (CY)	CY	$5	1,588,859	$7,944,000
*Ohio/Sunbury Shale	LS	$500,000	0.3	$150,000
Roadway	SY	$60	14,262	$856,000
Structures				
Bridges	SF	$120	10,810	$1,297,000
Culvert	CF	$15	0	$0
Mobilization	%	3%		$331,980
Demobilization	%	1.5%		$165,990
Contingency	%	25%		$2,890,993
Environmental In-Lieu Fees				**$1,000,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	22	$68,670
Waste Area ROW	Acre	$3,000	9	$25,530
Waste Area Stream In Lieu	LF	**	1,242	633,630
Stream In Lieu	LF	**	349	$309,563
***Maintenance Costs	MI	$2,000,000	1	$1,060,000
TOTAL:				**$17,710,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 5 - HOLLY BRANCH
KY 344 - MP 16.4 to MP 17.3 - 45mph

			SPOT IMPROVEMENT 5 TOTALS	
Mainline Length (miles)			0.81	
	Unit	Unit Cost	Quantity	Cost
Design				**$900,000**
Highway:	Mile	$650,000		$600,000
Geotech:	%	50%		$300,000
Right of Way				**$350,000**
Utilities		2%	1	**$200,000**
Construction				**$7,600,000**
MOT		5.0%		$266,000
Drainage		3.0%		$160,000
Earthwork				
Fill (CY)	CY	$5	739,729	$3,699,000
*Ohio/Sunbury Shale	LS	$500,000	0.5	$250,000
Roadway	SY	$60	19,917	$1,195,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	12,240	$184,000
Mobilization	%	3%		$172,620
Demobilization	%	1.5%		$86,310
Contingency	%	25%		$1,503,233
Environmental In-Lieu Fees				**$700,000**
Wetlands	Acre	$15,000	2	$30,000
Wooded	Acre	$3,150	6	$18,900
Waste Area ROW	Acre	$3,000	6	$18,900
Waste Area Stream In Lieu	LF	**	924	471,030
Stream In Lieu	LF	**	175	$136,325
***Maintenance Costs	MI	$2,000,000	1	$1,200,000
TOTAL:				**$10,950,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 6 - SOUTH OF LEWIS CO. PARK
KY 344 - MP 14.9 to MP 15.3 - 45mph

			SPOT IMPROVEMENT 6 TOTALS	
Mainline Length (miles)			0.43	
	Unit	Unit Cost	Quantity	Cost
Design				**$500,000**
Highway:	Mile	$650,000		$300,000
Geotech:	%	50%		$200,000
Right of Way				**$50,000**
Utilities		2%	1	**$100,000**
Construction				**$1,300,000**
MOT		5.0%		$46,000
Drainage		3.0%		$28,000
Earthwork				
Fill (CY)	CY	$5	27,828	$139,000
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0
Roadway	SY	$60	10,039	$602,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	12,000	$180,000
Mobilization	%	3%		$29,850
Demobilization	%	1.5%		$14,925
Contingency	%	25%		$259,944
Environmental In-Lieu Fees				**$600,000**
Wetlands	Acre	$15,000	0.1	$1,500
Wooded	Acre	$3,150	2	$6,300
Waste Area ROW	Acre	$3,000	0.1	$300
Waste Area Stream In Lieu	LF	**	15	7,522
Stream In Lieu	LF	**	650	$549,940
***Maintenance Costs**	MI	$2,000,000	0	$0
TOTAL:				**$2,550,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 7 - THURMAN CURVE
KY 344 at KY 377 - MP 13.8 to MP 14.6 - 45mph

			SPOT IMPROVEMENT 7 TOTALS	
Mainline Length (miles)			0.54	
	Unit	Unit Cost	Quantity	Cost
Design				**$600,000**
Highway:	Mile	$650,000		$400,000
Geotech:	%	50%		$200,000
Right of Way				**$250,000**
Utilities		2%	1	**$200,000**
Construction				**$5,400,000**
MOT		5.0%		$189,000
Drainage		3.0%		$114,000
Earthwork				
Fill (CY)	CY	$5	563,580	$2,818,000
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0
Roadway	SY	$60	13,132	$788,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	12,000	$180,000
Mobilization	%	3%		$122,670
Demobilization	%	1.5%		$61,335
Contingency	%	25%		$1,068,251
Environmental In-Lieu Fees				**$400,000**
Wetlands	Acre	$15,000	0.1	$1,500
Wooded	Acre	$3,150	5.1	$16,065
Waste Area ROW	Acre	$3,000	3	$9,030
Waste Area Stream In Lieu	LF	**	440	224,169
Stream In Lieu	LF	**	418	$145,056
***Maintenance Costs	MI	$2,000,000	0.42	$840,000
TOTAL:				**$7,690,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 8 - COUNTY LINE

KY 377 - MP 14.6 Rowan to MP 0.5 Lewis - 45mph

			SPOT IMPROVEMENT 8 TOTALS	
Mainline Length (miles)			1.14	
	Unit	Unit Cost	Quantity	Cost
Design				**$1,200,000**
Highway:	Mile	$650,000		$800,000
Geotech:	%	50%		$400,000
Right of Way				**$300,000**
Utilities		2%	1	**$300,000**
Construction				**$10,400,000**
MOT		5.0%		$368,000
Drainage		3.0%		$221,000
Earthwork				
Fill (CY)	CY	$5	1,089,889	$5,449,000
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0
Roadway	SY	$60	28,000	$1,680,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	15,360	$230,000
Mobilization	%	3%		$238,440
Demobilization	%	1.5%		$119,220
Contingency	%	25%		$2,076,415
Environmental In-Lieu Fees				**$1,900,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	35	$110,250
Waste Area ROW	Acre	$3,000	0	$0
Waste Area Stream In Lieu	LF	**	0	0
Stream In Lieu	LF	**	3,317	$1,743,999
***Maintenance Costs	MI	$2,000,000	0	$0
TOTAL:				**$14,100,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 9 - McCLEESE TO STAM RD
KY 377 - MP 1.2 to MP 3.0 - 45mph

			SPOT IMPROVEMENT 9 TOTALS	
Mainline Length (miles)			1.78	
	Unit	Unit Cost	Quantity	Cost
Design				**$1,800,000**
Highway:	Mile	$650,000		$1,200,000
Geotech:	%	50%		$600,000
Right of Way				**$500,000**
Utilities		2%	1	**$200,000**
Construction				**$6,800,000**
MOT		5.0%		$239,000
Drainage		3.0%		$144,000
Earthwork				
Fill (CY)	CY	$5	143,961	$720,000
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0
Roadway	SY	$60	43,800	$2,628,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	96,000	$1,440,000
Mobilization	%	3%		$155,130
Demobilization	%	1.5%		$77,565
Contingency	%	25%		$1,350,924
Environmental In-Lieu Fees				**$2,000,000**
Wetlands	Acre	$15,000	0.5	$7,500
Wooded	Acre	$3,150	14	$44,100
Waste Area ROW	Acre	$3,000	0	$0
Waste Area Stream In Lieu	LF	**	0	0
Stream In Lieu	LF	**	2,524	$1,934,881
***Maintenance Costs	MI	$2,000,000	0	$0
TOTAL:				**$11,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SPOT IMPROVEMENT 10 - BRIERY CURVE
KY 377 - MP 7.1 to MP 7.7 - 45mph

			SPOT IMPROVEMENT 10 TOTALS	
Mainline Length (miles)			0.65	
	Unit	Unit Cost	Quantity	Cost
Design				**$800,000**
Highway:	Mile	$650,000		$500,000
Geotech:	%	50%		$300,000
Right of Way				**$100,000**
Utilities		2%	1	**$100,000**
Construction				**$2,500,000**
MOT		5.0%		$87,000
Drainage		3.0%		$52,000
Earthwork				
Fill (CY)	CY	$5	111,662	$558,000
*Ohio/Sunbury Shale	LS	$500,000	0.0	$0
Roadway	SY	$60	16,000	$960,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	15,360	$230,000
Mobilization	%	3%		$56,610
Demobilization	%	1.5%		$28,305
Contingency	%	25%		$492,979
Environmental In-Lieu Fees				**$1,100,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	72	$226,800
Waste Area ROW	Acre	$3,000	0.1	$300
Waste Area Stream In Lieu	LF	**	13	6,682
Stream In Lieu	LF	**	1,110	$864,446
***Maintenance Costs	MI	$2,000,000	0	$0
TOTAL:				**$4,600,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3C

Red Alternative

			3C			
			From 3d-1 (Sta 100+00) to 3d-4 (Sta 334+92)		ALTERNATE 3C TOTALS	
Mainline Length (miles)			4.45		4.45	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$4,400,000**		**$4,400,000**
Highway:	Mile	$650,000		$2,900,000		
Geotech:	%	50%		$1,500,000		
Right of Way				**$700,000**		**$700,000**
Utilities		2%	1	**$700,000**		**$9,700,000**
Texas Gas Crossing	EA	$3,000,000	3	**$9,000,000**		
Construction				**$33,000,000**		**$33,000,000**
MOT		1.5%		$362,000		
Drainage		3.0%		$723,000		
Earthwork						
Cut (CY)	CY	$3.50	4,500,000	$15,750,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	109,629	$6,578,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	118,800	$1,782,000		
Mobilization	%	3%		$755,850		
Demobilization	%	1.5%		$377,925		
Contingency	%	25%		$6,582,194		
Environmental In-Lieu Fees				**$8,900,000**		**$8,900,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Areas ROW	Acre	$3,000	22.0	$100,000		
Waste Area Stream In Lieu	LF	**	3,212	$1,638,000		
Stream In Lieu	LF	**	7,975	$7,073,825		
***Mainteance Costs	MI	$2,000,000	7.7	**$15,320,000**		**$15,320,000**
TOTAL:				**$72,020,000**		**$72,020,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%	No Data
Ephemeral	$347.00	
Perennial	$887.00	
Intermittent	$651.00	

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3E-1

Blue 1 Alternative

			3E-1			
			From Ex. KY 377 (Sta 100+00) to ALT 3E-2 (Sta 181+12)		ALTERNATE 3E-1 TOTALS	
Mainline Length (miles)			1.54		1.54	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,500,000**		**$1,500,000**
Highway:	Mile	$650,000		$998,636		
Geotech	%	50%		$500,000		
Right of Way				$600,000		**$600,000**
Utilities		5%	1	**$800,000**		**$800,000**
		10%		$0		
Construction				**$14,800,000**		**$14,800,000**
MOT		5.0%		$526,000		
Drainage		3.0%		$316,000		
Earthwork						
Cut (CY)	CY	$5.00	1,650,000	$8,250,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	37,856	$2,271,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	0	$0		
Mobilization	%	3%		$340,890		
Demobilization	%	1.5%		$170,445		
Contingency	%	25%		$2,840,750		
Environmental In-Lieu Fees				$3,100,000		**$3,100,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	5.2	$16,000		
Waste Area Stream In Lieu	LF	**	764	$389,503		
Stream In Lieu	LF	**	3070	$2,723,090		
***Maintenance Costs	MI	$2,000,000	1.1	$2,140,000		**$2,140,000**
Total:				**$22,940,000**		**$22,940,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%	No Data
Ephemeral	$347.00	
Perennial	$887.00	
Intermittent	$651.00	

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 3E-2

Blue 2 Alternative

			3E-2		
			From ALT 3E-1 (Sta 181+12) to ALT 3D-3 (Sta 307+52)		ALTERNATE 3E-2 TOTALS
Mainline Length (miles)			2.39		2.39
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$2,400,000**		**$2,400,000**
Highway:	Mile	$650,000		$1,556,061		
Geotech	%	50%		$800,000		
Right of Way				$400,000		**$400,000**
Utilities		5%	1	**$1,300,000**		**$1,300,000**
		10%		$0		$0
Construction				**$24,400,000**		**$24,400,000**
MOT		1.5%		$270,000		
Drainage		3.0%		$541,000		
Earthwork						
Cut (CY)	CY	$3.50	4,000,000	$14,000,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	58,987	$3,539,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	32,400	$486,000		
Mobilization	%	3%		$565,080		
Demobilization	%	1.5%		$282,540		
Contingency	%	25%		$4,709,000		
Environmental In-Lieu Fees				**$6,300,000**		**$6,300,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	13.8	$41,450		
Waste Area Stream In Lieu	LF	**	2,017	$1,028,784		
Stream In Lieu	LF	**	5,900	$5,233,300		
***Maintenance Costs	MI	$2,000,000	3.1	**$6,200,000**		**$6,200,000**
Total:				**$41,000,000**		**$41,000,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**

	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE D-E CONNECTOR

Orange Alternative

			D-E CONNECTOR		
			From ALT 3E-1 (Sta 100+00) to ALT 3D-2 (Sta 177+19)		ALTERNATE D-E CONNECTOR TOTALS
Mainline Length (miles)			1.46		1.46
	Unit	Unit Cost	Quantity	Cost	Quantity / Cost
Design				**$1,500,000**	**$1,500,000**
Highway:	Mile	$650,000		$950,256	
Geotech	%	50%		$500,000	
Right of Way				$300,000	**$300,000**
Utilities		5%	1	**$1,200,000**	**$1,200,000**
		10%		$0	$0
Construction				**$22,700,000**	**$22,700,000**
MOT		1.5%		$251,000	
Drainage		3.0%		$503,000	
Earthwork					
Cut (CY)	CY	$3.50	4,125,000	$14,438,000	
*Ohio/Sunbury Shale	LS	$500,000		$0	
Roadway	SY	$60	36,022	$2,161,000	
Structures					
Bridges	SF	$120	0	$0	
Culvert	CF	$15	10,800	$162,000	
Mobilization	%	3%		$525,450	
Demobilization	%	1.5%		$262,725	
Contingency	%	25%		$4,378,750	
Environmental In-Lieu Fees				**$1,900,000**	**$1,900,000**
Wetlands	Acre	$15,000			
Wooded	Acre	$3,150			
Waste Area ROW	Acre	$3,000	19.3	$58,000	
Waste Area Stream In Lieu	LF	**	2,820	$1,409,916	
Stream In Lieu	LF	**	1,362	$472,614	
***Maintenance Costs	MI	$2,000,000	2.4	**$4,700,000**	**$4,700,000**
Total:				**$32,300,000**	**$32,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

** Avg. Cost/Foot with 20%

Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5A

KY 344 tie south of Kinniconick crossing Kinniconick Creek twice to Clarksburg Branch to Hazel Branch to KY 9 approx. 2 miles west of Vanceburg

			5A		5A-2		5A-3			
			KY 344 Tie (Sta 96+16) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to KY 9 (Sta 448+70)**		**ALTERNATE 5A TOTALS**	
Mainline Length (miles)			2.18		0.50		3.97		6.68	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$2,300,000**		**$600,000**		**$3,900,000**		**$6,800,000**
Highway:	Mile	$650,000		$1,500,000		$400,000		$2,600,000		
Geotech:	%	50%		$800,000		$200,000		$1,300,000		
Right of Way				**$300,000**		**$300,000**		**$1,400,000**		**$2,000,000**
Utilities		2%	1	**$500,000**	1	**$100,000**	1	**$600,000**		**$1,200,000**
Construction				**$21,000,000**		**$2,700,000**		**$25,100,000**		**$48,800,000**
MOT		1.5%		$231,000		$29,000		$276,000		
Drainage		3.0%		$461,000		$57,000		$552,000		
Earthwork										
Cut (CY)	CY	$3.50	2,203,000	$7,711,000		$0	2,584,000	$9,044,000		
	CY	$5.00		$0	207,700	$1,039,000		$0		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	1	$500,000		
Roadway	SY	$60	55,153	$3,309,000	14,476	$869,000	107,497	$6,450,000		
Structures										
Bridges	SF	$120	33,840	$4,060,800	0	$0	0	$0		
Culvert	CF	$15	20,000	$300,000	0	$0	160,000	$2,400,000		
Mobilization	%	3%		$482,184		$59,820		$576,660		
Demobilization	%	1.5%		$241,092		$29,910		$288,330		
Contingency	%	25%		$4,199,019		$520,933		$5,021,748		
Environmental In-Lieu Fees				**$2,000,000**		**$1,400,000**		**$11,400,000**		**$14,800,000**
Wetlands	Acre	$15,000	2	$30,000	0	$0	0	$0		
Wooded	Acre	$3,150	20	$63,000	11	$34,650	100	$313,425		
Waste Area ROW	Acre	$3,000	6	$18,000	1	$3,000	9	$27,000		
Waste Area Stream In Lieu	LF	**	1,000	$347,000	350	$228,000	960	$333,000		
Stream In Lieu	LF	**	1,866	$1,498,586	1,304	$1,121,956	14,740	$10,751,024		
***Maintenance Costs	MI	$2,000,000	2.1	**$4,200,000**	0.0	**$0**	3.5	**$7,000,000**		**$11,200,000**
TOTAL:				**$30,300,000**		**$5,100,000**		**$49,400,000**		**$84,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5A – 6.68 miles - From KY 344 tie-in south of Kinniconick crossing Kinniconick Creek twice to existing KY 59 at Fuller Branch to Clarksburg Branch over the ridge to Hazel Branch to KY 9 approx. 2.25 miles west of Vanceburg.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:

Waste Area ROW (acres) = 185,000 cu yards of excess/acre

Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5A-1

Follows existing KY 344 around Kinniconick Creek to existing KY 59 at Fuller Branch to Clarksburg Branch to Hazel Branch to KY 9 approx. 2 miles west of Vanceburg

			5A-1		5A-2		5A-3		
			KY 344 Tie (Sta 100+66) to exist. KY 59 Tie (Sta 211+09)		**KY 59 Tie (Sta 211+09) to KY 59 Tie (Sta 237+29)**		**KY 59 Tie (Sta 237+29) to KY 9 (Sta 448+70)**		**ALTERNATE 5A-1 TOTALS**
Mainline Length (miles)			2.09		0.50		3.97		6.59
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Design				**$2,100,000**		**$600,000**		**$3,900,000**		**$6,600,000**
Highway:	Mile	$650,000		$1,400,000		$400,000		$2,600,000		
Geotech:	%	50%		$700,000		$200,000		$1,300,000		
Right of Way				**$300,000**		**$300,000**		**$1,400,000**		**$2,000,000**
Utilities		2%	1	**$400,000**	1	**$100,000**	1	**$600,000**		**$1,100,000**
Construction				**$18,000,000**		**$2,700,000**		**$25,100,000**		**$45,800,000**
MOT		1.5%		$198,000		$29,000		$276,000		
Drainage		3.0%		$395,000		$57,000		$552,000		
Earthwork										
Cut (CY)	CY	$3.50	2,569,000	$8,992,000		$0	2,584,000	$9,044,000		
	CY	$5.00		$0	207,700	$1,039,000		$0		
*Ohio/Sunbury Shale	LS	$500,000		$0		$0	1	$500,000		
Roadway	SY	$60	56,687	$3,401,000	14,476	$869,000	107,497	$6,450,000		
Structures										
Bridges	SF	$120	6,580	$789,600	0	$0	0	$0		
Culvert	CF	$15	0	$0	0	$0	160,000	$2,400,000		
Mobilization	%	3%		$413,268		$59,820		$576,660		
Demobilization	%	1.5%		$206,634		$29,910		$288,330		
Contingency	%	25%		$3,598,876		$520,933		$5,021,748		
Environmental In-Lieu Fees				**$2,600,000**		**$1,400,000**		**$11,400,000**		**$15,400,000**
Wetlands	Acre	$15,000	1	$19,500	0	$0	0	$0		
Wooded	Acre	$3,150	41	$129,150	11	$34,650	100	$313,425		
Waste Area ROW	Acre	$3,000	20	$60,000	1	$3,000	9	$27,000		
Waste Area Stream In Lieu	LF	**	0	$0	350	$228,000	960	$333,000		
Stream In Lieu	LF	**	3,282	$2,341,766	1,304	$1,121,956	14,740	$10,751,024		
***Maintenance Costs	MI	$2,000,000	2.1	**$4,200,000**	0.0	**$0**	3.5	**$7,000,000**		**$11,200,000**
TOTAL:				**$27,600,000**		**$5,100,000**		**$49,400,000**		**$82,100,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

ALT 5A-1 – 6.59 miles - From KY 344 tie-in south of Kinniconick along existing KY 344 around Kinniconick Creek to existing KY 59 at Fuller Branch to Clarksburg Branch over the ridge to Hazel Branch to KY 9 approx. 2.25 miles west of Vanceburg.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4C-1

Yellow 1 Alternative

			4C-1			
			From ALT 3D-4 (Sta 100+00) to ALT 4D (Sta 244+27)		ALTERNATE 4C-1 TOTALS	
Mainline Length (miles)			2.73		2.73	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$2,700,000**		**$2,700,000**
Highway:	Mile	$650,000		$1,776,051		
Geotech	%	50%		$900,000		
Right of Way				$600,000		**$600,000**
Utilities		5%	1	**$2,700,000**		**$2,700,000**
		10%		$0		$0
Construction				**$53,300,000**		**$53,300,000**
MOT		1.5%		$591,000		
Drainage		3.0%		$1,181,000		
Earthwork						
Cut (CY)	CY	$3.50	8,775,000	$30,713,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	67,326	$4,040,000		
Structures						
Bridges	SF	$120	34,400	$4,128,000		
Culvert	CF	$15	32,400	$486,000		
Mobilization	%	3%		$1,234,170		
Demobilization	%	1.5%		$617,085		
Contingency	%	25%		$10,284,750		
Environmental In-Lieu Fees				**$7,200,000**		**$7,200,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	21	$70,000		
Waste Area ROW	Acre	$3,000	43	$130,000		
Waste Area Stream In Lieu	LF	**	6,320	$3,201,339		
Stream In Lieu	LF	**	4,860	$3,781,824		
***Mainteance Costs	MI	$2,000,000	**2.4**	**$4,840,000**		**$4,840,000**
Total:				**$71,340,000**		**$71,340,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4C-2

Yellow 2 Alternative

			4C-2			
			From ALT 4C-1 (Sta 244+27) to Ex. Alt 5A (Sta 311+19)		**ALTERNATE 4C-2 TOTALS**	
Mainline Length (miles)			1.27		1.27	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,400,000**		**$1,400,000**
Highway:	Mile	$650,000		$823,826		
Geotech	%	50%		$500,000		
Right of Way				$400,000		**$400,000**
Utilities		5%	1	**$1,000,000**		**$1,000,000**
		10%		$0		$0
Construction				**$18,400,000**		**$18,400,000**
MOT		1.5%		$204,000		
Drainage		3.0%		$407,000		
Earthwork						
Cut (CY)	CY	$5.00	1,275,000	$6,375,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	31,229	$1,874,000		
Structures						
Bridges	SF	$120	43,000	$5,160,000		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$425,460		
Demobilization	%	1.5%		$212,730		
Contingency	%	25%		$3,545,500		
Environmental In-Lieu Fees				**$3,100,000**		**$3,100,000**
Wetlands	Acre	$15,000	2	$30,000		
Wooded	Acre	$3,150	9	$30,000		
Waste Area ROW	Acre	$3,000	4.7	$14,000		
Waste Area Stream In Lieu	LF	**	685	$349,108		
Stream In Lieu	LF	**	3,058	$2,642,786		
***Maintenance Costs	MI	$2,000,000	2.0	**$3,980,000**		**$3,980,000**
Total:				**$28,280,000**		**$28,280,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4D-1

Purple Alternative

4D-1

Mainline Length (miles)			From ALT 4C-1 (Sta 100+00) to Alt. 4D-2 (Sta 205+18)		ALTERNATE 4D-1 TOTALS	
			1.99		1.99	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$2,000,000**		**$2,000,000**
Highway:	Mile	$650,000		$1,294,830		
Geotech	%	50%		$700,000		
Right of Way				$400,000		**$400,000**
Utilities		5%	1	**$1,400,000**		**$1,400,000**
		10%		$0		$0
Construction				**$26,500,000**		**$26,500,000**
MOT		1.5%		$294,000		
Drainage		3.0%		$587,000		
Earthwork						
Cut (CY)	CY	$3.50	4,125,000	$14,438,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	49,084	$2,945,000		
Structures						
Bridges	SF	$120	12,900	$1,548,000		
Culvert	CF	$15	43,200	$648,000		
Mobilization	%	3%		$613,800		
Demobilization	%	1.5%		$306,900		
Contingency	%	25%		$5,115,000		
Environmental In-Lieu Fees				**$5,300,000**		**$5,300,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	4	$10,000		
Waste Area ROW	Acre	$3,000	18.7	$56,000		
Waste Area Stream In Lieu	LF	**	2,727	$1,390,979		
Stream In Lieu	LF	**	4,292	$3,807,004		
***Maintenance Costs	MI	$2,000,000	**3.7**	**$7,300,000**		**$7,300,000**
Total:				**$42,900,000**		**$42,900,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4D-2

Rocky - Portion of Somerset Purple Alternative

			4D-2			
			From ALT 4D-1 (Sta 205+18) to Exist KY 59 (Sta 239+45)		ALTERNATE 4D-2 TOTALS	
Mainline Length (miles)			1.25		1.25	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,400,000**		**$1,400,000**
Highway:	Mile	$650,000		$814,347		
Geotech	%	50%		$500,000		
Right of Way				$600,000		**$600,000**
Utilities		5%	1	**$1,300,000**		**$1,300,000**
		10%		$0		$0
Construction				**$24,300,000**		**$24,300,000**
MOT		1.5%		$268,000		
Drainage		3.0%		$537,000		
Earthwork						
Cut (CY)	CY	$3.50	4,000,000	$14,000,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	30,870	$1,852,000		
Structures						
Bridges	SF	$120	12,900	$1,548,000		
Culvert	CF	$15	32,400	$486,000		
Mobilization	%	3%		$560,730		
Demobilization	%	1.5%		$280,365		
Contingency	%	25%		$4,672,750		
Environmental In-Lieu Fees				**$6,900,000**		**$6,900,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	16	$50,000		
Waste Area ROW	Acre	$3,000	21.1	$63,000		
Waste Area Stream In Lieu	LF	**	3,080	$5,238,219		
Stream In Lieu	LF	**	1,868	$1,591,036		
***Maintenance Costs	MI	$2,000,000	0.9	**$1,760,000**		**$1,760,000**
Total:				**$36,260,000**		**$36,260,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**

	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 4D-1 - 5E-2 Connector

Purple Alternative

			4D-1 5E-2 CONNECTOR			
			Vanceburg Hill East Reconstruction From ALT 4D-1 (Sta 100+00) to ALT 5D-2 (Sta 167+54)		**ALTERNATE 4D-1 - 5E-2 CONNECTOR TOTALS**	
Mainline Length (miles)			1.28		1.28	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,400,000**		**$1,400,000**
Highway:	Mile	$650,000		$831,458		
Geotech	%	50%		$500,000		
Right of Way				$300,000		**$300,000**
Utilities		5%	1	**$900,000**		**$900,000**
		10%		$0		$0
Construction				**$17,500,000**		**$17,500,000**
MOT		1.5%		$194,000		
Drainage		3.0%		$387,000		
Earthwork						
Cut (CY)	CY	$3.50	3,100,000	$10,850,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	31,519	$1,891,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$404,520		
Demobilization	%	1.5%		$202,260		
Contingency	%	25%		$3,371,000		
Environmental In-Lieu Fees				**$4,700,000**		**$4,700,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	14.4	$43,000		
Waste Area Stream In Lieu	LF	**	2,099	$1,070,718		
Stream In Lieu	LF	**	4,023	$3,568,401		
***Mainteance Costs	MI	$2,000,000	2.0	**$4,000,000**		**$4,000,000**
Total:				**$28,800,000**		**$28,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5D-1

Purple Alternative

			5D-1			
			Vanceburg Hill East Reconstruction From KY 59 (Sta 100+00) to Alt 5D-2 (Sta 124+74)		**ALTERNATE 5D-1 TOTALS**	
Mainline Length (miles)			0.47		0.47	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$600,000**		**$600,000**
Highway:	Mile	$650,000		$304,564		
Geotech	%	50%		$200,000		
Right of Way				$200,000		**$200,000**
Utilities		5%	1	**$500,000**		**$500,000**
		10%		$0		$0
Construction				**$8,100,000**		**$8,100,000**
MOT		1.5%		$89,000		
Drainage		3.0%		$178,000		
Earthwork						
Cut (CY)	CY	$3.50	1,450,000	$5,075,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	11,545	$693,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$185,910		
Demobilization	%	1.5%		$92,955		
Contingency	%	25%		$1,549,250		
Environmental In-Lieu Fees				**$1,100,000**		**$1,100,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	24	$80,000		
Waste Area ROW	Acre	$3,000	7.7	$23,000		
Waste Area Stream In Lieu	LF	**	1,129	$575,791		
Stream In Lieu	LF	**	828	$409,896		
***Maintenance Costs	MI	$2,000,000	0.5	**$900,000**		**$900,000**
Total:				**$11,400,000**		**$11,400,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5D-2

Purple Alternative

			5D-2		
			Vanceburg Hill East Reconstruction From Alt 5D-1 (Sta 124+74) to KY 59 (Sta 222+94)		**ALTERNATE 5D-2 TOTALS**
Mainline Length (miles)			1.86		1.86
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$2,000,000**		**$2,000,000**
Highway:	Mile	$650,000		$1,208,902		
Geotech	%	50%		$700,000		
Right of Way				$500,000		**$500,000**
Utilities		5%	1	**$3,400,000**		**$3,400,000**
		10%		$0		$0
Construction				**$66,900,000**		**$66,900,000**
MOT		1.5%		$741,000		
Drainage		3.0%		$1,481,000		
Earthwork						
Cut (CY)	CY	$3.50	13,275,000	$46,463,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	45,827	$2,750,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$1,547,910		
Demobilization	%	1.5%		$773,955		
Contingency	%	25%		$12,899,250		
Environmental In-Lieu Fees				**$8,600,000**		**$8,600,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	118	$370,000		
Waste Area ROW	Acre	$3,000	70.3	$211,000		
Waste Area Stream In Lieu	LF	**	10,271	$5,238,219		
Stream In Lieu	LF	**	6,528	$2,825,736		
***Maintenance Costs	MI	$2,000,000	2.0	**$3,940,000**		**$3,940,000**
Total:				**$85,340,000**		**$85,340,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5E-1

Purple Alternative

			5E-1			
			Reconstruction From Alt 5A (Sta 100+00) to Alt 5E-2 (Sta 146+08)		**ALTERNATE 5E-1 TOTALS**	
Mainline Length (miles)			0.87		0.87	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$900,000**		**$900,000**
Highway:	Mile	$650,000		$567,273		
Geotech	%	50%		$300,000		
Right of Way				$300,000		**$300,000**
Utilities		5%	1	**$2,300,000**		**$2,300,000**
		10%		$0		$0
Construction				**$44,100,000**		**$44,100,000**
MOT		1.5%		$488,000		
Drainage		3.0%		$977,000		
Earthwork						
Cut (CY)	CY	$3.50	8,050,000	$28,175,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	21,504	$1,290,000		
Structures						
Bridges	SF	$120	25,800	$3,096,000		
Culvert	CF	$15	0	$0		
Mobilization	%	3%		$1,020,780		
Demobilization	%	1.5%		$510,390		
Contingency	%	25%		$8,506,500		
Environmental In-Lieu Fees				**$3,900,000**		**$3,900,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	7.6	$20,000		
Waste Area ROW	Acre	$3,000	43.1	$130,000		
Waste Area Stream In Lieu	LF	**	6,298	$3,212,182		
Stream In Lieu	LF	**	980	$579,280		
***Maintenance Costs	MI	$2,000,000	1.0	**$1,960,000**		**$1,960,000**
Total:				**$53,460,000**		**$53,460,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5E-2

Purple Alternative

			5E-2			
			Reconstruction From Alt 5E-1 (Sta 146+08) to Alt 5E-3 (Sta 209+42)		**ALTERNATE 5E-2 TOTALS**	
Mainline Length (miles)			1.20		1.20	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$1,200,000**		**$1,200,000**
Highway:	Mile	$650,000		$779,754		
Geotech	%	50%		$400,000		
Right of Way				$300,000		**$300,000**
Utilities		5%	1	**$900,000**		**$900,000**
		10%		$0		$0
Construction				**$17,600,000**		**$17,600,000**
MOT		1.5%		$194,000		
Drainage		3.0%		$388,000		
Earthwork						
Cut (CY)	CY	$3.50	3,100,000	$10,850,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	29,559	$1,774,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	21,600	$324,000		
Mobilization	%	3%		$405,900		
Demobilization	%	1.5%		$202,950		
Contingency	%	25%		$3,382,500		
Environmental In-Lieu Fees				**$3,800,000**		**$3,800,000**
Wetlands	Acre	$15,000				
Wooded	Acre	$3,150				
Waste Area ROW	Acre	$3,000	16.0	$48,000		
Waste Area Stream In Lieu	LF	**	2,339	$1,193,023		
Stream In Lieu	LF	**	2,834	$2,513,758		
***Maintenance Costs	MI	$2,000,000	1.5	**$3,000,000**		**$3,000,000**
Total:				**$26,800,000**		**$26,800,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

No Data

**

	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - ALTERNATE 5E-3

Purple Alternative

			5E-3			
			Reconstruction From Alt 5E-2 (Sta 209+42) to Alt 5C (Sta 232+66)		**ALTERNATE 5E-3 TOTALS**	
Mainline Length (miles)			0.44		0.44	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$500,000**		**$500,000**
Highway:	Mile	$650,000		$286,098		
Geotech	%	50%		$200,000		
Right of Way				$100,000		**$100,000**
Utilities		5%	1	**$300,000**		**$300,000**
		10%		$0		**$0**
Construction				**$4,800,000**		**$4,800,000**
MOT		1.5%		$53,000		
Drainage		3.0%		$106,000		
Earthwork						
Cut (CY)	CY	$3.50	775,000	$2,713,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	10,845	$651,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	10,800	$162,000		
Mobilization	%	3%		$110,550		
Demobilization	%	1.5%		$55,275		
Contingency	%	25%		$921,250		
Environmental In-Lieu Fees				**$1,100,000**		**$1,100,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	10	$30,000		
Waste Area ROW	Acre	$3,000	3.8	$11,000		
Waste Area Stream In Lieu	LF	**	555	$282,935		
Stream In Lieu	LF	**	832	$737,984		
***Maintenance Costs	MI	$2,000,000	0.5	**$980,000**		**$980,000**
Total:				**$7,780,000**		**$7,780,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
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COST ESTIMATE - ALTERNATE 5E-2 - 5D-2 CONNECTOR

Purple Alternative

5E-2 5D-2 CONNECTOR

			Reconstruction From Alt 5E-2 (Sta 100+00) to Alt 5D-2 (Sta 117+77)		ALTERNATE 5E-2 to 5D-2 CONNECTOR TOTALS	
Mainline Length (miles)			0.34		0.34	
	Unit	Unit Cost	Quantity	Cost	Quantity	Cost
Design				**$500,000**		**$500,000**
Highway:	Mile	$650,000		$218,759		
Geotech	%	50%		$200,000		
Right of Way				$100,000		**$100,000**
Utilities		5%	1	**$200,000**		**$200,000**
		10%		$0		**$0**
Construction				**$2,700,000**		**$2,700,000**
MOT		1.5%		$30,000		
Drainage		3.0%		$60,000		
Earthwork						
Cut (CY)	CY	$3.50	425,000	$1,488,000		
*Ohio/Sunbury Shale	LS	$500,000		$0		
Roadway	SY	$60	8,293	$498,000		
Structures						
Bridges	SF	$120	0	$0		
Culvert	CF	$15	0	$0		
Mobilization	%	3%		$62,280		
Demobilization	%	1.5%		$31,140		
Contingency	%	25%		$519,000		
Environmental In-Lieu Fees				**$900,000**		**$900,000**
Wetlands	Acre	$15,000	0	$0		
Wooded	Acre	$3,150	3	$10,000		
Waste Area ROW	Acre	$3,000	1.8	$5,000		
Waste Area Stream In Lieu	LF	**	267	$133,538		
Stream In Lieu	LF	**	868	$769,916		
***Maintenance Costs	MI	$2,000,000	0.6	**$1,180,000**		**$1,180,000**
Total:				**$5,580,000**		**$5,580,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

COST ESTIMATE - SOUTH CONNECTOR

Connector between Alternatives 5B and 5C - Option 2

			SOUTH CONNECTOR TOTALS	
Mainline Length (miles)			0.69	
	Unit	Unit Cost	Quantity	Cost
Design				**$800,000**
Highway:	Mile	$650,000		$500,000
Geotech:	%	50%		$300,000
Right of Way				**$200,000**
Utilities		2%	1	**$300,000**
Construction				**$11,000,000**
MOT		1.5%		$120,000
Drainage		3.0%		$240,000
Earthwork				
Cut (CY)	CY	$5	1,386,572	$6,933,000
*Ohio/Sunbury Shale	LS	$500,000	0.1	$50,000
Roadway	SY	$60	16,991	$1,019,000
Structures				
Bridges	SF	$120	0	$0
Culvert	CF	$15	0	$0
Mobilization	%	3%		$250,860
Demobilization	%	1.5%		$125,430
Contingency	%	25%		$2,184,573
Environmental In-Lieu Fees				**$1,000,000**
Wetlands	Acre	$15,000	0	$0
Wooded	Acre	$3,150	24	$75,600
Waste Area ROW	Acre	$3,000	8	$24,000
Waste Area Stream In Lieu	LF	**	950	$330,000
Stream In Lieu	LF	**	1,354	$568,638
***Maintenance Costs	MI	$2,000,000		**$0**
TOTAL:				**$13,300,000**

* Ohio and Sunbury Shale Excavation - Estimated cost for removal, hauling, and encapsulation.

**	Avg. Cost/Foot with 20%
Ephemeral	$347.00
Perennial	$887.00
Intermittent	$651.00

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.
The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:
Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

***Maintenance costs of existing roadway when alternatives are on new alignment. Calculated cost for $100,000/mi for 25 years brought to present worth. Utilizing 1.7% interest rate =20.23 USPW factor
1.7% interest rate based on 5 year average for real interest rates (market rate less inflation) on 30-year US Treasurys

PRELIMINARY IMPACTS MATRIX

REMAINING ALTS (SEGMENTS) SECTIONS 1 THROUGH 3

Sections	Total Section 1A	Total Section 1B	Total Section 2A	Total Section 2B	3A-1a	3A-2	3B-1a	3B-2	3C	3D-1	3D-2	3D-3
CRITERIA												
CRASH SPOTS with CCRF>0.9	2	2	0	0	0	0	0	0	0	0	0	0
ENVIRONMENTAL												
Archaeology Sites	0	0	1	1	0	0	0	0	0	NO DATA	NO DATA	NO DATA
Aquatic/Terrestrial												
Wetlands (acres)	0.25	0.25	0.2	0.2	0.3	0.4	0.3	2	0	0	0	0
Pond	0	0	0	0	0	0	0	2	NO DATA	0	NO DATA	NO DATA
Ephemeral Stream (linear ft.)	1,764	1,764	0	0	0	2,701	0	4,018	0	392	0	0
Perennial Stream (linear ft.)	1,027	1,027	350	350	398	3,803	240	9,282	7,975	85	1,416	3,230
Intermittent Stream (linear ft.)	687	687	135	135	62	1,673	1,020	1,855	0	2,955	0	0
KDFWR Mitigation Site	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Designated Use Waters	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Threatened Endangered Species Habitat (linear ft.)	130	130	90	90	398	2,331	240	4,738	NO DATA	150	NO DATA	NO DATA
Habitat Scrub Shrub (acres)	0	0	0	0	1	0	0	2	NO DATA	0	NO DATA	NO DATA
Disturbed Woods (acres)	2	2	0	0	0	13	0	4	NO DATA	1	NO DATA	NO DATA
Mature Woods (acres)	12	12	5	5	1	60	3	73	NO DATA	27	NO DATA	NO DATA
Forested Wetland (acres)	1	1	0	0	0	0	1	2	NO DATA	0	NO DATA	NO DATA
Outcrops (acres)	0	0	0	0	0	6	0	1	NO DATA	0	NO DATA	NO DATA
100-year Floodplain (acres)	0	0	0	0	0	1	0	7	0	0	0	5
Floodway (acres)	0	0	0	0	0	0	0	0	0	0	0	0
Landslides	0	0	0	0	0	3	0	0	NO DATA	0	0	NO DATA
Bat Impacts (acres)	37	37	23	23	12	47	16	107	28	104	13	0
Community												
Schools	0	0	0	0	0	0	0	0	0	0	0	0
Churches	2	2	0	0	0	1	0	0	NO DATA	0	NO DATA	NO DATA
Cemeteries	2	2	1	1	0	2	0	0	NO DATA	1	NO DATA	NO DATA
Community (cluster of houses)	2	2	0	0	0	0	0	0	0	0	0	0
Fire Department	0	0	0	0	0	0	0	0	0	0	0	0
Water Tank	0	0	0	0	0	0	0	0	0	0	0	0
Historic												
NR Historic Property	0	0	1	1	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Determined Eligible from Previous Study	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Potentially Signifiant Property	0	0	0	0	1	2	1	0	NO DATA	0	NO DATA	NO DATA
Property Affected (acres)	1	1	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
UST												
UST	2	2	1	1	1	1	2	1	NO DATA	0	NO DATA	NO DATA
Environmental Justice Windshield Survey (yes or no)	0	0	0	0	no	no	no	no	NO DATA	no	NO DATA	NO DATA
Air Quality	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	NO DATA	low potential	NO DATA	NO DATA
Noise					2	3	1	0	NO DATA	1	NO DATA	NO DATA
UTILITIES												
Transmission Lines (linear ft.)	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Transmission Poles	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Substations	0	0	0	0	0	0	0	0	NO DATA	0	NO DATA	NO DATA
Water Mains (linear feet)	21,691	21,691	10,132	10,132	4,847	30,102	4,648	2,859	0	2,843	0	4,523
RIGHT OF WAY												
Parcels affected	130	130	24	24	16	25	12	21	6	8	2	3
Residential	0	0	0	0	0	2	0	2	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Farm	0	0	0	0	0	18	0	15	4	1	1	2
Classification not Listed	130	130	24	24	16	5	12	4	2	7	1	1
Number of acres affected	50	50	23	23	12	121	16	214	158	103	36	77
Residential/Commercial (estimated total take)					3	15	4	5	1	1	0	2
Barn/Garage (estimated total take)					3	21	1	8	3	1	0	2
GEOMETRY												
Bridges - Functionally Obsolete	1	1	1	1	1	1	1	0	0	0	0	0
Bridges - Structurally Deficient	0	0	0	0	0	0	0	0	0	0	0	0
Horizontal Curve does not meet 55	0	0	0	0	1	8	1	3	0	1	0	0
Vertical Curve does not meet 55	0	0	7	7	1	25	1	7	0	0	0	0
OTHER												
Gas Wells	0	0	0	0	1	0	1	1	0	1	0	0
Oil Wells	0	0	0	0	0	0	0	0	0	0	0	0
Shale (acres)	0	0	0	0	0	1	0	5	3	0	NO DATA	NO DATA
COSTS												
New In Lieu Fees for Stream Impacts PTM 2 REV3[6]	$1,970,294	$1,970,294	$398,335	$398,335	$393,388	$5,399,631	$876,900	$10,834,985	$7,073,825	$2,135,124	$1,255,992	$2,865,010
Waste Area Stream In Lieu (linear feet)[6]	147	65	22	0	127	961	17	798	3551	4972	316	513
Waste Area Stream In Lieu Costs[6]	$74,719	$33,024	$11,183	$0	$65,002	$489,939	$8,895	$406,982	$2,260,000	$3,200,000	$200,000	$326,000
Waste Area ROW (acres)[6]	1.00	0.44	0.15	0.00	0.87	6.58	0.12	5.46	22.00	33.99	1.82	2.68
Waste Area ROW Costs ($3000/acre)	$3,010	$1,331	$451	$0	$3,000	$20,000	$400	$16,394	$66,000	$102,000	$5,000	$8,000
Wetland Costs ($15,000/acre)	$10,500	$10,500	$0	$0	$9,000	$6,000	$7,500	$45,000	#VALUE!	$0	#VALUE!	#VALUE!
Wooded ($3,150/acre)	$42,525	$42,525	$16,380	$16,380	$3,000	$230,000	$10,080	$241,000	#VALUE!	$87,000	#VALUE!	#VALUE!
DBNF (acres)	0	0	0	0	0	0	0	1		38	0	0
pipelines (lf)	0	0	0	0	0	254	0	510	2600	0	0	300

Notes

1 LOS - Level of Service
2 ADT - Average Daily Traffic
3 ATS - Average Travel Speed/vehicle in mph
4 *Portions of this area did not have archived plans
5 If there is a blank, there are no expected impacts for this category.
6 Avg. Cost/Foot with 20% REV 3

Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

7 NO DATA - Outside the study area where data was not collected.

$347.00 Ephemeral
$887.00 Perennial
$651.00 Intermittent

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.

Streams were estimated for this data based on study area data.

Outside the study area

REMAINING ALTS (SEGMENTS) SECTIONS 4 AND 5

Sections	Total 4A	Total 4B	5A (Sta. 96+16 to Sta. 211+09)	5A-1 (Sta. 100+66 to Sta. 211+09)	5A-2 (Sta. 211+09 to Sta. 237+29)	5C-1 (Sta. 237+29 to Sta. 297+95)	5C-2 (Sta. 297+95 to Sta. 407+46)	5B-1 (Sta. 237+29 to Sta. 455+49)	North Connector	5B1 (Sta. 237+29 to Sta. 333+47)	5B2 (Sta. 333+47 to Sta. 407+46)	5B1-1 (Sta. 297+95 to Sta. 340+52)	5B1-2 (Sta. 340+52 to 455+49)
CRITERIA													
CRASH SPOTS with CCRF>0.9	1	1	0	0	0	0	2	0	0	0	2	0	0
ENVIRONMENTAL													
Archaeology Sites	0	0	0	0	0	0	0	0	0	0	0	0	0
Aquatic/Terrestrial													
Wetlands (acres)	0	0.3	0.8	0.3	0	0	0	0	0	0	0	0	0
Pond	0	0	0.3	0	0	0	0	0	0	0	0	0	0
Ephemeral Stream (linear ft.)	400	361	36	533	0	400	502	3,799	1,768	1,870	0	1,029	2,370
Perennial Stream (linear ft.)	921	1,608	1,249	1,556	1,157	1,938	2,105	5,458	0	3,042	3,544	0	3,520
Intermittent Stream (linear ft.)	2,829	2,077	581	1,193	147	0	1,291	4,907	1,202	3,475	345	325	4,582
KDFWR Mitigation Site	180	180	0	0	0	0	0	0	0	0	0	0	0
Designated Use Waters	350	907	690	0	0	0	0	0	0	0	0	0	0
Threatened Endangered Species Habitat (linear ft.)	661	907	1,249	1,556	1,157	1,938	2,105	4,907	0	3,042	3,544	0	2,969
Habitat Scrub Shrub (acres)	0	0	2	1	0	0	1	0	0	0	0	0	0
Disturbed Woods (acres)	2	3	1	1	0	0	6	35	0	0	0	0	35
Mature Woods (acres)	69	31	19	40	11	35	59	134	20	68	35	24	75
Forested Wetland (acres)	1	1	0	0	0	0	0	0	0	0	0	0	0
Outcrops (acres)	0	0	0	7	0	9	4	12	0	0	0	0	3
100-year Floodplain (acres)	6	21	4	2	0	0	2	1	0	0	2	0	1
Floodway (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0
Landslides	1	0	0	1	0	0	0	0	0	0	0	0	0
Bat Impacts (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0
Community													
Schools	0	0	0	0	0	0	0	0	0	0	0	0	0
Churches	0	0	0	0	0	0	1	0	0	0	1	0	0
Cemeteries	0	0	0	0	0	0	0	0	0	0	0	0	0
Community (cluster of houses)	0	0	0	0	0	0	1	0	0	0	1	0	0
Fire Department	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Tank	0	0	0	0	0	0	0	0	0	0	0	0	0
Historic													
NR Historic Property	0	0	0	0	0	0	0	0	0	0	0	0	0
Determined Eligible from Previous Study	0	0	0	0	0	0	0	0	0	0	0	0	0
Potentially Signifiant Property	0	0	0	0	0	1	0	1	0	2	0	0	0
Property Affected (acres)	0	0	0	0	0	5	0	1	0	4.6	0.4	0	3
UST													
UST	1	1	0	0	1	0	0	0	0	0	0	0	0
Environmental Justice Windshield Survey (yes or no)	no	no	no	no	yes	no	yes	no	no	yes	yes	no	no
Air Quality	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential
Noise			3	3	1	1	1	1	1	1	1	1	
UTILITIES													
Transmission Lines (linear ft.)	0	0	0	0	0	0	270	820	0	5	250	0	820
Transmission Poles	0	0	0	0	0	0	0	0	0	0	0	0	0
Substations	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Mains (linear feet)	14,575	5,159	3,004	6,099	2,700	6,364	5,919	6,800	0	2,253	1,590	0	436
RIGHT OF WAY													
Parcels affected	16	12	13	14	7	15	36	26	3	7	13	5	6
Residential	3	2	5	7	2	9	22	12	0	4	6	0	3
Commercial	1	1	0	0	1	0	1	0	0	0	1	0	0
Farm	10	7	8	7	3	4	3	7	2	3	0	2	1
Classification not Listed	2	2	0	0	1	2	10	7	1	0	6	3	2
Number of acres affected	114	105	62.5	67.2	13.2	43	66.5	179	24	69	46	28	108
Residential/Commercial (estimated total take)	2	1	0	1	0	5	8	9	0	2	3	0	3
Barn/Garage (estimated total take)	4	5	2	1	1	2	1	2	0	2	1	1	0
GEOMETRY													
Bridges - Functionally Obsolete	0	0	0	0	0	0	0	0	0	0	0	0	0
Bridges - Structurally Deficient	0	0	0	0	0	0	0	0	0	0	0	0	0
Horizontal Curve does not meet 55	8	3	2	5	0	9	23	9	0	2	2	0	0
Vertical Curve does not meet 55	13	5	1	2	0	0	8	0	0	1	0	0	0
OTHER													
Gas Wells	0	0	0	0	0	0	0	0	0	0	0	0	0
Oil Wells	0	0	0	0	0	0	0	0	0	0	0	0	0
Shale (acres)	5	2	7	8	1	2	18	45	2	6	14	0.4	42.6
COSTS													
New In Lieu Fees for Stream Impacts PTM 2 REV3[6]	$2,797,406	$2,903,690	$1,498,586	$2,341,766	$1,121,956	$1,857,806	$2,881,770	$9,353,956	$1,395,998	$5,609,369	$3,368,123	$568,638	$6,927,512
Waste Area Stream In Lieu (linear feet)[6]	1464.14	1353.50	1000	0	350	576	24	650	0	438	0	578	0
Waste Area Stream In Lieu Costs[6]	$746,713	$690,287	$347,000	$0	$228,000	$293,533	$97,467	$226,000	$0	$203,000	$0	$294,620	$0
Waste Area ROW (acres)[6]	10.03	9.27	6.00	20.00	1.00	3.94	8.06	4.00	0.00	3.00	0.00	3.96	0.00
Waste Area ROW Costs ($3000/acre)	$30,000	$28,000	$18,000	$60,000	$3,000	$12,000	$24,174	$12,000	$0	$9,000	$0	$11,870	$0
Wetland Costs ($15,000/acre)	$15,000	$21,000	$30,000	$19,500	$0	$0	$9,000	$0	$0	$0	$0	$0	$0
Wooded ($3,150/acre)	$224,000	$107,000	$63,000	$129,150	$34,650	$110,250	$203,175	$532,350	$63,000	$214,200	$110,250	$75,600	$346,500
DBNF (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0
pipelines (lf)	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes

1 LOS - Level of Service
2 ADT - Average Daily Traffic
3 ATS - Average Travel Speed/vehicle in mph
4 *Portions of this area did not have archived plans
5 If there is a blank, there are no expected impacts for this category.
6 Avg. Cost/Foot with 20% REV 3

$347.00 Ephemeral
$887.00 Perennial
$651.00 Intermittent

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.

The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:

Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

7 NO DATA - Outside the study area where data was not collected.

Streams were estimated for this data based on study area data.
Outside the study area

Remaining Alternatives

Sections	Total Section 1A	Total Section 1B	Total Section 2A	Total Section 2B	Total 3A	Total 3B	Total 3D	Total 5A	Total 5A-1	Total 5B	Total 5B with N. Connector	Total 5B-1	Total 5C	Total Alt 5A+5A- 2 +5C-1+5B1-1+5B2
CRITERIA														
CRASH SPOTS with CCRF>0.9	2	2	0	0	0	0	0	0	0	2	2	0	2	2
ENVIRONMENTAL														
Archaeology Sites	0	0	1	1	0	0	#VALUE!	0	0	0	0	0	0	0
Aquatic/Terrestrial														
Wetlands (acres)	0.25	0.25	0.2	0.2	0.7	2.3	0	0.8	0.3	0.8	0.8	0.8	0.8	0.8
Pond	0	0	0	0	0	2	#VALUE!	0.3	0	0.3	0.3	0.3	0.3	0.3
Ephemeral Stream (linear ft.)	1,764	1,764	0	0	5,878	4,943	854	2,933	3,430	1,906	3,674	3,835	938	1,465
Perennial Stream (linear ft.)	1,027	1,027	350	350	4,509	9,522	5,626	11,033	11,340	8,992	8,992	7,864	6,449	7,888
Intermittent Stream (linear ft.)	687	687	135	135	4,168	3,659	2,955	3,944	4,556	4,548	5,750	5,635	2,019	1,398
KDFWR Mitigation Site	0	0	0	0	0	0	#VALUE!	0	0	0	0	0	0	0
Designated Use Waters	0	0	0	0	0	0	#VALUE!	690	0	690	690	690	690	690
Threatened Endangered Species Habitat (linear ft.)	130	130	90	90	3037	4978	#VALUE!	11,033	11,340	8,992	8,992	7,313	6,449	7,888
Habitat Scrub Shrub (acres)	0	0	0	0	0.6	1.5	#VALUE!	2	1	2	2	2	3	2
Disturbed Woods (acres)	2	2	0	0	13.05	5.7	#VALUE!	5	5	1	1	36	7	1
Mature Woods (acres)	12	12	5	5	129	82	#VALUE!	126	147	133	153	164	124	124
Forested Wetland (acres)	1	1	0	0	0.4	2	#VALUE!	0	0	0	0	0	0	0
Outcrops (acres)	0	0	0	0	6	1	#VALUE!	0	7	0	0	12	13	9
100-year Floodplain (acres)	0	0	0	0	0.7	7	12	4	2	6	6	5	6	6
Floodway (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Landslides	0	0	0	0	3	0	#VALUE!	0	1	0	0	0	0	0
Bat Impacts (acres)	37	37	23	23	143	159	117	0	0	0	0	0	0	0
Community														
Schools	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Churches	2	2	0	0	1	0	#VALUE!	0	0	1	1	0	1	1
Cemeteries	2	2	1	1	2	1	#VALUE!	0	0	0	0	0	0	0
Community (cluster of houses)	2	2	0	0	0	0	0	0	0	1	1	0	1	1
Fire Department	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Tank	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Historic														
NR Historic Property	0	0	1	1	0	0	#VALUE!	0	0	0	0	0	0	0
Determined Eligible from Previous Study	0	0	0	0	0	0	#VALUE!	0	0	0	0	0	0	0
Potentially Signifiant Property	0	0	0	0	3	1	#VALUE!	0	0	2	2	1	1	1
Property Affected (acres)	1	1	0	0	0	0	#VALUE!	2	2	5	5	8	5	5.4
UST														
UST	2	2	1	1	2	3	#VALUE!	1	1	1	1	1	1	1
Environmental Justice Windshield Survey (yes or no)	0	0	0	0	#VALUE!	#VALUE!		yes	yes	yes	yes	yes	yes	yes
Air Quality	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential
Noise								5	2	6	4	2	4	4
UTILITIES														
Transmission Lines (linear ft.)	0	0	0	0	0	0	#VALUE!	337	337	255	255	820	270	250
Transmission Poles	0	0	0	0	0	0	#VALUE!	0	0	0	0	0	0	0
Substations	0	0	0	0	0	0	#VALUE!	0	0	0	0	0	0	0
Water Mains (linear feet)	21,691	21,691	10,132	10,132	35986	10290	7937	8,513	11,608	9,547	9,547	12,504	17,987	13,658
RIGHT OF WAY														
Parcels affected	130	130	24	24	62	40	16	35	36	40	43	46	71	53
Residential	0	0	0	0	2	2	0	12	14	17	17	19	38	22
Commercial	0	0	0	0	0	0	0	1	1	2	2	1	2	2
Farm	0	0	0	0	19	15	6	21	20	14	16	18	18	17
Classification not Listed	130	130	24	24	41	23	10	1	1	7	8	8	13	12
Number of acres affected	50	50	23	23	217	266	235	194	199	191	215	255	185	193
Residential/Commercial (estimated total take)					18	12	3	5	6	5	5	8	13	8
Barn/Garage (estimated total take)					26	10	3	10	9	6	6	3	6	7
GEOMETRY														
Bridges - Functionally Obsolete	1	1	1	1	2	1	0	0	0	0	0	0	0	0
Bridges - Structurally Deficient	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Priority Corridor

Sections	Total Section 1A	Total Section 1B	Total Section 2A	Total Section 2B	Total 3A	Total 3B	Total 3D	Total 5A	Total 5A-1	Total 5B	Total 5B with N. Connector	Total 5B-1	Total 5C	Total Alt 5A+5A- 2 +5C-1+5B1-1+5B2
CRITERIA														
Horizontal Curve does not meet 55	0	0	0	0	11	6	1	2	5	6	6	11	34	13
Vertical Curve does not meet 55	0	0	7	7	26	9	0	1	2	2	2	1	9	1
OTHER														
Gas Wells	0	0	0	0	3	2	1	0	0	0	0	0	0	0
Oil Wells	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shale (acres)	0	0	0	0	1	5	#VALUE!	34	35	28	30	53	28	24
COSTS														
New In Lieu Fees for Stream Impacts PTM 2 REV3[6]	$1,970,294	$1,970,294	$398,335	$398,335	$8,752,517	$12,543,244	$7,210,305	$13,371,566	$14,214,746	$11,598,034	$12,994,032	$11,974,498	$7,360,118	$8,415,109
Waste Area Stream In Lieu (linear feet)[6]	147	65	22	0	1,106	1,381	6,531	2,310	1,310	1,788	1,788	2,503	1,950	2,503
Waste Area Stream In Lieu Costs[6]	$74,719	$33,024	$11,183	$0	$564,077	$704,138	$4,190,000	$908,000	$561,000	$778,000	$778,000	$1,163,154	$966,000	$1,163,154
Waste Area ROW (acres)[6]	1.00	0.44	0.15	0.00	8	9	43	16	30	10	10	15	19	15
Waste Area ROW Costs ($3000/acre)	$3,010	$1,331	$451	$0	$23,400	$28,408	$130,000	$48,000	$90,000	$30,000	$30,000	$44,870	$57,174	$44,870
Wetland Costs ($15,000/acre)	$10,500	$10,500	$0	$0	$15,000	$52,500	#VALUE!	$30,000	$19,500	$30,000	$30,000	$30,000	$39,000	$30,000
Wooded ($3,150/acre)	$42,525	$42,525	$16,380	$16,380	$447,200	$276,280	#VALUE!	$411,075	$477,225	$422,100	$485,100	$630,000	$411,075	$393,750
DBNF (acres)	0	0	0	0	0	7	38	0	0	0	0	0	0	0
pipelines (lf)	0	0	0	0	254	510	300	0	0	0	0	0	0	0

Notes

1 LOS - Level of Service
2 ADT - Average Daily Traffic
3 ATS - Average Travel Speed/vehicle in mph
4 *Portions of this area did not have archived plans
5 If there is a blank, there are no expected impacts for this category.
6 Avg. Cost/Foot with 20% REV 3
$347.00 Epemerel
$887.00 Perennial
$651.00 Intermittent
Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.

The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:

Waste Area ROW (acres) = 185,000 cu yards of excess/acre
Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

7 NO DATA - Outside the study area where data was not collected.
Streams were estimated for this data based on study area data.
* Outside the study area

SPOT IMPROVEMENTS

Sections	Vanceburg Hill Spot Improvement 1	Leslie St. / Chestnut st. Spot Improvement 2	Fuller Branch Spot Improvement 3	Spot Improvement 4 - KY 59/KY 344 Intersection	Spot Improvement 5 - Holly Branch	Spot Improvement 6-South of Lewis County Park to the Old Jack Esham Place	Spot Improvement 7-Thurman Curve	Spot Improvement 8 - County Line	Spot Improvement 9-McCleese Hollow Road to Stamm Fork	Spot Improvement 10 - Briery Curve
CRITERIA										
CRASH SPOTS with CCRF>0.9	1	0	0	0	0	1	0	0	0	0
ENVIRONMENTAL										
Archaeology Sites	0	0	0	0	0	0	0	0	0	0
Aquatic/Terrestrial										
Wetlands (acres)	0	0	0	0	0	0	0	0	0.5	0
Pond	0	0	0	0	0	0	0	0	0	0
Ephemeral Stream (linear ft.)	146	138	0	0	35	0	418	1,366	299	0
Perennial Stream (linear ft.)	907	713	450	349	140	620	0	0	1,622	601
Intermittent Stream (linear ft.)	859	0	411	0	0	0	0	1,951	603	509
KDFWR Mitigation Site	0	0	0	0	0	0	0	0	0	0
Designated Use Waters	0	0	0	0	0	0	0	0	0	0
Threatened Endangered Species Habitat (linear ft.)	907	713	450	349	0	0	0	0	1,622	601
Habitat Scrub Shrub (acres)	0	1	0	0	2	0	0	0	0	0
Disturbed Woods (acres)	6	0	0	2	0	0	0	1	2	2
Mature Woods (acres)	46	9	1	20	6	2	5	34	13	70
Forested Wetland (acres)	0	0	0	0	0	0	0	0	1	0
Outcrops (acres)	2	1	0	7	0	0	0	0	0	0
100-year Floodplain (acres)	0	1	0	0	0	0	0	0	0	1
Floodway (acres)	0	0	0	0	0	0	0	0	0	0
Landslides	0	0	0	0	0	0	0	0	0	0
Bat Impacts (acres)	0	0	0	0	0	0	0	40	21	0
Community										
Schools	0	0	0	0	0	0	0	0	0	0
Churches	0	1	0	0	0	0	0	0	0	0
Cemeteries	0	0	0	0	0	0	0	0	0	0
Community (cluster of houses)	0	0	0	0	0	0	0	0	0	0
Fire Department	0	0	0	0	0	0	0	0	0	0
Water Tank	0	0	0	0	0	0	0	0	0	0
Historic										
NR Historic Property	0	0	0	0	0	0	0	0	0	0
Determined Eligible from Previous Study	0	0	0	0	0	0	0	0	0	0
Potentially Signifiant Property	0	0	0	0	0	0	0	0	0	0
Property Affected (acres)	0	0	0	0	0	0	0	0	0	0
UST										
UST	0	0	0	0	0	0	1	0	1	0
Environmental Justice Windshield Survey (yes or no)	no	no	no	no	no	no	no	no	no	no
Air Quality	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential	low potential
Noise	1	1	1	1	1	0	2	1	2	0
UTILITIES										

SPOT IMPROVEMENTS

Sections	Vanceburg Hill Spot Improvement 1	Leslie St. / Chestnut st. Spot Improvement 2	Fuller Branch Spot Improvement 3	Spot Improvement 4 - KY 59/KY 344 Intersection	Spot Improvement 5 - Holly Branch	Spot Improvement 6-South of Lewis County Park to the Old Jack Esham Place	Spot Improvement 7-Thurman Curve	Spot Improvement 8 - County Line	Spot Improvement 9-McCleese Hollow Road to Stamm Fork	Spot Improvement 10 - Briery Curve
CRITERIA										
Transmission Lines (linear ft.)	374	0	0	0	0	0	0	0	0	0
Transmission Poles	0	0	0	0	0	0	0	0	0	0
Substations	0	0	0	0	0	0	0	0	0	0
Water Mains (linear feet)	3,310	1,592	947	731	1,372	1,338	1,432	2,898	9,447	3,321
RIGHT OF WAY										
Parcels affected	13	22	5	11	6	3	4	7	10	4
Residential	3	17	1	7	2	0	1	0	1	1
Commercial	0	1	0	0	0	0	0	0	0	0
Farm	4	1	3	2	4	3	2	1	8	3
Classification not Listed	6	3	1	2	0	0	0	6	1	0
Number of acres affected	56	12	5	24	21	5	14	38	31	12
Residential/Commercial (estimated total take)	4	5	1	1	2	0	2	2	3	0
Barn/Garage (estimated total take)	5	3	0	0	1	1	0	0	2	1
GEOMETRY										
Bridges - Functionally Obsolete	0	0	0	0	0	0	0	0	1	0
Bridges - Structurally Deficient	0	0	0	0	0	0	0	0	0	0
Horizontal Curve does not meet 55	18	4	1	4	5	1	3	8	2	2
Vertical Curve does not meet 55	7	1	0	0	4	3	3	3	10	5
OTHER										
Gas Wells	0	0	0	0	0	0	0	1	0	0
Oil Wells	0	0	0	0	0	0	0	0	0	0
Shale (acres)	2.5	10	0	2	5	0	2	0	0	0.3
COSTS										
New In Lieu Fees for Stream Impacts PTM 2 REV3[6]	$1,414,380	$680,317	$666,711	$309,563	$136,325	$549,940	$145,046	$1,743,999	$1,934,881	$864,446
Waste Area Stream In Lieu (linear feet)[6]	400	450	0	1242	924	15	440	0	0	13
Waste Area Stream In Lieu Costs[6]	$260,000	$156,000	$0	$633,630	$471,030	$7,522	$224,169	$0	$0	$6,682
Waste Area ROW (acres)[6]	5.00	2.00	0.00	8.51	6.33	0.10	3.01	0.00	0.00	0.09
Waste Area ROW Costs ($3000/acre)	$15,000	$6,000	$0	$25,529	$18,978	$303	$9,032	$0	$0	$269
Wetland Costs ($15,000/acre)	$0	$15,000	$0	$0	$30,000	$0	$1,500	$0	$7,500	$0
Wooded ($3,150/acre)	$163,800	$28,350	$3,150	$68,670	$18,900	$6,300	$16,065	$109,935	$44,100	$226,800
DBNF (acres)	0	0	0	0	0	0	0	4	0	0
pipelines (lf)	0	0	0	0	0	0	0	0	150	0

Notes

1 LOS - Level of Service
2 ADT - Average Daily Traffic
3 ATS - Average Travel Speed/vehicle in mph
4 *Portions of this area did not have archived plans
5 If there is a blank, there are no expected impacts for this category.
6 Avg. Cost/Foot with 20% REV 3

$347.00 Ephemeral
$887.00 Perennial
$651.00 Intermittent

Waste Area In Lieu Fees = Average 146 lf / acre at $510/linear foot

7 NO DATA - Outside the study area where data was not collected.

Using the above figures, Alternatives 5A, 5A-1, 5B, 5C, North connector, South Connector, Spot Improvements 1 and 2 were calculated using GIS.

The remaining alternatives were estimated from the above below averages for the averages from the alternatives above using the following:

Waste Area ROW (acres) = 185,000 cu yards of excess/acre

Streams were estimated for this data based on study area data.

*Outside the study area