Value Engineering Study

VE# 201106

US 150 from KY49 to Leslie Ballard Road

Nelson County
Item Numbers 4-8308 and 4-8309

Study Dates: April 25-29, 2011
Report prepared by Brent A. Sweger, PE

This value engineering study as developed by participants as part of the Value Engineering Mod 1 course. The course was taught by Renee Hoekstra, CVS of RH Associates during the week of April 25-29, 2011. This report documents the result from the study.

The participants for this study were:

1. Renee Hoekstra, Team Leader
2. Farhad Abad
3. Boday Borres
4. Taylor Davis
5. Rob Martin
6. Luther Miracle
7. Kenny Ott
8. Brent Sweger
9. Ted Swansegar
10. Todd Vonbehren

Study Goals (as identified by the project design team)

1. Reduce congestion
2. LOS = D for a 10 year design
3. Improve intersection at McDonald's (KY49)
4. Review congestion at interchanges
5. Eliminate Y intersections, as possible

Performance Attributes and Level of Importance
(as identified and determined by the VE team)

1	Level of Service D: Mainline Operations	26%
2	Maintainability	21%
3	Maintenance of Traffic & Temporary Impacts	16%
4	Constructability	11%
5	Local Operations	26%

Cost Model

The major items identified in the cost estimate are listed below. The VE team focused on generating and developing ideas related to these items.

Roadway Embankment	$4.2M
Paving	$3.6M
Drainage	$1.9M
Bridge	$1.7M

Brainstorming Phase

The VE Team brainstormed ideas for each of the functional areas identified during the function analysis stage. From the list of ideas, each were screened and rated. Ideas that moved to the Development stage are identified with an asterisk in the table below.

	INCREASE CAPACITY
IC-01*	Use roundabouts at KY245
IC-02	Use roundabout at both termini/ramps at Parkway
IC-03	Reduce access points along the entire corridor
IC-04*	Close one end (east) of Pottershop Loop
IC-05	Add frontage roads
IC-06*	Medians and U-turns
IC-07	Reversible lane
IC-08	Direct ramps to KY 245 from Parkway
IC-09	Direct ramp to Lowe's from SB Parkway Ramp
IC-10	Widen KY 245 from US150 to US62
IC-11*	KY245 to US150 becomes mainline: tie US150 west section in as T intersection
IC-12	Station 137 to 149 make two lanes only
IC-13	Roundabout intersection with Parkway
IC-14	KY 49 roundabout
IC-15	Buy or relocate McDonalds
IC-16*	New connector from Springhill to KY49 + close current access to Pottershop Loop
IC-17	Median extension KY245 to past Walmart back access
IC-18*	Realign Maywood to Parkway Drive
IC-19	Realign KY49 and Plaza Drive east of McDonalds (90 degree intersection)
IC-20	Re-evaluate traffic projections to ensure adequacy of number of lanes
IC-21	Re-use existing asphalt pavement
IC-22	Concrete ILO asphalt
IC-23*	KY49 and KY245 and Parkway Ramps intersections: use concrete
IC-24	Concrete overlay of two existing concrete ramps
IC-25*	Move two ramps closer together
IC-26	Use geogrid to reduce thickness
IC-27*	Connect US150 and Pottershop opposite of Springhill and eliminate Pottershop "Y"
IC-28*	Use signal retiming to manage operations as an interim solution
IC-29	Preserve ROW through P&Z process
	SPAN SPACE
SS-01	Lower parkway and widen bridge
SS-02	Longitudinal joint and widen bridge each side
SS-03	Longitudinal joint and widen bridge one side
SS-04*	Roundabouts at existing ramps use existing bridge
SS-05*	Single span bridge
SS-06	Widening with 8" overlay on existing bridge (no longitudinal joints)
SS-07	MSE walls to shorten bridge (single span)

SS-08	Aesthetic/Context sensitive considerations
SS-09	Weathering steel
SS-10	Add raised sidewalk on bridge and eliminate 10' shoulder
SS-11	Raised shared-use path
SS-12	At-grade shared-use path
SS-13	At-grade shared-use path with barrier
SS-14	Reduce lane widths to reduce bridge width
	ACCOMMODATE UTILITIES
AU-01	Underground utilities
AU-02	Re-evaluate and discussion with utility owners (current impacts)
AU-03	Coordinate with signals, in-house departments (concurrent designs)
	ACCOMMODATE DRAINAGE
AD-01	Eliminate curb and gutter; no storm sewer
AD-02	Reduce fill width using MSE modified wall – eliminate culvert extensions
AD-03	Use pre-cast culvert extensions
AD-04*	Eliminate curb & gutter on right side (Sta 140 to 186)
AD-05*	Install detention basin on Parcel 84 – use to reduce storm sewer sizes
AD-06	Use an arch to extend culvert ILO box culvert
	ACCOMMODATE PEDESTRIANS
AP-01	Eliminate all sidewalks
AP-02	Reduce the width to 4'
AP-03	Paver sidewalk
AP-04*	Shared-use path on one side and no sidewalk on the other side
AP-05	Eliminate buffer between road and sidewalk
AP-06	Stamped concrete ILO grass for buffer
AP-07	Ask city for money for lighting
AP-08*	Extend sidewalk to Parkway Drive
AP-09*	Ped refuge islands at unsignalized crosswalks
AP-10*	Install HAWK signals
	MISCELLANEOUS
M-01	Solar powered traffic signals
M-02	Consider temporary signals at ramps for construction
M-03	Use Pottershop Loop as detour
M-04	Build structure on one side and shift traffic to new to then eliminate old bridge
M-05	Allow night work
M-06	Allow some total closures
M-07	Use Pottershop for northbound only detour
M-08	Close ramps for construction detour on US31E
M-09	Enforce truck route usage
M-10	Use truck routes as detours for all traffic
M-11	Change alignment to try and use only one side
M-12	Go to a 2-span bridge ILO 4-span. Eliminate shoulder piers
M-13	Spread footings for constructability.
M-14	Precast bridge decking
M-15	Proactive approach to public information during construction

Development Phase

The following pages document the ideas that were developed by the VE team. Each idea includes a description of what is included in the original design and what the VE alternative proposes to be changed. Differences in initial and life cycle costs, drawings, and expected benefits and risks are also included in each write-up.

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- Review costs of construction in more detail
RM BB

IC-01

February 2011

TITLE:	xxx USE Roundabout at Ky 245
FUNCTION:	Increase capacity xxx
BASELINE ASSUMPTION:	

Propose widen of the Ky 245/US150 intersection to add lanes to US150 and add double lefts to Ky 245

PROPOSED ALTERNATIVE:

Propose to remove at grade intersection at Ky 245/US150 and replace with a dual roundabout.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

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February 2011

TITLE: xxx USE Roundabout at Ky 245	
BENEFITS	**RISKS/CHALLENGES**
• No signal	• Possible impact to local business (Lowes/ Walmart
• increase capacity	• removal of one house
• decrease delay because of removing signal	• truck movements
• decrease delay on offpeak	• constructability
• decrease speeds	• MOT. maybe have to close road
• decrease worse crashes	• may have to change alignment to avoid businesses
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IC-01

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

The building of the roundabout would eliminate the construction of dual left off of Ky 245 which would decrease the R&W and the construction of Pavement on that approach. There would be the benefit of little delay for the off-peak hours

The Signal would delay each approach but the roundabout would decrease delays and the speeds at the intersection. The round about also would decrease the wear on the pavement because of the stop/Go that is caused by the installation of Traffi signal. There would be an increase in safety because of the elimination of rearends and possible angle crashes. Eliminate the signal would improve the delay because of the installation of two other signal at the ramps. The installation of roundabout would eliminate possible obstuction near the road (signal poles). It also would eliminate the installatio of traffic Loops in the pavement that may cause th failure of the pavement in the future.

IMPLEMENTATION CONSIDERATIONS:

Propose to be a dual lane roundabout because of Left turn volumes from Ky 245. A Single lane roundabout could be consider if traffic volumes are changed or can accommodat this option. Propose to move round about to the south to accommodate the MoT. This would enable the use of the existing road for MOT

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February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Traffic signal			1	65,000	65000			-65,000
R&W					0	30000	6	180000
relocation of House								$250,000
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			365,000

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

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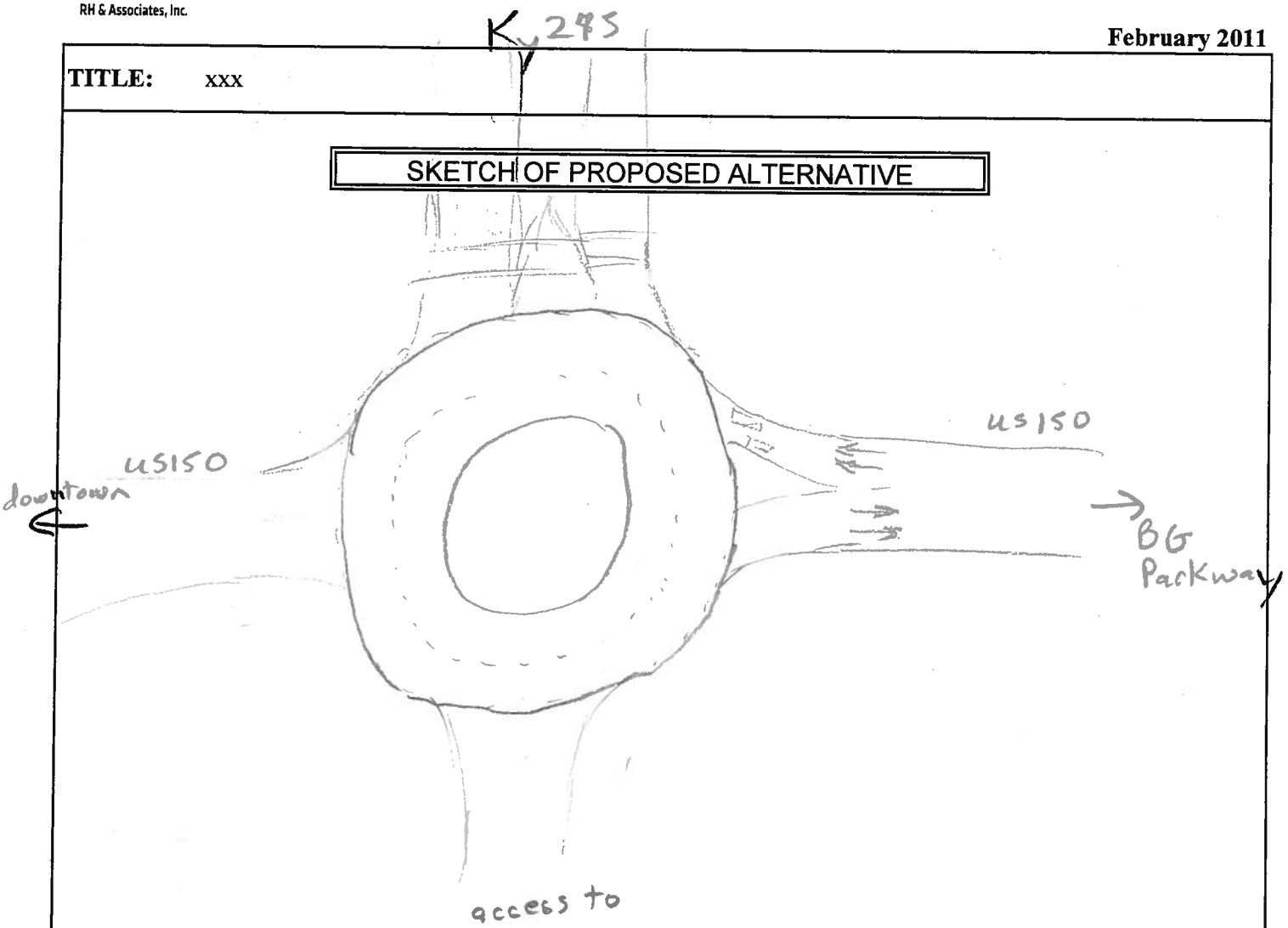
VALUE ENGINEERING PROPOSAL XX-XX

IC-01

February 2011

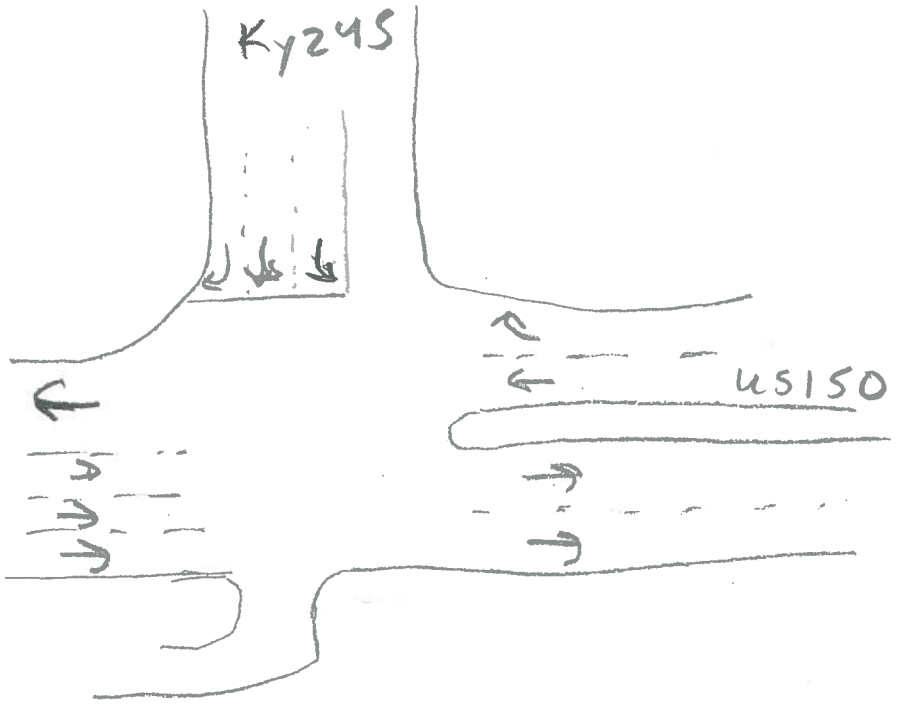
TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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February 2011

TITLE: xxx

Assumptions			
Interest/Discount Rate(%):	5	**Economic Life (yrs):**	10

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

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VALUE ENGINEERING PROPOSAL XX-XX

TV
Revised by BB
IC-04

February 2011

TITLE: xxx	CLOSE ONE END OF POTTERSHOP (EAST)
FUNCTION:	Increase Capasity xxx
BASELINE ASSUMPTION:	

DO NOTHING. LEAVE AS IS.

Reconstruct Pottershop East intersection at current location. BS

PROPOSED ALTERNATIVE:

CLOSE [redacted] INTERSECTION OF POTTERSHOP LANE & US 150 AT STA 148+93.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ MINIMAL COST - NO CHANGE

BS

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February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• REDUCE ACCESS POINTS ON US 150	• TRAVELY TIME INCREASE FOR SOME
• INCREASE MOBILITY	•
• REDUCE MAINTENANCE	•
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VALUE ENGINEERING PROPOSAL XX-XX

IC-04

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

It is proposed to completely close Pottershop loop to US 150 @ station 148+93. This closure eliminates 3 conflict (crash) point, therefore eliminating possibility of accidents @ this location and maintain the traffic flow on US 150. The number of users inconvienanced by this closure would be around 350 cars a day who would have to take a different route. This proposal enhances the value of realignment of west end of Pottershop loop with Springhill Drive @ US 150.

Traffic study attached

IMPLEMENTATION CONSIDERATIONS:

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TITLE:	xxx							
DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

Cost for closing → curb or pavement removal

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IC-04

February 2011

TITLE:	xxx

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

VALUE ENGINEERING PROPOSAL XX-XX

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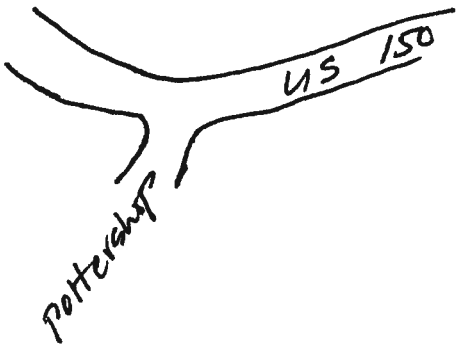
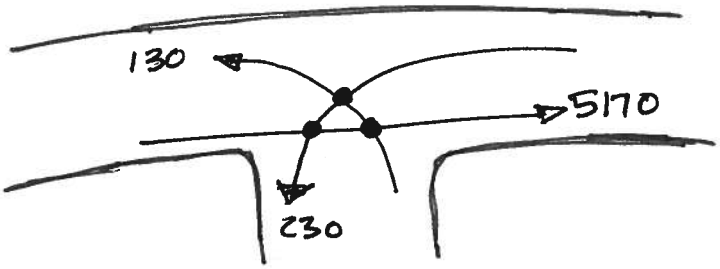
February 2011

TITLE: XXX

SKETCH OF BASELINE ASSUMPTION





Turning Movements @ the intersection

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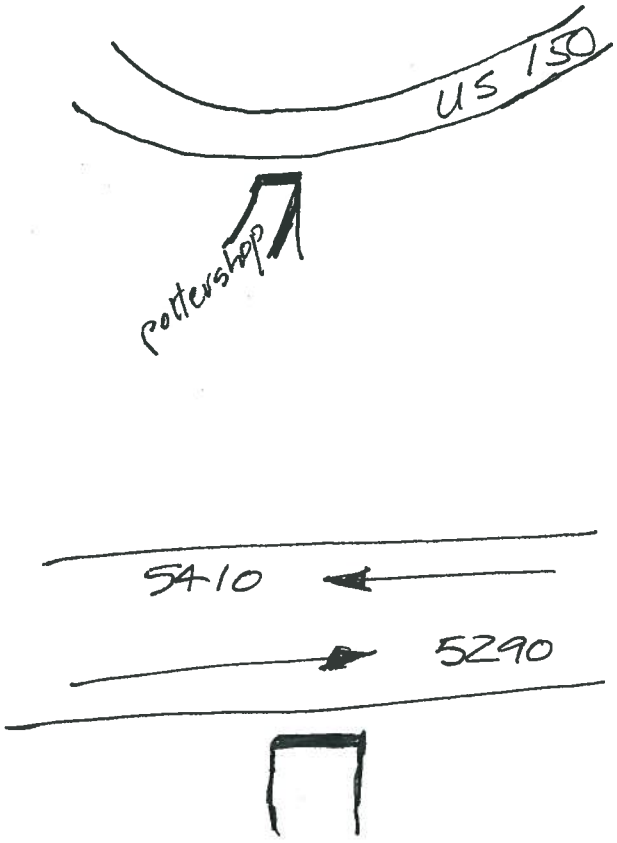
VALUE ENGINEERING PROPOSAL XX-XX

IC-04

February 2011

TITLE: xxx

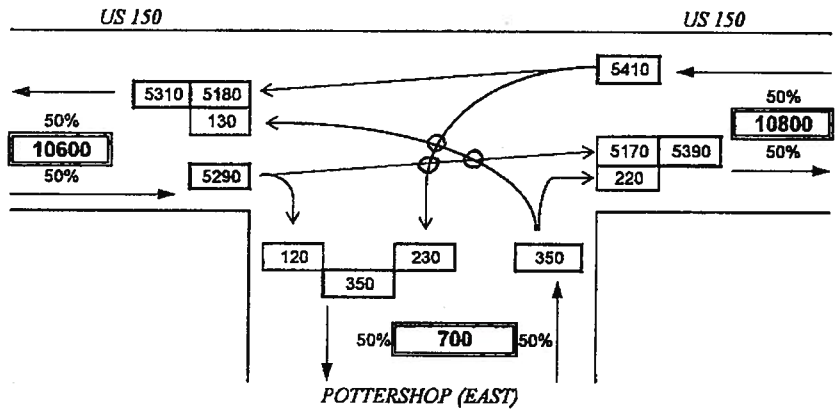
SKETCH OF PROPOSED ALTERNATIVE



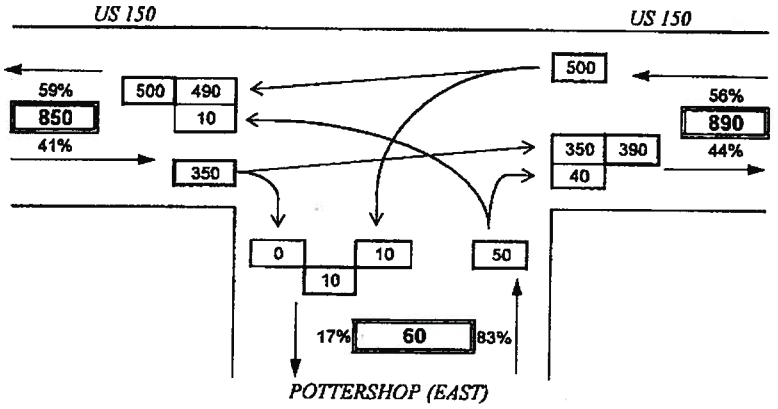
PROJECT: US 150 from KY 49 to Leslie Ballard Lane in Nelson Co.
ITEM NUMBER: 4-8308 & 4-8309
MARS NUMBER: Pending
REQUEST DATE: 5/5/2006
ANALYST: S. Walker
SCENARIO: **2006 Current ADT and Design Hour Volumes**
INTERSECTION: 3 - US 150 and POTTERSHOP (EAST)

NOTE: K-Factors, Directional Distributions, and Peak Hour Factors were determined from a 2006 Turning Movement Count. AM and PM DHVs represent 30th highest hour estimates for each turn maneuver.

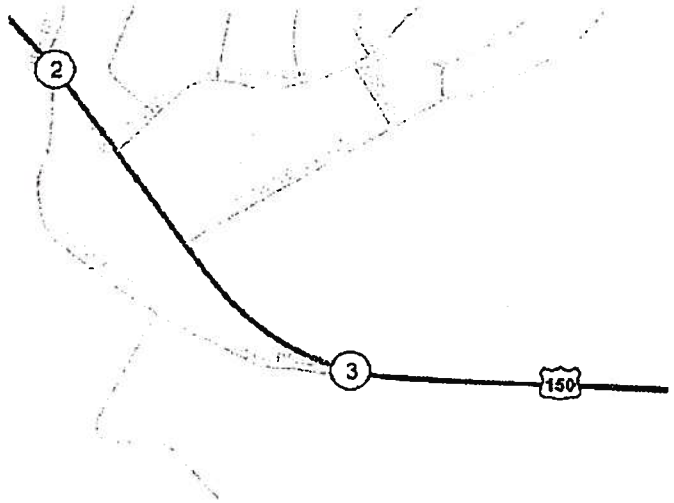
2006 ADT



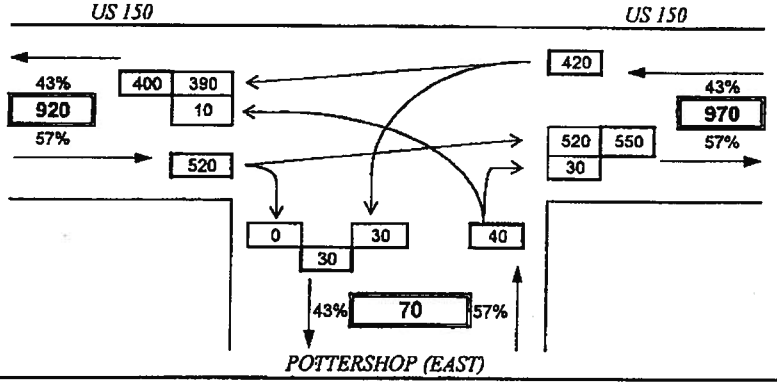
2006 AM Design Hour



Location Map



2006 PM Design Hour



10-04

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VALUE ENGINEERING PROPOSAL XX-XX IC-06

IC-06

February 2011

TITLE: xxx Medians & U-Turns

FUNCTION: Increase Capacity xxx

BASELINE ASSUMPTION:

Continuous left turn lane Sta 111+50 to 172+00

PROPOSED ALTERNATIVE:

Raised Median from Sta 116+00 to Sta 171+00 with Left Turn Lanes at Sta 130+00 (Spring Hill) and Sta 148+00 (Pottershop)

KJO

9

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 105900 -	$ -	$ 105,900 -
PROPOSED ALTERNATIVE:	$ 368,450 -	$ 18,700 -	$ 387,150 -∞
TOTAL (Baseline less Proposed)	$ (262,550) -	$ (18,700) -	$ (281,250) -

NO CHANGE

TD

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Reduce left turn conflicts	• Longer travel distance
• Reduce intersection delays	• Added mowing of median ⇒ Possible ? - Concrete ? - But cost ?
• Improve Esthetics by allowing Landscaping in median	• Widen on opposite side to allow large turning radii for trucks / Buses and larger Vehicles - See Sketch
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VALUE ENGINEERING PROPOSAL XX-XX

IC-06

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

The current design includes a continuous left turn lane. This configuration allows left turns at all intersections and residential entrances. There are currently 9 residential, 4 approach and 1 commercial access points from Sta 116+00 to Sta 171+00. This change would eliminate conflicting left turn movements by placing median u-turns at Sta 130+00, Springhill Dr. and Sta 145+00, Pottershop Rd (South). The median would be raised and prohibit left turns at other locations. This reduces the number of left turn conflict locations from 14 to 2. Reducing left turn conflicts will improve traffic flow thru this portion of the project. The raised median will provide an opportunity for improving esthetics by allowing landscaping in the median.

- Good Access control

IMPLEMENTATION CONSIDERATIONS:

Public Acceptance of concept

MOA with city for Median Landscape Maintenance

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Asphalt (Overlay) 3"	0	TON	1412	75.00	105,900	150	75.00	11,250
Curb & Gutter	0	LF	0	20.00	0	10,600	20.00	212,000
Embankment In Place	0	CY	0	12.00	0	3,700	12.00	44,400
Seeding & Protection	0	SY	0	0.50	0	8,600	0.50	4,300
SS Pipe 18"	0	LF	0	60.00	0	1300	60.00	78,000
CBI Type A	0	EACH	0	3700.00	0	5	3700.00	18,500
TOTAL COSTS*					105,900			368,450
							TOTAL (BASELINE LESS PROPOSED)	262,550

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

- Seems like very large difference in Asphalt overlay by just eliminating Median Lane, 14' wide from Sta 116+00 to Sta 141+00 eliminated add 2 left Turn Lanes
- RAISED Concrete Median may eliminate C+G and pipe, but will probably be a wash with extra concrete price. Quantity of Pipe and CBI's is only for Median in curve 140-150

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VALUE ENGINEERING PROPOSAL XX-XX

1C-06

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):	5%	**Economic Life (yrs):**	20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1						
2						
3						
4						
5						
Total Salvage & Replacement Costs						

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1	Mowing (20 yr)	0	0	1500.00	18,700.00
2					
3					
4					
5					
Total Annual Costs					

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)	0	18,700.00
RESULTS (Proposed less baseline)		

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

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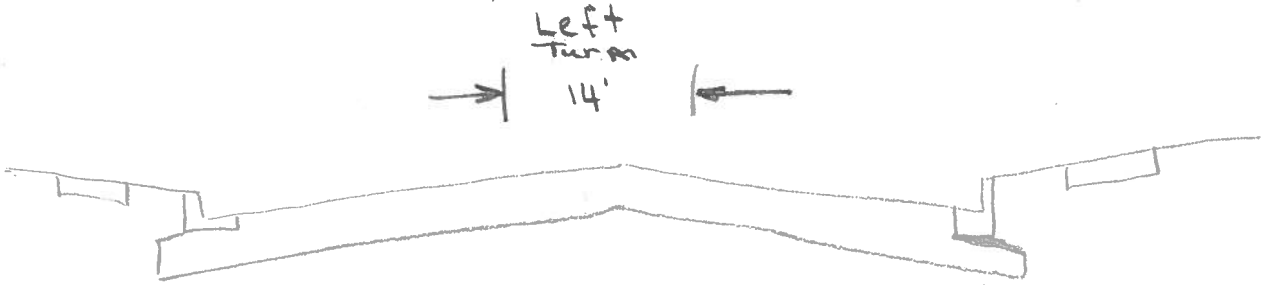
February 2011

TITLE: XXX

SKETCH OF BASELINE ASSUMPTION



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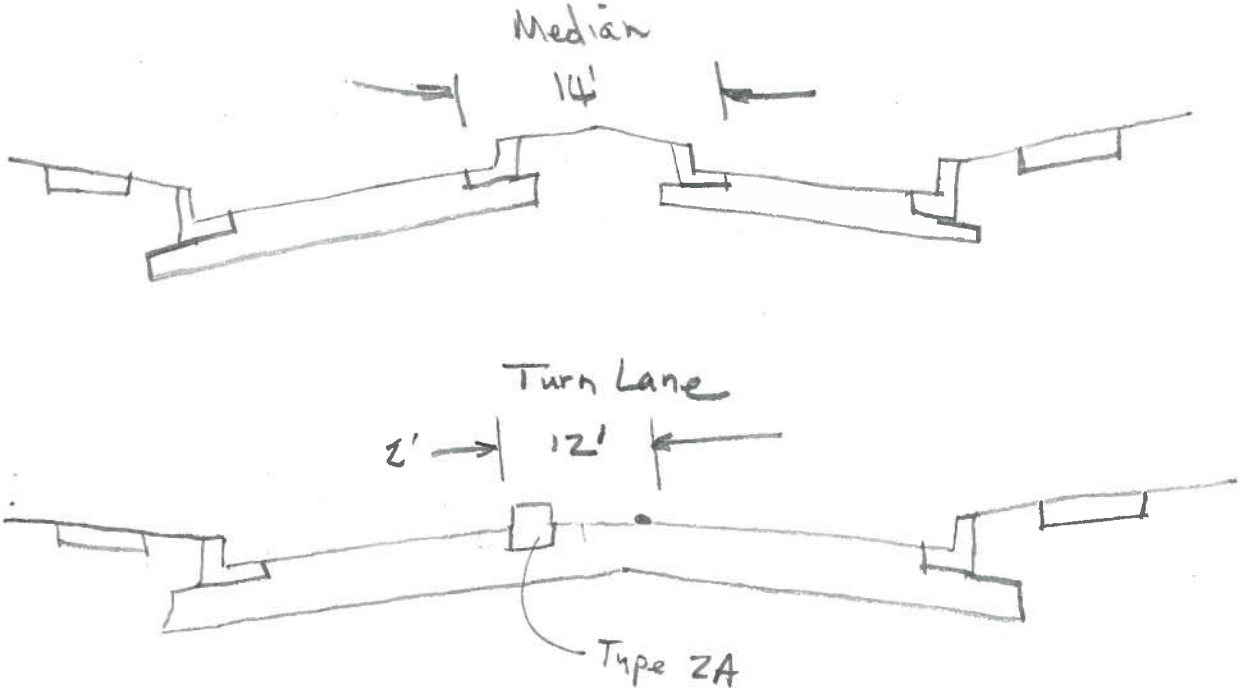
VALUE ENGINEERING PROPOSAL XX-XX

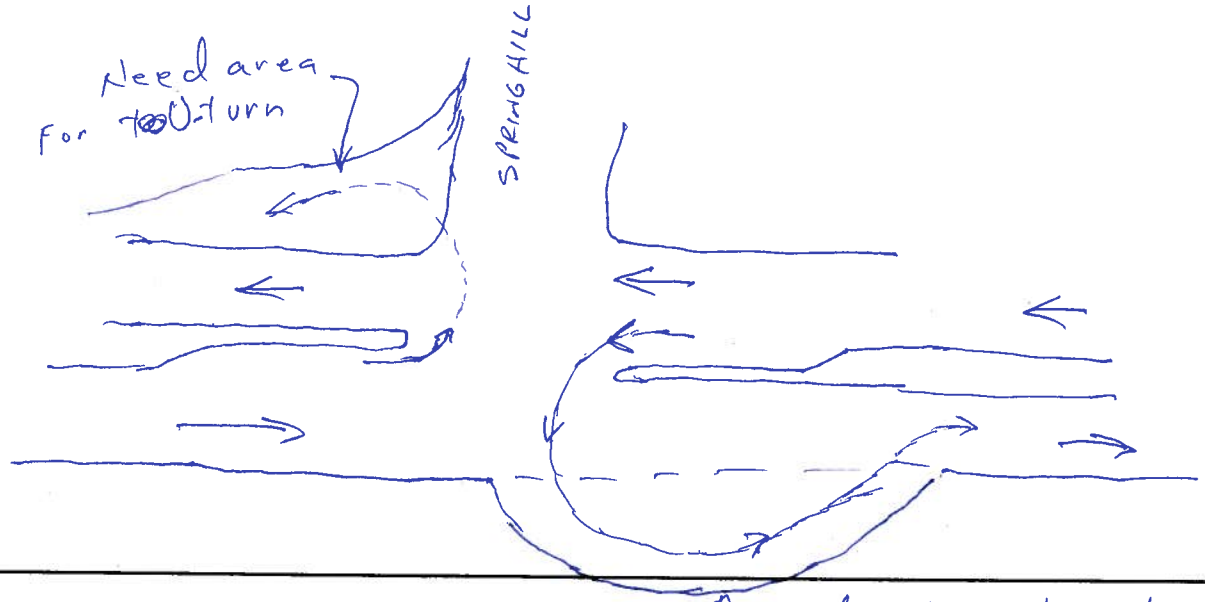
IC-06

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE





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IC-11

February 2011

TITLE: xxx KY 245- US-150 BECOMES MAINLINE | TIE US-150 AS T-INTERSECT

FUNCTION: INCREASE CAPACITY xxx IC-11

BASELINE ASSUMPTION:

WIDEN US-150 + KY 245 AT INTERSECTION, WITH DOUBLE LEFT TURNS FROM KY 245 to US 150.

PROPOSED ALTERNATIVE:

CONSTRUCT HORIZONTAL CURVE FOR US-150 AND KY 245 INSTEAD OF 90° T-INTERSECTION, ALLOWING MAIN FLOW OF TRAFFIC TO CONTINUE ON KY 245 ONTO US 150. EASTBOUND US150 WILL APPROACH KY 245 AT CURVED INTERSECTION,

T-intersection

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -
			NO CHANGE

BAS

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX

BENEFITS	RISKS/CHALLENGES
• MAINTAINS MOBILITY BY REDUCING CONGESTION.	• LIKELY NEED TO TAKE A SMALL BUSINESS (A+W ROOTBEER SHOP)
• INCREASES CAPACITY	• INCREASED COSTS WITH R/W ACQUISITION
• POSSIBILITY OF REMOVING THE NEED OF A 3RD LEFT TURN LANE FROM KY 245 - US150,	•
• REDUCE COSTS WITH REDUCING NUMBER OF LANES	•
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RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-11

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

EXISTING TRAFFIC REPORTS INDICATE THE MAJORITY OF TRAFFIC IS PRESENT ALONG KY 245, NOT US 150. INSTALLING A HORIBONTAL CURVE AT KY245 | US-150 INTERSECTION MAY INCREASE CAPACITY AND MAINTAIN MOBILITY BY IMPROVING THE LEVEL OF SERVICE FOR KY 245 AND WESTBOUND US 150 AT INTERSECTION. EASTBOUND US 150 WOULD APPROACH KY 245 AT A T-INTERSECTION. THIS ALIGNMENT MAY REQUIRE THE TAKING OF A SMALL BUSINESS ON the NORTHEAST CORNER OF INTERSECTION, HOWEVER, THIS BUSINESS OWNS A LARGE PARCEL ADJACENT TO THE EXISTING LOCATION WHICH WOULD ALLOW FOR QUICK CONSTRUCTION AT MINIMAL RELOCATION COSTS. THIS ALIGNMENT MAY REMOVE THE NEED FOR A FUTURE 3RD LEFT TURN LANE TURNING EASTBOUND ONTO US150 FROM KY 245, THIS FUTURE LEFT TURN LANE WAS ELIMINATED WITH THE PRACTICAL SOLUTIONS ALTERNATE, SO POSSIBILITY OF THE REMOVAL OF LANE FROM WARRANT WILL STAY WITHIN THE SCOPE. BY MAINTAINING MOBILITY WITH REDUCING CONGESTION, THIS MAY ALLOW FOR THE REDUCTION OF A LARGE SCOPE OF THIS PROJECT WEST OF THE INTERSECTION ALONG US 150. CURRENT R/W ILLUSTRATES THAT KYTC OWNS ENOUGH R/W SOUTH OF EXISTING ALIGNMENT TO ALLOW FOR CONSTRUCTION OF APPROACH WORK AND SLIGHT US150 REALIGNMENT. THIS WILL COORDINATE WITH THE PROPOSED LANE REDUCTIONS DUE TO INCREASED CAPACITY.

IMPLEMENTATION CONSIDERATIONS:

- THE POSSIBILITY OF RELOCATING A SMALL BUSINESS WOULD NEED TO BE INVESTIGATED.

SOME APPROACH WORK TO THE BRIDGE MAY NEED TO BE PERFORMED AND POSSIBLE SLIGHT ALIGNMENT SHIFT BETWEEN BLUEGRASS PKWY AND KY 245. THIS WOULD NEED TO BE CONSIDERED IN CONSTRUCTABILITY AND MAINTENANCE OF TRAFFIC PLAN BECAUSE OF THE TRAFFIC AMOUNT.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE:	xxx							
DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-11

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Bridge		LS	1	1700	1700	1	(1) 500	500
~~Asphalt Pvmt 5 LANE Pvmt SEEG~~		SY	(2) 18,900	#60	1134	(3) 12,200	732	732
~~3 LANE Pvmt SY~~								
Move LJS						1	1000	1000
ALT								
TAKE HOUSE							250	250
TOTAL COSTS*					2834 K			2232
TOTAL (BASELINE LESS PROPOSED)								602

148

148

135

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

(1) Rehab Exist Bridge to 3 Lane Bridge instead of 5 LANE using 8" SLAB overlay & increase slab overhang each side.

(2) $68' \times 2500' \div 9 = 18,900\ SY$

(3) $44' \times 2500 \div 9 = 12,200\ SY$

ALT - $1352 K

PUT in zeros

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

IMPLEMENTATION CONSIDERATIONS:

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-11

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):		**Economic Life (yrs):**	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

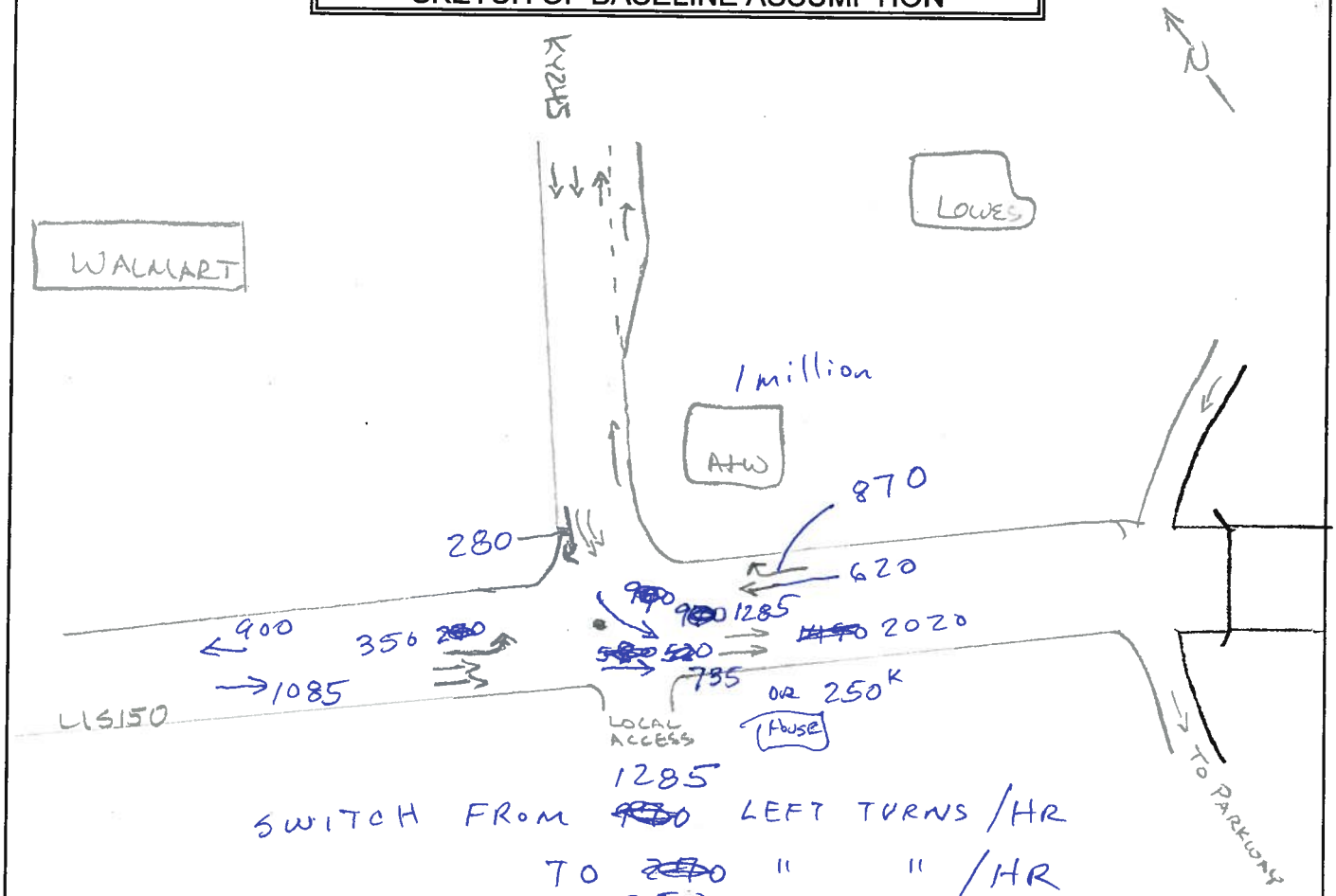
RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



SWITCH FROM ~~900~~ LEFT TURNS /HR

TO ~~280~~ " " /HR

350

REDUCE LT TURNS BY 935/HR

AT 2028 PM DESIGN HOUR

DRIVING FORCE FOR NEEDING 2 LANES (ACTUALLY 3) L TURN

THUS NEEDING TO CARRY THEM ACROSS BRIDGE

NTS

RH & Associates, Inc.

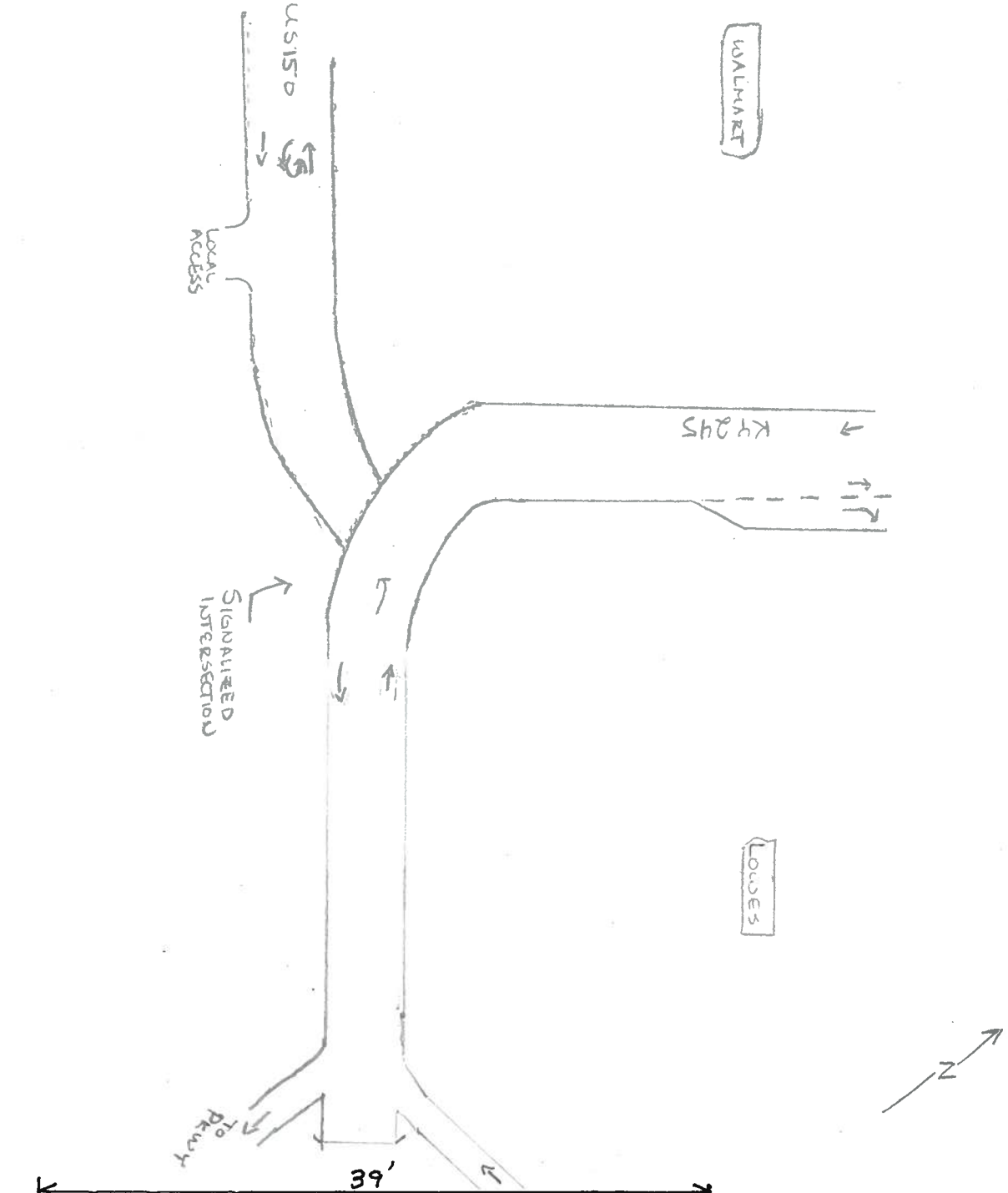
VALUE ENGINEERING PROPOSAL XX-XX

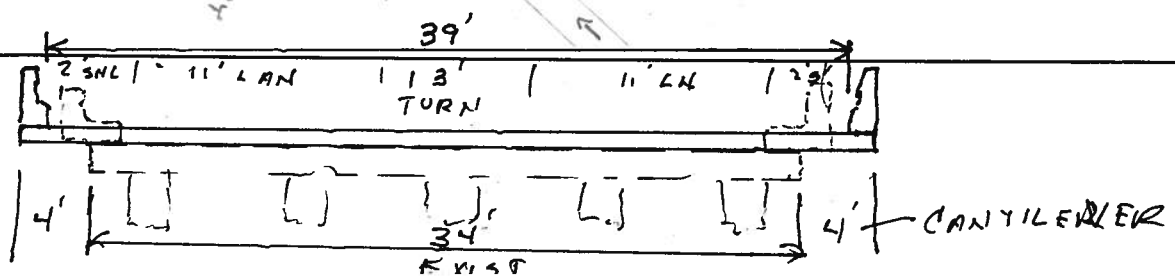
IC-11

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE





LM

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-16

February 2011

TITLE: IC-16 xxx New Connector Springhill to KY-49 Close Pottershop Access

FUNCTION: ~~Reduce Congestion~~ INCREASE xxx CAPACITY

BASELINE ASSUMPTION: 3-LANE WITH INTERSECTION IMPR. @ Potter Shop Entr's, Exist Design

PROPOSED ALTERNATIVE:

- Provide New Connector From KY-49 Just South of Exist. Residential Area to US 150 AT EXIST. SPRINGHILL Drive (Rural Roadway)
- Eliminate Pottershop Entrances on each end at US 150
- Begin US 150 3-lane Section at Exist. SPRINGHILL Drive thus Eliminating 2300-ft of Proposed 3-lane From Ky 49 to Springhill.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

like it

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX

BENEFITS	RISKS/CHALLENGES
• Reduces travel Distance for traffic traveling from KY-49 (South) to Parkway by ½-mile	• R/W PURCHASE FOR NEW 2000-FT CONNECTOR
• Eliminates most of 2028 ADT ACUTE RT Turns (1820) AS WELL AS 1820 Lt turns from US 150 to KY-49 South	• POSSIBLE ENVIRONMENTAL ISSUES
• Completely eliminates Y-INTERS. AT EACH END OF POTTERSHOP	• PUBLIC INPUT/APPROVAL
• Eliminates 2000-ft of 3-Lane section along US 150 BETW. KY 49 & Springhill Drive	• Add new traffic signal @ Springhill Drive
• Redirects 2200 ADT West Pottershop & 1100 ADT EAST POTTERSHOP WITH 1820 ADT FROM KY 49 (TOTAL 5120) into ONE INTERSECTION	• INCREASES PROJECT COST
• NO MOT ISSUES SINCE THIS IS A NEW ALIGNMENT	•
• ~~EXIS TIN~~ Proposed corridor is Vacant land so no houses or businesses need to be purchased	•
• USER COST SAVINGS	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-16

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION: Springhill Drive / KY 49 Connector will completely eliminate both Y-intersections at each end of Pottershop loop as well as most all traffic needing to make the acute right turn from N. KY 49 to E. US 150. It will also eliminate most left turns from W. US 150 to S. KY 49 eliminating the possibility queing left turn traffic from backing up into Westbound US 150 normal traffic flow / lane. Traffic traveling between Parkway and South KY 49 will have their travel distance reduced by 1/2-mile by adding ~~3~~ 3/8-mile !! The need to ~~widen~~ construct the 3-lane section of US 150 from KY 49 to Springhill drive goes away and no longer needs to be constructed because congestion relief obtained by eliminating the (3) Y-intersections and rerouting traffic along the new connector road.

IMPLEMENTATION CONSIDERATIONS:

- Need to determine if the are environmental, historical, etc issues with the proposed corridor that may inhibit using this route.
- Public opinion and issues to obtain this right-of-way

VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: XXX

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Asphalt 1-1/2" Base 10½" / 12"		TON	(1430)	$75/TON	(107)	4100	$75	307,
DGA		TON	(457)	$25	(12)	1300	$25	32,
Embankment		CY				30,000	$12	360
Eliminate 8x6 Culv Ext		LS	1	200	(200)			
ADD NEW 8x6 CULV						1	300K	300
Note: Adding 2000-ft Connector Road has a net								
		increase in project cost of					680K	
					**			
TOTAL COSTS*					(319)			999
Proposed – Savings on Baseline						TOTAL ~~(BASELINE LESS PROPOSED)~~		(380) NO CHANGE (680)

Note: Total Costs are rounded to nearest thousand dollars

- New Alignment is 2000-ft long w/ 12' LANES & 2' paved shoulders
- Eliminate 14' Middle lane on US 150 from Plaza Dr. to Springhill Dr.
  Asphalt = 1400' x 14' = 19,600 SF x 146 #/CF ÷ 2000 = 1430 TONS (12" Depth)
  BASE = 19,600 x 4/12 x 140 PCF ÷ 2000 = 457 TON
- Conn Emb = (36' x 3' say) = 45' x 9' x 2000' ÷ 27 = 30,000 CY

** REDUCTION IN BASELINE COST BY ELIMINATING 14-ft Turn Lane for 1400-ft.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-16

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):	6	Economic Life (yrs):	20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1	CONNECTOR COST - REDUCED PAMT ON US/50		0		680 K	212
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1	USER TIME SAVINGS (FROM CALTRAN)	0		432	4929
2	USER Vehicle Cost ($0.50/MILE)			332	3788
3					
4					
5					8,717 K

Total Annual Costs 0

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)	0	8,717 K

RESULTS (Proposed less baseline)

* ASSUME 50% CARS & 50% TRUCKS (ie: 1820 CAR & 1820 TRUCKS PER DAY

ANNUAL COST = .017 x 1820 x 365 Days = 11,293 HRS/YR (SAME FOR CARS & TRUCKS) ⇒ 11,293 x ($10.46 + $27.83) = 432,

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

ADT ON NEW CONNECTOR IS 2 x 1820 = 3,640 Vehicles per day that will travel ½-mile less per trip.

@ 50¢ENTS PER MILE THE ANNUAL USER COST SAVINGS IS 3640 x 365 DAYS x ½ mile/trip = 664,300 miles/YR x $0.50/mile = $332 K per year USER SAVINGS

* COST FOR USER TIME PER CALTRAN IS $10.46/HR FOR PASSENGER VEHICLES & $27.83/HR FOR TRUCKS

TIME SAVINGS IS TIME TO TRAVEL ½ MILE AT SAY 30mph = 1 minute = .017 HRS/TI

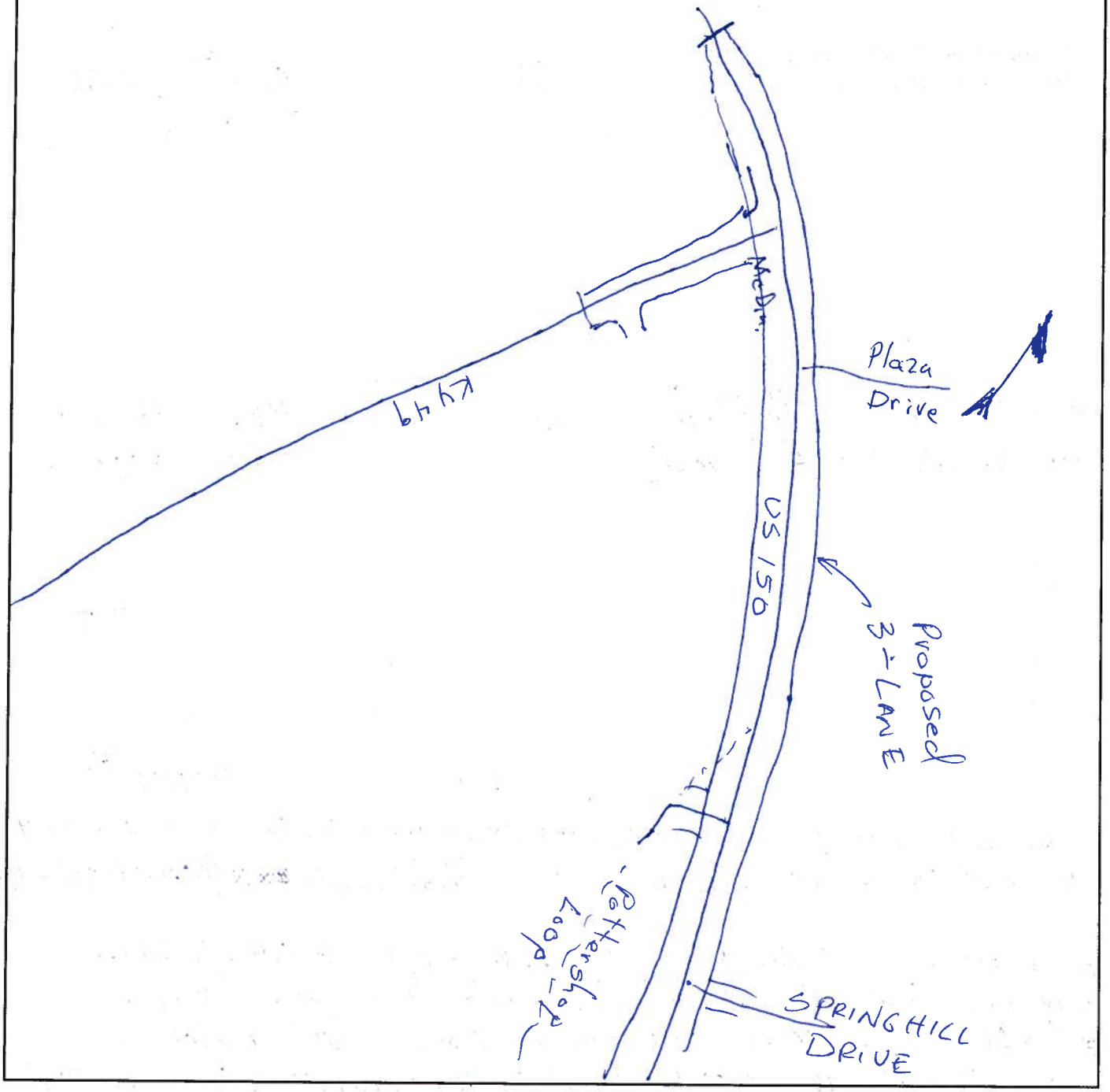
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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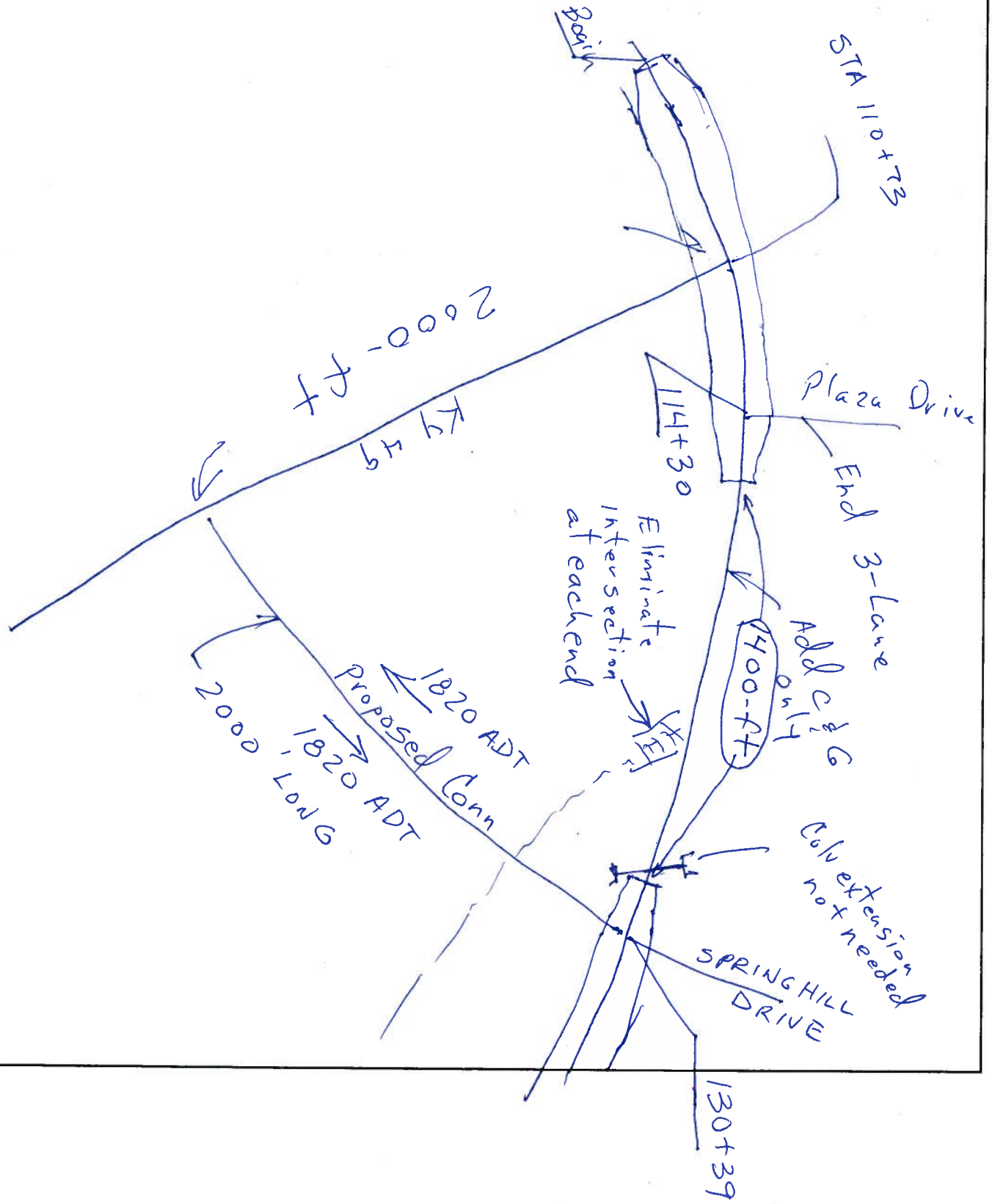
VALUE ENGINEERING PROPOSAL XX-XX

IC-16

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



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VALUE ENGINEERING PROPOSAL XX-XX

IC-18

February 2011

TITLE:	xxx I-C 18 Realign Maywood Dr. to Parkway Dr.
FUNCTION:	xxx
BASELINE ASSUMPTION:	
Reconstruct Maywood Ave. at existing intersection with US150.	
PROPOSED ALTERNATIVE:	
Realign Maywood Ave from Manor Ave to the intersection of US150 and Parkway Dr.	

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

Need * est

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Eliminate an access point	•
• Moves Maywood Av. Entrance further from 60 Pkwy interchange	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•

↑ PUBLIC OPPOSITION LIKELY

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

1C-18

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

Current project plans propose reconstructing the US150 and Maywood Ave. interchange at the existing location. Also proposed is a new entrance to provide access to parcel 104. The VE team proposes realigning Maywood Ave so that it will intersect US150 at the proposed entrance to parcel 104, aligning it with Parkway Dr. An entrance to parcel 104 would be proposed off of Maywood Ave. and the existing intersection of US150 and Maywood Ave removed.

↑ Need more of why we're recommending Ops, AM, Safety

IMPLEMENTATION CONSIDERATIONS:

Future need for a traffic signal at this location.

↳ So?

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE:	xxx							
DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

Need $ 185

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VALUE ENGINEERING PROPOSAL XX-XX

IC-18

February 2011

TITLE:	XXX

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

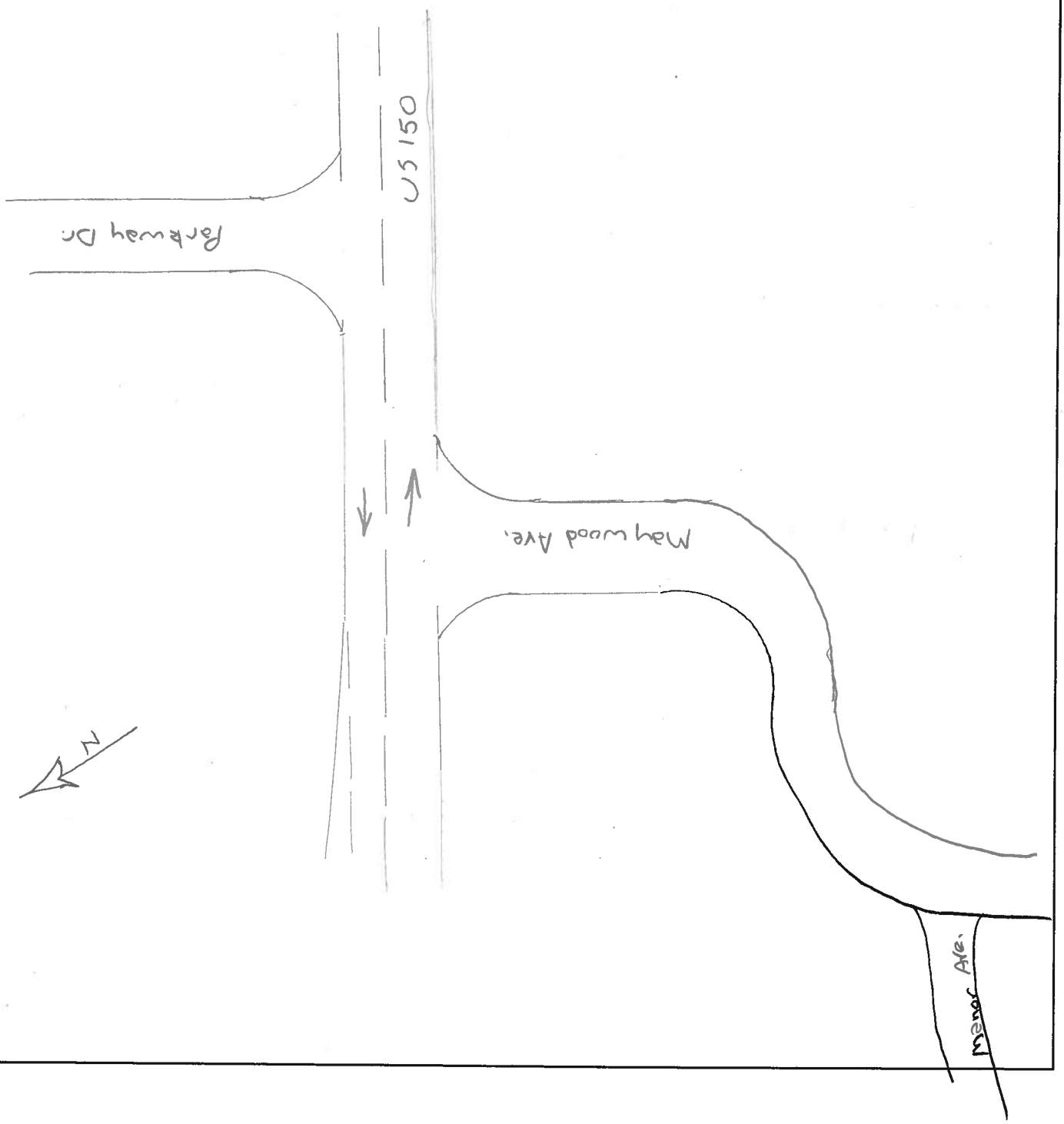
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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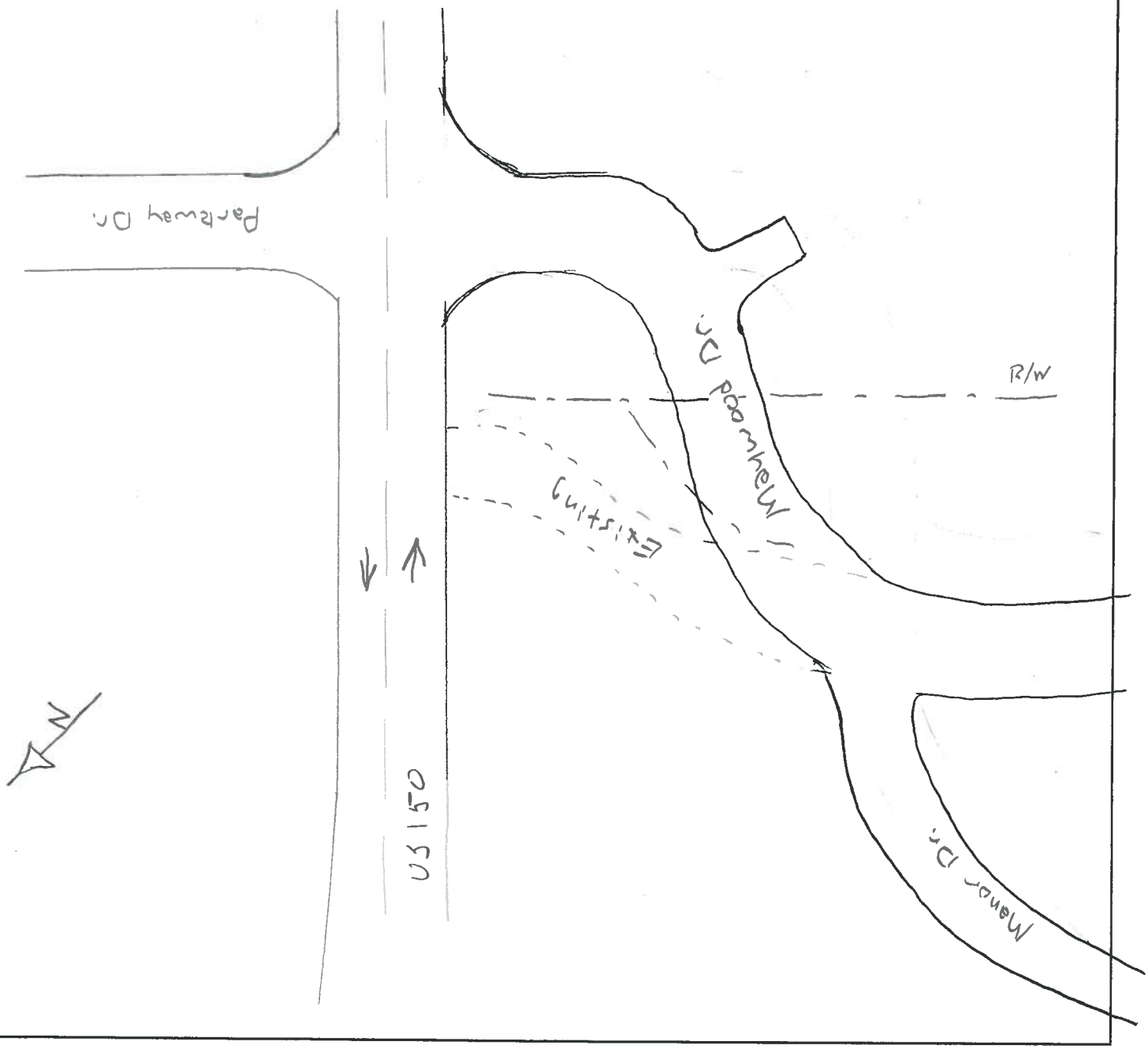
VALUE ENGINEERING PROPOSAL XX-XX

IC-18

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



IC-23

LM
RM
TAS
IC-23

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx KY 49 and KY 245, and Parkway RAMPS (concrete)

FUNCTION: Increase CAPACITY xxx

BASELINE ASSUMPTION:

The riding surface as proposed is Asphalt.

1¼ Asph sur
3 course Asphat base
@ 3" each
10¼

PROPOSED ALTERNATIVE:

Proposed

Intersections of KY 49 and US 150
KY 245 and US 150 and in-RAMPS
of Blue Grass parkway to US 150 should be
made of 9" non-reinforced Concrete.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 25.5	$ 167209 -	$ 197242 -
PROPOSED ALTERNATIVE:	$ 51.58	$ 52859 -	$ 113608 -
TOTAL (Baseline less Proposed)	$(30,716)	$ [redacted] -	$ 83 634 -
	30,033	[redacted]	NO CHANGE
	60,749		

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Lower Life-Cycle Cost	• Maybe higher capital cost.
• Less maintenance	• Longer interruption to traffic flow for construction
• better pavement for the installation of Traffic Loops TAS	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•

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VALUE ENGINEERING PROPOSAL XX-XX

IC-23

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

The Axle forces applied by heavy Trucks (during stopping & starting) on the pavement at the intersection which requires the truck to stop is greater than the riding surface can withstand for the life of the pavement. Usually ravelling, and rutting at these locations require pavement replacement every few years. The proposed rigid pavement (9" non-reinforced Concrete) will provide a long-lasting riding surface. The life-cycle cost are much lower than existing. The rideability over time would be much greater the existing surface.

IMPLEMENTATION CONSIDERATIONS:

Different expansion factor @ joints between asphalt & Concrete.

VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

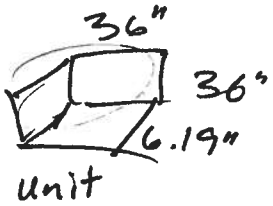
February 2011

TITLE: XXX

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
[illegible]								
[illegible]								
[illegible]								
[illegible]								
1								
Surfacing			1177.78	25.50	30,033.39	1177.78	51.58	60,749.89
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE



RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-23

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):	6	Economic Life (yrs):	20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1	1 Unit Asphalt	2	25.50		[redacted]	
2		[redacted] 20			51.58	
3						
4		10			28.80	
5			141.97		16.083	
Total Salvage & Replacement Costs			[redacted] 197242.82		[redacted] 113608	

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					
Total Annual Costs					

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		
RESULTS (Proposed less baseline)		

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION

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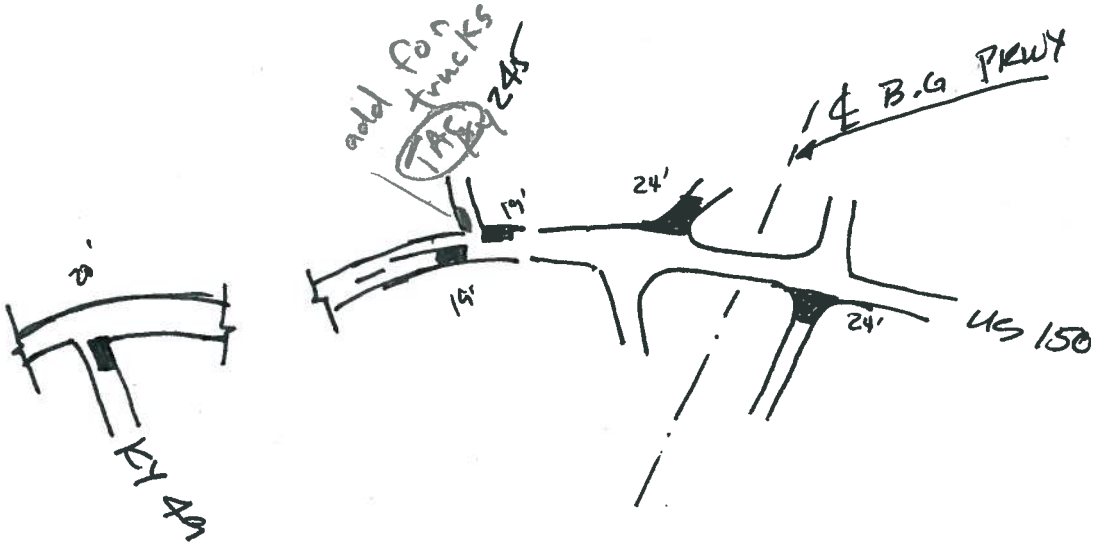
VALUE ENGINEERING PROPOSAL XX-XX

IC-23

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



20 Yr life-cycle $167.47 /unit Asphalt @ locations listed
replace @ every 2 years

20 Yr life-cycle 96@46 /unit
replace @ 10 yr

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VALUE ENGINEERING PROPOSAL XX-XX

RM - need study to see if Bridge width can be reduce

IC-25

February 2011

TITLE:	xxx Move two ramps closer together
FUNCTION:	xxx
BASELINE ASSUMPTION:	

The design re-uses the existing ramps and adds an additional turning lane on each exit ramp.

PROPOSED ALTERNATIVE:

The VE team recommends the ramps be rebuilt closer to the Parkway so they intersect approx. 200'-400' apart at US150.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 0 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 855,000-	$ -	$ -
TOTAL (Baseline less Proposed)	$(855,000)-	$ -	$ -

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Improve traffic operations at traffic signal/ ~~local~~ intersections	• does not account for peds or bikes
• Easier to construct w/ traffic	• does not include shoulders
• Ramp traffic is not affected by construction	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-25

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

By moving the ramps closer together, the traffic signals can be synchronized better and delays will be reduced for travelers. ~~because there is no~~ It is often operated together as one signal typically with four phase overlap phasing.

It is assumed to have 12' lanes and 14' curb lanes, which keeps the bridge cross section approximately the same.

IMPLEMENTATION CONSIDERATIONS:

The design team may want to consider building a sidewalk, at least on one side, to accommodate pedestrians. This design could also be ~~built w/ opening~~ opened w/ one travel lane in each direction until further capacity is needed. Lane widths may be reduced allowing a smaller cross section or providing for a sidewalk.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Granular Embankment		CY				19,000 ~~20.00~~	20.00	380,000
MSE wall		SF				~~17~~,000	27.50	467,500
3 ~~60~~ 4 "pipe		LF				150	~~297~~.00	7,050
TOTAL COSTS*								
						TOTAL (BASELINE LESS PROPOSED)		854,550

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-25
February 2011

TITLE:	xxx

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION

see next page

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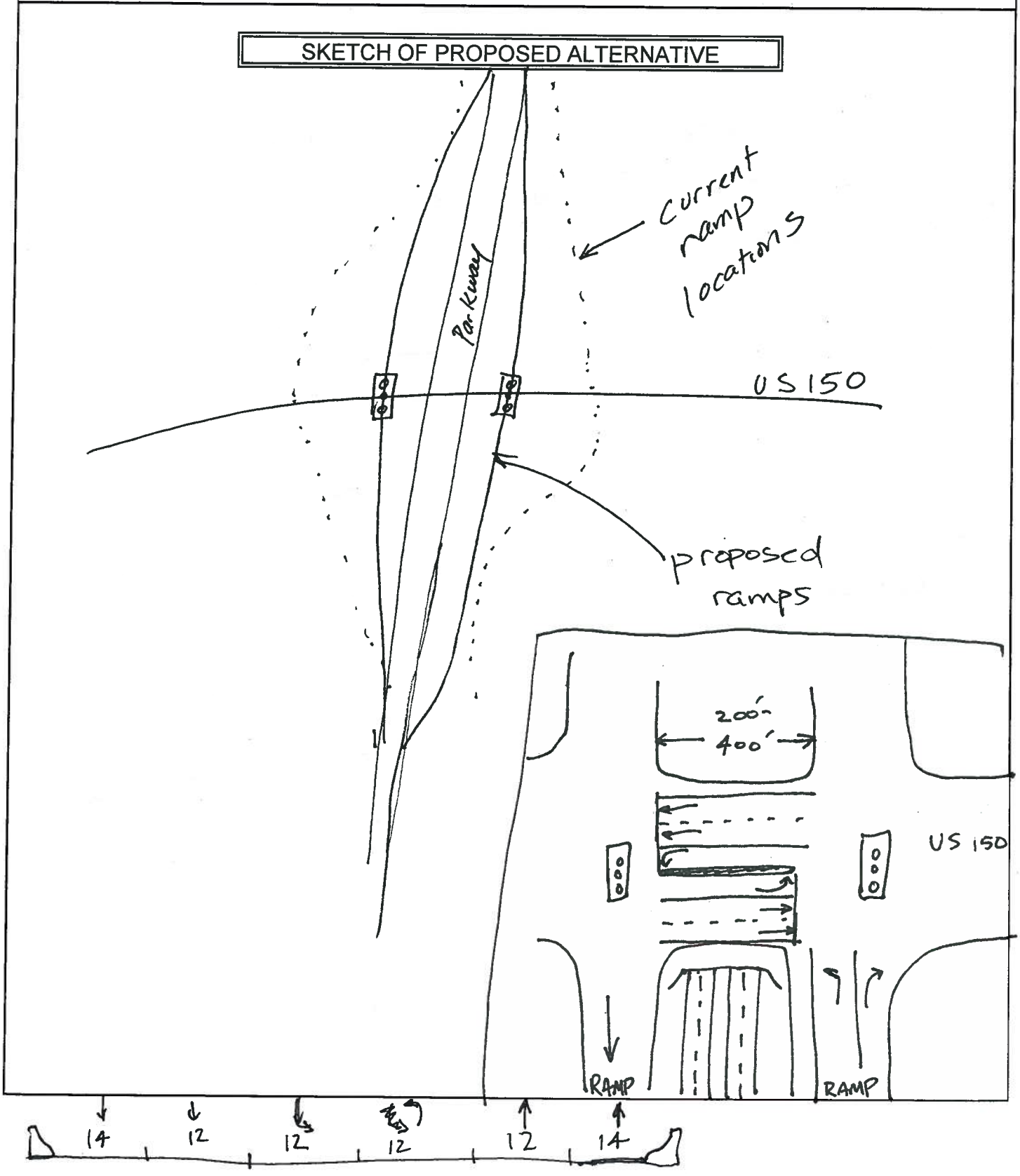
VALUE ENGINEERING PROPOSAL XX-XX

IC-25

February 2011

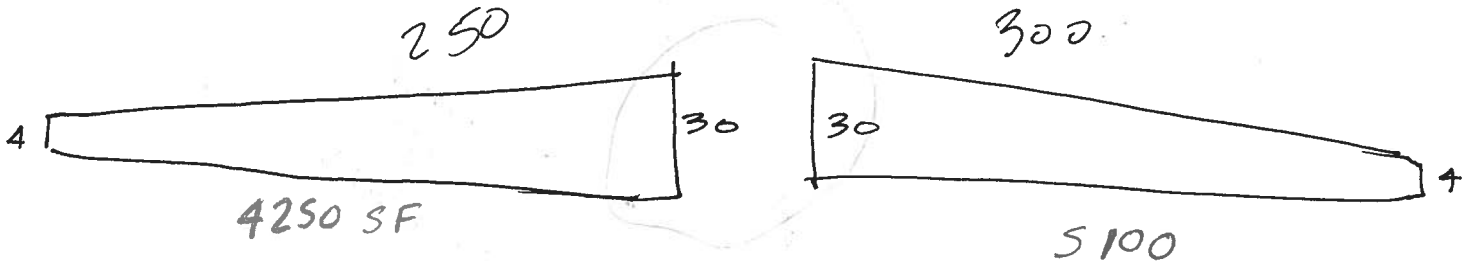
TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



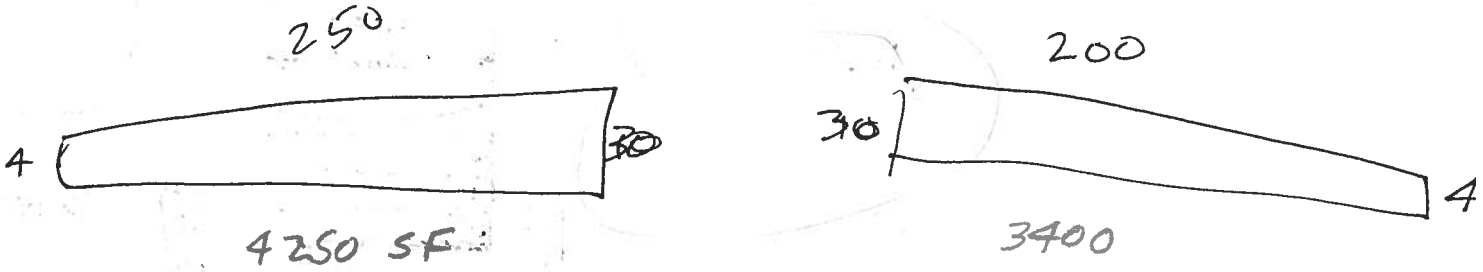
MSE $27.50

WB ramps



gran embankment = $20/cy

EB ramps



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VALUE ENGINEERING PROPOSAL XX-XX

IC-27

February 2011

TITLE: xxx Connect US150 to Pottershop opposite Springhill Drive & Eliminate Pottershop "Y" connections

FUNCTION: Increase Capacity #27 xxx

BASELINE ASSUMPTION:

Beginning at US 150 - Ky 49 Intersection, widen US 150 and Ky 49 approaches. Widen US 150 to the east to 3 lanes. Connect Pottershop Loop at existing intersections with US 150 with improved geometrics (square up and eliminate "Y"s)

PROPOSED ALTERNATIVE:

Transition from required widening at US 150 - Ky 49 interection to 2 Lane section, carry this east to new Springhill Road - New Pottershop Road connector at sta 130+39. Eliminate current connections to Pottershop Road

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

I'm not sure if I am convinced that US 150 would be reduced to 2 ln as a result of this. JA

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Reduced Conflict Points for Pottershop Connections	•
• Reduced Pavement Width from Intersection widening to SPRING Hill – New Pottershop	• No turn Lane for Lucknow Court (deadend, single office)
• Improved site distance for Pottershop connection	•
•	• cost of new connector
• compatible with Relocation of Ky 49 future corridor	•
•	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-27

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Pavement		SY	2160	60	129,600	1450	50	72,500
ROW		SF	12600	4.00	50,400	50000	3	150,000
Box Culvert		LF	120	1		120'		300,000
guardrail						400'	20	8000.
End Treatments						4'	2500	10,000
Earthwork						10000CY	6.00	60000
misc								25,000
TOTAL COSTS*					180,000			625,500
							TOTAL (BASELINE LESS PROPOSED)	440,500

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

This is a minor modification of a proposal made by the Design Team. The original proposal was eliminated in part due to cost. In essence, this proposal would offset the cost for realignment of Pottershop Road with the reduction in ROW and Paving on Mainline US 150. Safety considerations associated with combining the Pottershop Road connections to a single location oppasite Springhill are already documented by the Design Team (less conflict, better sight distance, better approach geometrics). This new Pottershop connector would be a logical beginning to a future connector to Ky 49, should the area along Ky 49 and the distilleries expand to the point the US 150 - KY 49 intersection become over whelmed. (The US 150 - Ky 49 intersection is difficult to improve due to 4F issues & expensive ROW)

IMPLEMENTATION CONSIDERATIONS:

cost & process considerations: The new Pottershop connector would involve construction of NEW 8'x6' Box culvert and appears to cross utility easement (probably sewer). ONE Possible alternative would be to trade ROW with Ballard Brothers, Old Pottershop Road ROW for new connector ROW. This would require assistance from the City/County and may be opposed by Corbett Family Trust unless could work out access agreements.

RH & Associates, Inc.

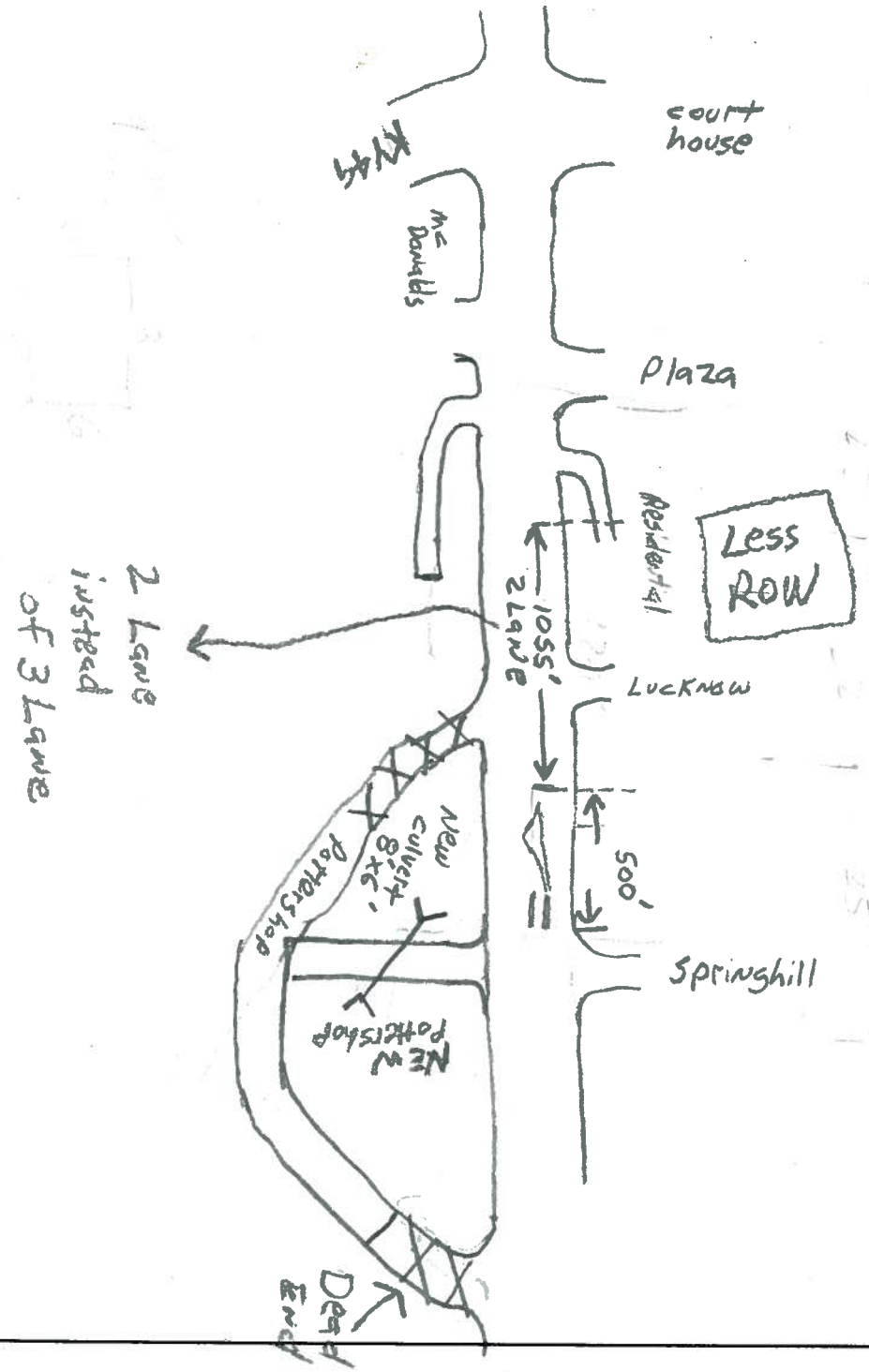
VALUE ENGINEERING PROPOSAL XX-XX

1C-27

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



o GOOD IDEA W/ NO FUNDING

TD.

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VALUE ENGINEERING PROPOSAL XX-XX

- I think this is a Good Practical Solutions Approach.
- I don't know much about signals, so I guess a study would be helpful.

IC-28

February 2011

TITLE:	xxx No Build - use signals to manage operations
FUNCTION:	xxx
BASELINE ASSUMPTION:	

Widen US 150 from BG Parkway to Ky 49

5 Lanes between BG Parkway to Ky 245
3 Lanes between Ky 245 to Ky 49
Install signals at East and west bound Ramps at BG Parkway

PROPOSED ALTERNATIVE:

Propose to install part time signal at either or both East bound or West bound ramps of the BG Parkway. Propose a time of day signal system between Ky 245 signal through the interchange to Parkland road Signal.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Use existing road to accommodate traffic flow	• No future development consideration
• May fix the problem in the present	• could increase delay of US150
• Could use existing/propose traffic signals for MOT for future Project	• would eliminate dual Left turn lane off Ky245
• Could use variable phasing to accommodate peak traffic	• increase rearends at signals
• could decrease delay on the Parkway ramps	•
• decrease angle accident at ramps in peak hours	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

IC-28

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

The use of propose part time traffic signals at the Parkway could accommodate the existing road and try to fix the problem in the present time frame until the project is funded. The Traffic signals probably would be built by state forces. The varible timing of the signals would accommodate the peak hours and would also benefit the off peak by flashing the signals With the use of flashing the signals on the off peak would benefit the mainline movements of US 150. The main point of doing this is to try to fix the problem with low cost fixes until the funding is available

IMPLEMENTATION CONSIDERATIONS:

Traffic Operations would use a consultant or present staff to develop signal system timing or time of day timing

The signals come be installed outside the the propose project limits to enable the use of the signals in the future project

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE:	xxx							
DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
whole project					1400000			
traffic signal						2	65000	130000
Consultant for in house						1	50000	50000
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

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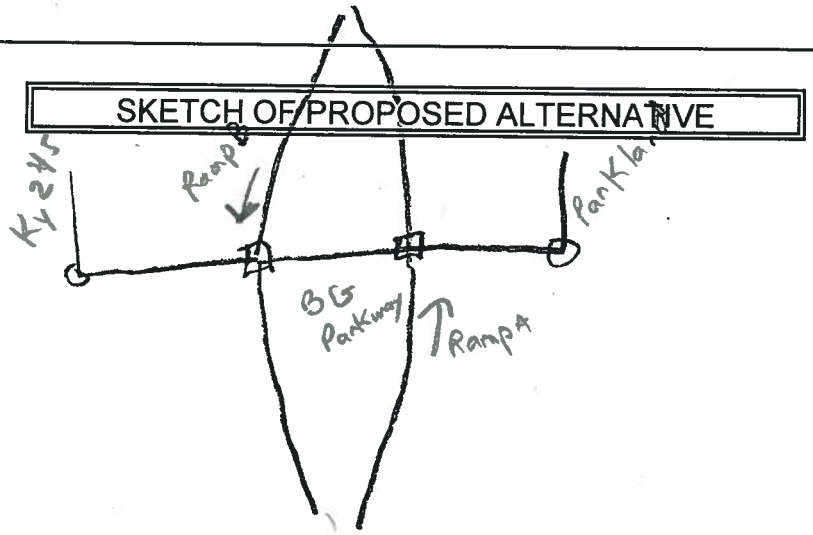
VALUE ENGINEERING PROPOSAL XX-XX

IC-28

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



□ propose partial signal

○ existing signal

Phasing

Morning peak

afternoon peak

VALUE ENGINEERING PROPOSAL XX-XX

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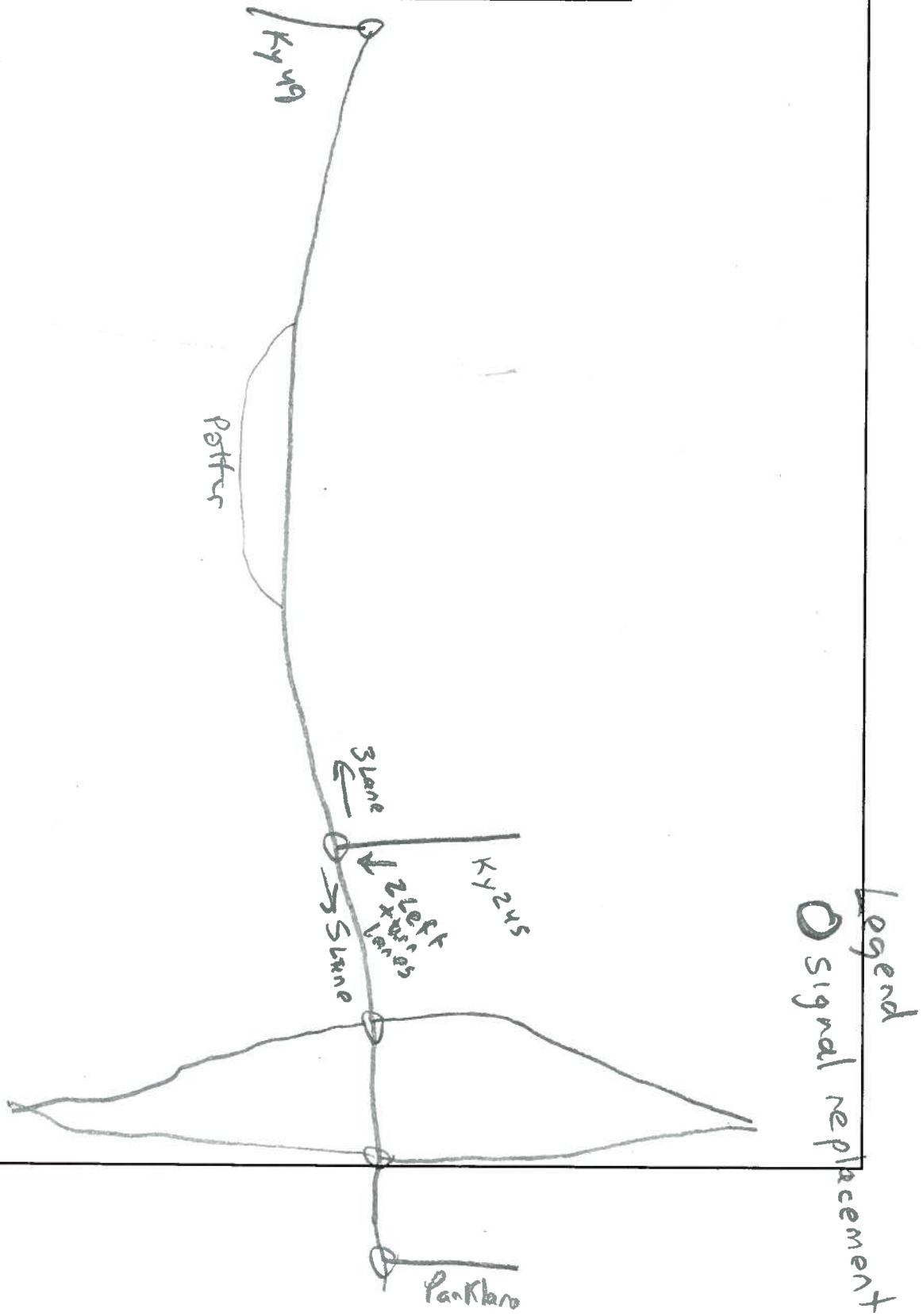
IC-28

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE:	XXX

Assumptions			
Interest/Discount Rate(%):		**Economic Life (yrs):**	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

LM

RM
very good!

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VALUE ENGINEERING PROPOSAL XX-XX

SS-04

February 2011

TITLE: xxx ROUNDABOUTS AT EXISTING RAMPS + USE EXISTING BRIDGE

FUNCTION: SPAN SPACE xxx SS04

BASELINE ASSUMPTION: Brief 1-2 sent

WIDEN US 150 FROM MY OLD KENTUCKY HOME STATE PARK TO LESLIE BALLARD LANE. IMPROVE US150 – BLUEGRASS PARKWAY INTERSECTION BY WIDENING BRIDGE AND RAMP INTERSECTIONS.

PROPOSED ALTERNATIVE:

CONSTRUCT ROUNDABOUT AT BOTH RAMP INTERSECTIONS OF US 150 – BLUEGRASS PARKWAY. UTILIZE EXISTING STRUCTURE AS A RESULT OF INCREASED MOBILITY DUE TO ROUNDABOUT INSTALLATIONS.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ -	$ -	$ -
PROPOSED ALTERNATIVE:	$ -	$ -	$ -
TOTAL (Baseline less Proposed)	$ -	$ -	$ -

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX SS-04 ROUNDABOUTS AT EXISTING RAMPS + USE EXISTING BRIDGE

BENEFITS	RISKS/CHALLENGES
• SEVERITY OF ACCIDENTS DECREASE W/ PROPER IMPLEMENTATION	• TRUCK TRAFFIC / PERFORM NEW TRAFFIC ANALYSIS
• REMOVES THE NEED FOR SIGNALS	• CONSTRUCTABILITY / MOT
• INCREASE MOBILITY BY REDUCING CONGESTION (BASIC FUNCTION)	• COMMUNITY SUPPORT / EDUCATION
• INCREASE CAPACITY (MAY ALLOW FOR DECREASED BRIDGE WIDTH)	•
• DECREASED OVERALL COSTS WITH SMALLER STRUCTURE	•
• RETAINS CURRENT RAMP CONFIGURATIONS AS PER KYTC'S PRACTICAL SOLUTIONS REQUEST	•
• COULD MAINTAIN FREE FLOW RIGHT LANE ACCESS TO BG PKWY	•
• POSSIBLE SAVINGS ≈ 800K - 1.4 MILLION	•
•	•
•	•
•	•

ROUNDABOUTS AT EXISTING RAMPS + USE EXISTING BRIDGE.

SS-04

SS-04

(1) PRINCIPAL	BASELINE	PROPOSED
SIGNALS	$ 130,000	0
CONCRETE APRON (APPROX 8")	0	$ 42,000
BRIDGE STRUCTURE (5-LANE)	1.7 MILLION	
BRIDGE STRUCT. (4-LANE)		1.0 MILLION
NO NEW BRIDGE		0
	1.83 MILLION	1.04 MILLION

(2) SALVG + REPLACE

		PROPOSED
REPLACE EXIST. BRIDGE DECK (YR 10)	→	$ 279,000
REHAB CONCRETE APRON (YR 5, 10, 15) TOTAL	→	$ 24,000

(3) MAINT + OPS WOULD BE SIMILAR FOR PROPOSED + BASELINE (i.e., OVERLAY INTERSECTION (SIGNALED) VS OVERLAY ROUNDABOUT)

COST CALCULATIONS NOT PERFORMED IN ORDER TO KEEP LIFE CYCLE IN ORDER OF MAGNITUDE.

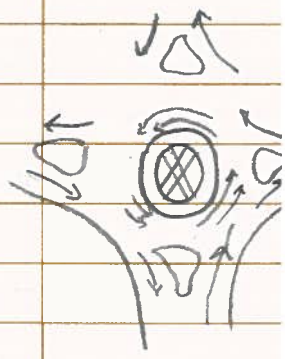
BASELINE : 1.83 MILLION

PROPOSED (#1) 1.04 MILLION + 24,000 = 1.06 MILLION

PROPOSED (#2) 42,000 + 279,000 + 24,000 = $345,000

SAVINGS RANGE: $790,000 — $1.4 MILLION

- BE AWARE OF YOUR AUDIENCE LOCATION
- INTRODUCTION, DISCUSS ROLE ON TEAM
- TIE-IN TO PROJECT GOALS + FUNCTIONS
- USE PROPS, BUT DON'T RELY ON THEM AS A LEANING POSTS.
- POSTURE, POISE, PRESENCE
- WHY ARE WE DOING THIS
- BE AWARE OF WHO IS IN YOUR AUDIENCE.
- DON'T BE AFRAID TO PUT DETAILS IN PRESENTATION.
- KEEP VE FOCUS IN MIND.



1.8
1,800,000
1.02
1,020,000

1,040,000
24,000
1.064

1,830,000
- 1,020,000
7

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VALUE ENGINEERING PROPOSAL XX-XX

SS-04

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

WITH A PROPERLY STUDIED, CURRENT TRAFFIC MODEL, ROUNDABOUTS HAVE BEEN SHOWN TO IMPROVE MOBILITY AND REDUCE THE SEVERITY OF TRAFFIC ACCIDENTS IN THE US AND EUROPE. ROUNDABOUTS AT THE EXISTING US150 - BLUEGRASS PKWY RAMP INTERSECTIONS WILL ELIMINATE THE NEED FOR SIGNALS AT THE RAMPENDS. THIS WILL DECREASE CONGESTION, WHICH WAS DEFINED AS A BASIC PROJECT FUNCTION BY THE VE TEAM. CURRENT FORECASTS WOULD MOST LIKELY REQUIRE A MULTI-LANE ROUNDABOUT AT BOTH RAMPS. DOT'S IN CALIFORNIA AND MINNESOTA, FOR EXAMPLE, HAVE HANDLED THIS CHALLENGING DESIGN ISSUE WITH MUCH SUCCESS, NOT ONLY IN THE ENGINEERING COMMUNITY BUT ALSO WITH PUBLIC SUPPORT. ROUNDABOUTS WOULD STAY WITHIN THE CABINET'S REQUEST OF CURRENT RAMP CONFIGURATION AS PER PRACTICAL SOLUTIONS MEETING. ALSO HAS ABILITY TO KEEP A FREE FLOW RIGHT ENTRANCE ONTO BLUEGRASS PKWY IN BOTH DIRECTIONS. ROUNDABOUTS COULD ALSO SAVE ON PROJECT COSTS WITH THE REDUCTION OF TRAFFIC SIGNALS, IMPROVING MOBILITY MAY ALLOW FOR THE USE OF A SMALLER BRIDGE STRUCTURE, OR STUDIES MAY INDICATE THAT THE EXISTING BRIDGE STRUCTURE MAY BE ADEQUATE FOR THE FUTURE TRAFFIC VOLUMES.

- STAYS WITHIN RAMP CONFIG AS PER PRACT. SOLUT. MEETING Dec 20
- POSSIBLE TO KEEP EXIST FREE FLOW RIGHT

IMPLEMENTATION CONSIDERATIONS:

A VITAL COMPONENT OF A QUALITY ROUNDABOUT DESIGN IS AN UPDATED, CURRENT TRAFFIC FORECAST REPORT. THE CURRENT FORECAST SHOULD BE UPDATED, WITH EMPHASIS ON TRUCK TRAFFIC.

ALSO, NHI IS CURRENTLY IN THE PROCESS OF REQUIRING THAT PROPOSED ROUNDABOUT DESIGNS IMPLEMENT AN ACCESSIBLE CENTER-THROUGH LANE TRAVERSING THE ROUNDABOUT TO ACCOMODATE OVER-SIZED LOADS. THIS CONCEPT SHOULD BE CONSIDERED ON THIS PROJECT.

VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: SS-04 xxx USE ROUNDABOUTS AT RAMP EXITS & USE EXISTING BRIDGE

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE			
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $	△
SIGNALS		EA	2	65,000	130,000	0	65,000	0	
CONCRETE TRUCK APRON (APPROX 8" THICK)		0	0	0	0	600 SY	$70.	42,000	
** BRIDGE STRUCTURE (5-LANE)		LS	1	1.7 MILL	1.7 MILL				
** BRIDGE STRUCTURE (4-LANE)						1	1.0 MILL	1.0 MILL	
** UTILIZE EXISTING BRIDGE									
TOTAL COSTS*									
								TOTAL (BASELINE LESS PROPOSED)	

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

** FURTHER TRAFFIC STUDIES ARE NEEDED TO DETERMINE BRIDGE REQUIREMENTS FOR SIZE.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

SS-04

February 2011

TITLE: SS-04 xxx USE ROUNDABOUTS AT RAMPS & USE EXISTING BRIDGE

Assumptions			
Interest/Discount Rate(%):	6%	**Economic Life (yrs):**	20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1	REPLACE BRIDGE DECK	10			500,000 x 0.558	$279,000
2	REHAB CONCRETE (MAINT) TRUCK APRON ON ROUNDABOUT	5			14,000 x 0.747	$10,500
3	"	10			14,000 x 0.558	$7800
4	"	15			14,000 x .417	$5800
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

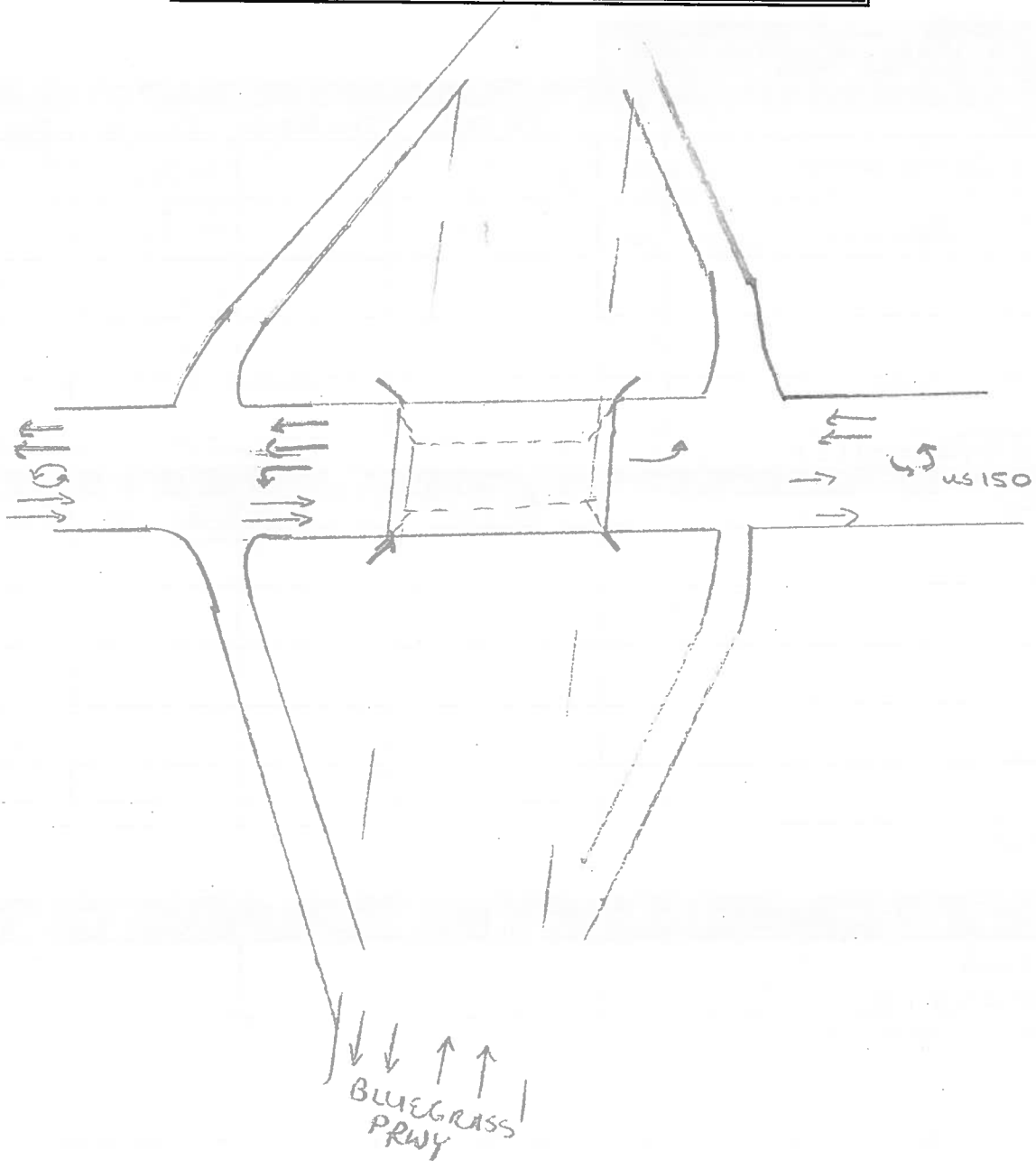
RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx cut & paste existing Alternate

SKETCH OF BASELINE ASSUMPTION



NTS

RH & Associates, Inc.

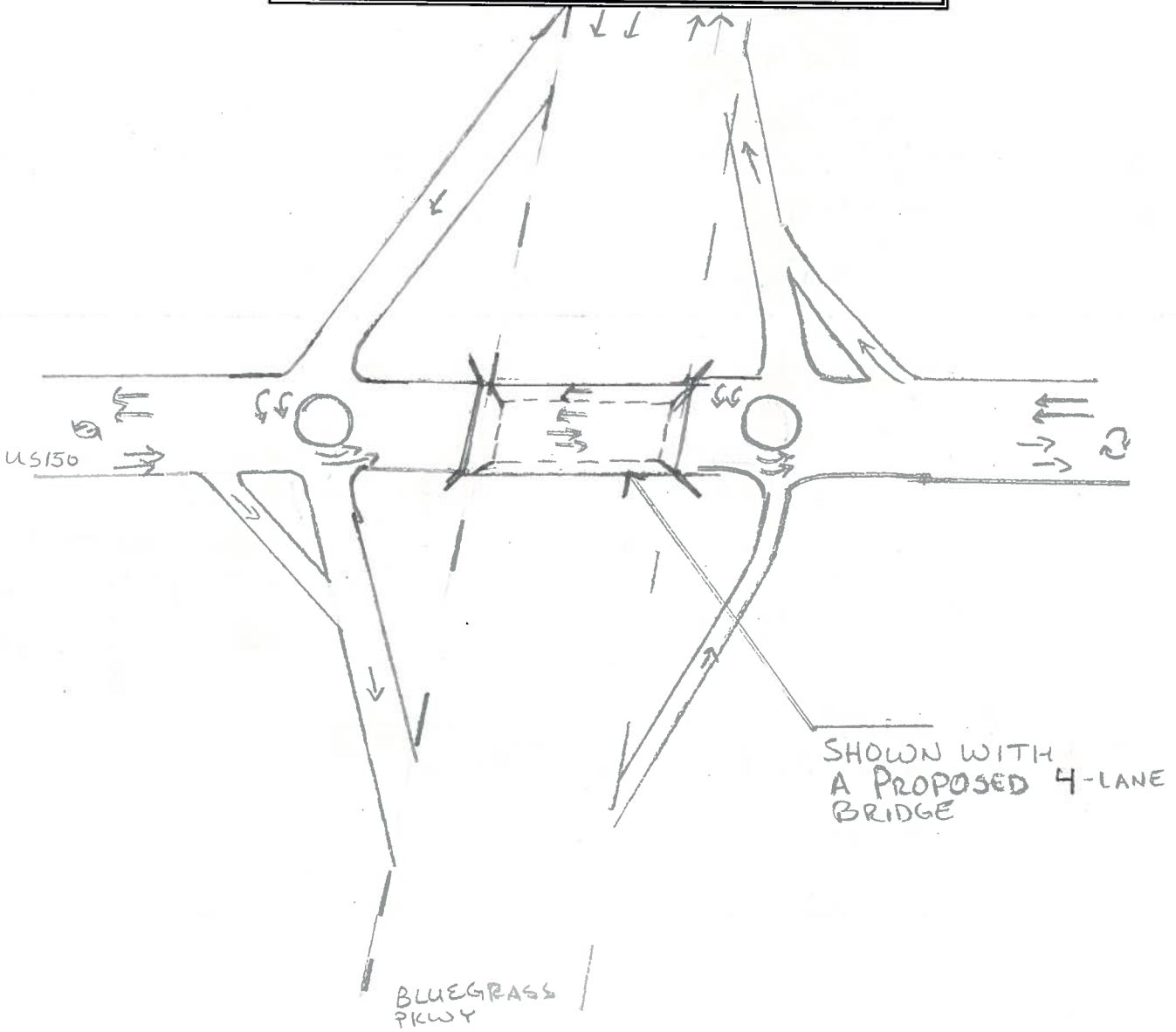
VALUE ENGINEERING PROPOSAL XX-XX

SS-04

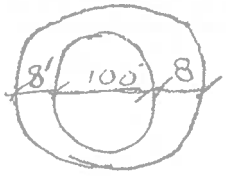
February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



NTS



~~116 - 100 =~~

$\frac{\pi}{4} \cdot 100^2 = 7850$ SF

$\frac{\pi}{4} \cdot 116^2 = 10,560$ SF

$\Delta = 2700$ SF
x 2 ROUNDS
≈ 5400 SF

~~x 2 ≈ 5,000 SY~~

~~x 70~~

~~2700 SF · $\frac{8}{12}$ = 1800 CY @~~

5400 SF / 9 = 600 SY. x $70 = $ 42,000

~~5~~ $\frac{1}{1.7} = \frac{x}{1.0}$

$\frac{1.0}{1.7} = \frac{0.6}{x}$

$x = 1.02$ mi

LM

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

SS-05

February 2011

TITLE: xxx	SINGLE SPAN BRIDGE
FUNCTION:	SPAN SPACE (SS-05) xxx
BASELINE ASSUMPTION:	
Replace existing Bridge w/ 4 span PCI Beams to widen & match the widened roadway.	
PROPOSED ALTERNATIVE:	
Replace with a single span bridge using a hybrid PCI Beam and MSE walls	

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 1.7 Million	$ -	$ -
PROPOSED ALTERNATIVE:	$ 1.2 Million	$ -	$ -
TOTAL (Baseline less Proposed)	$ 500K -	$ -	$ -
			NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx SINGLE SPAN BRIDGE	
BENEFITS	**RISKS/CHALLENGES**
• Eliminate Piers	• KYTC/CONTRACTOR EXPERIENCE
• REDUCTION IN MAINTENANCE	• RAISE ELEVATION OF MAINLINE to account for CLEARANCES & DEPTH OF BEAM
• REDUCE COST to BUILD	•
• ENTRANCE OPTIONS FOR RAMPS TO BE MOVED	• Requires stopping BG Pkwy traffic in both directions while setting beams
• IMPROVE SCHEDULE FOR CONSTRUCTION	•
• REDUCE INTERRUPTION for MOT ON the BG PKWY	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

SS-05

February 2011

TITLE: XXX SINGLE SPAN BRIDGE

DISCUSSION/JUSTIFICATION:

Replacing a bridge is a costly event. It is anticipated that $1.7 Million is the construction cost for the proposed/base line design of a four-span PCI Beam. Using MSE walls to create a single span use/scenario will eliminate the construction of 3 piers. This elimination would reduce cost of materials, construction time and impact maintenance of traffic on the BG Parkway. To add this scenario would limit future cost in maintaining a shorter bridge. This type of bridge will serve the purpose of spanning the Parkway and accommodating the capacity of US150. It also adds the option of many ramps closer and using less ROW.

IMPLEMENTATION CONSIDERATIONS:

Considerations made to this recommendation is to have education for both contractors & key TC personel (inspectors) as a requirement to work the project. Another consideration is for the structure Designer to make sure the depth of the beam will not encroach on the vertical clearances needed for the Parkway.

Lastly, in reviewing the current estimate, the VE Team feel that it is very low. When considering the update cost, we feel that $185/SF is more reasonable or in line with today's prices. Therefore the estimate for the base line is $3.5 million and the VE proposed is $2.6 million w/ a cost savings of ~~$900K~~. (This $185 SF for the VE proposed included cost of embankment and MSE walls.)

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
4-Span Pet-Beam		1	LS	$91/01	$1.7m	1	$85.00/ Sq Ft.	1.2M
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			500K

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

SS-05

February 2011

TITLE:	XXX

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

VALUE ENGINEERING PROPOSAL XX-XX

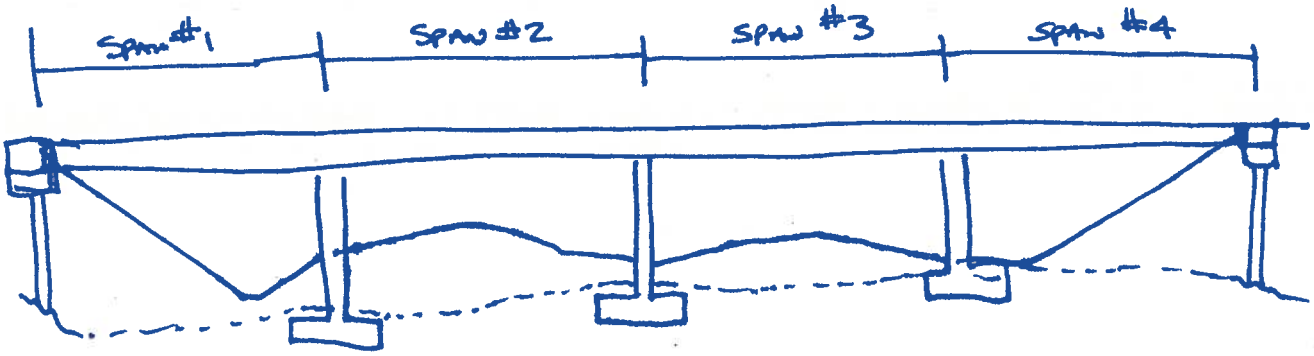
RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION

4- Span PCI Beam



RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

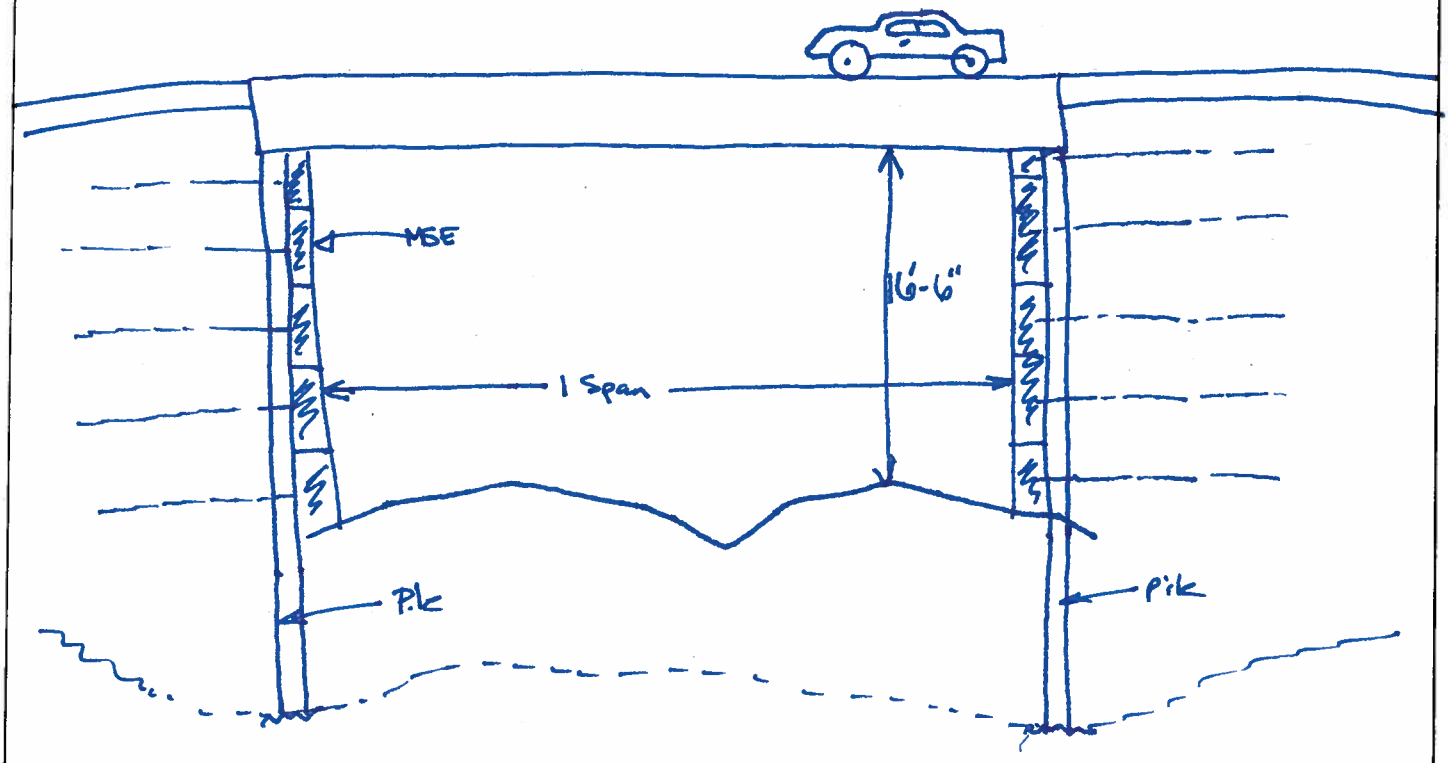
SS-05

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE

SINGLE SPAN - w/ MSE WALLS
& Hybid PCI Beams



RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AD-04

February 2011

TITLE: xxx Elim Curb & Gutter on Rt. side from Sta. 140+00 to 186+00

FUNCTION: Accommodate Drainage xxx (AD-04)

BASELINE ASSUMPTION:

Sidewalks & curb and gutter are to be utilized on both sides throughout the whole project length up to the interchange

PROPOSED ALTERNATIVE:

To improve drainage effects and reduce cost, the VE Team recommends eliminating curb and gutter from sta. 140+00 near the double barrel culvert to sta. 186+00 (before the interchange). This is approximately 4600'.

→ ADD 4' SHOULDER?

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 1607,944 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 496,240 -	$ -	$ -
TOTAL (Baseline less Proposed)	$ 106,704 -	$ -	$ -
			NO CHANGE

BAS

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• reduce cost	• increase ROW acquisition
• reduce construction time	• Deter pedestrian use on Rt. side of road
• use roadside ditch ↳ how is this a benefit? BAS	• more maintenance to ditches
• slow surface water flow due to infiltration in ditches	•
• many limit utility relocation ↳ risk? BAS	•
•	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AD-04

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

By eliminating curb and gutter w/ the assumption of eliminating the sidewalk this will dramatically decrease the cost of the project. Replacing the drainage design with ditches will accommodate the surface flow and adhere to the natural slope of the vertical alignment and direct the water to the double barrel culvert. The VE Team felt that the majority of the pedestrian would be using the northside walkway due to the developed area. This recommendation may also have less affect on any underground utility relocation

IMPLEMENTATION CONSIDERATIONS:

Review ROW acquisition.

VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
48" pipe			1500	$130/LF	195,000			
42" pipe			750	$110/LF	82,500			
36" pipe			750	$110/ft	82,500	1500'	$110/ft	165,000
30" pipe			750	$80/ft	60,000			
curb & gutter			4600	$20/ft	92,000			
Curb Box Inlet			15	3700/ea	55,500			
sidewalk			2555	$35/Syd	89,444			
4" Asphalt						2044 SY	$60/Syd	122,640
Jute net						4100 SY	6/Syd	24,600
Add'l ROW						46000 SF	4/Sft	184,000
TOTAL COSTS*					602,944			496,240
							TOTAL (BASELINE LESS PROPOSED)	106,704

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

Assume: 3000' @ 200' per drop box = 15 drop box

Assume: Additional 10' ROW along 4600' = 46,000 SF

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AD-04

February 2011

TITLE:	xxx

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

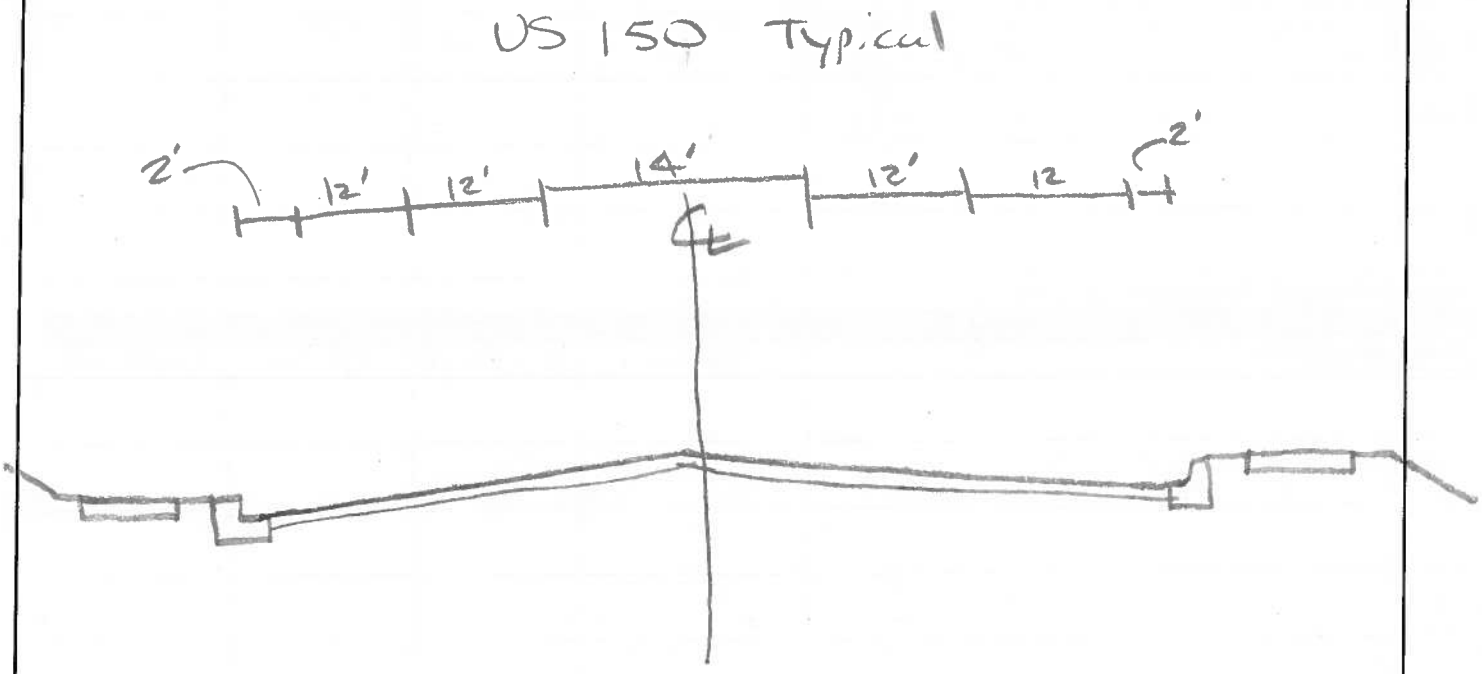
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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VALUE ENGINEERING PROPOSAL XX-XX

AD-04

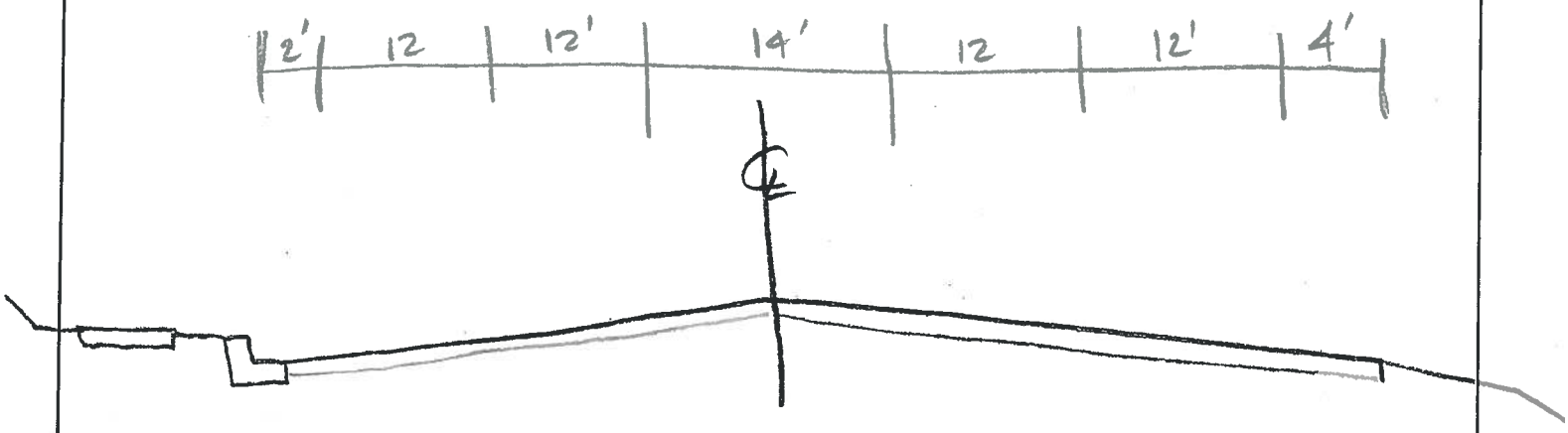
February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE

US 150

Sta. 140+00 to Sta. 186+00



Revised by: BB

VALUE ENGINEERING PROPOSAL XX-XX AD-05

AD-05

RH & Associates, Inc.

February 2011

TITLE:	xxx Install Detention - Parcel 84 - use to reduce Storm Sewer Sizes
FUNCTION:	Accommodate Drainage xxx
BASELINE ASSUMPTION:	
Storm Sewer on both sides from Sta 140+00 to Sta. 176+00	
PROPOSED ALTERNATIVE:	
Install Storm Drain outlet right of sta 150+00 Outlet to Detention Basin on Parcel 84	

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 240,000 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 210,000 -	$ -	$ -
TOTAL (Baseline less Proposed)	$ 30,000 -	$ -	$ -
			NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Reduces Storm Sewer Cost	• Maintain Detention Basin
• Less Impact to downstream Hydraulics	• Requires Purchase of additional right of way
• Improves water quality of discharge from roadway	•
• Opportunity to create greenspace	•
• Opportunity to Partner with local community	•
•	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AD-05

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

The current design indicates that storm drainage is installed on both sides of the project from Sta 140+00 to sta 176+00. The storm drainage discharges directly to Rowan Creek. This discharge location will increase the peak discharge into Rowan Creek at that location. Constructing a storm drain outlet right of Sta 150+00 will reduce the required pipe size for storm drainage from sta 150+00 to sta 140+00 and reduce the peak discharge from the roadway into Rowan Creek at sta 140+00. The construction of a detention basin right of sta 150+00 will allow further reducing the peak discharge from the project into the adjacent drainage. The detention basin will also provide an opportunity to reduce the impact of discharge from the project on Water Quality by allowing pollutants to settle out in the detention basin. The detention basin will provide erosion control during construction.

IMPLEMENTATION CONSIDERATIONS:

- ✓ Review Environmental Documentation
- ✓ Review Water Quality Certification Documentation
- ✓ Check Storm Sewer sizes.
- ✓ MOA with city to operate and maintain detention basin

✓ good point

KYTC should obtain a Memorandum of Agreement with the city to operate and maintain the detention basin. This provides the opportunity to partner with local community in creating a greenspace that would enhance the community.

VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Storm Sewer 48"	0	LF	1000	130.00	130,000	0	130.00	0
Storm Sewer 42"	0	LF	1000	110.00	110,000	0	110.00	0
Storm Sewer 24"	0	LF	0	70.00	0	1000	70.00	70,000
Storm Sewer 18"	0	LF	0	60.00	0	1000	60.00	60,000
Detention Basis	0	CY	0	12.00	0	2500	12.00	30,000
Right of Way	0	AC	0	50,000	0	1	50,000	50,000
TOTAL COSTS*					240,000			210,000
							TOTAL (BASELINE LESS PROPOSED)	30,000

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AD-05

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):	5%	**Economic Life (yrs):**	20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	**Description**	**Yr**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	**Description**	**Est Cost**	**Pres Worth**	**Est Cost**	**Pres Worth**
1	Maintenance 12.462210	0	0	5000	62,300
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

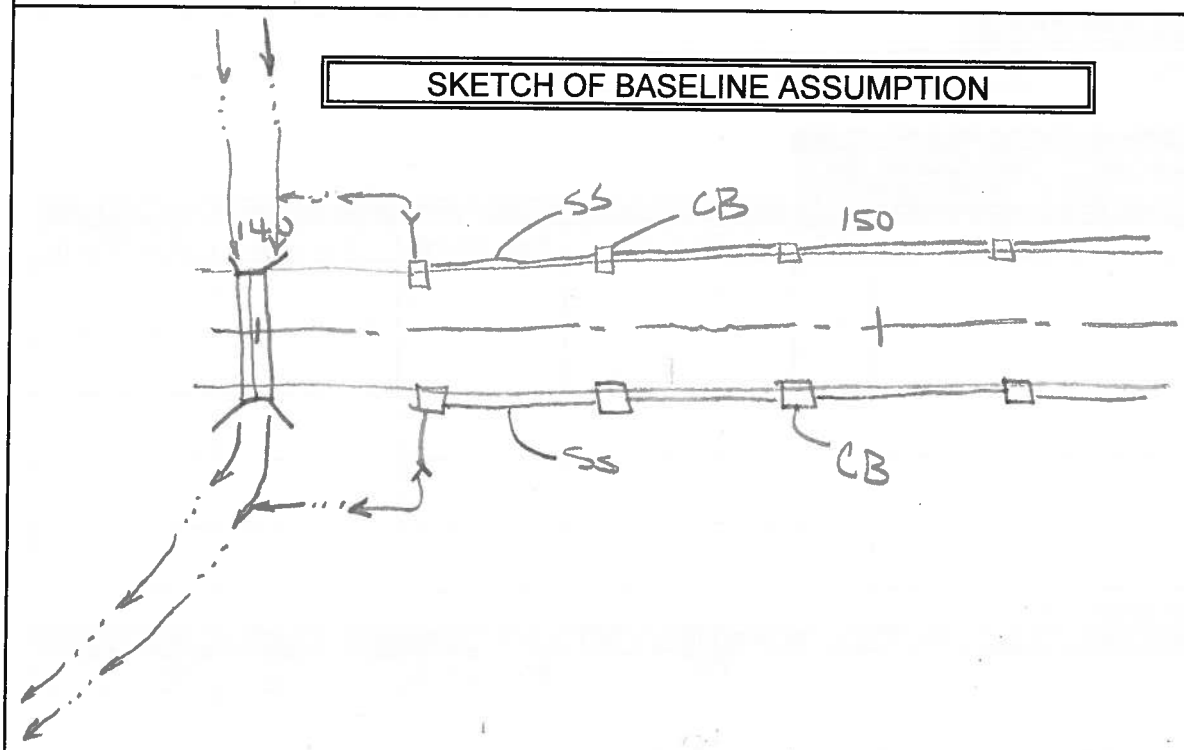
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



AD-05

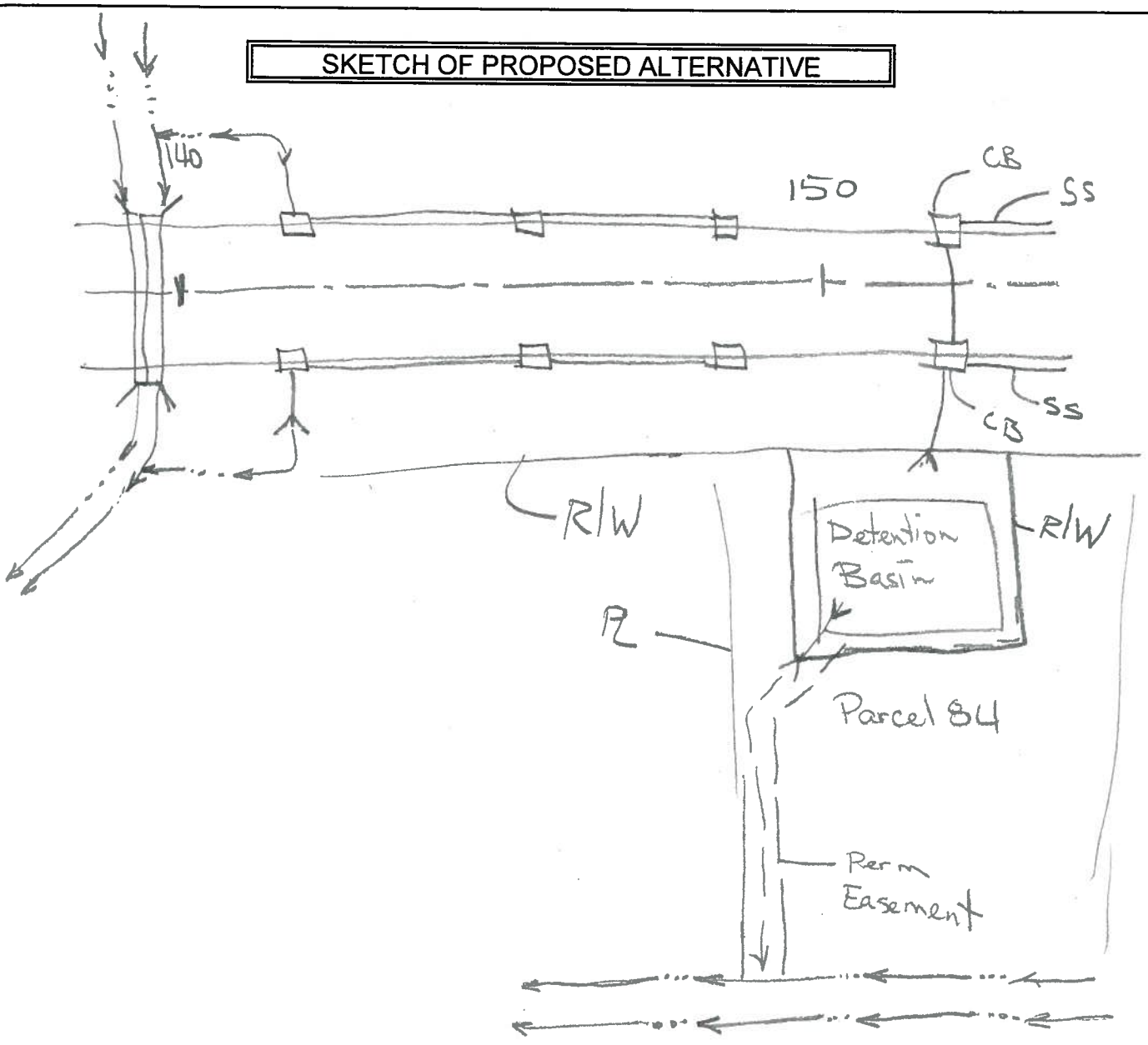
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: XXX

SKETCH OF PROPOSED ALTERNATIVE



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VALUE ENGINEERING PROPOSAL XX-XX AP-04

AP-04

February 2011

TITLE: xxx Multi Path on one side & no sidewalk on the other side

FUNCTION: Accommodate PED's xxx

BASELINE ASSUMPTION:

Sidewalk and Curb & Gutter on both sides

PROPOSED ALTERNATIVE:

8' multiuse path on one side with 8' shoulder on other side.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 2,162,500 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 1,696,000 -	$ -	$ -
TOTAL (Baseline less Proposed)	$ 466,500 -	$ -	$ -

NO CHANGE

TAS

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Accommodates Bicycles	• Pedestrians must cross road to walk
• Elimates Maintenance of one buffer Zone	• Access Point conflicts with Bicycle Traffic
• reduce pipe quantities (TAS)	• more R&W (TAS) Costs
•	•
•	•
•	•
•	•
•	•
•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-04

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

Current design incorporates 5' sidewalk with 2½' Buffer on both sides of the proposed roadway. This the minimum width to accommodate Bicycles and pedestrians. Utilizing an 8' multiuse path would allow for two-way bicycle and pedestrian traffic. Two-way bike/PED traffic is not easily accommodated on a 5' sidewalk. The 2½' buffer will require maintenance and will not easily support vegetation. Using a shoulder on one side elimates the need for a storm drainage system on that side of the roadway.

IMPLEMENTATION CONSIDERATIONS:

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Sidewalk 4inch		SY	12,000	35.00	420,000	9,600	35.00	336,000
C&G		LF	21,800	20.00	436,000	10,900	20.00	218,000
Asphalt		TON	0	75.00	0	5600	75.00	420,000
CBI Type A		EACH	120	3700.00	444,000	60	3700.00	222,000
SS Pipe 15"		LF	500	45.00	22,500	250	45.00	11,250
SS Pipe 18"		LF	1500	60.00	90,000	750	60.00	45,000
SS Pipe 24"		LF	1500	70.00	105,000	750	70.00	52,500
SS Pipe 30"		LF	1500	80.00	120,000	750	80.00	60,000
SS Pipe 36"		LF	1500	110.00	165,000	750	110.00	82,500
SS Pipe 42"		LF	1500	110.00	165,000	750	110.00	82,500
SS Pipe 48"		LF	1500	130.00	195,000	750	130.00	97,500
DGA		TON	0	25.00	0	1950	25.00	48,750
Guardrail		LF	0	20.00	0	1000	20.00	20,000
TOTAL COSTS*					2,162,500			1,696,000
							TOTAL (BASELINE LESS PROPOSED)	466,500

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-04

February 2011

TITLE: XXX

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

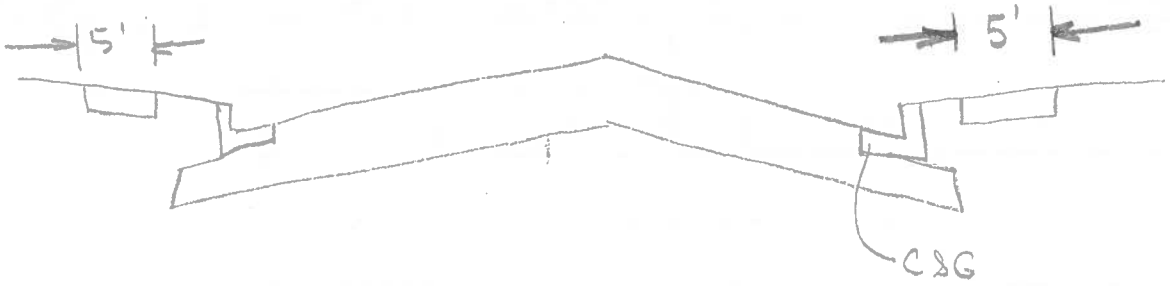
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



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VALUE ENGINEERING PROPOSAL XX-XX

AP-04

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE

Reviewed [illegible],
RM

RH
RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-08
February 2011

TITLE: xxx Extend sidewalk to Parkway Drive

FUNCTION: xxx

BASELINE ASSUMPTION:

The original design calls for a sidewalk to end ~~[illegible]~~ north of Filiatreau Lane. There is no planned sidewalk south of Filiatreau Lane.

PROPOSED ALTERNATIVE:

The VE team recommends extending the sidewalk from Filiatreau Lane to Parkway Drive.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 0 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 52,500 -	$ -	$ -
TOTAL (Baseline less Proposed)	$(52,500) -	$ -	$ -
			NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx	
BENEFITS	**RISKS/CHALLENGES**
• Provides a needed ped connection through interchange.	• None
• Connects industrial park, neighborhoods, commercial area	• Pedestrian Safety
•	• need to provide ped phase at interchange signals to allow crossing US 150
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•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-08

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION:

The area SE of the interchange continues to grow w/ residential neighborhoods & church & businesses at the industrial park. Providing safe accommodations for pedestrians is critical, esp as fewer people can afford to drive.

Sta 185 → Sta 204 (900')

IMPLEMENTATION CONSIDERATIONS:

Safe crossings at ramps are a challenge with right turning vehicles to/from the ramps.

- ASSUME bridge shoulder to accommodate sidewalk @ grade
  5' width

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VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX

DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
Sidewalk		SY				1500	35	52,500
TOTAL COSTS*								
						TOTAL (BASELINE LESS PROPOSED)		(52,500)

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-08

February 2011

TITLE:	xxx

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION

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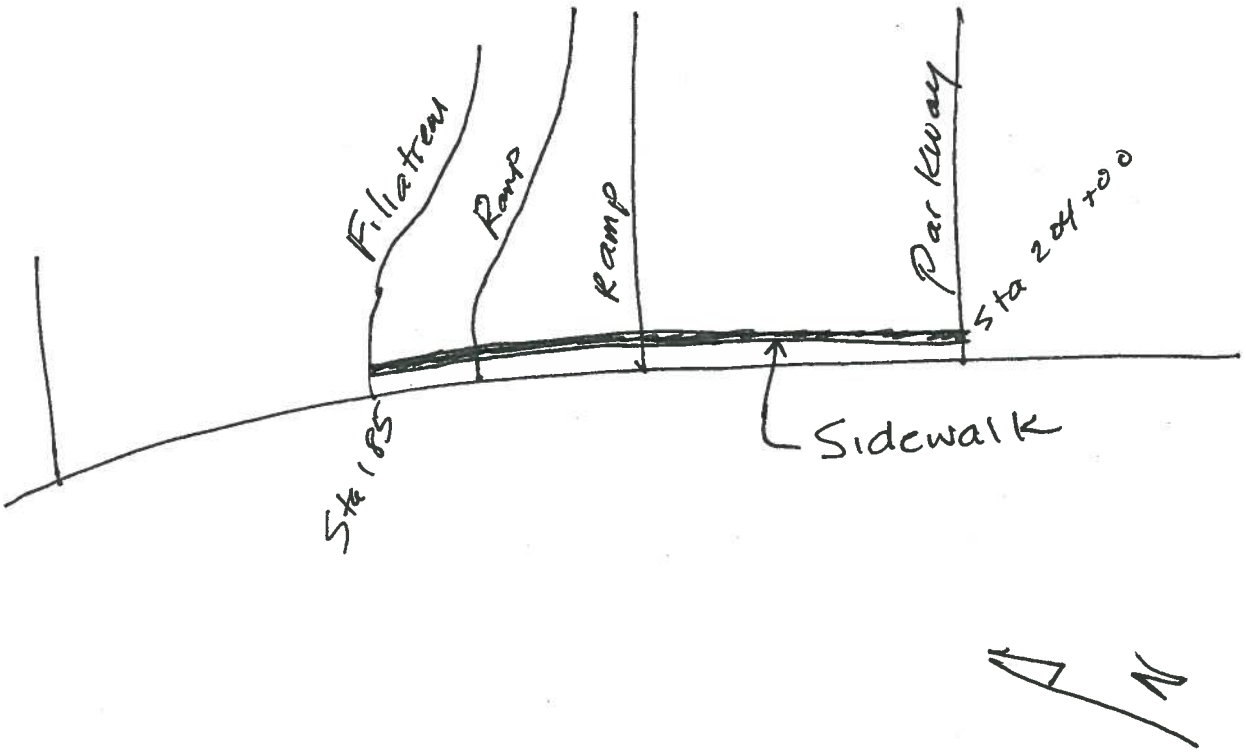
VALUE ENGINEERING PROPOSAL XX-XX

AP-08

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



- gym, factory, businesses, homes
- people can't drive
  - kids
  - can't afford

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VALUE ENGINEERING PROPOSAL XX-XX

AP-09

February 2011

TITLE: xxx Ped refuge islands at unsignalized intersections

FUNCTION: xxx

BASELINE ASSUMPTION:

The original design has sidewalks with crossings for pedestrians at signalized locations (KY49, KY 245).

PROPOSED ALTERNATIVE:

The proposal recommends the addition of five raised pedestrian refuge islands in the proximity of: ① Marvin Downs La.
② Pottershop Loop West
③ Pottershop Loop East
④ Walmart back entrance
⑤ Maywood Ave.

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ 0 -	$ -	$ -
PROPOSED ALTERNATIVE:	$ 18,000 -	$ -	$ -
TOTAL (Baseline less Proposed)	$ (18,000) -	$ -	$ -
			NO CHANGE

Cost

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX

BENEFITS	RISKS/CHALLENGES
• Designate ped crossing locations for peds	• Maintenance - restriping crosswalks
• Protect ped during crossing	•
• Raise visibility of peds to drivers	•
• USE OF PAVERS OR STAMPED (COLORED CONC WILL PROVIDE TRAFFIC CALMING KJO	•
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•	•
•	•
•	•

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-09

February 2011

TITLE: XXX

DISCUSSION/JUSTIFICATION:

This area in Bardstown contains many origins & destinations for pedestrians including homes, businesses (eating, shopping, employment), state park, industrial park, and downtown. To allow for safe pedestrian movements, unsignalized crossings ~~shall~~ are needed. Ped refuge islands allow for peds to cross one direction of traffic at a time with the ability to take safe refuge in the middle.

IMPLEMENTATION CONSIDERATIONS: Islands also raise the visibility of peds to drivers. They also may have a traffic calming effect as well as prevent drivers from using the TWLTL as an acceleration lane.

Be ~~Ensure~~ to locate islands where they will not interfere w/ turning vehicles at streets or entrances with ~~large~~ moderate volumes.

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE:	xxx							
DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
10'x30' Islands						5	3300	16500
Signs						10	150	1500
TOTAL COSTS*								
					TOTAL (BASELINE LESS PROPOSED)			(18,000)

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-09

February 2011

TITLE:	xxx

Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

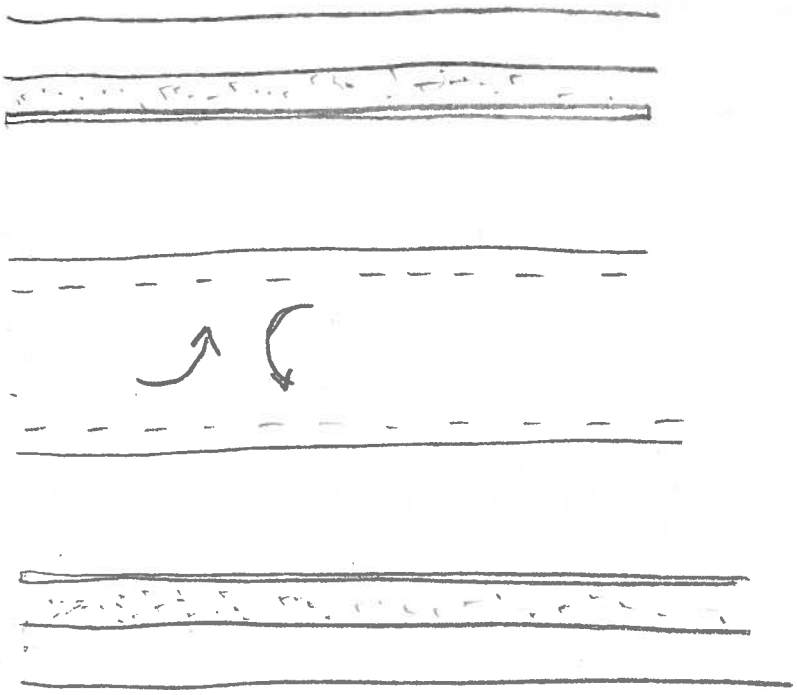
VALUE ENGINEERING PROPOSAL XX-XX

RH & Associates, Inc.

February 2011

TITLE: xxx

SKETCH OF BASELINE ASSUMPTION



RH & Associates, Inc.

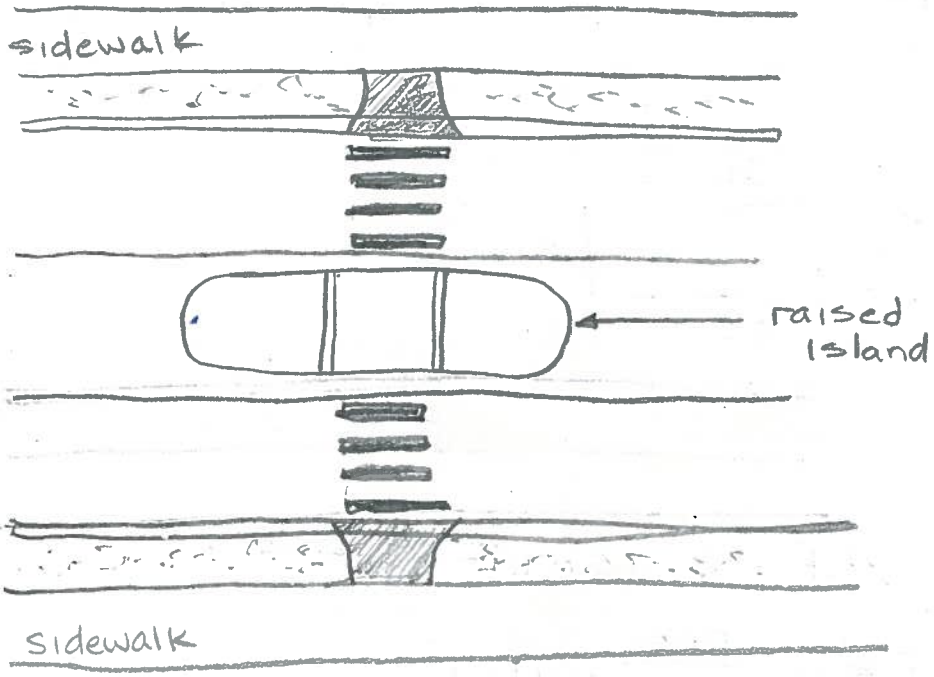
VALUE ENGINEERING PROPOSAL XX-XX

AP-09

February 2011

TITLE: xxx

SKETCH OF PROPOSED ALTERNATIVE



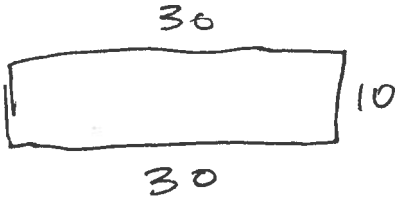
Marvin Downs Loop

~~Springhill Dr~~

Pottershop Loops

Walmart Back Ent

Maywood



$20/LF x 100LF = 2000

Island $35/SY $\frac{300}{9}$ = 1166

cros $35/SY x 3 = 105

$3272

Signs $150 x 2 = $300

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VALUE ENGINEERING PROPOSAL XX-XX

AP-10

February 2011

TITLE:	xxx AP-10 Install HAWK Signals
FUNCTION:	xxx
BASELINE ASSUMPTION:	
PROPOSED ALTERNATIVE:	
1. Install HAWK Signal at intersection of US150 and Springhill Dr.	

COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:	$ — -	$ — -	$ — -
PROPOSED ALTERNATIVE:	$ 30,000 -	$ — -	$ 30,000 -
TOTAL (Baseline less Proposed)	$ -	$ -	$ (30,000) -
			NO CHANGE

TAS

RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

February 2011

TITLE: XXX	
BENEFITS	**RISKS/CHALLENGES**
• Increase Pedestrian Safety	• Additional Cost
• Accommodate crossing of road (TAS)	• Learning Curve for motorists and pedestrians
•	• Approval from Traffic Operations (TAS) if needed!
•	•
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RH & Associates, Inc.

VALUE ENGINEERING PROPOSAL XX-XX

AP-10

February 2011

TITLE: xxx

DISCUSSION/JUSTIFICATION: HAWK is an acronym for High Intensity Activate Crosswalk. It uses a unique configuration of flashing lights and symbols to signal drivers and pedestrians and also includes audible alerts for hearing impaired pedestrians. The HAWK signal system has a flashing yellow phase, then a solid yellow phase warning motorists to stop. Following yellow is a solid red phase in which the pedestrian is signaled that it is safe to proceede crossing the roadway. The next phase for the motorist is the flashing red phase which begins after the Pedestrian has proceeded beyond the danger area of the motorist. During this phase the motorist can proceed with caution after yeilding. After this phase the signals turn dark.

Studies have shown an up to 97% compliance rate with motorists and a greater than 30% reduction in pedestrian accidents at locations where a HAWK signal has been installed.

IMPLEMENTATION ~~CONSIDERATIONS~~: The VE team is proposing the installation of a HAWK signal system at the intersection of US150 and Springhill Dr. This location was chosen because it is an unsignalized intersection and the entrance into a large subdivision, we feel that there may be a number of pedestrians coming from this subdivision wanting to cross US150 in route to McDonald's or one of the businesses on Pottershop Loop. This location is also just beyond a verticle crest in the alignment where sight distance may pose a problem for pedestrians without the use of signals. No other locations for HAWK signal locations were chosen for the project. Other locations where there may be a significant number of pedestrians crossing roads are at or near areas with existing signals.

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VALUE ENGINEERING PROPOSAL XX-XX

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DESIGN ELEMENT	**Markup**	**BASELINE ASSUMPTION**				**PROPOSED ALTERNATIVE**		
Description	%	Unit	Qty	Unit Cost $	TOTAL $	Qty	Unit Cost $	TOTAL $
HAWK Signal		EA	—	—		1	30,000	30,000
TOTAL COSTS*					—			30,000
							TOTAL (BASELINE LESS PROPOSED)	(30,000)

Note: Total Costs are rounded to nearest thousand dollars

NO CHANGE

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Assumptions			
Interest/Discount Rate(%):		Economic Life (yrs):	

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alterative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 00 yrs)		Baseline Assumption		Proposed Alternative	
Item	Description	Est Cost	Pres Worth	Est Cost	Pres Worth
1					
2					
3					
4					
5					

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.

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SKETCH OF BASELINE ASSUMPTION

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SKETCH OF PROPOSED ALTERNATIVE

See Attachments

AP-10

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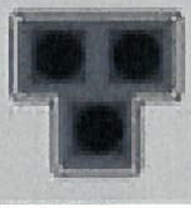
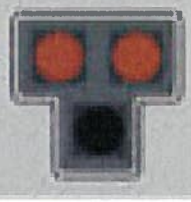
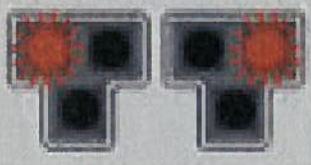
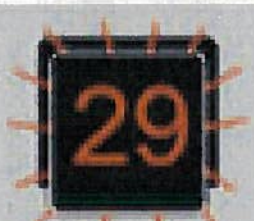
Drivers

. . .will see this	. . .will do this
	Proceed with Caution
 Flashing	Slow Down (Pedestrian has activated the push button)
	Prepare to Stop
	STOP! (Pedestrian in Crosswalk)
 Flashing	STOP! Proceed with Caution if Clear
	Proceed if Clear

Pedestrians

. . .will see this	. . .will do this
	Push the Button to Cross
	Wait
	Continue to Wait
	Start Crossing
 Flashing	Continue Crossing (Countdown Signal)
	Push the Button to Cross