APPENDIX E: RETURN-ON-INVESTMENT (ROI) ANALYSIS

ROI Summary

Concept	Total Cost	Safety Benefit	20-Yr ROI
Spot Improvements	\$10,770,000	\$63,000,000	5.85
2 + 1 Widening*	\$41,880,000	\$105,400,000	2.52
2 + 1 Widening	\$41,660,000	\$24,400,000	0.58
4-Lane Widening	\$225,389,000	\$64,100,000	0.28

^{*}First option is based on crash reduction for all crash types. Second option considers only head on, rear end, and sideswipe crashes.

CMF Analysis: Spot Improvements

Spot	MP	Horiz	Vert	Description	CMF	Star CMF	Tuno	Coverity	Crashes (2018 - 2022)			Crashes	E Vr Sovings	20-Yr Savings	
Spot	IVIP	HOIIZ	vert	Description	ID	Star	CIVIF	Type	Severity	Fatal	Injury	PDO	Reduced	5-11 Saviligs	20-11 Savings
1	15 - 16	4.70%	2.80%	Flatten Horizontal		4	0.259			0	2		1.5	\$273,319	\$1,093,277
2	0.2	4%	1%		9651		0.259 All 0.259	All	KABC	1	2		2.2	\$7,876,274	\$31,505,097
3	4.4	5.50%	1.50%						1	0		0.7	\$7,602,955	\$30,411,820	

Total \$16,000,000 \$63,000,000

CMF Analysis: 2+1 Roadway

Description	CMF	Star	CME	Typo	Severity	Crashes (2018 - 2022)		Crashes	E Vr Savings	20-Yr Savings		
Description	ID	Stai	CIVIF	туре	Severity	Fatal	Injury	PDO	Reduced	D-11 Saviligs	20-11 Savings	
Provide short	10267	4	0.53	All	All	5	23	49	36.2	\$26,352,255	\$105,409,019	\$105,400,000
2+1	10268	4	0.51	O, RE,	All	1	11	13	12.3	\$6,089,880	\$24,359,521	\$24,400,000

CMF Analysis: Four-Lane Widening

Description	escription CMF Star CMF Type		Severity	Crashes (2018 - 2022)			Crashes	E Vr Savings	20-Yr Savings			
Description	ID	Stai	CIVIF	Туре	Severity	Fatal	Injury	PDO	Reduced	3-11 Saviligs	20-11 Saviligs	
Convert 2 lane												
roadway	7574	4	0.714	All	All	_	23	49	22.0	\$16,035,627	\$64,142,509	\$6
to 4 lane	/3/4	4	0.714	All	All	5	25	49	22.0	\$10,055,027	\$64,142,509	Şt
divided												

\$64,100,000

Crash Costs

Crash Severity	Cost
PDO	\$10,711
Injury	\$184,426
Fatal	\$10,260,398

FHWA KY-specific comprehensive costs