

Benefit-Cost Analysis

Executive Summary

This document presents the approach used for conducting the benefit-cost analysis (BCA) for the Interstate 555 (I-555) project between Interstate 55 (I-55) in Crittenden County and Highway 49 in Jonesboro, Arkansas, and summarizes the BCA results. A project matrix, shown in Table 1, summarizes the components of this project. The project matrix describes the baseline conditions, proposed improvements, types of anticipated impacts, and economic benefits.

Table 1. I-555 Project Matrix

Current Baseline	Proposed Improvements	Type of Impacts	Economic Benefit
An approximate 44 mile fully controlled access corridor was recently designated as Interstate. The corridor has a higher than average crash rate, especially due to roadway departure crashes and crashes on wet pavement.	Pavement rehabilitation/reconstruction with surface treatment, such as an ultra-thin bonded wearing course (UTBWC), to enhance safety.	Improved safety; Reduced vehicle operating cost; and Reduced pavement maintenance cost	Monetized value of operating costs and crash reduction savings

Project Benefits

The BCA results for the entire I-555 corridor are shown below in Table 2. Segments of I-555 with independent utility were identified based on pavement condition and recommended treatment (reconstruction, overlay, concrete rehabilitation, or mill and inlay). Benefit-Cost analyses were conducted for each of the rural segments (six of the seven total segments) and are summarized in Table 3.

Table 2. Summary of the I-555 Corridor Benefit-Cost Analysis

Benefit/Cost Category	No Discount	Discounted at 3%	Discounted at 7%
Vehicle Operating Cost Benefit	\$7,670,884	\$4,992,485	\$2,994,128
Safety Benefit	\$184,083,692	\$127,232,458	\$83,519,779
Sum of Benefits	\$191,754,576	\$132,224,943	\$86,513,907
Project Life Cycle Costs	\$68,875,962	\$64,141,329	\$58,304,172
B/C Ratio	2.78	2.06	1.48

Table 3. Summary of I-555 Segments and Corridor Level Benefit-Cost Analysis

Segments of Independent Utility and Corridor Level BCA Summary													
County	Prioritized Segments	Non-Discounted				3% Discount Rate				7% Discount Rate			
		Total Cost	Safety Savings	VOC Savings	BCA (ND)	Total Cost	Safety Savings	VOC Savings	BCA (3%)	Total Cost	Safety Savings	VOC Savings	BCA (7%)
Craighead	5	EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA			
Craighead	5	EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA			
Craighead	3	\$ 9,583,650	\$ 25,374,244	\$ -	2.65	\$ 8,957,738	\$ 17,612,669	\$ -	1.97	\$ 8,127,240	\$ 11,622,236	\$ -	1.43
Poinsett	1	\$ 3,578,600	\$ 89,063,942	\$ 2,964,316	26.01	\$ 3,474,369	\$ 62,847,756	\$ 1,929,282	18.84	\$ 3,344,486	\$ 42,562,671	\$ 1,157,043	13.20
Poinsett	6	\$24,568,475	\$ 28,647,968	\$ 3,268,219	1.33	\$22,571,857	\$ 18,934,078	\$ 2,127,073	0.96	\$20,198,413	\$ 11,576,820	\$ 1,275,664	0.65
Poinsett	4	\$ 4,369,336	\$ 27,690,676	\$ 323,985	6.45	\$ 4,213,182	\$ 18,601,450	\$ 210,861	4.49	\$ 3,974,605	\$ 11,663,073	\$ 126,459	2.98
Poinsett	2	\$ 3,838,751	\$ 13,264,082	\$ -	3.46	\$ 3,859,261	\$ 9,206,811	\$ -	2.39	\$ 3,815,455	\$ 6,075,385	\$ -	1.59
Poinsett	2	\$ 3,838,751	\$ 13,264,082	\$ -	3.46	\$ 3,859,261	\$ 9,206,811	\$ -	2.39	\$ 3,815,455	\$ 6,075,385	\$ -	1.59
Crittenden	7	\$ 22,937,150	\$ 42,780	\$ 1,114,365	0.06	\$21,064,923	\$ 29,694	\$ 725,268	0.04	\$18,843,973	\$ 19,595	\$ 434,963	0.03
		\$ 68,875,962	\$ 184,083,692	\$ 7,670,885		\$64,141,330	\$127,232,458	\$ 4,992,484		\$58,304,172	\$ 83,519,780	\$ 2,994,129	
		Corridor Level Savings \$191,754,577			Corridor Level Savings \$132,224,942			Corridor Level Savings \$86,513,909					
		Corridor Level ND B/C Ratio 2.78			Corridor Level 3% B/C Ratio 2.06			Corridor Level 7% B/C Ratio 1.48					

Baseline Conditions

The study corridor is part of the 44-miles of former U.S. 63 which was designated as I-555 on March 11, 2016 with the passage of the Fixing America’s Surface Transportation (FAST) Act. I-555 extends from I-55 in Crittenden County to Highway 49 in Jonesboro, Arkansas. The BCA excluded 4.77 miles of I-555 in the Jonesboro urbanized area. The facility has many short sections of pavement with a condition rating of poor. Arkansas’ system of rating pavement consists of analyzing roughness as measured by the average pavement international roughness index (IRI), in addition to identifying locations with faulting and cracking. This system rates the pavement as ‘good’, ‘fair’, or ‘poor’.

The estimated costs to users, assuming the baseline conditions continue over the next 20 years, are categorized in two parts:

- Vehicle operating costs due to poor roadway conditions
- Safety impacts due to poor pavement conditions (particularly crashes on wet pavement)

Existing and Forecast Traffic Volumes and Travel Times

Traffic volumes, vehicle class, and historic traffic growth trends for the corridor were analyzed to estimate future traffic volumes and vehicle miles traveled. The speed limit was applied to estimate vehicle hours traveled. Speeds were slightly reduced for the No-Build scenario due to poor pavement conditions. Traffic volumes in the corridor were weighted based on the average daily traffic (ADT) reported per highway segment. Results of the weighted ADT, vehicle miles traveled (VMT), and vehicle hours traveled (VHT) are shown in Table 4, which reports I-555 VMT and VHT calculations for forecast years 2020 and 2040. Similar tables were prepared for each of the rural segments analyzed for pavement treatments and are available upon request.

Table 4. I-555 Corridor Vehicle Miles and Vehicle Hours Traveled Calculations

Year	Alternative	ADT	ATS (mph)	Distance (mi)	Hours/Veh	VHT	VMT
2020	No-Build	15,156	69.8	39.61	0.5675	8601	600,346
	Build		70	39.61	0.5659	8579	600,346
2040	No-Build	20,820	69.8	39.61	0.5675	11815	824,661
	Build		70	39.61	0.5659	11784	824,661
Step 1	Developed ADT values for 2020 and 2040 based on 2015 AADT = 14,000 and AAGF = 1.6						
Step 2	Determined vehicle-miles traveled based on ADT and distance						
Step 3	Determined vehicle-hours traveled based on average travel speeds and ADT						

The VMT was assumed to remain constant for project Build and No-Build conditions. It was assumed that no traffic would divert from the route due to pavement conditions. The VHT

increased slightly for the No-Build condition based upon a decrease in travel speed resulting from rough pavement.¹ Table 5 shows the estimated VMT and VHT per year. Table 6 shows the baseline vehicle operating costs per year for no-build and build conditions. Similar tables, available upon request, were prepared for each of the rural segments.

Table 5. Estimated VMT and VHT by Year

Estimates of VMT and VHT						
	Daily VMT			Daily VHT		
	Build	No-Build	Reduction (Increase)	Build	No-Build	Reduction (Increase)
2020	600,346	600,346	0	8,579	8,601	22
2040	824,661	824,661	0	11,784	11,815	30
Estimates of VMT and VHT by years using linear interpolation						
	Daily VMT			Daily VHT		
	Build ¹	No-Build	Reduction	Build ¹	No-Build	Reduction
2016	555,483	555,483	0	7,958	7,958	0
2017	566,698	566,698	0	8,119	8,119	0
2018	577,914	577,914	0	8,280	8,280	0
2019	589,130	589,130	0	8,440	8,440	0
2020	600,346	600,346	0	8,601	8,601	0
2021	611,561	611,561	0	8,739	8,762	23
2022	622,777	622,777	0	8,899	8,922	23
2023	633,993	633,993	0	9,060	9,083	23
2024	645,209	645,209	0	9,220	9,244	24
2025	656,425	656,425	0	9,380	9,404	24
2026	667,640	667,640	0	9,540	9,565	25
2027	678,856	678,856	0	9,701	9,726	25
2028	690,072	690,072	0	9,861	9,886	25
2029	701,288	701,288	0	10,021	10,047	26
2030	712,503	712,503	0	10,182	10,208	26
2031	723,719	723,719	0	10,342	10,368	27
2032	734,935	734,935	0	10,502	10,529	27
2033	746,151	746,151	0	10,662	10,690	27
2034	757,367	757,367	0	10,823	10,851	28
2035	768,582	768,582	0	10,983	11,011	28
2036	779,798	779,798	0	11,143	11,172	29
2037	791,014	791,014	0	11,303	11,333	29
2038	802,230	802,230	0	11,464	11,493	30
2039	813,445	813,445	0	11,624	11,654	30
2040	824,661	824,661	0	11,784	11,815	30

¹ Impact of Pavement Roughness on Vehicle Free-Flow Speed, T. Wang, J. Harvey, J.D. Lea, and C. Kim, (UCPRC)-TM-2013-04, p. 41 - “a one unit change of IRI (1 m/km = 63 inches/mile) only leads to about a 0.48 to 0.64 km/h (0.3 to 0.4 mph) change in free-flow speed”

Table 6. Baseline Vehicle Operating Costs

Vehicle Operating Cost - Existing Conditions							
Year	Total VMT	Reduction of VMT		Benefit per Auto VMT	Benefit per Truck VMT	DALY BENEFIT (Current Dollars)	ANNUAL BENEFIT (Current Dollars)
		Auto	Truck				
2016	555,483	0	0	\$0.398	\$0.941	\$0	\$0
2017	566,698	0	0	\$0.398	\$0.941	\$0	\$0
2018	577,914	0	0	\$0.398	\$0.941	\$0	\$0
2019	589,130	0	0	\$0.398	\$0.941	\$0	\$0
2020	600,346	0	0	\$0.398	\$0.941	\$0	\$0
2021	611,561	0	0	\$0.398	\$0.941	\$612,396	\$223,524,540
2022	622,777	0	0	\$0.398	\$0.941	\$623,627	\$227,623,885
2023	633,993	0	0	\$0.398	\$0.941	\$634,858	\$231,723,229
2024	645,209	0	0	\$0.398	\$0.941	\$646,089	\$235,822,573
2025	656,425	0	0	\$0.398	\$0.941	\$657,320	\$239,921,917
2026	667,640	0	0	\$0.398	\$0.941	\$668,551	\$244,021,261
2027	678,856	0	0	\$0.398	\$0.941	\$679,782	\$248,120,606
2028	690,072	0	0	\$0.398	\$0.941	\$691,014	\$252,219,950
2029	701,288	0	0	\$0.398	\$0.941	\$702,245	\$256,319,294
2030	712,503	0	0	\$0.398	\$0.941	\$713,476	\$260,418,638
2031	723,719	0	0	\$0.398	\$0.941	\$724,707	\$264,517,982
2032	734,935	0	0	\$0.398	\$0.941	\$735,938	\$268,617,327
2033	746,151	0	0	\$0.398	\$0.941	\$747,169	\$272,716,671
2034	757,367	0	0	\$0.398	\$0.941	\$758,400	\$276,816,015
2035	768,582	0	0	\$0.398	\$0.941	\$769,631	\$280,915,359
2036	779,798	0	0	\$0.398	\$0.941	\$780,862	\$285,014,703
2037	791,014	0	0	\$0.398	\$0.941	\$792,093	\$289,114,048
2038	802,230	0	0	\$0.398	\$0.941	\$803,324	\$293,213,392
2039	813,445	0	0	\$0.398	\$0.941	\$814,555	\$297,312,736
2040	824,661	0	0	\$0.398	\$0.941	\$825,787	\$301,412,080

Assumes 20 percent of VMT is trucks

Vehicle Operating Costs

The International Roughness Index (IRI) is an internationally accepted measure of pavement smoothness reported in inches/mile (in/mi). The IRI is used by a majority of state transportation agencies and has been shown to have good correlation to the public’s perception of pavement quality and the physical condition of the pavement. For these reasons, the IRI was selected as the performance metric to assess pavement conditions for the economic analysis of this project.

The estimated impacts of the roadway IRI on fuel, tire, and maintenance and repair costs were used to estimate the user operating cost due to poor roadway conditions. In the National Cooperative Highway Research Program (NCHRP) Report 720², Chatti and Zaabar (2012), a study on the effects of pavement condition on vehicle operating costs, shows that an average

² Chatti, K., & Zaabar, I. (2012). “Estimating the effects of pavement condition on vehicle operating costs” (NCHRP 720). Transportation Research Board.

reduction of 63.4 inch/mile in IRI results in 4.8% reduction in vehicle operating costs. According to AHTD pavement data for I-555, the current roadway IRI averages 80 inches/mile for the 44 mile corridor. Based on cost information for changes in the IRI, the vehicle operating costs in the I-555 corridor are inflated by a factor of 1.0013 compared to desirable conditions (IRI = 63.4).

Figure 1 shows the vehicle operating costs for all vehicle classes due to IRI changes from the baseline condition from NCHRP 720.

Figure 1. Effect of Roughness on Vehicle Operating Costs

Speed	Vehicle Class	Vehicle Operating Costs						
		Baseline Conditions (¢/km)	Baseline Conditions (¢/mi)	Adjustment Factors from the Baseline Conditions				
		IRI (m/km)						
		1	2	3	4	5	6	
56 km/h (35 mph)	Medium car	8.8	14.0	1.02	1.04	1.08	1.15	1.22
	Van	10.0	16.1	1.01	1.02	1.05	1.11	1.18
	SUV	10.2	16.3	1.02	1.03	1.09	1.20	1.34
	Light truck	14.9	23.9	1.01	1.02	1.06	1.13	1.22
	Articulated truck	36.1	57.7	1.02	1.03	1.07	1.13	1.19
88 km/h (55 mph)	Medium car	10.5	16.8	1.02	1.04	1.08	1.15	1.22
	Van	12.6	20.2	1.01	1.01	1.05	1.11	1.17
	SUV	13.0	20.8	1.02	1.03	1.09	1.20	1.32
	Light truck	21.6	34.6	1.01	1.02	1.05	1.12	1.20
	Articulated truck	56.7	90.7	1.01	1.02	1.05	1.10	1.15
112 km/h (70 mph)	Medium car	13.3	21.3	1.02	1.03	1.07	1.14	1.21
	Van	16.5	26.5	1.01	1.01	1.04	1.10	1.16
	SUV	17.6	28.2	1.01	1.03	1.08	1.18	1.29
	Light truck	30.1	48.1	1.01	1.01	1.04	1.10	1.17
	Articulated truck	81.2	130.0	1.01	1.02	1.04	1.08	1.13

1 m/km = 63.4 (in./mi)

Source: NCHRP Report 720, Table 7-5, page 58

Comparison of the collected IRI values with the FHWA recommendations indicates that the pavement on I-555 meets the good pavement criteria of an IRI below 95. However, the segments with a poor condition IRI rating, along with pavement sections rated as ‘fair’ or ‘poor’ by AHTD due to cracking and faulting, contribute to delay and higher operating costs for users. Given that there is currently no nationally recognized correlation between pavement cracking and/or faulting with user operating costs, only the IRI rating was used to quantify project benefits.

Figure 2 shows the interpolated cost increase factors per vehicle type due to an IRI unit increase for I-555 for decreasing the average IRI from 80 to 64.3.

Figure 2. I-555 Vehicle Operating Cost Savings Calculations

NCHRP Report 720: Estimating the Effects of Pavement Condition on Vehicle Operating Costs
 From Table 7-5. Effect of roughness on vehicle operating costs.
 112 km/hour (70 mph)

IRI Increase in Units (1 unit = 63.4 in/mi)

	Cents/Mile					Change in: Cents/Mile	Per VehClass	
	1	1.26183	2	Cents/Mi	% of traffic stream		Cents/Mile	\$/mile
Car	21.3	21.41154	1.02	21.726	60%	0.11153943	0.066923659	0.000669237
Van	26.5	26.56938	1.01	26.765	10%	0.06938486	0.006938486	6.93849E-05
SUV	28.2	28.27384	1.01	28.482	10%	0.07383596	0.007383596	7.3836E-05
Light Truck	48.1	48.22594	1.01	48.581	6%	0.12594006	0.007556404	7.5564E-05
Articulated Truck	130	130.3404	1.01	131.3	14%	0.34037855	0.047652997	0.00047653
					100%	0.72107886	0.136455142	0.001364551

Table 7 calculates the VOC savings based upon the IRI factors determined by interpolation (see Figure 2) and summarizes the VOC analysis for the next 20 years. The net present values (NPV) of the annual VOC were then calculated using the 3% and 7% discount rates recommended by TIGER BCA Guidance³. The NPV of VOC savings is \$7,670,885 with no discount factor; \$4,992,484 at a discount factor of 3%; and \$2,994,129 at a discount factor of 7%.

Safety Benefit Cost Savings

An analysis of the most recent five years of crash data revealed that a large percentage of the crashes were related to wet pavement conditions. It was determined that most segments would benefit from pavement treatment after reconstruction to remedy structural and drainage deficiencies is completed. The safety analysis was conducted based upon relieving crashes on wet pavement at rates similar to what has been experienced in other areas in Arkansas. Crashes were categorized by severity – fatal, serious, moderate, and probable injury, and property damage only. Crashes were further filtered in order to consider only wet weather crashes. A crash modification factor (CMF) of 0.07 was applied to a five year average of crashes on wet pavement to derive an estimated number of annual crashes after pavement treatment is applied. The CMF is based on research specific to Arkansas Interstates⁴.

Table 8 shows the results of the estimated crash reduction benefits. To calculate annualized Safety Benefit Cost Savings, a five year average of wet pavement crashes was determined. Next, the Statistical Value of Life (SVL) from the TIGER BCA Guidance was applied to calculate the value of No-Build crashes that would be reduced with a pavement treatment. Then the CMF was used to calculate the number of wet weather crashes expected for Build conditions. The Build crash value was subtracted from the No-Build crash value to determine the final Annual Safety Benefit Cost Savings.

³ US Department of Transportation (USDOT) (2015). "Benefit-Cost Analyses Guidance for TIGER Grant Applicants." Available at: <http://www.dot.gov/tiger/guidance#sthash.0MI9ixrq.dpuf>

⁴ Improving Interstate Safety with Pavement Surface Treatments in Arkansas, 2015 National Roadway Safety Awards

Table 7. I-555 Vehicle Operating Cost Savings Calculations

Vehicle Operating Benefits							
Year	Total VMT	Reduction of VMT		Benefit per Auto VMT	Benefit per Truck VMT	DALIY BENEFIT (Current Dollars)	ANNUAL BENEFIT (Current Dollars)
		Auto	Truck				
2016	555,483	0	0	\$0.398	\$0.941	\$0	\$0
2017	566,698	0	0	\$0.398	\$0.941	\$0	\$0
2018	577,914	0	0	\$0.398	\$0.941	\$0	\$0
2019	589,130	0	0	\$0.398	\$0.941	\$0	\$0
2020	600,346	0	0	\$0.398	\$0.941	\$0	\$0
2021	611,561	0	0	\$0.398	\$0.941	\$835	\$304,595
2022	622,777	0	0	\$0.398	\$0.941	\$850	\$310,181
2023	633,993	0	0	\$0.398	\$0.941	\$865	\$315,767
2024	645,209	0	0	\$0.398	\$0.941	\$880	\$321,354
2025	656,425	0	0	\$0.398	\$0.941	\$896	\$326,940
2026	667,640	0	0	\$0.398	\$0.941	\$911	\$332,526
2027	678,856	0	0	\$0.398	\$0.941	\$926	\$338,112
2028	690,072	0	0	\$0.398	\$0.941	\$942	\$343,698
2029	701,288	0	0	\$0.398	\$0.941	\$957	\$349,284
2030	712,503	0	0	\$0.398	\$0.941	\$972	\$354,870
2031	723,719	0	0	\$0.398	\$0.941	\$988	\$360,457
2032	734,935	0	0	\$0.398	\$0.941	\$1,003	\$366,043
2033	746,151	0	0	\$0.398	\$0.941	\$1,018	\$371,629
2034	757,367	0	0	\$0.398	\$0.941	\$1,033	\$377,215
2035	768,582	0	0	\$0.398	\$0.941	\$1,049	\$382,801
2036	779,798	0	0	\$0.398	\$0.941	\$1,064	\$388,387
2037	791,014	0	0	\$0.398	\$0.941	\$1,079	\$393,973
2038	802,230	0	0	\$0.398	\$0.941	\$1,095	\$399,560
2039	813,445	0	0	\$0.398	\$0.941	\$1,110	\$405,146
2040	824,661	0	0	\$0.398	\$0.941	\$1,125	\$410,732

Assumes 20 percent of VMT is trucks

Table 8. I-555 Estimated Crash Reduction Benefits

	VSL	5-YR AVG # CRASHES	NO-BUILD COST BY CRASH TYPE	CMF=0.07 BY CRASH TYPE	BUILD COST BY CRASH TYPE	BENEFIT BY CRASH TYPE
Fatal (1)	\$9,400,000.00	0.20	\$ 1,880,000.00	0.01	\$ 131,600.00	\$ 1,748,400.00
Severe - Serious (2)	\$3,020,533.33	1.80	\$ 5,436,960.00	0.13	\$ 380,587.20	\$ 5,056,372.80
Moderate (3)	\$ 441,800.00	2.80	\$ 1,237,040.00	0.20	\$ 86,592.80	\$ 1,150,447.20
Possible (4)	\$ 28,200.00	1.80	\$ 50,760.00	0.13	\$ 3,553.20	\$ 47,206.80
Property Damage Only (5)	\$ 10,000.00	15.20	\$ 152,000.00	1.06	\$ 10,640.00	\$ 141,360.00
			Crash Costs \$ 8,756,760.00		\$ 612,973.20	

ANNUAL BENEFIT: \$8,143,786.80

Project Life Cycle Cost Analysis

The planning level estimate assumes that the project engineering and construction costs total \$88,800,000. The project is assumed to be constructed between years 2019-2020. Table 9 shows the assumed project construction cost distributed over future years.

Annualized maintenance costs were calculated based on an average maintenance cost of \$16,400 per mile for existing and No-Build conditions and \$12,300 per mile for Build conditions. The No-Build estimate was derived from historic maintenance costs in the I-555 corridor. The Build condition maintenance cost was based on the historic maintenance costs on I-55, which has somewhat better pavement conditions. The annual maintenance costs were not adjusted to account for accelerated pavement deterioration in later years.

Table 9. I-555 Project Cost Estimate

Construction and Maintenance Costs							
Year	Build			No-Build			ANNUAL COST (Current Dollars)
	Activity	Costs	User Delay	Activity	Costs	User Delay	
2016	Maintenance	\$649,604	\$0	Maintenance	\$649,604	\$0	\$0
2017	Const & CE	\$8,200,000	\$0	Maintenance	\$649,604	\$0	\$7,550,396
2018	Const & CE	\$15,300,000	\$0	Maintenance	\$649,604	\$0	\$14,650,396
2019	Const & CE	\$48,300,000	\$0	Maintenance	\$649,604	\$0	\$47,650,396
2020	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2021	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2022	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2023	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2024	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2025	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2026	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2027	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2028	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2029	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2030	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2031	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2032	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2033	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2034	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2035	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2036	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2037	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2038	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2039	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401
2040	Maintenance	\$487,203	\$0	Maintenance	\$649,604	\$0	-\$162,401

Summary and Conclusions

This summary describes the methodology used for conducting the benefit-costs analysis for the I-555 Rehabilitation and Reconstruction. The economic benefits of implementing this project include cost savings for users due to reduced vehicle operating costs, reduced travel delays, and safety benefits. The summary of BCA analysis yields a current ratio of 2.78, a three percent discounted BCA ratio of 2.06, and a seven percent discounted BCA ratio of 1.48.

The benefits of the I-555 reconstruction and road diet improvements were evaluated in the following areas:

- Vehicle operating costs due to poor roadway conditions
- Safety impacts due to poor pavement conditions (particularly crashes on wet pavement)

Table 10 is a summary of the benefit-cost analysis for the entire I-555 corridor. Table 11 is a combined summary of the benefit-cost analyses for the individual segments and the whole corridor.

Table 10. Summary of I-555 Pavement Restoration Benefit-Cost Analysis

Benefit/Cost Category	No Discount	Discounted at 3%	Discounted at 7%
Vehicle Operating Cost Benefit	\$7,670,884	\$4,992,485	\$2,994,128
Safety Benefit	\$184,083,692	\$127,232,458	\$83,519,779
Sum of Benefits	\$191,754,576	\$132,224,943	\$86,513,907
Project Life Cycle Costs	\$68,875,962	\$64,141,329	\$58,304,172
B/C Ratio	2.78	2.06	1.48

Table 11. Summary of I-555 Segments and Corridor Level Benefit-Cost Analysis

Segments of Independent Utility and Corridor Level BCA Summary													
County	Prioritized Segments	Non-Discounted				3% Discount Rate				7% Discount Rate			
		Total Cost	Safety Savings	VOC Savings	BCA (ND)	Total Cost	Safety Savings	VOC Savings	BCA (3%)	Total Cost	Safety Savings	VOC Savings	BCA (7%)
Craighead	5	EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA			
Craighead	5	EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA				EXCLUDED PROJECT IN JONESBORO URBAN AREA			
Craighead	3	\$ 9,583,650	\$ 25,374,244	\$ -	2.65	\$ 8,957,738	\$ 17,612,669	\$ -	1.97	\$ 8,127,240	\$ 11,622,236	\$ -	1.43
Poinsett	1	\$ 3,578,600	\$ 89,063,942	\$ 2,964,316	26.01	\$ 3,474,369	\$ 62,847,756	\$ 1,929,282	18.84	\$ 3,344,486	\$ 42,562,671	\$ 1,157,043	13.20
Poinsett	6	\$24,568,475	\$ 28,647,968	\$ 3,268,219	1.33	\$22,571,857	\$ 18,934,078	\$ 2,127,073	0.96	\$20,198,413	\$ 11,576,820	\$ 1,275,664	0.65
Poinsett	4	\$ 4,369,336	\$ 27,690,676	\$ 323,985	6.45	\$ 4,213,182	\$ 18,601,450	\$ 210,861	4.49	\$ 3,974,605	\$ 11,663,073	\$ 126,459	2.98
Poinsett	2	\$ 3,838,751	\$ 13,264,082	\$ -	3.46	\$ 3,859,261	\$ 9,206,811	\$ -	2.39	\$ 3,815,455	\$ 6,075,385	\$ -	1.59
Crittenden	7	\$ 22,937,150	\$ 42,780	\$ 1,114,365	0.06	\$21,064,923	\$ 29,694	\$ 725,268	0.04	\$18,843,973	\$ 19,595	\$ 434,963	0.03
		\$ 68,875,962	\$ 184,083,692	\$ 7,670,885		\$64,141,330	\$127,232,458	\$ 4,992,484		\$58,304,172	\$ 83,519,780	\$ 2,994,129	
		Corridor Level Savings \$191,754,577			Corridor Level Savings \$132,224,942			Corridor Level Savings \$86,513,909					
		Corridor Level ND B/C Ratio 2.78			Corridor Level 3% B/C Ratio 2.06			Corridor Level 7% B/C Ratio 1.48					