

# Benne Road

Sponsor County Highway

Project No. RB23-000010

Project Type Safety

## TOTAL FUNDING

Total	County	Sponsor	Federal	Other
<b>\$1,020,000.00</b>	<b>\$1,020,000.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>

## Project Description

Benne Road has two sharp horizontal curves that have seen a lot of run off the road crashes over the last three years. There were five reported just in 2020. Also the intersection with Huffmeier Road is unconventional and too close to Route D, making a dangerous intersection that needs to be improved. The plan is to smooth both sharp curves on Benne Road, as well as add 4' shoulders for a more forgiving pavement section, and modify the intersection with Huffmeier Road to provide more separation from Route D. To keep costs down, in the tangent sections, a shoulder widening and overlay would be done rather than reconstruct more pavement than necessary.



# Road Board Application

## PROJECT INFORMATION

**Permit #:** RB23-000010 **Project Type:** Safety  
**Name:** Benne Road  
**Limits:** From Route D east 0.43 miles  
**Lane Miles:** 0.86  
**Federal Functional Classification:** 5 - Local  
**Anticipated useful life of the proposed improvements (years):** 20 **Estimated date of completion:** 12/31/2026

### Safety Information

<b>Traffic Volume ADT:</b>	<b>Existing</b> 739	<b>Future</b> 1350
<b>Crashes last 3 years:</b>	<b>Fatal</b> 0	<b>Serious injury</b> 4
	<b>Damage Only</b> 4	<b>Total crashes</b> 8

### Anticipated Crash Reduction Factor:

Crash Modification Factor (CMF)	Crash Type	No. of Crashes
CMF 1	Change Horiz. Curve Rad	6
CMF 2	Upgrade Narrow Shoulder	6
CMF 3	Install Rumble Strips	6
CMF 4	Change Intersection Skew	2
CMF 5		

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## CONTACT INFORMATION

**Sponsoring Agency:** St. Charles County Highway Department  
**Contact Person Name:** Chris Bostic  
**Title:**  
**Telephone Number:** 6369497305  
**E-mail Address:** cbostic@sccmo.org

### SIGNATURE

Chris Bostic

Digitally signed by Chris Bostic  
 DN: cn=Chris Bostic, o=St Charles County Highway  
 Dept, ou=Highway Department,  
 email=cbostic@sccmo.org, c=US  
 Date: 2023.03.30 07:36:58 -0500

signature

date





# BENNE ROAD PROJECT

HUFFMEIER RD

BENNE RD

ROUTED

ST. CHARLES  
COUNTY  
HIGHWAY  
DEPARTMENT

**BENNE ROAD PROJECT**  
FROM ROUTE D TO 0.46 MILES EAST  
THROUGH THE TWO SHARP TURNS ON BENNE RD  
PROJECT LENGTH: 0.46 MILES

  
**NORTH**  
NOT TO SCALE

ST. CHARLES COUNTY ROAD BOARD  
 2024 - 2026 TIP FINANCIAL WORKSHEET  
*Benne Road*

<b>FUNDING FOR IMPROVEMENTS</b>					
	County	Sponsor	Federal	Other	Total
Design	\$75,000.00	\$0.00	\$0.00	\$0.00	<b>\$75,000.00</b>
Utility Relocations	\$0.00	\$0.00	\$0.00	\$0.00	<b>\$0.00</b>
Right-of-Way	\$100,000.00	\$0.00	\$0.00	\$0.00	<b>\$100,000.00</b>
Construction	\$845,000.00	\$0.00	\$0.00	\$0.00	<b>\$845,000.00</b>
<b>TOTAL</b>	<b>\$1,020,000.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$1,020,000.00</b>
PERCENT (%)	100.00%	0.00%	0.00%	0.00%	100.00%
<b>FINANCIAL PLAN</b>					
<b>Design</b>	County	Sponsor	Federal	Other	Total
2024	\$75,000.00				\$75,000.00
2025					\$0.00
2026					\$0.00
<b>Utility Relocations</b>	County	Sponsor	Federal	Other	Total
2024					\$0.00
2025					\$0.00
2026					\$0.00
<b>Right-of-Way</b>	County	Sponsor	Federal	Other	Total
2024					\$0.00
2025	\$100,000.00				\$100,000.00
2026					\$0.00
<b>Construction</b>	County	Sponsor	Federal	Other	Total
2024					\$0.00
2025					\$0.00
2026	\$845,000.00				\$845,000.00

**Estimate of Project Costs**

<b>Project Sponsor:</b>	<b>Saint Charles County Highway Department</b>
<b>Project Title:</b>	<b>Benne Road</b>
<b>Date:</b>	<b>3/29/2023</b>

<b>Specific Roadway Items</b>				
<b>Item</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Amount</b>
Clearing and Grubbing	1	Lump Sum	\$ 25,000.00	\$25,000.00
Removal of Improvements	1	Lump Sum	\$ 20,000.00	\$20,000.00
Mobilization	1	Lump Sum	\$ 50,000.00	\$50,000.00
Surveying	1	Lump Sum	\$ 10,000.00	\$10,000.00
Earthwork	5000	Cubic Yards	\$ 12.00	\$60,000.00
Retaining Walls	0	Square Feet	\$ 25.00	\$0.00
4" Aggregate Base	6000	Square Yards	\$ 7.00	\$42,000.00
Widened Pavement: Lane widening to 11' lanes, 4' shoulders	2000	Square Yards	\$ 50.00	\$100,000.00
Full Depth New Pavement: 2-11' lanes, 4' shoulders	5000	Square Yards	\$ 60.00	\$300,000.00
Driveways/Side street	200	Square Yards	\$ 45.00	\$9,000.00
Curb and Gutter	0	Linear Feet	\$ 20.00	\$0.00
Box Culvert	0	Lump Sum	\$ 50,000.00	\$0.00
Crossroad Drainage	1	Lump Sum	\$ 20,000.00	\$20,000.00
Traffic Control	1	Lump Sum	\$ 15,000.00	\$15,000.00
Roundabout/Signal	0	Each	\$ 200,000.00	\$0.00
Erosion Control	1	Lump Sum	\$ 7,500.00	\$7,500.00
Temporary Pavement	0	Square Yards	\$ 30.00	\$0.00
Sodding	0	Square Yards	\$ 5.00	\$0.00
Seeding	2	Acres	\$ 4,000.00	\$8,000.00
Pavement Markings	4500	Linear Feet	\$ 2.00	\$9,000.00
				\$0.00
<b>SUBTOTAL:</b>				<b>\$675,500.00</b>

<b>Specific Bicycle Items</b>				
<b>Item</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Amount</b>
				\$0.00
				\$0.00
<b>SUBTOTAL:</b>				<b>\$0.00</b>

<b>Specific Pedestrian Items</b>				
<b>Item</b>	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Amount</b>
				\$0.00
				\$0.00
<b>SUBTOTAL:</b>				<b>\$0.00</b>

<b>Specific Transit Items</b>				
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Item	Quantity	Unit	Unit Price	Amount
				\$0.00
<b>SUBTOTAL:</b>				<b>\$0.00</b>

<b>Miscellaneous Other Items</b>				
Item	Quantity	Unit	Unit Price	Amount
				\$0.00
				\$0.00
<b>SUBTOTAL:</b>				<b>\$0.00</b>

<b>Construction Cost Total:</b>	<b>\$675,500.00</b>
<b>Contingency (20%):</b>	<b>\$135,100.00</b>
<b>Inflation (4%):</b>	<b>\$27,020.00</b>
<b>Preliminary Engineering:</b>	<b>\$75,000.00</b>
<b>Right-of-Way:</b>	<b>\$100,000.00</b>
<b>Project Total (rounded):</b>	<b>\$1,020,000.00</b>

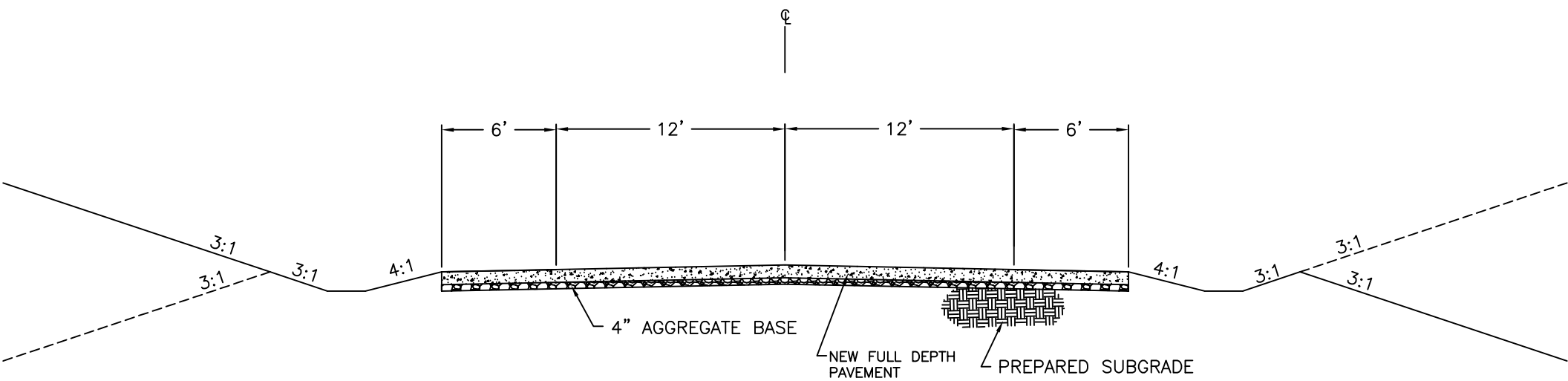


Benne Rd

<i>Project Schedule</i>	<i>Start Date (MO/YR)</i>	<i>Finish Date (MO/YR)</i>
Receive Notification of Funding	11/23	11/23
Consultant Selection	12/23	1/24
Award Engineering Services Contract	1/24	1/24
Obtain Environmental Clearances	1/24	5/25
Public Meeting/Hearing	9/24	9/24
Develop and Submit Preliminary Plans	1/24	9/24
Preliminary Plans Approved	10/24	11/24
Develop and Submit Right-of-Way Plans	12/24	3/25
Review and Approval of Right-of-Way Plans	3/25	4/25
Submit and Receive Approval for Notice to Proceed for Right-of-Way Acquisition (A-Date)	4/25	5/25
Right-of-Way Acquisition	5/25	11/25
Utility Coordination	1/24	11/25
Develop and Submit PS&E	7/25	10/25
District Approval of PS&E/Advertise for Bids	11/25	12/25
Submit and Receive Bids for Review and Approval	1/26	2/26
Project Implementation/Construction	3/26	12/26

BENNE ROAD  
TYPICAL SECTION

50' RIGHT-OF-WAY  
(2 - 12' LANES  
2 - 6' SHOULDERS)







# CRASH MODIFICATION FACTORS CLEARINGHOUSE

## CMF / CRF DETAILS

CMF ID: 10264

### CHANGE HORIZONTAL CURVE RADIUS FROM X TO Y (FEET)

DESCRIPTION:

PRIOR CONDITION: HORIZONTAL CURVE RADIUS OF X FEET

CATEGORY: ALIGNMENT

STUDY: STUDY ON MOTORCYCLE SAFETY IN NEGOTIATION WITH HORIZONTAL CURVES IN FLORIDA AND DEVELOPMENT OF CRASH MODIFICATION FACTORS, WANG ET AL., 20

Star Quality Rating: 5.0000 [\[VIEW SCORE DETAILS\]](#)

Rating Points Total: 80

#### Crash Modification Factor (CMF)

$$CMF = \frac{\left(\frac{Y}{5000}\right)^{-0.208}}{\left(\frac{X}{5000}\right)^{-0.208}}$$

Value:

= 0.874

Y = proposed horizontal curve radius, in feet

X = existing horizontal curve radius, in feet

Adjusted Standard Error:

Unadjusted Standard Error:

#### Crash Reduction Factor (CRF)

$$CRF = 100 * \left(1 - \frac{\left(\frac{Y}{5000}\right)^{-0.208}}{\left(\frac{X}{5000}\right)^{-0.208}}\right)$$

Value:

Y = proposed horizontal curve radius, in feet

X = existing horizontal curve radius, in feet

Adjusted Standard Error:

Unadjusted Standard Error:

Applicability

Crash Type: Other

**Crash Severity:** All**Roadway Types:** Not specified**Number of Lanes:** 2**Road Division Type:** Undivided**Speed Limit:****Area Type:** Rural**Traffic Volume:** Minimum of 460 to Maximum of 25180 Annual Average Daily Traffic (AADT)**Average Traffic Volume:** 4269 Annual Average Daily Traffic (AADT)**Time of Day:** All***If countermeasure is intersection-based*****Intersection Type:****Intersection Geometry:****Traffic Control:****Major Road Traffic Volume:****Minor Road Traffic Volume:****Average Major Road Volume :****Average Minor Road Volume :****Development Details****Date Range of Data Used:** 2005 to 2015**Municipality:****State:** FL**Country:** USA**Type of Methodology Used:** 7**Sample Size (crashes):** 439 crashes**Sample Size (miles):** 763 miles**Sample Size (mile-years):** 8393 mile-years**Other Details****Included in Highway Safety Manual?** No**Date Added to Clearinghouse:** Dec-07-2019**Comments:** This CMF applies to motorcycle-involved crashes on horizontal curves.[VIEW THE FULL STUDY DATA](#)[EXPORT DETAIL PAGE AS A PDF](#)



# CRASH MODIFICATION FACTORS CLEARINGHOUSE

## CMF / CRF DETAILS

CMF ID: 9830

### INSTALL EDGELINE RUMBLE STRIPS AT HORIZONTAL CURVE

DESCRIPTION: INSTALL EDGELINE RUMBLE STRIPS AT HORIZONTAL CURVE

PRIOR CONDITION: *NO PRIOR CONDITION(S)*

CATEGORY: ROADWAY

STUDY: [SAFETY EVALUATION OF EDGE-LINE RUMBLE STRIPES ON RURAL TWO-LANE HORIZONTAL CURVES, HIMES ET AL., 2017](#)

Star Quality Rating: [VIEW SCORE DETAILS]

Rating Points Total: 120

#### Crash Modification Factor (CMF)

Value: 0.75

Adjusted Standard Error:

Unadjusted Standard Error: 0.09

#### Crash Reduction Factor (CRF)

Value: 25 (This value indicates a decrease in crashes)

Adjusted Standard Error:

Unadjusted Standard Error: 9

#### Applicability

Crash Type: All

Crash Severity: All

Roadway Types: All

Number of Lanes: 2

Road Division Type: Undivided

Speed Limit:

Area Type: Rural

Traffic Volume: Minimum of 412 to Maximum of 4268 Annual Average Daily Traffic (AADT)

Average Traffic Volume: 1589 Annual Average Daily Traffic (AADT)

Time of Day: All

*If countermeasure is intersection-based*

**Intersection Type:**

**Intersection Geometry:**

**Traffic Control:**

**Major Road Traffic Volume:**

**Minor Road Traffic Volume:**

**Average Major Road Volume :**

**Average Minor Road Volume :**

**Development Details**

**Date Range of Data Used:** 2004 to 2012

**Municipality:**

**State:** KY

**Country:** USA

**Type of Methodology Used:** 2

**Sample Size (crashes):** 305 crashes before, 86 crashes after

**Sample Size (miles):** 15.59 miles before, 15.59 miles after

**Sample Size (miles):** 90.38 mile-years before, 34.36 mile-years after

**Other Details**

**Included in Highway Safety Manual?** No

**Date Added to Clearinghouse:** Oct-27-2018

**Comments:** The CMF is for Total crashes (all types and severities combined).

[VIEW THE FULL STUDY DATA](#)

[EXPORT DETAIL PAGE AS A F](#)

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For more information, contact Karen Scarry at [karen.scarry@dot.gov](mailto:karen.scarry@dot.gov)

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# CRASH MODIFICATION FACTORS CLEARINGHOUSE

## CMF / CRF DETAILS

CMF ID: 5402

### UPGRADE NARROW UNPAVED SHOULDER (< 5 FT) TO WIDE UNPAVED SHOULDER (> 5 FT)

DESCRIPTION: UPGRADE NARROW UNPAVED SHOULDER (< 5 FT) TO WIDE UNPAVED SHOULDER (> 5 FT)

PRIOR CONDITION: NARROW UNPAVED SHOULDER (< 5 FT)

CATEGORY: SHOULDER TREATMENTS

STUDY: EVALUATION OF SAFETY EFFECTIVENESS OF COMPOSITE SHOULDERS, WIDE UNPAVED SHOULDERS, AND WIDE PAVED SHOULDERS IN KANSAS, ZENG ET AL., 2013

Star Quality Rating: [\[VIEW SCORE DETAILS\]](#)

Rating Points Total: 105

#### Crash Modification Factor (CMF)

Value: 0.71

Adjusted Standard Error:

Unadjusted Standard Error: 0.048

#### Crash Reduction Factor (CRF)

Value: 29 (This value indicates a decrease in crashes)

Adjusted Standard Error:

Unadjusted Standard Error: 4.8

#### Applicability

Crash Type: All

Crash Severity: All

Roadway Types: Major Collector

Number of Lanes: 2

Road Division Type: Undivided

Speed Limit:

Area Type: Rural

Traffic Volume: Minimum of 65 to Maximum of 4950 Annual Average Daily Traffic (AADT)

Average Traffic Volume:

Time of Day: All

If countermeasure is intersection-based

**Intersection Type:**

**Intersection Geometry:**

**Traffic Control:**

**Major Road Traffic Volume:**

**Minor Road Traffic Volume:**

**Average Major Road Volume :**

**Average Minor Road Volume :**

**Development Details**

**Date Range of Data Used:** 2000 to 2009

**Municipality:**

**State:** KS

**Country:** USA

**Type of Methodology Used:** 7

**Sample Size (crashes):** 3135 crashes

**Other Details**

**Included in Highway Safety Manual?** No

**Date Added to Clearinghouse:** Jan-09-2014

**Comments:** The cross sectional model compares narrow unpaved shoulders to wide unpaved shoulders. There are more crashes in the sample, specifically associated with the category "wide paved shoulders," that wasn't included in the summary st

[VIEW THE FULL STUDY DATA](#)

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For more information, contact Karen Scurry at karen.scurry@dot.gov

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# St. Charles County Highway Traffic Count

Rainy & Windy 2/14/2023

301 N 3rd St  
St Charles, MO 63301  
(636) 949-7305

Benne Rd  
Near Route D Counts  
Date Start: 2/13/2023  
Latitude: 38° 42.3576 North  
Longitude: 90° 49.9988 West  
Benne Rd Rd Near Route D Counts 2-13-2023

Start Time	Mon 2/13/2023		Tue 2/14/2023		Wed 2/15/2023		Daily Average			
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		
12:00	*	5	1	5	2	*	2	5		
12:15	*	10	1	8	0	*	0	9		
12:30	*	12	1	10	1	*	1	11		
12:45	*	13	0	10	0	*	0	12		
01:00	*	10	0	10	0	*	0	10		
01:15	*	10	0	10	0	*	0	10		
01:30	*	9	0	16	0	*	0	12		
01:45	*	13	0	16	0	*	0	14		
02:00	*	10	0	8	0	*	0	9		
02:15	*	10	0	8	0	*	0	9		
02:30	*	16	0	4	0	*	0	10		
02:45	*	21	0	11	0	*	0	16		
03:00	*	14	0	19	0	*	0	16		
03:15	*	20	0	28	0	*	0	24		
03:30	*	20	0	23	0	*	0	22		
03:45	*	16	0	19	0	*	0	18		
04:00	*	24	2	14	0	*	1	19		
04:15	*	16	1	18	0	*	0	17		
04:30	*	11	1	22	1	*	1	16		
04:45	*	22	0	21	0	*	0	22		
05:00	*	15	3	18	2	*	2	16		
05:15	*	19	5	19	4	*	4	19		
05:30	*	16	2	11	7	*	4	14		
05:45	*	12	6	8	2	*	4	10		
06:00	*	9	2	9	5	*	4	9		
06:15	*	11	15	11	8	*	12	11		
06:30	*	9	20	5	11	*	16	7		
06:45	*	10	16	5	22	*	19	8		
07:00	*	8	13	3	18	*	16	6		
07:15	*	7	20	6	12	*	16	6		
07:30	*	7	24	4	27	*	26	6		
07:45	*	10	21	7	22	*	22	8		
08:00	*	5	17	3	16	*	16	4		
08:15	*	5	7	2	18	*	12	4		
08:30	*	4	19	2	16	*	18	3		
08:45	*	3	15	1	26	*	20	2		
09:00	*	6	9	4	6	*	8	5		
09:15	*	3	12	4	9	*	10	4		
09:30	*	2	5	3	10	*	8	2		
09:45	*	5	12	4	3	*	8	4		
10:00	10	1	2	0	*	*	6	0		
10:15	6	1	5	1	*	*	6	1		
10:30	5	0	12	0	*	*	8	0		
10:45	5	1	5	1	*	*	5	1		
11:00	12	0	10	0	*	*	11	0		
11:15	4	0	10	0	*	*	7	0		
11:30	8	0	12	0	*	*	10	0		
11:45	8	0	8	0	*	*	8	0		
Total	58	451	314	411	248	0	311	431		
Combined Total	509		725		248		742			
Peak	11:00	03:15	-	07:15	03:00	-	07:30	-	07:00	03:15
Vol.	32	80	-	82	89	-	83	-	80	83
P.H.F.	0.667	0.833	-	0.854	0.795	-	0.769	-	0.769	0.865
ADT	ADT 739		AADT 739							