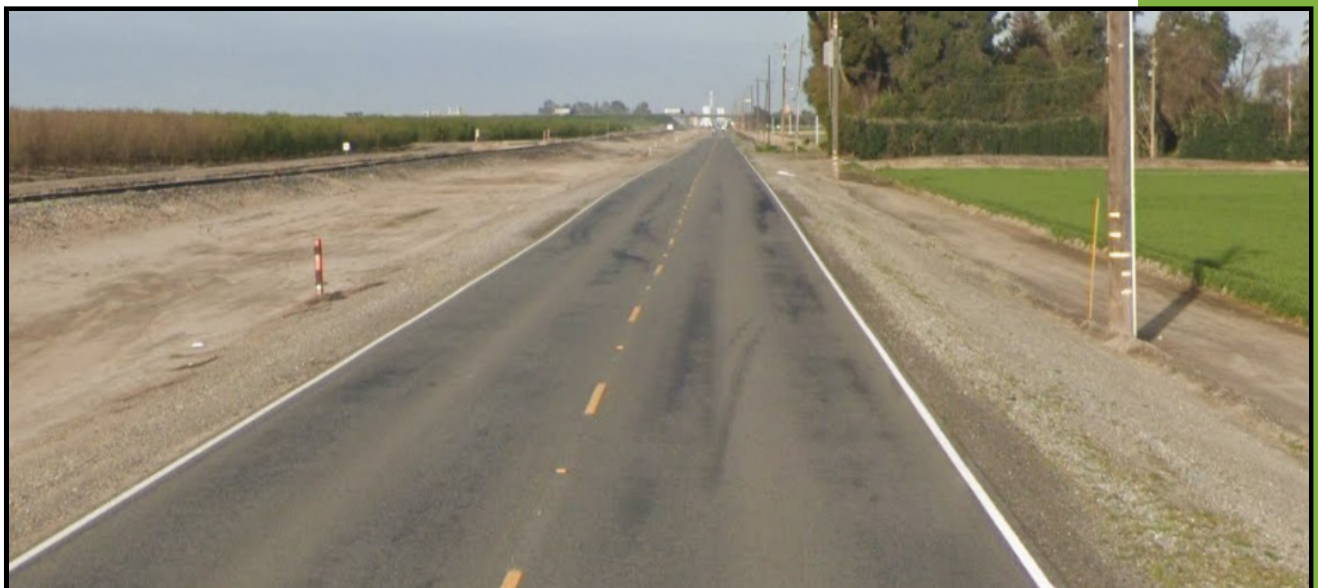




CMAQ APPLICATION: Pave Shoulder Project

Hageman Rd (Buttonwillow)

Project Limits: Hageman Rd (I5 - Shortcuts Ln)



KERN COUNCIL OF GOVERNMENTS
Congestion Mitigation and Air Quality (CMAQ) Program
PROJECT APPLICATION – Due Thursday, July 17, 2025

*Please note this is a PDF fillable form so responses may be typed. Items 1, 2, 7, and 22 are drop downs. Totals in item 6 will automatically calculate.

- (1) Is the project included in a local agency-adopted resolution supporting the project? YES NO
- (2) Does the proposed project meet basic eligibility requirements? YES NO
- (3) Project background and justification: Explain the project in terms of the existing infrastructure, its impact for service, safety or any other issue that is relevant to the project (attach to application). If the project scope relates to fueling infrastructure please provide a 3-year fleet conversion plan.
- (4) Lead Agency: _____
- (5) Project description [(Location:) + (Limits) + (;) + (Improvement/Activity)]

(6)	Funding Type	PE	R/W	Const.	Total
	Local	\$ _____	\$ _____	\$ _____	\$ _____
	Local	\$ _____	\$ _____	\$ _____	\$ _____
	State	\$ _____	\$ _____	\$ _____	\$ _____
	Federal	\$ _____	\$ _____	\$ _____	\$ _____
	Total	\$ _____	\$ _____	\$ _____	\$ _____

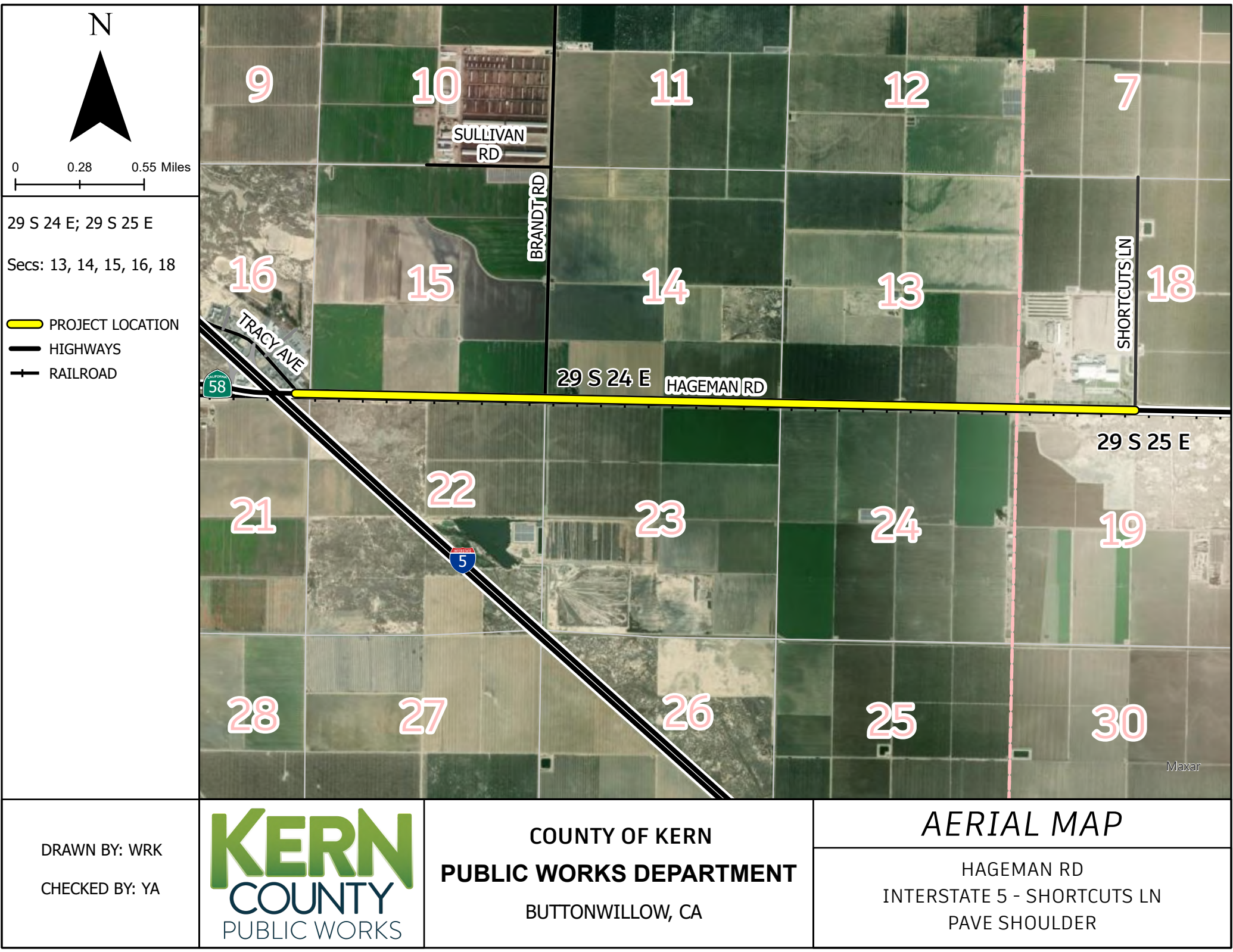
- (7) Programming Year by Phase: PE: _____ R/W: _____ Const: _____
- (8) VMT Reduction (annual miles): _____
- (9) VOC Reduction (kg/day): _____ Additional documentation required. See instructions.
- (10) NOx Reduction (kg/day): _____ Additional documentation required. See instructions.
- (11) PM₁₀ Reduction (kg/day): _____ Additional documentation required. See instructions.
- (12) PM_{2.5} Reduction (Kg/day): _____ Additional documentation required. See instructions.
- (13) CO Reduction (kg/day): _____ Additional documentation required. See instructions.
- (14) Cost-Effectiveness (\$/lb): _____ Additional documentation required. See instructions.
- (15) Livability and Safety: Describe how project provides the six benefits; limit to half page per benefit.
- (16) Hwy Peak Period LOS Before Project (AM/PM average): _____
- (17) Hwy Peak period LOS After Project (AM/PM average): _____
- (18) Bikeway Peak Period LOS Before Project (AM/PM average): _____
- (19) Bikeway Peak period LOS After Project (AM/PM average): _____
- (20) Pedestrian Peak period LOS Before Project (AM/PM average): _____
- (21) Pedestrian Peak period LOS After Project (AM/PM average): _____
- (22) Is the project identified as a RACM/BACM? YES NO

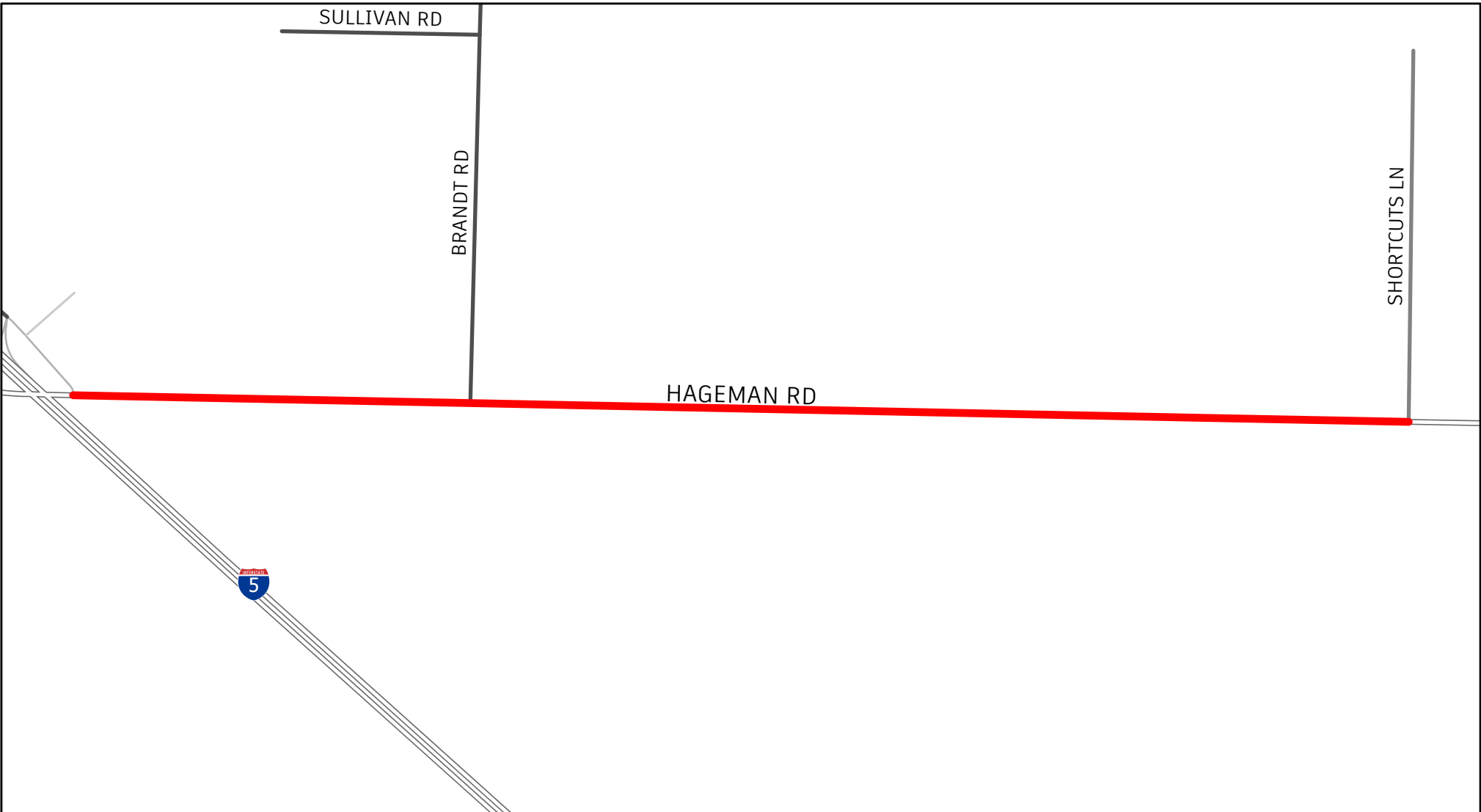
Application completed by: _____	Date Completed: _____
E-mail: _____	Phone Number: _____
Agency: _____	
Address: _____	

Send completed application electronically on a flash drive with transmittal letter on agency letterhead to:

Attn: Ceasar Valle ❖ Kern Council of Governments, 1401 19th Street, Suite 300, Bakersfield, CA 93301

OR send Digitally via [Dropbox, click here.](#)








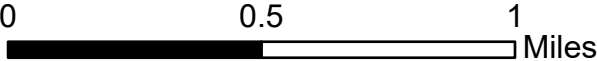
VICINITY MAP

HAGEMAN RD
INTERSTATE 5 - SHORTCUTS LN

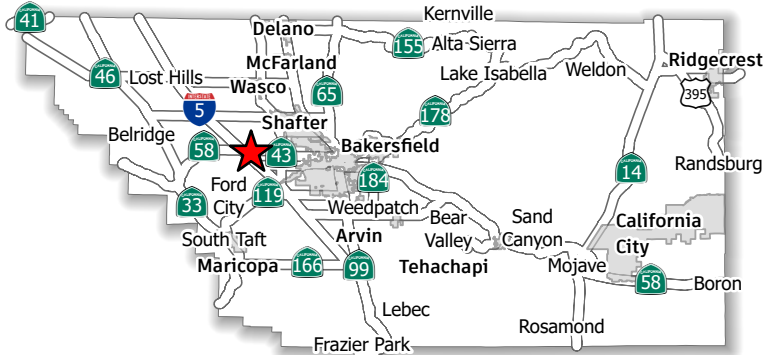
COUNTY OF KERN
DEPARTMENT OF PUBLIC WORKS

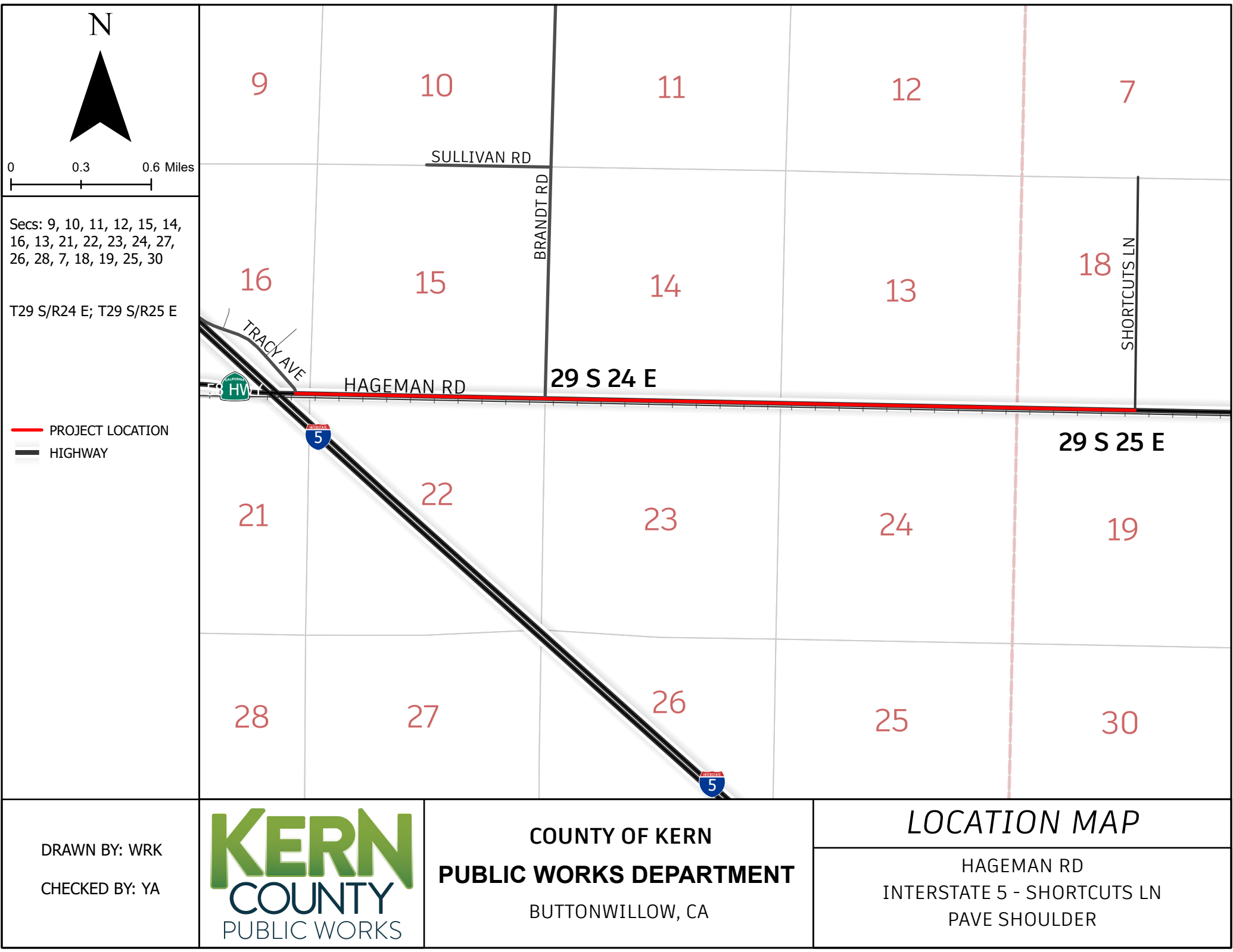
Legend

-  PROJECT LOCATION
-  HIGHWAYS
-  CITY LIMITS



Map by: Kilmerw
Printed: 4/22/2025







PROJECT BACKGROUND

1. Justitification
2. Livability
3. Safety
 - A. Collision Maps
 - B. Collision Rates

Project Description & Justification

Project Description

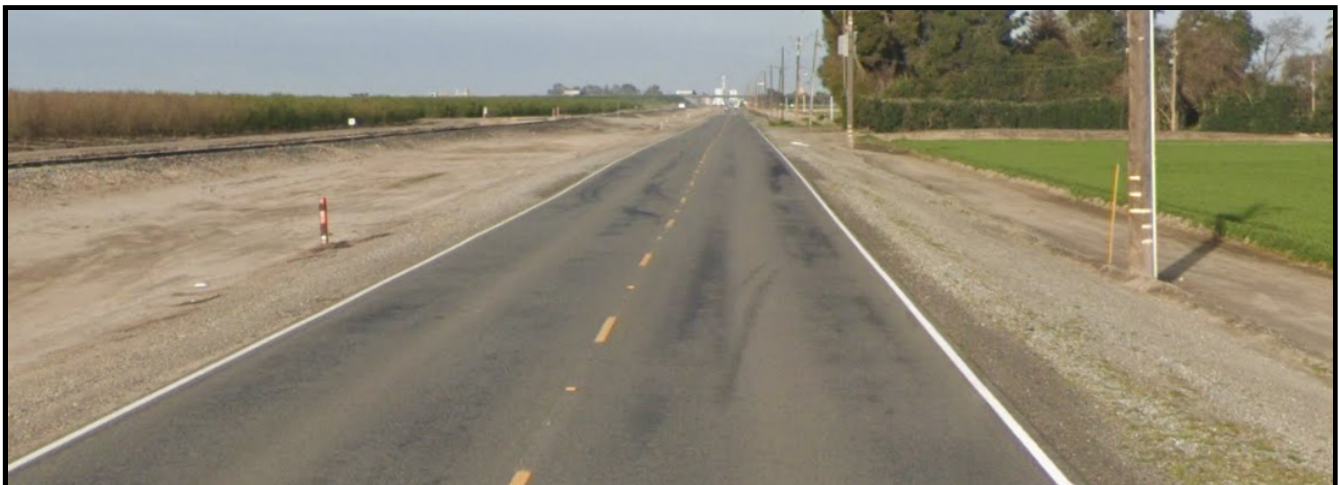
The proposed project is located east of Buttonwillow, an unincorporated community in western Kern County. The project will pave the dirt shoulder gaps of Hageman Road from I5 to Shortcuts Lane with asphalt. Pavement will consist of approximately 3.6 miles. In addition to the asphalt paving, the proposed project will also include the installation of ancillary facilities necessary for the proper construction and operation of these facilities according to the County of Kern, Caltrans, and Americans with Disabilities Act (ADA) design standards.

Project Justification

The proposed project is located in an unincorporated portion of Kern County near the community of Buttonwillow (Census Tract 66.00). It is located in one of the most socioeconomically and environmentally disadvantaged communities in the state, in the 96th percentile of overall scores based on CalEnviroscreen 4.0 (see attached Disadvantaged Community Map). Shoulder paving will improve the quality of life for residents in this neighborhood and the surrounding areas by significantly decreasing dust emissions and providing residents with a safer and more reliable route to and from their homes.

Travel on roads with dirt shoulders result in greater particulate matter emissions (PM₁₀). The San Joaquin Valley's Air Pollution Control District (Valley Air District) is currently in non-attainment for PM₁₀ under state clean air guidelines. Prolonged exposure to PM₁₀ is linked to premature death, respiratory and cardiovascular diseases, lost workdays, school absences, and reduced activity, all of which translate into increased health costs. Since travel on roads with paved shoulders results in significantly fewer particulate matter emissions (PM₁₀) than on those without, the proposed project is anticipated to reduce PM₁₀ emissions by about 9,322 pounds per year.

Installing paved shoulders will reduce the amount of dust particulate matter created when vehicles travel both eastbound and westbound on Hageman Road. Additionally, paved shoulders provide a place for vehicles to safely pull over. Paved shoulders also have numerous other benefits, such as providing structural support to the traveled way, thus extending pavement life; rainwater discharge thereby reducing hydroplaning; increased space between the traveled way and roadside obstacles; increased space for parking, emergency stops, emergency maneuvers, and bypassing left-turning vehicles; recovery area to regain control of a vehicle; increased sight lines at intersections; and increased space for pedestrian and bicycle travel where there is no sidewalk.



Hageman Rd, Kern County

Livability and Safety

1. Will enhance or reduce the average cost of user mobility through the creation of more convenient transportation options for travelers?

Yes, the shoulder project will reduce the average cost of user mobility by reducing travel delay and its related costs. When a driver or cyclist would like a car to pass them paved shoulders provide a safe space for them to move to the right, thereby reducing unsafe passing and reducing congestion. Shoulders reduce delays in other ways, as well, such as increasing sight lines at intersections, providing expanded space for deceleration when turning, and creating space for disabled vehicles to pull over. Additionally, the project has the potential to reduce costs related to rear-end and head-on collisions relating to passing or vehicle deceleration ahead of a turn. Per TIMS, in the past 10 years, there have been 10 crashes on this segment, with 1 fatal crash and 5 crashes with injuries among them.

2. Will improve existing transportation choices by enhancing points of modal connectivity, increasing the number of modes accommodated on existing assets, or reducing congestion on existing modal assets?

Yes, shoulders will increase the number of modes accommodated on the existing road by giving pedestrians a place to walk when there is no sidewalk and providing cyclists with a space to ride that is separate from motor vehicles. Shoulders also reduce delays from congestion by providing: increased sight lines at intersections, greater space for deceleration when turning, space for vehicles to move to the right for others to pass, and space for disabled vehicles to pull over. When a driver or a cyclist would like a car to pass them, shoulders provide space for them to move to the right, increasing roadway safety and improving speed and congestion. The project has the potential to reduce VMT by up to 8,820 annually.

3. Will improve travel between residential areas and commercial centers and jobs?

Yes, shoulders on this roadway will improve travel between residential and commercial areas by reducing travel delays, improving safety, and increasing modal options for travelers by providing additional space for non-drivers. This project will improve travel for both commuters and consumers as they move from SR43 to I5 and into commercial and residential networks in nearby neighborhoods of Buttonwillow, Stebbins, and Bowerbank and beyond; this is especially true with connecting residents with jobs in the surrounding agricultural farmland and food production plants.

4. Will improve accessibility and transportation services for economically disadvantaged populations, non-drivers, senior citizens, and persons with disabilities, or make goods, commodities, and services more readily available to these groups. The two Safety benefits are:

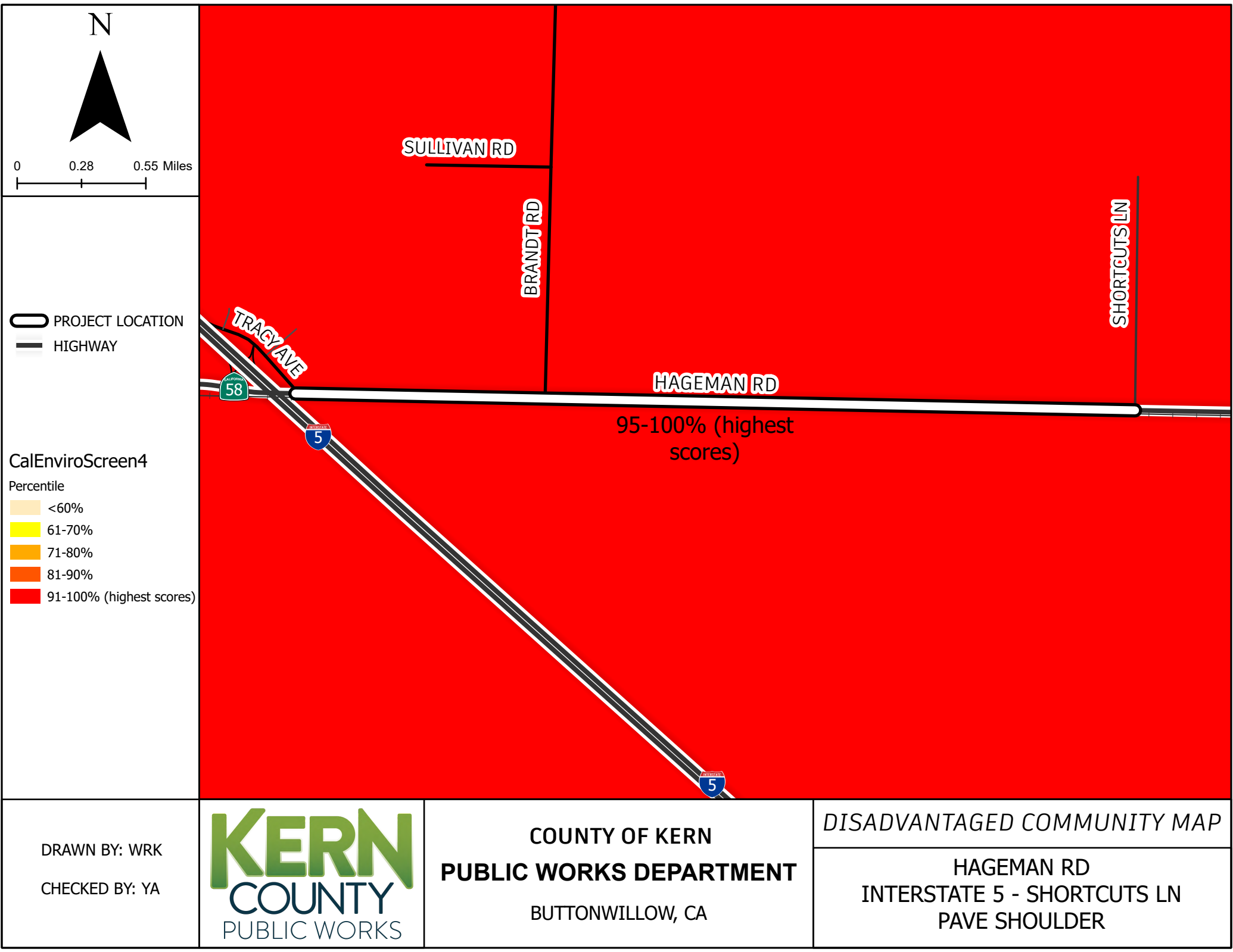
Yes, the project will improve accessibility and transportation services for non-drivers by installing shoulders that can be used by cyclists and pedestrians to access the community resources available nearby such as markets and healthcare in Buttonwillow. The project location is in Census Tract 66.00, which is in the 96th percentile for overall CalEnviroScreen 4.0 scores, and the 86th percentile for poverty burden scores. This improved connectivity will make goods and services more readily available by increasing roadway safety, increasing driver visibility, and providing a larger buffer zone between motorists and non-drivers, thereby reducing congestion and travel time for users of this facility.

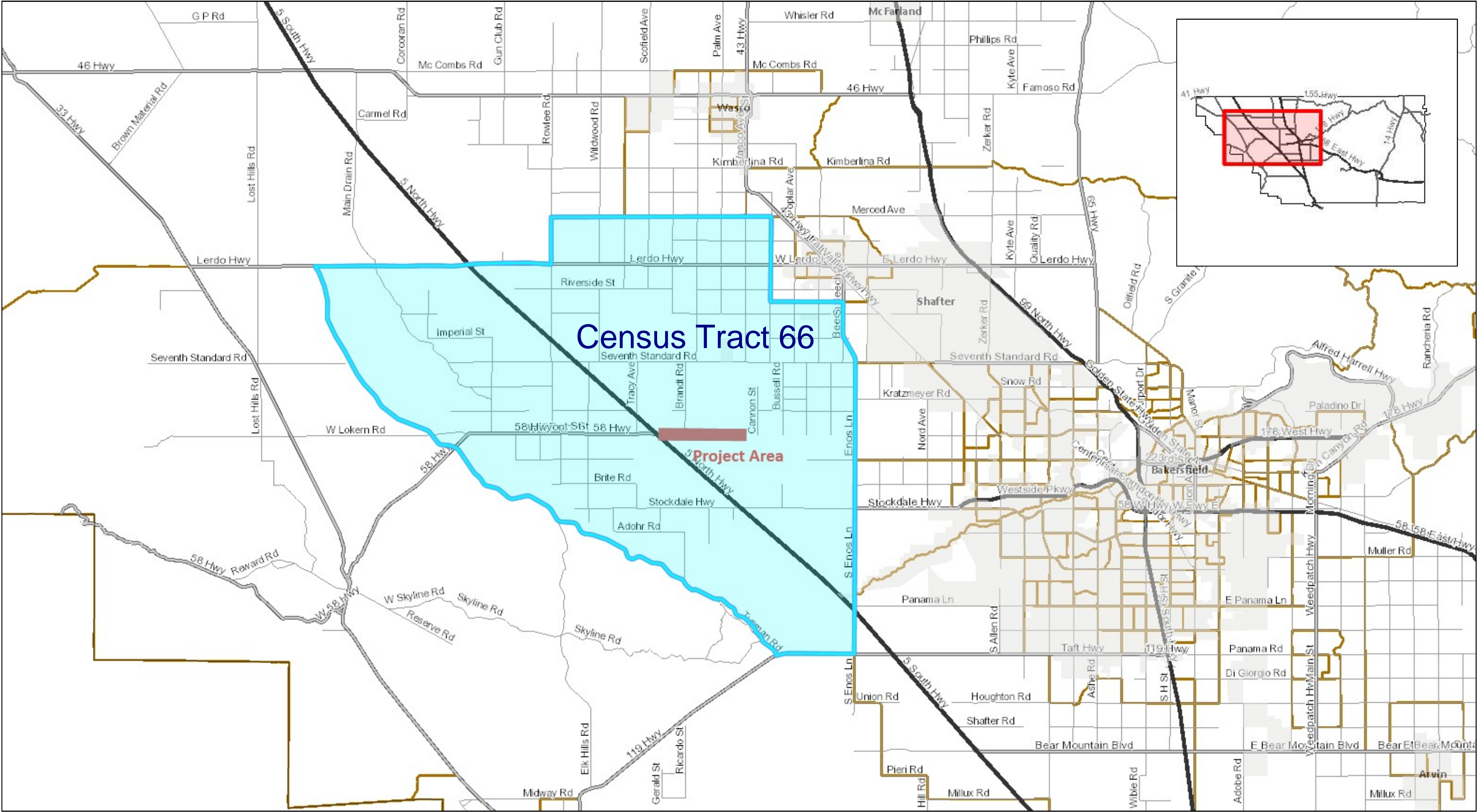
5. Is the existing Accident Rate higher than the average rate for a similar facility, and does the project reduce the Accident Rate to the average rate or lower? Yes or No and if yes, provide rates and supporting documentation:

No, the existing Collision/Accident Rate is not higher than the statewide average rate. The After Collision/Accident Rate will be below or equal to the statewide average rate (See attached Collision Map).

6. Is the existing Fatality Rate higher than the average rate for a similar facility, and does the project reduce the Fatality Rate to the average rate or lower? Yes or No and if yes, provide rates and supporting documentation.

No, the existing fatality rate is not higher than the state average. The project will keep the fatality rate 0.00, and below or equal to the state average rate. (See attached Traffic Collision Map).





9.12 0 4.56 9.12 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Latitude Geographics Group Ltd.

1: 288,895

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION

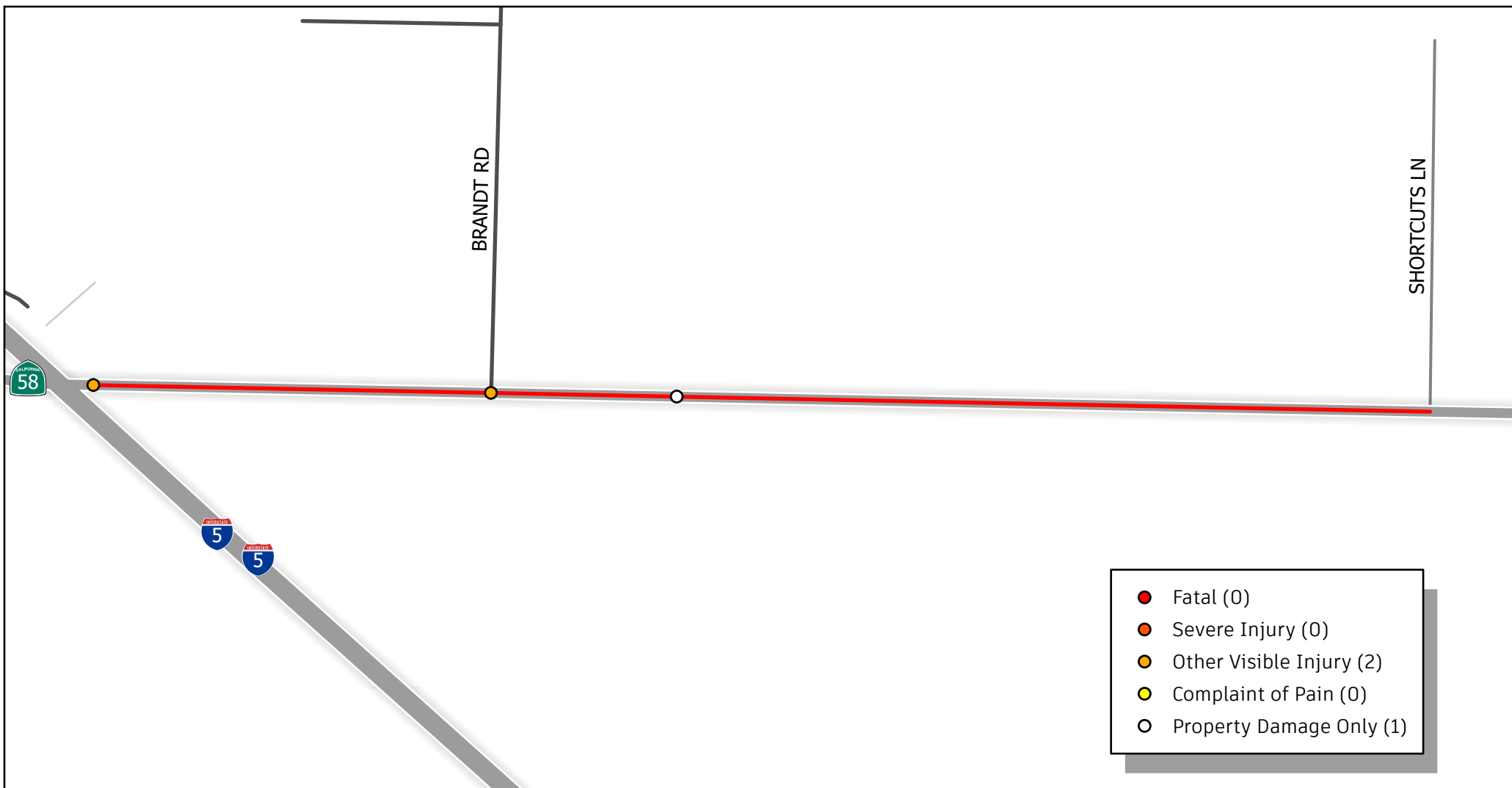
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TRAFFIC COLLISION MAP

HAGEMAN RD - (INTERSTATE 5 - SHORTCUTS LN)

JANUARY 2022 - DECEMBER 2024

LOCATION: BUTTONWILLOW



PROJECT LOCATION

CITY LIMITS

Total Collisions: 3
Fatalities: 0
Injuries: 2

Collision Rate (c/mve)

Statewide Average: 0.78
 Before Rate: 0.49
 After Rate: 0.78

Fatality Rate (c/mve)

Statewide Average: 0.025
 Before Rate: 0.0
 After Rate: 0.025

$$\text{Collision Rate} = \frac{(\text{Number of Collisions} \times 1 \text{ Million})}{(\text{ADT} \times 365 \text{ Days Per Year} \times \text{Segment Length} \times \text{Number of Years})}$$

C/MVE: Collisions per mile vehicles
 entering intersection

ADT: Average Daily Traffic Volume

0 0.45 0.9 Miles

KERN
 COUNTY
 PUBLIC WORKS

Collision Data Source:

California Highway Patrol (CHP), 2022

California State Transportation Agency (CalSTA) Department of Transportation, 2020
 Collision Data on California State Highways (road miles, travel, collisions, collision rates). 2022

Federal Highway Administration (FHWA) U.S. Department of Transportation, (2010)
 Roadway Safety Information Analysis: A Manual for Local Rural Road Owners. 2022



EMISSIONS BENEFIT & COST EFFECTIVENESS

CMAQ Pave Shoulder Project:
Hageman Rd (Buttonwillow)
Project Limits: Hageman Rd (I5 - Shortcuts Ln)

Project Description

The proposed project is located east of Buttonwillow, an unincorporated community in western Kern County. The project will pave the dirt shoulder gaps of Hageman Road from I5 to Shortcuts Lane with asphalt. Pavement will consist of approximately 3.6 miles. In addition to the asphalt paving, the proposed project will also include the installation of ancillary facilities necessary for the proper construction and operation of these facilities according to the County of Kern, Caltrans, and Americans with Disabilities Act (ADA) design standards.

Inputs to Calculate Cost-Effectiveness:

Total Project Cost	5,272,845	
CMAQ Dollars	4,668,050	
Effectiveness Period (Life):	20 yrs	
Days of Use/year (D):	365 days	
Length (L) of Curb and Gutter:	3.6 mile	Centerline miles
Annual Average Daily Traffic (ADT):	1561	vpd

Emissions Factors (g/vehicle mile from the SJV Amended 2003 PM-10 Plan & SJV Air District):

	Before Emission Factor	After Emission Factor	
PM10 Factor	907.18	4.54	← 1.58 for paved local roads 4.54 for rural local roads

Annual Emission Reductions (PM10 in pounds/year)

Daily PM10 Reductions (kg/day)	=	11.61
Annual Emission Reductions (lbs/yr)	=	9321.6

Capital Recovery Factor (CRF)

$$= \frac{(1+i)^n \times i}{(1+i)^n - 1} \quad \text{where } i = \text{Discount Rate (3\%)} \text{ and } n = \text{Project Life (20 years)}$$

So, the capital recovery factor = 0.07

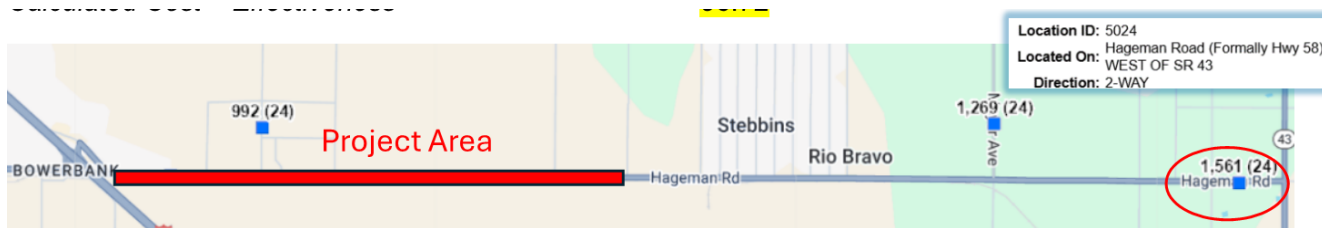
Cost - Effectiveness of Funding Dollars

$$= (\text{CRF} \times \text{Funding}) / (\text{Annual PM10 Reductions})$$

$$= 35.055$$

Thus,

$$\text{Calculated Cost - Effectiveness} = 35.05$$





LEVEL OF SERVICE

CMAQ Pave Shoulder Project:
Hageman Rd (Buttonwillow)
Project Limits: Hageman Rd (I5 - Shortcuts Ln)

Hageman Rd Paving Dirt Shoulder - Before Level of Service

BLOS and PLOS for the following road segment

Lanes per direction:	1
Outside lane width:	12 ft
Paved shoulder/bike lane/marked parking width:	0 ft
Bidirectional ADT traffic volume:	1561 (veh/day)
Posted speed limit:	55 mph
Heavy vehicle percentage:	2%
FHWA's pavement condition rating:	3
% of segment with occupied parking:	0%
% of segment with sidewalks:	0%

	Score	Level-of-service	Compatibility Level
BLOS:	3.74	D (3.51-4.50)	Moderately Low
PLOS:	4.39	D (3.51-4.50)	Moderately Low

Hageman Rd Paving Dirt Shoulder - After Level of Service

BLOS and PLOS for the following road segment

Lanes per direction:	1
Outside lane width:	12 ft
Paved shoulder/bike lane/marked parking width:	6 ft
Bidirectional ADT traffic volume:	1561 (veh/day)
Posted speed limit:	55 mph
Heavy vehicle percentage:	2%
FHWA's pavement condition rating:	3
% of segment with occupied parking:	0%
% of segment with sidewalks:	0%

	Score	Level-of-service	Compatibility Level
BLOS:	1.58	B (1.51-2.50)	Very High
PLOS:	3.89	D (3.51-4.50)	Moderately Low

Hageman Road
Annual Automobile VMT =

$$(D) * (ADT) * (A+C) * (L)$$

Where,

D = days of use per year (default is 200 days)

ADT = annual average two-way daily vehicular traffic on parallel road (project-specific data, with a maximum of 30,000)

A = adjustment factor (table lookup value)

C = activity center credit (table lookup value)

L = walking trip length (1.0 miles/trip in one direction)

Hageman Rd Annual VMT Reduction:

$$(365) * (1561) * (0.0038+0.0005) * (3.6) =$$

8,819.96

Automobile VMT Reduction Calculations

CARB's current method estimates the annual VMT reductions from new pedestrian facilities using Equation 1 (CARB, 2016 [B-1], 2018 [26], 2019 [16]):

Equation 1: Auto VMT Reductions (current method)

$$\text{Auto VMT Reduced} = (D) * (ADT) * (A + C) * (L)$$

Where,

		Units
D	= days of use per year (default is 200 days)	Days
ADT	= annual average two-way daily vehicular traffic on parallel road (project-specific data, with a maximum of 30,000)	Trips/day
A	= adjustment factor (table lookup value)	-
C	= activity center credit (table lookup value)	-
L	= walking trip length (1.0 miles/trip in one direction)	Miles/trip

The adjustment factor and activity center credit tables from CARB's 2016 report are replicated below in Tables 1 and 2. The multi-component adjustment factor uses mode share and facility-level bicycle ridership change data¹ and assumptions to estimate how much of the measured ADT would be converted to walking trips after pedestrian facility

Table 1. Adjustment Factor (A) Lookup Table

Average Daily Traffic (ADT)	Pedestrian Project Length (one-direction)	A (for cities with population >250,000 and non-university towns <250,000)	A (for university towns with population <250,000)
ADT ≤12,000 vehicles per day	≤1 mile	.0019	.0104
	>1 mile & ≤2 miles	.0029	.0155
	>2 miles	.0038	.0207
12,000<ADT ≤24,000 vehicles per day	≤1 mile	.0014	.0073
	>1 mile & ≤2 miles	.0020	.0109
	>2 miles	.0027	.0145
24,000<ADT≤30,000 vehicles per day (max is 30,000)	≤1 mile	.0010	.0052
	>1 mile & ≤2 miles	.0014	.0078
	>2 miles	.0019	.0104

Table 2. Activity Center Credit (C) Lookup Table

Count Your Activity Centers if There Are...	Within ½ Mile of the Project Area	Within ¼ Mile of the project Area
3	.0005	.001
>3 & <7	.0010	.002
≥7	.0015	.003

The adjustment factors in Table 1 "were derived from a limited set of bicycle commute mode split data for cities and university towns in the southern and western United States,"² then multiplied by 0.7³ to "estimate potential auto travel diverted to bikes" (same factor assumed for auto-walking substitution) and again by a 0.65 "growth factor" to "estimate the growth in bicycle trips from construction of the bike facility"⁴ (same