



# US 412 Corridor Project – Dunklin County

MoDOT Project Number: J0P2272

## Environmental Assessment

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**Missouri Department of Transportation**

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# US 412 CORRIDOR PROJECT

## Environmental Assessment Dunklin County, Missouri MoDOT Job Number: J0P2272

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The Missouri Department of Transportation (MoDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing a Location Study and National Environmental Policy Act (NEPA) investigation for a portion of US 412 in Dunklin County, Missouri. This study will be referred to as the US 412 Corridor Project Environmental Assessment (EA) study. The US 412 Corridor Project EA study is a transportation study that will investigate and identify improvements to US 412 to balance the need to improve the roadway with several community goals. The Study Area starts near the Arkansas state line and spans 20 miles northeast before ending at Route Y, near the city of Kennett.

The Federal Highway Administration signature gives approval to distribute this information for public and agency review and comment. Such approval does not commit to approve any future grant requests to fund the preferred alternative.

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## LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
APE	Area of Potential Effects
ASTM	American Society for Testing and Materials
BMP	Best Management Practice
CAAA	Clean Air Act Amendments
CAG	Community Advisory Group
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFR	Code of Federal Regulations
CMF	Crash Modification Factors
CO	Carbon Monoxide
CWA	Clean Water Act
dba	A-weighted decibel
DO	Dissolved Oxygen
DOT	Department of Transportation
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPG	Engineering Policy Guide
E-START	Environmental Site Tracking and Research Tool
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FI	Fatal & Injury
FINDS	Facility Index System
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GeoSTRAT	Geosciences Technical Resource Assessment Tool
GIS	Geographic Information System
GPM	Gallons Per Minute
GPS	Global Positioning System
HCM	Highway Capacity Manual
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HMGP	Hazard Mitigation Grant Program

HSIS	Highway Safety Information System
HSM	Highway Safety Manual
HUC	Hydrologic Unit Code
I	Interstate
IPaC	Information for Planning and Consultation
LAA	Likely to Adversely Affect
LEP	Limited English Proficiency
LESA	Land Evaluation and Site Assessment
LOMR	Letter of Map Revision
LOS	Level of Service
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MoDOT	Missouri Department of Transportation
MPH	Miles Per Hour
MRLC	Multi-Resolution Land Characteristics Consortium
MSAT	Mobile Source Air Toxics
MSS	Missouri Speleological Survey
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NATA	National-Scale Air Toxics Assessment
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHD	Natural Heritage Database
NHPA	National Historic Preservation Act
NLAA	Not Likely to Adversely Affect
NLCD	National Land Cover Database
NO <sub>2</sub>	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List (Superfund)
NRCS	Natural Resources Conservation Service
NRHP	National Registry of Historic Places
NSA	Noise Sensitive Area
NWI	National Wetland Inventory
NWP	Nationwide Permit
O <sub>3</sub>	Ozone

PA	Programmatic Agreement
PDO	Property Damage Only
PIP	Public Involvement Plan
PM	particulate matter
PM <sub>10</sub>	particulate matter less than 10 microns in aerodynamic diameter
PM <sub>2.5</sub>	particulate matter less than 2.5 microns in aerodynamic diameter
ppb	parts per billion
ppm	parts per million
PWSD	Public Water Service District
RCB	reinforced concrete box
RCRA	Resource Conservation and Recovery Act
ROW	Right of Way
RMP	Risk Management Plan
SEMA	State Emergency Management Agency
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO <sub>2</sub>	Sulfur Dioxide
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TAG	Technical Advisory Group
TDM	Transportation Demand Management
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
TS4	Transportation Separate Storm Sewer System
TSM	Transportation System Management
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
WRP	Wetland Reserve Program
WQC	Water Quality Certification

## EXECUTIVE SUMMARY

The intent of this Environmental Assessment (EA) is to coordinate planning efforts for the improvement of US 412 in Dunklin County. This project is a partnership between Dunklin County, Missouri, the Missouri Department of Transportation (MoDOT), and the Federal Highway Administration (FHWA). This portion of US 412 has been identified as a priority corridor for the Bootheel Regional Planning Commission and has been a part of that agency's long-range plan for many years.

The study area occurs entirely in Dunklin County, beginning near the Arkansas state line and spanning 20 miles northeast before ending at Route Y, near the city of Kennett. The corridor is divided into three sections: the western section begins just east of Route AC at the end of the existing four-lane section of US 412 and continues to Route 164 near Cardwell; the central section begins at Route 164 and continues to Route P in Senath; and the eastern section begins at Route P and continues to Route Y near Kennett.

Based on input from the public, MoDOT identified delays to commuter and commercial travelers, caused by the presence of large agricultural vehicles using the roadway, as a significant deficiency. Peaks in concentration for large agricultural vehicles occur during spring planting season and fall harvest but are present throughout the year and operate at substantially lower speeds than commuter and commercial vehicles. This speed disparity gives rise to operational concerns in terms of efficiency, safety and delay to commuter and commercial vehicles. The number and size of farm vehicles utilizing this corridor are forecasted to increase due to on-going agricultural developments (the addition of diversified products including but not limited to cotton, peanuts, soybeans, potatoes, watermelons, and cantaloupes) and forecasted growth in agricultural efficiency and production. The increase in farm vehicles interacting with the daily mix of commuter and commercial vehicles will likely exacerbate the current speed disparity and cause more traffic delays.

Extensive public engagement indicated that the intersection orientation for the numerous side roads along the corridor is contributing to performance concerns. When originally constructed, this roadway was situated parallel to the now defunct St. Louis and San Francisco railroad line. This orientation resulted in state and county roads intersecting US 412 at very sharp angles (approximately 45 degrees). Operationally, motorists experience difficult sight lines, and large agricultural vehicles navigate these intersections at very low speeds. Other study considerations, including the preservation of infrastructure, sustainable development, movement of goods (both agricultural and consumer), and resource conservation, were also evaluated as part of alternative development.

The US 412 roadway within the study area meets current design standards in terms of alignment and lane/shoulder width but includes multiple side road intersections with excessive approach angles. The original construction of the corridor included acquisition of limited access right of way, which allowed for orderly development of adjacent land and minimization of conflict points caused by entering and exiting vehicles. These factors, along with MoDOT's desire to utilize existing roadway facilities to the greatest extent possible and minimize disruption of adjacent land uses, resulted in alternative development that followed the current roadway path. Consideration for corridor improvements then focused on which roadway template (number and placement of new lanes) would best address the project purpose and need. The first build alternative (Alternative A) involved construction of a four-lane divided highway with a 60-foot-

wide grass median like the portion of the US 412 corridor which adjoins the study area to the east. The second build alternative (Alternative B) involved the construction of a four-lane highway with a variable width flush median like the US 412 corridor which adjoins the study area to the west. No-Build and Transportation System Management (TSM) alternatives were also evaluated.

During the study, the public was frequently engaged to help identify problems, needs and expectations for future operations along the corridor. The common theme throughout these engagements was to provide additional lanes in each direction of travel to help reduce conflicts between agricultural and commuter/commercial vehicles. Construction of an additional lane for each travel direction reduces time spent following slower moving vehicles. Input from the public also clearly indicated a desire for additional lanes, while minimizing acquisition of adjacent land.

Based on the study's Purpose and Need, logical termini, study area, analysis of the Reasonable Alternatives' impacts, and public and agency input, MoDOT has selected Alternative B (Four-Lane Undivided Roadway) as the Preferred Alternative. MoDOT has determined that Alternative B best addresses the Purpose & Need, connects at the logical termini, minimizes many negative impacts, provides substantial positive impacts, and was preferred by the majority of stakeholders. The selection of Alternative B is supported by fewer acreage acquisition requirements, fewer displacements, and lower overall project cost.

# 1. INTRODUCTION AND STUDY OVERVIEW

This section presents an overview of the study for the US 412 Environmental Assessment (EA). It includes the study background and a description of existing conditions in the study area.

## 1.1 OVERVIEW

### 1.1.1 Sponsorship

The Missouri Department of Transportation's (MoDOT's) Southeast District, in cooperation with the Federal Highway Administration (FHWA) and Dunklin County, is conducting an EA for US 412 in southwestern Dunklin County. This portion of US 412 begins southwest of Kennett, Missouri and continues across the Arkansas state line to terminate east of Paragould, Arkansas. This project is approximately 20 miles in length and involves improvements to US 412. It assesses the corridor's needs and provides potential solutions to address them. MoDOT is committed to the development of this project and has programmed funds in the current Statewide Transportation Improvement Program (STIP) for scoping and design of \$505,000 for prior programs, \$300,000 for fiscal year 2023-2024, and \$500,000 for July 2024 through June 2028.

This portion of US 412 is part of the Bootheel Regional Planning Commission's priority corridors and MoDOT's long range transportation plan. It forms a vital connection between the communities of Kennett, Missouri and Paragould/Jonesboro, Arkansas and other regions of the Bootheel of Missouri and northeast Arkansas.

### 1.1.2 Framework

The US 412 EA was developed in accordance with the provisions of the National Environmental Policy Act (NEPA). An EA is a concise public document intended to detail NEPA compliance and provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). NEPA established a national policy for proposed Federal actions and provides the framework for project environmental planning and decision-making requiring agencies to conduct environmental reviews which consider potential environmental impacts arising from proposed actions. This includes working cooperatively with all applicable/interested federal and state agencies, the public, and stakeholders to ensure all environmental issues are addressed.

NEPA requires FHWA, the lead federal agency, to consider avoiding, minimizing, and/or mitigating potential impacts to the human and natural environments before approving proposed transportation projects. Along with evaluation of potential environmental impacts, FHWA must consider the transportation needs of the public.

The FHWA NEPA study process considers potential impacts in an approach to balanced transportation decision making. It is FHWA policy (23 Code of Federal Regulations [CFR] § 771.105) that:

- Compliance with all applicable environmental requirements are reflected in the environmental document required by this regulation.
- Alternative courses of action are evaluated and decisions are made in the best overall public interest based upon a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts

of the proposed transportation improvement; and of national, state, and local environmental protection goals.

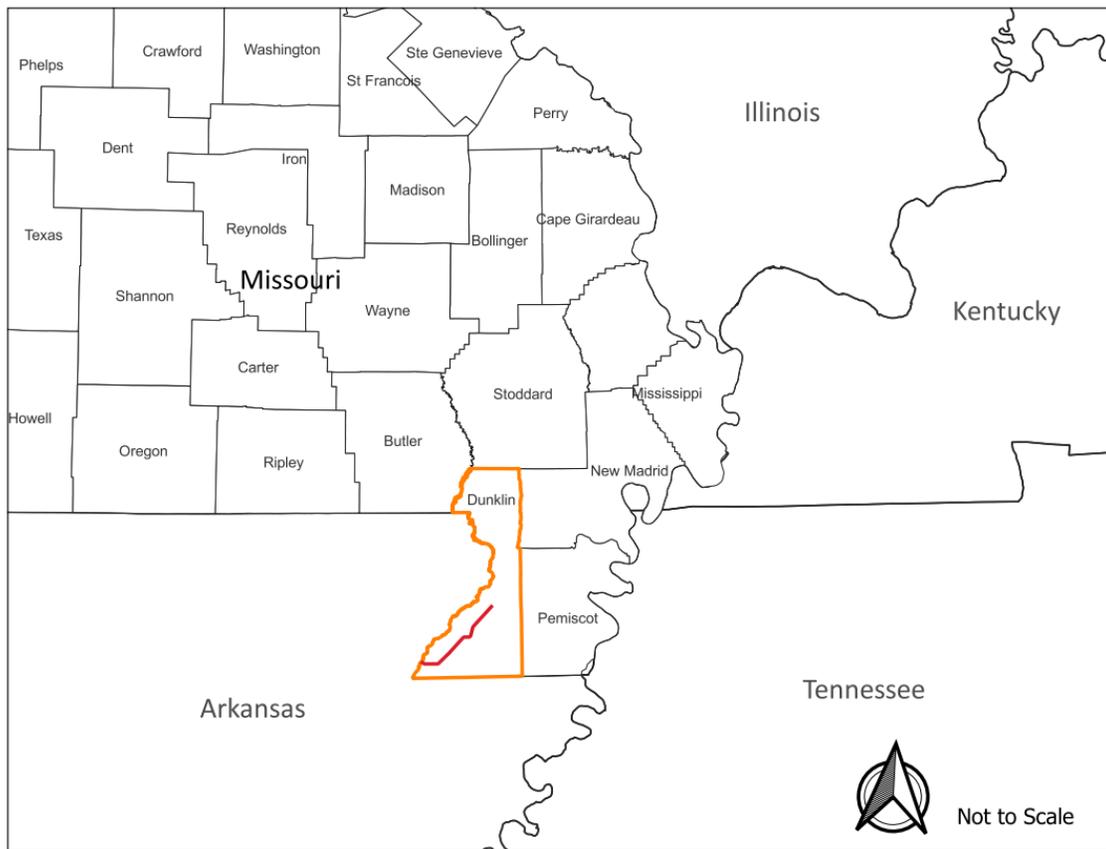
- Public involvement and a systematic interdisciplinary approach are essential parts of the development process for proposed actions.
- Measures necessary to mitigate adverse impacts are incorporated into the action.

**1.2 PROJECT DESCRIPTION AND BACKGROUND**

**1.2.1 Summary of Dunklin County**

Dunklin County occupies the western half of Missouri’s “Bootheel” with primary population centers along the US 412 corridor that include Kennett, Senath, Cardwell, Arbyrd, and Hornersville. Employment, health care, and shopping areas are located outside the population centers in the northeast Arkansas communities of Paragould and Jonesboro, which increases traffic demands on this corridor.

**Figure 1-1. US 412 Geographic Location**



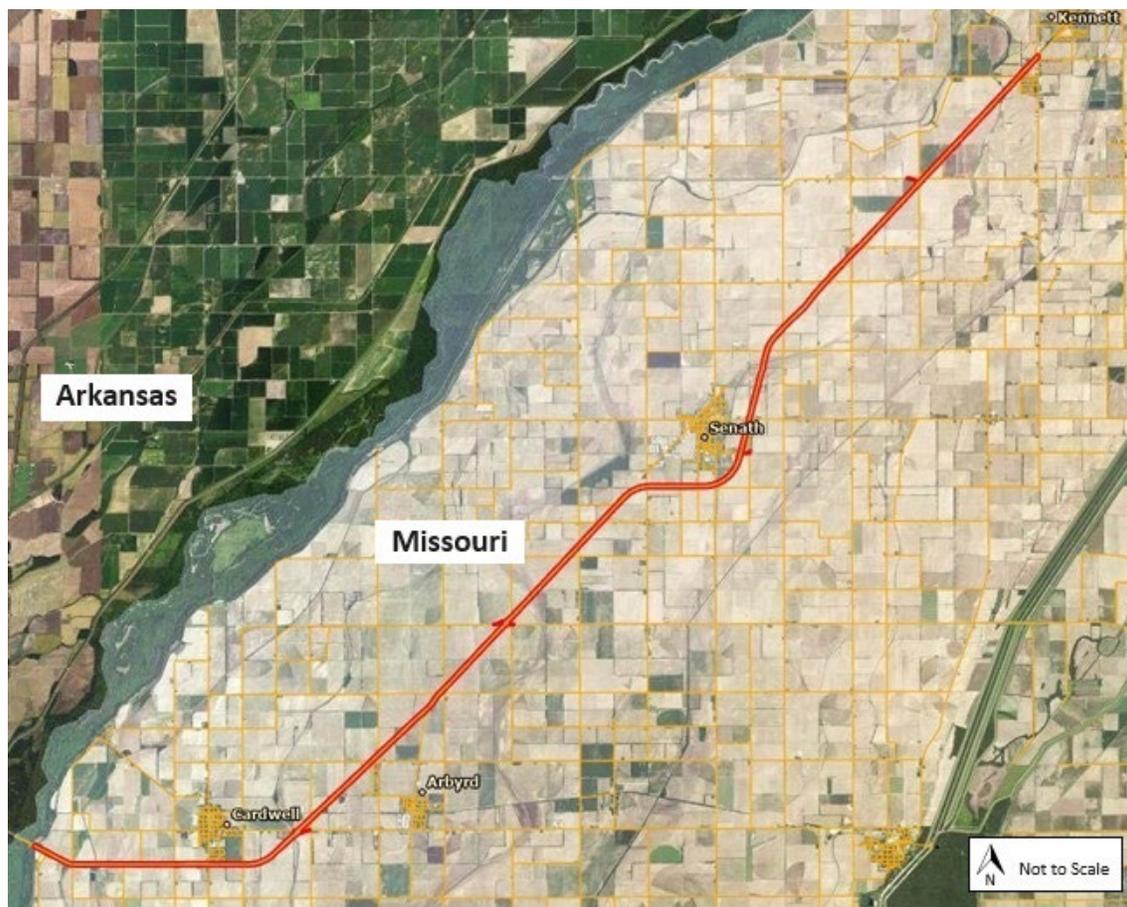
The county’s economy is largely based on agriculture throughout the entirety of the study area, contributing to consistent and slow-moving traffic due to cultivation, planting, harvesting, and product delivery vehicles and equipment. The presence of these slow-moving vehicles on a high-speed corridor complicates corridor operations and results in safety concerns and higher travel times. Growing agricultural diversity along the corridor and the addition of new processing facilities has introduced additional planting, harvesting and product transport vehicle types into traffic operations; and this trend will likely continue. Economic growth and accompanying employment opportunities in

northeast Arkansas will likely continue to tax the corridor with increasing numbers of daily commuters. In addition, with the closure of the hospital in Kennett, primary healthcare and emergency care must be sought in Paragould or Jonesboro via US 412.

### 1.2.2 Existing US 412 Description

The portion of US 412 which is being evaluated for this project is a two-lane facility that encompasses approximately twenty miles, beginning just southwest of Kennett at Dunklin County Route Y, and continues to the Arkansas state line, east of Paragould, Arkansas at Dunklin County Route AC. It is the last segment which has not been upgraded to multiple lanes (four or more) between Paragould, Arkansas and Jackson, Tennessee. At the eastern end of the study area, US 412 transitions to a four-lane undivided roadway through the limits of Kennett and then becomes a four-lane divided expressway. The boundary for the NEPA analysis (also called the study area) was established for the EA through applying a buffer of 175 feet around the centerline of the existing US 412 roadway between the project termini, to create a corridor 350 feet wide. The study area was then expanded to include a few locations where a buffer was applied to roads intersecting US 412 that were proposed for realignment. The study area is depicted on **Figure 1-2**.

**Figure 1-2. US 412 Project Location**



In 2002, MoDOT replaced the US 412 bridge crossing St. Francis River at the western end of the study area. Along with this replacement, a 0.5-mile section of four-lane divided expressway was constructed to accommodate future traffic demands. This divided expressway represents the western terminus of the study area.

Historic development of the roadway system in Missouri's Bootheel has resulted in a system that primarily follows east-west and north-south orientations. When present day US 412 (previously Missouri Route 25) was improved from Kennett to the Arkansas state line, it was built alongside the former St. Louis and San Francisco railroad. This railroad line traversed Dunklin County in a diagonal fashion with an angle of approximately 225 degrees. This orientation of a portion of US 412 has resulted in numerous state route and county road intersection angles outside the modern design recommendations of between 70 degrees and 110 degrees.

### **1.2.3 Logical Termini and Independent Utility**

The proposed action has independent utility in that it will meet all aspects of the identified Purpose and Need without the need for construction of additional improvements southwest or northeast of the project termini. As noted in **Section 1.2.2**, the proposed project consists of the last segment of US 412 in the local area which has not been upgraded to multiple lanes (four or more) between Paragould, Arkansas and Jackson, Tennessee. Specifically, the logical termini for this project are:

- The intersection of US 412 with Route AC at the southwest end of the project near the St. Francis River and Missouri-Arkansas state line; and
- The intersection of US 412 with Route Y at the northeast end of the project at the outskirts of Kennett, Missouri

### **1.2.4 Important Adjoining Roadways**

US 412 is the primary route for traffic traveling to and from northeast Arkansas. Important regional routes feeding traffic to the study area include Missouri Route 25, I-55 and I-155 to the east and Missouri Route 53 to the north. The major east-west route intersecting with US 412 is Missouri Route 164. There are several important high-traffic state route connectors in the study area which include but are not limited to Routes P, 108, F, and AC.

## 2. PURPOSE AND NEED FOR PROPOSED ACTION

This section presents the Purpose and Need for the US 412 Environmental Assessment. It references transportation-related problems and issues that prospective improvements to the corridor are intended to address. The Purpose and Need is crucial in the development and evaluation of alternatives and reaching consensus for the most appropriate solutions to identified problems.

### 2.1 PURPOSE AND NEED SUMMARY

The purpose of the US 412 EA is to investigate and identify improvements that result in a safe and efficient corridor between Route Y and AC. Within the context of this purpose, two specific transportation problems, or need elements, were identified. These specific transportation problems affecting operations along US 412 include:

- **Need to achieve travel efficiency and mobility** – Agricultural activities result in the contribution of very large equipment and vehicles to the US 412 roadway which creates a large disparity in travel speeds along the corridor resulting in traffic delays and platooning (stacking of slow moving vehicles) at speeds much lower than posted limits.
- **Need to correct deficient intersection geometry** -- Roadway deficiencies on the US 412 corridor includes substandard geometrics at the state and county road intersections.

Identification of a tentative Preferred Alternative will be based on how well it satisfies the EA's Purpose and Need and consideration of environmental, engineering, public, stakeholder and resource agencies input, and other factors.

The following sections examine the context of the transportation problems that affect the US 412 corridor. As defined herein, context refers to the overall nature, scope, and degree to which transportation problems affect the corridor.

#### 2.1.1 Element 1 – Need to Achieve Travel Efficiency and Mobility

US 412 is part of the National Highway System extending from Springer, New Mexico to I-65 near Columbia, Tennessee which accounts for more than 1,130 miles. Recognizing the importance of this transportation corridor as an economic benefit, the states of Arkansas, Missouri, and Tennessee petitioned the American Association of State Highway and Transportation Officials to designate state routes between Walnut Ridge, Arkansas and Jackson, Tennessee as a United States route with the number "412" in 1980. Supported by each state's Chambers of Commerce and Departments of Transportation, agencies have worked diligently to improve and upgrade the auxiliary interstate since inception. These improvements have varied from intersection and safety improvements to upgrades in capacity.

In Missouri, MoDOT has upgraded high priority sections of the corridor with improvements from two to four lanes beginning in 1991. The states of Arkansas and Tennessee completed upgrades of the corridor to four lanes between Walnut Ridge, Arkansas and Jackson, Tennessee and continued to extend upgrades beyond those communities.

Traffic utilizing the US 412 corridor includes:

- Through traffic traveling for work, school, or shopping
- Through traffic wishing to access health care facilities
- Commercial vehicles supporting retail and manufacturing interests
- Local circulation
- Movement of agricultural equipment, vehicles, and product
- Emergency services

Where available, the MoDOT Traffic Volume Maps 2021 data was used for this analysis with supporting traffic counts provided by MoDOT at various intersections. According to MoDOT data, on an average day US 412 within the study area carries 7,831 vehicles in the three-mile south section (Route AC to County Road 613), 6,073 vehicles in the ten-mile central section (County Road 613 to Route P), and 6,193 vehicles in the seven-mile north section (Route P to Route Y). It is projected the route will carry 7,972 vehicles in 2025 at the beginning of construction and 12,376 vehicles in the design year 2045. Trucks account for 15 percent of the daily traffic. Due to the traffic utilization and the importance of US 412 for travel, economic prosperity, and mobility, the need to address the issues of improved travel efficiency and mobility is a priority for US 412.

Dunklin County is a major contributor to agricultural production for the state of Missouri, being the 5<sup>th</sup> largest producing market in the US for cotton and the 5<sup>th</sup> largest producer of rice in the state. Additional commodities produced in Dunklin County are soybeans, corn, peanuts, wheat, watermelons, cantaloupes, and potatoes. Agriculture is the dominant economic activity along the corridor and is the leading contributor to the oversized vehicles and equipment causing reduced sight lines for passing and reducing sufficient passing opportunities to clear the platooning identified along the corridor.

Information provided by Dr. Justin Calhoun of the Fisher Delta Research Center in Portageville, Missouri indicates agricultural vehicles utilize US 412 for a variety of reasons throughout the year for activities which include, but are not limited to, weed eradication (burndown) as early as February, soil nutrient application (fertilizing), tilling, planting, herbicide application (self-propelled spray rigs), cotton defoliant application, harvest, straw production/baling/hauling, and crop hauling/transport. During the primary harvest season of September, October, and November, platooning is pronounced although some of these agricultural activities are seasonal, and transportation of commodities occurs year-round.

A specific example of this production trend is related to the growth of peanut cultivation. Processing harvested peanuts has traditionally occurred in northeast Arkansas, but Delta Peanut Company has recently constructed a processing facility in Kennett, Missouri at the northern/eastern end of the corridor. Peanut production also differs from traditional grain cultivation in that harvested product is not transported to farmer owned bins for drying and storage. Corn and soybeans are stored in farmers' grain bins until commodity prices are optimal, sometimes months after harvest. For peanut production, harvested products are not stored but taken directly to processing facilities. As peanut farming becomes more prevalent, harvest months will see more tractor trailer combinations utilizing US 412 in the study area. The newly constructed peanut processing facility in Kennett will also result in additional

transport trucks from outside the study area using US 412 to deliver peanut products for processing.

According to Dr. Calhoun, improvements in technology and farming techniques are expected to result in a significant increase in agricultural output in Dunklin County over the next decade. This production increase will result in additional harvest related agricultural vehicle demands placed upon US 412 and a corresponding increase in delay for following vehicles. Cotton is expected to remain the primary crop, but the cost efficiency of protein production, represented by peanut cultivation, will result in increased market share in comparison to all cultivars.

When utilizing roadways, working equipment generally travels at speeds of 25 to 35 miles per hour while transport equipment speeds ranged from 35 to 55 miles per hour. A recent speed study was conducted along the corridor to determine operational characteristics of the existing facility. This study occurred during harvest season along the corridor. The results of this study are included in **Appendix C**. In summary, platooning was noted, and the overall corridor is expected to reach a Level of Service (LOS) of D with the expected increases in agricultural traffic.

The Highway Capacity Manual (HCM) LOS performance measures for rural two-lane highways include percentage of time spent following and average travel speed. Typical analysis methodologies account for components of the corridor such as traffic volumes, percent of the roadway that is a no-passing zone, and heavy vehicle percentages; however, they don't account for the impact of the significantly slower agricultural traffic or the driver behavior of choosing not to pass when passing is permitted. Field data was incorporated into the LOS analysis to help address these limitations; however, with agricultural traffic expected to increase in the years to come, future operations will likely be worse than the analysis results.

In addition to the speed study results, recent interviews (stakeholders, a Community Advisory Group (CAG), a Technical Advisory Group (TAG), and public meetings noted a large concern for the disparity in operating speeds among the public. Due to equipment size and difficult sight lines, passing opportunities can be limited and the delay to travelers creates a common sense of frustration.

### **2.1.2 Element 2 – Need to Correct Deficient Intersection Geometry**

The existing alignment of US 412 results in many intersections with angles sharper than modern design practices typically accept. Desirable intersection angles are between 70 and 110 degrees (skew of 20 degrees or less), and ideally, designed intersections would have no skew at all and the two roads would intersect at 90 degrees. The sharp intersection angles along US 412 cause sight distance challenges and safety concerns for vehicles attempting to enter and leave US 412 which include, but are not limited to, difficulty in physically adjusting the point of view, views blocked by elements of the landscape, and views blocked by vehicle elements (i.e., side moldings and door frames of the car). Improving intersection geometrics is a priority for US 412. MoDOT's Engineering Policy Guide (EPG) (233.2.22) guidelines suggest minimizing the skew (angle that US 412 intersects with the side road) of at-grade intersections and entrances.

Another potential contributing factor to the need for improved intersections relates to slow-moving agricultural equipment. Turning movements for these vehicles are generally very

slow and can be further slowed by the need to turn and navigate the acute angles existing approach roadways currently present.

Within the study area, there are 14 intersections with other state routes and county roads that have substandard and undesirable intersection geometry. The analysis of intersections in the corridor is further described in **Appendix C**. Each of these intersections presents operational challenges to agricultural vehicles and non-farming vehicles. When navigating the sharp angles of these intersections, vehicles must slow to lower than typical speeds thereby contributing to further delay for following travelers. Comments from the CAG, TAG, both public meetings, as well as stakeholder interviews indicated a strong dissatisfaction with the functionality at these intersections thereby validating the need for correcting these deficient areas.

### 3. ALTERNATIVES

This section examines the development and evaluation of the study's alternatives. The alternative development process began with identification of initial Conceptual Alternatives that could potentially address the transportation needs in the study area. Conceptual Alternatives were developed with appropriate design criteria and consideration of existing planning goals, public engagement, potential environmental impacts, and engineering judgment.

This evaluation was developed by the study team and coordinated with the study's stakeholders. **Section 5** of this EA discusses the study's outreach efforts, which included the following events:

- Workshops and presentations to MoDOT technical staff
- In-person meetings with the Dunklin County Commission, the Kennett Chamber of Commerce, and the mayor of Senath, Missouri
- FHWA review of Purpose and Need and public information meeting handouts and boards (courtesy review copy to the FHWA)
- Agenda items at the CAG meetings
- Agenda items at the TAG meeting
- Focus items (station) at Public Engagement Meeting 2
- Agency collaboration packages for Purpose and Need, Reasonable Alternatives, and the Tentative Preferred Alternative

**Section 3.1** presents general descriptions of the Conceptual Alternatives. **Section 3.2** presents the metrics used in the Purpose and Need screening of the Conceptual Alternatives. **Section 3.3** presents the results of this screening. The alternatives that meet the study's Purpose and Need are referred to as Reasonable Alternatives.

The Reasonable Alternatives were further developed and refined based on more detailed engineering analysis and known constraints. This allowed for the establishment of preliminary study footprints and, in turn, for detailed impact assessments, cost estimates, and traffic evaluations. The specifications for the Reasonable Alternatives are presented in **Section 3.4**.

The Reasonable Alternative that best accomplishes the Purpose and Need for the proposed action while avoiding, minimizing, or mitigating the impacts to the social and natural environment is identified as the Tentative Preferred Alternative. The Tentative Preferred Alternative is discussed in **Section 3.5**.

Both figures and exhibits are included in this section to graphically depict the alternatives. Figures appear in the text while large-scale graphics are presented in the exhibits in **Appendix A**.

### **3.1 CONCEPTUAL ALTERNATIVES**

Based on the study's Purpose and Need, logical termini, and study area, a set of Conceptual Alternatives was developed. The Conceptual Alternatives represent alternatives that could potentially address the transportation needs in the study area. The location of the alternatives is depicted on **Figure 1-2** and on the Project Location Map (**Exhibit 1 in Appendix A.**) Because the project length is approximately 20 miles and the alternatives are located close together, the alternatives cannot be distinguished from each other on maps at far or medium scales. However, the Reasonable Alternatives are depicted in multi-sheet sets in **Exhibits 2 and 3 in Appendix A.** Typical roadway layouts for the Reasonable Alternatives are presented in **Figures 3-1, 3-2, and 3-3 below**, as well as in typical sections in **Appendix D.**

Each of the Conceptual Alternatives was developed to a comparable level of detail to enable a fair and reasonable comparison. Decisions were made based on their ability to satisfy the study's Purpose and Need. This evaluation is included in **Table 3-1.**

#### **3.1.1 No-Build Alternative**

The No-Build Alternative for the US 412 EA would consist of maintaining the existing roadways and structures in essentially their current conditions. Routine maintenance would continue, and occasional minor safety upgrades would be implemented. No capacity additions or major improvements would be made. Overall, the No-Build Alternative does not meet the study's Purpose and Need. It is described in this EA to provide a baseline condition against which the changes associated with the other alternatives may be evaluated.

The No-Build Alternative assumes that capacity additions or major improvements would not be constructed; thus, many impacts—positive and negative—associated with new construction, would not occur. These impacts include expenditure of funds, land use changes that include converting existing development or public lands into highway right-of-way, potential increased economic development, improved multimodal accessibility, and improved safety. The No-Build Alternative is not a no-cost concept because maintenance and repair of the existing roadway infrastructure would be needed to ensure the continued use of the corridor.

#### **3.1.2 Transportation System Management (TSM), Mass Transit, and Transportation Demand Management (TDM) Alternatives**

The Transportation System Management (TSM) alternative includes activities which maximize the efficiency of the existing system. TSM alternatives can include ridesharing, high-occupancy vehicle lanes on existing roadways, traffic signal timing optimization, and fringe parking. TSM alternatives are typically only relevant to major projects proposed in urbanized areas with a population of over 200,000. Based on 2020 Census estimates, the population of Dunklin County is 28,217 and includes the towns of Kennett (population 10,485), Senath (1,587), Cardwell (562), and Arbyrd (407). Based on the relatively low population numbers for the study area, the TSM alternative is not considered practicable.

The Mass Transit alternative includes reasonable and feasible transit options (bus systems, rail, etc.) even though they may not be within the existing FHWA funding authority. Based on the relatively low population numbers described above, the Mass Transit alternative is not considered practicable.

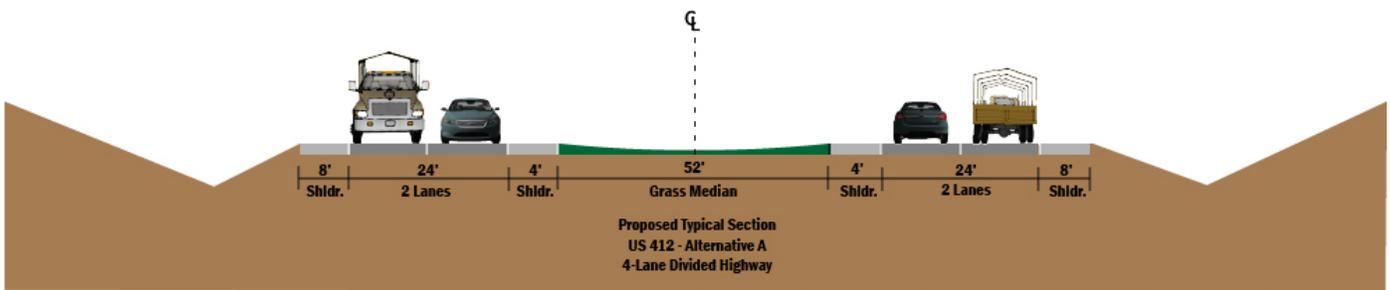
The Transportation Demand Management (TDM) alternative focuses on regional means of reducing the number of vehicle trips and vehicle miles traveled as well as increasing vehicle

occupancy. It expands the traveler's transportation options in terms of travel method, travel time, travel route, travel costs, and the quality and convenience of the travel experience. Typical activity within this component is providing contract funds to regional agencies that are actively promoting ridesharing, maintaining rideshare databases, and providing limited rideshare services to employers and individuals. Based on the limited population in the project area, efficiencies from travelers going to the same destination are expected to be minimal. Therefore, the TDM alternative is not considered practicable.

### 3.1.3 Alternative A – Four-Lane Divided Highway

This configuration would improve US 412 by adding two new 12-foot lanes parallel to the existing pavement with a 60-foot grass median (including 52 feet of grass and eight feet of paved shoulders) within the study area (**Exhibit 2**). A typical roadway layout for this alternative is shown in **Figure 3-1**.

**Figure 3-1. Typical Roadway Layout for Alternative A**



The existing four-lane undivided portion of US 412 near Kennett, Missouri would be widened to provide a 14-foot wide center turn lane from Route Y to the Ragland Slough stream crossing (**Exhibit 2, Sheet 8**). South of the Ragland Slough stream crossing, the four-lane undivided portion of US-412 would transition to an expressway configuration with two new lanes, each 12-foot wide, constructed on the north side of the existing roadway and would be separated by a 60-foot median (**Exhibit 2, Sheet 8**). This configuration remains consistent running west until County Road 602, approximately 1.5 miles north of Arbyrd (**Exhibit 2, Sheet 3**).

Between County Road 602 and a point approximately 1,000 feet south of Route 108, the alignment of the two new lanes continues to parallel the existing roadway with S-curves 1,300 feet longer in radius (flatter) than the existing horizontal alignment, resulting in a variable width median ranging from 60 feet to 130 feet. South of this point, the standard 60-foot median width is maintained with two new lanes constructed north of the existing roadway until reaching County Road 619 approximately one mile east of Cardwell (**Exhibit 2, Sheet 2**). At this point, the roadway template transitions so that the two new lanes, each 12-foot in width, are built south of the existing roadway. The configuration is maintained until reaching County Road 609 just west of Cardwell where the template transitions so that the two new lanes (a total width of 24 feet) are built north of the existing roadway (**Exhibit 2, Sheet 1**). This configuration is maintained until meeting up with the existing four-lane divided US 412 roadway template 1,400 feet east of Route AC (**Exhibit 2, Sheet 1**).

This alternative would be designed to support a posted speed of 60 miles per hour (MPH). Intersections of US 412 with state and county routes would be reconstructed to accomplish

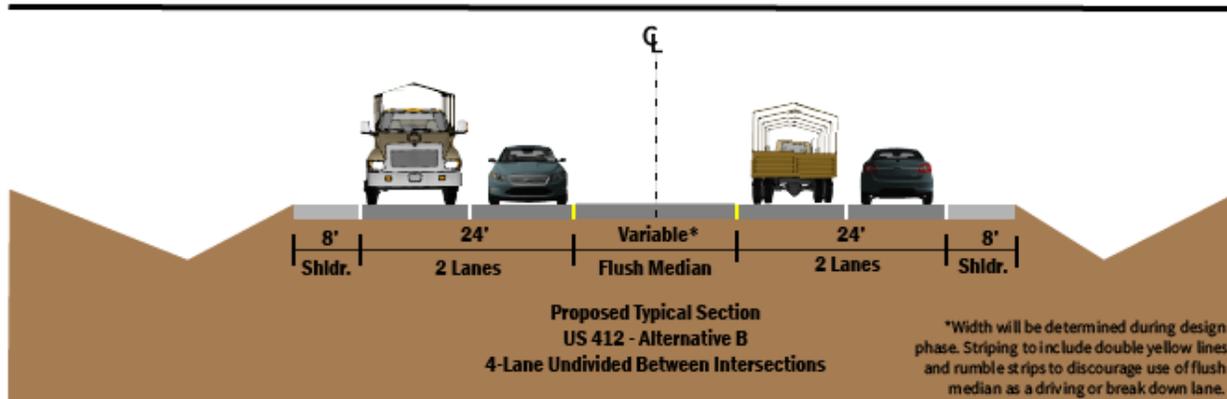
side road intersection angles between 70 and 110 degrees. These intersections include State Routes 164, V, N, CC, and A. Reconstruction of county road intersections at median crossovers would occur to provide intersection angles between 70 and 110 degrees. The county road intersections with unfavorable angles would be reconstructed in the same manner as the state routes.

Median crossovers would be provided between east and west bound lanes of US 412 at intersections with other state routes and key county roads. The placement of these crossovers would provide the best combination of side road access and safe operations along US 412. Crossovers are typically located at approximately one-mile intervals. Adjacent land use and available local road network are considerations in the placement of median crossovers. The proposed placement of median crossovers along the project corridor is presented in **Appendix C**. The existing US 412 right-of-way would be utilized with additional property acquisition north and south of the existing roadway, where new lanes are constructed. Existing US 412 pavement, with rehabilitation, would be used in place as part of this alternative.

### 3.1.4 Alternative B – Four-Lane Undivided Highway

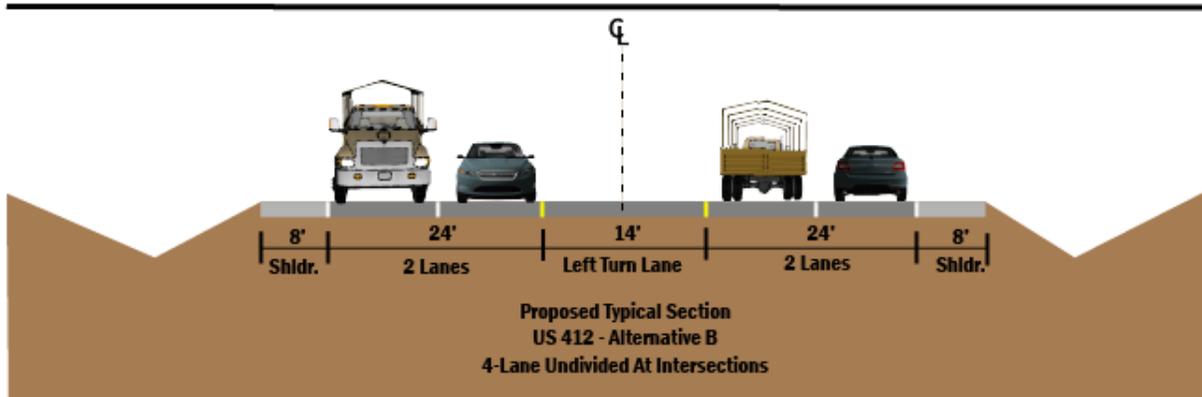
This configuration would provide a flush center median (8-foot to 14-foot in width) and two additional through lanes (each 12 feet wide) in each direction within the study area (**Exhibit 3**). The width of the median would vary through the corridor and the specific width of the median in a given area would be determined during the design phase. The roadway would include design features in the median to discourage the use of the median as a driving or breakdown lane. These would include striping with double yellow lines and rumble strips. A typical roadway layout for Alternative B at the parts of the roadway between intersections is shown in **Figure 3-2**.

**Figure 3-2. Typical Roadway Layout for Alternative B Between Intersections**



Where US 412 has intersections with state and county roads, a center left-turn lane would be provided instead of a center flush median. These areas would have a configuration with a 14-foot wide center left-turn lane and two additional through lanes (each 12-foot wide) in each direction. A typical roadway layout for Alternative B at the intersections is shown in **Figure 3-3**.

**Figure 3-3. Typical Roadway Layout for Alternative B at Intersections**



Existing US 412 pavement would be incorporated into this template for the entire study area. The widening of US 412 to achieve this four-lane typical section would begin at Route Y and occur symmetrically about the centerline of existing roadway (**Exhibit 3, Sheet 8**). This roadway section would continue westerly to County Road 542 northeast of Senath (**Exhibit 3, Sheet 6**).

Between County Road 542 and Route P to the south, this alternative would include all widening on the north side of the existing roadway (**Exhibit 3, Sheet 6**). This configuration would run westerly to a point approximately 600 feet west of Reagan/Hornbeck Street in Senath, Missouri. Between this point and County Road 527 south of Senath, the alignment shifts left and widening again occurs equally on both sides of the existing roadway at County Road 527 (**Exhibit 3, Sheets 5 and 6**). This configuration would run westerly to a point 1,250 feet west of County Road 613 near Cardwell, Missouri (**Exhibit 3, Sheet 2**). Beginning at this point and running westerly to Route 164/F at Cardwell, the alignment shifts left so that all widening occurs south of the existing roadway at the Route 164/F intersection with US 412 (**Exhibit 3, Sheet 2**).

Beginning at the Route 164/F intersection and running westerly to a point 1,350 feet east of County Road 609 west of Cardwell, the alignment shifts right and all widening again occurs equally on both sides of US 412 (**Exhibit 3, Sheets 1 and 2**). This configuration runs westerly to County Road 603 where the roadway transitions from four-lane undivided to a four-lane divided highway with a 60-foot grass median (**Exhibit 3, Sheet 1**). This configuration runs westerly until meeting up with the existing four-lane divided US 412 roadway template 1,400 feet east of Route AC (**Exhibit 3, Sheet 1**).

Intersections of US 412 and state routes would be reconstructed to accomplish side road intersection angles of 20 degrees or less. Intersecting side roads considered for reconstruction included Routes 164, V, N, CC, and A. County roads, at intersection with US 412, would be reconstructed to provide intersection angles between 70 and 110 degrees. The existing US 412 right-of-way would be utilized with additional property acquisition occurring north and south of the existing roadway where new lanes are constructed.

### **3.2 PURPOSE AND NEED SCREENING METRICS**

To determine the potential for each Conceptual Alternative to meet the Purpose and Need, screening criteria and standards were developed. Only those Conceptual Alternatives satisfying each element of the Purpose and Need were considered Reasonable Alternatives. Identification of the Tentative Preferred Alternative is based on how well it satisfied the Purpose

and Need in addition to consideration of environmental & engineering considerations, resource agency input, stakeholder input, and other factors.

For each Purpose and Need element, Evaluation Criteria are used to define the important pieces of the Purpose and Need elements that the Conceptual Alternatives are meant to satisfy. From there, the Standards – when the Evaluation Criteria can be said to achieve that part of the Purpose and Need – are defined. Standards ask specific questions as to what must be accomplished by a Conceptual Alternative to satisfy the Evaluation Criteria.

The progression is as follows:



In this case, a yes/no format was used to document the performance measures that define how well an alternative succeeds at accomplishing the Evaluation Criteria. **Table 3-1** presents a summary of the major elements of the Purpose and Need, the Evaluation Criteria, and Standards. Each of the steps are discussed in this section.

### **3.2.1 Purpose and Need Element #1: Need to Achieve Travel Efficiency and Mobility**

Traffic operations within the US 412 study area between Kennett and the Arkansas state line are negatively affected by the interaction of farm and non-farm vehicles. The large disparity in operating speeds between these traffic types results in delays and increased travel times for non-farm vehicles. Platooning was also noted and non-farm vehicles in these queues were traveling at speeds far below the 85th percentile operating speed (the speed at which 85% of vehicles travel on the roadway) of the corridor.

Four criteria are associated with this element:

#### **1. Evaluation Criterion 1A: Improve efficiency of traffic operations in study area**

This criterion focuses on improving traffic operations along US 412 when passenger and light fleet vehicles encounter large farm equipment or tractor trailer combination vehicles. These vehicles interact with one another on a regular basis; and innovation in agricultural practices results in increased production, larger farm vehicles, and more frequent commercial traffic and related interactions. Numerous field observations indicated regular occurrences of traffic queues along the existing roadway when these vehicle types interact. Existing terrain and roadway alignment conditions along US 412 allow for passing opportunities, but passenger vehicles are not consistently making use of these opportunities. Interactions occurring on US 412 result in platooning and delays for passenger and light fleet vehicles. Alternatives A and B both provide two additional through lanes with the addition of one 12-foot lane in each direction. The presence of these additional through lanes would give passenger and light fleet vehicles the opportunity to avoid time spent following slower moving farm equipment and tractor trailer combination vehicles. Additionally, improvements envisioned in both Alternatives A and B would provide standard width driving lanes and sufficient shoulder widths so that through lanes would be unencumbered by even the largest farm vehicles.

- Standard: Can the alternative provide improved efficiency of farm and non-farm vehicle interactions by providing safe and available passing opportunities, thereby reducing delays and travel time for non-farm vehicles?

**2. Evaluation Criterion 1B: Improve traffic operations related to US 412 vehicles turning movements onto side roads**

This criterion focuses on improving traffic operations along US 412 when farm vehicles turn onto US 412 and turn off onto side roads or driveways. These large vehicles cause delays to non-farm vehicles due to slower operating speeds, which are further reduced as turns are required. In addition, many of these vehicles are constructed so that large turning radiuses (flatter curves) are required for safe navigation; therefore, during turns, portions of the vehicles can encroach into adjacent lanes. Alternatives A and B would provide an additional standard width driving lane (12 feet in width) in each direction of US 412, sufficient shoulder widths, and vehicle specific turning radiuses (curves). This would allow farm vehicles to safely enter or exit US 412 without negatively impacting non-farm vehicles. Correction of these conditions will enable the large farm vehicles to exit at higher speeds and reduce delays to non-farm vehicles.

- Standard: Can the alternative reduce traffic conflicts and delays caused by turning movements of farm and non-farm vehicles?

**3. Evaluation Criterion 1C: Improve traffic operations related to side road vehicles crossing US 412**

This criterion focuses on providing safe and efficient traffic operations along US 412 when vehicles approaching the roadway intend to cross from one side to the other. Commuters, farm vehicles, and school buses regularly cross US 412. With 85th percentile operating speeds (the speed at which 85% of vehicles travel on the roadway) in the mid 60's (mph), the need for care, attention, and adequate facilities are required to assure safe passage. Existing topography and the US 412 alignment are favorable for these movements, but side road intersection angles are less than desirable and do not support optimum performance related to this criterion.

The No-Build Alternative, with only one-lane (12 feet in width) in each direction, provides the shortest passage across US 412, but undesirable side road geometry can present challenges to motorists.

Alternative A requires construction of median crossovers (60 feet in width) for these movements. Under this scenario, motorists would cross the first two lanes and could seek refuge in these crossovers. However, under Alternative A most farm vehicles, commercial tractor/trailer combinations, and school buses are too long (over 60' in length) to safely occupy these crossovers. They could encroach on one, or both, of the lanes previously crossed, resulting in degraded roadway performance.

Alternative B provides a flush center median (8 feet to 14 feet in width) and an additional lane in each direction (12 feet in width) resulting in an additional 38 feet of required travel before successful crossing. The center turn lane available under this alternative allows larger vehicles such as commercial trucks, school buses, and farm equipment to turn into the center turn lane to wait to complete their entry onto US 412. This alternative also provides improvements at side road intersections to improve operations. The existing topography and roadway alignment are favorable for required sight distance.

- Standard: Can the alternative provide improved traffic operations for side road vehicles crossing US 412?

### **3.2.2 Purpose and Need Element #2: Need to Correct Deficient Intersection Geometry**

Safety and mobility are negatively affected by numerous intersections in the study area that contain substandard and undesirable intersection geometry (intersection angles). The primarily diagonal alignment of US 412 results in intersections with side roads at undesirable intersection angles. This condition is problematic for all vehicles using US 412 but particularly farm vehicles. Proper and safe navigation of farm vehicles at these intersections requires very slow speeds and resulting conflicts and hindrance of US 412 travelers.

Three criteria are associated with this element:

#### **1. Evaluation Criterion 2A: Improve horizontal alignments at side road intersections with US 412**

This criterion focuses on improving intersection geometry by realigning side roads to intersect US 412 in a manner consistent with accepted design practice. MoDOT's Engineering Policy Guide suggests side roads intersect the US 412 alignment at angles between 70 and 110 degrees. Both Alternatives A and B include intersection improvements to correct undesirable intersection angles at side roads.

- Standard: Can the alternative provide intersection geometry meeting current design criteria?

#### **2. Evaluation Criterion 2B: Provide adequate lane width and turning radiuses at the study's key intersections**

This criterion focuses on improving intersection geometry by providing wider side road lanes and adequate turning radii (curves) to avoid off-tracking of large farm vehicles. Off-tracking is a term used to describe what happens when large trucks, or any vehicle with more than one set of wheels, have rear wheels that don't follow the same path as the front wheels while moving through a curve. Instead, the rear wheels follow the shorter of the two paths. In this case, the rear wheels may leave the pavement and enter the adjacent ditch. A consistent comment during public engagement indicated large farm vehicles and tractor trailer combinations struggle to navigate existing intersections, particularly those navigating sharp intersection angles (less than 70 degrees or more than 110 degrees). Field observations show off-tracking is common, as tire tracks can be seen outside existing pavement. Alternatives A and B both provide widened side road lanes and wider turning radii (flatter curves) to accommodate large vehicles.

- Standard: Does the alternative provide adequate lane width and turning radius (curvature) to farm vehicles and commercial tractor/trailer combinations from off-tracking?

#### **3. Evaluation Criterion 2C: Provide intersection geometry and layout that improves turning movement operations for US 412 traffic**

This criterion focuses on improving intersection geometry to provide a configuration familiar to drivers and meeting their expectations. Expectations and planning for this corridor indicate at-grade intersections will be present in the study area throughout the

life of this project. These planning assumptions also hold that this corridor will be a high-speed corridor moving traffic between the states of Missouri, Arkansas, and Tennessee. Traffic signals are not planned for the corridor in Missouri because unimpeded high-speed flow is the desired outcome for this project and overall corridor planning.

- Standard: Does the alternative provide adequate intersection geometry and layout to improve left turn vehicle movements on to and off of US 412 and meet driver expectations?

**Table 3-1. Conceptual Alternatives Evaluation Matrix<sup>1</sup>**

<b>Purpose and Need Element</b>	<b>Evaluation Criteria</b>	<b>Standards</b>	<b>No-Build</b>	<b>TSM, Mass Transit, and TDM</b>	<b>Alternative A 4-Lane Divided</b>	<b>Alternative B 4-Lane Undivided</b>
Element #1 - Need to Achieve Travel Efficiency and Mobility	1A) Improve efficiency of traffic operations in study area	Can the alternative provide improved efficiency of farm and non-farm vehicle interactions by providing safe and available passing opportunities, thereby reducing delays and travel time for non-farm vehicles?	No	No	Yes	Yes
Element #1 - Need to Achieve Travel Efficiency and Mobility	1B) Improve traffic operations related to mainline vehicles turning movements onto side roads	Can the alternative reduce traffic conflicts and delays caused by turning movements of farm and non-farm vehicles?	No	No	Yes	Yes
Element #1 - Need to Achieve Travel Efficiency and Mobility	1C) Improve traffic operations related to side road vehicles crossing mainline facility	Can the alternative provide improved traffic operations for side road vehicles crossing mainline facility?	No	No	No	Yes
Element #2 - Need to Correct Deficient Intersection Geometry	2A) Improve horizontal alignments at side road intersections with US 412	Can the alternative provide intersection geometry meeting current design criteria?	No	No	Yes	Yes
Element #2 - Need to Correct Deficient Intersection Geometry	2B) Provide adequate lane width and turning radiuses at the study's key intersections	Does the alternative provide adequate lane width and turning radiuses to eliminate off tracking of farm vehicles and commercial tractor/trailer combinations?	No	No	Yes	Yes
Element #2 - Need to Correct Deficient Intersection Geometry	2C) Provide intersection geometry and layout that improves turning movement operations for US 412 traffic	Does the alternative provide adequate intersection geometry and layout to improve left turn vehicle movements and meet drivers' expectations?	No	No	Yes	Yes
<b>Percent (%) of Purpose and Need Evaluation Criteria Met</b>			<b>0/6 Criteria Met (0%)</b>	<b>0/6 Criteria Met (0%)</b>	<b>5/6 Criteria Met (83%)</b>	<b>6/6 Criteria Met (100%)</b>

<sup>1</sup> See Sections 3.2 and 3.3 for the quantitative supporting materials for the evaluation criteria and standards. TSM = Transportation System Management; TDM = Transportation Demand Management

### **3.3 PURPOSE AND NEED SCREENING RESULTS**

To advance a Conceptual Alternative to a Reasonable Alternative, it must meet all or a majority of the seven Evaluation Criteria and satisfy each Purpose and Need Element. The screening determined that the No-Build Alternative, as described in **Section 3.1.1**, did not meet any of the seven Evaluation Criteria and did not satisfy either of the two Purpose and Need Elements. Therefore, the No-Build Alternative is not considered to be a Reasonable Alternative. However, NEPA analysis requirements require that the No-Build Alternative be included in the range of alternatives for consideration on all projects. Thus, the No-Build Alternative was carried forward for further evaluation.

The Purpose and Need screening determined that the TSM, Mass Transit, and TDM Alternatives, as described in **Section 3.1.2**, did not meet any criteria or satisfy the Purpose and Need. Therefore, these alternatives were not considered further.

The screening determined that Alternative A (Four-Lane Divided), as described in **Section 3.1.3**, met six of the seven criteria and Alternative B (Four-Lane Undivided), as described in **Section 3.1.4**, met all seven criteria. Therefore, Alternatives A and B were carried forward as Reasonable Alternatives for further evaluation.

### **3.4 SPECIFICATIONS OF THE REASONABLE ALTERNATIVES**

The Reasonable Alternatives were further developed and refined based on more detailed engineering analysis and known constraints. Once preliminary study footprints were established, detailed impact assessments, cost estimates, and traffic evaluations were developed. These refinements allowed further avoidance and minimization of environmental impacts and the optimization of engineering design.

#### **3.4.1 Design Criteria**

Key design criteria from MoDOT's Engineering Policy Guide used for the design of US 412 alternatives included:

- Roadway Configurations
  - Two 12-foot lanes in each travel direction from Route Y to Route AC
  - 60-foot depressed median separating east and west bound lanes (Alternative A)
  - 8-foot to 14-foot paved flush center median (Alternative B)
  - Paved 4-foot inside shoulders for east and west bound lanes (Alternative A, no inside shoulders for Alternative B)
  - Paved 8-foot outside shoulders (Alternatives A and B)
- Roadway Geometry
  - Minimum curve radius (horizontal alignment) of 1,480 feet
  - Side road intersection angles between 70 and 110 degrees (skew angles of 20 degrees or less)
  - Maximum superelevation (bank of roadway) of 8 percent

- Other Design Considerations
  - Open drainage on outside of shoulders throughout corridor
  - Design speed of 65 MPH
  - No signalized intersections
- Typical Cross Sections

The application of current design criteria for Alternative A results in a typical section that is 210 feet wide. **Sheet 1 in Appendix D** depicts the typical section for Alternative A from just south of Ragland Slough to Route AC. The application of current design criteria for Alternative B results in a typical section that is 164 feet wide. **Sheet 2 in Appendix D** depicts two typical sections for Alternative B, one showing the roadway configuration at intersections and another showing the roadway configuration between intersections. Using these typical sections allows for consistency in the evaluation of alternatives.

### 3.4.2 Access Management

This corridor was originally planned, designed, and constructed as Missouri Route 25 before being designated as US 412. Development of the three projects that constructed this roadway between Kennett, Missouri, and the Arkansas state line included acquisition of limited access right of way. Limited access right of way is where the number and general location of access points along the corridor is fixed and MoDOT appropriately regulates access. Points of access to US 412 would generally remain the same as existing conditions with slight modifications in the locations of some side road intersections. These modifications occur where side road intersection angles are improved to meet current design practice.

As mentioned previously, Alternatives A and B include reconfiguration of intersections at State Routes A, CC, V/N, and 164 as well as key county road intersections. Each reconfigured intersection would require right-of-way acquisition, to meet sight distance requirements, and full control of access in the intersection vicinity.

Access to US 412 near Octa, Missouri related to Alternative A includes consideration of modifications at Routes T and CC. Elimination of these access points is recommended due to the proximity of Route CC to a potential west bound lane of US 412. Motorists would access US 412 two miles north of Octa at the reconfigured intersection of US 412 and Route CC (north).

### 3.4.3 Construction Phasing

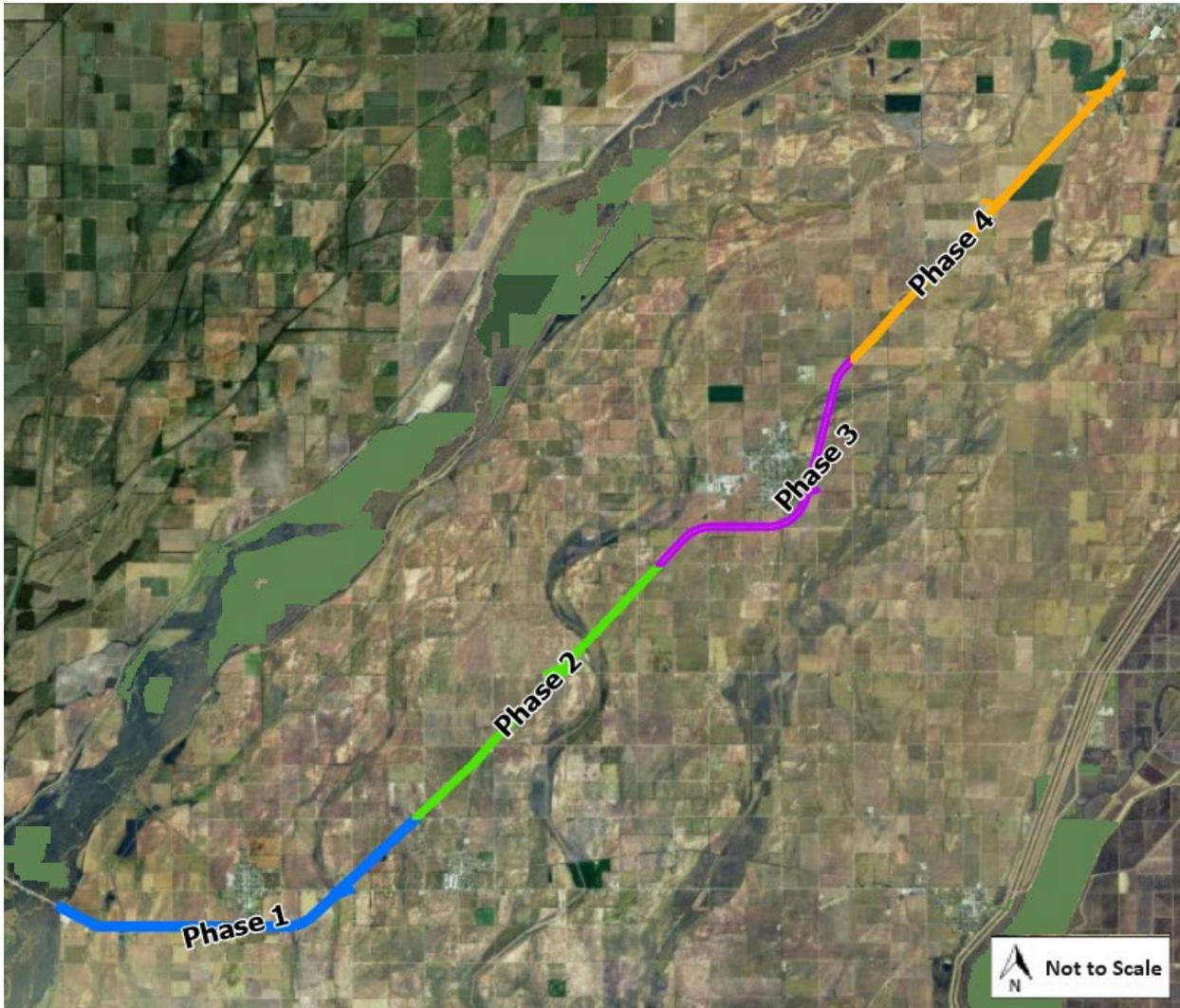
This section summarizes the construction phasing evaluation conducted for the Reasonable Alternatives.

MoDOT will amend or update the phasing and implementation document as necessary to reflect programming of projects resulting from this environmental document (**Commitment #1**). Construction of projects to implement results of this environmental document will be phased and take place over many years. MoDOT's Statewide Transportation Improvement Program (STIP) will be revised accordingly as specific phases are funded, designed, and constructed (**Commitment #2**).

Funding constraints necessitate that corridor improvement on this scale take place in phases over time, with cooperation between state and local entities. Construction of this corridor

improvement is proposed to take place in four phases. These phases are shown in **Figure 3-4** and described below.

**Figure 3-4. Proposed Project Phases**



- Phase 1 extends from the current four-lane portion of US 412 near Route AC to the intersection of US 412 and Dunklin County Road 610. This phase involves a transition from a four-lane configuration to a two-lane configuration, which may present unexpected lane changes to drivers unfamiliar with the roadway. Improvements to the US 412 roadway would occur along with reconfiguration of the Route 164 intersection. This portion of the corridor has experienced the highest accident rate and severity in the study area as indicated in the data trends from 2017-2021.
- Phase 2 extends from the intersection of Dunklin County Road 610 to Dunklin County Road 562. Improvements to the US 412 roadway would occur along with reconfiguration of the Route V/N intersection.
- Phase 3 extends from the intersection of Dunklin County Road 562 to Dunklin County Road 531. Improvements to the US 412 roadway would occur along with relocation of

the current Dunklin County Road 529 intersection. This county road would be re-aligned to intersect US 412 approximately 0.25 mile south of Route P or at existing Reagan Street.

- Phase 4 extends from the intersection of Dunklin County Road 531 to Route Y near Kennett, Missouri. Similar to Phase 1, this two-lane section of US 412 connects to a four-lane section of US 412 southwest of Kennett, and may present unexpected lane changes to drivers unfamiliar with the roadway. Improvements to US 412 roadway would occur along with reconfiguration of the Route CC and Route A intersections.

Both Alternatives A and B can be constructed in multiple independent phases – meaning each phase can be constructed without causing a burden on the next or previous phase and without negatively affecting operations of the overall corridor prior to completion of full build-out. Some negative operational impacts during construction such as lane closures, lane transitions, work staging at intersections, etc. are unavoidable, but a focus on constructability during design of all phases can help reduce these impacts.

#### **3.4.4 Traffic Safety**

A Highway Safety Manual (HSM) analysis was performed for the No-Build, four-lane divided (Alternative A), and four-lane undivided (Alternative B) alternatives. The HSM, Highway Safety Information System (HSIS), Crash Modification Factors (CMF) Clearinghouse, and U.S. Department of Transportation (USDOT) provide methodology or guidance for estimating crash frequency and severity.

The HSM provides methodology and guidance for predicting future total crashes and fatal and injury crashes based on a wide variety of engineering factors. The analysis incorporates AADT projections, which model traffic as increasing from 7,831 vehicles on average per day in the busiest section in 2021 to 12,376 vehicles on average per day in the busiest section in the design year 2045. HSM can analyze a variety of roadway types, lane configurations, and intersections. The HSM is suitable for analyzing two-lane roadways. Therefore, the two-lane No-Build option and Alternative A, which consists of two, two-lane sections separated by a median can be suitably analyzed by the HSM. The safety improvement of a two-lane roadway to a four-lane divided highway is well documented. There is substantial evidence that the safety improvement of this type of conversion can be adequately portrayed by HSM results. Alternative B is not directly supported by HSM, but individual components of a four-lane section with a flush center median can be analyzed under the context of HSM and literature review. The results of the HSM analysis are summarized in **Tables 3-2 through 3-4** below. A detailed presentation of the safety analysis is presented in a memo in **Appendix C**.

**Roadway Sections Analysis** – The HSM analysis was run in two parts. The first part developed predictions for the straight and curved segments of US 412, not including the intersections with county or state roads. The HSM analysis of the intersections was done in a separate, second part of the analysis. Predictions for the roadway sections were developed for the No-Build, Alternative A (Four-Lane Divided), and Alternative B (Four-Lane Undivided). The results are presented in **Table 3-2**.

**Table 3-2. Predicted Crashes by Scenario**

Scenario	No-Build Predicted Crashes	Four-Lane Divided (Alternative A) Predicted Crashes	Alternative A Percent Reduction (By Accident Severity)	Four-Lane Undivided (Alternative B) Predicted Crashes	Alternative B Percent Reduction (By Accident Severity)
<b>Total</b>	41.8	26.0	-38%	33.4	-20%
<b>FI</b>	13.5	13.6	0.7%	12.4	-8%
<b>PDO</b>	28.3	12.4	-56%	21.0	-26%

FI = Fatal & Injury Crashes, PDO = Property Damage Only

Both alternatives provide an estimated crash reduction compared to the No-Build option for total crashes and PDO (property damage only) collisions, and Alternative A provides a greater reduction for these crashes compared to Alternative B.

**Intersections Analysis** – Fourteen intersections in the US 412 study area have traffic data in MoDOT's Traffic Management System. A HSM Analysis was performed at these intersections and is shown in **Table 3-3**. The crash prediction analysis incorporated input for factors specific to each intersection such as the intersection angle, turn lanes, and lighting.

**Table 3-3. Predicted Intersection Related Crashes by Scenario: No-Build**

Intersection	N <sub>predicted</sub> (T) crashes/year	N <sub>predicted</sub> (FI) crashes/year	N <sub>predicted</sub> (PDO) crashes/year
<b>1 - 412 and AC</b>	0.69	0.30	0.39
<b>2 - 412 and 164/F</b>	0.20	0.08	0.12
<b>3 - 412 and 164</b>	2.90	1.25	1.65
<b>4 - 412 and 108</b>	0.79	0.33	0.46
<b>5 - 412 and V/N</b>	1.66	0.72	0.95
<b>6 - 412 and C</b>	1.25	0.54	0.71
<b>7 - 412 and 527</b>	2.04	0.88	1.16
<b>8 - 412 and Hornbeck</b>	1.29	0.56	0.74
<b>9 - 412 and P</b>	0.50	0.22	0.29
<b>10 - 412 and 532/T</b>	0.63	0.27	0.36
<b>11 - 412 and A</b>	0.72	0.31	0.41
<b>12 - 412 and Y</b>	0.67	0.29	0.38
<b>Sum</b>	13.36	5.75	7.62

N<sub>predicted</sub> (T) = number of total predicted crashes;  
 N<sub>predicted</sub> (FI) = number of predicted fatal & injury crashes;  
 N<sub>predicted</sub> (PDO) = number of predicted crashes with property damage only

The modeling for the No-Build Scenario predicts a total of 13.36 crashes per year for all intersections in the US 412 corridor, of which 5.75 are predicted as fatal & injury crashes (FI) and 7.62 are predicted as having PDO.

In modeling the Build Alternatives, the safety performance modeling for multilane highways does not distinguish between cases where an intersection has a median compared to intersections where no median is present. Therefore, although Alternative A has a depressed

median while Alternative B has no median, the input information was the same for both alternatives, and the output predictions are also the same. The results are presented in **Table 3-4**.

**Table 3-4. Alternative Predicted Crashes**

<b>Intersection</b>	<b>N<sub>predicted</sub> (T) crashes/year</b>	<b>N<sub>predicted</sub> (FI) crashes/year</b>	<b>N<sub>predicted</sub> (PDO) crashes/year</b>
<b>1 - 412 and AC</b>	0.88	0.37	0.51
<b>2 - 412 and 164/F</b>	0.60	0.20	0.40
<b>3 - 412 and 164</b>	1.96	0.79	1.17
<b>4 - 412 and 108</b>	0.69	0.25	0.44
<b>5 - 412 and V/N</b>	1.42	0.65	0.78
<b>6 - 412 and C</b>	1.64	0.82	0.83
<b>7 - 412 and 527</b>	1.58	0.76	0.81
<b>8 - 412 and Hornbeck</b>	1.06	0.49	0.58
<b>9 - 412 and P</b>	0.74	0.30	0.45
<b>10 - 412 and 532/T</b>	0.58	0.24	0.34
<b>11 - 412 and A</b>	0.61	0.23	0.38
<b>12 - 412 and Y</b>	0.96	0.40	0.56
<b>Sum</b>	<b>12.75</b>	<b>5.49</b>	<b>7.26</b>

N<sub>predicted</sub> (T) = number of total predicted crashes;  
 N<sub>predicted</sub> (FI) = number of predicted fatal & injury crashes;  
 N<sub>predicted</sub> (PDO) = number of predicted crashes with property damage only

The modeling for both Build Scenarios (Alternatives A and B) predicts a total of 12.75 crashes per year for all intersections in the US 412 corridor, of which 5.49 are predicted as FI and 7.26 are predicted as having PDO.

The predicted crash numbers are higher for some intersections under the Build Alternatives compared to the No-Build Alternative. These include US 412 intersections with Route AC, Route 164/F, Route C, Route P, and Route Y. All the intersections that show increased crashes in the Build Alternative scenarios have existing left-turn lanes on the uncontrolled approaches. The crash numbers in the Build Alternatives are higher because the model output for these scenarios does not include a crash reduction benefit from adding a turn lane (the turn lane is already present). Also, the Build Alternatives model uses a local calibration factor for multi-lane highways, which gives higher crash numbers compared to the local calibration factor for two-lane highways that is used in the No-Build Alternative modeling. For the combined set of all 12 intersections, the model predicts less total, FI, and PDO crashes for the Build Alternatives.

**3.5 TENTATIVE PREFERRED ALTERNATIVE**

Based on the study’s Purpose and Need, logical termini, study area, analysis of the Reasonable Alternatives’ impacts, and public and agency input, a Tentative Preferred Alternative was selected.

MoDOT has selected Alternative B (Four-Lane Undivided Roadway) as the Preferred Alternative because it best addresses the Purpose & Need, connects at the logical termini, minimizes many negative impacts, provides substantial positive impacts, and was preferred by the majority of stakeholders. This selection is supported by fewer acreage acquisition requirements, fewer displacements, and lower overall project cost. **Table 3-5** below summarizes each alternative’s effect on various components of the study area.

**Table 3-5. Comparison of Alternatives**

Screening Factor	No-Build	Alternative A (Four-Lane Divided)	Alternative B (Four-Lane Undivided, Preferred Alternative)
<b>Estimated Project Cost</b>			
Total Construction Cost	\$0	\$93,046	\$83,067
Design and Const. Eng. Cost (15%)	\$0	\$13,957	\$12,460
Total Right-of-Way Acquisition Cost	\$0	\$9,928	\$6,859
Total Utility Cost	\$0	\$1,230	\$435
Total Project Cost	\$0	\$117,344	\$102,821
<b>Public Input</b>			
Public Input (supports, somewhat supports, doesn't support)	Doesn't support	Somewhat supports	Supports
<b>Right-of-Way Impacts</b>			
Residential Displacements (Per tract; includes proximity damages)	0	7	4
Commercial Displacements (Per tract; includes proximity damages)	0	3	2
Miscellaneous Building Displacements (Per tract; outbuildings, irrigation, cell tower, etc.)	0	6	3
Total Displacements	0	16	9
Total Displacements Cost	\$0	\$1,300	\$660
<b>Right-of-Way Considerations</b>			
Length (miles)	0	19.95	19.95
Length of New Right-of-Way (miles)	0	19.45	19.45
Right-of-Way Acquisition (acres)	0	254.1	147.3
Parcels Impacted	0	87*	140*
Land Acquisitions Cost	\$0	\$5,307	\$3,008
Right-of-Way Incidental Costs	\$0	\$672	\$1,002
Miscellaneous Right-of-Way Cost	\$0	\$3,949	\$2,849
Total Right-of-Way Acquisition Cost	\$0	\$9,928	\$6,859
<b>Potential Environmental Considerations</b>			
Hazardous Materials Sites	none	6 sites at 4 locations	6 sites at 4 locations

Screening Factor	No-Build	Alternative A (Four-Lane Divided)	Alternative B (Four-Lane Undivided, Preferred Alternative)
Projected Noise Impacts in Design Year 2045	14	14	14
Threatened / Endangered Species	none	small amount of tree clearing	small amount of tree clearing
Migratory Birds	nesting birds under bridges	nesting birds under bridges	nesting birds under bridges
100-Year Floodplains	several crossings including six named streams	several crossings including six named streams	several crossings including six named streams
Wetland (acres in NEPA boundary)	0	20.8	20.8
Land Disturbance (acres)	0	496.5	389.7
Public Lands (acres)	0	0	0
Prime Farmland (acres)	0	242	142
<b>Socioeconomic/Community Considerations</b>			
Travel Time (increased, no change, improved)	no change/may worsen over time	improved	improved
Emergency Services (no change, improved)	no change/may worsen over time	improved	improved
Business Impacts (# of affected businesses)	none	2 active, 1 closed	2 active, 1 closed
Community Access (no change, improved access)	no change/may worsen over time	improved	improved
Noise Impacts/Mitigation Considered	none	no mitigation required**	no mitigation required**
<b>Potential Cultural Resource Considerations</b>			
Archaeological Sites (total)	0 in partial survey of corridor	0 in partial survey of corridor	0 in partial survey of corridor
National Register of Historic Places (NRHP) eligible / Section 4(f) Bridges	0	0	0
Impacts to NRHP listed or eligible / Section 4(f) buildings or historic districts	0	0	0
Cemeteries	none known	none known	none known

**Notes: All costs are in 2024 dollars and shown in thousands rounded to nearest \$1,000**

Alternative Right of way incidental costs based on input from Southeast District Right of Way Department. Assumed \$6,000 per parcel. Miscellaneous right of way costs include relocation, administrative settlements, condemnation, homestead, heritage, sign relocation, and irrigation equipment values. Due to permissions, not all of the study area was surveyed for archaeological resources, including one potentially eligible archaeology site.

\*Alternative A would widen on one side of the road and Alternative B would widen on both sides of the road, so Alternative B would impact more parcels despite the narrower footprint.

The Tentative Preferred Alternative, Alternative B (Four-Lane Undivided) is depicted on **Exhibit 3**. Important distinguishing features associated with this alternative include:

### **3.5.1 Engineering**

- Alternative B has fewer impacts (overhead power poles and potable water lines) than Alternative A.
- Alternatives A and B are equivalent in the improvement of side road intersection geometry.
- Alternative B is estimated to cost approximately \$15 million less than Alternative A.
- Alternative B is less impactful to stormwater runoff.

### **3.5.2 Environmental**

- Alternative B requires approximately 107 fewer acres of new right-of-way than Alternative A.
- Alternative B impacts approximately 94 fewer acres of agricultural land than Alternative A.
- Alternative B requires acquisition and removal of five fewer buildings/structures than Alternative A.
- Alternative B results in fewer impacts to adjacent agricultural irrigation systems.
- Based on the narrower corridor of Alternative B, it is expected to impact fewer linear feet of stream banks/channels than Alternative A.
- Based on the narrower corridor of Alternative B, it is expected to impact fewer acres of wetlands within the NEPA boundary compared to Alternative A.
- Based on the narrower corridor of Alternative B, it is expected to impact fewer acres of potential habitat for endangered species than Alternative A.

### **3.5.3 Community**

- Alternative B was overwhelmingly favored by the public during public meetings, Community Advisory Group (CAG) meetings and the Technical Advisory Group (TAG).

## 4. AFFECTED ENVIRONMENT AND IMPACTS

This section describes environmental and cultural resources in the proposed project area, regulations that protect these resources, and potential impacts associated with the Reasonable Alternatives and the No-Build Alternative. Proposed minimization/mitigation and commitments are described in this section for each resource and also presented as a group in **Section 6**.

The discussion is organized according to the categories listed in FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents (TA 6640.8A, October 30, 1987). The resources discussed include:

- Air Quality
- Hazardous Materials
- Noise
- Geology
- Endangered and Threatened Species
- Migratory Birds
- Demographics
- Land Use
- Floodplains
- FEMA Buyout Properties
- Waters and Wetlands
- Stormwater Management
- Cultural Resources
- Section 4(f)
- Section 6(f)
- Farmlands
- Construction Considerations
- Other Reasonably Foreseeable Environmental Effects

This section includes both figures and exhibits to illustrate the affected environment and impacts. Figures are included within the text while exhibits are large-scale graphics which are collected in **Appendix A**. If revisions to the design or construction result in changes in impacts that were not evaluated in this document, MoDOT will re-evaluate the NEPA analyses and determinations to ensure the commitments remain valid. Environmental commitments are not subject to change without prior written approval from the Federal Highway Administration. (**Commitment #3**).

### 4.1 AIR QUALITY

Pollution is a general term that refers to one or more substances that degrade the quality of the atmosphere. Air pollutants degrade the atmosphere by reducing visibility and damaging property, reducing the productivity of crops and natural vegetation, increasing susceptibility to disease, and damaging human and animal respiratory or overall health.

#### 4.1.1 Air Quality – Regulatory Background and Standards

In 1970, the United States created the Environmental Protection Agency (EPA) and passed the Clean Air Act. The Act originally empowered the EPA to determine safe limits and regulate six major air pollutants, now expanded to include 189 potential air pollutants.

Transportation modalities contribute to the nation's regulated air pollutants. Transportation Conformity was enacted as part of the 1990 Clean Air Act Amendments (CAAA). These regulations are the latest in a series of Clean Air Act amendments. This legislation modified and extended Federal legal authority provided by the earlier Clean Air Acts of 1963 and 1970. Under the CAAA, Transportation Conformity regulations require federally funded transportation plans and improvement programs/projects to conform to the purpose of State Implementation Plans (SIP) for air quality. MoDOT implements the conformity regulation in nonattainment and maintenance areas.

The CAAA and other regulations, such as the EPA's Control of Hazardous Air Pollutants from Mobile Sources rule, specify environmental policies and regulations to promote and ensure acceptable air quality. These policies and regulations were adopted in the Final Conformity Rule (40 CFR Parts 51 and 93). The EPA delegated authority to the Missouri Department of Natural Resources (MDNR) to monitor and enforce air quality regulations in Missouri. MDNR developed a SIP in 2015, with amendments to a supplement of the Interstate Transport Provisions section in 2022.

The Clean Air Act defines conformity as follows:

"Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) and achieving expeditious attainment of such standards; and that such activities (that is, approved transportation plans, programs, and projects in the state) will not:

- Cause or contribute to any new violation of any NAAQS in any area;
- Increase the frequency or severity of any existing violation of any NAAQS in any area; or
- Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area."

The EPA established the NAAQS for the following major air pollutants, which are known as criteria pollutants:

1. Carbon monoxide (CO)
2. Nitrogen dioxide (NO<sub>2</sub>)
3. Ozone (O<sub>3</sub>)
4. Particulate matter (PM) (PM less than 10 and less than 2.5 microns in aerodynamic diameter [PM<sub>10</sub> and PM<sub>2.5</sub>])
5. Sulfur dioxide (SO<sub>2</sub>)
6. Lead

MDNR has adopted the standards for the criteria pollutants listed in **Table 4-1**. The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. Air quality in Missouri is defined with respect to conformity with the NAAQS.

**Table 4-1. Criteria Pollutant Emission Standards**

<b>Pollutant</b>	<b>Period</b>	<b>Primary Standard</b>	<b>Secondary Standard</b>
Carbon Monoxide	1-hour	35 ppm	None
	8-hour	9 ppm	None
Lead	3-month	0.15 µg/m <sup>3</sup>	0.15 µg/m <sup>3</sup>
	Quarterly	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>
Nitrogen Dioxide	Annual	53 ppb	53 ppb
	Hourly	100 ppb	None
Ozone	8-hour	0.070 ppm	0.070 ppm
Sulfur Dioxide	24-hour	0.14 ppm	None
	1-year	0.03 ppm	None
	1-hour	75 ppb	None
Particle Pollution - PM <sub>2.5</sub>	Annual	12 µg/m <sup>3</sup>	12 µg/m <sup>3</sup>
	24-hour	35 µg/m <sup>3</sup>	35 µg/m <sup>3</sup>
Particle Pollution - PM <sub>10</sub>	24-hour	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>

Source: Missouri Secretary of State: Code of State Regulations (mo.gov) and the NAAQS Table /US EPA

Many of the activities for preventing and controlling air pollution are delegated to the state level of government, and Missouri has a SIP approved at the federal level that details the methods and procedures to be used in attaining and maintaining the ambient air quality standards in Missouri.

#### **4.1.2 Attainment Status**

Attainment areas are defined by the EPA as areas where air quality meets health standards for particular airborne pollutants. Based on the Current Nonattainment Area Map maintained by the Missouri Department of Natural Resources at <https://dnr.mo.gov/document-search/current-nonattainment-area-map>, Dunklin County is classified as an attainment area.

As Dunklin County is in attainment for air quality, no air quality assessment is required for the proposed improvements. Therefore, no project-level particulate matter hot-spot conformity determination or build alternatives air quality impact analysis was conducted.

## **4.2 HAZARDOUS MATERIALS**

Hazardous materials, defined in various ways under a number of regulatory programs, are dangerous or potentially harmful to human health or the environment when not managed properly. Hazardous materials may be generated from specific industrial or manufacturing processes or from commercial businesses. Solid waste comprises a broad range of materials that include garbage, refuse, sludge, non-hazardous industrial waste, municipal wastes, and hazardous waste. Hazardous materials can be solid, liquid, or gas.

### **4.2.1 Hazardous Materials – Regulatory Background and Standards**

Hazardous materials and wastes fall under the following regulatory programs:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) governs the cleanup of sites contaminated with hazardous material. These sites have been reported to the EPA by states, municipalities, private companies, and private persons, pursuant to Section 103 of CERCLA. Sites

evaluated under CERCLA that pose serious threats to human health and the environment are placed on the National Priorities List (NPL) and are commonly referred to as Superfund sites.

- Resource Conservation and Recovery Act (RCRA) governs hazardous wastes and handlers of hazardous wastes subject to reporting requirements (Threshold Planning Quantities) under Sections 311, 312, and 313 of the Superfund Amendment and Reauthorization Act. These sites generate, transport, store, treat, and/or dispose of hazardous waste as defined by RCRA.
- Emergency Response Notification System is a national database published by EPA that lists the locations of reported releases of oil and hazardous material.
- Other federal and state programs. MDNR also maintains databases in accordance with federal regulations that provide information on sites such as Superfund sites and sites with underground storage tanks (USTs), leaking underground storage tanks (LUST), spills/incidences reported under MDNR's Environmental Emergency Response Section, and dry-cleaning facilities.
- Some abandoned industrial and commercial properties lie vacant because concerns about hazardous chemical contamination prevent re-development, and these properties are commonly referred to as brownfields. The state of Missouri conducts a Brownfields/Voluntary Cleanup Program that addresses and oversees brownfield cleanups and promotes redeveloping brownfields.

#### **4.2.2 Hazardous Materials – Affected Environment**

To identify the current environmental conditions within the US 412 study area, a database search was conducted by Environmental Data Resources, Inc. (EDR). The databases searched conform to the ASTM International Standard E 1527-21 and included applicable inquiries for Federal, State, Tribal, and EDR Proprietary databases.

The EDR data was cross-referenced with MDNR's Environmental Site Tracking and Research Tool (E-START). As part of the MDNR's mission, this tool assists in regulating the management of hazardous waste, overseeing the cleanup of contamination, regulating the operation of USTs, and oversees removal and cleanup of petroleum storage tanks/releases. Two primary data sets are contained within E-START:

- Regulatory Petroleum and Hazardous Substances Storage Tank Facilities  
This data set provides status information for regulated petroleum and hazardous substance storage tanks This includes facilities with an active release, activity and use limitations, administrative and No Further Action Closures, and operating facilities with no known releases.
- Hazardous Substance Investigation and Substance Storage Tank Facilities  
This data set provides status information for active, long-term stewardship, environmental notice, and completed sites from the Hazardous Waste Program's Superfund Section, Federal Facilities Section, Permits Section, and Brownfields/Voluntary Cleanup Program.

In addition to the database search, field reconnaissance was conducted within the study area to verify the database information retrieved and to identify any other sites of potential

environmental concern. Utilizing this approach, potential sites of environmental concern were identified. To assess these sites, the best professional judgment standard was applied. Best professional judgment is the highest quality technical opinion developed after consideration of all reasonable available and pertinent data or information that forms the basis for recommendations. The assessment of potential facilities of concern focused on the following:

1. The contaminants that could be present.
2. The toxicity and mobility of these contaminants.
3. Geological factors that could influence the migration of possible contaminants.

Based on a review of the EDR Report, the Missouri E-START database, and field reconnaissance, 50 sites were identified where a potential for environmental concern exists. These sites were considered for further investigations and are summarized in **Table 4-2** below. A Hazardous Materials Memo is located in **Appendix E**. This memo discusses details for each identified site and recommendations for the risk potential to the project area. The memo also includes EDR maps showing the locations of the first 44 sites in **Table 4-2**. Sites 45-50 were observed during the field assessment but do not have database entries with EDR-mapped locations. The locations of Sites 45-50 are depicted on **Exhibit 4 in Appendix A**.

**Table 4-2. Summary of Sites with a Potential for Environmental Concern**

EDR Map Number	Site Name	Database(s)	Status
1	Zachary Lane	SPILLS	Pending
2	Zackwrie Lane South of Kennett	SPILLS	Pending
3	HWY 412 at SR A	SPILLS	Pending
4	HWY 412 Clandestine Drug Lab	CDL/SPILLS	Removed/Recovered
5	HWY 412 and SR P	SPILLS	Removed/Recovered
6	HWY 412 and SR P	SPILLS	Pending
7	SR 536 and HWY 12	SPILLS	Removed/Recovered
8	HWY 412 in Bucoda	SPILLS	Pending
9	Arbyrd Maintenance Lot	UST	Removed
10	Cardwell WWTF	FINDS	On-going
11	Cardwell WWTF	NPDES	N/A
12	Cardwell WWTF	NPDES	N/A
13	HWY 412 at HWY 162	SPILLS	Removed/Recovered
14	HWY 412 and SR F Intersection	SPILLS	Removed/Recovered
15	496 HWY 412	HMIRS	Removed
16	Hyde Thomas	EDR Hist Auto	Unknown

<b>EDR Map Number</b>	<b>Site Name</b>	<b>Database(s)</b>	<b>Status</b>
17	HWY 412 at SR AC	SPILLS	Removed/Recovered
18	1155 HWY 412	CDL/SPILLS	Removed/Recovered
19	Burton's Quick Stop	UIC	Active
20	HWY 142 South of Cardwell	SPILLS	Pending
21	Cardwell Country Club	UIC	Active
22	1155 HWY 412	SPILLS	Pending
23	HWY 412, One Mile East of Cardwell	SPILLS	Removed/Recovered
24	Burton's Quick Stop	EDR Hist Auto	Unknown
25	Burton's Quick Stop	UST	Active
26	J.R. Oil Company	EDR Hist Auto	Unknown
27	Prance Amoco #1 (Former)	SPILLS, SMARS	Pending
28	Prance Amoco #1 (Former)	US Brownfields	Active
29	Mr. T's Riverside	UST	Closed/Removed
30	Mr. T's Riverside	AST	Active
31	Riverside & Company, Inc.	EDR HIST AUTO	N/A
32	Gillion Auto Sales	EDR HIST AUTO	N/A
33	Well # 2 at SR P	PFAS	Analysis complete
34	Well # 1 - SR Y	PFAS	Analysis complete
35	Well # 3 - County Road 619	PFAS	Analysis complete
36	MFA Oil Company Petro Card	AST	Unknown
37	Auddie L. Ramsey	UST, LUST	Closed/Removed
38	Bob Gillion Service Station	UST, LUST	Closed/Removed
39	M-47 Kennett	UST	Closed/Removed
40	Former Cotton Patch Store	UST, LUST	Closed/Removed
41	Midway #2 (Brewer Brothers Sinclair)	UST, LUST	Closed/Removed
42	Raines Oil Company	UST, LUST	Closed/Removed
43	Tri-State Delta Chemicals	Superfund Site	Closed
44	Brewer Brothers Property	UST, LUST	On-going/Active
45	Miscellaneous Storage Area	None – 2023 field observation	N/A
46	Kennett Irrigation	None – 2023 field observation	N/A

EDR Map Number	Site Name	Database(s)	Status
47	Mid-Valley Irrigation	None – 2023 field observation	N/A
48	Danny Williams Auction	None – 2023 field observation	N/A
49	Former Service Station	Missouri E-START and 2023 field observation	N/A
50	Private Residence – Farm Equipment Storage	None – 2023 field observation	N/A

Gray shading (on Sites 19, 24, 25, 28, 38, and 49) indicates sites considered to have moderate to high-risk potential. The other listed sites are considered to have low risk potential.

### 4.2.3 Hazardous Materials – Impacts

No-Build Alternative Summary: The No-Build Alternative would have no additional impacts on these sites. No new right-of-way would be required; therefore, no new encroachments would occur. Maintenance of existing roads, bridges, and culverts would continue and are not likely to affect these sites.

Build Alternatives Summary: Relative to hazardous material impacts, there are no discernable differences among the Reasonable Alternatives.

Among the fifty sites identified from the database reviews and field investigation, for 44 sites, there is a low-risk potential for impacts to soil or groundwater in the vicinity of the project area. (Note that three of the total number of sites are three separate database listings for the same business: Burton’s Quick Stop, Site Listings 19, 24, and 25). These sites are described in detail in the Hazardous Materials Memo. The assessment of potential risk is based on professional judgement, past site practices, and available records. This is by nature a qualitative assessment.

Four locations are considered to have moderate to high-risk potential and are recommended for Phase I Environmental Site Assessments (ESA):

- **Sites 19, 24, and 25 - Burton’s Quick Stop**: This site poses a low to moderate risk potential for impacts to soil or groundwater. This site is located in Cardwell, Missouri, and is listed on the UIC, EDR HIST AUTO, and UST databases. See the section for Sites 19, 24, and 25 in the Hazardous Materials Memo for detailed information.
- **Site 28 - Prance Amoco #1 (Former)**: This site poses a high-risk potential for impacts to soil and groundwater. This site is located in Kennett, Missouri, and is listed as a current Brownfield. The site was a fueling station and auto repair shop until 2007. In 2016, five permanent groundwater monitoring wells and five temporary wells were installed to determine if groundwater contamination was present. Groundwater samples in all of the wells contained petroleum-related contaminants at levels above several target limits. The highest levels of contamination were located directly downgradient from the pump islands and gasoline aboveground storage tanks. While the tanks were later removed, no additional documentation is available regarding the contaminated soil or groundwater or any cleanup efforts.

- **Site 38 - Bob Gillion Service Station:** This site poses a moderate to high-risk potential for impacts to soil or groundwater. This site is located in Cardwell, Missouri, and listed in the LUST and UST databases. The UST database lists the site as having two 4,000-gallon gasoline USTs installed in January 1974. The USTs were last used in January 1990 and are listed as permanently closed in place in September 1996. Significant contamination was reported across the vicinity of the area. Further investigations continued for many years without successfully contacting a responsible party to fund the cleanup. The last entry is from March 2023 detailing that a letter was sent to the current owners. There is no additional documentation regarding contaminated soil or groundwater or any cleanup efforts.
- **Site 49 - Former Service Station:** This site poses a moderate risk potential for impacts to soil or groundwater. This site was field-identified and is located in Cardwell, Missouri. It is listed in the Missouri E-START database as Ho Bos Citgo Station. During the field investigation, the site was noted as appearing to be a former service station and auto repair shop. The property was noted to be abandoned and two aboveground fuel pumps were still present. Additional review is required to determine if possible contamination exists.

Prior to the commencement of construction, MoDOT shall ensure that Phase I ESAs are conducted at these locations, as appropriate (**Commitment #4**).

MoDOT shall ensure that inspection personnel/project managers will direct the contractor to cease work at any of these sites (or any other that may be encountered) if hazardous materials are encountered during construction. Inspection personnel/project managers should contact an environmental specialist to discuss options for remediation. MoDOT personnel, the environmental specialist, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR and EPA shall be contacted for coordination and approval of required activities (**Commitment #5**).

MoDOT shall ensure that all needed demolition notices, abatement notices, and project notifications to MDNR will be submitted prior to the commencement of demolition activities. Asbestos-containing material and demolition debris will be disposed of in accordance with state and federal regulations (**Commitment #6**).

### 4.3 NOISE

Sound is defined as vibrations that travel through the air or another medium and can be heard when they reach a person's or animal's ears. Noise is unwanted or and/or harmful sound. It is important to describe that noise as "harmful" because there are three problems with defining noise only as unwanted sound:

1. Noise causes auditory damage (e.g., noise-induced hearing loss, tinnitus, and hyperacusis) in everyone, not just in workers with occupational noise exposure. *Wanted* noise, whether from a rock concert or power tool use, also damages hearing.
2. Unwanted noise interferes with thought, concentration, and speech, which leads to stress – causing issues with cognition, learning, immune function, and cardiovascular health.

3. Noise (largely transportation noise) causes involuntary physiological responses, including increases in blood pressure and heart rate, increases in stress hormone levels, and inflammation of the arterial lining. Research shows that our bodies do not become accustomed to the noise, although it may be perceived that one is accustomed.

#### **4.3.1 Noise – Regulatory Background and Standards**

MoDOT's Noise Policy on highway traffic and construction noise impacts is outlined in accordance with the FHWA Noise Standard in CFR 23 Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise. This policy was developed by MoDOT and approved by FHWA. The guidelines in the MoDOT Noise Policy are used to determine the need, feasibility, and reasonableness of noise abatement measures and provide the basis for statewide uniformity in traffic noise analysis. MoDOT is required to complete a study for noise abatement any time it plans to add additional lanes to an existing highway, construct a new roadway, or change the location of a roadway.

According to MoDOT's Noise Policy, there are three types of projects: Types I, II, and III. The US 412 Project is a Type I project that requires a noise analysis because the design involves the addition of a through-traffic lane. The evaluation of traffic-noise impacts involves the following steps:

- Identification of existing activities and developed lands that may be affected by traffic noise.
- Prediction of traffic-noise levels with and without the construction of the proposed project.
- Determination of existing noise levels.
- Determination of future traffic-noise impacts.
- Evaluation of the feasibility and reasonableness of noise abatement measures.

Noise abatement is considered when traffic noise impacts are predicted. These impacts occur when existing or future highway traffic noise levels approach or exceed the Noise Abatement Criteria (NAC), or when predicted existing or future highway traffic noise levels substantially exceed the existing highway traffic noise level, even though the predicted level may not exceed the NAC. The term "approach" is considered to be one A-weighted decibel (dBA) less than the appropriate NAC. Consequently, a sensitive noise receptor is considered affected if the noise level is predicted to be 66 dBA or higher for exterior areas of residential land uses. MoDOT defines a "substantial increase" as an increase of 15 dBA or more above the existing noise level.

FHWA has determined the NAC for different land uses (i.e., activity categories) as described in **Table 4-3**. For the purpose of traffic noise analysis, the use of a property located adjacent to a transportation improvement is classified according to the human activities that occur or are expected to occur on the property. Noise abatement is considered when a traffic noise impact is predicted.

**Table 4-3. Noise Abatement Criteria**

Activity Category	dB(A) Leq(h)	dB(A) L10(h)	Description of Land Use Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 (Exterior)	70 (Exterior)	Residential
C	67 (Exterior)	70 (Exterior)	Active sports areas, amphitheatres, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (Interior)	55 (Interior)	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (Exterior)	75 (Exterior)	Hotels, motels, offices, restaurant/bars, and other developed lands, properties, or activities not included in A-D or F
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical) and warehousing
G	N/A	N/A	Undeveloped lands that are not permitted

Notes:

- Source: CFR 23 Part 772, Table 1 CFR 23 Part 772, Table 1
- dB(A): Hourly A-Weighted Sound Level in decibels
- L10: The sound level that is exceeded 10 percent of the time (the 90th percentile) for the period under consideration, with L10(h) being the hourly value of L10.  
*Leq*: The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.

A noise study was conducted for the US 412 project and is attached in **Appendix F**. Existing and future noise levels were determined using the Traffic Noise Model (TNM 2.5). When the model predicts a traffic noise impact for a given receptor, noise abatement measures are considered. The criteria for noise abatement includes feasibility and reasonableness. These factors are discussed in **Sections 4.3.5** and **4.3.6**.

**4.3.2 Noise Sensitive Land Uses**

Noise sensitive land uses are existing activities and developed lands that may be affected by traffic noise. The noise study extended from Route AC near the Arkansas border to just east of Route Y near Kennett. For the noise analysis, a study area of approximately 500 feet on either side of the proposed roadway was established. Within the study area, a total of 163 noise sensitive land uses (receivers) were identified. All of the land uses are considered to

be Activity Category B or C (exterior areas of single-family and multi-family domiciles and exterior areas of non-residential land uses, respectively). In both cases, the NAC is 67 dBA. The noise study also identified five Noise Sensitive Areas (NSAs). NSAs were defined as a collection of areas where frequent human use can take place. This can include exterior sitting or eating areas, playgrounds, pools, homes, businesses, or other similar locations where persons may gather. The five NSAs were located at Cardwell, Senath, a cluster of houses and a church near County Roads 530 and 532, and two locations in the outskirts of Kennett.

**4.3.3 Determination of Existing and Future Noise Levels**

The FHWA TNM 2.5 was used to model all relevant roadways, receivers, terrain lines, barriers, building rows, and ground zones in the project area for the existing condition. After consulting with MoDOT, the model was a flat model with no terrain to signify a worst-case scenario where no hills or ditches are present to alter the path of the noise to the receptor. The traffic data was taken from traffic counts and the study’s traffic modeling. Speeds used the posted speed limits.

Due to the close proximity of Alternatives A and B to each other, the noise study did not analyze each alternative separately. The traffic noise modeling used the Preferred Alternative lane centerlines. Using the TNM 2.5 traffic noise model, peak noise conditions were predicted for the identified receptors under existing (2023) and design year (2045) conditions.

**4.3.4 Traffic Noise Impacts**

Due to relatively low traffic volume and speed along the US 412 corridor, there are few locations that approach or exceed the Noise Abatement Criteria. **Table 4-4** summarizes the traffic noise levels and the number of impacted receptors for each NSA. A total of 14 impacted noise receptors were identified and are located in NSA1 (Cardwell), NSA2 (Senath), and NSA3 (northeast of Senath). The locations of the impacted noise receptors are depicted on the Noise Study Map within the Noise Study report (**Figure 2, Appendix F**).

**Table 4-4. Predicted Existing/Future Peak-Hour Noise Levels (in dBA)**

Location	Existing (2023) Noise Levels (dBA)	Future (2045) Noise Levels (dBA)	Number of Traffic Noise Impacts
NSA1	46.9 – 59.0	56.6 – 69.4	2
NSA2	45.5 – 63.2	56.5 – 73.6	11
NSA3	49.2 – 64.4	54.0 – 67.7	1
NSA4	50.9 – 59.1	58.3 – 64.0	0
NSA5	50.7 – 60.7	54.1 – 63.8	0

Both Reasonable Alternatives are placed along the route of the existing highway, and the traffic would be divided among four lanes instead of the existing two lanes. Due to these characteristics, the noise environment of the No-Build Alternative is assumed to be similar to the modelling results of the Reasonable Alternatives, and a No Build model was not required.

No-Build Alternative Summary: The No-Build Alternative involves no new construction although maintenance of existing roads, bridges, and culverts would continue. Traffic

projections for the design year (2045) assume an increase in traffic volume and associated noise along US 412 under the No-Build Alternative. This is projected to result in noise impacts at 14 locations in 2045 that do not currently have noise impacts.

Build Alternatives Summary: Traffic projections for the design year (2045) assume an increase in traffic volume which will result in noise impacts at 14 locations that do not currently have noise impacts. Potential economic benefits to the local project area from the roadway improvements could increase the number of residents and businesses in the area, which would proportionally increase the number of vehicles using and generating noise on the roadway compared to the No-Build condition. However, this increase would not be expected to increase noise impacts to receivers along the corridor.

#### **4.3.5 Barrier Analysis – Feasibility**

A barrier analysis was conducted for the receptors that would experience a traffic noise impact. Potential barriers must meet standards for both feasibility and reasonableness to be recommended for further consideration. For a barrier to be considered feasible, MoDOT requires at least a 5-dBA insertion loss for a minimum of two first row, impacted receivers. Feasibility also evaluates engineering limitations such as physical constraints. For reasons of safety (primarily wind load and clear space concerns), a noise wall's maximum height is limited to 20 feet. The noise analysis identified the first-row receivers for evaluation of whether a noise barrier could achieve a 5-dBA insertion loss for the impacted first row receivers.

MoDOT assisted with determining groupings or communities of receivers where noise abatement measures should be considered. This review used aerial photography and the locations of impacted receivers, as well as the staff's professional judgement. Potential barriers that achieve the minimum feasibility requirements were examined further for reasonableness. The locations of the modeled barriers in relation to the impacted noise receptors are depicted on the Noise Study Map (**Figure 2, Appendix F**).

At NSA1 (Cardwell), a traffic noise impact is predicted among two front row receptors located on the south side of US 412 west of the State Highway F intersection. Modeling Barrier NSA1-1 which ranges from eight to 20 feet high, insertion losses of over 5-dBA is expected for both receptors. Consequently, a noise barrier at this location is feasible.

At NSA2 (Senath), traffic noise impacts were predicted along both sides of US 412, so two barrier analyses were conducted. Barrier NSA2-1 was modeled on the east side of US 412 and included a total of 39 receivers. Of these receivers, eight had sound level impacts and eight were classified as first-row receivers. Using a barrier ranging from eight to 16 feet tall, insertion losses of over 5-dBA is expected for 25 receivers, including all eight first-row receivers. Consequently, a noise barrier at this location is feasible.

Barrier NSA2-2 was modeled in NSA2 (Senath) on the west side of US 412 and included a total of five receivers. Of these receivers, two had sound level impacts and three were first-row receivers. Using a barrier ranging from 16 to 20 feet tall, insertion losses of over 5-dBA are expected for one, first-row receiver. Consequently, a noise barrier at this location is not feasible.

At NSA3 (northeast of Senath), a traffic noise impact for one front row receptor in Octa is predicted. However, a barrier is not feasible because it would not meet MoDOT's feasibility

requirement or at least a 5-dBA insertion loss for a minimum of two first row, impacted receivers.

At NSA4 and NSA5, no barriers were modeled because traffic noise impacts are not expected.

**4.3.6 Barrier Analysis – Reasonability**

The barrier analysis next reviewed the barriers classified as feasible to evaluate whether they were reasonable. This evaluation incorporates social, economic, and environmental factors, including viewpoints of owners and residents located at the benefitted receptors. MoDOT standards for reasonability require that noise abatement measures shall not exceed 1,300 square feet of noise wall per benefitted receptor, or \$46,000 for other noise abatement techniques per benefitted receptor. A minimum reduction of 7-dBA for 100 percent of benefitted, first-row receptors is also required.

Potential barriers for the US 412 project that were classified as feasible included Barrier NSA1-1 at Cardwell and Barrier NSA2-1 at Senath. However, neither of these barriers were classified as reasonable due to square footage values per benefitted receptor which exceed the benchmark of 1,300 square feet. The summary of the reasonableness analysis is contained in **Table 4-5**.

**Table 4-5. Noise Barrier Feasibility and Reasonableness Summary**

Potential Barrier <sup>1</sup>	First Row Impacted Receivers with at least a 5-dBA Insertion Loss	Is a Noise Barrier Feasible?	Optimum Barrier Area (SF)	Receptors w/ 7-dBA Insertion Loss	Square Feet of Barrier per Receptor w/ 7-dBA Insertion Loss	Is a Noise Barrier Reasonable?
Barrier NSA1-1	2 of 2 (100%)	Yes	9,536	2 receptors	4,768	No
Barrier NSA 2-1	8 of 8 (100%)	Yes	39,339	25 receptors	1,574	No
Barrier NSA 2-2	1 of 2 (50%)	No	---	---	---	---

<sup>1</sup> In NSA3, one impacted first-row receiver is present, but no barrier was evaluated because at least two benefitted receivers are required under the Feasibility standard.

**4.3.7 Construction Noise**

The major construction activities associated with this project are expected to include earth removal, hauling, grading, and paving. As required by 23 CFR 772.19, the temporary increase in noise levels due to construction activities was considered. Temporary speech interference for passers-by and individuals living or working near the project can be expected as noise levels in the project area would be increased during construction. The sound levels resulting from construction activities at nearby noise-sensitive receivers would be a function of the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses. Ranges of sound levels from construction equipment used in roadway construction are shown in **Table 4-6**. For each type of equipment, the peak noise generated varies based on the type, model, and manufacturer of the equipment.

**Table 4-6. Typical Noise Level Emissions for Construction Equipment**

<b>Equipment</b>	<b>Range of Peak Noise Level (dB(A)) at 50 Feet From This Type of Equipment<sup>1</sup></b>
Crane	70 - 94
Backhoe	74 - 92
Front Loader	77 - 96
Dozer	70 - 95
Grader	80 - 92
Scraper	76 - 98
Air Compressor	70 <sup>3</sup> - 93 <sup>3</sup>
Tractor	77 - 96
Jack Hammer	82 - 97
Pile Driver <sup>4</sup>	95 - 106

Notes:

1. Cited noise level ranges are typical for the respective equipment. For point sources such as the construction equipment listed above, noise levels generally dissipate at a rate of -6 dB(A) for every doubling of distance over a hard surface or through the air. For example, if the noise level from a pile driver at a distance of 50 feet = 100 decibels (dB(A)), then at 400 feet, it will generally be 82 decibels (dB(A)) or less.
2. Crane, backhoe, front loader, dozer, grader, scraper, and air compressor values were obtained from Appendix A of Reagan and Grant's Special Report on Highway Construction Noise for the FHWA (Undated). Tractor, jack hammer, and pile driver values were obtained from Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances (EPA 1971).
3. Due to project safety and potential construction noise concerns, pile driving activities are typically limited to daytime hours.
4. Air compressor values were collected at a distance of 7 meters (23 feet) from the equipment.

MoDOT shall include standard specifications in the construction contract requiring all contractors to comply with all applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. If meeting the project schedule requires that earth removal, grading, hauling, and/or paving must occur during evening, nighttime, and/or weekend hours in the vicinity of residences, the Contractor shall notify MoDOT as soon as possible. In such instances, all reasonable attempts shall be made to notify and make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and/or residents. Construction projects lasting longer than two years that are known to cause impacts must also incorporate mitigation measures (**Commitment #7**).

Low-cost and easily implemented construction noise control measures will be incorporated into the project plans and specifications to the extent possible. These measures include, but are not limited to, limiting construction to Monday through Friday (to the extent possible), equipment condition and exhaust muffler requirements, haul-road locations, elimination of "tail gate banging," ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication (**Commitment #8**). Overall, noise impacts due to construction are expected to be minor and to occur infrequently.

## **4.4 GEOLOGY**

Geology information for the US 412 study was obtained from the MDNR, the Natural Resources Conservation Service (NRCS), and Missouri Geological Survey. A memo presenting the results of a geotechnical literature search for the project vicinity is attached as **Appendix H**.

### **4.4.1 Surficial Geology**

The geology of the study area is characterized by the deposition of alluvium from the Holocene epoch. This alluvial layer predominantly comprises sand, clays and gravel. The large variability in thickness of the alluvial deposits indicates the dynamic nature of the geological environment. Underlying the alluvial deposits lies the Wilcox group, which primarily consists of sands.

### **4.4.2 Surface Soils**

The study area is characterized by a predominantly flat topography, with the slope ranging from 0-1 percent. Based on the NRCS Soil Survey, the predominant deposits in the area are the Dubbs Silt Loams and the Dundee-Silverdale, Loamy Sands. These deposits show a loamy texture at the surface, and transition to higher sand content with increasing depth.

### **4.4.3 Hydrogeology**

The hydrogeological characteristics of the study area are influenced by its proximity to the St. Francis River to the west and the Little River Drainage Ditch to the east. The groundwater level, as indicated by data from the MDNR GeoSTRAT website (Geosciences Technical Resource Assessment Tool), is approximately 10 feet deep or less. This suggests that the site's hydrological system is in close connection with the surrounding surface water bodies which include channelized streams and numerous irrigation ditches, potentially contributing to the overall hydrological dynamics of the area.

### **4.4.4 Seismic Hazards**

Seismic hazards introduce the risk of structure damage, landslides, settlements, and liquefaction. The project is located near the New Madrid Seismic Fault Zone, which presents a notable consideration for seismic hazards. According to the United States Geological Survey (USGS) this zone is the result of a failed rift zone deep in the subsurface of the North American Plate which likely occurred over 500 million years ago. The failed rifting left a system of faults that are reactivated by modern tectonic movement. Notably, the MDNR designates the entire region, including the project area, as having liquefaction potential. This is a phenomenon where saturated soil loses its strength during seismic event causing the otherwise solid soil to behave temporarily as a viscous liquid. The unconsolidated sandy alluvial deposits found in this area present a relatively high liquefaction risk during earthquake events.

### **4.4.5 Mines and Sink Holes**

MDNR keeps a record of sinkholes reported to the program or shown on USGS topographic maps. Per the information sourced from the MDNR GeoSTRAT website, no instances of recorded sinkholes, caves, springs, losing streams, or gaining streams have been reported in the study area. The website also showed no mines in the study area. One operation classified as an Industrial Mineral Mines location is mapped by GeoSTRAT approximately 0.5-mile south of the existing roadway in the western portion of the project near the community of Buck Donic. The operation is named Dunklin County Sand and Gravel and is

classified as a sand and/or gravel mining operation.

#### **4.4.6 Expected Geological Impacts**

The project is located in an area designated as having geological hazards due to the proximity of the New Madrid Fault Zone and the Reelfoot Rift, and the classification of the area as having liquefaction potential. This applies to all of the alternatives.

No-Build Alternative Summary: The No-Build alternative would have no impact on local geologic conditions since the current location and configuration of the roadway would be maintained.

Build Alternatives Summary: Based on the evaluation of available data, no changes to local geologic conditions are expected from construction of either Reasonable Alternative; and neither alternative requires design modifications to account for local geological conditions.

### **4.5 THREATENED AND ENDANGERED SPECIES**

The primary law related to threatened and engendered species is the Endangered Species Act of 1973 (16 U.S.C. 1531-1543) which provides for the protection of these species and the conservation of those ecosystems upon which they depend for survival. The potential presence of federal- and state-listed species in the study area was evaluated through agency consultation, literature review, and field observation.

FHWA is the lead federal agency for this study. MoDOT is the designated non-federal representative for FHWA for completing coordination for compliance with Section 7 of the federal Endangered Species Act and with the Missouri Endangered Species Act. Consultation will be completed prior to construction or before any federal funds are obligated (**Commitment #9**).

Correspondence with the U.S. Fish and Wildlife Service (USFWS) for the project was generated through the USFWS Information for Planning and Consultation (IPaC) database. The original IPaC letter was created and downloaded by the MoDOT Environmental and Historic Preservation Section dated December 23, 2023 and most recently updated December 2, 2025. The recent letters had one addition to the list of species with overlapping ranges compared to the July 12, 2024 list that was included in **Appendix G**, the fat pocketbook mussel. The fat pocketbook mussel is addressed below. In addition, the status of the Monarch was updated from Candidate to Proposed Threatened. MoDOT also provided findings based on a review of the Missouri Natural Heritage Database (MNHD) and Missouri Speleological Survey (MSS) Database which are included in the same appendix. The correspondence resulted in the identification of several species that may occur or could potentially be affected by activities in the proximity of US 412.

A written assessment that includes pictures of habitat and discusses potential project impacts on each species listed in the USFWS IPaC and MDC reviews has been prepared in a Threatened and Endangered Species Review which is attached as **Appendix G**. No surveys to evaluate presence/absence of threatened/endangered species have been conducted for the US 412 project at this time.

No-Build Alternative Summary: The No-Build Alternative involves routine maintenance which would include replacement of existing bridges at the end of their functional life. No activities under the No-Build Alternative would be expected to impact threatened or endangered species, directly or indirectly.

Build Alternatives Summary: Federal or state-listed species that may occur or could potentially be affected by activities in the proximity of US 412 include:

Gray Bat (*Myotis grisescens*), federally-listed Endangered

Indiana bat (*Myotis sodalis*), federally-listed Endangered

Northern Long-Eared Bat (*Myotis septentrionalis*), federally-listed Endangered and

Tricolored Bat (*Perimyotis subflavus*), proposed for federally-listed Endangered status:

These bats hibernate during winter months in caves and mines. Gray bats also roost in caves during the summer. The potential for subterranean roosting habitat for the federally listed bats was investigated through a search of available geological data. According to maps provided through the Missouri Geological Survey's Geosciences Technical Resource Assessment Tool (GeoSTRAT) and MSS there are no cave records within 35 miles of the study area. No subterranean bat roosting habitat is anticipated to be in the vicinity of the project, so the Reasonable Alternatives would not impact these habitats.

Gray bats may range many miles from their cave roosts when foraging, so they may be present in the project area at times. Although gray bats would not use wooded habitat for roosting, they feed primarily on flying insects over rivers and lakes that are bordered by wooded habitat. A small amount of potential foraging habitat for the gray bat is present along wooded riparian corridors in the project area. However, the quality of the foraging habitat is limited for bats because many sections of the streams and adjacent field edges are regularly maintained to eliminate woody vegetation. Some tree clearing along streams is required for both Reasonable Alternatives. A determination of "may affect, not likely to adversely affect" for the gray bat is anticipated due to the limited clearing of trees along riparian corridors within the project area.

During the summer months, Indiana bats, northern long-eared bats, and tricolored bats roost and raise young in wooded areas, often in riparian forests and upland forests near perennial streams. Indiana and northern long-eared bats roost under the bark of trees, while tricolored bats primarily roost among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures. Tricolored bats are currently proposed to be federally listed as Endangered. MoDOT will continue to coordinate with USFWS on the status of tricolored bats and, if required, additional consultation will be initiated (**Commitment #10**).

The study area contains primarily agricultural and developed land, but some trees are present that could provide summer roosting and foraging habitat for the Indiana bat, northern long-eared bat, and tricolored bat. The estimated tree acreage within the study area was calculated using aerial photography and a total of 40.8 acres of wooded habitat was documented, along with over 120 individual trees which were noted to be scattered around residences and other developed areas. In December 2024, new FHWA/USFWS Range-wide Programmatic Consultation for Indiana, Northern Long-eared, and Tricolored Bats (Programmatic Agreement, or PA) and User Guidance was released for the listed bat species. In this release most trees greater than 3" diameter are considered suitable habitat for roosting bats. Additionally, structures including culverts with an inside diameter of 3-feet or more, and length of 23 feet or greater are suitable roost locations. Any bridge within suitable habitat is also considered suitable roosting habitat even if there are no signs of bats on the bridge. This change will move determinations to either May Effect, Not Likely to Adversely Affect (NLAA) or May Effect, Likely to Adversely Affect (LAA).

Both Reasonable Alternatives would result in the removal of trees, which could affect summer roosting and foraging habitat for the Indiana, northern long-eared, and tricolored bats. Under the new guidelines, if the suitable bat summer habitat trees are 100 feet or more from the road, and removed during the inactive season, (October 16 through March 31<sup>st</sup>), the project will fall under LAA and require formal consultation with the USFWS. Mitigation is likely required for the acreage of suitable habitat removed beyond 100 feet to offset adverse effects to the bats. A negative presence/absence survey (acoustic or mist-netting) results in a “not likely to adversely affect” determination with no mitigation necessary.

The location of trees within the study area in relation to existing roads is summarized in **Table 4-7** below.

**Table 4-7. Extent of Trees Within Study Area**

Total Within Study Area	Within 100 feet of Existing Road Surface	Between 100 and 300 feet	Beyond 300 feet
40.8 acres	30.9 acres	9.9 acres	0 acres

Because both Reasonable Alternatives follow the current route of US 412 and are located close to the existing roadway, neither alternative would impact any suitable habitat trees which are located over 300 feet from an existing road. Alternative A (Four-Lane Divided) has a wider overall roadway corridor, so it would involve slightly more clearing than Alternative B (Four-Lane Undivided, Preferred Alternative). Both Reasonable Alternatives are expected to require at least a small amount of tree clearing between 100 and 300 feet from the existing roadway, so a determination of “may affect, likely to adversely affect” is anticipated for the Indiana bat, northern long-eared bat, and tricolored bat. If necessary, MoDOT will ensure any mitigation requirements to offset adverse effects to bats are completed (**Commitment #11**).

Six bridges are present within the study area. The field survey assessed the bridges on October 19, 2022 for signs of use by bats roosting under the bridge structure which include sightings of roosting bats, staining on bridge surfaces, guano, or the presence of odors associated with bats. No bats or signs of use by bats were observed. Under the new guidelines, this would lead to a small number of bats using the bridge (<5 bats) therefore work done in the inactive season, or if bats are unlikely to be disturbed/killed during the active season then an effects determination would lead to a NLAA.

According to USFWS guidance (USFWS 2022), abandoned structures (barns, uninhabited houses, etc.) may need to be assessed for bat use in a similar manner to bridge surveys. A small number of abandoned structures are scattered through the study area. No assessment of the abandoned structures has been conducted at this time.

MoDOT will commit to the PA for federally listed bats and will complete consultation with the USFWS and/or MDC before construction. To avoid negative impacts to roosting Indiana and northern long-eared bats, as well as habitat generalist tricolored bats, MoDOT will remove any trees/limbs greater than three (3) inches in diameter between October 16 and March 31 (**Commitment #12**). Tree clearing will not occur prior to the completion of consultation with USFWS and MDC (**Commitment #13**). If abandoned structures are slated to be demolished

and could provide roosting habitat for bats, these structures will be evaluated for bat use as needed before demolition (**Commitment #14**).

Alligator Snapping Turtle (*Macrochelys temminckii*), proposed for federally-listed Threatened status – This reptile occurs in a variety of aquatic habitats including swamps, marshes, sloughs, streams, ponds, lakes and reservoirs that have a mud or silt bottom, slow current, moderate aquatic vegetation and deep water. Alligator snapping turtles are almost totally aquatic except when nesting but cannot remain submerged for very long periods of time. All life stages after nestlings rely on submerged features such as undercut banks, deadhead logs, aquatic vegetation, and large rocks as important structures for resting, foraging, and cover from predators.

The Missouri resource databases indicated that the alligator snapping turtle has been found in the St. Francis River system and that there are records of alligator snapping turtles within two miles of the project area. The study area has several channelized streams, wetlands, and a pond that appear to provide suitable habitat for the alligator snapping turtle. It appears that in general the roadside ditch wetlands do not provide suitable habitat for the turtle, although a few of the larger, more persistently inundated roadside ditch wetlands may provide areas of suitable habitat. The study area overlaps a small amount of wetlands which are connected to the St. Francis River wetland complex, but project activities will not extend to these areas because the terminus for construction activities is located at Route AC approximately 0.25 mile east of the western end of the study area.

For both Reasonable Alternatives, direct stream impacts would be limited to replacements of six existing bridges over channelized streams, and the replacements are not anticipated to impact the aquatic habitat at these locations. The alignments for both Reasonable Alternatives are being designed to avoid ponds and wetlands to the extent practicable. However, both Reasonable Alternatives are expected to impact a large amount of roadside ditch wetlands and a small amount of other wetlands due to construction of new lanes and site grading. Alternative A (Four-Lane Divided) is expected to impact more acreage of Wetland 6 compared to Alternative B (Four-Lane Undivided, Preferred Alternative) due to the location of the additional lanes for Alternative A on the south side of the existing roadway at this location. However, Wetland 6 contains disturbed emergent wetland habitat within a field and thus does not appear to provide suitable habitat for the turtle. Based on the limited impacts to suitable pond and wetland habitat for the Reasonable Alternatives and the fragmented nature of these habitats, the project is not likely to jeopardize the continued existence of alligator snapping turtles, and no adverse effects are anticipated.

Rabbitsfoot Mussel (*Quadrula cylindrica cylindrica*), federally-listed Threatened – This mussel is historically associated with small- to medium-sized streams and some larger rivers. It usually occurs in shallow areas along the bank and adjacent runs and riffles with gravel and sand substrates. The study area has several channelized streams but they appear to be too small to provide suitable habitat for the rabbitsfoot mussel. Based on the lack of suitable habitat within the project footprint and the use of BMPs to protect water quality to downstream tributaries, a determination of “no effect” is anticipated for the rabbitsfoot mussel.

Fat Pocketbook Mussel (*Potamilus capax*), federally-listed Endangered – This mussel inhabits a mixture of silt, mud, and sand substrates in medium- to large-sized rivers but is restricted to backwater areas along shore, wing dams, or side channels. It generally occupies the lower Ohio River but can occur in the Mississippi River basin. The study area has several channelized

streams but they appear to be too small to provide suitable habitat for the fat pocketbook. Based on the lack of suitable habitat within the project footprint and the use of BMPs to protect water quality to downstream tributaries, a determination of “no effect” is anticipated for the fat pocketbook.

Monarch Butterfly (*Danaus plexippus*), proposed for federally-listed Threatened status – Monarch butterfly was proposed for listing as threatened in December 2024. Two Monarch butterfly populations exist in North America, east and west of the Rocky Mountains. They migrate to overwintering sites in California and the country of Mexico. Milkweed is an obligate host plant for eggs and larvae, and adult butterflies require a variety of blooming nectar sources during breeding and migration. Conversion of native and naturalized milkweed and nectar plant habitats could negatively impact Monarchs at an individual and population level.

The project location contains primarily agricultural land and developed land, with some small areas of upland forest and wooded fencerows. The majority of the developed land is frequently mowed and contains common turf species and lawn weeds. However, several areas of open field along ditches and streams are mowed infrequently and contain a mix of young saplings, shrubs, native wildflowers, and weedy plants. The project would remove a small amount of naturalized native plant areas. However, it will also involve the conversion of some agricultural land to open field habitats as new right-of-way is established. Therefore, the project is not expected to result in a large net loss to naturalized native plant communities, and the project will not jeopardize the existence of Monarch butterfly. If the project has not progressed to construction by the time Monarch Butterfly is listed as threatened, MoDOT will revisit USFWS consultation requirements when the listing becomes final. MoDOT does not anticipate additional conservation or mitigation measures (**Commitment #15**).

Bald Eagle (*Haliaeetus leucocephalus*) – The US 412 project also lies within the geographic range of nesting bald eagles in Missouri. The bald eagle was formerly listed under the Endangered Species Act but was delisted due to successful recovery efforts for the species. However, it is still protected under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act. There are records of nesting bald eagles near, but outside of the project area. The Reasonable Alternatives are not expected to have adverse effects to bald eagles.

State-Listed Species – In correspondence for the project, the MoDOT Environmental and Historic Preservation Section relayed that the following species have been recorded at or near the project area: Rock Pocketbook, River Darter, Weed Shiner, Cypress Minnow, Flat floater, Ironcolor Shiner, Swamp Rabbit, Pugnose Minnow, Texas Lilliput, Purple Lilliput, Corkwood, Water Oak, Eastern Spadefoot, and Starhead Topminnow. All of these species are listed as State Species of Conservation Concern except for the Cypress Minnow which is state-listed as Endangered (MDC 2024). One state-listed species, water oak, was observed during the site assessments in Wetland 7 located near the intersection of US 412 with State Route 108. Neither Reasonable Alternative is expected to impact Wetland 7. The Reasonable Alternatives are not expected to have adverse effects to state-listed species.

MoDOT Environmental staff also review projects for the presence of Illinois Chorus Frogs. No records of Illinois Chorus Frogs were found in the Heritage Database within the project area.

## 4.6 MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the USFWS. The USFWS has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and the USFWS encourages implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

### 4.6.1 Migratory Birds – Affected Environment

The US 412 project corridor contains six road bridges that were assessed for the presence of migratory birds within or under the bridge structure. From west to east, the six bridges have the identifiers F0956, A1400, A1399, A1207, A1206, and A1205. A field assessment for migratory birds at the bridges was conducted by a biologist on October 22, 2022. Please note that additional surveys for migratory birds on the bridges may be required to fall within the one-year construction letting project. The findings of the bridge assessment, including photographs of the bridges, are included in the Threatened and Endangered Species Review prepared for the project (**Appendix G**).

The field survey documented the presence of nesting birds under all six of the surveyed bridges. Mud nests characteristic of cliff swallows (*Petrochelidon pyrrhonota*) were observed. No cliff swallow individuals were observed during the bridge survey in late October, but this species would have migrated south at this time of the year.

Some wooded areas and individual trees are present that could provide nesting habitat for migratory birds. Based on aerial photography and the site visits, the study area contains over 40 acres of wooded habitat and over 120 individual trees. MBTA protections apply to nesting birds within the project area.

### 4.6.2 Migratory Birds – Impacts and Mitigation Measures

No-Build Alternative Summary: The No-Build Alternative involves routine maintenance which would include replacement of existing bridges at the end of their functional life. Migratory birds nest under these bridges and appropriate measures would need to be taken during construction to prevent killing birds and destruction of their eggs. No other activities under the No-Build Alternative would be expected to impact migratory birds, directly or indirectly.

Build Alternatives Summary: Both Reasonable Alternatives involve replacement of existing bridges in the study area. Migratory birds nest under these bridges and appropriate measures would need to be taken during construction to prevent killing birds and destruction of their eggs. Required tree clearing could also impact nesting habitat for migratory birds.

To comply with the MBTA, MoDOT will take appropriate measures to prevent killing birds and destruction of their eggs. These may include seasonal restrictions on the removal or destruction of nests during nesting season, generally between April 1 and July 31. If restriction dates are not feasible, the bridges will be maintained to prevent birds from nesting using methods such as exclusionary devices or nest removal prior to egg laying. In some cases, MoDOT has obtained depredation permits from the USFWS with the help of the U.S. Department of Agriculture/Animal and Plant Health Inspection Service for removal of nests that contain eggs from bridges under construction. This permit would be used as a “last resort” where methods to prevent nesting have been unsuccessful. Migratory bird protection

measures will be specified in a Migratory Bird Job Special Provision. MoDOT will ensure that the contractor abides by this provision (**Commitment #16**).

#### **4.7 DEMOGRAPHICS**

Demographics are statistical, quantitative data relating to a population and/or subgroups within it. This subsection summarizes the demographic data for Dunklin County and presents census data for the census tracts in the US 412 study area.

##### **4.7.1 Demographics in Dunklin County**

Dunklin County ranks 40<sup>th</sup> among the 114 counties of Missouri in total population as reported in the 2020 U.S. Census, with a total population of 28,283. The population of Dunklin County in the 2010 U.S. Census was 31,953, an 11.5 percent decrease in population from 2010 to 2020. Communities in the vicinity of the study area include Kennett, Senath, Cardwell, and Arbyrd, Missouri. Between 2010 and 2020, the population for these communities changed as follows:

- Kennett decreased from 10,929 to 10,485 (4.1 percent decrease)
- Senath decreased from 1,767 to 1,587 (10.2 percent decrease)
- Cardwell decreased from 713 to 562 (21.2 percent decrease)
- Arbyrd decreased from 509 to 407 (20.0 percent decrease)

U.S. Census estimates for 2018-2022 indicate that the average household size in Dunklin County was 2.46 persons. The estimated median age for Dunklin County was 39.4 years and approximately 19.2 percent of the population was 65 years of age or older. The racial makeup of the county was 78.1 percent White (not Hispanic or Latino), 11.0 percent Black or African American, 0.6 percent Native American, 0.9 percent Asian, and 2.4 percent from two or more races. Hispanic or Latino made up 7.8 percent of the population.

The median income for a household in Dunklin County was \$44,868.00 compared to a median household income of \$65,920 for the state of Missouri. Dunklin County's per capita income (total income per resident) was \$26,123 compared to per capita income of \$36,754 for the state of Missouri. The percent of people in poverty was 25.9 percent compared to a Missouri statewide average of 13.2 percent. Of the people living in poverty in Dunklin County, 22.5 percent were under the age of 18 and 11.6 percent were 65 or older. Census data for Dunklin County and the state of Missouri are attached in **Appendix I**.

##### **4.7.2 Demographics in the Study Area**

**Exhibit 5** in **Appendix A** shows the Census Tracts associated with the US 412 study area from the 2020 Census. Employment data was obtained from the 2022 American Community Survey (ACS 5-Year Estimates Data Profiles, 2022), which produces population, demographic, and housing unit estimates. The Census Bureau's Population Estimates Program develops and disseminates the official estimates of the population for the nation, states, counties, cities, and towns. The demographics for the US 412 study area are summarized in **Table 4-8**.

**Table 4-8. Demographic Data – Census Tracts**

Tract	Total Population	Population 16 Years and Older	Percent Employed
29-069-3605.00	2,936	2,188	42
29-069-3607.00	3,576	2,717	53
29-069-3608.00	2,082	1,597	44
29-069-3609.00	1,666	1,302	52
29-069-3610.00	1,625	1,400	55

Census tract numbers are preceded by the state code (Missouri – 29) and county code (Dunklin – 069).

During stakeholder interviews regarding the US 412 project, one local official noted that the closure of Twin Rivers Regional Medical Center in Kennett in 2018 caused a reduction of middle-class employment in the area. Nearly 200 well-paying jobs at the hospital were lost, and this also caused a negative ripple effect for local schools, other public functions, and the proportion of elderly, young, and poor within the resident population.

Title VI of the Civil Rights Act of 1964 is a Federal law that prohibits discrimination on the basis of race, color, and national origin in Federally assisted programs and activities. As part of Title VI compliance, demographic data was analyzed for the project area. The analysis for race used American Community Survey (ACS) data for 2017-2021. The analysis for Limited English Proficiency (LEP) Persons used 2015 data from the U.S. Census . The demographic data are presented in **Table 4-9**.

**Table 4-9. Title VI Population Data**

Location	Total Population:	*Minority	**LEP Persons
<b>Missouri:</b>	6,196,156	23%	4.2%
<b>Dunklin County:</b>	28,592	22%	2.9%
<b>City of Kennett:</b>	10,457	25%	2.4%
<b>City of Senath:</b>	1,559	39%	14.1%
<b>City of Cardwell:</b>	668	11%	10.7%
<b>City of Arbyrd:</b>	337	20%	4.9%
Census Tract 29-069-3605.00, Block Group 3	760	42%	1.1%
Census Tract 29-069-3607.00, Block Group 1	1,164	10%	0.6%
Census Tract 29-069-3608.00, Block Group 1	848	32%	15.0%
Census Tract 29-069-3608.00, Block Group 2	1,134	42%	15.0%
Census Tract 29-069-3609.00, Block Group 1	649	11%	0.9%
Census Tract 29-069-3609.00, Block Group 2	581	3%	0.9%
Census Tract 29-069-3610.00, Block Group 1	518	19%	2.1%
Census Tract 29-069-3610.00, Block Group 2	754	11%	2.1%
Census Tract 29-069-3610.00, Block Group 3	449	20%	2.1%
Census Tract 05-055-4801.00, Block Group 3	462	5%	0.2%
Census Tract 05-055-4806.02, Block Group 1	2,924	14%	0%
<b>Study Area</b> <i>(Project limits + 1-mile radius)</i>	3,550	27%	N/A

\* The percent of individuals who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial.

\*\*Limited English Proficiency (LEP) Persons – The percentage of all individuals over 5 years of age who speak a language other than English and speak English less than "very well."

The public involvement process documented in **Section 5** also sought local knowledge of Title VI communities in the vicinity of the project. Input was sought from local elected officials, schools, churches, an assisted independent living service, and the owner of a hotel which serves many migrant workers. Interview questions included inquiries about sensitive locations or resources and LEP individuals or groups.

Seasonal migrant agricultural workers are not necessarily captured by census data and there is a potential for additional minority populations to be seasonally located along the US 412 project corridor. During the stakeholder interviews, one Dunklin County elected official relayed that Senath has a high Hispanic (Latino) and South African population. A second local official for Dunklin County relayed that the area has a significant amount of seasonal Hispanic workers, especially in Senath. The interviewees mentioned one specific location where many migrants reside, the 84 West Hotel which is on the western side of Kennett and lies outside the one-mile buffer for the project. Other stakeholders noted that many migrant workers ride old school buses to work and home every day, and that school buses struggle with safety and having sufficient room to maneuver on US 412.

The public involvement process reached out to migrant workers and to people who provide housing and services for migrant workers through advertised public meetings and other communications which are described in **Section 5**. The promotional materials included offers to provide accommodations for public participation that included translation services, but no community members requested or used the translation services. No responses were received from these groups.

Under the No-Build Alternative, current demographic trends related to social and socioeconomic factors would be expected to continue. The improvement of US 412 under the Reasonable Alternatives would address several concerns of residents such as reducing travel time to health services in Paragould, Arkansas and improving work commutes, enhancing the appeal of these towns as places to live and work and potentially increasing population.

#### **4.8 EXISTING AND FUTURE LAND USE**

Land use and zoning patterns influence transportation systems, and vice versa. Roads, trails, and transit systems provide vital transportation services to homes, businesses, schools, and other developed lands. In turn, developed land creates transportation demand that requires transportation service.

Land use includes undeveloped land as well as land that has been developed into uses such as commercial, residential, agricultural, institutional, and park land. Organizations with authority over the land can create land use plans for future land use types, locations, and densities. This section describes the existing and future land uses within the US 412 study area.

##### **4.8.1 Existing Land Use**

The overall study area totals 897 acres and land use within this boundary can be characterized in different ways. One way to depict land use is the Multi-Resolution Land Characteristics Consortium (MRLC) National Land Cover Database (NLCD). This data set provides nationwide land cover data which is generated and coordinated through a group of cooperating federal agencies. The main land types mapped within the study area are depicted in **Exhibit 6** within **Appendix A**.

**Table 4-10** presents the approximate amounts of each land use in the NLCD mapping for the study area. This analysis used all squares of the 30-meter-square NLCD grid that had a majority of the area overlapped by the study area. The total acreage of NLCD grid squares that had a majority of the area overlapped by the study area is 892.6 acres.

**Table 4-10. NLCD-Mapped Land Use within the Study Area**

<b>Mapped Land Use</b>	<b>Amount Within Study Area (Acres*)</b>	<b>Amount Within Study Area (Percent)</b>
Water (NLCD 11)	3.6	0.4%
Developed (NLCD 21–24)	429.8	48.2%
Forest (NLCD 41-43)	**	**
Shrubland (NLCD 51-52)	**	**
Herbaceous (NLCD 71-74)	1.6	0.2%
Agriculture (NLCD 82)	444.9	50.0%
Wetlands (NLCD 90)	10.0	1.12%
Unspecified	2.7	0.3%
<b>Totals</b>	<b>892.6</b>	<b>100.0%</b>

\*Acreage based on the sum of acreage of squares in the NLCD grid that had a majority of the square overlapped by the alternative outline

\*\*Indicates a small amount of habitat is present in the alternative footprint but is not observable at the scale of the 30-meter square NLCD grid

A second land use analysis method is zoned land use designations. Dunklin County does not have its own zoning, although the city of Kennett has a zoning map that covers its jurisdiction. The Dunklin County Assessor map parcel dataset has land classifications for each parcel and this data is summarized in **Table 4-11** and on **Exhibit 7** in **Appendix A**.

**Table 4-11. US 412 Land Use Summary (Dunklin County Tax Parcel Data)**

<b>Land Classification</b>	<b>Amount Within Study Area (Acres)</b>	<b>Amount Within Study Area (Percent)</b>
Residential	36.8	4.1%
Agriculture	397.1	44.3%
Commercial	12.2	1.4%
Institutional	2.3	0.3%
Mixed	59.5	6.6%
No Classification	12.9	1.4%
<b>Total for Zoned Parcels</b>	<b>520.8</b>	<b>58.1%</b>
Existing Public Land and Right-of-Way	376.2	41.9%
<b>Total Footprint Area</b>	<b>897.0</b>	<b>100.0%</b>

Within the study area, the predominant zoned land use is Agricultural, and a large proportion of the area consists of existing public right-of-way. The agricultural parcels are typically large and contain both farmland and structures such as barns and silos. Residential parcels are typically smaller and contain predominantly single-family homes. Commercial parcels are commonly small- to medium-sized and located near road intersections. A few parcels were classified as Mixed because the parcel data included more than one land classification, such as both Agricultural and Commercial.

**Exhibit 7** in **Appendix A** depicts parcels adjacent to the study area and labels several structures to provide additional context. Many institutions, such as schools and churches, are present in Kennett, Senath, Cardwell, and nearby towns; but businesses and institutions located farther than 275 feet from the US 412 centerline were not labeled on the exhibit. Land uses within or adjacent to the study area include:

- Three churches that include Johnsons Chapel, Trinity Community Church, and The Bridge Kennett.
- No schools are present within or adjacent to the study area, although several schools providing grade K-12 and college level education are present in the adjacent towns.
- One health care facility, Senath Nursing and Rehabilitation Center, has a parcel overlapped by the study area east of Senath.
- One government facility, the South Dunklin Research Farm, has a parcel overlapped by the study area to the northeast of Senath.
- No parks or public recreation areas are located adjacent to the Reasonable Alternatives, although several parks are present in the adjacent towns. Some protected land with government ownership is also present along the St. Francis River beyond the western terminus of the project. One parcel is part of the St. Francis

Sunken Lands Wildlife Management Area and is managed as a State Conservation Area by a state fish and wildlife agency. The other three parcels are enrolled in the Wetland Reserve Program (WRP) with conservation easements and are managed by the NRCS.

- Several commercial establishments have parcels overlapped by the study area. These establishments provide important local tax revenue and employment. Some establishments also generate some traffic through customers coming and going. Three gas stations (Mr. T's, Quick Stop, and a new Huck's gas station), three retail stores (Emerald's Triangle, Mr. T's Liquor and Smoke Shop, and Dollar General), and one commercial storage facility (Midway Mini Storage) are located near the southwestern end of the study area.

Commercial properties overlapped by the study area near Senath include T3 Trucking and the former Campus Corner restaurant (now closed). The owner of T3 Trucking approached MoDOT representatives during the public involvement process to note the large number of trucks entering and departing from this facility, and the need for safer intersections.

Northwest of Senath up to the outskirts of Kennett, several commercial properties are overlapped by the study area, and these are primarily agricultural support businesses. They include Delta Hemp Company, D & C Auto Sales, Mid-Valley Irrigation, Kennett Irrigation, Octa Gin, Ark Mo Well Drilling, and Graves Kennett Gin.

- Several residences have parcels overlapped by the study area and are scattered through the project corridor with some clustered near Cardwell, Senath, and Kennett.
- One cell phone tower is located south of Cardwell, in the southwest quadrant of the intersection of US 412 with Route F/164. A second cell phone tower is located outside but adjacent to the study area in the northwest quadrant of the intersection of Route 164 and County Road 619.
- An Aviation Landing Strip is depicted on the USGS topographic map as a dashed-line rectangle on the west side of US 412, north of Route P on the east side of Senath (**Exhibit 1 in Appendix A**). A grassed strip is present at this location, which lies in Tracts 180 and 182. During the public involvement phase, it was mentioned that one person flies planes out of this location for crop dusting, but the facility is not certified for public use.

#### **4.8.2 Future Land Use Planning**

The US 412 project is in a rural area with relatively low population, and formal land use planning for this area is limited. The Bootheel Regional Planning and Economic Development Commission, which promotes development in Dunklin, Mississippi, New Madrid, Pemiscot, Scott and Stoddard Counties, has prepared a 2019 Comprehensive Economic Development Strategy Report. This report cites infrastructure improvement as a target outcome related to one of their key goals of Agricultural Sustainability. This portion of US 412 is part of the Bootheel Regional Planning Commission's priority corridors and MoDOT's long range transportation plan.

### 4.8.3 Property Acquisition / Displacements and Other Land Use Impacts

The study area encompasses a total of 897 acres, although the Reasonable Alternatives would convert only a portion of this land to construct the project. Structures within the study area are depicted on **Exhibit 7**.

The proposed route for Alternative A (Four-Lane Divided) is depicted on **Exhibit 2 in Appendix A**, and the proposed route for Alternative B (Four-Lane Undivided, Preferred Alternative) is depicted on **Exhibit 3 in Appendix A**. Proposed right-of-way acquisitions for these alternatives have not been finalized. However, based on typical roadway dimensions and design guidelines for Alternative A, this alternative would require approximately 600 acres of land (including 345 acres of existing road and right-of-way and 254 acres of additional land to be acquired). Based on typical roadway dimensions and design guidelines for Alternative B, this alternative would require approximately 500 acres of land (including 340 acres of existing road and right-of-way and 147 acres of additional land to be acquired). Estimated right-of-way acquisition for both alternatives is presented in **Table 4-12**.

**Table 4-12. US 412 Estimated Right-of-Way Acquisition (Reasonable Alternatives)**

Land Classification	Alternative A (Four-Lane Divided) (acres)	Alternative B (Four-Lane Undivided, Preferred Alternative) (acres)
Residential	25.1	14.7
Agriculture	226.8	131.8
Commercial	2.2	0.8
<b>Total Expected Acquisition</b>	<b>254.1</b>	<b>147.3</b>

The number of building acquisitions, displacements, and partial takes has been estimated for the project based on typical dimensions for the Reasonable Alternatives but may change as designs are finalized. Initial estimates for the required building acquisitions for both alternatives are presented in **Table 4-13**.

**Table 4-13. US 412 Estimated Building Acquisition (Reasonable Alternatives)**

Type of Building	Alternative A (Four-Lane Divided) (number)	Alternative B (Four-Lane Undivided, Preferred Alternative) (number)
Residential	7	4
Outbuildings	5	2
Commercial	3	2
Cell Tower	1	1
<b>Total Expected Acquisition</b>	<b>16</b>	<b>9</b>

Initial estimates for the required full displacements and partial takes for each Reasonable Alternative are presented in **Table 4-14**. Please note that Alternative A would widen on one side of the road while Alternative B would widen on both sides of the road, so Alternative B would impact more parcels despite its narrower footprint.

**Table 4-14. US 412 Estimated Full Displacements and Partial Takes (Reasonable Alternatives)**

Type of Take	Alternative A (Four-Lane Divided) (each)	Alternative B (Four-Lane Undivided, Preferred Alternative) (each)
Full Displacements	7	4
Partial Takes	87	140

As project development progresses, a premium would be placed on minimizing right-of-way acquisitions and displacements. It is expected that some displacements may be avoided by revisions during the final design process. Techniques that may assist this effort include modified roadway drainage ditch widths to reduce the roadway footprint.

MoDOT will ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964) and the Americans with Disabilities Act. In accordance with the Uniform Relocation Act and the state of Missouri’s relocation programs, fair market compensation will be provided to property owners who are affected by this project (**Commitment #17**).

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration and thus would not require any right-of-way or property acquisition. It would also have no impact on terrestrial habitats because it would not involve any changes to land use.

Build Alternatives Summary: The Reasonable Alternatives are expected to have the following impacts:

- Neither Reasonable Alternative involves any displacements of churches, health care facilities, or government facilities although both would involve land acquisitions along the edge of the parcels. Alternative A would involve a partial take to the government research farm.
- Both alternatives would require relocating the cell phone tower near Cardwell.
- Both Reasonable Alternatives approach or overlap the edge of several commercial properties. Both Reasonable Alternatives are expected to require proximity damages and a few building takes on commercial properties.
- Both Reasonable Alternatives approach or overlap the edge of several residential properties. Both Reasonable Alternatives are expected to require proximity damages and some building takes on residential properties. Due to the wider dimensions of

Alternative A, it would require more residential proximity damages and displacements compared to Alternative B.

- Due to the intensive agricultural use of land along the US 412 area, impacts to natural habitats (habitats other than Agriculture and Developed classifications) are minimal for both alternatives.

#### **4.8.4 Travel Pattern and Operational Impacts**

The No-Build Alternative would leave all physical infrastructure facilities in the same configuration as currently exist. Interactions between commuters/commercial vehicles and slower moving agricultural vehicles will continue to result in delays and subsequent increases in travel times. Fourteen side road intersections which intersect US 412 at approximately 45 degrees would not be reconstructed and would continue to present less than favorable conditions for vehicles wishing to enter or exit. These sharp intersection angles will also continue to result in agricultural vehicles slowing down to very low operational speeds to navigate these intersections which also exacerbates the delays experienced by commuter and commercial vehicles.

Improvement of US 412 by adding additional lanes would affect travel patterns and operational aspects of traffic flow. Addition of lanes and reconfiguration of side road intersections would result in these operations impacts:

- Alternative A (Four-Lane Divided) would improve overall traffic operations by providing an additional lane in each travel direction for commuter and commercial vehicles to navigate around and past slower moving agricultural vehicles. Fourteen side road intersections would be reconstructed to intersect US 412 at standard angles which would result in improved flow on and off the roadway. This alternative would introduce median crossovers at selected intersections. This would result in some county road intersections functioning as “right in, right out only” and vehicles losing their current ability to make left turns. This condition would also require more complicated movements for agricultural vehicles wishing to travel from one side of US 412 to the other.
- Alternative B (Four-Lane Undivided, Preferred Alternative) would improve overall traffic operations by providing an additional lane in each travel direction for commuter and commercial vehicles to navigate around and past slower moving agricultural vehicles. Fourteen side road intersections would be reconstructed to intersect US 412 at standard angles which would result in improved flow on and off the roadway. Vehicles wishing to cross from one side of US 412 to the other would essentially operate as they do now.

#### **4.9 FLOODPLAINS**

**Exhibit 8** in **Appendix A** shows the Federal Emergency Management Agency (FEMA) 100-year floodplain and 500-year floodplain for the US 412 study area. The effective information for the study area is included in several FEMA Flood Insurance Rate Maps (FIRMs) and from southwest to northeast these include 290122155B, 290122160B, 290122120B, 290122150B, and 290122130B, all of which are dated April 3, 1989. Additional FIRM maps depict land within the corporate boundaries of Arbyd (2901230001A, dated June 3, 1988), Cardwell (2901250001B, dated March 1, 1979), and Senath (290131B, dated December 5, 1975 and converted by letter on July 1, 1987).

Mapped floodplain areas are dispersed in the vicinity of the US 412 study area and are typically linear features that are oriented roughly perpendicular to the roadway. The existing roadway, and therefore the No-Build Alternative, Alternative A (Four-Lane Divided), and Alternative B (Four-Lane Undivided, Preferred Alternative) overlap the FEMA floodplain at several locations including the St. Francis River, Red Devil Ditch (also called Mud Slough Ditch), an unnamed tributary to Little Slough Ditch, an unnamed drainage east of Cardwell, Kinnemore Slough, Honey Cypress Ditch, Pole Cat Slough including some outskirts of Senath, and Ragalin Slough (also called Ragland Slough). The majority of the floodplain is mapped as Zone A (100-Year Flood) with small amounts of other flood zones such as Zone B in the towns. The remaining land within the vicinity of the project is mapped as Zone X (500-Year Flood). None of these areas are mapped as a FEMA floodway.

The alignment of US 412 requires stream crossings at Red Devil Ditch, Kinnemore Slough, Honey Cypress Ditch, Pole Cat Slough (two crossings), and Ragalin Slough. Mayor Joe Lane, the mayor of Senath and floodplain coordinator for the Senath region of Dunklin County, confirmed that no floodplain development permits would be needed from local jurisdictions in the study area.

Dunklin County participates in the National Flood Insurance Program which is administered by FEMA. This program aims to reduce flood damage by restricting development in floodplains. All the stream crossings in the project occur in Special Flood Hazard Area A and are subject to floodplain development permits as administered by the Missouri State Emergency Management Agency (SEMA). MoDOT will obtain floodplain development permit(s) from SEMA prior to FHWA authorization for construction within the 100-year floodplain (**Commitment #18**). MoDOT will conduct an engineering analysis at the floodplain crossings prior to submission of the floodplain development permit application(s) to SEMA (**Commitment #19**). MoDOT will ensure modifications to the functions of the natural floodplain environment are avoided or are maintained as closely as practicable in its natural state (**Commitment #20**).

FEMA does not have digital information available for any portion of the study area and no flood modeling has been performed. For this reason, a base flood elevation has not been established for any part of the study area. Information related to past flooding events collected by MoDOT indicates high water elevations have never threatened inundation of any of the existing stream crossing bridges. For each crossing, one foot of freeboard is required per MoDOT's EPG Section 748.3.5.3. This requirement has not been compromised during the life of all existing bridges.

Hydraulic studies will be completed during the design phase of project development to establish structure size, height above design flood level and waterway opening for all stream crossings. At each crossing, bridges and culverts will be designed to provide sufficient waterway openings to ensure upstream flood levels do not increase more than one foot (**Commitment #21**). MoDOT shall also follow the FHWA policies and procedures for the location and hydraulic design of highway encroachments on floodplains (23 CFR 650A) (**Commitment #22**).

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration thus would not involve changes to the topography of land within the 100-year floodplain. Existing bridges in the study area are currently over 50 years old and would be replaced at the end of their functional life as part of routine maintenance. The new bridges would be designed according to current engineering guidelines and would be expected to maintain or reduce the volume of material within the floodplain.

Build Alternatives Summary: The Reasonable Alternative alignments are largely identical at the crossings, with the proposed roadway lanes for Alternative A (Four-Lane Divided) and Alternative B (Four-Lane Undivided, Preferred Alternative) located in close proximity to each other. Both Reasonable Alternatives would involve an increase in the amount of paved roadway along the length of the study area. Through the majority of the project length, Alternative A would add two additional lanes to the existing roadway and Alternative B would add three additional lanes (two through lanes and one center turning lane). The new lanes would require the addition of fill over the existing topography so that the new lanes would lie at the same elevation as the existing roadway. Thus, both Reasonable Alternatives would involve additions of fill within the 100-year floodplain.

Both alternatives would involve replacements of existing bridges and culverts, and the new structures would be wider than the existing structures to provide additional road lanes and wider lanes. Alternative A would use crossings with two bridges a short distance apart with two lanes each, while Alternative B would use crossings with one wider bridge with four lanes and a median. The bridges are designed to have the bridge deck higher than projected 100-year flood levels. Due to the very flat topography of the study area, during flood events water can spread out across a wide area so the water level of the floodwaters would rise very slowly once the streams escaped their banks. The replacement bridges are not expected to change flow patterns of water moving in the 100-year floodplain during either base or flood conditions. It was concluded that the Reasonable Alternatives would not be expected to result in incompatible floodplain development.

#### **4.9.1 Floodplain Technical Memorandum**

Executive Order 11988 requires each Federal agency to reduce flood losses, to avoid actions located in or adversely affecting floodplains unless there is no practicable alternative, and to take action to mitigate losses if avoidance is not practicable. Subpart A of 23 CFR 650 (Location and Hydraulic Design of Encroachments on Flood Plains) on the FHWA engineering standards also establishes standards to minimize impacts to floodplains. A Floodplain Technical Memo has been prepared to discuss the issues listed in 23 CFR 650 and is attached as **Appendix J**. Based on the analysis in the floodplain technical memo, it has been determined that there is no practicable alternative to the proposed construction in floodplains and that the proposed action includes all practicable measures to minimize harm impacts to floodplains which may result from such use.

#### **4.10 FEMA BUYOUT PROPERTIES**

The Flood Disaster Protection Act of 1973, as amended by the Disaster Relief and Emergency Assistance Act of 1988 (The Stafford Act), allowed the use of disaster relief funds for the Hazard Mitigation Grant Program (HMGP). This program and the subsequent Volkmer Bill allow the use of disaster relief funds to “buyout” flood damaged property, which had been affected by the Great Flood of 1993. FEMA buyout properties have several restrictions including that the sites shall stay in public ownership and shall be used for open space purposes. No structures or improvements may be erected on these properties unless they are open on all sides.

There are no FEMA buyout properties within the study area. One property owned by the City of Senath east of Pole Cat Slough (Tract 193 on **Exhibit 7**) is overlapped by 100-year floodplain; however, Mayor Joe Lane, the mayor of Senath and city floodplain administrator, confirmed that this is not a FEMA buyout property. Mr. Lane stated that there have not been

any FEMA flood buyouts of properties in or around Senath.

**4.11 SECTION 404 RESOURCES – WATERS AND WETLANDS**

Section 404 of the Clean Water Act authorizes U.S. Army Corps of Engineers (USACE) to regulate discharge of dredged or fill material in all waters of the United States, including jurisdictional wetlands. Streams, wetlands, and a pond in the study area are depicted on **Exhibit 8** in **Appendix A** and are discussed further in a Water and Wetland Delineation Report which is included in **Appendix K**. The water and wetland delineation has not been reviewed by the USACE, which is the regulating authority of Section 404 of the CWA and must make the final decision with regards to the extent and jurisdictional status of any water/wetland features on the site.

**4.11.1 Streams and Watersheds – Affected Environment**

The US 412 project corridor crosses several watersheds within Dunklin County that generally drain in a southwest direction. From west to east, these watersheds are listed in **Table 4-15**. The western quarter of the study area, extending from the western terminus to a location roughly between Cardwell and Arbyrd, drains to the Lower St. Francis River 8-digit watershed (HUC 0802-0203) The majority of the study area drains to the Little River Ditches 8-digit watershed (HUC Code 0802-0204).

**Table 4-15. List of Watersheds and Named Streams in Study Area**

<b>Watershed Name</b>	<b>HUC (Hydrologic Unit Code)</b>	<b>USGS Named Streams Included in Study Area</b>
Indian Hill Island-St. Francis River	0802-0203-0608	--
Little Slough Ditch	0802-0203-0802	--
Cockle Burr Slough Ditch	0802-0203-0801	Mud Slough Ditch, Kinnemore Slough
Honey Cypress Ditch Number 2-Buffero Creek Ditch	0802-0204-0803	Honey Cypress Ditch
Varney River	0802-0203-0604	--
Headwaters Buffalo Creek Ditch	0802-0204-0802	Pole Cat Slough*, Ragland Slough*

\*Indicates streams listed on the 303(d) Impaired Waters List for Missouri

Of these watersheds, Pole Cat Slough and Ragland Slough are identified on the 303(d) Impaired Waters list. Ragland Slough drains into Pole Cat Slough northwest of Senath, and in the 303(d) mapping it is treated as an upstream reach of Pole Cat Slough. Pole Cat Slough has designated beneficial uses of boating, fishing, irrigation, livestock/wildlife watering, swimming, protection of aquatic life, and fish consumption. Pole Cat Slough is listed as impaired for protection of aquatic life and fish consumption uses, and impaired parameters that have been identified include dissolved oxygen and temperature. The probable sources identified as contributing to impairment for the 2020 listing were limited to dissolved oxygen. The proposed project would not impact dissolved oxygen levels.

Pole Cat Slough drains into Buffalo Ditch, which is also listed on the state 303(d) list as impaired for protection of aquatic life and fish consumption uses. Buffalo Ditch has an identified impaired parameter of dissolved oxygen. No restoration plans or Total Maximum Daily Loads (TMDLs) have been developed for Pole Cat Slough or Buffalo Ditch at this time.

Of the streams within or adjacent to the study area, the St. Francis River is designated as a Traditional Navigable Water. The reach of the St. Francis River just west of the project is listed as a Regional Condition stream by the USACE under Regional Condition #2 (Seasonal Restrictions for Activities Proposed in Spawning Areas). The St. Francis River is also listed under Regional Condition #4 (Priority Watersheds).

Perennial streams in the corridor include Mud Slough Ditch (sometimes called Red Devil Ditch), Kinnemore Slough, Honey Cypress Ditch, and Pole Cat Slough. Intermittent streams include Ragland Slough (sometimes called Ragalin Slough), an unnamed tributary to Little Slough Ditch, and an unnamed tributary to Honey Cypress Ditch. The perennial and intermittent streams are similar to each other, with straightened, channelized profiles. The banks of the streams are regularly trimmed so woody vegetation and shading of the streams are minimal. One ephemeral stream which drains to Honey Cypress Ditch was also documented.

#### **4.11.2 Wetlands and Open Waters – Affected Environment**

The Federal Register (1982) defines wetlands as “Those areas inundated or saturated by surface or groundwater at a frequency and duration to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil condition.” Recognizing the variety of beneficial wetland functions, Executive Order (EO) 11990—Wetlands Protection mandates consideration of wetland impacts, as does Missouri’s EO 96-03. EO 11990 mandates a no-net-loss-of-national-wetlands policy.

Within the 897-acre study area, the delineation documented 92 roadside ditch wetlands totaling 18.38 acres and nine other wetlands totaling 2.46 acres. The National Wetland Inventory map depicted no features within the study area except for riverine features along the streams, a lake east of Senath that appears to be an error, and a small overlap of a large Palustrine Forested (PFO) wetland along the St. Francis River at the western terminus of the project. Two wetlands were documented at this location by the St. Francis River during the delineation. The delineation also documented one open water pond, of which 0.60 acre is overlapped by the study area.

#### **4.11.3 Section 404 Resources – Water and Wetland Impacts**

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration and thus would not involve any impacts to waters and wetlands. Existing bridges in the study area are currently over 50 years old and would be replaced at the end of their functional life as part of routine maintenance. The new bridges would be designed according to current engineering guidelines and would be expected to involve some minor temporary and/or permanent impacts to the streams crossing the study area in order to construct the new bridges. No impacts to water quality are expected from the No-Build Alternative.

Build Alternatives Summary: For both Reasonable Alternatives, direct stream impacts would be limited to replacements of existing bridges over Mud Slough Ditch, Kinnemore Slough, Honey Cypress Ditch, Pole Cat Slough (downstream bridge), Pole Cat Slough (upstream

bridge), and Ragland Slough. The new structures would be wider than the existing structures to provide additional road lanes and wider lanes. Alternative A (Four-Lane Divided) would use crossings with two bridges a short distance apart with two lanes each, while Alternative B (Four-Lane Undivided, Preferred Alternative) would use crossings with one wider bridge with four lanes and a median. The bridges are expected to span the stream channels without placing fill within the Ordinary High Water Mark of the stream other than the bridge support piers. Because the new bridges will be wider than the existing bridges, additional support piers are expected to be required for the new bridges compared to the existing conditions. In addition, three intermittent streams (Ragland Slough and two unnamed streams) currently flow through culverts which would need to be extended to accommodate the wider bridges.

The placement of additional piers within the Ordinary High Water Mark and the extension of culverts would be considered impacts to jurisdictional streams that would require authorization from the USACE under either a Nationwide Permit (NWP) 14 for Linear Transportation Projects, or an Individual Permit. If the roadside ditch wetlands, other wetlands, and pond within the study area are determined to be jurisdictional by the USACE, impacts to these features would also require authorization from the USACE. NWP 14 can authorize projects with impacts of up to 0.5 acre of non-tidal waters and wetlands, and it requires a Pre-Construction Notification for projects with greater than 0.1 acre of discharges into wetlands and other special aquatic sites. These acreage thresholds can be applied individually to separate crossings in some cases. The study area does not contain Regional Condition streams that would trigger a requirement for an Individual Permit.

Section 401 of the CWA requires consultation and Water Quality Certification (WQC) with the state through the MDNR. State legislation has removed MDNR's authority to condition NWPs for MoDOT highway and bridge projects. In general, all activities that require individual permits and most requiring general permits will subsequently require WQCs. However, MoDOT operates under a Memorandum of Understanding with MDNR, and under the terms of this agreement MoDOT is not required to obtain a WQC unless a project requires an Individual Permit.

MoDOT shall ensure that for impacts to streams or wetlands that would occur with this project, the appropriate Section 404 permit and/or Section 401 certification would be acquired prior to construction. MoDOT will fulfill any compensatory mitigation requirements through an approved mitigation bank, or other USACE-approved method. **(Commitment #23).**

Both Reasonable Alternatives would involve some limited impacts to wetlands that lie within the footprint of the new roadway and right-of-way. Proposed right-of-way acquisitions and grading plans, which would affect the amount of wetland impacts, have not been finalized. However, based on the wider corridor of Alternative A (Four-Lane Divided), Alternative A is expected to impact more wetlands than Alternative B (Four-Lane Undivided, Preferred Alternative).

Water quality impacts for both Reasonable Alternatives could include increased sediment discharge to stormwater due to the exposure of disturbed soils to rainfall and stormwater runoff. To minimize this occurrence, the project activities would comply with the general state operating permit (MO-0137910) issued by the Missouri Department of Natural Resources.

#### **4.11.4 Only Practicable Alternative Finding**

Executive Order 11990 requires each Federal agency to avoid undertaking or providing assistance for new construction located in wetlands unless (1) there is no practicable alternative to such construction, and (2) the proposed action includes all practicable measures to minimize harm to wetlands which may result. Wetland areas are dispersed in the vicinity of the US 412 roadway corridor as well as in many locations in the nearby landscape. To achieve the Purpose and Need of the project, work activities such as the addition of new lanes, widening of the roadway, extension of culverts, and ditch reconstruction would need to be conducted beyond the existing footprint of the roadway. Due to the presence of dispersed wetlands around the project area and the need to perform construction beyond the existing footprint, there is no practicable alternative to impacting wetlands. The project would be constructed in accordance with current policies and standards of the MoDOT and FHWA in order to provide a safe, efficient, and convenient transportation facility at the lowest cost for public use. The Reasonable Alternatives include design adjustments to avoid wetlands where feasible, and indirect impacts to wetlands would be minimized through the use of appropriate erosion and sediment control BMPs.

Based upon the above considerations, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.

#### **4.12 USACE SECTION 408 PROGRAM**

The USACE Section 408 Program provides permission for people, towns, or businesses to alter or impact USACE projects such as dams, levees, or waterways. The program requires that before any changes can be made, the USACE must review alterations to ensure they won't harm the project or the public.

One levee developed by the USACE for flood control is present within the study area. According to the National Levee Database maintained by the USACE, levee system structures (raised earthworks) are present along both sides of the St. Francis River located at the western terminus of the project. An unpaved road (Levee Road) runs along the top of the levee and connects to a four-lane section of US 412 on the north side. On the south side of US 412, Levee Road connects to an auxiliary road that connects to US 412 via Route AC. This auxiliary road also provides access to US 412 for Mr. T's Riverside and a utility building adjacent to the river. The section of US 412 that includes the bridge, levee crossing, and access to Levee Road via the auxiliary road has been previously upgraded to a four-lane road. The four-lane road section extends approximately 0.15 mile east of Route AC. Therefore, although the levee is located within the study area, the project will not involve alterations or impacts to this structure.

In addition, the project team made an inquiry to Ms. Tanya Wells, Inspection Manager and 408 Coordinator of the USACE, in April 2024 regarding whether any of the streams crossed by the project were classified as Section 408 waters. Ms. Wells confirmed that none of these locations was a federal ditch and that no Section 408 coordination permission would be required to impact these features. Therefore, the Reasonable Alternatives will not impact any Section 408 features and no coordination with the USACE through the Section 408 program would be required.

## **4.13 STORMWATER MANAGEMENT**

### **4.13.1 Section 402 NPDES (Transportation Separate Storm Sewer System (TS4) Permit)**

The Federal Water Pollution Control Act, under authority granted to the State of Missouri compliant with Missouri State Law, State Operating Permit MO-0137910, allows MoDOT to discharge stormwater from its Transportation Separate Storm Sewer System (TS4) system. MoDOT must develop and implement a comprehensive program to prevent pollution of surface waters from stormwater runoff in regulated municipal separate storm sewer system (MS4) areas, watersheds subject to an approved and effective TMDL, and Outstanding Nation and State Resource Waters in the state.

MoDOT currently holds a general TS4 permit. In accordance with the National Pollutant Discharge Elimination System (NPDES) requirements of the CWA, MoDOT shall adhere to the TS4 permit applicable at the time of construction (State Operating Permit MO-0137910) **(Commitment #24)**.

MoDOT must adhere to its statewide Operating Permit MO-0137910, Section II Area-Wide Land Disturbance Stormwater Permit Conditions for construction projects with land disturbance greater than or equal to one acre and projects disturbing less than one acre when part of a common plan of development or sale causing land disturbance of one acre or more. MoDOT's Operating Permit requires MoDOT to implement an on-site SWPPP to prevent or minimize adverse impacts to streams in and adjacent to a project area. The plan describes BMPs and procedures to minimize pollution, suspended solids, turbidity, and downstream sedimentation that may degrade water quality and adversely impact aquatic life. Stormwater compliance requirements are in the supplemental revisions in every MoDOT construction contract.

### **4.13.2 Stormwater Management – Affected Environment and Impacts**

Existing stormwater management systems within the US 412 corridor consist primarily of an open drainage system with ditches parallel to the roadway that are connected by culverts located under road crossings and driveways. The ditches channel surface water into several named streams that flow southward. Although the study area overlaps some outskirts of Kennett and Senath, these parts of the towns do not have enclosed stormwater systems. In general, the open drainage system is well maintained through the corridor. However, due to the very flat topography of the area, some ditches retain water for short to long periods or flood a small amount of the surrounding ground following rain events.

Due to the rural character of the study area, an open drainage system is proposed for the stormwater management system for both build alternatives. Open drainage systems convey stormwater through uncovered swales and channels. In contrast, closed drainage systems transfer stormwater through underground pipes and culverts. Closed systems are generally used in more densely developed areas such as urban and suburban neighborhoods. The existing US 412 infrastructure uses an open drainage system so the proposed build alternatives would have consistency with current conditions.

The town of Kennett, located at the northeastern end of the study area, is a MS4 community. Mr. Keith Westerfield, Street Superintendent for Kennett, was consulted about Kennett's MS4 program and he relayed that the MS4 area is defined by city limits which begin about 0.75 mile north of the US 412 project limits. In addition, all stormwater runoff in the study area

originates outside the MS4 and flows away from it. Therefore, no work under the proposed project would take place in the MS4 area. Although Pole Cat Slough and Buffalo Ditch are state 303(d) listed impaired waters with watersheds that overlap the study area, no restoration plans or TMDLs have been developed for these streams.

Several streams within the study area are under the jurisdiction of Consolidated Drainage District No. 2, and include Red Devil Ditch, Kinnemore Slough, Honey Cypress Ditch, Pole Cat Slough, and Ragland Slough. Any alternations to these streams will be coordinated with this drainage district as required (**Commitment #25**).

No-Build Alternative Summary: Under the No-Build Alternative, existing surface water conditions would not be affected.

Build Alternatives Summary: Stormwater runoff is addressed by custom temporary and permanent erosion control plans developed during final design of the project, which would be included within the contract specifications to address temporary erosion and sedimentation during construction. Standards in MoDOT's *Standard Specifications Book for Highway Construction* (2023) would also be followed (**Commitment #26**). MoDOT's BMPs reduce impacts to the aquatic environment to minimal levels. BMPs cover most activities needed to restore the construction area to an acceptable condition. This includes cleanup, shaping, replacing topsoil, and establishing vegetative cover on all disturbed bare areas, as appropriate.

MoDOT shall ensure that its Stormwater Pollution Prevention Plan (SWPPP) is implemented with appropriate erosion and sediment control BMPs implemented during construction and disturbed areas seeded following construction. Selection and incorporation of the BMPs shall consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall (**Commitment #27**). The SWPPP will be designed to prevent or minimize adverse impacts to streams, water courses, lakes, ponds, or other impoundments within and adjacent to the study area.

The proposed improvements would result in the disturbance of more than 1 acre of total land area. Accordingly, the work would be subject to the requirements of the Section 402 NPDES TS4 Permit.

#### **4.14 CULTURAL RESOURCES**

NEPA requires that agencies consider the effects and environmental impacts of their proposed actions on all aspects of the human environment. Important elements of the human/cultural environment are preserved to retain a community's sense of history. Therefore, the term "cultural resources" has come to encompass all physical evidence of past human behavior including historic buildings, structures, objects, historic districts, archaeological sites, Native American traditional places, and traditional ways of life.

##### **4.14.1 Cultural Resources – Regulatory Background and Standards**

Federal approvals associated with the US 412 EA are subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800). NHPA Section 106 requires that the federal agency responsible for an undertaking, the FHWA for this study, consider the effects of its actions on historic properties and consult with the State Historic Preservation Office (SHPO) and other consulting parties (those persons with interests in the effect of the undertaking on historic properties). Consulting parties typically include Native American tribes, the federal Advisory Council on

Historic Preservation (ACHP), local governments with jurisdiction over the area, those with a legal or economic interest in the study, and those with a demonstrated interest in the study or historic properties. These entities are provided with opportunities to consult on the proposed project. Consulting is “the process of seeking, discussing and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process.” This includes consulting to determine if there are any historic resources and if so, what the project effects on them would be. If a determination of adverse effect is found with the US 412 project, consultation will continue to occur with agency officials, SHPO, and ACHP to agree on how the adverse effect will be resolved.

Section 4(f) of the Department of Transportation Act of 1966 protects publicly owned land of a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance or land of a historic site of national, state, or local significance. As noted in 23 CFR 774.3, a transportation project approved by FHWA may not cause anything beyond a minor (de minimis) impact to a Section 4(f) property unless there is no feasible and prudent avoidance alternative and all possible planning to minimize harm is conducted. **Section 4.16** contains the details of the Section 4(f) analysis.

A review of relevant publications and records prior to the field component of the study is completed to obtain a comprehensive understanding of the project area cultural sequence and knowledge of types of cultural resources which might be expected to occur. Further, previously reported cultural resources may also be present within a proposed project area. The process includes review of cultural resource management reports that have been produced for areas near the project. These reports are housed in the MDNR SHPO, Jefferson City, Missouri and are catalogued by county as well as author. The repository also includes historic – architecture site forms for the state, NRHP forms for Missouri, and correspondence regarding the project. Additionally, the SHPO Geographic Information System (GIS) layers include locations of sites and previous Phase I surveys on USGS topographic quadrangles. Other resources consulted that contain important data include the State Archives facility in Jefferson City, local historic societies when appropriate, and the State Historic Society in Columbia.

#### **4.14.2 Tribal Coordination**

FHWA is to consult with any Indian tribe that may attach religious and cultural significance to properties that may be affected by their Section 106 undertakings. A list of tribes with interests in Dunklin County, Missouri was obtained from MoDOT’s Tribal Nation Consultation Map. Four tribes were listed including the Eastern Shawnee Tribe of Oklahoma, Osage Nation, Quapaw Tribe of Oklahoma, and Shawnee Tribe.

Representatives from these four Tribal nations were contacted via letter in order to initiate consultation in accordance with Section 106 of the NHPA of 1964, as amended, for the proposed US 412 project. Letters for NEPA consultation were sent out on November 28, 2022 and letters for Section 106 consultation were sent out on April 5, 2023. Letters indicating no objection to the proposed project were received from the Eastern Shawnee Tribe of Oklahoma, Osage Nation, and Quapaw Nation (**Appendix L**).

The Osage Nation stated in their response letter dated January 19, 2023 that while there are no known cultural resources within the NEPA study area, there are known cultural resources throughout the county including two known trails, one located west of the APE and one located east of the APE. The Osage Nation has requested to be consulted on all stages of

this project. The consultation involves development of a programmatic agreement under the NHPA in consultation with the Osage Nation and including the Osage Nation as a signatory (**Appendix L**).

The Eastern Shawnee Tribe response letter was dated January 3, 2023 and included a request that they be notified following any inadvertent discovery of archaeological sites or objects during construction. They also asked that all ground disturbing activity stop until the Tribe and State agencies are consulted. Therefore, should the project inadvertently discover an archaeological site or object(s), MoDOT will immediately contact the Eastern Shawnee Tribe, as well as the appropriate state agencies, within 24 hours if possible and otherwise within 48 hours, and implement stop-work procedures as established in the PA for the project in **Appendix L**. Communication with Tribes will be performed through FHWA or by MoDOT at FHWA's request.

The Quapaw Nation response letter was dated April 12, 2023 and included a request for a copy of the cultural reconnaissance survey for the project. A copy of the archaeological report was sent to the Quapaw Nation and Osage Nation on August 21, 2024.

#### **4.14.3 Resources Identified during the Archival Review**

Route 412 Corridor Project Conclusions from the Archival Review are described in this section. The findings of the Archival Review are presented in the cultural resource survey report prepared for the project which is attached as **Appendix M** and in the archeological survey report which is attached as **Appendix N**. Archival Review for cultural resources found three previously reported cultural surveys adjacent to or intersecting the current project area. Archival Review for archeological resources found four previously recorded archaeological sites within one mile of the project area. One of the previously recorded archaeological sites, site 23DU15, appears to be within the project boundary at the southwest portion of the corridor near Buck Donic. The polygon for the site 23DU15 boundary provided by MDNR is overlapped by the study area on the north side of US 412. Site 23DU15 was recorded as part of an Archaeological Survey in the Lower Mississippi Alluvial Valley, 1940-1947 (Phillips et al. 1951). It is assumed to be a prehistoric site, but no other information is readily available.

The development of the Bootheel of Missouri was slow primarily due to the almost impassable swamps and transportation challenges. Through the mid-1800s, new settlers filtered into the areas closest to the rivers establishing farms, but few towns were established. In the early 1900s, the state began construction of a drainage program in the St. Francis River basin resulting in the Little River Drainage District. These efforts opened up abundant land for agricultural production. The project corridor is primarily rural agricultural farmland with scattered residences and commercial buildings. There are three primary cities along the Route 412 Corridor in Dunklin County which include Kennett, Senath, and Cardwell. The City of Kennett, platted in 1846, is the County seat and the largest city in Dunklin County with a 2020 population of 10,288. It is located in the southeast corner of the Bootheel of Missouri just twenty miles from the Mississippi River. Senath was founded in 1882 and has a current population of 1,553 at the 2020 census. It lies approximately nine miles southwest of Kennett. Cardwell was platted in 1895 and is located in the southwestern corner of Missouri's Bootheel, two miles from the Arkansas State Line (Rebok, 2002). Additional consideration was given during the survey to the identification of Post-World War II Subdivisions (1946-1975) that the project may directly affect.

No historic properties, districts, structures, places, or landscapes on the NRHP have been identified within the study area.

The corridor architectural survey also identified six bridge resources within the project corridor. In 1957, the Little River Drainage District began expanded efforts to enlarge ditches, strengthen levees, and incorporate enhancements to prevent bank erosion to the area. None of these are listed on the NRHP and all of all the bridges in the corridor are covered by the Program Comment for Post-1945 Concrete and Steel Bridges issued by the Advisory Council on Historic Preservation on November 16, 2012.

#### **4.14.4 Resources Identified during the Architectural Survey**

The cultural resource survey report prepared for the project is attached as **Appendix M**. The architectural survey identified 257 parcels which were located along the Route 412 project corridor. These parcels were defined using ArcGIS to identify parcel boundaries that intersected the area of potential effects (APE). The parcels are depicted in the NEPA and APE Limits Map attached to the cultural resources report (**Appendix M**). Of the 257 parcels, 104 parcels have resources located within the APE boundary but only sixty of these identified resources were more than forty years old ranging in date from ca. 1890-1983. The Dunklin County Property Valuation property parcel data and APE shapefile were provided and were unaltered for the architectural study. The following is the designation of the parcels within the APE:

- P – Parcels in the APE containing buildings outside the APE (18)
- V – Vacant or Agricultural Farmland Properties (135)
- M – Modern properties constructed after 1983 (44)
- H – Properties constructed before 1983 (60)

**Summary of Parcels Designated P, V and M** – A total of 18 properties are “P” designated properties in the APE. This indicates that a portion of parcel is in the APE, but none of the associated buildings; therefore, these properties will not be impacted by the current project. All 135 parcels with the “V” designation are vacant or agricultural farmland and have no buildings, structures, landscapes, or objects, and no concreted or asphalted parking lots on the premises. A total of 44 modern “M” cultural resources were located. None of the architectural resources surveyed are recommended as individually eligible for listing on the NRHP. The residential examples of Gable Front, I-House, Pyramidal, and Ranch architecture are very common architectural types and the examples surveyed do not represent the works of master’s and do not possess high artistic value. They also do not retain sufficient historical integrity to embody the distinct characteristics of a type, period, and method of construction to make them eligible for listing on the NRHP under Criterion C. In addition, there are no apparent associations with historical events or persons to make them eligible for listing under Criteria A or B.

**Summary of Bridges and Culverts** – A list of bridges within the study area was provided by the MoDOT Historic Preservation Section. All identified bridges are located along the project corridor on Route 412. They consist of six reinforced concrete and steel bridges constructed in 1963. All bridges are covered by the Program Comment for Post-1945 Concrete and Steel Bridges issued by the Advisory Council on Historic Preservation on November 16, 2012. No bridges or culverts are listed in the NRHP, and no historic bridges

or culverts were identified during the current survey.

Summary of Historic Parcels (H) – Historic parcels comprised sixty of the parcels within the APE consisting of three properties dating between 1890 and 1925 and the remaining fifty-seven dating between 1930 and 1983. The oldest building in the APE, AR254, dates to 1900. It is a one-story front gable residence, in good condition; however, it has undergone renovations on the exterior and two additions have been added on the rear of the building. Further, the building does not possess any unique stylistic characteristics. For these reasons AR254 is not eligible for the NRHP. One residence was built in 1915, AR239. The property is a Craftsman Style residence with a pyramidal metal roof and wood cladding. It is in good condition but is a common form of architecture and lacks architectural and historical distinction for the NRHP.

Also present in the APE are four subdivisions that fall within the Post-War II Subdivisions (1946-1975) Era. The Jonesway Jones 2<sup>nd</sup> Addition, which is located just outside of the City of Kennett on the south side of the corridor, includes primarily Ranch Style homes from the 1970-1977 era. AR138 and AR139 fall within the APE of the project boundary. At the Senath City Limits, there are three additional Post-War II Subdivisions, the RA Don Estates, Rose First, and Stone Subdivision. These are also located on the south side of the Route 412 Corridor and contain primarily Ranch Style homes from the early 1950s through 1978. There are ten homes that fall within the APE of the project boundary. (AR82, AR95, AR98, AR99, AR100, AR101, AR102, AR103, AR104, and AR105) None of the homes nor the subdivision itself possess any distinguishing characteristics that would make them eligible for the NRHP under either Criteria A, B, or C. The remainder of the properties that date between 1940 and 1983 consist of non-descript residential examples of Gable Front, I-House, Pyramidal, and Ranch architecture. The buildings are very common architectural types and the examples surveyed do not represent the works of master's and do not possess high artistic value. They also do not retain sufficient historical integrity to embody the distinct characteristics of a type, period, and method of construction to make them eligible for listing on the NRHP under Criterion C. In addition, there are no apparent associations with historical events or persons to make them eligible for listing under Criteria A or B.

The Post-War II Subdivisions (1946-1975) along the Route 412 corridor that have resources within the APE constructed between 1950-1978 and primarily represent the Ranch Style home. It was determined that many of the homes do not retain sufficient integrity and no cohesive landscape or small-scale features were identified to recommend listing as an eligible collection or subdivision to the NRHP under Criterion C.

#### **4.14.5 Resources Identified during the Archaeological Survey**

The archaeological survey report prepared for the project is attached as **Appendix N**. A MoDOT-approved field research approach was used to perform a Phase I archaeological resource survey. The survey area was carried out for approximately 22 miles of 100' (30m) along the US 412 corridor in Dunklin County, Missouri. The field investigation was conducted only on parcels where affirmative permission for site access was received from the landowner. A map of parcels with their permission status is provided as **Exhibit 9** in **Appendix A**.

The field investigation was carried out under mixed surface visibility conditions with most of the corridor in cultivated settings with recently harvested, disced fields, or planted in cotton with high visibility. A few areas within the corridor had poor visibility in grass and weed

covered. Where visibility was poor, over a 15 m linear distance a shovel test was performed. Shovel testing involved excavation of small holes approximately 30 cm in diameter and up to 30 cm below surface at 15 m intervals. Soils were carefully observed to determine presence/absence of cultural evidence. Soil was screened through a portable 1/4-inch screen or troweled through where clay content or moisture rendered screening impractical. Shovel tests were recorded using a GPS device, a shovel test log was kept, and sample photographs of shovel tests were taken.

A total of 116 shovel tests were performed for this survey and none were positive for cultural materials. Two previously unreported archaeological sites (23DU1611 and 23DU1612) were identified within the project corridor by the field investigation. These sites were found using a pedestrian survey, so artifacts were found on the ground surface and not through shovel tests. These historic sites consisted of low to moderate scatters of household waste possibly associated with nearby homesteads. The archaeological investigation recommended that neither of these sites are considered eligible for listing on the NRHP. Therefore, no NRHP resources were identified within the project corridor.

#### **4.14.6 Section 106 Impacts/SHPO Coordination**

The portion of the previously recorded archaeological site 23DU15 that overlaps within the study area lies partly on land with affirmative landowner permission for site access. The area with granted permission was surveyed using pedestrian survey and visual inspection methods and no cultural materials were found. On the remaining portion of the site 23DU15 overlap area, affirmative landowner access was not granted and therefore no archaeological survey was conducted in this area. It was recommended that a revisit be made prior to any construction within the bounds of this potentially-eligible site.

As noted in **Section 4.15.5** above and as shown on **Exhibit 9**, the cultural resource investigations for the US 412 project could not be conducted on some parcels where affirmative landowner permission for site access was not granted. Therefore, an analysis of impacts to Section 106 resources on these parcels could not be completed as of the publication date of this EA report.

Excavations associated with the proposed US 412 improvements could impact archaeological resources on the parcels where affirmative landowner access was not granted. Therefore, a Phase I archaeological resource survey will be conducted upon acquisition of these parcels. MoDOT, in consultation with FHWA and SHPO, developed a project specific Programmatic Agreement (PA) to guide further archaeological survey work, including identifying parcels requiring future survey and testing, and mitigation measures if sites cannot be avoided during the project. Efforts to avoid, minimize, or mitigate adverse effects were addressed through consultation for the development of the PA, which includes continuing consultation to ensure stipulations in the PA are accomplished. The PA will guide the remaining Phase I testing, and address data recovery for sites determined as eligible for listing in the NRHP.

On January 17, 2024, FHWA notified the ACHP, inviting the ACHP to consult on the development of the PA. The ACHP has chosen not to participate in consultation (January 26, 2024). MoDOT submitted a draft PA to The Osage Nation and SHPO for legal review and to FHWA for approval. MoDOT distributed the PA to the Missouri Highways and Transportation Commission, the SHPO, The Osage Nation, and FHWA for signatures. MoDOT will adhere

to all stipulations of the executed Section 106 PA for the US 412 project (**Commitment #28**). The PA is located in **Appendix L**.

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration and thus would not involve any effects to cultural resources.

Build Alternatives Summary: The Phase I archaeological survey concluded that all of the sites, as observed, do not appear to qualify as eligible for listing under the NRHP and the current project as designed is unlikely to affect significant cultural resources. The previously documented archaeological site 23DU15 was not revisited during this survey and it is recommended that a revisit be made prior to any construction within the bounds of this potentially eligible site. Additionally, it is beyond the scope of this investigation to comment or make recommendations on the areas within the corridor where the survey crew was not permitted. The formal submission of the archaeological survey report was sent on March 2, 2024, to the Missouri SHPO. After review of the report, SHPO issued a letter on April 8, 2024 which concurred that archaeological sites 23DU1611 and 23DU1612 should be considered not eligible for inclusion in the NRHP and that archaeological site 23DU15 should be treated as unevaluated and therefore potentially eligible for inclusion in the NRHP. This correspondence is attached in **Appendix L**.

The formal submission of the architectural survey report was sent on February 2, 2024. Comments were received back from SHPO on February 23, 2024, with concurrence that the proposed project (SHPO Project Number: 002-DU-23) would have *No Effect on Historic Properties* from an architectural standpoint. Correspondence with SHPO is attached in **Appendix L**.

#### **4.15 SECTION 4(F)**

Section 4(f) refers to a section within the U.S. Department of Transportation Act of 1966. This legislation provides for consideration of significant publicly owned park and recreation lands, wildlife and waterfowl refuges, and publicly or privately owned historic sites during transportation project development. These rules only apply to the U.S. Department of Transportation (DOT) and are implemented by the FHWA and the Federal Transit Administration.

##### **4.15.1 Parks, Recreation, and Wildlife Refuge Section 4(f) Resources Identified within Study Area**

Based on field investigations and records reviews, no parks and recreation Section 4(f) resources are present within the study area. The nearest resources are Oak Haven Park located in southwestern Kennett on the north side of US 412 approximately 0.5-mile northwest of the project terminus, and Williamson Park and Douglas Memorial Park in Senath, both of which are located at least 0.25 mile away from the project.

Based on a review of available maps and the Protected Areas Database of the United States (USGS 2024b), no wildlife refuges are located within or adjacent to the study area. One parcel that is located just beyond the western terminus of the project along the St. Francis River is part of the St. Francis Sunken Lands Wildlife Management Area managed by the Arkansas Game and Fish Commission. This parcel is not classified as a wildlife refuge. At its closest end to the project, the parcel is located approximately 1,200 feet north of the western terminus of the US 412 project. The St. Francis Sunken Lands Wildlife Management Area will not be impacted by the project. Therefore, the No Build and Reasonable Alternatives

would involve no conversion of existing park, recreational area, or wildlife and waterfowl refuge to a transportation use, and would involve no impacts to access for any parks, recreation facilities, or wildlife and waterfowl refuges. Thus, there would be no Section 4(f) impact to these resources.

#### **4.15.2 Historic Section 4(f) Resources Identified within Study Area**

The Section 4(f) analysis considers a historic site significant only if it is on or eligible for the NRHP, based on a determination by the SHPO or Tribal Historic Preservation Officer (THPO). The ACHP will also be invited to serve as a consulting party and may choose to be considered an official with jurisdiction over that resource. Historic properties are also subject to review pursuant to Section 106 of the NHPA as described in **Section 4.15.1. Section 4.15.6** summarizes the NRHP eligible resources in the study area, the avoidance measures employed, and the tasks that will be conducted to complete the Section 106 coordination process. Based on the cultural resource surveys conducted for the project, no Section 4(f) historic resources were noted in the US 412 study area.

#### **4.16 SECTION 6(F)**

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act provides restrictions for public recreation facilities funded by the LWCF. LWCF funds acquisition and development of public outdoor recreation facilities including community, county, and state parks; trails; fairgrounds; conservation areas; boat ramps; shooting ranges, etc. LWCF-assisted facilities must be maintained for outdoor recreation in perpetuity. Therefore, mitigation including replacement land of at least equal value and recreation utility is required. Projects with recorded LWCF assistance in the vicinity of the project include Willoughby Park and Kennett Park in the town of Kennett, and a Fiscal Year 1980 Local Government Consolidated Grant at the town of Senath.

Four sites designated as conservation areas are located just beyond the western terminus of the project along the St. Francis River. One parcel is part of the St. Francis Sunken Lands Wildlife Management Area discussed in **Section 4.16.1** above and the other three parcels are enrolled in the Wetland Reserve Program (WRP) with conservation easements and are managed by the NRCS. These four conservation areas do not appear to have received LWCF funding. Based on field investigations and records reviews, no LWCF funds were used in the vicinity of US 412. The No-Build and Reasonable Alternatives would not involve any impacts to Section 6(f) resources.

#### **4.17 FARMLAND**

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. The FPPA requires federally funded projects to be coordinated with the NRCS, which provides technical assistance regarding important farmlands. Coordination has been undertaken for the US 412 study through correspondence with the NRCS, which requested to be included as an Interested Agency during initial agency consultation for the project.

NRCS classifies soil units as either "Prime Farmland" or "Prime Farmland if Drained." The soil units for the study area are predominantly prime farmlands, with over 95% of the soils qualifying on an acreage basis. However, applying these numbers directly would generate an over-estimate because the mapped soil units include the US 412 roadway and existing right-of-way as part of the prime farmland soil units. The GIS analysis run by the NRCS consultation took

these factors into account and removed developed areas from the prime farmland analysis. No farmland in the study area was classified as Farmland of Statewide Importance.

Inquiries about legacy and heritage farmsteads including Century Farms were submitted to the NRCS as part of project consultation, but they indicated that they do not have information on legacy, heritage, or century farms. A webpage providing data from the University of Missouri Extension returned records for 27 century farms in Dunklin County with years of acquisition ranging from 1853 to 1911. However, the list provides no location data for these farms so it is unknown whether any are located in the vicinity of the US 412 project. The public involvement process did not generate any comments from landowners or other stakeholders regarding farms with legacy, heritage, or century classifications.

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration and capacity additions on major improvements would not be constructed; thus, it would not involve any direct impacts to farmland.

Build Alternatives Summary: The NRCS utilizes a Land Evaluation and Site Assessment (LESA) system to establish a farmland conversion impact rating score for proposed sites of federally funded and assisted projects. The rating is an indicator for project sponsors to consider alternative sites if the potential adverse impacts on farmland exceed the recommended thresholds.

A Farmland Conversion Impact Rating Form was completed for the project with the assistance of Mr. Rod Taylor of the NRCS, and the form is attached in the Farmland Protection Policy Act coordination package in **Appendix O**. The form includes a two-part assessment, with a total of 260 points possible. The alternatives received the following scores:

- Alternative A (Four-Lane Divided): 123.7
- Alternative B (Four-Lane Undivided, Preferred Alternative): 122.8

For project sites where the total points equal or exceed 160, the NRCS will require the consideration of actions that would reduce adverse impacts. These would include alternative sites, modifications or other mitigation). Based on both Alternatives A and B scoring below the 160-point threshold, it appears that consideration of actions to reduce adverse impacts to farmland would not be required under the FPPA.

The alternatives were also assessed for the extent that they would change the farming landscape via the bisection of farmsteads. Because both Reasonable Alternatives run along an existing road corridor and involve expansion toward the edge of farmland parcels, no farm bisections are anticipated from the project. No information about Heritage Farms or Century Farms has been obtained for the US 412 corridor, so no impacts to these resources are known at this time.

The selection of Alternative B (Four-Lane Undivided) as the Preferred Alternative was based, in part, on its lower expected impacts to farmland. The US 412 corridor is located in one of the most productive agricultural areas of the nation and agriculture is highly important to the local and regional economy. Alternative A would impact approximately 100 more acres of farmland due to the wider dimensions of the four-lane divided roadway as well as the placement of the new lanes with an offset from the existing road. Other impacts to farmland include acquisitions of farm investments such as relocations or shortening of irrigation pivot systems. These takings are lower for Alternative B compared to Alternative A.

The proposed US 412 project is expected to have indirect benefits to large areas of farmland that are not located in the immediate vicinity of the project. US 412 is a major avenue for agricultural and transport vehicles, as discussed in the project Purpose and Need (**Section 2**). The proposed project is expected to have beneficial effects on farm transportation operations because it would allow cars and small trucks to pass large farm equipment which moves at comparatively slower speeds, improving safety for all vehicle types. Intersection improvements would also resolve safety issues relating to large farm vehicles having to occupy more than one lane as the equipment moves through intersections that currently have sharp intersection angles.

**4.18 CONSTRUCTION COSTS AND IMPACTS**

A planning level cost estimate representing unit costs expected for the year 2023 was prepared for each of the Reasonable Alternatives and is presented in **Table 4-16**. These cost estimates will be updated as the alternatives are further refined.

**Table 4-16. US 412 Cost Estimate Summary (Reasonable Alternatives)**

Alternative	Right of Way	Construction	Utilities	Total
Alternative A (Four-Lane Divided)	\$9,226,000	\$92,099,000	\$1,230,000	\$102,555,000
Alternative B (Four-Lane Undivided, Preferred Alternative)	\$5,752,000	\$80,995,000	\$435,000	\$87,182,000

No-Build Alternative Summary: The No-Build Alternative for the Route 412 EA would consist of maintaining the current roadways and structures in essentially their current conditions. Routine maintenance would continue, and occasional minor safety upgrades would be implemented. No capacity additions or major improvements would be made. The No-Build Alternative is not a no-cost concept because maintenance and repair of the existing roadway infrastructure would be needed to ensure the continued use of the corridor.

Build Alternatives Summary: Construction activities may result in short-term impacts on air quality and visibility for vehicles using the corridor within the study area. These impacts would be temporary and localized to the area(s) experiencing construction activities and their immediate vicinity. Construction generated dust and suspended particulates could occur during ground excavation and hauling operations and would be directly affected by wind and soil moisture conditions. The extent of these impacts would depend on equipment type and number of units in operation.

MoDOT shall ensure that contractors’ operations do not result in dust and suspended particulates migrating across active lanes of traffic which would cause diminished visibility for vehicle operators, and that fugitive dust does not migrate off the limits of the project corridor (**Commitment #29**).

Implementation of the projects preferred alternative may require removal of improvements associated with adjacent properties. These activities could include:

- Plugging and closure of wells.

- Septic tank plugging and disposal.
- Lead and asbestos abatement associated with building or bridge removal.

Contractors will be required to comply with all applicable local, state, and federal regulations regarding removal of these improvements (**Commitment #30**).

MoDOT shall ensure that details of utility disposition are determined during project design. Agreements with utility companies shall be negotiated and executed prior to seeking project federal authorization for construction. MoDOT's utility engineers and representatives of the various utilities affected shall plan the details of utility adjustments on an individual basis (**Commitment #31**).

MoDOT shall ensure that careful refueling practices are employed to limit spills of gasoline and diesel fuels (**Commitment #32**).

#### **4.18.1 Construction and Maintenance of Traffic**

Relative to construction and vehicular operation during construction, both Reasonable Alternatives would use standard MoDOT operating procedures. Both Reasonable Alternatives include improvement of the existing roadway. During these operations, construction equipment and activities would occur near traffic utilizing the existing roadway. When this condition occurs measures would be required to provide advanced notification and understandable direction through the work zone. Periodically, traffic flows would be altered as ongoing stages of construction occur.

Construction of Alternative A (Four-Lane Divided) provides for the addition of two new lanes primarily built north of the existing roadway. At County Road 619, the roadway alignment shifts so that two new lanes are built south of the existing roadway. This configuration continues through Cardwell to County Road 609 where the two additional lanes are once again constructed north of the existing roadway. At each of these lane transitions, approximately one quarter mile of existing roadway pavement would be removed. All other portions of existing US 412 roadway (approximately 98%) would be used in place, existing pavement would be rehabilitated and function as either east or west bound lanes.

Construction of Alternative B (Four-Lane Undivided, Preferred Alternative) provides for the addition of a new lane of traffic for each direction and a continuous center left turn lane from Route Y near Kennett to the Ragland Slough stream crossing. Beginning just west of Ragland Slough, the four-lane undivided roadway template would transition to a divided four-lane roadway template with a 60-foot median to connect with the existing four-lane divided facility near Route AC. The existing roadway would be incorporated into the new roadway template for the entirety of this alternative. Between County Roads 527 and 542, the roadway horizontal alignment transitions so that widening occurs along the north side of the existing pavement instead of symmetrical about the existing centerline. Roadway horizontal alignment also transitions between County Roads 613 and 609 so that all widening occurs along the south side of existing pavement instead of symmetrical about the existing centerline.

MoDOT will ensure local and regional access to existing rural and urban areas and facilities are maintained during construction (**Commitment #33**). MoDOT shall ensure that the construction contract includes a Traffic Management Plan to provide response to temporary disruptions in travel patterns and travel time. A Traffic Management Plan will be developed

during project design as part of the final design process (**Commitment #34**).

#### **4.18.2 Utility Impacts**

Both Alternatives A and B would require relocation of a cell tower in the southwest quadrant of the US 412/164/F intersection near Cardwell, Missouri. Neither alternative results in other extraordinary utility impacts.

#### **4.19 OTHER REASONABLY FORESEEABLE ENVIRONMENTAL EFFECTS**

Regulations in 23 CFR 771.119(b) direct FHWA to “Determine which aspects of the proposed action have potential for reasonably foreseeable social, economic, or environmental impacts; identify alternatives and measures that might mitigate adverse environmental impacts; and identify other environmental review and consultation requirements that should be performed concurrently with the EA.” Therefore, the project review included an analysis of reasonably foreseeable environmental effects of the proposed agency action.

The analysis reviewed Statewide Transportation Improvement Programs (STIP)s for Missouri and Arkansas to identify other transportation projects in active, planning, or reasonably foreseeable stages that might contribute to impacts from the US 412 project. The Missouri STIP for 2024-2028 includes several projects in Dunklin and Pemiscot Counties near the US 412 project; however, these projects are limited to bridge replacements, pavement preservation treatments, pavement resurfacing, and addition of rumble strips. The list of High Priority Unfunded Needs compiled by MoDOT in October 2023 did not include any projects in Dunklin County.

In the Arkansas STIP for 2023-2026, projects in adjacent Greene County (which includes Paragould) and nearby Craighead County (which includes Jonesboro) were largely limited to several roadway preservation projects. However, two widening/capacity upgrade projects are slated for approximately eight miles of US Route 49 between Paragould and Marmaduke to the northwest of the US 412 project. In addition, large sections of Interstate-55 in Mississippi County, Arkansas to the south of the US 412 project are slated for major widening and/or other improvements. Both Route 49 and Interstate-55 are roads running in northeast-to-southwest directions that roughly parallel US 412. Improved travel times along these roads could potentially attract travelers away from the US 412 project area if inefficient travel conditions continue under the No-Build Alternative.

As noted in **Section 2.1.1**, improvements in technology and farming techniques are being implemented in Dunklin County and are expected to result in a significant increase in agricultural output in the county over the next decade. One specific example is conversion of some acreage of cotton production to peanut production, which is being supported through investments such as the new Delta Peanut processing facility in Kennett at the northeastern end of the corridor. This shift is expected to generate an increase in overall agricultural vehicle traffic, with a concentrated increase at harvest time as the perishable peanuts are transported directly to the processing facility.

The analysis identified sensitive resources to be analyzed for reasonably foreseeable environmental effects related to the proposed project. Sensitive resources were identified using the environmental information collected during the study, as well as public and agency scoping comments received. These resources are discussed in the Build Alternatives Summary below.

No-Build Alternative Summary: The No-Build Alternative would retain the existing roadway configuration and capacity additions on major improvements would not be constructed; thus,

many impacts—positive and negative—associated with new construction, would not occur. Current trends for land use would be expected to continue.

Build Alternatives Summary: Interrelated resources assessed for reasonably foreseeable environmental effects include:

- **Land Use** – The predominant land use in the study area as well as in the overall vicinity of the project is intensive agriculture along with low-density development. The majority of the land in the project vicinity is classified as Prime Farmland and agricultural infrastructure such as wells, irrigation rigs, barns, and grain bins are common. The project would involve some acquisition of farmland and takes of infrastructure adjacent to the existing roadway. Benefits to farmland in the regional area are expected through improvements in travel efficiency and safety, particularly in regard to large agricultural vehicles that use the roadway. The project is expected to complement regional land use plans to improve infrastructure related to one of the key goals of agricultural sustainability. Improved transit along US 412 is expected to benefit both agricultural economic development and general economic development in the area as access to processing facilities, workplaces, homes, businesses, and regional health care facilities improves.
- **Streams and Water Quality** – The study area crosses several named streams and a few unnamed tributaries. Water quality impacts from the project and other reasonably foreseeable development activities are not expected to contribute to adverse impacts on aquatic resources.
- **Wetlands and Ponds** – The study area contains 92 roadside ditch wetlands totaling 18.38 acres, many of which would be impacted under the Reasonable Alternatives. The new roadway design would follow routine design practices which would attempt to improve surface drainage to reduce the amount of water standing in the ditches after rains. However, due to the very flat topography of the area, the new ditches would likely still retain some water which would create some new roadside ditch wetlands. Due to the disturbed condition of the roadside ditch wetlands and their replacement with a similar drainage system along the new roadway, reasonably foreseeable impacts to wetlands and water quality from impacts to the roadside ditch wetlands are expected to be minor. Impacts to jurisdictional wetlands would require mitigation to develop new wetlands, which would provide compensation for wetland losses and would counteract environmental changes that could cause impacts related to wetlands.
- **Threatened and Endangered Species and Woodlands** – Both Reasonable Alternatives would require the clearing of isolated trees and small stands of woodland which is likely suitable summer roosting habitat for federally-listed bats. The vicinity of the US 412 project contains similar agricultural lands except for some large areas of wooded wetland along the St. Francis River located to the west and the Hornersville Swamp State Wildlife Management Area and the Big Lake Wildlife Management Area located to the southeast. No changes to these wooded wetlands are anticipated from the project or from other activity in the project vicinity. It is anticipated that tree clearing for construction of the Preferred Alternative and other reasonable foreseeable projects would be conducted outside the active summer roosting season to avoid adverse impacts to listed bats. Reasonably foreseeable impacts to threatened and endangered species and woodland from the Preferred Alternative would be considered minor and not significant.

## 5. PUBLIC INVOLVEMENT

Knowing that involvement of stakeholders is critical to a better understanding of US 412 and public sentiment regarding potential improvements, the study team utilized several tools to ensure that a variety of opportunities for public involvement were available throughout the development of the US 412 EA. The Public Involvement Plan (PIP) was guided by both NEPA requirements for public involvement and MoDOT's public involvement policies. In addition, the study team worked closely with MoDOT's Southeast District Communications Office to plan and execute engagement.

The approach to the EA helped assess the needs and issues of the US 412 corridor, as well as the impacts and overall effectiveness of potential alternatives to address those needs. Stakeholder and public involvement were critical to this approach and helped build awareness and understanding of the US 412 EA. The findings of the EA reflect an interdisciplinary, collaborative process and include input from various persons and groups with a stake in the project. This section outlines the techniques and tools used to exchange information and gather feedback. A Communications and Public Involvement document for the US 412 project is attached in **Appendix Q**.

Please note that during the initial public involvement process, Alternative B (Four-Lane Undivided) was referred to as a "Five-Lane Undivided" alternative. Later in the NEPA process the description for Alternative B was revised to "Four-Lane Undivided" to clarify that Alternative B primarily has a flush median in the center and not a lane for driving or turning. However, references to "Five-Lane Undivided" remain in the early public involvement documentation including the PIP.

### 5.1 PUBLIC INVOLVEMENT PLAN

The PIP outlined the community involvement and outreach program and identified key stakeholders and how the planning process would include them. Key stakeholders included agencies, citizens groups, and the general public. The PIP was reviewed by MoDOT Southeast District Communications personnel and FHWA. Comments from both were addressed for the final PIP. The PIP and a list of critical stakeholders are included in **Appendix Q**.

The proposed project has the potential for construction-related disruptions to farm operations. Construction-related disruptions are expected to be highest during the primary harvest season of September, October, and November. To mitigate potential disruptions, MoDOT's project development process is dedicated to maintaining an open dialog with stakeholders, including the farm community, in order to understand their needs and arriving at design solutions that will allow critical farm operations during construction (**Commitment #35**).

### 5.2 STAKEHOLDER INTERVIEWS

The study team conducted stakeholder interviews with a total of eleven individuals on November 29<sup>th</sup>, November 30<sup>th</sup>, and December 9<sup>th</sup>, 2022. Interviewees included mayors from affected communities, community leaders, and elected officials. A list of interviewees is provided in **Table 5-1** and documentation of the stakeholder interviews is included in **Appendix Q**.

**Table 5-1. List of Stakeholders Interviewed**

<b>Interviewees</b>	<b>Entity</b>
Judge Mark Preyer	Dunklin County
Timothy Jamerson	Consolidated Drainage District 2
Mayor Dr. Chancellor Wayne	City of Kennett
Melissa Combs	Kennett Chamber of Commerce
Danny Ray	Kennett Chamber of Commerce
Jim Grebing	Bootheel Regional Planning Economic Development Commission
Commissioner Don Collins	Dunklin County
Mayor Joe Lane	City of Senath
Mayor Terry Lee	City of Hornersville
Mayor Jeff Wilson	City of Arbyrd
Mayor Mike Clark	City of Cardwell

Notes from stakeholder interviews are summarized below:

**1. Usage of the Road**

- There is an increase in the amount of truck traffic because of manufacturing and farming.
- Residents drive US 412 to access healthcare in Arkansas (there are limited quality healthcare options on the Missouri side).
- Residents drive US 412 for work, to go shopping, and for general resources (mostly south to Paragould and Jonesboro).

**2. Safety**

- Safety was a concern for stakeholders, especially at intersections and crossings.
- Specific areas which were mentioned frequently included the exit to Senath and the area around Mr. T's (a liquor store).
- There have been several fatal accidents on US 412 that have affected the community.

**3. Widening the Road**

- There is a consensus that widening the road, whether to a divided four-lane or an undivided four-lane, would increase safety, decrease crashes, and help people traverse the area more easily.
- There are bottlenecks where US 412 transitions from four lanes to two lanes. Drivers try to pass slower traffic before they reach the bottleneck, which adds to the safety issue.

**4. Economic Driver**

- A widened US 412 corridor could potentially add revenue/tax dollars to adjacent communities through increased travel, potential manufacturing/farming opportunities, and opportunities for truck stops and gas stations.

### **5.3 PRE-LOCATION PUBLIC INFORMATION MEETING**

Public meetings were an important opportunity for direct involvement with a broader audience. At these meetings, study team members were available to discuss, explain, and help participants understand the information presented. Two community briefings have been conducted to date. The first public meeting is discussed in this section and the second meeting is discussed in **Section 5.6** below. In addition to the two public meetings that have been conducted to date, a Public Hearing on the EA will be held in 2025.

The purpose of the first public meeting, called a Pre-Location Community Briefing, was to share background information about the project and gather ideas, areas of concern, and questions from the community. The briefing was held on Thursday, December 8, 2022, from 4:00 to 6:00 p.m. at Senath-Hornersville High School, located in Senath, Missouri. Several opportunities for public input were built into the Community Briefing including a mapping activity, comment cards, and conversations with MoDOT staff members and the study team. Materials from the Pre-Location Community Briefing including sign-in sheets and project map displays are included in **Appendix Q**.

The meeting was advertised through a press release, social media posts (reaching thousands of persons), flyers posted throughout the community, a postcard mailing to persons who live along US 412, a radio interview, and yard signs. Copies of promotional materials are included in **Appendix Q**. A total of 43 people attended the Community Briefing.

Following the in-person meeting, presentation materials and a comment form were posted to the project website, [www.modot.org/412](http://www.modot.org/412), and made available for comment through December 31, 2022. A total of 21 comments were received, with 12 spoken comments recorded by project team members during the meeting, seven written comment cards submitted during the meeting, one comment submitted via the online comment form, and one comment card mailed in after the meeting.

Most meeting attendees owned property along the corridor and, while many noted a need for increased capacity along the corridor, most had questions about impacts to their property and the amount of land required for improvements. Specific safety concerns were noted at Ridings and Neely in Senath and the intersection of US 412 and Routes P, C, 164, and 527. The full set of comments for this meeting is presented in **Appendix Q**. Comments that were deemed to be substantive were noted as such in **Appendix Q** along with their responses.

### **5.4 COMMUNITY ADVISORY GROUP (CAG)**

To further engage the public in the development of the Purpose & Need and study alternatives, a CAG was established. CAG members represented various study area constituencies including residents, chambers of commerce, emergency responders, schools, and other community stakeholders. The CAG was carefully selected to ensure a wide range of viewpoints were represented and recognized.

Two CAG meetings were conducted near the US 412 corridor. Each CAG meeting had a formal agenda with goals and objectives, which are captured in the presentation slides and meeting minutes from each meeting. CAG members were invited to the meetings by email invitation followed by a calendar invitation. Phone calls were made the week of the meeting to those who had not yet responded. Both CAG meetings were facilitated by the consultant project manager and included key MoDOT staff to assist in answering questions. The meetings were also open

to members of the general public to observe the group's discussion. Materials from the CAG meetings, including a list of group members, are included in **Appendix Q**.

#### **5.4.1 CAG Meeting 1**

This meeting was conducted on March 8, 2023. This meeting focused on an introduction to the EA and identification of issues of concern. Presentation slides and meeting minutes are included in **Appendix Q**.

#### **5.4.2 CAG Meeting 2**

This meeting was conducted on May 23, 2023. This meeting focused on a review of alternatives. Presentation slides and meeting minutes are included in **Appendix Q**.

### **5.5 TECHNICAL ADVISORY GROUP (TAG)**

The TAG was organized around the affected jurisdictions, support agencies, and regional partners. The TAG included staff from various divisions within MoDOT; public works staff from Arbyrd, Kennett, and Senath; and others. The purpose of the TAG was to coordinate with technical staff on the development of the study's Purpose and Need, development of alternatives, and screening of alternatives. One TAG meeting was conducted near the US 412 corridor.

#### **5.5.1 TAG Meeting 1**

This meeting was conducted on May 23, 2023. It focused on study details and provided a recap of CAG meeting #1 and the Pre-Location Public Information Meeting. Study team members facilitated the meeting and provided meeting agendas, presentations, and supporting materials. The TAG meeting used the same presentation slides as the CAG Meeting 2, which occurred on the same day. Discussions focused on issues along US 412. Meeting minutes are included in **Appendix Q**.

### **5.6 REASONABLE ALTERNATIVES PUBLIC INFORMATION MEETING**

A second Public Meeting was held on Thursday, June 15, 2023, from 4:00 to 6:00 p.m. at the Senath-Hornersville High School, located in Senath, Missouri. The purpose of this meeting was to share the two Reasonable Alternatives for US 412 with the community and assess community preference.

Several opportunities for public input were built into the Community Briefing including comments related to maps via conversations with the project team, comment cards, historic preservation conversations, and general conversations with project team members including MoDOT staff members and members of the project team. Materials from the Pre-Location Community Briefing including sign-in sheets and project map displays are included in **Appendix Q**.

The meeting was advertised through a press release, social media posts, flyers, a postcard to persons who live along US 412, and an eblast from the Kennett Chamber of Commerce. Copies of promotional materials are included in **Appendix Q**. About 50 people attended the Community Briefing. Presentation materials and a comment form were posted to the project website and made available for comments three weeks after the in-person meeting. A total of 15 comment cards were submitted during the meeting, and six additional comments were submitted either online or by other means. Materials from the Reasonable Alternatives Public Information Meeting including a handout, meeting board, project maps, sign-in sheet, and

meeting summary are included in **Appendix Q**. Comments are summarized in **Table 5-2** below and the full set of comments for this meeting, along with responses, is presented in **Appendix O**. Three comments from the public related to specific issues or questions about the project were responded to by the project team via email, and this correspondence is attached in **Appendix Q**.

Respondents who preferred the five-lane undivided alternative frequently mentioned its benefit to nearby farms and farm equipment accessibility. Respondents who preferred this alternative also commented on the cost efficiency, the seamless tie-in to what’s already built in Arkansas, and perceived safety of the five-lane alternative. One respondent expressed a preference for the four-lane divided alternative. Safety concerns noted by respondents included unsafe crossings, exit and entrance lanes, and intersections. Other comments included background information about the project area, trucking concerns, and suggestions for the project team.

**Table 5-2. Comment Suggestions from the Public**

<b>Comment Type</b>	<b>Number of Mentions</b>
Preference for Five-Lane Undivided	12
Safety Concerns	6
Other comments	6
Unsure which alignment to choose	1
Preference for Divided Four-Lane	1

**5.7 COMMUNICATIONS AND MEDIA RELATIONS**

Informational materials were developed and updated throughout the study, and promotional and informational materials that were specific to a given meeting are included in **Appendix Q** in the section for that meeting. The materials that were prepared include the following:

- A fact sheet was written and designed for distribution at the TAG meeting, second CAG meeting, and Reasonable Alternatives public meeting. This handout is included in the meeting materials for the Reasonable Alternatives public meeting in **Appendix Q**.
- The study website is a tool for both public outreach and involvement. The website is located at [www.modot.org/412](http://www.modot.org/412) and includes general study information, contact information, presentations from public meetings and information on how residents can be involved. It serves as a centralized information portal for learning about the study, getting updates, providing input, and downloading public meeting displays and other materials.
- The study mailing list includes stakeholders, CAG members, elected officials, coordinating agencies, and property owners along the corridor. Anyone who attends a stakeholder meeting or signs up for mailings through the study website is added to the master mailing list.
- MoDOT’s telephone number is provided to the public to comment and ask questions about the U.S. 412 Environmental Assessment: 1-888-ASK-MoDOT (1-888-275-6636).
- The study team’s media outreach program created and distributed press advisories to announce the public meetings and the public hearing.

## 6. ENVIRONMENTAL COMMITMENTS

MoDOT as the lead agency for this study is responsible for all regulatory commitments, whether or not specifically delineated herein, after construction limits are determined. Federal authorization for construction shall not be granted until the necessary regulatory obligations have been satisfactorily completed.

1. MoDOT will amend or update the phasing and implementation document as necessary to reflect programming of projects resulting from this environmental document. (Construction Phasing – **Section 3.4.3**)
2. MoDOT's Statewide Transportation Improvement Program (STIP) will be revised as specific phases of projects are funded, designed, and constructed. (Construction Phasing – **Section 3.4.3**)
3. MoDOT shall ensure that if revisions to the design or construction result in changes in impacts that were not evaluated in this document, the NEPA analyses and determinations will be re-evaluated to ensure the commitments remain valid. Environmental commitments are not subject to change without prior written approval from the Federal Highway Administration. (General – **Section 4.0**)
4. MoDOT shall ensure that, prior to construction, Phase I Environmental Site Assessments are conducted, as appropriate. (Hazardous Materials – **Section 4.2.3**)
5. If hazardous materials are encountered during construction, MoDOT shall ensure that inspection personnel/project managers will direct the contractor to cease work at that location. MoDOT personnel, an environmental specialist, and the contractor will develop a plan for sampling, remediation, and continuation of project construction. Independent consulting, analytical, and remediation services will be contracted if necessary. MDNR and EPA shall be contacted for coordination and approval of required activities. (Hazardous Materials – **Section 4.2.3**)
6. MoDOT shall ensure that all needed demolition notices, abatements notices, and project notifications to MDNR will be submitted, prior to the commencement of demolition activities. Asbestos containing material and demolition debris will be disposed of according to state and federal regulations. (Hazardous Materials – **Section 4.2.3**)
7. MoDOT shall include standard specifications in the construction contract requiring all contractors to comply with applicable local, state, and federal laws and regulations relating to noise levels permissible within and adjacent to the project construction site. If meeting the project schedule requires that earth removal, grading, hauling, and/or paving must occur during evening, nighttime, and/or weekend hours in the vicinity of residences, the Contractor shall notify MoDOT as soon as possible. In such instances, all reasonable attempts shall be made to notify and make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and/or residents. Construction projects lasting longer than two years that are known to cause impacts must also incorporate mitigation measures. (Noise – **Section 4.3.7**)
8. Low-cost and easily implemented construction noise control measures will be incorporated into the project plans and specifications to the extent possible. These measures include, but are not limited to, limiting construction to Monday through Friday (to the extent possible), equipment condition and exhaust muffler requirements, haul-

road locations, elimination of “tail gate banging,” ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication. (Noise – **Section 4.3.7**)

9. MoDOT, as the designated non-federal representative for FHWA, will complete coordination for compliance with Section 7 of the Endangered Species Act and with the Missouri Endangered Species Act. Consultation will be completed prior to construction or before any federal funds are obligated. (Endangered Species – **Section 4.5**)
10. MoDOT will continue to coordinate with USFWS on the status of tricolored bats and, if required, additional consultation will be initiated. (Endangered Species – **Section 4.5**)
11. If necessary, MoDOT will ensure any mitigation requirements to offset adverse effects to bats are completed. (Endangered Species – **Section 4.5**)
12. MoDOT will commit to the PA for federally listed bats and will complete consultation with the USFWS and/or MDC before construction. To avoid negative impacts to roosting Indiana and northern long-eared bats, as well as habitat generalist tricolored bats, MoDOT will remove any trees/limbs greater than three (3) inches in diameter between October 16 and March 31. (Endangered Species – **Section 4.5**)
13. Tree clearing will not occur prior to the completion of consultation with USFWS and MDC. (Endangered Species – **Section 4.5**)
14. If abandoned structures are slated to be demolished and could provide roosting habitat for bats, these structures will be evaluated for bat use as needed before demolition. (Endangered Species – **Section 4.5**)
15. If the project has not progressed to construction by the time Monarch Butterfly is listed as threatened, MoDOT will revisit USFWS consultation requirements when the listing becomes final. MoDOT does not anticipate additional conservation or mitigation measures. (Endangered Species – **Section 4.5**)
16. MoDOT will ensure the contractor abides by the Migratory Bird Job Special Provision. (Migratory Birds – **Section 4.6.2**)
17. MoDOT shall ensure that the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, be carried out without discrimination based on race, color, national origin, religion, and age and in compliance with Title VI (the Civil Rights Act of 1964) and the Americans with Disabilities Act. In accordance with the Uniform Act and the states’ relocation programs, fair market compensation shall be provided to property owners who are affected by this project. (Right-of-Way/Property Acquisition – **Section 4.9.3**)
18. MoDOT will obtain floodplain development permit(s) from SEMA prior to FHWA authorization for construction within the 100-year floodplain. (Floodplains – **Section 4.10**)
19. MoDOT will conduct an engineering analysis the floodplain crossings prior to submission of the floodplain development permit application(s) to SEMA (Floodplains – **Section 4.10**)
20. MoDOT will ensure modifications to the functions of the natural floodplain environment are avoided or are maintained as closely as practicable in its natural state (Floodplains – **Section 4.10**)

21. Bridges and culverts will be designed to provide sufficient waterway openings to ensure upstream flood levels do not increase more than one foot (Floodplains – **Section 4.10**)
22. MoDOT shall follow the FHWA policies and procedures for the location and hydraulic design of highway encroachments on floodplains (23 CFR 650A) (Floodplains – **Section 4.10**)
23. MoDOT shall ensure that for impacts to waters or wetlands for this project, the appropriate Section 404 permit and/or Section 401 certification will be acquired prior to construction, and all conditions and requirements outlined in the permit and/or certification will be followed. MoDOT will fulfill any compensatory mitigation requirements through an approved mitigation bank, or other USACE-approved method. (Section 404 Resources – **Section 4.12.3**)
24. MoDOT shall ensure that the project will operate under the provisions of the general TS4 state operating permit (MO-0137910) issued by the Missouri Department of Natural Resources. (Stormwater – **Section 4.14.1**)
25. Red Devil Ditch, Kinnemore Slough, Honey Cypress Ditch, Pole Cat Slough, and Ragland Slough are under the jurisdiction of Consolidated Drainage District No. 2, and any alternations to these streams will be coordinated with this drainage district, as required. (Stormwater – **Section 4.14.2**)
26. Custom temporary and permanent erosion control plans will be developed during final design of the project and included within the contract specifications. Standards in MoDOT's *Standard Specifications Book for Highway Construction* (2023) will also be followed (Stormwater – **Section 4.14.2**)
27. MoDOT shall ensure that its Stormwater Pollution Prevention Plan (SWPPP) is implemented with appropriate erosion and sediment control BMPs implemented during construction and disturbed areas seeded following construction. Selection and incorporation of the BMPs shall consider the type of work activity undertaken and site conditions, such as soils, topography, and seasonal rainfall. (Stormwater – **Section 4.14.2**)
28. MoDOT will adhere to all stipulations in the executed Section 106 Programmatic Agreement. (Cultural Resources – **Section 4.15.1**)
29. MoDOT shall ensure that contractors' operations do not result in dust and suspended particulates migrating across active lanes of traffic which would cause diminished visibility for vehicle operators, and that fugitive dust does not migrate off the limits of the project corridor. (Construction – **Section 4.19**)
30. Contractors will be required to comply with all applicable local, state, and federal regulations regarding removal of improvements associated with adjacent properties such as wells, septic tanks, and structures that may contain lead and asbestos. (Construction – **Section 4.19**)
31. MoDOT shall ensure details of utility disposition are determined during project design. Agreements with utilities shall be negotiated and executed prior to seeking project federal authorization for construction. MoDOT's utility engineers and representatives of the various utilities shall plan the details of utility adjustments on an individual basis. (Construction – **Section 4.19**)

32. MoDOT shall ensure that careful refueling practices are employed to limit spills of gasoline and diesel fuels. (Construction – **Section 4.19**)
33. MoDOT will ensure local and regional access to existing rural and urban areas and facilities are maintained during construction (Construction – **Section 4.19.1**)
34. MoDOT shall ensure that the construction contract includes a Traffic Management Plan to provide response to temporary disruptions in travel patterns and travel time. The Traffic Management Plan will be developed during project design as part of the final design process. (Construction – **Section 4.19.1**)
35. MoDOT's project development process is dedicated to maintaining an open dialog with stakeholders, including the farm community in order to understand their needs and arrive at design solutions that will allow critical farm operations during construction. (Public Involvement – **Section 5.1**)

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