

ARDOT Job 090069

NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS

Environmental Assessment



January 2021

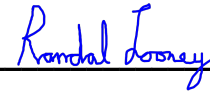
NORTHWEST ARKANSAS NATIONAL AIRPORT ACCESS

ARDOT Job 090069; F.A.P. Number HPP-0004(80)

Environmental Assessment

Submitted pursuant to:

The National Environmental Policy Act
42 U.S.C. §4322(2)(c) and 23 C.F.R. §771



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Submitted by:

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and

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Date of Approval



U.S. Department of Transportation
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In compliance with the National Environmental Policy Act, this Environmental Assessment describes the proposed project to provide a roadway that would connect the Northwest Arkansas National Airport (XNA) to Hwy. 612 (Springdale Northern Bypass) in Benton County, AR. The analysis did not identify any significant adverse environmental impacts and identifies the New Location Alternative as the Preferred Alternative.

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Chapter 1 – Purpose and Need

Chapter 1 describes current transportation problems, explains how the proposed project could resolve these problems, and outlines the project's lead agency roles.

1.1 What is the proposed project?

The Federal Highway Administration (FHWA), in cooperation with the Arkansas Department of Transportation (ARDOT) and the Northwest Arkansas National Airport (XNA), are proposing an improved connection between XNA and the Springdale Northern Bypass (SNB). The SNB is also known as Highway (Hwy.) 612. The project area is shown on **Figure 1**.

1.2 What is the history of the proposed project?

The Northwest Arkansas Regional Airport Authority was formed to evaluate, plan, and develop a new commercial airport to serve the air trade area of Northwest Arkansas. To accomplish this, the Authority prepared a feasibility study, site selection study, master plan, and an Environmental Impact Statement (EIS) to aid in a location for the new airport. The airport began operations at its current location in 1998.

In 1999, an EIS was initiated to identify a better access road from Interstate 49 (I-49) to the airport. Work on this EIS continued through 2019. Over the course of the EIS study (19 years), the project area, population, property development, and area roadways changed substantially. Because of these changes, especially the completion of the SNB from I-49 to Hwy. 112, the scope of the project was reduced and, in 2019, the EIS was terminated, an Environmental Assessment (EA) was initiated, and the airport changed its name to the Northwest Arkansas National Airport. **Figure 2** presents a summary and timeline of the activities related to the proposed access road.

1.3 What are the existing conditions in the project area?

Population Characteristics

The project area is located in Northwest Arkansas in Benton County. Benton County, and adjacent Washington County, have experienced substantial population growth since 2000 (**Table 1**: Population Growth). The larger cities within these counties include Rogers, Fayetteville, Springdale, and Bentonville. The smaller towns include Highfill, Elm Springs, and Caves Springs. According to the U.S. Census Bureau, Northwest Arkansas experienced a considerable population growth from 2000 to 2019. Project area cities and towns experienced between 51% and 378% growth in population as compared to an average growth for the state of 13%. The Fayetteville-Springdale-Rogers area was the 14th fastest growing metro area in the United States in 2017 (Holtmeyer, 2018).

Figure 1: General Project Location

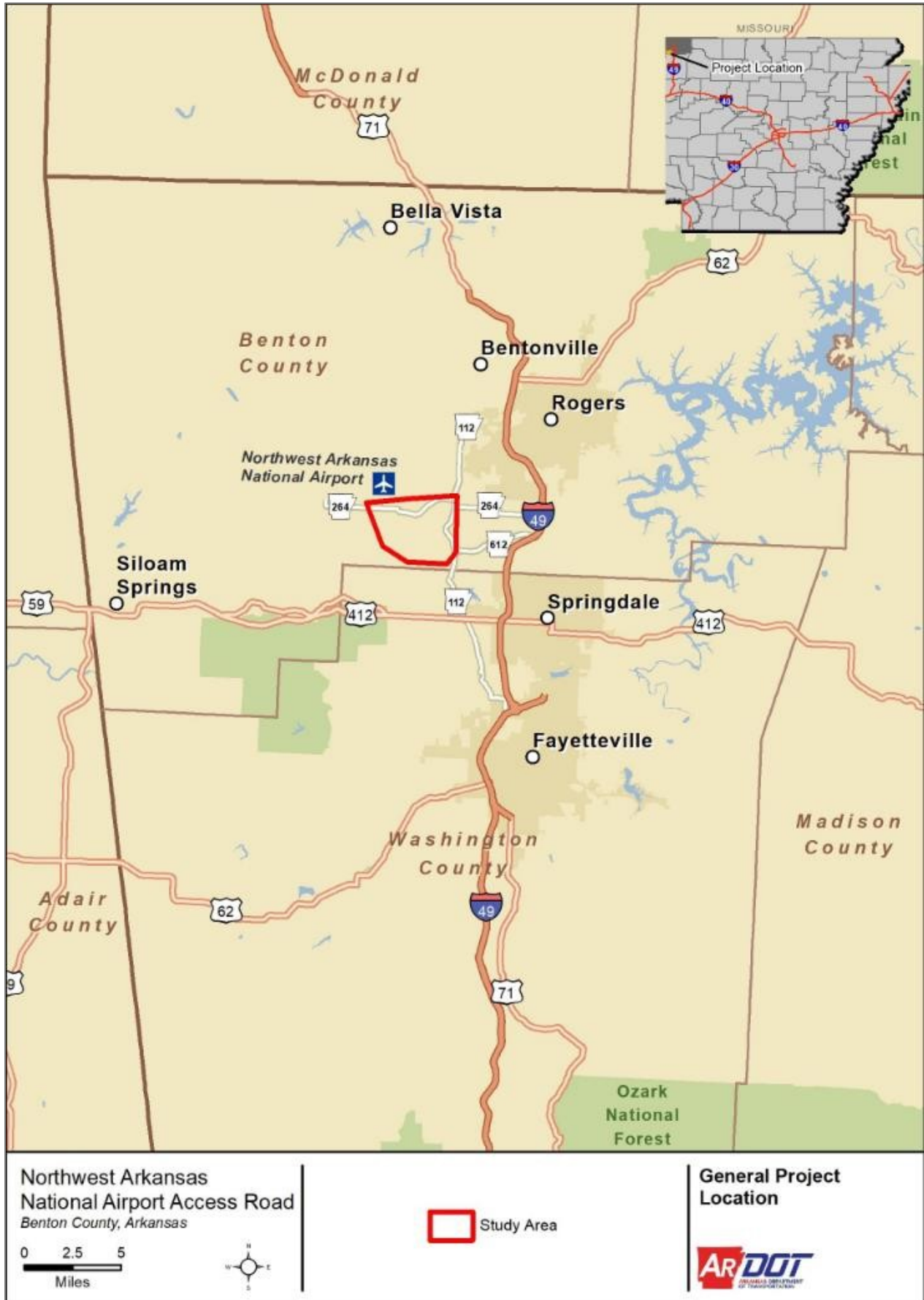


Figure 2: History of XNA Access Road

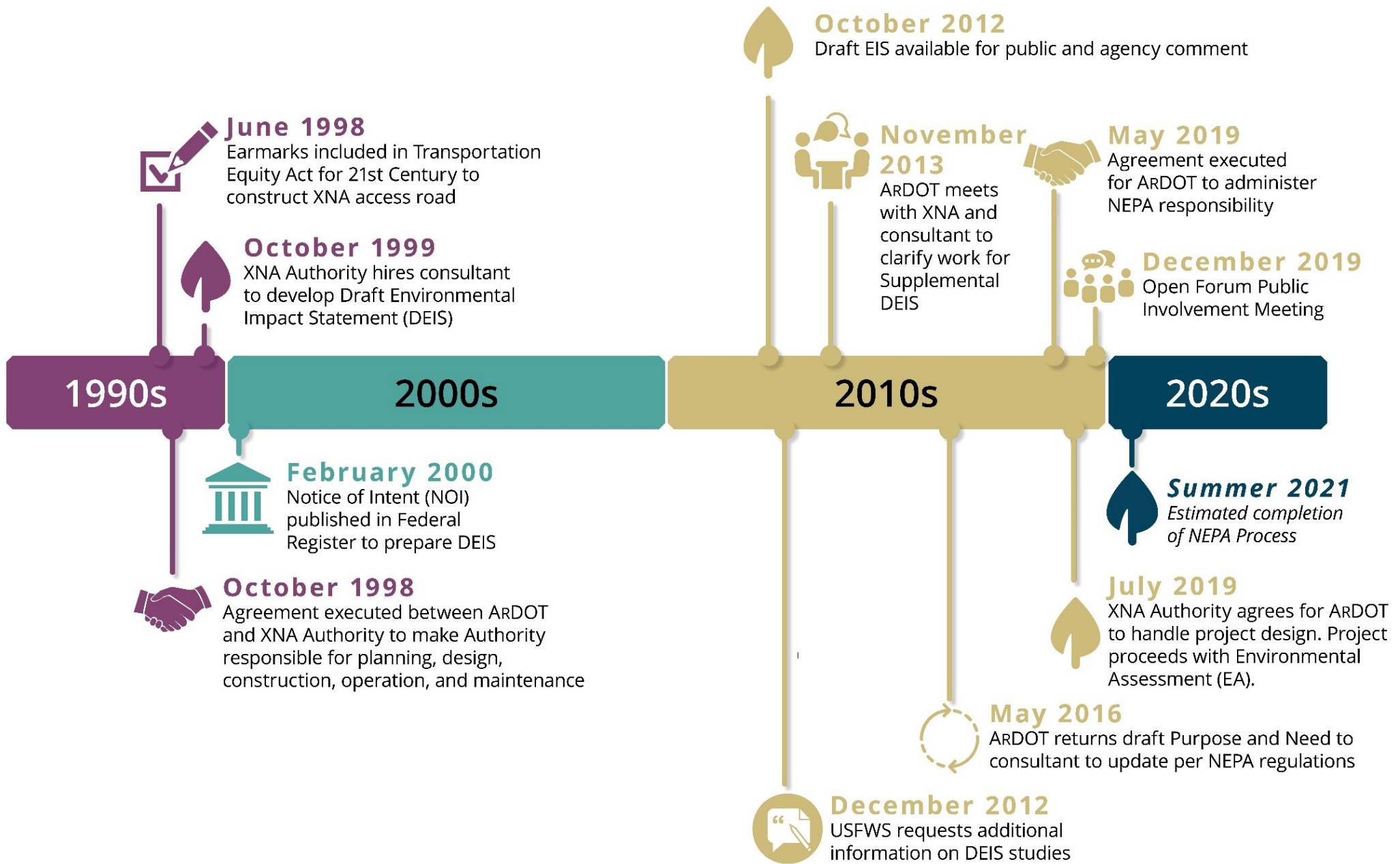


Table 1: Population Growth

Location	2000	2019*	Change	% Change
State of Arkansas	2,673,400	3,017,804	344,404	13%
Benton County	153,406	279,141	125,735	82%
Cave Springs	1,103	5,276	4173	378%
Highfill	379	635	256	68%
Rogers	38,829	68,669	29,840	77%
Bentonville	19,730	54,909	35,179	178%
Washington County	157,715	239,187	81,472	52%
Elm Springs	1,004	2,472	1468	146%
Fayetteville	58,047	87,590	29,543	51%
Springdale	45,798	81,125	35,327	77%

*Annual Estimates of the Resident Population for Incorporated Places and Counties in Arkansas: April 1, 2010 to July 1, 2019. Retrieved August 20, 2020.

According to the website Talk Business and Politics (2016), the growth in Northwest Arkansas has been related to an influx of higher paying jobs that resulted in continued investment in local cities and businesses. The presence of several growth oriented business makes this area an attractive place for people to live and work. A growth oriented business has the potential to generate significant revenue within one or more trading sector industries. Employers that have influenced growth in Northwest Arkansas include Walmart Stores in Bentonville, Tyson Foods in Springdale, the University of Arkansas in Fayetteville, and J.B. Hunt Transport Services, Inc. in Lowell. Other major employers within Benton and Washington Counties include Ozark Mountain Poultry, Inc., Simmons Foods, PAM Transportation Services, Inc., and Harps Food Stores.

The region has witnessed massive quality-of-life investments over the past decade that spurred consistent population growth. The investments include the construction of Arvest Ballpark, the Razorback Regional Greenway, the Walmart AMP, the Scott Family Amazeum, and a major renovation to Walton Arts Center. Additional community enhancements include the Crystal Bridges Museum of American Art, Brightwater, Theatre Squared, Bike NWA, and Downtown Bentonville, Inc. Outdoor recreation amenities such as walking, biking, and running trails have also increased.

Existing Transportation Network

Figure 3 shows the highway system that surrounds XNA. I-49 is located about five miles east of the project area and is the primary interstate highway that provides access to Northwest Arkansas from Missouri to the north and I-40 to the south. From I-49, the most direct routes to XNA are provided by Hwy. 264, Hwy. 112, Hwy. 12, and the SNB.

Hwy. 264 is a two-lane east-west road that provides a connection between the south entrance of XNA and the towns of Highfill, Healing Springs, Cave Springs, and I-49. Hwy. 264 along this section does not have shoulders and has two 90-degree curves requiring very slow speeds.

Hwy. 112 is a two-lane north-south highway that passes through Cave Springs and connects to the SNB in the project area and to Bentonville to the north and Elm Springs to the south. Hwy. 112 will serve as the backbone of future growth west of I-49, but runs directly through downtown Cave Springs with reduced speeds and congestion.

Hwy. 12/SW Regional Airport Boulevard (Blvd.) provides access to the north entrance of XNA from Bentonville and northern Highfill. Hwy. 12 is a two-lane roadway that provides a connection to I-49 from Hwy. 71B (SE Walton Blvd.) in Bentonville and to Centerton via Hwy. 279.

The SNB (Hwy. 612 on Figure 3) is a four-lane highway located about 2.5 miles south of Cave Springs that has fully-controlled access and provides a direct connection between Hwy. 112 and I-49. The SNB would eventually tie into Hwy. 412 to the south of the project area.

Airport Blvd. and Regional Avenue (Ave.) are located on the east side of XNA. Airport Blvd. connects Hwy. 264 to Regional Ave. on the south side of the airport. Regional Ave. provides a connection between Airport Blvd. and Hwy. 12 at the north entrance of XNA.

Northwest Arkansas has been an area of growth for over 20 years which has resulted in transportation improvements to local, state, and interstate roadways. **Figure 4** shows some of the important roadway improvement projects within or near the project area. These projects include the SNB, Hwy. 112 corridor improvements, and the Hwy. 264 bridge over Little Osage Creek. The SNB project would construct the remainder of the western half of the SNB to Hwy. 412 and is considered as an essential east-west bypass corridor improvement. The Hwy. 112 corridor improvements projects would widen approximately 20 miles of Hwy. 112 from Fayetteville to Bentonville. The Little Osage Creek project consists of the replacement of the Hwy. 264 bridge over Little Osage Creek. Major projects near the project and under construction include the Hwy. 71B interchange and construction of Hwy. 549, the Bella Vista Bypass.

Figure 3: Existing Transportation Network

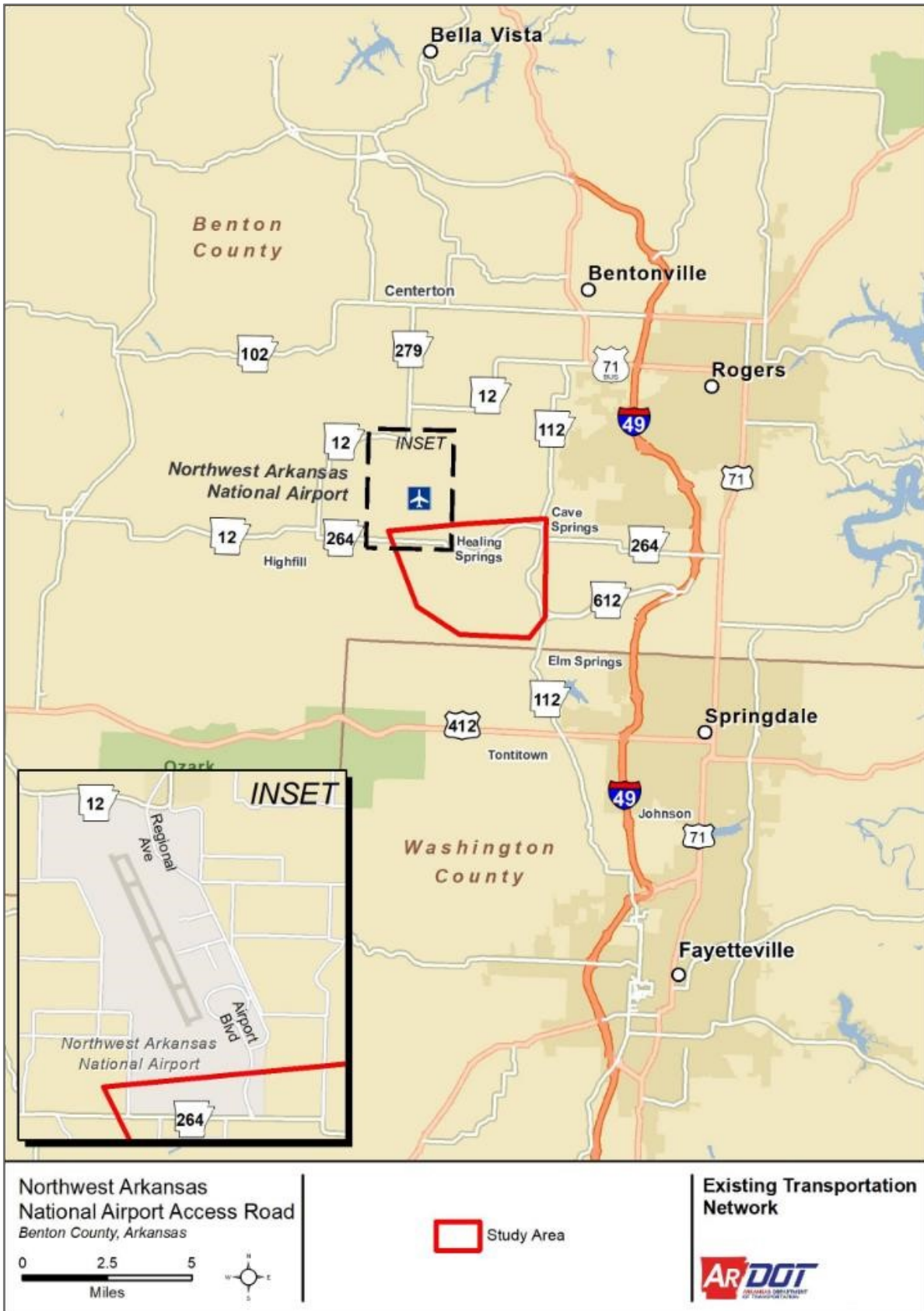
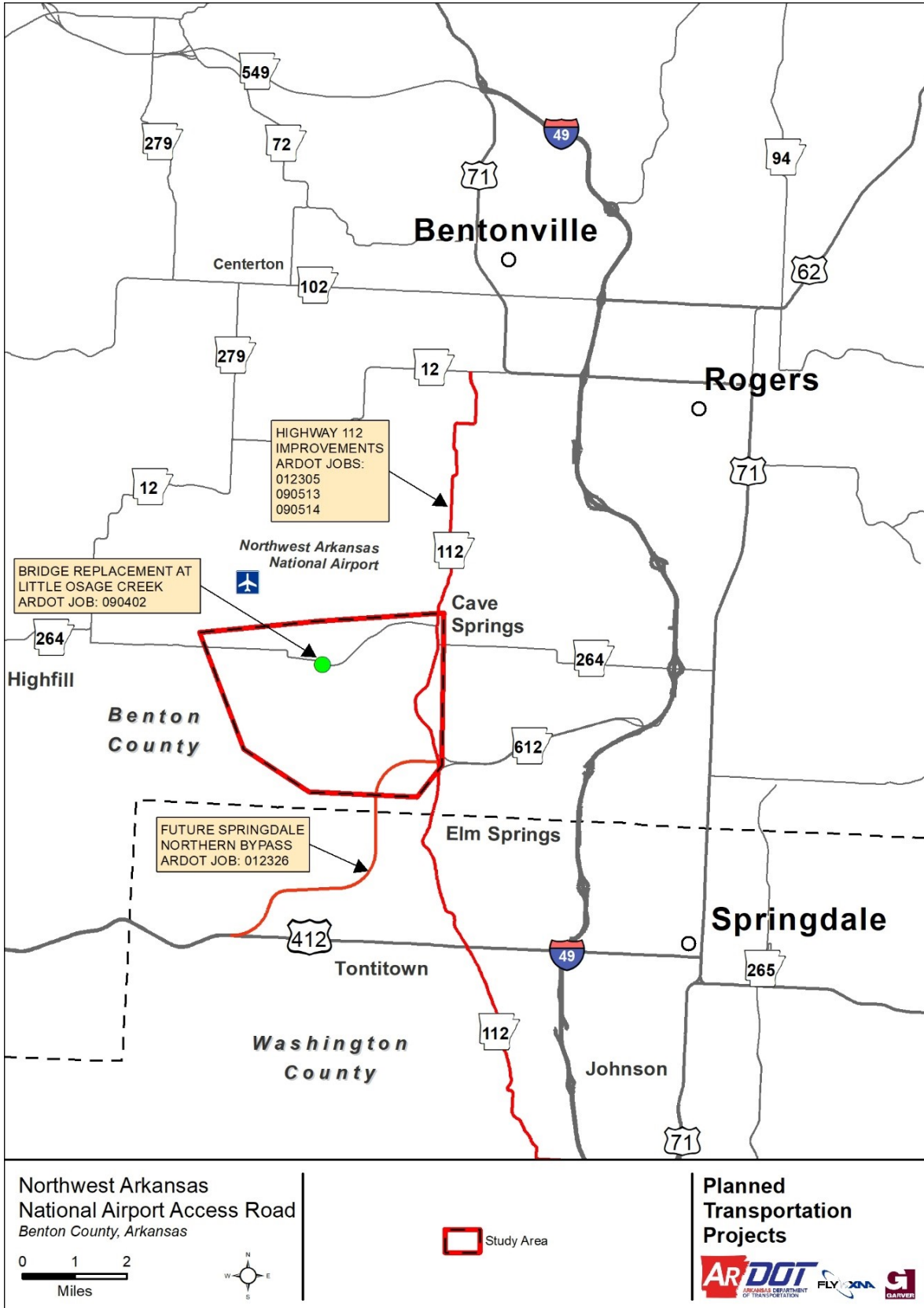


Figure 4: Planned Transportation Projects



Enplanement Growth

The population growth in Northwest Arkansas, as described above, has resulted in the increased demand for air travel. In 2019, XNA saw a 17% increase in passengers, representing substantial growth for a small-hub airport. The number of passengers using XNA in 2019 was 64% higher than in 2011, and the airport has experienced eight consecutive years of passenger growth. A study conducted by Mead and Hunt (2020) predicts enplanements at XNA will double by 2033 and more than triple by the end of the 20-year planning period to approximately 2.9 million annually. As passenger volumes and airport-related employment have increased, so has the volume of traffic to and from the airport and on the local roadway network.

An **enplanement** is one person boarding an airplane.

1.4 Why are improvements needed?

Existing and Future Traffic Conditions

Access to XNA is provided by Hwy. 264 to the south and Hwy. 12 to the north. Both roads are winding, narrow, mostly two-lane highways. Due to poor connectivity between I-49 and the XNA, motorists must use local roads to and from I-49 to get to the airport resulting in misdirection, longer travel times, and delay.

Connectivity

Connectivity refers to the number of links in a transportation network and how directly travelers can reach their destinations. As connectivity increases, travel distances decrease and route options increase. The concept of connectivity primarily relates to developed areas, where the design of local street networks can have a significant impact not only on trip lengths, but also on overall network performance. In addition, connectivity improvements can have a significant impact on local travel patterns. Due to a lack of connectivity between Interstate 49 and XNA, motorists traveling between these points must use local roads, resulting in misdirection and longer travel times.

Both access roads to XNA, Hwy. 264 and Hwy. 12, are minor arterials with deficient horizontal geometry in the vicinity of XNA. To the south, Hwy. 264 has a posted speed limit of 55 mph, though 0.5 mile east of the airport entrance, drivers encounter sharp 90-degree reverse curves with a posted advisory speed of 20 mph. Approaching from the south or east, Hwy. 264 provides an indirect route to the airport by forcing traffic through downtown Cave Springs.

Approaching from the north via Hwy. 71B (Walton Blvd.), drivers encounter an urbanizing corridor with traffic signals, varying lane configurations, and a series of sharp 90-degree curves. Walmart Distribution Centers are located along Hwy. 12, providing an additional source of heavy truck traffic. North of XNA, Hwy. 12 is posted for 55 mph but has a sharp curve just north of the airport property with an advisory speed of 25 mph.

Resiliency

FHWA Order 5520 establishes FHWA policy on preparedness and resilience to climate change and extreme weather events and for integrating resilience into long-range transportation planning. The policy encourages state departments of transportation to develop, implement, and evaluate risk-based and cost-effective strategies to minimize climate and extreme weather risks and improve resiliency to protect critical infrastructure using the best available science, technology, and information.

For this study, resiliency was evaluated by identifying failure critical infrastructure along the corridor and determining if failures at these locations would result in a significant increase in travel distance. Locations which tend to flood were also noted. Hwy. 112 has notable flooding tendencies, particularly on the segment just north of the SNB, which provides access to XNA. Hwy. 264 also has several locations which are prone to flooding, necessitating road closures on both the east and west sides of the south airport entrance. Hwy. 264 flooded twice in 2019, resulting in temporary road closures and causing delays for people traveling to or from XNA.

Resiliency is defined as the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruption (FHWA 2014) and to focus on the ability to prepare for and recover from disasters and disruptive events (Dix et al. 2018).

Congestion

While the primary study area for this project is bounded by Hwy. 12 to the west and the SNB to the east and encompasses the area south of XNA, including Hwy. 264, the entire network system was considered in the congestion evaluation.

In 2018, much of the extended study area corridors operate at fair or better than fair condition, except for a few notable areas along I-49, Hwy. 71B, Hwy. 102, and Hwy. 112. With the exception of Hwy. 112 which will be widened from two lanes to four lanes in a future separate project, the 2040 No-Action traffic conditions are anticipated to worsen along the above corridors as well and other areas in the extended study area. **Table 2** identifies the areas with unacceptable congestion levels. The Traffic Study is provided in **Appendix A**.

Table 2: Congestion Levels

Route	Segment	2018 Congestion Levels	2040 Congestion Levels
I-49	Washington County Line to Hwy. 264	Poor	Very Poor
	Hwy. 264 to Hwy. 71B	Fair	Very Poor
	Hwy. 71B to Hwy. 102	Good or Better	Very Poor
Hwy. 12	Regional Ave. to West of Mill Dam Rd.	Good or Better	Fair
	West of Mill Dam Rd. to SW Shell Rd.	Fair	Poor
	SW Shell Rd. to SW I St.	Good or Better	Very Poor
	SW I St. to Hwy. 71B	Very Poor	Very Poor
Hwy. 62	I-49 SB Ramp to I-49 NB Ramp	Very Poor	Very Poor
Hwy. 71B	Hwy. 72 to SE 18th St.	Very Poor	Very Poor
	SE 18th St. to SE 28 th St./Airport Rd.	Fair	Poor
	SE 28 th St./Airport Rd. to I-49	Very Poor	Very Poor
	I-49 to 46th St.	Fair	Very Poor
	Dixieland Rd. to N 8th St.	Fair	Fair
Hwy 102	N Vaughn Rd. to Hwy 102 Spur/S Fish Hatchery Rd.	Fair	Poor
	SW Elm Tree Rd. to SW I St.	Fair	Very Poor
	SW I St. to Hwy. 71B	Poor	Very Poor
	Hwy. 71B to SE J St.	Very Poor	Very Poor
	SE J St. to SE Moberly Ln.	Poor	Very Poor
	SE Moberly Ln. to I-49	Very Poor	Very Poor
Hwy. 112	Washington County Line to Hwy. 12	Poor	Good or Better
Hwy. 264	Airport Blvd. to Bush Arbor Rd.	Fair	Poor
	Bush Arbor Rd. to Hwy. 112	Good or Better	Fair
	Hwy. 112 to Rainbow Rd.	Good or Better	Fair
	Rainbow Rd. to West of Goad Springs Rd.	Good or Better	Poor
	West of Goad Springs Rd. to Hwy. 71B	Very Poor	Very Poor
Airport Blvd.	Airport Entrance to Hwy. 264	Good or Better	Very Poor
SW I St.	Hwy. 12 to Hwy. 71B	Fair	Very Poor

Source: Garver 2020

1.5 What is the purpose of this project?

As the population grows in Northwest Arkansas and activity at XNA also grows with increasing enplanements and movement of goods, the purpose of the proposed project is to provide an improved connection between XNA and the SNB that reduces congestion and increases reliability.

1.6 Who is the lead agency for this project?

The FHWA is the lead agency and has the primary responsibility for the content and accuracy of this EA in accordance with the National Environmental Policy Act (NEPA).

1.7 What is the purpose of this Environmental Assessment?

This EA is being prepared to:

- Explain the purpose and need of the project.
- Describe the alternatives considered for implementing the project.
- Evaluate the social, economic, and environmental effects of the alternatives.
- Inform and receive feedback from the public and local officials about the potential impacts of the proposed project.
- Determine whether effects are significant and require an Environmental Impact Statement or if the project effects can be sufficiently documented through this EA and a Finding of No Significant Impacts (FONSI).

What are **significant** impacts?

NEPA regulations do not provide specific thresholds to determine if project impacts are considered significant, but they do discuss the process that should be used to evaluate impacts.

Consideration is given both to context of the setting, and intensity, which is the severity of the impacts.

A **Finding of No Significant Impact (FONSI)**

presents the reasons why an action will not have significant environmental effects and therefore does not require preparing an Environmental Impact Statement. Based on analyses and project feedback received to date, the ARDOT anticipates preparing a FONSI for this project.

Chapter 2 – Alternatives Development

Chapter 2 identifies the project limits, explains how project alternatives were developed, describes the public involvement process, and details the alternatives evaluated in this EA.

2.1 What are the project limits and why were they chosen?

The project limits include the south entrance to XNA at Hwy. 264 as the northern terminus and the SNB as the southern terminus. These project limits were selected to provide the closest direct connection from XNA to a major regional highway system.

2.2 What alternatives are evaluated in this EA?

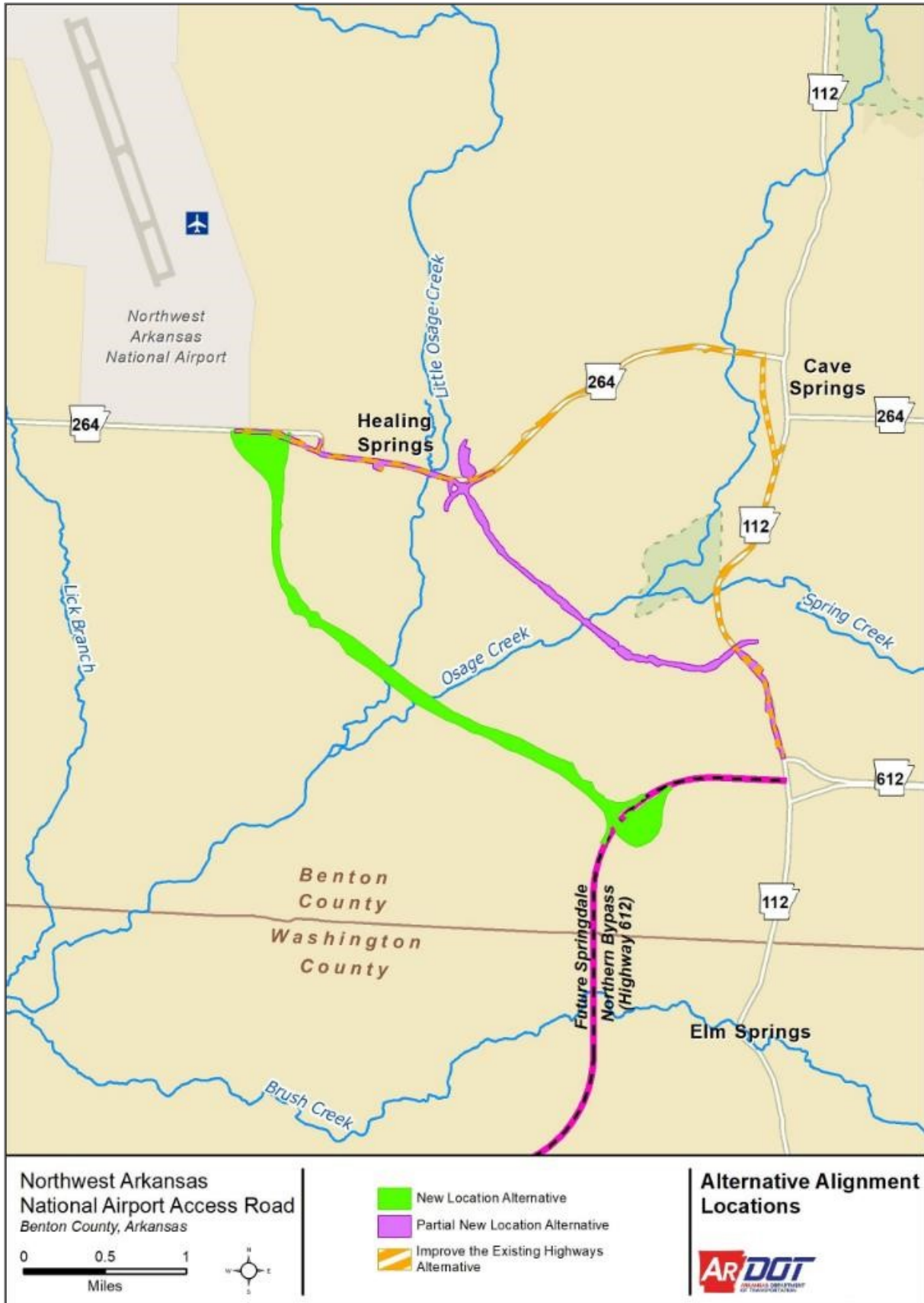
Four alternatives are evaluated in this EA: No Action Alternative, New Location Alternative, Partial New Location Alternative, and Improve Existing Highways Alternative. A discussion of the planned Hwy. 112 improvements project is included below and in Chapter 3 but it is not an alternative in this study. A map of the action alternatives is provided in **Figure 5**.

No Action Alternative

The No Action Alternative would involve maintenance activities and planned improvements to area roadways that currently provide access to the XNA airport. Selection of the No Action Alternative would avoid a major state and federal expenditure and impacts to the economic, natural, and social environments directly related to this project.

NEPA requires including a **“No Action”** alternative in environmental analysis. Although it is unlikely to meet the project’s purpose and need, the “No Action” alternative provides a baseline against which the other alternatives can be compared.

Figure 5: Alternative Alignment Locations



New Location Alternative

The New Location Alternative shown on **Figure 6** would be a fully-controlled access highway facility approximately 4.6 miles long with a new grade separated trumpet-type interchange at the SNB. A layout of the proposed trumpet interchange is provided on **Figure 7**. This interchange would be designed to connect to the future location of the SNB between Hwy. 112 and Hwy. 412. The SNB would need to be extended west approximately one mile from its current terminus at Hwy. 112 to meet the New Location Alternative interchange. This future interchange location was identified based on interchange spacing requirements by FHWA and consideration of environmental impacts. This alternative would then extend north and west from the SNB on a new alignment to an at-grade intersection at Hwy. 264 east of the existing entrance road to XNA. The typical section would consist of a four-lane divided highway with a 60-foot-wide depressed grass median, six-foot-wide inner shoulders, and 10-foot-wide outer shoulders. The design speed would be 70 mph. Overpasses would be located at three local roads: Holmes Rd., Haden Rd., and Wager Dr. Bridges would also be constructed over Little Osage Creek and Osage Creek. The estimated cost for right of way (ROW) acquisition and construction of this alternative is approximately \$85.6 million. The typical section of the New Location Alternative is shown on **Figure 8**.

A **fully-controlled access highway** is one where vehicles can only enter or exit the roadway via ramps at interchanges. These facilities are designed for higher speeds with a preference to through traffic.

A **partially-controlled access highway** is one where vehicles may enter or exit the roadway via ramps at interchanges, but also at-grade at selected major public intersections. These types of facilities also limit the number of private driveway connections.

Partial New Location Alternative

The Partial New Location Alternative would be approximately 4.3 miles long with 2.7 miles on new location paralleling Colonel Myers Rd. to the east with full access control and 1.6 miles of improvements to Hwy. 112 and Hwy. 264 with partial access control. A roundabout is proposed at Colonel Meyers Rd. and Hwy. 264. The two consecutive 90-degree curves near Brush Harbor Rd. would be replaced with a straighter and safer alignment. The typical section for both full and partial control sections would consist of four lanes with a 15-foot-wide raised grass median, curb and gutter, and a 45 mph design speed (Figure 8). This alternative would have at-grade intersections at Hwy. 112 and Hwy. 264. Overpasses would be located at Farrar Rd. and Kelly Rd. Bridges would be constructed over Little Osage Creek and Osage Creek. The estimated cost for ROW and construction of this alternative is approximately \$66.4 million. The Partial New Location Alternative is shown on **Figure 9**.

Figure 6: New Location Alternative

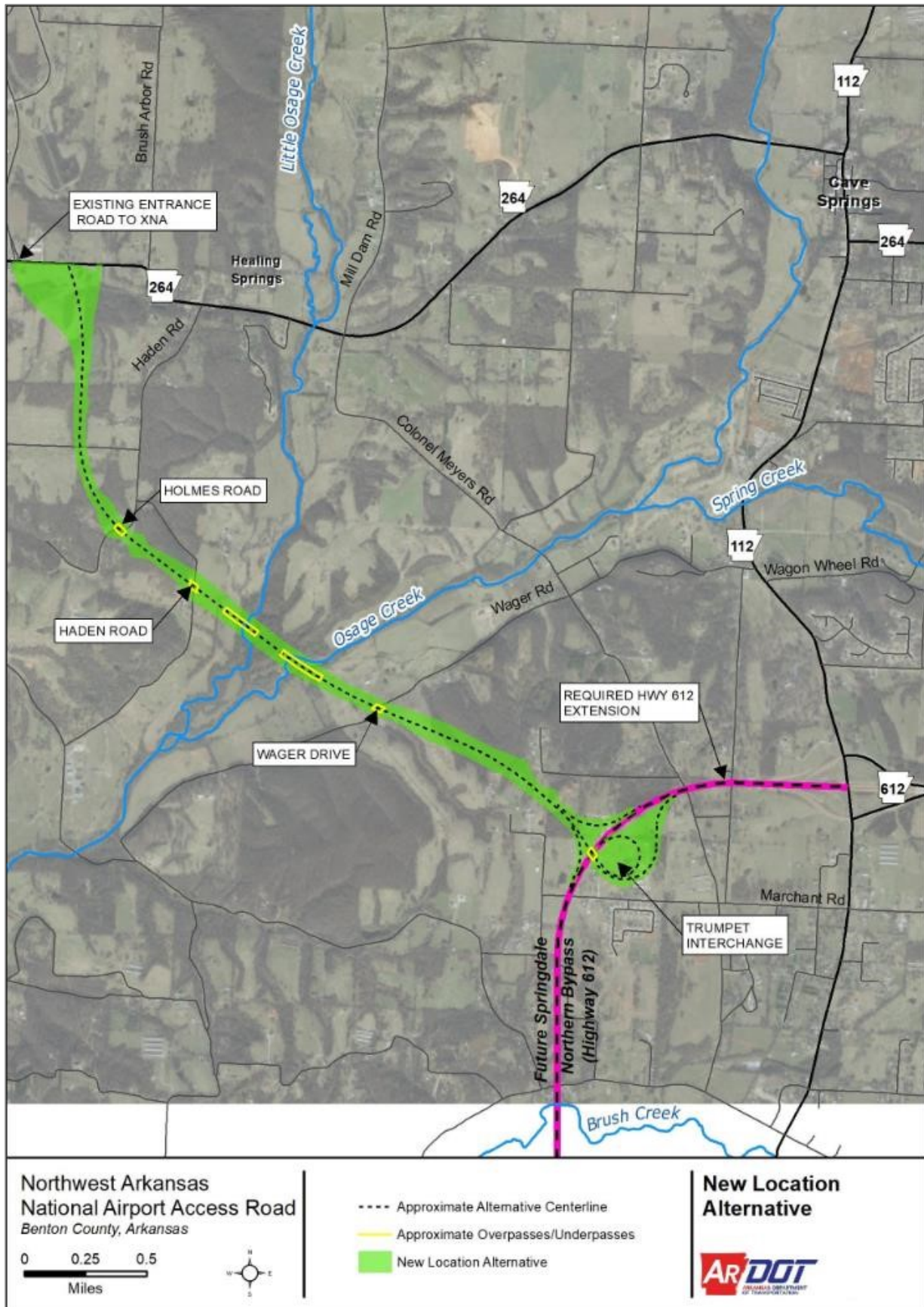


Figure 7: Trumpet Interchange - South end of New Location Alternative

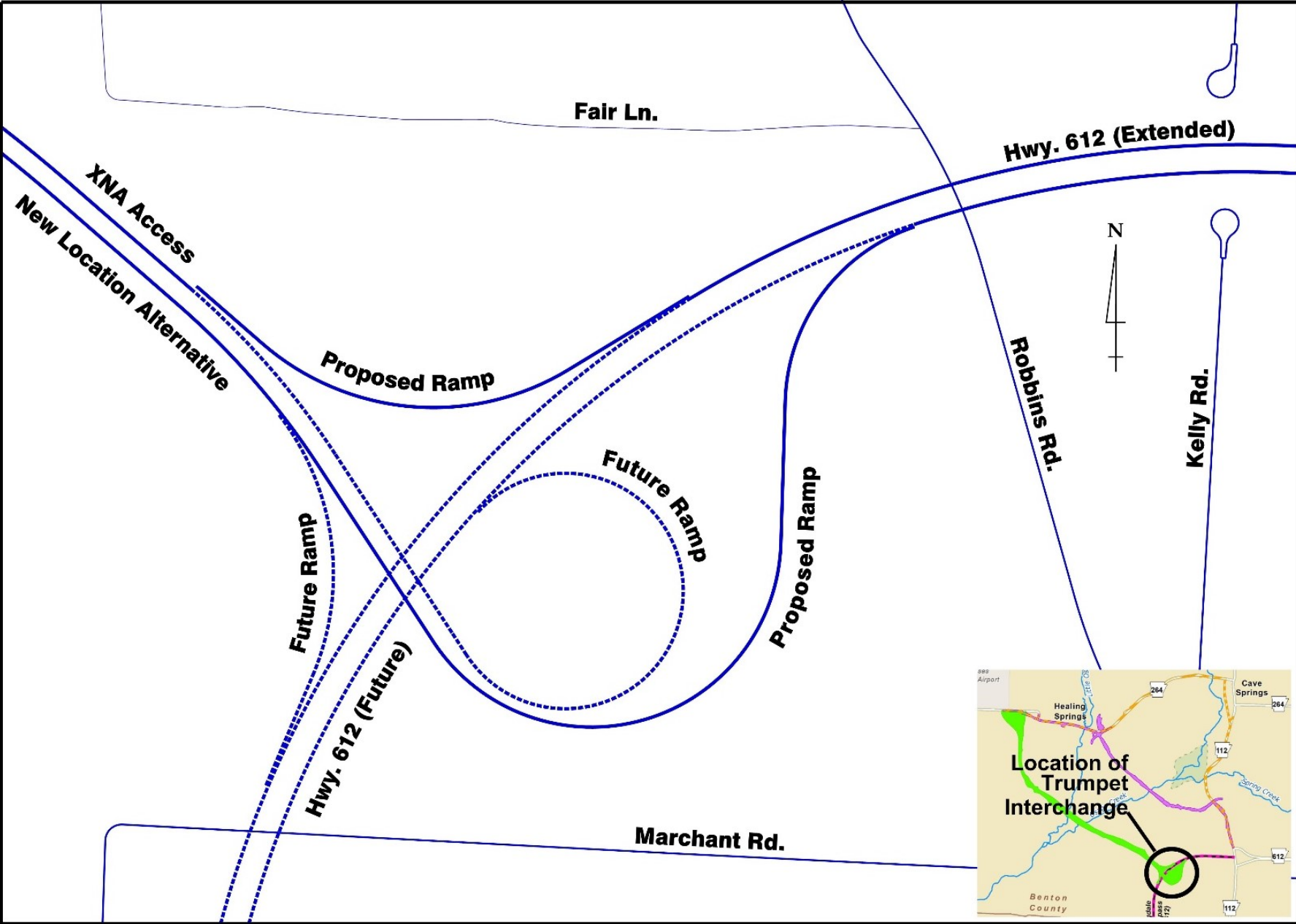


Figure 8: Typical Sections

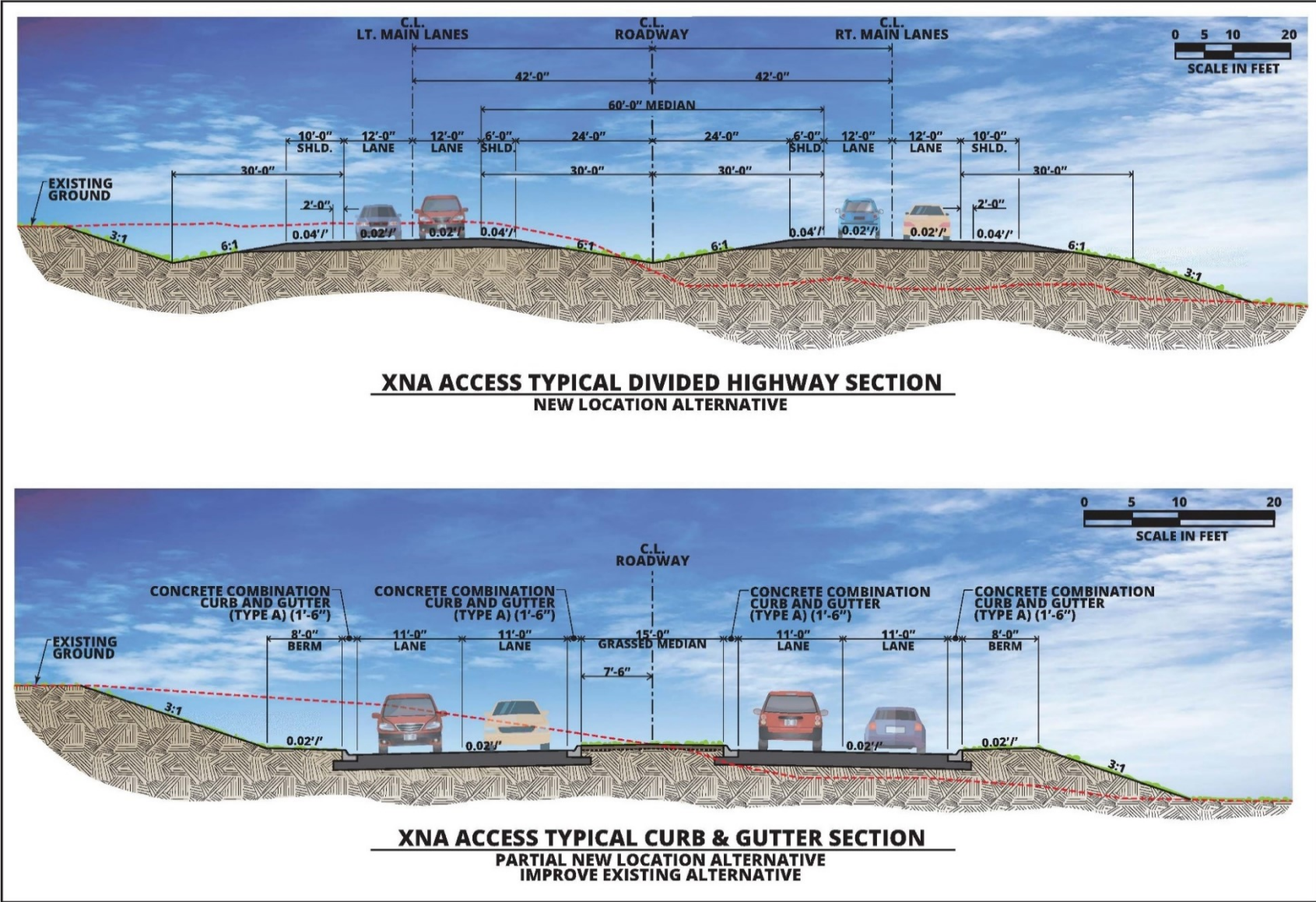
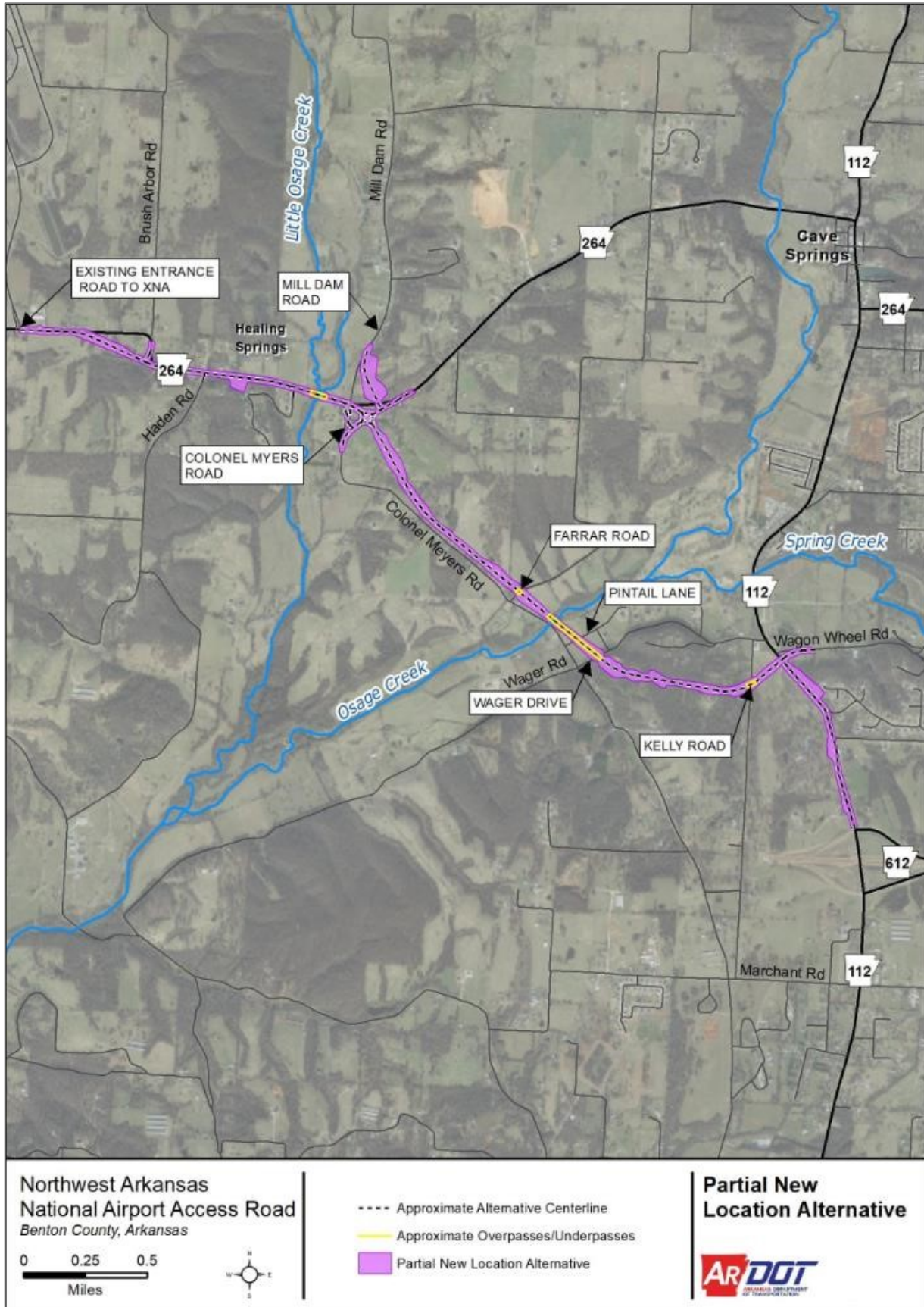


Figure 9: Partial New Location Alternative



Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would be approximately 6.6 miles long and begin at the SNB and Hwy. 112 interchange. The improvements would follow existing Hwy. 112 towards Cave Springs. A bypass west of Cave Springs, beginning 400 feet south of East Ave. to 260 feet west of N. Allen Street (St.), would minimize substantial impacts to the homes, businesses, parks, and historic structures along Hwy. 112 in Cave Springs. After the bypass intersects Hwy. 264, the improvements follow Hwy. 264 west to the south entrance of XNA. The consecutive 90-degree curves on Hwy. 264 would be replaced with a straighter and safer alignment. The typical section would consist of four travel lanes, a 15-foot-wide raised grass median, curb and gutter, partial access control, and a 45 mph design speed (Figure 8). No overpasses would be provided. Bridges would be provided at Spring Creek, Osage Creek, and Little Osage Creek. The estimated cost for ROW and construction of this alternative is approximately \$57.1 million. **Figure 10** shows the Improve the Existing Highways Alternative.

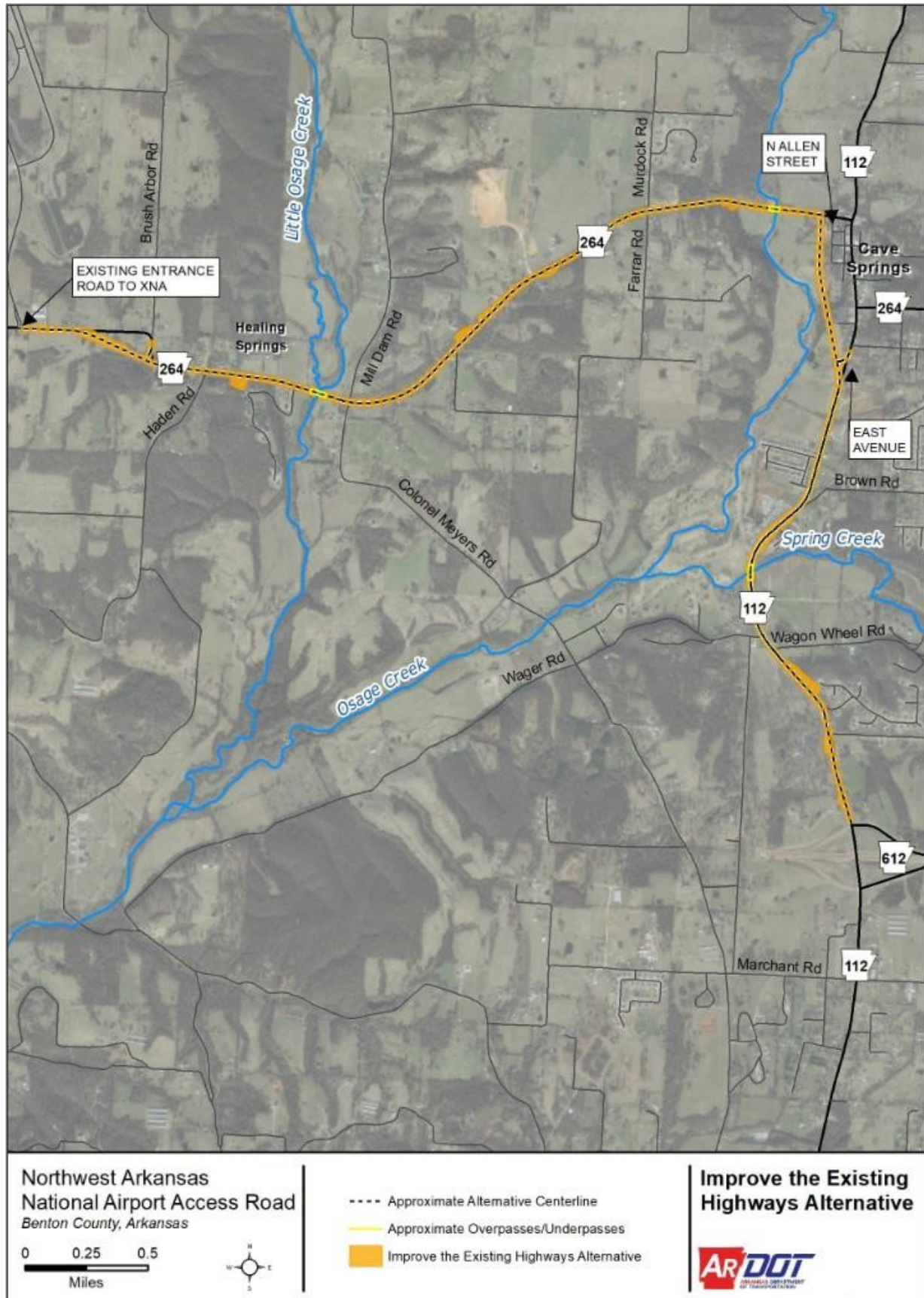
Highway 112

At the request of the Northwest Arkansas Regional Planning Commission (NWARPC), the Metropolitan Planning Organization (MPO) for the Northwest Arkansas metro area, the Arkansas State Highway Commission authorized the study of 20 miles of Hwy. 112 from Fayetteville to Bentonville to determine the feasibility of improvements to address capacity and safety needs that would improve reliability, reduce congestion, reduce serious and fatal crashes, and develop an urban arterial that addresses all modes of transportation (NWARPC, 2018). The study was completed in 2015 and identified a preliminary Improvement Alternative that would widen Hwy. 112 from two to four lanes along the entire 20 miles. Project design is underway for two segments of Hwy. 112: Hwy. 412 to the SNB and the SNB to Hwy. 12.

Although improvements to only Hwy. 112 are not an alternative for this project, the future Hwy. 112 improvements that overlap with this study are already programmed and in development, and scheduled to be constructed within the near future. The overlap with the Hwy. 112 improvements projects for the Improve the Existing Highways Alternative is from the SNB to Hwy. 264. The overlap for the Partial New Location Alternative is from the SNB to Wagon Wheel Rd. There is no overlap with the New Location Alternative. An outline of the Hwy. 112 impacts is provided in Chapter 3 to identify impacts that would likely occur in the future regardless of which project, the XNA connector or the Hwy. 112 improvements, is funded first.

The project details have not been finalized for the separate Hwy. 112 projects, but the improvements and typical section are expected to be similar to those for Hwy. 112 from the SNB to Hwy. 264 as described above for the Improve the Existing Highways Alternative.

Figure 10: Improve the Existing Highways Alternative and Hwy. 112 Improvements



2.3 How has the public been involved?

On December 5, 2019, a local officials' meeting and an open forum public involvement meeting were held at Trinity Grace Church in Rogers, Arkansas. A total of 196 people, 27 of which were local officials, attended the meetings. Maps showing the proposed alignments for the action alternatives were presented for review and comment. Eighty-three comment forms/emails and five letters were received. The complete public involvement meeting synopsis is included in **Appendix B**.

Additional communication with the public included a project website (<https://xnaaccess.azurewebsites.net/>) published in October 2019 to provide study information and updates. The website includes a project overview, frequently asked questions, information presented at the December 2019 public meeting, and project contact information.

2.4 How have government agencies been involved?

In December 2019, input from local officials was solicited regarding the proposed project. Additionally, federal and state resource agencies were provided maps and project information and asked to review the proposed study area and provide information or identify concerns they may have about the project impacts.

In addition, Section 163 of the Federal Aviation Administration Reauthorization Act of 2018, which concerns actions on or around an airport, was considered in the development of the action alternatives. If the project impacts the runway protection zone (RPZ) or any other component of the Airport Layout Plan (ALP), the project would require FAA review. Based on information provided by XNA through their coordination with FAA, participation in the EA process would not be required. Agency coordination is provided in **Appendix C**.

2.5 How have tribal governments been involved?

Section 106 of the National Historic Preservation Act requires federal agencies to consult with tribes where projects may affect tribal areas with historical or cultural significance. The FHWA initiated coordination with tribes having an active cultural interest in the area. The Tribal Historic Preservation Officers were given the opportunity to comment on the proposed project. The Osage Nation provided avoidance areas that contain significant historic properties for the Osage Nation. No other comments were received. A copy of the cultural resources report completed for the project would be provided to any tribes that request it. Tribal correspondence is provided in Appendix C.

Chapter 3 – Environmental Impacts & Mitigation

This chapter summarizes potential project impacts on people and the environment.

3.1 How were potential impacts evaluated?

Studies were conducted to determine how the proposed project would potentially impact the natural, cultural, and social environments. Results of studies and analyses that are not fully discussed in the following EA text are incorporated by reference or included in the appendices. Resources not impacted by the project are not discussed in detail.

The analyses considered both the intensity of the effects and their duration (e.g., short-term during construction, or long term, remaining after construction). The effects discussed in this chapter are presumed to be long-term unless otherwise noted and generally described as positive or negative. The analyses in this chapter are based on preliminary design of the three action alternatives. The anticipated Hwy. 112 impacts as a result of the proposed corridor improvements that overlap with the Improve the Existing Highways Alternative and Partial New Location Alternative are also included for informational purposes, to identify impacts that would likely occur in the future regardless of which project is funded first: XNA or the Hwy. 112 corridor improvements.

Potential impacts are changes or effects that may occur as a result of a proposed project. The impacts may be social or cultural, economic, or ecological. The terms “impact” and “effect” can be used interchangeably.

3.2 How would the project affect local traffic conditions?

From a connectivity standpoint, each of the action alternatives would reduce the overall trip duration for regional movements and from I-49 to XNA via the SNB. Additionally, the New Location Alternative and the Partial New Location Alternative would substantially reduce the travel distance from the SNB to XNA, as well as remove some of the XNA traffic from roads that serve local traffic, which improves safety and efficiency for all road users.

Travel Times

The travel times were all derived from the Northwest Arkansas Travel Demand Model. All values are measured from Airport Blvd. at Hwy. 264 to the Westbound ramp at the Hwy. 112/SNB interchange. **Table 3** below shows the results for each Alternative and the comparison with the 2040 No Action Alternative. All three action alternatives perform better than the No Action Alternative with regard to travel times with the New Location Alternative having the shortest travel time.

Table 3: Travel Time Comparison

Alternative	Length (miles)	Average ADT	AM Travel Time (Min)	PM Travel Time (Min)
2040 No Action	6.63	13,246	8.19	8.80
2040 New Location Alternative	4.60	18,814	4.99	5.04
2040 Partial New Location Alternative	4.34	14,960	5.76	5.97
2040 Improve Existing Alternative	6.63	13,883	7.47	7.66

Traffic Congestion

The percent change in Average Daily Traffic volumes from the 2040 No Action Alternative for each of the action alternatives was minimal outside the study area; therefore, congestion analyses of the action alternatives outside the study area were not performed. As shown in **Table 4**, the action alternatives operate better than the No Action Alternative in 2040.

Table 4: Congestion Level Comparison

Route	Segment	2018 Congestion Levels	2040 No Action Alt. Congestion Levels	2040 New Location Alt. Congestion Levels	2040 Partial New Location Alt. Congestion Levels	2040 Improve Existing Alt. Congestion Levels
Hwy. 12	Regional Ave. to West of Mill Dam Rd.	Good or Better	Fair	Fair	Fair	Fair
Hwy. 112	Washington Co. Line to Hwy. 12	Poor	Good or Better	Good or Better	Good or Better	Good or Better
Hwy. 264	Airport Blvd. to Bush Arbor Rd.	Fair	Poor	Fair	Good or Better	Good or Better
	Bush Arbor Rd. to Mill Dam Rd.	Good or Better	Fair	Fair	Good or Better	Good or Better
	Mill Dam Rd. to Hwy. 112	Good or Better	Fair	Fair	Fair	Good or Better
Airport Blvd.	Airport Entrance to Hwy. 264	Good or Better	Very Poor	Good or Better	Good or Better	Good or Better
Regional Ave.	Hwy. 12 to Airport Blvd.	Good or Better	Good or Better	Good or Better	Good or Better	Good or Better
New Connector	Hwy. 264 to Hwy. 612 (New Location Alt.)	n/a	n/a	Good or Better	n/a	n/a
	Hwy. 264 to Hwy. 112 (Partial New Location Alt.)	n/a	n/a	n/a	Good or Better	n/a

New Location Alternative

Overall, the New Location Alternative provides the most direct connection and the shortest travel times between XNA and the SNB. Congestion in the study area would be reduced when compared to the No Action Alternative.

Local travel patterns are not anticipated to be disrupted long-term by the construction of this alternative since it is on new location. After construction is complete, residents would still be able to travel the local roadway network between Hwy. 264 and Robbins Rd. and between Hwy. 112 and Hendrix Rd. on overpasses at Holmes Rd., Haden Rd., and Wager Dr.

Partial New Location

The Partial New Location Alternative would result in slightly longer travel times when compared to the New Location Alternative. Congestion in the study area would be reduced when compared to the No Action Alternative.

Local travel patterns would be temporarily disrupted by the construction of this alternative. After construction, overpasses at Farrar Rd. and Kelly Rd. would provide continued access for residents along Colonel Myers Rd., Wager Dr., and Robbins Rd., so local long-term travel patterns would not be substantially impacted.

Improve the Existing Highways Alternative

Although the Improve the Existing Highways Alternative has the longest expected travel time when compared to the other action alternatives, it would reduce congestion in the study area and slightly improve travel times when compared to the No Action Alternative. Local travel patterns would remain very similar to current patterns although the number of vehicles using Hwy. 112 is expected to increase.

Highway 112

Because the Hwy. 112 improvements would only improve part of the route from the SNB to XNA, it would not substantially improve travel times or connectivity over the existing condition.

3.3 Would the project affect land use?

The U.S. Geological Survey (USGS) 2016 National Land Cover Dataset was used to identify land use/land cover types along the alternative alignments as shown on **Figure 11**. The construction of the proposed project would result in the direct conversion of land from its present use to a transportation use. The majority of land cover along the action alternatives consists of pastureland, deciduous forest cover, developed open space, a mixture of light residential development south of Hwy. 264 and XNA, and isolated small business development along Hwy. 264 and along Hwy. 112 south of downtown Cave Springs. The dominant land use types identified by alternative are shown in **Table 5**. The additional ROW required for each alternative that would be converted to transportation use is summarized in **Table 6**. A discussion of induced development is provided in **Section 3.15**.

Figure 11: Land Use

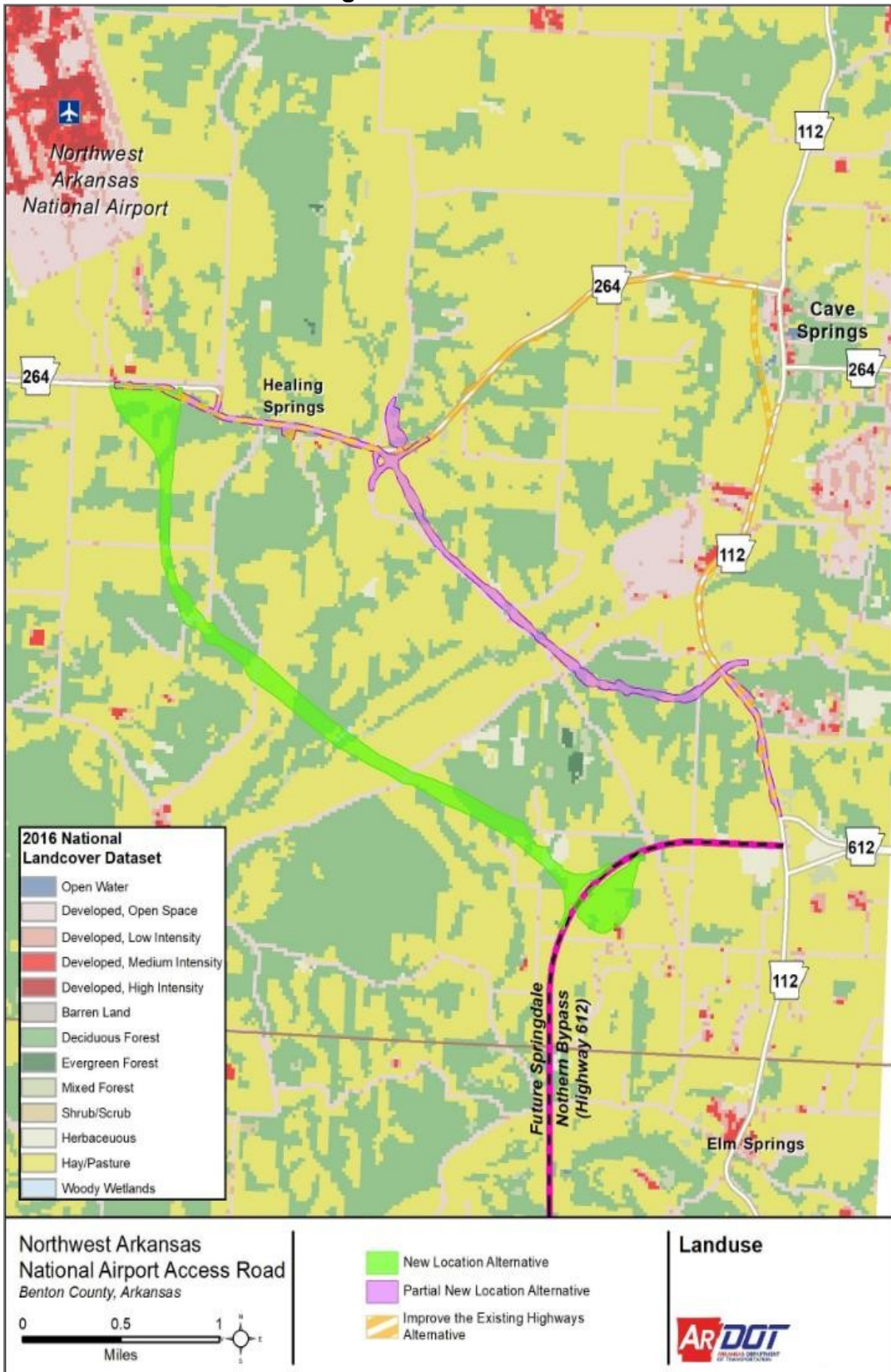


Table 5: Land Use Types

Alternative	Acres of each Land Use Type				Total Acres
	Hay/Pasture	Deciduous Forest	Herbaceous	Developed Open Space*	
No Action	0	0	0	0	0
New Location	140.3	91.4	3.3	4.9	240.0
Partial New Location	60.6	24.6	0.9	31	117.1
Improve Existing Hwys.	40.4	13.6	0.1	61	115.1

*Developed open space includes the existing highway footprint, which is why the total acreage is larger than the proposed ROW acquisition in Table 6

Table 6: Right of Way Impacts and Relocations

Alternative	ROW Required	Number of Relocations			TOTAL
		Residential	Business	Landlord	
No Action	0 acres	0	0	0	0
New Location	241.8 acres	2	3	0	5
Partial New Location	100.6 acres	11	1	4	16
Improve Existing Hwys.	74.7 acres	17	2	5	24

No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed and not affect land use patterns within the project area. Land use changes would likely continue along the current trend of increasing development and urban sprawl seen throughout Northwest Arkansas in recent years.

New Location Alternative

The New Location Alternative would require the acquisition of approximately 241.8 acres of right of way. This would predominantly include the conversion of forested and pastureland with scattered low-density residential development. The New Location Alternative would not directly impact any planned developments and is consistent with the comprehensive land use plans for the area.

Partial New Location Alternative

The Partial New Location Alternative would require the acquisition of approximately 100.6 acres of right of way. This would predominantly include the conversion of forested and pastureland, scattered low-density residential development, and developed open space.

The Partial New Location Alternative would not directly impact any planned developments and is consistent with the comprehensive land plans for the area. Access to existing residential development and business enterprises not displaced by the project would not be impacted by the construction of the project.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would require the acquisition of approximately 74.7 acres of right of way. Land use adjacent to this alternative is likely to follow the same trends of development as the past 20 years that have concentrated on residential development northward toward Bentonville along Hwy. 112 and eastward along Hwy. 264 toward the community of Lowell at I-49.

Highway 112

Hwy. 112 impacts associated with the Improve the Existing Highway Alternative include 20.4 acres of hay/pasture, 3.2 acres of deciduous forest, and 25.5 acres of developed open space, for a total footprint of 49.1 acres and 35.6 acres of ROW required. Hwy. 112 impacts associated with the Partial New Location Alternative include 5.8 acres of hay/pasture, 1.2 acre deciduous forest, and 9.8 acres of developed open space for a total footprint of 16.8 acres and 10.0 acres of ROW required.

3.4 Would there be any relocations?

Described below are the types and number of relocations associated with each alternative. When avoidance is not possible, relocation assistance would be provided in accordance with Public Law 91-646, Uniform Relocation Assistance Act of 1970. Construction of the project would not begin until decent, safe, and sanitary replacement housing is in place for all residential occupants. Table 6 above summarizes the number and type of relocations required for each alternative.

Acquisition and relocation assistance would be provided to displaced persons in accordance with the Uniform Relocation Assistance and Real Properties Acquisitions Policies Act of 1970. A Conceptual Stage Relocation Statement (CSRS) was completed to identify comparable replacement residential and commercial properties within a six-mile radius of the displacement and is included in **Appendix D**.

Relocations occur when a residence, business, or nonprofit organization is impacted severely enough that they cannot continue to live or do business at their current location. This usually occurs when proposed ROW acquisition requires removing a structure, taking most of a business's parking, or severing access to a property.

No Action Alternative

The No Action Alternative would not require any relocations.

New Location Alternative

The New Location Alternative is anticipated to involve two residential relocations and three business relocations. One of the impacted properties is a farmhouse associated with a farming business and is counted as both a business and a residential relocation.

Partial New Location Alternative

The Partial New Location Alternative is anticipated to involve 11 residential relocations (four of these are residential tenants that also have landlord business impacts) and one business relocation.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative is anticipated to involve 17 residential relocations (nine of these are residential tenants involving five landlord business impacts) and two business relocations.

Highway 112

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include 13 residential relocations (eight of these are residential tenants involving four landlord business impacts) and two business relocations. Hwy. 112 impacts associated with the Partial New Location Alternative include one residential and one business relocation.

3.5 How would the project affect views?

The viewshed for the proposed project includes views of the surrounding landscape from the alternatives and views of proposed alternatives from the surrounding landscape. The landscape within the project area consists mostly of scattered residential development and large areas of pasture or other undeveloped lands. Older homes are typically more isolated and surrounded by pastures that support cattle grazing or hay meadows. Newer residential developments are typically associated with more open space or little forest cover between the home and the roadway.

A **viewshed** is the area that is visible from a specific location. The viewshed may be from the point of view from a traveler or a neighbor. Project viewers such as **travelers** include drivers, bicyclists, and pedestrians that have views *from* the road.

Construction of all action alternatives and the Hwy. 112 improvements would result in the short-term presence of construction vehicles and equipment, temporarily altering the area's visual character. Vegetation impacts in temporary construction easements would be minor and short-term until new vegetation becomes established. Overall, construction activities would have minor short-term impacts on views in the project area. Adverse impacts to the overall viewshed are not expected as a result of the project for any alternative.

No Action Alternative

The No Action Alternative would not result in a change to the viewshed or to the existing visual character or quality of the project area.

New Location Alternative

This alignment largely passes through undeveloped pasture and woodland (**Photos 1-2**) and would primarily be viewed at local roadway crossings and scattered homes near the proposed alignment. Construction of a new roadway and removal of several acres of trees and other vegetation would alter the viewshed along the project corridor. The

new bridges over Osage Creek and Little Osage Creek would be elevated and increase the visibility of the roadway to nearby residences and expand travelers' views of the surrounding rural landscape. Overall visual quality impacts are likely to be beneficial for travelers but may be negative for adjacent residents for whom views of the roadway would become more prominent.

Compared with the other action alternatives, the New Location Alternative would provide the least visible changes in the viewshed due to crossing the most rural, undeveloped portion of the project area.

Partial New Location Alternative

Views along this alignment mostly consist of existing roadways (Hwys. 112 and 264), pastureland, and scattered homes (**Photos 3-4**). Most views along Hwy. 264 are restricted because Hwy. 264 is at a lower or equal elevation than the surrounding landscape. On Hwy. 112, the roadway is not visible to most of the homes on the east side of the highway. Under the Partial New Location Alternative, proposed improvements along the existing highways would not be out of character with the existing views as highways are already incorporated into the visual character of their locations and are compatible with surrounding land development. However, proposed improvements would involve a grass center median which would improve the visual character. Additional alterations to the viewshed include the proposed interchange at Hwy. 264 and Colonel Myers Rd.

Photo 1. North view from Wager Dr.



Photo 2. North view from west of Holmes Rd.



Photo 3. Northwest view from Hwy. 112



Photo 4. West view from Hwy. 264



Similar to the New Location Alternative, the section of the Partial New Location Alternative that occurs along new location would alter visual resources by introducing new roadway infrastructure and removing existing vegetation. Construction of the proposed bridge over Osage Creek, which would be higher than the surrounding area, would increase the visibility of the roadway to nearby residences and expand travelers' views of the surrounding rural landscape. For the approximately one-mile section on

new location located parallel to Colonel Meyers Rd. (**Photo 5**), existing homes along, and travelers on, Colonel Meyers Rd. would have a more prominent view of the proposed roadway. As roadways are already incorporated into the visual character of this section of the project corridor, the proposed improvements would not be out of character with the existing views. Between Wager Dr. and Hwy. 112, adjacent landowners' views of the new roadway would mostly be blocked because of the dense forested vegetation lying between the homes and the proposed road.

Photo 5. South view from Colonel Meyers Rd.



Overall viewshed impacts are likely to be beneficial or neutral for travelers and may be negative for adjacent residents for whom views of the roadway would become more prominent.

Improve the Existing Highways Alternative

Views along this alignment mostly consist of roadways, pastureland, narrow forests, and scattered commercial and residential development (**Photos 6-9**). Because this alternative primarily follows existing Hwys. 112 and 264, views to and from the roadway would change very little except the roadway width would increase and include a grass median that may be planted to improve the visual character. Increased roadway widths would alter the appearance of the existing roadway for travelers and adjacent landowners and would result in existing residences and commercial buildings being in closer proximity to the roadway. However, proposed improvements would not be out of character with the existing views, as highways are already incorporated into the viewshed and are compatible with surrounding land development.

Photo 6. East view from Hwy. 264



Photo 7. South view from Hwy. 264



Photo 8. North view from Hwy. 112



Photo 9. South view from Hwy. 264, west of bypass



The most notable alteration to the viewshed under this alternative is the construction of a bypass of Hwy. 112 to the west of downtown Cave Springs on new location. The homes located immediately east of this approximately 0.7-mile long bypass section would have a view of a new four-lane roadway where there was once primarily only open space and scattered trees (Photo 9).

Compared with the other action alternatives, the Improve the Existing Highways Alternative would provide the most visible changes in the viewshed due to crossing the most populated portions of the

project. Overall viewshed impacts are likely to be beneficial or neutral for travelers and may be negative for adjacent landowners for whom views of the roadway would become more prominent. Impacts may also be beneficial for adjacent businesses, who may benefit from increased visibility to travelers.

Highway 112

Views to and from the proposed Hwy. 112 improvements would be similar to those of the Improve the Existing Highways Alternative and the Hwy. 112 section of the Partial New Location Alternative.

3.6 Would there be highway-related noise impacts?

A traffic noise analysis is required for proposed Federal-aid highway projects that would construct a highway on new location, substantially alter an existing highway, or increase the number of through-traffic lanes. A screening-level traffic noise study was completed for the proposed project to assess potential noise impacts as a result of proposed improvements. A screening analysis typically represents a worst-case scenario with higher sound levels than would be expected in detailed modeling and may be used to determine if there is a need for a detailed analysis. For screening analysis purposes, the *ARDOT Policy on Highway Traffic Noise Abatement* requires determining noise levels within 4 dBA of the Noise Abatement Criteria (NAC) values. This analysis identified Activity Category B and C noise sensitive receptors within the project corridors, which represent land uses such as residential areas, parks, and churches. Receptors located within the noise screening analysis threshold of 63 dBA will be identified. The screening analysis threshold for a receptor to be impacted is 66 dBA for NAC Categories B and C, or a substantial increase, which occurs when a design year noise level is predicted to increase 10 or more dBA above the existing noise levels.

What is noise?

Sound is anything we hear, while noise is unwanted or undesirable sound. Traffic noise is a combination of the noises produced by vehicle engines, exhaust, and tires.

A-weighted decibels, abbreviated **dBA**, are an expression of the relative loudness of sounds in air as perceived by the human ear.

The FHWA Traffic Noise Model (TNM) Version 2.5 software program is used to predict existing and future traffic noise levels. The TNM straight line model uses roadway information and the existing and design year traffic. Receptors (discrete points modeled in the TNM program) are incrementally placed away from the existing and proposed roadway centerlines to determine the distance to which impacts extend. The model assumes that the roadway and receptors were located at the same elevation with no intervening barriers such as topography or dense vegetation. The screening-level noise assessment and maps are provided in **Appendix E**.

No Action Alternative

The No Action Alternative was analyzed in the screening level study. A total of 124 receptors would be impacted within the 66 dBA buffer, which includes 59 residential receptors, 61 recreational vehicle pads at The Creeks Golf & RV Resort, one food stand with exterior seating, one park (T.R. Wallis), the Cave Springs Community Building with exterior people activity areas, and one place of worship with exterior

people activity areas. **Table 7** shows noise impacts per alternative. The table also shows the number of receptors within the 63 dBA Noise Boundary Zone (NBZ). This is the area of land away from the centerline of the roadway between where the 66 dBA and the 63 dBA sound level can be heard.

Table 7: Receptors Identified in Screening-Level Noise Analysis

Alternatives	Receptors (63 NBZ)	NAC Impacts (66 NBZ)	Substantial Increase (SI) Impacts	Total Impacts (NAC + SI)
No Action	8	124	N/A	124
New Location	3	0	7	7
Partial New Location	3	8	6	14
Improve Existing Hwys.	32	20	3	23

Note1: NBZ – Noise Buffer Zone

Note2: N/A – Not Applicable. Impacts are not counted for a No Action Alternative

New Location Alternative

Seven receptors were identified in the noise buffer zone under future build conditions, three are within the 63 dBA buffer all of which are substantial increase impacts. None of these impacted receptors are within the existing 66 dBA contour distance that approaches the NAC criteria. There are approximately four noise-sensitive properties located within the current proposed ROW which are not included in the total number of impacts because they would likely be relocated.

Partial New Location Alternative

Seventeen receptors were identified in the noise buffer zone under future build conditions, 8 receptors are impacted within the 66 dBA buffer, three are within the 63 dBA buffer, and six are substantial increase impacts. One of these impacted receptors is within the existing 66 dBA contour distance that approaches the NAC criteria. There are approximately nine noise sensitive properties located within the current proposed ROW that are not included in the total number of impacts because they would likely be relocated.

Improve the Existing Highways Alternative

Thirty-two receptors were identified in the noise buffer zone under future build conditions. Twenty-three of these receptors are predicted to experience noise impacts under future action conditions, 20 are NAC 66 dBA impacts, and three are substantial increase impacts. There are approximately nine noise sensitive properties located within the current proposed ROW which are not included in the total number of impacts because they would likely be relocated.

Highway 112

Within the Hwy. 112 section of the Improve the Existing Highways Alternative, 32 receptors were predicted to experience noise levels within the 63 dBA NBZ, 11 receptors are NAC 66dBA impacts,

and four are substantial increase. Within the Hwy. 112 section associated with the Partial New Location Alternative, one receptor is predicted to be impacted within the 66 dBA buffer and two noise receptors are predicted to experience noise levels within the 63 dBA NBZ.

3.7 Would any historic or archeological resources be affected by the project?

Section 106 of the National Historic Preservation Act requires agencies to consider the effects of federal actions to historic properties. In compliance with Section 106 requirements, the FHWA is conducting ongoing consultation with the appropriate Native American tribes.

Historic properties are those that are listed, or eligible for inclusion, in the National Register of Historic Places (NRHP), as defined in (36 CFR §800.16(I)).

Prior to alternative alignment development, records were checked to determine if previously documented cultural resources were known in the project area. This included a record review of the Automated Management of Archeological Site Data in Arkansas (AMASDA) database maintained by the Arkansas Archeological Survey for previously recorded archeological sites immediately proximal to the action alternatives. A historic properties records check was also conducted of the Arkansas Historic Preservation Program (AHPP)'s structure database. In addition, a historic structures survey assessed 72 structures and one cemetery for inclusion to the National Register of Historic Places (NRHP). An Architectural Resources Survey was submitted to AHPP requesting concurrence on eligibility determination. AHPP concurred that eleven historic properties were eligible for inclusion in the NRHP. Section 106 related documentation is provided in **Appendix F**.

Once a Preferred Alternative is identified, a Phase I cultural resources survey that includes shovel tests would be conducted. The report documenting the results of the survey, quantifying impacts to historic properties, and stating recommendations would be prepared and submitted to the State Historic Preservation Officer (SHPO) for review. If prehistoric or historic sites are identified, the sites would be evaluated to determine if Phase II testing is necessary. Should any of the undetermined sites be impacted and avoidance is not possible, then site-specific data recovery plans would be prepared, and data recovery would be carried out at the earliest practicable time.

The following identifies the number of archeological sites and historic structures within or near each alternative. All undetermined sites are considered potentially eligible for inclusion in the NRHP until proven otherwise.

New Location Alternative

Seven previously recorded undetermined archeological sites were identified proximal to the New Location Alternative. No archeological sites on the NRHP were identified. One structure is considered eligible to the NRHP.

Partial New Location Alternative

Four previously recorded undetermined archeological sites were identified proximal to this alternative. No archeological sites on the NRHP were identified. Three structures are considered eligible to the NRHP.

Improve the Existing Highways Alternative

Five previously recorded undetermined archeological sites were identified proximal to this alternative. No archeological sites on the NRHP were identified. Nine structures are considered eligible to the NRHP.

Highway 112

Hwy. 112 impacts associated with the Partial New Location Alternative would include one previously recorded undetermined archeological site. No structures eligible to the NRHP would be associated with the Partial New Location Alternative portion of Hwy. 112. Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include two previously undetermined archeological sites and four structures eligible to the NRHP.

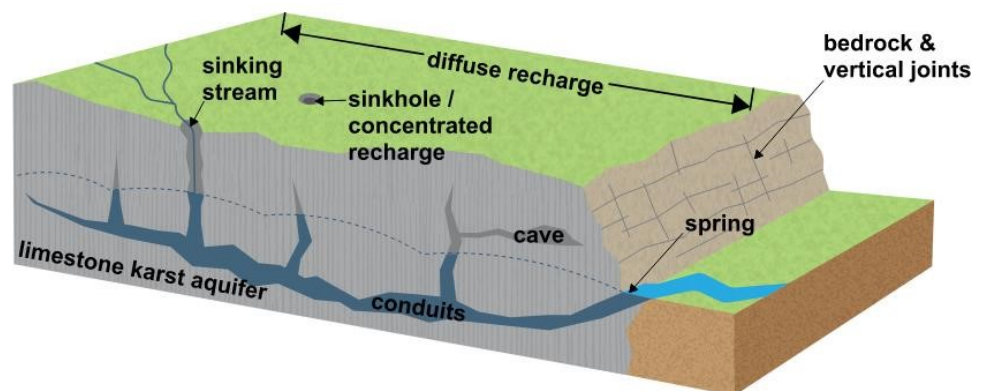
3.8 Would any karst areas be impacted?

Karst can be defined as an area of land underlain by soluble rocks, primarily limestone and dolomites, where surface water and groundwater have slowly dissolved bedrock at the surface and in the subsurface. This process forms a unique set of surface features that can include sinkholes, springs, and sinking streams and subsurface features such as caves. The project area is located in an area underlain by the Mississippian Boone Formation, a host for these karst features, which consists of very fine to coarse-grained limestone with interbedded chert. The presence of the chert in the Mississippian Boone Formation masks the traditional karst landforms at the surface (Brahana, 2018). In Arkansas, the Mississippian Boone Formation varies in thickness from 200 to 500 feet and exclusively represents the Springfield Plateau Aquifer (Hays et al., 2016). Caves are well known to have formed within the Mississippian Boone Formation.

The project area is located in an area of karst. **Figure 12** represents a conceptual model of the karst terrain and the underlying karst aquifer and can be considered representative of the Mississippian Boone Formation.

Precipitation that falls on the karst landscape that

Figure 12: Conceptual Model of The Karst Terrain and the Underlying Karst Aquifer



replenishes groundwater supplies is known as recharge. Two common types of recharge in karst areas include diffuse recharge and concentrated recharge. **Diffuse recharge** slowly seeps through the soil and into the underlying bedrock. **Concentrated recharge** enters the subsurface through larger dissolved out openings in the bedrock. Water that enters the subsurface through areas of concentrated recharge, such as sink holes, moves through the subsurface more quickly due to the larger channels/conduits in the bedrock. Any contamination at the surface can travel through areas of concentrated recharge relatively quickly to reach the underlying aquifer and effect groundwater quality.

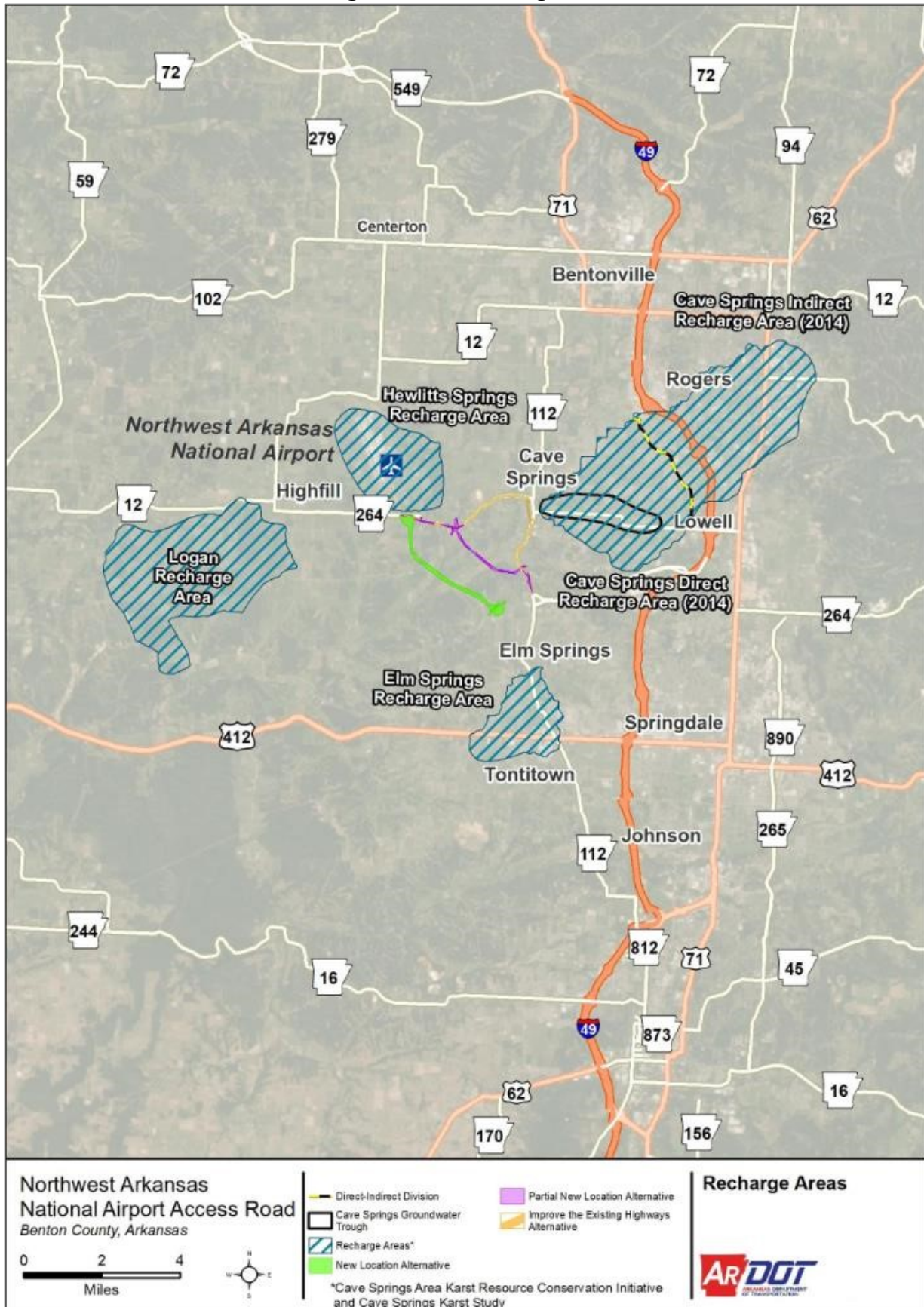
Good groundwater quality is essential in maintaining stream, spring, and karst cave environments that support healthy ecosystems and endangered species habitat. About 75% of the water which ultimately reaches rivers and lakes in the area passes through groundwater systems for some distance and most of the groundwater recharge enters through sinking streams as opposed to sinkholes or water infiltrating through soil (Aley and Moss, 2001). A losing stream is a surface stream that loses considerable volumes of water to the subsurface in localized areas. In addition, karst groundwater systems can be affected by changes in recharge to the groundwater flow system caused by changes in land cover and changes in drainage. A decrease to surface water quality of recharge water would likely affect the quality of groundwater resources. Areas identified as open groundwater systems provide ineffective natural cleansing and are especially vulnerable to contaminated inputs associated with runoff and spills.

Four mapped spring recharge areas were identified near the project area and include the Cave Springs Recharge Area, Hewlitt Springs Recharge Area, Elm Springs Recharge Area, and Logan Springs Recharge Area. These spring recharge areas were delineated and mapped by the Ozark Underground Laboratory (OUL) and are shown on **Figure 13**. None of the action alternatives would impact these mapped recharge areas. None of the project area streams that flow into or through the alternative alignments flow into known mapped recharge areas. The dye tracing conducted by OUL identified threatened and endangered species habitat slightly to the north, east, west, and south of the project area. The potential exists for similar habitat to be found along the action alternatives.

Garver learned during a field review in September 2020 with USFWS that an Ozark Cavefish (a federally-protected species) was observed at a spring between the New Location Alternative and the Partial New Location Alternative. This would indicate there is an open groundwater system in the project area with openings large enough for movement of the cavefish and the transport of food for the cavefish.

A Karst Assessment was conducted along the action alternatives to identify any surface karst features, subsurface karst features, and any exposures of the Boone Formation to identify any outcrops that may be receiving water or discharging water. Additionally, a review of USGS topographic mapping of the project area was conducted to identify any sinkholes, ponds, and springs. The project area is located on four USGS maps that include the Springdale, Centerton, Robinson, and Bentonville quadrangle maps. Topographic mapping shows relatively flat-lying upland areas dissected by valleys and tributaries to Little Osage Creek, Osage Creek, and Spring Creek. Land within the study area represents a masked or mantled karst terrain.

Figure 13: Recharge Areas



Coordination with the Arkansas Geological Survey indicated that a farm pond may indicate the presence of a sinkhole. All farm ponds were visually assessed as to their landscape position, signs indicative of sinkholes, and construction method. All ponds were determined to have been created by constructing a berm on the downstream side for capturing stormwater runoff. These ponds were not considered to be karst features.

Additionally, topographic mapping shows numerous springs can be found within the valley areas, which is typical of karst topography. Springs within the project area respond rapidly to precipitation events which indicates that concentrated or focused recharge is a major component of total recharge to springs (Aley and Moss, 2001). Karst springs can serve as habitat for federally listed species including the Ozark Cavefish and the Benton County Cave Crayfish. An assessment for threatened and endangered species habitat and an assessment to identify karst features were conducted in the winter of 2020 (details in **Section 3.12**). There are no mapped recharge areas or caves along the action alternatives.

No Action Alternative

The No Action Alternative would not impact karst or associated habitats in the project area.

New Location Alternative

The New Location Alternative would require impacts to the most area of karst terrain (242 acres) and would directly impact two springs and three ponds. Osage Creek and Little Osage Creek may be temporarily impacted by construction activities associated with the proposed project.

Partial New Location Alternative

The Partial New Location Alternative would impact 121 acres of karst terrain and would directly impact three springs and one pond. Osage Creek and Little Osage Creek may be temporarily impacted by construction activities associated with the proposed project.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would require 128 acres of karst terrain and would directly impact two springs and five ponds. Osage Creek, Little Osage Creek, and Spring Creek may be temporarily impacted by construction activities associated with the proposed project.

Highway 112

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would cross through 56 acres of karst terrain and impact two ponds and one spring. Temporary impacts to Spring Creek are anticipated with regard to construction activities. Hwy. 112 impacts associated with the Partial New Location Alternative would cross 17 acres of karst terrain and would not impact any springs or ponds. Temporary impacts to Spring Creek are anticipated during construction activities.

Karst Best Management Practices

During construction, there is the potential to encounter voids or caves and their inhabitants; therefore, precautionary measures must be taken during construction in sensitive areas, such as karst regions, to avoid impacts to groundwater and the aquatic habitat of sensitive species. The construction of highways and associated activities can introduce pollutant contamination into the groundwater because of minimal filtration and rapid introduction of the surface water into the groundwater flow system. Introduction of contaminants such as petroleum products would be detrimental to water quality in wells, springs, caves, and any organisms that may inhabit the caves.

Erosion and sediment control would follow ARDOT's best management practices (BMPs) to minimize sedimentation and avoid impacts to groundwater and sensitive or endangered species.

In the event cave discovery is made during construction, the USFWS and ARDOT Environmental Division would be contacted for a determination of the proper procedures to be followed as is outlined in the Cave Discovery Special Provision that will be added to the project contract.

3.9 How would water resources, wetlands, and streams be affected?

Coordination with the Arkansas Department of Health (ADH) revealed that no surface water intakes, public water supply wells, or wellhead protection areas are present within the project area. No public water supply systems would be impacted by any of the action alternatives.

Topographic review identified that two perennial streams, Little Osage Creek and Osage Creek, several unnamed intermittent and ephemeral tributaries, and numerous ponds and springs are located within the project area. Both perennial streams receive flow from the adjacent uplands. Little Osage Creek is designated as an Ecologically Sensitive Waterbody (ESW) under the Arkansas Division of Environmental Quality (ADEQ) Rule 2 and generally flows through the central portion of the project area. Osage Creek crosses the entire project area, extending from just west of Cave Springs to the western project area boundary. The Healing Springs Stream Mitigation site is located adjacent and north of Hwy. 264 between Cave Springs and XNA. Several springs, considered difficult-to-replace resources by the U.S. Army Corps of Engineers (USACE), are located in the region.

The proposed corridors of all action alternatives were evaluated to identify wetlands, streams, springs, and ponds. Wetlands were preliminarily identified and classified by qualified biologists based on Cowardin et al. (1979). The majority of wetland determinations were made using vegetation, hydrology, and soils in accordance with the routine approach described in the USACE Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). None of the streams flowing into or through the corridors associated with all three action alternatives flow

What are **wetlands**?

Wetlands are areas typically inundated or saturated by surface or groundwater to the extent that they can support vegetation adapted for life in wet soil conditions. Wetlands are protected under Section 404 of the Clean Water Act because they provide flood control, aid in water quality, and provide wildlife habitat.

into known delineated recharge areas.

Figure 14 shows the location of preliminary identified wetlands, streams, and springs along each alternative and **Table 8** summarizes anticipated impacts to those aquatic features. An aquatic resources assessment is provided in **Appendix G**.

No Action Alternative

The No Action Alternative would not impact any wetlands, streams, or springs. No groundwater resources would be affected.

New Location Alternative

The New Location Alternative would have direct impacts to wetlands and streams as summarized in Table 8. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. This alternative would impact the most wetlands (3.2 acres) of the three action alternatives, one acre of which is considered open water. Although this alternative would impact approximately 6,509 linear feet (LF) of stream (comprised of 18 streams), an estimated 97% of the impacted streams are considered ephemeral, meaning they only flow after rain events. Additionally, this alternative impacts the least amount of perennial and intermittent streams, which retain increased aquatic life value. None of the streams flowing into or through this alternative's corridor flow into known groundwater recharge zones. This alternative would impact two springs, which is less than the Partial New Location Alternative, and equal to the Improve the Existing Highways Alternative. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. Three ponds (totaling 1.0 acre) with wetland fringes along their edges would also be impacted by this alternative.

Partial New Location Alternative

The Partial Location Alternative would impact the least amount of wetlands (0.8 acre) and streams (6,705 LF), as compared to the other action alternatives; however, stream impacts would be greater to intermittent and perennial streams than those impacts determined for the New Location Alternative. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. None of the streams flowing into or through this alternative's corridor flow into known groundwater recharge zones. This alternative would impact three springs, which is more springs than the other action alternatives, and one pond with a wetland fringe around it. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. The Hwy. 112 impacts falling within this section of the Partial New Location Alternative would impact one spring.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would impact an estimated 1.5 acres of wetlands. Due

to the location and orientation of the streams along the existing roadways, this alternative would impact the most streams (20 streams comprising 14,849 LF). The greater amount of impacts is attributed to the parallel nature of many of the streams within and adjacent to the proposed ROW, of which approximately 7,500 LF are from a single parallel stream located immediately south of Hwy. 264. Direct impacts to wetlands and streams would occur as a result of direct fill, temporary clearing, grading, culvert installation, and channel improvements. This alternative would impact five ponds totaling 0.5 acre and two springs. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas.

The Healing Springs Mitigation Site is located adjacent to the existing Hwy. 264 ROW; however, this site and the spring run associated with the property would be avoided by this alternative.

Highway 112

Hwy. 112 impacts associated with the Partial New Location Alternative include approximately 916 LF of streams. There are no wetland or pond impacts associated with the Partial New Location Alternative.

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative include one spring, approximately 1,621 LF of streams, 0.9 acre of wetlands, and two ponds.

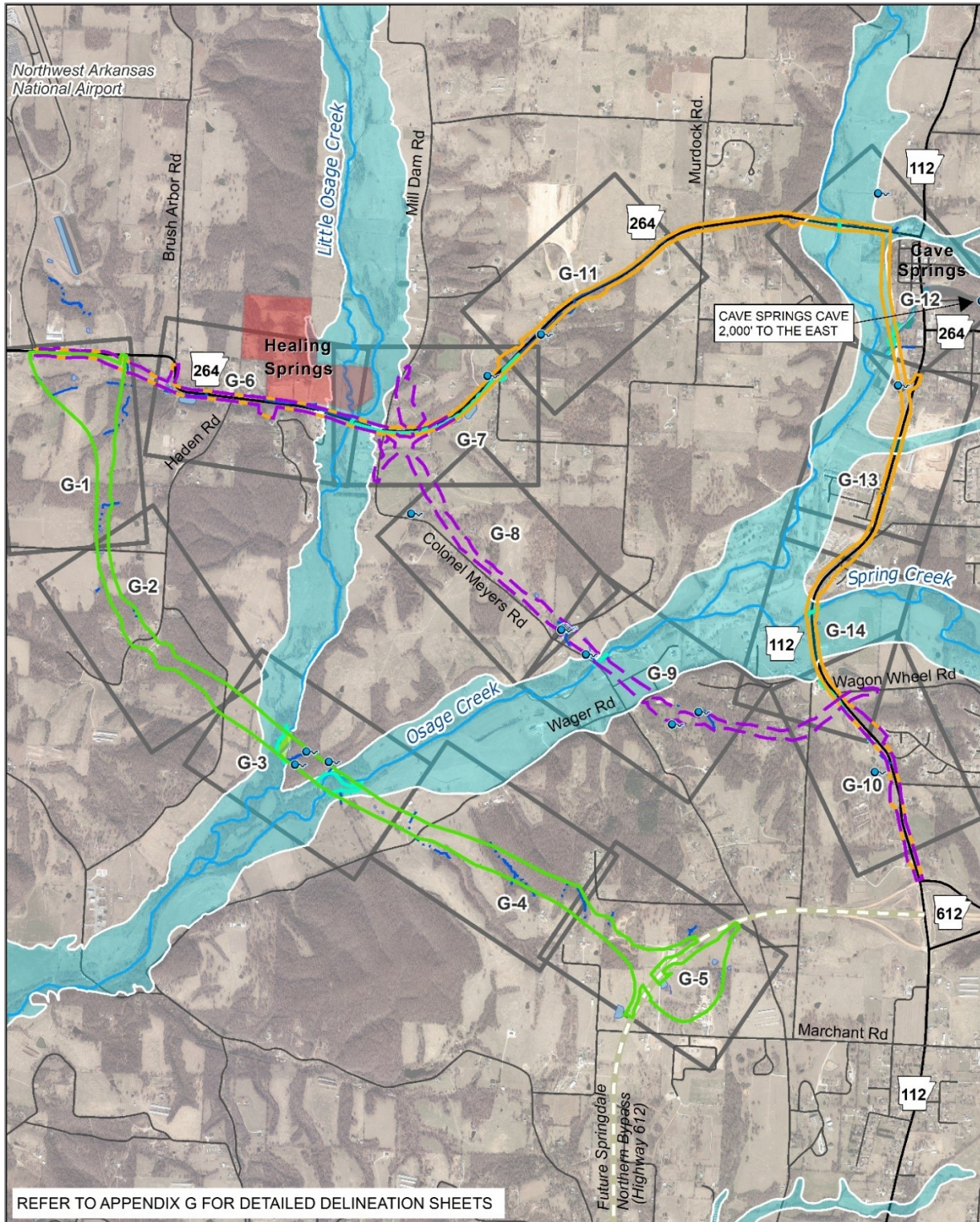
Table 8: Approximate Wetland, Stream, and Spring Impacts

Alternative	Wetlands (acres)*				Streams (linear feet)**				Springs
	PEM	PFO	PUB	Total	Per	Int	Eph	Total	
No Action	0	0	0	0	0	0	0	0	0
New Location	0.1	2.1	1.0	3.2	0	196	6,313	6,509	2
Partial New Location	0.3	0.4	0.1	0.8	2,046	3,903	756	6,705	3
Improve Existing Hwys.	0.5	0.5	0.5	1.5	4,991	9,067	791	14,849	2

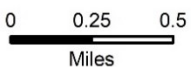
* PEM - Emergent Wetland; PFO - Forested Wetland; PUB - Pond or Open Water Wetland

** Per - Perennial; Int - Intermittent; Eph - Ephemeral

Figure 14: Aquatic Features Overview



Northwest Arkansas National Airport Access Road
Benton County, Arkansas



- Perennial Channel
- Intermittent Channel
- Ephemeral with OHWM
- PEM Wetland
- PFO Wetland
- PUB Wetland
- Pond
- New Location Alternative
- Partial New Location Alternative
- Improve the Existing Highways Alternative
- FEMA Effective Zone A
- Springs
- Healing Springs Mitigation Area
- Appendix G Panels

Aquatic Features Overview



Best Management Practices

During construction activities for any action alternative, streams would be subject to a temporary influx of sediment laden surface runoff associated with construction activities such as clearing and grubbing and bridge installation. Construction activities would comply with requirements of the Clean Water Act (CWA) as required by the USACE Section 404 permit program. Additionally, as required by Section 402 of the CWA, all action alternatives would obtain coverage under the National Pollutant Discharge Elimination System (NPDES) general permit for Construction Activities. The provisions of this permit include preparation of a Stormwater Pollution Prevention Plan (SWPPP), which contains a selection of BMPs to be implemented to effectively reduce or prevent the discharge of pollutants into receiving waters during construction activities. Stormwater runoff would be controlled and monitored according to applicable federal regulations. Water quality regulations required by the ADEQ State Water Quality Certification (Section 401 of the CWA) also would be implemented.

What is the **Clean Water Act (CWA)**?

The CWA is a federal regulation governing activities that may have a harmful effect on the quality of the nation's water bodies. Section 404 of the CWA governs discharge of material into water bodies. Section 402 of the CWA governs the discharge of pollutants into water bodies. Section 401 of the CWA gives the states the authority to regulate the discharges that may affect water quality.

As described in **Section 3.8**, all action alternatives would cross areas of land underlain by the Boone Aquifer. Groundwater may be temporarily impacted by surface runoff due to disturbance from land clearing, culvert construction, and operating construction equipment and vehicles. As mentioned above, BMPs would be implemented to minimize sediment leaving the construction site. The action alternatives have been evaluated at the surface for the presence of karst features that provide a direct connection to the groundwater flow system. As stated previously, none of the project area streams that flow into or through the action alternatives flow into known mapped recharge areas. The dye tracing conducted by OUL identified threatened and endangered species habitat slightly to the north, east, west, and south of the project area. The potential exists for similar habitat to be found along the action alternatives.

Based on observation information provided by the USFWS regarding a spring located between the Partial New Location Alternative and New Location Alternative, the potential for an open groundwater system in the project area exists.

3.10 Would floodplains be impacted by the project?

The project was evaluated to determine if any encroachment into special flood hazard areas, identified through the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, would occur within the action alternatives. As shown in **Figure 15**, special flood hazard areas, also known as the 100-year floodplain, associated with Osage Creek, Little Osage Creek, and Spring Creek are present within the project area.

What is a floodplain?

Floodplains are land areas that become covered by water in a flood event. 100-year floodplains are areas that would be covered by a flood event that has a 1% chance of occurring (or being exceeded) each year, also known as a 100-year flood. This is the floodplain commonly used for insurance and regulatory purposes.

The final project design would be reviewed to confirm that the design is adequate and that the potential risk to life and property are minimized. Adjacent properties should not be impacted nor have a greater flood risk than existed before construction of the project. For any of the action alternatives, associated floodplain impacts would result in a no net rise of the floodplain elevation or affect water surface elevations.

No Action Alternative

The No Action Alternative would not affect any floodplains.

New Location Alternative

The New Location Alternative would cross 15.6 acres of floodplain associated with Osage Creek and Little Osage Creek. The floodplains for Osage Creek and Little Osage Creek would be bridged, which would result in only minor impacts to the floodplains. The bridge crossings of the floodplains would be constructed in a manner to cause zero rise in the 100-year flood elevations.

Partial New Location Alternative

The Partial New Location Alternative would cross 11.0 acres of floodplain associated with Osage Creek and Little Osage Creek. A new bridge would be built on the new location segment over Osage Creek and the existing bridge on Hwy. 264 over Little Osage Creek would be widened. Only minor impacts to the floodplain would occur at these crossings.

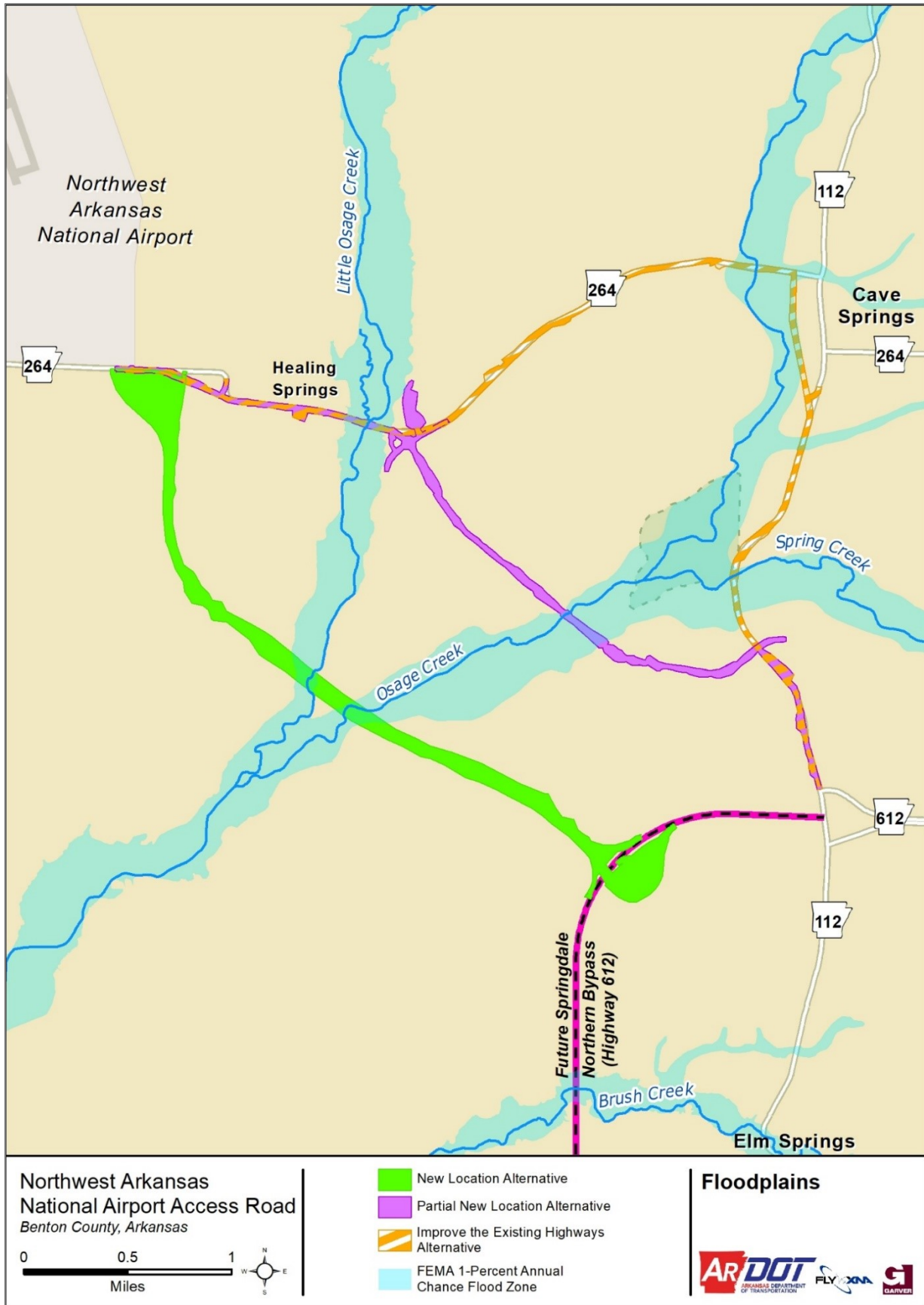
Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would cross 24.4 acres of floodplain associated with Osage Creek, Little Osage Creek, and Spring Creek. All of these floodplains are already bridged with structures that would be widened to accommodate the widened highway. Only minor impacts to the floodplain would occur at these crossings.

Highway 112

Hwy. 112 improvements would cross 14.0 acres of floodplains associated with Osage Creek and Spring Creek similar to the Improve the Existing Highways Alternative. Only minor impacts to the floodplain would occur at these crossings. No floodplains would be impacted along the Partial New Location Alternative segment of the Hwy. 112 improvements.

Figure 15: Floodplains



3.11 Are impacts to wildlife or their habitat expected from the project?

The project area has varied topography and contains diverse vegetation types. The project area is primarily located in the Springfield Plateau Ecoregion with a small portion of the New Location Alternative located within the Dissected Springfield Plateau-Elk River Hills of the Ozark Highlands Ecoregion (Level IV Ecoregions 39a and 39b; Woods et al., 2005). This ecoregion is underlain by highly soluble and fractured limestone and dolomite, is highly dissected, partly forested, and is rich in karst features. According to Woods et al. (2005), potential natural vegetation consists of oak–hickory forest and some oak–hickory–pine forest; native uplands consist of mixed deciduous forest containing black oak (*Quercus velutina*), white oak (*Q. alba*), blackjack oak (*Q. marilandica*), post oak (*Q. stellate*), and hickories (*Carya* spp.) with some mixed deciduous–shortleaf pine (*Pinus* spp.) forest; and floodplains with low terraces commonly containing willows (*Salix* spp.), maples (*Acer* spp.), hickories, birch (*Betula nigra*), American elm (*Ulmus americana*), and American sycamore (*Platanus occidentalis*). Based on the 2016 NLCD prepared by the USGS, as shown in Figure 11, the majority of the land cover identified along and adjacent to the action alternatives consists of pastureland and woodland.

Common edge plant species in the project area include blackberries (*Rubus* spp.), honeysuckles (*Lonicera* spp.) and other vine species, American beauty berry (*Callicarpa americana*), and young trees. It should be noted that storm damage from a spring 2020 tornado has left the area with numerous mature trees uprooted and laying on the ground, which provide additional habitat for ground dwelling wildlife such as rabbits, foxes, and smaller rodents.

The study area has forested, edge, and open field habitats present for many of the common wildlife species and species of concern. Most wildlife species found in the project area are habitat generalists and are not restricted to a particular habitat type. The species of wildlife expected to use or be present within the proposed project area include white-tailed deer (*Odocoileus virginianus*), fox squirrel (*Sciurus niger*), cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), mink (*Mustela vison*), opossum (*Didelphis virginiana*), skunk (*Mephitis mephitis*), muskrat (*Ondatra zibethicus*), and beaver (*Castor canadensis*). Various avian species (comprised of raptors, waterfowl, songbirds, neo-tropical migrants), as well as a variety of reptiles and amphibians including timber rattlesnakes (*Crotalus horridus*), copperheads (*Agkistrodon contortrix*), cottonmouths (*A. piscivorus*), water snakes (*Nerodia* spp.), salamanders, lizards, skinks, tortoises, and turtles are present in and/or migrate through the general area.

Natural Diversity Database occurrence data obtained from the Arkansas Natural Heritage Commission (ANHC) indicates there are ten state-identified species of concern and several sensitive streams within the study area. The species' detailed habitat descriptions, state status, global and state rank data have been provided by ANHC and are included in **Appendix H**.

What are **edge species**?

The area where two habitat types meet, such as woodlands and pastures, is called edge habitat. Edges provide greater plant diversity, cover, nesting areas, and travel corridors for wildlife (McPeake, University of Arkansas Cooperative Extension Service).

No Action Alternative

The No Action Alternative would have no effect on wildlife or wildlife habitat.

New Location Alternative

The New Location Alternative corridor contains a dominance of pastureland grazed by livestock. The large tracts of open pasture are fragmented with hardwood forested areas that are interconnected along drainage features and hillsides. These forested areas contain young to mature trees with a species composition consisting predominantly of white and red oak species (*Quercus* spp.), hackberry (*Celtis* spp.), hickory, cherry (*Prunus* spp.), elm, and Sycamore.

The New Location Alternative would cross three ANHC identified sensitive streams (Osage Creek, Little Osage Creek, and an unnamed tributary to Little Osage Creek) and would impact areas known to have swamp milkweed (*Asclepias incarnata* ssp. *Incarnata*), and habitat for the Arkansas darter (*Etheostoma cragini*), midget crayfish (*Faxonius nana*), Meek's short pointed crayfish (*Faxonius meeki brevis*), least darter (*Etheostoma microperca*), sunburst darter (*Etheostoma mihileze*), and redspot chub (*Nocomis asper*). Little Osage Creek is also considered an ESW by ADEQ. Two Arkansas darter and one midget crayfish occurrences are documented in close proximity to this alternative. Approximately 2,236 LF of preferred habitat for the Meek's short pointed crayfish, midget crayfish, Arkansas darter, least darter, sunburst darter, and redspot chub would be impacted directly and/or indirectly by construction activities, primarily increased turbidity and sedimentation. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Conversion of forested, edge, and stream bank habitat types to a roadway would reduce the available habitat for the swamp milkweed (*Asclepias incarnata* ssp. *incarnata*), Palmer's hawthorn (*Crataegus palmeri*), and Ozark trillium (*Trillium ozarkanum*); however, the same habitat types remain in the immediate vicinity. Approximately 75 acres of upland forested habitat would be lost. Details on forested impacts associated with federally listed bat species are provided in **Section 3.12** and karst habitat impacts are covered in **Section 3.8**.

Unimpeded wildlife movement through the area would be reduced by the new four-lane roadway and restricted primarily to bridge crossings at Osage Creek and Little Osage Creek.

Partial New Location Alternative

The general wildlife habitat associated with the Partial New Location Alternative is similar in species composition and abundance to the New Location Alternative for the section between Hwy. 112 and Hwy. 264 that is on new location. The wildlife habitat along the Hwy. 112 and Hwy. 264 segments of this alternative are primarily associated with the creek drainages.

The Partial New Location Alternative would cross five ANHC identified sensitive streams (Osage Creek, Little Osage Creek, and tributaries to Little Osage Creek) and would impact areas known to have ringed salamander (*Ambystoma annulatum*), midget crayfish, and least darter species, as identified by ANHC. Approximately 2,489 LF of preferred habitat for the midget crayfish, Arkansas darter, least darter,

sunburst darter, and redbspot chub would be impacted either directly, by culvert installation or channel improvements, and indirectly by sedimentation. An estimated 2,043 LF of Meek's short pointed crayfish habitat would also be impacted by this alternative. The portion of these state listed aquatic species' habitat impacts associated with improving Hwy. 112 is 320 LF. Several other species occurrences are documented in close proximity to this alternative, most of which are upgradient relative to the alternative. Additionally, other habitat generalist species occur within this alternative's corridor. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Approximately 26 acres of suitable forested habitat for the Palmer's Hawthorn and Ozark trillium would be impacted directly by clearing and grubbing. Direct forest conversion impacts would include clearing and grubbing activities that would remove forest habitat within the project footprint. Indirect impacts due to sedimentation from these construction activities may also occur. Details on forested impacts associated with federally listed bat species are provided in **Section 3.12** and karst habitat impacts are covered in **Section 3.8**.

Unimpeded wildlife movement through the area would be reduced by the new four-lane roadway on new location between Hwys. 112 and 264. There is already a two-lane roadway (Colonel Myers Rd.) impacting wildlife movement along this section of the project. The footprint of Hwys. 112 and 264 would be enlarged, making crossing for wildlife more dangerous.

Improve the Existing Highways Alternative

Wildlife habitat along existing Hwys. 112 and 264 is very fragmented with significantly more development adjacent to both roadways. The landscape within the existing ROW is regularly maintained in unforested areas. This alternative would have the least amount of impacts to undisturbed wildlife habitat.

The Improve the Existing Highways Alternative would cross six ANHC identified sensitive streams (Osage Creek, Little Osage Creek, tributaries to Little Osage Creek, and Spring Creek) and would impact areas known to have ringed salamander, midget crayfish, Arkansas darter, and least darter species, as identified by ANHC. Approximately 5,668 LF of preferred habitat for the midget crayfish, Arkansas darter, least darter, sunburst darter, and redbspot chub would be impacted in the same ways previously described in the Partial New Location Alternative section. An estimated 4,790 LF of Meek's short pointed crayfish habitat would also be impacted by this alternative. Additionally, one of the sensitive streams would be upstream of these species' locations. Several other species occurrences are also documented in close proximity and downgradient relevant to this alternative. Other habitat generalist species occur within this alternative's corridor. BMPs would include installing and maintaining appropriate sediment control features and protecting natural buffers.

Wildlife movement is already restricted by the existing roadway and other developments such as houses and businesses. Adding additional lanes would increase the distance for wildlife crossing these roadways, making it more dangerous.

Highway 112

The Hwy. 112 impacts associated with the Partial New Location Alternative include 3.53 acres of forested area and 165 LF of stream that would be considered habitat for state-listed species.

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative include forested area impacts of 5.0 acres and 1,032 LF of stream associated with preferred habitat for the Meek's short pointed crayfish, midget crayfish, Arkansas darter, least darter, sunburst darter, and redspot chub. Habitat associated with these species is located downgradient relative to the highway, which may increase the potential for sedimentation impacts. The other habitat generalist species also occur within this alternative's corridor.

Hwy. 112 impacts associated with the Improve Existing Highways Alternative would include crossing one ANHC identified sensitive stream (Spring Creek) and would impact areas known to have ringed salamander and midget crayfish species.

Wildlife movement is already restricted by the existing roadway and other developments such as houses and businesses. Adding additional lanes would increase the distance for wildlife crossing Hwy. 112, making it more dangerous.

3.12 Are impacts to federally-protected species expected from the project?

In accordance with the Endangered Species Act of 1973, federally-listed threatened and endangered species were identified for the proposed project area using the USFWS online Information, Planning, and Conservation decision support system (USFWS, April 2020). A total of ten threatened or endangered species are on the USFWS Official Species List for the proposed project area and have the potential to be present in or migrate through Benton County. The listed species include the Northern Long-eared Bat (*Myotis septentrionalis*), Indiana Bat (*Myotis sodalis*), Gray Bat (*Myotis grisescens*), Ozark Big-eared Bat (*Corynorhinus townsendii ingens*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Ozark Cavefish (*Amblyopsis rosae*), Benton County Cave Crayfish (*Cambarus aculabrum*), and the Missouri Bladderpod (*Physaria filiformis*). Additionally, the Eastern Black Rail (*Laterallus jamaicensis ssp. jamaicensis*) is included on the Official Species List as proposed threatened. **Table 9** details the status and closest known occurrences of these federally listed species that have a potential to be impacted.

An **endangered species** is one that is in danger of extinction throughout all or a substantial portion of its range. Endangered species receive the highest level of protection.

A **threatened species** is one that is likely to become endangered in the near future.

Table 9: Federally Listed Species, Status and Known Occurrences

Species/Status	Closest Known Occurrence
Northern Long-eared Bat (Threatened)	Osage Creek (Redman, 2015), within 5 miles (ANHC, 2020)
Gray Bat (Endangered)	Cave Springs Cave, within 1 mile (ANHC, 2020)
Indiana Bat (Endangered)	Within 1 mile (ANHC, 2020)
Ozark Big-eared Bat (Endangered)	Currently Unknown
Eastern Black Rail (Proposed Threatened)	Currently Unknown
Ozark Cavefish (Threatened)	Cave Springs Cave, within 1 mile (ANHC, 2020)
Benton County Cave Crayfish (Endangered)	Cave Springs Cave, within 5 miles (ANHC, 2020)

No critical habitats are present within the proposed project area. A habitat assessment for the federally-protected species was conducted for all three action alternatives. Based on habitat observed in the study area (see **Figure 16** and Appendix H), suitable forested foraging and roosting habitat is present for the listed bat species, potential karst features for the cave obligate species, and wetlands for the Eastern Black Rail. Based on coordination with USFWS and ANHC, review of the Northern Long-eared Bat Consultation Area map and Final 4(D) Rule Guidance document, no known occupied bat maternity roost trees were identified within 150 feet of the action alternatives; however, potential roost trees are present. ANHC data did not reveal records of any listed bat species as occurring within the action alternatives but did have occurrence records of Gray Bats at Cave Springs Cave. Suitable habitats for the Red Knot, Piping Plover, and Missouri Bladderpod were not identified within the study area of any of the alternatives.

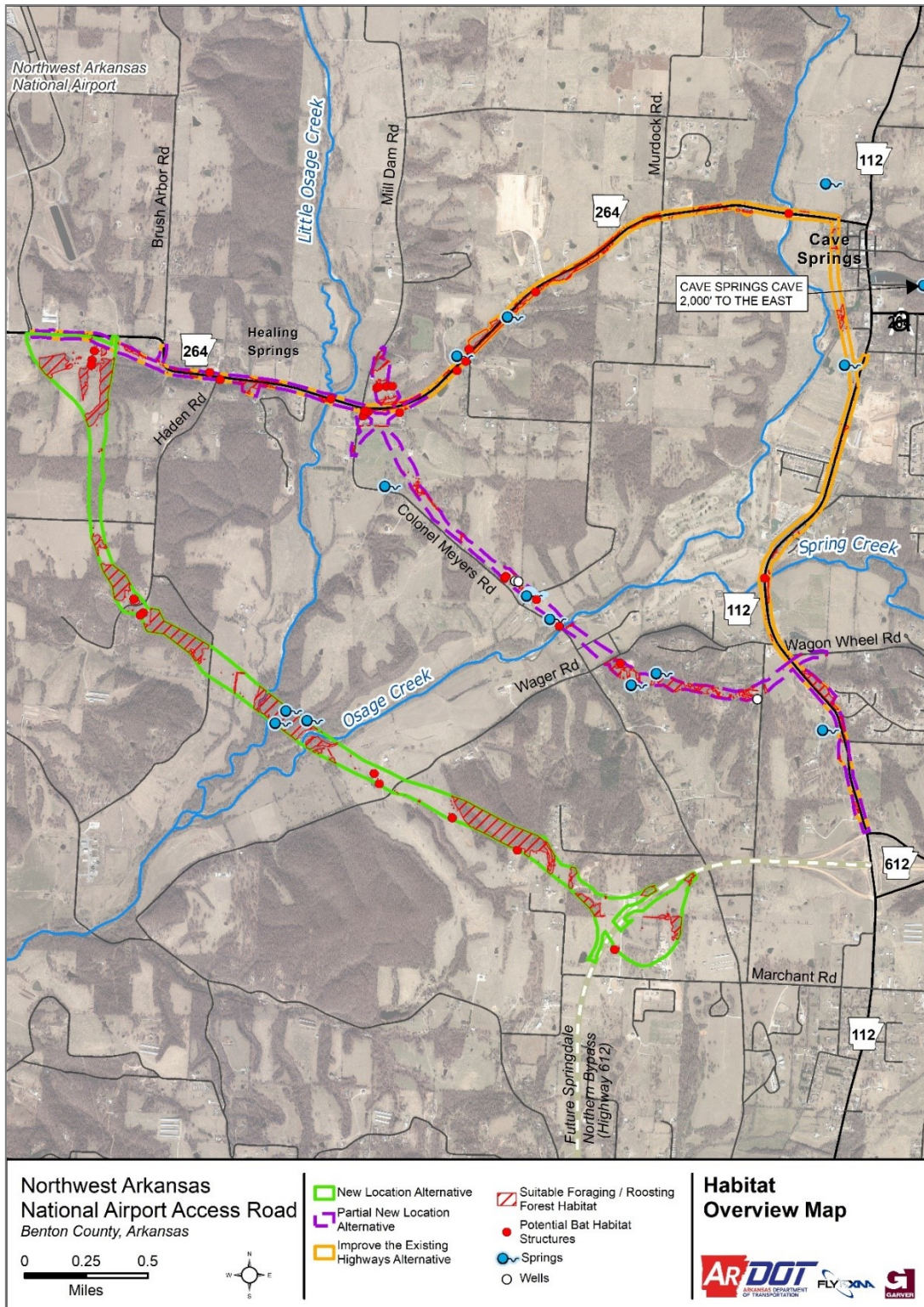
Consultation with USFWS began early and has been ongoing throughout the NEPA process. A summary of the habitat assessment is provided in the request for technical assistance that was submitted to USFWS in April 2020 (see Appendix H). A subsequent field review of the three action alternatives was completed with the USFWS in September 2020. A summary of the field review can be found in Appendix H and includes the following:

- All three alternatives would impact springs and likely to require blasting
- The USFWS does not have occurrence records for the listed species within any of the three alternatives
- The entire area is surrounded by Ozark Cavefish and Benton County Cave Crayfish occurrence records
- Other projects in the area are currently being reviewed by the USFWS and the recommendation was to overlap projects as much as possible
- Recommendation was made to follow karst BMPs
- Strong possibility that highway development would impact the cave obligate species

The USFWS responded in October 2020 (see Appendix C) and recommended following the BMPs developed for the Cave Springs Cave Recharge area. These BMPs are described in the *Cave Springs Area Karst Resource Conservation Regulations*. Section 7 consultation will continue upon selection of

the Preferred Alternative. Avoidance and mitigation measures will be determined upon completion of Section 7 consultation.

Figure 16: Habitat Overview Map



All action alternatives exhibited suitable habitat for the Indiana, Northern Long-eared, Gray, and Ozark Big-eared bats, Ozark Cavefish, Benton County Cave Crayfish, and Eastern Black Rail. According to the USFWS, Gray bats roost almost exclusively in caves throughout the year and are rarely found roosting in structures. However, the USFWS Arkansas Ecological Services Field Office has indicated reports of Gray bats occasionally roosting in storm sewers, mines, and buildings (USFWS, 2018). Additionally, none of the action alternatives would have direct effects on the Cave Springs Cave or its water quality. Suitable habitat and impacts within the respective alternative corridors for each species is presented in **Table 10**. Avoidance and minimization measures (AMM) would be implemented through ARDOT Special Provisions (SP) for tree clearing in karst areas, water quality, and cave discovery SPs, the USFWS's *Community Growth Best Management Practices for Conservation of Karst Recharge Zones*, and *Cave Springs Area Karst Resource Conservation Regulations*.

Bald Eagles (*Haliaeetus leucocephalus*) are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act. Suitable nesting trees and foraging areas for the Bald Eagle were observed within all action alternatives' corridors; however, no Bald Eagles or nests were observed during the site reconnaissance. Impacts to suitable nesting trees would include tree clearing associated with road construction. Implementation of the following BMPs would minimize potential unforeseen impacts to Bald Eagles:

- Suitable nesting trees and foraging areas are present within the proposed project area for the Bald Eagle. Prior to construction, the project area would be surveyed to ensure no nesting eagles are present or would be negatively impacted by the project.
- Maintain a 330-foot buffer between an identified nest and the project area.
- Restrict all clearing within 660 feet of a nest to outside of the nesting season of late May to late September.
- Maintain natural landscape buffers that screen construction activities from an identified nest.

Protected migratory birds include Cliff Swallows (*Petrochelidon pyrrhonota*) and Barn Swallows (*Hirundo rustica*). Barn Swallows use man-made structures for nesting and live in close association with humans. Both swallow species commonly use bridges and culverts for nesting. Other migratory birds can also nest on transportation structures. Implementation of the following mitigation measures for all action alternatives would ensure that the proposed project would avoid or minimize potential adverse effects to migratory birds, other birds of prey protected under the MBTA, and federally protected species:

- Suitable nesting habitat is present within the proposed project area for migratory birds. Construction activities with the potential to affect migratory birds are encouraged to occur between August 15 and March 31 to avoid the nesting season. Suitable habitat for non-migratory ground nesting birds is also present and construction is encouraged to occur during the same timeframe. Provided construction can be conducted within the non-nesting season, no adverse effects are anticipated to migratory birds. The ARDOT migratory bird SP would be implemented as part of the project.

Table 10: Federally Listed Species Preliminary Habitat Impacts

Species/Status	Suitable Habitat	Alternatives			
		No Action	New Location	Partial New Location	Improve the Existing Hwys.
Northern Long-eared Bat (<i>Myotis septentrionalis</i>) Threatened	Forested Acreage	0	75.5	26.4	18.9
	Roosting Structures	0	11	15	12
Gray Bat (<i>Myotis grisescens</i>) Endangered	Forested Acreage	0	75.5	26.4	18.9
	Roosting Structures	0	11	15	12
Indiana Bat (<i>Myotis sodalis</i>) Endangered	Forested Acreage	0	75.5	26.4	18.9
	Roosting Structures	0	11	15	12
Ozark Big-eared Bat (<i>Corynorhinus townsendii ingens</i>) Endangered	Acres of Summer Foraging Habitat	0	75.5	26.4	18.9
Eastern Black Rail (<i>Laterallus jamaicensis ssp. jamaicensis</i>) Proposed Threatened	Wetland Acreage	0	0	0.07	0.08
Ozark Cavefish (<i>Amblyopsis rosae</i>) Threatened	No. of Springs Impacted	0	2	3	2
Benton County Cave Crayfish (<i>Cambarus aculabrum</i>) Endangered	No. of Springs Impacted	0	2	3	2

No Action Alternative

The No Action Alternative would have no effect on federally-protected species.

New Location Alternative

The New Location Alternative would impact the greatest amount of suitable foraging habitat for all four listed bat species with an estimated 75.5 acres of forested area impacted. Direct impacts would include

tree clearing and grubbing by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. An estimated 11 building or barn structures suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats were observed. A known Gray bat maternity colony is located within Cave Springs Cave that is 2.75 miles northeast of this alternative. A 2014 presence/absence bat survey conducted in close proximity to the New Location Alternative documented occurrences of Northern Long-eared bats and Gray bats along Osage Creek (Redman, 2014).

Suitable habitat associated with springs along Osage Creek and Little Osage Creek was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Springs are considered direct conduits to groundwater resources (CTA, 2015), which may provide suitable habitat for the Ozark Cavefish and the Benton County Cave Crayfish. The Partial New Location Alternative impacts three springs while the New Location Alternative and the Improve the Existing Highways Alternative each impact two springs. Direct impacts to springs may occur due to heavy equipment usage in close proximity that may compact surrounding soils and installation of spring boxes, which would allow for continued issuance of the springs to downstream areas. The introduction of sediment and degraded water quality into these systems from both construction and post-construction paved roadway surfaces may also indirectly impact these two species, which are known to be vulnerable to chemicals in the groundwater (USFWS, 2019).

The New Location Alternative would impact several structures potentially suitable for barn swallow nesting, including one box culvert that would potentially be suitable for swallows. Bridges constructed as part of this alternative could provide future additional suitable nesting habitat.

Partial New Location Alternative

The Partial New Location Alternative would impact 26.4 acres of suitable foraging habitat for all four listed bat species. An estimated 13 building or barn structures and two existing bridges suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats would be impacted. Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. The known Gray bat maternity colony located within Cave Springs Cave is 1.6 miles northeast of this alternative. Suitable habitat associated with springs along Osage Creek and Little Osage Creek was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Three springs would be impacted by the Partial New Location Alternative, which is one more than the Improve the Existing Highways Alternative, and the same as those impacted by the New Location Alternative. The direct and indirect impacts to springs located in the Partial New Location Alternative would be similar to those identified in the New Location Alternative.

Suitable habitat in the form of emergent wetlands was observed for the Eastern Black Rail. This alternative would impact 0.07 acre of emergent wetlands containing dense vegetation cover. Direct impacts of filling of the wetlands and indirect impacts of downstream sedimentation would occur. The

same BMPs to control off-site sedimentation as identified for the New Alignment Alternative would be implemented to ensure off-site wetlands would not be impacted.

Suitable migratory bird habitat within the Partial New Location Alternative would be impacted by removal of several structures potentially suitable for barn swallow nesting and two bridge structures potentially suitable for swallows and other migratory birds. Bridges constructed as part of this alternative would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Improve the Existing Highways Alternative

The Improve the Existing Highways Alternative would impact 18.9 acres of suitable foraging habitat for all four listed bat species, which is the least amount of forested area impacted compared to the other two action alternatives. An estimated nine building or barn structures and three bridges suitable for summer roosting for the Indiana, Gray, and Northern Long-eared bats would be impacted. Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. The known Gray bat maternity roost located within Cave Springs Cave is 2,000 feet east of this alternative. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Suitable habitat associated with springs along the existing highways was observed for the Ozark Cavefish and the Benton County Cave Crayfish. Two springs would be impacted by the Improve the Existing Highways Alternative. The direct and indirect impacts to springs located in the Improve the Existing Highways Alternative would be similar to those identified in the New Location Alternative.

Suitable habitat in the form of emergent wetlands was observed for the Eastern Black Rail. This alternative would impact 0.08 acre of emergent wetlands containing dense vegetation cover. Direct impacts of filling of the wetlands and indirect impacts of downstream sedimentation would occur. The same BMPs to control off-site sedimentation as identified for the New Alignment Alternative would be implemented to ensure off-site wetlands would not be impacted.

Suitable migratory bird habitat within the Improve the Existing Highways Alternative would be impacted by removal of several structures potentially suitable for barn swallow nesting and three bridge structures potentially suitable for swallows and other migratory birds. Bridges constructed as part of this alternative would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

Highway 112

The Hwy. 112 impacts associated with the Partial New Location Alternative include 3.53 acres of suitable summer foraging habitat for all four listed bat species. There are no suitable roosting structures, springs, wetlands, or ponds associated with the Partial New Location Alternative section on Hwy. 112.

Hwy. 112 impacts associated with the Improve the Existing Highways Alternative would include 5.0 acres of suitable foraging habitat for all four listed bat species, one suitable summer roosting structure, one spring, 0.08 acre of emergent wetlands, and one structure (Spring Creek bridge) suitable for migratory bird nesting. One structure suitable for summer roosting for the Indiana and Northern Long-eared Bats, and possibly the Gray Bat (Spring Creek bridge) was identified. The known Gray bat maternity roost located within Cave Springs Cave is also 2,000 feet east of this alternative. Bridge improvements would provide future suitable nesting habitat. The ARDOT migratory bird SP would be implemented as part of the project.

Direct impacts would include tree clearing and grubbing, and bridge demolition by heavy equipment and indirect impacts would include potential sedimentation as a result of ground disturbing activities. Implementation of the same mitigation measures identified for the New Location Alternative would be utilized for this alternative.

The Hwy. 112 impacts associated with the Improve the Existing Highways Alternative and the Partial New Location Alternative would have no direct effects on the Cave Springs Cave or its water quality.

3.13 Are there any hazardous materials located in the project area?

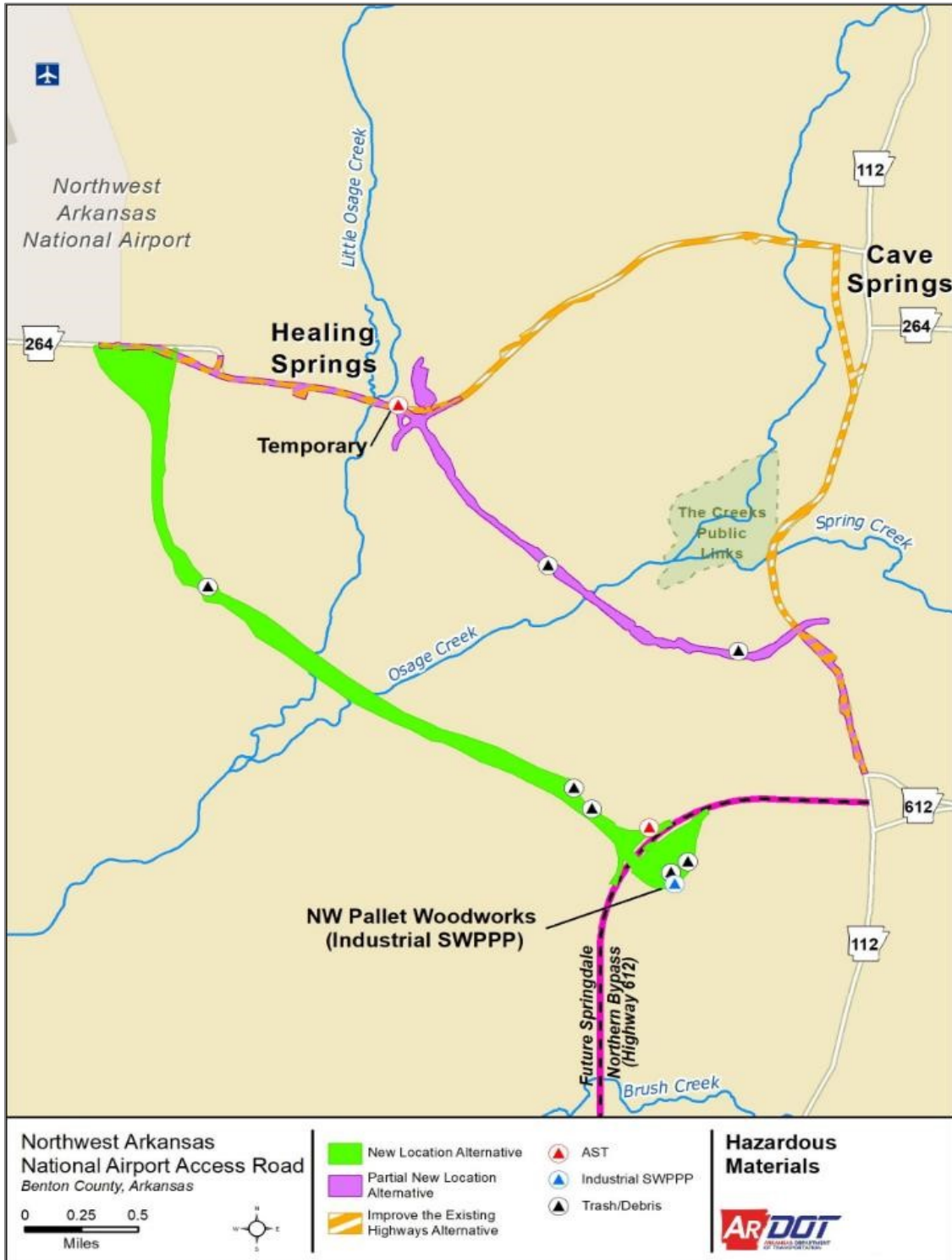
A site reconnaissance and a review of public government databases were used to determine if any hazardous materials were present in the project area. The site reconnaissance identified approximately seven small trash dumps, two sites with aboveground storage tanks (ASTs), and one site with an Industrial Storm Water Pollution Prevention Plan. Potential impacts are summarized below for each alternative. The locations of these sites are provided in **Figure 17**.

Hazardous materials are any materials which if encountered may cause a potential health risk to the public.

If hazardous materials are identified, observed, or accidentally uncovered during construction, work would be halted, and the appropriate entities would be notified. Prior to resuming construction, the type of contaminant and extent of contamination would be identified. If necessary, a remediation and disposal plan would be developed. All remediation work would be conducted in conformance with the ADEQ, Environmental Protection Agency (EPA), and Occupational Safety and Health Administration (OSHA) regulations.

Additionally, an asbestos survey by a certified asbestos inspector would be conducted on each building identified for demolition. If the survey detects the presence of any asbestos-containing materials, plans would be developed for the safe removal of these materials prior to demolition. All asbestos abatement work would be conducted in accordance with ADEQ, EPA, and OSHA asbestos abatement regulations.

Figure 17: Hazardous Materials



No Action Alternative

The No Action Alternative would not impact any hazardous materials. None of the identified trash/dump sites would be remediated under the No Action Alternative.

New Location Alternative

Five trash/debris dump sites were observed within the footprint of the New Location Alternative. All of these sites would have to be remediated prior to construction. The site located at Northwest Pallet Woodworks had soil staining and petroleum odors observed near an overturned, partially full, 55-gallon drum containing an unknown substance. This facility possesses an Industrial SWPPP that allows the facility to discharge stormwater associated with industrial activity and likely contains hazardous materials, including petroleum products. Northwest Pallet Woodworks is one of the relocations associated with the New Location Alternative. This alternative would also require the removal of an AST near the south end of the alignment.

Partial New Location Alternative

Two trash/debris dump sites were observed within the footprint of the Partial New Location Alternative. Due to grading limits, only the northernmost site would have to be remediated prior to construction. Additionally, one registered AST is located near the alignment but would not be impacted by the Partial New Location Alternative.

Improve the Existing Highways Alternative

One registered AST is located near the Improve the Existing Highways Alternative but would not be impacted by this alternative.

Highway 112

No hazardous materials were identified along Hwy. 112.

3.14 Would any prime farmlands be impacted by the project?

The Natural Resource Conservation Service (NRCS) administers the Farmland Protection Policy Act (FPPA) of 1981 to ensure that federal programs minimize unnecessary and irreversible conversion of prime farmland or farmland of statewide importance to non-agricultural uses. The NRCS Web Soil Survey was accessed to identify the presence of any prime farmland in the project area.

No Action Alternative

No prime farmland would be converted under the No Action Alternative.

Prime farmland is defined by the U.S. Department of Agriculture as land that has the best combination of physical and chemical characteristics for producing crops. In some areas, land that does not meet the criteria for prime or unique farmland is considered to be **farmland of statewide importance** and may include lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

Action Alternatives

The New Location Alternative, Partial New Location Alternative, and the Improve the Existing Highways Alternative would disturb 11.0, 5.1, and 0.0 acres, respectively, of prime farmland. The prime farmland worksheet, form CPA-106, was sent to the NRCS for their review and completion. Each action alternative received a total site assessment score of less than 160 points on the worksheet; therefore, the provisions of the FPPA do not apply.

Highway 112

No prime farmland would be impacted by Hwy. 112 improvements.

3.15 Does the project have any indirect effects?

Council of Environmental Quality (CEQ) and FHWA regulations require that potential indirect effects be considered during the NEPA process. Indirect effects are reasonably foreseeable effects that may be caused by the project but would occur in the future or outside of the project area.

Encroachment-Alteration Effects

Encroachment-alteration effects are physical, chemical, or biological changes in the environment that occur as a result of the project but are removed in time or distance from the direct effects. Impacts to water quality that occur as a result of the project but are then distributed off-site as water moves downstream beyond the project area, are the primary encroachment-alteration effect for this project.

No Action Alternative

For the No Action Alternative, no improvements would be constructed; therefore, no short-term or long-term indirect effects (of any type) are anticipated to occur.

Action Alternatives

For each action alternative, construction is anticipated to cause temporary encroachment-alteration effects to water quality that may impact streams, karst features (e.g. springs), and cave-obligate species. The action alternatives would directly impact streams (including Little Osage Creek and Osage Creek) due to vegetation removal and earth moving activities during construction. These activities may indirectly affect receiving drainages by causing a temporary increase in sedimentation, which decreases water quality, to the local watershed from stormwater runoff. These temporary impacts would likely include increased turbidity in some areas or even sources of petroleum or other pollutants from construction vehicles.

Based on the amount of new land disturbance, the New Location Alternative would appear to have the greater likelihood of indirectly impacting water quality. All action alternatives would also directly impact

Indirect effects are defined as impacts that are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable” according to the CEQ (40 Code of Federal Regulations [CFR] 1508.8) and may “include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems”.

springs (i.e., karst features) and may, therefore, indirectly impact other springs and other connected, subterranean karst features, through the introduction of degraded water quality associated with construction and/or stormwater runoff. While stormwater has an immediate effect on surface waters, some of these contaminants may also reach an aquifer, which in turn indirectly affects springs. Decreased water quality is a known threat to karst systems (including springs). Therefore, karst features and/or springs may also be temporarily degraded if construction results in a direct connection between the surface and the groundwater system that allows pollution from septic tanks, urban runoff, and waste from livestock/poultry to impact groundwater. Moreover, because springs are linked to suitable habitat for aquatic cave species such as the Ozark Cavefish and the Benton County Cave Crayfish, the introduction of degraded water quality may also indirectly impact these two species, which are known to be vulnerable to chemicals in the groundwater (USFWS, 2019).

Based on the number of direct impacts to springs, the Partial New Location Alternative would presumably have the greatest risk of indirectly impacting springs and cave-obligate species. Based on proximity to Cave Springs Cave and the number of adjacent recharge areas, the Improve the Existing Highways Alternative and the Hwy. 112 improvements would appear to have the overall greater risk to karst features and/or cave-obligate species. However, without additional studies, the true potential for karst, spring, and groundwater impacts is not known. Regardless, BMP measures would be implemented as part of the design and construction of the project to avoid and/or reduce encroachment-alteration effects to surrounding resources resulting from stormwater runoff. These construction BMPs would help minimize water quality degradation. Additionally, the project would have provisions relating to karst features (including springs) in place that would reduce impacts if cave or surface openings are encountered during construction.

As mentioned in **Section 3.8**, four karst recharge areas are located near the proposed project area: Logan Cave to the west, Hewlett Springs to the north, Elm Springs to the south, and Cave Springs Cave to the east. Based on ADEQ flowline data, none of the streams within the project area flow (either directly or indirectly) into any of the four karst recharge areas. Therefore, encroachment-alteration effects to these surrounding recharge areas are not anticipated.

Induced-Growth Effects

Changes in the pattern of land use, growth patterns, population density, or growth rate due to the construction of a highway project also may occur, and the resulting induced development can impact sensitive resources. This is another type of indirect effect that is categorized as induced-growth effects. An assessment of induced-growth effects is summarized below and provided in **Appendix I**.

Increased accessibility due to the proposed project is anticipated by some city planners to increase the rate of future development within the project vicinity. The increased rate of development for residential, commercial, and mixed-use purposes in the three induced-growth areas described below (one for the New Location Alternative and two for the Partial New Location Alternative) would potentially impact sensitive biological resources. However, for each action alternative, measures such as general

construction BMPs, permitting guidelines, and regulatory requirements would minimize potential adverse induced-growth impacts for sensitive resources.

No Action Alternative

With the No Action Alternative, no improvements would be constructed, and increased accessibility and induced growth would not occur as a result. However, there are several planned projects in the vicinity (such as the SNB extension, widening of Hwy. 112, and future development within the surrounding communities) that would be constructed regardless of the proposed project; these projects are addressed in **Section 3.16**.

New Location Alternative

The New Location Alternative would have only two points of exit and entry, one at each end. Increased accessibility is not expected to occur in the area immediately surrounding the proposed alignment's connection to the SNB extension as both the proposed roadway and the SNB are fully-controlled access facilities. The north end would connect to Hwy. 264 approximately 0.2 mile east of the intersection of Hwy. 264 and Airport Blvd. Induced growth is expected to occur surrounding this intersection and it is likely that facilities such as fuel stations or travel-related services would be developed here. Induced-growth related development in this area may impact up to approximately 6 acres of potentially suitable roosting habitat for federally-protected bat species, up to 1,200 LF of a stream, and up to 0.4 acre of ponds. These stream impacts may also result in a temporary decrease in water quality on and off-site during development. No floodplains, known springs, habitat for aquatic cave-obligate species or other threatened/endangered species, and other sensitive resources were identified within the induced growth area. However, because the project occurs within a karst region, aquatic resources may be connected underground or off-site to karst features; therefore, the likelihood exists that impacts to karst features and/or groundwater would occur as a result of induced growth in this area.

The New Location Alternative would result in changes in traffic and mobility that would increase the likelihood of land use changes. City and regional planners anticipate the project would increase the rate and intensity of development in their jurisdictional areas, particularly around intersections (i.e., around the proposed road's intersection with Hwy. 264 and with the SNB interchange) where land use would be expected to change from rural/undeveloped to commercial or even industrial. Few, if any, land use changes would be anticipated along the existing Hwy. 112 or Hwy. 264 as traffic growth rates (compared to the No Action Alternative) would be reduced in these areas as a result of the project.

Sensitive noise receptors in the project vicinity would be directly impacted by noise caused from the proposed project. Additionally, traffic patterns would change as a result of the project and these changes may result in increased traffic noise levels in some areas. However, induced-growth effects are not anticipated to result in substantial traffic noise.

Partial New Location Alternative

The Partial New Location Alternative is fully controlled only on the new alignment section between Hwy. 264 and Hwy. 112. Multiple exit and entry points already exist along the existing highways. While widening would occur along the route on the existing highway and this action may increase mobility, improvements along the existing highways are not expected to substantially increase the overall accessibility of these areas as these routes are already accessible. Only the proposed alignment's connections to Hwy. 264 and Hwy. 112 are anticipated to result in increased accessibility.

Induced growth is expected to occur within portions of these two areas and it is likely that facilities such as fuel stations or travel-related services would be developed around these intersections. Induced-growth related development in this area may impact up to approximately 14 acres of potentially suitable roosting habitat for federally-protected bat species, 2,800 LF of streams, and 2.3 acres of ponds and wetlands. These stream impacts may also result in a temporary decrease in water quality during development. While present within an area identified as having increased accessibility, Little Osage Creek is not considered an area likely for induced growth to occur given the significant regulatory requirements for impacting such a large water resource. Floodplains, however, are still considered areas where induced-growth would potentially occur despite the regulatory constraints associated with floodplain development. If both of the induced-growth areas were entirely developed, a total of approximately 33.6 acres of floodplains would be impacted. No other sensitive resources (e.g., observed springs, historic properties, or habitat for federally-protected species) are known to occur within the induced growth areas identified for this alternative. However, because the project occurs within a karst region, aquatic resources may be connected below ground or off-site to karst features and, therefore, the likelihood exists that impacts to karst features and/or groundwater would occur as a result of induced growth in this area.

Feedback from city planners primarily indicated regional growth would occur regardless of the proposed project, yet they also indicated they expected an increase in the rate and intensity of development in the area. This increase in the rate of development coupled with the project's changes in increased mobility suggests land use changes along the Partial New Location Alternative would be expected. In addition to the areas of increased accessibility described below, land use changes would be likely along the sections of the Partial New Location Alternative utilizing the existing highway. The Partial New Location Alternative increases the likelihood of redevelopment along the existing highway and zoning is predicted by some planners to change from rural/undeveloped to commercial or industrial. The greatest likelihood of land use changes would be expected around the proposed roadway's interchanges with Hwy. 112 and Hwy. 264.

Similar to the New Location Alternative, some areas of the project would have increased noise levels because of traffic pattern changes caused by the proposed project. However, induced-growth effects are not anticipated to result in substantial traffic noise.

Improve the Existing Highways Alternative

The Improve Existing Highways Alternative includes widening of existing highway along the entire proposed route and this action may increase mobility, however these widening improvements are not anticipated to cause a substantial increase in the overall accessibility of the area. Therefore, there are no areas identified as having a potential for induced growth along this alignment.

This alternative has the potential to cause land use changes resulting from increased mobility due to road widening. Anticipated land use changes primarily include an increase in the rate/intensity of development and redevelopment along the existing highway, which may include more service-based businesses such as dining and lodging.

Highway 112

Induced-growth effects for these planned improvements are very similar to those described above for the Improve the Existing Highways Alternative and the Partial New Location Alternatives.

3.16 Does the project have any cumulative impacts?

Cumulative impacts result from the total effects of a proposed project when added to other past, present, and reasonably foreseeable future projects or actions. Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of others. The cumulative impacts that result from an action may be undetectable but can add to other disturbances and eventually lead to a measurable environmental change. For any given resource, a cumulative impact would only potentially exist if the resource were also directly or indirectly impacted by the proposed project.

Cumulative impacts are defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action (CFR 40 §1508.7).

No Action Alternative

The No Action Alternative would not result in any cumulative effects.

Action Alternatives

For the action alternatives, cumulative impacts to water resources, federally-protected species habitat, land use, and noise were evaluated. Cumulative analyses considered other past, present, and reasonably foreseeable future projects identified primarily through assessment of aerial imagery and the Statewide Transportation Improvement Plan (STIP). Interviews with city and regional planners were also conducted, though very few planners provided information regarding foreseeable projects within their jurisdictions. Other actions evaluated include the past and future sections of the SNB, proposed Hwy. 112 widening (including construction of a bypass around Cave Springs), construction of a wastewater line from Cave Springs to the Northwest Arkansas Conservation Authority (NACA), current/future residential and commercial development, and other reasonably foreseeable transportation projects. Due to the minor or negligible direct impacts to communities, air quality, and

historic properties from the proposed project, the potential for cumulative impacts to these resources is considered low and detailed analyses were not conducted. The detailed cumulative impacts assessment, which was conducted individually by resource, is provided in Appendix I and is summarized below.

Water Resources

The proposed action alternatives would directly impact surface water sources and may indirectly affect receiving drainages associated with a temporary increase in sedimentation to the local watershed from stormwater runoff. Additionally, some induced growth impacts may occur as described in **Section 3.15**. The combined impacts resulting from direct, indirect, and those other actions where impacts were able to be estimated would produce a cumulative impact of 23,420 LF for streams and 6.9 acres for wetlands within the study area investigated for this resource, which is the project's 98,327-acre HUC12 watershed. However, this likely only represents a subset of the impacts resulting from other actions as not all future projects appeared to have been clearly identified during the interview process. Therefore, cumulative impacts were also conservatively calculated based on historical trends with resulting estimates indicating a total loss of approximately 213 acres (8.1%) of wetlands throughout the entire resource study area. The true cumulative impact to the acreages of water resources would be somewhere between these two values (i.e., between 7 and 213 acres). With the use of BMPs for the proposed action alternatives and assuming appropriate implementation of BMPs for other actions, stormwater runoff resulting from the project combined with impacts of other actions are anticipated to be minimized or prevented and not influence other areas of the watershed. Additionally, given the relatively minor percentage of wetland reduction for the entire resource study area, the proposed project is not expected to contribute substantial cumulative impacts to waters and wetlands in the project vicinity. Cumulative impacts to floodplains related to other past and reasonably foreseeable future actions combined with the proposed project are possible. However, both Benton and Washington Counties participate in FEMA's National Flood Insurance Program and Benton County (which is where the proposed project and most of the other actions are located) participates in the Community Rating System. Participation in the Community Rating System program mitigates home and business damage by flooding.

Federally-Protected Species Wildlife Habitat

As detailed in **Section 3.12**, the proposed project has the potential to impact seven federally-listed species: the Gray Bat, Indiana Bat, Northern Long-eared Bat, Ozark Big-eared Bat, Eastern Black Rail, Ozark Cavefish, and the Benton County Cave Crayfish. Resources associated with these species include wooded habitat and riparian corridors (for bat roosting/foraging), caves (for bat roosting), emergent wetlands (for the rail), and cave streams or springs (for the Ozark Cavefish and the Benton County Cave Crayfish). The combined impacts resulting from direct, indirect, and those other actions where impacts were able to be estimated would produce a cumulative impact of 503 acres of tree clearing within the study area investigated for this resource. Cumulative impacts conservatively calculated based on historical trends indicating a total loss of approximately 1,431 acres (11.7%) of

woodlands throughout the entire resource study area. However, not all of these wooded areas may be suitable bat habitat. Likely the true cumulative impact for the acreages of tree removal would be somewhere between these two values (i.e., between 503 and 1,431 acres).

For the proposed action alternatives, general minimization and mitigation measures such as erosion and sedimentation BMPs as a part of the SWPPP would be applied to help protect water quality within this important karst region and as a result, also help protect stream and/or spring habitats potentially utilized by threatened and endangered species. Additionally, BMPs identified by USFWS (2007) would be used for the proposed action alternatives as a guide to ensure that any sedimentation is kept to a minimum and to avoid impacts to groundwater and sensitive or endangered species. USFWS specifically recommended in their October 8, 2020 letter that the proposed project follow karst BMPs consistent with those previously developed for the Cave Springs Cave Recharge area. For some of the residential developments identified as other actions, compliance with the Cave Springs Area Karst Resource Conservation Regulations would be required. This conservation initiative was proposed to mitigate for any potentially adverse effects to sensitive resources resulting from possible secondary and cumulative development and applies to any project within the Cave Springs Direct Recharge Area in the city limits of Rogers, Cave Springs, Lowell, and Springdale. Additionally, for any other actions involving federal funds or permits, coordination with, and project clearance from, the USFWS would be required prior to construction. However, for other actions that do not involve a federal nexus, project clearance from USFWS would likely not be required.

Given the quantity of available bat habitat in the project vicinity and the conservation measures in place for those federally funded/permitted projects, the proposed project is not expected to contribute to substantial cumulative impacts to bat habitat. Precise impacts to aquatic cave-obligate species is unknown given the subterranean and indirect nature of these potential impacts. However, given the proposed project, the Hwy. 112 widening project (including the Cave Springs Bypass), and the Cave Spring's wastewater improvements project will all cross through areas identified by USFWS as having karst features (e.g., springs, caves, and losing streams), cumulative effects of these developments and the supporting infrastructure is a concern for conservation and protection of at-risk species. Therefore, the USFWS recommends that in order to minimize impacts to listed species, ARDOT should coordinate the paths of the Cave Springs Bypass, widening of Hwy. 112, and construction of the XNA connector road to overlap as much as possible and follow alignments being proposed for other actions, such as the NACA. Moreover, because the project occurs within a karst region, aquatic resources may be connected below ground or off-site to karst features and, therefore, the possibility exists that impacting particular aquatic resources may affect habitat for cave-obligate species. However, given that the proposed action alternatives and most of the identifiable other actions do not appear to directly impact any recharge zones in the area or known cave systems, cumulative impacts are not anticipated to be substantial. Cumulative impacts to Eastern Black Rail habitat (i.e. emergent wetlands) are not considered substantial given the very minimal impacts anticipated from direct, indirect, and other project actions.

Land Use

As detailed in **Sections 3.3** and **3.15**, the proposed project has the potential to impact land use. The direct and indirect acreages of rural/undeveloped lands converted to maintained ROW, combined with the conversion of 347 acres of undeveloped land to developed land use by other actions, results in a cumulative impact of 676 acres of converted lands. This cumulative value of converted land would represent approximately 6% of the undeveloped land within the study area investigated for this resource. Figure 11 shows the direct land use impacts in relation to the 2016 NLCD.

Based on the 2040 Metropolitan Transportation Plan developed for the project area, minimization and mitigation for some land use impacts may occur through the work on the Northwest Arkansas Regional Open Space Plan. However, this Open Space Plan appears to offer little direct mitigation for cumulative impacts to land use with regards to the proposed action alternatives and foreseeable other actions in the resource study area. While direct impacts to land use from the action alternatives are large in quantity, the cumulative reduction in percent of undeveloped land is relatively minor and not likely to contribute substantial cumulative impacts to land use in the project vicinity.

Traffic Noise

Sensitive noise receptors in the project vicinity are directly impacted by noise caused from the proposed action alternatives (**Section 3.6**), while induced-growth effects are not anticipated to result in substantial traffic noise. As detailed in Appendix I, traffic patterns would change as a result of the action alternatives. These changes may result in increased traffic noise levels in some areas. Other considerations include noise associated with the XNA, which is expected to increase in the future as the airport is more heavily utilized by aircraft. However, based on a recent noise analysis conducted for a separate project at XNA, these future aircraft noise impacts are not projected to expand beyond airport property. Thus, substantial cumulative impacts related to traffic noise are not anticipated to occur as a result of the proposed action alternatives.

3.17 What resources are either not present or not affected?

Air Quality

Benton County is in attainment for all National Ambient Air Quality Standards; therefore, the project is not subject to transportation conformity requirements. An air quality analysis was prepared for corridor 4AB and corridor 5AB for the Northwest Arkansas Regional EIS in September 2012. Corridor 4AB and Corridor 5AB are located in the same general location as the New Location and Partial New Location Alternatives. Local air quality air impacts were assessed by comparing future carbon monoxide (CO) levels with state and federal standards. The analysis indicated that the highest existing 1-hour CO concentration was 6.1 parts per million (ppm) and the highest future for that no action analysis was 6.9 ppm, both well below the 1-hour standard of 35 ppm.

For each action alternative in this EA, the amount of mobile source air toxics (MSAT) emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are

the same for each alternative. The VMT for the New Location Alternative and the Partial New Location Alternative are lower than that of the No Action Alternative, while the VMT for the Improve the Existing Highways Alternative is slightly higher due to the additional traffic attracted to the improved route. However, Vehicle Hours Traveled (VHT), which can also be correlated to MSAT, are lower for all three action alternatives than that of the No Action Alternative due to overall improved travel efficiency.

Because the VMT and VHT estimated for the No Action Alternative are near to or higher than the levels for any of the action alternatives, significantly higher levels of MSAT are not expected from any of the action alternatives compared to the No Action Alternative. Refer to **Table 11**.

Table 11: VMT and VHT Comparison for Design Year 2040

Alternative	Length (miles)	Average ADT	VMT	VHT
No Action	6.63	13,246	87,818	1,835
New Location	4.60	18,814	86,544	1,248
Partial New Location	4.34	14,960	64,926	1,392
Improve Existing Hwys.	6.63	13,883	92,042	1,750

In addition, because the estimated VMT under each of the action alternatives are nearly the same, varying by less than five percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent from 2010 to 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

In sum, under all action alternatives in the design year, it is expected there would be reduced MSAT emissions in the immediate area of the project relative to the No Action Alternative, due to the reduced VMT and VHT associated with more direct routing, reduced delay, higher travel speeds, and due to EPA's MSAT reduction programs.

Energy

There are no energy impacts associated with the proposed project.

Environmental Justice

Review of census data indicated that none of the census tracts or census block groups within the project area had median household incomes below the poverty guidelines or minority populations greater than 50%. No impacts to environmental justice populations are anticipated.

Wild and Scenic Rivers

No Wild and Scenic Rivers would be impacted by the proposed project.

Section 4(f) and Section 6(f) Resources

No Section 4(f) or Section 6(f) resources have been identified within the proposed project area.

Chapter 4 – Results and Recommendations

This chapter summarizes environmental analysis results and recommendations.

4.1 What are the results of this EA?

Table 12 summarizes impacts of the action alternatives for comparison purposes.

Table 12: Alternatives Comparison Table

Resource Categories	No Action Alternative	New Location Alternative	Partial New Location Alternative	Improve Existing Hwys. Alternative
ENGINEERING				
Length	6.6 miles	4.6 miles	4.3 miles	6.6 miles
ROW Required	0 acres	241.8 acres	100.6 acres	74.7 acres
Construction Cost*	\$0	\$79,773,225	\$61,944,051	\$50,511,233
ROW Cost*	\$0	\$5,830,000	\$4,815,000	\$6,625,000
Total Cost*	\$0	\$85,603,225	\$66,759,051	\$57,136,233
NATURAL RESOURCES				
Wetlands	0 acres	3.3 acres	0.8 acre	1.5 acres
100-Year Floodplains	0 acres	15.6 acres crossed	11 acres crossed	24.4 acres crossed
Streams	0 LF	6,509 LF	6,705 LF	14,849 LF
Karst Springs	0	2	3	2
Suitable Habitat; Ozark Cavefish	0	2 springs	3 springs	2 springs
Suitable Habitat; Benton County Crayfish	0	2 springs	3 springs	2 springs
Suitable Habitat; Bats	0	75.5 acres	26.4 acres	18.9 acres
Suitable Roosting Structures	0	11	15	12

Resource Categories	No Action Alternative	New Location Alternative	Partial New Location Alternative	Improve Existing Hwys. Alternative
RELOCATIONS				
Residences	0	2	11	17
Landlord Businesses	0	0	4	5
Businesses	0	3	1	2
OTHER RESOURCES				
NRHP Eligible Sites	0	1	3	9
Hazardous Materials Sites	0	6	2	0
Noise Impacts	123	7	14	24
Prime Farmland (acres)	0	11	5.1	0
Visual Quality	0	Least Noticeable Changes	Moderately Noticeable Changes	Greatest Noticeable Changes

* Costs are based on preliminary design and do not include utility relocations.

4.2 What is the Preferred Alternative?

The New Location Alternative has been identified as the Preferred Alternative because it provides the most direct and reliable route to the airport with environmental and social impacts comparable to the other build alternatives. The New Location Alternative best reduces the likelihood of congestion, accidents, or extreme weather events interfering with airport access by providing a completely new route to the airport, allowing for the existing highways and the new access road to serve as redundant routes in the case of such events.

Table 13 identifies the major impacts associated with the Preferred Alternative.

Table 13: Impacts Associated with the Preferred Alternative

Resource Categories	No Action	Preferred Alternative
Relocations Required	0	5
Visual Quality	None	Least Noticeable Changes
ROW Required	0 acres	241.8 acres

Resource Categories	No Action	Preferred Alternative
Known NRHP Sites	0	1
Stream Impacts	0 LF	6,509 LF
Wetland Impacts	0 acres	3.2 acres
Floodplain Impacts	0 acres	0 acres
Hazardous Materials Sites	None	6 sites
Farmland Impacts	0 acres	11 acres
Karst Springs	0	2
Suitable Bat Habitat	0	75.5 acres
Roosting Structures	0	11

4.1 What commitments have been made?

ARDOT's standard commitments regarding relocation procedures, hazardous waste abatement, cultural resources discovery, water quality impact controls, and revegetation have been made for this project. The commitments are as follows:

- Residents and businesses displaced as a direct result of acquisition for the project will be eligible for relocation assistance in accordance with Public Law 91-646, Uniform Relocation Assistance Act of 1970.
- An asbestos survey will be conducted by a certified asbestos inspector on each building slated for acquisition and demolition. All detected asbestos-containing materials will be removed prior to demolition in accordance with ADEQ, EPA, and OSHA regulations.
- In the event of cave discovery during construction, work will immediately be discontinued in the area, access shall be denied, and the opening secured to prevent unauthorized entry. The USFWS will be contacted for the proper procedures to be followed and to examine the cave to determine usage by any listed species.
- A detailed hydrology and hydraulics study will be performed during the final design to demonstrate that the project would not result in any increase in flood level due to construction that would violate applicable floodplain regulations or ordinances.
- If hazardous materials, unknown illegal dumps, or USTs are identified or accidentally uncovered during construction, the type and extent of the contamination will be determined according to the ARDOT response protocol. In cooperation with the ADEQ, appropriate remediation and disposal methods will be determined.

- Project construction will be in compliance with all applicable CWA regulations, as required. This includes obtaining the following: Section 401 Water Quality Certification, Section 402 NPDES, and Section 404 Permit for Dredged or Fill Material.
- Stream and wetland mitigation will be offered at an approved mitigation site at a ratio approved during the Section 404 permitting process.
- An intensive cultural resources survey will be conducted for the Preferred Alternative. If sites are affected, a report documenting the survey results and stating the ARDOT's recommendations will be prepared and submitted for SHPO review. If prehistoric sites are impacted, FHWA-led consultation with the appropriate Native American Tribe will be conducted and the site(s) evaluated to determine if Phase II testing is necessary. Should any of the sites be determined as eligible or potentially eligible for NRHP nomination and avoidance is not possible, site-specific treatment plans will be prepared and data recovery conducted at the earliest practicable time. All borrow pits, waste areas, and work roads will be surveyed for cultural resources when locations become available.
- Water Pollution Control and Nesting Sites of Migratory Birds Special Provisions will be incorporated into the construction contract to minimize potential impacts to water quality and migratory birds.
- Appropriate action will be taken to mitigate any permanent impacts to private drinking water sources should they occur due to this project.
- Water quality best management practices will follow the Cave Spring Area Karst Resource Conservation Regulations as recommended by the USFWS. Section 7 consultation with the USFWS will continue upon the selection of the Preferred Alternative. USFWS concurrence/clearance will be obtained for the Preferred Alternative prior to final NEPA approval.
- A wildflower seed mix will be included in the permanent seeding for the project.

4.2 Is the NEPA process finished?

After this EA is approved by the FHWA for public dissemination, a Location Public Hearing will be held.

After a review of comments received from citizens, public officials, and public agencies, if it is determined that there are not significant impacts associated with the Preferred Alternative, a FONSI document will be prepared and submitted to the FHWA. If significant, immitigable impacts are identified, an EIS would be initiated. If FHWA issues a FONSI, it will identify the Selected Alternative. The issuance of a FONSI concludes the NEPA process.

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Acronyms

AAS	Arkansas Archeological Survey
ADEQ	Arkansas Division of Environmental Quality
ADH	Arkansas Department of Health
ADT	Average Daily Traffic
ALP	Airport Layout Plan
AMASDA	Automated Management of Archeological Site Data in Arkansas
AMM	Avoidance and Minimization Measures
ARDOT	Arkansas Department of Transportation
AST	Aboveground Storage Tanks
BMP	Best Management Practice
CEQ	Council of Environmental Quality
CMF	Crash Modification Factor
CO	Carbon Monoxide
CSRS	Conceptual Stage Relocation Statement
CWA	Clean Water Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESW	Ecologically Sensitive Waterbody
FEMA	Federal Emergency Management Agency
FHWA	Federal Hwy. Administration
FONSI	Finding of No Significant Impact

FPPA	Farmland Protection Policy Act
IPaC	Information, Planning, and Conservation
LF	Linear Feet
MBTA	Migratory Bird Treaty Act
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NACA	Northwest Arkansas Conservation Authority
NBZ	Noise Boundary Zone
NEPA	National Environmental Policy Act
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWARPC	Northwest Arkansas Regional Planning Commission
OSHA	Occupational Safety and Health Administration
OUL	Ozark Underground Laboratory
PPM	Parts Per Million
ROW	Right of Way
RPZ	Runway Protection Zone
SHPO	State Historic Preservation Office
SI	Substantial Increase
SNB	Springdale Northern Bypass
SP	Special Provision
STIP	Statewide Transportation Improvement Plan
SWPPP	Stormwater Pollution Prevention Plan
TNM	Traffic Noise Model
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Travelled
XNA	Northwest Arkansas National Airport