Northwest Arkansas Transportation Alternatives Analysis

Prepared by URS Corporation for the

Northwest Arkansas Regional Planning Commission

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Contents

Executive Guide to the Study

For more than a decade, various groups have promoted interest in a rail transit project that would serve the north-south corridor in Washington and Benton Counties in Northwest Arkansas. The advocacy efforts captured the interest of public officials and private individuals and interests. However, there has been no detailed study of the potential and the feasibility of the concept that addressed the potential for federal funding assistance for the project, and that studied the options in a way that satisfies the metropolitan planning requirements of the US Department of Transportation. The designated agency for such studies, the Northwest Arkansas Regional Planning Commission (NWARPC), responded to the widespread interest by obtaining special federal funding to conduct an Alternatives Analysis in the 40-mile north south corridor.

This report documents the results of the Alternatives Analysis study commissioned by NWARPC. To the greatest extent possible, the study approach followed the planning guidelines of the Federal Transit Administration (FTA) especially those that apply to New Starts and Major Capital Investment funding. Section 1.2 of this report explains the changing nature of many of those regulations due to the expiration of one federal transportation authorization bill and the passage of a new one, and how the study approach bridged that transition.

Section 1 concludes with the development of the purpose and need for the project. The articulation of a Purpose and Need Statement is a threshold requirement of the Federal Transit Administration. The statement covers both the transportation need and the need to support, encourage and bring about many of the environmental, economic development and quality of life goals of the NWA Long Range Transportation Plan. The study used the broad purpose and need components to develop the recommended option, known as the Locally Preferred Alternative or LPA.

A significant difference between the federal planning guidelines and previous studies is that the Alternatives Analysis approach requires a location-neutral and mode-neutral examination of the options within the broad category of fixed-guideway transit. The selection of alternative locations and the modal (vehicle) technologies are described in Section 4, Conceptual Transportation Alternatives. Section 4 also addresses a common misconception that light rail vehicles can operate on freight rail lines. In the current regulatory environment in the US, this is not permitted. However, the good news is that the vehicle industry is rapidly responding to consumer demand for more modern, higher performing, and quieter commuter rail vehicles known as DMU (diesel multiple units).

Another significant requirement of this study was that ridership forecasts had to be based on the current adopted land use and population projections of the 2035 long range transportation plan. Budget limitations further required that the ridership projections use the existing travel demand model developed and maintained by NWARPC staff in cooperation with the Arkansas Highway and Transportation Department. While the model has served the area well for automobile-based planning of the regional street and highway plan, it is extremely limited in its ability to estimate demand for alternative transit facilities. The implications and limitations of this approach are explained in Section 5. While this problem may be rectified by future development of a model with transit or mode split capabilities, the current FTA requirements force the transit options to be measured by its output.

The capital and operating costs of three alternatives were estimated and are detailed in Section 6. The cost was estimated for projects covering the entire length of the corridor but obviously shorter segments, or starter lines, could be developed. The capital costs, in 2014 dollars, are estimate to be:

- New Location: $2.286 Billion
- Commuter Rail on Arkansas & Missouri RR ROW: $664.0 Million
- Bus Rapid Transit on US71B: $97.8 Million

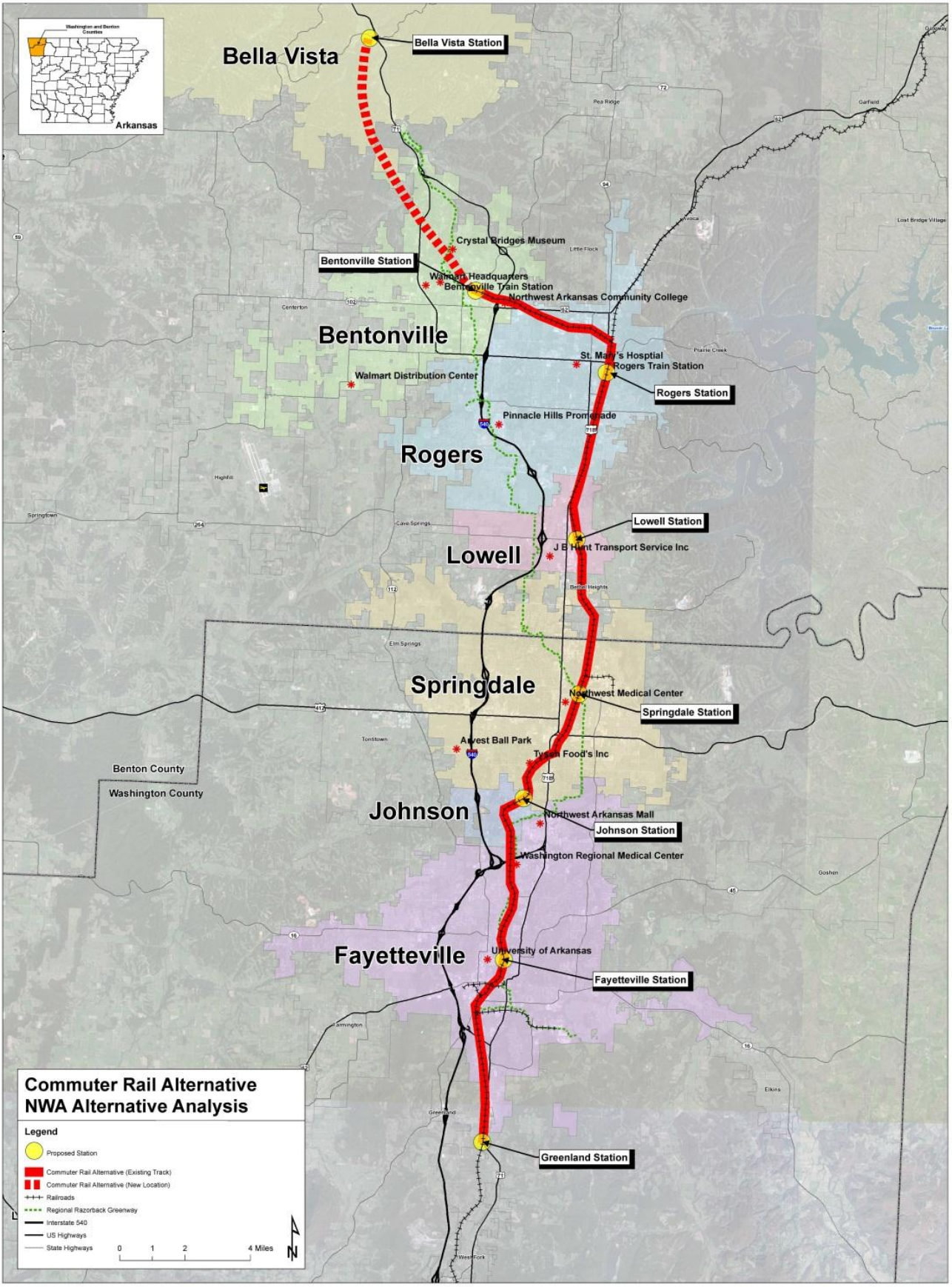
The essence of the Alternatives Analysis is the comparison of the attributes of each to the criteria derived from the Goals and Objectives of the metropolitan transportation plan. Section 7 displays the results. Based on this screening, the Locally Preferred Alternative is the Commuter Rail on the right of way of the A&M Railroad, along with a new location segment from Bentonville to Bella Vista. A unique factor is that the current management of the A&M is very open to discussing the project with the NWARPC and its policy leaders. This is not the typical position of freight railroad operations in the US.

The selection of an LPA does not mean that this project is to be pursued above all other transit options, or other surface transportation options. It simply means that, of the projects proposed for this regional corridor, it is the one for which Federal funding assistance would be requested if NEPA and other funding requirements were met. An LPA can also be revisited and modified if and when a NEPA process is initiated.

Section 7 also identifies a broad range of transit-supportive actions that would be required to support a funding request and to help compensate for ridership that is commensurate with its urbanized area population. These range from zoning and permitting policies to encourage mixed use development to reducing the growth in free and low cost surface parking. These actions also may include expansion of the innovative pedestrian and bicycle linkages such as the Razorback Greenway. It is important for the area to find ways to provide conventional bus transit service that has more coverage, more frequency, and a longer daily time span. Additionally, Bus Rapid Transit options should be explored in more detail even though in general they do not bring about as much economic development as rail-based projects.

Technically, this Alternatives Analysis report could conclude with the basic findings listed in the beginning of Section 8. It is highly unlikely the project could qualify for conventional Federal transit funding in the current environment. The scope of this study allowed for an alternative ending. This "path forward" shows how NWARPC, its members, and the larger community can continue a planning and implementation effort for this project. The Recommendations, Development Policies, and Implementation Toolkit provide a framework for regional cooperation to bring about changes that can bring future federal funding into the realm of possibility.

Figure E-1: Locally Preferred Alternative


Bella Vista
Bella Vista Station
Crystal Bridges Museum
Bentonville Station
Walmart Headquarters
Bentonville Train Station
Northwest Arkansas Community College
Bentonville
St. Mary's Hospital
Rogers Train Station
Walmart Distribution Center
Rogers Station
Pinnacle Hills Promenade
Rogers
Lowell Station
J B Hunt Transport Service Inc
Lowell
Springdale
Northwest Medical Center
Springdale Station
Arvest Ball Park
Tyson Food's Inc
Benton County
Washington County
Johnson
Northwest Arkansas Mall
Johnson Station
Washington Regional Medical Center
Fayetteville
University of Arkansas
Fayetteville Station
Greenland Station
Arkansas
Commuter Rail Alternative
NWA Alternative Analysis
Legend
Proposed Station
Commuter Rail Alternative (Existing Track)
Commuter Rail Alternative (New Location)
Railroads
Regional Razorback Greenway
Interstate 540
US Highways
State Highways
0 1 2 4 Miles

Section 1 - Purpose and Need

1.1 Background

For more than a decade, there has been a great deal of public interest in the feasibility of a light rail project in Northwest Arkansas (NWA). It has been studied or addressed in no fewer than seven planning studies and reports since 2004. These are:

1. The Potential for a NWA Regional Light Rail System. Beta Rubicon, 2004
2. Interstate 540 Improvement Study. Parsons Transportation Group, 2006
3. NWA Rail: Visioning Rail Transit in Northwest Arkansas. UA Community Design Center, 2007
4. Northwest Arkansas Razorback Regional Greenway TIGER II Grant Application. NWARPC, 2010
5. Northwest Arkansas Transit Development Plan. Connetics, 2010
6. Northwest Arkansas Western Beltway Feasibility Study. Parsons Brinkerhoff, 2011
7. Northwest Arkansas Regional Development Strategy. Market Street, 2011

The Northwest Arkansas Regional Planning Commission (NWARPC) 2035 Long Range Transportation Plan identified the need for further analysis of public transportation alternatives in the 40 mile long North South Corridor. The options for further study included light rail, commuter rail, streetcar, and other fixed guideway options such as bus rapid transit. This was reinforced by opinions and suggestions received during the public participation component of the long range plan update. Planning guidelines from both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) require that funding sources be identified for all projects included in a region's long range transportation plan. It has been generally accepted that there is not enough public or private funding now or in the forecast period to pay for a major light rail or fixed guideway project. Therefore, the regional transportation planning process administered by the NWARPC has not been allowed to include a light rail proposal, and until recently NWARPC has not had funding to study the feasibility of a light rail or fixed guideway project.

In order to be responsive to the many public comments and interested parties, the NWARPC sought special Federal funds which could be used to examine the feasibility of a fixed guideway system. After several attempts to obtain Federal funding for the study, NWARPC received an award for a Transit Alternatives Analysis (AA) grant in 2012, and received a grant from the Federal Transit Administration to conduct an alternatives analysis (AA) for the corridor. Documents from NWARPC in support of the grant application stated:

> We would anticipate such a study to analyze our north-south travel corridor, and determine the feasibility of a major transit investment to alleviate traffic congestion, promote and support sustainable urban development, decrease air pollution, and meet future travel demands in Northwest Arkansas. A transportation alternatives analysis is included as a work task in the current Northwest Arkansas Regional Planning Commission Unified Planning Work Program.

1.2 US DOT Guidelines for Alternatives Analysis Studies

Federal transit (and highway) grants are made pursuant to appropriations enacted by Congress. These appropriations, in turn, are made within the legal structure of Authorization Acts. As mentioned, the AA grant was made in 2012, and the authorization bill at the time was known as SAFETEA-LU (Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users). Later in 2012, SAFETEA LU was replaced with a new authorization bill known as MAP-21 (Moving Ahead for Progress in the 21st Century). MAP-21 included a shift in the role of Alternatives Analysis in the metropolitan planning process. Previously, an Alternatives Analysis (AA) was required to be completed before the project sponsor could apply for New Starts funding under the FTA Capital Investment Grant program. MAP-21 eliminated the requirement that an AA be a stand-alone requirement and instead places it in the systems planning phase of the metropolitan planning process. MAP-21 does not change requirements of a National Environmental Policy Act (NEPA), which still require a detailed alternatives analysis component. The NWARPC staff sought guidance from FTA on whether the NWA Transit Alternatives Analysis should still be still a stand-alone process.

FTA provided the following guidance:

> Project sponsors may still conduct a stand-alone AA separate from the NEPA review if they wish. This may ultimately streamline the environmental review process because the results of prior planning work evaluating alternatives may be incorporated into the NEPA review. If a sponsor chooses to do a separate AA to help inform the NEPA process, FTA's involvement would be minimal compared to what it had been under SAFETEA-LU. FTA would not comment on the adequacy of the AA or the alternatives covered in it, other than identifying its sufficiency for incorporation into the NEPA process. As general good planning practice, FTA would suggest sponsors look at a range of alternatives and consider carefully the evaluation criteria that will be used to choose among alternatives. FTA is available for technical assistance if requested.
>
> Early scoping is another option. It is an optional early NEPA planning step that precedes formal NEPA scoping. FTA encourages the use of early scoping as a way to start the NEPA process when a proposed action (a locally preferred alternative, for example) has not yet been identified and a large number of transit mode and alignment alternatives in a broad study area are under consideration. Early scoping activities can include public meetings, newspaper advertisements, and meetings with Federal, state and local agencies and non-government to government tribal outreach that may have an interest in the outcome of the study. Early scoping can also help streamline the NEPA process.
>
> If early scoping is intended to result in screening of alternatives for future study, the process would need to comply with the requirements for linking planning and NEPA if the elimination of alternatives is to be given credit in the NEPA process.
>
> The decision of whether to begin or complete an AA already underway is a local one. FTA will offer technical advice if requested.

NWARPC made the decision to continue with an AA as a stand-alone step. If a fixed guideway project is developed in the near future based on the findings and recommendations of this study, and if Federal funds are contemplated, a NEPA evaluation will be required. More detailed alternatives analysis will likely be required at that time, but such AA efforts should, as MAP-21 guidance describes, be accelerated and

streamlined by building on the public input, environmental screening, and technical analysis conducted as part of this AA and documented in this report and supplementary material.

1.3 Overview of Study Area. The study area is within Benton and Washington Counties located in the northwest corner of Arkansas. It borders Oklahoma and Missouri and is commonly referred to as Northwest Arkansas or NWA. Local governments (32 cities and two counties) and transportation agencies in Washington and Benton Counties are active members of the Northwest Arkansas Regional Planning Commission and participated in this Alternatives Analysis study. Figure 1-1 shows the proposed study area which comprises a North-South corridor concentrated along I-49[1].

NWA has developed in a linear north south corridor due to terrain and other environmental features. Transportation facilities have had a major historic role in shaping the area, beginning with the Butterfield Overland Trail and Stagecoach route, the St Louis-San Francisco railroad in the 1870s, US 71 (now US 71B), and the aforementioned I-49.

Northwest Arkansas has been one of the nation's fastest growing areas for two decades. The 2010 Census shows Benton County having 221,339 persons and Washington County with 203,065 for a total of 424,404, a growth of 36.4% between 2000 and 2010. The Fayetteville-Springdale-Rogers AR-MO Metropolitan Statistical Area (MSA,) includes the following counties: Benton, Madison, Washington in Arkansas and McDonald County in Missouri (Figure 1-2).

Characteristics of the study area are detailed further in Section 2.

[1] In April 2014, I-540 was redesignated as I-49. Where this report refers to a study or document with the name "I-540", the original designation is used but the reader should be aware that I-540 and I-49 now refer to the same route.

Figure 1-1. Study Area

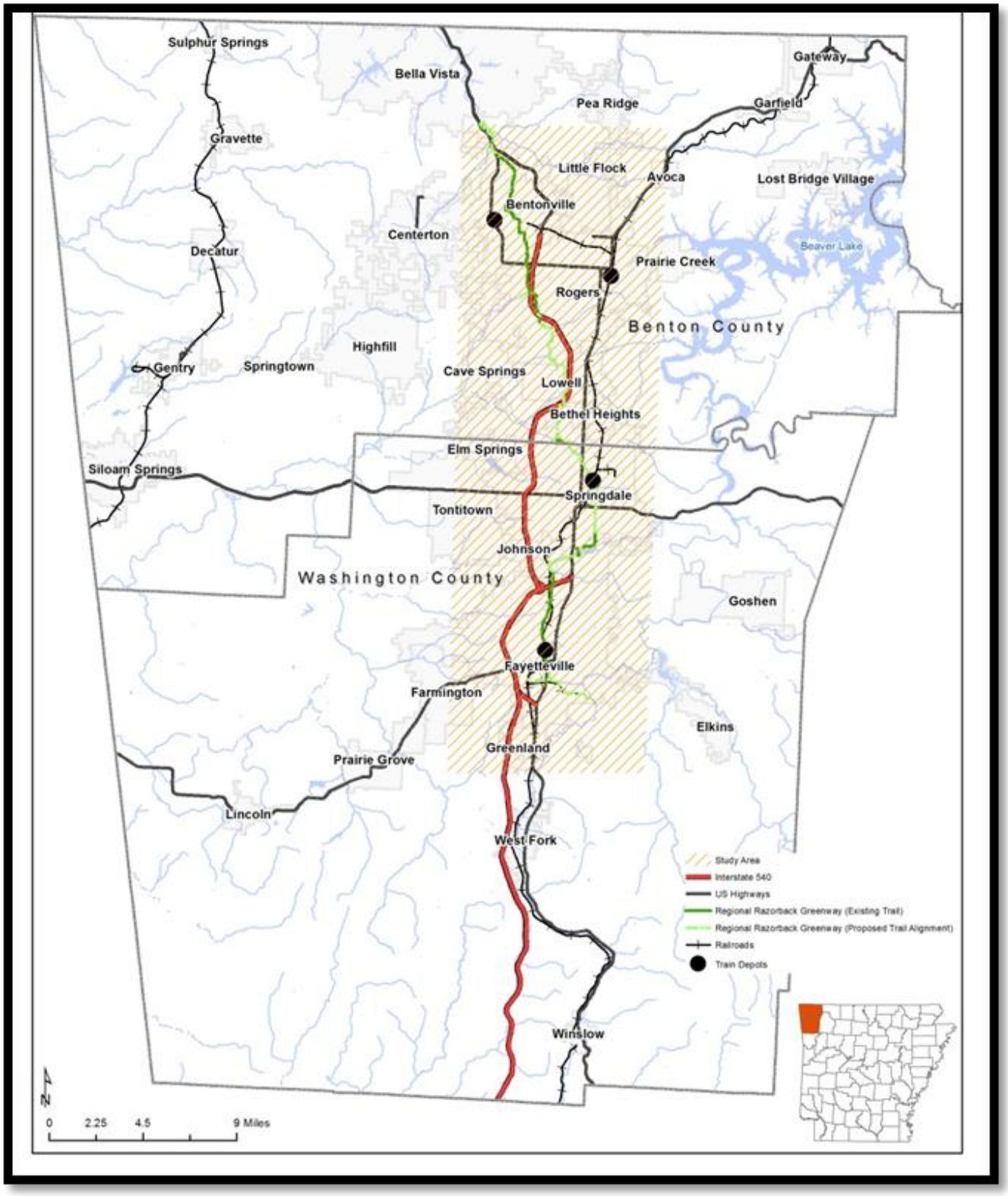
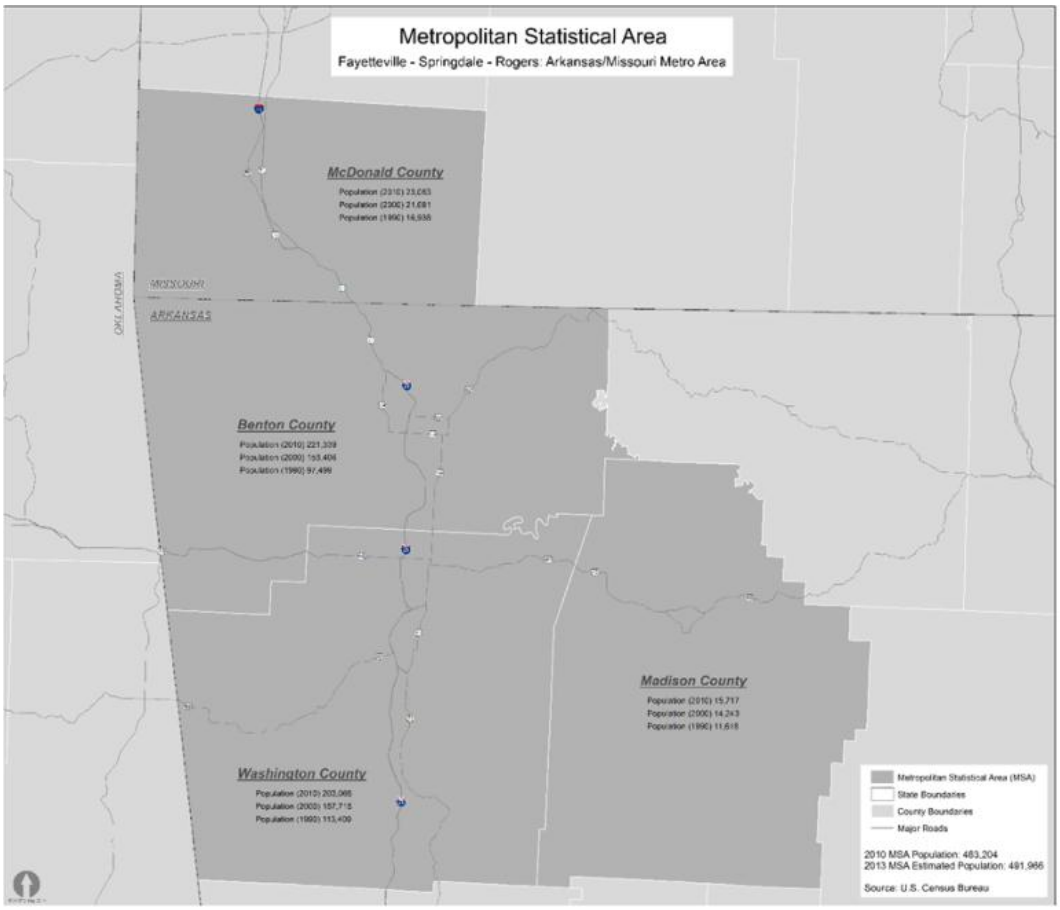


Figure 1-2 Metropolitan Statistical Area



In 2012, the population of NWA was at 482,200 according to a 2013 Census report. The MSA comprises almost 15% of the population of Arkansas. The NWA Urbanized Area (UZA) population was 295,083 according to the 2010 Census, which established the Northwest Arkansas Regional Planning Commission as a Transportation Management Area (TMA) for the first time.

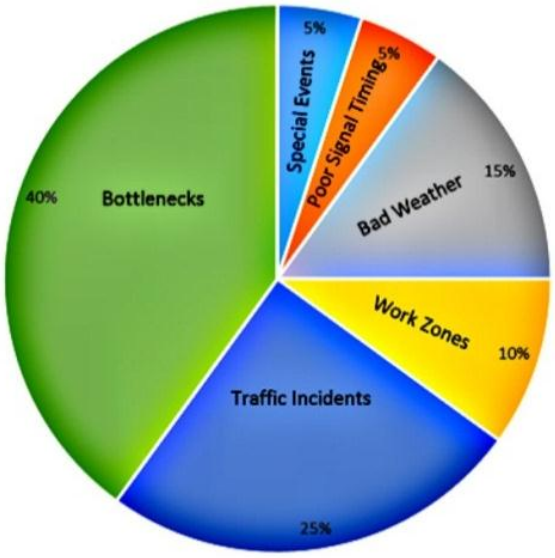
Table 1-1 Population Trends

NWA Two County Area

	1990	*2000*	*2010*	*2035*
Washington	113,409	157,715	203,065	315,135
Benton	97,499	153,406	221,339	376,139
Total	210,908	311,121	424,404	691,274

The economy of NWA is a diverse mix of manufacturing, education, retail, and global corporate management. It is well known for the world headquarters of Wal-Mart Corporation, Tysons Foods and JB Hunt. The 25,000-student University of Arkansas is located on the south part of the corridor, and the 9,000-student Northwest Arkansas Community College (NWACC) is on the north end. Large employers are arrayed up and down the corridor, along with thriving historic downtown centers in Fayetteville, Springdale, Rogers and Bentonville.

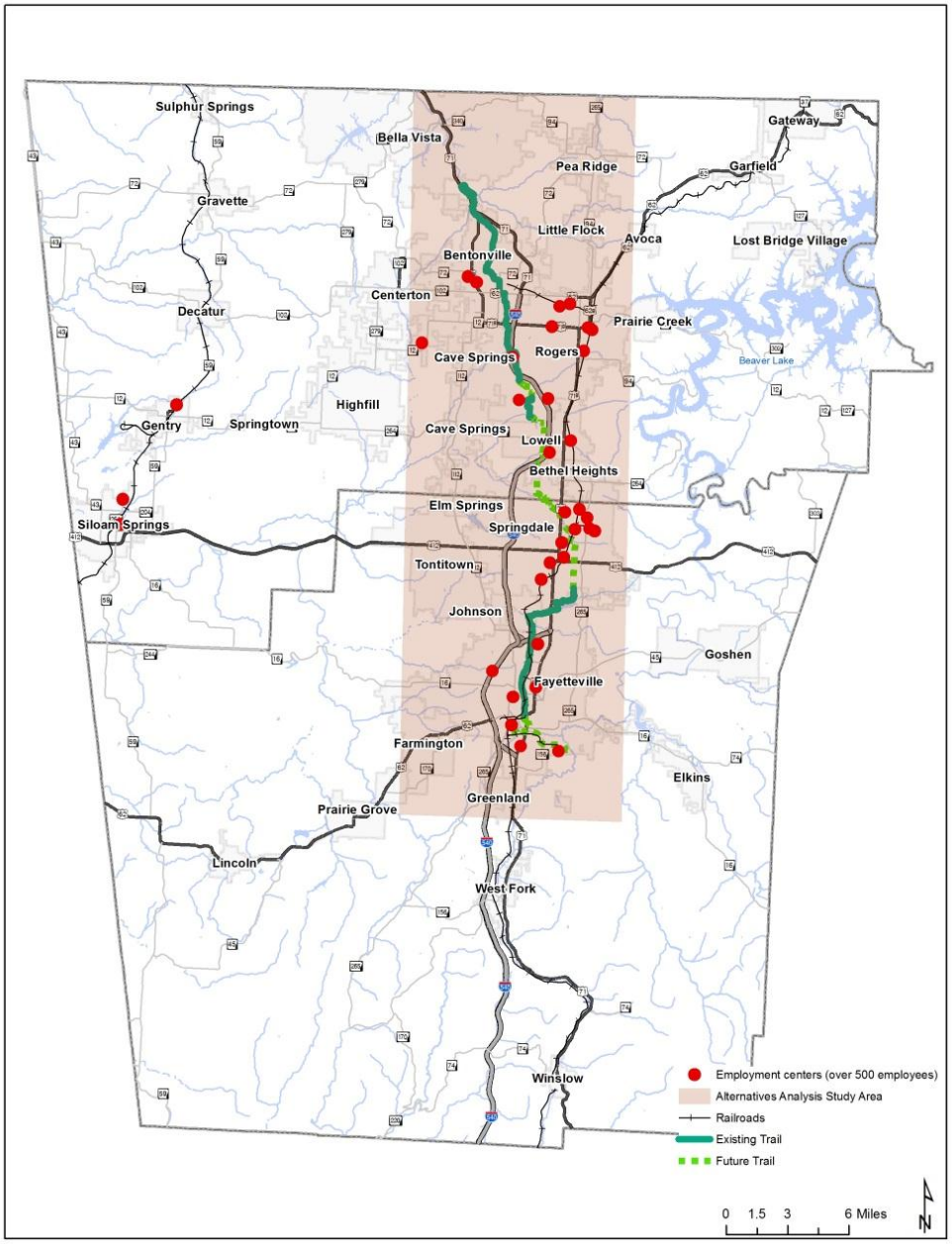
I-49 is the main spine of the transportation system in Northwest Arkansas. I-49 is now part of I-49 (National High Priority Corridor #1), and is also a part of the Strategic Highway Network (STRAHNET). Due to the rapid of the region in the past two decades, traffic volumes in the corridor have grown significantly to levels that are producing high traffic congestion. The "Traffic Congestion in Benton and Washington County" study prepared by Texas A&M Transportation Institute in 2012 estimated that area residents are experiencing travel delays at a cost of $103 million annually. As congestion increases throughout the region, the need to explore alternative regional transportation options is becoming more evident. This pie chart, published in a FHWA study[2], shows sources of congestion by percentage.



[2] "Traffic Congestion and Reliability: Linking Solutions to Problems" FHWA

(footnote continued)

Figure 1-3 Employment centers of over 500 employees



The area is served by two transit agencies with distinctly different histories and missions. Razorback Transit is owned and operated by the University of Arkansas. It has the mission of serving student and employee transportation to the main campus with fixed route and paratransit service in Fayetteville and surrounding areas within Washington County. It also serves a significant number of trips by persons not associated with the University, but the level of service is linked to the academic year. Ozark Regional Transit (ORT) serves Benton and Washington counties. ORT has a very large service area compared to its fleet, route structure and limited span of daily service. Bus service in the area has been the subject of much study and there is a widespread opinion that neither transit agency has the financial base to serve the general commuting needs of NWA or to undertake a major capital investment such as a fixed guideway project at this time.

Pedestrian and biking modes have received a boost in popularity from the planning and implementation of the Razorback Greenway which will eventually connect almost the entire length of the North South Corridor. Both transit systems provide bicycle racks on busses. Transportation plans at the regional and local level have placed a strong emphasis on pedestrian and bike facilities that are providing more connectivity within and between neighborhoods.

1.4 Project Status and History

As discussed in 1.1, a fixed guideway transit facility is not yet a part of the fiscally-constrained regional transportation plan, but its study is a recommendation within the2035 Regional Transportation Plan. The review of previous studies and documents included two planning studies which have done the most to generate public interest and support in a fixed guideway rail project. In 2004, the Beta Rubicon group published The Potential for a NWA Regional Light Rail Study. It outlined a rail project which used the Arkansas Missouri Railroad (A&M) right of way for the spine of a passenger rail line. Beta released a study known as NWA Rail: Visioning Rail Transit in Northwest Arkansas. This study emphasized the potential for a rail project to reshape development patterns in the corridor to achieve transportation, environmental, energy and quality of life goals in the region. Public interest in both of these studies led the Northwest Arkansas Regional Planning Commission Rubicon also proposed a new location rail loop extending from the northern end of the existing freight line. In 2007, the University of Arkansas's Community Design Center to seek funding for a study that would follow the transportation planning guidelines of the Federal Transit Administration (FTA). This Alternatives Analysis study is the direct result of the regional transportation planning process.

1.5 Regional Goals & Objectives

A Purpose and Need Statement for the NWA Fixed Guideway Transit option was developed by reviewing the regional transportation goals as published in the 2035 Long Range Transportation Plan and applying goals which would be advanced by a significant investment in a fixed guideway transit project. The regional goals are summarized as follows.

Goal 1: Increase transportation mobility and accessibility thus promoting the economic vitality in the region by supporting an integrated system with efficient connections between transportation modes.

Objectives:
1. Minimize travel time.
2. Increase accessibility to employment for all persons in the region.
3. Increase accessibility to other major commercial, industrial, educational, medical, and recreation centers.

Goal 2: Increase transportation safety for all modes of travel by providing for safer travel for all modes of transportation, including walking, bicycling, transit and auto.

Goal 3: Provide a transportation system that protects and enhances the environment, promotes energy conservation and improves the quality of life. Use appropriate planning and design criteria to avoid or minimize negative impacts on residential neighborhoods.

Objectives:
1. Provide for a transportation system that both serves and complements desired community development standards and land use patterns as included in local master plans.
2. Promote a transportation system that improves connections between communities.
3. Protect community and neighborhood integrity and social cohesiveness by minimizing residential and business re-locations.

Goal 4: Minimize use of fossil fuels and vehicular operating costs while identifying improvements to the environment.

Objectives:
1. Minimize energy consumption on a system-wide basis by reducing congestion.
2. Minimize air, water, noise and visual pollution.
3. Minimize disturbances of the region's natural aesthetics and wildlife habitat.
4. Provide for needed highway and transit system enhancements.

Goal 5: Encourage land development patterns that promote transportation efficiency.

Objectives:
1. Support in-fill development and the concentration of new commercial and office space activity that enhance the selection of alternative forms of transportation.
2. Identify transit corridors that allow higher density mixed-use areas to be served by public transit.
3. Encourage major facilities to locate along planned public transit lines and implement "transit friendly" strategies.
4. Encourage transit stops/stations within convenient walking distance of major concentrations of employment.

Goal 6: Acquire and preserve right-of-way at the least possible cost.

Objectives:
1. Identify and protect corridors needed for future highway, transit, freight, or other transportation system requirements.
2. Support the adoption of local right-of-way corridors.
3. Identify future corridors for advance right-of-way acquisition for highways, local roads, transit, bicycle and pedestrian use.
4. Promote shared right-of-way/easements for multiple purposes and utilities.

Goal 7: Promote system performance standards to ensure optimum use and efficiency.

Objectives:
1. Promote policies that maximize the use of existing transportation system (i.e. new technologies, access management, and travel demand management) and explore opportunities connectivity.
2. Maintain and preserve existing highway, transit and other facilities in good condition.
3. Encourage local governments and private entities to implement transportation demand management techniques in order to reduce demand and provide commuter benefits.

The results of comparing the 2035 NWARPC long range plan goals with the attributes and impacts of a fixed guideway project in the I-49 Corridor are summarized in the following table.

Table 1-2

Goal	Fixed Guideway Support of Goal
1.Mobility & Accessibility	High
2. Safety	High
3. Environment, Energy, Quality of Life	High
4. Minimize Fossil Fuel Use	High
5. Land Development Pattern Change	High
6. ROW Preservation	Med
7. Performance Standards	Low

1.6 Project Purpose

As determined in consultation with the public, stakeholders, the steering committee, staff and other interested parties, the proposed purpose for a fixed-guideway transit project in the North South Corridor is to:

- Respond to the historical and forecast rapid population and travel growth in a proactive manner
- Reduce the area's heavy reliance on the single occupant automobile
- Provide additional capacity in a corridor in which additional highway capacity is limited by topography and environmental issues
- Reduce the projected use of fossil fuels and reduce the projected increase in harmful emissions of greenhouse gases
- Enhance NWA's livability and the use of supportive modes such as bicycling and walking
- Promote mixed-use land developments around stations to further enhance livability and sustainability
- Provide mobility to those without access to automobiles, including those too young to drive, senior citizens, persons with disabilities, low income families, and those who do not choose to own automobiles.

1.7 Need for Proposed Project

The Transportation Need for the project is to reduce the current and forecast vehicular traffic on I-49, US 71 B, and connecting routes.

Decades of rapid growth, combined with the linear development patterns shaped by physical constraints, have led to increased highway congestion and delays, concerns about air quality, lack of alternatives to the private automobile, a decrease in perceived quality of life, traffic safety concerns, and a concern about being able to sustain high quality economic development and employment trends the area has enjoyed up until the present.

The 2035 plan projects a 62% increase in population for a two county total of 691,700. The travel demand associated with this amount of growth cannot be served by highways, streets or existing levels of public transportation. The 2035 plan shows a shortfall of $4.4 billion in funds needed provide capacity if travel demand is met solely by streets and highways. The plan also assumes that historic development patterns of separate residential, commercial, and retail land uses will continue. The proposed Fixed Guideway Project is a transportation project but it embodies a vision of change in land use, radiating outward from station areas. These changes are part of a growing trend in the US to target specific areas for higher density mixed use developments that are more amenable to walking, bicycles, and public transportation (local bus, streetcar and other fixed guideway transit). This "Transit Orient Development (TOD)" is often referred to as sustainable development, livable communities, and other similar terms.

The 2006 I-540 [I-49] Improvement Strategy prepared by The Parsons Group for the Arkansas Highway and Transportation Department (AHTD) found that even with lane additions and interchange reconfigurations, the level of service in many areas of I-49 will improve only minimally from a level of service "F" (gridlock) to level of service "E" (approaching gridlock), with the best segments reaching only a level of service "C".

Average daily counts recorded by Arkansas Highway and Transportation Department (AHTD) project an average increase of 232% in two locations along the I-49 corridor (one in Johnson and the second in Rogers). The Northwest Arkansas Travel Demand Model shows traffic forecasts for these two locations around 91,000 ADT for the location in Johnson and 100,356 ADT for the one in Rogers for the forecast year 2030. These two numbers raise the percent change from 1991 to 2030 to an average of 400%. These are not uncommon percent change numbers for the forecast years of the travel demand model. According to the model results, I-49 will reach capacity around year 2015 and will be well over capacity in 2030 if solutions are not found. Solutions are needed not

just to widen highway but to provide alternative, viable transportation solutions for Northwest Arkansas.

Other north-south corridor problem areas other include Highway 112 to the west of I-49, a two lane mostly rural state highway, US 71B, a mixed use urban highway that was used to carry most of the traffic north-south before I-49 was built, and Highway 265, also east of I-49, a four/two lane state highway that carries a lot of north-south traffic on the east side of the urban corridor. All of these highways are presently at or near capacity, and travel demand forecasts indicate traffic will exceed capacity by the year 2030.

Additional highway capacity beyond what is programmed will become increasingly difficult to finance. The feasibility and cost of acquiring additional ROW in the main north-south corridors will become costlier and more difficult. The 2035 LRP cites a shortfall from now until the forecast year of $2.7 billion in just the North South Highway Corridors.

Further, capacity improvements to highway segments do not always result in additional capacity in a corridor or network. NWARPC, in response to MAP-21 and to the regional situation, has started a Congestion Management System (CMS) planning process and has already identified 160 miles (centerline) of local arterials and freeways which will be the focus of CMS techniques and projects in the coming years.

Continued reliance on the single or low-occupancy automobile will become more and more difficult to sustain for all the above reasons, so the Northwest Arkansas region must also consider CMS and a range of other options beyond additional lane miles of roads and highways. This study of the feasibility of high capacity transit alternatives fits into the overall transportation responsibilities of the NWARPC.

The Purpose & Need can be summarized as providing capacity for increased travel demand while fostering economic development and sustainable urban redevelopment that radiates from station areas.

Section 2 - Study Area and Existing Conditions

2.1 Study Area Description

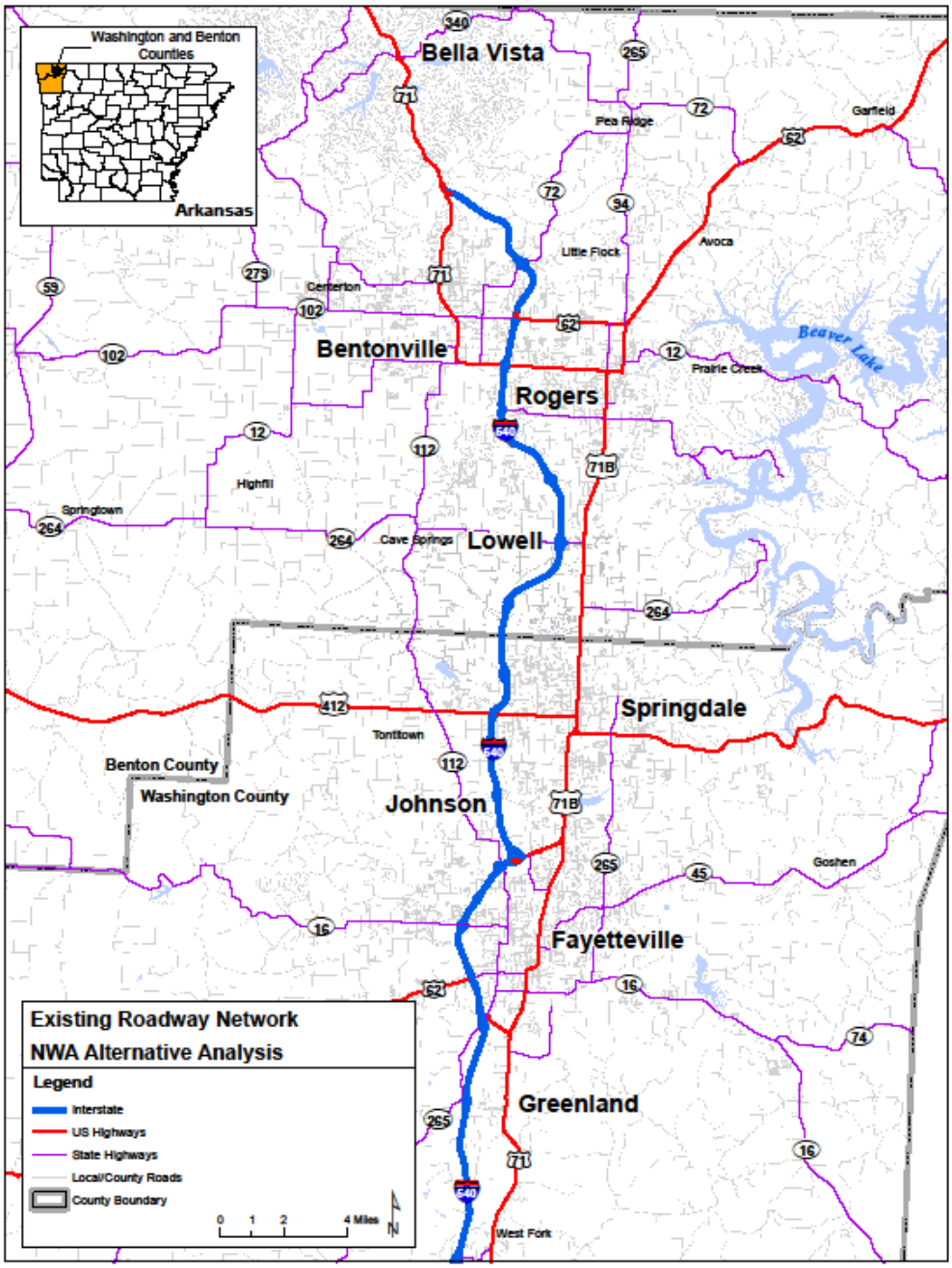
The project is located within Benton and Washington Counties in the northwest corner of the State of Arkansas. This region of the state has seen a substantial increase in population over the past twenty years, particularly in Benton County, as the seat of several large corporate headquarters. Since 1990, Washington County has seen a population increase of over 65% and Benton County has seen an increase of over 100% in the same time period. Figure 2.1 shows the location of the two counties in the state as well as the major communities that make up the study area. Washington County is home to the University of Arkansas as well as Tyson Foods Corporate headquarters in Springdale. Benton County is home to the corporate headquarters of Wal-Mart in Bentonville, Daisy Outdoor Products in Rogers, and JB Hunt Transport Services in Lowell.

The counties are located in the Boston Mountains and Springfield plateau sub regions of the Ozark Mountains. Outside of the urban development along the I-49 and US 71 corridors from Fayetteville in the south to Bentonville in the north; the region is fairly rural in nature composed mainly of large agricultural areas and undeveloped lands. As the population continues to grow there are numerous large subdivision developments that have been and continue to be built in the area, particularly in the smaller communities between Fayetteville and Bentonville and to the west of I-49.

2.2 Existing Roadway Network

As explained earlier, the study area is strongly north-south linear, with two major routes connecting the developed areas and providing through traffic service. These are the parallel routes of I-49 and US 71B. The major east-west roads include US 62 at the north end in Rogers, US 412 in Springdale, and US 62 in the south near Fayetteville. There are numerous other state routes that traverse the study area connecting to smaller local and county roads. The existing roadway network is displayed in Figure 2-1.

Figure 2-1. Existing Road Network



2.3 Existing Transit Service

Public transportation in the study area is provided by Ozark Regional Transit (ORT) and Razorback Transit. There are significant differences in the mission and market of ORT and Razorback.

ORT serves four (4) counties comprising more than 3200 square miles. Razorback Transit concentrates its service in Fayetteville and Johnson, an area of 18 square miles. Both systems receive FTA capital and operating assistance on an annual basis. ORT has eighteen fixed bus routes in the four county area. Service in the study area consists of 11 routes connecting the communities of Bentonville, Rogers, Lowell, Springdale, Johnson, and Fayetteville as shown in Figure 2-3. The ORT service has grown in coverage as recent budget increases have allowed for an expansion of operations. Two new routes in Springdale and Rogers are being implemented in 2014. ORT plans revisions to existing routes in an effort to provide more transit service to its service area, especially to unserved or underserved communities.

Of particular interest is a relatively new Route 490 which connects the University of Arkansas on a frequency of approximately one trip per hour. The two buses dedicated to Route 490 use I-49 for the majority of the route.

The ORT is also planning to implement a new express route that will connect to the communities of Farmington, Greenland, and Prairie Grove in the southwest part of the study area.

The University of Arkansas operates Razorback Transit, a fare-free bus system, to on-campus locations and major off-campus living and shopping areas at the University of Arkansas in Fayetteville. The bus system operates on ten fixed routes, shown on Figure 2-4, from 7:00 a.m. to 6:00 p.m., Monday through Friday and 7:00 a.m. to 10:30 p.m., on Saturday during the fall and Spring Semesters. Service is reduced in summer months and during scholastic term breaks.

A planning study was completed for ORT in 2010 and both the University of Arkansas and the City of Fayetteville are analyzing the Razorback Transit service in two general planning studies in progress as of mid-2014.

Figure 2-3. Ozark Regional Transit Routes

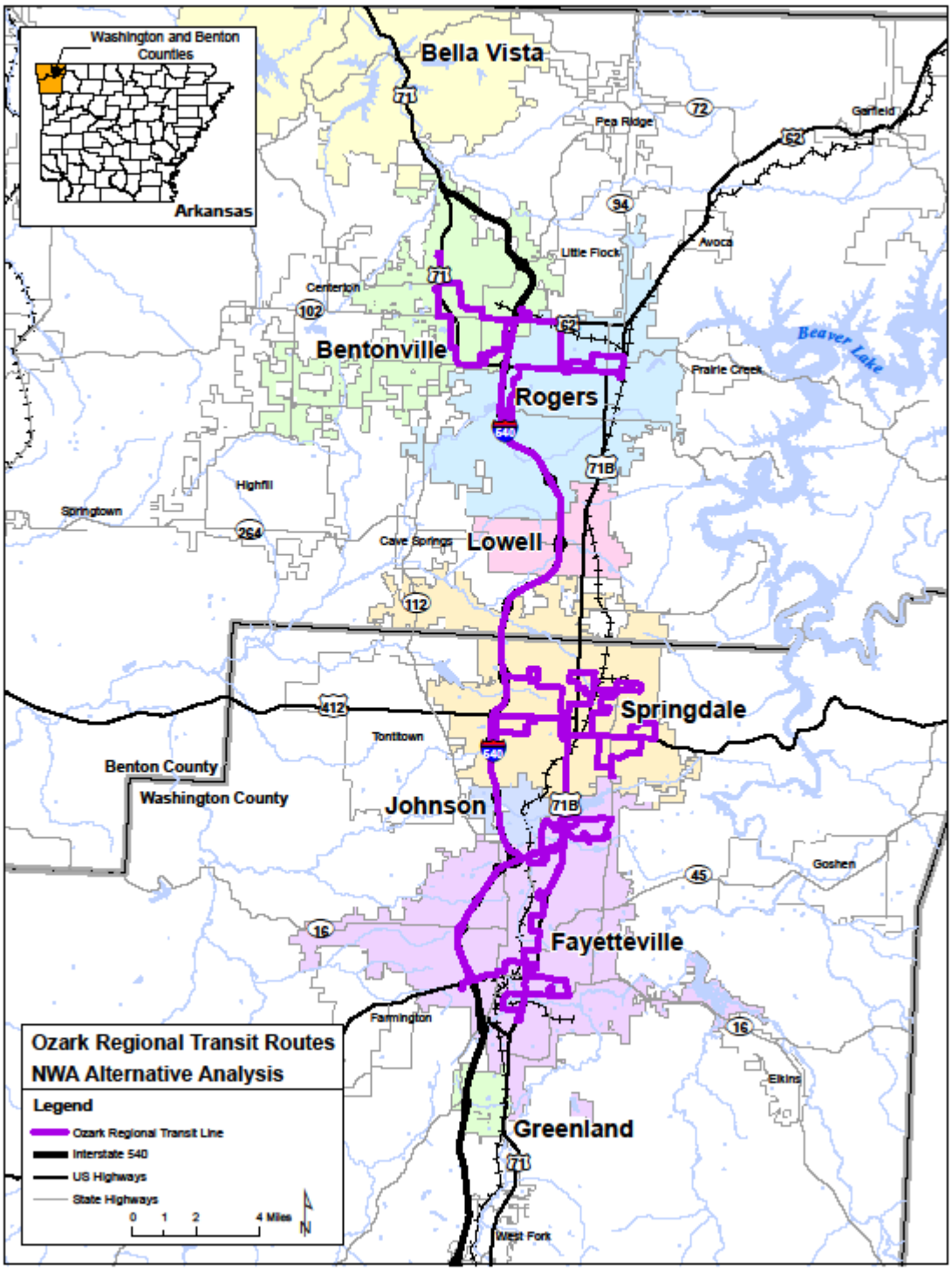
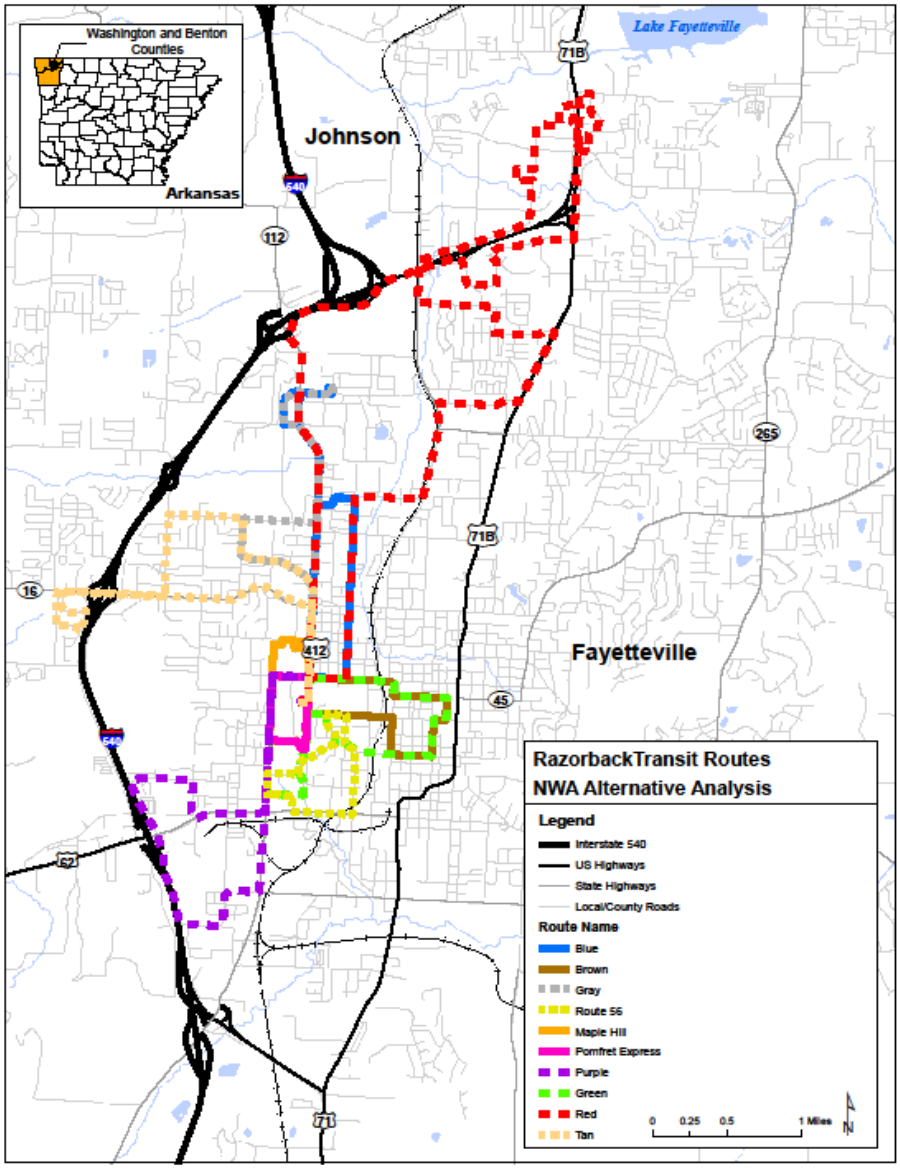
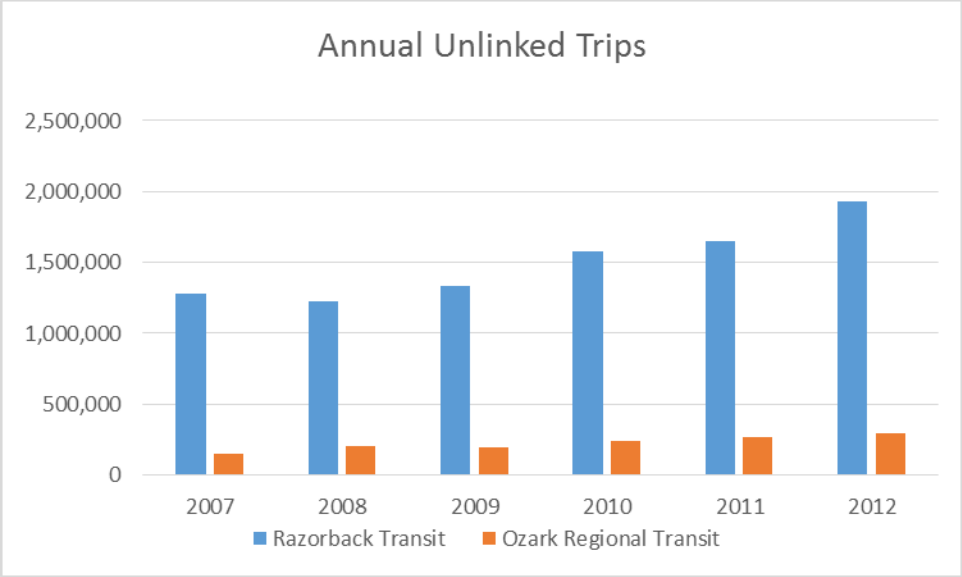


Figure 2-4. Razorback Transit Routes

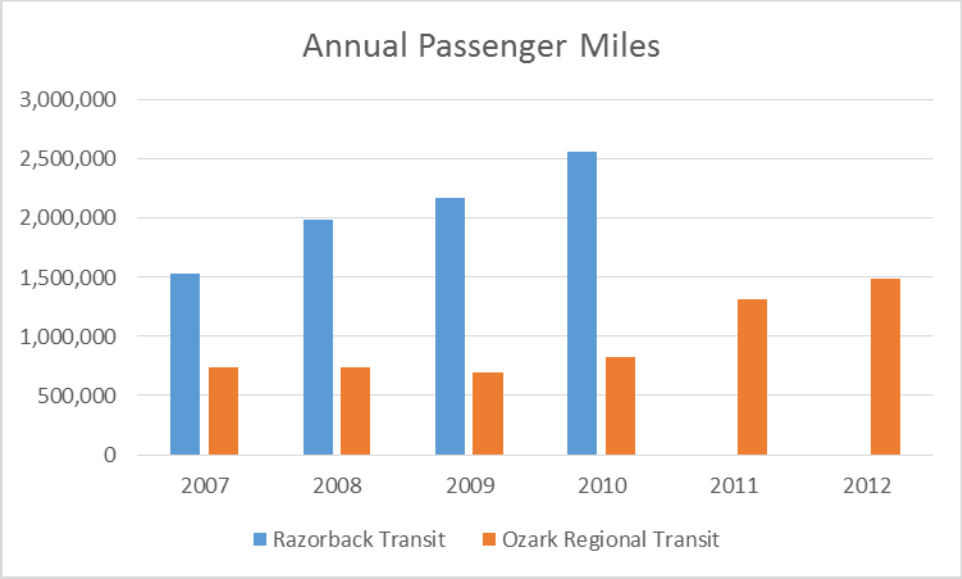


The following two charts further highlight the different service and usage characteristics of the two transit systems. Although Razorback Transit serves a much smaller area, it is compact and services a specific market, students and employees of the University of Arkansas. Its convenience, coupled with limited unrestricted parking supply, makes for effective use. ORT serves large areas of sparsely populated areas with lifeline service to from those areas to the jobs and services within the study area. These two realities are shown in the Annual Unlinked Trip[3] as reported by the agencies to the FTA National Transit Database (NTB). Unlinked trips on transit routes are comparable to average daily traffic counts on the roadway system.



[3] Note: An Unlinked Transit Passenger Trip is a trip on one transit vehicle regardless of the type of fare paid or transfer presented. A person riding only one vehicle from origin to destination takes ONE unlinked passenger trip; a person who transfers to a second vehicle takes TWO unlinked passenger trips; a person who transfers to a third vehicle takes THREE unlinked passenger trips. APTA estimates that the number of people riding transit on an average weekday is 45% of the number of unlinked transit passenger trips.

Although it has fewer passengers , the average trip length of a passenger using ORT is much higher than the average trip length for Razorback Transit. (FTA changed its reporting rules in 2011 to make optional the reporting of Passenger Miles [4]for small systems. ORT still reports its annual passenger miles. Exhibit A includes National Transit Database reports for both transit systems from 2007 to 2012.



[4] Note: Passenger Miles is the cumulative sum of the distances ridden by each passenger.

Source: 2007-2012 National Transit Database

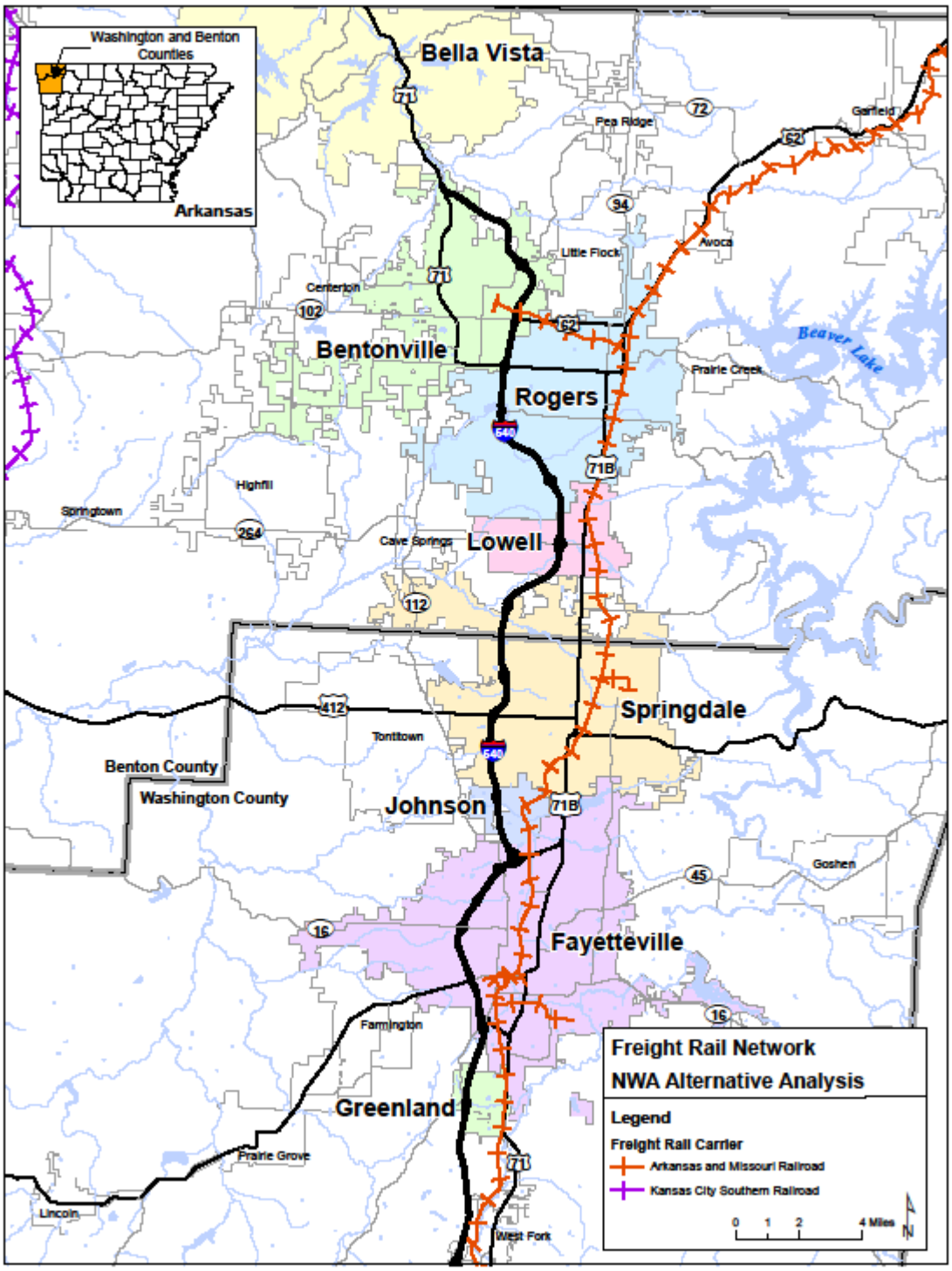
2.4 Existing Freight Rail Service

A&M operates a Class III railroad on 150 miles of track from Monett, Missouri to Fort Smith, Arkansas. A large section of this route runs roughly parallel to US 71B through the study area, see Figure 2-5. The A&M provides freight services along its route and interchanges traffic with three Class I railroads including Burlington Northern Santa Fe, Kansas City Southern, and Union Pacific.

Along with freight service, the A&M also operates a passenger excursion train. This train takes passengers on one of three scenic tours between Springdale, Van Buren, and Fort Smith on a regular basis.

A&M has more than 30 industrial customers within the study area and additional customers and depots outside the study area.

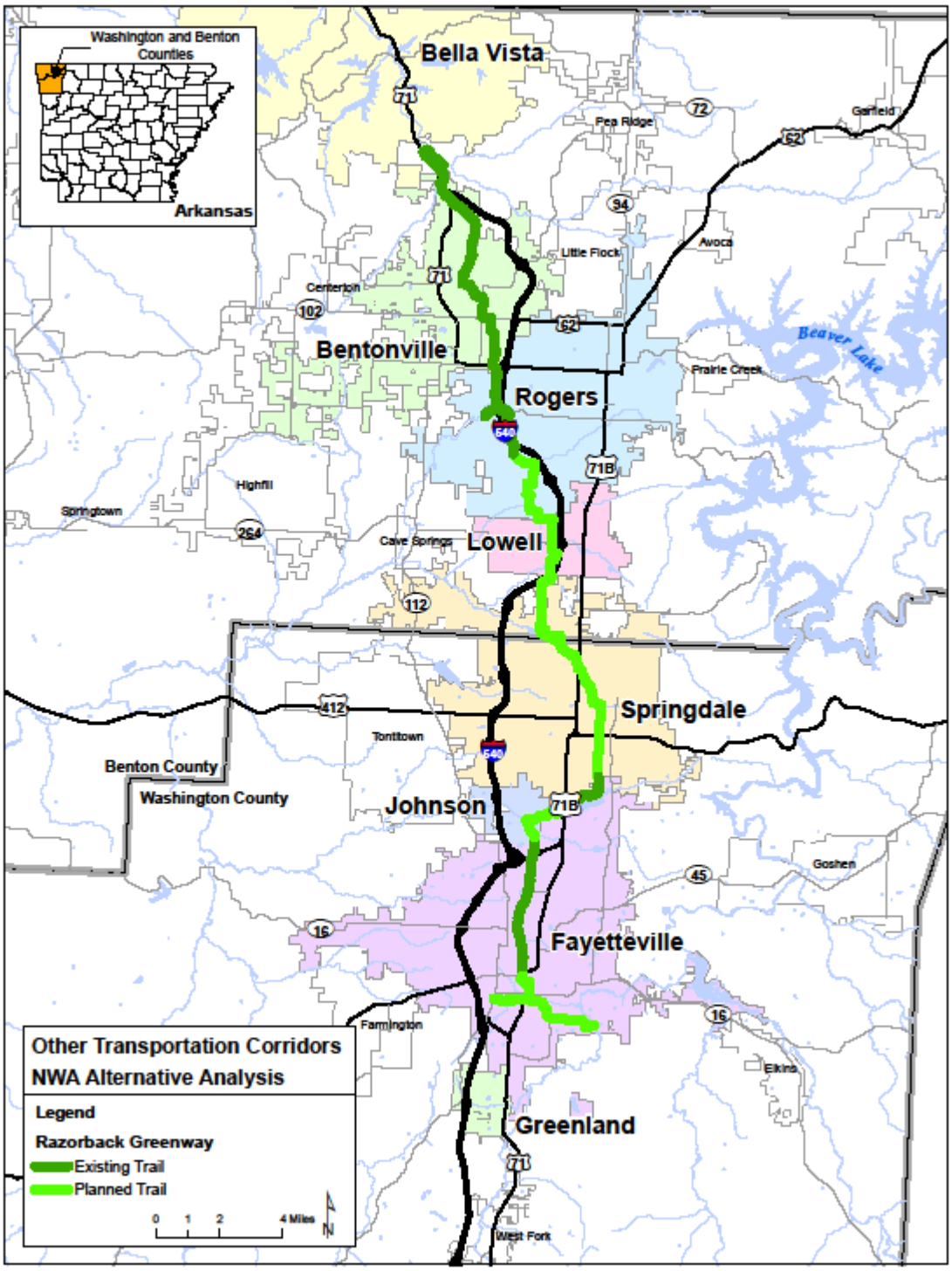
Figure 2-5. Existing Freight Railroad Lines



2.5 Other Transportation Corridors

The Razorback Regional Greenway when complete will consist of a 36-mile, primarily off-road, bike and pedestrian trail that extends from the Bella Vista Trail in north Bentonville south to the Frisco Trail in south Fayetteville. Figure 2-6 shows the entire anticipated corridor as well as those sections which have been constructed. As of the date of this report, 14.2 miles of the planned route have been constructed and are in use with the remaining 21.8 miles either in the planning or design phase.

Figure 2-6. Razorback Greenway Project

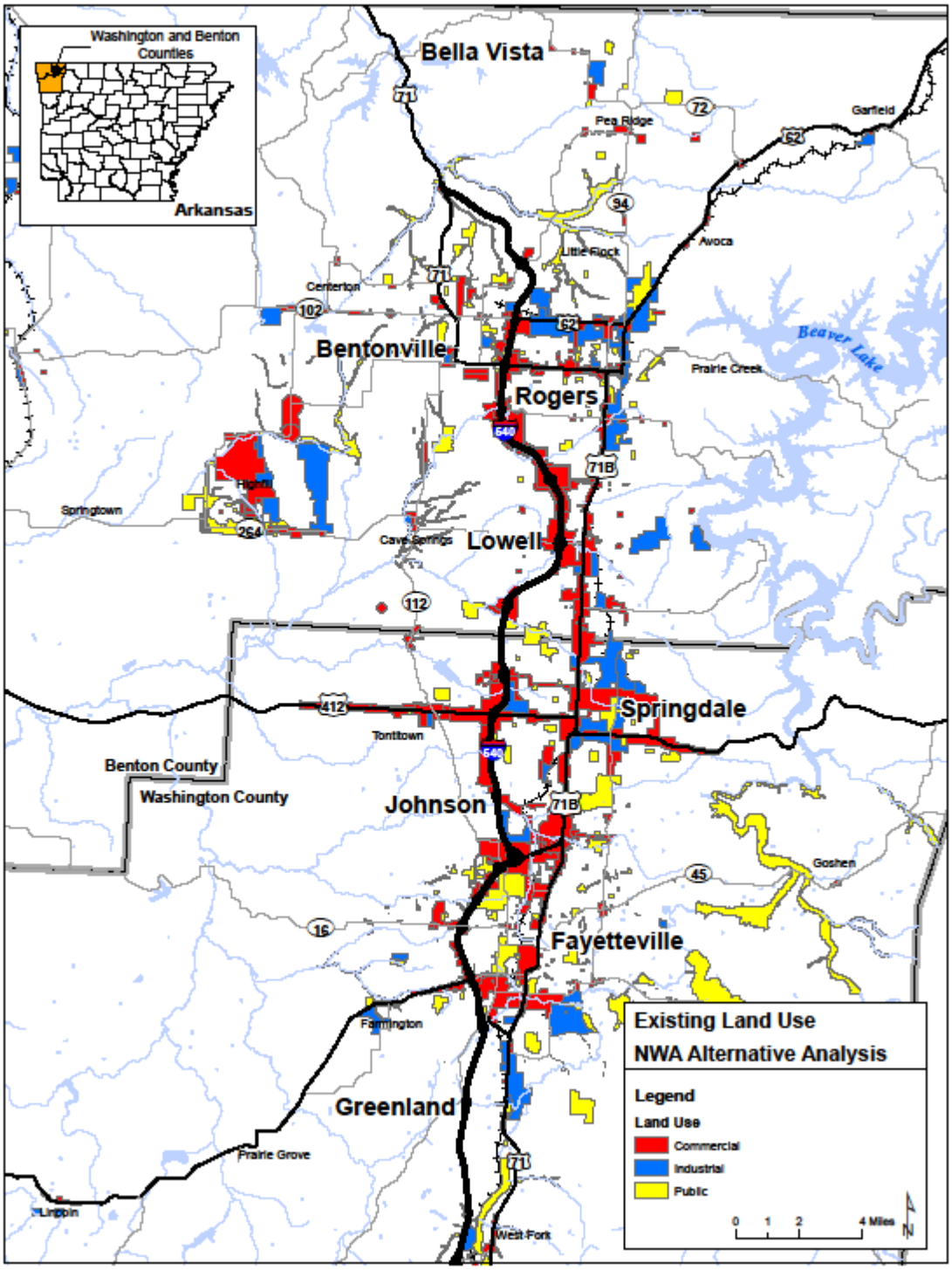


2.6 Existing Land Use and Zoning

Land use throughout the study area was compiled by the Northwest Arkansas Regional Planning Commission staff and is shown on Figure 2-7. The majority of the commercial and industrial development is concentrated along I-49 and US 71B. In the Rogers and Springdale areas, the US 62 and US 412 corridors are also concentrated with commercial and industrial land use. The remaining areas between and adjacent to I-49 and US 71B corridors are mostly residential development which becomes more scattered and rural the further west and east from the main roadway corridors.

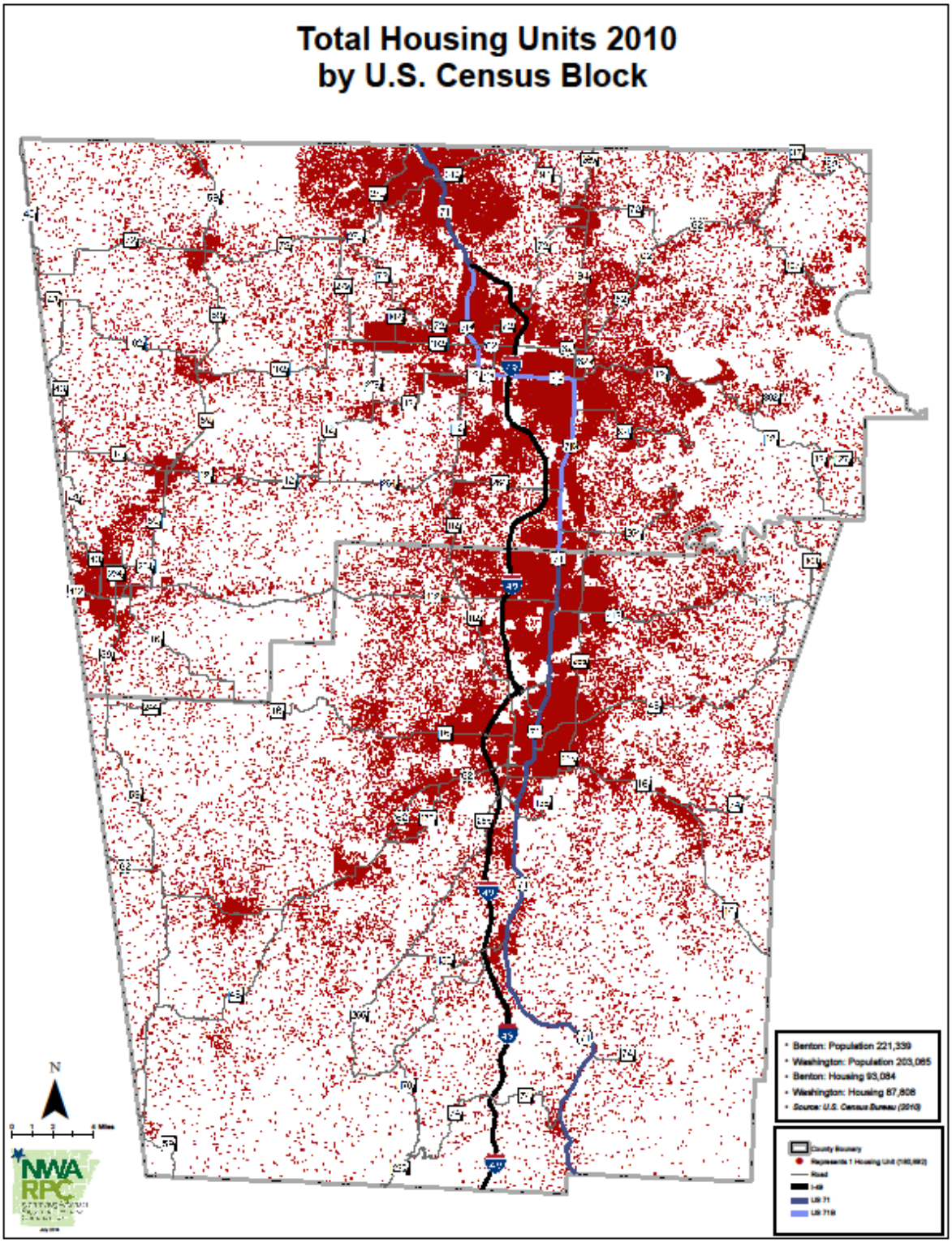
Zoning laws are maintained and amended from time to time by each of the communities within the study area. Extraterritorial jurisdiction is exercised in certain instances by the municipalities.

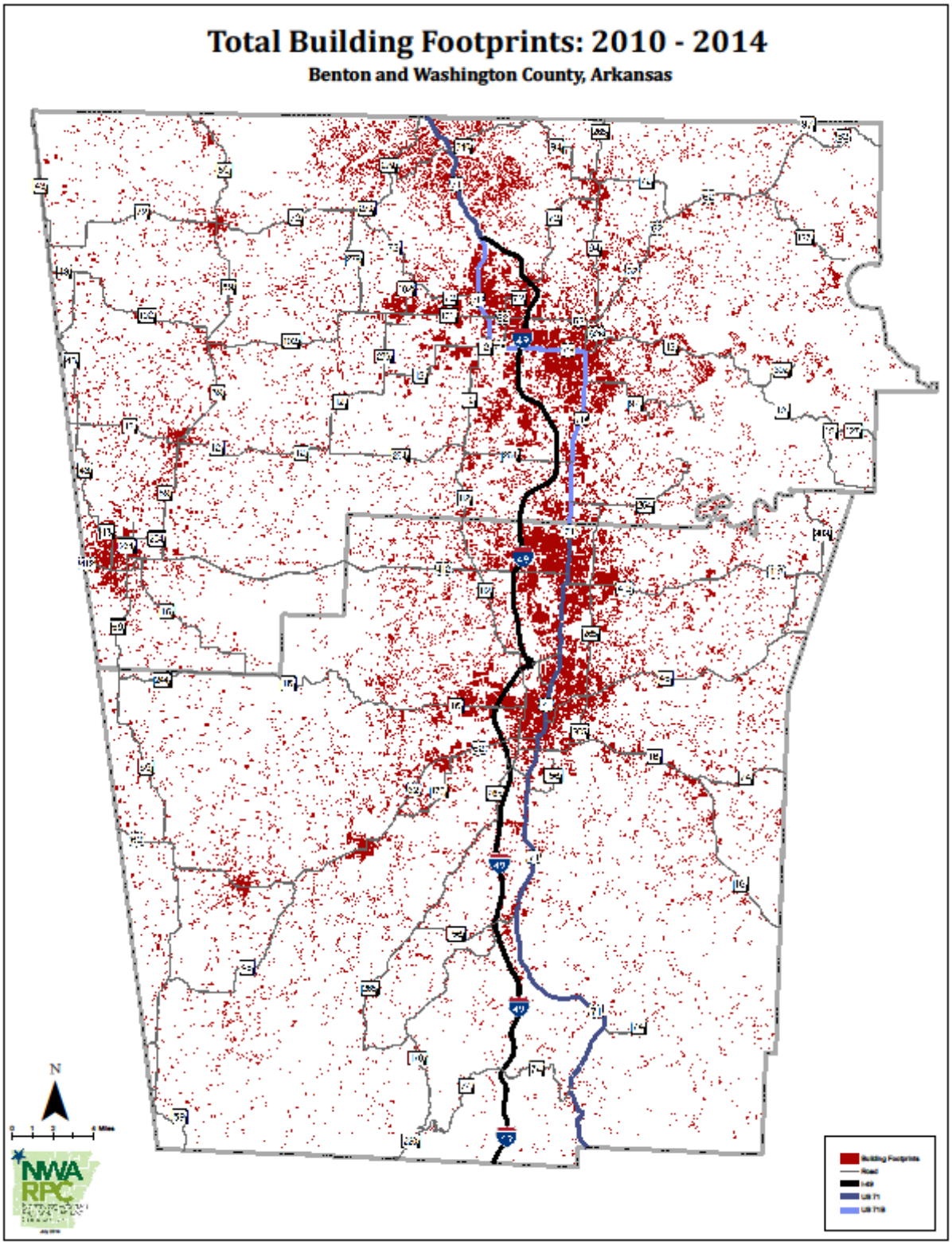
Figure 2-7. Existing Land Use



The next two figures are an attempt to show the physical manifestation of the growth of population, employment, and associated urban development as they relate to land use in the study area. Figure 2-8 shows the distribution of housing units in the study area. The concentration of residential units has implications for all the alternatives, but especially any new location options. It shows where the potential riders are, and it shows how challenging it would be to develop a new location alternative in the central part of the corridor. Figure 2-9 shows more of the built environment by revealing the cumulative building footprints in the study area.

Fig 2-8. Housing Unit Locations

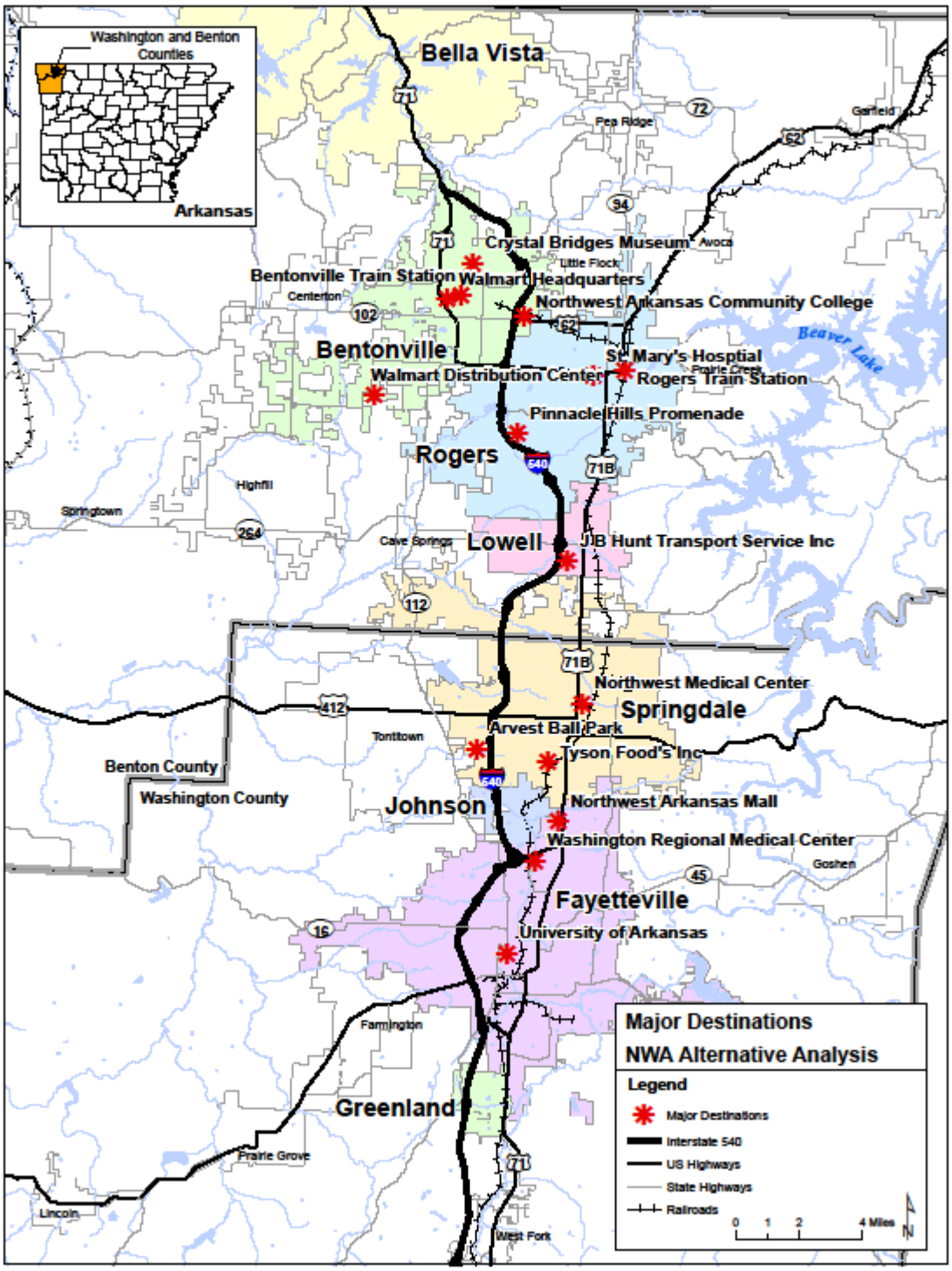



Total Building Footprints: 2010 - 2014
Benton and Washington County, Arkansas
N
NWA RPC

2.7 Major Destinations / Traffic Generators

Figure 2-10 shows the major destinations within the study area. These destinations also represent the major traffic generators due to their status as major employers, retailers, or service/entertainment providers. As with commercial development discussed in the previous section, the majority of the destinations/traffic generators are located along the I-49 and US 71B corridors. Most major generators are on or adjacent to US71B but there has been some shifting to the west adjacent to I 49 interchanges and frontage roads. This is particularly true of commercial land uses such as shopping centers.

Figure 2-10. Major Destinations



2.8 Demographics

While population in the State of Arkansas has grown at a fairly steady rate, Washington and Benton Counties, Springdale, Rogers, and Bentonville have seen dramatic population growth in the past 10 years alone. Current populations for the state and counties, as well as the communities within the study area, are displayed in Table 2-1. This increased growth in population and economic development has been most notable in Rogers and Bentonville, with a 94 and 78 percent increase in population, respectively, in just the past ten years. Almost all of this population growth has occurred within the I-49 and US 71B corridor, with the areas west of the interstate still fairly rural in nature. The majority of the growth within the study area has stemmed from an influx of workers who commute to nearby Fayetteville and Springdale and Bentonville, all of which have seen significant economic growth in the past decade.

Figure 2-11 shows the income levels by Traffic Analysis Zone (TAZ). Northwest Arkansas in general has some of the highest income levels in the state, but the figure shows low income areas in Fayetteville and Springdale.

Northwest Arkansas has experienced an in-migration of Latino or Hispanic population. Between the year 2000 and 2010 the two-county regions' total population grew by 36.4 percent while the Hispanic population grew from 26,401 to 65,741 or by 149.0 percent. From this it can be seen that the Hispanic population continues to increase at a faster rate than the general population. The Census 2010 Hispanic population figure of 65,741 makes up 15.5 percent of the 424,404 two-county total population. This Hispanic total population ratio is higher in the cities of Northwest Arkansas with an 18.4 percent and 26.7 percent ratio for Washington and Benton County Cities respectively (Source: May 2013 Title VI Plan, NWARPC).

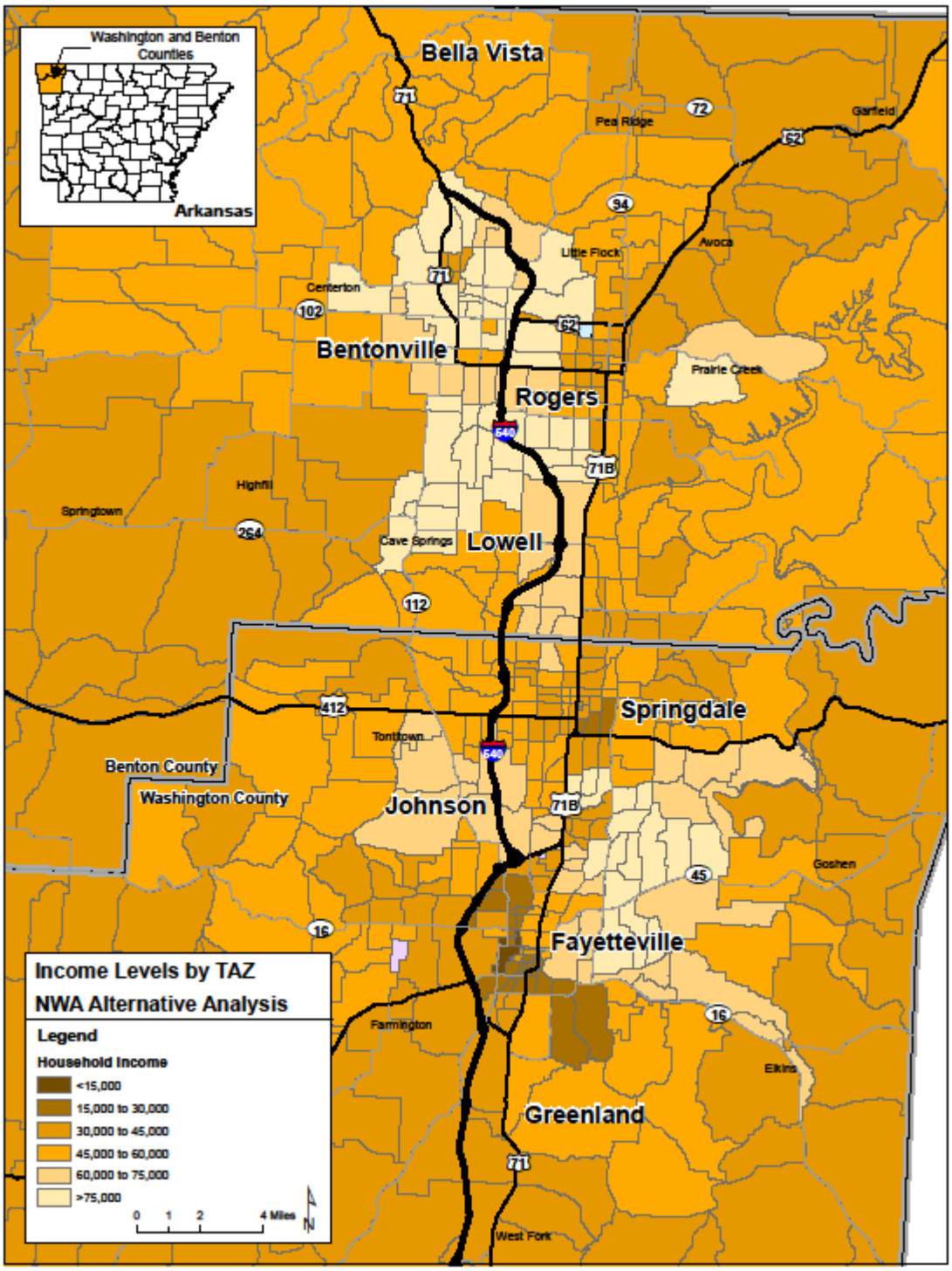
Table 2-1

Population Statistics and Trends

Geographic Area	*Population*		*Total Growth*	*Minority*	*Poverty*
	2000	**2010**	**2000-2010**	*(%)*	*(%)*
Bentonville	19,730	35,301	15,571	8,108	3,177
			(78%)	(23%)	(9.0%)
Rogers	38,829	55,964	17,135	21,246	7,667
			(94%)	(38%)	(13.7%)
Lowell	5,013	7,327	2,314	2,292	667
			(46%)	(31%)	(9.1%)
Johnson	2,319	3,354	1,035	707	456
			(44%)	(21%)	(13.6%)
Springdale	45,798	69,797	23,999	32,999	16,192
			(52%)	(47%)	(23.2%)
Fayetteville	58,047	73,580	15,533	14,182	17,364
			(27%)	(19%)	(23.6%)
Benton County	153,406	221,339	67,933	51,734	26,782
			(44%)	(23%)	(12.1%)
Washington County	157,715	203,065	45,350	52,519	39,597
			(29%)	(26%)	(19.5%)
State of Arkansas	**2,673,400**	**2,915,918**	**242,518**	**742,449 (25%)**	**545,276**
			(9%)		**(18.7%)**

Source: US Census Bureau compiled from 2000 and 2010 census data.

Figure 2-11. Income Levels by TAZ



2.9 Environmental Resources

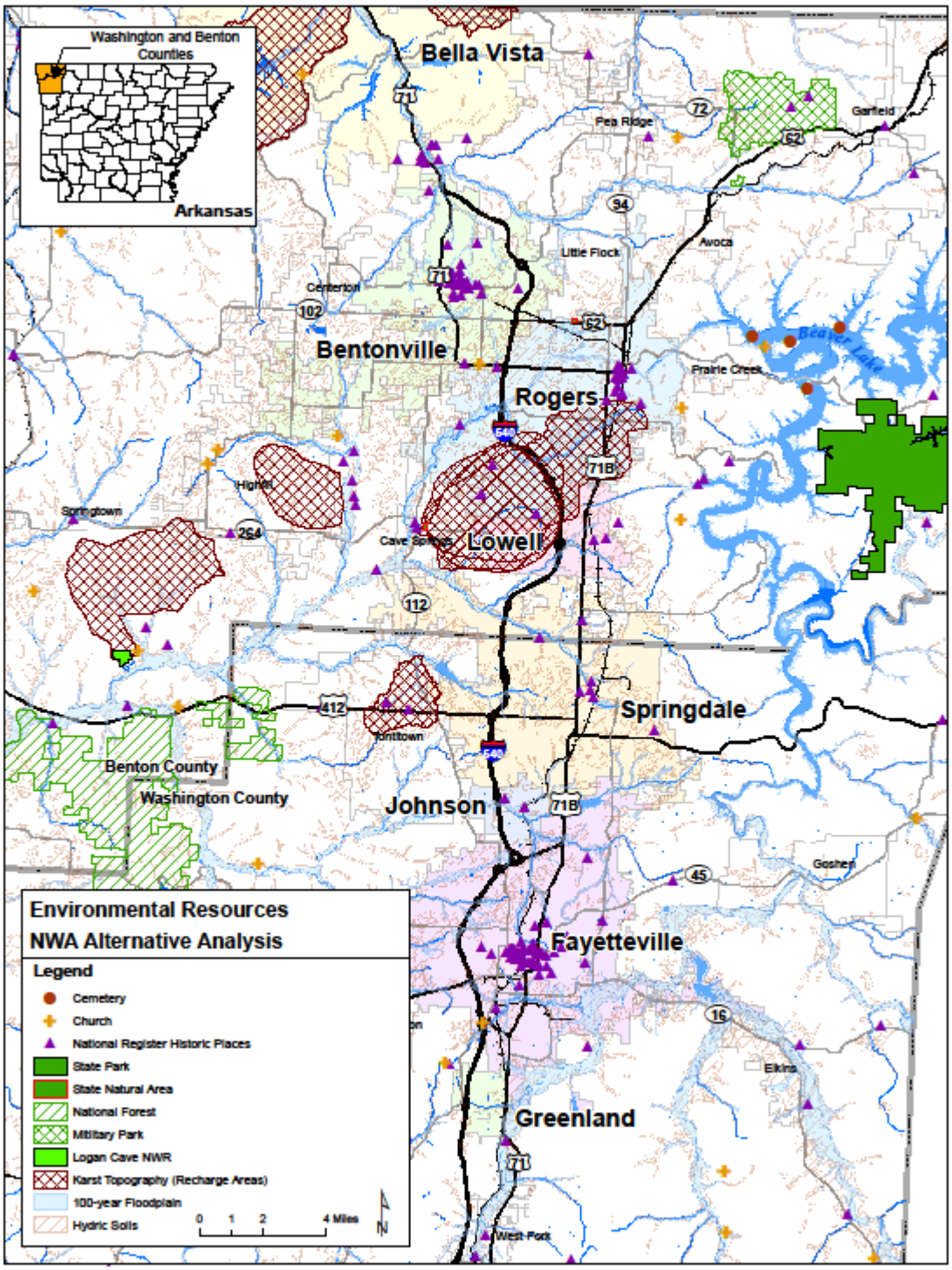
The study area immediately adjacent to the I-49 and US 71B corridors is fairly urban in nature with dense commercial and residential development and very few remaining natural areas. As the population of the area continues to grow, the perimeter of the study area is changing from rural pasture land and larger homesteads to traditional suburban single-family residential subdivisions, apartments and large commercial/retail complex. The study area once consisted of mainly upland terrain with oak-hickory and oak-hickory-pine forests. Savannas and tall grass prairies were also present; however, most of this has been replaced by agriculture or expanding development. There are several pockets of undeveloped land surrounding the study area that have been protected as national forest, state parks, and natural areas. While none are immediately adjacent to the project, they do represent an important environmental resource to the area. These include Hobbs State Park, Ozark National Forest, Logan Cave National Wildlife Refuge, and the Cave Springs Cave and Searles Prairie Natural Areas.

Figure 2-12 shows the environmental resources at a broad level of detail. The geology and natural setting of northwest Arkansas are unique due in large part to the Karst topography, layers of limestone that are easily erodible by water and which over time form a unique system of underground caves, springs, and sinkholes. This unique topography also provides habitat to many rare species of plants and animals. As is shown on the environmental resources figure, there are large pockets of Karst topography recharge areas in the study area, particularly in the Lowell and Rogers communities.

Potential wetland areas within the study area are associated with the streams and other waterways that traverse the counties. While there are large pockets of hydric soils throughout the area, particularly in the middle and western portions of Benton County, the elevations and topography of the region would restrict most wetland habitat to the channel bottoms and adjacent floodplains of the larger streams and creeks.

There are several species that are listed as threatened or endangered under the Endangered Species Act (ESA) for both Benton and Washington counties.

Figure 2-12. Environmental Resources



Section 3 – Public Outreach

Public outreach and notification for this study adhered to the Public Participation Plan prepared and adopted by the NWARPC in 2007. To that end, the study team advertised and staffed three open houses, two stakeholder meetings, and promoted and managed a website and a Facebook page. Bilingual notices were provided in legal ads and other notices. The public was invited to provide spoken and written comments, and to respond to a survey which continued for most of the study schedule. There was a significant amount of print and electronic media coverage of the meetings and the study itself.

The Open Houses were offered at locations on the south, middle and north part of the study area, as follows

- April 11, 2013 at the NWARPC offices in Springdale
- September 12, 2013 at the Bentonville Public Library in Bentonville
- November 21 , 2013 at the City Administration Building in Fayetteville

An inclusive list of stakeholders was developed at the beginning of the study and is included in the Appendices. Members were drawn from government agencies, non-profit advocacy groups, business groups and representatives, and elected officials. Two meetings were held:

- Jan 30, 2013 at the Jones Center in Springdale
- Jun 13, 2013 at the Northwest Arkansas Community College

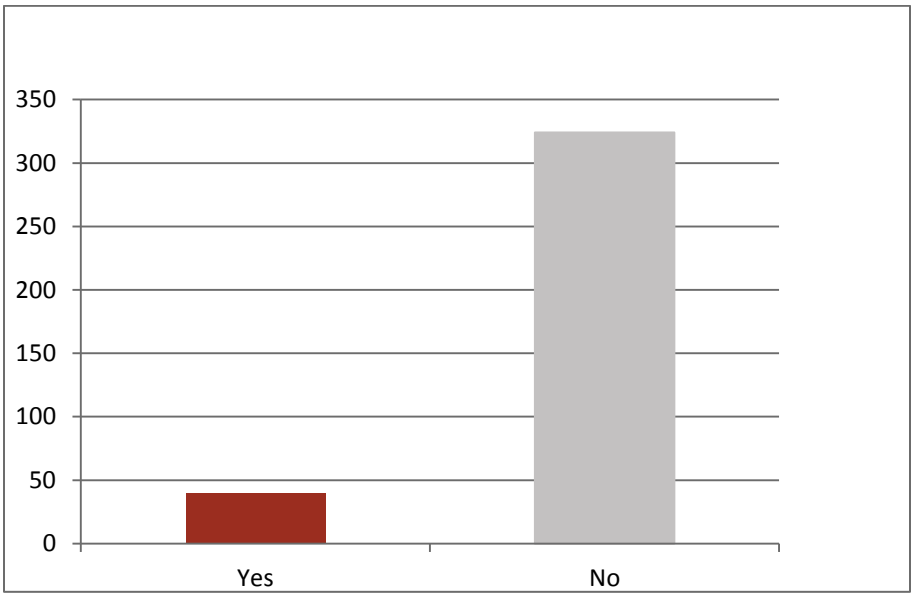
Throughout the study, NWARPC staff solicited opinions through survey instruments that were distributed at the Open Houses. The survey was also available online.

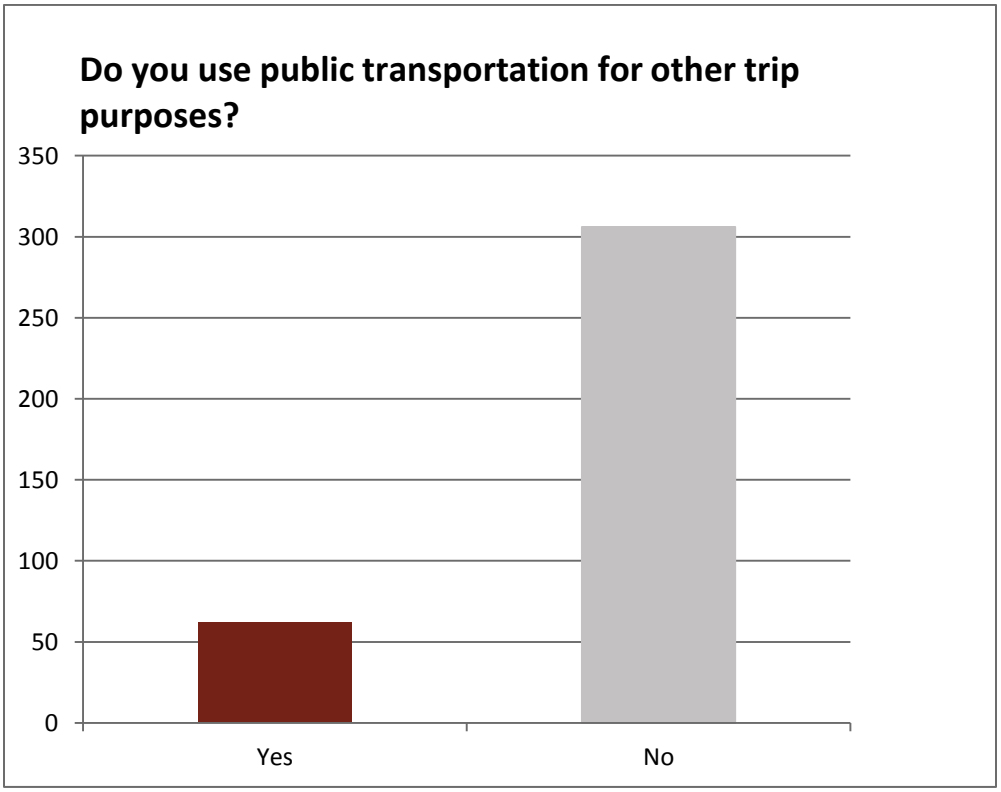
As the charts below indicate, only a small fraction of those responding to the survey are frequent public transit users. That is understandable given the small coverage of the two fixed route systems. A high percentage of survey respondents said they would use any and all types of higher capacity, higher speed fixed guideway transit.

The attitudes and general comments were consistent with an earlier public survey conducted during the NWARPC update of the Long Range Transportation Plan. Almost 75% of respondents reported they would be in favor of a light rail transit alternative in the study area.

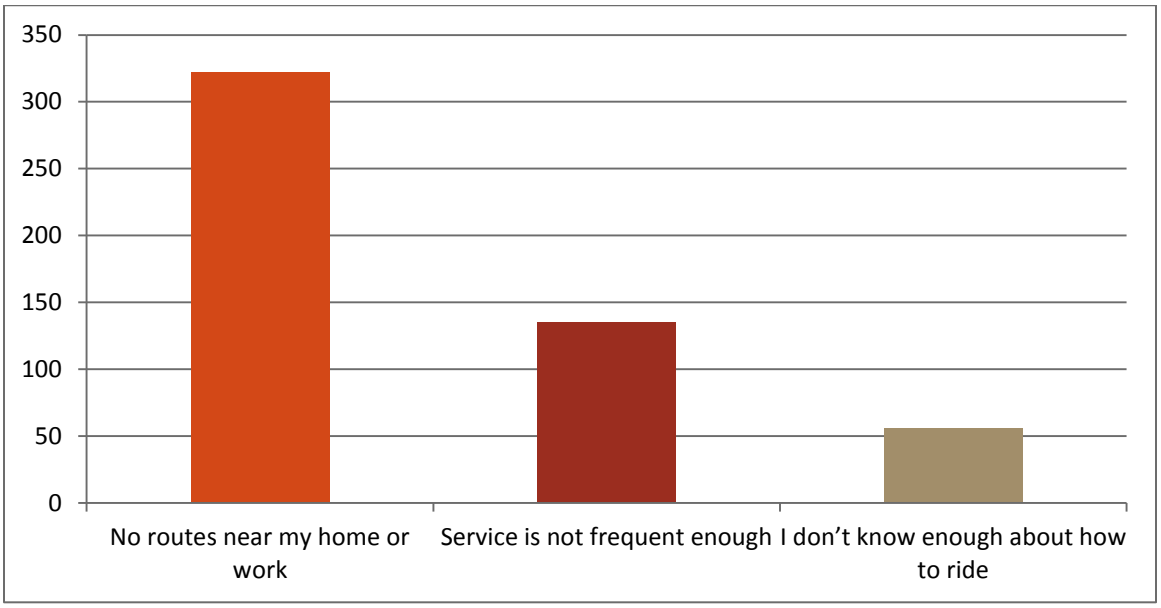
A graphical summary of survey results follows:

Do you currently use public transportation to commute?

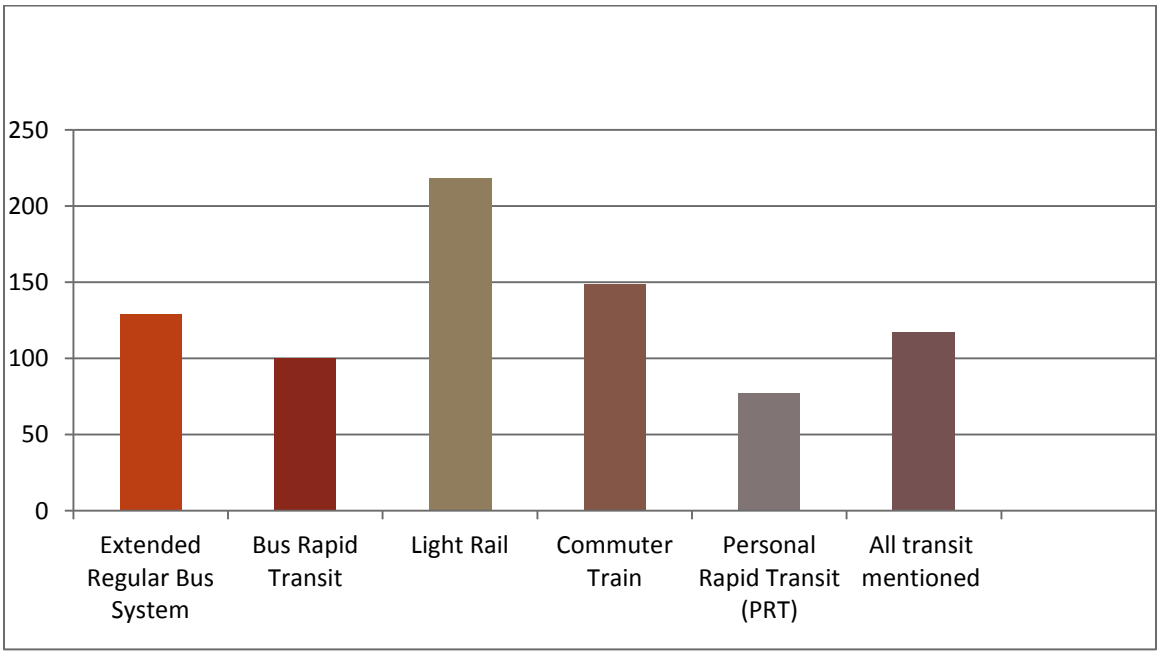




Why are you not using public transit?



What type of public transportation would you like to see in Northwest Arkansas?



NWARPC developed a website, “http://www.nwafgs.org”, which was used to disseminate information, meeting notices, and to collect survey responses.

The consulting team developed a Facebook page, **“**NWA Transit Alternatives Analysis”. It was used to publicize the study, meetings, and to provide general background on topical subjects related to fixed guideway development in the US. Statistics on number of views and followers were maintained by Facebook. The study did not pay to promote the Facebook page.

There was turnout of 75-150 persons at each of the open houses. The format for each session was a self-guided tour of boards and other displays which were designed to educate the public on the scope, purpose and techniques of the study, to provide definition and examples of fixed guideway modes and vehicles, and to provide performance and applicability information for current vehicle technologies. Staff and members of the consulting team were available to take questions and comments. There was general support and interest in improved transit in general, including the existing fixed route services of Razorback Transit and Ozark Regional Transit.

To conclude the public outreach for the AA, the final version of the AA Study will be made available with links from the website and Facebook, and its availability will also be publicized with media releases, with dissemination to the TAC, the Planning Commission board, and stakeholders.

Section 4 - Conceptual Transportation Alternatives

4.1 Planning Considerations

The impetus for this study arose from a decade of widespread interest in a fixed guideway transit line in the study area and in particular along the Arkansas & Missouri Railroad corridor. As discussed in the Purpose and Need section, this study was performed in a time of transition in the rules governing how projects are evaluated once they qualify to enter the New Starts or Small Starts funding process. The expiration of the previous authorization legislation (SAFETEA-LU) and the new authorization legislation (MAP-21) creates the need to state the basis for generating and evaluating alternatives for this study.

Horizon Timeline: FTA published Final Policy Guidance for the New and Small Starts Evaluation and Rating Process in August 2013, approximately midway in the study period. This guidance provided the option of using a 10 year or 20 year horizon, and NWARPC elected to use a 20 year horizon. The primary reason for this was a realistic assessment of how long it would take to develop the plans, financing, and design of the NWA region's first major fixed route facility.

No Build Alternative: By selecting the 20 year horizon, the No Build alternative becomes the existing transportation network plus all projects identified in the Metropolitan Planning Organization's fiscally constrained long range plan. Therefore, the NARTS 2035 Long Range Transportation Plan serves as the point of comparison for the Build Alternatives.

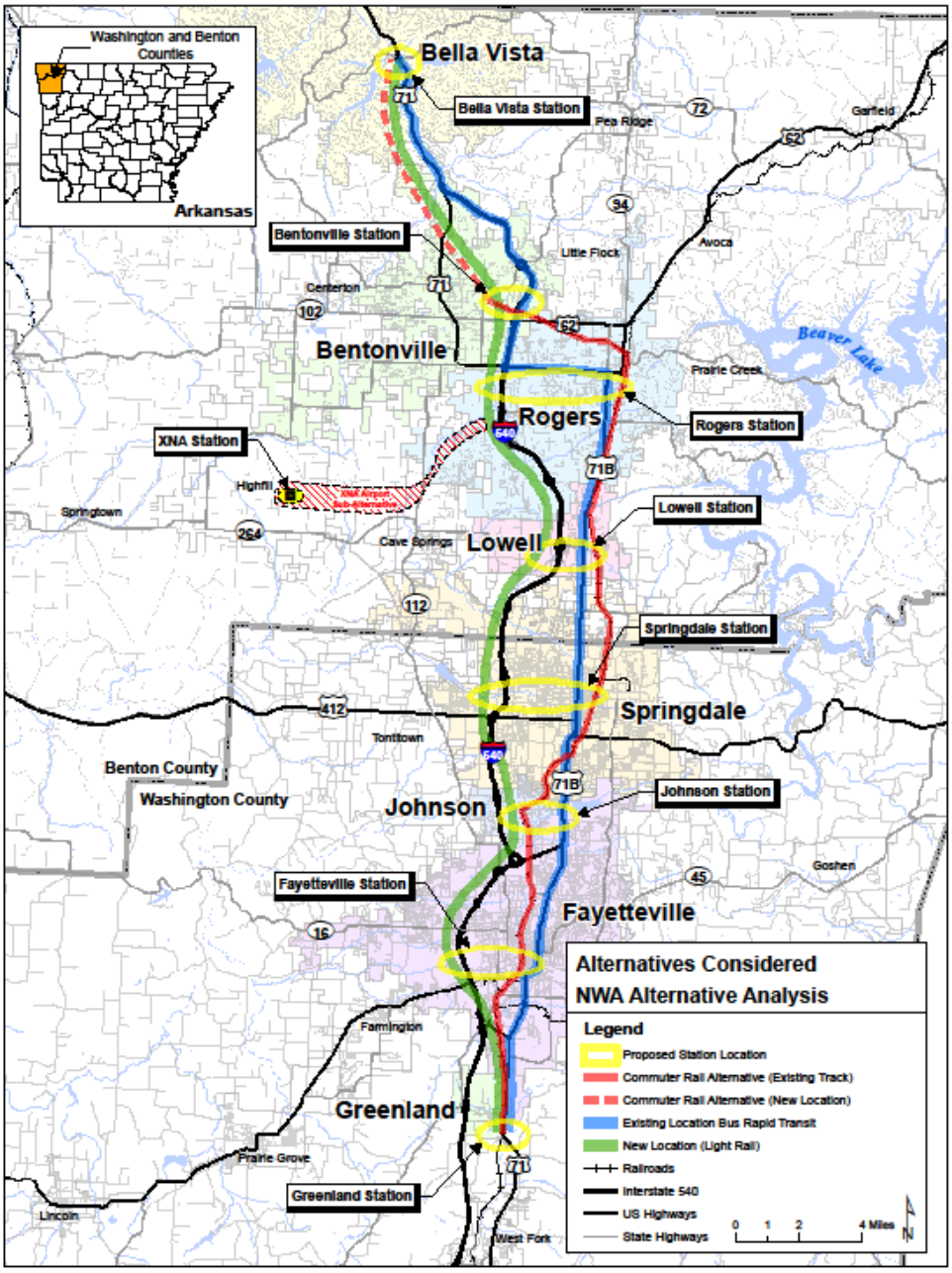
Build Alternatives were developed by considering the previous studies and advocacy plans and documents along with the transportation and quality of life/sustainability goals and objectives described in the Purpose and Need section. These, in turn, were derived from a review of the Goals and Objectives of the NARTS 2035 plan. The general description of the alternatives were developed in work sessions and were presented in various public outreach efforts including stakeholder briefings, open house meetings, websites, social media, and local news media coverage. The alternatives used the common corridor/study area as defined in the NWARPC RFQ for this study. As described earlier, the study area encompasses a north-south corridor that is concentrated along the I-49 and US 71B routes and contains incorporated city boundaries in both Benton and Washington Counties. This corridor runs about 36 miles from the cities of Bella Vista and Bentonville on the north end and Greenland on the south end and about 10 miles east-west from Highway 112 to Highway 265.

The initial alignment alternatives for the study were defined to be:

- New Location Fixed Guideway Light Rail (LR). The general alignment is parallel to I-49 from Greenland to Bella Vista. The same alignment is also reviewed for the costs and benefits of a Bus Rapid Transit fixed guideway (separate right of way) facility.
- Existing Location Fixed Guideway Rail. The general alignment is, to the maximum extent possible, within the existing ROW of the A&M freight and passenger excursion line. The southern terminus is in Greenland, but the freight line departs from the corridor at a point south of Bentonville. New Location, bus connector and/or street-running mode would have to be considered from Bentonville to Bella Vista in order to serve the entire corridor.
- Existing Location Bus Rapid Transit (BRT). This alignment is the existing US 71B, formerly US 71, from Greenland to Bella Vista. Due to land use constraints, available ROW, and other factors to be discussed, this BRT option does not include exclusive fixed guideway elements but instead relies on corridor-level priority treatment at selected intersections, and enhanced passenger amenities and vehicles.

The length, capital cost, operating cost, economic development potential and other benefits and costs of each alternative were analyzed and are described in comparative detail in future sections. Figure 4-1 shows the Build Alternatives that were evaluated and were the subject of public review and comment.

Figure 4-1 Build Alternatives



4.2 Description of Alternatives

BRT on Existing Location Alternative

This alternative was developed to examine the feasibility and efficiency of Bus Rapid Transit on US 71B. The current (2010) Level of Service[5] (LOS) on US 71B ranges from B to F, with the most congested sections being located in the northern portion of the route inside Fayetteville city limits. By 2035, it is anticipated that about two-thirds of the US71 B in the study area will experience LOS F. There are more than 65 signalized intersections on US 71B, so the main component of the BRT alternative is a coordinated signal pre-emption system for public transit buses. To remain consistent for comparative purposes, eight (8) major BRT stations were assumed, which is a station about every 5 miles. In practice, a closer spacing of stations could be allowed which has the off-setting effect of slowing operational speeds but increasing the access to employment centers along the route. The eight station locations assumed for BRT are:

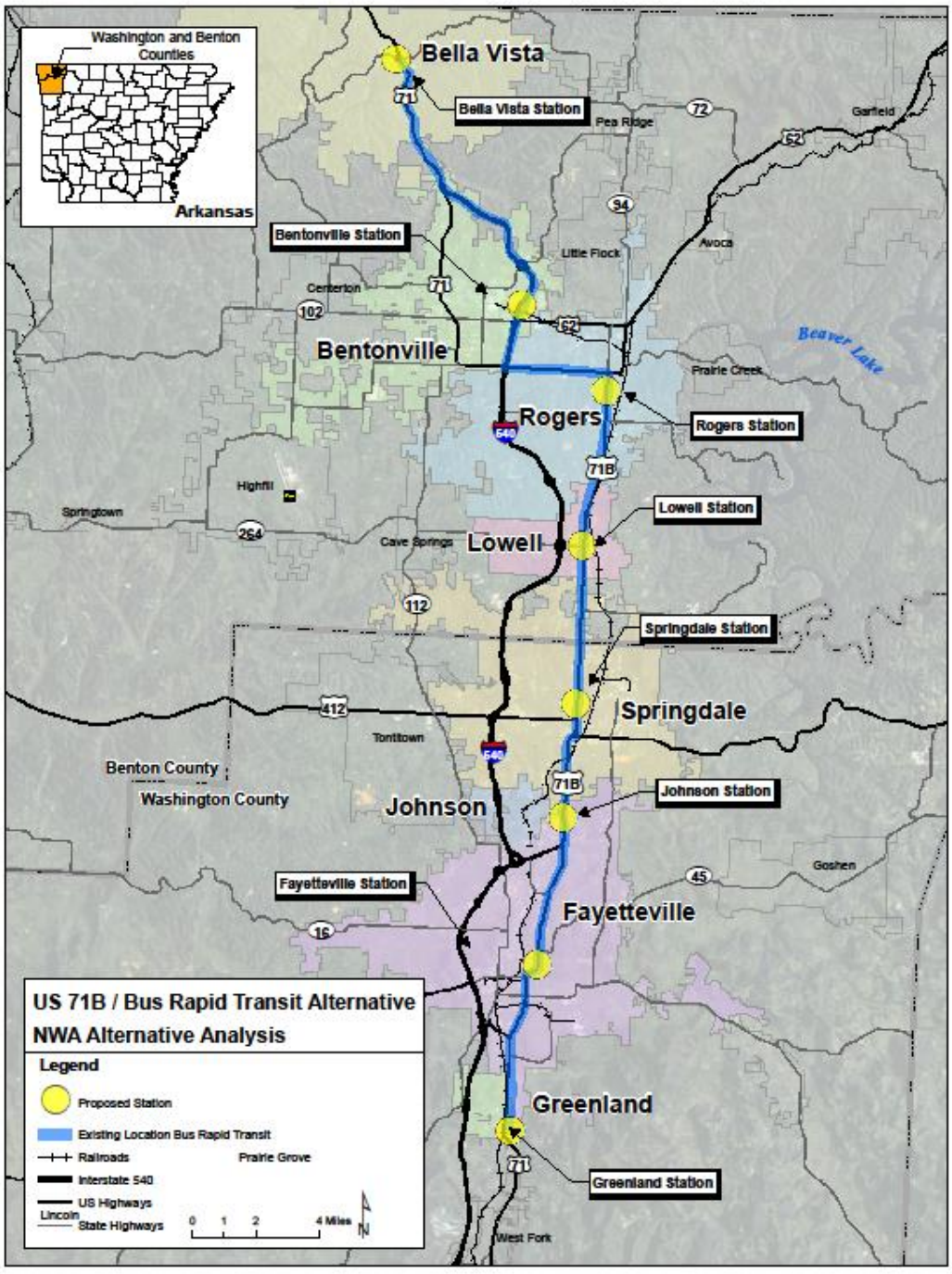
1. Greenland: SW corner of RR Tracks & Frisco Street
2. Fayetteville: College Ave. (US 71B) north of Dickson St. Intersection
3. Johnson: US 71B north of Joyce Ave. Intersection
4. Springdale: US 71B at Emma Ave.
5. Lowell: US 71B at W. Monroe
6. Rogers: US 71B at W. Walnut
7. Bentonville: US 62 at Northwest Arkansas Community College (NWACC)
8. Bella Vista: US71 at Dartmoor Rd.

Figure 4-2 shows the BRT Alternative and potential station locations.

The main components of Existing Location BRT Alternative will consist of signal preemption and center-lane sections reserved for BRT in peak periods. There are approximately 70 signalized intersections from Greenland to Bella Vista. Not all signal locations will require priority treatment. This is detailed in the cost estimate (Section 6). Existing location BRT can benefit from selected use of existing center left turn lanes during peak periods, combined with signal pre-emption. Use of the center turn lanes for

[5] Level of Service is a term with letter designations A through F to denote “free flow” , or A, down to “breakdown” or F. More detail can be found in the Highway Capacity Manual.

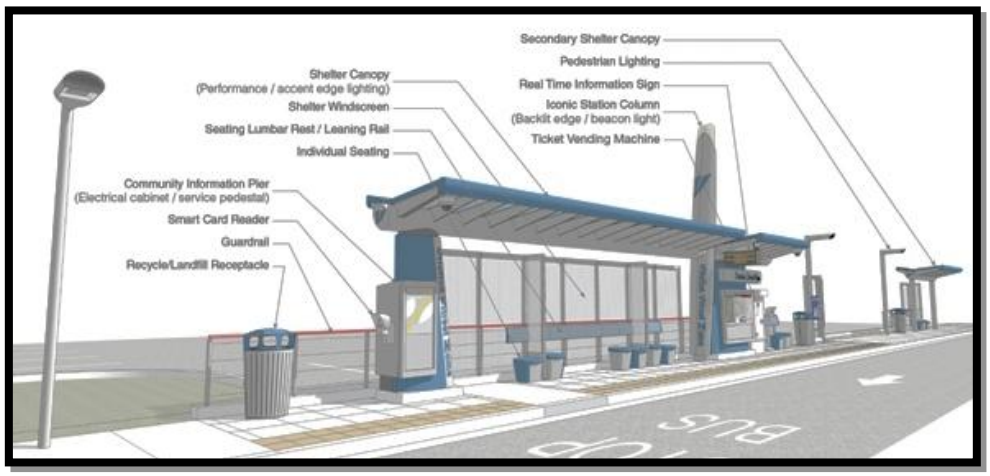
Figure 4-2 BRT on Existing Location



BRT would be recommended where the roadway width could be widened with minimal ROW costs and impacts. The level of detail in this Alternatives Analysis does not allow for a definitive feasibility determination for using center lanes for BRT, but based on windshield surveys, the sections of US 71B from North Street to Millsap Road in Fayetteville and from Lakeview Road to Emma Street in Springdale, each about 3 miles, could be candidate sections for BRT. Similar sections have been built for the Healthline BRT in Cleveland, Ohio and the BRT line in Vancouver.

Healthline Median Platform, Cleveland OH

Passenger stations and boarding platforms would generally be located on the sides of the highway, but in some locations where safety issues could be fully addressed, center platforms could be used.



BRT Platform Elements (Valley Metro, Phoenix)

New Location Alternative

As mentioned, this alternative runs parallel to the I-49 facility to augment capacity on the facility with the highest VMT (vehicle miles of travel) and projected congestion. Much of I-49 is projected to have Level of Service D, E or F in the horizon year of 2035[6]. Another objective in locating close to I-49 was to increase the potential for mixed use development around the stations. A third factor in locating the New Location Alternative near I 49 rather than just west of the A&M ROW, or in general to the east of I 49, is the high certainty of negative Social, Environmental, and Economic impacts that would occur if it were located closer to the A&M. Providing a separate grade-separated facility would require the acquisition of numerous dwelling units, commercial properties and other facilities. It would also be necessary to sever numerous east-west collector streets and possibly arterial streets for safety and to allow the light rail to operate at optimal speeds. Noise and vibration impacts would be more likely to arise in a corridor which is currently not in proximity to freeway or freight rail noise and vibration impacts.

In general, there is more intensive zoning already in place along the interstate. Locating further to the west would tend to increase urban sprawl and would introduce more conflicts between a new transportation facility and residential areas, open space, and environmentally sensitive areas. Locating it further to the east would be problematic due to the existing land uses, density of the street network which would be disrupted by the need to restrict at grade crossings, and other social, cultural and institutional areas and land uses which would be adversely affected.

General and representative station locations were chosen for each alternative, both for the purposes of building the network for estimating ridership, and to facilitate the assessment of the economic development potential for each alternative. These locations were not the subject of a detailed siting study, and they should be considered to be within a ½ mile radius of potential station locations. Stations would have park-ride surface parking to the extent practical, bus stop connections to the future bus network provided by Ozark Regional Transit (ORT), Razorback Transit, or other local and regional transit connections, and connections to any existing or programmed pedestrian and bicycle facilities. Station locations for the New Location alternative are as follows:

1. Greenland: SW corner of RR Tracks & Frisco St.

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[6] Northwest Arkansas Western Beltway Feasibility Study, 2011. Parsons Brinkerhoff; Northwest Arkansas Regional Planning Commission.

2. Fayetteville: W. Persimmon/N. Salem
3. Johnson: New Hope Road at Johnson Mill Blvd.
4. Springdale: South of W. Sunset, approx. ¼ mile West of I-49
5. Lowell: W. Monroe at Oakwood
6. Rogers: SE Medical Parkway at NW Medical Center
7. Bentonville: SE 14th at Phyllis
8. Bella Vista: US71 at Dartmoor Rd.

Figure 4-3 shows the New Location Alternative and potential station locations.

Typical cross sections for ballasted double track are shown in Figure 4-4.

Figure 4-3 New Location Light Rail

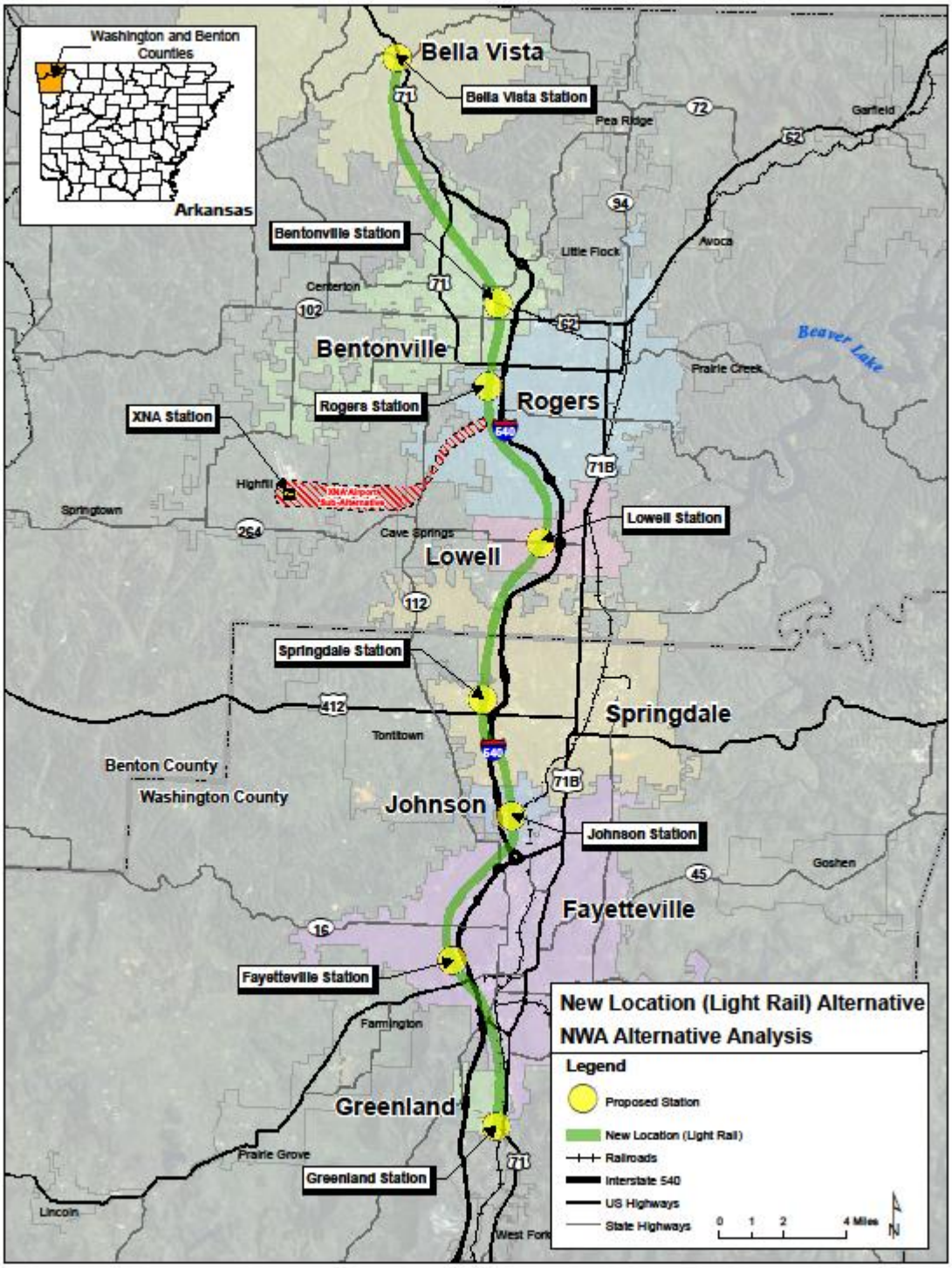
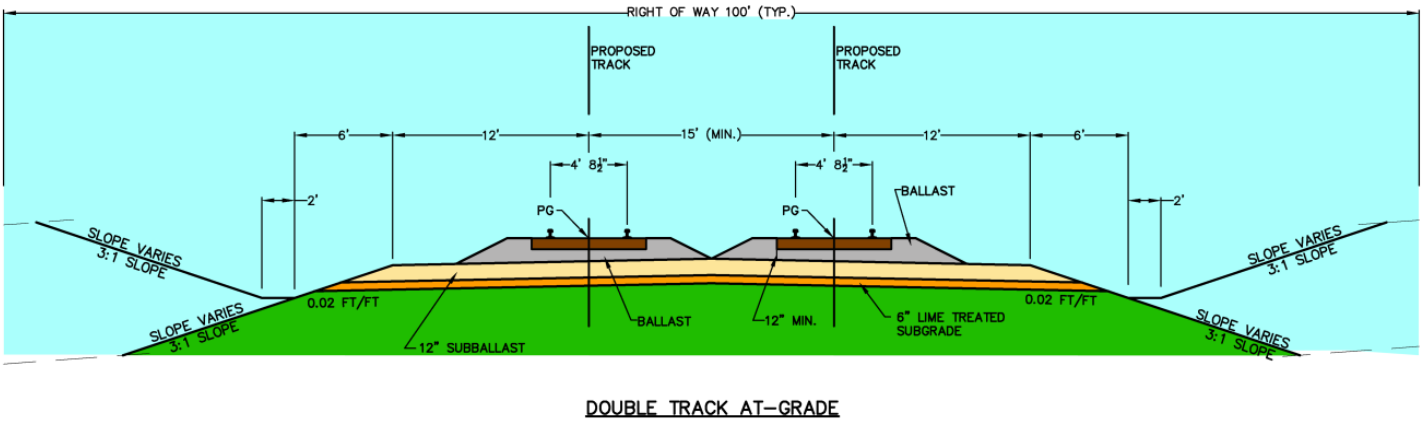


Figure 4.4 Typical Ballasted Section



DOUBLE TRACK AT-GRADE

Existing Location Commuter Rail Alternative

Many of the previous studies, plans and recommendations called for utilization of the right of way of the Arkansas & Missouri Railroad (A&M), which connects Monett, Missouri with Ft. Smith, Arkansas, a distance of about 140 miles. Its headquarters is in Springdale. Within the study area, it traverses the town centers of Rogers, Lowell, Springdale, Johnson, Fayetteville and Greenland. It is an active freight short line with more than 30 customers within the study area. It interchanges with three Class I railroads: Burlington Northern Santa Fe, Kansas City Southern, and Union Pacific.

The previous studies have tended to use the term "Light Rail" for the passenger service that would be provided within the A&M right of way. **Light Rail, as described in detail later in this section, is not compatible with freight track in the United States for various regulatory and physical reasons.** By their nature, light rail vehicles do not meet the crashworthiness standards set by FRA for vehicles operating on the same track or system of tracks as freight service (49 U.S.C. 20102.).

In specific circumstances, waivers can be issued by FRA that allows an exception to the rule. Currently there are 15 locations operating with FRA waivers. These are usually confined to situations where a light rail line must cross a freight track. This usually requires a sophisticated and expensive fail-safe system of signals, lockouts, emergency derailers and other methods to prevent a potential collision between a freight train and light rail vehicles. There are also a few cases where light rail has a waiver to run on shared track, but these situations have a "temporal separation" of service, meaning that the hours of freight service are restricted and cannot overlap the hours of passenger rail service.

There is obviously a great deal of interest across the US in using the general railroad system for light rail purposes, and there is specific interest in Northwest Arkansas as evidenced by the previous studies, plans, and policy documents. And while "tracksharing" is a very common practice in Germany, France and a few other European locations, it is extremely rare and difficult to accomplish in the US. There are many

research documents covering this topic. Here is an excerpt from one, "Safe Transit in Shared Use":[7]

> With the resurgence of public transit systems, interest has emerged in the use of corridors that are part of the general railroad system. Many of these corridors are located in areas where LRT is the preferred transit mode, due, in part, to the adaptability of LRT and the fact that it is physically capable of operating on the general railroad system in most respects. The most prominent exception is non-compliance with FRA vehicle safety requirements. The FRA regulation receiving most of the attention regarding shared use operations is the required buff strength of 800 kips. Light rail vehicles in use in the United States do not meet this standard, although vehicles recently put in service have structural characteristics that are near compliant. Other FRA vehicle requirements, including window glazing, horn, bells, and headlight patterns, must also be addressed for shared use operations.
>
> Where freight operations can be limited to times when LRT would not operate, such as late night, FRA has granted waivers to their rules. Temporal separation reflects the original method of management of train movements based on timetable authority. In temporal separation of FRA-compliant and non-compliant modes, trains are kept absolutely separate by assignment of specific blocks of time to each mode. The duration of the blocks, or the time scale for compliant and non-compliant temporal separation, has traditionally been in 8- to 12-hour blocks, with one non-compliant (traditionally LRT) block and one compliant (i.e., freight) block per 24-hour cycle. This type of temporal separation of LRT and freight operations has been applied by several rail systems, beginning with the introduction of LRT in San Diego in 1981. In some locations, this type of shared use of track by compliant and non-compliant trains is not satisfactory for the concerned service providers, as the frequency and flexibility of operations is constrained, curtailing the quality and service for each mode.

Unlike most freight lines in the US, the A&M operates its own regular passenger excursion service with stops in Springdale, Van Buren and Ft. Smith. Passengers ride in refurbished passenger and parlor cars of varying types and ages, with propulsion

[7] Federal Transit Administration, 2011.

provided by diesel electric locomotives. Passenger excursions vary in time of day and frequency throughout the year, but are concentrated on Fridays, Saturdays and Sundays. Special excursions and charters can occur in both mid-day and evening time periods, and on any weekday and weekends.

Within the corridor, all existing A&M track is Continuously Welded Rail (CWR). There is a maximum speed limit of 49 mph, although it is less in congested areas. Dispatching is done from Springdale and Ft Smith. Most traffic is scheduled freight, with some shuttles from Union Pacific.

The ROW owned by A&M is variable, but is generally 100' with the track centerline being the same as the center of the ROW. There are some stretches of 200' ROW, and the ROW narrows to 50' in most of the downtown areas and other sections with topographic constraints. The majority of the A&M line is single track, with only limited passing track. There are spurs and storage track at most of the industrial customers. A detailed set of ROW maps and track charts are is provided in a separate document.[8]

The A&M no longer serves the central portion of Bentonville and its status at and beyond the campus of Northwest Arkansas Community College is now subject to a contract to purchase the ROW where it traverses the campus. It is not yet known if NWACC will preserve the ROW for future transportation use. While some rail modes can be built as street-running modes. For example, the Austin MetroRail commuter railroad line (Red Line) operates on downtown streets (5th and 4th) for about 1 mile to reach the downtown convention center stop. However, it can become more difficult to meld this type of rail operation into an existing urban fabric, especially an older town center with narrow streets and typical grid turning radii of 50-60'. The northern segment of Existing Location alternative assumes a bus connection might be necessary if the ultimate northern termini in Bella Vista are to be connected.

The Existing Location alternative would provide double track capacity throughout the corridor, along with passenger platforms and amenities at 8 locations, as follows:

1. Greenland: SW corner of RR Tracks & Frisco St.
2. Fayetteville: Dickson St. at RR
3. Johnson: N. Gregg at Van Asche

[8] Placeholder footnote for track charts and ROW maps

4. Springdale: Emma Ave. at RR
5. Lowell: McClure at RR
6. Rogers: Elm Street at RR
7. Bentonville: W. Tower Road at RR (NWACC)
8. Bella Vista: US71 at Dartmoor Rd.

Figure 4-5 shows the Commuter Rail Alternative and potential station locations. Figure 4-5A shows typical double track cross section for Commuter Rail, which is virtually identical to LRT cross section requirements.

Figure 4-5. Commuter Rail Alternative

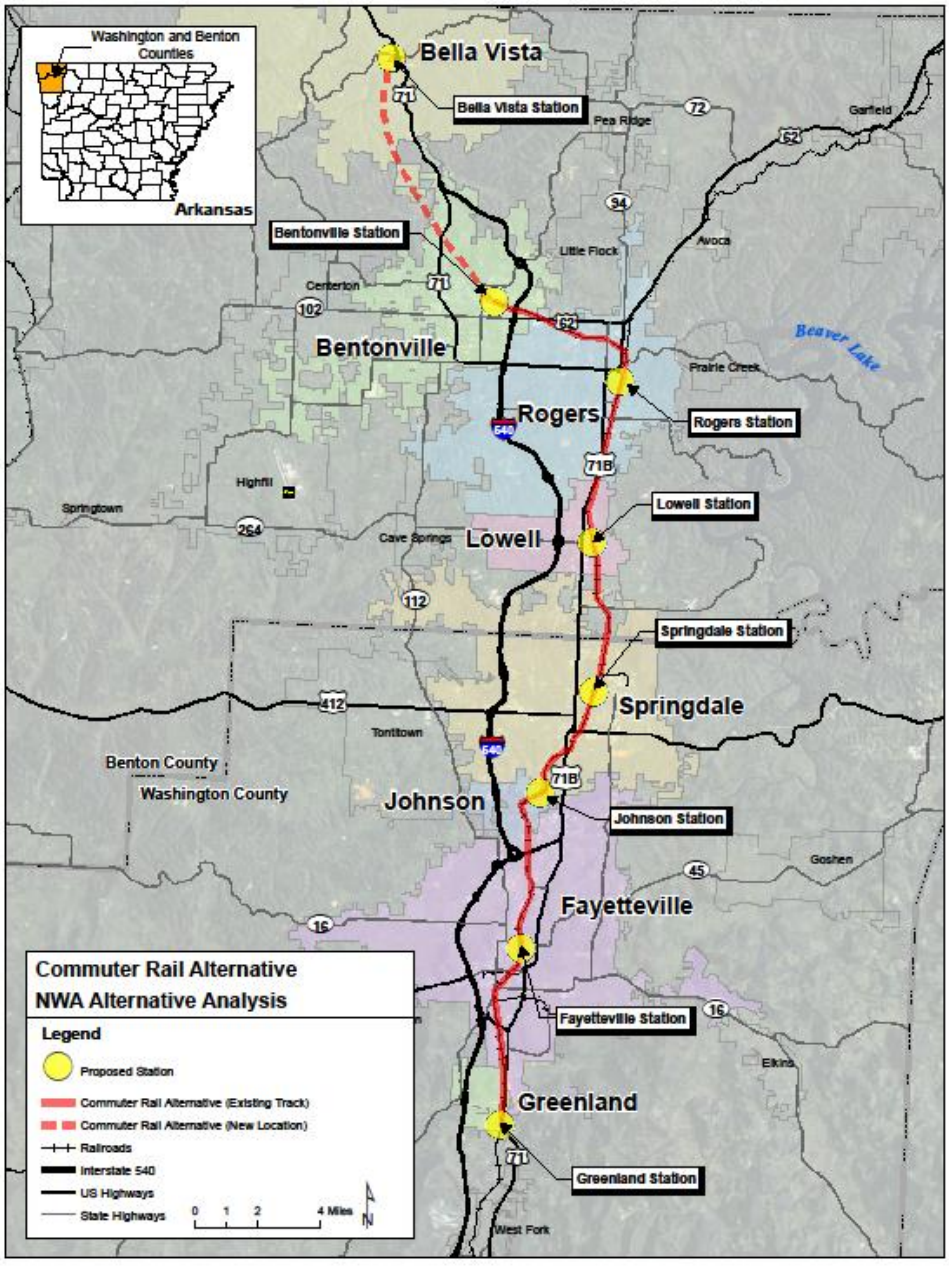
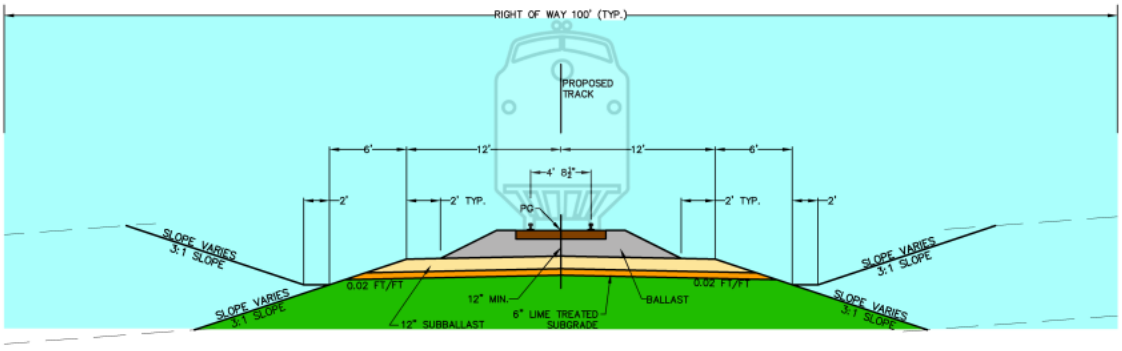
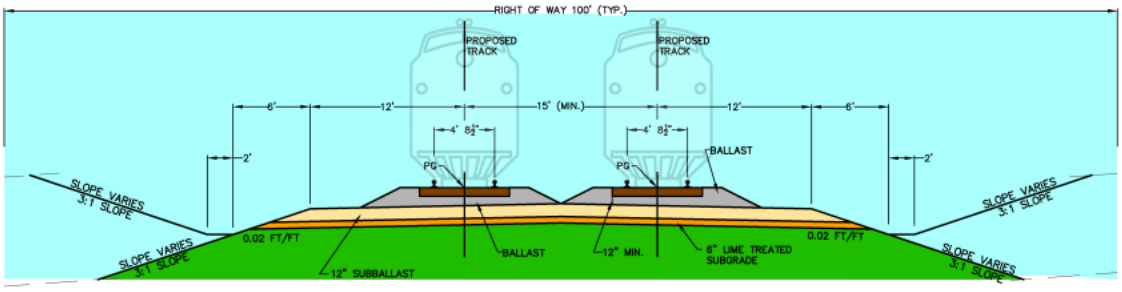


Figure 4-5A- CR Typical Cross Section for Single and Double Track



SINGLE TRACK AT-GRADE



DOUBLE TRACK AT-GRADE

4.3 Constraints

The purpose of preparing environmental constraints mapping at this time is to assist in fatal flaw analysis, identify environmental areas of concern and use this to try to avoid or minimize impacts during the preliminary alternatives development.

The primary areas of more detailed environmental analysis would examine ways to minimize impacts at stream crossings to maintain water quality and protect floodplain storage capacity and wetlands. Another environmental design and location goal would be to avoid and minimize impacts to Karst topography in order to protect the recharge zones and minimize potential harmful effects to cave habitats and associated threatened and endangered species. Finally, in a NEPA AA process, alternatives will need to integrate alignments to complement and not harm historic resources. Some alternatives would be subject to noise and vibration analysis.

At this point there does not appear to be any fatal environmental flaws or impacts which cannot be mitigated.

Social, Economic, Environmental (SEE) Constraints. This review is at the regional and corridor level. Detailed assessments of impacts are made once a NEPA process has been initiated, indicating there is a Federal role in a project. The Locally Preferred Alternative (LPA) will be more detailed and defined by Conceptual or Preliminary Engineering so that more exact location of the facility is known in relation to sensitive receptors, environmentally sensitive areas, minority and low income residential areas, and cultural resources. A listing of local SEE issues during the AA or planning process can inform and shorten the environmental assessment process later on.

Figure 4-6 shows the general location of the build alternatives with a an overlay of environmental constraints, including areas of Karst topography, floodplains, National Register Historic Places, hydric soils/wetlands, parks, National Forests and other locations of environmental, cultural and social significance. At this scale, and with the alternatives still being broadly defined, detail impacts cannot be identified. However, in the context of an Alternatives Analysis, the following issues have been identified and would need to be studied in more detail if certain alternatives advance into a project development stage.

Karst Topography. As has been discussed, Northwest Arkansas has undergone tremendous population growth in the last two decades, and as a result there has been

extensive expansion of the surface transportation infrastructure to meet the travel demands. This has brought several environmental issues and concerns to the forefront.

Northwest Arkansas is part of the Ozark Highlands Ecoregion, a region of Karst topography which has eroded to form steep hills, valleys, and bluffs. Karst is a distinctive topography in which the landscape is the result of the dissolving action of water on limestone and other formations such as marble. This has resulted in a complicated region of surface and subsurface features that includes sinkholes, vertical shafts, surface and underground streams and springs which form and support complex underground drainage systems and caves. Surface waters, including runoff from urban infrastructure such as highways, streets, parking lots and buildings tend to make their way into the groundwater of Northwest Arkansas. If the surface water is polluted, it can be assumed the groundwater will also be polluted.

Extensive underground habitats in the region are home to many sensitive and endangered species, including especially Ozark cavefish and several bat species. Local, state, regional and federal agencies and organizations have worked to develop guidelines and practices to minimize, if not eliminate altogether, the potentially harmful effects of continued urban development, including transportation projects. [9]

The New Location alternative would traverse sensitive Karst areas including the Cave Springs Recharge Area. While this is not a fatal flaw if proper protections and mitigation can be provided, the project design would have to consider its potential for adverse effects on the recharge area. In addition to the project itself, the environmental effects of proposed and/or likely station area development would have to be considered.

NWARPC in cooperation with State and Federal agencies has commissioned a new and comprehensive study of the Karst areas. When complete, this study will provide a detailed guide for project planning.

Other aspects of the physical environment which will be of concern to a NEPA-level analysis of proposed facilities include but are not limited to:

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[9] Example: “Community Growth Best Management Practices for Conservation of the Cave Springs Recharge Area”. USFWS , 2005

- Wetlands;
- Pipelines;
- Streams and waterways;
- 100-year Floodplains;
- Air Quality;
- Hazardous Toxic or Radioactive Waste (HTRW) areas; and
- Threatened or endangered species in addition to those mentioned above.

Human Environment

Typical of most southern and southwestern growth regions, most of NWA land use is relatively low density single family residential, commercial, and industrial along with the open space and other public land uses to support the population. Acquisition of rights of way will unavoidably affect existing residential areas, stores, employment centers, medical facilities, schools, and open space. In particular, a light rail or BRT fixed guideway facility will require access control that can separate areas and disrupt the local street pattern.

During the NEPA process for a proposed project, the identification of low income and minority areas would be part of a review of Environmental Justice (EJ). EPA defines EJ as "…the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

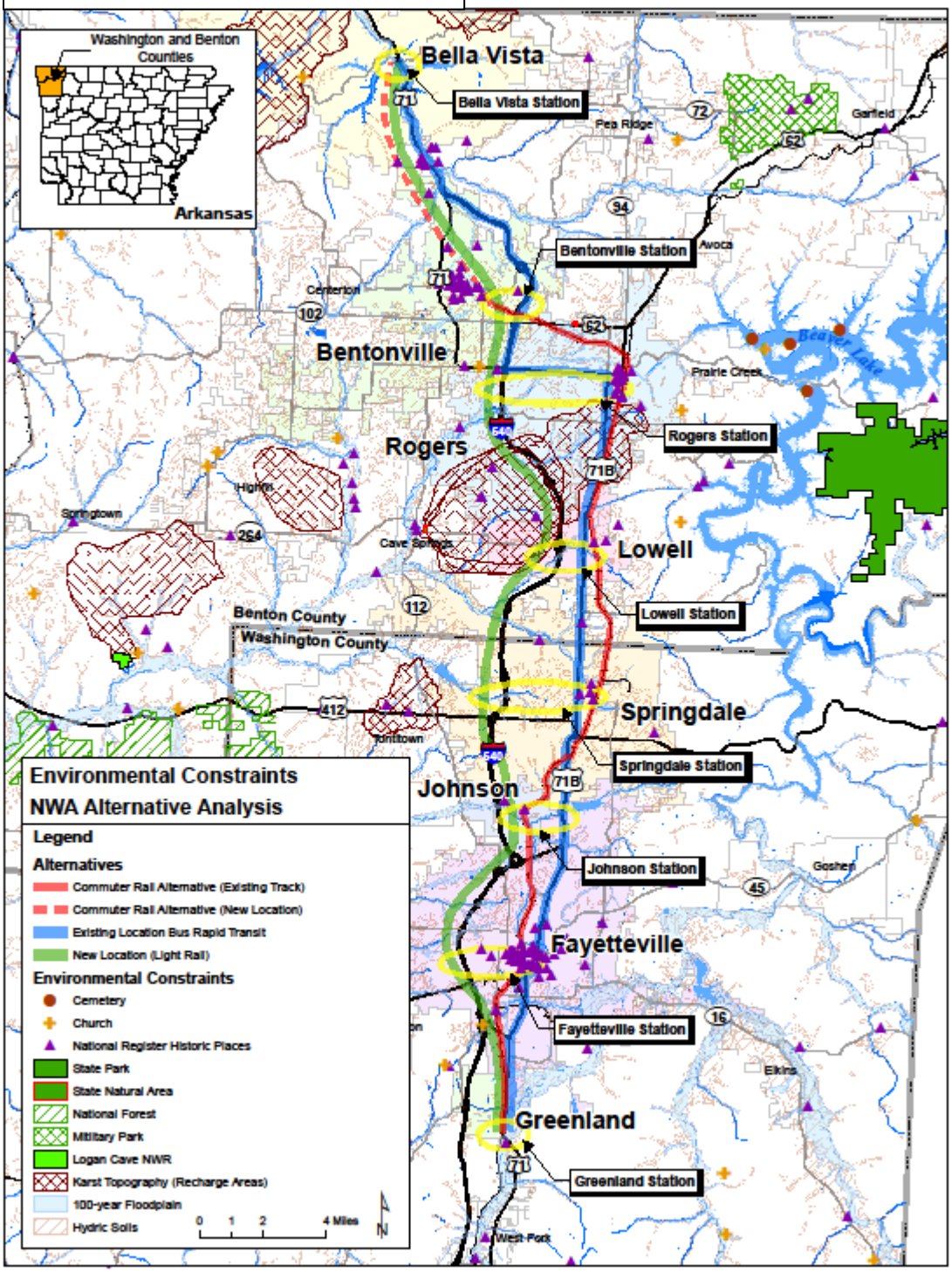
A proposed project will need to be evaluated with respect to proximity and impact on cultural resources, Historic Places, churches, schools, museums etc. Noise and vibration impacts, as well as visual impacts and changes to access, would need to be stud for most alternatives.

Northwest Arkansas has a wealth of parks and recreation facilities, and a detailed NEPA environmental analysis will take them all into account. Of particular importance is the newly developed, 36-mile Northwest Arkansas Razorback Regional Greenway. Community leaders from across northwest Arkansas have been working for several years on a regional trail plan to connect the cities in Washington and Benton counties. The objectives of the Greenway are to create a safe place for recreation, alternative transportation, and healthy lifestyles.

Many miles of trail are already completed. By the end of 2014, the entire trail will form a 36-mile primarily off-road shared-use concrete and asphalt trail that extends from

Bentonville to Fayetteville. Much of the route is near the A&M corridor. It also crosses the I-49 ROW.

Figure 4-6. Environmental Constraints



4.4 Vehicles

Modal Technology

The transit alternatives in the Northwest Arkansas Transit Alternatives Analysis Study are a combination of alignments and vehicle technology. Some alternative locations could support more than one applicable or feasible technology. For example, a new location guideway could accommodate light rail vehicles, low-floor articulated buses in Bus Rapid Transit mode, monorail, or even Maglev (magnetic levitation) if the horizontal and vertical geometry of the guideway were compatible with the requirements of the various modes.

The Alternatives Analysis compared the benefits and costs of the various choices on as level a playing field as possible. To this end, only existing proven technologies were considered. There are more vehicle and propulsion technology choices today than there were two decades ago, and there will no doubt be additional choices in the next ten or twenty years. But for now, the AA must be guided by the Purpose and Need to determine which available technologies should be considered.

While there are generally accepted descriptions and definitions of fixed guideway modes, there is no "official" classification in the US, especially among the modes of heavy rail, light rail, and urban rail (streetcars with fewer stations and faster operating speeds). With the advent of more modern commuter rail vehicles, even the line between commuter rail and light rail is becoming blurred. This chapter will provide the descriptions and definitions used in the alternatives analysis and in the various presentations and other material provided to the public, stakeholders, and advisory committees.

When defining a mode, one must consider not just the vehicle and its technology, but the nature of the right of way in which it operates. Although this study focuses on fixed guideway facilities, most modes will have some of the ROW in an exclusive, fully grade separated section, and some sections that have less than full separation. Various cities' versions of light rail and Streetcars in particular can have wide differences in the quality of the ROW. With this in mind, the fixed guideway modes considered in the AA are as follows:

- Heavy Rail
- Light Rail
- Commuter Rail
- Bus Rapid Transit

Technologies not considered because they are not appropriate for a 40 mile corridor or because the technology is still in development include Monorail, Personal Rapid Transit, and Magnetic Levitation (Mag Lev). Streetcars were also not considered because of their slower speed. Streetcars may be appropriate in some areas as a feeder/circulator service linking a fixed guideway station with mixed use neighborhoods and downtowns in a 1 to 4 mile radius. Similarly, HOV (high occupancy vehicles) and HOT (high occupancy and toll) facilities were not studied because they were not considered supportive of the Purpose and Need and goals for the project.

The following is a brief description of the modes that were considered in this AA, along with US examples of each.

Heavy Rail

First, the terms Heavy Rail and Light Rail are misnomers. The terms have nothing to do with the weight of the rail or the vehicles. They just evolved in the lexicon of transit planners. Heavy Rail mode consists of high capacity cars running in fully separate rights of way for 100% of the system. High voltage electric power is supplied from a ground level third rail. Stations are several miles apart. Speeds exceed 60 mph. Tracks can be elevated, at grade but with no at grade intersections with streets, or below grade (subways). All of these modes can exist on one line. An example is the Washington Metro connection to Reagan National Airport. It begins at the airport as above grade, but has several at-grade and subway sections.

APTA (American Public Transportation Association) provides this additional definition:

> Heavy rail (metro, subway, rapid transit, or rapid rail) is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails; separate rights-of-way from which all other vehicular and foot traffic are excluded; sophisticated signaling, and high platform loading.

Examples include BART in San Francisco, Washington METRO , MARTA in Atlanta and the NYC subway system.

BART – San Francisco

MARTA - Atlanta

Light Rail

Light Rail is a mode of transit service operating passenger rail cars in single car consists or in short two-car or three-car consists on fixed rails in right-of-way that is often separated from other traffic for part or much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line via pantograph; driven by an operator on board the vehicle; and may have either high platform loading or low level boarding using steps. Light Rail systems in the US vary widely in the percentage of the route system which is in a guideway or trackbed fully separated from vehicular traffic and other rail lines. Some systems have signalized intersections, some have fully automated rail barrier arms or gates, and some operate in very short downtown sections on city streets, usually in a lane divided by some sort of physical delineation. Trackbeds for light rail can be ballasted (generally the cheapest to build), direct fixation on top of paved surfaces and structures, or embedded track for locations where the light rail operates on city streets, usually in a dedicated lane or lanes. Light Rail cars and systems operate with a sophisticated signaling and communication network. Speeds can range from 15 mph on mixed traffic sections to 80 mph or greater in separate ROW sections.

Examples in the US include DART in the Dallas, TX metropolitan area, the TIDE in Norfolk-Hampton Roads, VA, Houston, TX, St. Louis, MO, Denver, CO, Sacramento, CA and Phoenix, AZ.

DART Light Rail

St. Louis Metro Rail

Commuter Rail

Commuter Rail is a mode of transit service (also called **metropolitan rail**, **regional rail**, or **suburban rail**) characterized by diesel railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs . A few commuter rail operations use vehicles powered by overhead electric wires, mostly in the Northeast Corridor.

Nashville Music Star

Rail Runner New Mexico

Service is operated on a regular, but generally peak-hour, basis by or under contract with a transit operator for transporting passengers within urbanized areas, or between urbanized areas and outlying areas. Commuter rail service can use either locomotive push-pull or self-propelled railroad passenger cars known as DMUs. It is generally characterized by multi-trip

tickets, specific station to station fares, railroad employment practices and usually only one or two stations in a central business district. Most service is provided on routes of current or former freight railroads.

Examples in the US include Nashville's Music Star,Austin's Capital Metro Red Line, the Trinity Railway Express (TRE) connecting Ft. Worth and Dallas, Caltrans in California, the Front Runner in Salt Lake City, and the Rail Runner in New Mexico.

Bus Rapid Transit (BRT)

BRT is the name given to express service bus systems that operate in combinations of separate fixed guideways, in their own lanes on city streets, and in mixed traffic. There is an extremely broad definition of what constitutes BRT. The more sophisticated systems use bus stations instead of bus stops, a design feature that allows passengers to pay before boarding the bus. This allows for faster, more orderly boardings, similar to those of heavy or light rail systems. Stations may also have elevated boarding platforms level with the bus floors so passengers don't need to climb steps, or use wheelchair lifts, to get on the bus. Passenger information systems are often provided which mimic the station arrival and departure information systems of rail transit and train stations. US examples include San Antonio, Eugene, OR, Seattle, WA, Boston, MA, the Euclid Avenue project in Cleveland, OH, Kansas City, MO and NYC 34th Street, and Ft. Worth, TX. A new project is underway in El Paso, TX.

Eugene OR

Seattle

Boston Silver Line

Modes Not Considered in the Northwest Arkansas Alternatives Analysis:

Streetcars

Often considered to be at the low-speed end of light rail mode, streetcars, also known as Trolleys or Trams, is steel-wheel-on-rail transit mode. It operates on-street, sharing the pavement with other vehicles (mixed traffic mode), with little or no priority signaling at intersections. Streetcars operate in general like local buses, with stop spacing at about 4 blocks, average speeds of 10-20 mph. Streetcar track is usually embedded but can be built on ballasted sections in its own ROW, or on track that is directly fixed (with epoxy or fasteners) to existing paved surfaces. Streetcar vehicles can be modern low floor vehicles, or restored or replica vehicles. Typical propulsion is overhead electric, but advances are being made in battery and hybrid power for all or portions of streetcar lines.

Streetcars were not considered as a corridor alternative due to low speed and system passenger capacity. Streetcar lines can be very effective in promoting TOD in specific zones or short corridors (2-10 miles). They can also be effectively linked to higher capacity fixed guideway projects, such as in Portland and in the Washington, DC H Street Trolley (under construction).

Personal Rapid Transit (PRT)

PRT is also known as the Automatic Transit Network or ATN.

The Advanced Transit Association (ATRA) has provided this definition of Personal Rapid Transit:

- Direct origin-to-destination service with no need to transfer or stop at intermediate stations.
- Small vehicles available for the exclusive use of an individual or small group traveling together by choice.
- Service available on demand by the user rather than on fixed schedules.
- Fully automated vehicles (no human drivers) which can be available for use 24 hours a day, 7 days a week.
- Vehicles captive to a guideway that is reserved for their exclusive use.
- Small (narrow and light) guideways are usually elevated but also can be at or near ground level or underground.
- Vehicles able to use all guideways and stations on a fully connected PRT network.

PRT was not considered due to its low capacity. It is more suited for airport or campus transportation venues. Due to dispersed stations, PRT does not serve as a catalyst for mixed use developments.

Monorail

Monorails are an electric railway of guided transit vehicles operating singly or in multi- car trains.

The vehicles are suspended from or straddle a guideway formed by a single beam, rail, or tube. Stations or platforms are also at car level, above city sidewalks and first floor businesses, etc. They can be automated or operated by a human in the cab. Monorails in the US have been built only in theme park or major entertainment venues and have limited application. They are limited in their ability to generate economic development at platforms due to the elevated nature. Most monorails operate at speeds of 40 mph or less.

Section 5 - Ridership

The most challenging part of the Alternatives Analysis was the development and interpretation of ridership forecasts for the build alternatives for the forecast year of 2035. Scant attention was given to ridership forecasts or goals in the previous Northwest Arkansas light rail studies. There are always multiple reasons and justifications for investing in a major transportation project, but the usage, whether it is measured in riders on a transit line or cars on a highway, is always at or near the top of the list. Ridership estimates are very important to the Federal Transit Administration when they review proposals from across the country competing for scarce Federal funds. In the 80s and 90s, several major rail projects were built with major Federal funding, and for various reasons they fell far short of the ridership forecasts, at least initially. Congress eventually required that applicants use an approved ridership forecasting methodology in the FTA evaluation process, and this has become part of the New Starts Criteria. While different models and approaches are allowable, the forecasting process must be reviewed and approved by FTA prior to receiving approval to enter into project development. While it is normal for advocates to portray the most optimistic scenario for future ridership on a new project, if the applicant or grantee wants to use FTA funds, an approved process must be followed.

One of the key requirements is that the future land use forecast, which serves as the basis for calculating overall travel demand, must be the same land use forecast used in the area's regional long range transportation plan. There is substantial research and evidence demonstrating that fixed guideway transit systems has the capability to create more intensive land use around stations and along corridors. Station area land use is not just more intense, it is typically mixed-used development, or urban villages, or Transit Oriented Development (TOD). It goes by many names but the introduction of well-planned rail stations can be transformative. Examples are many but include Washington DC, San Diego, Portland, San Francisco, Toronto, Montreal, Calgary and Dallas.

Unless such intensified mixed use development is already an integral part of the long range land use forecasts, the ridership forecasts used in an Alternatives Analysis cannot assume anything except status quo land uses. Sometimes FTA will consider "transit-supportive policies" of local governments if there is a sufficient demonstration of the enforceability or "teeth" of those policies, which can include zoning, incentives and waivers, public policy on the amount of public parking that is required in certain areas or

as part of developments, limitations or phasing out of free public parking, incentives to use bus transit and other feeder modes such as walking and bicycling.

In addition to the limits on land use assumptions, the transit ridership forecasts must be linked to and consistent with the regional travel demand model. In large urban areas (over 1,000,000 population), the regional travel demand model will have a separate but integrated transit forecast model or a mode choice model. Such a mode choice model does not exist in the Northwest Arkansas region. It was noted at the beginning of the study that the available funding for the Alternatives Analysis was not as much as NWARPC originally requested from FTA. The actual funding was not at a level to allow development of a mode-choice travel demand model. The agreed-upon approach was to use the Northwest Arkansas Travel Demand Model, or TDM, as the basis for ridership forecasts for the transit alternatives.

The Northwest Arkansas TDM has been focused on estimating the demand for street and highway improvements. Although the trip generation step estimated transit trip generation, the availability of transit service was not included as a factor in assigning trips to the existing and future transportation networks. Due to the rapid growth in vehicular travel in Northwest Arkansas, the TDM has been built to test different highway scenarios[10] such as:

- Change in number of lanes
- Adding new roads
- Adding new major businesses or residential areas
- Future year scenarios

To make up for the lack of transit mode choice, an overlay model for the Northwest Arkansas TDM was created to produce a transit trip table reflective of the availability of existing public transportation. The overlay model estimates or replicates current transit ridership on Razorback Transit and Ozark Regional Transit bus routes. It was then possible to generate ridership estimates for the build alternatives. This approach is a reasonable methodology given the resources available to NWARPC and the consultant team, but it does have several limiting factors:

[1010] "Northwest Arkansas Travel Demand Model Results and Scenarios". C. Scarlat and J. McClarty. NWARPC . Presentation to Arkansas GIS Users Symposium, 2009.

The TDM, like most urban models, starts with a calculation of Trip Productions (usually the home) and Trip Attractions (the destination of the original trip of the individual, such as place of work or shopping center or school). In the Northwest Arkansas TDM, trip attractions were created for highway trips only, so a methodology to estimate transit attractions was developed and this was based on highway mode attraction rates.

Because the existing NWA TDM does not assume any transit service other than traditional bus service with an average speed of 20 mph, the mode choice does not take into potential travel time savings from faster modes. The consultant team used "mode propensity" factors to produce transit trip attractions.

The numbers of transit trips produced by the TDM are higher than the observed or actual trips on the existing transit routes. Overall, there were more than 23,000 transit trips produced by the model for 2010 whereas the actual ridership reported by Razorback Transit and Ozark Regional Transit totaled 11,925. The implications of this difference will be discussed later in this section.

A detailed discussion of the modeling process, results and comparative analysis is contained in a technical memorandum prepared by the consulting firm which developed the ridership forecasts for the AA. [11] A few of the key technical issues and findings are discussed below.

Trip Generation

The trip generation model produced both highway and non-highway trips. The highway trips were distributed using a traditional gravity model. The non-highway trips were not included in the original distribution model. Alliance determined that the non-highway trips should be distributed based on highway travel time skim using a gravity model for each trip purpose. Two main factors were important for that determination: 1) about half of the non-highway trips actually used highways and 2) many of the transit eligible production-attraction pairs did not have viable transit paths between the location of the production and the location of the attraction. Therefore the use of transit skims for the distribution of transit eligible (non-highway) trips was not an option. For the trip distribution model used to distribute transit eligible trips, the consulting team adopted the original NWA TDM distribution model parameters used for highway trips as there

[1111] Technical Memorandum: Modeling Methodology, Ridership Forecasting and Special Market Ridership Assessment. Alliance Transportation Group. February 2014.

was no other source of information readily available. The highway network skims for 2010 and 2035 were used for distributing 2010 and 2035 transit trips, respectively.

Mode Choice

The Mode Choice step in travel demand modeling is simply a way to estimate the probability of a trip being made by auto or public transportation or another mode. The purpose of the NWA mode choice model was two-fold: 1) to allocate the transit eligible (non-highway) trips generated in the logit[12]-based generation step to a correct category of transit and highway trips and 2) to help compare potential ridership for several transit alternatives (i.e. bus rapid transit [BRT], light rail transit [LRT], and commuter rail transit [CRT]). With this purpose in mind, Alliance adopted a straight forward multinomial logit model structure to split non-highway trips and test the transit alternatives. The trips are split among highway, existing local bus and a potential transit alternative. The potential transit alternatives include Bus Rapid Transit (BRT), (LRT), and Commuter Rail Transit (CRT). With this model structure, the consulting team used the same set of mode choice coefficients for each transit alternative. This implies that the mode choice model will differentiate the transit alternatives based on the level of service (LOS) characteristics developed for each alternative by the consulting team, i.e. headways and average speed and span of service.

The aforementioned limitations of the modeling process resulted in low ridership estimates for each of the build alternatives. The NWARPC may want to seek funding for the development of a new travel demand model that includes a robust Mode Choice model. This will be discussed later in the report in the "The Path Forward" section.

The forecast ridership used in this AA study should not be taken as a firm indicator of whether the area should pursue the development of a fixed guideway rail project. However, the ridership numbers may be a serious hurdle to seeking federal funding assistance for further project funding under the present rules (New Starts Criteria) for funding proposals or until other changes take place that would allow a higher number of transit trips to be forecast by the regional travel demand mode.

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[12] Logit models are one type of mode choice model and is based on probability and economic utility.

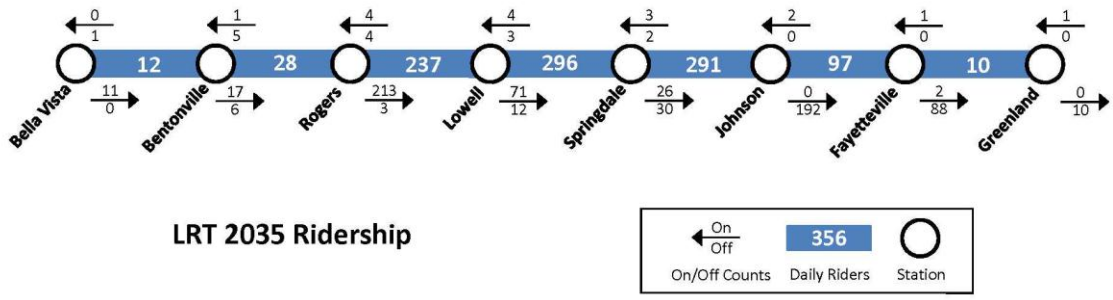
The results of the Alternatives Analysis ridership forecasts were used in the second level screening of the build alternatives along with other factors. The results of the ridership forecast for each of the three build alternatives are discussed below.

Model Results-2035

Figure 5-1 shows the results for forecasts for the Light Rail Transit mode. The Light Rail Transit Alternative would operate at higher average speed than other alternatives, and would therefore have offered the fastest travel time among the transit alternatives considered. However, as it was built on a new alignment parallel to I 49, its stations are located in suburban areas with low density residential areas and with commercial areas characterized by large parking lots, lack of sidewalks for pedestrian access, lack of bike access, and limited bus transit connectivity.

The figure below shows the daily ridership by route for the Light Rail Transit Alternative. For the base year, 276 daily LRT riders were estimated, whereas 356 daily LRT riders were forecast for the year 2035.

Figure 5-1 Light Rail Transit Ridership



The directional imbalance of the forecast ridership is the result of the standard practice of the industry to assign transit trips in production-attraction (PA) format. The imbalance is especially noticeable for trips of very directional nature, such as HBW trips. This is due to the fact that the typical commuting pattern of one trip toward downtown in the morning peak period and one trip away from town in town in the afternoon peak period is assigned as two inbound trips in PA format. This convention allows transit planners and the models that forecast ridership to connect the household characteristics (median income, household size, vehicle availability, area type) of transit

riders based on the zone the transit rider starts their trip. This convention also ensures the outbound work trips return to the same zones as the inbound trips. In reality, on a daily basis, the Inbound and outbound ridership will be equal to half of the total ridership of the two directions.

The same apparent imbalance shows up in the forecasts for the Commuter Rail Transit (CRT) and Bus Rapid Transit (BRT) modes. The results of the ridership forecasts for those are shown in Figures 5-2 and 5-3, respectively.

Figure 5-2 Commuter Rail Transit Ridership (A&M Corridor)

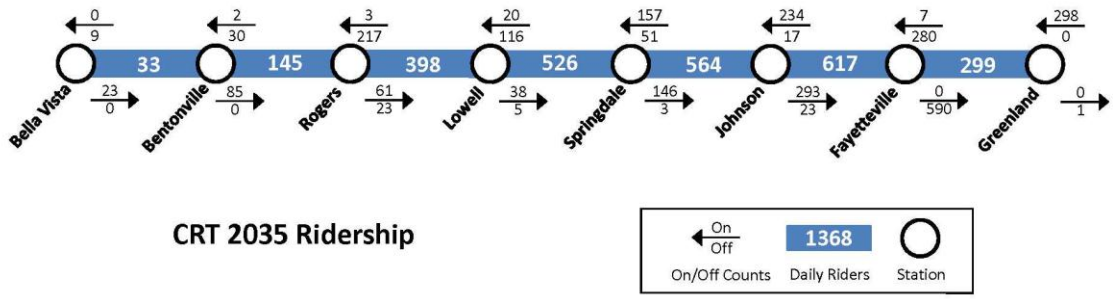
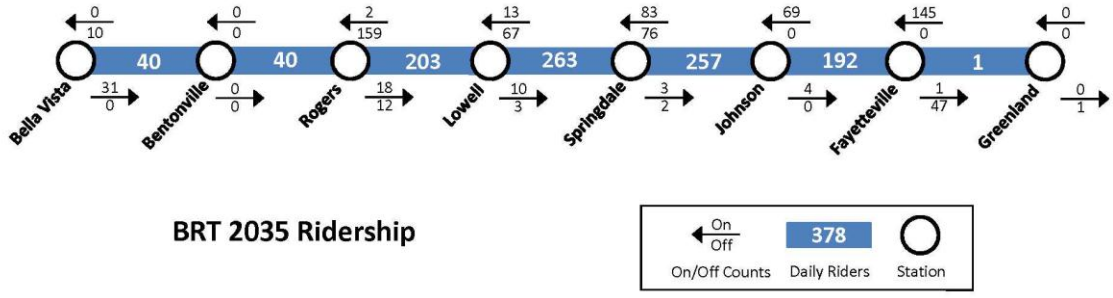


Figure 5-3 Bus Rapid Transit Ridership (US 71B)



Keeping in mind the limitations of the modeling process used in the Alternative Analysis, the highest potential ridership occurs on the Commuter Rail Transit alternative. Even though CRT has a lower trip frequency (longer headways) and fewer total trips due to the need to share the ROW with the freight operations, the CRT has the advantage of having stations located in downtowns and other areas where there is a higher-than-average density of trip attractions. As mentioned, the forecast land use employed by this modeling process does not assume redevelopment potential beyond existing trends; the station areas have the highest potential for transformation into TOD, Transit Oriented Development, as discussed in “The Path Forward” section.

Section 6 - Financial Performance of Alternatives

This section provides a planning-level estimate of the capital, operating and maintenance costs of the Build Alternatives. Capital costs developed during the Alternatives Analysis study are preliminary and contain allocated and unallocated contingencies to allow for potential unknowns that are likely to occur in any major capital project. These can arise from higher than expected ROW acquisition and relocation costs, unforeseen conditions, utility adjustments, fluctuations in the price of materials in excess of inflation forecasts, and mitigation measures required by environmental findings.

The contingency set aside for the cost estimates for the Northwest Arkansas Alternatives Analysis study is set at 35% of construction and design costs, not including vehicle costs. As the design of a project advances from planning to preliminary engineering and final design, the percentage reserved for contingencies is lowered progressively as successive cost estimates are developed based on more input such as soils reports, property surveys, environmental mitigation agreements, utility discovery etc.

Capital cost estimates for the Build Alternatives are produced from unit costs, lump sum amounts, and allowances which are in turn developed from recent projects which have been competitively bid. While no project's costs can be directly transferred to another situation, adjustments and assumptions are made to reflect local conditions as much as possible.

Few of the previous studies and plans for fixed guideways contained a capital or operating cost estimate. The 2004 Beta-Rubicon study provided a range of $550 M to $1.24 B for a 41.2 mile project on the A&M right of way, including 10 stations and 10 to 22 cars. Applying the general CPI to adjust for inflation since 2004, the range would be $693 M to $1.56 B in 2014 dollars.

6.1 New Location Alternative (Light Rail)

Capital costs for the new location alternative assume that approximately 80% of the Light Rail track could be track-on-ballast. This is cheaper than a paved trackbed with embedded track and cheaper than a paved busway for BRT as well. It is assumed that 20% would consist of structures and/or paved trackbed with embedded track. A per mile cost of construction of trackbed and the overhead power supply, or overhead

catenary system (OCS) was developed largely from the bid on the latest section of the DART (Dallas) green line to open in 2013. Right of Way (including relocations) allowance is 8% of the construction cost.

Operating costs for the Light Rail on New Location are based on using six (6), 2-car train sets in the peak hours (1 spare train set), and using 4 cars in the off peak. This amounts to approximately 20,600 revenue vehicle-hours per year. The operating and maintenance cost range, supported by the National Transit Database (NTD) for 2012 is $300.00 per hour.

6.2 Existing Location CR (Commuter Rail)

The capital cost assumptions for this alternative assume that the majority of the A&M line between Greenland and the northern part of Rogers has sufficient ROW to add a parallel track to facilitate the movement of passenger cars and freight locomotives without having to request a temporal waiver from the FRA. There will be several exceptions to the double track including Fayetteville in the vicinity of Dixon Street and to the north of Dixon where there is insufficient ROW. A detailed operating plan may identify other locations where single track would be sufficient but still allow for safe operation.

Operating costs for service on the A&M would be slightly higher than for an independent Light Rail on new location. Some of the costs of dispatching and PTC (Positive Train Control) procedures would have to be allocated to a passenger service. Diesel fuel costs are likely to exceed the energy cost of electric power on Light Rail for the foreseeable future. An average of $350 per hour of vehicle revenue service was used for the operating and maintenance costs for Commuter Rail DMU service. Commuter rail operating hours and frequency of service are less than can be provided by New Location LRT. 6 cars in the peak period, with 2 cars in off-peak, will provide 10,600 revenue vehicle-hours of service.

6.3 Existing Location BRT

The capital cost assumptions for BRT assume an average of $20,000 per signalized intersection to establish signal preemption for BRT in selected sections of the corridor. For the sections of US 71B that can be widened to accommodate exclusive median lanes for BRT, a per-mile urban arterial widening cost was used that assumed no structures or business relocations were involved.

BRT service, according to FTA guidelines, must be branded as a different service and it is recommended (but not required) that a new generation of buses designed for BRT applications be deployed. The current cost for a non-articulated BRT vehicle with diesel power is approximately $500,000 per bus. The number of peak period vehicles for this service is 18, with 8-10 buses operated on the line in the off peak. This amounts to 38,000 vehicle hours per year. This high number is somewhat offset by the lower operating cost of bus service. Based on the experience of Ozark and Razorback transit operations, an average cost of $65 per vehicle hour was applied for operations and maintenance.

Table 6-1 Capital Costs for Build Alternatives

(2014 Dollars)

Major Cost Categories (FTA Definitions)	*New Location Light Rail*	*Existing Location*	*Existing Location*
	Light Rail	**Commuter Rail**	**Bus Rapid Transit**
Guideway/transit way and structures	$ 1,054,878,000	$ 255,288,768	$ 38,000,000
Stops & stations	$ 6,000,000	$ 6,000,000	$ 800,000
Systems, signals, & communications	$ 35,720,000	$ 48,594,450	$ 1,380,000
Utilities	$ 24,440,000	$ 1,965,000	$ 3,500,000
Vehicles	$ 29,400,000	$ 45,000,000	$ 10,000,000
ROW	$ 96,024,000	$ 6,000,000	$ 3,040,000
Maintenance & Storage Facilities	$ 22,000,000	$ 22,600,000	$ 6,000,000
Special Conditions	$ 72,018,000	$ 25,558,356	$ 3,040,000
Professional and Administrative Design Fees	$ 318,196,200	$ 91,051,643	$ 11,000,000
Contingencies (allocated and Unallocated	$ 627,636,870	$ 162,332,876	$ 21,000,000
TOTAL	**$ 2,286,313,070**	**$ 664,391,093**	**$ 97,760,000**
Length (Miles)	**37.6**	**39.3**	**39.9**
Cost Per Mile	**$ 60,806,199**	**$ 16,905,626**	**$ 2,450,125**

Table 6-2 Operating & Maintenance Costs for Build Alternatives

Cost/Hours	*New Location Light Rail*	*Existing Location Commuter Rail*	*Existing Location BRT*
Cost Per Hour	$300.00	$350.00	$65.00
Annual Hours	20,600	10,600	38,000
Annual O and M Cost	$6,180,000	$3,710,000	$2,519,000

Section 7 - Level 2 Screening and Locally Preferred Alternative

The following criteria are based on the Purpose and Need statement that was developed by the study team. The criteria are also derived from a review of the NARTS goals and objectives for the long range transportation plan which were discussed in Section 1 of this report.

1. Connecting Key Destinations
    a. Connects higher education campuses, i.e., University of Arkansas-Fayetteville and Northwest Arkansas Community College
    b. Connects civic and cultural Centers
    c. Connects major employment centers
    d. Connects neighborhood sub-regions

2. Integrates with Existing Transportation Network
    a. Freight rail compatibility
    b. Historic stations and transit centers
    c. Bicycle and pedestrian routes
    d. Minimize impacts to existing auto traffic

3. Economic Development
    a. Revitalize neighborhoods
    b. Develop underutilized property
    c. Enhance values of existing property
    d. Facilitate new opportunities in existing neighborhoods
    e. Promote Green mixed use development

4. Optimize System Performance and Potential for Expansion
    a. Compatibility with staged implementation
    b. Maximize transit ridership
    c. Leverage Federal/state/private funding

5. Technical Considerations
    a. Environmental impacts
    b. Environmental benefits
    c. Capital cost
    d. Annual operating costs

7.1 Screening Results

Table 7-1 illustrates the results of the Level 2 screening process. All criteria were given equal weight in this Alternatives Analysis. Some criteria have an intrinsic higher weight, and these are different for each region and corridor. A discussion of this, along with a review of the latest FTA New Starts process criteria, follows the table.

Table 7-1 Level 2 Screening Results

CRITERIA	NEW LOCATION LRT	EXISTING LOCATION CRT	EXISTING LOCATION BRT
Connect Key Destinations:			
Campuses	3	4	4
Civic and Cultural Centers	2	3	3
Major Employment Centers	2	4	4
Neighborhood Sub-regions	2	3	3
Integrates with Existing Transportation Network:			
Freight Rail	4	2	4
Historic stations & transit centers	0	5	2
Bicycle & Pedestrian Routes	1	4	3
Auto Traffic	3	4	4
Economic Development:			
Revitalize Residential Districts	2	4	2
Develop Underutilized Property	2	5	2
Enhance values of adjacent property	3	5	2
Facilitate New Opportunities in Existing Neighborhoods	2	4	3
Promote Green Mixed Use Development	3	5	3
Optimize System Operation & Potential for Expansion:			
Staged Implementation	4	4	5
Maximizing transit ridership	2	4	3
Leverage Federal/state/private funds	1	3	4
Technical Considerations:			
Environmental impacts	1	5	5
Environmental Benefits	2	4	3
Capital Cost	1	3	4
Annual operating costs	4	3	2
TOTAL LEVEL 2 SCREENING POINTS	**44**	**78**	**66**

7.2 Criteria Conclusion and LPA

It is obvious from the totals in the table above that the Existing Location Commuter Rail option (in the existing A&M corridor) ranked higher in the Level 2 screening than other alternatives. As mentioned in Section 4 Alternatives Development, the alternatives are comprised of locations and specific modal technology. Modal technology, in turn, consists of vehicles and an assumed service scenario. The criteria rankings for Northwest Arkansas arise in part from the location of the alternative in relation to the various land uses in the study area, and in part from the mode technology and service.

The criteria rankings are further reinforced by examining the population within a one mile bandwidth of each alternative. Over half of the urbanized area population is within a one mile bandwidth of the A&M railroad corridor. In ascending order, the populations within one mile are as follows:

New Location: 89,554 , or 30% of the UZA

BRT on US71B: 147,052 or 49% of the UZA

Commuter Rail on A&M ROW: 152,781 or 52% of the UZA

Figures 7-1, 2 and 3 show the one mile bandwidth in relation to each alternative.

Figure 7-1 Bandwidth for New Location

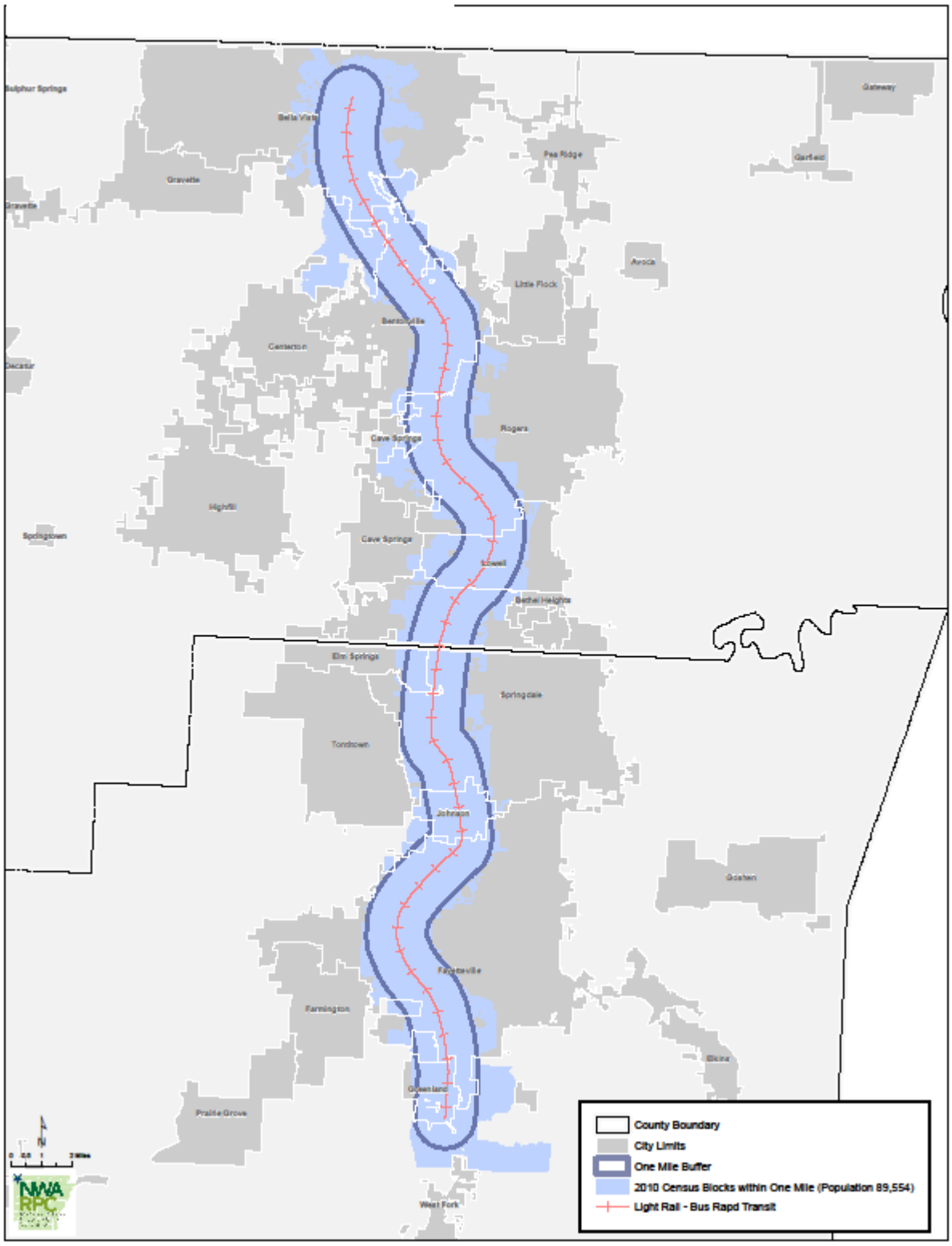


Figure 7-2 Bandwidth BRT on US71B

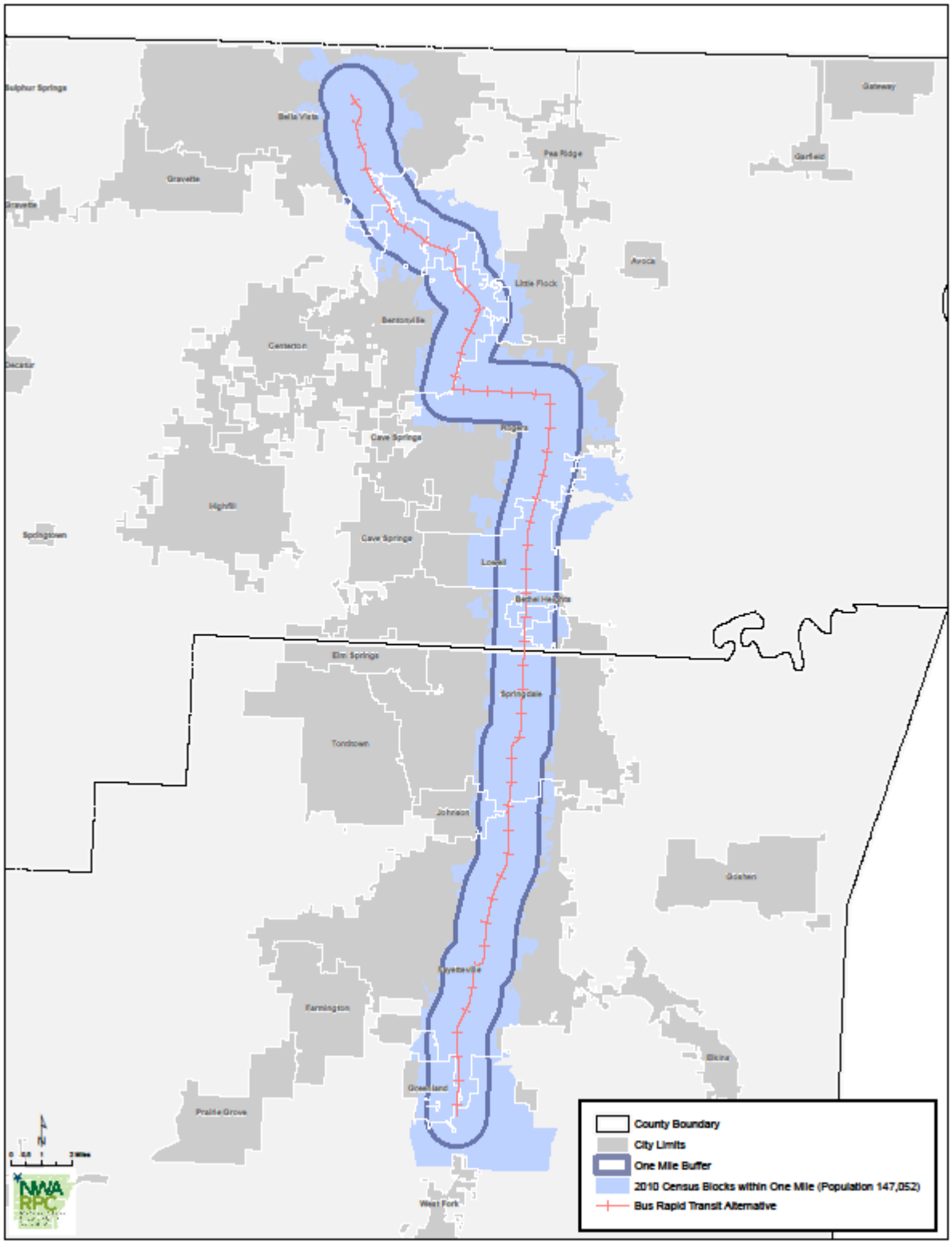
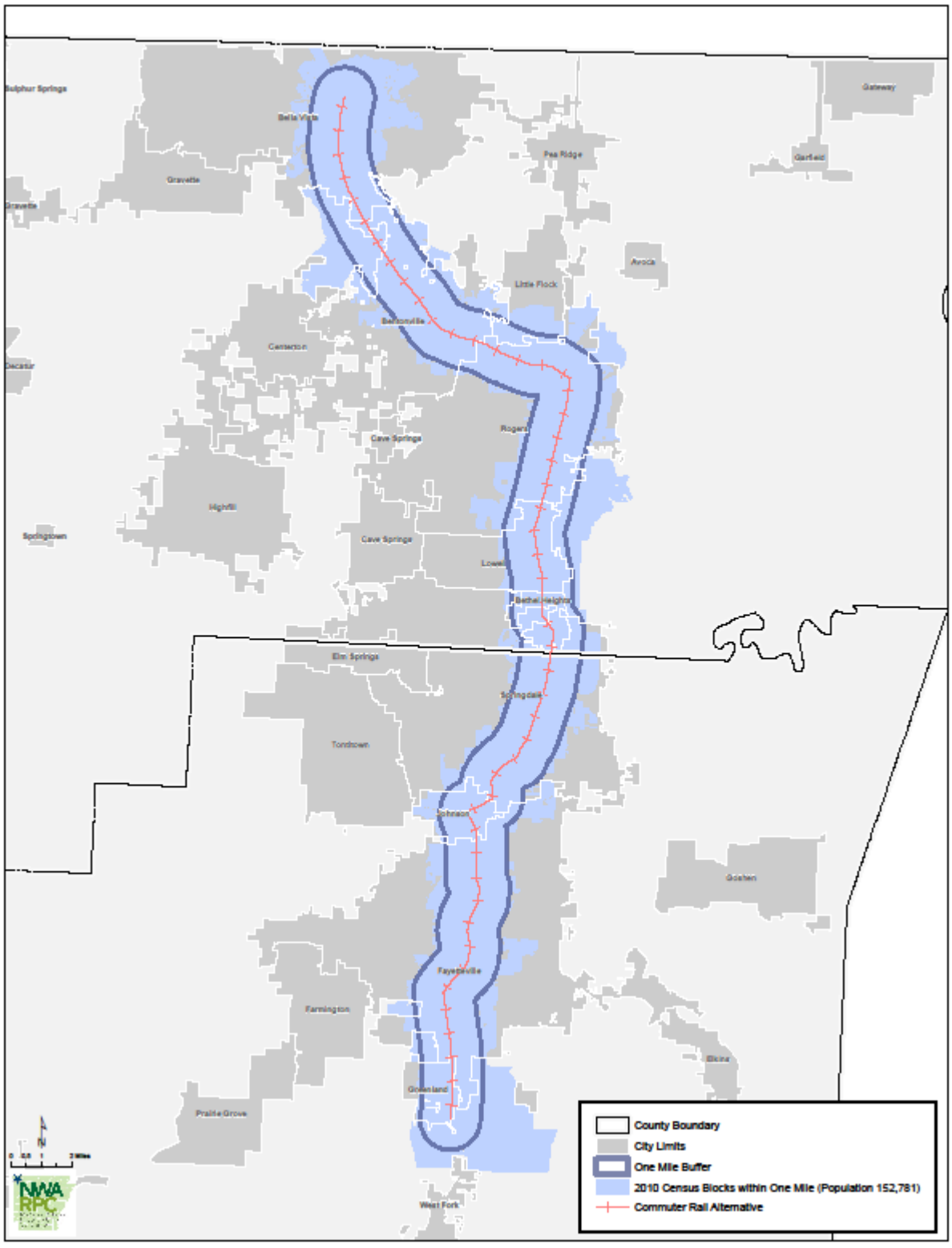


Figure 7-3 Bandwidth for Commuter Rail



As described in the Financial Performance section, building the entire 39-mile Commuter Rail option is expensive. And it is unlikely it will qualify for Federal funding assistance in the near term. A staged implementation is very feasible and would provide the area with a "starter kit" to demonstrate the attractiveness of fixed guideway passenger service. A key to future expansion will be to select the first stage carefully so that it can bring about mixed use development, also known as Transit Oriented Development. The selection of the starter line must be done in close cooperation with the A&M ownership, discussed further in Section 8. Creating the proper public and private incentives and framework will be just as important as buying passenger rail cars and laying new parallel track.

An example of a starter line would be downtown Fayetteville to downtown Springdale on the A&M line. Double tracking, 3 stations, 4 modern DMU cars and other requirements would cost about $229M in 2014 dollars.

The criteria rankings of the New Location LRT alternative were lower in many cases simply because the new location is in an area of typical suburban low-density development. Over time, a new location light rail would undoubtedly influence the development and bring about higher densities, but as was discussed in the Ridership section, FTA policy guidance and regulations require that the forecast be based on the existing regional land use forecasts used in the financially constrained transportation plan. FTA and the new MAP 21 legislation provide some opportunity for a change in the land use assumptions, discussed later in this section.

Similarly, the criteria rankings of the Existing Location CRT option were positively influenced more by its location than the modal technology (commuter rail mode). Commuter rail, by its very nature, is on tracks and ROW which have the primary purpose of serving local and through freight traffic. Commuter rail service scenarios are comprised of service during the commuting or peak hours, with limited mid-day, evening, and weekend service. This is in contrast to a dedicated passenger facility which has frequent service for 12 to 16 hours a day. There is no doubt that the Northwest Arkansas Region would be well served by a light rail service scenario in this corridor, but it is not feasible due to the volume and frequency of the freight service provided by A&M.

The Existing Location CRT option benefits from its historic location as the main transportation spine of Northwest Arkansas dating back to the 1800s. The town centers grew from the station locations, and although the area has grown along many east-west

axes, the town centers still have strong activity and strong potential for higher levels of development and occupancy.

The BRT alternative suffers from the previously discussed fact that developers and investors prefer facilities with fixed guideways, i.e., rails or separate fixed busways, over bus transit facilities with little or no infrastructure associated with them. However, that does not mean that a staged BRT project in the US71 B corridor should not be pursued. This is detailed further in The Path Forward section of this report.

A true fixed-guideway project has the potential to generate more station area development simply because of the perceived permanence of the transit service. Fixed guideway transit usually supports a higher transit ridership than traditional bus service, so a higher population level can be served which in turn means a larger market for the retail and commercial establishments that might locate in the vicinity of a station.

7.3 Revisions to New Starts Criteria Process under MAP-21

As mentioned several times in this report, the New Starts criteria that govern the rating of proposed fixed guideways and major BRT projects are in a transition period due to changes in the authorizing legislation (MAP-21). A new Final Rule for major capital investments, including New Starts, became effective in April 2013[13]. As is the custom with FTA, it issued further Policy Guidance to define and implement the regulatory and statutory provisions of the new rule.[14]

The new rules still stress ridership and ridership-related values and benefits, but will provide some flexibility in allowing a project sponsor to demonstrate and place a dollar value on "enrichments". Enrichments can consist of economic development that will be induced or generated by the investment in a major transit project. This is a departure from previous New Starts criteria. The project sponsor must provide ample proof or local policy commitment in support of enrichment claims. The Policy Guidance provides this definition of economic benefit enrichments"

[13] Federal Transit Administration 49 CFR Part 611 [Docket No. FTA–2010–0009] Major Capital Investment Projects , April 2013.

[14] Federal Transit Administration New and Small Starts Evaluation and Rating Process: Final Policy Guidance, August 2013

"The extent to which the proposed project would produce changes in development patterns around the transit investment and the resulting magnitude of changes in population and employment, considering: the economic conditions in the project corridor; the mechanisms by which the project would improve those conditions; the availability of land in station areas for development and redevelopment and a pro forma assessment of the feasibility of specific development scenarios."

It is very important to note that FTA will require substantial evidence of strongly pro-transit land use and transportation polices for the above to be considered. Here is a listing of the potential sources a project sponsor may have to document in order to show that the potential for economic benefits has a high probability of occurring as a result of the transit investment.

Sources of Information to Justify Benefits of Enrichments

- ✓ Transit Supportive Plans and Policies:
  - Growth Management
  - Transit Supportive Corridor Policies;
  - Supportive Zoning Regulations Near Transit Stations; and
  - Tools to Implement Land Use Policies
- ✓ Performance and Impacts of Policies:
  - Performance of Land Use Policies; and
  - Potential Impact of Transit Project on Regional Land Use.
- ✓ Tools to maintain or increase the share of affordable housing in the project corridor:
  - Evaluation of Corridor-Specific Affordable Housing Needs and Supply
  - Plans and Policies to Preserve and Increase Affordable Housing such as:
  - Inclusionary zoning and/or density bonuses for affordable housing
  - Employer assisted housing policies
  - Voluntary or mandatory inclusionary housing policies
  - Rent controls or condominium conversion controls
  - Zoning to promote housing diversity
  - Affordability covenants

- ✓ Adopted Financing Tools and Strategies to Preserve and Increase Affordable Housing such as:
  - Target property acquisition, rehabilitation, and development funding for low income housing within the corridor, including:

- Low Income Housing Tax Credits
- Ongoing affordable housing operating subsidies
- Weatherization and utilities support program
- Local tax abatements for low income or senior housing
- Local of State programs that provide mortgage or other home
- ownership assistance for lower income and senior households
- Established land banking programs or transfer tax programs
- Local or regional affordable housing trust funds
- Targeted tax increment financing or other value capture strategies for low income housing
- Developer Activity to Preserve and Increase Affordable Housing

Section 8 of this AA report, The Path Forward, will discuss the above FTA policy and the options for the Northwest Arkansas region relative to Federal funding and the financial feasibility of implementing fixed guideway transit in the region.

Section 8-Conclusion: The Path Forward

The Northwest Regional Planning Commission contracted for this Alternatives Analysis because it correctly perceived there was widespread interested in a rail project that would connect the region and sustain and enhance the high quality of life by reducing congestion and spurring a return to traditional urban densities and mixed use land development. The public outreach effort during this study added to the evidence of the interest. Open houses were well-attended by lay citizens, elected officials, and representatives of special interest groups. Local and statewide news media provided full coverage of meetings, and the stakeholder committee and TAC advisory committee were fully engaged. There is no doubt there is strong interest in providing a stronger transit mode.

All the interested parties have different expectations, and this study's goal is to provide a common ground and a baseline of information for continued efforts to bring about a fixed-guideway transit project in Northwest Arkansas.

The common ground should start with the three parts of this section: Findings, Recommendations, and Path Forward for Development Policies.

8.1 Findings

- ✓ The LPA, along with the other alternatives that were considered, is not currently eligible for New Starts (Major Capital Investment) Funding. Due to high capital cost and the inability of current model to show a high degree of ridership, it is unlikely the project can advance to project funding status in the FTA Major Capital Investments process (New Starts) as conditions exist now. Changes in the law will now allow FTA will consider factors other than ridership, but the ridership thresholds are currently set as follows:

RATING	MOBILITY IMPROVEMENT*
High	>29.9 Million
Medium High	15-29.9 Million
Medium	5-14.9 Million
Medium Low	2.5 -4.9 Million
Low	<2.5 Million

*Mobility Improvement =Estimated Annual Trips by Non Transit Dependent Persons plus 2 times Number of Annual Trips by Transit Dependent Persons

The Federal Funding Guidelines above are important, but only for Federal funding eligibility. There have been many new commuter rail lines built using only non-Federal funds in the past decade. Federal funding was either denied or not requested becausep project ridership and user benefits, as calculated according to FTA requirements, did not meet Federal requirements. The following shows 2013 ridership levels for several of these Non-Federally Funded commuter rail lines.

Commuter Line	Annual Ridership	Daily Ridership	Corridor Length (miles)
Cap Metro Red Line (Austin)	817,000	2400	32
A Train (Denton)	522,000	2000	21
Music Star (Nashville)	246,000	900	32
Rail Runner (New Mexico)	1,082,000	3500	97

By comparison, the 2035 ridership from the model for the Commuter Rail alternative would be 355,000 riders per year. As discussed elsewhere in this report, the ridership forecasts are very conservative due to the limitations of the modeling procedures.

There are two Federal funding factors for NWARPC to work on as it considers further pursuit of Federal funding sources. FTA rules will now allow project sponsors to consider economic and other benefits of fixed guideway proposals, not just ridership. This is discussed later in this section. Second, NWARPC should weigh the costs and benefits of developing a TDM with mode choice capability. The NWARPC staff is currently upgrading and enhancing the TDM and that may provide enough mode choice capability.

- ✓ <u>Without Federal Funding or other funding source, a Fixed Guideway proposal is not eligible for inclusion in a financially constrained long range plan</u>. The cost of the New Location Alternative is on a scale with the total funding for all other projects in the 2035 LRP. The Existing Location Commuter Rail alternative also does not have adequate funding sources that can be determined presently.

- ✓ <u>Highway Widening will not achieve all the goals.</u> Although there are funds and projects in development to add needed highway capacity in the I 49 corridor, no region can ever “widen its way” out of congestion. As capacity increases, more

automobile traffic will find its way to the improved facilities. A fixed guideway transit project should remain a goal.

- ✓ <u>There are advantages to a non-Federally funded project.</u> This is not to say that Federal funds should not be sought. But there are many recent major rail projects in the US that were built without Federal funds. Nashville and Denton County Commuter Rail projects are two nearby examples. Some of the advantages of having no Federal funds have to do with project delivery. A project can advance from concept to opening day years faster. Although any responsible project development process will follow good environmental practices, no NEPA process should be necessary. It will be simpler to use expedited project delivery methods such as Design-Build (DB), Design-Build-Operate-Maintain (DBOM), or other project delivery methods. The Design-Bid-Build traditional project delivery process generally takes much longer and requires much more supervision and administration by the project sponsor. With FTA funding, Congress requires a Project Management Oversight Consultant (PMOC) which adds time and costs to the project delivery.

  Any of the expedited project delivery methods could include a negotiated or competitively procured arrangement with the A&M, which might greatly accelerate the implementation and integration with its freight operations.

  It should be noted that even without Federal funding, the Federal Railroad Administration retains jurisdiction over any light rail or commuter rail projects that interact or are in proximity to freight lines and freight traffic. The FRA "crashworthiness" regulations apply to all services regardless of funding source.

- ✓ <u>A&M Ownership is experienced in Passenger Service</u>. This is one of the biggest pluses for the project. There are very few Class I, II or III railroads in the US that voluntarily operate passenger service. Even though it is excursion, charter and special event service, the A&M has a mindset that it can serve passengers as well as freight. It is a very successful freight line but it is also a successful passenger enterprise. Most railroads will not even "come to the table" to discuss passenger service. While A&M has not endorsed this study's findings, it is safe to say the ownership and management are more than willing to meet with area leaders on how to begin implementing this project in workable stages, or "minimal operable segments".

8.2 Recommendations

Northwest Arkansas communities should work with NWARPC to improve its existing public transit service and to get "Transit Ready". Whether Federal funding is sought or not, a successful fixed guideway project must be developed side by side with a sound bus service expansion plan and an economic redevelopment plan that begins at the station locations and radiates outward into the broader community. As presented at the end of Section 7, transit supportive development policies may go a long way toward making a project eligible for Federal funding for New Starts projects. Even if Federal funds are not received or not sought, the affected municipalities in NWA should work to enhance and develop a comprehensive set of zoning and public finance policies to promote walkable, sustainable neighborhoods in the A&M /Razorback Greenway corridor.

- ✓ The Northwest Arkansas Region should create and adopt an integrated land use and transportation plan that is based on promotion of mixed use development patterns.
- ✓ Most regions that have built regional commuter transit systems have started with a multijurisdictional vision and plan for future transportation and land use in the region. MPO's such as NWARPC usually play a central role in facilitating the plan and providing the technical expertise needed to complete it. Local elected leaders, however, are instrumental in generating the political and public support for local adoption of the regional plan, and for aligning local comprehensive plans and zoning with the regional transportation and land use plan. For the most part, transportation and land use plans are based on trends of the past 2 or 3 decades. To get a different result, a different strategy must be employed. That involves forecasting change.
- ✓ Communities in NWA can become "transit ready" ahead of a system being built.
- ✓ The principles of TOD planning and real estate development are directly transferrable to downtown, commercial corridor revitalization efforts, and moving to a more compact development pattern to reduce suburban sprawl.

Cities can determine, as some already have, where higher density or concentrated development is appropriate. Cities can also identify infrastructure needs, establish funding sources, and implement zoning and other land use regulations to attract development compatible with future transit. A nearby example can be found in the Kansas City region have completed several planning studies for future transit corridors, well in advance of BRT and possibly light rail transit service. (Kansas City is also undertaking a streetcar project in the downtown area, primarily for economic development reasons.)

- ✓ <u>Keep the Development Focused in the Corridor.</u>

  The NWA corridor has strong anchors on the north and south, although employment is dispersed on the north. Bentonville and Fayetteville have the largest concentrations of employment in the region, making them logical anchors for either end of a linear transit corridor. The University of Arkansas has approximately 25,000 students and 4,000 faculty and staff, and U of A sporting events have a national draw. Several large employers are located in Bentonville including Wal-Mart, Wal-Mart suppliers, and two major hospitals. However, in Bentonville and elsewhere along the corridor that employment is dispersed in suburban office parks, which are difficult to serve efficiently with transit.

- ✓ Look for ways to add energy and developer interest in the communities and downtowns between Fayetteville and Bentonville.
- ✓ TOD has been attractive to local governments, property owners, and real estate developers because of its potential to re-energize communities and neighborhoods. *Mixed use development has also been misapplied in places.* There is a body of academic and consultant research and real world examples of successful TOD throughout the U.S. Property value increases of 10 to 25 percent and higher have been observed in successful TODs. While many are in larger metro areas such as Washington D.C., Charlotte, N.C. (South End), Dallas, TX, and Denver, CO, smaller metros can attract TOD under the right conditions as described herein
- ✓ In addition to the rail LPA along the A&M, begin a stage development of high quality Bus Rapid Transit (BRT) along US 71B.

  Bus Rapid Transit (BRT) can have many of the same benefits as commuter and light rail, but with less real estate development impact. However, it is emerging as a lower cost alternative to commuter rail. Built in a dedicated guideway, or with dedicated lanes, "gold" and "silver" standard BRT can provide levels of service, reliability, and comfort similar to light rail. While the real estate and economic impacts is typically less than light or heavy rail, BRT can have positive land use and economic impacts when there is permanence in the system, such as connecting major employers, institutions, activity, and population centers, and having a dedicated or partially dedicated guideway.

8.3 Path Forward for Development Policies

This study produced a technical paper "Northwest Arkansas Commuter Corridors Alternatives Analysis: Transit Oriented Development Scenarios" by URS's subconsultant, Economic and Planning Systems, Inc. of Denver, Colorado. If the area is to someday qualify for Federal funding for a fixed guideway transit project, a unified development strategy must emerge. Key strategies from the report comprise the remainder of The Path Forward, and these should be the focus of coordination efforts by the NWARPC policy board.

TOD has been discussed throughout this report. To recap the most important characteristics relevant to Northwest Arkansas, transit oriented development (TOD) can be defined as mixed use residential or commercial development within walking distance of a transit station designed to maximize access to transit and incorporating features designed to encourage transit ridership. A TOD often resembles other activity centers with a greater mix of uses and higher densities than the surrounding market area. TODs typically have the following features:

- **Mix of Uses –** Land uses can be mixed either vertically or horizontally. TOD is most often primarily residential at suburban locations but can have employment and other commercial and retail uses at activity center and downtown locations.
- **Compact Development –** TODs are built at higher densities than the surrounding market area, creating a focal point around a transit station. The density and amount of development are market driven; higher land values support higher development densities and more urban locations support greater amounts of development.
- **Pedestrian Oriented –** The development pattern at TODs is designed to facilitate pedestrian access to and from the station with ample sidewalks, interconnected blocks and streets, and buildings oriented toward the street, and parking located in secondary locations.
- **TOD Typology –** Stations can be classified according to their transit function and there approximate place in the continuum of urban and suburban development. This continuum ranges from Downtown and Regional Activity or Employment Centers areas on the larger and most intense end of the development spectrum to Neighborhood Centers on the smaller end. There are also more specialized single use centers such as hospitals or major sports complexes. The mix of uses varies by

type and location; however, the larger, more intense urban centers tend to be higher density and contain more employment uses while smaller centers tend to contain lower densities and a greater proportion of housing.

The presence of transit at a station can have a positive effect on development potential in the immediate area because transit improves the regional accessibility of properties, which has a positive impact on property values. These higher land values can support higher development densities and in some cases a different mix of land uses in much the same way as property adjacent to a highway interchange is different from development farther away. However, the presence of transit alone does not translate to greater development potentials. There are other key economic requirements impacting TOD, including:

- **A Positive Market** – TOD cannot overcome other negative local or national real estate market conditions, including negative household or employment growth, declining building and land values, or the lack of conventional development financing.
- **Supportive Public Policy** – In order for a TOD activity center to be built, the local jurisdiction needs to provide a planning framework and zoning that allows for the type, mix, and density of development supportable by the market and desired by the community.
- **Realistic Expectations** – TOD can alter the location, density, and form of development within a market area. It can have a positive impact on the development capture of a city or sub region. However, it cannot by itself create measurable demand for net new development within the larger region.

TOD also requires a commitment to a long-term development plan. Historically, TOD does not occur until the transit investment is in place and providing a high level of accessibility that is generating high levels of ridership. In all but the most robust real estate markets, a TOD plan may take 10, 20, or more years to be fully implemented as a significant activity center. As discussed herein, however, Northwest Arkansas can justify being "transit-ready". Kansas City, Denver, and Dallas regions have planned for transit service and TOD well in advance of the investment in fixed guideway transit service.

A station area plan is key as it provides direction for the preferred land uses to be developed within a station influence area over a long-term time horizon of 20 to 25 years. The typical area of influence is approximately a half-mile radius modified by logical roadway and geographic features. In addition to the land use element, the plan

should be grounded by a market study that identifies the potentials for TOD land uses. It should also contain an infrastructure inventory and needs analysis, redevelopment strategies, and recommendations for changes and incentives to encourage TOD. The TOD plan allows the planners to address the individual characteristics and market opportunities and constraints of individual station locations and settings.

Transit Ready

An earlier recommendation in this section was for the NWA region to become Transit Ready. Planning for transit and TOD is compatible with multiple revitalization and redevelopment goals such as attracting mixed use development, increasing development density and diversity, creating walkable neighborhoods and business districts, and redeveloping or re-purposing obsolete industrial property adjacent to rail corridors. Many of the principles of TOD—higher densities, walkability, and a mix of uses—are the same principles that apply to any urban, suburban, or downtown revitalization planning effort. Since land use change can take several years, it is important to begin planning and implementing higher density development and revitalization plans now to position the region for future transit service.

Transit Oriented Development Benefits

Transit Oriented Development (TOD) is being pursued by communities for several reasons including local economic development benefits, increased access to jobs (by residents) and labor force (by employers), and for the environmental and social benefits of compact development. The private sector, land owners, investors, and developers are interested in TOD because of its potential to support higher property values. TOD also increases ridership on transit systems, and to the transit operator is a lower cost way of adding riders compared to expanding the transit system. An overview of the motivations for developing TOD and its benefits follows.

Demand for Transit Accessible Real Estate

Demographers, economists, and the national homebuilding industry expect housing and commercial real estate demand to shift dramatically in the coming years; some areas of the U.S. are already experiencing these predicted shifts. Over the past decade there have been at least four national studies of housing preferences and national demographic trends that indicate increasing demand for more compact and transit accessible housing, workplace, and retail locations. Conversely, the demand for large homes and large lot suburban and exurban development is expected to decrease. Some highlights of this research are summarized below:

- Approximately 38 percent of Americans would like the option to live in attached housing (apartments, condos, townhomes), and 35 to 40 percent would prefer single family homes on small lots (less than 7,000 square feet).
- Attached housing comprises only 30 percent of the housing supply and small lot housing comprises only another 30 percent of the housing supply, creating a gap between housing preferences and what the market is providing.
- One quarter of Americans would like to be able to walk or cycle to work, yet only 4 percent actually do. However, when work, shopping, and services are located less than one mile from home, roughly 40 percent of the population will walk or cycle to these locations.
- From 1990 to 2010 approximately 80 percent of housing demand was from growing families (children of baby boomers having their own children). Over the next 20 years, this market segment is projected to be one quarter of the housing market. The housing market will be dominated by empty nesters (baby boomers), smaller households as households size continues to fall, and the young labor force
- Generation Y and Millennials show stronger preferences for more urban style housing in both central city and suburban locations, and have lower rates of car ownership. They also prefer workplaces in more mixed use urban style environments rather than the single use suburban business parks popular from the 1970s through the 2000s. As the U.S. labor force shrinks with the retirement of the baby boomers, attracting this young labor force will be important to businesses and cities.

Real Estate Impacts

There is a growing body of evidence in both academic research and the experience of real estate developers (and local governments) engaged in TOD that TOD locations support higher property values than non-TOD locations. The access and convenience that good transit service provides makes these locations attractive to residents and businesses, resulting in higher property values.

There have been numerous academic and consultant studies that estimated the premiums in real estate values associated with being located close (generally within one-quarter- to one/half-mile of high frequency transit), as summarized below. Rent and value premiums range from as little as seven percent in Boston to as much as 40 percent in the San Francisco Bay Area (Table 8-1).

- Average rents in the Bay Area for a one-bedroom apartment were priced 10 percent above comparable projects and 16 percent higher for two-bedroom units.[15] On average, rents at the East Bay TOD (e.g. Oakland and Berkeley) were 10 to 15 percent higher than non-TOD units.
- A similar study conducted in Dallas found that a sample of properties located around DART rail stations saw increases in property values and rents of about 25 percent greater than overall county levels and comparable non-TOD properties.[16] Specifically, an analysis at Dallas' Mockingbird Station found a rent premium of 23 percent above comparable non TOD units. In addition, between 1997 and 2001 median values of residential properties increased 32.1 percent near DART light rail stations compared to 19.5 percent in control group areas.

[15] *Transit-Oriented Development in the United States: Experience, Challenges, and Prospects.* TCRP Report 102. Transportation Research Board. 2004.

[16] *The Initial Economic Impacts of the DART LRT System.* Center for Economic Development and Research. 1999.

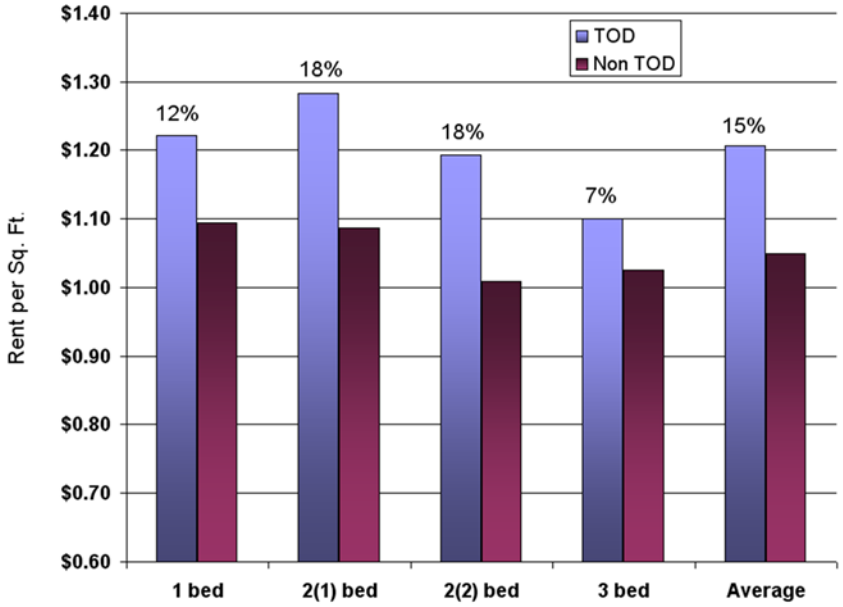
Table 8-1
Transit Oriented Development Residential Property Premiums

City/Region	System	Technology	Study Date	Passenger Miles [1]	Metro Area Congestion Ranking [2]	Value of Proximity to Station
Residential						
Alameda County (Bay Area)	BART	Heavy Rail	1994	1,448,529,163	8	39%
Netherlands	---	Commuter Rail	2006	---	---	25%
No. San Diego County (Coaster Line)	NCTD	Commuter Rail		40,139,482	13	+20%
Santa Clara County (Silicon Valley)	VTA	Light Rail	2001	54,474,946	8	15%
Bay Area	BART	Heavy Rail	1996	1,448,529,163	8	10-15%
Philadelphia	SEPTA	Commuter Rail	1993	486,427,898	11	7-15%
Portland, OR	TriMet	Light Rail	1993	193,574,421	25	11%
Boston	MBTA	Commuter Rail	1994	792,889,367	12	6.7%
Commercial						
Santa Clara County (Silicon Valley)	VTA	Light Rail	2001	54,474,946	8	23%
Washington D.C.	WMATA	Heavy Rail		1,639,628,551	7	10-20%
San Diego, CA	Various	Various		---	13	20-40%

1 Federal Transit Administration National Transit Database, http://www.ntdprogram.gov/ntdprogram/
2 Texas Transportation Institute Urban Mobility Report, http://mobility.tamu.edu/ums/
Source: Research summarized by Economic & Planning Systems
\\epspdc02\Proj\123044-Arkansas\NWNorth-SouthCorridor AA\Data\[123044-TOD Premiums.xls]Sheet1

- A study completed by EPS in the Denver, Colorado region found that apartment rents in TOD locations were 15 percent higher than comparable properties in non-TOD locations (Figure 8-1).

Figure 8-1
Denver Region TOD Apartment Rent Premiums



Much of the evidence suggests that TOD projects served by intensive transit service produce the healthiest real estate results. However, while good quality transit is important, it is not the only factor in determining financial performance. Higher densities, pedestrian amenities, and retail services all contribute to the level of premium. According to the TRB, it is the synergy of proximity, density, mix of uses, and pedestrian friendliness that truly translates into property values and enhanced real estate performance.[17]

Equity

Transportation and fuel costs are rising nation and worldwide. For those who cannot afford to own a car or choose not to, good public transit can provide a viable means to access better job opportunities that may not be close to home. Transit can connect people of all income ranges to opportunities for job training, education, and career advancement.

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[17] *Transit-Oriented Development in the United States: Experience, Challenges, and Prospects.* TCRP Report 102. Transportation Research Board (TRB)

Rail and Bus Rapid Transit TOD

The conventional wisdom has been that bus transit does not support TOD. The fixed investment that a rail line represents conveys a sense of permanence to property owners, investors, and developers—rail lines rarely move, while bus routes can be easily changed. However, modern bus rapid transit (BRT) is beginning to emerge as a viable and lower cost alternative to rail, and is supporting TOD or at least development oriented to transportation corridors. The highest levels of BRT, gold and silver rated, have dedicated or partial guideways and service that approach the schedule reliability and safety levels of rail transit. Examples detailed in the separate report cover Fixed Guideway BRTs including Mason Corridor, Fort Collins, Colorado MAX Line, Kansas City, MO, Health Line, Cleveland, OH.

According to a study published by the Institute for Transportation & Development Policy, the Health Line has generated approximately $115 in economic development for every dollar spent on the bus system. Since the health line began, there has been more than $4.3 billion in proposed, new, or finished development projects along the corridor.

LPA Station Concepts

The consultant team prepared conceptual development scenarios for the approximate station locations identified for the LPA commuter rail alternative in the AA. This is part of the Path Forward and is intended to generate ideas and help set in motion the planning for TOD to help the region be more "transit ready." Shifting the overall development pattern of the region to a more nodal and transportation corridor-oriented pattern should be a focus of future land use and infrastructure planning. This is important for functional reasons but will also be an essential step to make the project eligible for FTA capital funding assistance.

This portion starts with descriptions of the proposed station areas for the LPA. Next, each station area is classified within a station area typology framework that characterizes the types of development that are compatible with the transit function and the geographic and market context. It concludes by identifying potential development and redevelopment sites and estimate the mix of land uses and amount of development these sites could support at some point in the future.

This analysis is not intended to imply any local government action on specific properties. Market conditions and property owners will determine when development or redevelopment is appropriate.

Proposed Station Areas

EPS examined six proposed station areas for this analysis: Downtown Fayetteville, Johnson, Downtown Springdale, Lowell, Downtown Rogers, and Bentonville. Actual station locations for eventual construction have not yet been identified. The locations chosen in this analysis represent logical locations based on roadway access and existing development patterns, particularly for the Downtown stations.

Downtown Fayetteville

A logical location for the Fayetteville Station would be south of intersection of the rail with West Dickson Street. This is near the heart of Downtown Fayetteville, approximately one-quarter- to one-half of a mile to the center of the University of Arkansas (U of A) campus just to the west. Dickson Street and Downtown Fayetteville is a densely developed mixed use district containing ground floor retail, restaurant, and office businesses, homes, and student apartments. Fayetteville has the largest and strongest downtown in the Region due to the presence of 24,595 students and 4,000 staff at U of A. The station would serve U of A staff and faculty, U of A events, and northbound commuters. In fact, much of the downtown development pattern can be considered TOD as it is already dense for the NW Arkansas region and contains a mix of land uses.

Johnson

The Johnson station would be located at approximately Main Drive and the rail alignment. This area also has approximately 250 acres of undeveloped agricultural land surrounding the station area, largely on the west side of the rail alignment. The small residential community of Johnson is located to the east.

I-49 at Gregg St.

Although not identified in the AA, Fayetteville Junction could be considered as a station location for either rail or BRT. The Washington Regional Medical Center, a large employment center and major destination, is located here, and there are several hundred acres of undeveloped land surrounding this junction. The undeveloped land provides an opportunity to create a new development that is transit ready.

Downtown Springdale

Downtown Springdale has been identified as a logical location for Springdale's station at roughly Emma Avenue and the rail alignment. Springdale envisions that a commuter rail station could be a catalyst for downtown and an additional amenity to support business and street activity. The station could integrate well with the Razorback Greenway, which is the first of many projects aimed at revitalizing downtown, including daylighting Spring Creek.

Downtown Springdale's compact street grid and comparably higher density development is support of transit, although property values are low and vacancies are high at this time. The City's offices are the dominant occupant of downtown office space. The Springdale Housing Authority owns income restricted apartments within one-quarter of a mile of downtown.

Rogers

Rogers station could be located near the center of their downtown in the vicinity of the intersection of Walnut Street (E-W) and 1st Street (N-S). Downtown Rogers is an 1800's main street oriented around the historic rail depot area along 1st Street. The A&M has some maintenance facilities here, including a station for its excursion passenger service.

The City of Rogers has made substantial investments in the streetscape environment in Downtown, including brick paving, planters, curb bulb outs, and cross walks. The downtown is visually appealing with an attractive building stock. Although there are still some vacancies in street level storefronts, these investments are helping to attract new businesses, including at least two new restaurants.

Lowell

The approximately station location for Lowell would be in the vicinity of Hwy. 264 (West Monroe Ave.) at US 71B. Land use in this area is a mix of agricultural and ag-industrial buildings, active agricultural fields, and new residential subdivisions on former agricultural properties. In addition, there are several recently constructed single family residential subdivisions in this vicinity indicating demand for housing in this area. Homes are generally in the entry level first time buyer and first move-up market segments.

Bentonville

Bentonville is the home of Wal-Mart, whose headquarter is located at the northeast corner of 8th Street and South Walton Boulevard. A possible commuter rail station location is in the vicinity of Southeast 8th and Southeast J Streets. The City's Southeast

Downtown Plan proposes creating a Market District and an Arts District in this area. The Market District is proposed in area between SE 5th, SE 8th, SE J, SE E Court. The Market District block has a vacant Tyson chicken plant, an active Kraft Foods manufacturing facility, and a number of homes. Integrating the station at the western edge of this plan area should be evaluated further.

The Arts District is planned for roughly three square block area between SW B and SW A west to east, respectively, and approximately Southeast 4th on the north and Southeast 8th on the south. This area is developed with a mix of aging industrial and commercial buildings. Southeast 6th Street would be a key connection between the two Districts.

Surrounding land use ranges from residential at Moberly Lane to large distribution warehouses between Moberly and Southeast J Streets. Downtown (The Square) is approximately one-half of a mile to the northwest. The rail right of way appears to end in this 5th to 8th block; extending the rail into downtown may not be practical as it would require substantial property acquisition in established neighborhoods. The rail ROW situation has also been complicated by the recent sale of A&M ROW to the Northwest Arkansas Community College.

The Wal-Mart headquarters is located approximately 1.5 miles to the west and is not walkable from this station location. Wal-Mart campus buildings are a mixture of one to two story buildings that have been gradually converted to office from warehouse and distribution uses. The Square is the core of Downtown Bentonville, a four- to six-block commercial district with two- to three-story mixed use buildings dating from the 1800s. The buildings are in good condition and occupied with a variety of restaurants and specialty retail businesses. The original Walton's Five and Dime is located here, and the area is busy with shoppers, diners, and tourists.

A high frequency circulator service would be needed to connect the station area with the Wal-Mart headquarters and The Square. It would not be practical to attempt to extend the rail beyond the 5th to 8th block area due to the impacts to existing homes and other properties.

Station Typologies

The consultant team created station typologies for each station area after evaluating the existing land use conditions surrounding them, the type of station (e.g. neighborhood walk up vs. park-n-ride) , its economic function along the corridor, roadway connections and other access, available land, and each jurisdiction's planning

objectives for the station areas. A station area typology is an aspirational characterization of future development that also reflects the economic and geographic characteristics of the area, as described above. The typologies contain a range of development intensities (amounts) and densities based on these site characteristics. A benefit of creating station typologies is that it helps establish unique market positions for each station so that they are not all competing for the same types of development.

The study area corridor is linear and connects two major employment and entertainment destinations. It differs from the suburb to central city corridors in which the central city station is often surrounded by the largest amount of and highest density development. The NWA corridor can be thought of as having two anchors on the north and south ends, with unique nodes in between. The proposed station typologies described below are scaled for the NWA commuter rail corridor and listed generally in order of development intensity.

First, we apply the station typologies to each station area to create future development scenarios. Next, we estimate the potential land use mix and densities for each prototype and assign these development types to vacant sites and potential redevelopment sites at each station.

Downtown - Fayetteville

A Downtown station typology has the full range of land uses including a variety of residential, retail and restaurant, major employers, and institutional developments. Downtown Fayetteville has the highest land use densities in the region. While development around a new commuter rail station will be limited to site specific redevelopment and infill projects, Fayetteville can be expected to be the most densely developed TOD initially. Downtown Fayetteville's station will serve a broad transit rider market, including inbound and outbound commuters as well as special events at U of A.

Urban Center – Fayetteville Junction

An Urban Center is an area of focused development with densities that are higher than the surrounding area. Urban Centers are urban in the sense of development density and the diversity of land uses present, but are generally located in suburban settings. Urban Centers have good regional access from highways and arterials, absent transit. Transit service enhances the access to markets and labor already present at an Urban Center location. Because of their location and access characteristics, Urban Centers are able to support significant amounts of office employment, retail development, and institutional uses including hospitals, government centers, and education facilities.

I-49/Gregg is envisioned as an Urban Center station. There are two highway interchanges serving this area, at Fulbright Expressway just east of North Gregg Avenue, and at I-49 and Highway 112, providing excellent regional access by car. A major medical center has already located here, proving the location's attractiveness for large employers. The addition of rail transit or BRT will further enhance this site's access.

Commuter Town Center – Johnson and Lowell

Commuter Town Centers are suburban stations that function both as park-n-rides for the transit system and as an organizing feature and anchor for a residential community. Commuter town centers are mostly residential, with a limited amount of neighborhood or community-serving commercial depending on the size of the site's retail trade area. Homes can be built at higher than typical densities (smaller lot sizes) and clustered around the station, connected by a compact street grid with low automobile speeds, and with sidewalks, trails, and bicycle facilities. The principles of Traditional Neighborhood Design (TND) can be applied in this setting as an alternative to larger lot suburban development designed around the car. The South Pass development planned in Fayetteville, while not a TOD, is an example of the style of suburban residential development that can be integrated with transit.

Johnson and Lowell stations have large parcels of undeveloped land in the vicinity of the stations that could be developed with a large number of homes. At Lowell, the rail corridor has numerous industrial and ag-industrial buildings that may be candidates for redevelopment, depending on the ultimate station location. The market will determine when and if these buildings will be redeveloped, and any subarea planning should assume some phasing of development so as not to unduly disrupt businesses.

Main Street – Springdale and Rogers

Springdale and Rogers both have traditional Main Streets with good access to their surrounding residential populations. These areas already have a compact walkable street grid, a mix of businesses and residents, and an interesting building stock which sets the stage for TOD. Springdale and Rogers are working to re-energize their Main Streets, and transit stations have proven to be excellent catalysts for Main Street and Downtown revitalization as they create a daily flow of traffic and people. Businesses and services can locate near stations to capitalize on the increased customer traffic.

The Main Street stations will have a finer grain of development that complements the existing buildings, and potentially less parking than other stations due to land constraints. Springdale and Rogers will need to continue their revitalization efforts to

fully leverage the impact of a future transit station. The Springdale station also presents an opportunity to connect affordable housing and low to moderate income families with more job opportunities in the region. The Springdale Housing Authority owns an affordable housing development within a quarter-mile of the station and there are other free-market but modestly priced homes in the area

Cultural and Market District - Bentonville

The City of Bentonville's SE Downtown Plan identifies the potential station area as a Market and Arts District, as noted above. The Market District is planned for a large semi enclosed or enclosed Public Market, a Public Art Center, and high density residential development. The Arts District is planned to include several civic buildings including a library, theater, farmer's co-op, a park, and a parking structure. Private development could include a hotel and medium to high density housing.

For this analysis, the consultant team has assumed that the station will be in this area to complement the City's redevelopment and economic development plans. This station will be different than others, as it will need to serve this activity district as well as The Square and the Wal-Mart headquarters. A high quality circulator service (e.g. bus or streetcar) will be essential to making this station work from a transit perspective.

Table 8-2 recaps the typologies of the selected stations.

Table 8-2 NWA Commuter Rail Station Typologies

Cities	Current Land Use	Future Station Typology	Residential	Commercial Development	Scale	Parking and function
Fayetteville	Downtown	Downtown and Special Events	• Urban multifamily and townhome	• Retail, restaurant, entertainment emphasis • Office and institutional	2-5+ Stories	• Parking structure • Walk up • Circulator bus or streetcar • Special events
I-49/Gregg	Agricultural, Hospital, Hwy. Interchange	Major Urban Center	• Multifamily and townhome	• Employment emphasis • Significant retail possible	<4 stories	• Both commuter park-n-ride and employment/ services destination
Johnson	Agricultural, Residential	Commuter Town Center	• Small lot single family • Some apartments and townhomes	• Neighborhood retail and restaurants	2 stories or less	• Commuter park-n-ride
Springdale	Main Street	Main Street	• Multifamily and townhome	• Main street style retail/restaurant and office	< 4 stories	• Small park-n-ride • Walk-up • Feeder bus routes
Lowell	Agricultural, industrial, residential	Commuter Town Center	• Small lot single family • Some apartments and townhomes	• Neighborhood retail and restaurants	< 4-5 stories	• Commuter park-n-ride
Rogers	Main Street	Main Street	• Multifamily and townhome	• Main street style retail/restaurant and office	< 4 stories	• Small park-n-ride • Walk-up • Feeder bus routes
Bentonville	Industrial	Activity District	• Multifamily and townhome	• Cultural and entertainment • Retail, restaurant • Some office	< 4 stories	• Parking structure • Walk up • Circulator bus or streetcar • Special events

Station Planning Considerations

This section provides guidance and suggestions on land use and infrastructure planning around future commuter rail stations. Many of the same principles could be applied to BRT stations in similar locations. The considerations offered here are based on a windshield inspection tour of each station area, interviews with local jurisdiction planners, and professional experience in TOD planning at other similar stations and on similar corridors.

Downtown Fayetteville

As noted earlier, Downtown Fayetteville already has many of the elements that contribute to successful TOD: relatively high development densities, a compact street grid, policies that prioritize bicycle and pedestrian street improvements, and mixed use zoning. The potential commuter rail station area is largely developed. The remaining sites are generally small surface parking lots and other small vacant parcels. Any additional development in Downtown Fayetteville would likely be a continuation of the current land use pattern. There may be market pressure to increase densities, however, due to the limited land supply and generally strong market conditions in Fayetteville (Figure 8-2).

If and when a commuter rail or BRT station location is identified, the City's focus will likely need to be on integrating parking with the station in a pedestrian supportive manner. Structured parking will likely be needed due to the land constraints. The City should also continue its focus on bicycle and pedestrian needs and access to the station, and bike and pedestrian routes to the station.

Johnson

The proposed station typology for Johnson is for a commuter town center, which implies largely residential development. There are large undeveloped agricultural parcels to the east of the rail along Main Drive, which could be planned for Traditional Neighborhood Design-style (TND) residential neighborhood (Figure 8-3). TND neighborhoods typically have smaller lots than conventional residential developments; however, they also have neighborhood parks, trails, sidewalks, bicycle lanes, and other features to compensate for the smaller lots. There is a collection of older railroad depot and commercial buildings that could be converted to small scale neighborhood serving

commercial uses while maintaining the agricultural and railroad heritage of the neighborhood.

Some improvements to Main Drive may be needed to facilitate bicycle and pedestrian access to the station from the existing neighborhoods and new development. Station parking should be located in a way that respects the surrounding context, and does not create a perceived walking barrier or “sea of parking” between development and the station.

Figure 8- 2
Downtown Fayetteville Station Context

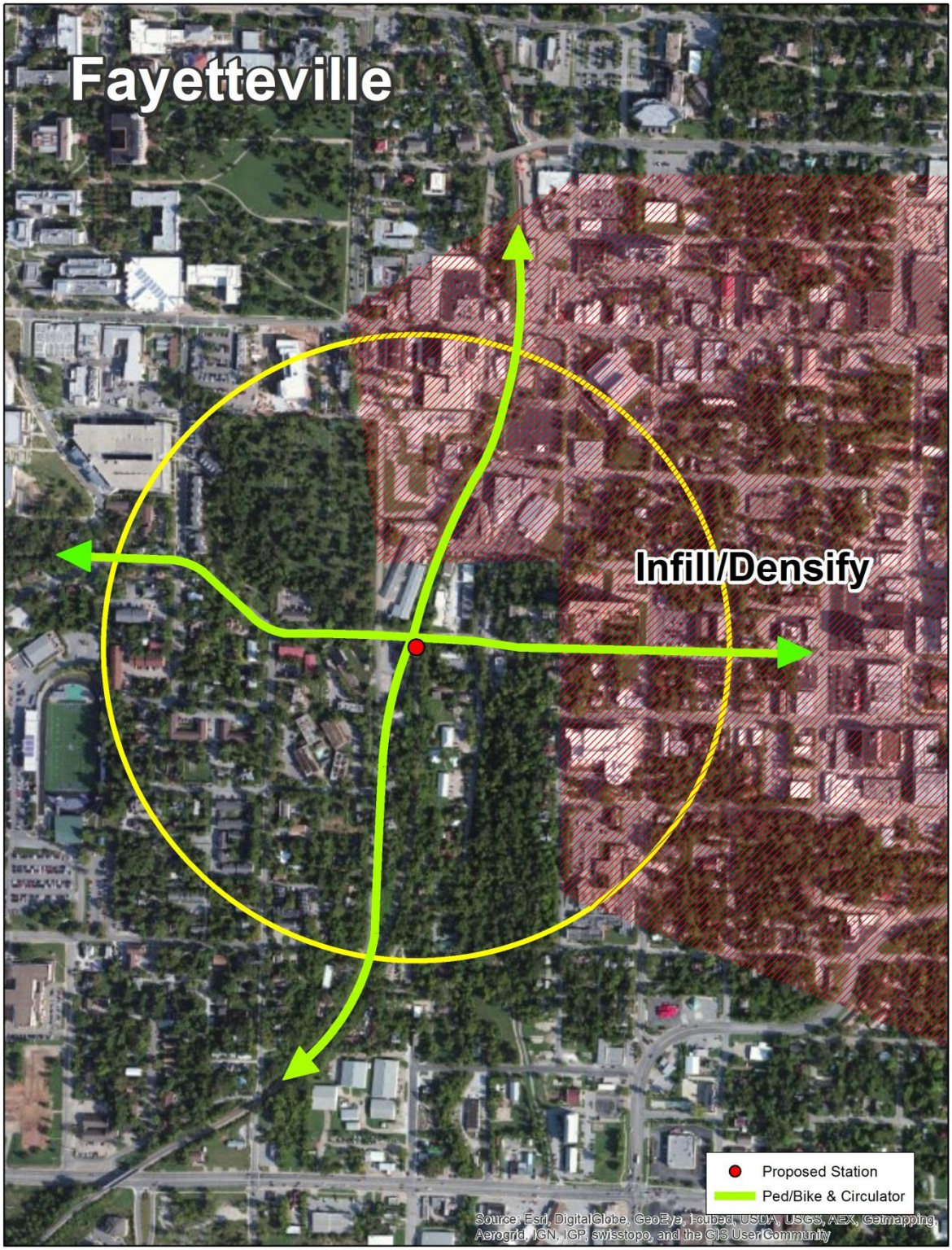
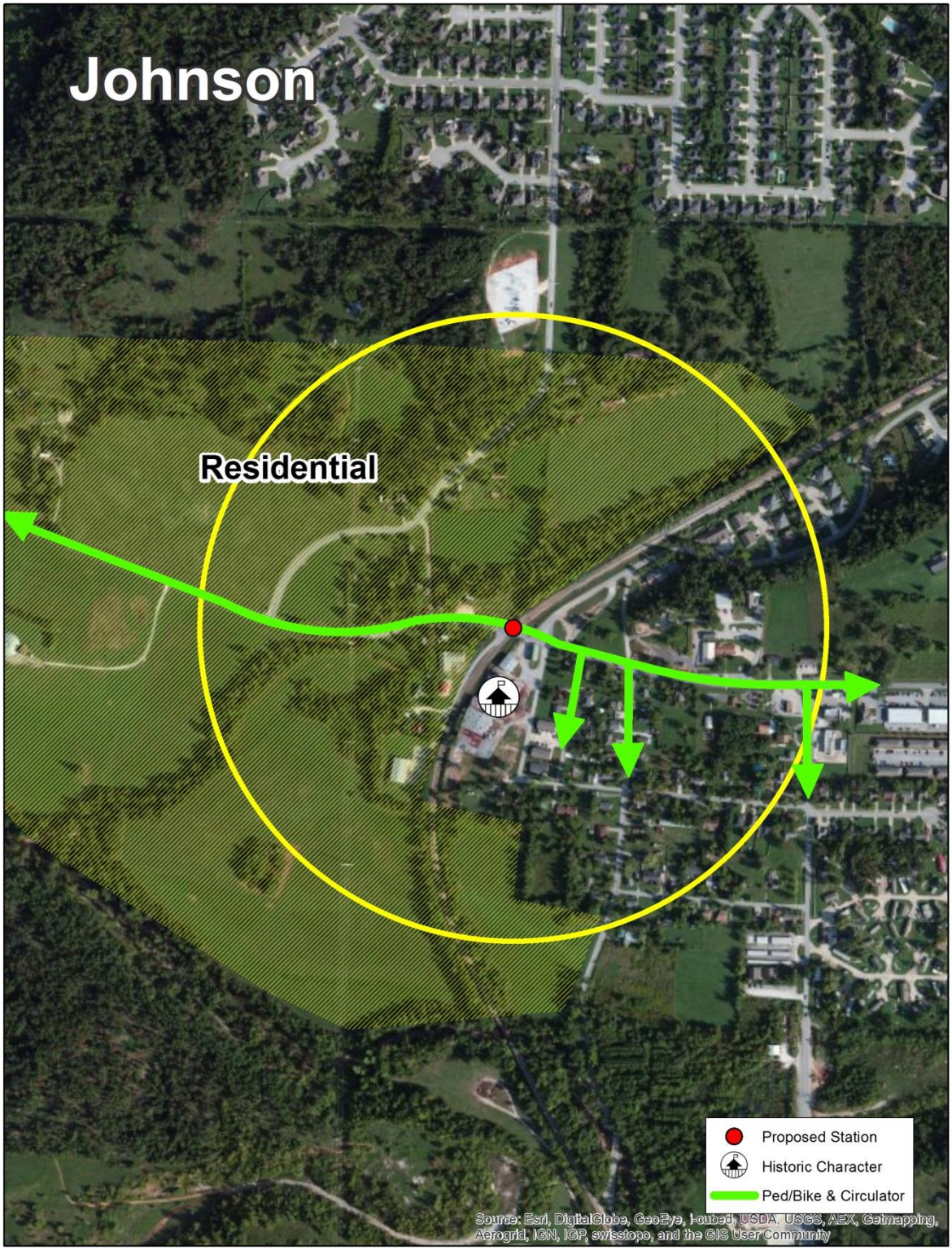


Figure 8-3
Johnson Station Context



Springdale

Downtown Springdale has a compact street grid and a mixture of building types built in a traditional Main Street style along Emma Avenue, as well as eclectic rail road depot and small industrial/commercial buildings. While this provides a good physical context for TOD, market demand for infill development will need to be catalyzed. The City should continue its downtown revitalization efforts including additional streetscape investments, sidewalks, bike lanes, small parks, and other investments. Some façade improvements or renovations to City and private buildings would also help to improve Downtown Springdale's image.

The station location in this analysis is shown at approximately Emma Avenue and the rail. The area within a quarter- to half-mile radius here is largely developed (Figure 8- 4). Expanding employment and population around the station will require infill development and redevelopment. The City could begin creating a phased plan that identifies key redevelopment or adaptive re-use properties, and any infrastructure needs that need to be addressed to facilitate the market.

There are several neighborhoods surrounding the quarter-mile radius that would benefit from regional transit service. Additional focus should be on creating safe and attractive pedestrian and bicycle connections to the station. There are some areas of low to moderate income households, to the southeast of the station area near the Airport, which will need a better connection to the station. A circulator or feeder bus route may also be needed, potentially along Emma and West Meadow Avenue.

Lowell

A potential location for Lowell station is shown near the intersection of East Monroe Avenue and the rail alignment. Monroe Avenue as well as US-71B provides access to a large catchment area for the station. The area is developed with a mixture of strip and freestanding commercial buildings along the US-71B frontage, agricultural, and industrial buildings. Newer single family neighborhoods have been built east of the rail, and west of US-71B.

As a commuter town center station, future development is proposed to be largely residential. A mixture of medium density housing, such as apartments and possibly townhomes, could be located between the station and the US-71B frontage (Figure 8-5). The US-71B frontage and corners at East Monroe Avenue could be anchored by new commercial and mixed use development, creating a gateway into the station and

surrounding development. A mixture of small-lot single family homes, townhomes, and apartments could be built as infill or as redevelopment over time north and south of the Monroe Avenue axis.

Monroe Avenue is a high capacity arterial roadway and would be the primary east-west access to the station. To encourage bicycle and pedestrian access to the station, sidewalks and bicycle lanes, with some separation from traffic, should be considered. The area also has a large suburban block pattern that inhibits bicycle and pedestrian movements. The feasibility of creating additional mid-block connections to the station from surrounding developments should be explored.

Figure 8-4
Downtown Springdale Station Context

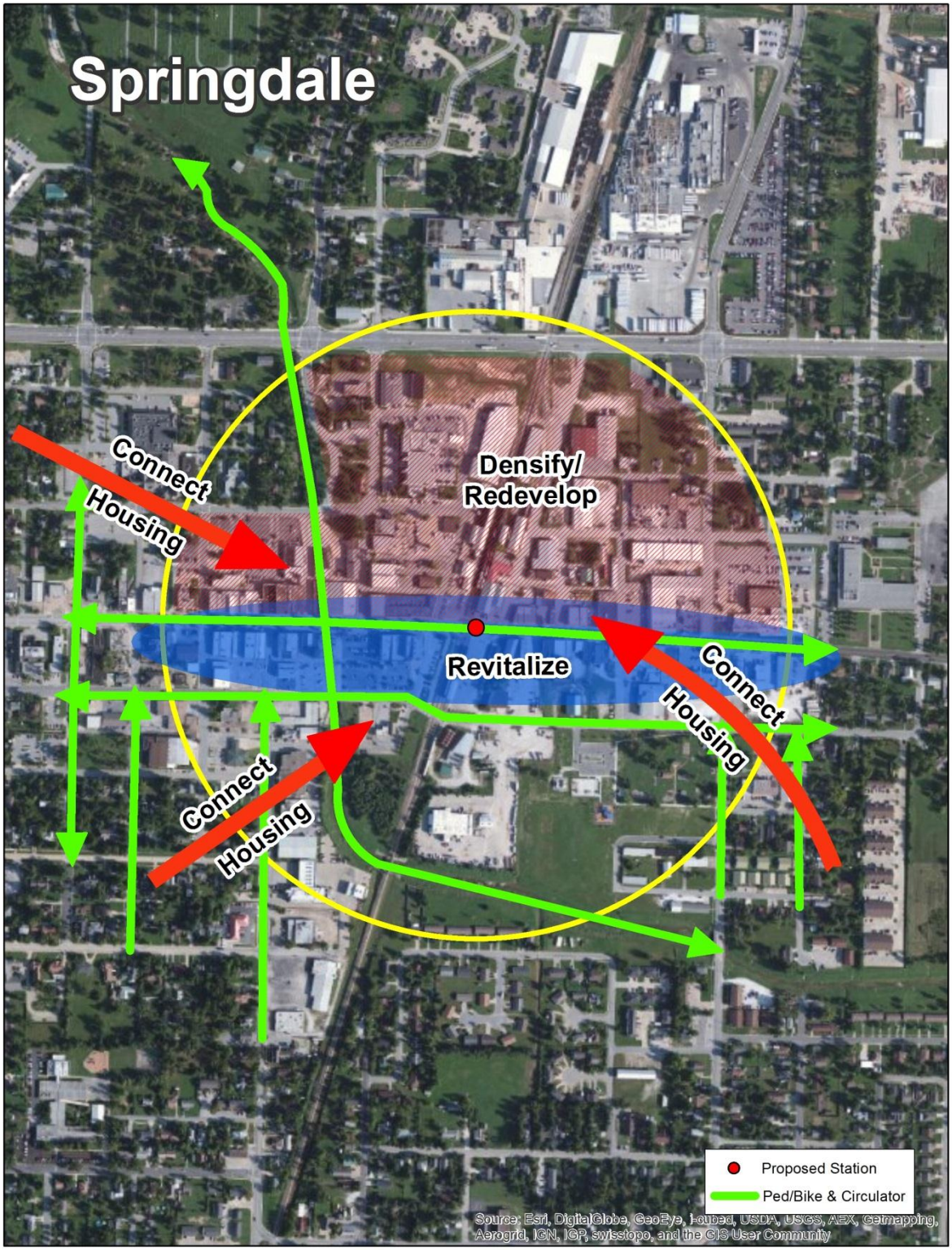
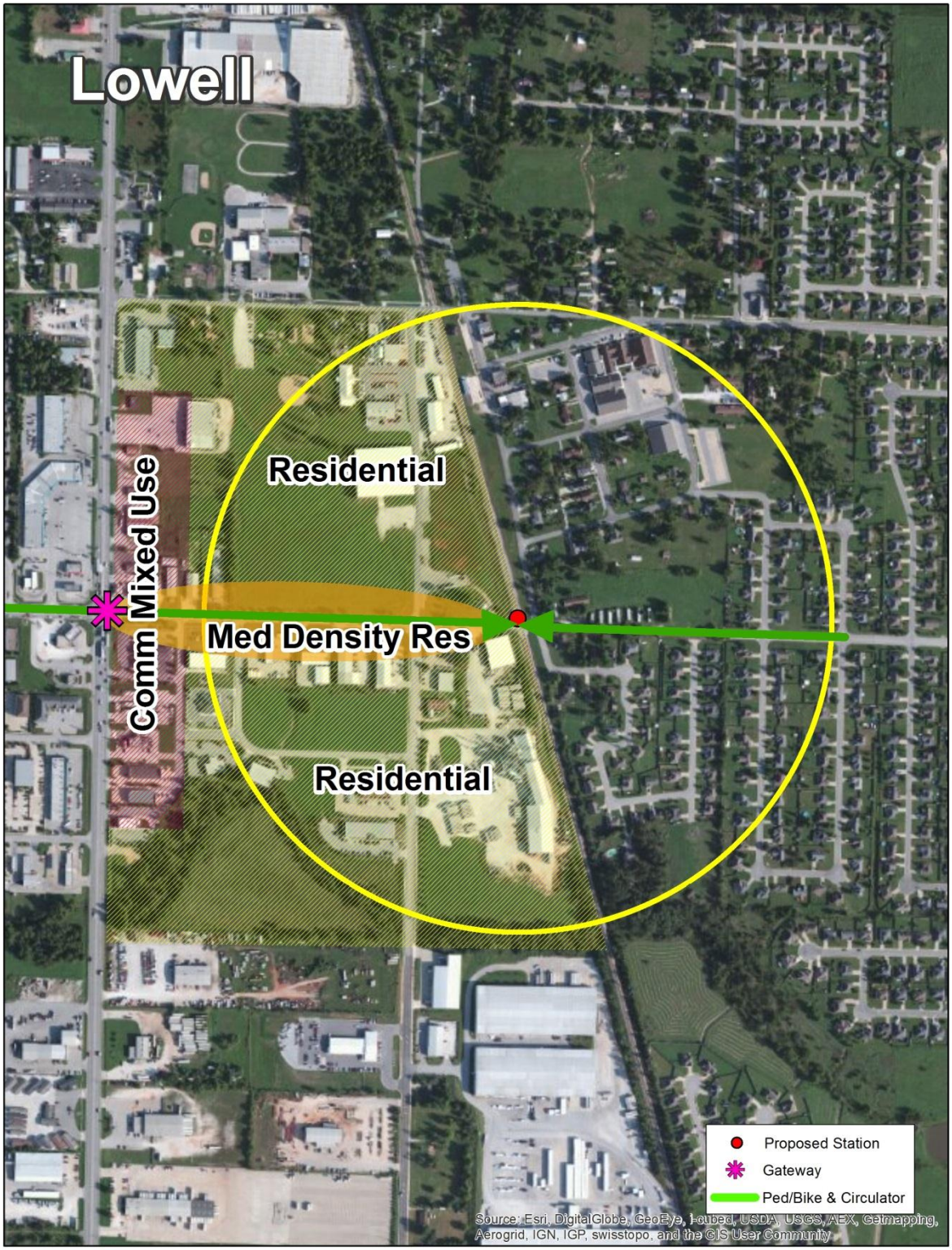


Figure 8-5
Lowell Station Context



Rogers

A logical location for a station in Rogers is in or near the center of their downtown, which is near the intersection of Walnut Street (E-W) and 1st Street (N-S). Downtown Rogers is an 1800's main street oriented around the historic rail depot area along 1st Street. The Arkansas & Missouri Railroad has some maintenance facilities here, including a station for its excursion passenger service. The collection of 1800s 2-story buildings on Main Street and Walnut Street, combined with the railroad depot style buildings along the rail corridor provide a unique and attractive context for infill and redevelopment.

Similar to Springdale and Fayetteville, Downtown Rogers is largely built out (Figure 8-6). There are a few undeveloped parcels and surface parking lots that could potentially be developed. There are also numerous small industrial/commercial properties that could be redevelopment or re-use candidates. A station area or downtown plan in Rogers should begin identifying areas with building stock that contributes to the desired development vision, and areas where redevelopment may be acceptable. Downtown Rogers could target expanding retail and restaurant activity, small professional office, and multifamily development in and around Downtown.

Station parking should be located in a way that is convenient to Downtown Businesses and the station, potentially along 1st Street or Arkansas Street. The block pattern in Downtown Rogers is small and generally well connected, which facilitates walking from the nearby neighborhoods. Bicycle lanes could be considered on Elm and Chestnut parallel to the busier Walnut Street.

Bentonville

The City of Bentonville's SE Downtown Plan was described in the previous Chapter and is shown below (Figure 8- 7). This redevelopment could be a regional and potentially national draw as a synergy with the Crystal Bridges Museum of American Art. The City's plan does not show a transit station location. Consultant team suggest that a location on the eastern edge of the property be identified, possibly along SE J Street, and that it be integrated with the plan as it is executed and developed.

This station will need to serve the Market and Arts Districts as well as The Square and the Wal-Mart headquarters. A high quality circulator service (e.g. bus or streetcar) will be essential to making this station work from a transit perspective. A circulator would also benefit these proposed districts, the Square businesses, Wal-Mart, and other major employers.

Figure 8-6
Rogers Station Context

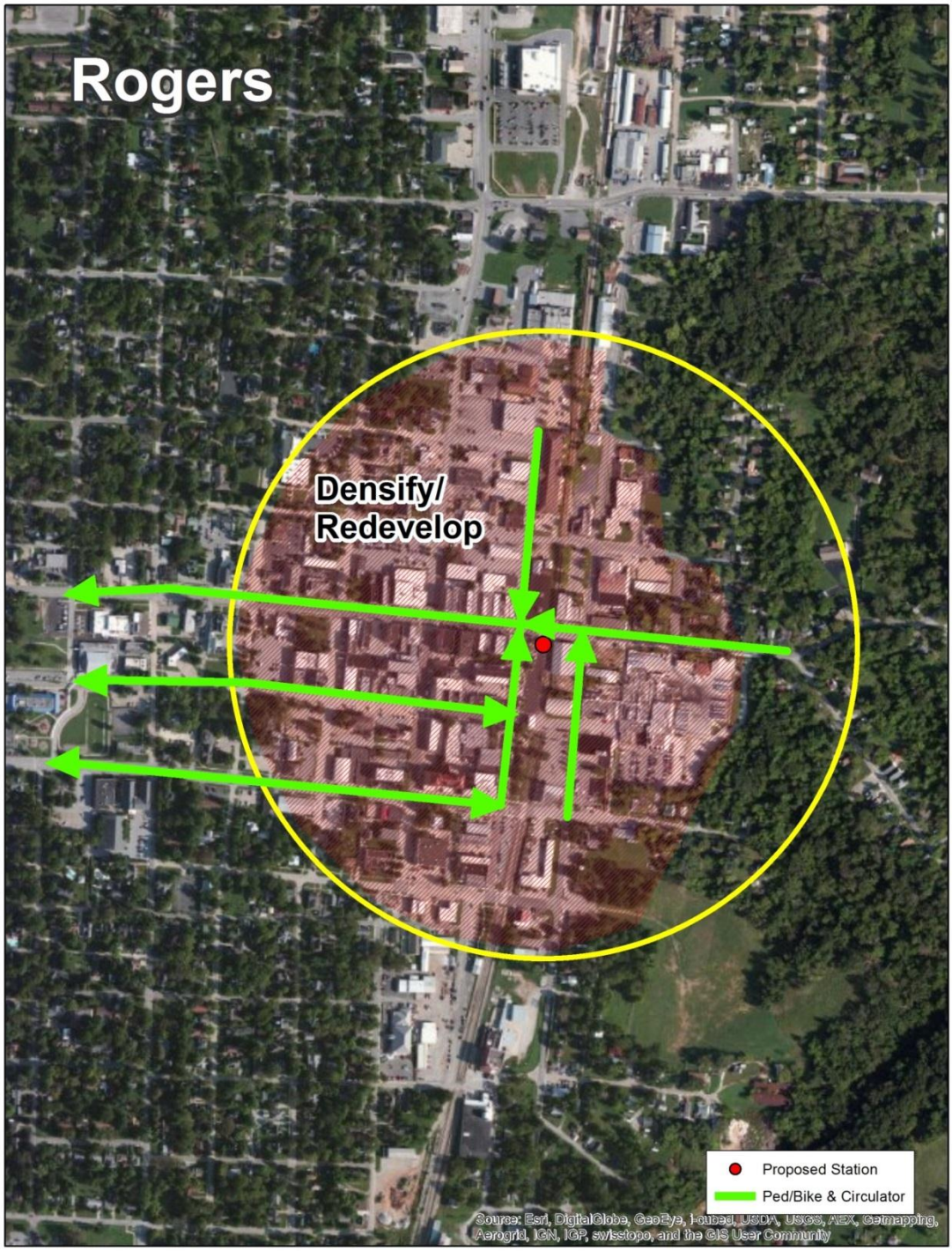


Figure 8-7
Bentonville Station Context

8.4 Implementation Toolkit

This section provides general information on the tools the local and regional government organizations can use to plan for high capacity transit service and complementary TOD. Regional and Comprehensive Plans, Zoning, Parking, and Station Area Funding and Development Incentives are covered.

Regional and Comprehensive Plans

One of the first steps in planning for high capacity regional transit is to integrate a strategic land use into the Regional Transportation Plan, and for local governments to integrate their Comprehensive Plans with the Regional Plan so that they are built on a similar set of transportation and land use policy assumptions. Through collaboration across the various local jurisdictions, the Regional Transportation Plan would reflect the common transportation and land use goals for the region. The local plans then align local land use policies, development priorities, and even zoning with the Regional Plan.

Good examples of this planning framework includes the Kansas City metro area's Smart Moves plan prepared by the Mid America Regional Council (MARC), and the Denver region's Metro Vision 2030 prepared by the Denver Regional Council of Governments. In general, these plans establish the planning framework for focusing growth around existing and planned transportation corridors, and on moving towards a more nodal and corridor oriented development pattern that can be served with regional transit.

Zoning

While zoning regulations alone cannot catalyze markets, they can shape where markets exist and are an important ingredient to creating transit supportive design. Transit-supportive zoning can accommodate complex projects and remove some of the uncertainty and costs otherwise borne by developers in areas where entitlements are not already in place. Typical TOD features such as zoning for a mix of land uses, higher densities and building heights, careful placement of parking, and a strong street wall can provide assurance to potential developers as to each city's vision for the future of the station area.

Specifically, new TOD and Mixed Use zoning standards should:

- **Encourage higher-intensity mixed land uses.** A mix of land uses—higher density residential, employment, basic goods and services, restaurants and retail—as well as careful attention to the public realm and the siting of buildings is essential to fostering a distinctive destination. A diverse use mix helps ensure activity beyond traditional business hours.
- **Utilize build-to lines, rather than setbacks.** Specifying build-to lines rather than minimum setbacks will assure consistent street walls throughout station areas. New and redeveloped buildings should generally be placed at the sidewalk to give streets and blocks a comfortable sense of enclosure.
- **Assure compact blocks.** Blocks within TOD areas should be no more than a five-minute walk around their perimeters (about 1,320 feet or one quarter-mile). This helps to promote a compact, walkable neighborhood with good interconnectedness and variety.
- **Carefully manage parking.** Parking should be on-street and/or at the center of blocks, using liner buildings to mask the lots or structures. When impossible to mask surface lot parking, lots should be behind or to the side of buildings to minimize disruption of the street wall.
- **Provide flexibility.** Each municipality's regulatory framework should be flexible enough to allow and encourage diverse and detailed architectural facades, preserve key views, allow engaging signage and sidewalk commerce, and provide attractive furnishings, colorful plantings, public art, and other points of detail.

Parking Management

Station area parking can be an issue in passenger rail station areas and TODs. Neighbors may be concerned about on-street and overflow parking impacts. Planners and developers are sometimes concerned about parking demands and potential or perceived conflicts with the station or development. The development of parking plans to serve the needs of both the transit station and the surrounding development should be handled in a carefully phased and coordinated manner.

Extensive research exists related to parking management practices in general and parking policies around TOD projects in particular. One of the most comprehensive summaries of parking management around TOD is contained in The New Transit Town: Best Practices in Transit- Oriented Development (Hank Dittmar & Gloria Ohland, Island Press 2004). That publication lists several suggested strategies for managing parking around TOD, including:

- Configure parking so it does not dominate the site by orienting parking away from pedestrian paths, behind buildings, or in structures or underground, which frees up developable land that might otherwise have been required for parking.
- Charge for parking where appropriate to encourage use of other modes and provide a revenue source.
- In urban markets, off-street parking can be reduced by up to 30 percent in TOD projects, but changes in parking requirements should be based on the specific needs of the local development.
- Protect neighborhoods by developing parking plans for those areas most affected by transit or TOD parking through the use of residential parking permits and time restrictions and development of overflow parking contingency plans during peak periods or special events.
- Utilize on-street parking to reduce off-street parking needs, provide short-term access local businesses, and provide traffic calming effects.
- Create parking districts in larger areas around TODs with municipal parking facilities funded by in-lieu fees and annual maintenance fees.

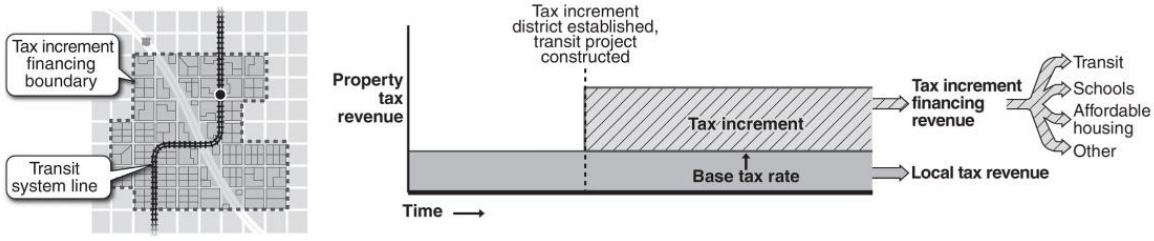
Another strategy not specifically mentioned in this publication but in many others is the use of shared parking with a transit facility. Many transit agencies work with local developers or municipalities to build a joint-use facility where a certain portion is devoted to free or paid transit parking and the remainder is available for commercial or residential purposes. In addition, these facilities can be focused on the specific temporal needs of each use; for example, in Broomfield, Colorado, the Regional Transportation District (RTD) built a shared-use parking facility next to a new events center that provides parking for transit patrons during weekdays but is available for paid parking for events center attendees at nights and on weekends.

Rail Project and Station Area Funding and Development Incentives

The Arkansas Legislature has enabled several financing tools that can be used by local governments to pay for infrastructure and revitalize downtowns and redevelopment districts. Many of these tools can be used for transit station area improvements and to incentivize or attract TOD and other new development or redevelopment, or to pay for portions of the transit project itself.

Redevelopment Districts and Tax Increment Financing

The Arkansas Constitution enables local governments to issue bonds or notes to finance improvements in a redevelopment district. The bonds will be paid back from the increased tax revenue generated as a result of the improvements. A redevelopment district must be in an area that is considered blighted, deteriorated, or underdeveloped. Tax increment financing or "TIF" captures the growth in assessed value and property tax revenue and uses this revenue to incentivize development or pay for amenities and other improvements such as streetscaping, utilities, road and circulation improvements, station area parking, and bicycle and pedestrian facilities. TIF is a widely used tool in TOD to pay for improvements needed to help establish a market and attract investment and development.



Tax increment is collected from properties within tax increment financing boundary and used to pay for redevelopment activities, including transit.

Improvement Districts

Arkansas Law also allows several types of improvement districts, which are real estate or land based funding and financing tools that use property tax levies to pay for a specific set of improvements. The property tax revenue can be used to pay the debt service on bonds, which allows improvements to be constructed earlier than with a pay-as-you-go approach. The districts that are most applicable to downtown, deteriorating commercial corridors, and TOD are summarized below.

- **Municipal Improvement District –** MIDs are authorized to levy property taxes to construct and maintain a wide range of public improvements and facilities including utilities, off-street parking facilities, sidewalks, benches, and recreational areas. Forming a MID requires a signed petition from a majority of property representing the majority of the assessed value in the proposed district.
- **Suburban Improvement District –** SIDs largely apply to unincorporated areas, although they can include a portion of a municipality. The types of improvements a SID is authorized to construct are more limited than a MID. SIDs are designed to fund and construct utilities, waterworks, streets, sidewalks, and similar

improvements, rather than broader public realm improvements such as recreation areas and parking facilities. A SID also requires a signed petition from a majority of property representing the majority of the assessed value in the proposed district.

Property Owner's Improvement District – Property owners can on their own form a district with a petition of 100 percent of the property owners in the district. Like a MID, POIDs are authorized to fund and construct a broad range of facilities including utilities, roads, sidewalks, recreation facilities, stadiums, clubhouses, auditoriums, parks, green belt areas, and "any other facilities to provide for the recreation and cultural needs of the owners of the lands within the district". This type of district could be used early in a development project to pay for neighborhood or community amenities, and would likely be established by the land development before land or buildings were sold to residents or commercial property owners, since it requires approval of 100 percent of property owners.

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Exhibit A

National Transit Database Summary Tables

Razorback Transit

Ozark Regional Transit