2011

# Northwest Arkansas Western Beltway Feasibility Study - Final Report

Prepared for: Northwest Arkansas Regional Planning Commission

Prepared by: Parsons Brinkerhoff, in cooperation with: Garver and Stantec

## TABLE OF CONTENTS

## TABLES



## FIGURES

## APPENDICES

Appendix I – Project Assumptions for Toll Road Analysis
Appendix II – Northwest Arkansas Traffic Volumes and Annual Growth Rates for North-South Highways
Appendix III – Operational Analysis of NWA's Major North-South Highways
Appendix IV – Summary of Toll Transactions and Toll Revenues

## INTRODUCTION - WHY WAS A STUDY FOR A WESTERN BELTWAY CONDUCTED?

The *2030 Northwest Arkansas Regional Transportation Plan* developed by the Northwest Arkansas Regional Planning Commission (NWARPC) in 2006 cites the need for a north-south transportation corridor as an alternative to continually adding lanes to Interstate 540 (I-540) which is becoming increasingly congested. The proposed beltway route would provide additional north-south capacity for motorists and address projected future traffic growth in Washington and Benton Counties. The 2030 Plan indicates an approximate location for the corridor. Sentiment expressed by city and county officials and the general public at public hearings for the *2030 Transportation Plan* favored the study of a north-south corridor as an alternative to the expense and disruption of expanding capacity on I-540. The proposed Western Beltway is a response to considerable population and employment growth in Northwest Arkansas (NWA) and expectations that robust growth will continue into the future.

Several transportation studies have been conducted in prior years to find options to satisfy transportation needs that will serve anticipated growth and support economic development expected in the region. *The Western Beltway Concept Development and Feasibility Study* was one such study that was funded by The Northwest Arkansas Council and completed in January 2008. The study concept focused on the development and preliminary toll feasibility of constructing a western beltway as a new north-south limited access toll road. The proposed Western Beltway would also serve as an alternative to widening I-540, which is an existing north-south transportation backbone of the region. It determined the extent of the proposed Western Beltway to satisfy the transportation needs in the region, identified potential fatal flaws, and estimated the potential toll revenue and preliminary cost to evaluate the feasibility of the proposed facility. The study also established the framework for future project development activities. Relevancies between the January 2008 study and the current study include; further examination of the proposed Western Beltway with new methodology and more detailed analysis on travel demand forecasting, traffic analysis, alternative evaluation, cost/benefit calculation and financial analysis. Based on the recommendations from the 2008 study, a maximum of two prudent and feasible corridors or new alignments as well as options for the southern connection with I-540 were developed.

## FUTURE TRANSPORTATION DEMAND AND ECONOMIC DEVELOPMENT

The business successes of major employers in Northwest Arkansas have largely driven recent population and economic growth in Benton and Washington Counties. Substantial population and employment growth is expected to continue despite the current economic slowdown, with population in the two-county area projected to increase by almost 300,000 (approximately 77 percent) between 2009 and 2030 (**Table 1**). Much of this new growth is anticipated to occur west of the I-540 corridor, because of limited land for expansion east of the corridor and minimal opportunities for infill development in currently developed areas. Improvements to the regional transportation network that will accommodate increased traffic are needed to address anticipated community growth and support future regional economic development.

**Table 1. Population Growth in Northwest Arkansas**

**Population Trends and Projections for Larger Cities in the NARTS Two-County Area**

| | NWA Population Trend | | | | | Population Projections | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
| Fayetteville | 42,099 | 50,073 | 58,047 | 67,545 | 73,580 | 81,450 | 89,321 | 97,191 | 105,061 | 112,931 |
| Springdale | 29,941 | 37,870 | 45,798 | 57,317 | 69,797 | 79,761 | 89,725 | 99,689 | 109,653 | 119,617 |
| Rogers | 24,692 | 31,761 | 38,829 | 47,165 | 55,964 | 63,782 | 71,600 | 79,418 | 87,236 | 95,054 |
| Bentonville | 11,257 | 15,494 | 19,730 | 27,465 | 35,301 | 41,312 | 47,323 | 53,334 | 59,345 | 65,356 |
| Bella Vista | 9,083 | 12,833 | 16,582 | 21,496 | 26,461 | 30,806 | 35,150 | 39,495 | 43,839 | 48,184 |
| Siloam Spri | 8,151 | 9,497 | 10,843 | 13,054 | 15,039 | 16,761 | 18,483 | 20,205 | 21,927 | 23,649 |
| Lowell | 1,224 | 3,119 | 5,013 | 6,254 | 7,327 | 8,853 | 10,379 | 11,904 | 13,430 | 14,956 |
| Centerton | 491 | 1,319 | 2,146 | 5,406 | 9,515 | 11,771 | 14,027 | 16,283 | 18,539 | 20,795 |
| Benton Cou | 97,499 | 125,453 | 153,406 | 186,598 | 221,339 | 252,299 | 283,259 | 314,219 | 345,179 | 376,139 |
| Washingto | 113,409 | 135,562 | 157,715 | 182,782 | 203,065 | 225,479 | 247,893 | 270,307 | 292,721 | 315,135 |
| Region | 210,908 | 261,015 | 311,121 | 369,380 | 424,404 | 477,778 | 531,152 | 584,526 | 637,900 | 691,274 |

Source: Figures from 1990 to 2000 are from the U.S. Census; Projections are based on Census figures and building permit trends compiled by NWARPC

## EXISTING CONDITIONS

### SUMMARY OF PREVIOUS STUDIES

Previous studies associated with this feasibility study were reviewed to determine identified Northwest Arkansas roadway deficiencies, motorist safety concerns, capacity and access issues, and recommended improvements. Previous studies that were reviewed include:

- 1990 US 71 Corridor Study

- US 71 Benton County, Arkansas and McDonald County, Missouri – Bella Vista to Pineville – Final Environmental Impact Statement, December 1999
- 2006 Arkansas State Highway and Transportation Department (AHTD) I-540 Improvement Study
- Springdale Northern Bypass (Highway 412) Environmental Studies
- Bella Vista Reports – August 2007
- Design Reassessment of Bella Vista-Pineville, MO Environmental Impact Statement Highway 71 in Benton County, Arkansas – June 2007 and November 2007
- Western Beltway Concept Development and Feasibility Study – January 2008

**1990 Corridor Study**

In response to Section 166 of the Federal-aid Highway Act of 1987, the Arkansas AHTD, and the Louisiana, Missouri and Texas Department's of Transportation cooperatively conducted a feasibility study for constructing a proposed north-south freeway that will traverse the states of Missouri, Arkansas, Texas and Louisiana, starting from Kansas City, Missouri to Shreveport, Louisiana. Two alternative routes for the proposed highway were identified and studied. The preferred route was selected based on the fact that it would maximize access to major employment, population, and activity centers. The study then evaluated the needs and advantages of providing full access control to the entire length of the proposed corridor. The cost for developing the route to AASHTO freeway standards was examined and compared with the current state fund situation. A cost-benefit analysis was also conducted for the preferred alternative.

The key findings of the study included the following:

- The preferred route, Alternative 1, was selected based on environmental constraints, costs, right-of-way acquisition issues, and effectiveness in serving the economic and regional needs.
- Constructing the route to full access-control freeway standards would positively impact transportation service and economic development.
- A cost-effectiveness analysis showed that the preferred route would provide nearly $154 million dollars annually in road user benefits resulting from decreased travel time and accident rate reduction. A benefit/cost ratio of 1.29 was derived when the road user benefit was compared to the construction costs.

- Other benefits of the proposed facility included complementing existing east-west Interstate routes and other modes of transportation, fostering land and economic development, increasing property values, improving access between rural areas and employment centers, and enhancing safety. The corridor was also supported by the Department of Defense because it would strengthen defense strategic mobility. Thirteen Department of Defense installations within a 50 mile range of the proposed freeway would benefit from improved access and reduction in response time.
- The cost for constructing the proposed freeway to appropriate American Association of State and Highway Transportation Officials (AASHTO) standards was approximately $1.7 billion. No major environmental or social impediments were identified along the proposed corridor.

Relevance of the *1990 Corridor Study* to the *Western Beltway Feasibility Study* is as follows:

- The study was the first to investigate the improvements for the Highway 71 Corridor in Arkansas.
- The concept and procedure to conduct the feasibility study can be applied in the *Western Beltway Feasibility Study*.
- The methodology used to conduct the cost-benefit analysis can be applied in the *Western Beltway Feasibility Study*. A benefit/cost ratio can also be derived when the road user benefit is compared to construction cost for the proposed Western Beltway.
- The study provided a general location for the future I-49 corridor through Arkansas.

**US 71 - Benton County, Arkansas and McDonald County, Missouri – Bella Vista to Pineville – Final Environmental Impact Statement, December 1999**

This Final Environmental Impact Study (FEIS) was prepared for the proposed improvements to US 71 from south of Bella Vista, Arkansas to near Pineville, Missouri. The report provided a summary of the alternative improvements that had been considered for US 71, the potential environmental impacts of these alternatives, and the identification of the Selected Alternative.

The key findings in the report included the following:

- The purpose of the US 71 Improvement project was to provide a safe, efficient, environmentally sound and cost-effective multi-state high-priority corridor with upgraded roadway design features, improved local access and increased roadway capacity that responds to the needs of the study area and the region.

- After preliminary screening, the "No-build" alternative and "Freeway-build" alternatives within "Far West Corridor", "Near West Corridor", and "Existing Corridor" were defined and evaluated. The interim improvements which represent a staging of the ultimate freeway improvements were developed for each alternative to address the short-term needs for safety and capacity improvements along the corridor. The total cumulative impacts of the combined interim and ultimate improvements were evaluated in this EIS.
- The Alternative evaluation used a "two-step" approach, which included determining the best alignment for each segment of the study corridor in "Phase I" and conducting the total-project evaluation in "Phase II" using the alternatives formed as the combination of the best alignment for each segment in "Phase I". In both steps, the evaluation factors included engineering, traffic, environmental and social issues.
- The Far West Alternative was selected as the preferred alternative based on three primary considerations – the effectiveness of the alternatives in accomplishing the goals of the proposed action (i.e. Purpose and Need), the comparison of the alternatives' overall impacts and benefits, and inputs from the public and review agencies, including comments from the public hearings.
- The public participation showed majority support in favor of the Far West Alternative.
- The resource agency comments requesting further clarification on secondary and cumulative impacts and impacts to cultural resources were addressed and clarified in the last section of the FEIS report.

Relevancies of the *US 71 AR and MO EIS* to the Western Beltway Feasibility Study are as follows:

- The traffic data along US 71 could be applied to the Western Beltway Study.
- The approach to develop "interim improvements" to address the short-term needs as a staging of the ultimate freeway improvements can be applied when the Western Beltway is built.
- The "two-step" approach used to select the best alternative alignment can be applied when defining the best alternative for the proposed Western Beltway.
- The same evaluation factors, including engineering, traffic, social and environmental issues, secondary and cumulative impacts, and cultural impact, are recommended for consideration when evaluating the best alternative for the proposed Western Beltway.
- The successful public/agency participation experience can be applied in the Western Beltway project.

**2006 AHTD Interstate 540 Improvement Study**

At the request of the Northwest Arkansas Regional Transportation Study (NARTS) Policy Committee, the Arkansas Highway Commission authorized a study to determine the need for and feasibility of improvements to I-540 and its interchanges within the NARTS area. The *I-540 Improvement Study* was prepared in 2006. The study examined the traffic and crash data on the freeway as well as nineteen interchanges and the cross-streets in the interchange vicinities, identified the deficiencies and needs of the existing facility to accommodate projected growth in 2024, and recommended short-term, interim and long-term improvements to relieve existing traffic congestion, provide increased capacity to handle future traffic growth, and enhance motorist safety. Preliminary planning-level cost estimates were also developed for the study.

The key findings of the study included the following:

- The population and traffic forecast for the northwest Arkansas region indicated the necessity for the improvement to both I-540 and its interchanges to avoid significant traffic congestion in the future.
- I-540 was recommended to be widened to six or eight lanes, depending on the location.
- Recommendations were made for 17 of the 19 interchanges examined. The extent of the improvements varied greatly from interchange to interchange. Short-term improvements, such as installing a traffic signal or adding a short auxiliary lane at a ramp terminal, are relatively minor and would help relieve traffic congestion in the near term. Long-term improvements, such as interchange reconfiguration, are those improvements necessary to relieve existing traffic congestion and accommodate projected 2024 traffic growth. Interim improvements are less extensive methods of extending the service life of an interchange and may be used to stage long-term improvements.
- Preliminary planning-level cost estimates developed for the recommended improvements included construction costs, a 15 percent allowance for engineering and other costs, and an allowance for utility relocations and right-of-way costs. The estimated total cost for widening I-540 was $85,700,000 and the estimated total cost for I-540 Interchange improvements was $191,190,000.
- Ninety-eight percent of the respondents at the study's public meetings supported the proposed improvements of the interchanges along I-540.

Relevance of the *I-540 Improvement Study* to the Western Beltway Feasibility Study is as follows:

- The new Western Beltway toll facility is an alternative north-south corridor proposed to relieve the severe congestion issue on I-540 in Benton and Washington Counties.
- The findings of the *Western Beltway Feasibility Study* can be used to evaluate the need to widen I-540 as recommended in the *I-540 Improvement Study*, which has a significant total estimated cost of nearly $300 million.
- The existing and future traffic analysis from the I-540 Improvement Study can be reviewed and considered in the Western Beltway Feasibility Study.
- Ability and efficiency to accommodate future traffic and population growth, potential environmental, social and economic impacts, cost effectiveness, and funding mechanisms can compared with the new Western Beltway proposal.
- A similar approach to develop interim phases as a way to stage a large-scale long-term project can be applied to the proposed Western Beltway.

**Springdale Northern Bypass (Highway 412) Environmental Studies**

The *Springdale Northern Bypass Environmental Studies*, provided the public with information regarding the proposed Springdale Northern Bypass (Highway 412) project, including the history of the project development, environmental documentation prepared by AHTD, as well as the current status and future steps for the project. The proposed bypass, from Highway 412 west of Tontitown to just west of Beaver Lake, was proposed to be a four-lane, divided and fully controlled access facility in Benton and Washington Counties in Arkansas.

The key information from the report includes the following:

- The proposed Springdale Bypass was developed during a Major Investment Study (MIS) in 1996 to evaluate various concepts to alleviate existing traffic congestion on Highway 412.
- The four location alignments were evaluated in the Draft Environmental Impact Statement (DEIS) completed in 2002. One additional alignment from the public hearing was evaluated in a Supplemental Draft Environmental Impact Statement (SDEIS).
- The FHWA and AHTD evaluated the alignments in the DEIS and SDEIS for social, economic and environmental impacts, traffic analysis, and conceptual design. Public comments from DEIS public hearings were also considered to select the preferred alignment for the Final Environmental Impact Statement (FEIS).

- An in-depth analysis of the preferred alignment was then conducted by AHTD in cooperation with the FHWA and the results of this analysis were documented in the FEIS issued October 6, 2005.
- The proposed bypass was approved by FHWA in 2006. Based upon consideration of all the social, economic and environmental evaluations contained in the DEIS, SDEIS, and FEIS, FHWA determined that the "Select Alignment Alternative" was the non-toll funding alternative - Alignment 5 Non-Toll Funding. This alternative was determined by the study to be the best solution for meeting the region's long-term transportation needs and for minimizing the environmental impact.
- Preliminary design was prepared for the entire length of the Selected Alignment Alternative. A design reassessment was to be prepared when revisions were developed between the proposed project as described in the FEIS, and the proposed project developed during preliminary design.
- Construction will begin after completion of the Cultural Resources survey, final design plan and right-of-way acquisition.

Relevance of the *Springdale Northern Bypass Environmental Studies* to the Western Beltway Feasibility Study is as follows:

- A similar environmental documentation preparation process will be applied if the Western Beltway Feasibility Study reveals that the proposed project is financially feasible.
- The project summary will reflect the scope, scale and schedule which might be anticipated if the Western Beltway project moves forward.
- Bypass locations identified in the study can provide locations for interchanges with as western beltway

**Bella Vista Toll and Traffic Reports – August 2007**

In 2007 per the request of AHTD, independent traffic and toll revenue estimates were conducted for the proposed US 71 Bypass around the City of Bella Vista located in northwest Arkansas. The study was updated during the summer of 2009. Both the *Draft* and the *Final Bella Vista Bypass Traffic and Revenue Reports* examined the potential impacts of factors that could influence the Bella Vista Bypass traffic and revenue estimates; collected and summarized data on traffic counts, speed and truck trips; analyzed the congestion on US 71; as well as other factors that were entered in to the traffic and toll revenue model to estimate the toll usage and

toll revenue for a 30 to 40 year time frame. Ultimately, sensitivity models runs were conducted using various key input parameters, including toll rates, value of time, and growth rate. The updated 2009 report utilized more detailed socioeconomic projections from Woods & Poole.

The important assumptions and findings of both reports can be concluded as follows:

- The toll rate, trip purpose and value of time for both passenger trips and truck trips were used to calculate a weighted average diversion curve, to show the relationship between time savings and the percentage of vehicles that will be diverted to the toll facility. The speed data indicated that the congestion on US 71 exists northbound in the AM and southbound in the PM in the City of Bella Vista and points south of the city. The ramp-up period for the Bypass will be approximately four years, with revenue estimates reduced by 45 percent, 30 percent, 15 percent, and 10 percent for the first four years, respectively.
- Assuming a mainline toll collection point, toll rate for passenger cars of $1.50 and correspondingly higher tolls for trucks, the base case estimated gross toll revenues prepared in 2009 were approximately 20 percent higher than the 2007 estimates.
- With the assumption that only vehicles with transponders will be allowed on the roadway when the Bypass operates as an electronic toll collection (ETC) facility, 35 percent of passenger vehicle trips and 50-60 percent truck trips were estimated to be made by vehicles equipped with appropriate electronic devices in the opening year of 2012. As a result, the base case traffic and revenue estimate in both the 2007 and 2009 reports indicated that revenue collected by an electronic toll collection facility would be much lower than the revenue collected by a full service toll facility. The difference would be reduced to approximately 36 percent of the revenue collected by a full service toll facility in a 30 year time frame.
- The sensitivity analysis indicated that the traffic and toll revenue estimates were more sensitive to toll rate changes than to changes in growth rate and value of time.

Prior to the studies in 2007 and 2009, two Bella Vista Bypass Toll Studies were performed in 2004 and 2006. The 2006 toll study was the update to the 2004 study, with the assumption that only the Arkansas portion of the bypass would be a toll facility. The study assessed the feasibility of implementing tolls on the US 71 Bella Vista Bypass project in Arkansas by comparing the estimated toll revenue with the project's construction and operations/maintenance cost. The financial analysis evaluated a "Net Pledge Option" with TIFIA

funding as well as two "Gross Pledge Options" illustrating project financing with and without a TIFIA loan.

The key findings of the 2006 report include the following:

- The estimated capital cost for the US 71 Bella Vista Bypass Project is approximately $211.6 million.
- The projected revenue is sufficient to fund the proposed debt service in each of the funding options.
- The Gross Pledge option with a TIFIA loan is the most efficient financing option for the project. It will fully fund the construction cost of the Project, even if it requires AHTD to fund the operations and management costs in the early years.

The *Design Reassessment of Bella Vista – Pineville, MO Environmental Impact Statement, Highway 71 in Benton County, Arkansas,* (Final EIS) was completed in June 2007 due to the changes in the 1998 Conceptual Design. The Final EIS summarized the conceptual design changes as well as the resulting changes to environmental impacts and cost estimates.

The following changes were anticipated:

- Due to the design modifications developed after the Final EIS, the impact totals for prime farmland will increase approximately 5 percent, farmland of statewide importance will increase about 8 percent, 11 more businesses or households will be relocated, and three archeological sites will be recommended for Phase II evaluation.
- The total estimated cost for the 2006 modified design is almost twice as much as the cost for the 1998 conceptual design. The main reasons for the increase in cost are increased construction cost since 1998, increased property values, and higher estimated right-of -way acquisition due to the design modification.
- The Final EIS also indicated that based on the 2006 study, the toll revenues would only cover the construction cost. AHTD will need to fund the roadway operation and maintenance. However, due to the difference of the estimated traffic diversion to the tolled Bypass, the estimates in 2009 are approximately 60 percent to 65 percent of the revenue estimated in the 2006 study.

Relevance of the three Bella Vista reports to the Western Beltway Feasibility Study is described below:

- The traffic data along US 71 could be applied to the Western Beltway study. The population and growth forecasting data in the Bella Vista reports can be used as a reference to understand the growth potential and travel demand in the pertinent locations of the proposed Western Beltway. The methodology used in the Bella Vista Bypass traffic and revenue estimates and sensitivity analysis can be adjusted, as necessary, and applied to the proposed Western Beltway feasibility study.
- The estimated toll revenues from Bella Vista Bypass can be compared to the estimated revenue generated from the proposed Western Beltway.
- The comparable financing options for Bella Vista Bypass can be applied and evaluated for the proposed Western Beltway.

**Design Reassessment of Bella Vista – Pineville, MO Environmental Impact Statement Highway 71 in Benton County, Arkansas – June 2007 and November 2007**

An application for the ARRA Discretionary Grant program was prepared for the proposed Highway 71- Bella Vista Bypass (the Bypass). The purpose of the application was to request $ 145.4 million TIGER grant fund to cover part of the construction cost and proposed innovative strategies. The proposed 18.9-mile Bypass project involves constructing a new, four-lane, interstate-type facility from the Highway 71/Highway 71B interchange south of Bella Vista, Arkansas to Highway 71 south of Pineville, Missouri. The grant application demonstrated the importance of the Bypass to the community as well as the Highway 71 and Future I-49 corridors. It also developed a thorough analysis of the expected benefits and costs associated with the proposed Bypass, and provided information about the project implementation plan, schedule and public involvement status.

The key information within the application included:

- The proposed Bella Vista Bypass is a critical link in Congressionally-designated High-Priority Corridor 1 and 72 (Future I-49). The project will greatly enhance the sustainability of the region's transportation system by improving safety and relieving congestion. The project will also improve the quality of life and community's economic competitiveness through environmental benefits, job creation, and commercial development along the entire corridor.
- The proposed Bypass project has been in the planning and development stages since 1991. With right-of-way acquisition and design activities substantially completed, the project will be ready once funding is received to complete the financing package. The

Missouri Department of Transportation (MoDOT) has committed sufficient funds for their portion of the Bypass. Full funding of this application for ARRA TIGER Discretionary Grant Program funds will supplement Federal-aid, state funds, and toll revenues for the Arkansas portion of the Bypass. This, combined with funding for the Missouri portion of the Bypass, will complete the financing package for this project and allow the tolled portion of the Bypass to be constructed using innovative practices, including Alternative Construction Methods (ACM), safety strategies, Intelligent Transportation Systems (ITS) and toll pricing incentives.

- AHTD will be the lead agency, supported by MoDOT, and partnering with many local, jurisdictions and businesses.
- In evaluation of the expected project outcome, the short-term outcomes with regards to safety improvements and congestion relief, as well as the long-term benefits including sustained employment opportunities, life-cycle cost, economic competitiveness, livability, and sustainability were considered.
- The Benefit Cost Analysis (BCA) compared the bypass as an interstate-type toll facility with the existing Highway 71. The analysis revealed a benefit cost ratio of 1.26 for the proposed Bypass. The total benefit of the bypass as a toll facility, when compared to the No-Build Alternative, would provide a cost savings of $108.1 million over the next 20 years for road users in the area.
- Upon notification of grant award by USDOT in January 2010, if the project receives the full funding, it was scheduled to be let to contract in July 2010 and the project is expected to be substantially completed and open to traffic by the late 2013. However, only $10 million was provided for the Bypass and on July 8th, 2011, a ground breaking ceremony was held for a short section of the route.

Relevancies of the *ARRA Application* to the Western Beltway Feasibility Study include the following:

- The assumptions and methodology to develop a complete cost revenue estimate for the proposed Bella Vista Bypass can be applied when developing the cost estimate for the proposed Western Beltway.
- The innovative strategies to be applied to the proposed Bella Vista Bypass can be considered for the proposed Western Beltway.
- The same factors can be considered when estimating the expected outcomes for the proposed Western Beltway project.

- A similar list of funding sources can be considered when developing the implementation plan for the proposed Western Beltway.
- The history of the Bella Vista Bypass project development can be used as a reference to develop a similar project schedule for the proposed Western Beltway.

**Western Beltway Concept Development and Feasibility Study – January 2008**

In order to satisfy the transportation needs to serve the anticipated growth and promote the economic development expected for the region, the Northwest Arkansas Council funded a concept development and preliminary toll feasibility study in 2008 for constructing a western beltway as a new north-south limited access toll road. The proposed Western Beltway would also serve as an alternative to improving I-540, an existing north-south transportation backbone for the region. The *Concept Development and Feasibility Study* determined the extent of the proposed roadway required to satisfy the transportation needs in the region, identified potential fatal flaws, and estimated the potential toll revenue and preliminary costs to evaluate the feasibility of the proposed facility. The study also established the framework for future project development activities.

The important assumptions and findings of the *2008 Western Beltway Concept Development and Feasibility Study* are listed below:

- Comments from public hearings during the development of the 2030 Transportation Plan showed general support of a new north-south corridor such as the Western Beltway as an alternative to widening I-540 from four to six lanes and ultimately eight lanes in the future.
- When forecasting the toll traffic and revenues, a toll diversion model was used, and three primary factors including travel time savings, value of travel time and toll rate were considered.
- Based on the net present value of the gross revenue derived from two different traffic growth scenarios, the moderate growth scenario produces approximately 35 percent less revenue than the high growth rate scenario, which reflected the sensitivity of the growth rate and the diversion of traffic from I-540 to the Western Beltway as I-540 begins to reach capacity.
- Based on the evaluation of the alternative corridors, Alternatives A and B were found to have minimal to moderate impacts to ecological resources, right-of-way acquisition and cultural resources. They also had the lowest project cost and highest bonding potential.

Alternative C was found to have major environmental impacts, while Alternative D did not meet the financial criteria.

- For Alternatives A and B, the estimated revenue could potentially cover about 16 to 69 percent of the project cost, considering moderate growth with the Western Beltway as two-lane toll facility and I-540 at six lanes versus high growth with the Western Beltway as a four-lane toll facility and I-540 at four lanes. The remaining 31 to 84 percent of the project cost would have to be funded from other sources. Therefore, the project cannot be funded solely using traditional revenue bond financing.
- The next steps of the project development include determining other funding options to complete the financial plan of the project, as well as a "two-phased" approach to develop the Western Beltway. Phase I would involve a system level Corridor Planning Study of the entire corridor, and Phase II would involve an EIS for the preferred alignment.

Relevancies of the *2008 Western Beltway Concept Development and Feasibility Study* to the current *Western Beltway Feasibility Study* are as follows:

- The current Western Beltway Feasibility Study will extend the preliminary concept that was developed in the 2008 study and will further examine the feasibility of the proposed Western Beltway with new methodology and more detailed analysis of travel demand forecasting, crash and traffic analysis, public perceptions, alternative evaluation, cost/benefit calculation, and financial analysis.
- The 2008 study will be used as a starting point for development of project alternatives in the current Western Beltway Feasibility Study. Based on the recommendations from the 2008 study, a maximum of two feasible corridors or new alignments as well as options for the southern connection with I-540 will be developed. A single conceptual alignment alternative will then be produced for each corridor to determine the impacts and costs of the facility.
- The environmental impacts of different alternatives in the 2008 study can be reviewed and applied when screening the fatal flaws for the alternative alignments in the current study.
- The traffic data used in the 2008 report can be adjusted, where appropriate, and applied to the current *Western Beltway Feasibility Study*. The methodology and assumptions for cost/benefit analysis in the 2008 report can be adjusted and applied*, where appropriate, to the curre*nt *Western Beltway Feasibility Study*. The estimated toll revenues and

project cost for the proposed Western Beltway in the 2008 report can be *compared to the toll revenue fore*cast and cost obtained from the current study.

- Potential funding sources that were identified or recommended in the 2008 report will be reviewed and included for discussion in the current study if feasible.
- The proposed project schedule and "two-phased" approach for the next-step project development can be re-assessed and applied to the current study, where appropriate.

## EXISTING TRAVEL CONDITIONS

The unique linear arrangement of cities in Northwest Arkansas produces travel patterns that are heavily concentrated on one freeway, I-540, and a limited number of north-south arterial routes to serve current and anticipated travel demand. Current conditions involving traffic growth, future demand and safety were examined to identify deficiencies and determine the need for a future beltway west of I-540 in Washington and Benton Counties.

Information on the 2009 existing conditions was provided in a database from the Northwest Arkansas Regional Planning Commission (NWARPC). Additionally, the NWARPC provided a population table and accident data. The 2010 average daily traffic data (ADT) as well as truck percentages were obtained from the AHTD. For the Northwest Arkansas Western Beltway Feasibility Study, the existing conditions on the following north/south corridors in Washington and Benton counties were considered:

- Interstate 540
- Highway 71/Highway 71B
- Highway 265
- Highway 112

## TRAFFIC DATA

Existing 2010 traffic data was used to determine if these facilities are sufficient for the existing and future traffic demand. The 2035 projected traffic volumes were used for the analysis. These volumes were based on an annual growth rate of population trends between 2010 and projected to 2035. For this study, the annual growth rate varied between Washington County and Benton County.

The population trends and projections for the larger cities in the NARTS two-county area are shown in Appendix II of this report. For Washington County, the population grew at an annual rate of 2.96 percent between 1990 and 2010 (**Table 2**). For Benton County, the growth was

even higher at 4.18 percent. This reflects the rapid growth in northwest Arkansas over the past decade which is being followed by stabilization in growth rates. Based on the 2035 population projections, the growth rate in Washington County is estimated to be 1.77 percent per year and the growth rate in Benton County is projected to be 2.14 percent. Using these values, the 2010 Average Daily Traffic (ADT) could be projected to 2035.

**Table 2. Northwest Arkansas City and County Population Trends and Projections**

| NWA Population Trend | | | | | | Population Projections | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| City/County | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 |
| Fayetteville | 42,099 | 50,073 | 58,047 | 67,545 | 73,580 | 81,450 | 89,321 | 97,191 | 105,061 | 112,931 |
| Springdale | 29,941 | 37,870 | 45,798 | 57,317 | 69,797 | 79,761 | 89,725 | 99,689 | 109,653 | 119,617 |
| Rogers | 24,692 | 31,761 | 38,829 | 47,165 | 55,964 | 63,782 | 71,600 | 79,418 | 87,236 | 95,054 |
| Bentonville | 11,257 | 15,494 | 19,730 | 27,465 | 35,301 | 41,312 | 47,323 | 53,334 | 59,345 | 65,356 |
| Bella Vista | 9,083 | 12,833 | 16,582 | 21,496 | 26,461 | 30,806 | 35,150 | 39,495 | 43,839 | 48,184 |
| Siloam Springs | 8,151 | 9,497 | 10,843 | 13,054 | 15,039 | 16,761 | 18,483 | 20,205 | 21,927 | 23,649 |
| Lowell | 1,224 | 3,119 | 5,013 | 6,254 | 7,327 | 8,853 | 10,379 | 11,904 | 13,430 | 14,956 |
| Centerton | 491 | 1,319 | 2,146 | 5,406 | 9,515 | 11,771 | 14,027 | 16,283 | 18,539 | 20,795 |
| Washington Co. | 113,409 | 135,562 | 157,715 | 182,782 | 203,065 | 225,479 | 247,893 | 270,307 | 292,721 | 315,135 |
| Benton County | 97,499 | 125,453 | 153,406 | 186,598 | 221,339 | 252,299 | 283,259 | 314,219 | 345,179 | 376,139 |
| Region | 210,908 | 261,015 | 311,121 | 369,380 | 424,404 | 477,778 | 531,152 | 584,526 | 637,900 | 691,274 |

**Source: Figures from 1990 to 2000 are from the U.S. Census; Projections are based on Census figures and building permit trends compiled by NWARPC**

The 2009 and 2010 existing traffic volumes, annual growth rates (AGR) used at each location and the projected 2035 traffic volumes are shown in Appendix II of this report**.** The 2009 information was included as a comparison for the operational analysis shown at the end of this section.

## ACCIDENT ANALYSIS

The NWARPC provided the most recent three-year crash data (2007 through 2009) for I-540, Highway 71/71B, Highway 112, and Highway 265. Each of these corridors was divided into segments for crash ratio analysis. Additionally, the severity of each crash was noted.

### Crash Ratios

Crash ratios describe the performance of a roadway section by comparing the crash rate to the average crash rate for the facility type. To calculate the crash rate for each segment, the three-

year accident data as well as annual average daily traffic were required. For the crash rates calculated in this analysis, an average one-year ADT was calculated from the 2007, 2008, and 2009 ADTs.

Crash rates for roadway segments are normally expressed in terms of crashes per million vehicle-miles of travel (MVM), using the following equation:

$$R_{sec} = A \times 10^6/(365 \times T \times V \times L)$$

**Where $R_{sec}$ = crash rate for the roadway section**
**A = number of reported crashes**
**T = time period of the analysis (yr)**
**V = annual average daily traffic volume (veh/day)**
**L = length of the segment (mi)**

Once the segment crash rate was known, this was compared to the AHTD crash rates per segment type to determine the crash ratio. The following equation is used to calculate the crash ratio:

**Crash Ratio = Segment Crash Rate/ AHTD Facility Crash Rate**

For the I-540 segments, two of the segments had a crash ratio greater than one as shown in **Table 3**. Crawford County Line to Exit 58 showed a crash rate much larger than the AHTD facility crash rate, and Exit 62 to Exit 67 showed a crash rate somewhat larger than the AHTD facility crash rate. For the Highway 71/Highway 71B segments, five of the segments had a crash ratio greater than one as shown in **Table 4**.

**Table 3. Crash Rations for I-540 Roadway Segments**

| Roadway Segment | Segment Classification | Segment Length | Crashes (3-Year Average) | ADT (3-Year Average) | Segment Crash Rate | AHTD Facility Type Crash Rate | Crash Ratio |
|---|---|---|---|---|---|---|---|
| 1 - Crawford County Line to W. Wilson St. (Exit 58) | Rural 4-Lane Divided | 17.3 | 79 | 19,500 | 0.64 | 0.38 | **1.69** |
| 2 - W. Wilson Street (Exit 58) to Highway 62/Highway 180 (Exit 62) | Urban 4-Lane Divided | 4.1 | 24 | 30,933 | 0.53 | 0.82 | **0.64** |
| 3 - Highway 62/Highway 180 (Exit 62) to Highway 71B (Exit 67) | Urban 4-Lane Divided | 5.5 | 135 | 64,525 | 1.05 | 0.82 | **1.28** |
| 4 - Highway 71B (Exit 67) to Elm Springs Rd. (Exit 73) | Urban 4-Lane Divided | 5.5 | 92 | 61,444 | 0.75 | 0.82 | 0.91 |
| 5 - Elm Springs Rd. (Exit 73) to Pleasant Grove Rd. (Exit 81) | Urban 4-Lane Divided | 7.8 | 106 | 64,044 | 0.58 | 0.82 | 0.71 |
| 6 - Pleasant Grove Rd. (Exit 81) to Highway 71B (Exit 86) | Urban 4-Lane Divided | 5.1 | 94 | 61,417 | 0.82 | 0.82 | 1.00 |
| 7 - Highway 71B (Exit 86) to Highway 71/Highway 72 (Exit 93) | Urban 4-Lane Divided | 6.2 | 40 | 35,733 | 0.50 | 0.82 | 0.61 |

**Table 4. Crash Ratios for Highway 71/71B Roadway Segments**

| Roadway Segment | Segment Classification | Segment Length | Crashes (3-Year Average) | ADT (3-Year Average) | Segment Crash Rate | AHTD Facility Type Crash Rate | Crash Ratio |
|---|---|---|---|---|---|---|---|
| **1 - Crawford County Line to Highway 156** | Rural 2-Lane Undivided | 15.0 | 15 | 2,350 | 1.17 | 1.15 | 1.01 |
| **2 - Highway 156 to Highway 71 Spur (South)** | Urban 4-Lane Undivided | 8.3 | 18 | 8,213 | 0.72 | 5.57 | 0.13 |
| **3 - Highway 71 Spur (South) to North Avenue** | Urban 4-Lane Undivided | 3.8 | 194 | 17,757 | 7.89 | 5.57 | 1.42 |
| **4 - North Avenue to Highway 71 Spur (North)** | Urban 4-Lane Undivided | 3.0 | 199 | 30,633 | 6.04 | 5.57 | 1.08 |
| **5 - Highway 71 Spur (North) to Highway 412** | Urban 4-Lane Undivided | 5.9 | 288 | 32,793 | 4.07 | 5.57 | 0.73 |
| **6 - Highway 412 to South of Highway 264** | Urban 4-Lane Undivided | 5.3 | 206 | 28,061 | 3.80 | 5.57 | 0.68 |
| **7 - South of Highway 264 to Highway 12** | Urban 4-Lane Undivided | 5.7 | 139 | 23,100 | 2.87 | 5.57 | 0.52 |
| **8 - Highway 62 to Highway 12** | Urban 4-Lane Undivided | 4.8 | 304 | 29708 | 5.90 | 5.57 | 1.06 |
| **9 - Highway 12 Split to I-540** | Urban 4-Lane Undivided | 6.2 | 194 | 24924 | 3.46 | 5.57 | 0.62 |
| **10 - I-540 to Missouri State Line** | Urban 4-Lane Undivided | 6.2 | 89 | 32150 | 1.23 | 0.82 | 1.50 |

For its facility type, Highway 112 had a crash rates significantly higher than the AHTD crash rates along most of the route. **Table 5** summarizes the results of the crash ratios. From Highway 180 to Garland Avenue, the crash rate was much larger than the AHTD facility crash

rate. This stretch of Highway 112 (also known as Razorback Road) goes through the University of Arkansas campus and is adjacent to Don W. Reynolds Razorback Stadium, Bud Walton Arena, John McDonnell Field, etc. The crash rates were somewhat increased over the AHTD facility crash rate from Garland Avenue to the Benton County Line.

**Table 5. Crash Ratios for Highway 112 Roadway Segment**

| Roadway Segment | Segment Classification | Segment Length | Crashes (3-Year Average) | ADT (3-Year Average | Segment Crash Rate | AHTD Facility Type Crash Rate | Crash Ratio |
|---|---|---|---|---|---|---|---|
| **1 - I-540 (South) to Highway 180** | Urban 4-Lane Undivided | 1.5 | 22 | 7,967 | 5.12 | 5.57 | 0.92 |
| **2 - Highway 180 to Garland Avenue** | Urban 2-Lane Undivided | 1.1 | 51 | 15,217 | 8.00 | 3.40 | 2.35 |
| **3 - Garland Avenue to Highway 16** | Urban 4-Lane Undivided | 0.6 | 28 | 14,850 | 8.57 | 5.57 | 1.54 |
| **4 - Highway 16 to Howard Nickell Rd.** | Urban 2-Lane Undivided | 3.5 | 74 | 10,950 | 5.24 | 3.40 | 1.54 |
| **5 - Howard Nickell Rd. to Benton County Line** | Rural 2-Lane Undivided | 7.4 | 28 | 5,818 | 1.79 | 1.15 | 1.56 |
| **6 - Benton County Line to Highway 12** | Urban 2-Lane Undivided | 9.4 | 24 | 5,324 | 1.30 | 3.40 | 0.38 |

As shown in **Table 6**, one of the roadway segments on Highway 265 had crash rates greater than the AHTD facility crash rates.

**Table 6. Crash Ratios for Highway 265 Roadway Segments**

| Roadway Segment | Segment Classification | Segment Length | Crashes (3-Year Average) | ADT (3-Year Average | Segment Crash Rate | AHTD Facility Type Crash Rate | Crash Ratio |
|---|---|---|---|---|---|---|---|
| **1 - South of SR 156 to I-540** | Rural 2-Lane Undivided | 10.2 | 7 | 2,333 | 0.77 | 1.15 | 0.67 |
| **2 - SR 16 to SR 45** | Urban 4-Lane Undivided | 2.6 | 63 | 20,044 | 3.36 | 5.57 | 0.60 |
| **3 - SR 45 to US 412** | Urban 2-Lane Undivided | 5.5 | 109 | 17,594 | 3.09 | 3.40 | 0.91 |
| **4 - US 412 to Huntsville Road** | Urban 4-Lane Undivided | 1.4 | 43 | 19,978 | 4.06 | 5.57 | 0.73 |

### Crash Severity

The severity of the crashes was also considered in the accident analysis. The total of crashes for all four corridors was 7,982 with 3.36 percent containing either serious injuries or fatalities. I-540 accounted for the highest percentage of severe and fatal crashes with 6.55 percent, which was more than twice as high as the other three corridors. This was likely due to the higher speeds along this corridor compared to the other corridors. Highway 71/71B had the most total accidents with 4,939 occurring during the three year period. However, only 2.49 percent of those accidents were severe or fatal.

## OPERATIONAL ANALYSIS

Basic freeway and highway level of service for the year 2009 were provided by the NWARPC for I-540, Highway 265, Highway 71/71B, and Highway 112. To determine if these facilities are sufficient for the projected traffic demand, an operational analysis for the years 2010 and 2035 was conducted. Level of Service (LOS) is a concept defined by the *Highway Capacity Manual (HCM)* to qualitatively describe operating conditions within a traffic stream. LOS is typically stratified into six categories (A through F). These range from LOS A as the highest quality to LOS F as a breakdown.

For basic freeway, multi-lane highway, and directional two-lane highway segments, the *HCM* uses density as the basis for determining LOS. Density is determined by the ratio of flow to speed and is measured in passenger cars per mile per lane. To determine LOS at each location along the corridors, the current version of the *Highway Capacity Software (HCS+)* was used. The software is capable of analyzing freeways, multi-lane unsignalized highways, and single-lane unsignalized highways. Sections were selected based upon available traffic volume data. Major assumptions include K=0.11, D=0.6, and BFFS of posted speed plus 10 mph.

Due to project scope and available data, the signalized analysis in HCS was not utilized. In order to properly evaluate the operations of the signalized sections of roadway at a generalized planning level, the analysis utilized tables from the *Quality/Level of Service Handbook* from the Florida Department of Transportation (FDOT). Sections including signals or signals within approximately two miles utilized this analysis. Density data was not available with this method. The tables do not include LOS A for any Class of roadway or LOS B for Class II and Class III roadways. It is assumed that for any signalized roadway it is impossible to achieve LOS A and very difficult to achieve LOS B.

The major finding of the operational analysis was that without additional north-south highway capacity improvements, almost all of the routes will experience major capacity problems leading to growing congestion that will produce longer commuter delays and impediments to commercial traffic serving the region. Specific operational analyses are presented in Appendix III.

## WHAT IS THE PURPOSE AND NEED FOR A WESTERN BELTWAY?

A proposed Western Beltway or major arterial highway will ultimately be needed to:

- Accommodate continuing population and employment growth and accompanying urban and rural development;
- Improve mobility on Northwest Arkansas's regional transportation network; and
- Provide the transportation infrastructure necessary to support future land use and economic development.

The purpose of the proposed Western Beltway is to provide:

- Additional regional transportation capacity to accommodate future travel demand resulting from population and employment growth and support anticipated economic development;
- A north-south transportation corridor as an alternative to I-540 to accommodate through traffic and increase regional mobility;
- Efficient and convenient access to employers, major medical facilities, emergency response vehicle destinations and the Northwest Arkansas Regional Airport (XNA);
- System connectivity among communities in the region and with other regions; and
- A possible urban boundary and/or corridor to help guide future community growth.

Providing an alternate north-south transportation corridor could delay or reduce the need to continually expand I-540, thereby reducing traffic impacts that would occur on that facility for the duration of construction. In addition, an alternate through-route for commercial truck traffic could be provided. I-49 could potentially be designated along the proposed Beltway or existing I-540. Improvement in the movement of through traffic, especially trucks, and the separation of local traffic from that same through traffic, along with reduction in I-540 congestion and traffic on north-south arterials, were noted by local community residents and leaders as important benefits to the region.

Finally, the proposed beltway corridor could also provide a possible boundary between urban and rural areas, serving as a buffer or boundary to help guide land use planning and development and assist planners and policymakers in containing urban sprawl, benefitting local communities' social, economic and natural environment. Establishment of a location for the Western Beltway would assist local communities in planning for future commercial, residential and industrial development, and taking measures to preserve a transportation corridor, potentially reducing the costs of future development. Determination of a corridor would also facilitate planning for other transportation improvements and infrastructure in the region.

## FUTURE LAND USE

If population growth over the next two decades continues at the same pace as previous growth, the expansion will result in an additional 267,000 people living in the region by 2025. If a typical occupation rate of 2.5 persons per dwelling unit is assumed, well over 100,000 new homes or apartments will have to be constructed within the twenty year forecast period along with commercial development and public facilities that will be needed to support them. While some developable land exists east of I-540, it can be anticipated that most of the new development will take place in the western regions of Washington and Benton Counties. Such development is already evident in the vicinity of XNA and northern areas of the region. As a consequence, corresponding traffic growth will require additional transportation infrastructure including a new north-south principal arterial highway.

## WHAT WERE PUBLIC REACTIONS ABOUT A WESTERN BELTWAY?

Public outreach has been a major endeavor of the *Northwestern Arkansas Western Beltway Feasibility Study.* A public meeting, web-based questionnaires, stakeholder interviews and meetings with Northwest Arkansas public officials have been conducted to gauge public perceptions about the need for a western beltway as well as perceived benefits and concerns.

### PUBLIC MEETING

A public meeting was held on September 16th, 2010 at the Arvest Ballpark in Springdale to obtain public input for the beltway feasibility study. Forty-two citizens attended the event to view displays showing the proposed corridors for the facility, information about environmental resources in the study area, discuss the project with the study's planners and engineers and fill out questionnaires to record their opinions about the project.

Almost all of the attendees said the beltway would be needed to serve future development, population growth, and north-south traffic, reduce I-540 congestion, facilitate through-traffic and trucks and help plan for future development. The meeting participants were concerned about the environment and natural resources, potential for the beltway to induce sprawl, potential to harm existing businesses, the need to raise taxes to pay for the beltway and potential for adverse effects to existing land uses. Most of the commenters said they thought drivers would be willing to pay tolls. Other responses noted on the questionnaires were that

the beltway would provide faster travel times and take car and truck traffic off of I-540. The meeting attendees stated that the beltway was a long range project and the establishment of a location would help officials plan for future development.

## COMMENTS FROM PUBLIC OFFICIALS

Public officials from Washington and Benton Counties were invited to a project briefing immediately prior the public meeting. After a brief presentation about the study purpose and process, the officials were requested to fill out a questionnaire similar to the one distributed to the public meeting attendees. Most of the officials responded that the beltway would ultimately be needed for traffic and population growth. They noted concerns about environmental harm, sprawl and adverse effects to farmlands and funding.

The officials were requested to rank a list of potential benefits for a western beltway. Their rankings are noted below:

1. Remove trucks and through-traffic from I-540
2. Relieve traffic along NWA's north-south arterial routes
3. Support economic development for NWA region
4. Improve connections between NWA cities and towns
5. Provide better regional access to XNA
6. Provide better access to job sites, major medical facilities and faster service for emergency response vehicles
7. Other – Economic development and improved safety

Ranking of public officials concerns:

1. Tolls may not cover costs and funding would compete with other NWA projects
2. Would draw customers away from existing businesses
3. Would produce environmental harm to the area
4. Would change the character of western region of NWA
5. Would compete with proposed transit solutions for NWA mobility
6. Would stimulate more growth in region
7. Other – Time to develop beltway – "need to speed it up"

## STAKEHOLDER INTERVIEWS

Stakeholders included mayors, environmental and economic interests, real estate developers, port and logistics management from Fort Smith, University of Arkansas, Ozark and Razorback Transit managers and XNA who may have in interest in a western beltway were interviewed regarding their perceptions of the proposed project. General comments from the interviews noted that a western beltway would help interregional commerce; access should be limited to minimize sprawl; the beltway would be inconsistent with Fayetteville's growth plans that emphasize less auto based travel; the project is long range but right of way should be preserved first; toll collection methods should be compatible with the Oklahoma Turnpike system; and two lanes of the beltway could be constructed initially and additional lanes could be added as traffic grows.

**Benefits noted by the stakeholders were:**

- Better access to XNA
- Not much benefit for Springdale
- Increased property values
- Benefits would be long range
- Relieve I-540 congestion
- Development opportunities in west
- "No benefit"
- Accommodate I-49 trucks
- Link NWA with Ft. Smith commerce
- Help airfreight at XNA
- Provide better access from north to I-40 and the Fort Smith port
- Would help local businesses-WalMart, Tyson, J.B. Hunt

**Stakeholder suggestions for funding possibilities:**

- Long-range project for Regional Mobility Authority
- Tolls, especially for trucks
- Public/private partnerships
- Preserve right of way first
- Project should not be funded
- Beltway should revert to state when bonds paid
- Regional economic interests may help support
- No new taxes to pay for it
- Sales tax

**Stakeholder's opinions about downside of beltway:**

- Would take traffic and business away from cities
- Would use resources needed for other projects
- Sprawl

- Harm to natural beauty and environment
- Promote continued reliance on cars
- "No downside"

## REPONSES TO WEBSITE QUESTIONNAIRE

A questionnaire was made available on the NWARPC's website to enable persons interested in the Western Beltway study to record their thoughts, opinions and preferences. Almost two hundred responses were received. Of the responses, 49 percent said the beltway was needed, 41 percent said it was not needed and 10 percent were not sure. Typical benefits noted were reduced congestion, help trucks and improve access to XNA. Concerns were sprawl, lost business and the competition for money needed for other transportation projects.

# WHAT HAVE THE ENVIRONMENTAL INVESTIGATIONS DETERMINED?

## CONSTRAINTS MAP

The process used to develop alternative corridors for the Western Beltway involved close collaboration among the project's environmental scientists and location engineers to identify and avoid sensitive environmental and economic resources. The environmental researchers examined web based data and previous environmental studies in the Washington and Benton county region to map sensitive locations that could be avoided by beltway alternatives. The map included the locations of historic sites and resources, existing and proposed schools, churches, cemeteries, hospitals, recreational trails, streams, lakes, flood plains, parks and recreation areas, national forests as well as previously identified locations of pervious Karst geology. The avoidance of highly porous Karst sub surface conditions is important in Northwest Arkansas because hazardous spills in these areas could lead to damage to habitats of known endangered species such as the Blind Cave Fish. The location engineers used the constraints map as a base for defining corridors for the beltway.

This collaborative process resulted in conceptual corridors for a Western Beltway that produce minimal environmental effects and minimize the potential for a fatal flaw associated with environmental harm.

# ENVIRONMENTAL EXAMINATIONS

## ANTICIPATED LAND USE AND DEVELOPMENT

### Predominant Land Use Patterns and Major Activity Centers

The Western Beltway corridor alternatives are proposed for rural unincorporated areas that are predominantly agricultural (mostly pasture), timber or undeveloped, or more sparsely developed areas of incorporated communities. Incorporated areas include the western regions of Fayetteville, Farmington, Tontitown, Highfill, and Centerton, but also include similar but smaller areas within Greenland and Bentonville. Corridor alternatives are also proposed within the planning areas of Bella Vista and Elm Springs, but do not encroach on their current corporate limits. Small unincorporated communities within the study area include Hiwasse, to the north; Healing Springs and Harmon, to the east central; Robinson, to the west; and Wedington Woods, Wheeler, and Savoy to the southwest.

Aerial photography, windshield surveys of the corridor, and existing land use maps indicate that the corridor is composed of mostly agricultural, undeveloped land, with scattered, large-lot residential uses. Although other land uses are present within the corridor, the area under study is largely undeveloped and these predominant open land and low density uses characterize the Beltway Corridor. Most of the project study area lies within the Illinois River watershed. According to the Arkansas Watershed Information System, 45 percent of the watershed was pastureland, 37 percent was forest, 13 percent was in urban use, and five percent comprised other land uses in 2006.[1] These percentages represent areas that extend beyond the corridor study area, but generally illustrate the land use types that are characteristic of the region.

The primary major activity center in the corridor study area is the Northwest Arkansas Regional Airport (XNA) in Highfill. Downtown Farmington also is located within the corridor study area. Major activity centers lying outside the corridor study area in other communities would be linked to the proposed Beltway via major arterial highways, including US 62/SH 45 (Fayetteville/University of Arkansas), SH 16 (Fayetteville), US 412 (Springdale), and SH 102 (Bentonville).

A number of public uses, including institutional and utility uses, are notable features of the corridor environment and would need to be considered for potential impacts from any proposed Beltway facility. These include at least two facilities of the University of Arkansas Agricultural Experiment Station in Washington County: the Savoy Research and Extension

[1] Arkansas Watershed Information System, Arkansas Automated Reporting and Mapping System, Center for Advanced Spatial Technology, University of Arkansas, Fayetteville.

Complex and the Physiology Farm in the Farmington area. The Experiment Station is a research facility for basic and applied agricultural sciences.

In addition to XNA, facilities in Benton County include a water treatment plant operated by the Northwest Arkansas Conservation Authority (NACA) and located south of Highfill near the county line. Another facility in Benton County, located along the western edge of the corridor also near the county line, is the Osage Creek Amphitheater, an outdoor live entertainment venue.

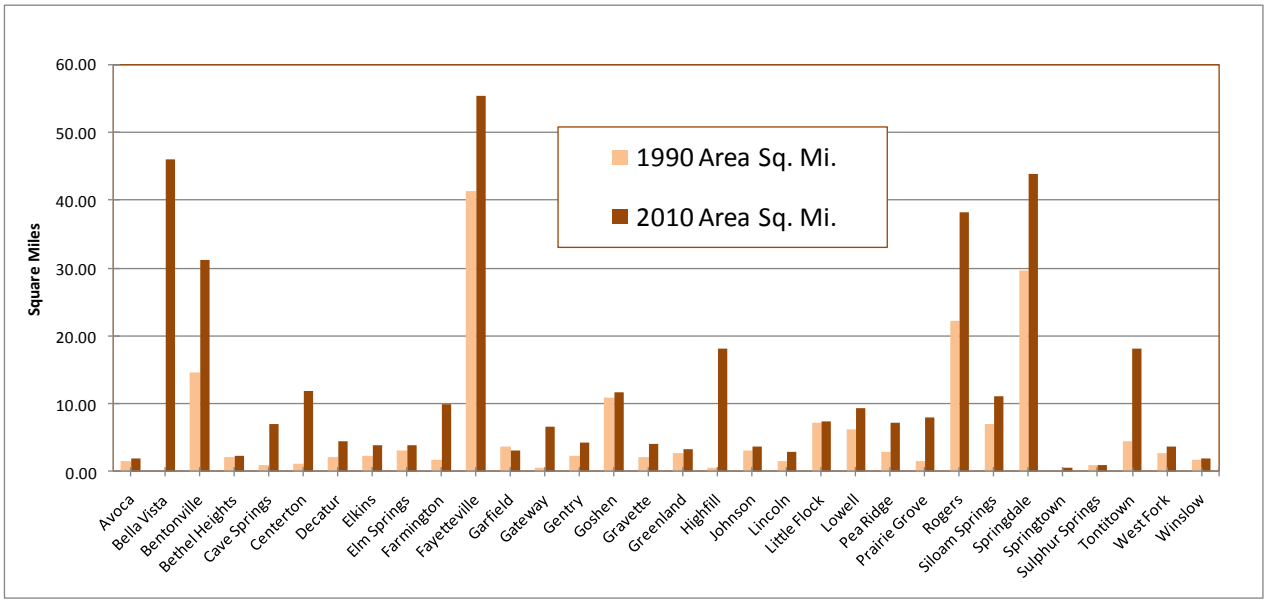
Three contiguous areas of the Ozark National Forest are located in the corridor vicinity near the Benton-Washington county line, with a much larger contiguous area lying farther west. The national forest is a federal multi-use, multi-purpose property. A western alternative would directly affect national forest lands; the other alternative would not.

Within Fayetteville, the West Side Wastewater Treatment Plant lies near proposed alternatives, as does Williams Elementary School in Farmington. Several city parks are also located nearby and are discussed in another section of this report.

Land Use Plans and Prospects

Although many local land use plans do not currently account for the future existence of the proposed Western Beltway within their jurisdictions, trends of recent decades have indicated community growth and land development westward from the I-540 corridor. The municipalities of Farmington, Fayetteville, Highfill, Centerton, and Tontitown have all annexed land to the west of their former corporate limits, expanding considerably over the last 20 years (**Figure 1**). The largest cities in the area (Bentonville, Fayetteville, Rogers and Springdale) typically had the largest annexations—an average of 15.2 square miles (sq. mi.) between 1990 and 2010, much of it to the west of their previous limits; however, the small town of Highfill annexed 17.6 sq. mi.—including the area of XNA—the largest of any local community, making the town over 36 times larger (3,581 percent) in area than it was in 1990. Other small corridor communities also annexed relatively large areas, including: Centerton, 10.9 sq. mi. (1,025 percent); Tontitown, 13.6 sq. mi. (304 percent); and Farmington, 8.2 sq. mi. (475 percent). Other communities also made large annexations in proportion to their size, both west of the corridor—Prairie Grove, 6.5 sq. mi. (433 percent), and also east—Cave Springs, 6.2 sq. mi. (715 percent). No comparison is available for Bella Vista since it was not incorporated in 1990, but the community is currently the second largest city in area in the region (46 sq. mi.), trailing only Fayetteville (55 sq. mi.).

**Figure 1. Change in City Area in Square Miles from 1990 to 2010**




Source: Northwest Arkansas Regional Planning Commission, 2011

Although existing land use in the Beltway corridor is comprised largely of uses typical of rural areas and small towns (such as agricultural and low-density, single-family residential uses), many Beltway communities are planning for considerable growth and development. Benton County drafted a land use and development plan in 2011, but to date it has not been officially adopted. Washington County's future land use plan—a compilation of municipal land use plans within the cities' respective planning areas—generally proposes rural and agricultural uses in the unincorporated areas of the county. Most unincorporated areas of Washington County within the corridor are zoned for agricultural or low-density single-family residential use, except for scattered properties with conditional use permits.

Centerton's future land use plan shows a concentration of industrial, commercial, high and medium density residential, and mixed uses where the corridor intersects Arkansas Highway 102 generally within the city limits. Most of the remainder of the corridor within Centerton's planning area, especially outside city limits, is planned for agricultural use, with pockets of low-density and medium-density residential use. The Beltway Corridor also crosses the alignment of a proposed east-west electrical transmission line corridor through the Centerton area, generally south and parallel to Arkansas 102. Preliminary plans indicate a likely interchange with the proposed Beltway at Arkansas 102. The types of proposed land uses are consistent with access to a major new-location, limited-access highway. The highway interchange footprint would be likely to alter the currently envisioned layout of uses, pushing and expanding development and possible redevelopment outward from the interchange location.

Only the extreme southwestern reaches of Bentonville enter the proposed Corridor area. The nearest designated land uses in the City's future land use plan are agricultural, although an area of commercial, office, industrial and mixed uses are planned a short distance to the east.

Most of Highfill remains largely agricultural and undeveloped. Land use is dominated by the Northwest Arkansas Regional Airport. Highfill's future land use plan indicates considerable commercial and industrial development. The greater part of this future development is mapped for the west side of the airport, in the vicinity of the Beltway corridor. A few airport-associated uses already exist and would be expected to multiply with the presence of the Beltway, especially since preliminary plans indicate an interchange would be located in the community on Arkansas 264. Completion of the XNA Access Road would also facilitate future development in the community's planning area.

The Tontitown planning area comprises mostly residential uses, especially within city limits, plus agricultural uses in the western and southern parts of the planning area, and commercial uses along the US 412 corridor within the city. Future land use plans for the unincorporated portions of the planning area call for agricultural or single-family residential uses. US 412 would remain the major commercial corridor. Preliminary plans propose an interchange in the Tontitown area, either with US 412 or the proposed Springdale Northern Bypass.

The beltway corridor through Farmington comprises properties currently zoned primarily for residential and agricultural uses, with commercial uses along US 62. The future land use plan designates agricultural use outside city limits to the west. However, the proposed alternatives would lie within the city's corporate limits. Planned industrial uses within city limits would be consistent with the proposed corridor alternatives.

Overall, much of the study area is undeveloped and lies outside of incorporated municipalities, and often outside of the communities' planning areas. Property surrounding this new location facility's proposed highway interchanges would provide land development opportunities. These properties are likely to attract commercial development, contributing to the local tax base and generating jobs for the region. The revenue from highway-induced development can, in turn, help to fund further infrastructure improvements and maintenance. In addition, other reasonably foreseeable projects would be likely to have a substantial impact on land development. The effects of these projects in combination with the proposed Beltway project would be considered "cumulative impacts". Such projects include the following:

- Springdale Northern Bypass: This bypass is proposed to be a four-lane, divided, fully controlled access (Interstate type) facility constructed on new alignment with interchanges at selected locations. It would include two 12-foot travel lanes in each direction separated by a variable width median. The Selected Alignment Alternative

begins at an interchange with existing Highway 412 west of Tontitown where the highway presently changes from four to five lanes and will end with an interchange on existing Highway 412 just west of Beaver Lake. Communities in and around the study area include Springdale, Tontitown, Elm Springs, Bethel Heights, Lowell, Sonora, Rogers, Bentonville, Fayetteville, and Cave Springs. Highway 412 is part of a congressionally designated High Priority Corridor (HPC) running east and west across northern Arkansas.

- Bella Vista Bypass (I-49): The Bella Vista Bypass will connect Arkansas and Missouri with an interstate highway that will eventually be part of I-49. The proposed bypass is about 20 miles, extending from US 71 just south of Bella Vista to US 71 near Pineville, Missouri. Arkansas' portion is approximately 15 miles in length, while the Missouri section will be about 5 miles. The bypass will be constructed as a four-lane, divided, interstate type facility west of existing Highway 71 from Bella Vista, Arkansas, to Pineville, Missouri. The ROW acquisition is essentially complete.

- XNA Access Road: The XNA Access Road will be a new location facility running generally northwest to southeast. It will connect XNA in Highfill to the Springdale Northern Bypass.

- I-540 Improvements: The Interstate 540 Improvement Study made recommendations to increase the number of lanes for most of the I-540 corridor and recommended short-term, mid-term and long-term solutions for interchanges. Increased mobility and changes in access to a major facility such as I-540 will likely result in development or redevelopment in affected areas. However, the I-540 improvements would not have effects as obvious and clearly attributable to the facility as the planned new location facilities described above. New location roadways in undeveloped or underdeveloped areas will have much more dynamic impacts on land development than improvements to existing facilities in corridors already developed or partly developed.

Growth and Development Trends

Driving the expansion of local communities in the region and associated land development is substantial recent and anticipated future population growth. **Figure 2** illustrates population growth in the Northwest Arkansas region from 2000 to 2010. During this period, population in the region grew by over 113,000, or 36 percent, from over 311,000 to more than 424,000.

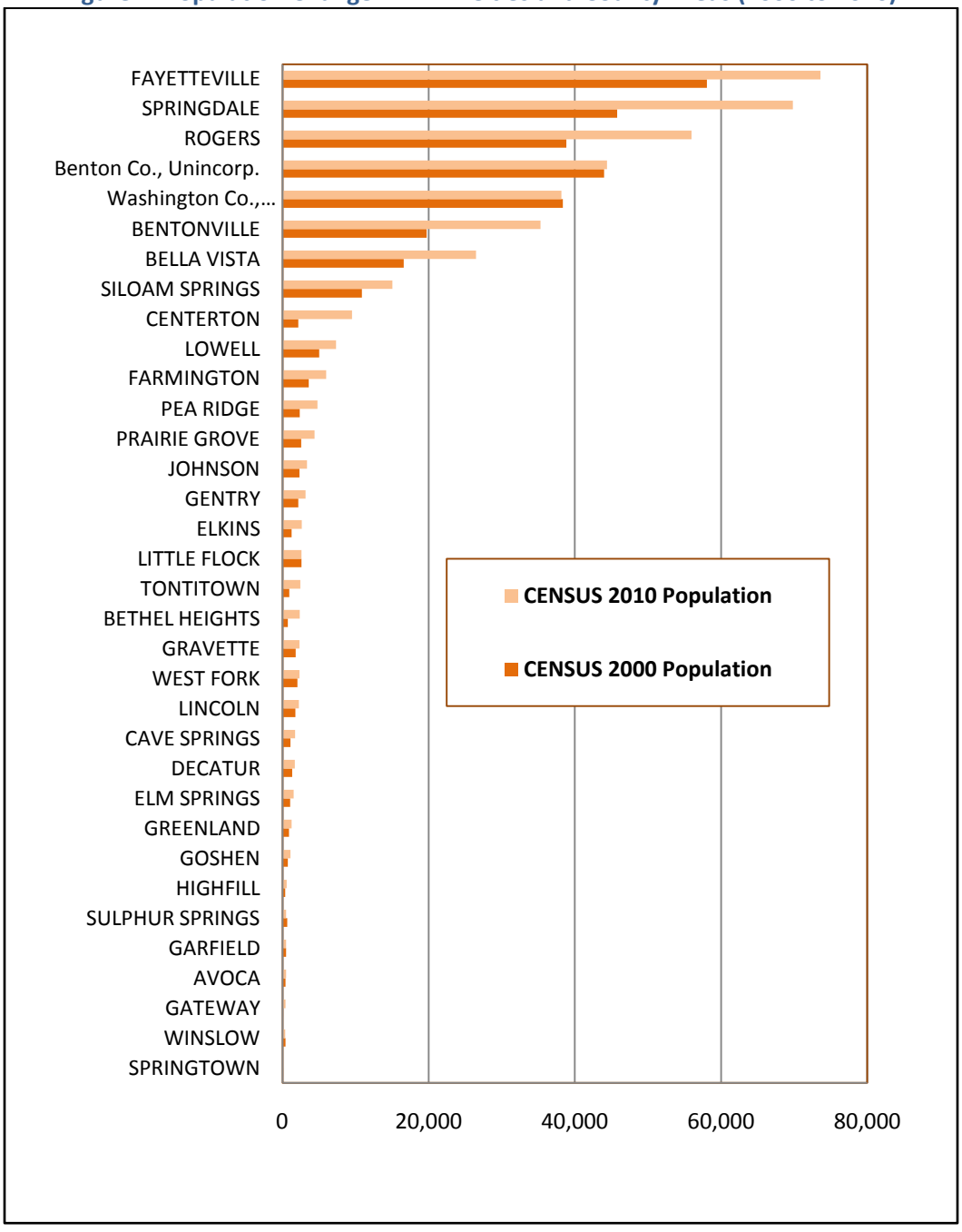
Substantial population growth had occurred in the previous decade, as well, increasing by approximately 100,000, or 48 percent. The two-county region's population is projected to grow to approximately 650,000 by 2020, an increase of approximately 226,500 (35 percent), and to nearly 708,000 by 2035, an increase of over 283,000 (40 percent).

Other indicators of area growth include employment, building permits, etc. Growth trends have been disrupted by the recession and subsequent slow economic growth since 2007, but

demonstrate long-term trends that have fueled development in the Beltway corridor. Regional employment[2] grew by approximately 49,000 from 2000 to 2007, or 28 percent (**Figure 3**), from an estimated 171,675 to 220,525. The blue line in the graph represents the number of persons in the area that were able to work in 2009. The redline shows the number who were currently employed. Employment held steady in 2008 but declined by approximately 7,000 (3 percent) to an estimated 213,725 by 2009. Assuming the impacts of fluctuations in the national economy will balance out over time, employment is projected to increase in coming years. Projections for the Northwest Arkansas Workforce Investment Area[3] developed by the Arkansas Department of Workforce Services show employment in the region growing by approximately 35 percent from 2006 to 2016—an increase of over 96,000 workers during the ten-year projection period.

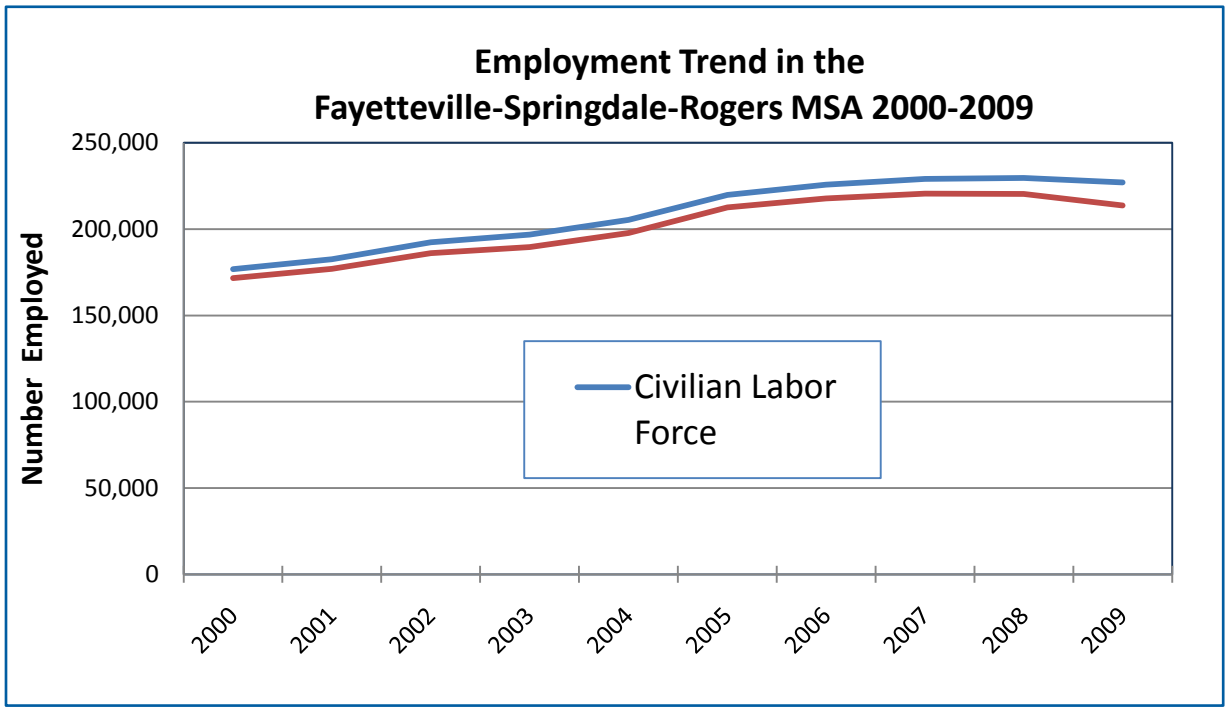
[2] Region defined as the Fayetteville-Springdale-Rogers Metropolitan Statistical Area (MSA), which includes Madison County, Arkansas, and McDonald County, Missouri, in addition to Benton and Washington Counties.
[3] Baxter, Benton, Boone, Carroll, Madison, Marion, Newton, Searcy and Washington Counties

**Figure 2. Population Change in NWA Cities and County Areas (2000 to 2010)**




Source: US Census Bureau, 2011

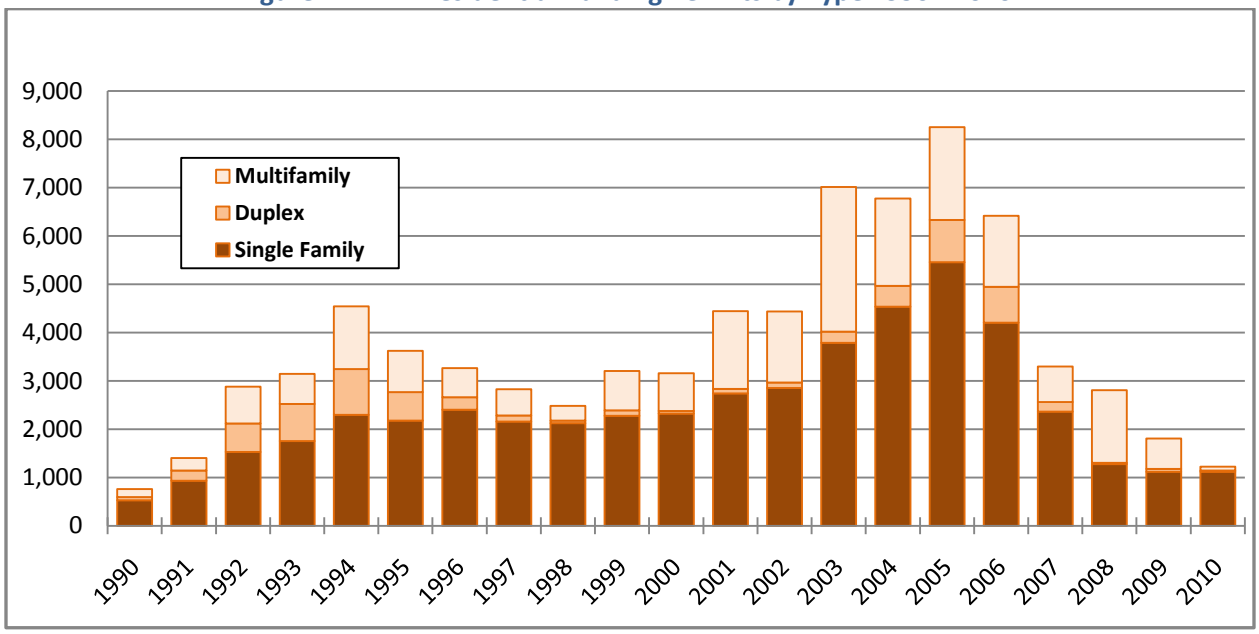
Figure 3. Employment Trends (2000 – 2009)




Source: Arkansas Department of Workforce Services, 2011

A measure of growth in land development is issuance of residential building permits. **Figure 4** shows residential building permit activity from 1990 through 2010, with building permits during that time totaling 71,965. Permit activity peaked in the mid-2000s (with more than 8,000 permits issued in 2005) but has slowed considerably during the national economic downturn.

**Figure 4. NWA Residential Building Permits by Type 1990 - 2010**




Source: Northwest Arkansas Regional Planning Commission, 2011

In summary, growth trends and projections indicate that land development and the growth of the region's communities into the Beltway corridor is likely to occur regardless of whether or not a Beltway highway facility is built. Although a new location highway facility would likely induce land development in the Beltway corridor, the more pertinent effects on land use and development would be how such a facility would influence the location and intensity of development in the corridor and adjoining communities. Commercial and industrial development would be attracted to areas in proximity to interchanges of the Beltway with major arterial highways. Residential development would be attracted to areas farther away but remaining within reasonable distances of those interchanges to provide efficient access for area residents and commuters. A Beltway could also have the effect of representing a development boundary, with areas between the existing urban land uses of the corridor communities and the Beltway location potentially being the preferred location for residential and commercial development. Areas to the west of the corridor could be considered less preferable because of the greater distance from the region's urban centers and less convenient access to the activities and amenities of those communities.

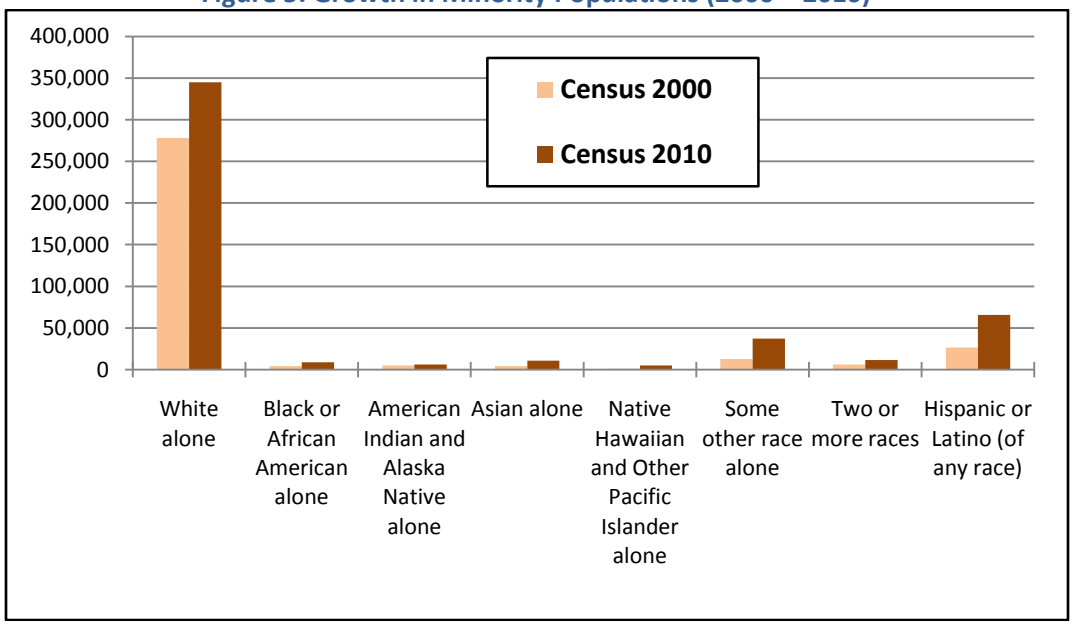
Another implication of projected future population growth and land development is that, as communities continue to grow and expand into the Western Beltway, opportunities for development of a linear transportation facility with minimal impacts on existing land use will diminish. As development continues, the potential for a highway facility to cause significant impacts to the social and built environment increases. Population growth in the western

regions of Washington and Belton counties can produce greater potential for residential and commercial displacement and relocation, noise impacts, and impacts on community facilities, community and neighborhood cohesion, and environmental justice.

## SOCIOECONOMIC CHARACTERISTICS AND ENVIRONMENTAL JUSTICE

Executive Order (EO) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Any transportation project that receives federal funding or requires federal authorization would be subject to EO 12898. Federal guidelines define minority populations as Hispanic or Latino, Black or African-American, American Indian and Alaska Native, Asian and Native Hawaiian or other Pacific Islander. Low-income populations are generally defined as persons living in households with incomes below the federal poverty level. **Figure 5** illustrates the growth in these populations in the Benton-Washington County region.

**Figure 5. Growth in Minority Populations (2000 – 2010)**




Source: US Census Bureau, 2011

Examination of 2010 Census data indicates that lower percentages of minorities reside in census tracts encompassing the Beltway Corridor than in larger surrounding jurisdictions, i.e. Benton County, Washington County, or the two-county Northwest Arkansas region. **Table 7** provides this comparison for each racial/ethnic category. The corridor is predominantly White non-Hispanic—approximately 85 percent, compared to 75 percent for the two-county region.

Hispanic or Latino residents represent a considerably lower percentage of corridor population (6.7 percent) than in the regional population (15.5 percent). Percentages of racial minorities in the corridor are low and generally comparable to percentages for each county and the region.

A more detailed analysis would be required during the National Environmental Policy Act (NEPA) process to identify any neighborhoods or pockets of minority populations that may be located within the corridor census tracts. Examination of individual census tract data shows that the corridor census tracts in Benton County have higher percentages of Hispanic or Latino residents than the total corridor—7.4 to 9.5 percent compared to 6.7 percent for the corridor—as do two census tracts in Washington County representing north Farmington, Fayetteville, Wedington Woods and Wheeler—7.3 to 8 percent. The percentages for these five census tracts represent approximately 2,660 Hispanics/Latinos. Those same two Washington County tracts also have somewhat higher percentages of Black or African-American residents—3.7 to 5.7 percent (approximately 700 people)—than in the total corridor (1.7 percent). The American Indian/Alaskan Native percentages are somewhat higher than the corridor average (1.9 percent) in the Benton County census tracts (2.5 to 3.6 percent) and in the Washington County tract representing the western, rural part of the corridor (2.7 percent), accounting for approximately 700 people. Asians reside in higher percentages in the southernmost Benton County census tract (3.6 percent) and the Washington County tract in the western, rural area (3.4 percent)—representing approximately 475 people. Asians comprise 1.8 percent of the total corridor population.

**Table 7. Corridor and Regional Population by Race and Ethnicity**

| Race/Ethnicity[1] | Corridor Census Tracts[2] | % | Benton County | % | Washington County | % | Both Counties | % |
|---|---|---|---|---|---|---|---|---|
| **White Non-Hispanic** | 49,084 | 85.2 | 169,605 | 76.6 | 150,546 | 74.1 | 320,151 | 75.4 |
| **Hispanic or Latino** | 3,835 | 6.7 | 34,283 | 15.5 | 31,458 | 15.5 | 65,741 | 15.5 |
| **Black or African-American** | 981 | 1.7 | 2,647 | 1.2 | 5,828 | 2.9 | 8,475 | 2.0 |
| **American Indian and Alaska Native** | 1,075 | 1.9 | 3,440 | 1.6 | 2,154 | 1.1 | 5,594 | 1.3 |
| **Asian** | 1,065 | 1.8 | 6,245 | 2.8 | 4,372 | 2.2 | 10,617 | 2.5 |
| **Native Hawaiian/Other Pacific Islander** | 50 | 0.1 | 634 | 0.3 | 4,100 | 2.0 | 4,734 | 1.1 |
| **Some other race** | 27 | 0.05 | 224 | 0.1 | 227 | 0.1 | 451 | 0.1 |
| **Two or more races** | 1,472 | 2.6 | 4,261 | 1.9 | 4,380 | 2.2 | 8,641 | 2.0 |
| **Total Population** | 57,589 | 100 | 221,339 | 100 | 203,065 | 100 | 424,404 | 100 |

Source: US Census Bureau, 2010 Census, Summary File 1, 2011

[1] Hispanic or Latino persons may be of any race; consequently, race categories (Black or African-American, Asian, etc.) exclude Hispanics or Latinos.

[2] 2010 Benton County Census Tracts 209.02, 213.01, 213.05; Washington County Census Tracts 105.01, 105.04, 105.06, 105.08, 110.01, 110.03

**Table 8** shows that poverty rates for census tracts encompassed by the Beltway Corridor[4] are generally comparable to the poverty rate for the entire Northwest Arkansas two-county region and substantially lower than the poverty rate for Washington County. Corridor census tracts with somewhat higher poverty rates than the total corridor (12.1 percent) represent areas of the corridor in: southern Benton County (15 percent); western, rural Washington County (15.4 percent); and the Wedington Woods, Wheeler, Fayetteville area in Washington County (19.7 percent).

**Table 8. Corridor and Regional Low-Income Population**

| Household Income Status | Total Corridor Census Tracts | Benton County | Washington County | Both Counties |
|---|---|---|---|---|
| **Below Poverty Level** | 12.1% | 11.2% | 16.4% | 13.7% |
| **At or Above Poverty Level** | 87.9% | 88.8% | 83.6% | 86.3% |

Source: US Census Bureau, 2005-2009 American Community Survey, 2011

Overall, the potential for impacts to environmental justice from the proposed Beltway is relatively low, based on the relatively low percentages of minority and low-income populations in the corridor. The NEPA evaluation would require a more extensive analysis of the likely actual impact of design alternatives. The NEPA process would determine if a proposed alternative would likely cause disproportionately high and adverse effects on minority and/or low-income populations. Such impacts could include displacement/relocation, noise, aesthetics, community cohesion, air quality, access and other possible effects. Benefits to population groups resulting from construction and operation of a Beltway would also be considered in evaluating impacts.

Farmington would be the incorporated community that would most likely need to address potential issues of community cohesion. Various proposed Beltway alternatives are routed through the city, although the most densely settled areas are avoided to minimize impact. Most other incorporated cities and towns affected are either on the edge of the Beltway corridor (Centerton, Bentonville, Tontitown, Fayetteville, and Greenland), or feature large undeveloped areas through which the proposed alternatives are routed (Highfill), and therefore would be less susceptible to impacts on community cohesion. A number of small, unincorporated communities would be susceptible to disruptions resulting from potential residential displacements, noise impacts, barrier impacts (access, sense of community, aesthetics), redevelopment, etc. The minimal size and scale of these communities make them particularly susceptible. These communities may include: Hiwasse, in the northern part of the

[4] 2000 Benton County Census Tracts 209, 213.01, 213.02; Washington County Census Tracts 105.01, 105.04, 105.06, 105.08, 110.01, 110.03

corridor in Benton County; Robinson, along the westernmost alternative in Benton County; and Harmon, Wedington Woods, Wheeler, and Savoy in Washington County.

## AIR QUALITY

The Beltway study area lies entirely within a region that is currently in attainment of National Ambient Air Quality Standards. However, as acknowledged in the following passage from the Regional Transportation Plan, growth in traffic and the development of transportation infrastructure to accommodate have implications for future regional air quality:

> Studies have shown that adding lanes or adding more roadways to a transportation system can increase the number of vehicles on the roadway, a phenomenon called induced traffic. This increased vehicular traffic directly increases contamination levels in the air from fuel emissions. Although Northwest Arkansas is an air-quality attainment area now, increased traffic congestion could change this status within the twenty-five year planning horizon (*2035 Northwest Arkansas Regional Transportation Plan*, III-17).

In addition, the 2035 Regional Transportation Plan recognizes the potential for indirect environmental impacts in stating that "the requisite roadways that come with new development on the fringe of a community create increased vehicular traffic that diminishes air quality." However, the air quality impacts of additional vehicular traffic generated by development near a proposed Beltway facility would have to be measured against the potential benefits of reducing future congestion on I-540 and other existing routes by providing a new north-south roadway alternative. Continued population and employment growth and the accompanying development and traffic growth could threaten the region's air quality attainment status. Transportation alternatives, such as the Beltway will need to be considered, weighing the potential impacts and benefits to regional air quality.

## POTENTIAL FOR NOISE IMPACTS

Impacts from traffic noise primarily affect a class of defined sensitive receivers, which include residences, schools, libraries, hospitals, places of worship, and other similar land uses. In the Beltway Corridor, the main concern with noise impacts would be centered in residential communities that lie in close proximity to the proposed Beltway alternatives and feature some of these uses. Communities near elevated interchanges or roadway sections could potentially suffer greater noise impacts than at-grade sections.

On-site windshield surveys and review of aerial photography indicates that the greatest areas of concern for potential impacts to existing sensitive receivers would be in those parts of the corridor that pass through Farmington, Fayetteville and Tontitown, as well as in the small unincorporated communities of Savoy, Wedington Woods, Wheeler, Harmon and Robinson. As

noted previously, continuing growth in the region's population and accompanying land development will likely result in greater constraints on planning roadway alignments that avoid noise impacts to residential communities. Current federal noise guidelines require that planned land uses be considered, as well as existing uses, when evaluating noise impacts from transportation facilities.

## VISUAL QUALITY AND AESTEHTEICS

Areas most likely to be sensitive to visual impacts would probably be in the Farmington and Fayetteville area. In this part of the corridor, mountainous terrain creates vistas that may be rated as high quality visual resources by residents and visitors. Overpasses and interchanges where the Beltway facility would intersect arterial roadways could intrude on these vistas and result in adverse visual impacts. Locations along Arkansas Highway 45/62 in Farmington and Fayetteville were noted during windshield surveys in 2011 as having views of mountain landscapes.

## ECOSYSTEMS

The project study area spans the boundary of two ecoregions—the Ozark Highlands in the north and the Boston Mountains in the south. The area within the Ozark Highlands where the study area is located is the Springfield Plateau, which lies over highly soluble, fractured limestone and dolomite. The plateau is highly dissected, partly forested, with numerous karst features.

Caves and sinkholes are common in the Ozark Highlands with considerable underground drainage greatly influencing surface water availability and water temperature. Also common are clear, cold, perennial, spring-fed streams, typically with gravelly substrates, in addition to many small dry valleys. The region is characterized by considerable habitat diversity and numerous species.

Natural vegetation in the Ozark Highlands is mostly oak-hickory forest, with open forest dominating rugged areas and pastureland and hay What land common in nearly level areas. Shortleaf pine may be found on steep, cherty escarpments and on shallow sandstone-based soils. Glades in which grass and eastern red cedar are dominant may be found on shallow, droughty soils, especially over dolomite.

Forests are widespread in the Boston Mountains, with northern red oak, southern red oak, white oak, and hickories usually dominant in the uplands, and shortleaf pine growing over sandstone on drier, south-facing and west-facing slopes. Pastureland or hayland is common on nearly level ridge tops, benches, and valley floors.

The water quality of streams in the Boston Mountain region is generally exceptional, supporting fish communities that are mostly composed of sensitive species. These tend to be diverse, often darter-dominated communities alongside nearly equal proportions of minnows and sunfishes. Summer flow in many small streams is limited or non-existent but isolated, enduring pools are known to occur.

Natural communities in Benton County listed as "special elements" by the Arkansas Natural Heritage Commission include cave streams, Ozark prairies and woodlands, and Ozark Mountain springs. In Washington County, Ozark-Ouachita dry oak woodland natural communities are listed as a special element.

Eleven animal species and one plant species are on the combined lists of threatened or endangered species for Benton and Washington Counties (10 in Benton County and 10 in Washington County) designated by the US Fish and Wildlife Service. These include candidate or recovering species. Six of these species are also listed as threatened or endangered by the State of Arkansas. Potential effects on these species or their habitats from the proposed project would be of primary concern in assessing ecological effects (**Table 9**).

Plant species listed in Benton or Washington County as threatened or endangered by the Arkansas Natural Heritage Commission include a caric sedge (*Carex opaca*), open-ground whitlow-grass (*Draba aprica*), small-headed pipewort (*Eriocaulon koernickianum*), forked wood aster (*Eurybia furcata*), ovate-leaved catchfly (*Silene ovata*), and royal catchfly (*Silene regia*).

In addition to threatened and endangered species, several other wildlife species have been identified by the Arkansas Game and Fish Commission for conservation purposes in the Ozark Highlands and Boston Mountains ecoregions and within habitat potentially found in the project study area. Among these, some of the mammals include the American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), eastern small-footed bat (*Myotis leibii*), long-tailed weasel (*Mustela frenata*), Ozark pocket gopher (*Geomys bursarius ozarkensis*), plains harvest mouse (*Reithodontomys montanus*), and Seminole bat (*Sorex longirostris*).

**Table 9. Threatened and Endangered Species in Benton and Washington Counties**

| Group | Name | Federal Status | County | State Listed |
|---|---|---|---|---|
| **Birds** | Arctic peregrine falcon (*Falco peregrinus tundrius*) | Recovery | Benton, Washington | No |
| **Birds** | Bald eagle (*Haliaeetus leucocephalus*) | Recovery | Benton | Yes |
| **Clams** | Neosho mucket (*Lampsilis rafinesqueana*) | Candidate | Benton, Washington | No |
| **Clams** | Rabbitsfoot (*Quadrula cylindrica cylindrica*) | Candidate | Benton, Washington | No |
| **Crustaceans** | Cave crayfish (*Cambarus aculabrum*) | Endangered | Benton, Washington | Yes |
| **Fishes** | Arkansas darter (*Etheostoma cragini*) | Candidate | Benton, Washington | No |
| **Fishes** | Ozark cavefish (*Amblyopsis rosae*) | Threatened | Benton | Yes |
| **Mammals** | Florida panther (*Puma (=Felis) concolor coryi*) | Endangered | Washington | No |
| **Mammals** | Gray bat (*Myotis grisescens*) | Endangered | Benton, Washington | Yes |
| **Mammals** | Indiana bat (*Myotis sodalis*) | Endangered | Benton, Washington | Yes |
| **Mammals** | Ozark big-eared bat (*Corynorhinus (=Plecotus) townsendii ingens*) | Endangered | Benton, Washington | Yes |
| **Flowering Plants** | Missouri bladderpod (*Physaria filiformis*) | Threatened | Washington | No |

Sources: US Fish and Wildlife Service; Arkansas Game and Fish Commission; Arkansas Natural Heritage Commission, 2011

Birds include Bell's vireo (*Vireo bellii*), Bewick's wren (*Thryomanes bewickii*), the blue-winged warbler (*Vermivora pinus*), cerulean warbler (*Dendroica cerulea*), chimney swift (*Chaetura pelagic*), chuck-will's-widow (*Caprimulgus carolinensis*), eastern towhee (*Pipilo erythrophthalmus*), grasshopper sparrow (*Ammodramus savannarum*), hooded warbler (*Wilsonia citrina*), Kentucky warbler (*Opofornis formosus*), lesser yellowlegs (*Tringa flavipes*), northern bobwhite (*Colinus virginianus*), pied-billed grebe (*Podilymbus podiceps*), prairie warbler (*Dendroica discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), ruffed grouse (*Bonasa umbellus*), rusty blackbird (*Euphagus carolinus*), short-billed dowitcher (*Limnodromus griseus*), solitary sandpiper (*Tringa solitaria*), Swainson's warbler (*Limnothlypis swainsonii*), western sandpiper (*Calidris mauri*), whip-poor-will (*Caprimulgus vociferus*), Wilson's phalarope (*Phalaropus tricolor*), wood thrush (*Hylocichla mustelina*), worm-eating warbler (*Helmitheros vermivorus*), and yellow warbler (*Dendroica petechia*).

Some reptile species include the ornate box tortoise (*Terrapene ornate ornate*), Graham's crayfish snake (*Regina grahamii*), queen snake (*Regina septemvittata*), western diamondback rattlesnake (*Crotalus atrox*), and southern prairie skink (*Eumeces obtusirostris*). Amphibians include the wood frog (*Rana sylvatica*), eastern tiger salamander (*Ambystoma tigrinum tigrinum*), grotto salamander (*Eurycea spelaea*), Hurter's spadefoot (*Scaphiopus hurterii*), and ringed salamander (*Ambystoma annulatum*). Among fishes, the Ozark chub (*Erimystax harryi*), bluntface shiner (*Cyprinella camura*), southern cavefish (*Typhlichthys subterraneus*), and several species of darter are included. Also included are several crayfish, mussel, insect and other invertebrate species, including several cave- and karst-dwelling invertebrates.

It should also be noted that the Fayetteville Natural Heritage Association has ranked two potential conservation areas in the Beltway Corridor. These areas are south of US 62 in Fayetteville where an interchange is proposed for one of the Beltway alternatives.

## WATER RESOURCES

The Ozark Highlands feature numerous caves and sinkholes, along with clear, cold, perennial, spring-fed streams. Underground drainage heavily influences surface water availability and temperature. In the Boston Mountains, stream water quality is generally exceptional. Biochemical, nutrient, and mineral water quality parameter concentrations all tend to be very low. During low flows, streams in the region usually run clear. Summer flow in many small streams is limited or non-existent but isolated, enduring pools may occur.

Wetlands occur in all of the major geomorphic classes, but the limestone geology of the region creates unique wetland environments associated with springs, seeps, and sinkholes where the calcareous substrate and high-pH waters support unusual plant and animal communities. Reservoir construction and agricultural practices have altered or eliminated many wetlands in the region.

The study area lies over the Ozark aquifer and the Springfield Plateau aquifer, which are part of the Ozark Plateaus aquifer system. Most of the study area lies within the Illinois River watershed, which is part of the Arkansas River basin. A relatively minor area in the Greenland vicinity lies within the Buffalo Reservoir watershed (part of the White River basin). The proposed corridor[s] cross the following streams:

- Brush Creek
- Cato Springs Branch
- Clear Creek
- Farmington Branch
- Goose Creek
- Hamestring Creek
- Hickory Creek

- Lick Branch
- Osage Creek
- Owl Creek
- Spavinaw Creek
- Spring Branch
- Spring Creek
- Wildcat Creek

Two of these streams, Clear Creek and Osage Creek, are listed as impaired waters under Section 303(d) of the Clean Water Act. In addition, the proposed Beltway alternatives lie within five miles upstream of other 303(d) impaired waters, including the Illinois River. These are waters that would be sensitive to potential water quality impacts from a new location highway facility and related development and for which impacts on stormwater runoff would need to be evaluated in the NEPA process.

Because of the numerous stream crossings along the proposed Beltway alternatives, the proposed project would be subject to US Army Corps of Engineers permitting requirements under Section 404 and Section 401 of the Clean Water Act. The proposed project would also cross other unnamed tributary creeks and springs. Depending on the extent of potential impacts from a proposed project design, an alternative may qualify for a nationwide permit or may otherwise need an individual permit issued by the Corps.

The proposed project corridors would cross 13 one-percent (100-year) floodplains designated by the Federal Emergency Management Agency (FEMA). These floodplains are associated with the above listed streams, except for Cato Springs Branch. In these areas, facility design would need to accommodate occasional inundation by floodwaters and coordination with local floodplain management administrators would be required.

## HISTORIC AND ARCHEOLOGICAL RESOURCES

Historic and archaeological resources were identified in accordance with Section 106 of the National Historic Preservation Act and the Arkansas Historic Preservation Program. Existing historic properties inventories, including the National Register of Historic Places (NRHP) and the Arkansas Register of Historic Places (ARHP), were reviewed and listed National Register and Arkansas Register sites in Benton and Washington counties were identified and mapped. Listed or eligible properties that lie within 1,500 feet of the project corridor[s] are described below.

NRHP Sites

- Walnut Grove Presbyterian Church, Arkansas Highway 170, Farmington: This building was added to the NRHP in 1995. Built in 1903, it is considered architecturally significant, representing Romanesque / Late Gothic Revival architectural style and the 1900-1924 period.
- Johnson Barn, Cato Spring Road (north of Round Top Mountain), Fayetteville: This barn, built in 1933, was designed by the Johnson Brothers using the best design features of other local barns. It was listed on the NRHP in 1990.
- Mack Morton Barn, 11516 Appleby Road, Appleby (south of Farmington): This structure is an eleven-sided barn built circa 1900 and listed on the NRHP in 2005.

ARHP Sites

- Douglas Cemetery, Douglas Cemetery Road, Highfill: The cemetery was added to the ARHP in 2002, and is located approximately ½ mile north of Arkansas 264 (Healing Springs Road) and one mile west of Northwest Arkansas Regional Airport. It was a burial place from 1858 to 1952 and is associated with the early settlement of the Highfill community.
- Thornsberry Church, northwest of County Roads 66 and 88, Tontitown: This church building was listed on the ARHP in 1996. It is a single-story, one-room, wood-frame structure resting on a continuous fieldstone foundation, built in 1894.

This is not an exhaustive list of all properties eligible or potentially eligible for listing on the NRHP or the ARHP, but are known resources that have been identified in the vicinity of the proposed Beltway alternatives and officially listed on the national and state registers. A historical resource survey conducted by a professional historian would be necessary to determine potential impacts on significant cultural resources during the NEPA process for any proposed facilities with federal authorization. These properties would also be subject to Section 4(f) of the Department of Transportation Act for any projects involving the US DOT (FHWA, etc.). Other potential Section 4(f) properties are discussed in the section that follows.

The locations of known archeological sites are kept confidential to prevent unauthorized excavation and looting of undiscovered or uncollected artifacts from the sites. Information on known site locations may only be released to authorized professional archeologists and such actions must be conducted in compliance with applicable provisions of the National Historic Preservation Act and the Arkansas Antiquity Act. The Arkansas State Archeologist, Arkansas Historic Preservation Program, and Arkansas Archeological Survey have the primary roles and responsibilities for supporting and overseeing archeological studies for public infrastructure projects in Arkansas.

## PARKLANDS AND SECTION 4(F) PROPERTIES

Parklands, national forests, and other public lands can be important community and regional resources. For that reason they must be considered when a proposed transportation project reaches the NEPA process. It is prudent to identify their presence in proximity to a proposed project in anticipation of potential impacts assessed during NEPA evaluation.

Publicly-owned public parks, recreation areas, and wildlife refuges are also subject to Section 4(f) of the Department of Transportation Act of 1966 (49 USC §303). Significant historical sites, public or private (as described in the preceding section), are also subject to Section 4(f). Section 4(f) grants special protection to these resources. Historic sites are protected under Section 4(f) if they are listed on or determined eligible for inclusion on the National Register of Historic Places (NRHP). Archeological sites are protected only if (1) they are listed or eligible for the NRHP and (2) contain resources that warrant preservation in place. Within NRHP listed or eligible historic districts, Section 4(f) applies to the use of those properties that are considered contributing to the eligibility of the historic district, as well as any individually eligible property within the district. Generally, properties within the bounds of a historic district are assumed to contribute, unless it is otherwise stated or they are determined not to contribute.

The US Secretary of Transportation may approve a US DOT project or program that "uses" a Section 4(f) resource only if the Secretary makes the following findings:

- There is no feasible and prudent alternative to the use of the Section 4(f) resources; and
- The project includes all possible planning to minimize harm to the Section 4(f) resource resulting from the use.

In general, a Section 4(f) "use" occurs with a transportation project or a program when:

- Section 4(f) land is permanently incorporated into a transportation facility;
- There is a temporary occupancy of Section 4(f) land that is adverse to the protected activities, features, or attributes that qualify the resource for protection under Section 4(f); or
- Land from a Section 4(f) resource is not incorporated into the project but the proximity effects of the project or program are so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired, which is considered a "constructive use".

An alternative is not considered to be prudent if it does not meet the project need, or if it involves truly unusual factors, unique problems, or environmental impacts, cost or community disruption reaching an extraordinary magnitude. An alternative is not considered to be feasible if it cannot be constructed in accordance with sound engineering practices.

Section 4(f) resources and national forest lands were identified along the entire Western Beltway Corridor through review of available GIS mapping and databases and secondary data source review. National forest lands are multiple use resources administered by the US Forest Service that are not considered Section 4(f) properties unless specific areas within them have been designated for park use, recreation, wildlife conservation, or include an NRHP-eligible resource. Ozark National Forest management includes specific policies to facilitate these types of resource uses.

Three contiguous areas of the Ozark National Forest are located in the corridor vicinity near the Benton-Washington county line, with a much larger contiguous area lying farther west. One alternative would directly affect national forest lands; the other alternative would not. The US Forest Service's 2005 Revised Forest Land and Resource Management Plan designates areas for recreation, wilderness, wildlife habitat, recreational trail corridors, and wild and scenic rivers. Some of these areas are or could be subject to Section 4(f). Further correspondence with the Forest Service may be necessary to determine if areas of the Ozark National Forest in proximity to the project corridor qualify for protection as Section 4(f) resources, and if these areas would be affected by a proposed alternative.

The Logan Cave National Wildlife Refuge (NWR) is located approximately two miles west of the alternative corridor. It is a 123-acre refuge administered by the US Fish and Wildlife Service featuring a limestone-solution cave. The primary objectives of this refuge are to properly administer, preserve, and develop the tract for protection of a unique cave ecosystem, which provides essential habitat for the endangered gray bat, endangered Ozark cave crayfish, threatened Ozark cavefish, and other significant, cave-dwelling wildlife species. It is not anticipated that the proposed Western Beltway alternatives would adversely affect the Logan Cave NWR.

The Cave Springs Cave Natural Area functions as a wildlife refuge. It is located approximately four miles east of the proposed project corridor. This natural area is administered by the Arkansas Natural Heritage Commission. This resource would not be affected by the proposed project.

Prairie Grove Battlefield State Park is located approximately one to two miles west-southwest of the alternative corridors in Prairie Grove. The 840-acre state park protects and interprets the site of the Battle of Prairie Grove, which occurred during the Civil War in 1862. This battle was the last major Civil War engagement in northwest Arkansas. Facilities include a museum and visitor center, historic structures, a special event meeting facility, picnic facilities, a playground, walking trail, and driving tour. The park would not be directly affected by the proposed alternatives.

Several city parks administered by area communities lie in proximity to the proposed corridor alternatives. City of Fayetteville parks in the corridor study area include Harmony Pointe Park, Holland Park, Bundrick Park, and a proposed regional park.

- Harmony Pointe Park, 6264 Milliken Bend, comprises 8.35 acres on Owl Creek. The park features a playground for ages 2 through 12, a pavilion, picnic tables and grill, and open play area.
- Holland Park, 4385 West Alberta Street, occupies approximately five acres. This park features a 0.5-mile multi-use trail, gazebo, basketball court, picnic area, and playground. The playground is a modern design intended to challenge children physically and mentally.
- Bundrick Park, 1660 North Plantation Avenue, occupies 4.25 acres and includes two playgrounds, a picnic area, and natural areas.
- A proposed regional park on Judge Cummins Road in southwest Fayetteville would be developed on approximately 240 acres of land currently owned by the City.

The City of Farmington owns and maintains two existing public parks within the corridor vicinity and one that is under construction.

- Creekside Park, in the northeast quadrant of Hunter Street and Valley Drive, features a half-mile walking trail, picnic tables, benches, large playground, rental pavilion, basketball court, volleyball pit, and restrooms.
- Ecology Park, at the end of Nature Lane, north of Ecology Drive and east of Double Springs Road, is a small park with picnic tables, a grill, and some play equipment.
- The Farmington Sports Complex is currently under construction southwest of Southwinds Road, near AR-170. Construction is expected to be completed in Spring 2012. The park will feature six baseball/softball fields, a walking trail, picnic area, playground, concession stand, and restroom facilities.

In the Town of Highfill, the Highfill City Park occupies a substantial area northeast of the intersection of South Main and 4th Streets.

It is also possible that the C. B. “Charlie” Craig State Fish Hatchery, 977 West Fish Hatchery Road, Centerton, may be considered a wildlife refuge. The goals of the fish hatcheries are to produce the appropriate fish species and numbers to assist in establishing, maintaining, or enhancing existing fish populations and to provide the angling public a better fishing opportunity in Arkansas lakes and streams. The fish grown at state hatcheries are stocked to maintain a balanced fish population and to supplement fish stocks in heavily fished waters.

In addition to the above described public lands, the properties listed on or eligible for listing on the National Register of Historic Places, which are described in the Historic and Archeological Resources section, are also subject to the provisions of Section 4(f).

## GEOLOGY AND SOILS

The Ozark region comprises a series of plateaus (Ozark Plateaus) that have been dissected into rugged terrain by streams. The geology of the region is characterized by limestone, dolomite, or chert, particularly in the Ozark Highlands. In the Ozark Highlands, cherty soils occur frequently, having developed from carbonate rocks or interbedded chert, sandstone, and shale. In this region, common soils include mesic ultisols, alfisols, and mollisols. Soil order mosaic, soil temperature regime, and lithology are all distinct from nearby ecoregions.

The Boston Mountains are underlain by Pennsylvanian sandstone, shale, and siltstone. Some folding and faulting have occurred but strata generally are much less deformed than in the other plateaus. Maximum elevations are higher, soils have a warmer temperature regime, and carbonate rocks are much less extensive than in the Ozark Highlands. Upland soils are mostly ultisols that developed under oak-hickory and oak-hickory-pine forests.

Karst geology exists within the Western Beltway Study area. The porous rock formations below the ground surface allow groundwater to flow into the region's underground caves. These underground caves provide habitat for the Ozark cavefish and cave crayfish, endangered species referred to above in the discussion of threatened and endangered species. A new location highway facility could cause increases in stormwater runoff carrying pesticides or other chemicals, pathogens, or sediment, which could cause adverse impacts to subterranean water quality. In addition, the risk of hazardous substance spills or other contamination from vehicles using the Beltway would arise. The potential impacts from these sources would be evaluated during the NEPA process, as well as potential mitigation measures.

## HAZARDOUS MATERIALS

A preliminary environmental site assessment would be the first step during the NEPA process in evaluating the potential threat of encountering contaminants during construction of the proposed Beltway. Assessment would require the examination of federal and state environmental regulatory databases for permitted hazardous material facilities within the proposed project study area for specific alternatives. Sites listed in the databases include underground storage tank sites (which may be leaking) and recorded spills hazardous or toxic materials, as well as storage facilities and landfills. Identification of potential sites during database review would be followed by review of state files for regulated industries. This

research would then be followed up with on-site surveys and, if necessary, interviews of owners or operators. The NEPA studies should be conducted to satisfy the requirements of a Phase I Environmental Site Assessment as defined by ASTM Standard Practice E1527-05.

## WHAT ALTERNATIVES WERE CONSIDERED IN THE STUDY?

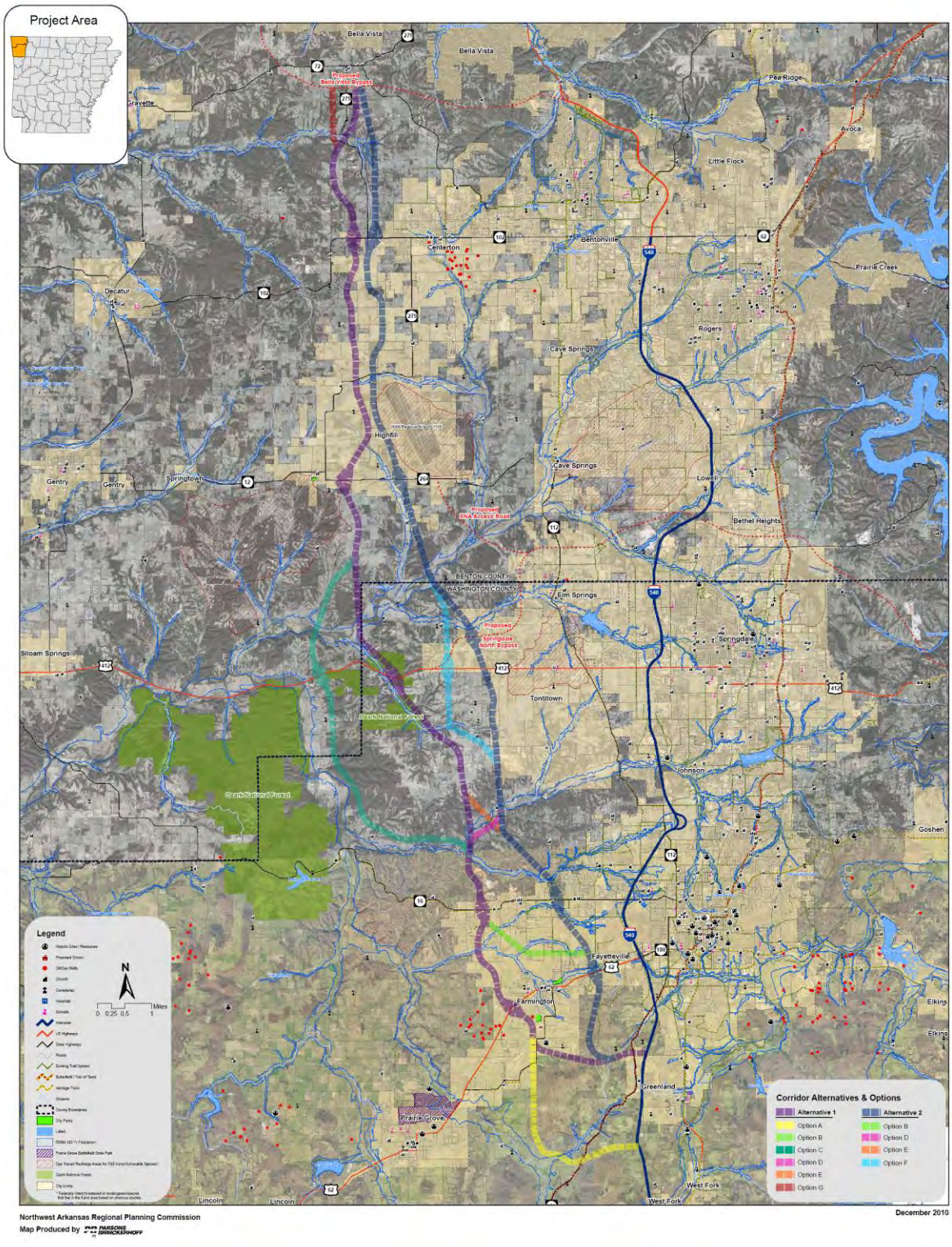
The study identified two major corridor alternatives along with options for connecting the corridors to existing Northwest Arkansas roads. The corridors are displayed in **Figure 6** and are located west of I-540 and the Northwest Arkansas Regional Airport (XNA) and east of the Ozark National Forest. The proposed beltway would connect on the south to I-540 immediately north of Greenland and extend northerly to interchange with the proposed location of the Bella Vista Bypass. Interchanges are proposed for US 62, Highway 16, US 412, Highway 264 and Highway 102. Several other roads with less traffic were considered for interchanges but were not included in the concept in order to facilitate toll road operations.

An optional location that would connect the beltway with I-540 south of Greenland was considered but set aside after discussions with the Mayor of Greenland revealed this location would be incompatible with the city's plans for economic development.

A beltway location west of the Ozark National Forest was initially considered but determined not feasible based on a previous internal study conducted for the Northwest Arkansas Council. The study found that this location would provide substantially less service for north-south traffic in the two county region and would involve much greater costs.

**Figure 6** shows the corridors that were presented to the project's Steering Committee in August 2010 for comment and approval. The map reflects the committee's comments and suggestions.

## Figure 6. Corridor Alternatives Map



## TRANSIT ALTERNATIVES

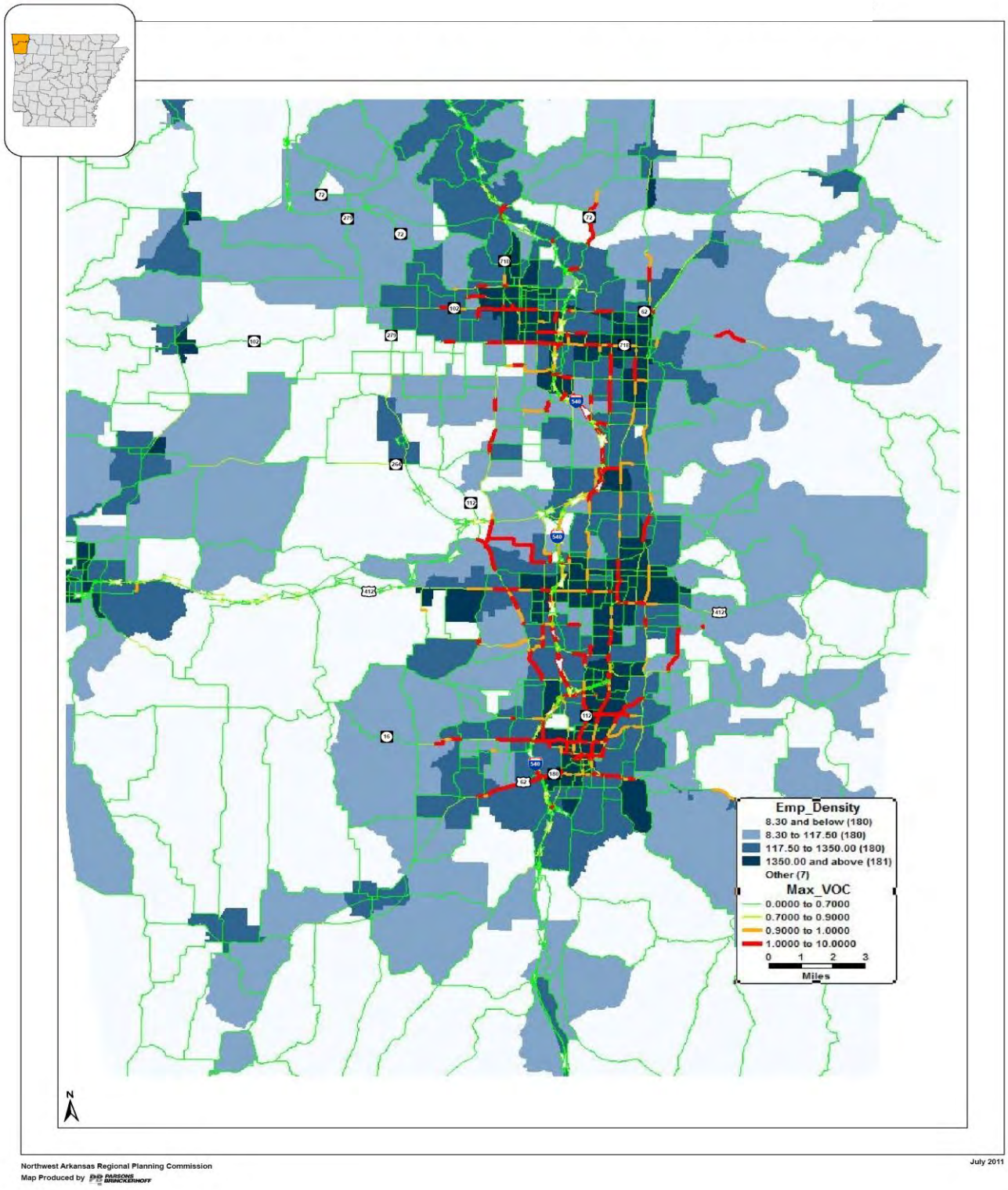
The use of transit to accommodate travel demand has been a frequent topic of discussion in Northwest Arkansas. A cursory examination of existing regional land use densities found conditions that would not currently warrant some types of mass transit such as light rail. However, the region's transit system managers were interviewed to explore the potential for a western beltway corridor to serve future express transit routes. If such a need could be anticipated, it could indicate the need for additional right of way and possible roadway cross section considerations to accommodate future transit facilities. The interview with Razorback Transit management indicated that the service is mainly targeted to University needs and the location of a western beltway would be beyond the system's service area. Therefore, Razorback Transit would not likely benefit from express lanes or related infrastructure along the Beltway.

Ozark transit is considering expansion of fixed route service in both counties if funding becomes available and believes the region will continue to grow. The combination of anticipated growth and concerns about future energy availability are perceived as reasons for a possible need for future Beltway related transit infrastructure such as park and ride lots at key locations and perhaps space for future rail or rubber tired rapid transit. Such space could be preserved by providing wider than normal outside shoulders adjacent to the travel lanes.

## WHAT HAS BEEN DONE TO INCREASE ACCURACY OF TRAFFIC FORECASTS FOR NORTHWEST ARKANSAS?

The Northwest Arkansas Regional Planning Commission (NWARPC) owns and maintains a TransCAD travel demand model that enables the agency's planners to analyze the region's transportation systems to determine existing and forecast traffic problems and evaluate and prioritize improvement options. A major effort of the *Northwest Arkansas Western Beltway Feasibility Study* was to engage an experienced travel demand model developer to refine the NWARPC's model to increase its accuracy and improve its operations. The effort included training for the agency's staff that would use the refined model for future evaluations and projections. The work included improvements for operational efficiencies, updates for traffic and planning variables as well as incorporation of traffic information from McDonald County located immediately to the north of the Arkansas/Missouri state line. The model developer also installed a device referred to as a scenario manager that allows the model to perform quick analyses of transportation improvements and enable improved traffic and toll analyses.

Figure 7. 2035 Alternative 2 – VOC & Employment



## WHAT ARE THE FINDINGS FROM THE TRAVEL DEMAND MODELING PERFORMED FOR THE WESTERN BELTWAY?

The improved travel demand model was used to examine traffic volume forecasts within the two-county region along I-540 to determine future traffic conditions with and without a western beltway. It should be noted that Alternative 2 (shown on **Figure 6**) was used as a basis for the forecasts. Several assumptions were established to perform the forecasts including the ultimate provision of six lanes along I-540 in the two-county region as well as completion of the western leg of the Springdale Bypass, the Bella Vista Bypass and the XNA access road. A full list of assumptions is contained in the appendix.

The following maps display the 2035 peak period travel conditions along both I-540 and the Western Beltway. The maps shows forecast traffic volumes and forecast travel speeds. For the morning peak travel time, the forecast shows that approximately 6,600 vehicles travel North/South through the region. Without a Western beltway and assuming the 3 lanes on I-540 in each direction, the forecast finds volume to capacity ratios in the range of 0.25 to 1.12 which does not represent severe congestion. If the Western Beltway was constructed along the Alternative 2 corridor, the travel demand model found approximately 800 vehicles switching to the Beltway at the southern I-540 interchange north of Greenland and up to 2000 vehicles using the beltway north of US 62 while the majority of the traffic remains on I-540. It should be noted that US 71, which runs parallel to I-540 to the East carries a lot of traffic, indicating that motorists are trying to travel NE in the region and not NW. This is further supported by the employment densities shows in **Figure 7**, **Figure 8** and **Figure 9**.

**Figure 8. 2035 Alternative 2 – Flow & Employment**

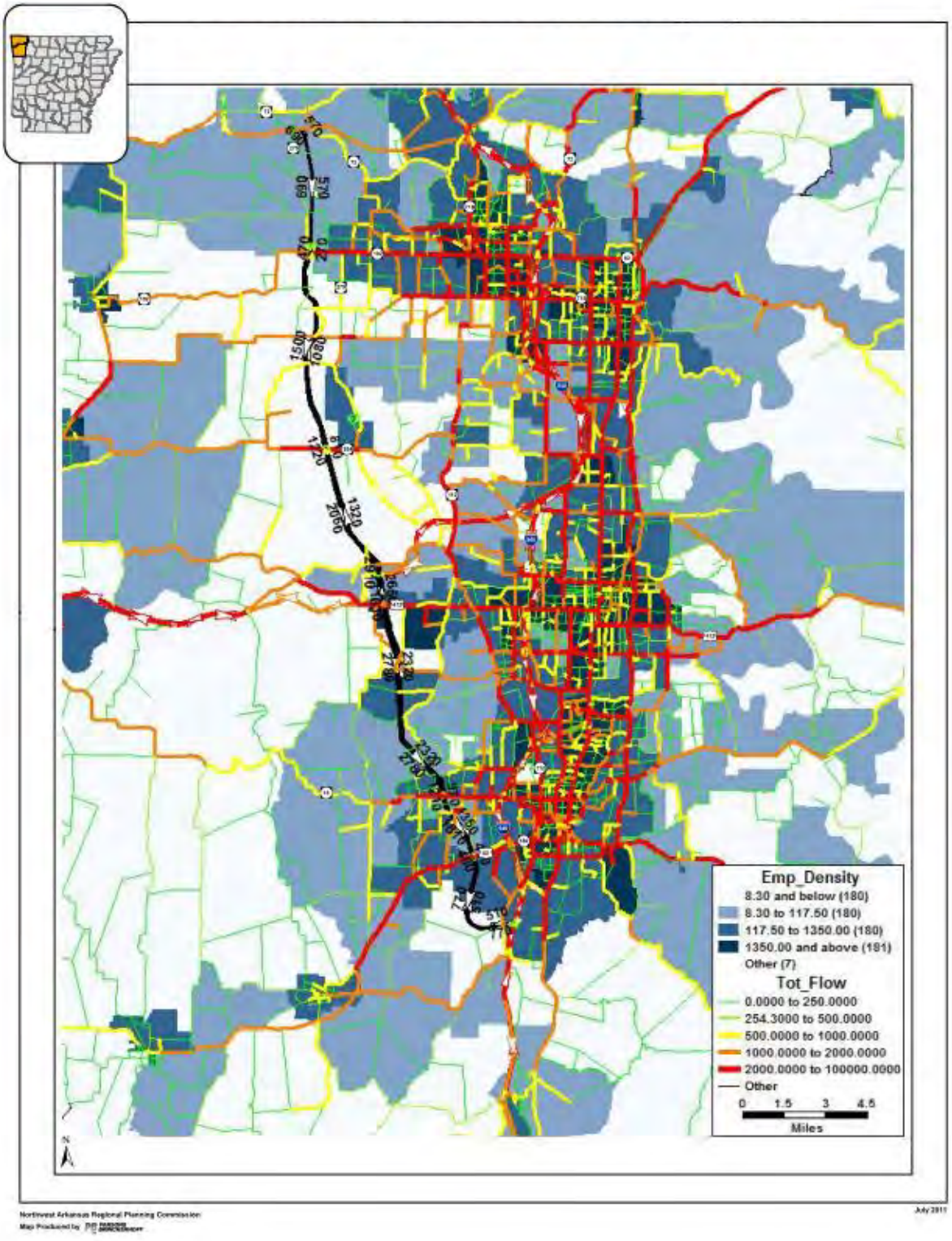
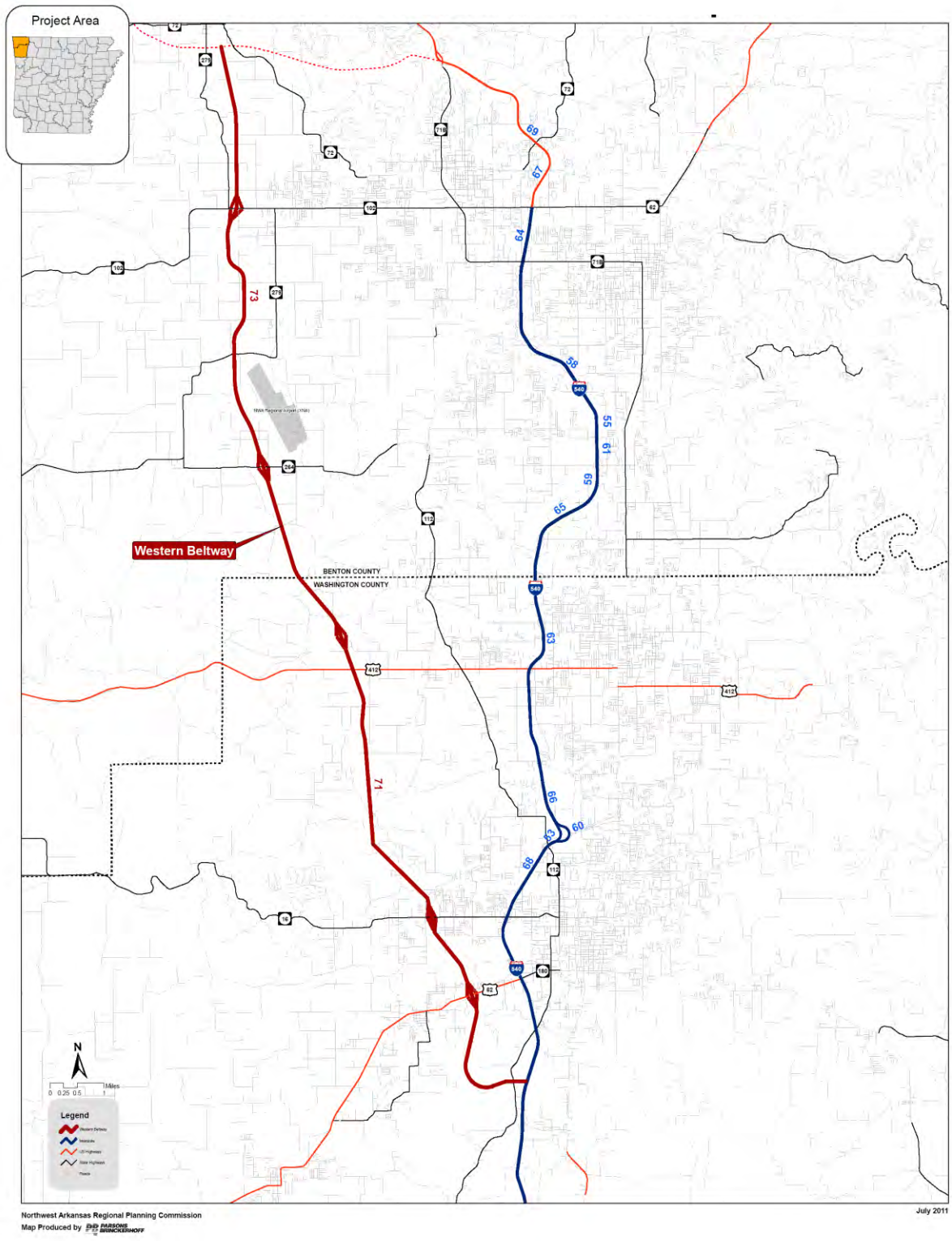


**Figure 9. 2035 Alternative 2 & I-540 AM Speeds**



As can be seen in the previous maps, with three lanes in each direction, I-540 will provide improved travel conditions in some locations but will experience increasing congestion and reduced travel a speeds toward the end of the 25 year analysis period. A western beltway will attract traffic that will be generated from new development in the western regions of the study area as well as through traffic that would use the beltway for reduced travel times. The findings suggest that a western beltway may be a longer range need for the area that will provide increasing benefit as the region continues to attract population and commerce.

## HOW WOULD TRUCK VOLUMES THROUGH THE STUDY AREA BE AFFECTED IF I-49 IS COMPLETED BETWEEN NEW ORLEANS AND KANSAS CITY?

I – 49 is a proposed multi-lane highway corridor that would provide improved freight and passenger mobility in the central region of the US and would connect New Orleans, Louisiana with Kansas City, Missouri. The route would generally follow the location of US 61 in southern Louisiana and US 71 north from Lafayette, Louisiana and would extend through the two county study area for the Western Beltway. Major freeway improvements have been implemented in Louisiana that could serve as a location for I-49. Arkansas routes have also been improved between the Louisiana/Arkansas border and Texarkana that could continue the I-49 concept that is envisioned to be routed along I-540 through Washington and Benton Counties.

While I-49 is a long range concept, completion of the route could increase truck volumes through the study region that could ultimately contribute to congestion along I-540 and increase the need for a western beltway. This increase in truck volumes has been analyzed as part of the Western Beltway feasibility study.

A national freight model was applied to analyze the impact of the I-49 expansion. This freight model is based on commodity flows of the Freight Analysis Framework 3.1 (FAF3), which has been published by the Federal Highway Administration (FHWA). FAF3 provides commodity flows by 43 commodity classes between 123 FAF zones across the United States. International flows are provided as well, including the port of entry into or the port of exit from the United States. For this study, only flows by the truck mode were considered, including the truck portion of multi-modal freight flows. Louisiana is represented by three FAF zones, Arkansas by one and Missouri by 4 FAF zones. As this resolution is too coarse to simulate truck flows, FAF3 flows are disaggregated from 123 FAF zones to 3,241 U.S. counties. Employment by type and input/output coefficients are used to disaggregate each commodity class to employment of those industries that produce and consume that commodity. Subsequently, commodity flows in

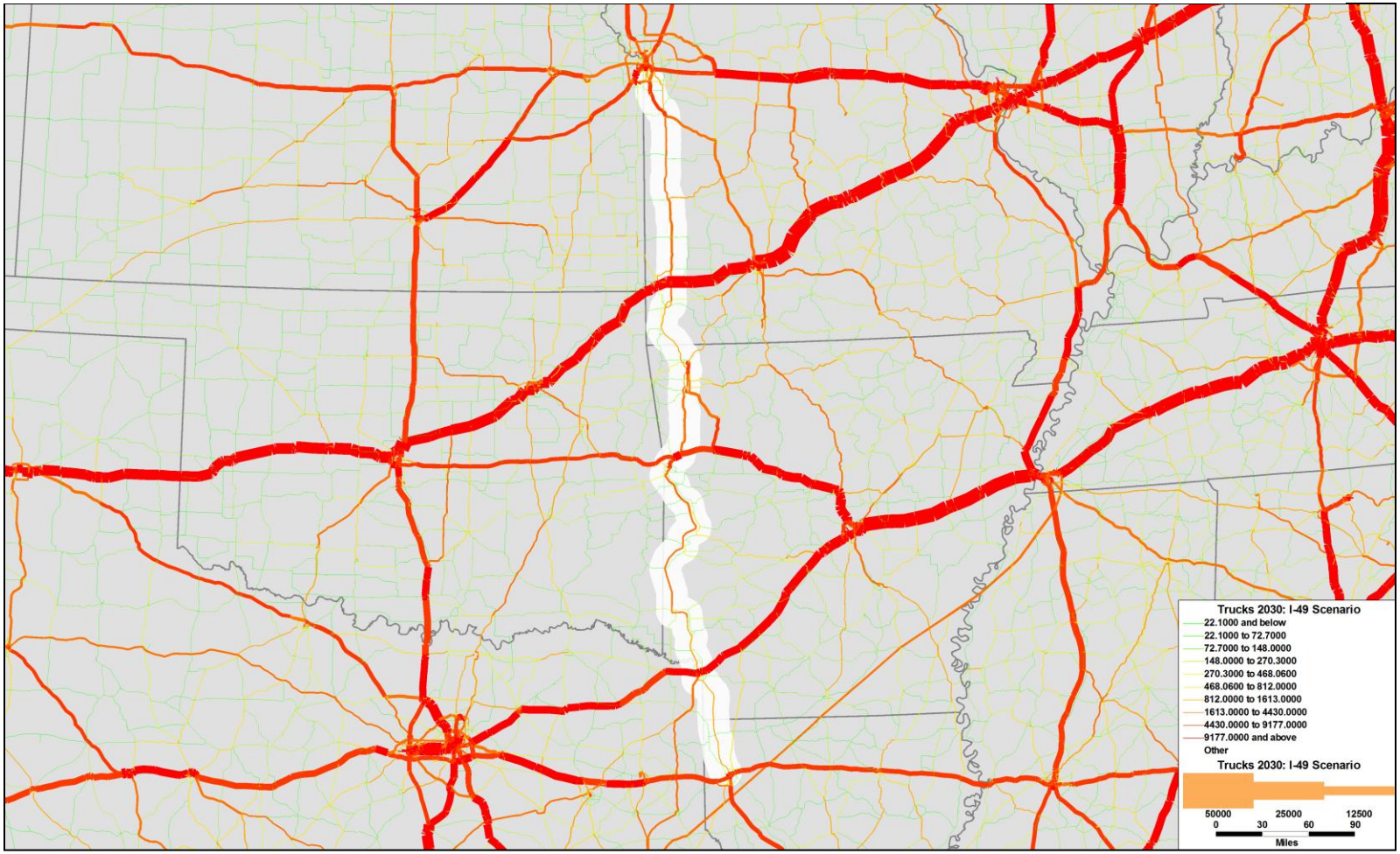
tons are converted to truck trips by using average payload factors. An empty-truck rate was added to account for trucks that are not fully loaded. Two truck types, namely single-unit trucks and multi-unit trucks, are distinguished. While single-unit trucks are used predominantly for short-distance trips, multi-unit trucks drive the majority of long-haul trips.

The truck travel demand was extracted from the FAF3 dataset for the year 2030 and is assigned to a national highway network. To account for slower acceleration and more space that trucks take up on the road in comparison to autos, a passenger-car equivalent (PCE) factor of 1.5 was used for single-unit trucks, and a PCE of 2.5 has been used for multi-unit trucks. The same truck travel demand was used for both the base scenario and the I-49 expansion scenario. For the I-49 expansion scenario, links were added where new facilities are planned (mostly the location south between Texarkana and Fort Smith, AR), and existing links were changed into highway links where existing roads are planned to be converted to I-49. In line with surrounding rural interstates in Missouri, Arkansas and Louisiana, the expanded I-49 highway is expected to operate at a maximum speed of 65 mph, have two lanes in each direction, and have a capacity of 2,200 vehicles per lane per hour.

The analysis found that unless I-49 stimulated entirely new markets that the construction of I-49 up from New Orleans to Kansas City is unlikely to result in significantly higher truck flows in the corridor. This is the result of two facts: there is not much truck bound freight flowing north and south in this entire corridor right now, and a new route will not attract traffic from other corridors because it offers them no major travel time savings or more efficient access to markets. Granted, the construction of new distribution centers along I-49 might change these findings. Anecdotal evidence suggests that most of the trucks that would be attracted to the I-49 corridor would be those ultimately moving east and west on I-30 and I-40 rather than continuous north and south travel.

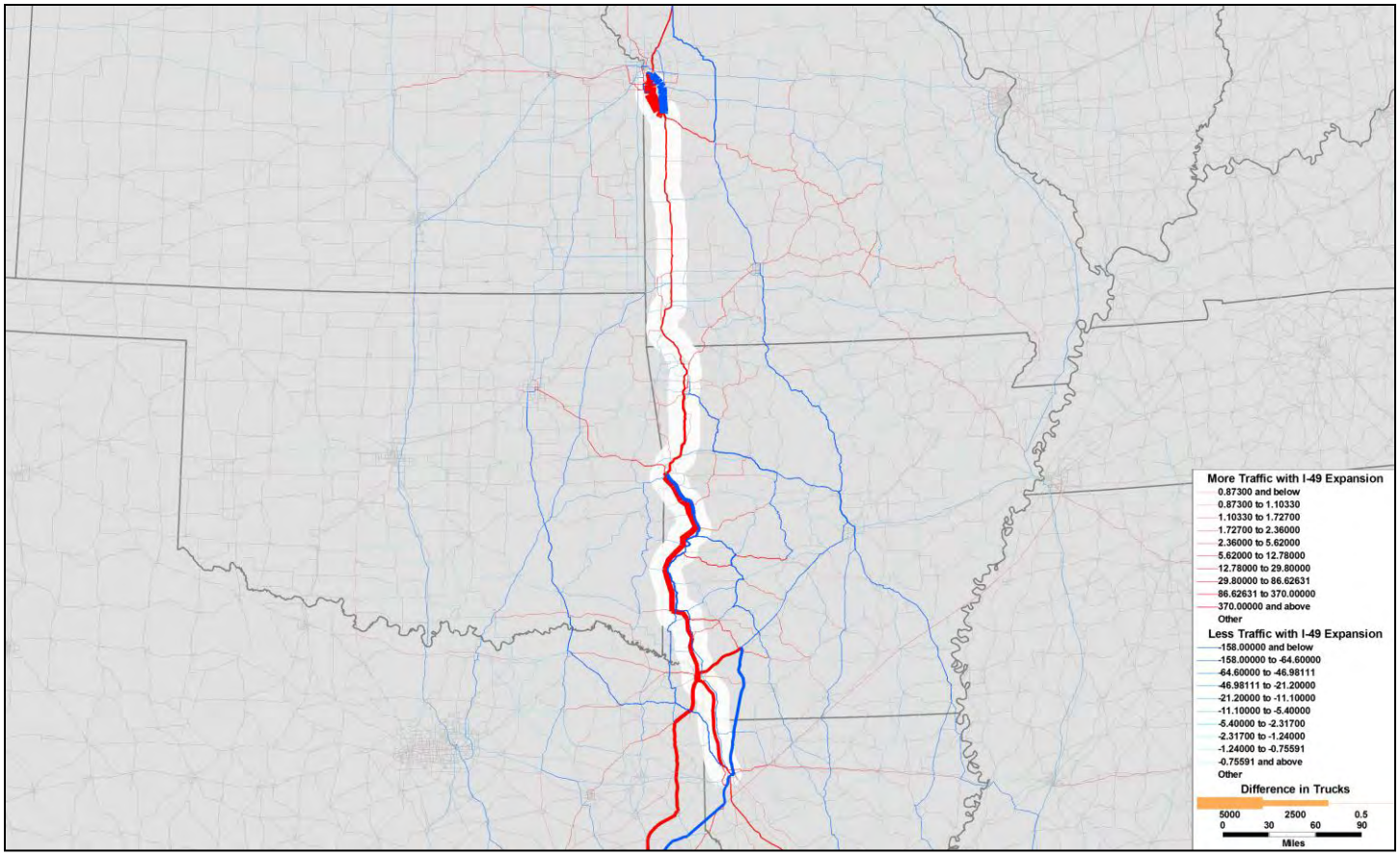
**Figure 10** shows freight flows through the central region of the US. The widths of the flow bands correspond to the volume of freight being transported through the region. The I-49 route is highlighted in white. As seen, the amount of freight flow through Northwest Arkansas is relatively less than flows along major interstate routes. **Figure 11** shows a forecast of a relatively minor increase in freight flow through the study area if I-49 was completed.

**Figure 10. Freight Flows through the Central United States**




Source: Parsons Brinckerhoff - FHWA Freight Analysis Framework

**Figure 11. Increased Freight Flow through Northwest Arkansas with Completion of I-49**




Source: Parsons Brinckerhoff - FHWA Freight Analysis Framework Base

## HOW MUCH IS THE WESTERN BELTWAY ESTIMATED TO COST?

Roadway construction cost estimates for each of the major corridor alternatives and options were developed by Garver's engineers using detailed unit costs for labor, materials and equipment initially prepared for the Springdale Bypass. Garver updated the estimates to reflect current costs for these components. The costs are shown in **Table 10** and refer to the alternative corridors and options shown in the preceding map on page 10.

Additional costs were also developed for tolling collection systems and are estimated to be $40 million (2010 dollars) for Alternative 2. Toll collection system costs include:

- Purchase and installation of equipment that would read transponders and record images of vehicle license plates,
- A utility building that would house equipment to record data captured in the lanes and provide power to the lane equipment,
- Computer and networking systems that would be used in a toll operations center,
- Fiber optic cable to transmit data between the tolling equipment and the operations center, and
- Advance signing to inform drivers of toll rates.

Cost estimates for periodic rehabilitation and replacement and annual operating and maintenance costs were also developed and are summarized in **Table 11** and **Table 12**, respectively. It was assumed that the Western Beltway would be run by a standalone operation. If the Regional Mobility Authority or another entity operates toll roads in the region or state, then it could be possible for that entity to also operate the Western Beltway. Combining operations would lead to some operational efficiencies that could lower operating and maintenance cost for each facility.

**Table 10. Cost Estimates for Roadway Items**

| Preliminary Corridor Cost Estimate (in 2010 Dollars) | | | | |
|---|---|---|---|---|
| | Alternative 1 | | | Alternative 2 |
| | Alt. 1 | Option A* | Option C* | |
| **Construction Cost** | $557.0 | $35.9 | $23.0 | $532.4 |
| **Planning and Environmental (5%)** | $27.8 | $1.8 | $1.1 | $26.6 |
| **Engineering (PS&E)(7%)** | $39.0 | $2.5 | $1.6 | $37.3 |
| **Utility Relocation (4%)** | $22.3 | $1.4 | $0.9 | $21.3 |
| **Right of Way and Relocations (12%)** | $66.8 | $4.3 | $2.8 | $63.9 |
| **Construction Engineering and Inspection (10%)** | $55.7 | $3.6 | $2.3 | $53.2 |
| **TOTAL CORRIDOR COST** | $768.6 | $49.5 | $31.7 | $734.7 |
| | | | | |
| Construction Cost Estimate (in 2010 Dollars) | | | | |
| | Alternative 1 | | | Alternative 2 |
| | Alt. 1 | Option A* | Option C* | |
| Main Lane Miles | 33.6 | 2.9 | 1.9 | 31.7 |
| Cost/mi. | $11.2 | $11.2 | $11.2 | $11.2 |
| Subtotal | $376.3 | $32.5 | $21.3 | $355.2 |
| Number of Overpasses | 16 | 2 | 1 | 14 |
| Cost/each | $1.7 | $1.7 | $1.7 | $1.7 |
| Subtotal | $27.2 | $3.4 | $1.7 | $23.8 |
| Number of Diamond Interchanges | 5 | | | 5 |
| Cost/each | $8.1 | | | $8.1 |
| Subtotal | $40.5 | | | $40.5 |
| Number of Fully Directional Interchanges | 2 | | | 2 |
| Cost/each | $56.5 | | | $56.5 |
| Subtotal | $113.0 | | | $113.0 |
| **Construction Cost** | $557.0 | $35.9 | $23.0 | $532.4 |

*Option A and Option C columns represent the additional lengths and costs that would be incurred if these segments were substituted in place of similar Alternative 1 Corridor Segments
Notes:
1) All dollar figures are shown in millions
2) This estimate does not include cost for toll plazas

Source: Garver

**Table 11. Periodic Rehabilitation and Replacement Costs**

| Item | Year | Description | Cost (per lane-mile, 2010$) |
|---|---|---|---|
| **Asphalt Pavement** | 12 | 1" Milling and 3" Overlay | $149,000 |
| | 20 | 4" Milling and 6" Overlay | $244,000 |
| | 20 | Install New Guardrail | $8,200 |
| | 30 | 1" Milling and 3" Overlay | $149,000 |

| Item | Year | Description | Cost (per lane-mile, 2010$) |
|---|---|---|---|
| **Replace Existing Bridge Deck** | 50 | This is the average replacement cost per roadway length (not bridge length) | $470,000 |
| **Signing** | Every 10 Years | Replace signs and retain existing support structures | $1,800 |
| **Striping and Markers** | Every 3 Years | | $14,000 |
| | | | |
| **Item** | Year | Description | Cost ( $2010, millions) |
| **Toll Collection System** | Every 5 Years | Software, computer systems | $3.1 |
| | Every 10 Years | Equipment: lane, toll utility building, toll operations building | $0.6 |
| | Every 20 Years | Fiber optic cable | $2.7 |
| | Every 40 years | Loop system | $0.1 |

Source: Garver and Parsons Brinckerhoff
Note: Western Beltway estimated to include 127 lane miles

**Table 12. Annual Operations and Maintenance Costs**

| Item | Description | Annual Cost Opening Year (2025) Dollars in Millions |
|---|---|---|
| **Roadway** | Mowing, Trash Cleanup, Small Patching, Snow Removal, Misc. Minor Repairs | $1.9 |
| **Toll Collection** | Credit Card Fees, Equipment Maintenance, Operations Staff, Call Center Staff, Traffic Management Center Staff, Violations Processing Staff | $5.2 |
| **Other Costs** | Insurance, Police, Marketing, Office Lease, Utilities | $2.2 |
| | **Total Cost (2025 Dollars)** | $9.3 |

Source: Garver and Parsons Brinckerhoff

**Table 13. Total Cost for Western Beltway**

| Item | Cost |
|---|---|
| Construction | $532 M |
| Planning and Environmental Processing | $27 M |
| Engineering | $37 M |
| Utility Relocation | $21 M |
| Right of Way and Relocation | $64 M |
| Construction Engineering and Inspection | $53 M |
| Toll Collection System | $40 M |
| Total Cost | **$775 M** |

Source: Parsons Brinckerhoff / Garver

## HOW COULD A WESTERN BELTWAY BE FUNDED?

Northwest Arkansas has grown rapidly over the past three decades and even with the construction of I-540 over this time frame, the region has outgrown its existing transportation infrastructure. Transportation planning conducted by the NWARPC identified major highway projects such as the Bella Vista Bypass, the Springdale Bypass, the XNA Access road, major widening and interchange improvements for I-540 as well as numerous city and county road widening and improvement projects. Almost all if these projects require funding that is not currently available and not anticipated to be available over the next several years.

A western beltway is envisioned as a transportation improvement that would be constructed within the next ten to 20 years and that its ultimate construction will have to rely on toll financing as well as other funding sources to supplement toll revenues.

## HOW MUCH OF THE FUNDING WOULD TOLLS PROVIDE?

The Beltway study team includes Stantec Inc., a transportation consulting firm with expertise in toll traffic and revenue forecasts, as well as previous experience in Northwest Arkansas related to the Bella Vista Bypass toll studies. Stantec, in collaboration with Parsons Brinckerhoff's toll road specialists, conducted toll traffic and revenue forecasts for the Western Beltway using forecasts produced by NWARPC's newly refined and updated travel demand model.

## TOLL-FREE VOLUMES

Volume summaries were prepared for six north-south screenlines in the Western Beltway corridor. Screenlines were chosen to coincide with proposed interchanges for the Western Beltway. **Figure 12** summarizes the location of these screenlines.

**Figure 12. Screenline Locations**

Screenline 1

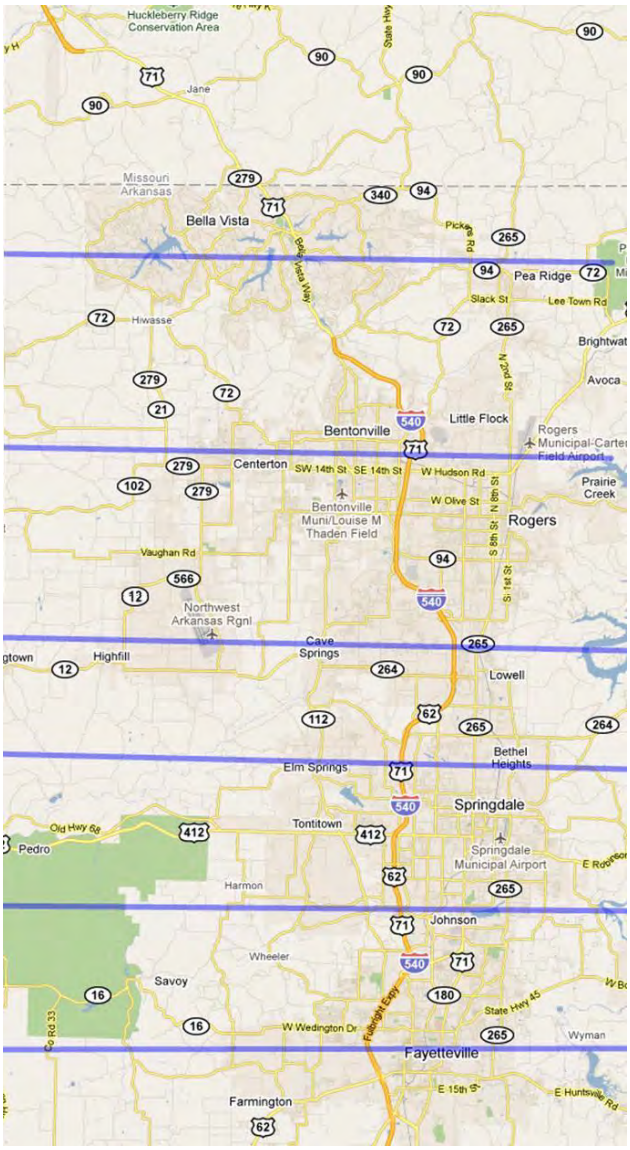
Screenline 2

Screenline 3

Screenline 4

Screenline 5

Screenline 6



The 2035 model runs show that the highest north-south volumes occur between Screenlines 3-5. **Table 14** summarizes daily vehicle estimates along each north-south route for Screenline 4.

**Table 14. Daily Vehicle Estimates North of US 412**

| Screenline | Route | Daily Vehicles | Percentage |
|---|---|---|---|
| **4** | AR 43 | 7,081 | 1.8 |
| **4** | Dawn Hill East | 2,136 | 0.5 |
| **4** | US 59 | 33,441 | 8.6 |
| **4** | Fairmount | 817 | 0.2 |
| **4** | Gailey Hollow | 2,050 | 0.5 |
| **4** | Western Beltway SB | 21,982 | 5.6 |
| **4** | Western Beltway NB | 22,318 | 5.7 |
| **4** | 56th | 13,783 | 3.5 |
| **4** | 48th | 79 | 0.0 |
| **4** | I-540 SB | 62,255 | 16.0 |
| **4** | I-540 NB | 61,530 | 15.8 |
| **4** | AR 112 | 23,447 | 6.0 |
| **4** | Robbins Road | 8,091 | 2.1 |
| **4** | Old Wire | 3,152 | 0.8 |
| **4** | North Pump Station | 3,502 | 0.9 |
| **4** | 40th | 3,670 | 0.9 |
| **4** | Silent Grove | 12,777 | 3.3 |
| **4** | Old Missouri | 44,933 | 11.5 |
| **4** | Thompson | 43,288 | 11.1 |
| **4** | Oak | 1,977 | 0.5 |
| **4** | Mountain | 1,140 | 0.3 |
| **4** | Mayo | 9,979 | 2.6 |
| **4** | Luper | 3,034 | 0.8 |
| **4** | Hwy 303 | 3,535 | 0.9 |
| **TOTAL** | | 389,998 | 100.0 |

The I-540 corridor carries about 124,000 vehicles per day in 2035. This represents about 32 percent of the entire north-south demand. The proposed Western Beltway, when operated as a toll-free facility, would carry about 44,000 vehicles per day or 11 percent of the north-south demand.

## TOLLED VOLUMES

The implementation of a toll would cause some vehicles to avoid the Western Beltway and use alternative north-south routes. The Western Beltway continues to offer a time savings benefit compared to the I-540 corridor, so a portion of north-south traffic will continue to use the Western Beltway. In order to capture an accurate sense of this tolled traffic, Stantec separated

the modeled volumes into three analyses time periods – the AM peak period, the PM peak period, and off-peak travel. Because the time savings is more substantial during the peak periods of travel, slightly higher toll rates per mile were assumed during the AM and PM peak periods ($0.20 per mile for passenger vehicles) versus the off-peak periods ($0.15 per mile for passenger vehicles). Trucks would be charged higher tolls, based on truck size or number of axles. Light trucks would be charged 1.5 times the passenger vehicle rate and heavy trucks would be charged 3.0 times the passenger vehicle rate.

Prior to the opening of the Western Beltway, I-540 is assumed to expand from four lanes to six lanes. Due to the widening of I-540 in 2025, travel time savings for the Western Beltway is dramatically reduced. This increased capacity for the Western Beltway's primary competitor has a significant negative impact on the traffic and revenue potential for the Western Beltway. Areas where congestion occurs today are mitigated as the expected growth rate for north-south traffic volumes is less than the increase in capacity in the I-540 corridor (a 50 percent increase when it is widened from four to six lanes). In 2035, daily transactions at Screenline 4 are expected to be about 13,000, or roughly 30 percent of the toll-free volume.

Additionally, as shown on **Figure 6**, the region's employment locations are densely concentrated along the I-540 corridor. As a consequence, commuting trips are also concentrated in this corridor and would infrequently use the Western Beltway as an alternative to I-540 even during peak travel times.

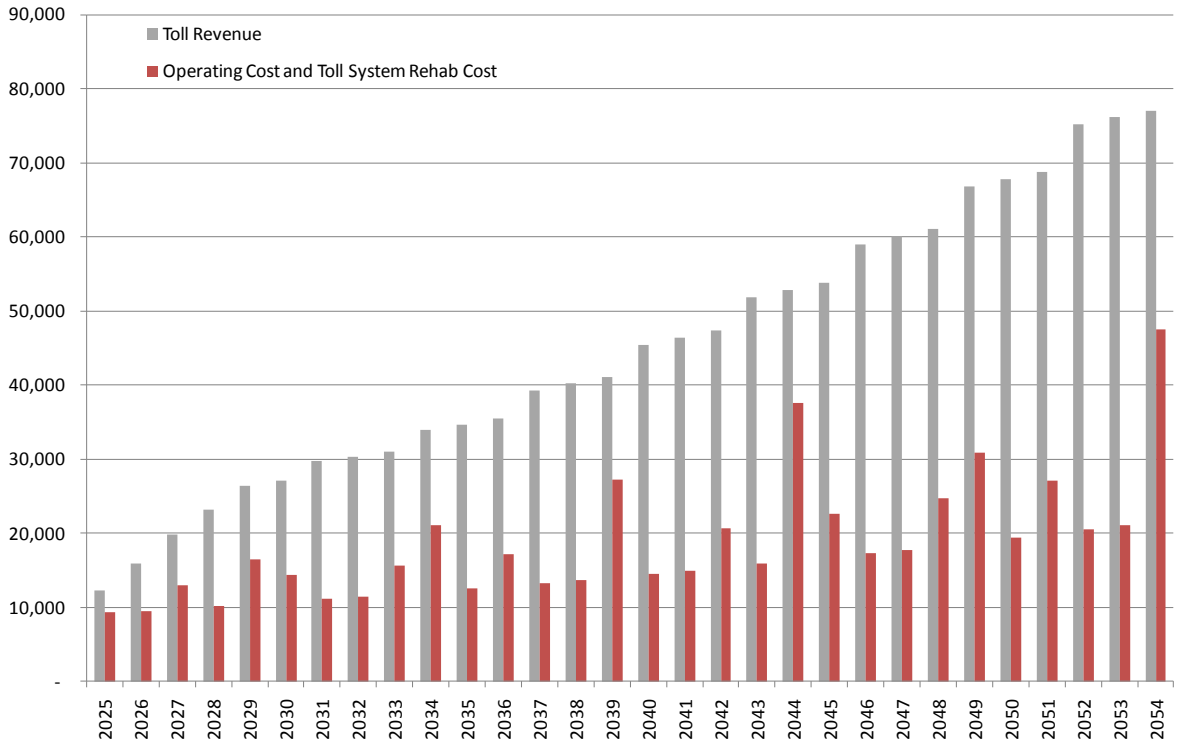
### TWO-LANE FACILITY

During the course of the study, questions were raised about constructing the beltway to only two lanes instead of four in order to reduce costs. If the facility were to operate as a two-lane toll road, one travel lane in each direction, the opportunity for vehicles to pass is diminished. Therefore, the travel time savings for the Western Beltway would be reduced as the average free-flow speed for the facility would be lower. Consequently, the diminished time savings lessens the attractiveness of the Western Beltway to customers, decreasing trips on the facility as compared to the base case. More study would be necessary to quantify the decrease in traffic and revenue for a two-lane facility compared to a four-lane facility.

## ANNUAL COST AND REVENUE FORECAST

Stantec estimates that gross toll revenue would be $12.8 million in the opening year of 2025. Toll revenue is forecast to increase in each future year as traffic increases and toll rate adjustments are periodically enacted. The Western Beltway revenue and cost forecast is shown in **Figure 13**.

**Figure 13. Annual Revenue and Cost (Year of Expenditure Dollars, 000s)**




Source: Stantec, Garver, and Parsons Brinckerhoff

## CAN TOLLS BE USED TO PAY FOR A WESTERN BELTWAY?

As previously mentioned, I-540 will be widened from four lanes to a minimum of six lanes. Because of this added capacity, travel time savings for the Western Beltway is dramatically reduced. This increased capacity for the Western Beltway's primary competitor will significantly reduce the amount of traffic and revenue that could be generated by tolling the Western Beltway. I-540 congestion that occurs today will be reduced because the expected growth rate for north-south traffic is less than the increase in capacity that will be provided by

the additional lanes along I-540. A 50 percent increase in capacity will be provided when I-540 is widened from four to six lanes.

Preliminary estimates show that toll revenues would pay for operating and maintenance costs in all years of operation, and support the issuance of bonds that would only pay for between 5 percent and 10 percent of initial project capital costs.

## WHAT OTHER FUNDING SOURCES COULD BE USED TO SUPPLEMENT THE TOLL REVENUES?

Northwest Arkansas is unique from the standpoint of a strong economy with rapid population and economic growth. However, the region must compete with other areas of the state for transportation revenues. The ability to compete for funds is complicated by the region's necessity for a large number of badly needed and costly projects such as the Bella Vista Bypass, Springdale Bypass, XNA Access Road as well as the requirement to expand I-540 and improve its interchanges.

The Arkansas Highway and Transportation Department typically funds such projects using allocated federal funding sources matched with state transportation revenues. However, both of these funding sources are limited due to intense statewide competition, current economic conditions and a congressional reluctance to increase taxes. Other previously available funding sources included congressional earmarks, which have lately lost support from elected officials.

Such funding hurdles are not unusual in Arkansas. It should be noted that the Western Beltway is a long range project. Emphasis at this point is on planning rather than implementation. An example of a similar long range, high cost project was the implementation of I-540 to connect Northwest Arkansas with I-40. It resulted in tremendous benefits for the region but required extraordinary funding efforts that were ultimately successful. Federal funding for a Western Beltway is highly uncertain and is currently being debated in congress. It could conceivably be available in the long range as the economy recovers.

Besides traditional federal formula funding that can be used on a pay as you go basis, other current sources of funding could be pursued for the Western Beltway assuming the programs are continued following congressional deliberations:

- USDOT TIFIA loan – federally subsidized loan program with competitive application process. Can be up to 33 percent of project costs with an option to deferred repayment

- Grant Anticipation Revenue Vehicles (GARVEE) – a type of debt that leverages future federal aid funding
- Local option / dedicated taxes and fees – sales, fuel, vehicle registration, etc.
- Credit enhancement - County / City / State / Private backing of toll bonds for better credit rating / lower interest rate
- 'Value capture' techniques – provide pay as you go funding or initial capital cost funding in the form of tax increment financing, development impact fees, or special assessment districts
- Public agency maintains facility and does not charge the Western Beltway for its services
- Deferral of construction sales tax to be repaid later with tolls (requires state enabling legislation)
- The private sector may be a source of long range funding assistance similar to the support that has been provided for XNA. Options for private support for Western Beltway implementation are noted in **Table 15**.

**Table 15. Private Source Funding Options**

| # | Option | Private Sector Role |
|---|---|---|
| **1** | Subordinate Loan | Provide a loan with favorable terms that would be subordinate to toll revenue bonds |
| **2** | Credit Enhancement | Provide financial backing for toll bonds that would lead to better credit rating / lower interest rate |
| **3** | Direct Cash Support – Development Period | Donate cash that could be used to design or build the project |
| **4** | Right-of-way Donations | Purchase right-of way along preferred alignment that would be donated to the project |
| **5** | Backstop of Development Cost Overruns | Provide a guarantee to cover design or construction cost overruns |
| **6** | Preferential Material or Equipment Pricing | Provide preferential material or equipment pricing (to the extent that businesses are either suppliers or have procurement relationships) |
| **7** | Direct Cash Support – Operating Period | Provide a guaranteed annual amount to fund operations and/or provide annual deposits into a rehabilitation and replacement reserve fund |
| **8** | Additional Tolls | Pay additional per vehicle toll on vehicles owned by contributing business |
| **9** | Guaranteed Toll Revenue | Enter in to an agreement for a certain annual level of toll road usage for vehicles owned by contributing business |
| **10** | Advertising Revenue | Pledge revenue for billboard, toll gantry or other forms of advertising |
| **11** | Naming Rights | Purchase naming rights for the entire roadway or interchanges |

Source: Parsons Brinckerhoff

## IS A WESTERN BELTWAY FEASIBLE?

### WOULD A WESTERN BELTWAY BE GENERALLY ACCEPTABLE TO THE PUBLIC?

Yes. Public outreach conducted for the *Northwest Arkansas Western Beltway Feasibility Study* found that while some concerns exist about environmental impacts, funding and effects to existing businesses, the public, stakeholders and most elected officials generally perceived a western beltway as a long range transportation improvement that will ultimately be needed for the region.

### WOULD A WESTERN BELTWAY CAUSE MAJOR ENVIRONMENTAL HARM?

No. The process employed to locate corridor concepts for a western beltway was designed to minimize environmental intrusion and eliminate fatal flaws. It began with the development of a constraints map that prominently displayed locations of environmentally sensitive resources. The project's engineers in collaboration with environmental specialists used this map as a basis for locating conceptual beltway corridors that avoided environmental resources and potentially sensitive areas and did not encroach on lands within the Ozark National Forest, parks or other protected areas. As a result, a western beltway could be likely be implemented without major adverse environmental consequences.

### WILL A WESTERN BELTWAY BE NEEDED?

Yes. Travel demand modeling conducted for the Western Beltway Study found that even with construction of additional lanes on I-540, significant traffic would use a western beltway or an alternative route by 2035. Future beltway traffic will generally accommodate vehicles generated by new development in the western regions of Washington and Benton Counties as well as vehicles traveling through the area. Volumes forecast for the southern beltway segment approach 45,000 vehicles per day. This amount of traffic warrants the need for a freeway or major arterial such as the Western Beltway.

## CAN A WESTERN BELTWAY BE FUNDED WITH TOLLS?

No. Preliminary estimates show that if I-540 is widened to a minimum of six lanes, significantly less traffic would divert to a western beltway if tolls are imposed. As a consequence, toll revenues could pay for operating and maintenance costs in all years of operation, but would only support the issuance of bonds that would only pay for between 5 percent and 10 percent of initial project capital costs.

## PARTIAL BELTWAY IMPLEMENTATION OPTIONS

Traffic forecasts and financial analyses conducted for this study revealed that while the facility will furnish improved mobility for the region, tolls would be inadequate to substantially fund the construction of the Beltway and its implementation would not offer major relief for I-540 traffic.

These conclusions led to questions about the mobility benefits of partial beltway implementation combined with possible expansion of Highway 112 to a four-lane arterial with signalized intersections and short bypasses around Cave Springs and Elm Springs.

The updated Northwest Arkansas travel demand model equipped with a new scenario manager provided an ideal tool for this type of analysis. The Parsons Brinckerhoff and Northwest Arkansas Regional Planning Commission (NWARPC) modelers collaborated to conduct the analysis of the options. **Figures 14 - 16** show forecast traffic volumes with the entire Western Beltway (Base Alternative) and construction of separate segments of the beltway. **Figure 15** shows the northern segment that would begin at the southern end of the proposed Bella Vista Bypass and connect with the proposed XNA access road and tie into I-540 by connecting with the western portion of the Springdale Bypass and the southern segment that would extend from I-540 north of Greenland to tie back into I-540 by a connection with the western portion of the Springdale Bypass. This option would also include the improvements to Highway 112 mentioned above.

**Figure 16** shows traffic volumes with construction of the northern segment only along with improvements to Highway 112.

**Figure 14. 2035 Base Alternative: Full Western Beltway, No Hwy 112 Improvements**

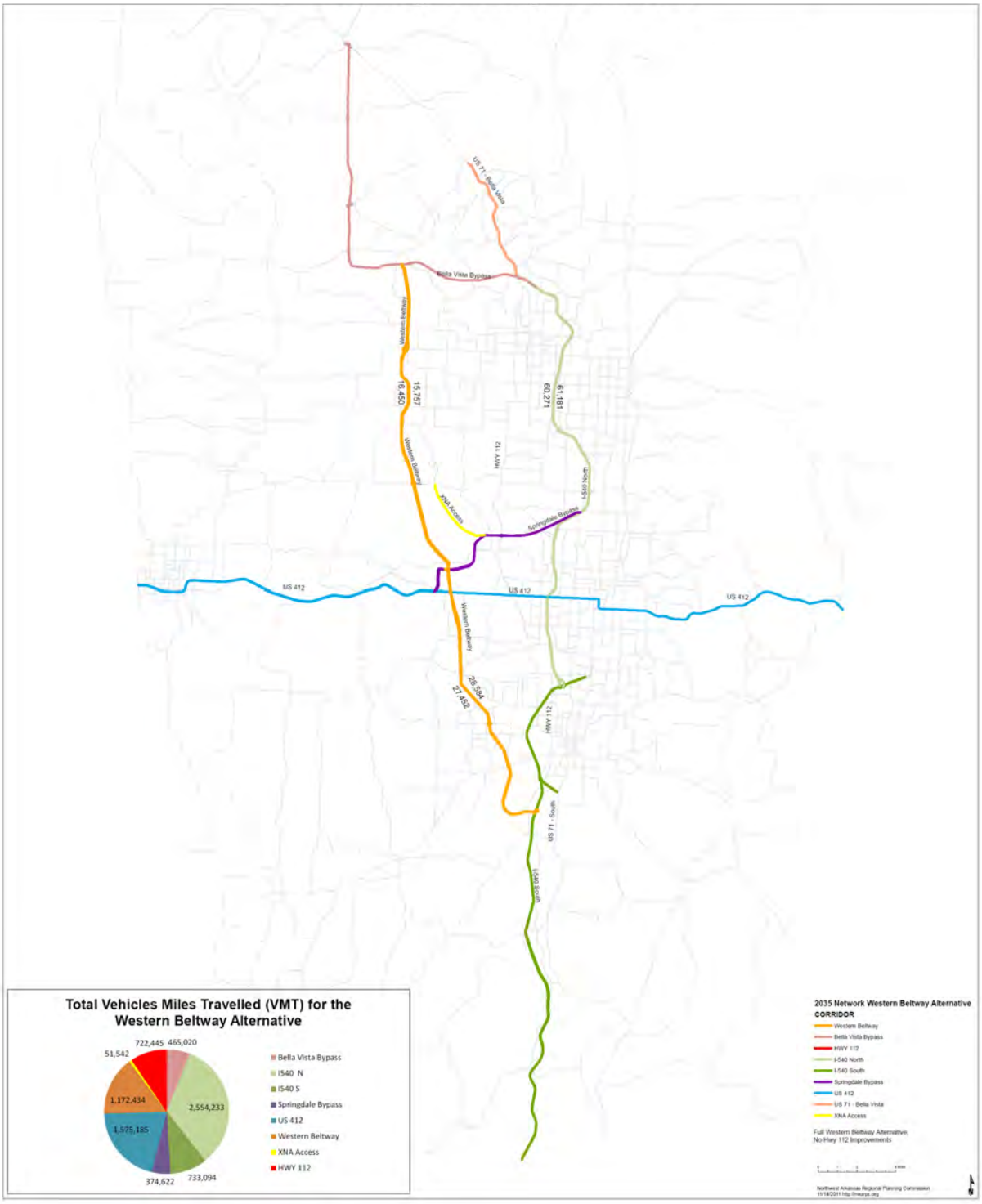


**Figure 15. 2035 Alternative 1: Hwy 112 Improvements N/S Western Beltway**

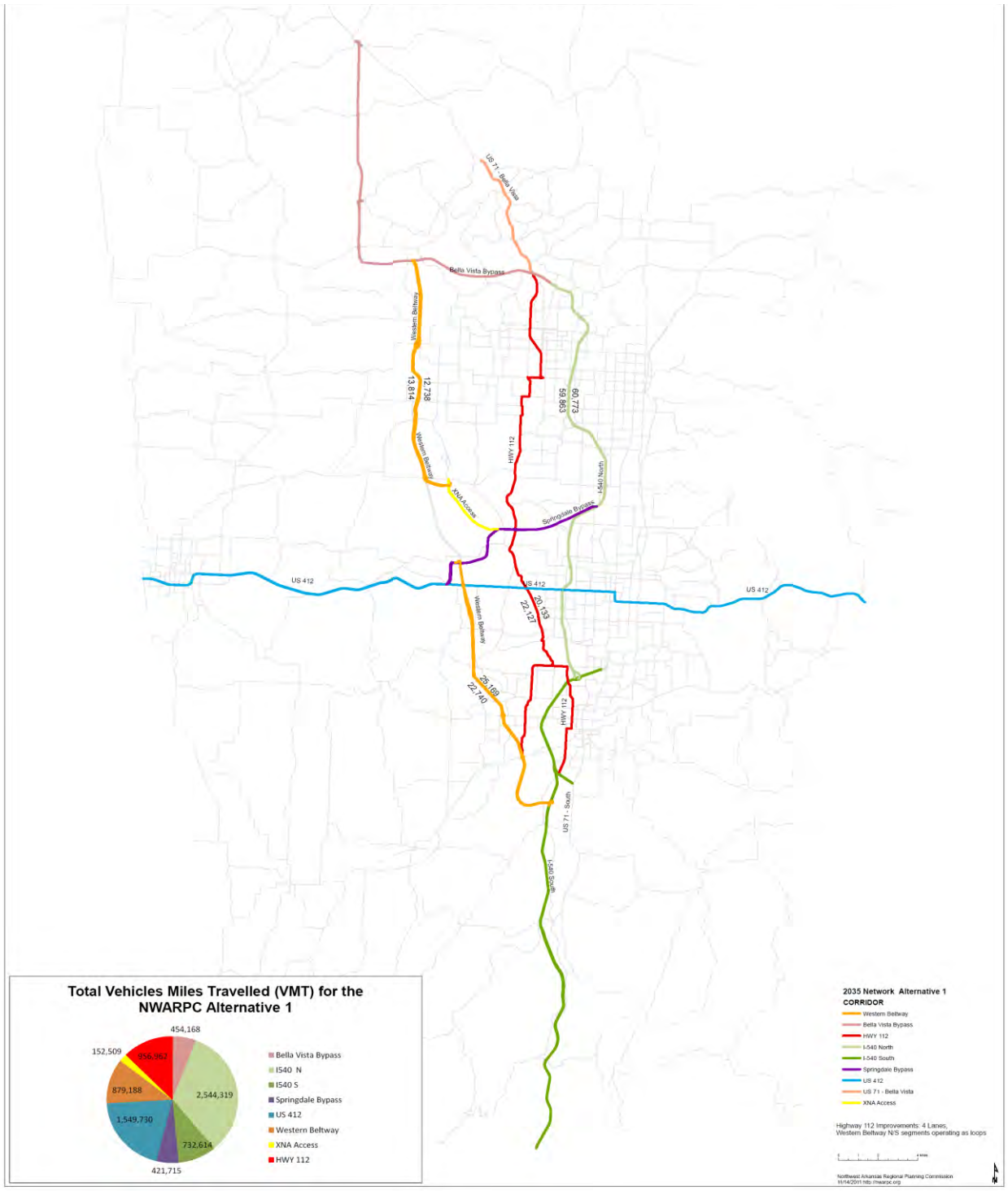
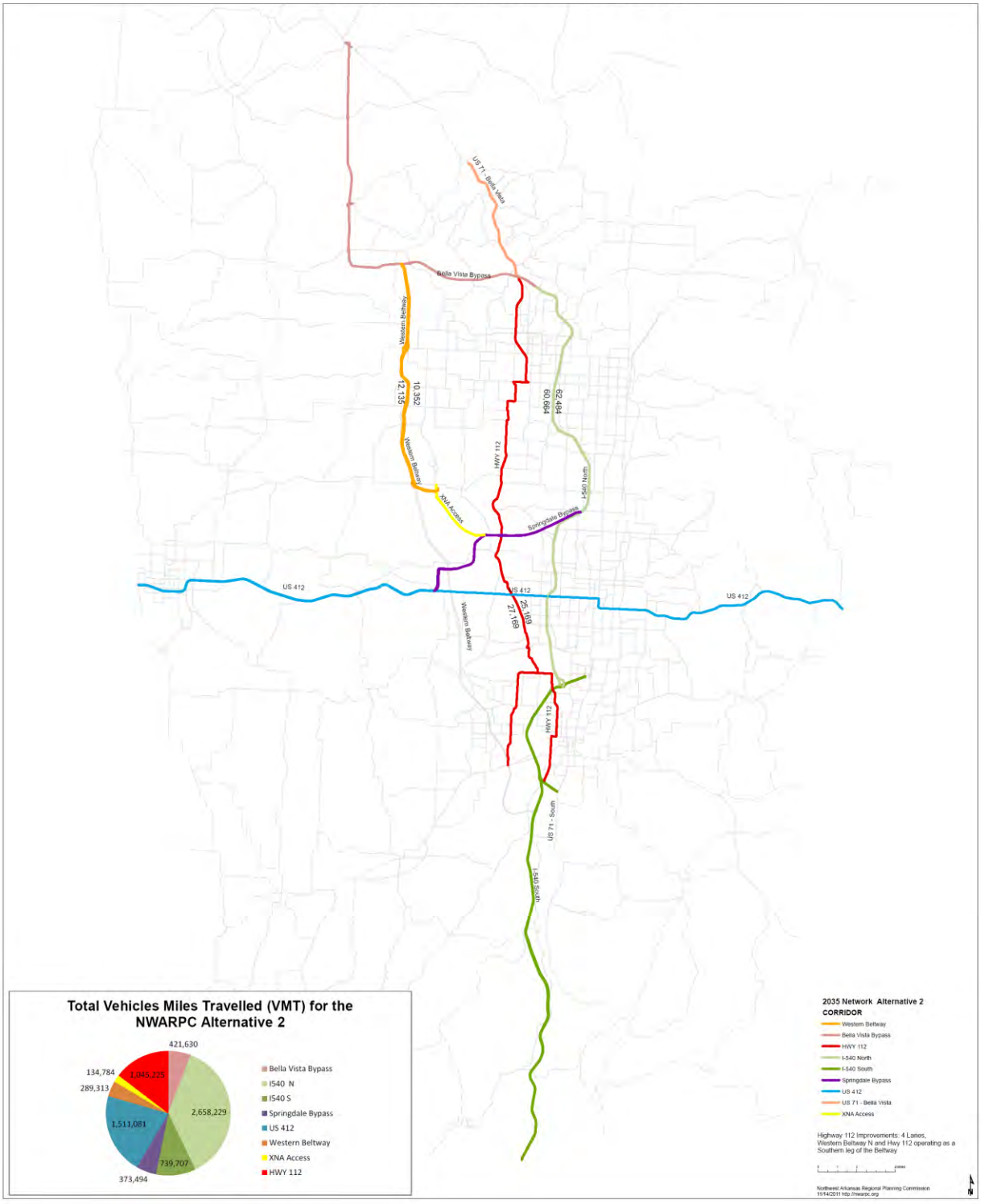
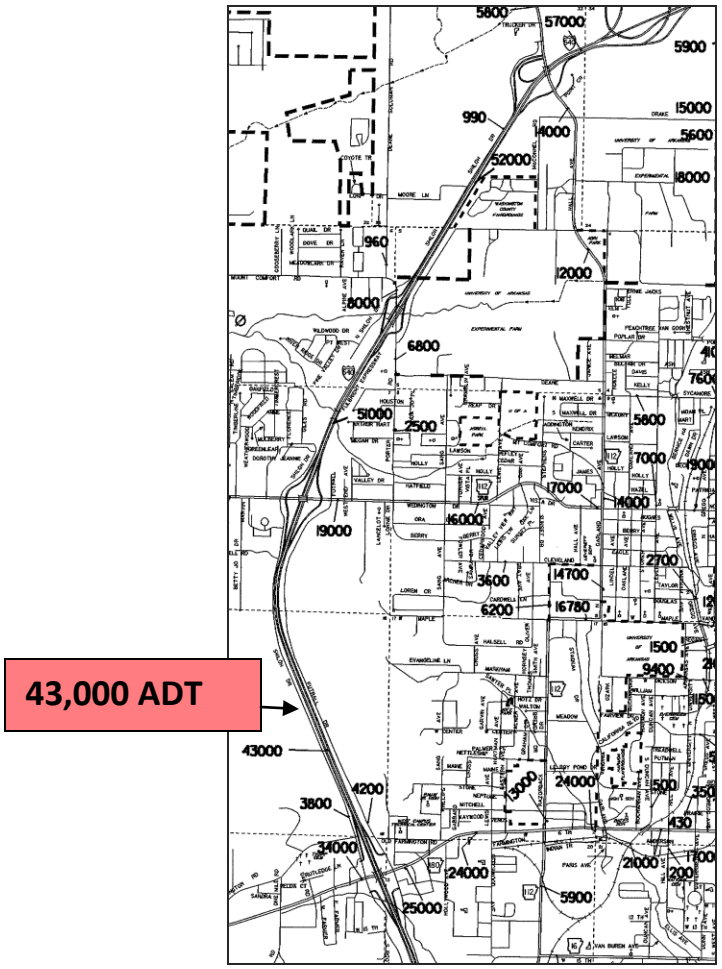


**Figure 16. Alternative 2: Hwy 112 Improvements Hwy 112 as Southern Leg**



The analysis of the options found that even with construction of additional lanes on I-540, significant traffic would use a western beltway by 2035. Volumes forecast for the southern segment approach 45,000 vehicles per day are consistent with the amount of traffic using I-540 between the Farmington and Weddington interchanges just a few years ago and indicates a lack of north-south highway capacity to serve the region (**Figure 17**). This amount of traffic warrants the need for a major arterial such as the Western Beltway as well as improvements to Highway 112.

**Figure 17. 2035 Volumes**



## WHAT ARE THE MAJOR FINDINGS FROM THE STUDY?

### OTHER CONSIDERATIONS

While the current economic downturn has abated rapid development in Washington and Benton Counties, the economic drivers, quality of life amenities and conditions that stimulated regional prosperity over the past three decades remain. As the nation's economy recovers, a return to booming regional growth can be anticipated. Analyses conducted during this study as well as previous studies find the need for additional highway capacity, especially in north-south directions to accommodate traffic generated by a linear arrangement of population centers in the two counties and the external traffic they generate and attract. The analysis determined that even with additional lanes, I–540 will be inadequate to satisfy future traffic demand and will return to increasing stop and go conditions during peak travel times.

Future land development that will result from population and economic growth will likely occur in areas west of I-540. Currently, only a few minor two-lane roads are available to serve this future development. It is logical to assume the need for a future major arterial roadway to provide for travel in the region which will necessitate a similar study, concerns for right of way preservation and questions associated with funding and prioritization. The completion of the *Northwest Arkansas Western Beltway Feasibility Study* will provide importation analyses and documentation that can support future planning and governmental decision making for regional growth and development.

### CONCLUSIONS

The completion of the *Northwest Arkansas Western Beltway Feasibility Study* provides answers to questions posed by the NWARPC committees regarding the need for a new beltway. The study found mixed public support with a small majority of the people responding to study questionnaires favoring the project.

Care was taken during the engineering studies to locate beltway corridors to identify and avoid environmental resources. As a result, the implementation of the project is not expected to cause major adverse environmental harm.

Traffic studies and forecasts concluded that even with expansion of I-540 to provide additional lanes, a major arterial highway such as the Western Beltway will be needed to address future north-south traffic congestion in the western regions of Washington and Benton counties as the region grows and population and traffic expand. However, toll analyses performed for the study concluded that toll revenues would provide only a small portion of the funding needed for construction of a western beltway. Due to major changes and uncertainty in traditional highway funding sources, no alternative funding options could be identified.

Due to these findings, a western beltway does not appear to be a solution to I-540 congestion in the short term but would furnish relief by diverting traffic away from the facility.

## APPENDICIES:

APPENDIX I - PROJECT ASSUMPTIONS FOR TOLL ROAD ANALYSIS

APPENDIX II - NORTHWEST ARKANSAS TRAFFIC VOLUMES AND ANNUAL GROWTH RATES FOR NORTH-SOUTH HIGHWAYS

APPENDIX III - OPERATIONAL ANALYSIS OF NWA'S MAJOR NORTH-SOUTH HIGHWAYS

APPENDIX IV – SUMMARY OF TOLL TRANSACTIONS AND TOLL REVENUES

## APPENDIX I - WESTERN BELTWAY PROJECT ASSUMPTIONS

### Project Description

*Project Alignment and Capital Cost*

- Alignment to be studied: Identified as Alternative 2 on attached Corridor Alternatives Map
- Initial capital cost: $774 million in 2010 dollars (including toll collection systems). Costs will be escalated to year-of-expenditure dollars for the financial analysis.

### Operating Assumptions

*Ownership & Operation*

- Publically owned and operated as stand-alone toll facility
- Traditional procurement

*Timing*

- Construction start: January 2020
- Roadway open: January 1, 2025
- Forecast horizon: 30 years from project opening

*Tolling Assumptions*

- Toll Rates
    - Variable tolling will be in place whereby a higher toll rate per mile would be charged during weekday AM and PM peak periods, and a lower toll rate per mile would be charged during off-peak hours and on weekends and holidays. (The Bella Vista Bypass assumed a fixed toll rate per mile.)
    - For passenger cars, one peak period toll rate would be analyzed, e.g. 20 cents per mile and one off-peak toll rate would be analyzed, e.g. 15 cents per mile in 2010 dollars. Adjustments would be made for the higher video toll rate in the toll diversion curves. (The Bella Vista Bypass assumed a toll rate of 10 cents per mile for through traffic and 25 cents per mile for local traffic.)

- For trucks and commercial vehicles, the toll rate would be based on a multiple of the passenger car toll rate and based on the vehicle size. (The Bella Vista Bypass assumed light trucks would be charged at double the rate of passenger cars and heavy trucks would be charged at four times the passenger car rate.) The current assumption is that light trucks would be charged at 1.5 times and heavy trucks at 3.0 times the passenger car rate.
- The projected revenues would be based on the assumption that toll rates would increase every three years to keep pace with inflation, assumed to be 2.5 percent/year. Toll rates will be rounded to the closest five cents (e.g., $2.55 rather than $2.56) (The Bella Vista Bypass assumed that toll rates would increase at the rate of inflation, but due to the cash transactions, tolls were increased less frequently than on an annual basis in 25 cent increments.)

- Toll Collection
  - Electronic Toll Collection (ETC) using transponders with Video Tolling for vehicles without transponders. (The mainline toll collection point on the Bella Vista Bypass was assumed to have two express ETC lanes and two cash lanes per direction.)
  - ETC transponders would be distributed to motorists who open accounts, at low or no cost. One or more transponders would be tied to an account.
  - Vehicles without transponders would be billed based on video recognition of license plates for an additional charge. Stantec currently assumes that video tolls would be 20% higher than electronic toll. (Cash tolls were assumed to be collected on the Bella Vista Bypass.)
  - Transponder share of toll transactions - 50% first year, 60% fifth year, 70% tenth year and 80% in the twentieth year and thereafter.
  - There would be a widespread publicity campaign to introduce ETC transponder use in Northwest Arkansas.
  - Uncollectable toll revenue equal to 10% of video toll revenue.
  - The ETC system selected would be compatible with transponders used on nearby toll roads, such as the Oklahoma Turnpike.
  - Toll collection points would be located between interchanges in both directions of travel, as determined by Parsons Brinckerhoff. Stantec assumed six overhead gantry toll collection points.

*Traffic Assumptions*

- Traffic ramp-up – adjustment to baseline forecast to account for the time drivers will take to evaluate alternatives and become accustomed to using the toll road (same as Bella Vista Bypass):
    - First Year 55%
    - Second Year 70%
    - Third Year 85%
    - Fourth Year 90%
    - Fifth Year 100%
- Truck data collected for the Bella Vista Bypass would be reviewed to determine the average number of axles and the average truck toll rate.
- Available data would be analyzed to determine the percentage of trucks on I-540.

*Network Assumptions*

- The transportation improvements included in the Northwest Arkansas Regional Planning Commission (NWARPC) regional model for 2035, as updated by Parsons Brinckerhoff, would be implemented, on schedule and as configured in the model. Notable highway project opening years:
    - I-540 expanded to six lanes prior to the opening of the Western Beltway.
    - Bella Vista Bypass Toll Road will open in 2020 (two lanes in each direction).
    - Western leg of the Highway 412 Northern Bypass (portion west of I-540) will open in 2025.
    - XNA Access Road to Highway 112 will open in 2020.
- No competing routes or improvements to existing roads, other than those included in the updated Northwest Arkansas Regional Planning Commission (NWARPC) 2035 regional model, would be constructed and all feeder routes included in the model would be constructed as planned and on schedule.

*Socio-economic Conditions*

- Population, labor force and employment growth would generally follow the trends forecast by IHS Global Insight through 2040 and then would be extrapolated at a gradually decreasing annual rate of change through 2065.

*Uses of Toll Revenue*

- All operating costs (toll collection, roadway maintenance, administration & overhead) and toll collection equipment rehabilitation & replacement costs paid prior to debt service.
- All roadway rehabilitation expenses paid with excess revenues after debt service.
- Toll system operating cost estimate is based on a stand-alone toll operations center and customer service center.

**Funding Assumptions**

- Primary funding source: non-recourse, tax-exempt, toll revenue bonds (backed only by toll revenues)
- Project funding contribution from tolls will be identified. The amount and timing of any costs not covered by toll revenue will be presented.
- Toll bond proceeds assumed to pay project costs after the point in time when a commitment is made to construct the project.

# APPENDIX II - NORTHWEST ARKANSAS TRAFFIC VOLUMES AND ANNUAL GROWTH RATES FOR NORTH-SOUTH HIGHWAYS

| Table 1. I-540 Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| **Washington County** | | | | |
| **I-540 Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **Exit 45 - Exit 53 Hwy. 74 to Hwy. 170** | 20,000 | 17,000 | 1.77% | 26000 |
| **Exit 53 - Exit 58 Hwy. 170 to W. Wilson St** | 22,000 | 20,000 | 1.77% | 31000 |
| **Exit 58 - Exit 61 W. Wilson St to Hwy. 265/Hwy. 112** | 27,000 | 26,000 | 1.77% | 40000 |
| **Exit 61 - Exit 62 Hwy. 265/Hwy. 112 to Hwy. 62/Hwy. 180** | 34,000 | 32,000 | 1.77% | 50000 |
| **Exit 62 - Exit 64 Hwy. 62/Hwy. 180 to Hwy. 16/Hwy. 112 Spur** | 54,000 | 52,000 | 1.77% | 81000 |
| **Exit 64 - Exit 65 Hwy. 16/Hwy. 112 Spur to N. Porter Rd.** | 63,000 | 61,000 | 1.77% | 95000 |
| **Exit 65 - Exit 66 N. Porter Rd. to Hwy. 112** | 67,000 | 65,000 | 1.77% | 101000 |
| **Exit 66 - Exit 67 Hwy. 112 to Hwy. 71 Business** | 74,000 | 72,000 | 1.77% | 112000 |
| **Exit 67 - Exit 69 Hwy. 71 Business to Great House Springs Rd.** | 60,000 | 58,000 | 1.77% | 90000 |
| **Exit 69 - Exit 72 Great House Springs Rd. to Hwy. 412** | 61,000 | 60,000 | 1.77% | 93000 |
| **Exit 72 - Exit 73 Hwy. 412 to Elm Springs Rd.** | 63,000 | 62,000 | 1.77% | 96000 |
| **Exit 73 - Exit 76 Elm Springs Rd. to Wagon Wheel Rd.** | 64,000 | 69,000 | 1.77% | 107000 |
| **Benton County** | | | | |
| **I-540 Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **Exit 76 - Exit 77 Wagon Wheel Rd. to Prop. Hwy 412 Bypass** | 64,000 | 69,000 | 2.14% | 117,000 |
| **Exit 77 - Exit 78 Prop. Hwy 412 Bypass to Hwy. 264** | 63,000 | 69,000 | 2.14% | 117,000 |
| **Exit 78 - Exit 81 Hwy. 264 to Pleasant Grove Rd.** | 65,000 | 69,000 | 2.14% | 117,000 |
| **Exit 81 - Exit 82 Pleasant Grove Rd. to Perry Rd.** | 64,000 | 69,000 | 2.14% | 117,000 |
| **Exit 82 - Exit 83 Perry Rd. to Hwy. 94** | 63,000 | 69,000 | 2.14% | 117,000 |
| **Exit 83 - Exit 85 Hwy. 94 to Hwy. 71B** | 67,000 | 70,000 | 2.14% | 119,000 |
| **Exit 85 - Exit 86 Hwy. 71B to Hwy. 102/Hwy. 62** | 55,000 | 58,000 | 2.14% | 98,000 |
| **Exit 86 - Exit 88 Hwy. 102/Hwy. 62 to Hwy. 71/Hwy. 72** | 39,000 | 42,000 | 2.14% | 71,000 |
| **Exit 88 - Exit 93 North Hwy. 71/Hwy. 72 to North** | 32,000 | 34,000 | 2.14% | 58,000 |

| Table 2. Highway 71 Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| **Washington County** | | | | |
| **Highway 71 Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **Highway 74 (East) to Highway 156 (West)** | 2,800 | 2,800 | 1.77% | 4,300 |
| **Highway 156 (West) to CR 30** | 5,700 | 5,900 | 1.77% | 9,100 |
| **CR 30 to Wilson Street** | 6,200 | 6,300 | 1.77% | 9,800 |
| **Wilson Street to Sunrise Mountain Road** | 7,600 | 8,500 | 1.77% | 13,000 |
| **Sunrise Mountain Road to Highway 71B** | 10,000 | 10,000 | 1.77% | 16,000 |
| **Highway 71B to I-540** | 9,800 | 10,000 | 1.77% | 16,000 |
| **Benton County** | | | | |
| **Highway 71 Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **Highway 71B to CR 40** | 45,000 | 48,000 | 2.14% | 81,000 |

| Table 3. Highway 71B Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| Washington County | | | | |
| **Highway 71B Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **Highway 71 to Highway 265** | 10,000 | 9,000 | 1.77% | 14,000 |
| **Highway 265 to Highway 16** | 11,000 | 11,000 | 1.77% | 17,000 |
| **Highway 16 to Highway 180** | 13,000 | 12,000 | 1.77% | 19,000 |
| **Highway 180 to School Avenue** | 18,000 | 18,000 | 1.77% | 28,000 |
| **School Avenue to Rock Street** | 15,000 | 15,000 | 1.77% | 23,000 |
| **Rock Street to Dickson Street** | 21,000 | 24,000 | 1.77% | 37,000 |
| **Dickson Street to Highway 45** | 25,000 | 27,000 | 1.77% | 42,000 |
| **Highway 45 to Trenton Boulevard** | 23,000 | 24,000 | 1.77% | 47,000 |
| **Trenton Boulevard to Oakwood Street** | 25,000 | 27,000 | 1.77% | 42,000 |
| **Oakwood Street to Township Road** | 28,000 | 29,000 | 1.77% | 45,000 |
| **Township Road to Highway 71** | 31,000 | 31,000 | 1.77% | 48,000 |
| **I-540 to Northhills Boulevard** | 46,000 | 46,000 | 1.77% | 71,000 |
| **Northhills Boulevard to Highway 71B** | 32,000 | 32,000 | 1.77% | 50,000 |
| **Highway 71B to Zion Road** | 40,000 | 39,000 | 1.77% | 60,000 |
| **Zion Road to Main Drive** | 37,000 | 37,000 | 1.77% | 57,000 |
| **Main Drive to Shady Grove Road** | 33,000 | 32,000 | 1.77% | 50,000 |
| **Shady Grove Road to Arapaho Avenue** | 29,000 | 28,000 | 1.77% | 43,000 |
| **Arapaho Avenue to Robinson Avenue** | 22,000 | 22,000 | 1.77% | 34,000 |
| **Robinson Avenue to Highway 412 (East)** | 22,000 | 22,000* | 1.77% | 34,000 |
| **Highway 412 (East) to Highway 412 (West)** | 32,000 | 34,000 | 1.77% | 53,000 |
| **Highway 412 (West) to Emma Avenue** | 30,000 | 30,000 | 1.77% | 47,000 |
| **Emma Avenue to Huntsville Avenue** | 28,000 | 29,000 | 1.77% | 45,000 |
| **Huntsville Avenue to Randall Wobbe Lane** | 26,000 | 26,000 | 1.77% | 40,000 |
| **Randall Wobbe Lane to County Line** | 25,000 | 25,000* | 1.77% | 39,000 |
| Benton County | | | | |
| **Highway 71B Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |

| Table 3. Highway 71B Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| County Line to Highway 264 (East) | 26,000 | 26,000 | 2.14% | 44,000 |
| Highway 264 (East) to Apple Blossom Avenue | 28,000 | 28,000 | 2.14% | 48,000 |
| Apple Blossom Avenue to Highway 264 (West) | 31,000 | 30,000 | 2.14% | 51,000 |
| Highway 264 (West) to Pleasant Grove Road | - | 24,000 | 2.14% | 41,000 |
| Pleasant Grove Road to Price Lane | 20,000 | 22,000 | 2.14% | 37,000 |
| Price Lane to Highway 94 (West) | 22,000 | 22,000 | 2.14% | 37,000 |
| Highway 94 (West) to Oak Street | 22,000 | 23,000 | 2.14% | 39,000 |
| Oak Street to Highway 94 (North) | 22,000 | 22,000 | 2.14% | 37,000 |
| Highway 94 (North) to Dixieland Road | 24,000 | 24,000 | 2.14% | 41,000 |
| Dixieland Road to 34th Street | 27,000 | 27,000 | 2.14% | 46,000 |
| 34th Street to 45th Street | 30,000 | 28,000 | 2.14% | 48,000 |
| 45th Street to I-540 | 31,000 | 31,000 | 2.14% | 53,000 |
| I-540 to Highway 112 | 37,000 | 38,000 | 2.14% | 65,000 |
| Highway 112 to Highway 12 | 32,000 | 34,000 | 2.14% | 58,000 |
| Highway 12 to Rainbow Lane | 19,000 | 21,000 | 2.14% | 36,000 |
| Rainbow Lane to Highway 204 | 23,000 | 24,000 | 2.14% | 41,000 |
| Highway 204 to SW A Street | 28,000 | 30,000 | 2.14% | 51,000 |
| SW A Street to Highway 102 | 26,000 | 28,000 | 2.14% | 48,000 |
| Highway 102 to SW 8th Street | 28,000 | 30,000 | 2.14% | 51,000 |
| SW 8th Street to SW I Street | 29,000 | 27,000 | 2.14% | 46,000 |
| SW I Street to Highway 72 | 31,000 | 30,000 | 2.14% | 51,000 |
| Highway 72 to Tiger Boulevard | 23,000 | 23,000 | 2.14% | 39,000 |
| Tiger Boulevard to NW A Street | 17,000 | 16,000 | 2.14% | 27,000 |
| NW A Street to I-540 | 20,000 | 19,000 | 2.14% | 32,000 |

*2010 ADT was not available, therefore 2009 ADT was used.

| Table 4. Highway 112 Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| Washington County | | | | |
| Highway 112 Location | 2009 ADT | 2010 ADT | 2010 to 2035 AGR | 2035 ADT |
| I-540 to Highway 265 | 6,800 | 7,300 | 1.77% | 11,000 |
| Highway 265 to W. 15th Street | 6,500 | 6,600 | 1.77% | 10,000 |
| W. 15th Street to Highway 180 | 11,000 | 9,900 | 1.77% | 15,000 |
| Highway 180 to Maple Avenue | 17,000 | 17,000 | 1.77% | 26,000 |
| Maple Avenue to Garland Avenue | 14,000 | 14,000 | 1.77% | 22,000 |
| Garland Avenue to Wedington Road | 14,000 | 14,000 | 1.77% | 22,000 |
| Wedington Road to Velma Drive | 6,800 | 15,000 | 1.77% | 23,000 |
| Velma Drive to W. Drake Street | 14,000 | 14,000 | 1.77% | 22,000 |
| W. Drake Street to I-540 | 12,000 | 18,000 | 1.77% | 28,000 |
| I-540 to Van Asche Drive | 16,000 | 8,100 | 1.77% | 13,000 |
| Van Asche Drive to S. Maestri Road | 8,000 | 7,700 | 1.77% | 12,000 |
| S. Maestri Road to Great House Springs Road | 6,700 | 5,900 | 1.77% | 9,100 |
| Great House Springs Road to CR 204 | 5,900 | 5,300 | 1.77% | 8,200 |
| CR 204 to Highway 412 | 5,500 | 6,300 | 1.77% | 9,800 |
| Highway 412 to CR 84 | 6,400 | 4,000 | 1.77% | 6,200 |
| CR 84 to Water Avenue | 4,300 | 5,800 | 1.77% | 9,000 |
| Water Avenue to County Line | 6,300 | 6,000 | 1.77% | 9,300 |

| Table 4. Highway 112 Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| Benton County | | | | |
| Highway 112 Location | 2009 ADT | 2010 ADT | 2010 to 2035 AGR | 2035 ADT |
| **County Line to CR 70** | 6,000 | 6,000 | 2.14% | 10,000 |
| **CR 70 to Highway 264 (East)** | 5,000 | 4,500 | 2.14% | 7,600 |
| **Highway 264 (East) to Highway 264 (West)** | 9,100 | 7,900 | 2.14% | 13,000 |
| **Highway 264 (West) to Sand Road** | 4,500 | 4,100 | 2.14% | 7,000 |
| **Sand Road to Haxton Road** | 5,000 | 4,600 | 2.14% | 7,800 |
| **Haxton Road to Windmill Road** | 3,800 | 4,200 | 2.14% | 7,100 |
| **Windmill Road to SW Regional Airport Boulevard** | 4,800 | 4,100 | 2.14% | 7,000 |
| **SW Regional Airport Boulevard to Highway 71B** | 21,000 | 22,000 | 2.14% | 37,000 |

| Table 5 Highway 265 Traffic Volumes & Annual Growth Rate | | | | |
|---|---|---|---|---|
| Washington County | | | | |
| **Highway 112 Location** | **2009 ADT** | **2010 ADT** | **2010 to 2035 AGR** | **2035 ADT** |
| **CR 20 to Wilson Street** | 4,100 | 3,600 | 1.77% | 5,600 |
| **Wilson Street to I540** | 1,700 | 1,700 | 1.77% | 2,600 |
| **Highway 16 to CR 48** | 16,000 | 15,000 | 1.77% | 23,000 |
| **CR 48 to Highway 45** | 19,000 | 21,000 | 1.77% | 33,000 |
| **Highway 45 to Township Road** | 22,000 | 21,000 | 1.77% | 33,000 |
| **Township Road to Old Wire Road** | 18,000 | 17,000 | 1.77% | 36,000 |
| **Old Wire Road to Joyce Boulevard** | 18,000 | 17,000 | 1.77% | 26,000 |
| **Joyce Boulevard to Randal Place** | 16,000 | 16,000* | 1.77% | 25,000 |
| **Randal Place to E. Zion Road** | 18,000 | 17,000 | 1.77% | 26,000 |
| **E. Zion Rd to Co. Highway 555** | 18,000 | 17,000 | 1.77% | 26,000 |
| **Co. Highway 555 to Highway 412** | 16,000 | 16,000 | 1.77% | 25,000 |
| **Highway 412 to Beverly Avenue** | 20,000 | 19,000 | 1.77% | 29,000 |
| **Beverly Avenue to E. Emma Avenue** | 19,000 | 19,000 | 1.77% | 29,000 |
| **E. Emma Avenue to E. Mountain Road** | 18,000 | 17,000 | 1.77% | 26,000 |
| **E. Mountain Road to E. Randall Wobbe Lane** | 17,000 | 16,000 | 1.77% | 25,000 |

*2010 ADT was not available, therefore 2009 ADT was used.

## APPENDIX III - OPERATIONAL ANALYSIS OF NWA'S MAJOR NORTH-SOUTH HIGHWAYS

As noted in the report, the freeway module of *HCS+* was used to determine the level of service (LOS) along I-540 and the Fulbright Expressway. **Table 1** below shows the levels of service as stated in the *HCM*, pp. 10-9 and 11-7.

**Table 1. LOS Thresholds – Freeways**

| Level of Service | Description | Density (pc/mi/ln) |
|---|---|---|
| **A** | Free flow | ≤11 |
| **B** | Slight restriction to free flow | > 11 – 18 |
| **C** | Restrictions to free flow | > 18 – 26 |
| **D** | Noticeable restriction, declining speeds | > 26 – 35 |
| **E** | No gaps in traffic, volatile speeds | > 35 – 45 |
| **F** | Breakdown, large queues, recurring congestion | > 45 |

For this study, I-540 was divided into 21 segments beginning at the Exit 45 interchange at Highway 74 and ending at the Exit 93 interchange north of the convergence with Highway 71. Based on the findings for the I-540 corridor, the majority of the route is already congested and inadequate. As expected, the operational analysis for I-540 indicates that this facility will continue to operate at over capacity unless widening for additional lanes or an additional north/south corridor is added. Additional lanes or an alternate route are needed from the Exit 62 interchange at Highway 62 in Washington County all the way to the end of I-540 at Exit 93 in Benton County. LOS data from 2009 was provided by NWARPC; it is unclear what methodology was used to determine these LOS values, but it appears that delay was used rather than density in the calculations. Even though the volumes are similar, this may have caused some minor discrepancies between the values provided for 2010 and the values calculated for 2010 using HCS. **Table 2** summarizes the I-540 LOS. Once density levels reach a certain level, the program no longer reports a density value as shown on most of the 2035 segments.

**Table 2. Freeway Level of Service – I-540**

| Washington County | | | | | |
|---|---|---|---|---|---|
| I-540 Location | 2009 | 2010 | | 2035 | |
| | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| **Exit 45 - Exit 53 Hwy. 74 to Hwy. 170** | A | 11.7 | B | 18.2 | C |
| **Exit 53 - Exit 58 Hwy. 170 to W. Wilson St** | A | 13.7 | B | 22.5 | C |
| **Exit 58 - Exit 61 W. Wilson St to Hwy. 265/Hwy. 112** | C | 17.5 | B | 31.2 | D |
| **Exit 61 - Exit 62 Hwy. 265/Hwy. 112 to Hwy. 62/Hwy. 180** | B | 20.6 | C | 42.1 | E |
| **Exit 62 - Exit 64 Hwy. 62/Hwy. 180 to Hwy. 16/Hwy. 112 Spur** | E | 39.2 | E | 714.0 | F |
| **Exit 64 - Exit 65 Hwy. 16/Hwy. 112 Spur to N. Porter Rd.** | F | 54.6 | F | - | F |
| **Exit 65 - Exit 66 N. Porter Rd. to Hwy. 112** | F | 67.0 | F | - | F |
| **Exit 66 - Exit 67 Hwy. 112 to Hwy. 71 Business** | F | 106.5 | F | - | F |

| Table 2. Freeway Level of Service – I-540 | | | | | |
|---|---|---|---|---|---|
| **Exit 67 - Exit 69 Hwy. 71 Business to Great House Springs Rd.** | F | 46.1 | F | - | F |
| **Exit 69 - Exit 72 Great House Springs Rd. to Hwy. 412** | F | 48.6 | F | - | F |
| **Exit 72 - Exit 73 Hwy. 412 to Elm Springs Rd.** | F | 55.2 | F | - | F |
| **Exit 73 - Exit 76 Elm Springs Rd. to Wagon Wheel Rd.** | F | 80.6 | F | - | F |
| Benton County | | | | | |
| I-540 Location | **2009** | **2010** | | **2035** | |
| | **LOS** | **Density (pc/mi/ln)** | **LOS** | **Density (pc/mi/ln)** | **LOS** |
| **Exit 76 - Exit 77 Wagon Wheel Rd. to Prop. Hwy 412 Bypass** | F | 80.6 | F | - | F |
| **Exit 77 - Exit 78 Prop. Hwy 412 Bypass to Hwy. 264** | F | 76.3 | F | - | F |
| **Exit 78 - Exit 81 Hwy. 264 to Pleasant Grove Rd.** | F | 85.4 | F | - | F |
| **Exit 81 - Exit 82 Pleasant Grove Rd. to Perry Rd.** | F | 85.4 | F | - | F |
| **Exit 82 - Exit 83 Perry Rd. to Hwy. 94** | F | 85.4 | F | - | F |
| **Exit 83 - Exit 85 Hwy. 94 to Hwy. 71B** | F | 86.1 | F | - | F |
| **Exit 85 - Exit 86 Hwy. 71B to Hwy. 102/Hwy. 62** | D | 46.1 | F | - | F |
| **Exit 86 - Exit 88 Hwy. 102/Hwy. 62 to Hwy. 71/Hwy. 72** | E | 27.3 | D | 118.9 | F |
| **Exit 88 - Exit 93 North Hwy. 71/Hwy. 72 to North** | C | 20.5 | C | 51.8 | F |

From I-540 to Highway 71B, Highway 71 (Fulbright Expressway) is a freeway section. Additionally, the Fulbright Expressway runs concurrent with I-540 from Exit 86 to Exit 93. Based on the findings for Fulbright Expressway (shown in **Table 3**), the freeway sections operate at an acceptable level of service for 2010, but improvements will be necessary to achieve adequate levels of service for 2035 from I-540 to North Hills Boulevard.

| Table 3 Freeway Level of Service - Fulbright Expressway | | | | | |
|---|---|---|---|---|---|
| Washington County | | | | | |
| I-540 Location | **2009** | **2010** | | **2035** | |
| | **LOS** | **Density (pc/mi/ln)** | **LOS** | **Density (pc/mi/ln)** | **LOS** |
| **I-540 to North Hills Boulevard** | D | 25.4 | C | 62.8 | F |
| **North Hills Boulevard to Highway 71B** | B | 16.3 | B | 28.8 | D |
| **Highway 71B to I-540** | A | 5.1 | A | 8.1 | A |

**Directional Two-Lane Highway Analysis - Highway 112 and Highway 265**

The directional two-lane highway module of *HCS+* was used to determine the LOS along segments of Highway 112 and Highway 265. **Table 4** below show the levels of service as stated in the *HCM*, pp. 15-7.

| Table 4. LOS Thresholds – Two-Lane Highways | | | | | |
|---|---|---|---|---|---|
| Level of Service | Description | Class I Highways | | Class II Highways PTSF (%) | Class III Highways PTSF (%) |
| | | ATS (mi/h) | PTSF (%) | | |
| **A** | Free flow | >55 | ≤35 | ≤40 | >91.7 |
| **B** | Slight restriction to free flow | >50-55 | >35-50 | >40-55 | > 83.3-91.7 |
| **C** | Restrictions to free flow | >45-50 | >50-65 | >55-70 | > 75.0-83.3 |
| **D** | Noticeable restriction, declining speeds | >40-45 | >65-80 | >70-85 | > 66.7-75.0 |
| **E** | No gaps in traffic, volatile speeds | ≤40 | >80 | >85 | ≤ 66.7 |

ATS = Average Travel Speed
PTSF = Percent Time Spent Following

Portions of Highway 112 from Van Asche Drive to Highway 71B and the segment of Highway 265 from CR 20 to I-540 were analyzed as directional two-lane highways. These analyses utilized speed and passing ability to determine LOS. The free flow speeds used for these analyses ranged from 45-55 mph. The results of these analyses are shown in **Tables 5** and **6**. Some discrepancies are shown between the LOS in 2009 and in 2010; this is likely due to the different methodologies used to calculate LOS for 2009 and 2010. When comparing the LOS for 2010 and 2035, this analysis shows that all of Highway 265 and most of the Highway 112 corridors will maintain adequate LOS, but some improvements will be needed on Highway 112 from Water Avenue to County Line.

| Table 5. Directional Two-Lane Highway Analysis – Highway 112 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Washington County | | | | | | | |
| Highway 112 Location | 2009 | | | 2010 | | | 2035 |
| | LOS | ATS (mi/hr) | PTSF (%) | LOS | ATS (mi/hr) | PTSF (%) | LOS |
| **Van Asche Drive to S. Maestri Road** | A | 36.9 | 74.7 | C | 33.8 | 84.8 | D |
| **S. Maestri Road to Great House Springs Road** | D | 39.3 | 71.4 | C | 37.1 | 79.7 | C |
| **Great House Springs Road to CR 204** | E | 36.6 | 68.7 | C | 34.8 | 77.0 | C |
| **CR 84 to Water Avenue** | E | 37.5 | 70.2 | C | 35.4 | 79.7 | C |
| **Water Avenue to County Line** | - | 24.6 | 71.4 | D | 22.4 | 81.1 | E |
| Benton County | | | | | | | |
| Highway 112 Location | 2009 | | | 2010 | | | 2035 |
| | LOS | ATS (mi/hr) | PTSF (%) | LOS | ATS (mi/hr) | PTSF (%) | LOS |
| **County Line to CR 70** | D | 44.3 | 69.6 | B | 41.5 | 81.4 | C |
| **Highway 264 (West) to Sand Road** | D | 33.0 | 63.7 | C | 31.2 | 74.0 | C |
| **Sand Road to Haxton Road** | D | 48.9 | 66.8 | B | 46.7 | 75.2 | C |
| **Haxton Road to Windmill Road** | A | 52.7 | 63.0 | B | 50.9 | 73.3 | B |

| Table 6. Directional Two-Lane Highway Analysis – Highway 265 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Washington County | | | | | | | |
| Highway 112 Location | 2009 | 2010 | | | 2035 | | |
| | LOS | ATS (mi/hr) | PTSF (%) | LOS | ATS (mi/hr) | PTSF (%) | LOS |
| **CR 20 to Wilson Street** | C | 30.9 | 61.0 | C | 29.2 | 70.3 | C |
| **Wilson Street to I-540** | A | 43.7 | 46.3 | B | 42.3 | 54.0 | B |

**Multi-Lane Highway Analysis - Highway 71B**

For the 2015 and 2035 conditions, the segment of Highway 71B from NWA Street to I-540 was analyzed as a multi-lane highway. For multi-lane highways, the *HCM* pg. 14-4 uses speed and density as the basis for determining LOS. The multi-lane highway analysis was performed using a base free flow speed of 55 mph.

| Table 7. LOS Thresholds – Multi-Lane Highways | | |
|---|---|---|
| Level of Service | Description | Density (pc/mi/ln) |
| **A** | Free flow | ≤11 |
| **B** | Slight restriction to free flow | > 11 – 18 |
| **C** | Restrictions to free flow | > 18 – 26 |
| **D** | Noticeable restriction, declining speeds | > 26 – 35 |
| **E** | No gaps in traffic, volatile speeds | > 35 – 41 |
| **F** | Breakdown, large queues, recurring congestion | > 41 |

The results of this analysis are shown in **Table 8**. This table shows that this stretch of Highway 71B has an adequate LOS and is expected to maintain adequate LOS in 2035.

| Table 8. Multi-Lane Highway Analysis – Highway 71B | | | | | |
|---|---|---|---|---|---|
| Benton County | | | | | |
| I-540 Location | 2009 | 2010 | | 2035 | |
| | LOS | Density (pc/mi/ln) | LOS | Density (pc/mi/ln) | LOS |
| **NW A Street to I-540** | A | 12.8 | B | 21.5 | c |

**Signalized Arterials - Highway 71, Highway 71B, Highway 112 and Highway 265**

Portions of Highways 71, 71B, 112, and 265 were analyzed as signalized arterials. The LOS values were determined based on *Table 1* from the *2009 Quality/LOS Handbook* produced by the Florida Department of Transportation. This table is shown below as **Table 9.** In this analysis, the LOS is based on ADT. For roadway segments such as four-lane undivided, which do not have a separate category, the ADT chart values were reduced by an appropriate percentage to determine the LOS for these types of roadway segments.

| Table 9. Signalized Arterials | | | | | |
|---|---|---|---|---|---|
| Class I (> 0.00 to 1.99 signalized intersections per mile) | | | | | |
| Lanes | **Median** | **B** | **C** | **D** | **E** |
| **2** | Undivided | 9,600 | 15,400 | 16,500 | *** |
| **4** | Divided | 29,300 | 35,500 | 36,700 | *** |
| **6** | Divided | 45,000 | 53,700 | 55,300 | *** |
| **8** | Divided | 60,800 | 71,800 | 73,800 | *** |
| Class II (2.00 to 4.50 signalized intersections per mile) | | | | | |
| Lanes | **Median** | **B** | **C** | **D** | **E** |
| **2** | Undivided | ** | 10,500 | 15,200 | 16,200 |
| **4** | Divided | ** | 25,000 | 33,200 | 35,100 |
| **6** | Divided | ** | 39,000 | 50,300 | 53,100 |
| **8** | Divided | ** | 53,100 | 67,300 | 70,900 |
| Class III/ IV (>4.50 signalized intersections per mile) | | | | | |
| Lanes | **Median** | **B** | **C** | **D** | **E** |
| **2** | Undivided | ** | 5,100 | 11,900 | 14,900 |
| **4** | Divided | ** | 12,600 | 28,200 | 31,900 |
| **6** | Divided | ** | 19,700 | 43,700 | 48,200 |
| **8** | Divided | ** | 27,000 | 59,500 | 64,700 |

** Cannot be achieved using table input value defaults
*** Not applicable for that level of service letter grade. Volumes greater than LOS D become LOS F because intersection capacities have been reached.

**Table 10** shows some discrepancy between the 2009 LOS and the 2010 LOS which, as noted earlier, is likely due to differences in calculation procedures. According to this analysis, some driving difficulties with poor LOS may currently be experienced throughout this corridor. By the year 2035, these issues will become much more severe, and improvements will be necessary from Highway 180 all the way to Tiger Boulevard.

| Table 10. Signalized Arterial – Highway 71B | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Washington County | | | | | | | | | |
| **Highway 71B Location** | **2009** | **Number of Lanes** | **Median or TWLTL** | **Class** | **Adjust.** | **2010** | | **2035** | |
| | **LOS** | | | | | **ADT** | **LOS** | **ADT** | **LOS** |
| **Highway 71 to Highway 265** | A | 4 | No | I | -25% | 9,000 | B | 14,000 | B |
| **Highway 265 to Highway 16** | A | 4 | No | I | -25% | 11,000 | B | 17,000 | B |
| **Highway 16 to Highway 180** | A | 4 | No | I | -25% | 12,000 | B | 19,000 | B |
| **Highway 180 to School Avenue** | A | 4 | No | I | -25% | 18,000 | B | 28,000 | F |
| **School Avenue to Rock Street** | A | 4 | No | I | -25% | 15,000 | B | 23,000 | C |
| **Rock Street to Dickson Street** | A | 4 | No | III | -25% | 24,000 | D | 37,000 | F |
| **Dickson Street to Highway 45** | A | 4 | No | III | -25% | 27,000 | F | 42,000 | F |
| **Highway 45 to Trenton Boulevard** | A | 4 | No | III | -25% | 24,000 | F | 47,000 | F |
| **Trenton Boulevard to Oakwood Street** | A | 4 | No | II | -25% | 27,000 | F | 42,000 | F |
| **Oakwood Street to Township Road** | A | 4 | Yes | II | 0 | 29,000 | D | 45,000 | F |
| **Township Road to Highway 71** | A | 4 | Yes | I | 0 | 31,000 | C | 48,000 | F |
| **Highway 71B to Zion Road** | D | 6 | Yes | II | 0 | 39,000 | C | 60,000 | F |
| **Zion Road to Main Drive** | D | 6 | Yes | II | 0 | 37,000 | C | 57,000 | F |
| **Main Drive to Shady Grove Road** | B | 4 | Yes | II | 0 | 32,000 | D | 50,000 | F |
| **Shady Grove Road to Arapaho Avenue** | B | 4 | Yes | II | 0 | 28,000 | D | 43,000 | F |
| **Arapaho Avenue to Robinson Avenue** | A | 4 | Yes | I | 0 | 22,000 | B | 34,000 | C |
| **Robinson Avenue to Highway 412 (East)** | A | 4 | Yes | I | 0 | 22,000* | B | 34,000 | C |

| Table 10. Signalized Arterial – Highway 71B | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Highway 412 (East) to Highway 412 (West) | B | 4 | Yes | III | 0 | 34,000 | F | 53,000 | F |
| Highway 412 (West) to Emma Avenue | A | 4 | Yes | II | 0 | 30,000 | D | 47,000 | F |
| Emma Avenue to Huntsville Avenue | B | 4 | Yes | II | 0 | 29,000 | D | 45,000 | F |
| Huntsville Avenue to Randall Wobbe Lane | B | 4 | Yes | II | 0 | 26,000 | D | 40,000 | F |
| Randall Wobbe Lane to County Line | B | 4 | Yes | II | 0 | 25,000* | C | 39,000 | F |
| Benton County | | | | | | | | | |
| Highway 71B Location | 2009 LOS | Number of Lanes | Median or TWLTL | Class | Adjust. | 2010 ADT | 2010 LOS | 2035 ADT | 2035 LOS |
| County Line to Highway 264 (East) | B | 4 | Yes | I | 0 | 26,000 | B | 44,000 | F |
| Highway 264 (East) to Apple Blossom Avenue | B | 4 | Yes | I | 0 | 28,000 | B | 48,000 | F |
| Apple Blossom Avenue to Highway 264 (West) | A | 4 | Yes | I | 0 | 30,000 | C | 51,000 | F |
| Highway 264 (West) to Pleasant Grove Road | B | 4 | Yes | I | 0 | 24,000 | B | 41,000 | F |
| Pleasant Grove Road to Price Lane | A | 5 | Yes | I | 0 | 22,000 | B | 37,000 | F |
| Price Lane to Highway 94 (West) | A | 5 | Yes | I | 0 | 22,000 | B | 37,000 | F |
| Highway 94 (West) to Oak Street | A | 5 | Yes | I | 0 | 23,000 | B | 39,000 | F |
| Oak Street to Highway 94 (North) | A | 5 | Yes | II | 0 | 22,000 | C | 37,000 | F |
| Highway 94 (North) to Dixieland Road | A | 4 | Yes | I | 0 | 24,000 | B | 41,000 | F |
| Dixieland Road to 34th Street | A | 5 | Yes | II | 0 | 27,000 | D | 46,000 | F |
| 34th Street to 45th Street | A | 5 | Yes | II | 0 | 28,000 | D | 48,000 | F |
| 45th Street to I-540 | A | 5 | Yes | III | 0 | 31,000 | D | 53,000 | F |
| I-540 to Highway 112 | C | 4 | Yes | II | 0 | 38,000 | F | 65,000 | F |
| Highway 112 to Highway 12 | D | 4 | Yes | I | 0 | 34,000 | C | 58,000 | F |
| Highway 12 to Rainbow Lane | B | 4 | Yes | I | 0 | 21,000 | B | 36,000 | D |
| Rainbow Lane to Highway 204 | B | 4 | Yes | I | 0 | 24,000 | B | 41,000 | F |
| Highway 204 to SW A Street | C | 4 | Yes | I | 0 | 30,000 | C | 51,000 | F |
| SW A Street to Highway 102 | A | 4 | Yes | II | 0 | 28,000 | D | 48,000 | F |
| Highway 102 to SW 8th Street | B | 4 | Yes | II | 0 | 30,000 | D | 51,000 | F |
| SW 8th Street to SW I Street | A | 4 | Yes | I | 0 | 27,000 | B | 46,000 | F |
| SW I Street to Highway 72 | A | 4 | Yes | I | 0 | 30,000 | C | 51,000 | F |
| Highway 72 to Tiger Boulevard | A | 4 | Yes | I | 0 | 23,000 | B | 39,000 | F |
| Tiger Boulevard to NW A Street | A | 4 | Yes | I | 0 | 16,000 | B | 27,000 | B |

*2010 ADT was not available, therefore 2009 ADT was used.

**Table 11** shows that with the exception of the segment from Highway 71B to CR 40 which is already at LOS F, Highway 71 is expected to maintain LOS B or better through the year 2035.

| Table 11. Signalized Arterial – Highway 71 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Washington County | | | | | | | | | |
| Highway 71 Location | 2009 LOS | Number of Lanes | Median or TWLTL | Class | Adjust. | 2010 ADT | 2010 LOS | 2035 ADT | 2035 LOS |
| Highway 74 (East) to Highway 156 (West) | B | 2 | No | I | -25% | 2800 | B | 4300 | B |
| Highway 156 (West) to CR 30 | A | 4 | No | I | -25% | 5900 | B | 9100 | B |
| CR 30 to Wilson Street | A | 4 | No | I | -25% | 6300 | B | 9800 | B |
| Wilson Street to Sunrise Mountain | A | 4 | No | I | -25% | 8500 | B | 13000 | B |

| Table 11. Signalized Arterial – Highway 71 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Road** | | | | | | | | | |
| **Sunrise Mountain Road to Highway 71B** | A | 4 | No | I | -25% | 10000 | B | 16000 | B |
| Benton County | | | | | | | | | |
| **Highway 71 Location** | **2009** | | | | | **2010** | | **2035** | |
| | **LOS** | **Number of Lanes** | **Median or TWLTL** | **Class** | **Adjust.** | **ADT** | **LOS** | **ADT** | **LOS** |
| **Highway 71B to CR 40** | F | 4 | Yes | II | 0 | 48000 | F | 81000 | F |

**Table 12** also shows that discrepancies exist between the LOS for 2009 and for 2010. In 2035, LOS F is experienced in multiple places throughout the corridor if improvements are not made.

| Table 12. Signalized Arterial – Highway 112 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Washington County** | | | | | | | | | |
| **Highway 112 Location** | **2009** | | | **Class** | **Adjust.** | **2010** | | **2035** | |
| | **LOS** | **Number of Lanes** | **Median or TWLTL** | | | **ADT** | **LOS** | **ADT** | **LOS** |
| **I-540 to Highway 265** | A | 4 | Yes | I | 0 | 7,300 | B | 11,000 | B |
| **Highway 265 to W. 15th Street** | A | 4 | Yes | I | 0 | 6,600 | B | 10,000 | B |
| **W. 15th Street to Highway 180** | A | 4 | Yes | I | 0 | 9,900 | B | 15,000 | B |
| **Highway 180 to Maple Avenue** | - | 2 | No | I | -20% | 17,000 | F | 26,000 | F |
| **Maple Avenue to Garland Avenue** | B | 2 | Yes | I | 0 | 14,000 | C | 22,000 | F |
| **Garland Avenue to Wedington Road** | B | 4 | Yes | II | 0 | 14,000 | C | 22,000 | C |
| **Wedington Road to Velma Drive** | C | 2 | No | I | -20% | 15,000 | F | 23,000 | F |
| **Velma Drive to W. Drake Street** | B | 2 | No | I | -20% | 14,000 | F | 22,000 | F |
| **W. Drake Street to I-540** | C | 2 | Yes | III | 0 | 18,000 | F | 28,000 | F |
| **I-540 to Van Asche Drive** | A | 2 | No | I | -20% | 8,100 | C | 13,000 | D |
| **CR 204 to Highway 412** | E | 2 | No | I | -20% | 6,300 | B | 9,800 | C |
| **Highway 412 to CR 84** | D | 2 | No | I | -20% | 4,000 | B | 6,200 | B |
| **Benton County** | | | | | | | | | |
| **Highway 112 Location** | **2009** | **Number of Lanes** | **Median or TWLTL** | **Class** | **Adjust.** | **2010** | | **2035** | |
| | **LOS** | | | | | **ADT** | **LOS** | **ADT** | **LOS** |
| **CR 70 to Highway 264 (East)** | D | 2 | No | I | -20% | 4,500 | B | 7,600 | B |
| **Highway 264 (East) to Highway 264 (West)** | D | 2 | No | I | -20% | 7,900 | C | 13,000 | D |
| **Windmill Road to SW Regional Airport Boulevard** | A | 2 | No | I | -20% | 4,100 | B | 7,000 | B |
| **SW Regional Airport Boulevard to Highway 71B** | B | 2 | Yes | II | 0 | 22,000 | F | 7,800 | F |

**Table 13** shows that Highway 265 from Highway 45 to Highway 555 is currently experiencing LOS F. By 2035, the more segments along this corridor will experience LOS F. Improvements are currently needed along this corridor.

| Table 13. Signalized Arterial- Highway 265 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Washington County | | | | | | | | | |
| Highway 265 Location | 2009 | Number of Lanes | Median or TWLTL | Class | Adjust. | 2010 | | 2035 | |
| | LOS | | | | | ADT | LOS | ADT | LOS |
| **Highway 16 to CR 48** | A | 4 | No | I | 0 | 15,000 | B | 23,000 | B |
| **CR 48 to Highway 45** | A | 4 | No | I | 0 | 21,000 | B | 33,000 | C |
| **Highway 45 to Township Road** | B | 2 | Yes | II | 0 | 21,000 | F | 33,000 | F |
| **Township Road to Old Wire Road** | B | 2 | No | I | 0 | 17,000 | F | 26,000 | F |
| **Old Wire Road to Joyce Boulevard** | C | 2 | No | I | 0 | 17,000 | F | 26,000 | F |
| **Joyce Boulevard to Randal Place** | B | 2 | No | I | 0 | 16,000 | D | 25,000 | F |
| **Randal Place to E. Zion Road** | C | 2 | No | I | 0 | 17,000 | F | 26,000 | F |
| **E. Zion Rd to Co. Highway 555** | B | 2 | No | I | 0 | 17,000 | F | 26,000 | F |
| **Co. Highway 555 to Highway 412** | B | 2 | No | I | 0 | 16,000 | D | 25,000 | F |
| **Highway 412 to Beverly Avenue** | A | 4 | Yes | II | 0 | 19,000 | C | 29,000 | D |
| **Beverly Avenue to E. Emma Avenue** | B | 4 | No | I | 0 | 19,000 | B | 29,000 | B |
| **E. Emma Avenue to E. Mountain Road** | A | 4 | Yes | II | 0 | 17,000 | C | 26,000 | D |
| **E. Mountain Road to E. Randall Wobbe Lane** | A | 4 | No | I | 0 | 16,000 | B | 25,000 | B |

## APPENDIX IV SUMMARY OF TOLL TRANSACTIONS AND TOLL REVENUES

| Annual Toll Transactions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Electronic Tolls | | | | Video Tolls | | | | GRAND TOTAL |
| | Cars | Light Trucks | Heavy Trucks | Total | Cars | Light Trucks | Heavy Trucks | Total | |
| **2025** | 3,064,000 | 120,000 | 370,000 | 3,554,000 | 3,064,000 | 120,000 | 370,000 | 3,554,000 | 7,109,000 |
| **2026** | 4,155,000 | 163,000 | 501,000 | 4,820,000 | 3,835,000 | 151,000 | 463,000 | 4,449,000 | 9,268,000 |
| **2027** | 5,367,000 | 211,000 | 648,000 | 6,226,000 | 4,572,000 | 180,000 | 552,000 | 5,304,000 | 11,529,000 |
| **2028** | 6,037,000 | 237,000 | 729,000 | 7,003,000 | 4,743,000 | 187,000 | 573,000 | 5,503,000 | 12,506,000 |
| **2029** | 7,117,000 | 280,000 | 860,000 | 8,257,000 | 5,153,000 | 203,000 | 623,000 | 5,979,000 | 14,236,000 |
| **2030** | 7,570,000 | 290,000 | 920,000 | 8,781,000 | 5,047,000 | 194,000 | 613,000 | 5,854,000 | 14,635,000 |
| **2031** | 7,998,000 | 307,000 | 972,000 | 9,277,000 | 4,902,000 | 188,000 | 596,000 | 5,686,000 | 14,963,000 |
| **2032** | 8,441,000 | 324,000 | 1,027,000 | 9,792,000 | 4,748,000 | 182,000 | 577,000 | 5,508,000 | 15,299,000 |
| **2033** | 8,900,000 | 342,000 | 1,083,000 | 10,325,000 | 4,585,000 | 176,000 | 558,000 | 5,319,000 | 15,643,000 |
| **2034** | 9,376,000 | 360,000 | 1,141,000 | 10,877,000 | 4,412,000 | 169,000 | 537,000 | 5,118,000 | 15,995,000 |
| **2035** | 9,901,000 | 372,000 | 1,210,000 | 11,483,000 | 4,243,000 | 160,000 | 519,000 | 4,921,000 | 16,405,000 |
| **2036** | 10,266,000 | 386,000 | 1,255,000 | 11,907,000 | 4,193,000 | 158,000 | 513,000 | 4,864,000 | 16,771,000 |
| **2037** | 10,643,000 | 400,000 | 1,302,000 | 12,345,000 | 4,139,000 | 156,000 | 506,000 | 4,801,000 | 17,145,000 |
| **2038** | 11,031,000 | 415,000 | 1,350,000 | 12,796,000 | 4,080,000 | 153,000 | 499,000 | 4,733,000 | 17,528,000 |
| **2039** | 11,432,000 | 430,000 | 1,399,000 | 13,261,000 | 4,017,000 | 151,000 | 492,000 | 4,659,000 | 17,920,000 |
| **2040** | 11,881,000 | 439,000 | 1,460,000 | 13,780,000 | 3,960,000 | 146,000 | 487,000 | 4,593,000 | 18,373,000 |
| **2041** | 12,299,000 | 454,000 | 1,512,000 | 14,264,000 | 3,884,000 | 143,000 | 477,000 | 4,505,000 | 18,769,000 |
| **2042** | 12,719,000 | 470,000 | 1,564,000 | 14,752,000 | 3,799,000 | 140,000 | 467,000 | 4,407,000 | 19,159,000 |
| **2043** | 13,141,000 | 485,000 | 1,616,000 | 15,243,000 | 3,707,000 | 137,000 | 456,000 | 4,299,000 | 19,542,000 |
| **2044** | 13,565,000 | 501,000 | 1,669,000 | 15,735,000 | 3,606,000 | 133,000 | 444,000 | 4,183,000 | 19,918,000 |

| Annual Toll Transactions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Electronic Tolls | | | | Video Tolls | | | | GRAND TOTAL |
| | Cars | Light Trucks | Heavy Trucks | Total | Cars | Light Trucks | Heavy Trucks | Total | |
| **2045** | 13,990,000 | 517,000 | 1,722,000 | 16,228,000 | 3,497,000 | 129,000 | 430,000 | 4,057,000 | 20,285,000 |
| **2046** | 14,237,000 | 526,000 | 1,753,000 | 16,515,000 | 3,559,000 | 131,000 | 438,000 | 4,129,000 | 20,644,000 |
| **2047** | 14,477,000 | 535,000 | 1,783,000 | 16,794,000 | 3,619,000 | 134,000 | 446,000 | 4,199,000 | 20,993,000 |
| **2048** | 14,710,000 | 544,000 | 1,812,000 | 17,065,000 | 3,677,000 | 136,000 | 453,000 | 4,266,000 | 21,332,000 |
| **2049** | 14,935,000 | 552,000 | 1,840,000 | 17,327,000 | 3,734,000 | 138,000 | 460,000 | 4,332,000 | 21,659,000 |
| **2050** | 15,152,000 | 560,000 | 1,868,000 | 17,580,000 | 3,788,000 | 140,000 | 467,000 | 4,395,000 | 21,975,000 |
| **2051** | 15,360,000 | 568,000 | 1,894,000 | 17,823,000 | 3,840,000 | 142,000 | 474,000 | 4,456,000 | 22,278,000 |
| **2052** | 15,560,000 | 575,000 | 1,919,000 | 18,055,000 | 3,890,000 | 144,000 | 480,000 | 4,514,000 | 22,568,000 |
| **2053** | 15,750,000 | 582,000 | 1,943,000 | 18,276,000 | 3,937,000 | 146,000 | 486,000 | 4,569,000 | 22,845,000 |
| **2054** | 15,930,000 | 589,000 | 1,966,000 | 18,486,000 | 3,983,000 | 147,000 | 492,000 | 4,621,000 | 23,107,000 |
| **2055** | 16,100,000 | 596,000 | 1,988,000 | 18,683,000 | 4,025,000 | 149,000 | 497,000 | 4,671,000 | 23,354,000 |
| **2056** | 16,272,000 | 602,000 | 2,010,000 | 18,883,000 | 4,068,000 | 151,000 | 502,000 | 4,721,000 | 23,604,000 |
| **2057** | 16,445,000 | 609,000 | 2,032,000 | 19,086,000 | 4,111,000 | 152,000 | 508,000 | 4,771,000 | 23,857,000 |
| **2058** | 16,621,000 | 615,000 | 2,054,000 | 19,291,000 | 4,155,000 | 154,000 | 514,000 | 4,823,000 | 24,113,000 |
| **2059** | 16,799,000 | 622,000 | 2,077,000 | 19,498,000 | 4,200,000 | 155,000 | 519,000 | 4,874,000 | 24,372,000 |
| **2060** | 16,979,000 | 629,000 | 2,100,000 | 19,707,000 | 4,245,000 | 157,000 | 525,000 | 4,927,000 | 24,634,000 |
| **2061** | 17,161,000 | 635,000 | 2,123,000 | 19,919,000 | 4,290,000 | 159,000 | 531,000 | 4,980,000 | 24,899,000 |
| **2062** | 17,345,000 | 642,000 | 2,146,000 | 20,134,000 | 4,336,000 | 161,000 | 537,000 | 5,033,000 | 25,167,000 |
| **2063** | 17,531,000 | 649,000 | 2,170,000 | 20,351,000 | 4,383,000 | 162,000 | 543,000 | 5,088,000 | 25,438,000 |
| **2064** | 17,720,000 | 656,000 | 2,194,000 | 20,570,000 | 4,430,000 | 164,000 | 549,000 | 5,143,000 | 25,713,000 |
| **2065** | 17,910,000 | 664,000 | 2,218,000 | 20,792,000 | 4,478,000 | 166,000 | 555,000 | 5,198,000 | 25,990,000 |

## Annual Toll Revenues

| Year | Electronic Tolls | | | | Video Tolls | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | Cars | Light Trucks | Heavy Trucks | Total | Cars | Light Trucks | Heavy Trucks | Total | |
| **2025** | $4,154,000 | $250,000 | $1,430,000 | $5,834,000 | $4,992,000 | $300,000 | $1,716,000 | $7,008,000 | $12,842,000 |
| **2026** | $5,639,000 | $340,000 | $1,941,000 | $7,920,000 | $6,254,000 | $377,000 | $2,150,000 | $8,781,000 | $16,701,000 |
| **2027** | $7,292,000 | $440,000 | $2,511,000 | $10,242,000 | $7,463,000 | $449,000 | $2,567,000 | $10,480,000 | $20,722,000 |
| **2028** | $8,869,000 | $535,000 | $3,061,000 | $12,465,000 | $8,352,000 | $505,000 | $2,884,000 | $11,741,000 | $24,206,000 |
| **2029** | $10,467,000 | $632,000 | $3,613,000 | $14,712,000 | $9,084,000 | $550,000 | $3,138,000 | $12,771,000 | $27,483,000 |
| **2030** | $11,123,000 | $654,000 | $3,860,000 | $15,638,000 | $8,887,000 | $524,000 | $3,086,000 | $12,497,000 | $28,135,000 |
| **2031** | $12,661,000 | $744,000 | $4,381,000 | $17,787,000 | $9,287,000 | $548,000 | $3,225,000 | $13,060,000 | $30,846,000 |
| **2032** | $13,375,000 | $786,000 | $4,630,000 | $18,790,000 | $9,004,000 | $531,000 | $3,127,000 | $12,662,000 | $31,452,000 |
| **2033** | $14,114,000 | $830,000 | $4,887,000 | $19,831,000 | $8,702,000 | $513,000 | $3,023,000 | $12,238,000 | $32,069,000 |
| **2034** | $15,904,000 | $935,000 | $5,521,000 | $22,360,000 | $9,019,000 | $526,000 | $3,118,000 | $12,664,000 | $35,023,000 |
| **2035** | $16,779,000 | $966,000 | $5,849,000 | $23,594,000 | $8,666,000 | $495,000 | $3,009,000 | $12,170,000 | $35,764,000 |
| **2036** | $17,412,000 | $1,002,000 | $6,072,000 | $24,486,000 | $8,570,000 | $490,000 | $2,976,000 | $12,037,000 | $36,522,000 |
| **2037** | $19,593,000 | $1,128,000 | $6,821,000 | $27,542,000 | $9,180,000 | $525,000 | $3,184,000 | $12,889,000 | $40,431,000 |
| **2038** | $20,324,000 | $1,171,000 | $7,077,000 | $28,572,000 | $9,057,000 | $518,000 | $3,142,000 | $12,717,000 | $41,289,000 |
| **2039** | $21,079,000 | $1,214,000 | $7,342,000 | $29,635,000 | $8,923,000 | $511,000 | $3,096,000 | $12,530,000 | $42,165,000 |
| **2040** | $23,640,000 | $1,337,000 | $8,272,000 | $33,248,000 | $9,436,000 | $535,000 | $3,308,000 | $13,280,000 | $46,528,000 |
| **2041** | $24,490,000 | $1,385,000 | $8,572,000 | $34,446,000 | $9,261,000 | $525,000 | $3,248,000 | $13,034,000 | $47,480,000 |
| **2042** | $25,346,000 | $1,434,000 | $8,874,000 | $35,654,000 | $9,066,000 | $514,000 | $3,180,000 | $12,761,000 | $48,415,000 |
| **2043** | $28,155,000 | $1,593,000 | $9,863,000 | $39,610,000 | $9,481,000 | $541,000 | $3,335,000 | $13,356,000 | $52,966,000 |
| **2044** | $29,086,000 | $1,646,000 | $10,192,000 | $40,923,000 | $9,231,000 | $527,000 | $3,248,000 | $13,005,000 | $53,929,000 |
| **2045** | $30,021,000 | $1,699,000 | $10,522,000 | $42,241,000 | $8,961,000 | $511,000 | $3,153,000 | $12,625,000 | $54,866,000 |
| **2046** | $32,905,000 | $1,863,000 | $11,529,000 | $46,297,000 | $9,887,000 | $558,000 | $3,455,000 | $13,900,000 | $60,197,000 |
| **2047** | $33,487,000 | $1,896,000 | $11,736,000 | $47,119,000 | $10,061,000 | $568,000 | $3,517,000 | $14,147,000 | $61,266,000 |

## Annual Toll Revenues

| Year | Electronic Tolls | | | | Video Tolls | | | | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| | Cars | Light Trucks | Heavy Trucks | Total | Cars | Light Trucks | Heavy Trucks | Total | |
| **2048** | $34,053,000 | $1,928,000 | $11,937,000 | $47,918,000 | $10,231,000 | $578,000 | $3,577,000 | $14,387,000 | $62,305,000 |
| **2049** | $37,219,000 | $2,107,000 | $13,060,000 | $52,386,000 | $11,162,000 | $632,000 | $3,918,000 | $15,712,000 | $68,098,000 |
| **2050** | $37,789,000 | $2,140,000 | $13,263,000 | $53,192,000 | $11,333,000 | $642,000 | $3,980,000 | $15,954,000 | $69,147,000 |
| **2051** | $38,339,000 | $2,171,000 | $13,460,000 | $53,970,000 | $11,498,000 | $651,000 | $4,038,000 | $16,187,000 | $70,158,000 |
| **2052** | $41,881,000 | $2,372,000 | $14,705,000 | $58,958,000 | $12,585,000 | $711,000 | $4,412,000 | $17,708,000 | $76,666,000 |
| **2053** | $42,426,000 | $2,403,000 | $14,900,000 | $59,728,000 | $12,749,000 | $720,000 | $4,470,000 | $17,939,000 | $77,668,000 |
| **2054** | $42,944,000 | $2,432,000 | $15,086,000 | $60,462,000 | $12,905,000 | $729,000 | $4,526,000 | $18,159,000 | $78,622,000 |
| **2055** | $46,762,000 | $2,649,000 | $16,426,000 | $65,837,000 | $14,033,000 | $795,000 | $4,927,000 | $19,754,000 | $85,591,000 |
| **2056** | $47,297,000 | $2,680,000 | $16,618,000 | $66,595,000 | $14,193,000 | $804,000 | $4,984,000 | $19,981,000 | $86,576,000 |
| **2057** | $47,838,000 | $2,711,000 | $16,813,000 | $67,362,000 | $14,356,000 | $813,000 | $5,043,000 | $20,212,000 | $87,574,000 |
| **2058** | $52,152,000 | $2,957,000 | $18,335,000 | $73,444,000 | $15,648,000 | $887,000 | $5,499,000 | $22,034,000 | $95,478,000 |
| **2059** | $52,751,000 | $2,991,000 | $18,550,000 | $74,292,000 | $15,828,000 | $897,000 | $5,563,000 | $22,288,000 | $96,580,000 |
| **2060** | $53,356,000 | $3,026,000 | $18,768,000 | $75,150,000 | $16,010,000 | $908,000 | $5,628,000 | $22,546,000 | $97,696,000 |
| **2061** | $57,977,000 | $3,288,000 | $20,400,000 | $81,665,000 | $17,392,000 | $986,000 | $6,122,000 | $24,500,000 | $106,165,000 |
| **2062** | $58,643,000 | $3,326,000 | $20,640,000 | $82,609,000 | $17,592,000 | $998,000 | $6,194,000 | $24,783,000 | $107,392,000 |
| **2063** | $59,317,000 | $3,365,000 | $20,882,000 | $83,564,000 | $17,794,000 | $1,009,000 | $6,267,000 | $25,070,000 | $108,634,000 |
| **2064** | $64,747,000 | $3,674,000 | $22,800,000 | $91,222,000 | $19,431,000 | $1,102,000 | $6,842,000 | $27,375,000 | $118,596,000 |
| **2065** | $65,492,000 | $3,717,000 | $23,068,000 | $92,278,000 | $19,654,000 | $1,115,000 | $6,922,000 | $27,692,000 | $119,970,000 |