CENTRAL OK go

CENTRAL OKLAHOMA COMMUTER CORRIDORS STUDY

acog

FINAL REPORT

DECEMBER 2015

COMMUTER CORRIDORS STUDY

FINAL REPORT

DECEMBER 2015

PREPARED FOR:
Association of Central Oklahoma Governments

PREPARED BY:
URS Corporation

CentralOK!go Steering Committee – October 2014

City of Oklahoma City, Hon. Mick Cornett, Mayor –Chair
City of Del City, Hon. Brian Linley, Mayor
City of Del City, Hon. Ken Bartlett, Councilmember
City of Edmond, Hon. Victoria Caldwell, Councilmember
City of Edmond, Hon. Elizabeth Waner, Councilmember
City of Midwest City, Hon. Jack Fry, Mayor
City of Midwest City, Hon. Rick Dawkins, Councilmember
City of Moore, Hon. Jason Blair, Vice-Mayor
City of Norman, Hon. Cindy Rosenthal, Mayor
City of Norman, Hon. Tom Kovach, Councilmember
City of Oklahoma City, Hon. Pete White, Councilmember
Cleveland County, Hon. Rod Cleveland, Commissioner
Oklahoma County, Hon. Willa Johnson, Commissioner
Oklahoma House of Representatives, Hon. Charlie Joyner, Representative District 95
Association of Central Oklahoma Governments, John G. Johnson, Executive Director
American Fidelity Foundation, Tom J. McDaniel, President
BancFirst, Jay Hannah, Executive Vice President-Financial Services
Central Oklahoma Transportation and Parking Authority Board, Kay Bickham, Trustee
Chesapeake Energy Corporation, Corporate Development and Government Relations
Devon Energy Corporation, Klaholt Kimker, Vice President–Administration
Greater OKC Chamber of Commerce, Roy Williams, President
The Humphreys Company, Blair Humphreys, Developer
KME Traffic and Transportation, Ken Morris, President
NewView Oklahoma, Lauren Branch, President/CEO
Norman Chamber of Commerce, Tom Sherman, Past Chairman
OKC Mayor's Committee on Disability Concerns, Pam Henry, Chair
Oklahoma City University, Craig Knutson, Chief of Staff/Office of the President
Oklahoma Health Center Foundation, Terry Taylor, Director of Planning and Operations
Oklahoma State University OKC, Natalie Shirley, President
Oklahomans for the Arts, Jennifer James, Executive Director
OnTrac, Marion Hutchison, Chair, Executive Committee
Sandridge Energy, Inc., Justin Byrne, Associate General Counsel
Saxum Strategies, Renzi Stone, President/CEO
Sonic Corporation, Cliff Hudson, CEO
Tinker Air Force Base, Vice Base Commander
University of Central Oklahoma, Tim Tillman, Sustainability Coordinator
University of Oklahoma, Danny Hilliard, Vice President – Government Relations

Association of Central Oklahoma Governments

Intermodal Transportation Policy Committee as of October 2014

Bethany, Hon. Phillip Shirey, Councilmember
Blanchard, Hon. Yvonne Lackey, Councilmember
Cedar Valley, Hon. Stan Wieczorek, Mayor
Choctaw, Hon. Roger Malone, Councilmember
Cole, Hon. William Anderson, Trustee
Del City, Hon. Ken Bartlett, Councilmember
Edmond, Hon. Elizabeth Waner, Councilmember
Forest Park, Hon. Marianne Yarbrough, Trustee
Guthrie, Hon. John Wood, Vice Mayor
Harrah, Hon. Kim Bishop, Councilmember
Jones City, Hon. Ray Poland, Mayor
Lexington, Hon. Mark Easton, Councilmember
Luther, Hon. Birlene Langley, Mayor
Midwest City, Hon. Jack Fry, Mayor
Moore, Hon. Mark Hamm, Councilmember
Mustang, Hon. Jay Adams, Mayor
Newcastle, Hon. Mike Fullerton, Councilmember
Nichols Hills, Hon. Peter Hoffman, Mayor
Nicoma Park, Hon. Robert Pittman, Mayor
Noble, Hon. Marge Hill, Councilmember
Norman, Hon. Cindy Rosenthal, Mayor
Oklahoma City, Hon. Pete White, Councilmember
Piedmont, Hon. Valerie Thomerson, Mayor
Slaughterville, Hon. John Koehler, Trustee
Spencer, Hon. Earnest Ware, Mayor
Tuttle, Hon. Mary Smith, Councilmember
The Village, Hon. David Bennett, Mayor
Warr Acres, Hon. Jim Mickley, Vice-Mayor
Yukon, Hon. Ken Smith, Mayor
Canadian County, Hon. Jack Stewart, Commissioner
Cleveland County, Hon. Rod Cleveland, Commissioner
Logan County, Hon. Mark Sharpton, Commissioner
McClain County, Hon. Wilson Lyles, Commissioner
Oklahoma County, Hon. Willa Johnson, Commissioner

Agency Members

Central Oklahoma Transportation and Parking Authority, Jason Ferbrache, Administrator
Cleveland Area Rapid Transit, Doug Myers, Director
Oklahoma City Airport Trust, Randon Rieger, P.E., Civil Engineer III
OTC – Division III, McClain & Cleveland Counties In OCARTS Area Dan B. Overland, Transportation Commissioner
OTC – Division IV, Canadian, Logan, & Oklahoma Counties In OCARTS Area, Greg Love, Transportation Commissioner
OTC – Division VII, Grady County In OCARTS Area, Bradley W. Burgess, Transportation Commissioner

Non-Voting Members

Federal Aviation Administration, Edward N. Agnew, Manager, AR/OK Airports Development Office
Federal Highway Administration, Gary Corino, OK Division Administrator
Federal Transit Administration, Robert C. Patrick, Regional Administrator

CentralOK!go Team

Association of Central Oklahoma
John G. Johnson, Executive Director
Daniel J. O'Connor, Director of Transportation Planning
Holly Massie, Special Programs Officer II

URS Corporation
Diane Cowin, Project Manager
Brian Piascik, Deputy Project Manager

Guernsey
Karl Stickley, P.E.

Alliance Transportation Group, Inc.
Andrea Weckmueller-Behringer

Economic & Planning Systems
Brian Duffany

Redbud Marketing, LLC
Kristi Pempin

Dunbar Transportation
Julie Dunbar

CentralOK!go Funding Partners

ACOG, Oklahoma City, Norman, Edmond, Moore, Midwest City, and Del City

Preparation of this study and report was financially aided through funds provided by the U.S. Department of Transportation, Federal Highway Administration and Federal Transit Administration

Table of Contents

Table of Contents (Cont.)

List of Figures

List of Figures (Cont.)

List of Tables

List of Tables (Cont.)

1.0 Introduction

Over the last 20 years, Central Oklahoma has experienced significant growth in population and employment and has emerged on the national level as a vibrant place for families, entertainment, businesses and industry. By 2040, the metropolitan area is expected to grow nearly 40% in both population and employment when compared to 2010 levels. Local policies of the region's cities and counties are welcoming toward growth and private sector success. However, with this growth come increased traffic, congestion, and the need and desire for more mobility choices. Such factors have a direct impact on a region's economic health and quality of life.

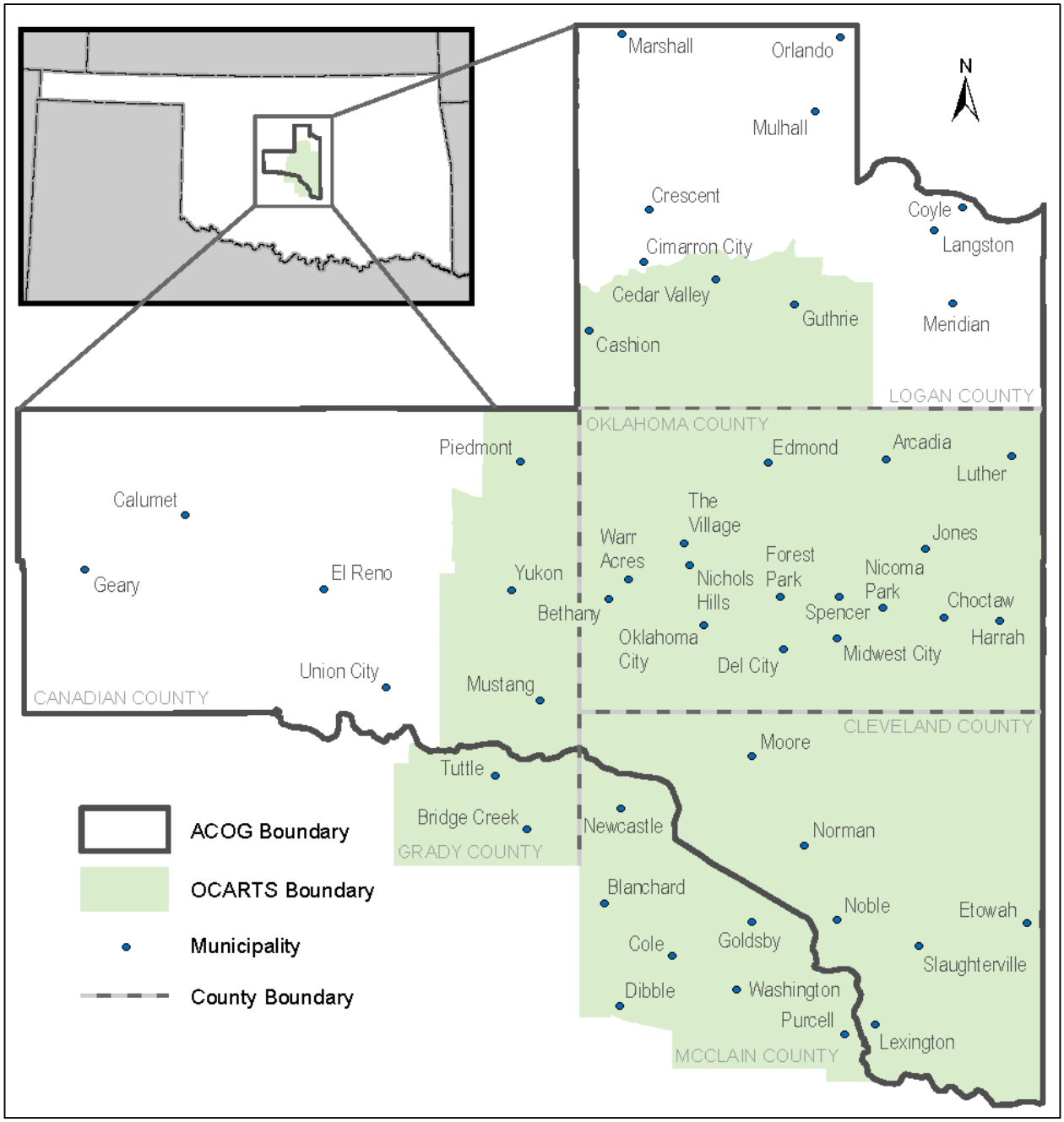
Central Oklahoma, as the largest metropolitan area in the state, includes the state's capital, the nation's largest Air Force Air Logistics Center, 12 colleges and universities, a first rate medical district, leading edge oil and gas companies, manufacturing, and vibrant cultural events and entertainment venues. In order to keep the region moving forward and competitive as a desirable place to live, work, and play, a well-balanced transportation system is a must. This includes a variety of travel options consisting of roadways, buses, bicycle and pedestrian facilities, and high-capacity passenger transit—rail, streetcar, bus rapid transit (BRT), and express bus.

The CentralOK!go Commuter Corridors Study (CentralOK!go) defines transit solutions to offer mobility choices to Central Oklahomans.

1.1 The Local Setting

Central Oklahoma's transportation planning efforts are focused within an area known as the Oklahoma City Area Regional Transportation Study (OCARTS) area, illustrated in Figure 1-1. This planning boundary contains 2,085 square miles and 40 cities and towns located within Oklahoma and Cleveland Counties and portions of Canadian, Grady, Logan and McClain Counties. The OCARTS Transportation Management Area (TMA) included a 2010 population of 1.1 million people and two urbanized areas designated by the U.S. Census Bureau—the Oklahoma City Urbanized Area (UZA) and the Norman UZA. The region is expected to grow to nearly 1.6 million residents by 2040.

Figure 1-1: Oklahoma City Area Regional Transportation Study (OCARTS) Region



Source: ACOG

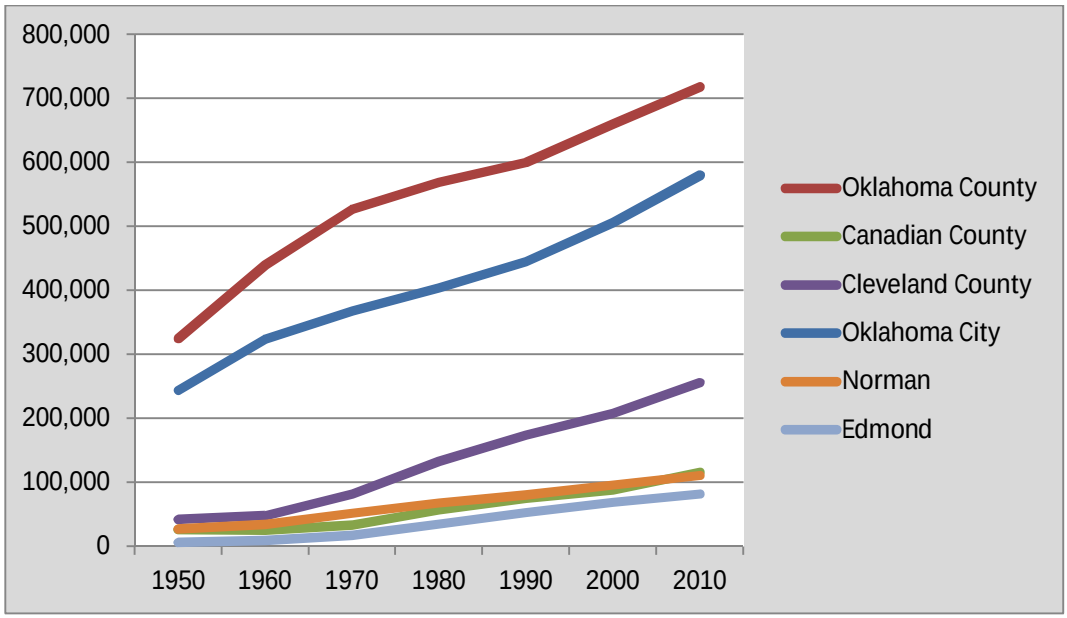
With a 2010 population of approximately 580,000 people, Oklahoma City is the largest city in the state and ranks 27th among U.S. cities in population. The population increased to just over 610,000 as of July 2013. Select county and city population growth trends since 1950 are illustrated in Figure 1-2.

In 1993, Oklahoma City residents approved a redevelopment package known as the Metropolitan Area Projects (MAPS) to create a more vibrant downtown. The city added a new baseball park, central library, and sports arena; made renovations to the Oklahoma River, Civic Center Music Hall, Cox Convention Center, and state fairgrounds; and constructed a water canal in the Bricktown entertainment district

with water taxis transporting passengers within the district. MAPS has become one of the most successful public-private partnerships undertaken in the U.S., exceeding $3 billion in private investment as of 2010 according to the Greater Oklahoma City Chamber. As a result of MAPS, the population living in downtown housing has exponentially increased, together with demand for additional residential and retail amenities, such as grocers, services, and shops.

Subsequent MAPS initiatives have also been approved, which have yielded over 70 new and renovated schools and technology upgrades, NBA-level sports arena upgrades and practice facility, a planned new central park, convention center, whitewater river improvements, a downtown modern streetcar, and miles of additional sidewalks and trails.

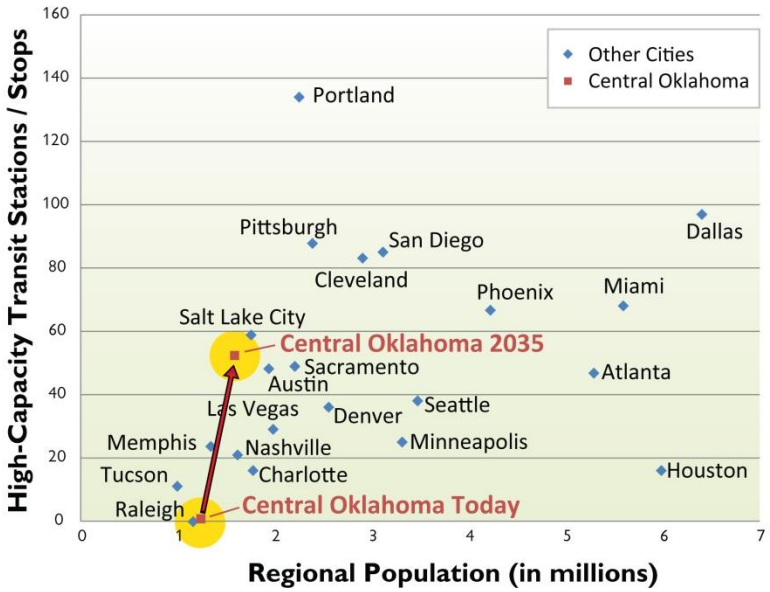
Figure 1-2: Central Oklahoma Population Growth



Source: US Census Bureau.

Currently, travel in Central Oklahoma is dominated by the private automobile, with a very small portion by bus. However, initial steps toward a regional transit system have begun with the upcoming modern streetcar in downtown Oklahoma City and adoption of the CentralOK!go Commuter Corridors Study locally preferred alternatives (LPAs). These routes, paired with expanded bus service, could serve over 32,000 citizens and visitors daily — moving them around the region to destinations like Tinker Air Force Base (AFB), the University of Oklahoma (OU), Chesapeake Energy Arena, Bricktown, and the University of Central Oklahoma (UCO). Such a regional transit system would provide mobility options on par with Tucson, Charlotte, Las Vegas, Salt Lake City, and Austin, as illustrated in Figure 1-3.

Figure 1-3: High-Capacity Transit Stations per Regional Population



1.2 Transit Provides Solutions

High-capacity transit has been proven to help communities around the country by improving mobility; providing predictable travel times to increase access to jobs, housing and shopping; enhancing quality of life; generating economic development; and providing safe, energy-efficient travel.

1.2.1 Improve Mobility

- Measured Improvement – Mobility can be measured by the number of travel choices to commuters, the amount of throughput on a roadway, or the ease of connecting people to places. Improvements are shown in improved accessibility for all users, higher speeds or shorter travel times, and unconstrained access into activity centers.
- Traffic Congestion – Congestion has become an issue in every major metropolitan area nationwide, including Central Oklahoma. Congestion results in delay, increased travel and labor costs, lost productivity, and pollution. While transit alone will not solve traffic congestion, it can maximize the carrying capacity of the current transportation system through efficiently moving commuters in fewer vehicles and alternate modes.

1.2.2 Provide Lifestyle Choices and Improved Access for Workers

- Travel and Living Choices – When high-capacity transit is available as an alternative mode of transportation, it can encourage land use patterns near stops with a mix of jobs, housing, and retail development that ultimately reduces trips, travel time, and travel distances. Transit provides an alternative for commuters who drive, and presents opportunities to live and work either in the same place, or along a congested corridor without being required to sit in traffic.
- Job Access – High-capacity transit increases accessibility to and from activity centers, connecting residents with job opportunities and employers with the regional workforce.

1.2.3 Enhance Quality of Life

- Time and Money – Taking transit saves time and money, including savings on vehicle fuel and maintenance costs. In addition, using transit can reduce stress by allowing riders to work, read and relax on their way to work, school or recreation rather than sitting in traffic.
- Accessibility – High-capacity transit provides critical access to regional employment, educational opportunities, and medical and social services for those with physical, age, or economic limitations.

1.2.4 Generate Economic Development

- Economic Development and Growth – Transit enhances economic competitiveness, focuses efficient growth, increases opportunities to gain and retain a talented workforce, and spurs transit oriented development (TOD) to concentrate destinations and origins.
- Transit Options – Transit helps connect land use and transportation to create active and healthier communities, providing communities with expanded transportation systems that often accommodate walking and biking.

1.2.5 Provide Safe, Energy-Efficient Transportation

- Air Pollution – Vehicle emissions are a major contributor to air pollution. A single occupancy auto commuter switching to transit saves nearly 54,000 pounds per year in carbon dioxide. In fact, it is one of the most significant actions an individual can do to reduce household carbon emissions.

1.3 What is CentralOK!go?

CentralOK!go was initiated to analyze transportation options in three commuter corridors in order to enhance regional mobility and provide alternatives to travel by private automobile. With input from local communities, stakeholders and citizens, the study identified options for moving people throughout the Central Oklahoma region, either for work, school, shopping, or leisure.

CentralOK!go considered various routes and modes of public transportation, focusing on three regional corridors all converging in downtown Oklahoma City at the Santa Fe Station Intermodal Hub. The locally preferred alternatives (LPAs) resulting from CentralOK!go serve as the start for a regional high-capacity transit system in Central Oklahoma.

1.3.1 Study Foundation

The 2005 Regional Fixed Guideway Study (2005 Study) resulted in a 2030 Transit System Plan for Central Oklahoma and recommended specific corridors for further investigation for the implementation of passenger rail, bus rapid transit (BRT), a downtown Oklahoma City streetcar system, and an improved bus system to enhance connections among all public transportation services. The 2005 Study also prioritized which corridors would be most likely to support longer distance rail or bus service, as shown in Figure 1-4.

1.3.2 Project Purpose

CentralOK!go was designed to provide more in-depth analysis and generate a locally preferred alignment and transit mode for each of the three study corridors—the North Corridor, between

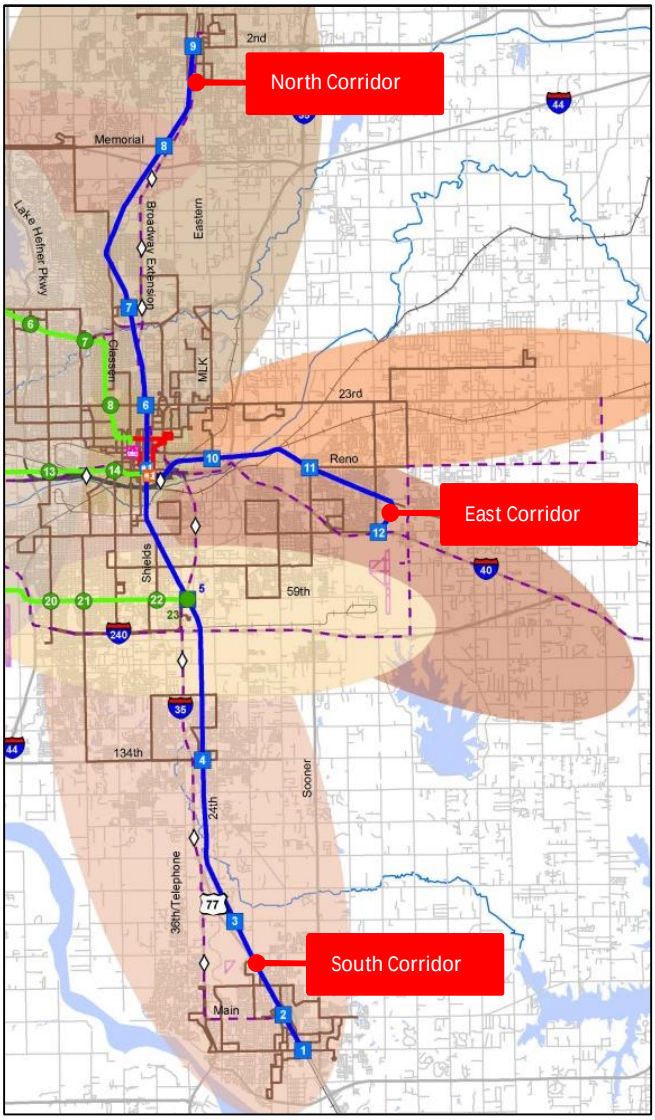
Oklahoma City and Edmond; the East Corridor, between Oklahoma City and Midwest City; and the South Corridor, between Oklahoma City and Norman.

Various transit modes, including rapid buses and rail options, were evaluated based their ability to meet the following goals:

1. Enhance connections between regional activity centers (employers, universities, retail, etc.) and increase equitable access to transit to the entire community,
2. Maximize regional participation,
3. Promote economic development, and
4. Provide a balanced and coordinated transportation system that offers many choices.

While each corridor was evaluated independently, it was also important to understand how they would work together as a regional system. This is important for a variety of reasons, including ease of use for transit patrons, operability for the regional transit partners, and garnering regional support and potential funding opportunities.

Figure 1-4: Potential Corridors Identified in Regional Fixed Guideway Study



Source: Regional Fixed Guideway Study, 2005.

Following recommendations from the 2005 Study, CentralOK!go was the next step in the federal planning process for evaluating the feasibility of high-capacity transit. CentralOK!go provided more in-depth analysis and information concerning alignment, technology, ridership forecasts, estimated costs, and potential funding sources for each corridor and as a system.

Other plans considered during CentralOK!go included:

- Intermodal Transportation Hub Master Plan for Central Oklahoma (June 2011)
- Downtown Circulator – Alternatives Analysis for Greater Downtown Oklahoma City Area, Alternatives Analysis Revised Draft Report (November 2011)
- Encompass 2035 Plan Report – Oklahoma City Area Regional Transportation Study, (June 2012)
- Oklahoma Statewide Freight and Passenger Rail Plan (May 2012)
- OKC Quiet Zone Process (ongoing)
- Transit Service Analysis for Central Oklahoma Transportation and Parking Authority (COTPA) (October 2013)

1.4 Study Sponsors & Regional Transit Dialogue

1.4.1 Study Sponsors

CentralOK!go was sponsored by the Association of Central Oklahoma Governments (ACOG), with planning, technical, and policy support from the Cities of Del City, Edmond, Midwest City, Moore, Norman, and Oklahoma City.

1.4.2 Regional Transit Dialogue

Another outgrowth of the 2005 Study was a visioning process, known as the Regional Transit Dialogue (RTD), initiated by ACOG in 2009. The RTD has been used to engage locally elected officials, policy stakeholders, private sector leaders, and the public in a discussion about how the region could develop a more comprehensive public transportation system in the years to come. To accomplish this, the RTD Steering Committee was developed and charged with exploring potential governing concepts, funding strategies, and transit supportive land use policies throughout the region. Each is described below.

Governance/Finance Subcommittee

The Governance/Finance subcommittee was responsible for recommending an appropriate governing structure and funding mechanism(s) to pay for regional transit improvements. A Regional Transit Authority (RTA) with taxing authority is the most common approach to funding a regional system nationwide.

On May 22, 2014, Oklahoma House Bill 2480 was signed into law by Governor Fallin, which enhanced the framework for the development of a regional transit authority. The law allows any combination of any portions of cities, towns, and counties, or their agencies, by resolution of their governing boards, to jointly create a transportation authority and a regional district (pursuant to the provisions of Section 176 of Title 60 of the Oklahoma Statutes) for the purpose of planning, financing, constructing, maintaining, and operating transportation projects located within the boundaries of such a regional district.

Technical/Land Use Subcommittee

The Technical/Land Use subcommittee examined land use practices and worked together to develop recommendations that support regional transit, throughout the region in general and specifically around

future transit stations. A summary of findings and recommendations was then developed for cities to use as a roadmap to encourage transit supportive land uses in appropriate areas of the region.

Public Outreach Subcommittee

The Public Outreach subcommittee was developed to first identify public input needs throughout the region. Moving forward their charge will be to build consensus, and continue to help build momentum for transit improvements throughout the region.

1.5 Stakeholder & Community Involvement Overview

1.5.1 Stakeholder Leadership

The RTD Steering Committee reconvened to serve as the CentralOK!go Steering Committee, and community and stakeholder workgroups were established to help analyze and determine the best high-capacity transit solutions for the Central Oklahoma region in the three corridors.

1.5.2 Community Involvement

A key component of CentralOK!go was seeking resident and stakeholder suggestions and ideas about transportation options in the three corridors. To accomplish this, the study team held four public open-houses, conducted two webinars, published periodic project newsletters, and attended ten local events to gather input on the study's recommendations. All activities, outcomes, and other project details were made available on a dedicated project website and through social media, including Facebook and Twitter, to engage a larger audience.

1.6 Planning Process

Figure 1-5 presents the four-phased CentralOK!go study approach used to identify the locally preferred alternatives (LPAs) for the North, East, and South Corridors.

CentralOK!go was predicated on goals and objectives developed in Phase 1 by the Steering Committee and public and stakeholder input. This approach ensured that the process, as well as the study results, closely reflected the desires of the public and community leadership.

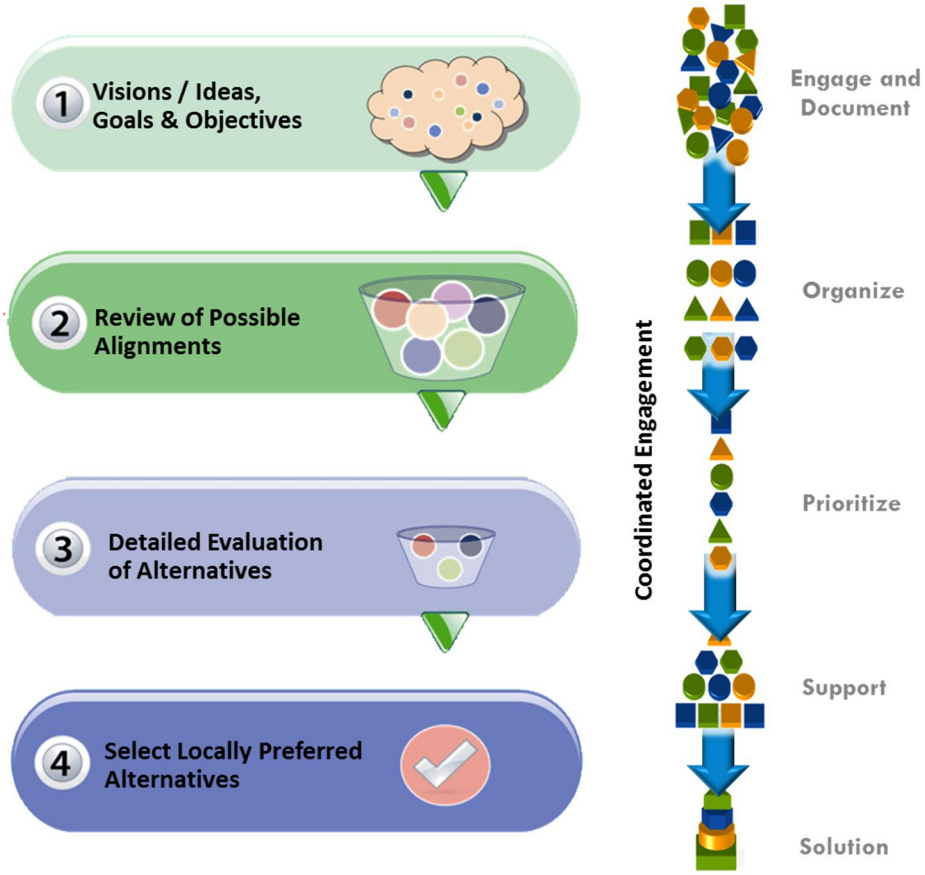
Phase 2 of CentralOK!go identified and narrowed several preliminary alignments and modes within each corridor to those with the highest potential to succeed. This was accomplished with the guidance of the Steering Committee and the stakeholders and public.

During Phase 3, detailed evaluation was conducted, including the use of the regional travel demand model to estimate ridership and costs, with the goal of identifying the highest ranking alignment and mode in each study corridor.

Phase 4 was used to refine and select the LPA for each of the three corridors and to evaluate how those LPAs would function as a system.

Key to every phase of the planning process was the input from the Steering Committee, the stakeholders and the public.

Figure 1-5: CentralOK!go Commuter Corridors Study Process



This page intentionally left blank.

2.0 Regional Issues & Opportunities

2.1 Previous Studies

This section provides a review of seven transportation studies or plans pertinent to the three corridors evaluated as part of CentralOK!go, as shown in Table 2-1.

Table 2-1: Previous Studies in the Central Oklahoma Area

Study/Plan	Reference/Acronym
Regional Fixed Guideway Study (December 2005)	2005 Study
Intermodal Transportation Hub Master Plan for Central Oklahoma (June 2011)	Hub Plan
Downtown Circulator – Alternatives Analysis for Greater Downtown Oklahoma City Area, Alternatives Analysis (AA) Revised Draft Report (November 2011)	Circulator Study
Encompass 2035 Plan Report – Oklahoma City Area Regional Transportation Study, (June 2012)	Encompass
Oklahoma Statewide Freight and Passenger Rail Plan (May 2012)	State Rail Plan
OKC Quiet Zone Process (ongoing)	OKC QZ
Nelson Nygaard – Transit Service Analysis for COTPA (October 2013)	Nelson Nygaard Study

The remainder of the section provides an overview of the transportation issues and opportunities identified in these previous studies, as well as others identified by the project team during the existing conditions research effort. Observed issues and opportunities are included but not specifically referenced to one of the recent studies or plans.

Summarized in Table 2-2, the issues and opportunities have been broadly sorted into five categories:

- Transportation
- Environmental Quality and Sustainability
- Land Use and Economic Development
- Quality of Life
- Public Awareness

Although the information is relatively broad-based, its intent was to provide context to the CentralOK!go effort and to help guide development of project goals and objectives, as well as the definition and evaluation of alternatives.

Table 2-2: List of Issues and Opportunities

Issues	Opportunities
Transportation	
Roadway and Bridge Maintenance	Implement enhanced operation and management techniques (efficiency and reliability) and improve the efficiency of existing transportation
Traffic Congestion	Promote alternative modes of transportation (encouraging land-use patterns of development which reduce travel distance)
Limited Fixed-Route Transit Service	Invest in transit to improve the existing bus system. Create momentum for local dedicated funding. Local desire for improved transit service.
Limited Express Bus Service in the North and South Corridors	Ridership on existing bus service is an indication of latent demand for long haul commuter travel patterns
Environmental Quality and Sustainability	
Air Pollution – Attainment Concerns	Increase use of alternative fuels in transit fleets – reduces system emissions/potentially boosts local economy if natural gas is used. Non-attainment makes region eligible for new federal funding sources
Potential Impact on Historical, Cultural, Archaeological, and Tribal Sites	Carefully evaluate historical, cultural, archaeological, and tribal sites before construction – CentralOK!go evaluation includes environmental considerations
Land Use and Economic Development	
Regional Land Use Patterns and Growth	Increase accessibility to and between centers of activity – greater density improves transit propensity
Limited Transit Options for Some Work Trips	Integrate land use and transportation to create more active, healthier communities
Rail may Contribute to Noise Pollution	Identify quiet zone locations and infrastructure modifications to minimize noise associated with rail operations
Economic Competitiveness	Improve transit system to enhance economic competiveness and focus growth
Quality of Life	
Provide Safe and Efficient Transportation Options	Develop corridor specific alternatives to congested roads – reduce travel time and delays due to congestion, shorten peak periods of volume
Underserved Populations	Provide transportation access for everyone – potential ridership from underserved areas
Safety and Security	Provide safe transit service and provide effective connections
Public Awareness	
Communication with the Public	Influence travel behavior by providing traffic information
Achieve Consensus Among Competing Interests	Inform, educate, and actively involve the public and local agencies throughout the planning process
Funding Resources	Capital and operating funding resources will need to be identified before implementing new transit services. Currently none of the region's transit operators (EMBARK, CART, Citylink) have a dedicated operating funding source.
Transit Stigma	Enhance transit marketing/branding and use of technology to share transit information. An effective marketing strategy can help the region pursue an ambitious and forward thinking transportation agenda.

Source: URS, 2013.

2.2 Transportation Issues and Opportunities

2.2.1 Transportation Issues

Roadway and Bridge Maintenance

The Oklahoma Department of Transportation (ODOT), like other state DOTs across the country, is struggling to maintain its roads and bridges under current financial constraints. However, ongoing maintenance and repair of local roadways and bridges is critical to a safe and reliable transportation system (*Encompass*).

Traffic Congestion

Congestion results in delay, costs, lost productivity, and pollution. When rail transit is available as an alternative mode of transportation, it can encourage land use patterns near stops that provide a mix of housing, service, and retail development which reduces travel time and distance.

In Central Oklahoma, the major routes that access the central core experience the highest traffic volumes during peak travel times. The most congested segments include I-35 (from SE 19th Street in Moore to I-240), I-40 (from Air Depot Boulevard to downtown Oklahoma City), I-40 (from I-44 to MacArthur Boulevard), I-44 (from NW 39th Street to Will Rogers World Airport), and I-235 (from NW 23rd Street to I-40).

Limited Fixed-Route Transit Service

EMBARK (formerly known as METRO Transit) is operated by the Central Oklahoma Transportation and Parking Authority (COTPA), a trust of the City of Oklahoma City. EMBARK provides fixed-route and paratransit services in Oklahoma City and some service to Midwest City. Buses operate every 30 to 60 minutes in a hub and spoke system from the downtown transit center, located at NW 5th Street and Harvey in downtown Oklahoma City. The service currently does not provide a timed-transfer system at the transit center and results in longer layover times for some patrons. In addition, some routes include out of direction loops and deviations which increase travel times. Except for a couple of routes, fixed-route service does not operate in the evenings after 7:00 PM and on Sundays. In 2013, the agency completed a Transit Service Analysis, which recommended enhancements to improve bus service throughout the service area including improved frequencies, more direct service, and new routes to serve areas that are currently underserved. These upgrades will continue to improve service as they are implemented.

Currently, EMBARK is funded primarily by the City of Oklahoma City General Fund and federal formula funds. There is a need for a reliable dedicated funding source for transit because under the current funding structure, EMBARK is unable to make major investments in its system. This limitation lends itself to reduced responsiveness to demand and the inability to try new and innovative services because of the potential for budget cuts from year to year.

The Nelson Nygaard Study identified several proposed/revised routes within the current EMBARK bus network that became effective in March 2014. The proposed alternatives identified in CentralOK!go may overlap and/or intersect the routes identified in the Nelson Nygaard Study.

Cleveland Area Rapid Transit (CART) is the public transit system for the City of Norman and the University of Oklahoma. CART operates nine fixed routes serving Norman and the OU campus, and provides a commuter route to Oklahoma City in coordination with EMBARK. More than one million passengers use CART annually.

Citylink is the public transit system of the City of Edmond and the University of Central Oklahoma (UCO). Citylink has four fixed routes that serve the City of Edmond and the UCO campus, and a commuter route between Oklahoma City and Edmond.

Limited Express Bus Service in the North and South Corridors

Express bus service operating from Norman and Edmond to downtown Oklahoma City is primarily limited to peak periods on one corridor. There are currently no express bus services operating along an east-west corridor.

2.2.2 Transportation Opportunities

Implement Enhanced Operation and Management Techniques (Efficiency and Reliability) and Improve the Efficiency of Existing Transportation

Preserve existing and future investments by implementing appropriate funding for maintenance of roads and bridge infrastructure. State of Good Repair funding initiatives for transit could also benefit roadway maintenance. Perform regularly scheduled maintenance on public transit vehicles to ensure reliability and to maintain safety (*Hub Plan, Circulator Study, Encompass, OKC QZ*).

Promote Alternative Modes of Transportation (Encourage Land Use Patterns of Development That Reduce Travel Distance)

Increase transportation efficiencies and improve capacity constraints by taking steps to promote and invest in transit, bicycling, and pedestrian systems. Project 180 has taken an important step in improving the streetscape in downtown Oklahoma City; however, improvements to mobility and accessibility outside the central core can also help encourage travel behavior that reduces travel distances and increases roadway facility efficiencies (*Hub Plan, Circulator Study, Encompass, OKC QZ*).

Improve Transit Service in the Region

Invest in transit to improve the existing bus system by implementing easier to understand bus routes, timed transfers at the downtown Oklahoma City Transit Center, and more direct routing throughout the EMBARK service area. Implement a dedicated funding source for transit in the region in order to provide resources to allow for long range transit planning. Identify potential transit corridors through an assessment of future congestion patterns where buses or rail could be most competitive with the automobile in terms of travel time. Perform a transit market analysis to determine untapped markets and origin and destination pairs (*Nelson Nygaard*).

2.3 Environmental Quality and Sustainability Issues and Opportunities

2.3.1 Environmental Quality and Sustainability Issues

Air Pollution – Attainment Concerns

In 2011 and 2012, Central Oklahoma's ozone levels exceeded the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards. The 2013 and 2014 ozone results were dramatically better, and based on the 2012-2014 three-year average all ozone monitoring sites were in attainment with the current national standard of 0.075 parts per million (ppm). Many factors such as weather, wind, wildfires, and demand for electricity can contribute to ozone levels.

EPA is engaged in the mandated five-year review cycle for determining whether the ozone standard should be revised. In April 2014, EPA was ordered by the US District Court to propose the revised standard by December 1, 2014 and finalize the standard by October 1, 2015. The Clean Air Act instructs the EPA to set ambient air quality standards that protect public health. Scientific studies show humans experience harmful effects from exposure to ozone at levels much lower than the current standard. All indications are the standard will be lowered to a value in a range of 0.065-0.070 ppm. If a lower standard within this range is proposed, Oklahoma will have significant difficulties meeting this new standard at most, if not all, ozone monitors across the state. If designated non-attainment, the region would be required to implement a plan to meet air quality standards, or risk losing some federal financial assistance.

Potential Impact on Historical, Cultural, Archaeological, and Tribal Sites

An expansion of existing rights-of-way (ROW) may have potential impacts on historical, cultural, archaeological, and/or tribal sites (*Encompass, State Rail Plan*).

2.3.2 Environmental Quality and Sustainability Opportunities

Decrease Air Emissions in the Region with Improved Transit Service and Use of Alternative Fuels

Encourage environmentally-friendly travel behavior that achieves better fuel efficiency and helps reduce the overall number of trips made by automobile. Promote the usage of alternative fuels such as locally produced natural gas and biofuels to decrease emissions in the region. Improve network efficiency and

implement transportation strategies such as idle reduction and signal timing to improve fuel efficiency (*Circulator Study, Encompass, State Rail Plan*).

Vehicle emissions are a major contributor to air pollution. Each person who takes transit removes an auto from the road. Even greater emission reduction could be achieved by the use of alternative fuels in transit fleets, with the bonus of boosting the local economy when natural gas is used. Continued attainment of federal air quality standards will make Central Oklahoma healthier for its citizens and more desirable for business (*Congestion Mitigation/Air Quality, U.S. Department of Energy funds et. al*).

Historical, Cultural, Archaeological, and Tribal Sites are Evaluated before Construction

Quantitative, geographic and socio-economic analysis on the new transportation corridors will determine associated impacts to historical and cultural resources. The evaluation in CentralOK!go incorporated environmental considerations as alternatives were eliminated from the process (*State Rail Plan, Encompass, Circulator Study*).

2.4 Land Use and Economic Development Issues and Opportunities

2.4.1 Land Use and Economic Development Issues

Land-Use Patterns

The low density suburban development patterns in the region have led to a more dispersed population with longer trips between home, work, school, and recreation.

Low density growth patterns within a region can reduce the effectiveness of transit.

Limited Transit Options for Some Work Trips

Areas of employment in the region are dispersed and not confined to one area. Although there is a concentration of employment in the central core of Oklahoma City, a number of the larger employers are located outside of downtown (Chesapeake Energy, Tinker AFB, and the University of Oklahoma, among others). There is a need for improved transit service to major activity centers and employment centers located outside of downtown.

Rail May Contribute to Noise Pollution

The Greater Oklahoma City Chamber is working with the City of Oklahoma City and the Alliance for Economic Development to establish a Quiet Zone in downtown Oklahoma City. Once established, future potential rail based transit service would be expected to follow the requirements established for quiet zones (*OKC QZ*).

Economic Competitiveness

Roadway congestion is one measure that companies use to determine if they should remain in or move into a community. Central Oklahoma has attracted and retained businesses to date, but as congestion levels continue to increase the economic competitiveness of the region will be tested in the years to come if a more balanced transportation system is not developed.

2.4.2 Land Use and Economic Development Opportunities

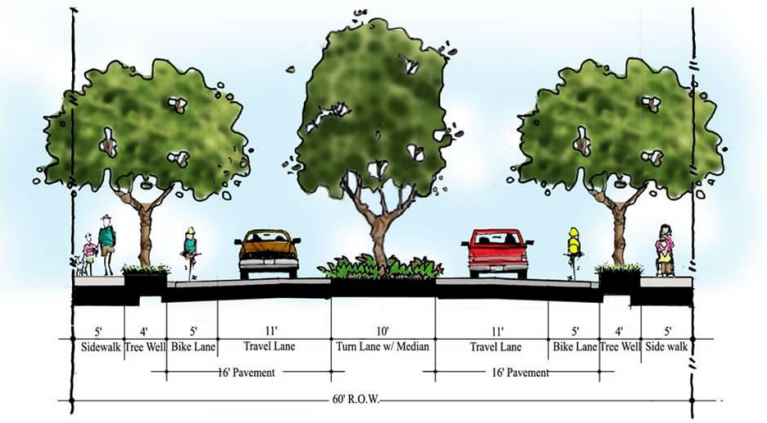
Increase Accessibility to and Between Centers of Activity

The transportation system should provide the opportunity for all people to gain access to jobs through a variety of travel options. Rail and other high-capacity transit increases accessibility to and between

centers of activity. Transportation that serves large employment centers will enhance the region's economic vitality (*2005 Study, Encompass*).

Integrate land use and transportation to create more active, healthier communities

Promote compact and contiguous land use patterns, where appropriate, that maximize the effectiveness of transit and other alternative modes such as walking and bicycling. Encourage high density and mixed use development to reduce trip lengths and to promote internal or short distance trip patterns. Encourage municipalities to develop sidewalk and trail networks that provide safe facilities for bicyclists and pedestrians (*2005 Study, Encompass*).



Identify, Evaluate, Recommend, and Develop a Regional Public Transportation System that will Strengthen Central Oklahoma

This will provide access to jobs and help strengthen the central cores of cities within the Central Oklahoma region by investing in projects which complement existing infrastructure. Use socioeconomic and federal transportation information to develop long range plans that ensure continued growth of the region and downtown Oklahoma City (*2005 Study, Encompass*).

Transit Can Enhance Economic Competiveness

A well-developed transit system with frequent service and well defined stops and stations can be an amenity to attract economic development and employers to the region. It can focus development to defined areas and improve transit productivity.

2.5 Quality of Life Issues and Opportunities

2.5.1 Quality of Life Issues

Provide Safe and Efficient Transportation Options

Well maintained and safe multimodal transportation options need to be provided to meet the mobility needs of the Central Oklahoma region (*Encompass*).

Underserved Populations

A reliable and frequent transit service is needed to better provide work and medical trips for underserved populations with limited mobility.

Safety and Security

One of the most significant personal barriers to using transit is the negative perception of transit as it relates to safety and security. As transit service is expanded, the need for safety and security becomes a design consideration and a cost factor.

2.5.2 Quality of Life Opportunities

Reduce Roadway Congestion

A reliable transit system will encourage more people to use it and can result in a decrease in individual automobile trips and less roadway congestion. Once the investment is in place, corridor-based transit can be effective at encouraging mode shift from automobile use. Transit can reduce traffic volumes, shorten peak periods, and/or create more capacity on adjacent roadways (*2005 Study, Encompass, State Rail Plan*).

Provide Transportation Access for Everyone – Potential Ridership from Underserved Areas

The transportation system should provide the opportunity for all people to gain access to jobs through a variety of travel options. The investment in alternative modes of transportation provides mobility options to people who are less likely to have access to an automobile, including low income, senior citizens, and persons with disabilities (*2005 Study, Encompass*).

Provide Safe Transit Service

Improvements to multimodal transportation facilities such as bus stop waiting areas, the sidewalk network, and bike trails will provide safer transportation options and fewer conflicts with automobile traffic (*2005 Study, Encompass*).

Provide Effective Connections

Reliable, convenient, and well-connected transportation modes are essential to providing efficient movement of people and goods. The coordination of transportation and land use planning will reduce automobile trips, decrease travel time, enhance mobility, and preserve agricultural and recreational lands (*2005 Study, Encompass*).

2.6 Public Awareness Issues and Opportunities

2.6.1 Public Awareness Issues

Communicating with the Public

An ongoing public and stakeholder outreach effort is needed to ensure effective communication and to build consensus among competing interests (*2005 Study*).

Achieve Consensus among Competing Interests

Capital and operating funding resources will need to be identified before implementing new transit services. Currently none of the region's transit operators (EMBARK, CART, Citylink) have a dedicated operating funding source.

Public Perspective of Current Transit Services

Many people do not have a high opinion of transit, often a result of being unfamiliar with and nonusers of current transit services. Various service and system improvements can be planned and implemented to attract new riders and enhance public perspective of current transit services and future system plans.

2.6.2 Public Awareness Opportunities

Influence Travel Behavior by Providing Traffic Information

Real-time traffic information through roadway message boards, websites, and smartphone applications is an important component to effective communication to drivers. Early notification of accidents and construction sites can influence route and mode choices (*2005 Study, Encompass*).

Inform, Educate, and Actively Involve the Public and Local Agencies throughout the Planning Process

Inform the public of long-range planning goals and objectives. Present information in a manner that is easy and accessible for everyone to read and understand. Formulate a process to incorporate public and agency input into the planning process (*2005 Study, Encompass*).

Maintain Accountability, Credibility and Responsibility of the Steering Committee and Sponsoring Agencies throughout the Study

This can be accomplished through clear communication and accurate documentation. Identifying potential conflicts and cooperating with local and regional transportation agencies conducting concurrent transportation studies will help keep all parties focused on the goals of the project. The RTD ensures that multiple local governments, legislators and private sector leaders are involved in the process to study, analyze, recommend and promote measures to improve public transportation within Central Oklahoma. (*2005 Study*, Encompass)

Transit Marketing/Branding

Develop a well-recognized brand for transit service delivery options throughout the region as they become available. Premium services, such as rail and BRT lines, should have unique brands for station facilities and vehicles. Implement a regional public transit marketing campaign that targets new markets for transit. Marketing programs should take advantage of technology to share transit information with the riding public as well as advertise the benefits of transit. Transit technologies such as real-time information at stops, trip planning applications for smartphones, and smartcard or mobile phone fare payment systems improve the overall efficiency of the service and help to attract riders.

This page intentionally left blank.

3.0 Developing Transportation Alternatives

3.1 Goals & Objectives

Establishing project goals and objectives is an important first step in the development of system planning and corridor studies. They guide the planning process, weaving the region's needs and desires into that process, and ultimately resulting in recommendations that reflect local priorities.

This section documents the goals and objectives established for each of the three corridors included in this study as well as the methodology to develop them.

3.1.1 Methodology

A three-step process was utilized to develop the goals and objectives for the three study corridors. The project team first worked with the CentralOK!go Steering Committee to develop regional goals for the overall study. The team then presented the regional study goals to the individual corridor workgroups and asked them to add any corridor-specific goals that they felt were important. Finally, the workgroups developed objectives for each regional goal. Ultimately, the Steering Committee adopted both the regional and corridor-specific goals, as well as a set of objectives to reach each goal.

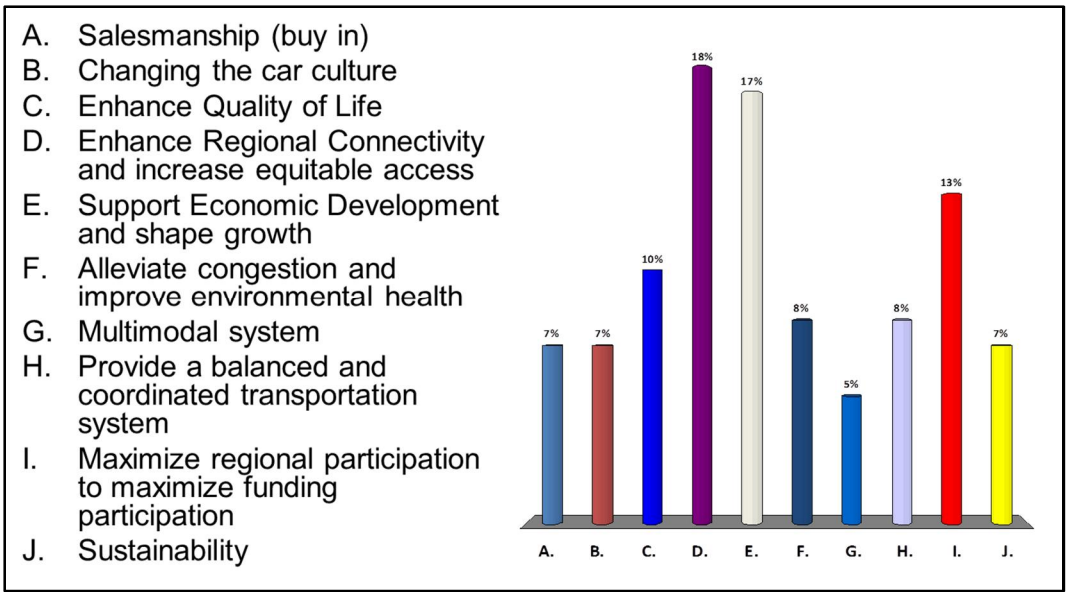
3.1.2 Overall Study Goals

In March 2013, the CentralOK!go project team met with the Steering Committee to discuss existing conditions within the three study corridors and develop overarching study goals that would apply to a regional system.

The study goals were established through an interactive session with the Steering Committee. The committee was divided into smaller groups of 4-5 members, and each small group was tasked with brainstorming goals for CentralOK!go. Afterward, the full Steering Committee reconvened, and each group reported on the goals they developed.

From these reports, the project team created a comprehensive list of all of the recommended study goals. Each one was discussed in detail, and some of the recommended goals were combined into a single goal and the wording was revised on others. After the Steering Committee refined its comprehensive list of goals, each member anonymously voted for their top five. The results of this vote are shown in Figure 3-1.

Figure 3-1: Results of CentralOK!go Steering Committee Vote on Study Goals



Subsequent to the individual vote, the Steering Committee and project team discussed the results, which resulted in some of the goals being combined further. Ultimately, the CentralOK!go Steering Committee reached agreement on the following study goals:

Enhance Quality of Life was the "umbrella goal" under which the remaining goals fall:

1. Enhance Regional Connectivity and Increase Equitable Access
2. Support Economic Development and Shape Growth
3. Provide a Balanced and Coordinated Multimodal Transportation System
4. Maximize Regional Participation to Maximize Funding Participation

3.1.3 Workgroup-Identified Corridor Goals and Objectives for Overall Study Goals

As part of CentralOK!go, individual workgroups were established for each of the three study corridors, as well as the downtown Oklahoma City area where the corridors converge. Each workgroup was comprised of stakeholders and community leaders within their respective corridors and downtown Oklahoma City. Members included local elected officials; city, county, and state representatives; business leaders; representatives from various local non-profits and advocacy groups; and homeowner association members, among others. These workgroups were established in order to obtain valuable feedback from representatives who live and work within each of the corridors. Specific workgroup feedback assisted in guiding the study, along with Steering Committee feedback.

In July 2013, the project team conducted the first round of workgroup meetings for the North, East, and South Corridors and downtown Oklahoma City. The purposes of the first round meetings were to:

- Introduce the study to the workgroups,
- Provide corridor-specific background information and data,
- Have the workgroups rank the Steering Committee's study goals and identify any additional corridor-specific goals, and
- Establish objectives for the identified study goals.

Corridor Workgroups

The corridor workgroups convened on July 11 (South Corridor), July 15 (East Corridor), July 16 (North Corridor), and July 17 (downtown), 2013. After introduction of the study by the project team and a presentation on existing conditions within the corridors, the workgroup members were divided into smaller groups and asked to rank the Steering Committee-identified study goals by order of importance and suggest additional corridor-specific goals. Following reports from the small group discussions, the workgroup voted as a whole, ranking the overall study goals and voting on additional goals for the corridors. The results of the study goal rankings, additional corridor-specific goals, and objectives to reach the study goals are provided below.

North Corridor Workgroup
North Corridor Study Goal Ranking (by order of importance):

1. Enhance Regional Connectivity and Increase Equitable Access
2. Provide a Balanced and Coordinated Multimodal Transportation System
3. Maximize Regional Participation to Maximize Funding Participation
4. Support Economic Development and Shape Growth

In addition, the following corridor-specific goals were recommended by the North Corridor Workgroup:

1. Provide easy-to-use service with a focus on multimodal connections
2. Maximize the ability to access local, regional, and federal funding to build and operate the service through governance

East Corridor Workgroup
East Corridor Study Goal Ranking (by order of importance):

1. Provide a Balanced and Coordinated Multimodal Transportation System
2. Enhance Regional Connectivity and Increase Equitable Access
3. Support Economic Development and Shape Growth
4. Maximize Regional Participation to Maximize Funding Participation

In addition, the following corridor-specific goals were recommended by the East Corridor Workgroup:

1. Provide for future transit growth through preservation of existing rail corridors
2. Provide travel options to major activity centers, including "last mile" connections within the East Corridor and the region

South Corridor Workgroup
South Corridor Study Goal Ranking (by order of importance):

1. Enhance Regional Connectivity and Increase Equitable Access
2. Support Economic Development and Shape Growth
3. Maximize Regional Participation to Maximize Funding Participation
4. Provide a Balanced and Coordinated Multimodal Transportation System

In addition, the following corridor-specific goals were recommended by the South Corridor Workgroup:

1. Provide a Reliable and Convenient Service
2. Enhance the Transit and Land Use Nexus

Downtown Oklahoma City Workgroup
Downtown Oklahoma City Study Goal Ranking (by order of importance):

1. Provide a Balanced and Coordinated Multimodal Transportation System
2. Enhance Regional Connectivity and Increase Equitable Access
3. Support Economic Development and Shape Growth
4. Maximize Regional Participation to Maximize Funding Participation

In addition, because all three corridors overlap in downtown Oklahoma City, the Downtown Workgroup was asked to brainstorm one or two additional goals that would be applied to all three corridors that would speak to the unique nature of downtown Oklahoma City. The downtown workgroup identified the following two goals:

1. Promote Regional Awareness and Partnership
2. Provide an Accessible, Convenient, and Efficient Service that Empowers Communities

Finally, the workgroups were asked to develop objectives for each of the overall study goals. The objectives are shown in Table 3-1.

Table 3-1: Final Study Goals and Objectives

Goal: Enhance Regional Connectivity and Increase Equitable Access	Goal: Support Economic Development and Shape Growth	Goal: Provide a Balanced and Coordinated Multimodal Transportation System	Goal: Maximize Regional Participation to Maximize Funding Participation
Objectives: • Maximize connection to major activity centers in the region • Provide a seamless connection to central OKC • Maximize the use of dedicated ROW • Provide access to limited mobility (low-income and zero-car) populations	Objectives: • Provide compatibility with current and future land use plans • Serve areas with highest projected population and employment densities • Serve areas slated for transit-friendly development (mixed use or transit-oriented development) • Maximize redevelopment and infill opportunities • Maximize opportunities to develop significant areas of vacant land within the urbanized area.	Objectives: • Maximize ridership potential and frequency of service • Maximize opportunities for multi-modal connections (connections with major roadways, bike lanes, and bike/pedestrian trails) • Provide transit service in the areas with the worst congestion • Reduce dependency on interstate highway system	Objectives: • Provide access/ connect to a variety of jurisdictions in order to increase the number of potential funding sources available to the project • Ensure consistency with regional long range transportation plan and local comprehensive plans

Source: URS, 2013.

Corridor Workgroup Outcomes

The study goal rankings, additional corridor-specific goals, and objectives were subsequently used to develop evaluation criteria for analysis of alignments and alternatives within the three corridors. In this way, the Steering Committee and workgroup feedback played an integral role in shaping the overall direction of the corridor study and results of the analysis.

3.2 Approach

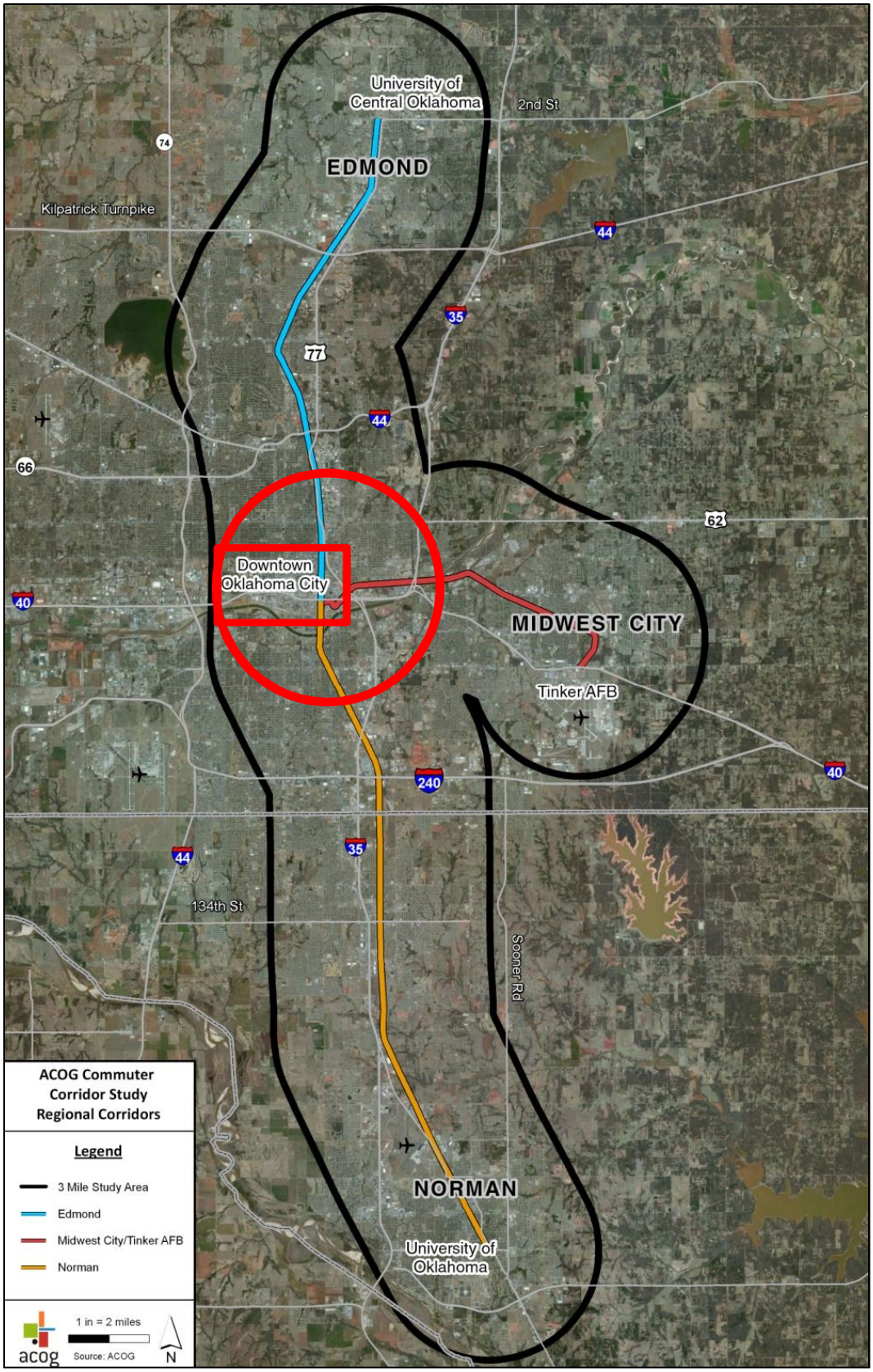
CentralOK!go focused on analyzing the three commuter corridors that showed the highest potential for high-capacity transit in the 2005 Regional Fixed Guideway Study, as shown in Figure 3-2. The three CentralOK!go corridors were identified as:

- The North Corridor – Extending between downtown Oklahoma City and downtown Edmond
- The East Corridor – Extending between downtown Oklahoma City, through Del City and Midwest City, near Tinker Air Force Base
- The South Corridor – Extending between downtown Oklahoma City, through Moore and Norman to SH-9

Each corridor study area was developed by drawing a three mile buffer around the existing freight rail line, which served as its central “spine” for data gathering and analysis, and evaluation of several parallel alignments (rail and roadway) that might serve commuter travel needs within the corridor.

Initially, each corridor was evaluated individually to determine the most appropriate alignment, mode, and its ability to support a major transit investment on its own. On a regional scale, the corridors were later evaluated as a system, with downtown Oklahoma City serving as the connection and transfer point among the corridors at the Santa Fe Station. Through a previous, separate study Santa Fe Station was determined to be the future Intermodal Transportation Hub for the region.

Figure 3-2: CentralOK!go Regional Study Area



3.3 Regional Transit Indicators

Several important conditions must be met for transit to operate effectively and efficiently at both the regional level and the neighborhood level. At the regional level, transit service should be focused on areas of major activity (in terms of residential, employment, or entertainment). At the neighborhood level, transit stops must be located in areas that are safe and convenient for patrons. To achieve these conditions, certain indicators should be met to ensure a successful transit program.

- Transit service should support existing communities. Transit works best in areas with higher population and employment densities, as well as in areas where land use patterns are supportive and sidewalks are present.
- Transit service should value the communities and neighborhoods that it serves. It should provide access to major activity centers and provide environmental suitability.
- Transit should be developed in a way that enhances economic competitiveness. This includes the potential for Transit Oriented Development (TOD), summarized in Chapter 8 and described more thoroughly in Appendix C.
- Transit services should be developed to focus the coordination and leverage of a federal investment in the region. Because a significant portion of the capital cost and ongoing maintenance costs will be borne locally, the system should be supported regionally ensuring sufficient local matching and operating funds.
- Transit should provide an equitable and affordable travel mode, regardless of the availability of other travel options.
- A well-conceived transit system should provide transportation choices throughout the region that are easy to use, with competitive travel times. It should serve existing travel patterns and provide a travel choice in heavily congested corridors.

3.3.1 Downtown Oklahoma City

For the purpose of this study, downtown Oklahoma City was defined as being bound by N. 13th Street on the north, S. 11th Street on the south, Lincoln Boulevard to the east, and May Avenue to the west. Downtown Oklahoma City is home to 52,400 employees, 7,600 residents, 40,340 theatre seats, two universities, and 174,600 square feet of convention/arena space. Downtown Oklahoma City is the nucleus of Central Oklahoma. Downtown is home to 22 major employers (defined as having over 500 employees). Downtown Oklahoma City is also the regional transportation hub, which contains EMBARK's transit center and the new intermodal transit hub at Santa Fe Station. Santa Fe Station is the terminus of the Amtrak passenger rail service between Oklahoma City and Ft. Worth, Texas, will serve the new modern streetcar line, and is envisioned as the downtown terminus and transfer point for the recommended CentralOK!go commuter services. EMBARK's downtown transit center is located between NW 4th Street and NW 5th Street on Hudson Avenue and serves as the terminus point for 23 of its 24 fixed routes. While downtown has always been the employment, entertainment, cultural, and convention hub, it is increasingly developing a strong residential base, as well, thanks to new areas opening up for development and the planned Oklahoma City Core to Shore development which will extend the downtown area.

3.3.2 North Corridor

Corridor Overview

The North Corridor, between downtown Oklahoma City and Edmond, is approximately 14 miles in length. According to the region's long-range transportation plan, Encompass 2035, population within the corridor is projected to increase by approximately 22% and employment by 25%, from 2005 to 2035.

Portions of the North Corridor have a sound base for improved transit use, due to the number of major employers and mixed-use development, areas with high concentration of limited mobility populations, and numerous existing transit routes that operate within the corridor. There are sufficient alignment options for transit service in the corridor as many arterials have potential capacity to accommodate transit and there is an active freight rail line, with passing tracks in areas. Finally, land use and development patterns suggest a potential for commuter-based transit service due, in part, to the high levels of single-family residential development (about 44% of corridor) and employment centers concentrated in Edmond and downtown Oklahoma City. This development pattern is best suited for transit stations with associated park-and-ride facilities.

Trip Generators

Major trip generators in Oklahoma City include the State Capitol, Remington Park, OKC Zoo, Classen Curve, the Chesapeake Energy campus, and University of Oklahoma (OU) Health Sciences Center. In Edmond, major trip generators include City of Edmond offices, the University of Central Oklahoma, OU Medical Center-Edmond, Nestle and Purina. Eleven of the region's 74 major employers (those with over 500 employees, not including those in downtown Oklahoma City) are located in the corridor.

Existing bus routes serving the North Corridor include EMBARK Routes 1, 2, 3, 5, 7, 8, 10, 18, 19, 22, and 24 and Edmond Citylink Routes 2, 3, 4, and 100X ExpressLink.

Limited Mobility

Within the North Corridor, 35% of the census block groups contain an above average level of limited mobility populations, with 17% of those block groups being in the high category. Limited mobility populations include zero car households, households below the poverty level, persons 65 years of age and older, and persons under 18 years of age. These groups often rely on public transportation as their primary means of longer distance travel as they cannot afford or cannot operate an automobile. Figure 3-3 shows limited mobility populations within the corridor by block group.

Corridor Land Use

In the North Corridor, land use is primarily industrial along the Burlington Northern Santa Fe (BNSF) Railroad alignment, and there is a cluster of commercial/office development along the Kilpatrick Turnpike. Aside from those areas, the corridor is mostly residential (44 % of the total land area). There are also several areas of transit-friendly development including commercial/mixed use (9%) and multi-family housing (3%).

3.3.3 East Corridor

Corridor Overview

The East Corridor, connecting downtown OKC to Del City, Midwest City and Tinker AFB, is approximately 9 miles in length. Population and employment are projected to increase by 17% and 23%, respectively, between 2005 and 2035 according to Encompass 2035.

Tinker Air Force Base, Rose State College and several other employment and activity centers are located within the corridor. There are also large open spaces, extensive industrial sites, and commercial clusters along arterials and I-40, providing opportunity for economic redevelopment. The corridor includes multiple transportation facilities – Union Pacific (UP)/BNSF rail line, I-40, and several four-lane arterial facilities – that that could largely accommodate transit within existing rights-of-way. The UP/BNSF rail alignment is partially abandoned and would require extensive rehabilitation, but offers availability that other existing freight rail lines cannot. Finally, the presence of Tinker AFB military runway Clear and Accident Potential Zones within the eastern portion of the corridor and multiple river and creek crossings present some potential restrictions and environmental challenges.

Trip Generators

Major trip generators in the East Corridor include Rose State College, Midwest Regional Medical Center, Midwest City Town Center, Boeing, and Tinker AFB. The Midwest City Town Center is a shopping and restaurant district with regional significance. Tinker AFB employs more than 26,000 workers and is the largest single-site employer in Oklahoma. Six of the region's 74 major employers (those with over 500 employees, not including those in downtown Oklahoma City) are located in the East Corridor.

Existing bus routes serving the corridor include EMBARK Routes 15 and 19.

Limited Mobility

Within the East Corridor, 31% of the census block groups contain an above average level of limited mobility populations, with 15% of those block groups being in the high category. Limited mobility populations include zero car households, households below the poverty level, persons 65 years of age and older, and persons under 18 years of age. These groups often rely on public transportation as their primary means of longer distance travel as they cannot afford or cannot operate an automobile. Some examples of high concentrations of zero car households can be students who live on a college campus or military personnel living and working on base. Figure 3-3 shows limited mobility populations within the corridor by block group.

Corridor Land Use

Land use in the East Corridor consists of large areas of open space along the river, several golf courses, parks, and open space/low density development near Tinker AFB's Clear and Accident Potential Zones. There is also extensive industrial development along the river, east of I-35, and at Tinker AFB. There are commercial clusters along arterials and I-40, as well as transit-friendly residential areas with higher density (Reno, Sooner to Douglas) and mixed-uses with high employment density (I-40 and SE 29th Street). However, throughout the corridor continuous sidewalks and street-oriented buildings are partly missing.

3.3.4 South Corridor

Corridor Overview

The South Corridor, connecting downtown Oklahoma City with Moore and Norman, is approximately 17 miles long. Population and employment are projected to increase by about 30% and 41%, respectively, between 2005 and 2035 according to Encompass 2035.

The corridor includes several major activity centers, including commercial development in Moore, the University of Oklahoma, and downtown Norman. Norman's OU campus and downtown contain higher density with higher levels of pedestrian activity. There are concentrations of commercial development around existing highways and major arterials. There are a sufficient number of alignment options for

high-capacity transit service in the South Corridor. The BNSF rail line has existing Amtrak service to Fort Worth, Texas, with a station in downtown Norman; thus, the existing track is in good condition.

Trip Generators

Major trip generators include the University of Oklahoma, downtown Norman, Norman Regional Hospital, and commercial development and government services along I-35 in Moore. Nine of the 74 major employers in the metropolitan area (those with over 500 employees, not including those in downtown Oklahoma City) are located in the South Corridor.

Numerous EMBARK routes serve the downtown Oklahoma City area, and CART has six city routes and three university routes operating weekdays and Saturdays. Additionally, EMBARK and CART jointly operate Express Route 24 between Norman and Oklahoma City on weekdays.

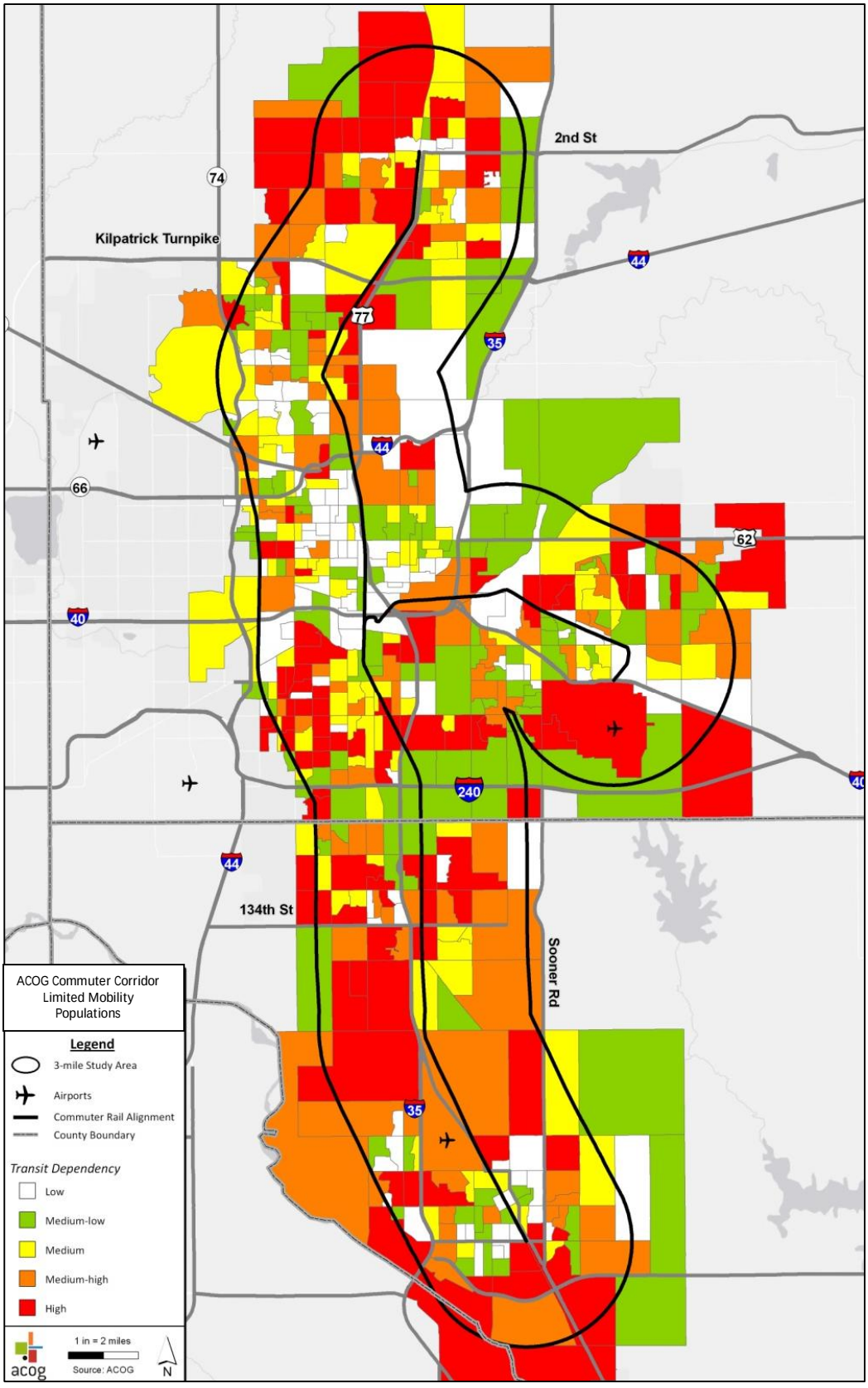
Limited Mobility

Within the South Corridor, 41% of the census block groups contain an above average level of limited mobility populations, with 22% of those block groups being in the high category. Limited mobility populations include zero car households, households below the poverty level, persons 65 years of age and older, and persons under 18 years of age. These groups often rely on public transportation as their primary means of longer distance travel as they cannot afford or cannot operate an automobile. Some examples of high concentrations of zero car households can be students who live on a college campus or military personnel living and working on base. Figure 3-3 shows limited mobility populations within the corridor by block group.

Corridor Land Use

In the South Corridor, land use is primarily industrial along the BNSF alignment. There are concentrations of multi-family, institutional and public land uses in Norman, and commercial land use concentrations around primary highways throughout the corridor. Significant commercial development is located near I-35 at SE 4th and SE 19th Streets in Moore.

Figure 3-3: Block Groups with High Levels of Limited Mobility Populations



3.4 High-Capacity Transit Modes

One of the first steps in the planning process was to identify various high-capacity transit modes and determine their applicability within the Central Oklahoma region. The transit modes eventually considered were determined to be the most viable for the corridors studied based on technical analysis, industry standards, potential for federal funding, and history as proven technologies.

3.4.1 What is High-Capacity Transit?

High-capacity transit is public transportation that:

- Travels in its own right-of-way (ROW) for at least a portion of its route;
- Has priority over other travel modes (i.e. traffic signals designed to hold a green light longer when transit vehicles approach);
- Offers vehicles that make fewer stops, travel at higher speeds, have more frequent service, and carry more people than local buses.

Based on this definition, high capacity transit technologies include bus rapid transit (BRT), personal rapid transit (PRT), monorail/automated people mover (APM), streetcar, light rail transit (LRT), commuter rail, maglev/ high-speed rail (HSR), and heavy rail.

Conventional bus and express bus provide supplemental service to any of the above systems. A detailed definition of each of these modes is discussed below, including system characteristics, applicable corridors, operational issues, and constraints.

3.4.2 System Characteristics

The system characteristics for each mode reflect standards for similar systems across the U.S. as described below.

Hourly Capacity

Hourly capacity is based on the average vehicle capacity multiplied by the number of vehicles per train (when discussing rail technologies) multiplied by the typical frequency of service for a one hour period during rush hour in one direction only.

Average and Top Speeds

Average speed is based on the typical speeds that each mode can achieve on average over the length of a typical corridor. The speeds also consider whether the mode functions in fully or partially dedicated ROW. Typically, the longer distance the mode travels, the higher speeds the mode will achieve.

Top speed is the fastest speed at which the mode can travel either due to speed restrictions placed on the travel way or the speed that the technology is rated for safe travel.

Station Spacing

Stop or station spacing is determined by utilizing a typical station spacing for each mode that is employed across the U.S. On average, the further distance a mode travels in a corridor, the larger spacing between stations.

Frequency

Frequency of service is determined for each mode by using the typical headways, and the anticipated headways when projects are implemented. Two times are included. The first time interval is the typical

frequency for the certain mode during peak travel times during rush hours, and the second time interval is typical frequency during all other times throughout the day.

3.4.3 Bus Rapid Transit (BRT)

BRT is a public transport bus service which aims to combine bus lanes with high-quality and enhanced bus stations, vehicles, amenities, and branding to achieve the performance and quality of a light rail system, with the flexibility, cost, and simplicity of a bus system. BRT operates in mixed traffic or in its own lane. It may consist of longer buses (holding more passengers) with ground level boarding and advanced technology—for example, signal priority, which allows the bus to communicate with traffic signals to hold them green until the bus has passed through the intersection. BRT is typically used to travel within a city and between close-in suburbs. The Metropolitan Area Express (MAX) in Las Vegas and the HealthLine in Cleveland are examples of BRT service in operation today.

System Characteristics

BRT typically carries between 700 – 1,300 passengers per hour in the peak direction. Its average speed is between 15-30 miles per hour (mostly dependent on station spacing). Most BRT operates on arterials, but freeway running BRT has been implemented in California and is scheduled to open in 2016 in Denver. Buses typically run every 10-15 minutes during peak periods and every 15-30 minutes during off-peak hours.

Operational Opportunities and Constraints

BRT is a very flexible technology that can be used in a wide variety of settings. An operational benefit is its ability to operate within dedicated ROW or mixed traffic where high density and/or limited ROW is present. While this operational characteristic can reduce costs associated with purchasing additional ROW, it requires additional planning to avoid potential conflicts among the various modes that share the ROW. Operation in shared ROW also results in a reduced ability for the mode to operate consistently on schedule.

3.4.4 Streetcar

Streetcar is typically an electrified system—using poles and overhead catenary wires—that can operate in mixed traffic, in its own road lane, or in a separate ROW. This type of transit is generally used to circulate within densely urbanized areas to connect nearby activity centers and is often used to link numerous elements of transit systems. Modern streetcars are operating in Tacoma, WA; Portland, OR; and Salt Lake City, UT.

System Characteristics

Because streetcars often share travel lanes with automobiles, their average speeds are 10-30 miles per hour, with maximum speeds of about 35 miles per hour. Trains generally run about every 10 minutes during peak periods and every 15-20 minutes in off peak times. They can carry between 700 – 2,000 passengers per hour in each direction. Station stops for streetcars are similar to buses with two to four blocks between stops.

Operational Opportunities and Constraints

Streetcar is a flexible technology that can be used in a variety of urban settings. Like BRT, streetcar can be operated within the existing street network, in either dedicated ROW or mixed traffic. It often serves high density, downtown areas where ROW is limited, with minor impacts to the existing environment. While this operational characteristic reduces costs associated with purchasing additional ROW, additional planning is required to avoid potential conflicts and ensure safety among the various modes that share the ROW. Utilizing shared ROW can also reduce its ability to operate consistently on schedule.

3.4.5 Light Rail

Light rail typically transports riders between work and home, and is often used to travel between suburbs and central cities. Dallas Area Rapid Transit (or DART) operates light rail throughout Dallas in a hub and spoke pattern with all lines converging in downtown Dallas. This is common of light rail systems in the U.S.

System Characteristics

Light rail typically carries between 500 – 1,400 passengers per hour in the peak direction. Its average speed is between 30-50 miles per hour, with a top speed of 55-65 miles per hour. Many western cities in the U.S. have built or expanded light rail systems in the past 20 years including, Dallas and Houston, TX;

Saint Louis, MO; Denver, CO; Salt Lake City, UT; Phoenix, AZ; Portland, OR. Stations are typically spaced about every mile and only offer local service (stopping at every station). Stations stops are quick, as is the acceleration and deceleration at station stops.

Operational Opportunities and Constraints

Light rail operates in dedicated ROW and can be built to operate at-grade, below grade, or on elevated rail. The overhead catenary still allows it to cross city streets at-grade. For downtown operation in shared ROW, three- to four-car trains are the maximum length due to the size of typical city blocks and the length of rail vehicles.

3.4.6 Commuter Rail

Commuter rail is typically used to travel longer distances between cities and regions, often using existing railroad lines. Examples include the Capitol Corridor between San Jose and Sacramento in Northern California, the Trinity Railway Express between Fort Worth and Dallas, TX, and the Rail Runner Express between Albuquerque and Santa Fe, NM.

System Characteristics

Commuter rail service carries between 600 – 2,400 passengers per hour in the peak direction, with average speeds of about 60 miles per hour and a top speed of 79 miles per hour. The higher speeds and longer corridors allow stations to be spaced between 2-5 miles apart. Commuter rail began as a service focused around peak traffic periods, where trains would begin in the areas outside of the major city for the morning commute (often with trains running every 30 minutes) and then operate outbound for the evening commute. Increasingly, hourly off-peak service has been added during mid-day hours, and new commuter rail lines are being proposed with service running all day; more frequently during peak periods.

Operational Opportunities and Constraints

Commuter rail locomotives can pull up to ten coaches at a time, but in western cities the number is typically two to four, depending on ridership. In many instances, commuter rail trains share track with freight rail operators. When passenger rail uses the same tracks as freight rail, the Federal Railroad Administration (FRA) requires passenger trains to conform to stringent specifications for safety through the utilization of compliant vehicles, FRA vehicle wavers, or FRA-approved temporal separation. In order to be considered “FRA compliant” the commuter vehicles must adhere to the FRA requirements outlined in 49 CFR Part 238, including crashworthiness, rollover strength, and window, electrical system, suspension and braking standards.

Commuter rail service requires extensive planning and coordination among private freight railroads, the passenger rail operator and the affected municipalities to establish and maintain service.

3.4.7 Heavy rail

Heavy rail is similar to light rail in terms of corridor length as it often transports riders between work and home, and is typically used to travel between suburbs and central cities. However, the major difference is that heavy rail is used in much more densely populated areas and is completely grade-separated (either elevated or in subway applications), as its power comes from an electrified third rail.

System Characteristics

Heavy rail service carries 2,000 – 5,000 passengers per hour in the peak direction, with stations typically spaced about every mile, and often much closer in the central city. Because of its urban nature, headways are normally every 10 minutes during peak periods, and 15 minutes during off-peak hours. Heavy rail is found in Washington D.C., New York City, Philadelphia, and San Francisco.

Operational Opportunities and Constraints

Heavy rail is extremely expensive to construct due to the complete grade-separation that is required. This allows it to carry a significant number of passengers, likely more than would ever need to be transported in most cities in the U.S.

3.4.8 Maglev/High-Speed Rail (HSR)

Maglev and high-speed rail systems are in use in several locations in Europe and Japan. They often operate similar to regional flights in the U.S., with headways being hourly or every two to three hours. These rail applications differ from air operations in that they connect into the central city, rather than a more suburban location needed for airports.

System Characteristics

Maglev and high-speed rail systems are typically 300 miles or longer with stations spaced every 100 miles, and operate at speeds of over 200 miles per hour. Both require fully dedicated, grade-separated ROW and infrastructure due to the high operating speeds.

Operational Opportunities and Constraints

There are currently no HSR systems in the U.S., with the closest being Amtrak's Acela train that operates between Boston/Hartford/New York/Philadelphia/Baltimore/Washington D.C. with top speeds of 150 miles per hour, which is lower than what is typically described as high-speed rail. If developed in the future, the initial focus would likely be on a heavily congested travel corridor near one of the coasts. In the longer term, Oklahoma City could be part of a multi-state alignment. The Amtrak Heartland Flyer service corridor (Oklahoma City to Ft. Worth), as well as the Oklahoma City to Tulsa corridor (no rail service currently) are part of the federally-designated South Central High-Speed Rail Corridor.

3.4.9 Monorail/Automated People Mover (APM)

Monorail uses a single rail track for passenger or freight movement. Monorails can run at-grade, below grade, or on elevated rail. The distinguishing feature for monorail is that the vehicles are wider than the guideway that supports them. Examples of monorail include Disneyworld in Florida, Disneyland in California, Sydney Metro in Australia, and the maglev trains in Japan and China. There are no locations in the U.S. that use monorail for commuter service.

Automated People Movers (APM) are fully automated, grade-separated mass transit systems serving relatively small areas such as airports, downtown districts, office parks, or theme parks. Detroit, MI and Jacksonville and Miami, FL each have examples, but beyond airport use, there are few systems in operation that could be considered for commuter use.

System Characteristics

Both Monorails and APMs operate at average speeds of 15-20 miles per hour with top speeds in 25-30 miles per hour range, with some faster examples. Monorails are now common in Las Vegas, NV with several examples operating between casinos, all of which are air-conditioned. APMs are most commonly seen operating between airport terminals. Both examples typically run every 7-10 minutes during peak times and 10-15 minutes for off peak times.

Operational Opportunities and Constraints

Both systems are expensive to construct, and tend to be focused on areas that have a great deal of amusement use. However, given their typical elevated nature, they have a very small footprint.

3.4.10 Personal Rapid Transit (PRT)

Personal Rapid Transit (PRT) is similar to monorail but on a smaller scale. It requires a fully dedicated, grade-separated operating environment with vehicles that typically hold between four to ten passengers. The University of West Virginia in Morgantown, WV has what many refer to as the original PRT system; however, in most instances it operates more like an APM, where the system operates in all-stop service and carries up to 20 people per car.

System Characteristics

PRT corridors are typically three to ten miles in length with stations spaced a quarter- to a half-mile apart. Headways would typically be about every ten minutes in the peak periods and 30 minutes during off-peak hours.

Operational Opportunities and Constraints

The Morgantown example has been very expensive to operate and maintain; therefore, no other systems have been constructed in the U.S. to date. There are no public transportation examples in the U.S.

3.4.11 Other Modes

Conventional Bus

Conventional bus service is the type of fixed route service seen today in the Central Oklahoma region operated by COTPA, CART, and Edmond Citylink. Conventional bus service often focuses trips between activity centers and downtowns in a hub and spoke pattern. Crosstown routes may also be offered along major arterials, providing connections to other routes for passenger transfers. Buses typically operate every 30 minutes during peak travel periods, with off-peak service offered every 30-60 minutes, depending upon demand and budget.

Express Bus

Express bus service provides faster travel times on more highly utilized routes by offering limited stops, often with improved frequencies compared to conventional bus routes. Headways during peak periods are typically every 10-15 minutes, with off-peak service running every 30 minutes. Express service from park-and-ride lots is often offered only during peak periods, with convention routes serving the same stops during off-peak times.

3.5 Analysis of Modes

Modal Screening Criteria
Each of the high-capacity transit modes described in the previous sections was evaluated to determine its appropriateness for the CentralOK!go commuter corridors. The modal screening utilized evaluation criteria reflective of the goals and objectives adopted by the Steering Committee:

Umbrella Goal: Enhance Quality of Life

- Enhance regional connectivity and increase equitable access
- Support economic development and shape growth
- Provide a balanced and coordinated multimodal transportation system
- Maximize regional participation

The first step was to conduct an initial high-level screening to identify transit modes that did not meet the project's goals and objectives, and therefore should be removed from further consideration. This screening relied on general operational characteristics found in typical systems for the specific mode. For example, there are no instances of high speed rail service that are ten miles or less in length, as the trains would be unable to take advantage of the technology's maximum speed capabilities. Therefore, high speed rail in the 9-mile long East Corridor would not be appropriate, no matter the cost or public and political support. Other vehicle technologies could better serve a corridor of this length.

The criteria used for the initial modal screening, and their relationship to the project goals, are summarized in Table 3-2.

Table 3-2: Relationship between Project Goals and Initial Modal Screening Criteria

Criteria:	Enhance Regional Connectivity	Support Economic Development and Shape Growth	Provide a Balanced and Coordinated Multimodal Transportation System	Maximize Regional Participation
Potential ROW Impacts			✓	✓
Provides Access to Community	✓	✓	✓	✓
Improves Mobility	✓		✓	✓
Compatible with Local and Regional Plans (Including Costs)	✓	✓	✓	✓
Consistent with Existing Community Character and Land Use		✓	✓	
Provides Appropriate Level of Transit Capacity	✓		✓	
Provides Economic Development Potential		✓		✓

Transit Modes for Initial Screening

The initial list of transit modes considered in CentralOK!go was intended to be inclusive and reflect those suggested in previous studies, including:

- Regional Fixed Guideway Study (2005 Study), December 2005
- Encompass 2035, ACOG, April 2011
- Downtown Circulator, City of Oklahoma City, 2011
- Intermodal Transportation Hub Master Plan for Central Oklahoma, ACOG, June 2011
- Oklahoma Statewide Freight and Passenger Rail Plan, ODOT, 2012
- Local comprehensive and transportation plans

The modes considered and evaluated as part of the initial modal screening included:

- Conventional bus (local bus service used on most routes today)
- Express bus (often limited stops, higher frequency, or other enhancements to improve travel times)
- Bus rapid transit (BRT)
- Streetcar
- Light rail transit (LRT)
- Commuter rail
- Heavy rail
- Maglev/high-speed rail (HSR)
- Monorail/Automated People Mover (APM)
- Personal Rapid Transit (PRT)

Methodology

Because not all transit modes are suitable for all environments, a key first step was to identify the most appropriate modes and screen out the others.

Table 3-3 lists each criterion, the type of evaluation conducted, and the information used in the analysis of the North, East, and South Corridors. The evaluation results were summarized using a qualitative and comparative rating scale of "Poor," "Fair," "Good."

The results of the analysis for each criterion are described in the subsequent sections.

Table 3-3: Descripion of Initial Screening Criteria

Criteria	Type of Evaluation	References
Potential ROW impacts	Qualitative assessment of ability to accommodate mode within various existing ROW such as those found in the Edmond, Midwest City and Norman corridors	General operating environments associated with each mode are based on systems currently in revenue operation in the United States as well as on literature review, research
Improves mobility	Qualitative assessment of travel time	Based on typical comparisons of operating characteristics and stop spacing for various modes
Provides access to community	Qualitative assessment of a mode's ability to provide access based on predominant types of trips within a corridor/community and/or current and future major trip generators desired to be served	Based on typical stop spacing for each mode from systems currently in revenue operations in the United States.
Compatible with local and regional plans	Qualitative assessment based on local and regional plans, including cost/budget elements	2005 Study, Encompass 2035, Downtown Area Alternatives Analysis, Intermodal Transportation Hub Master Plan for Central Oklahoma, Oklahoma Statewide Freight and Passenger Rail Plan, local plans
Consistent with existing community character and land use	Qualitative assessment of a mode's compatibility with existing land use and community character	General land uses adjacent to various transit systems currently in operation in the United States, along with review of windshield surveys and Google Maps Streetview.
Provides appropriate level of transit capacity	Qualitative evaluation of mode's ability to accommodate existing and future transit ridership in the corridor	High-level comparison of existing transit ridership in the corridor and typical range of transit ridership associated with a mode using literature research and similar projects
Provides economic development potential	Qualitative assessment of mode's ability to catalyze and support economic development	Based on typical stop spacing for each mode, typical frequency of service, and typical passenger capacities

Potential Right-of-Way Impacts

The screening of potential ROW impacts is based on a qualitative evaluation of a transit mode's ability to be accommodated within various existing or operating environments, within arterial roadways, interstate freeways or freight railroad corridors, such as those found within the North, East, and South Corridors. This screening is based on typical operating environments for transit modes currently in

operation within the United States. Table 3-4 presents the results of the initial screening of modes based on potential ROW impacts.

Table 3-4: Results – Potential Right-of-Way Impacts

Transit Mode	Description	Assessment
Conventional Bus	Operates in mixed traffic, using sidewalks for boarding and alighting; typically integrated within existing adjacent uses and does not require ROW acquisition	Good
Express Bus	Operates in mixed traffic and utilizes tools such as signal prioritization, signal preemption, and queue jumpers to improve travel time	Good
BRT	Highly flexible and adaptable mode, depending on ROW availability. For example, BRT could use existing freeway shoulders[1] or high-occupancy vehicle/toll (HOV/HOT) lanes; however, on arterial streets BRT would likely require dedicated ROW, which is often prohibitive in ROW constrained areas.	Poor
Streetcar	Operates in mixed traffic and stations can be either center platforms or integrated with sidewalks. At station locations, on-street parking would be prohibited	Fair
LRT	Operates in a semi-exclusive guideway. Could require ROW acquisition if at grade. Track could also be on aerial structure or subgrade	Poor
Commuter Rail	Operates in a dedicated ROW, typically within an existing freight railroad	Fair
Heavy Rail	Because of electrified third rail, Track requires fully dedicated ROW; can be elevated	Poor
Maglev/HSR	Requires a fully dedicated, grade-separated ROW because of high operating speeds	Poor
Monorail/APM	Requires a fully dedicated, grade-separated operating environment[2]	Poor
PRT	Similar to monorail, requires a fully dedicated, grade-separated operating environment	Poor

Notes: [1] – Buses are allowed to use freeway shoulders in some states, such as Minnesota (on Interstate 694).
[2] – Examples include the Las Vegas and Seattle monorail systems.
Source: URS, 2013.

Provides Access to Community

There is always a balance that must be met between access (to a given roadway) and efficiency (of the vehicles on a given roadway). The roadway network includes a variety of classifications ranging from local neighborhood streets that provide access to individual parcels to freeways that provide access typically a minimum of one mile apart. Transit modes utilize a similar hierarchy. Conventional bus and streetcars often stop every few blocks, while BRT, light rail, and commuter rail stops are normally spaced at greater than one mile apart. Table 3-5 presents how well each mode provides access to the community.

Table 3-5: Results – Provides Access to the Community

Transit Mode	Typical Corridor Length	Typical Stop Spacing	Description	Assessment
Conventional Bus	Varies	< ¼ mile	Frequent stops provide transit access to many communities	Good
Express Bus	Varies	¼ - 1 mile	Frequent stops (largely the same stop spacing as conventional bus or slightly longer spacing between stops) provide transit access to many communities	Good
BRT	5-20 miles	¼ - 1 mile	Less frequent stops and longer corridors cater more to daily work commuters and thus provide access to fewer communities	Fair
Streetcar	2-5 miles	¼ mile	Frequent stops provide transit access to many communities	Good
LRT	10-20 miles	1 mile	Somewhat frequent station stop spacing provides transit access to more communities	Fair
Commuter Rail	20-100 miles	2 - 5 miles	Less frequent stops and longer corridors cater more to daily work commuters and thus provide access to fewer communities	Fair
Heavy Rail	5-20 miles	½ - 2 miles	Frequent stops provide transit access to many communities	Good
Maglev/HSR	300 miles	50 – 100 miles	Very long distances between stops cater to regional and cross-country travel, which does not provide good transit access to individual communities	Poor
Monorail/APM	4-6 miles	½ - 2 miles	Somewhat frequent station stop spacing provides transit access to communities	Good
PRT	3 miles	< ½ mile	Frequent stops provide transit access to many communities	Good

Improves Mobility

In order to improve mobility, the needs of transit patrons must be met, both in terms of access to the system and travel time once on the system. Therefore, providing predictable and competitive travel times and frequent service is important to encourage utilization of the transit system. Table 3-6 describes how well each mode is anticipated to improve mobility.

Table 3-6: Results – Improves Mobility

Transit Mode	Description	Assessment
Conventional Bus	Since the bus would operate in mixed traffic alongside passenger vehicles, this mode would not offer an improvement in travel time	Poor
Express Bus	Signal preemption, queue jumpers, and other such enhancements would afford this mode some improvement in travel time, especially for longer trips	Fair
BRT	Dedicated ROW and longer spacing between stops would allow this mode to create a noticeable improvement in travel time	Good
Streetcar	Depending on the stop spacing and the operating characteristics (dedicated ROW or shared road ROW; signal preemption, etc.), this mode would offer some improvement in travel time	Fair
LRT	Dedicated ROW and longer spacing between stops would allow this mode to create a noticeable improvement in travel time	Good
Commuter Rail	Dedicated ROW and longer spacing between stops would allow this mode to create a noticeable improvement in travel time	Good
Heavy Rail	Dedicated ROW and faster speeds than some other modes would be coupled with frequent stops; these characteristics would offer some improvement in travel time	Fair
Maglev/HSR	Dedicated ROW, high speeds, and longer spacing between stops would allow this mode to create a noticeable improvement in travel time	Good
Monorail/APM	Dedicated ROW coupled with slower speeds and frequent stops would allow this mode to create some improvement in travel time	Fair
PRT	Dedicated ROW with a very robust PRT network could improve travel time; this mode could also experience significant delays during peak periods, because the small vehicles may not be numerous enough at key commuter locations to handle peak loads	Fair

Compatible with Local and Regional Plans

The initial screening for this criterion included a review of existing local and regional plans as described in Section 2.1.

Table 3-7 presents the results of the initial screening of modes based on their consistency with local and regional plans.

Table 3-7: Results – Compatible with Local and Regional Plans

Transit Mode	Description	Assessment
Conventional Bus	Most plans support transit in the corridor, including improving local bus service	Good
Express Bus	Identified in Encompass 2035; studied by COTPA 2005 Study in portions of the three corridors	Good
BRT	Identified in Encompass 2035; studied by COTPA 2005 Study	Fair
Streetcar	Identified in 2005 Study and Encompass 2035; studied by Downtown Area AA and an LPA has been identified for the downtown OKC streetcar	Good
LRT	Studied as a modal option in COTPA 2005 Study; not specifically identified in major planning documents	Fair
Commuter Rail	Identified in Encompass 2035; identified in Intermodal Hub Master Plan; studied by 2005 Study	Good
Heavy Rail	None of the local plans recommend heavy rail for any of the three corridors	Poor
Maglev/HSR	None of the local plans recommend maglev or high-speed rail for any of the three corridors	Poor
Monorail/APM	None of the local plans recommend monorail or automated people mover for any of the three corridors	Poor
PRT	None of the local plans recommend PRT for any of the three corridors	Poor

Consistent with Existing Community Character and Land Use

Local land use patterns in the Central Oklahoma region are primarily low density, with extensive suburban growth during previous decades. Oklahoma City is categorized as a mid-sized city. This leads to a community character that is more suburban with lower density development compared to larger, more densely developed cities in the eastern U.S. Therefore, high capacity transit modes with substantial infrastructure costs and footprints are not warranted in most western cities, including Oklahoma City, as they do not fit in with the intensity of development seen here. Table 3-8 presents the results of the initial screening of modes based on consistency with existing community character.

Table 3-8: Results – Consistent with Existing Community Character and Land Use

Transit Mode	Evaluation	Assessment
Conventional Bus	Currently operating within corridors, could be expanded with minimal impact on existing communities, land use, and businesses	Good
Express Bus	Improvements associated with express bus service could be implemented with minimal impact on existing communities, land use, and businesses	Good
BRT	Although this mode would require some dedicated ROW, BRT service would have a similar relationship to existing community character and land use as the conventional local bus service to which the community is already accustomed	Good
Streetcar	This mode is a historical transit mode in the corridors (interurban) and could be implemented within existing road ROW shared with passenger vehicles; as such, this mode would be consistent with existing community character and land use	Good
LRT	While light rail would require more infrastructure (overhead catenary wires and substations) and additional ROW in many areas along the study corridors (due the requirement to physically separate it from active freight rail lines), this mode could possibly operate within existing freight rail ROW given the existing ROW width and would be similar to existing freight rail in its relationship to community character and land use; as such, this mode would be consistent with existing community character and land use	Fair
Commuter Rail	This mode would utilize existing ROW within an active freight corridor; as such, this mode would be consistent with existing community character and land use.	Good
Heavy Rail	The infrastructure and ROW requirements for this mode would make it incompatible with existing community character and land use	Poor
Maglev/HSR	The infrastructure and ROW requirements for this mode would make it incompatible with existing community character and land use	Poor
Monorail/APM	The infrastructure and ROW requirements for this mode would make it incompatible with existing community character and land use.	Poor
PRT	The infrastructure and ROW requirements for this mode would make it incompatible with existing community character and land use	Poor

Provides Appropriate Level of Transit Capacity

Table 3-9 presents the results of the initial screening of modes based on each transit mode's ability to provide appropriate level of transit capacity to the corridor, given its existing transit ridership. The existing average weekday ridership (summation of existing bus routes between March 2012 and April 2013) for each of the three corridors is:

- North Corridor: 5,193 riders/weekday (Source: EMBARK & Citylink)
- East City Corridor: 605 riders/weekday (Source: EMBARK)
- South Corridor: 3,861 riders/weekday (Source: EMBARK & CART)

Projected employment and population figures for 2035 indicate modest growth in the Central Oklahoma region. The region is projected to grow approximately 36% in population and 39% in employment between 2005 and 2035. In each of the three proposed corridors, however, the projected rates of growth are somewhat different from the regional growth projections. In the North Corridor, population and employment are projected to increase by 22% and 25%, respectively. In the East Corridor,

population is projected to increase by 17% while employment has a projected increase of 23%. Finally, in the South Corridor, projected increases are the highest of the three corridors, at 30% for population and 41% for employment.

If projected population increases in each corridor are used as a proxy for the projected rate of increase in transit weekday ridership in each corridor, the resulting increases would be modest: 6,336 for the North corridor, 708 for the East corridor, and 5,020 for the South corridor. These estimated increases would be expected due to typical growth, and do not include significant changes to funding or operating characteristics.

Planned transit capacity needs to be appropriate for future ridership demand. For instance, heavy rail or subway systems are found in densely populated locations where there is significant transit demand. In Oklahoma City, there will likely never be this level of demand, so implementing heavy rail would not be appropriate, when less expensive, more easily implemented alternatives would provide sufficient capacity to accommodate projected transit growth. This criterion is a qualitative assessment of the modal capacity. Modes with insufficient or too much capacity are not rated as well as modes with a more appropriate level of capacity.

Table 3-9: Results – Ability to Provide Appropriate Level of Transit Capacity

Transit Mode	Typical Range Of Average Weekday Ridership	Assessment
Conventional Bus	500 – 20,000	Good
Express Bus	500 – 20,000	Good
BRT	3,000 – 50,000	Fair
Streetcar	500 – 20,000	Good
LRT	7,000 – 50,000	Fair
Commuter Rail	10,000 – 20,000	Good
Heavy Rail	30,000 – 325,000	Poor
Maglev/HSR*	N/A	Poor
Monorail/APM	4,000 – 20,000	Fair
PRT*	N/A	Poor

*Note: Unproven technology; currently no system in operation in the U.S.

Provides Economic Development Potential

Rail alternatives have a greater sense of permanence, as they rely on infrastructure that is not easily moved (tracks), which makes land near rail stops/stations more attractive for development. This is important to the development community, as this sense of permanence can be seen as a benefit to future home and business owners, making these locations more competitive than other areas that are not served by high-capacity transit. As more improvements are implemented to conventional bus service (as well as express bus and BRT), including improved stops/stations with improved amenities, the more sense of permanence these alternatives begin to take on, as relocating stops and other infrastructure becomes more expensive. Table 3-10 presents the economic development potential each mode provides.

Table 3-10: Results – Provides Economic Development Potential

Transit Mode	Description	Assessment
Conventional Bus	• Utilizes existing streets with minimal investment in stations • Frequent stops and comparatively low operating speeds. Ride can be bumpy and noisy compared to rail • Flexible routes, noise, and lower quality of service limit economic impacts	Poor
Express Bus	• Less investment in guideway and stations than BRT or rail • Ride is less comfortable than rail; may be subject to traffic delays • Focused on AM/PM peak trips and home-work trips • Less permanence and lower quality service limits economic impacts	Fair
BRT	• Investment in fixed guideway, less permanent than rail • Provides a high level of service throughout the day, not just the AM/PM peak • Serves multiple home, work, and activity/entertainment destinations • Gold Standard BRT can have economic impacts equal to light rail	Good
Streetcar	• Permanent investment in fixed guideway • Serves closely spaced destinations at operating speeds that are lower than LRT • Provides frequent service throughout the day and night • Economic and real estate impacts are localized compared to more regional systems, limited to a 1 to 3 block distance from the alignment and stations	Good
LRT	• Permanent investment in fixed guideway • Provides a high level of service throughout the day, not just the AM/PM Peak • Serves multiple home, work, and activity/entertainment destinations • Station design can support transit oriented development (TOD)	Good
Commuter Rail	• Permanent investment in fixed guideway • Highest level of service is during the AM/PM peak with less frequent service during the day • Focuses on the home-work commute and a more limited number of activity/entertainment destinations than LRT or heavy rail • TOD is possible but often constrained by the need for large park-n-ride lots and the presence of adjacent industrial land uses when ROW is shared with freight rail	Fair
Heavy Rail	• Permanent investment in fixed guideway • Same as LRT with additional passenger capacity and even higher levels of service throughout the day and night • Serves the highest density urban markets • Station design can support transit oriented development (TOD)	Good
Maglev/HSR	• Permanent investment in fixed guideway • Focused on long distance commutes and destination travel • Very high speeds and less frequent service as a result of high operating costs and safety needs • TOD could be supported at large regional employment centers but is impractical for local economic development	Fair
Monorail/ APM	• Permanent investment in fixed guideway • Serves closely spaced destinations at operating speeds that are lower than LRT (similar to streetcar) • Provides frequent service throughout the day and night • Elevated operations decrease interaction with street level business and social activity. Best suited to connecting two to three related destinations and specific trip types	Fair

Findings

Based on the initial assessment of transit modes, four high-capacity modes were kept for further analysis and paired with alignment options to develop potential alternatives: bus rapid transit (BRT), streetcar, light rail transit (LRT), and commuter rail (CR).

Each of these modes was considered potentially viable in each corridor in conjunction with conventional and express bus. Streetcar and BRT are designed to operate within existing streets where feasible, provide good access to the community, offer the appropriate level of transit capacity, and are compatible with local and regional plans. In addition, both provide improved travel times and travel time reliability when using dedicated right-of-way. Light rail transit and commuter rail will require dedicated right-of-way. However, they offer the potential for significant travel time savings while still providing an appropriate level of transit capacity and consistency with existing community character and land use. The characteristics of the alignment options in each corridor helped determine which modes were paired with each option for evaluation.

Four modes were eliminated from further evaluation: heavy rail, maglev/high speed rail (HSR), monorail/automated people mover (APM), and personal rapid transit (PRT). Although these modes scored well in certain areas, including access, mobility, and economic development potential, they did not meet the goals of the project. All four scored a “Poor” for compatibility with local and regional plans, primarily because they are not recommended in any of the plans. Cost was also a strong consideration under this criterion, and heavy rail, maglev/HSR, and PRT are all very expensive transit options that would likely not be cost-effective for the corridors. The results of the initial screening of transit modes are summarized in Table 3-11.

Table 3-11: Modal Screening Results

Screening Criteria	Conventional Bus	Express Bus	BRT	Streetcar	Light Rail	Commuter Rail	Heavy Rail	Maglev/ HSR	Monorail/ APM	PRT
Potential ROW impacts	Good	Good	Poor	Fair	Poor	Fair	Poor	Poor	Poor	Poor
Improves mobility	Good	Good	Fair	Good	Fair	Poor	Good	Poor	Good	Good
Provides access to community	Poor	Fair	Good	Fair	Good	Fair	Fair	Good	Fair	Fair
Compatible with local and regional plans	Good	Good	Fair	Good	Fair	Good	Poor	Poor	Poor	Poor
Consistent with existing community character and land use	Good	Good	Good	Good	Fair	Good	Poor	Poor	Poor	Poor
Provides appropriate level of transit capacity	Good	Good	Fair	Good	Fair	Good	Poor	Poor	Fair	Poor
Provides economic development potential	Fair	Fair	Good	Good	Good	Fair	Good	Fair	Fair	Fair
Overall Rating	Good	Good	Good	Good	Good	Good	Poor	Poor	Poor	Poor

3.6 Initial Alignments Considered

3.6.1 Introduction

An analysis of parallel transportation facilities was undertaken to identify the existing rail and roadway infrastructure within each corridor considered most compatible with high-capacity transit implementation. The results of the initial analysis were used to identify preliminary alignments for further consideration and evaluation.

3.6.2 Methodology

The parallel transportation facilities within the three Central Oklahoma commuter corridors were identified from field review of roadways and freight railroad rights-of-way (ROW), and included the following:

- North Corridor (seven facilities)
  - ✓ BNSF Railway (BNSF) Railroad ROW
  - ✓ Western Avenue/Classen Boulevard
  - ✓ Kelley Avenue
  - ✓ Eastern Avenue/Martin Luther King Avenue
  - ✓ I-235/Broadway Extension
  - ✓ N May Avenue
  - ✓ N Pennsylvania Avenue
- East Corridor (six facilities)
  - ✓ UP freight railroad ROW/ODOT-owned abandoned rail ROW
  - ✓ Reno Avenue
  - ✓ I-40
  - ✓ SE 15th Street
  - ✓ NE 4th Street/NE 8th Street/NE 10th Street
  - ✓ SE 29th Street/Shields Boulevard
- South Corridor (seven facilities)
  - ✓ BNSF Railroad ROW
  - ✓ Shields Boulevard
  - ✓ I-35 to US-77
  - ✓ Santa Fe Avenue
  - ✓ Sooner Road
  - ✓ Eastern Avenue
  - ✓ Bryant Avenue

Existing land use and environmental features were analyzed within one-half mile of each parallel transportation facility, referred to as the “facility buffer” throughout this chapter. Evaluation criteria was established based on the study goals and objectives developed by the Steering Committee, stakeholders and the public, and each alignment was scored according to how well it performed against the evaluation criteria.

3.6.3 Corridor Facility Descriptions

North Corridor

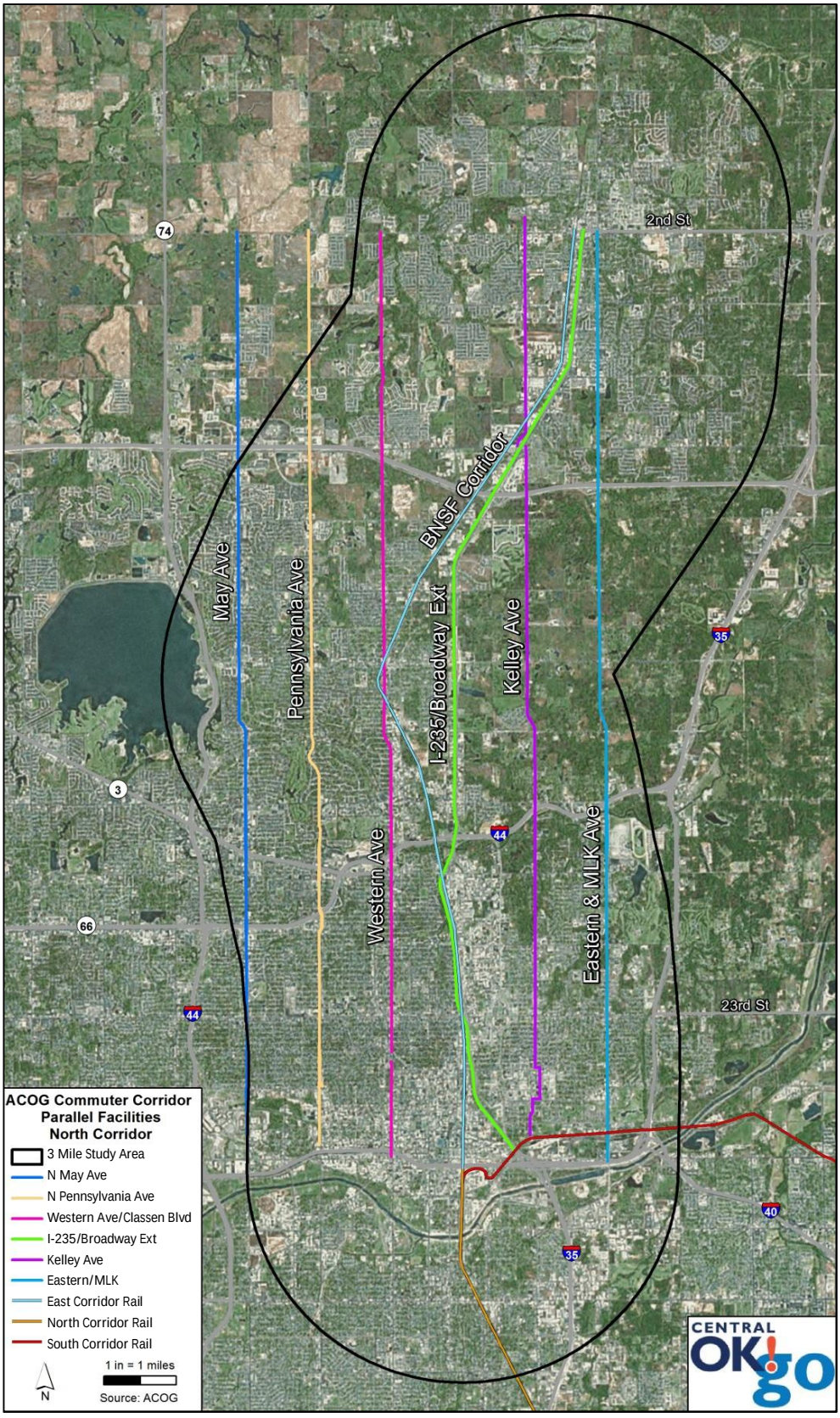
The North Corridor included seven initial parallel transportation facilities of varying types including arterials, a freeway and the BNSF freight railroad. The BNSF mainline is primarily a single track railroad. The facility types, number of lanes per roadway, and existing daily traffic volumes are provided in Table 3-12, and their locations are shown in Figure 3-4.

Table 3-12: North Corridor Parallel Transportation Facilities

Facility Name	Facility Type	Number of Lanes	Existing Daily Volume
N May Avenue	Principal Arterial	4	17,500
N Pennsylvania Avenue	Principal Arterial	4	17,300
Western Avenue/ Classen Boulevard	Principal Arterial	4/4	14,000/15,100
BNSF Rail Corridor	Mainline Freight Railroad	Generally Single Track	30-35 Trains
I-235/Broadway Extension	Interstate/Freeway	6	61,600
Kelley Avenue	Minor Arterial	2	9,700
Eastern/MLK	Principal Arterial/Minor Arterial	4	11,600

Source: ACOG, 2012.

Figure 3-4: North Corridor Parallel Transportation Facilities



East Corridor

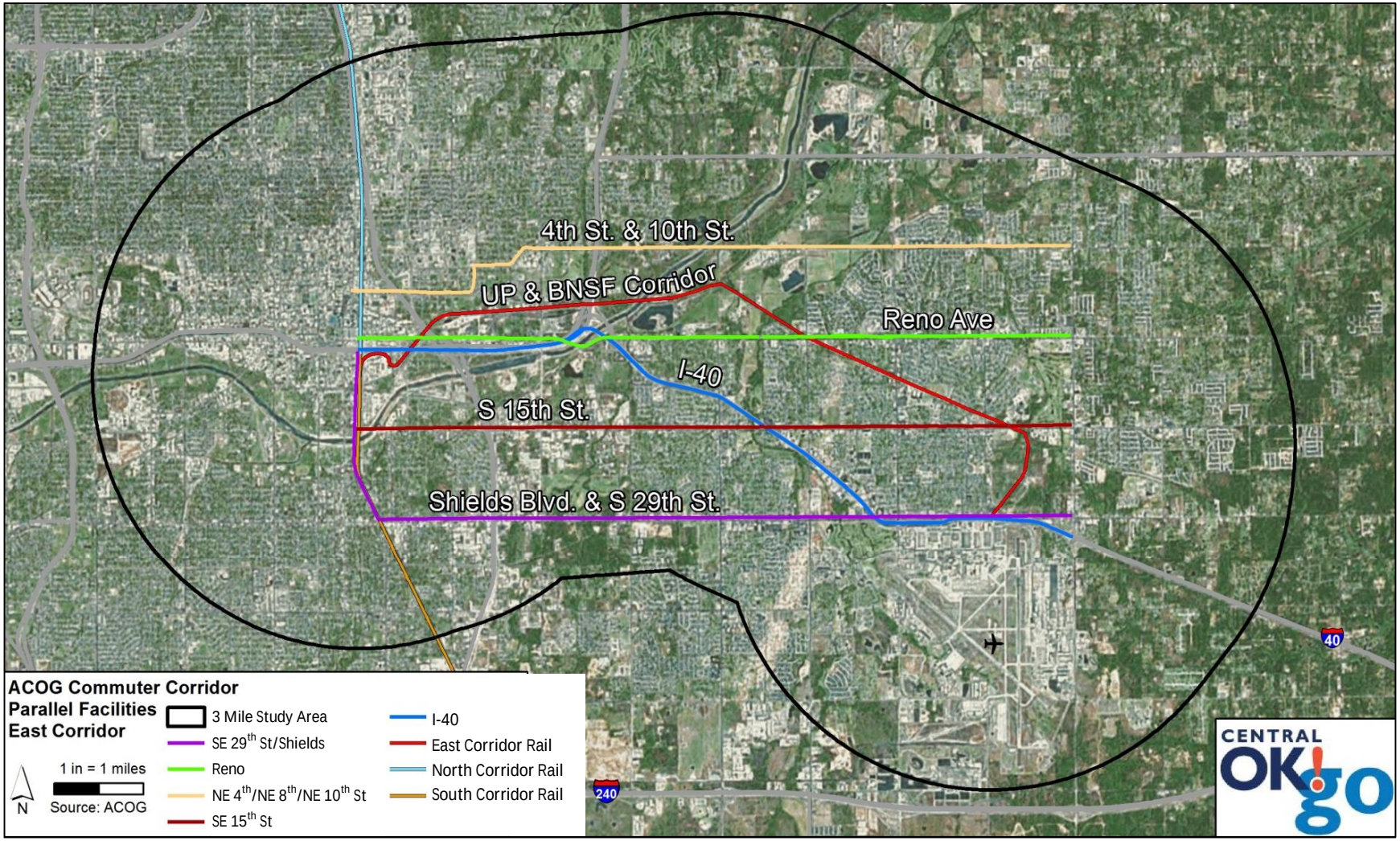
The East Corridor included six initial parallel transportation facilities of varying types including minor arterials, principal arterials, an interstate, and a partially active and partially inactive freight railroad corridor. The partially active railroad is generally single tracked. The facility types, number of lanes per roadway, and existing daily traffic volumes are provided in Table 3-13, and their locations are provided in Figure 3-5.

Table 3-13: East Corridor Parallel Transportation Facilities

Facility Name	Facility Type	Number of Lanes	Existing Daily Volume
NE 4th/NE 8th/NE 10th Streets	Minor Arterial	4	17,100
Reno	Principal Arterial	4	25,500
SE 15th Street	Minor Arterial	4	21,800
SE 29th Street/ Shields	Principal Arterial	4	27,500
I-40	Interstate	6-8	108,000
UP and BNSF Rail Corridor	Partially Active Freight Corridor; Track Conditions "New" to "Abandoned"	Generally Single Track	N/A

Source: ACOG, 2012.

Figure 3-5: East Corridor Parallel Transportation Facilities



South Corridor

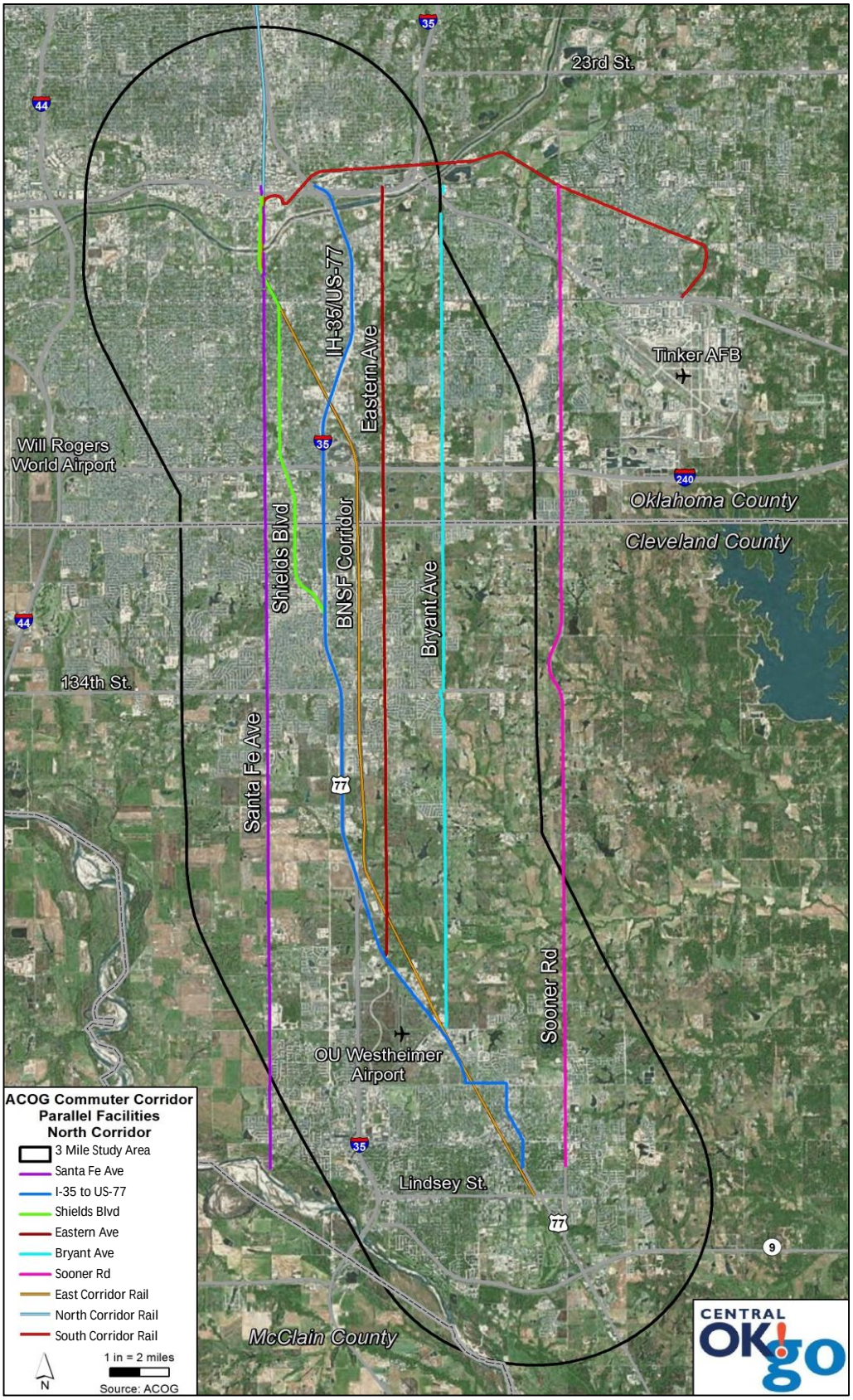
The seven South Corridor parallel facilities included roadways of varying functional classification and the BNSF mainline freight railroad. The BNSF mainline is primarily a single track railroad with passing sidings located throughout the length of the corridor. The facility types, number of lanes per roadway facility, and existing daily traffic volumes are included in Table 3-14, and their locations are shown in Figure 3-6.

Table 3-14: South Corridor Parallel Transportation Facilities

Facility Name	Facility Type	Number of Lanes	Existing Daily Volume
Shields Boulevard	Principal Arterial	6	16,760
I-35 to US-77	Interstate Highway	6	136,800
Santa Fe Avenue	Minor Arterial	2-4	21,410
Eastern Avenue	Minor Arterial	2-4	10,270
Bryant Avenue	Minor Arterial	2-4	19,635
Sooner Road	Principal Arterial	4	23,195
BNSF Rail Corridor	Mainline Freight Railroad	Generally Single Track	30-35 Trains

Source: ACOG, 2012.

Figure 3-6: South Corridor Parallel Transportation Facilities



3.6.4 Evaluation Criteria and Scoring of Parallel Facilities

The following sections describe the evaluation criteria and scoring methodology used to analyze the ½-mile buffer around each parallel transportation facility. The criteria were designed to support the adopted study goals, as discussed in Section 3.1.

Throughout this evaluation, if a defined area (block group for example) was located fully within a facility buffer, it was fully included in the evaluation. Where only a portion fell within the facility buffer, the percentage included was applied toward the total. For example, if 25% of a block group was located within the facility buffer, then the total population of that block group was multiplied by 0.25 to more closely represent the population within that block group.

Criteria were scored using positive, negative or neutral rankings. Table 3-15 describes the scoring process for each goal and its associated criteria and Table 3-16 through Table 3-21 show the scoring results by corridor.

The scores for each criterion were developed based on “natural breaks” or obvious “groupings” in the supporting data. This is a manual data clustering method designed to determine the best arrangement of values into different classes in order to reduce the variance within classes and maximize the variance between classes.

Table 3-15: Parallel Transportation Facilities – Criteria and Thresholds

Criteria	Description (All criteria used a ½ mile buffer around each facility)	Threshold
Goal: Enhance Regional Connectivity/ Equitable Access		
Number of Activity Centers Served	The number of ACOG-identified activity centers served by each facility within one-half mile of alignment	Number of activity centers within the buffer around each facility; For rankings, facilities with more than 10 activity centers were ranked positive, 5 to 10 activity centers were ranked neutral, and less than 5 were ranked negative.
Serves Limited Mobility Populations (zero car)	Preliminary quantitative assessment of limited mobility populations along each facility based on 2010 census data for zero-car households	Rankings were determined by comparing the alternatives to each other. Top third are ranked positive, middle third are neutral and bottom third are negative. In some cases, alternatives may change grouping based on their assessment so each group may not be exactly one-third of the alternative.
Serves Limited Mobility populations (poverty)	Preliminary quantitative assessment of limited mobility populations along each facility based on 2010 census data for individuals below poverty threshold	Rankings were be determined after looking at natural "breaks" in the data
Goal: Support Economic Development/ Shape Growth		
Compatible with Current and Future Land Use	Quantitative assessment of the percentage of commercial and high-density residential areas along facility	Ranking were determined after looking at natural "breaks" in the data
Existing (2010) Population	Quantitative assessment of total existing (2010) population per acre	Ranking were determined after looking at natural "breaks" in the data
Existing (2010) Employment	Quantitative assessment of total existing (2010) employment per acre	Ranking were determined after looking at natural "breaks" in the data
Projected (2035) Population	Quantitative assessment of total projected (2035) population per acre	Ranking were determined after looking at natural "breaks" in the data
Projected (2035) Employment	Quantitative assessment of total projected (2035) employment per acre	Ranking were determined after looking at natural "breaks" in the data
Serves Areas Slated for Development	Qualitative assessment of the area served by each facility that is slated for transit-friendly development	Ranking based on the amount of TOD/Mixed Use/High-Density development along each facility
Goal: Provide a Balanced/Coordinated Multimodal System		
LOS Analysis (D-F)	Quantitative assessment of the mileage of moderate and highly congested roadway segments within each facility buffer	Percentage of roadway segments within each facility buffer that are considered moderately or highly congested (V/C Ratio >= 0.7); Rankings were determined after looking at natural "breaks" in the data
Existing Transit Ridership	Quantitative assessment of the existing transit ridership within the buffer of each facility	Three points were given for each top-10 ridership route predominantly on the facility (50% or more), 2 points for each top-10 route with less than 50% on the facility; 1 point for each top 10 route that crossed the facility; 3 points were subtracted for each bottom-15 route that predominantly runs on the facility

Table 3-15: Parallel Transportation Facilities – Criteria and Thresholds

Criteria	Description (All criteria used a ½ mile buffer around each facility)	Threshold
		(50% or greater), 2 points were subtracted for bottom-15 routes (less than 50%) on the facility
Existing and Proposed Bike Trails	Quantitative assessment of the number of bike trails that cross or are on the facility, and total mileage of existing and proposed bike trails on the facility and within the facility buffer. Additionally, a qualitative assessment was considered based on Edmond and OKC Bike Master Plans.	The first number is the number of existing and proposed bike routes crossed by the facility; the second number is the mileage of on-facility or parallel bike routes; Facilities received a "+" ranking if they had 5 or more crossings and 1 mile or more of on-facility routes; they received a "o" if they had 5 or more crossings and less than 1 mile of on-facility routes, and they received a negative if they had less than 5 crossings and less than 1 mile of on-facility routes.
Existing and Proposed Pedestrian Infrastructure	Qualitative assessment of the existing state of pedestrian facilities and proposed pedestrian facilities on each transportation facility	Rankings of the facilities were based on the percentage of pedestrian facilities along the alignment and any pedestrian amenities (crossings, buffers, walls, etc.). A positive ranking was given for corridors with at least 70% coverage of pedestrian facilities with some amenities; a neutral ranking was given for corridors with 40% to 69% coverage of pedestrian facilities with some amenities; a negative ranking was given for corridors with 39% or less coverage of pedestrian facilities.
Footprint/ ROW	Qualitative assessment of the ease of implementation from a ROW perspective (setbacks of development from roadway, existence/width of median, natural resources that could constrain implementation, etc.)	Facilities with a positive ranking have ample room within the existing ROW to implement the new transit alignment, neutral rankings were given to facilities with some minor ROW constraints, and negative rankings were given to facilities with significant ROW constraints
Goal: Maximize Regional Participation to Maximize Funding		
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	Qualitative assessment of the compatibility of a new transit alignment on a facility when compared to existing local comp plans (plans for high-density development, mixed-use development, TOD zones, etc.) and the Regional MTP	A positive ranking was given to facilities that are planned for transit and/or transit-friendly development, a neutral ranking was given to facilities that are planned for some transit-friendly development, and a negative ranking was given to facilities that include no provisions for transit or transit-friendly development

3.6.5 Evaluation Matrices

The evaluation results for each corridor are included in the following sections. Note that existing railroad corridors were not evaluated during this phase of the project, as they only support the commuter rail mode. Additionally, because this is a regional transit study, and there are no fatal flaws with using the

railroad corridors for high-capacity transit, it was assumed that they would advance to the next phase. During this phase of the project, the engineering team was defining the rail alignments more thoroughly for the next phase of evaluation when modeling and a more detailed evaluation took place.

North Corridor Evaluation Results

In the North Corridor, the two facilities that scored at the top were the Western Avenue/Classen Boulevard facility and the I-235/Broadway Extension facility.

The Western Avenue/Classen Boulevard facility provides good access to activity centers, serves large population and employment bases, as well as areas planned for future development. This facility is also successfully used by transit and ties into existing and proposed bike and pedestrian facilities.

The I-235/Broadway Extension facility provides good access to activity centers, serves limited mobility populations, is consistent with local and regional plans, current and future land use, and serves areas planned for development. This facility also ties into existing and proposed bike trails and offers sufficient ROW. The full scoring results of the North Corridor are shown in Table 3-16 and Table 3-17.

During this phase of the study, the BNSF corridor was not evaluated, as the purpose of this analysis was to focus on developing and understanding the roadway alternatives in the North Corridor.

East Corridor Evaluation Results

In the East Corridor, the two facilities that scored at the top were the NE 4th/NE 8th/NE 10th Street facility and SE 29th Street/Shields Boulevard facility.

The NE 4th/NE 8th/NE 10th Street facility provides good access to activity centers, serves limited mobility populations, serves a large population and employment base, and ties into existing and proposed bike and pedestrian facilities. The SE 29th Street/Shields Boulevard facility provides good access to activity centers, serves limited mobility populations, serves a large population and employment base, is compatible with current and future land uses, serves areas planned for development, and offers sufficient capacity. The full scoring results of the East Corridor are shown in Table 3-18 and Table 3-19.

The east rail corridor was not evaluated during this phase, as the purpose of this analysis was to focus on developing and understanding the roadway alternatives in the East Corridor.

South Corridor Evaluation Results

In the South Corridor, the two facilities that scored at the top were the Shields Boulevard facility and Santa Fe Avenue facility.

Shields Boulevard provides good access to activity centers, serves limited mobility populations, serves a large population and employment base, is consistent with local and regional plans, current and future land use, and serves areas planned for development. Additionally, it offers sufficient ROW along most of the alignment.

Santa Fe Avenue provides good access to activity centers, serves limited mobility populations, serves a large population and employment base, ties into existing and proposed bike trails, and offers sufficient capacity. The full scoring results of the South Corridor are shown in Table 3-20 and Table 3-21.

The BNSF corridor was not evaluated during this phase, as the purpose of this analysis was to focus on developing and understanding the roadway alternatives in the South Corridor.

Table 3-16: North Corridor Parallel Transportation Facilities – Analysis

	May Avenue	Penn Avenue	Western/ Classen	I-235/ Broadway	Kelley Avenue	Eastern/ MLK
Enhance Regional Connectivity/ Equitable Access						
Number of Activity Centers Served	8 (6/2)	7 (5/2)	16 (14/2)	14 (10/4)	8 (7/1)	10 (7/3)
Serves Limited Mobility Populations (zero car)	5.1%	7.6%	6.6%	9.5%	13.7%	10.4%
Serves Limited Mobility populations (poverty)	13.2%	19.0%	18.0%	26.0%	26.0%	25.9%
Support Economic Development/ Shape Growth						
Compatible with Current and Future Land Use	22.7%	25.9%	21.7%	28.4%	25.1%	24.4%
Existing (2010) Population	4.8	5.2	4.5	2.7	2.3	2.3
Existing (2010) Employment	3.9	4.2	3.5	2.2	1.8	1.9
Projected (2035) Population	5.0	5.9	5.5	3.2	3.2	2.7
Projected (2035) Employment	3.8	3.4	5.0	6.3	4.2	2.2
Serves Areas Slated for Development	0	0	+	+	-	+
Provide a Balanced/Coordinated Multimodal System						
LOS Analysis (D-F)	10.3%	15.3%	17.1%	73.9%	5.4%	1.1%
Existing Transit Ridership	6	8	7	2	3	1
Existing and Proposed Bike Trails	6/0.0	4/0.0	8/2.4	11/8.2	4/0.0	6/0.0
Existing and Proposed Pedestrian Facilities	0	0	+	-	0	+
Footprint/ROW	-	-	-	+	-	0
Maximize Regional Participation to Maximize Funding						
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	0	-	-	+	0	0
Number of Positive Scores	*4*	*5*	*9*	*9*	*4*	*6*
Number of Neutral Scores	*9*	*7*	*4*	*3*	*7*	*5*
Number of Negative Scores	*2*	*3*	*2*	*3*	*4*	*4*
Total Points	2	2	7	6	0	2

Table 3-17: North Corridor Parallel Transportation Facilities – Results

	May Avenue	Penn Avenue	Western/ Classen	I-235/ Broadway	Kelley Avenue	Eastern/ MLK
Enhance Regional Connectivity/ Equitable Access						
Number of Activity Centers Served	0	0	+	+	0	0
Serves Limited Mobility Populations (zero car)	0	0	0	+	+	+
Serves Limited Mobility populations (poverty)	-	0	0	+	+	+
Support Economic Development/ Shape Growth						
Compatible with Current and Future Land Use	0	+	0	+	+	+
Existing (2010) Population	+	+	+	0	-	-
Existing (2010) Employment	+	+	+	-	-	-
Projected (2035) Population	+	+	+	0	0	-
Projected (2035) Employment	0	0	+	+	0	-
Serves Areas Slated for Development	0	0	+	+	-	+
Provide a Balanced/Coordinated Multimodal System						
LOS Analysis (D-F)	0	0	0	-	+	+
Existing Transit Ridership	+	+	+	0	0	0
Existing and Proposed Bike Trails	0	-	+	+	0	0
Existing and Proposed Pedestrian Facilities	0	0	+	-	0	+
Footprint/ROW	-	-	-	+	-	0
Maximize Regional Participation to Maximize Funding						
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	0	-	-	+	0	0
Number of Positive Scores	*4*	*5*	*9*	*9*	*4*	*6*
Number of Neutral Scores	*9*	*7*	*4*	*3*	*7*	*5*
Number of Negative Scores	*2*	*3*	*2*	*3*	*4*	*4*
Total Points	2	2	7	6	0	2

Table 3-18: East Corridor Parallel Transportation Facilities – Analysis

Evaluation Criteria	NE 4th/NE 8th/ NE 10th	Reno	SE 15th	SE 29th/ Shields	I-40
Enhance Regional Connectivity/ Equitable Access					
Number of Activity Centers Served	12 (12/0)	10 (9/1)	7 (6/1)	12 (9/3)	9 (7/2)
Serves Limited Mobility Populations (zero car)	14.2%	7.8%	6.7%	12.6%	8.3%
Serves Limited Mobility populations (poverty)	28.6%	16.6%	23.7%	23.3%	23.0%
Support Economic Development/ Shape Growth					
Compatible with Current and Future Land Use	19.1%	22.3%	21.7%	22.3%	23.5%
Existing (2010) Population	3.1	3.0	3.5	2.8	2.0
Existing (2010) Employment	2.3	2.3	2.6	2.1	1.5
Projected (2035) Population	4.1	3.6	4.3	3.6	2.6
Projected (2035) Employment	7.1	6.6	2.6	5.4	5.3
Serves Areas Slated for Development	0	+	-	+	+
Provide a Balanced/Coordinated Multimodal System					
LOS Analysis (D-F)	10.3%	12.0%	17.6%	8.4%	57.9%
Existing Transit Ridership	-6	-2	0	0	-2
Existing and Proposed Bike Trails	9/2.4	6/0.5	5/0.0	5/0.0	3/0.0
Existing and Proposed Pedestrian Facilities	+	0	+	-	-
Footprint/ROW	-	-	-	-	+
Maximize Regional Participation to Maximize Funding					
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	0	+	0	0	+
Number of Positive Scores	*7*	*4*	*4*	*6*	*5*
Number of Neutral Scores	*6*	*9*	*8*	*7*	*3*
Number of Negative Scores	*2*	*2*	*3*	*2*	*7*
Total Points	5	2	1	3	-2

Table 3-19: East Corridor Parallel Transportation Facilities – Results

Evaluation Criteria	NE 4th/NE 8th/ NE 10th	Reno	SE 15th	SE 29th/ Shields	I-40
Enhance Regional Connectivity/ Equitable Access					
Number of Activity Centers Served	+	0	0	+	0
Serves Limited Mobility Populations (zero car)	+	0	0	+	0
Serves Limited Mobility populations (poverty)	+	0	+	+	+
Support Economic Development/ Shape Growth					
Compatible with Current and Future Land Use	0	+	0	+	+
Existing (2010) Population	0	0	+	+	-
Existing (2010) Employment	0	0	0	+	-
Projected (2035) Population	+	0	+	+	-
Projected (2035) Employment	+	+	-	0	0
Serves Areas Slated for Development	0	+	-	+	+
Provide a Balanced/Coordinated Multimodal System					
LOS Analysis (D-F)	0	0	0	+	-
Existing Transit Ridership	-	-	0	0	-
Existing and Proposed Bike Trails	+	0	0	0	-
Existing and Proposed Pedestrian Facilities	+	0	+	-	-
Footprint/ROW	-	-	-	-	+
Maximize Regional Participation to Maximize Funding					
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	0	+	0	0	+
Number of Positive Scores	*7*	*4*	*4*	*6*	*5*
Number of Neutral Scores	*6*	*9*	*8*	*7*	*3*
Number of Negative Scores	*2*	*2*	*3*	*2*	*7*
Total Points	5	2	1	3	-2

Table 3-20: South Corridor Parallel Transportation Facilities – Analysis

	Shields Boulevard	1-35 to US-77	Santa Fe Avenue	Eastern Avenue	Bryant Avenue	Sooner Road
Enhance Regional Connectivity/ Equitable Access						
Number of Activity Centers Served	23 (19/4)	13 (10/3)	12 (11/1)	17 (14/3)	11 (8/3)	4 (3/1)
Serves Limited Mobility Populations (zero car)	8.6%	5.1%	7.3%	4.9%	6.8%	5.8%
Serves Limited Mobility populations (poverty)	22.3%	22.8%	16.4%	18.8%	19.7%	13.0%
Support Economic Development/ Shape Growth						
Compatible with Current and Future Land Use	26.7%	24.3%	16.1%	15.3%	12.0%	13.4%
Existing (2010) Population	3.4	2.6	3.7	2.6	2.8	2.4
Existing (2010) Employment	2.6	2.0	2.8	1.9	2.0	1.9
Projected (2035) Population	4.1	3.0	4.6	3.1	3.7	3.3
Projected (2035) Employment	6.3	4.7	4.0	3.7	2.6	1.4
Serves Areas Slated for Development	+	+	-	+	0	-
Provide a Balanced/Coordinated Multimodal System						
LOS Analysis (D-F)	31.8%	61.3%	7.0%	2.0%	4.5%	8.1%
Existing Transit Ridership	0	-3	0	0	0	2
Existing and Proposed Bike Trails	16/0.8	14/0.8	26/9.4	18/3.1	20/6.2	13/5.5
Existing and Proposed Pedestrian Facilities	0	-	-	0	0	+
Footprint/ROW	+	+	0	0	-	+
Maximize Regional Participation to Maximize Funding						
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	+	+	0	-	-	0
Number of Positive Scores	*11*	*7*	*7*	*4*	*4*	*5*
Number of Neutral Scores	*3*	*4*	*5*	*9*	*7*	*4*
Number of Negative Scores	*1*	*4*	*3*	*2*	*4*	*6*
Total Points	12	3	4	2	0	-1

Table 3-21: South Corridor Parallel Transportation Facilities – Results

	Shields Boulevard	1-35 to US-77	Santa Fe Avenue	Eastern Avenue	Bryant Avenue	Sooner Road
Enhance Regional Connectivity/ Equitable Access						
Number of Activity Centers Served	+	+	+	+	+	-
Serves Limited Mobility Populations (zero car)	+	0	+	0	+	0
Serves Limited Mobility populations (poverty)	+	+	-	0	0	-
Support Economic Development/ Shape Growth						
Compatible with Current and Future Land Use	+	+	0	0	-	-
Existing (2010) Population	+	0	+	0	0	0
Existing (2010) Employment	+	0	+	0	0	0
Projected (2035) Population	+	-	+	-	0	-
Projected (2035) Employment	+	+	0	0	-	-
Serves Areas Slated for Development	+	+	-	+	0	-
Provide a Balanced/Coordinated Multimodal System						
LOS Analysis (D-F)	-	-	+	+	+	+
Existing Transit Ridership	0	-	0	0	0	+
Existing and Proposed Bike Trails	0	0	+	+	+	+
Existing and Proposed Pedestrian Facilities	0	-	-	0	0	+
Footprint/ROW	+	+	0	0	-	+
Maximize Regional Participation to Maximize Funding						
Consistency with Local Comp Plans and the Regional Long-Range Transportation Plan	+	+	0	-	-	0
Number of Positive Scores	*11*	*7*	*7*	*4*	*4*	*5*
Number of Neutral Scores	*3*	*4*	*5*	*9*	*7*	*4*
Number of Negative Scores	*1*	*4*	*3*	*2*	*4*	*6*
Total Points	12	3	4	2	0	-1

3.7 Alignment Analysis

3.7.1 Introduction

Based on the results of the parallel transportation facility analysis, a more focused alignment analysis was conducted in order to present reasonable options for high capacity transit to the Steering Committee, workgroups, and public for consideration. These alignments used portions of the parallel transportation facilities developed and evaluated earlier in this chapter, but also connected to the logical termini in each corridor (Santa Fe Station in downtown Oklahoma City, downtown Edmond in the North Corridor, Tinker AFB in the East Corridor, and SH-9 in the South Corridor).

3.7.2 Methodology

The alignment analysis looked at potential routes within each of the three corridors without consideration of mode (i.e. train or bus), resulting in narrowing of potential routes without eliminating any specific mode. Ultimately, through the initial mode analysis and the alignment analysis, a subset of potential alignments and modes was produced and combined as specific alternatives to carry forward into the detailed evaluation of alternatives phase of the study.

Alignment Identification Process

This process included the identification of potential high-capacity transit routes in each of the three corridors based on corridor-wide data, including socioeconomic data (population and employment densities), activity centers and corridors, existing economic development trends, and local knowledge of the Central Oklahoma region.

The project team conducted a two-day internal workshop to identify potential alignments and identified seven alignments for analysis in each of the three corridors, as shown in Figure 3-7 through Figure 3-9 below.

Figure 3-7: North Corridor Alignments

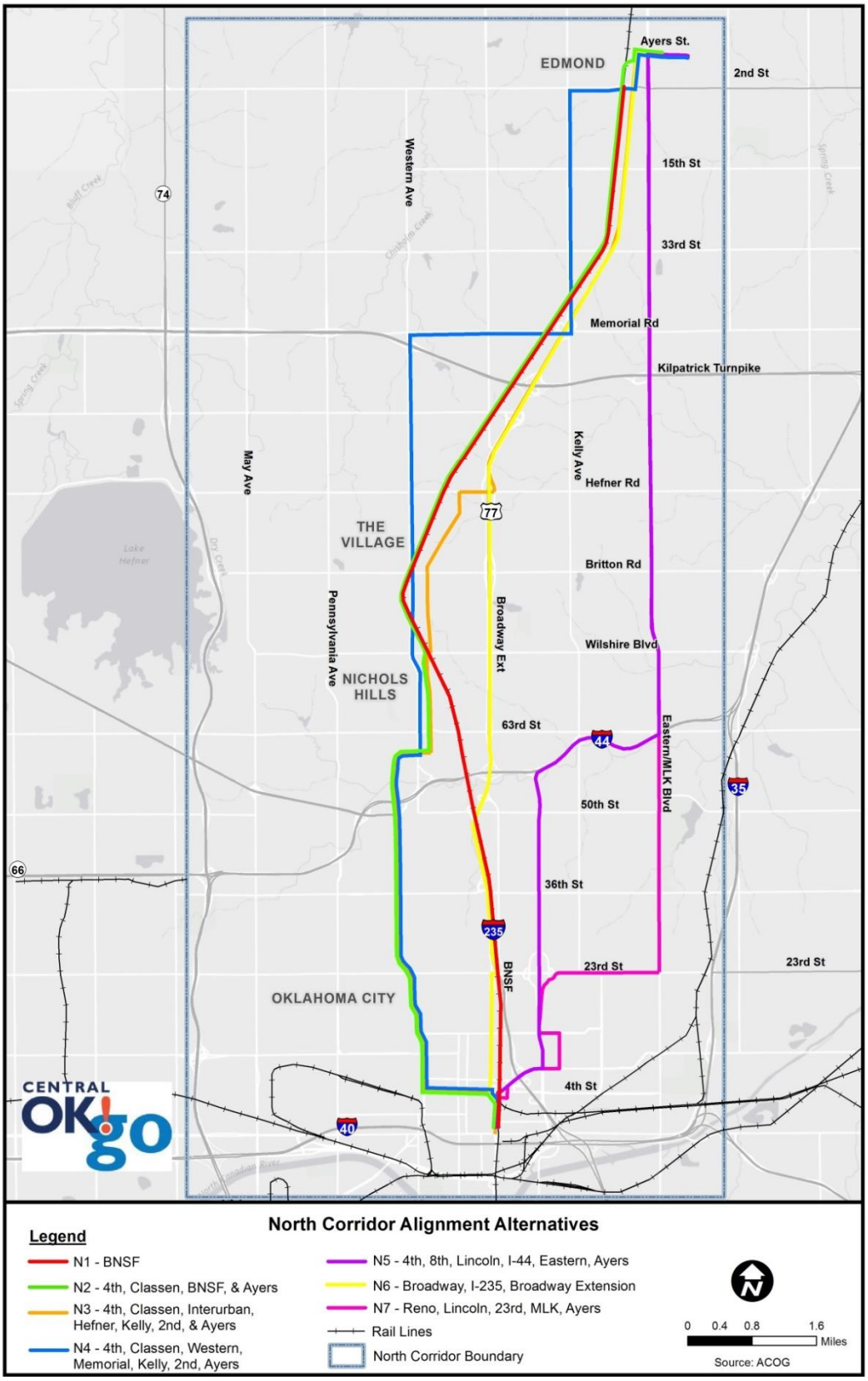


Figure 3-8: East Corridor Alignments

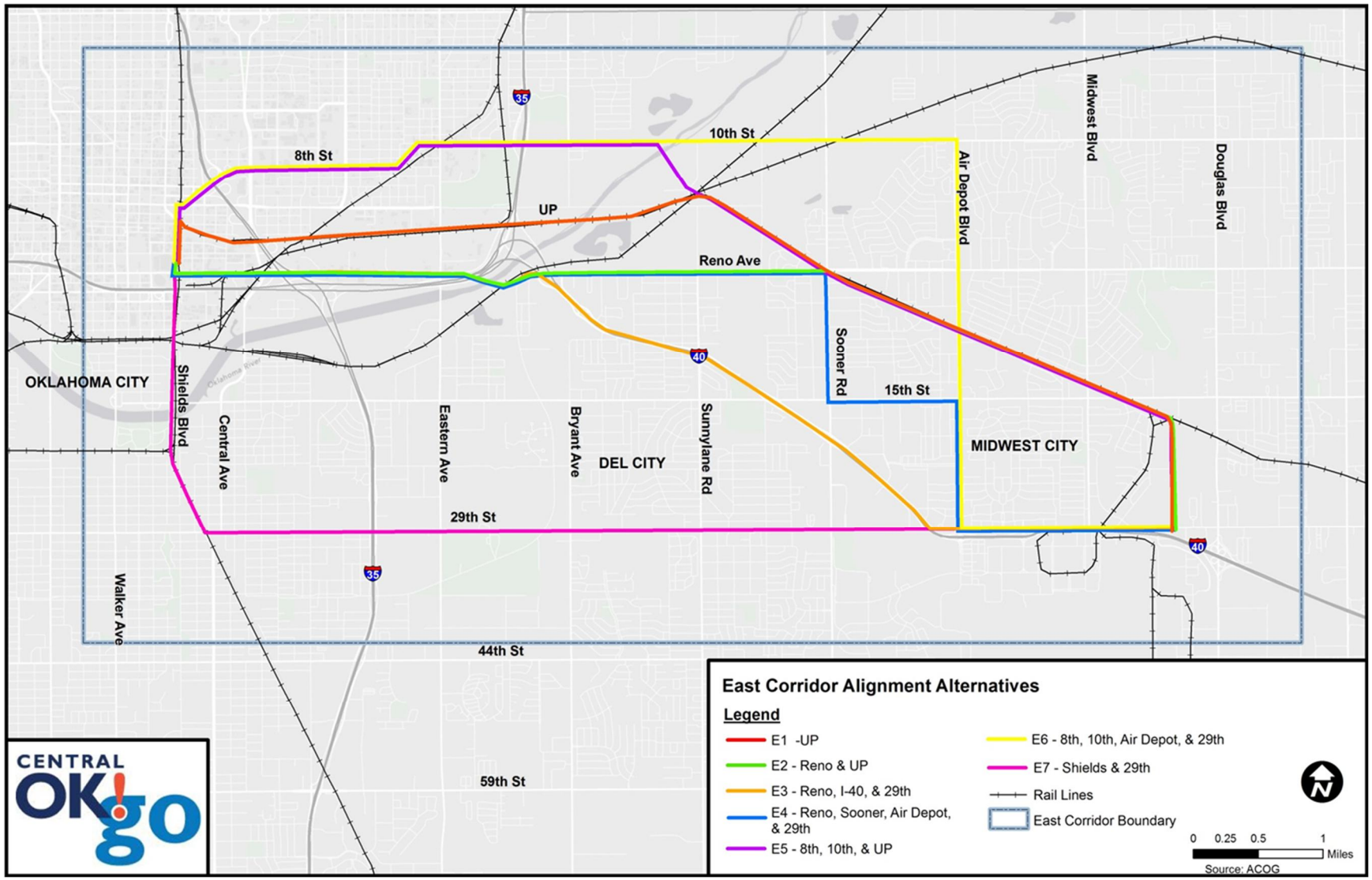
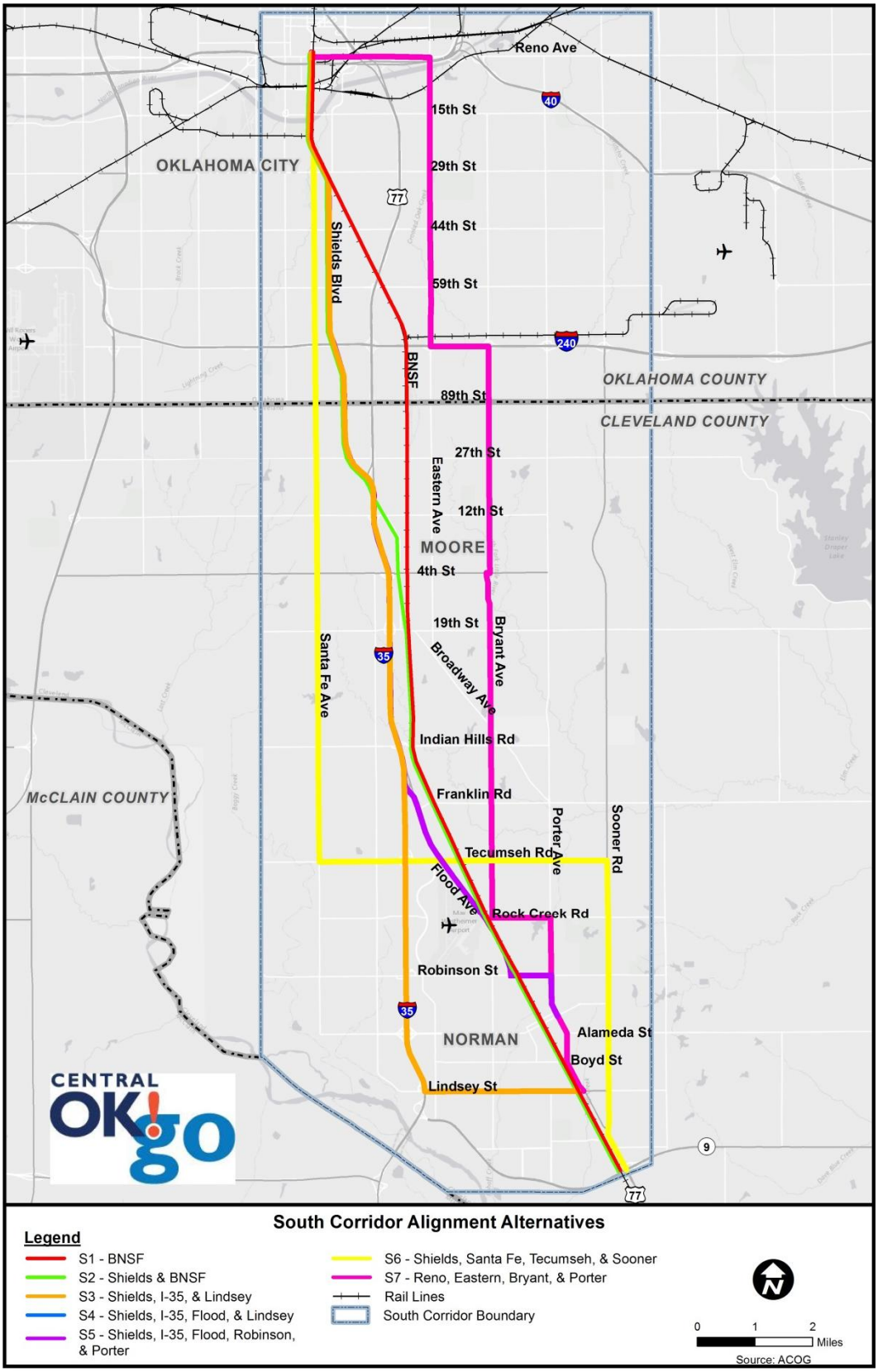


Figure 3-9: South Corridor Alignments



Evaluation Criteria

After establishing the alignments for evaluation, a set of evaluation criteria was developed based on the study goals and objectives. The fifteen specific evaluation criteria grouped by goal and objective are as follows:

Goal 1: Enhance Regional Connectivity
Objectives:

- Maximize Connections Between Activity Centers
  - ✓ Number of Activity Centers Served
- Provide Access to Limited Mobility Populations
  - ✓ Percentage of Zero-Car Households
  - ✓ Percentage of Individuals Below the Poverty Threshold
- Maximize the Use of Dedicated ROW
  - ✓ Ability of Existing ROW to Accommodate Dedicated ROW

Goal 2: Support Economic Development & Shape Growth
Objectives:

- Compatibility with Current and Future Land Use and Land Use Plans
  - ✓ Qualitative Assessment of Compatibility of High-Capacity Transit with Existing and Planned Land Uses and Existing Land Use Plans
- Serve Areas with Highest Existing and Projected Population and Employment Densities
  - ✓ Existing (2010) Population per Acre
  - ✓ Projected (2035) Population per Acre
  - ✓ Existing (2010) Employment per Acre
  - ✓ Projected (2035) Employment per Acre
- Serve Areas Slated for Transit-Friendly Development
  - ✓ Qualitative Assessment of Proposed Transit-Friendly Development
- Maximize Redevelopment and Infill Opportunities
  - ✓ Urbanized Area Ripe for Redevelopment/Infill

Goal 3: Provide a Balanced & Coordinated Multimodal System
Objectives:

- Provide Transit Service in the Areas with the Worst Congestion
  - ✓ Congestion Hot Spots
- Maximize Opportunities for Multi-Modal Connections
  - ✓ Existing Transit Routes
  - ✓ Existing and Proposed Bike Lanes/Trails
  - ✓ Existing and Proposed Pedestrian Facilities

Evaluation Scoring

Existing land use and environmental features were analyzed within one-half mile of each potential alignment. For this phase, Goal 4, Maximize Regional Participation to Maximize Funding, was not

included in the analysis. This criterion was dependent on mode selection in combination with alignment, and at this early phase, alignment and mode were evaluated separately.

Each of the alignments under consideration was scored based on the fifteen criteria described above. For each criterion, the alignments were awarded either one point, zero points, or a point was deducted based on the data associated with that specific criterion, and the scores were tallied to obtain a total. It should be noted that scoring was completed for each corridor individually in order to see how each alignment within a specific corridor compared to the other alignments in the corridor. The ultimate goal was to determine the top alignment(s) for each corridor without influence from alignments outside of that corridor.

Because there were a different number of criteria under each goal, the project team created a "balancing" factor to ensure equal weighting among the goals. Each goal was then weighted based on feedback from the corridor workgroups and applied to the criteria, so in essence there were two weighting measures used to balance and then to weight the goals appropriately.

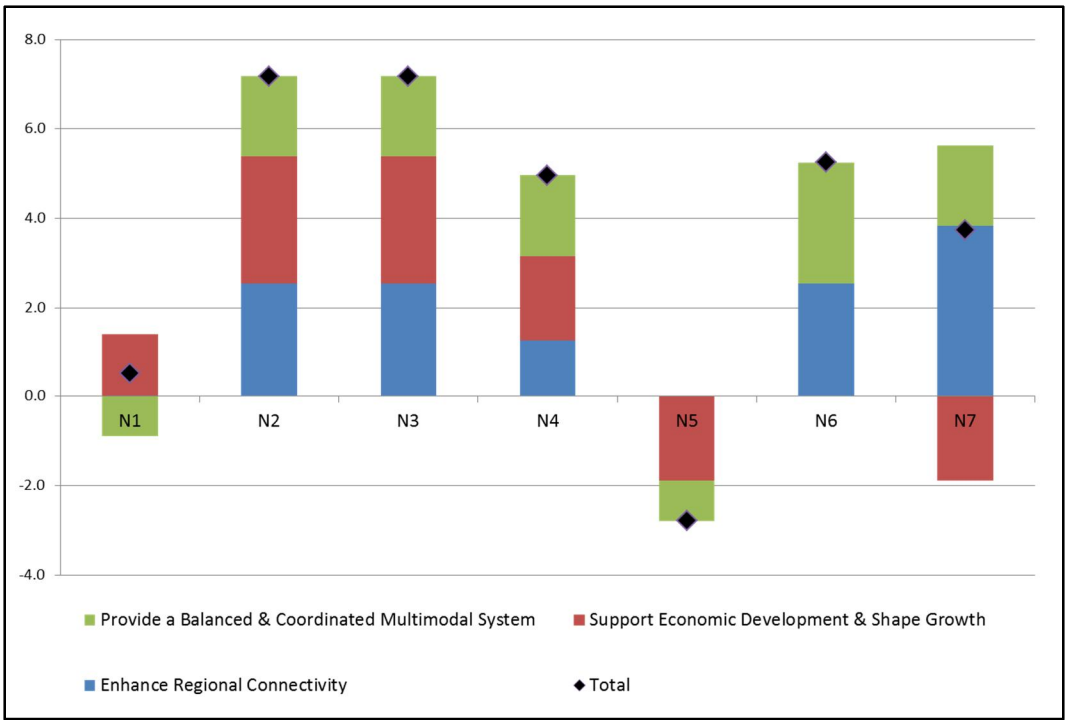
3.7.3 Evaluation Results

Separate evaluation matrices were developed for each of the three corridors in order to show the scoring and rankings of each of the alignments under consideration for that specific corridor. The final alignment evaluation results for the North, South, and East Corridors are provided below.

North Corridor Evaluation Results

The North Corridor evaluation results for each of the seven alignments under consideration are shown in Figure 3-10.

Figure 3-10: North Corridor – Alignment Analysis Results



The North Corridor alignment evaluation resulted in six alignments with positive overall scores. The alignments with the highest overall scores were Alignments N2 and N3 which both received the same total points as well as the same point totals for all three goals. These two alignments provide the best connections to activity centers within the North Corridor, provide the best access to existing and projected population and employment densities, and have the best opportunities for economic development due to the existing development momentum and proposed developments along these two alignments.

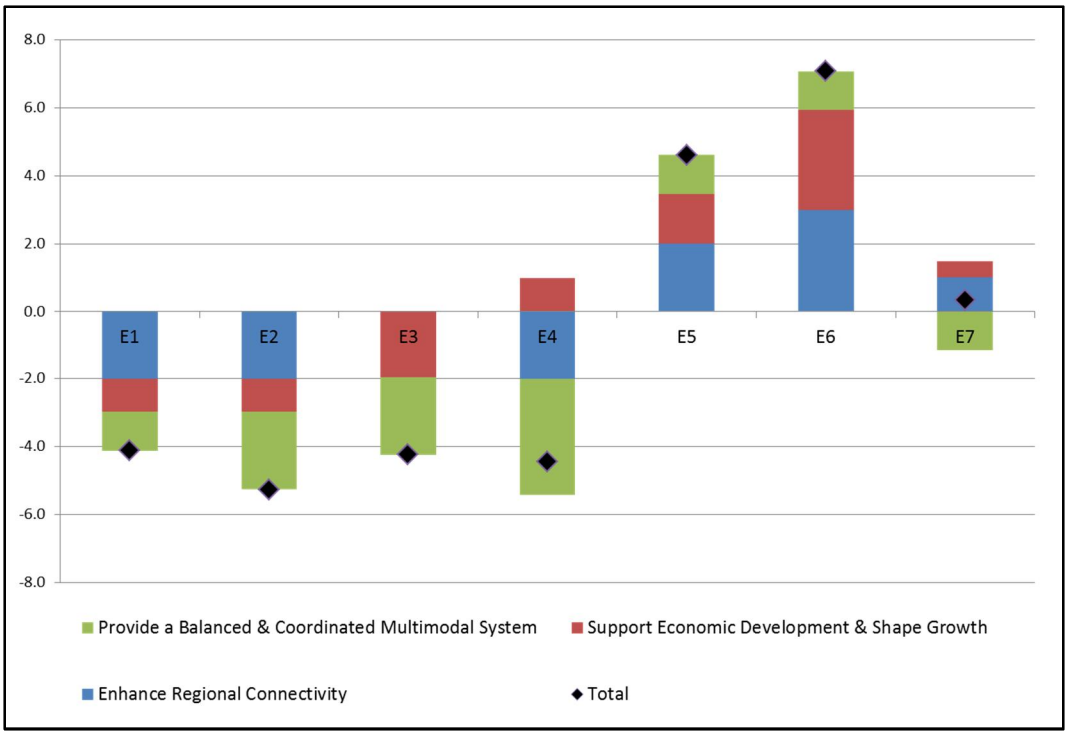
Alternative N7 received the fifth highest total score, but it scored the highest for 'Enhance Regional Connectivity' due to the fact that N7 would directly serve some of the largest activity centers in the North Corridor – the Health Sciences Center, the Capitol Complex, and the Adventure District. N7 is the only alignment that directly serves all of these major activity centers as well as the only alignment that serves the east side of the corridor. However, N7 did not score well for 'Support Economic Development & Shape Growth'.

As a result of the alignment evaluation, Alignments N2 and N3 were recommended by the project team for advancement to the next round of analysis (Detailed Evaluation of Alternatives). Alignment N1 was advanced as well due to the fact that it was the only alignment to exclusively use the BNSF ROW which the Steering Committee determined was important to consider in the next round of analysis. Additionally, based on feedback received from the steering committee and the stakeholder and community workgroup, Alignment N7 was advanced as it was the only alignment to serve the east side of the corridor. Therefore, alignments N1, N2, N3, and N7 were advanced to the detailed evaluation of alternatives phase of the study.

East Corridor Evaluation Results

The East Corridor evaluation results for each of the seven alignments under consideration are shown below in Figure 3-11.

Figure 3-11: East Corridor – Alignment Analysis Results



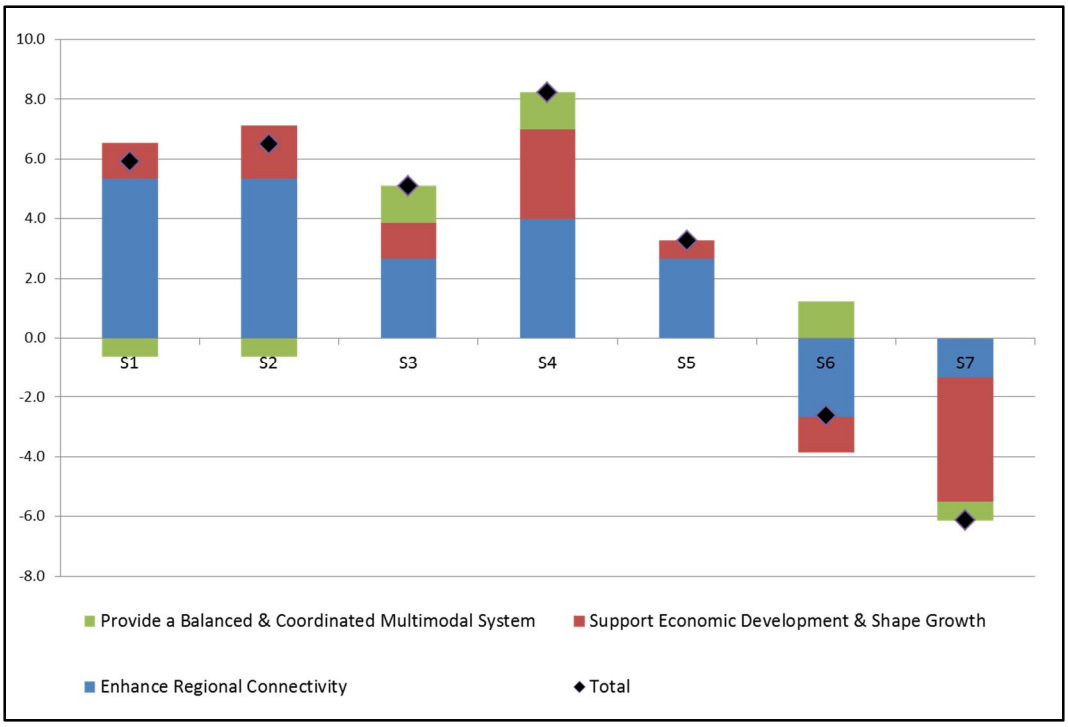
Only three of the seven alignments under consideration in the East Corridor received a positive overall score. Of those, two alignments (Alignments E5 and E6) stood out from the others. The main reasons for the dominant scores associated with E6 were that this alignment would provide the best access to major activity centers in the East Corridor, provide access to the areas with the highest population and employment densities, and has the best opportunities for multi-modal connections.

As a result of the alignment analysis, Alignments E5 and E6 were recommended by the project team for advancement to the next round of analysis (Detailed Evaluation of Alternatives). After discussing the results of the analysis with the Steering Committee and East Corridor stakeholder and community workgroup, the committees determined that it was too early in the process to eliminate the alignment that used the UP ROW and the abandoned rail ROW. Therefore, alignment E1 was added to the list of recommended alignments for further consideration and the steering committee, workgroup and public concurred with this recommendation. Therefore, Alignments E1, E5, and E6 were advanced to the detailed evaluation of alternatives phase of the study.

South Corridor Evaluation Results

The South Corridor evaluation results for each of the seven alignments under consideration are shown in Figure 3-12.

Figure 3-12: South Corridor – Alignment Analysis Results



The evaluation of the South Corridor resulted in positive total scores for five of the seven alignments: S1, S2, S3, S4, and S5. Alignments S6 and S7 performed poorly and both ended up with negative total scores. Of the alignments with positive total scores, Alignment S4 scored the highest, followed by Alignments S2, S1, S3, and S5, respectively.

Alternative S4 received the highest score for 'Support Economic Development & Shape Growth' due to the fact that the alignment traverses areas of the South Corridor that have high existing development momentum as well as planned developments. S4 also received the highest score for 'Provide a Balanced & Coordinated Multimodal System' due to the alignment having the best opportunity for multimodal connections and serving areas with higher levels of congestion.

Alignments S1 and S2 scored the highest for 'Enhance Regional Connectivity' because both of these alignments serve a larger number of existing activity centers and corridors than the other alignments. However, both alignments received a negative score for 'Provide a Balanced & Coordinated Multimodal System', as both have fewer opportunities for multimodal connections.

As a result of the alignment evaluation, Alignments S1, S2, and S4 were recommended by the project team for advancement to the next round of analysis (Detailed Evaluation of Alternatives). Based on positive feedback received from the Steering Committee and the stakeholder and community workgroup, these alignment recommendations were advanced.

3.8 Alternatives Defined by Central Oklahoma

The results of the initial alignment screening were presented to the Steering Committee and corridor workgroups along with potential alignment and mode pairings. Based on the analysis, local knowledge of the corridors and public sentiment, the CentralOK!go Steering Committee and workgroups recommended the following alignment and mode pairs to progress to the Detailed Evaluation of Alternatives:

North Corridor:

- ✓ N1-Commuter Rail
- ✓ N2-LRT or Streetcar or BRT
- ✓ N3-LRT or Streetcar or BRT
- ✓ N7-Streetcar or BRT

East Corridor:

- ✓ E1-Commuter Rail
- ✓ E5-LRT or Streetcar or BRT
- ✓ E6-Streetcar or BRT

South Corridor:

- ✓ S1-Commuter Rail
- ✓ S2-Streetcar or BRT
- ✓ S4-Streetcar or BRT

The specific alternatives are displayed and discussed by corridor in the following chapter.

4.0 Detailed Evaluation of Alternatives

4.1 Detailed Alternatives

The detailed evaluation of alternatives phase examined the alignment and mode combinations considered most feasible from the initial alignment screening, as described in the previous chapter. The alternatives selected by the CentralOK!go Steering Committee and workgroups were evaluated against one another utilizing a set of evaluation criteria based upon the adopted goals and objectives. The analysis also considered the estimated ridership for each alternative and their technical feasibility based on engineering constraints and potential environmental and social impacts or benefits. The estimated one-time cost to build the alternative, "Capital Cost", and the ongoing cost to operate and maintain the alternative, "O&M Costs", were both considered.

The results of the detailed evaluation and public and stakeholder sentiment were presented to the Steering Committee to assist them in selecting a locally preferred alternative (LPA) for each of the three corridors.

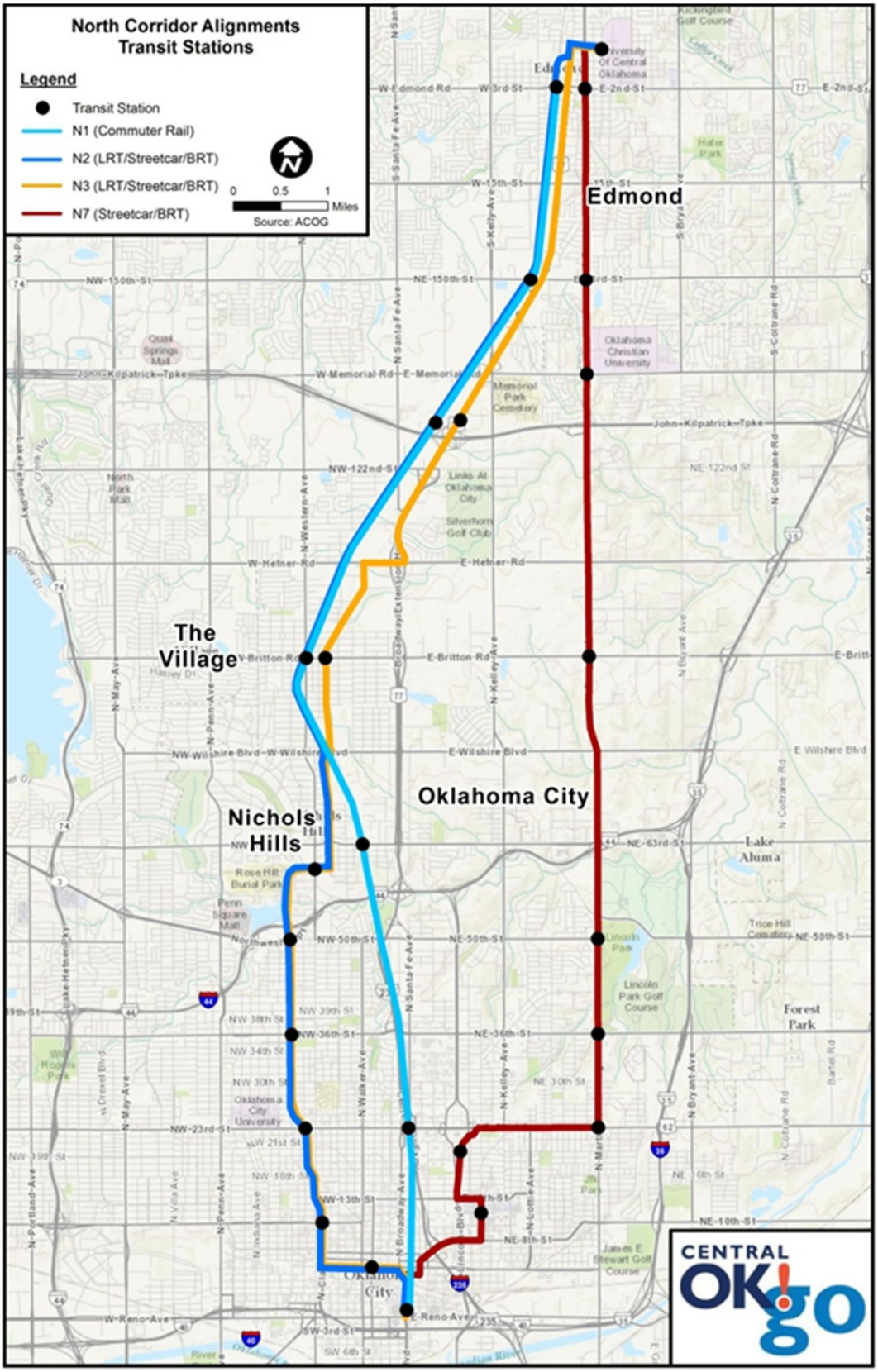
4.1.1 North Corridor

Four alignment alternatives were advanced to the detailed evaluation phase of the study for the North Corridor. These alternatives are described below and illustrated in Figure 4-1.

- N1 (Commuter Rail) – This alternative would utilize the existing BNSF ROW from the Santa Fe Station in downtown Oklahoma City to downtown Edmond. The alternative would use commuter rail technology on new track adjacent to the existing track within BNSF ROW for its entire length. The alternative would use fully dedicated ROW and assumed successful negotiations for shared ROW with BNSF. There were seven preliminary stations identified for this alternative.
- N2 (LRT or Streetcar or BRT) – This alternative would travel north out of the Santa Fe Station in downtown Oklahoma City along E.K. Gaylord Boulevard to NW 4th Street. The alternative then would travel west on NW 4th Street to Classen Boulevard, north on Classen Boulevard and then would travel up around Classen Curve, north along Classen Court to Wilshire Boulevard, then utilize existing BNSF ROW from Wilshire Boulevard to downtown Edmond, continuing to the University of Central Oklahoma (UCO) on local streets. All of the modes considered (LRT, streetcar, and BRT) would travel within fully dedicated ROW and would require the construction of a new parallel track (LRT or streetcar) or busway (BRT) for the portion within the existing BNSF ROW. This alternative also assumed successful negotiations for shared ROW with BNSF. There were twelve preliminary stations identified for this alternative.
- N3 (LRT or Streetcar or BRT) – This alternative follows the same route as N2 between the Santa Fe Station in downtown Oklahoma City and Wilshire Boulevard and then would continue north on the abandoned interurban ROW to Hefner Road, would then turn east on Hefner Road then north on Broadway Extension into downtown Edmond, continuing to UCO on local streets. All of the alternative modes would travel within fully dedicated ROW within existing highway, roadway arterials, and local streets. There were twelve preliminary stations identified for this alternative.

- N7 (Streetcar or BRT) – This alternative would travel north out of the Santa Fe Station along E.K. Gaylord, then turn northeast on Harrison Avenue to NE 8th Street where it would travel east on NE 8th Street to North Phillips Street. At this point the alternative would travel north on Phillips Street through the Health Sciences Center to NE 13th Street and then would turn west on NE 13th Street to Lincoln Boulevard. The alternative then travels north on Lincoln Boulevard, around the east side of the Capitol Complex and turns east on NE 23rd Street. The alternative would continue east on NE 23rd Street to Martin Luther King Avenue and then travel north on Martin Luther King Avenue, continuing north on Eastern Avenue to downtown Edmond and terminating at UCO on local streets. Either mode would share existing roadway travel lanes with no dedicated ROW. There were eleven preliminary stations identified for this alternative.

Figure 4-1: North Corridor Alternatives



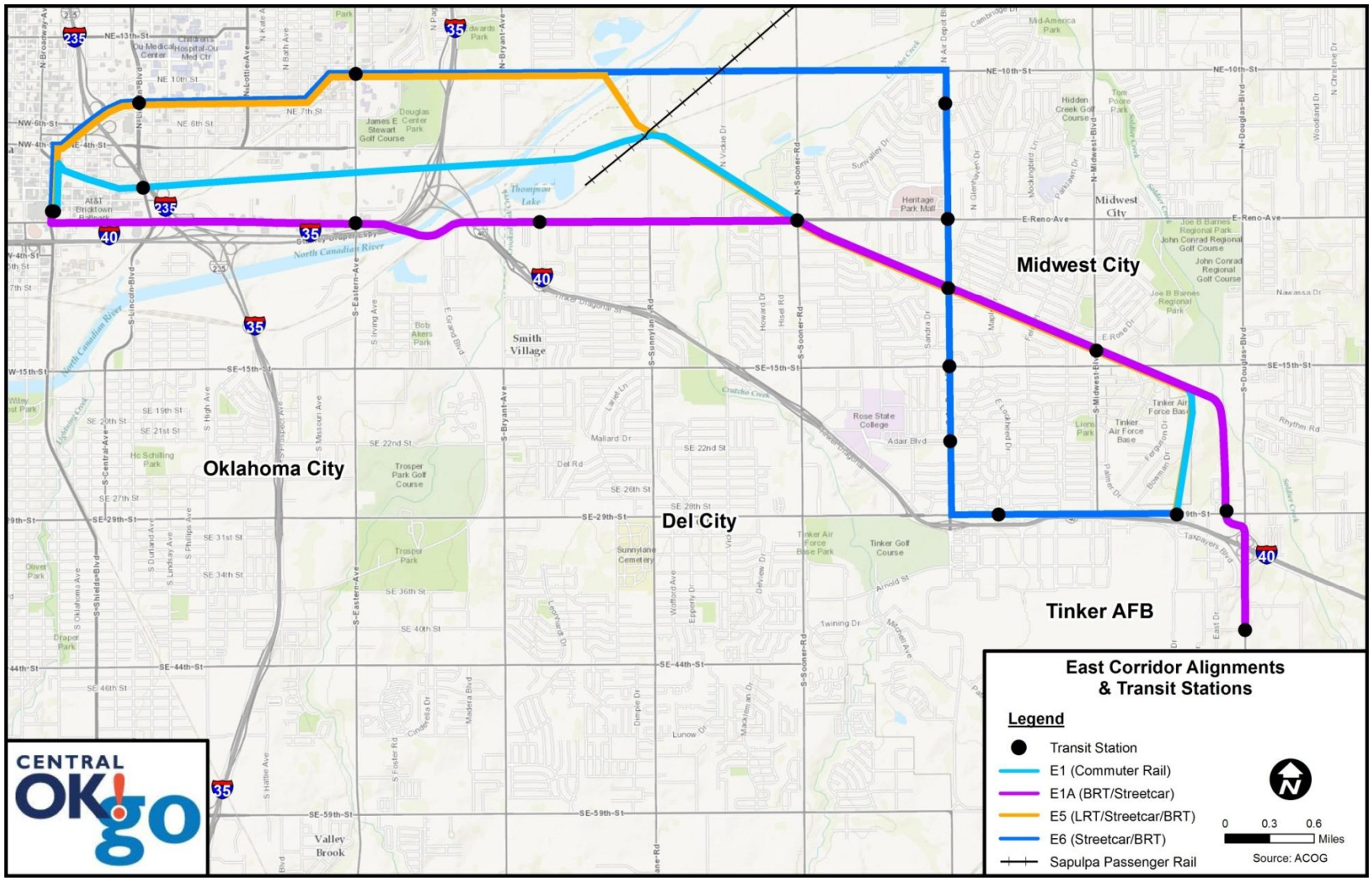
4.1.2 East Corridor

Three alignment alternatives were initially advanced to the detailed evaluation of alternatives phase of the study for the East Corridor. One additional variation on the initial E1 alternative was later developed during the detailed evaluation of alternatives analysis, as described below and illustrated in Figure 4-2:

- E1 (Commuter Rail) – This alternative would utilize the existing UP ROW between the Santa Fe Station in downtown Oklahoma City to the intersection with Sunnylane Road to the east, at which point it would follow the abandoned rail ROW in Midwest City in a southeasterly direction before turning south and terminating north of Tinker AFB to the east of the Midwest City Town Center Plaza. The mode would be commuter rail technology utilizing a new parallel track adjacent to the existing UP track within the UP ROW as well as a new track within the abandoned rail ROW. The alternative would travel within 100% dedicated ROW and assumed successful negotiations for shared ROW with UP. There were six preliminary stations identified for this alternative.
- E5 (LRT or Streetcar or BRT) – This alternative would travel north from the Santa Fe Station in downtown Oklahoma City along E.K. Gaylord/Broadway and then travel northeast along Harrison Avenue to NE 8th Street. The alternative would then travel east on NE 8th and NE 10th Streets, cross southeast over the Canadian River and Sunnylane Road and then would utilize the abandoned rail ROW through Midwest City, terminating just north of Tinker AFB and east of the Midwest City Town Center Plaza. The modes considered for this alternative were LRT, Streetcar, or BRT and the alternatives would utilize existing roadways and the abandoned rail ROW. LRT would require the construction of a separate guideway within 100% dedicated ROW, while the streetcar and BRT options would be located within existing travel lanes on the roadways and within dedicated ROW for the portion within the abandoned rail ROW, resulting in these two modes having approximately 50% dedicated ROW. There were seven preliminary stations identified for this alternative.
- E6 (Streetcar or BRT) – This alternative would travel north out of the Santa Fe Station in downtown Oklahoma City and would utilize NE 8th and NE 10th Streets along the same route as Alternative E5. However, Alternative E6 would continue east along NE 10th Street to Air Depot Boulevard and then would turn south on Air Depot continuing to SE 29th Street in Midwest City. From there Alternative E6 would travel east on SE 29th Street past the Midwest City Town Center Plaza and terminate just north of Tinker AFB. Streetcar and BRT were evaluated and either would operate within existing travel lanes with no dedicated ROW. There were ten preliminary stations identified for this alternative.
- E1A (Streetcar or BRT) – After completion of the detailed evaluation of the above alternatives, the project team determined that a variation on Alternative E1, termed Alternative E1A, should be considered as well due to the fact that the Transportation Demand Modeling (TDM) results pointed to travel time between downtown Oklahoma City and Tinker AFB being the most important factor in estimated ridership, as discussed in the East Corridor section of Appendix A. Alternative E1A would travel east from the Santa Fe Station in downtown Oklahoma City along Reno Avenue to Sooner Road and then would utilize the abandoned rail ROW, traveling southeast along the abandoned rail ROW through Midwest City and then turning south and providing service to a proposed park-and-ride station located at the northwest corner of I-40 and Douglas Boulevard. The alternative then would travel south on Douglas Boulevard to the 24-hour gate at Tinker AFB. Both Streetcar and BRT modes were evaluated and would operate within 100% dedicated ROW with the BRT mode using contraflow lanes (i.e. reversible travel lanes with in-bound travel for the morning commute into downtown Oklahoma City and out-

bound travel for the evening commute to Del City and Midwest City) within the portion of the route on Reno Avenue. There were eight preliminary stations identified for this alternative.

Figure 4-2: East Corridor Alternatives

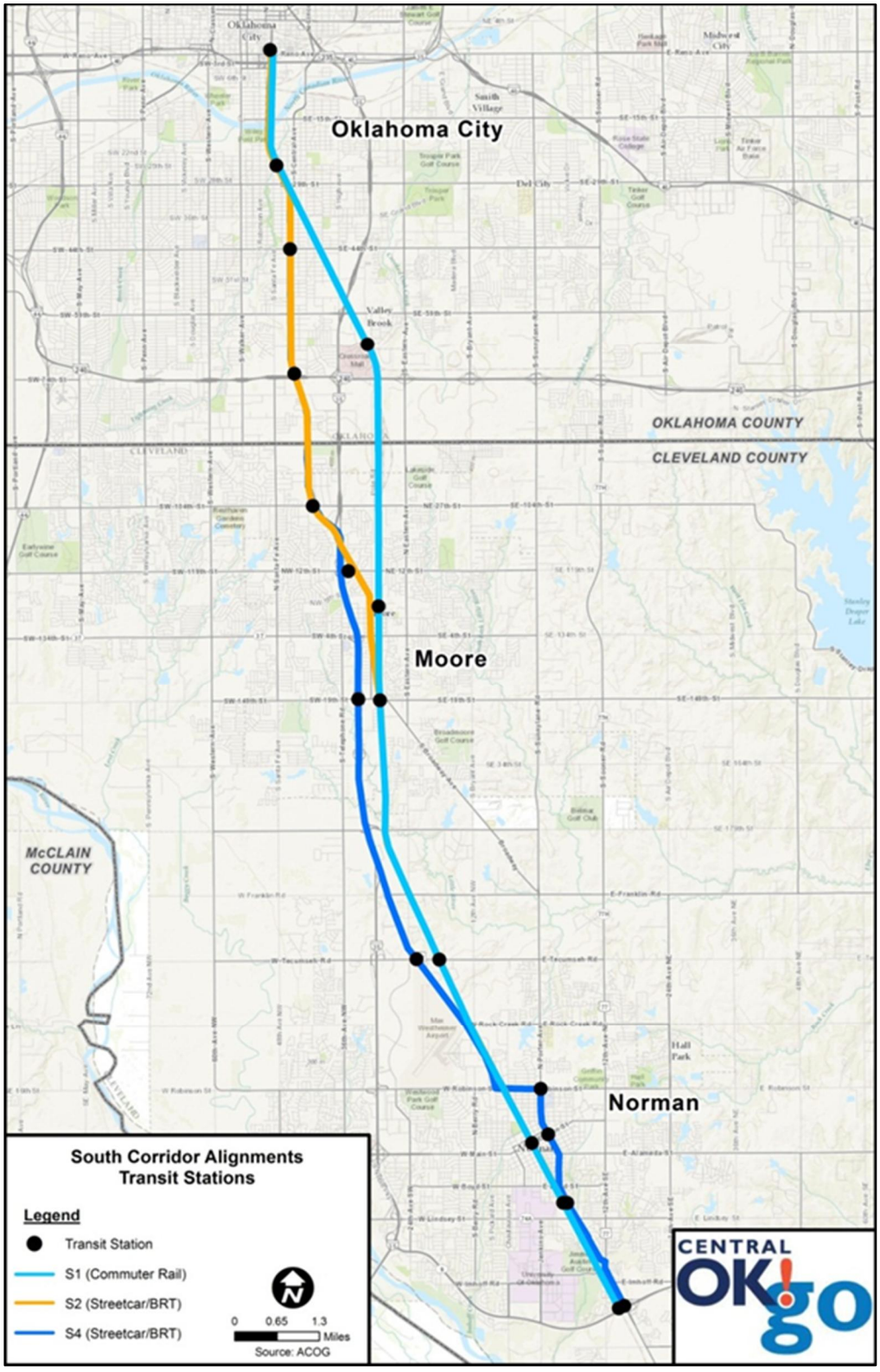


4.1.3 South Corridor

Three alignment alternatives were advanced to the detailed evaluation of alternatives phase of the study for the South Corridor. These alternatives are described below and displayed in Figure 4-3:

- S1 (Commuter Rail) – This alternative would follow the BNSF ROW from the Santa Fe Station in downtown Oklahoma City through southern Oklahoma City, the City of Moore, the City of Norman and adjacent to the University of Oklahoma, and would terminate at the intersection of the BNSF ROW with SH-9. The mode would be commuter rail utilizing a new parallel track adjacent to the existing BNSF track within BNSF ROW for the entire length of the alternative. The alternative would travel completely within dedicated ROW and assumed successful negotiations for shared ROW with BNSF. There were nine preliminary stations identified for this alternative.
- S2 (Streetcar or BRT) – This alternative would follow Shields Boulevard from the Santa Fe Station in downtown Oklahoma City to the I-35 interchange at which point the alternative would cross over I-35 and then utilize the BNSF ROW through the City of Moore, City of Norman and University of Oklahoma, terminating at SH-9. The alternative would utilize either streetcar or BRT with both modes requiring either a new track (streetcar) or busway (BRT) parallel to the existing BNSF track in the areas that share BNSF ROW. The alternative would be located completely within dedicated ROW and assumed successful negotiations for shared ROW with BNSF. There were eleven preliminary stations identified for this alternative.
- S4 (Streetcar or BRT) – This alternative would follow Shields Boulevard from the Santa Fe Station in downtown Oklahoma City to the I-35 interchange at which point the alternative utilizes I-35 through the City of Moore. The alternative then would continue southeast down Flood Avenue, east on Robinson Street, and then south on Porter Avenue and Classen Boulevard, terminating at SH-9. The alternative would use either streetcar or BRT and would travel within 100% dedicated ROW within I-35 and roadway arterials. There were twelve preliminary stations identified for this alternative.

Figure 4-3: South Corridor Alternatives



4.2 Detailed Evaluation

4.2.1 Introduction

Based on the results of the alignment and modal analyses and subsequent community and stakeholder input, four alignment alternatives were evaluated in the North Corridor, four in the East Corridor, and three in the South Corridor.

4.2.2 Methodology

Through the initial mode analysis and the alignment analysis, a subset of potential alignments and modes was produced and combined as specific alternatives to carry forward into the detailed evaluation phase of the study. These alternatives were evaluated against one another based on a set of evaluation criteria. The evaluation criteria utilized for the detailed evaluation were based on the goals and objectives identified for study by the Steering Committee, the community and stakeholder workgroups, and the public at large. The criteria are discussed in detail below. The detailed evaluation resulted in a technical recommendation that was presented to the corridor workgroups and the general public. The results of the detailed evaluation and the public and stakeholder sentiments were ultimately presented to the Steering Committee to assist them in the determination of a LPA for each of the three corridors.

4.2.3 Detailed Analysis Criteria

After establishing the alternatives for evaluation, a set of evaluation criteria was developed based on the study goals and objectives that were established by the Steering Committee and the corridor workgroups. At the detailed level of evaluation, it was determined that the "Maximize Regional Participation to Maximize Funding" goal could not be evaluated and differentiated across the alternatives. Therefore it was not used to evaluate alternatives. A fourth evaluation criterion (technical feasibility) and associated objectives were added during this stage of the study to review the technical feasibility of each alternative, including engineering constraints and potential environmental or social impacts or benefits. The goals and objectives are listed below and the 37 evaluation criteria based on these are outlined in Table 4-1.

Goal: Enhance Regional Connectivity

Objectives:

- Maximize the Connections Between Activity Centers
- Provide Access to Limited Mobility Populations
- Provide a Seamless Connection to Central Oklahoma City

Goal: Support Economic Development and Shape Growth

Objectives:

- Ensure Compatibility with Current and Future Land Uses and Land Use Plans
- Serve Areas with Highest Existing and Projected Population and Employment Densities
- Maximize Redevelopment and Infill Opportunities

Goal: Provide a Balanced and Coordinated Multimodal System

Objectives:

- Maximize Ridership Potential
- Maximize Opportunities for Multi-Modal Connections

- Provide Reliable Service
- Provide Convenient Service
- Ensure the Ability to Handle Increases in Ridership
- Maximize Frequency of Service

Added Evaluation Criterion: Technical Feasibility

Objectives

- Engineering Feasibility
- Environmental and Social Impacts and Benefits

Table 4-1: Detailed Evaluation Criteria

Goal	Objective	Criteria	Description
Enhance Regional Connectivity	Maximize Connections between Major Activity Centers	(1) Number of Activity Centers Served	The number of ACOG-identified activity centers served by each alternative within one-half mile of each station; Activity centers separated into regionally significant, significant, and locally-significant activity centers
		(2) Number of Activity Corridors Served	The number of ACOG-identified activity corridors served by each alternative within one-half mile of each station
		(3) Access to Parkland & Community Facilities	Quantitative assessment of how many public parks and community facilities are served by each alternative
	Provide Access to Limited Mobility Populations	(4) Populations with limited mobility (Poverty + Zero Car) Station Access	Quantitative assessment of the percentage of the population within one-half mile of each alternative's stations that are under the poverty level or do not own a car
		(5) Populations with limited mobility (Youths + Seniors) Station Access	Quantitative assessment of the percentage of the population within one-half mile of each alternative's stations that are under the age of 18 or over the age of 65
		(6) Environmental Justice Benefit (Station Access)	Quantitative assessment of the number of block groups within one-quarter mile of each alternative's stations where the population of the block groups are predominantly environmental justice populations (i.e. minority or low-income) that could benefit from additional mobility options provided by the alternative
	Provide a Seamless Connection to Central OKC	(7) Connection to Central OKC	Number of stations for each alternative that are within Central Oklahoma City; Central Oklahoma City is defined as the area bordered by N 23rd on the north, MLK/Eastern on the east, S 29th Street on the south, and Pennsylvania on the west
Support Economic Development and Shape Growth	Compatibility with Current and Future Land Use Plans	(8) Transit and Land Use Compatibility	Qualitative assessment of compatibility of transit with existing and future land use designations and consistency with each community's major planning objectives and future land use plans
	Serve Areas with Highest Projected Population and Employment Densities	(9) Existing (2010) Total Population	Quantitative assessment of total existing (2010) population within one-half mile of each station
		(10) Existing (2010) Population per Acre	Quantitative assessment of total existing (2010) population per acre within one-half mile of each station
		(11) Existing (2010) Total Employment	Quantitative assessment of total existing (2010) employment within one-half mile of each station
		(12) Existing (2010) Employment per Acre	Quantitative assessment of total existing (2010) employment per acre within one-half mile of each station

Table 4-1: Detailed Evaluation Criteria

Goal	Objective	Criteria	Description
		(13) Projected (2035) Total Population	Quantitative assessment of total projected (2035) population within one-half mile of each station
		(14) Projected (2035) Population per Acre	Quantitative assessment of total projected (2035) population per acre within a half-mile of each station
		(15) Projected (2035) Total Employment	Quantitative assessment of total projected (2035) employment within a half-mile of each station
		(16) Projected (2035) Employment per Acre	Quantitative assessment of total projected (2035) employment per acre within a half-mile of each station
	Maximize Redevelopment and Infill Opportunities	(17) Economic Development Potential (Total Points)	Qualitative evaluation of market conditions and development momentum within a half-mile of proposed station locations reported as total points
		(18) Economic Development Potential (Average per Station)	Qualitative evaluation of market conditions and development momentum within a half-mile of proposed station locations reported as an average per station
Provide a Balanced & Coordinated Multimodal System	Maximize Ridership Potential	(19-20) Estimated Ridership/Ridership Threshold	Average daily ridership for each of the alternatives derived from the transportation demand model utilizing the established Central Oklahoma regional model as a baseline
	Maximize Opportunities for Multimodal Connections	(21) Connections to Highways	Quantitative assessment of the number of highways that intersect each alternative and have direct access to a park-and-ride station
		(22) Existing and Proposed Bike Trails	Quantitative assessment of the number of existing and proposed bike trails that cross, are on, or are within one-half mile of each station. Additionally, a qualitative assessment was considered based on Edmond, OKC, and Norman Bike Plans
		(23) Existing and Proposed Pedestrian Facilities	Qualitative assessment of the existing state of pedestrian facilities and proposed pedestrian facilities around stations; a positive ranking is given for station areas with continuous sidewalks, a neutral ranking is given for station areas with some sidewalks, and a negative ranking is given to station areas with no sidewalks
	Reliable Service	(24) Dedicated ROW Percentage	Quantitative assessment of the percentage of each alternative that is within dedicated ROW (i.e. does not share a lane with other vehicles)
	Convenient Service	(25) Vehicle Capacity	Quantitative assessment of the capacity of vehicles associated with each mode (i.e. Commuter Rail, BRT, LRT, and Streetcar). Number of people it can carry per hour during rush hour. Assumes 15 minute headways during rush hour
	Ability to Handle Increases in	(26) Latent Capacity	Qualitative assessment of the ability of each mode to handle increases in ridership without requiring additional capital investment or vehicle purchase

Table 4-1: Detailed Evaluation Criteria

Goal	Objective	Criteria	Description
	Ridership		
	Maximize Frequency of Service	(27) Frequency of Service	Quantitative assessment for each alternative of the number of times that a transit vehicle stops at stations throughout the day
Technical Feasibility	Engineering	(28) Engineering Constraints	Quantitative engineering assessment of areas along each alternative that could potentially be difficult or expensive when implementing high-capacity transit
		(29) Major Utility Conflicts	Quantitative assessment of specific areas along each alternative that could potentially be difficult or expensive when implementing high-capacity transit due to the existence of major utilities
		(30) ROW/Parking/ Traffic Operations	Qualitative assessment for each alternative of the areas that have constrained ROW (little room to expand on either side of the transportation facility due to existing development, structures, or other conditions) as well as potential impact to parking and traffic operations
	Environmental & Social	(31) Historic Resources	Historic Resources and Districts within 150 feet on either side of each alternative alignment and a 300 foot radius around each station
		(32) Environmental Justice – Alignments	Number of EJ block groups adjacent to or within 150 feet of each alternative alignment that could potentially have impacts as a result of the implementation of the alternative
		(33) Hazardous Materials	Quantitative assessment of the number of existing known hazardous material and waste sites located within 1,000 feet of each alternative alignment and stations that could impact construction or be a threat to human health if disturbed
		(34) Waters of the U.S.	Quantitative assessment of the number of waters of the U.S. that are crossed by each alternative; the greater the number of crossing, the greater the potential for impacts
		(35) Floodplains	Number and extent (linear footage) of floodplains crossed by each alternative
		(36) Noise & Vibration	Quantitative assessment of the number of sensitive receptors located within a half-mile on either side of each alternative; sensitive receptors include hospitals, parklands, public libraries, religious institutions, daycares, retirement centers, schools, and TV and radio stations
		(37) Air Quality Benefits	Quantitative assessment of the reduction in air emissions as a result of the implementation of each alternative; based on change in vehicle miles traveled from No Build to Build

4.2.4 Detailed Evaluation Scoring

Once the detailed evaluation and analyses was performed for all 37 criteria listed above, each of the alternatives was compared against other alternatives in the same corridor resulting in a ranking. For each criterion, the alternatives were scored and awarded between zero and three points. Zero points were applied if the alternative did not score well and three points were applied if the alternative scored very well when compared to the others.

The scores for each alternative were first added and then compared to the other alternatives in the corridor. It should be noted that scoring was completed for each corridor individually in order to understand how each alternative within a specific corridor compared to the others within that corridor. The ultimate goal was to determine the top alternative(s) for each corridor without influence from alternatives outside of that corridor.

Because there were a different number of criteria under each goal, it was necessary for the project team to create a "balancing" factor in order to create equal weighting among the goals. Each goal was weighted based on feedback from the corridor workgroups and applied to the criteria.

4.2.5 Detailed Evaluation Scores (Matrices)

Separate evaluation matrices were developed for each of the three corridors to show the detailed evaluation scoring and rankings of the alternatives under consideration within each corridor. The final detailed alternative evaluation matrices for the North, East, and South Corridors are shown in Table 4-2 through Table 4-4. Each corridor matrix includes the specific alternative along the top row and the goals, objectives, and criteria in the first column. These final matrices include the balancing factor and the specific corridor weighting based on workgroup and Steering Committee feedback. Totals at the bottom of the tables are not intended to be true totals of the scoring because of the weighting of criteria.

The specific evaluation results of potential social and environmental impacts and the engineering constraints and utility conflicts along each preliminary alternative in the CentralOK!go corridors are provided in Section 4.3. This is followed by projected ridership in Section 4.4, and estimated capital costs and operating and maintenance costs for each alternative in Section 4.5.

Table 4-2: North Corridor Detailed Evaluation

	N1 (CR)	N2 (BRT)	N2 (LRT)	N2 (SC)	N3 (BRT)	N3 (LRT)	N3 (SC)	N7 (BRT)	N7 (SC)
Enhance Regional Connectivity/Equitable Access									
Maximize Connections Between Major Activity Centers									
Number of Activity Centers Served	0	2	2	2	2	2	2	3	3
Number of Activity Corridors Served	0	3	3	3	1	1	1	1	1
Access to Parkland & Community Facilities	0	2	2	2	1	1	1	3	3
Provide Access to Limited Mobility Populations									
Limited Mobility (Poverty + Zero Car) Station Access	0	1	1	1	1	1	1	3	3
Limited Mobility (Youths + Seniors) Station Access	2	1	1	1	1	1	1	3	3
EJ Benefit (Station Access)	0	1	1	1	0	0	0	3	3
Provide a Seamless Connection to Central OKC									
Connection to Central OKC	2	3	3	3	3	3	3	3	3
Support Economic Development/ Shape Growth									
Compatibility with Current and Future Land Use Plans									
Qualitative assessment of compatibility of high-capacity transit with existing and planned land uses and existing land use plans	3	3	3	3	2	2	2	0	0
Serve Areas with Highest Projected Population and Employment Densities									
Existing (2010) Total Population	0	3	3	3	2	2	2	1	1
Existing (2010) Population per Acre	0	2	2	2	3	3	3	1	1
Existing (2010) Total Employment	0	3	3	3	2	2	2	1	1
Existing (2010) Employment per Acre	3	1	1	1	2	2	2	0	0
Projected (2035) Total Population	0	3	3	3	2	2	2	1	1
Projected (2035) Population per Acre	0	2	2	2	3	3	3	1	1
Projected (2035) Total Employment	0	3	3	3	2	2	2	1	1
Projected (2035) Employment per Acre	3	1	1	1	2	2	2	0	0
Maximize Redevelopment and Infill Opportunities									
Economic Development Potential (Total Points)	0	1	3	3	1	3	3	0	1
Economic Development Potential (Average per Station)	2	1	3	3	1	3	3	0	1

Table 4-2: North Corridor Detailed Evaluation

	N1 (CR)	N2 (BRT)	N2 (LRT)	N2 (SC)	N3 (BRT)	N3 (LRT)	N3 (SC)	N7 (BRT)	N7 (SC)
Provide Balanced/Coordinated Multimodal System									
Maximize Ridership Potential									
Estimated Ridership	2	3	3	3	3	3	3	0	0
Ridership Threshold	1	3	1	2	3	1	2	0	0
Maximize Opportunities for Multimodal Connections									
Connections to Highways	1	1	1	1	1	1	1	0	0
Existing and Proposed Bike Facilities	0	3	3	3	3	3	3	2	2
Existing and Proposed Pedestrian Facilities	0	1	1	1	1	1	1	2	2
Reliable Service									
Dedicated ROW Percentage	3	3	3	3	3	3	3	0	0
Convenient Service									
Vehicle Capacity	3	0	1	1	0	1	1	0	1
Ability to Handle Increases in Ridership									
Latent Capacity	3	0	2	1	0	1	1	3	2
Maximize Frequency of Service									
Frequency of Service	3	3	3	3	3	3	3	3	3
Technical Feasibility									
Engineering									
Engineering Constraints	3	1	1	1	0	0	0	3	2
Major Utility Conflicts	3	1	1	1	0	0	0	2	2
ROW/Parking/Traffic Operations	2	1	1	1	0	0	0	3	2
Environmental & Social									
Historic Resources	3	1	1	1	0	0	0	2	2
EJ - Alignments	0	1	1	1	2	2	2	0	0
Hazardous Materials	2	3	0	0	2	1	1	3	2
Waters of the U.S.	2	3	3	3	1	1	1	0	0
Floodplains	3	2	2	2	2	2	2	0	0
Noise & Vibration	3	2	2	2	1	1	1	0	0
Air Quality Benefits	1	2	3	3	2	2	2	0	1

Table 4-2: North Corridor Detailed Evaluation

	N1 (CR)	N2 (BRT)	N2 (LRT)	N2 (SC)	N3 (BRT)	N3 (LRT)	N3 (SC)	N7 (BRT)	N7 (SC)
Un-Weighted									
Positives (+1)	2.3	8.9	9.2	9.2	7.2	9.0	8.2	4.8	7.6
Neutrals (0)	11.7	1.6	0.7	0.7	5.4	3.8	3.8	10.6	7.8
Negatives (-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Points	2.3	8.9	9.2	9.2	7.2	9.0	8.2	4.8	7.6
Weighted per Corridor Feedback									
Positives (+2)	5.7	21.2	22.3	22.3	17.1	21.8	19.8	11.1	17.6
Neutrals (+1)	15.0	3.3	2.1	2.1	7.9	5.9	5.9	13.8	10.5
Negatives (0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Points	20.6	24.5	24.4	24.4	25.0	27.7	25.7	24.9	28.2
Annualized* Capital Cost (in $ millions)	$9.3	$34.2	$48.7	$41.6	$40.4	$62.2	$53.3	$3.5	$37.8
Annualized* O&M Cost (in $ millions)	$3.8	$3.2	$5.3	$4.2	$3.4	$5.6	$4.5	$3.4	$4.5

* The cost per year of owning and operating an asset over its entire lifespan

Table 4-3: East Corridor Detailed Evaluation

	E1 (CR)	E1A (BRT)	E1A (SC)	E5 (BRT)	E5 (LRT)	E5 (SC)	E6 (BRT)	E6 (SC)
Enhance Regional Connectivity/Equitable Access								
Maximize Connections Between Major Activity Centers								
Number of Activity Centers Served	0	0	0	1	1	1	3	3
Number of Activity Corridors Served	0	0	0	0	0	0	3	3
Access to Parkland & Community Facilities	0	0	0	0	0	0	0	0
Provide Access to Limited Mobility Populations								
Limited Mobility (Poverty + Zero Car) Station Access	0	1	1	3	3	3	2	2
Limited Mobility (Youths + Seniors) Station Access	2	2	2	3	3	3	2	2
EJ Benefit (Station Access)	0	1	1	2	2	2	3	3
Provide a Seamless Connection to Central OKC								
Connection to Central OKC	2	2	2	3	3	3	3	3
Support Economic Development/ Shape Growth								
Compatibility with Current and Future Land Use Plans								
Qualitative assessment of compatibility of high-capacity transit with existing and planned land uses and existing land use plans	0	1	1	1	1	1	2	2
Serve Areas with Highest Projected Population and Employment Densities								
Existing (2010) Total Population	0	1	1	1	1	1	3	3
Existing (2010) Population per Acre	1	1	1	2	2	2	3	3
Existing (2010) Total Employment	0	0	0	2	2	2	3	3
Existing (2010) Employment per Acre	2	1	1	3	3	3	1	1
Projected (2035) Total Population	0	1	1	1	1	1	3	3
Projected (2035) Population per Acre	1	1	1	2	2	2	3	3
Projected (2035) Total Employment	0	0	0	2	2	2	3	3
Projected (2035) Employment per Acre	1	0	0	3	3	3	0	0
Maximize Redevelopment and Infill Opportunities								
Economic Development Potential (Total Points)	1	0	1	0	2	2	2	3
Economic Development Potential (Average per Station)	2	1	2	0	2	2	1	3

Table 4-3: East Corridor Detailed Evaluation

	E1 (CR)	E1A (BRT)	E1A (SC)	E5 (BRT)	E5 (LRT)	E5 (SC)	E6 (BRT)	E6 (SC)
Provide a Balanced/Coordinated Multimodal System								
Maximize Ridership Potential								
Estimated Ridership	3	3	3	0	0	0	0	0
Ridership Threshold	1	3	1	0	0	0	0	0
Maximize Opportunities for Multimodal Connections								
Connections to Highways	2	3	3	1	1	1	3	3
Existing and Proposed Bike Facilities	3	3	3	3	3	3	3	3
Existing and Proposed Pedestrian Facilities	0	0	0	0	0	0	1	1
Reliable Service								
Dedicated ROW Percentage	3	3	3	3	3	3	0	0
Convenient Service								
Vehicle Capacity	3	0	1	0	1	1	0	1
Ability to Handle Increases in Ridership								
Latent Capacity	3	3	1	2	2	1	3	1
Maximize Frequency of Service								
Frequency of Service	1	3	3	3	3	3	3	3
Technical Feasibility								
Engineering								
Engineering Constraints	0	3	2	2	0	1	3	3
Major Utility Conflicts	2	2	1	1	0	0	3	3
ROW/Parking/Traffic Operations	0	1	0	2	0	1	3	3
Environmental & Social								
Historic Resources	3	3	3	3	3	3	3	3
EJ - Alignments	3	2	2	1	1	1	0	0
Hazardous Materials	2	2	2	3	1	1	1	0
Waters of the U.S.	3	3	3	3	3	3	3	3
Floodplains	1	1	1	0	0	0	3	3
Noise & Vibration	3	2	2	1	1	1	0	0
Air Quality Benefits	3	3	3	0	1	1	0	2

Table 4-3: East Corridor Detailed Evaluation

	E1 (CR)	E1A (BRT)	E1A (SC)	E5 (BRT)	E5 (LRT)	E5 (SC)	E6 (BRT)	E6 (SC)
Un-Weighted								
Positives (+1)	4.8	7.9	10.2	5.8	7.3	8.7	2.8	3.0
Neutrals (0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Negatives (-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Points	4.8	7.9	10.2	5.8	7.3	8.7	2.8	3.0
Weighted per Corridor Feedback								
Positives (+1)	5.6	9.1	11.9	6.7	8.4	10.1	3.2	3.6
Neutrals (0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Negatives (-1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Points	5.6	9.1	11.9	6.7	8.4	10.1	3.2	3.6
Annualized* Capital Cost (in $ millions)	$8.8	$19.4	$22.3	$9.8	$25.5	$21.9	$3.1	$29.0
Annualized* O&M Cost (in $ millions)	$3.4	$2.6	$2.0	$2.3	$3.8	$3.0	$3.2	$4.2

* The cost per year of owning and operating an asset over its entire lifespan

Table 4-4: South Corridor Detailed Evaluation

	S1 (CR)	S2 (BRT)	S2 (SC)	S4 (BRT)	S4 (SC)
Enhance Regional Connectivity/Equitable Access					
Maximize Connections Between Major Activity Centers					
Number of Activity Centers Served	3	2	2	3	3
Number of Activity Corridors Served	1	2	2	3	3
Access to Parkland & Community Facilities	0	0	0	0	0
Provide Access to Limited Mobility Populations					
Limited Mobility (Poverty + Zero Car) Station Access	2	3	3	2	2
Limited Mobility (Youths + Seniors) Station Access	2	3	3	3	3
EJ Benefit (Station Access)	2	3	3	3	3
Provide a Seamless Connection to Central OKC					
Connection to Central OKC	1	1	1	1	1
Support Economic Development/ Shape Growth					
Compatibility with Current and Future Land Use Plans					
Qualitative assessment of compatibility of high-capacity transit with existing and planned land uses and existing land use plans	0	0	0	0	0
Serve Areas with Highest Projected Population and Employment Densities					
Existing (2010) Total Population	0	2	2	3	3
Existing (2010) Population per Acre	2	3	3	3	3
Existing (2010) Total Employment	3	2	2	2	2
Existing (2010) Employment per Acre	3	2	2	1	1
Projected (2035) Total Population	0	2	2	3	3
Projected (2035) Population per Acre	2	3	3	3	3
Projected (2035) Total Employment	3	2	2	3	3
Projected (2035) Employment per Acre	3	2	2	1	1
Maximize Redevelopment and Infill Opportunities					
Economic Development Potential (Total Points)	0	1	2	1	3
Economic Development Potential (Average per Station)	1	0	3	0	2

Table 4-4: South Corridor Detailed Evaluation

	S1 (CR)	S2 (BRT)	S2 (SC)	S4 (BRT)	S4 (SC)
Provide a Balanced/Coordinated Multimodal System					
Maximize Ridership Potential					
Estimated Ridership	0	2	2	3	3
Ridership Threshold	2	3	2	3	2
Maximize Opportunities for Multimodal Connections					
Connections to Highways	0	2	2	3	3
Existing and Proposed Bike Facilities	2	1	1	3	3
Existing and Proposed Pedestrian Facilities	1	0	0	0	0
Reliable Service					
Dedicated ROW Percentage	3	3	3	3	3
Convenient Service					
Vehicle Capacity	3	0	1	0	1
Ability to Handle Increases in Ridership					
Latent Capacity	3	1	2	0	1
Maximize Frequency of Service					
Frequency of Service	3	3	3	3	3
Technical Feasibility					
Engineering					
Engineering Constraints	3	0	0	1	1
Major Utility Conflicts	3	1	1	0	0
ROW/Parking/Traffic Operations	3	1	1	0	0
Environmental & Social					
Historic Resources	3	2	2	3	3
EJ - Alignments	0	1	1	2	2
Hazardous Materials	1	3	0	2	0
Waters of the U.S.	3	3	3	3	3
Floodplains	3	0	0	1	1
Noise & Vibration	3	1	1	0	0
Air Quality Benefits	0	1	1	2	3

Table 4-4: South Corridor Detailed Evaluation

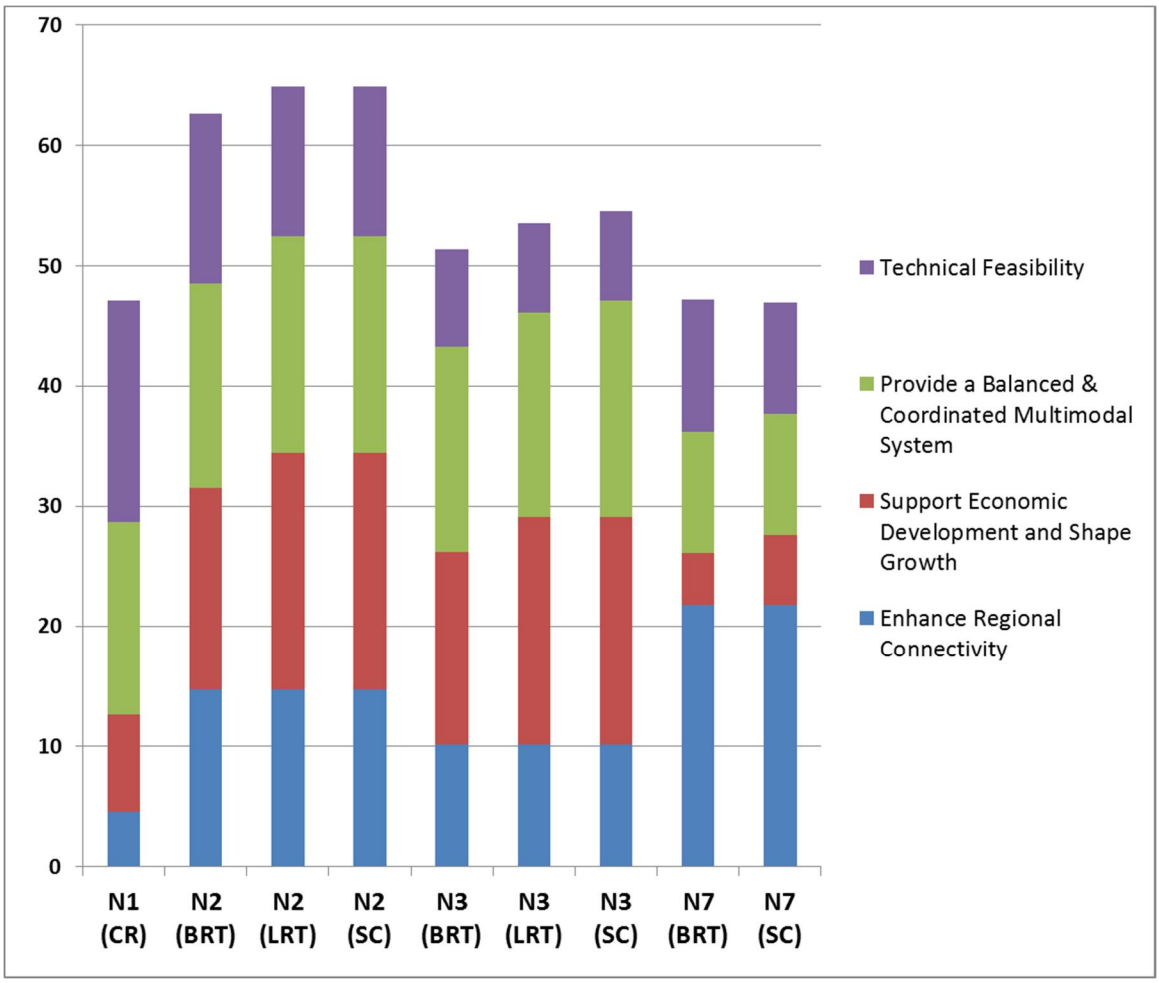
	S1 (CR)	S2 (BRT)	S2 (SC)	S4 (BRT)	S4 (SC)
Un-Weighted					
Positives (+1)	4.1	6.7	6.1	3.6	4.5
Neutrals (0)	0.0	0.0	0.0	0.0	0.0
Negatives (-1)	0.0	0.0	0.0	0.0	0.0
Total Points	4.1	6.7	6.1	3.6	4.5
Weighted per Corridor Feedback					
Positives (+1)	5.2	7.9	7.1	4.5	5.5
Neutrals (0)	0.0	0.0	0.0	0.0	0.0
Negatives (-1)	0.0	0.0	0.0	0.0	0.0
Total Points	5.2	7.9	7.1	4.5	5.5
Annualized* Capital Cost (in $ millions)	$11.4	$34.2	$43.5	$40.6	$57.3
Annualized* O&M Cost (in $ millions)	$5.3	$3.4	$4.5	$3.4	$4.5

* The cost per year of owning and operating an asset over its entire lifespan

North Corridor Detailed Evaluation Results

The detailed evaluation results for the North Corridor's nine alternatives under consideration (four alignments plus mode combinations) are shown in Figure 4-4.

Figure 4-4: North Corridor – Detailed Alternative Evaluation Results

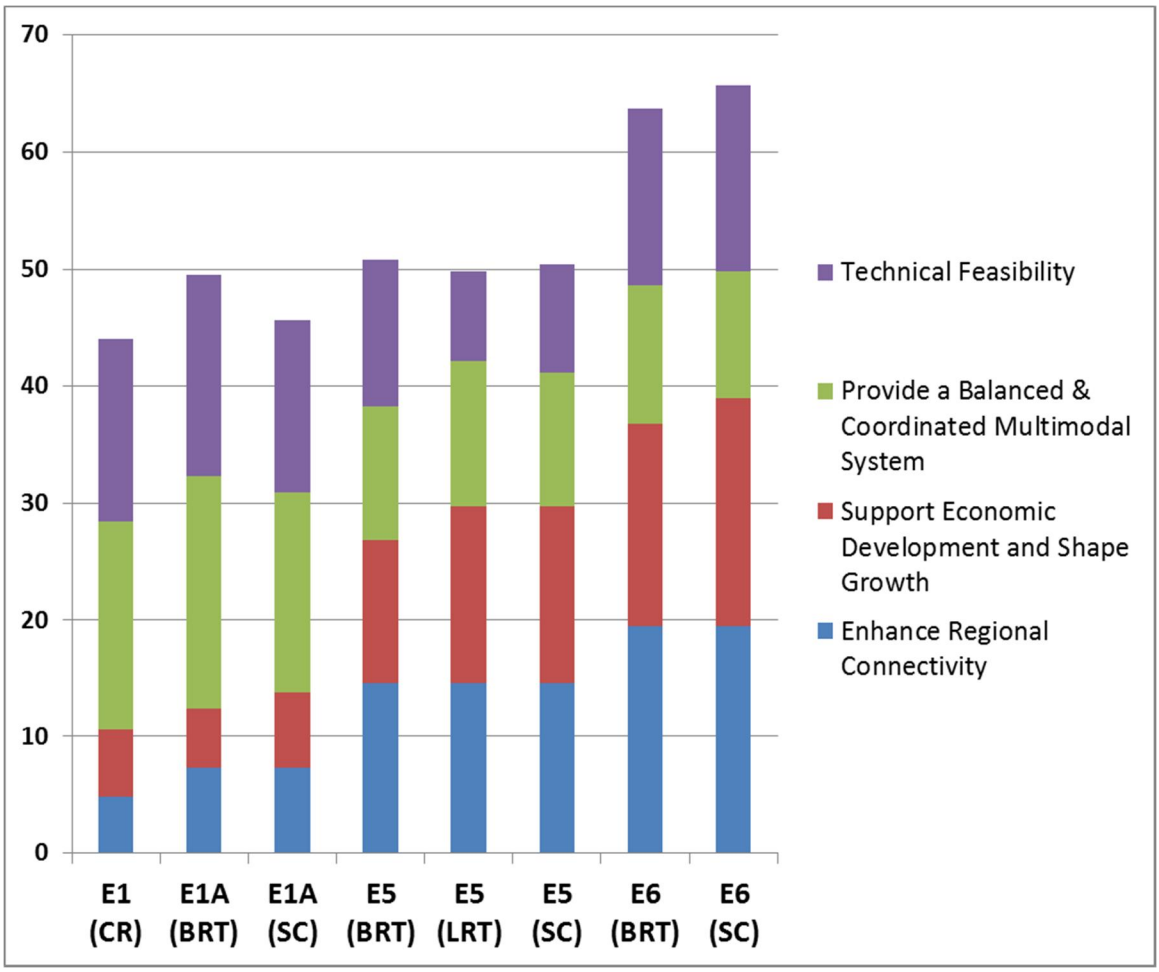


The results of the detailed evaluation of alternatives in the North Corridor have point totals varying from 47 to 65 total points. Based on the detailed analysis, Alternatives N1 (Commuter Rail) and N7 (BRT or Streetcar) score the lowest while Alternative N2 (LRT or Streetcar) scores the highest. Alternative N2 (all modes) stands out among the alternatives, with all of the other alternatives receiving fairly similar total scores. Alternative N2 provides the best connection to activity centers and activity corridors, serves the areas with the highest population and employment densities, and traverses areas with the highest economic development potential.

East Corridor Detailed Evaluation Results

The detailed evaluation results for the eight alternatives under consideration in the East Corridor (four alignments plus mode combinations) are shown in Figure 4-5.

Figure 4-5: East Corridor – Detailed Alternative Evaluation Results

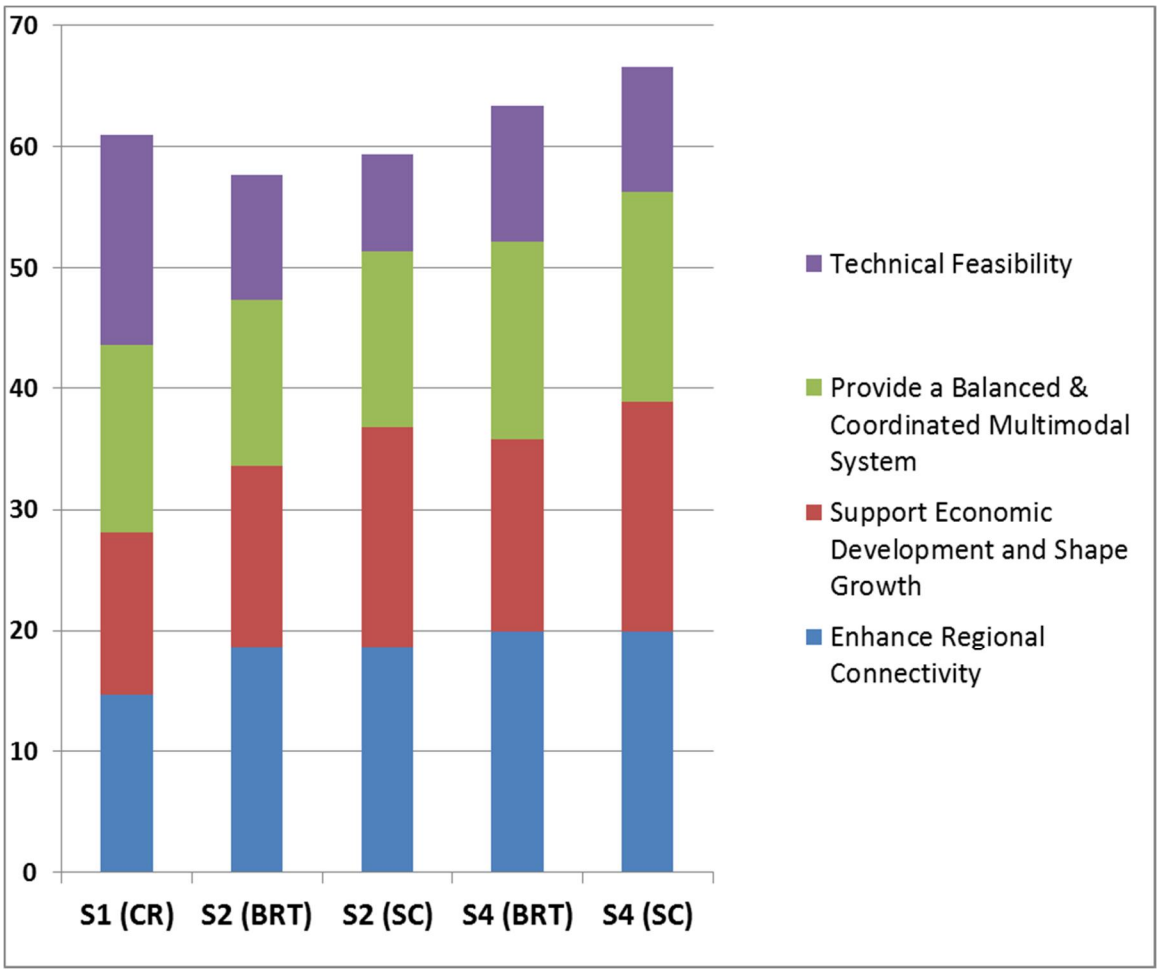


The results of the detailed evaluation of alternatives in the East Corridor show point totals ranging from 44 to 66 total points. Based on the detailed analysis, Alternative E1 (Commuter Rail) scores the lowest while Alternative E6 (Streetcar) scores the highest. Alternative E6 (using either Streetcar or BRT) stands out among the alternatives, with all of the other alternatives receiving similar total scores. The overarching reason for this disparity is that Alternative E6 provides the best connection of activity centers and corridors, serves the areas with the highest population and employment densities, and traverses areas with the highest economic development potential.

South Corridor Detailed Evaluation Results

The detailed evaluation results for the South Corridor's five alternatives under consideration (three alignments plus mode combinations) are shown in Figure 4-6.

Figure 4-6: South Corridor – Detailed Alternative Evaluation Results



The detailed evaluation of the South Corridor resulted in similar total scores for each of the alternatives under consideration, with point totals varying from 58 points to 67 points. Alternative S2 (BRT) scored the lowest of all of the South Corridor alternatives, while Alternative S4 (Streetcar) scored the highest. However, due to the low variability in total scores, all of the South Corridor alternatives would be viable alternatives from a detailed technical analysis perspective.

4.3 Potential Social and Environmental Benefits and Impacts

4.3.1 Introduction

This section includes an evaluation of potential social and environmental impacts and the engineering constraints and utility conflicts along each preliminary alternative in the CentralOK!go corridors.

General observations of the engineering constraints and utility conflicts are presented; the next phase in the project development process will include engineering design and a more thorough review of environmental constraints.

The social and environmental impacts evaluation focused on the preliminary alignments identified for detailed evaluation and the associated potential station locations. This desktop analysis is designed to identify environmental characteristics that could be impacted from the proposed corridor alternatives and stations and is a review of readily available data from federal, state, and local agencies. The environmental characteristics that are identified and researched for the proposed alternatives and stations are attributes that would be further evaluated through the National Environmental Policy Act (NEPA) process if federal funding was identified for the project. This analysis did not include the distribution of solicitation letters, investigations and/or laboratory analysis of any samples, or the preparation of environmental documentation in accordance with the NEPA process.

The results of the social and environmental analyses were integrated into the detailed evaluation matrices for each of the three corridors, providing 11 of the 37 total criteria used in the detailed evaluation of alternatives phase of CentralOK!go. Populations with limited mobility and EJ station access and access to parkland and community facilities criteria were considered in the *Enhance Regional Connectivity* set of criteria. The rest of the social and environmental criteria were included in the technical feasibility portion of the detailed evaluation of alternatives matrices.

The following assumptions were made for each alternative:

North Corridor

- N1: Commuter rail – Construction of parallel tracks within or parallel and adjacent to the existing railroad ROW would be possible
- N2: Light rail transit (LRT), streetcar, BRT – The alternative would be constructed as a dedicated guideway
- N3: LRT, streetcar, BRT – The alternative would be constructed as a dedicated guideway
- N7: BRT – The alternative would run in the existing road ROW and not require construction of additional infrastructure

East Corridor

- E1: Commuter Rail – Construction of track from the elevated BNSF tracks to Lincoln Boulevard along the partially abandoned ROW, upgrade of the existing UP tracks from Lincoln Boulevard to Sunnylane, construction of track along the abandoned ROW from Sunnylane to east of Midwest Boulevard, construction of track along new ROW from the abandoned ROW to SE 29th Street
- E1A: Streetcar, BRT – The alternative would run in the existing road and the abandoned railroad ROW and construction of new track would be required for the streetcar alternative.
- E5: LRT, Streetcar, BRT – Construction of a new river bridge and approaches south of NE 10th Street and west of Sunnylane Road, construction of a new guideway through UP tracks at Sunnylane Road, construction of a new guideway along the abandoned ROW from Sunnylane

Road to east of Midwest Boulevard, construction of guideway along new ROW from the abandoned ROW to SE 29th Street

- E6: BRT – The alternative would run in the existing road ROW and would not require the construction of additional infrastructure

South Corridor

- S1 – Commuter Rail – Construction of parallel tracks within or parallel and adjacent to the existing railroad ROW would be possible
- S2: LRT, Streetcar, BRT – Construction of dedicated guideways along the corridor would be needed
- S4: LRT, Streetcar, BRT – Construction of dedicated guideways along the corridor would be needed

4.3.2 Social and Environmental Evaluation Criteria

Eight different environmental and social resource areas were evaluated including:

1. Air Quality
2. Cultural Resources
3. Parkland and Community Facilities
4. Water Resources
5. Access for Populations with Limited Mobility
6. Environmental Justice
7. Noise and Vibration
8. Hazardous Waste

A brief description of the analysis criteria used to evaluate the eight resource areas including data source are included below.

1. Air Quality – Quantitative assessment of the reduction in air emissions as a result of the implementation of each alternative – the higher the reduction in air emissions, the higher the ranking. The assessment is based on change in Vehicle Miles Traveled (VMT) from No Build to the Build conditions.
2. Cultural Resources – National Register of Historic Places (NRHP) within 150 feet on either side of each alternative alignment and 300 foot radius of each station. This data was provided by Oklahoma State University (OSU) and the Oklahoma State Historic Preservation Office (SHPO).
3. Parkland and Community Facilities – Identified parks and community facilities (museums, YMCAs, libraries, community centers) within a quarter-mile radius of each station. This data was obtained from city websites and internet research.
4. Water Resources – Identified the linear footage of floodplain that each alternative alignment crosses. This data was obtained from the Federal Emergency Management Agency's (FEMA) National Flood Hazard Geographic Information System (GIS). Identified the linear footage of wetland that each alternative alignment crosses. This information was obtained from the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). Identified waters of the U.S. (rivers, streams, and bodies of water) that each alternative alignment crosses. This data was obtained from U.S. Geological Survey (USGS) topographic maps.
5. Access for populations with limited mobility – Quantitative assessment of the percentage of the population within one-half mile of each alternative's stations that have limited mobility; therefore, the higher the percentage of populations with limited mobility within the station areas, the higher the ranking for the alternative. Populations with limited mobility were divided

into two criteria, Poverty + Zero Car Households and Youths (under the age of 18) + Seniors (over the age of 65). The project team first identified populations with limited mobility within a quarter-mile of each station then identified the number of trips by limited mobility populations for each alternative alignment and the number of linked trips. This data was obtained from U.S. Census Bureau.

6. Environmental Justice – Defined by the Environmental Protection Agency [EPA] as "the fair treatment and meaningful involvement of all people regardless of race, color, sex, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." Identified the number of Environmental Justice Census Blocks (EJBs) within each corridor and identified the following:
   - ✓ Number of EJBs within 150 feet of either side of the alignment alternatives and a quarter-mile radius of each station
   - ✓ Number of EJBs that are 50% or more below poverty level within 150 feet of either side of the alignment alternatives and a quarter-mile radius of each station
   - ✓ Number of EJBs that are 10% greater than the average within 150 feet of either side of the alignment alternatives and a quarter-mile radius of each station
   - ✓ Number EJBs that are 1% greater than the national unemployment rate (7.3%) within 150 feet of either side of the alignment alternatives and a quarter-mile radius of each station
   - ✓ This data was obtained from U.S. Census Bureau.
7. Noise and Vibration – Identified the number of sensitive receptors (hospitals, parklands, public libraries, churches, childcare facilities, retirement centers, schools, TV and radio stations) within 150 feet of either side of the alignment alternatives. This data was obtained from city websites and Google Earth.
8. Hazardous Waste – Identified the number of existing hazardous waste sites within 150 feet of either side of the alignment alternatives or a quarter-mile radius of each station. The types of sites evaluated included: National Priority List (NPL); Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS); Resource Conservation and Recovery Act (RCRA); Treatment, Storage, and Disposal Facility (TSDF); Engineering Control Sites, Institutional Control Sites, Emergency Response Notification System (ERNS); Hazardous Materials Information Reporting Systems (HMIRS); Department of Transportation data of Incidents and Accidents; Clandestine Drug Labs, Brownfields sites, Records of Decision (ROD); Mines Master Index File; Toxic Chemical Release Inventory System (TRIS); PCB Activity Database System (PADS); Risk Management Plans; Dry cleaners; Voluntary Cleanup & Superfund Sites; Permitted Solid Waste Disposal and Processing Facilities; Underground Injection Wells Database; Leaking Underground Storage Tanks (LUSTs); Underground Storage Tanks (USTs); Leaking Aboveground Storage Tanks (LASTs); and Aboveground Storage Tanks (ASTs). This data was obtained from a commercial database supplied by Environmental Data Resources, Inc.

4.3.3 North Corridor

Air Quality

The results of the analysis indicate that for the North Corridor, Alternatives N2 (LRT), N2 (Streetcar), N3 (LRT), and N3 (Streetcar) would have the highest reduction in emissions and therefore the highest rankings. Alternatives N2 (BRT) and N3 (BRT) would result in the second highest reduction in emissions, followed by a precipitous drop-off for Alternative N1 (Commuter Rail), another large drop-off for N7 (Streetcar) and lastly N7 (BRT).

Cultural Resources

The results from the analysis identified that Alternative N3 has the highest number of cultural sites within the North Corridor; therefore, the highest potential impact to cultural sites. Alternative N1 has the lowest number of cultural sites within the study area. Construction would occur along alternatives N1, N2, and N3; therefore, there is potential for impacts to the cultural sites along these alternative alignments. Table 4-5 presents the results for cultural resources for the North Corridor.

Table 4-5: Cultural Resources Results for the North Corridor

	N1 (Rail)	N2	N3	N7
Cultural Resources (Both Alignment & Stations)	3	7	8	4

Source: Guernsey, 2014

Parkland and Community Facilities

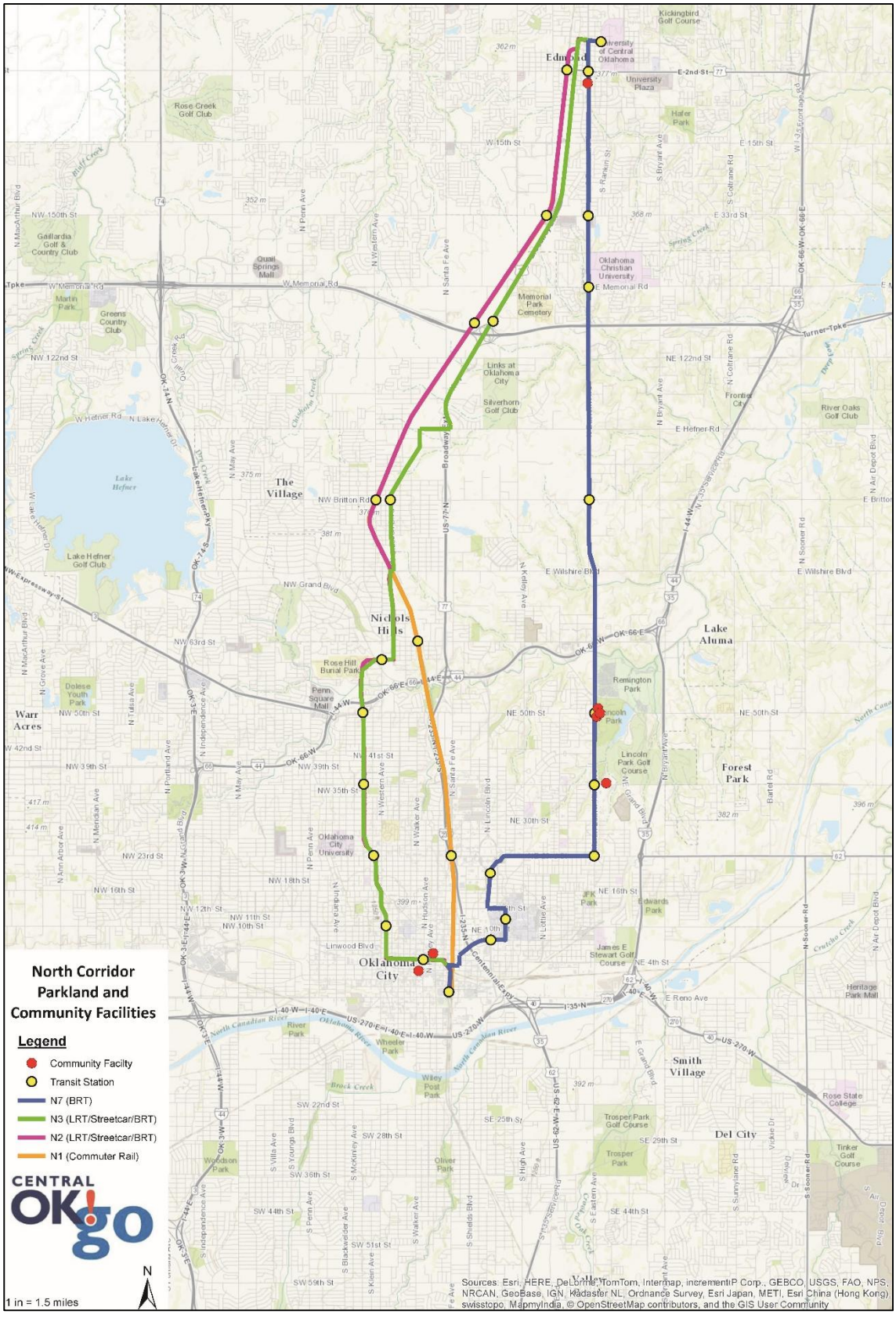
The analysis for parkland and community facilities near the stations identified NE 50th Street and Martin Luther King Avenue (MLK), along Alternative N7, as having the highest number of facilities within the corridor, while 19 of the stations in the corridor do not have any facilities. There would be construction activities associated with all the stations. Table 4-6 presents the results for parkland and community facilities, and Figure 4-7 presents the parkland and community facility sites and proposed stations for the North Corridor alignments.

Table 4-6: Parkland and Community Results for the North Corridor

Stations	Parklands / Community Facilities
Ayers & University	0
2nd & BNSF	1
2nd & Boulevard	1
33rd & BNSF	0
33rd & Boulevard	0
Memorial and Eastern	0
Kilpatrick and Broadway	0
Kilpatrick and BNSF	0
Britton & BNSF	0
Britton & Classen	0
Britton & Eastern	0
Western & Classen	0
NW 63rd & BNSF	0
NE 50th & MLK	3
NW 50th & Classen	1
NE 36th & MLK	1
NW 36th & Classen	0
NW 23rd & Classen	0
NW 23rd & BNSF	0
NE 23rd & MLK	0
State Capitol	0
NW 10th & Classen	0
NW 4th & Hudson	2
Stanton L. Young Boulevard & Phillips	0
NE 8th & Lincoln	0
Santa Fe Station	0

Source: Guernsey, 2014

Figure 4-7: Parkland and Community Facilities Results for the North Corridor



Water Resources

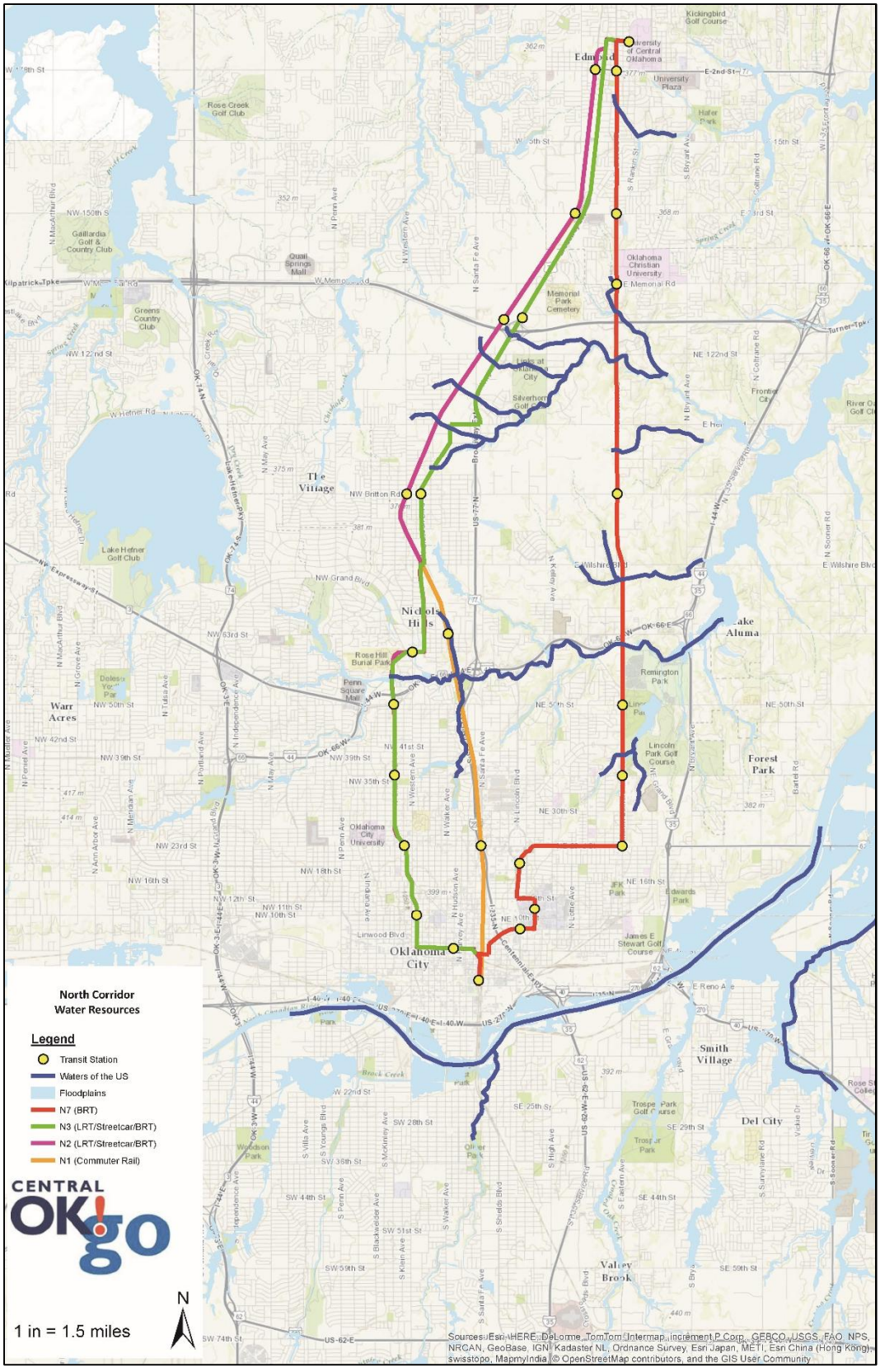
The results from the water resources analysis identified that Alternative N7 has the most water crossings and also has the highest linear footage of floodplain impact; therefore, Alternative N7 has the highest potential impact to water resources (floodplains and waters of the U.S.). Alternative N2 has the least number of water crossings and linear footage of floodplain impact. Construction would occur along Alternatives N1, N2, and N3; therefore, there is low potential for impacts to the water resources along these alternatives. Table 4-7 presents the results for water resources and Figure 4-8 shows the water resources and the alternative alignments for the North Corridor.

Table 4-7: Water Resources Results for the North Corridor

	N1 (Rail)	N2	N3	N7
Floodplains (linear feet)	200	240	240	1,930
Wetlands (linear feet)	0	0	0	0
Waters of the U.S.	5	4	6	7

Source: Guernsey, 2014

Figure 4-8: Water Resources Results for the North Corridor



Access for Populations with Limited Mobility

The results for the Poverty + Zero Car Households criterion show that Alternative N7 (BRT and Streetcar) serves the highest percentage of populations with limited mobility, resulting in the highest ranking among North Corridor alternatives. Alternatives N2 (LRT, Streetcar, BRT) and N3 (LRT, Streetcar, BRT) followed with both of these alternatives receiving the same score. The lowest scoring alternative in the North Corridor was Alternative N1 (Commuter Rail) which served the lowest percentage of populations with limited mobility and therefore ranked last among the alternatives. Figure 4-9 illustrates the Poverty + Zero Car Household for the North Corridor.

The results for the Youths + Seniors criterion show that Alternative N7 (Streetcar or BRT) serves the highest percentage of populations with limited mobility, resulting in the highest ranking among North Corridor alternatives. Alternative N1 (Commuter Rail) ranked second among alternatives, and Alternatives N2 (LRT, Streetcar, BRT) and N3 (LRT, Streetcar, BRT) ranked last among alternatives, with both of these alternatives receiving the same score. Figure 4-10 shows the populations with limited mobility youth and seniors for the North Corridor.

Figure 4-9: Limited Mobility Populations Poverty + Zero Car Households for the North Corridor

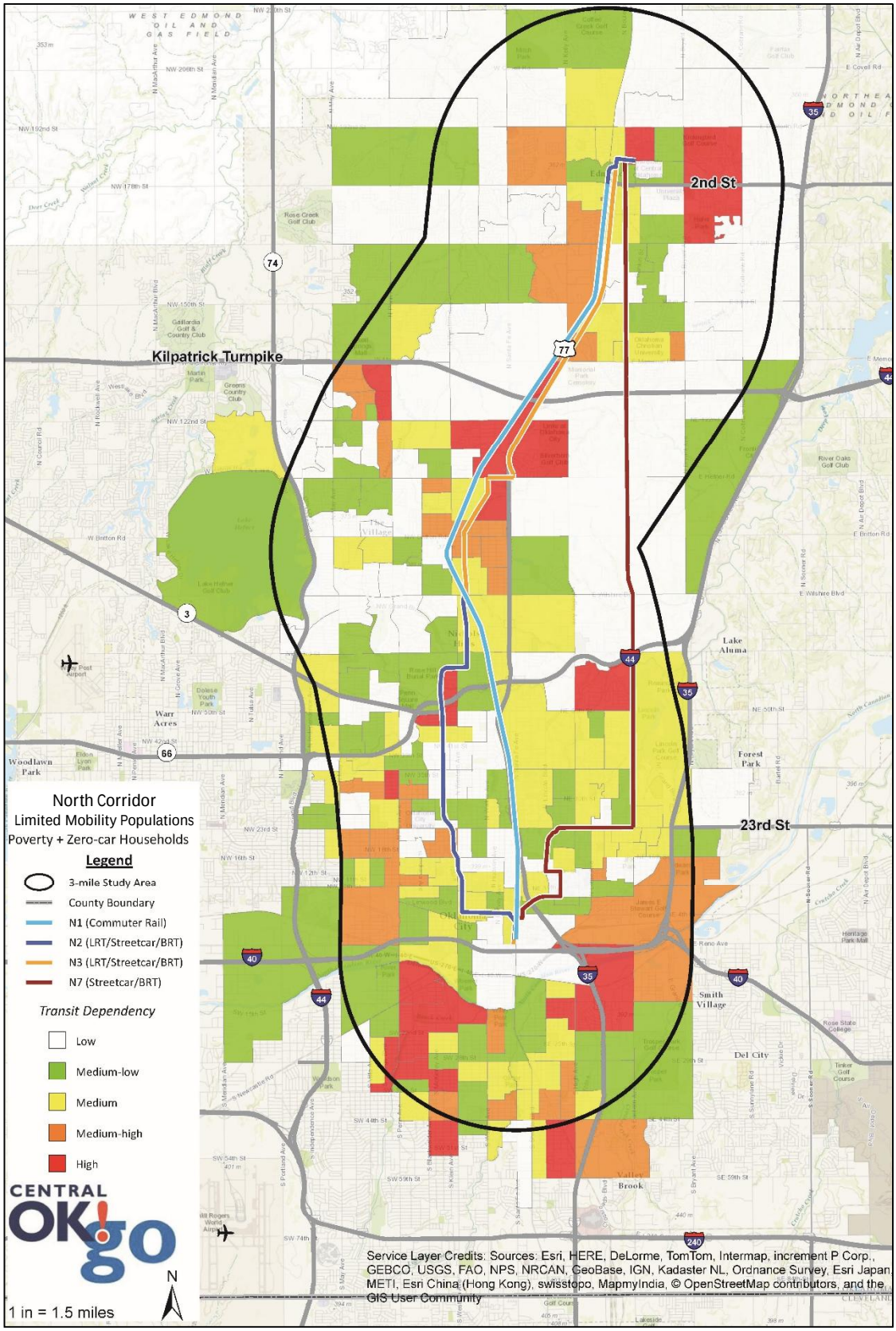
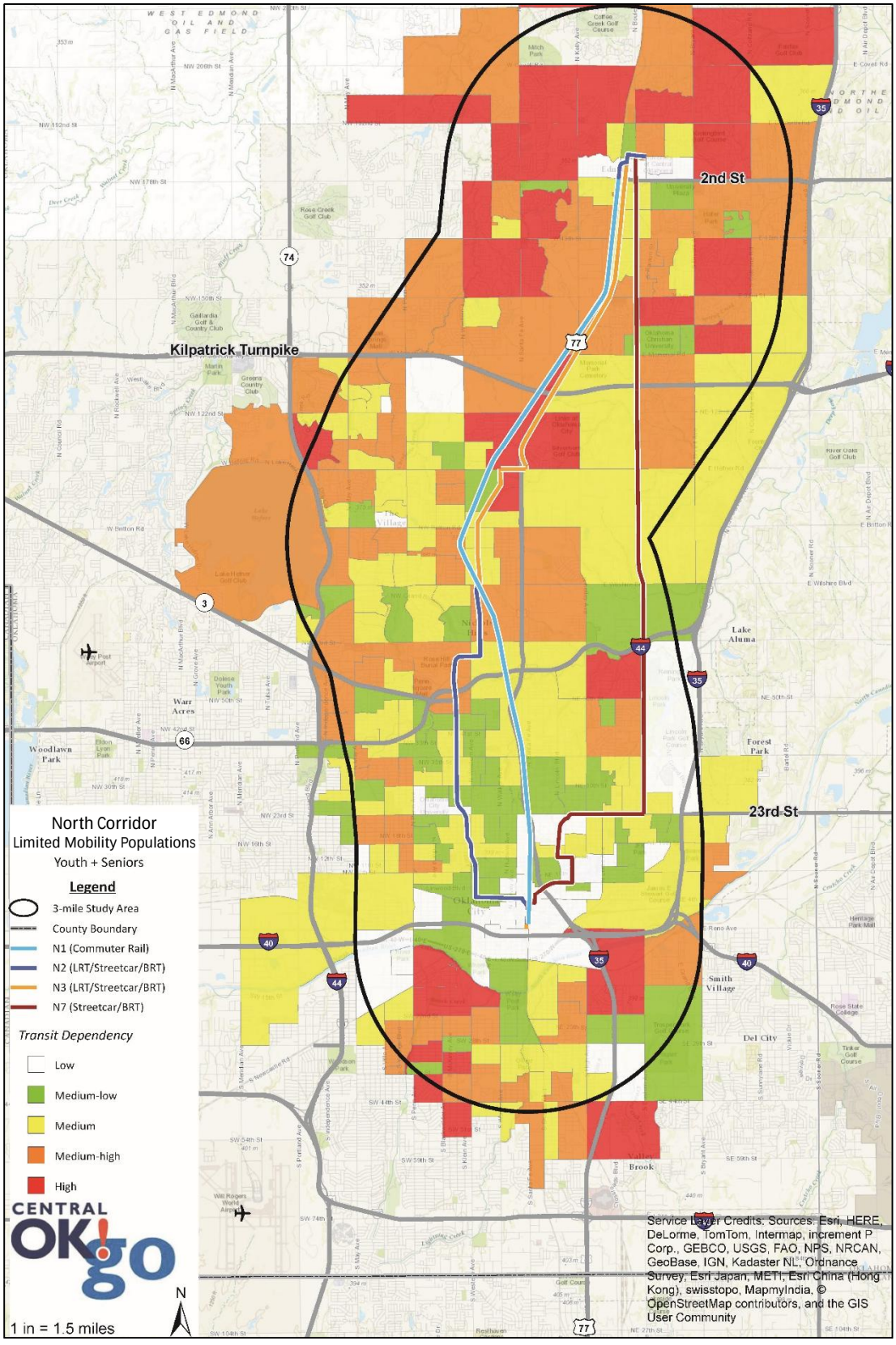


Figure 4-10: Limited Mobility Populations Youth + Seniors for the North Corridor



Environmental Justice

The evaluation identified that the North Corridor has the highest number of environmental justice blocks (EJBs) within the overall study area. Alternative N2 had the highest number of EJBs within the corridor, while Alternative N1 had the fewest. The stations along Alternative N7 have the highest number of EJBs that are 50% or more below poverty, 10% greater than the average, and 1% greater than the national unemployment rate, which is a positive impact for the communities in the study area. The station areas along Alternative N7 have the highest number of EJBs, and if built these EJB communities would receive an increase, or improvement, in mobility due to their proximity to the stations. While the alignment for Alternative N2 has the highest number of EJBs that are 50% or more below poverty, Alternative N1 has the highest number of EJBs that are 10% greater than the average, and Alternative N7 has the highest number of EJBs that are 1% greater than the national unemployment rate. This would be a negative impact for Alternatives N2, N1, and N7. Table 4-8 presents the results for environmental justice and Figure 4-11 illustrates the EJBs in relation to the alternative alignments and proposed stations for the North Corridor.

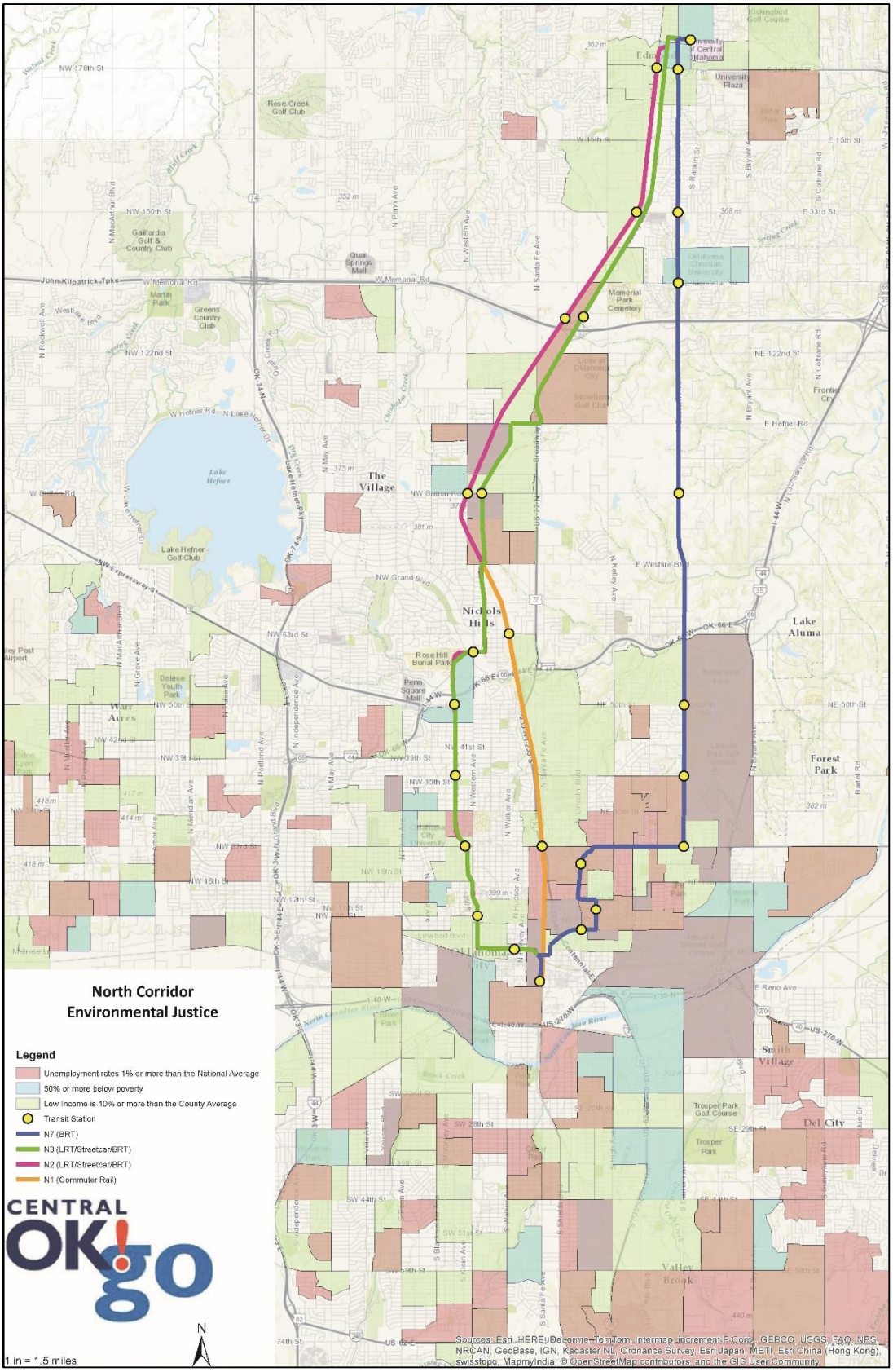
Table 4-8: Environmental Justice Results for the North Corridor

Corridor	Environmental Justice (Block Groups)
North	243

Environmental Justice (Block Groups)	N1 (Rail)		N2		N3		N7	
	34		41		36		38	
	Positive (+)	Negative (-)	Negative (-)	Negative (-)	Positive (+)	Positive (+)	Positive (+)	Negative (-)
Environmental Justice (Block Groups – 50% or more below poverty)	5	2	2	1	4	6	3	3
Environmental Justice (Block Groups – 10% greater than the average)	8	8	10	13	8	13	12	10
Environmental Justice (Block Groups – 1% greater than national unemployment rate [7.3%])	1	9	4	6	2	6	1	5

Source: Guernsey, 2014

Figure 4-11: Environmental Justice for the North Corridor



Noise and Vibration

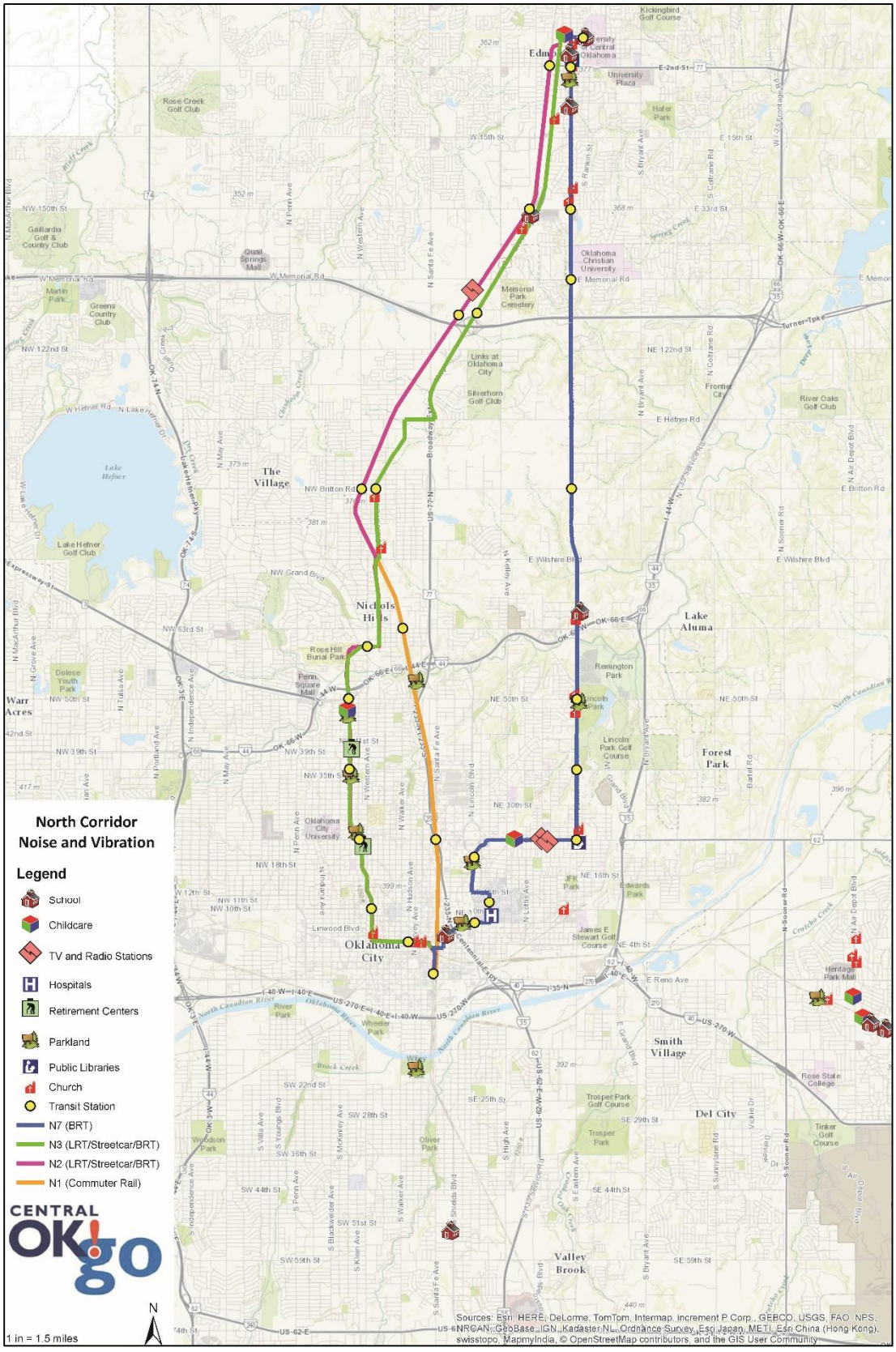
The results for this evaluation identified that Alternative N7 has the highest number of sensitive receptors for noise and vibration within the study area; therefore, Alternative N7 has the highest potential impact to these sites. Alternative N1 has the lowest number of noise and vibration sites within the study area. Table 4-9 presents the results for noise and vibration and Figure 4-12 shows the facilities near the alternative alignments and proposed stations for the North Corridor.

Table 4-9: Noise and Vibration Results for the North Corridor

	N1 (Rail)	N2	N3	N7
Hospitals	0	0	0	1
Parkland	1	3	4	3
Public Library	0	0	1	2
Churches	1	4	7	9
Childcare	0	2	2	1
Retirement Center	0	2	2	0
Schools	1	2	3	5
TV & Radio Stations	1	1	0	2
Total	4	14	19	23

Source: Guernsey, 2014

Figure 4-12: Noise and Vibration Results for the North Corridor



Hazardous Waste

The results for the hazardous waste evaluation identified that Alternative N7 has the highest number of hazardous waste sites within the North Corridor; therefore, it has the highest potential impact. Alternative N2 has the least number of hazardous waste sites within the corridor. Table 4-10 presents the results for hazardous waste and Figure 4-13 shows these facilities and the alternative alignments and proposed stations for the North Corridor.

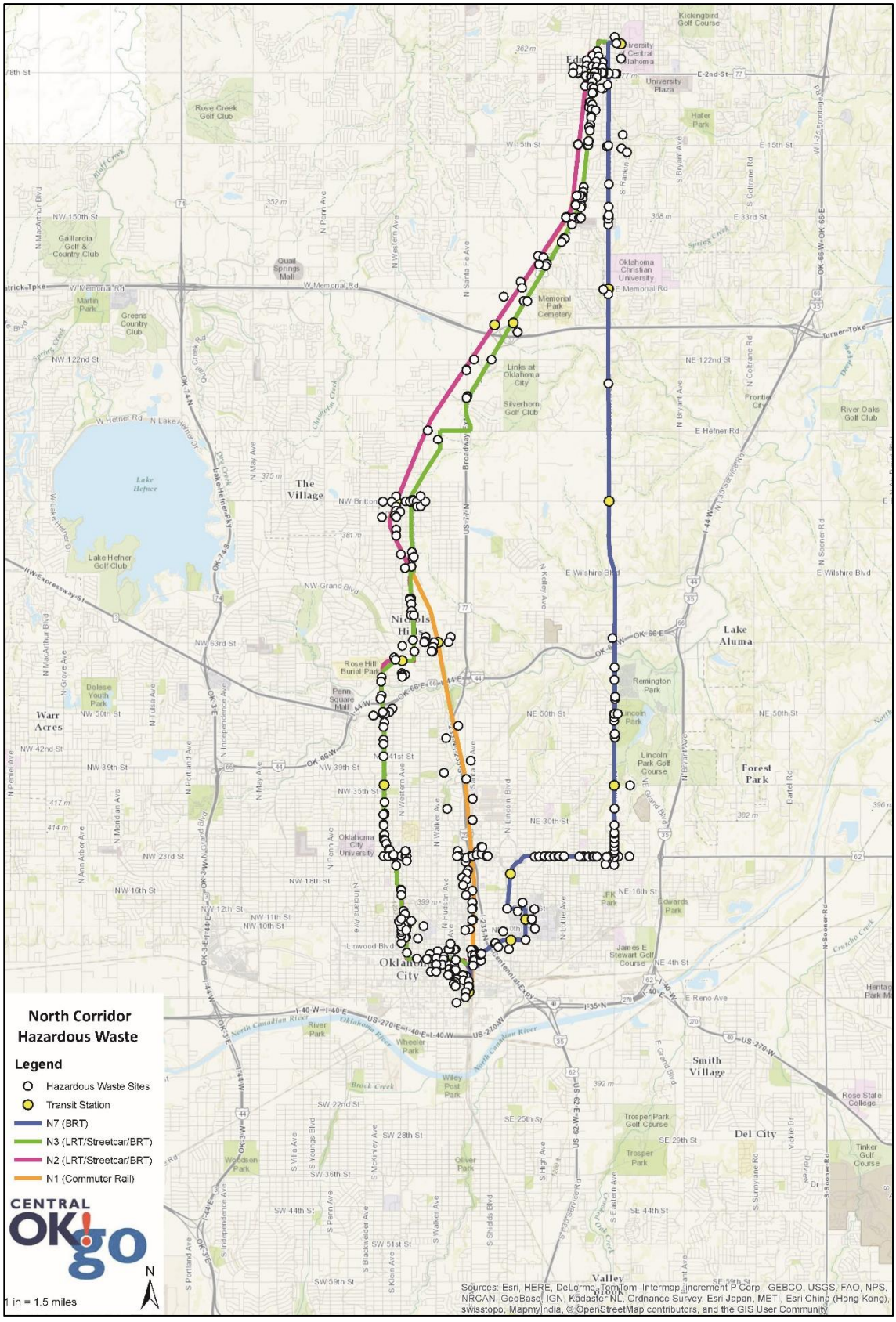
Table 4-10: Hazardous Waste Results for the North Corridor

	N1 (Rail)	N2	N3	N7
Hazardous Waste (Alignments)	63	76	85	55
Hazardous Waste (Stations Combined per Alignment)	102	158	119	93

Hazardous Waste (Stations)	Hazardous Waste Sites
Ayers & University	4
2nd & BNSF	31
2nd & Boulevard	22
33rd & BNSF	10
33rd & Boulevard	5
Memorial and Eastern	2
Kilpatrick and Broadway	1
Kilpatrick and BNSF	0
Britton & BNSF	13
Britton & Classen	14
Britton & Eastern	0
Western & Classen	9
NW 63rd & BNSF	11
NE 50th & MLK	6
NW 50th & Classen	9
NE 36th & MLK	1
NW 36th & Classen	1
NW 23rd & Classen	16
NW 23rd & BNSF	18
NE 23rd & MLK	17
State Capitol	0
NW 10th & Classen	16
NW 4th & Hudson	30
Stanton L. young Boulevard & Phillips	7
NE 8th & Lincoln	10
Santa Fe Station	19

Source: Guernsey, 2014

Figure 4-13: Hazardous Waste Results for the North Corridor



4.3.4 East Corridor

As was noted previously, Alternative E1A was developed after much of the detailed analysis was completed (including potential social and environmental benefits and impacts) as an attempt to improve upon Alternative E1. Because these alignments use similar routing, it was believed at this stage in the project that there were no fatal flaws and all potential impacts would be mitigated. Therefore, the potential impacts identified for Alternative E1 are also potential impacts for Alternative E1A.

Air Quality

The results of the air quality benefits analysis indicate that for the East Corridor, Alternatives E1 (Commuter Rail), E1A (Streetcar), and E1A (BRT) would have the highest reduction in emissions and therefore the highest rankings followed by Alternative E6 (Streetcar) with the second highest reduction. These alternatives are followed by Alternatives E5 (LRT and Streetcar) which would result in the third highest reduction in emissions, followed by a precipitous drop-off for Alternative E6 (BRT) and another large drop-off for Alternative E5 (BRT) which would actually result in an increase in air emissions.

Cultural Resources

The results from the analysis identified Alternatives E1, E5, and E6 with one cultural resource site each within the East Corridor. Construction would occur along Alternatives E1 and E5; therefore, there is potential for impacts to the cultural sites along these alternatives. Table 4-11 presents the results for cultural resources for the East Corridor.

Table 4-11: Cultural Resources for the East Corridor

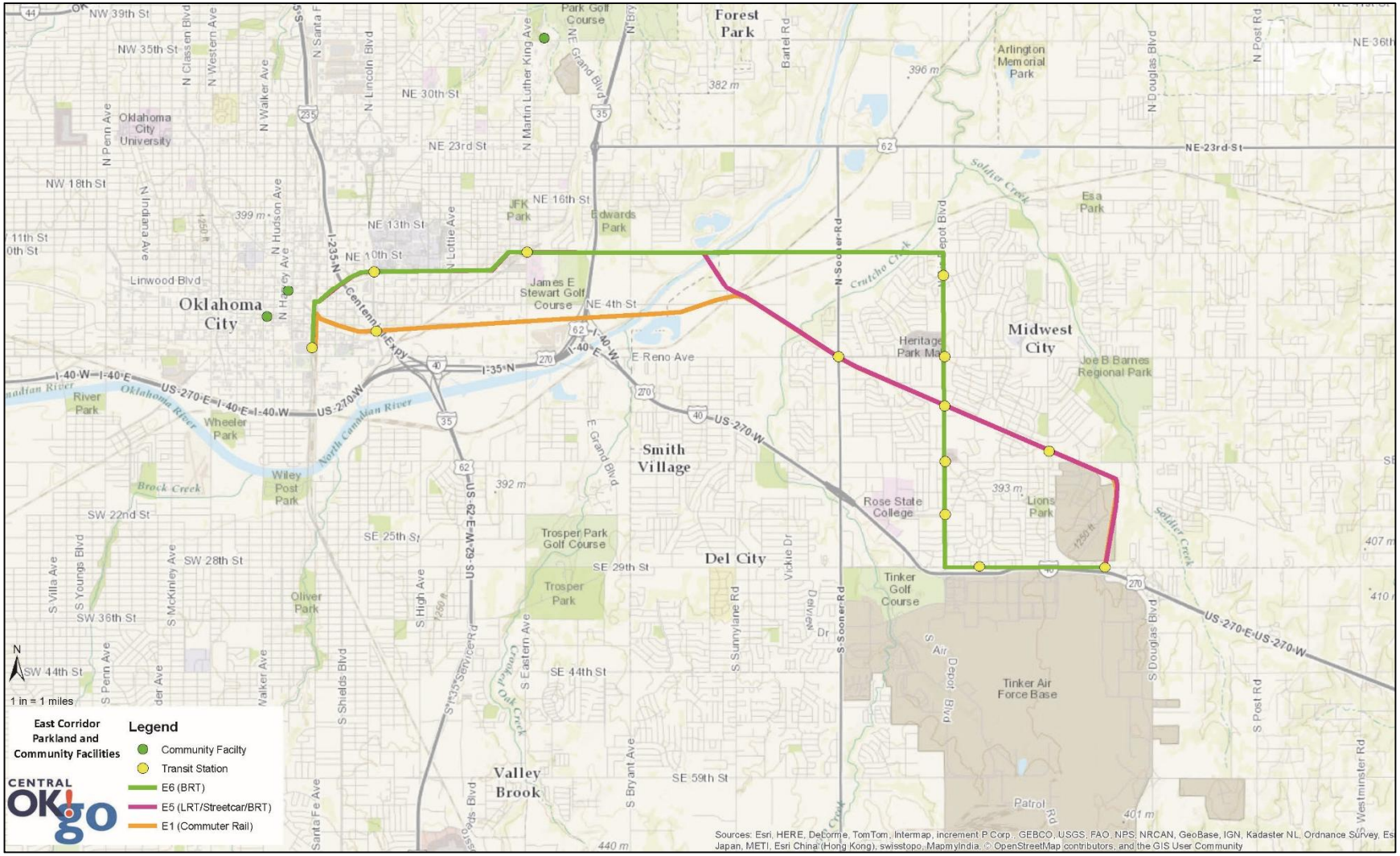
	E1 (Rail)	E1A	E5	E6
Cultural Resources (Both Alignment & Stations)	1	1	1	1

Source: Guernsey, 2014

Parkland and Community Facilities

The analysis for parkland and community facilities within the East Corridor did not indicate any of these types of facilities within the study area, as illustrated in Figure 4-14.

Figure 4-14: Parkland and Community Facilities Results for the East Corridor



Water Resources

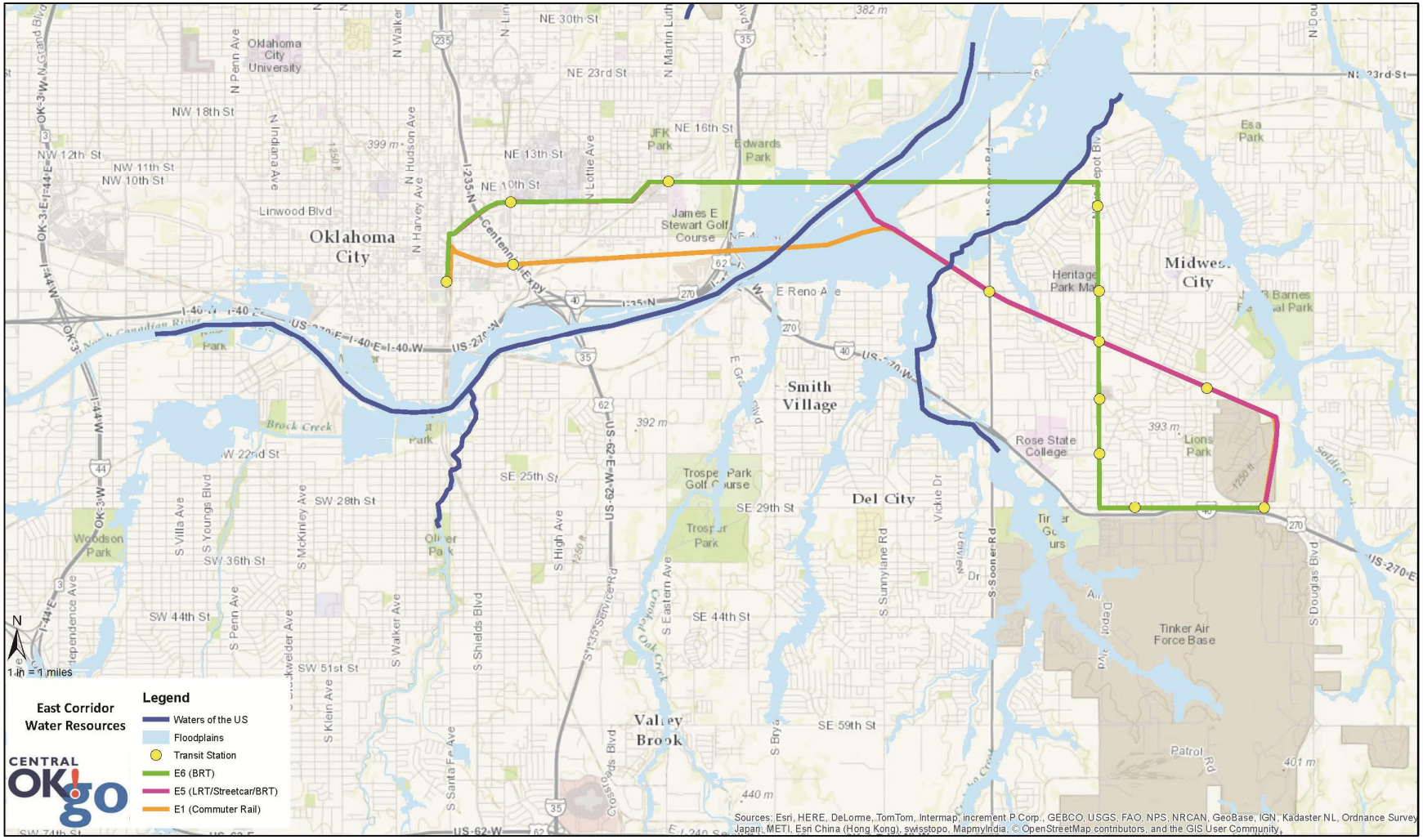
The results from the water resources analysis identified that Alternative E5 has the highest linear footage of floodplain impact. All the alternative alignments have two crossings of waters of the U.S. Therefore, Alternative E5 has the highest potential impact to water resources (floodplains and water of the U.S.). Alternative E6 has the least linear footage of floodplain impact. Construction would occur along Alternatives E1 and E5; therefore, there is high potential for impacts to the water resources along these alternatives. Table 4-12 presents the results for water resources for the East corridor and Figure 4-15 shows the Water Resources and the alternative alignments for the East Corridor.

Table 4-12: Water Resources for the East Corridor

	E1 (Rail)	E1A	E5	E6
Floodplains (linear feet)	4,885	4,885	5,710	3,305
Wetlands (linear feet)	0	0	0	0
Waters of the U.S.	2	2	2	2

Source: Guernsey, 2014

Figure 4-15: Water Resources for the East Corridor



Access for Populations with Limited Mobility

The results for the Poverty + Zero Car Households criterion show that Alternative E5 (LRT, BRT, or Streetcar) serves the highest percentage of populations with limited mobility, resulting in the highest ranking among East Corridor alternatives. Alternative E6 (Streetcar or BRT) ranked second among alternatives in the East Corridor, followed by Alternative E1A (Streetcar or BRT) and lastly Alternative E1 (Commuter Rail). Figure 4-16 illustrates the Poverty + Zero Car Households for the East Corridor.

The results for the Youths + Seniors criterion show that Alternative E5 (LRT, Streetcar, or BRT) serves the highest percentage of populations with limited mobility, resulting in the highest ranking among East Corridor alternatives. Figure 4-17 shows the concentrations of youths and seniors for the East Corridor. The rest of the alternatives in the East Corridor (E1, E1A, and E6) all scored the same coming in second within the corridor.

Figure 4-16: Limited Mobility Populations Poverty + Zero Car Households for the East Corridor

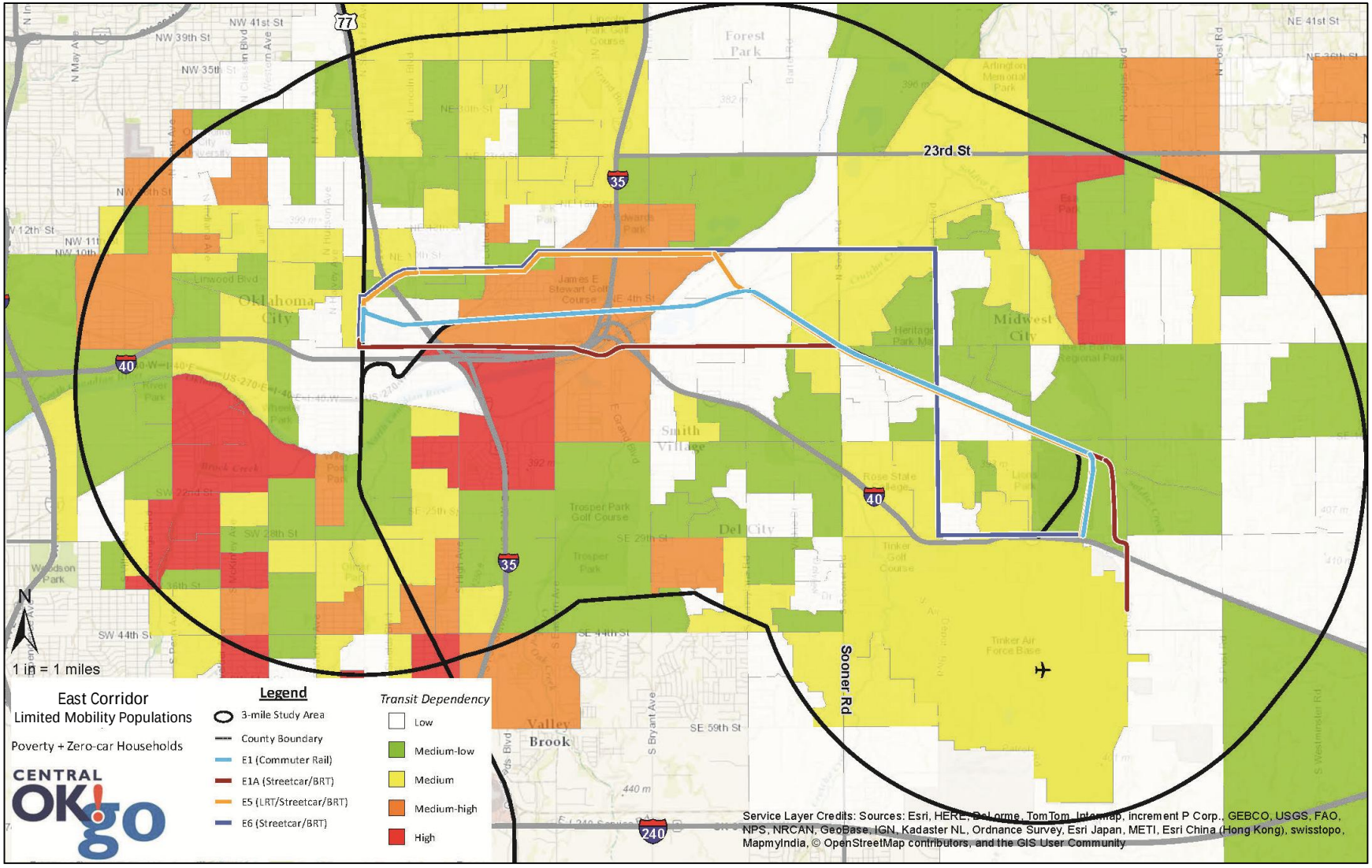
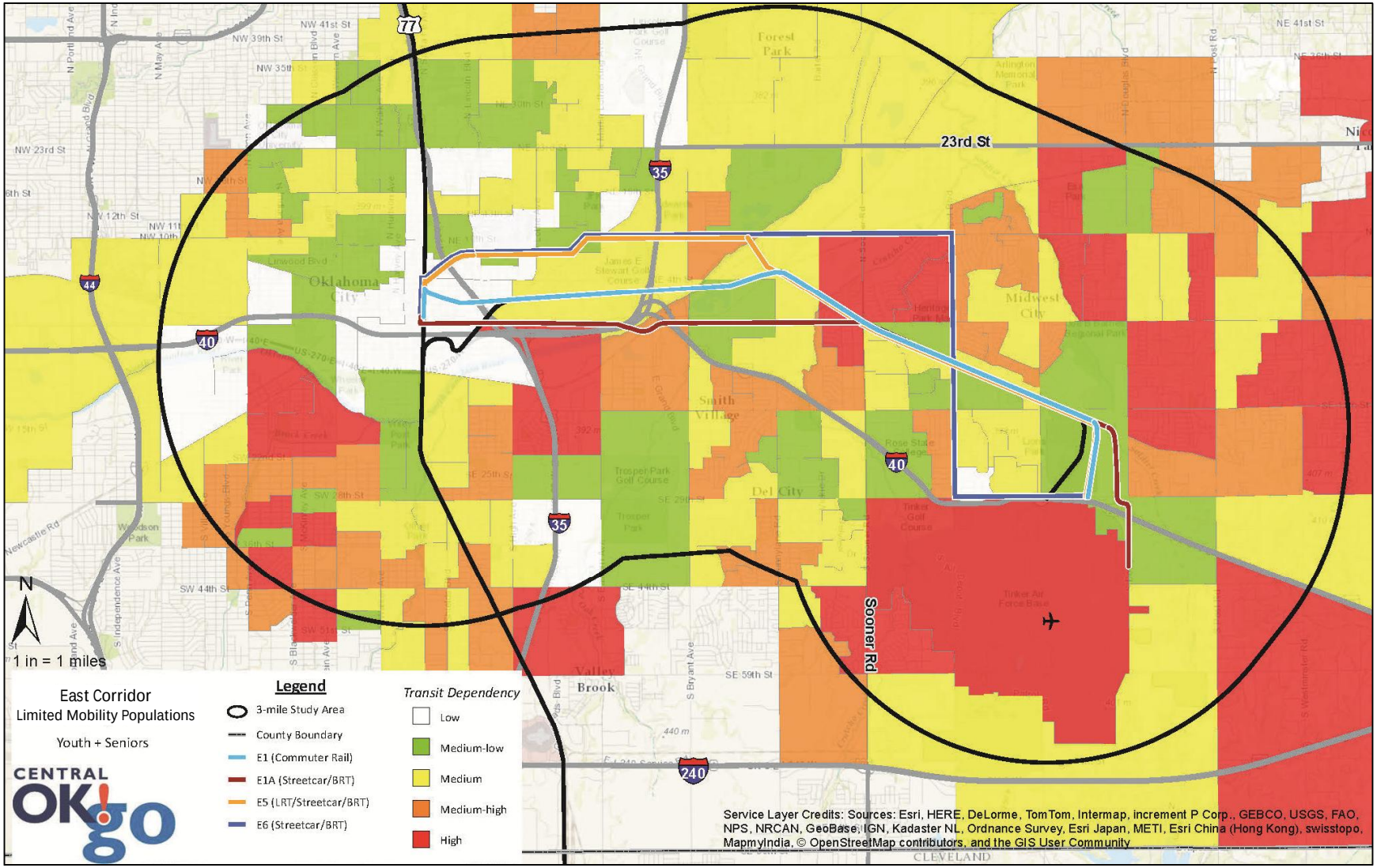


Figure 4-17: Limited Mobility Populations – Youth + Seniors for the East Corridor



Environmental Justice

The evaluation identified that the East Corridor has the lowest number of environmental justice blocks (EJBs) among the three corridors analyzed in this study. Alternative E6 has the highest number of EJBs within the East Corridor, while Alternative E1 has the least number of EJBs. The stations along Alternative E5 have the highest number of EJBs that are 50% or more below poverty, 10% greater than the average, and 1% greater than the national unemployment rate. This is a positive impact for the communities in the study area because it creates the best access to transportation for these populations with fewer negative impacts. Because of the potential for ROW impacts along Alternative E6, especially at station locations, this alternative had more negative impacts. Table 4-13 presents the results for environmental justice and Figure 4-18 illustrates the EJBs in relation to the alternative alignments and proposed stations for the East Corridor.

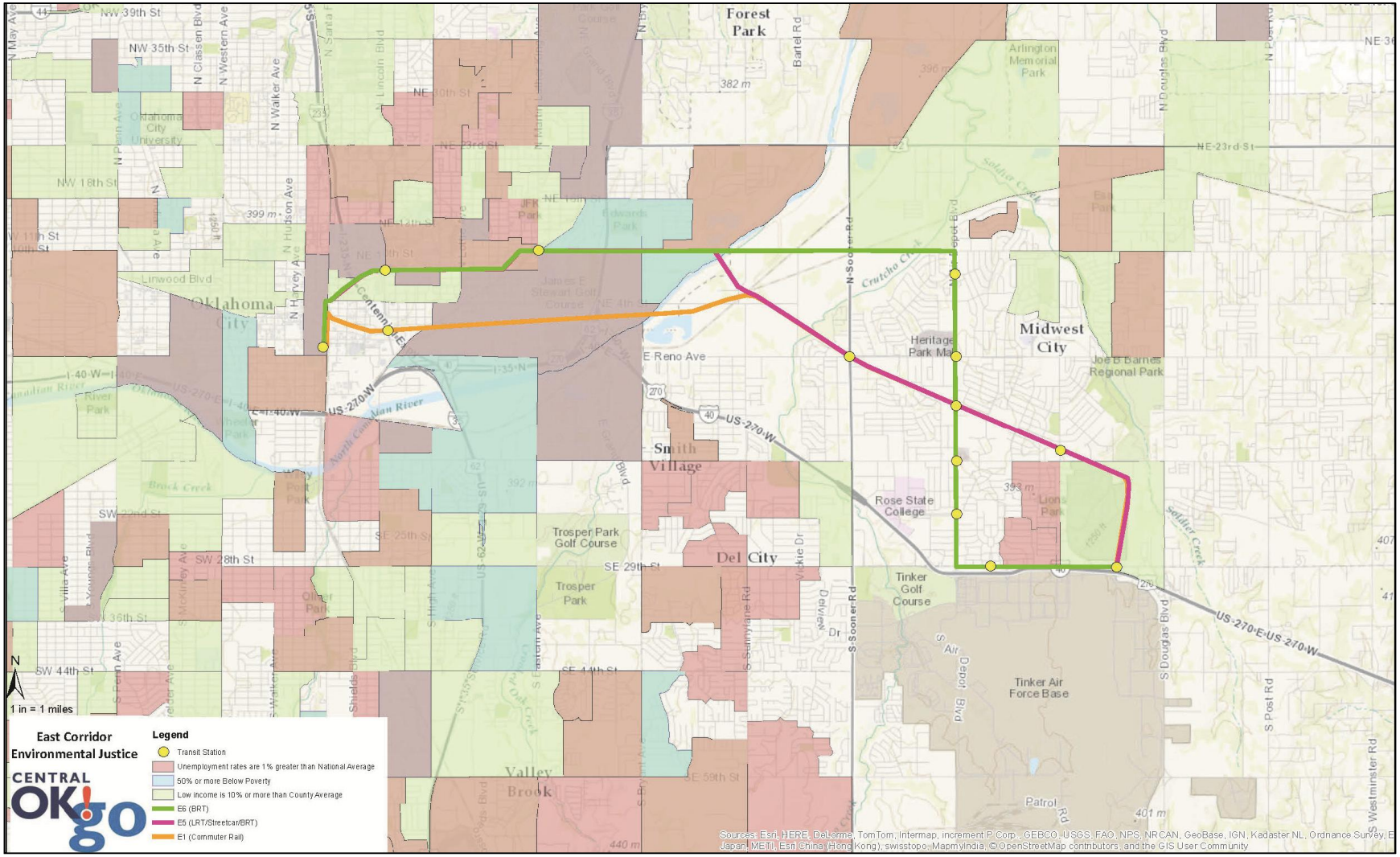
Table 4-13: Environmental Justice for the East Corridor

Corridor	Environmental Justice (Block Groups)
East	132

Environmental Justice (Block Groups) (Alignment, Stations [A,S])	E1 (Rail)		E1A		E5		E6	
	13		13		22		29	
	Pos. (+)	Neg. (-)	Pos. (+)	Neg. (-)	Pos. (+)	Neg. (-)	Pos. (+)	Neg. (-)
Environmental Justice (Block Groups – 50% or more below poverty) (A,S)	1	1	1	1	5	1	1	5
Environmental Justice (Block Groups – 10% greater than the average) (A,S)	1	1	1	1	10	2	3	11
Environmental Justice (Block Groups – 1% greater than national unemployment rate [7.3%]) (A,S)	1	1	1	1	6	1	2	7

Source: Guernsey, 2014

Figure 4-18: Environmental Justice Results for the East Corridor



Noise and Vibration

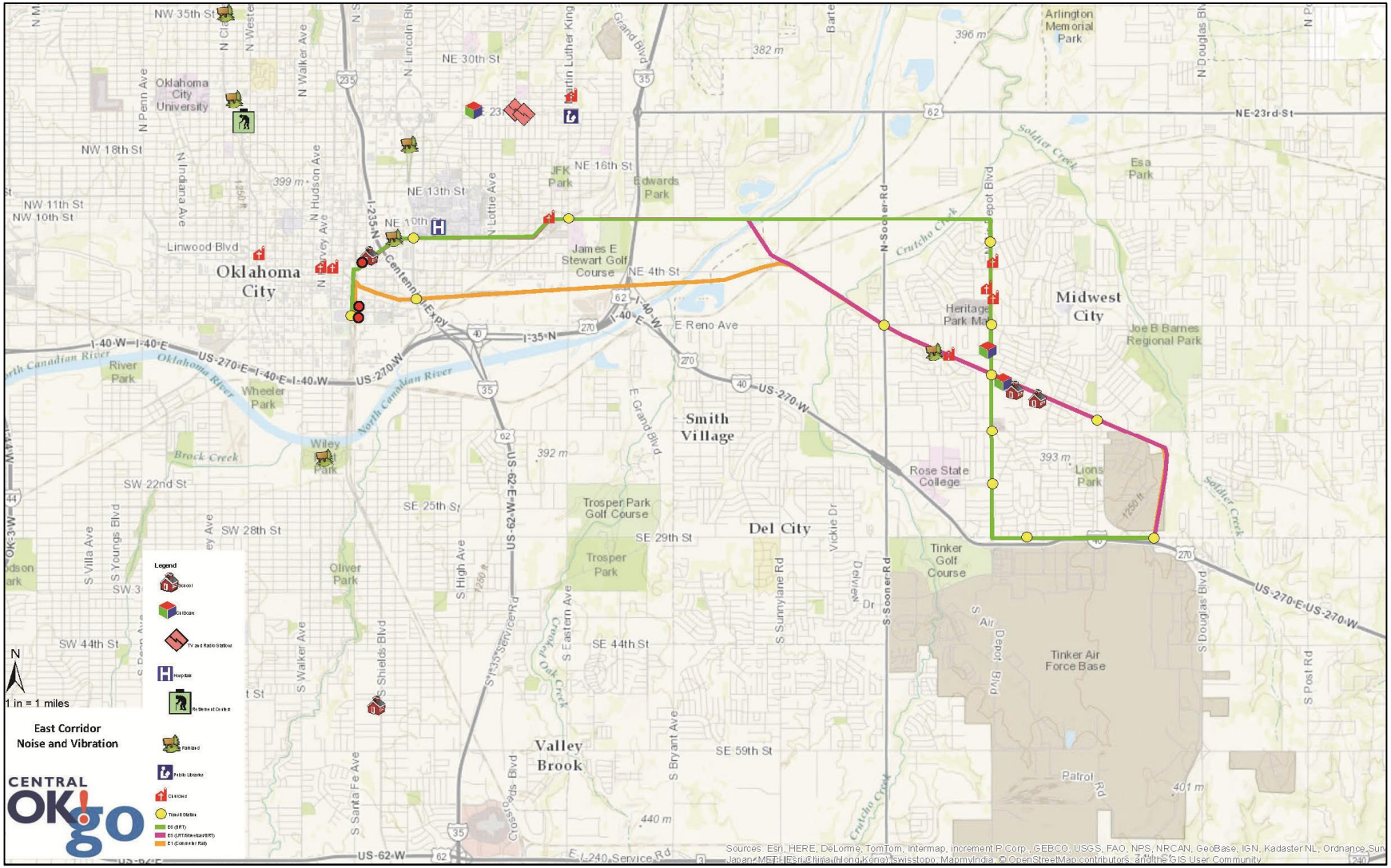
The results for this evaluation identified that Alternative E6 has the highest number of sensitive receptors within the study area; therefore, it has the highest potential impact to these sites. Alternative E1 has the lowest number of noise and vibration sites within the study area. Table 4-14 presents the results for noise and vibration and Figure 4-19 shows the facilities near the alternative alignments and proposed stations for the East Corridor.

Table 4-14: Noise and Vibration for East Corridor

Facility	E1 (Rail)	E1A	E5	E6
Hospitals	0	0	1	1
Parkland	1	1	2	1
Public Library	0	0	0	0
Churches	1	1	2	5
Childcare	1	1	1	2
Retirement Center	0	0	0	0
Schools	2	2	3	1
TV & Radio Stations	0	0	0	0
Total	5	5	9	10

Source: Guernsey, 2014

Figure 4-19: Noise and Vibration Results for the East Corridor



Hazardous Waste

The results for the hazardous waste evaluation identified that Alternative E6 has the highest number of hazardous waste sites within the East Corridor; therefore, it has the highest potential impact. Alternative E1 has the lowest number of hazardous waste sites within the study area. Table 4-15 presents the results for hazardous waste and Figure 4-20 illustrates these facilities and the alternative alignments and proposed stations for the East Corridor.

Table 4-15: Hazardous Waste for East Corridor

	E1 (Rail)	E1A	E5	E6
Hazardous Waste (Alignments)	24	24	48	39
Hazardous Waste (Stations Combined per Alignment)	42	42	60	97

Hazardous Waste (Stations)	Hazardous Waste Sites
NE 8th Street & Lincoln	10
Lincoln & UP Railroad	4
Martin Luther King Avenue & NE 10th Street	12
Sooner & UP Railroad	3
Blue Ridge & Air Depot	0
Reno & Air Depot	16
Air Depot & UP Railroad	9
SE 15th Street & Air Depot	7
Adair & Air Depot	17
Mid America & SE 29th Street	7
Industrial & SE 29th Street	0
Midwest Boulevard & UP Railroad	7
Santa Fe Station	19

Source: Guernsey, 2014

Figure 4-20: Hazardous Waste Results for the East Corridor

4.3.5 South Corridor

Air Quality

The results of the air quality benefits analysis indicate that for the South Corridor, Alternative S4 (Streetcar) would have the highest reduction in emissions and therefore the highest ranking followed closely by Alternative S4 (BRT) with the second highest reduction. These two alternatives are followed by Alternatives S2 (Streetcar), S2 (BRT), and lastly S1 (Commuter Rail), which would result in the smallest reduction in air emissions.

Cultural Resources

The results from the analysis identified that Alternative S2 has the highest number of cultural sites within the South Corridor; therefore, the highest potential impact to cultural sites, while Alternative S4 has the lowest number of cultural sites within the study area. Construction would occur along all Alternatives (S1, S2, and S4); therefore, there is potential for impacts to the cultural sites along these alternative alignments. Table 4-16 presents the results for cultural resources.

Table 4-16: Cultural Resources for the South Corridor

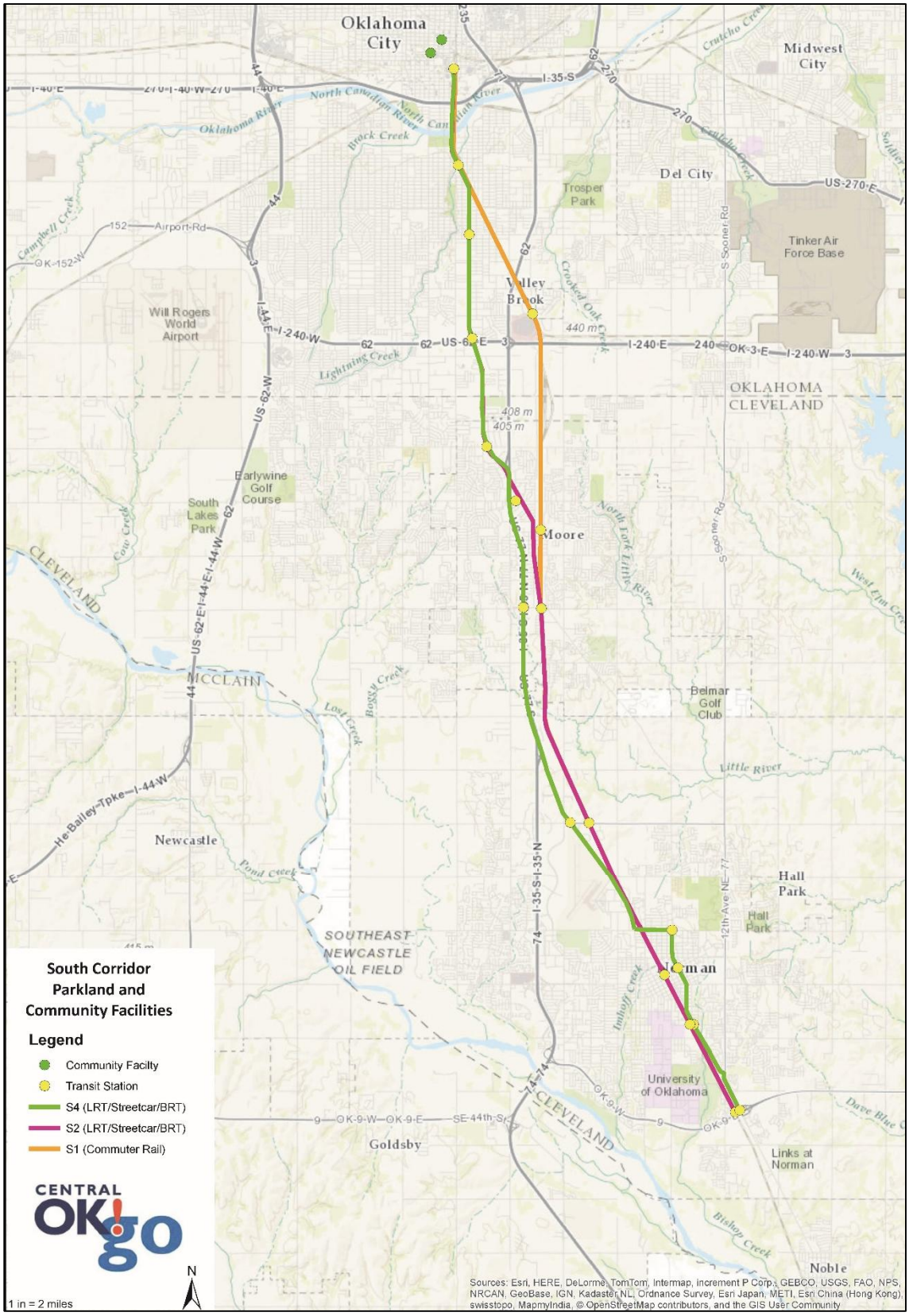
	S1 (Rail)	S2	S4
Cultural Resources (Both Alignment & Stations)	2	2	1

Source: Guernsey, 2014

Parkland and Community Facilities

The analysis for parkland and community facilities within the South Corridor did not indicate any of these types of facilities within the South Corridor, as illustrated in Figure 4-21.

Figure 4-21: Parkland and Community Facilities Results for the South Corridor



Water Resources

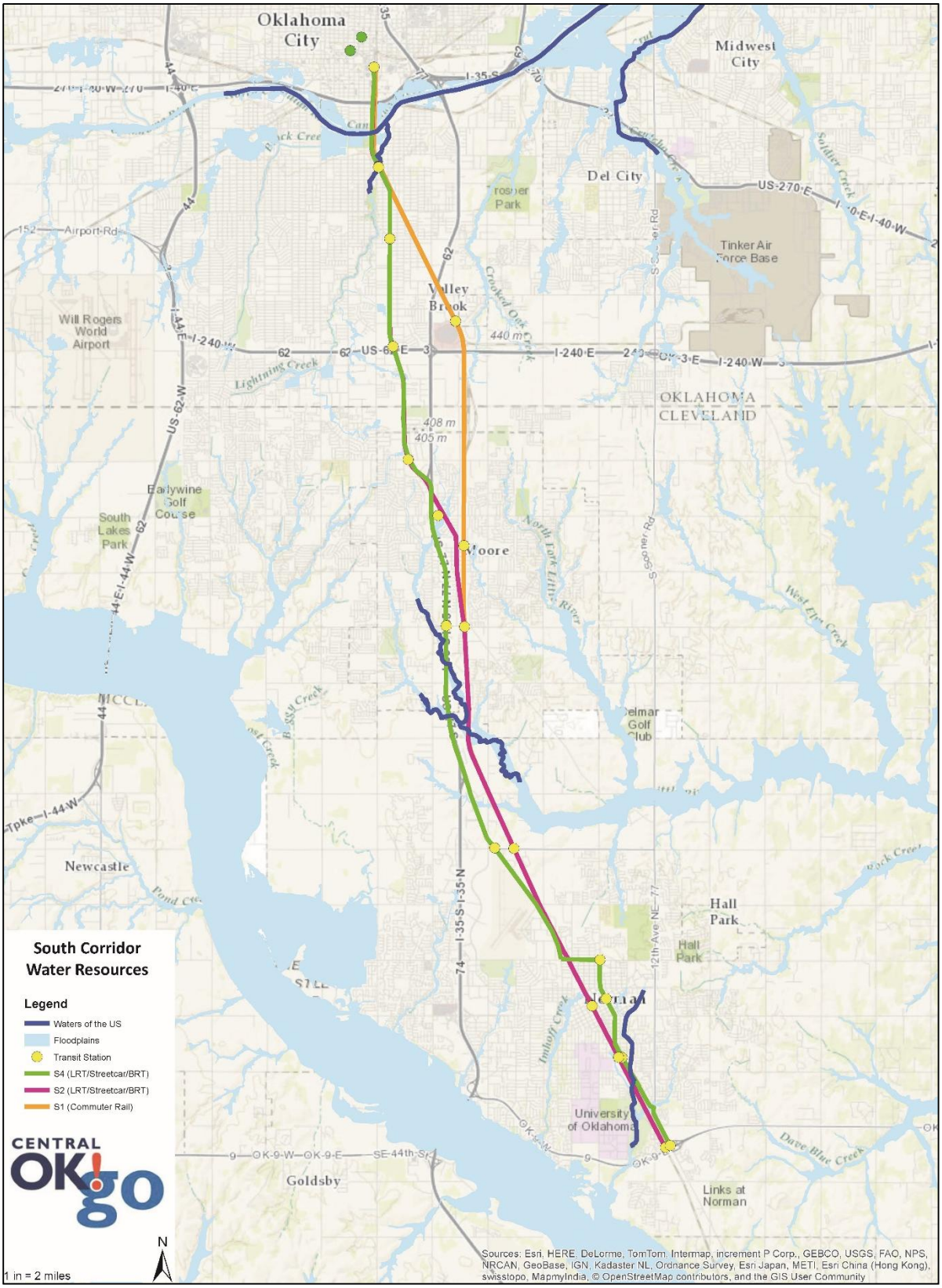
The results from the water resources analysis identified that Alternative S2 has the same number of water crossings as Alternative S4, but has the highest linear footage of floodplain impact; therefore, Alternative S2 has the highest potential impact to water resources (floodplains and waters of the U.S.). Alternative S4 has the same number of water crossings, but with lower linear footage of floodplain impact. Construction would occur along all alternatives (Alternative S1, S2, and S4); therefore, there is potential for impacts to the water resources along these alternative alignments. Table 4-17 presents the results for Water Resources and Figure 4-22 shows the Water Resources and the alternative alignments for the South Corridor.

Table 4-17: Water Resources for South Corridor

	S1 (Rail)	S2	S4
Floodplains (linear feet)	1,460	2,405	2,030
Wetlands (linear feet)	0	0	0
Waters of the U.S.	4	4	4

Source: Guernsey, 2014

Figure 4-22: Water Resources Results for the South Corridor



Access for Populations with Limited Mobility

The results for the Poverty + Zero Car Households criterion show that Alternative S2 (Streetcar or BRT) serves the highest percentage of populations with limited mobility, resulting in the highest ranking among South Corridor alternatives. Alternative S4 (Streetcar or BRT) ranked second among alternatives in the South Corridor, followed by Alternative S1 (Commuter Rail) which ranked last. Figure 4-23 shows the results for the Poverty + Zero Car Households criterion.

The results for the Youths + Seniors criterion show that Alternative S2 (Streetcar or BRT) and Alternative S4 (Streetcar or BRT) serve the highest percentage of populations with limited mobility, resulting in the highest ranking among South Corridor alternatives. Alternative S1 (Commuter Rail) serves the lowest percentage of populations with limited mobility and therefore ranked last among alternatives in the South Corridor. Figure 4-24 illustrates the results for the populations with limited mobility Youths + Seniors for the South Corridor.

Figure 4-23: Limited Mobility Populations – Poverty + Zero Car Households for the South Corridor

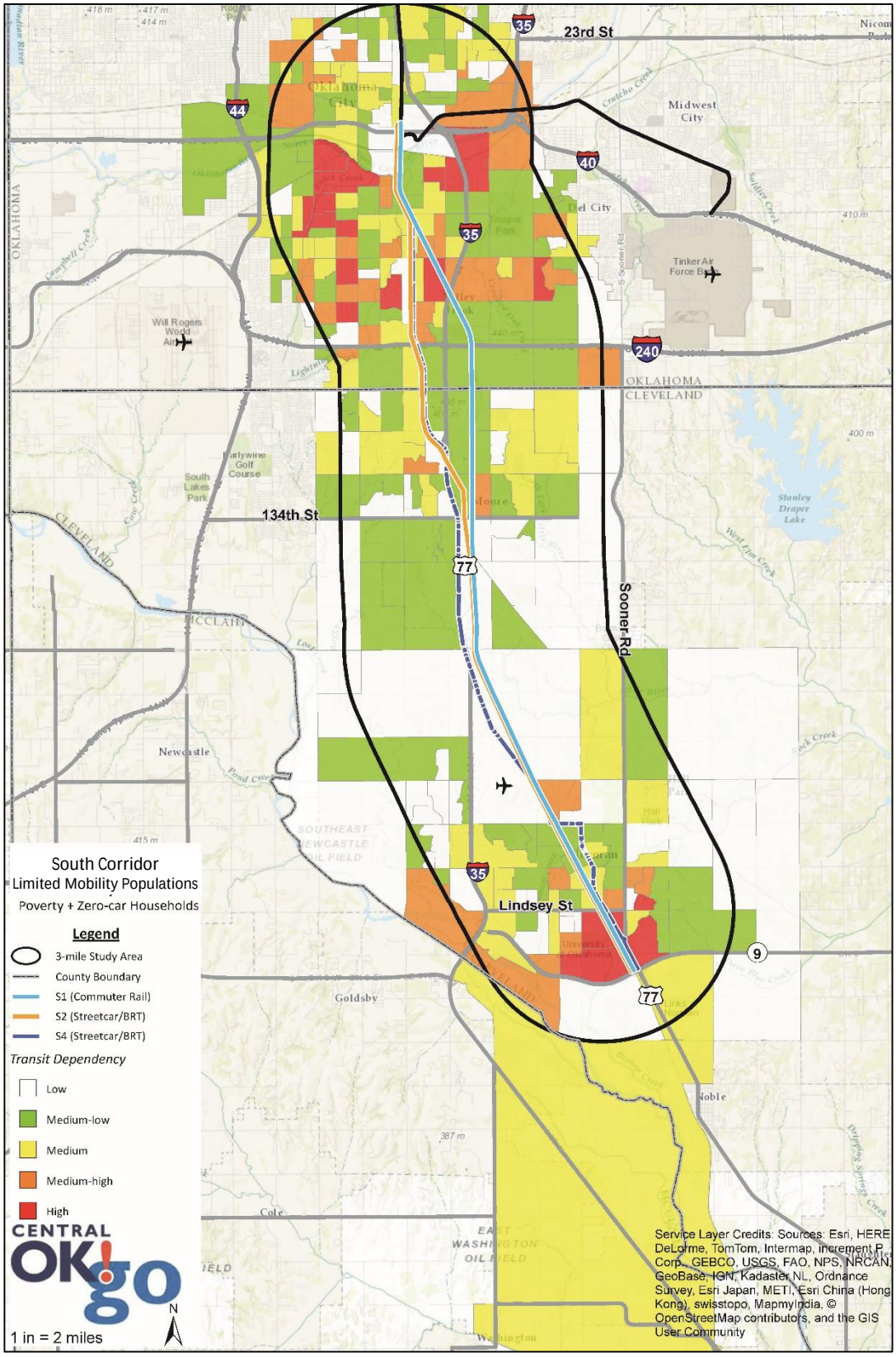
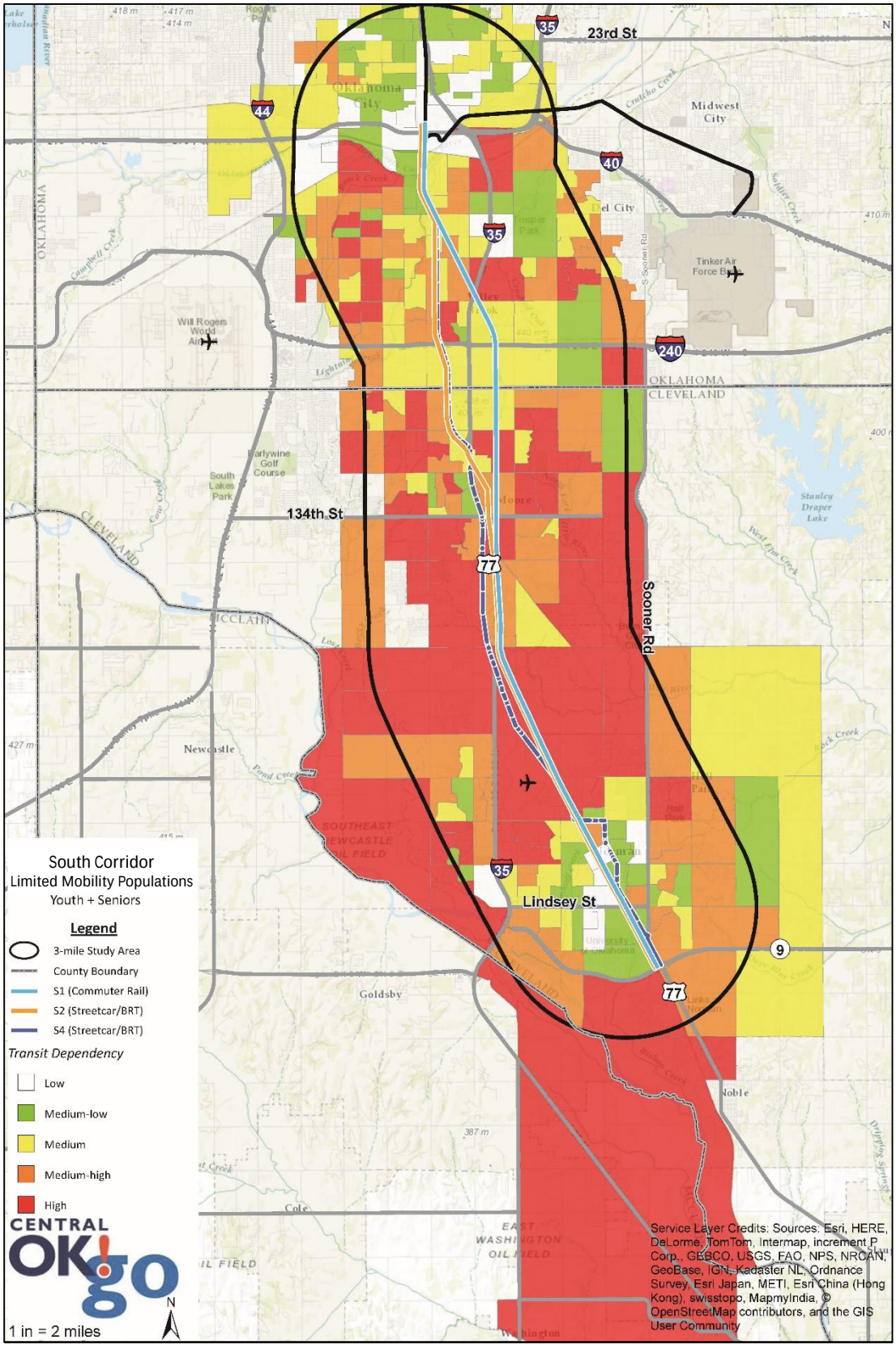


Figure 4-24: Limited Mobility Populations – Youth + Senior Households for the South Corridor



Environmental Justice

The evaluation identified that the South Corridor has the second highest number of environmental justice blocks (EJBs) within the overall study area. Alternative S4 alternative has the highest number of EJBs within the South Corridor, while Alternative S1 has the lowest number. The stations along all the alternatives have the same number of EJBs that are 50% or more below poverty and 10% greater than the average. The stations along Alternative S2 and S4 have the highest number of EJBs and, if built, these EJB communities would receive an increase, or improvement, in mobility due to their proximity, to the stations. Table 4-18 presents the results for Environmental Justice and Figure 4-25 illustrates the EJBs in relation to the alternative alignments and proposed stations for the South Corridor.

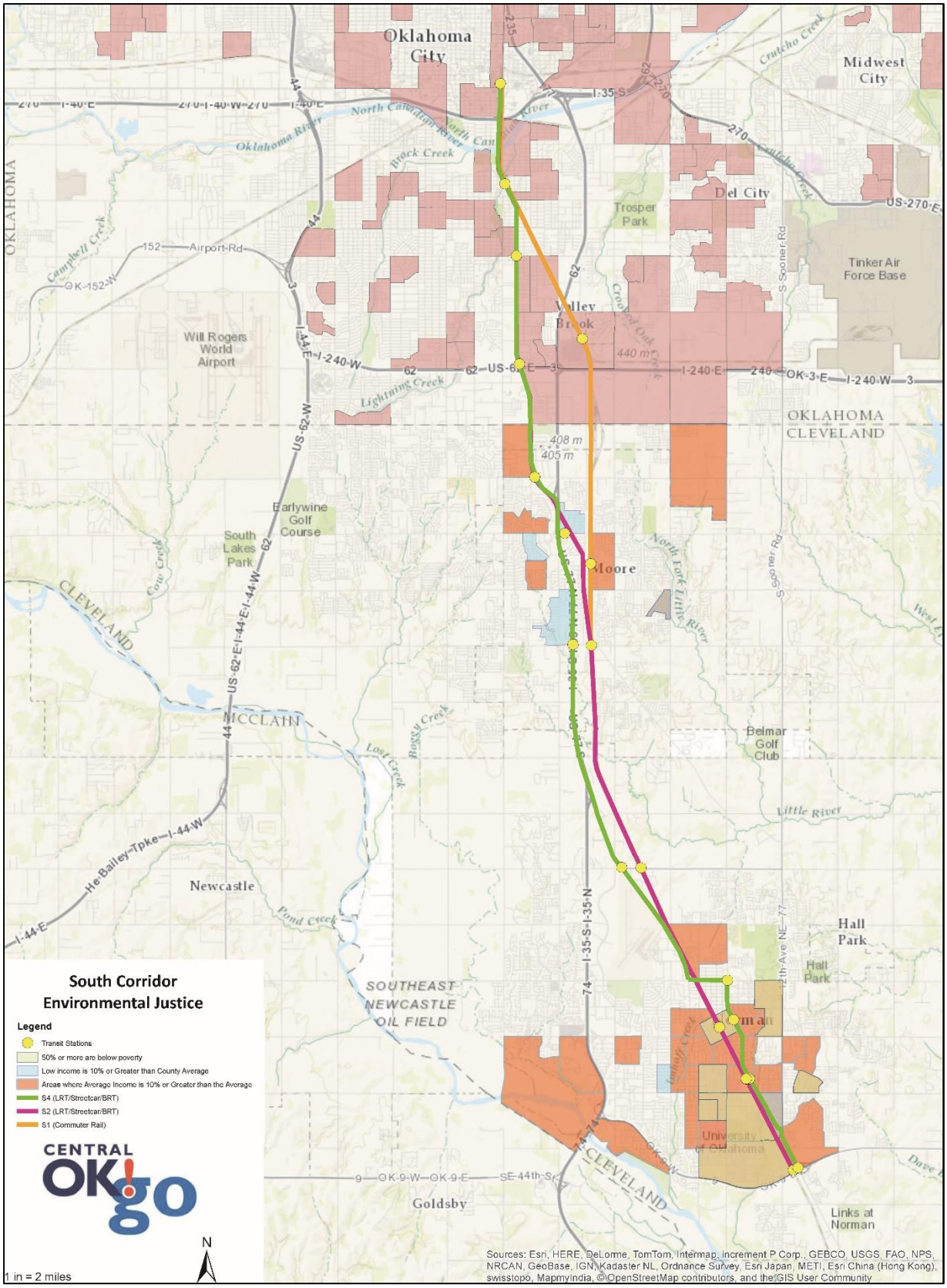
Table 4-18: Environmental Justice Results for the South Corridor

Corridor	Environmental Justice (Block Groups)
South	222

Environmental Justice (Block Groups)	S1 (Rail)		S2		S4	
	33		37		44	
	Positive (+)	Negative (-)	Positive (+)	Negative (-)	Positive (+)	Negative (-)
Environmental Justice (Block Groups – 50% or more below poverty)	2	2	2	3	2	0
Environmental Justice (Block Groups – 10% greater than the average)	7	7	12	12	7	12
Environmental Justice (Block Groups – 1% greater than national unemployment rate [7.3%])	2	3	6	6	3	7

Source: Guernsey, 2014

Figure 4-25: Environmental Justice Results for the South Corridor



Noise and Vibration

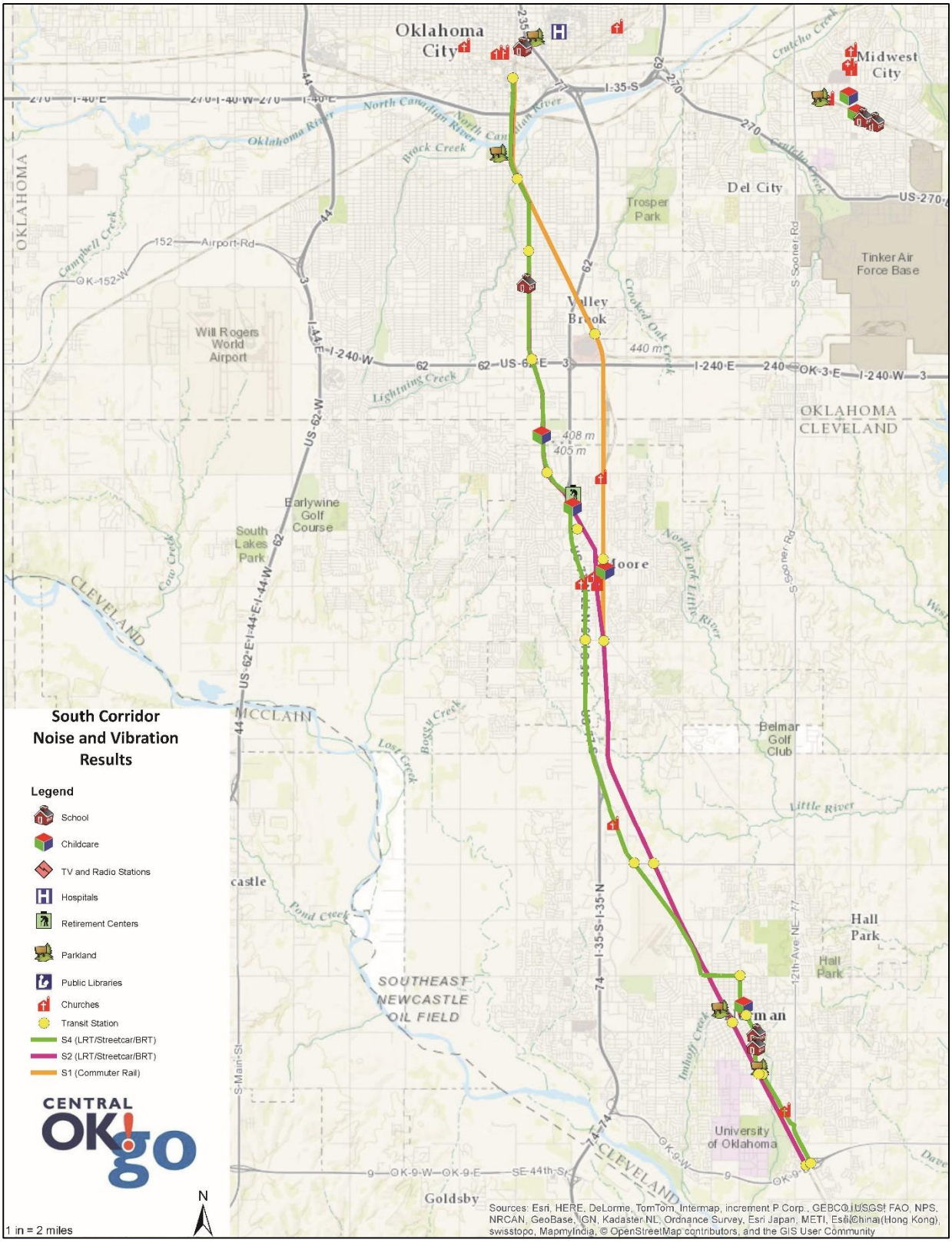
The results for this evaluation identified that Alternative S4 has the highest number of sensitive receptors within the study area; therefore, it has the highest potential impact to these sites. Alternative S1 has the least number of noise and vibration sites within the study area. Construction will occur along all alternatives; therefore, there is potential for impacts to the facilities. Table 4-19 presents the results for Noise and Vibration and Figure 4-26 shows these facilities and the alternative alignments and proposed stations for the South Corridor.

Table 4-19: Noise and Vibration Results for the South Corridor

Facility	S1 (Rail)	S2	S4
Hospitals	0	0	0
Parkland	2	2	2
Public Library	0	0	0
Churches	1	3	6
Childcare	1	2	3
Retirement Center	0	1	1
Schools	0	1	3
TV & Radio Stations	0	0	0
Total	4	9	15

Source: Guernsey, 2014

Figure 4-26: Noise and Vibration Results for the South Corridor



Hazardous Waste

The results for the hazardous waste evaluation identified that Alternative S4 has the highest number of hazardous waste sites within the study area; therefore, it has the highest potential impact. Alternative S1 has the lowest number of hazardous waste sites within the study area. Construction would occur along Alternatives S1, S2, or S4; therefore, there is potential for impacts along these alignments. Table 4-20 presents the results for hazardous waste and Figure 4-27 illustrates the facilities near the alternative alignments and proposed stations for the South Corridor.

Table 4-20: Hazardous Waste for the South Corridor

	S1 (Rail)	S2	S4
Hazardous Waste (Alignments)	73	86	85
Hazardous Waste (Stations Combined per Alignment)	97	110	124

Hazardous Waste (Stations)	Hazardous Waste Sites
Capital Hill (25th)	18
SE 44th & Shields	5
Crossroads Mall	3
I-240 & Shields	11
N 27th & Shields	6
N 12th & I-35/Broadway	5
2nd & BNSF	11
S 19th & I-35	3
S 19th & BNSF	7
Tecumseh & Flood	4
Tecumseh & BNSF Railroad	9
Porter & Robinson	7
Main Street & Porter	40
Main Street & BNSF	26
Brooks & BNSF	1
Brooks & Classen	2
SH-9 & BNSF	3
SH-9 & Classen	4
Santa Fe Station	19

Source: Guernsey, 2014

Figure 4-27: Hazardous Waste Results for the South Corridor

4.3.6 Engineering Constraints and Utility Conflicts

This analysis represents an initial assessment of the engineering constraints and utility conflicts that could impact construction of the proposed alternatives. This evaluation was based upon windshield surveys of the alignments, supplemented by aerial photograph review. Observations of engineering constraints and utility conflicts are presented for each alternative in which construction of infrastructure would be required. The observations are presented in sequential order, starting at the Santa Fe Station and proceeding along the alternative alignment.

North Corridor

Alternative N1

- Single track over I-235
- Single track under NW 50th Street Bridge piers are approximately 53 feet apart. They will need modification for a double track
- Single track over I-44
- Single track under NW 63rd Street, (63rd Street bridge may need modification for double tracks)
- Single track crosses Western Avenue
- Single track crosses the middle of the intersection of Western Avenue and Britton Road. Intersection will need modification for double tracks
- Approximately 13.9 miles of track
  - ✓ 6.6 miles of single track
  - ✓ 47.6% single track in this alignment
- All railroad bridges that cross over roadway will need to be widened for a parallel track.

Alternative N2

- On North E.K. Gaylord Boulevard
  - ✓ From Santa Fe Station to NE 4th Street – established downtown business district
- On NE 4th Street
  - ✓ From North E.K. Gaylord Boulevard to N Classen Boulevard – a possible engineering constraint could be St. Joesph's Old Cathedral on the north
- On North Classen Boulevard
  - ✓ From NW 4th Street to NW 8th Street – already six lane facility, possible engineering constraint is a grade separation between north and south bound lanes while possible utility constraints include utility poles on the east
  - ✓ From NW 8th Street to NW 10th Street – could require a retaining wall in this vicinity should widening the roadway alternative be chosen. Other possible engineering constraints could include older historic homes on east and west side, roadway lighting runs down the center median
  - ✓ At NW 23rd Street Intersection – possible historic Golden Dome building on SE corner of intersection
  - ✓ From NW 24th Street to NW 36th Street – possible site constraint could be the Military Park on the North, possible historic corner rock building Barber Shop
  - ✓ From NW 36th Street to NW 46th Street – on the east side is Memorial Park
  - ✓ NW 46th Street to NW 50th Street – Flower Garden Park is on the west

- ✓ From I-44 to NW 63rd Street – widening this extent could be constrained by I-44 bridge piers, Belle Isle Lake, Rose Hill Burial Park on the northwest. The existing median has large transmission lines and a tank battery
- ✓ From NW 63rd Street to NW 70th Street – this extent is quite wide with a large median. Widening this section of roadway could be constrained by newly constructed Chesapeake Energy multi-floor buildings. Utilities that could pose a constraint are large transmission lines, transformers, vaults, Natural Gas pipeline, oil tank battery on west side, and large pull boxes
- ✓ From NW 70th Street to West Wilshire Boulevard – some possible utility constraints in this extent consist of power poles, power lines, storm drain down center of roadway

- Guideway Parallel to BNSF Tracks
  - ✓ New guideway crossing at Western Avenue
  - ✓ Single track crosses the middle of the intersection of Western Avenue and Britton Road. Intersection will need to be modified to add guideway crossing
  - ✓ All railroad bridges that cross over roadway will need to be widened for a parallel guideway

Alternative N3

- On North E.K. Gaylord Boulevard
  - ✓ From Santa Fe Station to NE 4th Street – established downtown business district
- On NE 4th Street
  - ✓ From North E.K. Gaylord Boulevard to N Classen Boulevard – a possible engineering constraint could be St. Joesph's Old Cathedral on the north
- On North Classen Boulevard
  - ✓ From NW 4th Street to NW 8th Street – already six lane facility, possible engineering constraint is a grade separation between north and south bound lanes while possible utility constraints are some utility poles on the east
  - ✓ From NW 8th Street to NW 10th Street – could require a retaining wall in this vicinity should widening the roadway alternative be chosen. Other possible engineering constraints could be older historic homes on east and west side, roadway lighting runs down the center median
  - ✓ At NW 23rd Street Intersection – possible historic Golden Dome building on southeast corner of intersection
  - ✓ From NW 24th Street to NW 36th Street – possible site constraint could be the Military Park on the North, possible historic building Barber Shop
  - ✓ From NW 36th Street to NW 46th Street – on the east side is Memorial Park
  - ✓ NW 46th Street to NW 50th Street – Flower Garden Park is on the west
  - ✓ From I-44 to NW 63rd Street – widening this extent could be constrained by I-44 bridge piers, Belle Isle Lake, Rose Hill Burial Park on the Northwest. The existing median has large transmission lines and a tank battery
  - ✓ From NW 63rd Street to NW 70th Street – this extent is quite wide with a large median. Widening this section of roadway could be constrained by newly constructed Chesapeake multi-floor buildings. Utilities that could pose a constraint are large transmission lines, transformers, vaults, Natural Gas pipeline, oil tank battery on west side, and large pull boxes
  - ✓ From NW 70th Street to West Wilshire Boulevard – some possible utility constraints in this extent consist of power poles, power lines, storm drain down center of roadway

- ✓ From West Wilshire Boulevard to NW 86th Street – this section of the Alternative could need to cross the Railroad corridor and currently has a slightly narrowed median.
- ✓ From NW 86th Street to NW 92nd Street – has some power lines
- ✓ From NW 92nd Street to West Britton Road – in this vicinity is a lumber store and as NW 94th Street is approached, the median ends
- ✓ West Britton Road & N Western Avenue – Possible building takes could involve Tooter's Garage, Gateway Academy, Tom's Tires, and a rock building on the southeast

- On West Britton Road turning back north on N Classen Boulevard
  - ✓ From NW 96th Street NW 104th Street – in this section Britton Park is on the east. May have some utility constraints with an oil well, transmission lines, and more transmission lines on the north with utility poles

- On West Hefner Road to I-235/US 77 Hwy Frontage Roads
  - ✓ From West Hefner Road to point where northbound Frontage Road tapers back in parallel to Highway – is bounded on the east by Broadway Park
  - ✓ From West Hefner Road to NE 122nd Street – Utilities that were observed were a fire hydrant, water, light poles, transmission lines

- On Broadway Extension/Broadway
  - ✓ At northbound frontage road of the Broadway Extension & NE 122nd Street – has large transmission lines on the north side of intersection
  - ✓ From NE 122nd Street to East Memorial Road – possible property takes would involve large car dealerships like Bob Howard Toyota, Bob Howard Honda, Bob Howard Chrysler Jeep Dodge Ram, Bob Howard Buick GMC on the east and Bob Howard Nissan on the west
  - ✓ From East Memorial Road to West 33rd Street – possible utility constraints could be medium sized transmission lines and double mast arm light poles in the median of the wide six lane facility. Within the city limits of Edmond nice sized trees are within the median as well
  - ✓ From West 33rd Street to E 2nd Street – the wide facility is fronted with business on both sides
  - ✓ From East 2nd Street to Ayers Street - possible engineering constraints are historic downtown Edmond with narrower business frontage
  - ✓ Ayers Street & Boulevard Street – Boulevard Wedding Chapel on SW corner

Alternative N7

- This alternative is proposed to run in existing roadway ROW, and therefore it is anticipated that the new infrastructure requirements will be minimal.

East Corridor

Alternative E1

- Modify junction and new track at E.K. Gaylord Boulevard & Robert S. Kerr Avenue
- Add track from E.K. Gaylord Boulevard to I-235
- Single track passes under beginning of I-35 & I-40 interchange. May need room for parallel tracks
- Single track over North Canadian River. Widen to double tracks
- Tracks will need to be added from Sunnylane Road to the end of the alignment
- New ROW required from abandoned rail ROW south to SE 29th Street

- All single railroad tracks that cross a river or at-grade road crossing will need to be widened to a parallel track
  - ✓ Approximately 5.3 miles of abandoned track
  - ✓ Approximately 3.7 miles of single track

Alternative E1A

- New ROW required from abandoned rail ROW south to SE 29th Street
- Transition from abandoned ROW onto Reno Avenue will need to be analyzed. Could require a signal or could span to north side.
- Integration into Del City development on Reno Avenue to be determined
- Streetcar alignment decisions to be determined:
  - ✓ Use travel lanes on bridge over I-40 or other configuration including new span
  - ✓ Alignment in travel lanes on Reno Avenue, possibly use of center lane as an exclusive guideway, or expand street profile
  - ✓ Alignment to Santa Fe Station to be integrated with downtown streetcar alignment

Alternative E5

- On North E.K. Gaylord Boulevard
  - ✓ From the Santa Fe Station to NE 4th Street – established downtown business district
- On NE 8th Street
  - ✓ From North Walnut Avenue to Research Parkway – possible engineering constraints could be width of overpass
  - ✓ From Research Parkway to N Lincoln Boulevard – possible utility constraints in this section could be large transmission lines
- On NE 8th Street transitioning to NE 10th Street
  - ✓ From N Lincoln Boulevard to North Eastern Avenue – the large median transitions to a smaller one. Possible utility constraint is a large transmission line
  - ✓ Under I-35 – the clear span width of piers may be a possible engineering constraint
- New Alignment from NE 10th Street to Sunnylane Road
  - ✓ Construction of a new river bridge and approaches would be needed
  - ✓ A new guideway through the UP tracks at Sunnylane would be required
- Abandoned Rail ROW and New Alignment
  - ✓ From N Sunnylane Road to east of S Midwest Boulevard – construction of a new guideway along the abandoned ROW would be needed
  - ✓ From S Midwest Boulevard to SE 29th Street – from the abandoned ROW to the south, construction of a new guideway is required on new ROW

Alternative E6

- This alternative is proposed to run in existing roadway ROW except at station locations, and therefore it is anticipated that the new infrastructure requirements will be minimal.

South Corridor

Alternative S1

- Double track over I-40. May be used as storage

- Single track under I-35. Looks to have been double tracked at one time. There is 92 feet between I-35 bridge piers
- Single track over SE 19th Street in Moore
- Single track over creek near Indian Hills Road
- Multiple single and double at grade crossings
- All railroad bridges will need to be widened for a parallel track
- Approximately 19.4 miles of track
  - ✓ Approximately 8.9 miles of single track
  - ✓ 46% single track

Alternative S2

- On S Shields Boulevard
  - ✓ From W Reno Avenue to NW 27th Street in Moore – the current facility consists of six lanes, with median the entire length. Left turn bays use the median at various locations and the median contains street lighting. Residential and commercial encroachment the entire length is noted due to it being six lanes wide already
  - ✓ From the Santa Fe Station to SE 31st Street – Railroad tracks parallel S Shields Boulevard and therefore this extent is constrained by the Railroad
  - ✓ From NW 27th Street to I-35 in Moore and continuing south – there is room to add a third lane for interstate access. The engineering constraint at this location is the existing ramps that are bridges
  - ✓ From the Shields Boulevard exit to SW 19th Street in Moore – I-35 is six lanes wide, with overpasses and frontage roads being the biggest engineering constraint
- Broadway Street to SE 19th Street
  - ✓ There is no crossing of I-35 to connect to Broadway Street, requiring construction of a guideway either over or under I-35
  - ✓ No room for widening of Broadway Street through Moore
- Guideway Parallel to BNSF Tracks
  - ✓ Add guideway bridge over SE 19th Street in Moore
  - ✓ Add guideway bridge over creek near Indian Hills Road
  - ✓ Add guideway bridge over Robinson Street
  - ✓ Multiple guideway grade crossings

Alternative S4

- On S Shields Boulevard
  - ✓ From W Reno Avenue to NW 27th Street in Moore – the current facility consists of six lanes, with median the entire length. Left turn bays use the median at various locations and the median contains street lighting. Residential and commercial encroachment the entire length is noted due to it being six lanes wide already
  - ✓ From the Santa Fe Station to SE 31st Street – railroad tracks parallel S Shields Boulevard and therefore this extent is constrained by the Railroad
  - ✓ From NW 27th Street to I-35 in Moore and continuing south – there is room to add a third lane for interstate access. The engineering constraint at this location is the existing ramps that are bridges

  - ✓ From the Shields Boulevard exit to SW 19th Street in Moore – I-35 is six lanes wide, with overpasses and frontage roads being the biggest engineering constraint

- On I-35 from Shields Boulevard to Flood Avenue
  - ✓ I-35 is six lanes wide
  - ✓ Frontage roads and existing overpasses constrict the addition of guideways
- Alignment leaves I-35 and runs along Flood Avenue:
  - ✓ Parallels railroad
  - ✓ Max Westheimer Airport to the west
  - ✓ No room for widening
- Robinson Street
  - ✓ New underpass for railroad
  - ✓ No room for widening
- Porter Avenue/Classen Boulevaard
  - ✓ Through downtown Norman
  - ✓ Four lanes at 11 feet
  - ✓ No room for widening

4.4 Ridership Projections for Preliminary Alternatives

ACOG undertook CentralOK!go for the Oklahoma City metropolitan area in order to determine the most suitable transit technology and route alignment for three separate commuter corridors.

The travel demand modeling for CentralOK!go was carried out using the ACOG regional travel demand model (TDM).

Following the calibration and validation of the ACOG TDM to base year conditions, the Encompass 2035 Metropolitan Transportation Plan demographic forecasts by traffic analysis zone (TAZ) were used for the 2035 horizon year to populate demographic and employment characteristics of the model.

In anticipation of the development of a comprehensive regional transit system, the project team worked closely with ACOG to develop a future, regional No-Build Alternative for the year 2035, against which each of the commuter corridor alternatives were measured. A thorough discussion of the travel demand modeling effort, and more specific modeling results may be found in Appendix A.

The No-Build Alternative, developed in coordination with regional stakeholders and ACOG, consisted of regional bus routes that were largely based on:

- Cleveland Area Rapid Transit (CART) Long-Range Public Transportation Plan recommendations and feedback received from the Norman Comprehensive Transportation Plan development
- EMBARK route updates developed in 2013 by Nelson-Nygaard for COTPA
- City of Edmond's Citylink transit routes
- Additional regional transit improvements, such as express bus routes to Yukon and Mustang (both of these routes are envisioned to be future routes that would provide express bus service from areas not served by this study to downtown Oklahoma City)

4.4.1 North Corridor

Table 4-21 shows the 2035 ridership for each alternative; and the 2035 system-wide and system-wide change from the 2035 No-Build for the North Corridor.

Table 4-21: System-Wide Ridership for Horizon Year 2035

Alternative	Ridership for Alternative	System-Wide Ridership	Difference from No-Build
No-Build	N/A	23,800	N/A
Alternative N1	1,970	26,800	2,980
Alternative N2	3,300	28,600	4,800
Alternative N2/N3 Hybrid*	N/A	N/A	N/A
Alternative N7	370	24,700	800

Alternative N2/N3 Hybrid was not modeled during this phase of the project.

Alternative N2 was considered a stand-in for the N2/N3 Hybrid Alternative, and was also envisioned to operate in dedicated ROW and was modeled transit technology-independent (accounting for LRT, BRT, or streetcar, but similar in character to rail-based transit).

Alternative N2 provides both the highest ridership (compared to the other alternatives), and the highest region-wide ridership in the North Corridor.

4.4.2 East Corridor

Table 4-22 shows the 2035 ridership for each alternative; and the 2035 system-wide and system-wide change from the 2035 No-Build for the East Corridor. Alternative E1A was developed after the modeling was completed at this stage of the project. It is assumed that it would attract a similar level of ridership as Alternative E1.

Table 4-22: System-Wide Ridership for Horizon Year 2035

Alternative	Ridership for Alternative	System-Wide Ridership	Difference from No-Build
No-Build	N/A	23,821	N/A
Alternative E1	1,154	25,606	1,786
Alternative E1A	1,154	25,606	1,786
Alternative E5	263	24,587	767
Alternative E6	271	24,657	836

Alternative E1 provides both the highest ridership (compared to the other alternatives), and the highest region-wide ridership in the East Corridor.

4.4.3 South Corridor

Table 4-23 shows the 2035 ridership for each alternative; and the 2035 system-wide and system-wide change from the 2035 No-Build for the South Corridor.

Table 4-23: System-Wide Ridership for Horizon Year 2035

Alternative	Ridership for Alternative	System-Wide Ridership	Difference from No-Build
No-Build	N/A	23,800	N/A
Alternative S1	3,060	28,000	4,200
Alternative S2	3,810	28,800	5,000
Alternative S4	4,270	29,100	5,300

Alternative S4 provides both the highest ridership (compared to the other alternatives), and the highest region-wide ridership in the South Corridor.

All of the Alternatives in the South Corridor scored comparably well, where in the North and East Corridors, there was one alternative that clearly attracted the most ridership.

4.5 Capital and Operating Costs

4.5.1 Capital Costs

Estimated capital and operating and maintenance (O&M) costs were developed for the preliminary alternatives for consideration by the Steering Committee, workgroups and the public as input for recommending a LPA for each corridor. Other significant inputs included the technical analyses (environmental and social benefits and impacts) and public sentiment.

This section provides an overview of the methodology for development of capital costs and operating costs. This includes initial construction and vehicle costs as well as ongoing O&M cost estimates. As a corridor level planning study, CentralOK!go utilized order-of-magnitude capital cost estimates since detailed engineering occurs later in the planning process. Throughout the stages of project development, more detailed information is gained and estimates are continually refined. Appendix B contains the full capital and operating cost information.

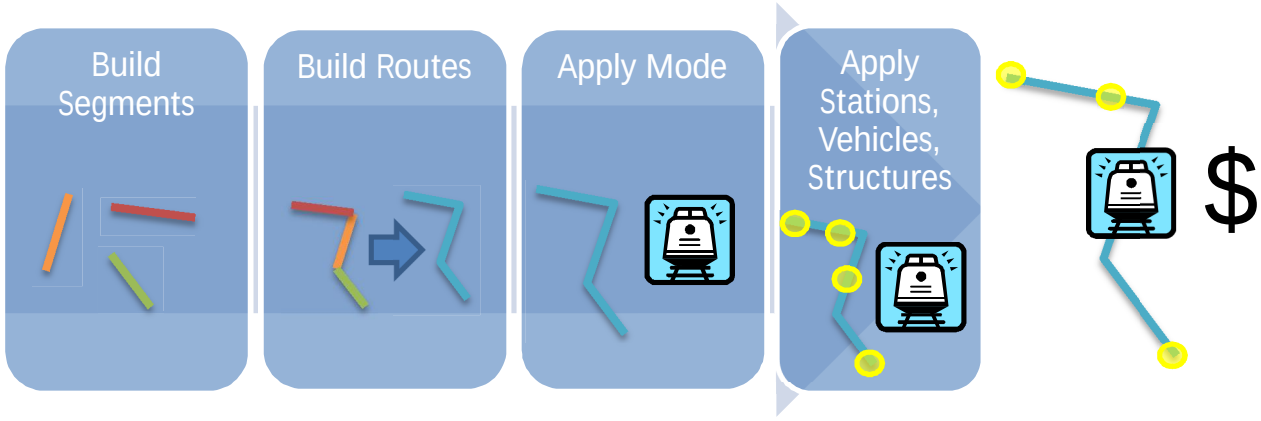
Methodology

Rough order-of-magnitude (ROM) costs were calculated using a modified “top-down” approach by gathering total capital cost data from similar systems in the United States and extrapolating or adjusting them according to the conditions of this study. This was done by applying per-mile costs from other systems with similar characteristics to portions of CentralOK!go routes. The goal of this effort was to make relative comparisons between the systems.

A further level of detail was added to the “top down” method by breaking the analysis into logical segments with distinct conditions and separately applying cost for vehicles, stations, and structures (bridges).

The process for determining ROM capital costs for CentralOK!go is graphically represented in Figure 4-28 and described further below.

Figure 4-28: Process for Determining ROM Capital Costs



Revisions, Refinements and Iteration

The following sections describe the iterations performed to the capital cost estimates based on input from the Steering Committee, workgroups, and the public.

Additional Alternative – North Corridor
The "NAlt1" streetcar route was developed as a shortened version of the N3 streetcar route for inclusion with the N1 commuter rail route as a full system alternative for the North Corridor. The "NAlt1" route extends from NW 10th Street and Classen Drive (the northern terminus of the currently proposed MAPS 3 downtown Oklahoma City streetcar project) to a connection with the N1 commuter rail route at NW 63rd Street and I-235.

Additional Alternatives – East Corridor
Cost estimates for several alternatives were added in the East Corridor to determine if an alignment using Reno Avenue might be more cost effective. The Reno Avenue corridor has sufficient roadway capacity and ROW width, as well as an existing bridge over the Oklahoma River that provides a direct connection to downtown Oklahoma City. Alternatives "EAlt1" commuter rail, "EAlt2" BRT, "EAlt3" streetcar, and "EAlt4" contraflow/mixed BRT were added to the East Corridor alternatives. The "EAlt2" BRT option would include fully-exclusive bus-only lanes (typically requiring reconstruction of the entire street section), while the "EAlt4" contraflow/mixed BRT would be the most cost effective option using existing roadway lanes converted to temporary transit-only use during peak commute times. Similar to "EAlt2" BRT, "EAlt3" streetcar was assumed to include reconstruction of the entire street section which is typically required for the installation of the "embedded" tracks, whether or not the service is mixed-flow. It was assumed that each of the additional alternatives would use the existing Reno Avenue Oklahoma River Bridge with minimal modifications, except for the "EAlt1" commuter rail option which was assumed to include a new bridge. (Streetcar tracks "EAlt3" can typically be retrofitted into existing highway bridge structures.)

Results

The ROM capital costs are included in the following tables. There is also a capital cost range, total cost per mile and annualized capital cost (based on the useful lives of the various cost items to develop each alternative) for each alternative in each corridor. The top-down approach, as described above, lends itself to providing a capital cost range because it is impossible to predict the particular conditions that a project will face as it moves through development – the national cost data vary widely even for systems

that appear. The actual cost of a system could reasonably be expected to fall within the ranges provided, but is subject to external factors and currently unknown conditions that require detailed engineering.

Table 4-24: North Corridor ROM Capital Costs by Alternative

Route Name/ Description	Route Miles	Order of Magnitude Capital Cost	Order of Magnitude Capital Cost Range	Total Cost per Mile	Annualized Capital Cost (based on midpoint)
N1 – Commuter Rail	13.9	$310 M	$260 M – $360 M	$22 M	$18.1 M
N2 – LRT	16.0	$850 M	$720 M – $980 M	$53 M	$48.7 M
N2 – Streetcar	16.0	$720 M	$610 M – $830 M	$45 M	$41.6 M
N2 – BRT	16.0	$600 M	$510 M – $690 M	$37 M	$34.7 M
N3 – LRT	16.1	$1,080 M	$920 M – $1,240 M	$67 M	$62.2 M
N3 – Streetcar	16.1	$930 M	$790 M – $1,070 M	$58 M	$53.3 M
N3 – BRT	16.1	$710 M	$600 M – $820 M	$44 M	$41.0 M
N7 – Streetcar	15.9	$650 M	$550 M – $750 M	$41 M	$37.8 M
N7 – BRT	15.9	$60 M	$50 M – $70 M	$4 M	$4.1 M
NAlt1 – Streetcar	5.3	$320 M	$270 M – $370 M	$61 M	$18.3 M

Table 4-25: East Corridor ROM Capital Costs by Alternative

Route Name/ Description	Route Miles	Order of Magnitude Capital Cost	Order of Magnitude Capital Cost Range	Total Cost per Mile	Annualized Capital Cost (based on midpoint)
E1 – Commuter Rail	9.1	$240 M	$200 M – $280 M	$26 M	$14.1 M
E5 – LRT	9.7	$440 M	$370 M – $510 M	$45 M	$25.5 M
E5 – Streetcar	9.7	$380 M	$320 M – $440 M	$39 M	$21.9 M
E5 – BRT	9.7	$170 M	$140 M – $200 M	$17 M	$10.2 M
E6 – Streetcar	11.1	$460 M	$390 M – $530 M	$41 M	$27.0 M
E6 – BRT	20.9	$50 M	$40 M – $60 M	$2 M	$3.2 M
EAlt1 – Commuter Rail	9.8	$330 M	$280 M – $380 M	$34 M	$19.4 M
EAlt2 – BRT	9.8	$300 M	$260 M – $350 M	$31 M	$17.4 M
EAlt3 – Streetcar	9.8	$380 M	$320 M – $440 M	$39 M	$22.3 M
EAlt4 – BRT (Contraflow Transit Only Lane)	9.8	$140 M	$120 M – $160 M	$14 M	$8.4 M

Table 4-26: South Corridor ROM Capital Costs by Alternative

Route Name/ Description	Route Miles	Order of Magnitude Capital Cost	Order of Magnitude Capital Cost Range	Total Cost per Mile	Annualized Capital Cost (based on midpoint)
S1 – Commuter Rail	20.7	$360 M	$310 M – $410 M	$17 M	$21.5 M
S2 – Streetcar	20.7	$750 M	$640 M – $860 M	$36 M	$43.5 M
S2 – BRT	20.7	$600 M	$510 M – $690 M	$29 M	$34.8 M
S4 – Streetcar	21.4	$1,000 M	$850 M – $1,150 M	$47 M	$57.3 M
S4 – BRT	21.4	$710 M	$600 M – $820 M	$33 M	$41.2 M

4.5.2 Operations Costs

Introduction

This Section summarizes the methodology used to estimate the operation and maintenance (O&M) costs for the preliminary alternatives identified for detailed evaluation. Also discussed below, are three additional modified alternatives that arose during CentralOK!go. The following sections describe the alignments evaluated, the operating characteristics and service assumptions used to develop total revenue hour requirements for each alternative, the cost assumptions used, and the resulting O&M costs for each alternative.

Service Assumptions

Table 4-27 provides the assumptions made regarding operating hours and frequencies of proposed high-capacity transit service. Approximately 1,900 peak and 4,000 off-peak hours are anticipated per year, resulting from over 14,500 round trips. Peak period is defined as the periods of day during which traffic levels rise from their normal levels to maximum levels. These periods are typically in the morning and evening rush hours when most people travel to and from work.

Table 4-27: Service Assumptions

	Days/year	Service Characteristics	Peak	Off Peak
Weekday	252	Service Hours	5.5	11.5
		Frequency (min.)	15	30
		Round Trips	22	23
Weekend/Holiday	113	Service Hours	4.5	9.5
		Frequency (min.)	30	30
		Round Trips	9	19
Annual Total	365	Service Hours	1,894.5	3,971.5
		Round Trips	6,561	7,943

Layovers are the time allowed at a transit stop between arrival and departure for the purpose of turning vehicles, recovery of delays, and preparing for the return trip. The minimum layover varies by mode and vehicle. For BRT and streetcar alternatives, a total of 10 minutes of layover per round trip was assumed. For LRT alternatives, 15 minutes of round-trip layover was assumed, while commuter rail was calculated using an assumption of 20 minutes per round trip (approximately 10 minutes per terminus).

O&M Cost Assumptions

O&M costs for each alternative were calculated by multiplying the anticipated revenue hours required to maintain service headways of 15-30 minutes by the mode-specific, 2017 cost per revenue mile assumed for the Oklahoma City area, as shown in Table 4-28. Headway is how often the vehicle arrives at the station in the same direction. To produce a reasonable estimate, 2012 NTD average national cost per revenue mile statistics were reduced by a factor of 0.24 to regionalize the data. This factor was derived by comparing known local bus revenue hour costs for Oklahoma City to the national average for bus. Once 2012 costs were determined, they were escalated to 2017 values using an inflation factor of 3% per year.

Table 4-28: Cost per Revenue Hour

Mode	2012 National Average	2012 Oklahoma City	2017 Oklahoma City
Commuter Rail	$501.00	$403.04	$467.23
Light Rail	$257.00	$206.75	$239.68
BRT	$151.00	$121.47	$140.82
Streetcar	$189.00	$152.04	$176.26

Because of the preliminary nature of this study, the number and location of maintenance facilities associated with each alternative is undetermined. In order to maintain a fair comparison among alternatives, the estimated costs developed for this analysis do not include maintenance facilities or operational costs for deadhead mileage. A deadhead is the movement of the vehicle without passengers, typically for the purpose of getting to or from a maintenance or layover facility to passenger operations.

O&M Cost Projections

Table 4-29 summarizes the annual O&M cost projections for each of the preliminary alternatives. As shown below, for any given alignment, BRT is the least expensive technology to operate while commuter rail and LRT are the most expensive.

Table 4-29: Annual O&M Cost Projection Summary (in millions of dollars)

	Commuter Rail	LRT	Streetcar	BRT
Alternative N1	$4.8	–	–	–
Alternative N2	–	$4.8	$3.5	$2.8
Alternative N3	–	$5.2	$3.5	$2.8
Alternative N7	–	–	$3.8	$3.1
North Corridor Streetcar Ext.	–	–	$2.3	–
Alternative E1	$3.5	–	–	–
Alternative E1+ (to Tinker AFB)	$3.5	–	–	–
Alternative E1A	–	–	$2.6	$2.0
Alternative E5	–	$3.5	$2.6	$2.0
Alternative E6	–	–	$3.5	$2.8
Alternative S1	$5.2	–	–	–
Alternative S2	–	–	$3.8	$3.1
Alternative S4	–	–	$3.8	$3.1

4.6 Evaluation Results Summarized

Based on the evaluation results in the Detailed Evaluation, the remaining alternatives were presented to the CentralOK!go Steering Committee, corridor workgroups, and the public to select the LPA for each corridor. This discussion is presented in Chapter 5.

This Page intentionally left blank.

5.0 Selection and Description of the Locally Preferred Alternatives for Each Corridor

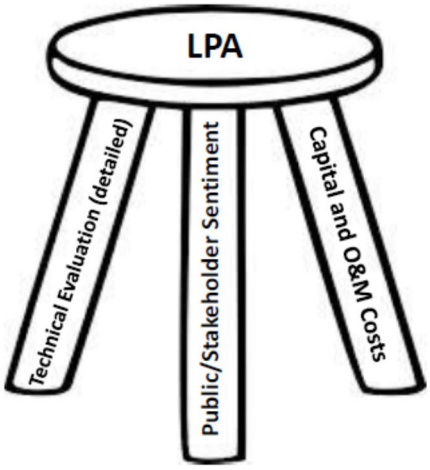
5.1 Introduction

In July 2014, the CentralOK!go Steering Committee selected a Locally Preferred Alterative (LPA) for each study corridor. The LPAs included an alignment and high-capacity transit mode, and were based upon detailed evaluation of several preliminary alternatives within the corridors, estimated capital and operating & maintenance (O&M) costs, and community and stakeholder input received over the course of the study. The Steering Committee's LPA selections were subsequently approved by the ACOG Board of Directors in October 2014.

5.2 Methodology

The Steering Committee considered three primary factors in the identification of an LPA for each corridor:

- Capital costs for construction and on-going operation and maintenance costs,
- Technical feasibility and detailed evaluation, and
- Public and stakeholder sentiment.



This approach ensures that the LPA for each corridor represents the best transit solution from a technical, funding, and public support standpoint. The LPAs from the individual corridors must also enhance the overall transit system to best serve the Central Oklahoma region.

The CentralOK!go study recommendations provide a starting point for advancing high-capacity transit services in the region. While each corridor was evaluated independently for its ability to serve potential customers, it is imperative that the recommended improvements work together as a regional system. This is important for many reasons, including ease of use for transit patrons, operability for the regional transit partners, garnering public support, and securing regional and federal funding to build and operate the system.

The detailed evaluation, cost estimates, and public survey results were reviewed and considered by the Steering Committee at a workshop in May 2014. The committee reached preliminary agreement on the North and South Corridor LPAs at the workshop, but requested additional information and coordination with representatives of the East Corridor. Further discussions were held with Tinker AFB officials and project partners in Del City and Midwest City. The Steering Committee reached final consensus on the LPAs for the three corridors at its July 17, 2014 meeting.

5.2.1 LPA Public and Stakeholder Outreach

Workgroup Meetings

Final workgroup meetings were held for each of the three corridors in spring 2014. The workgroups included individuals who live and/or work in each study corridor, as well as the downtown Oklahoma

City area, and represented a broad range of views, backgrounds, and interests. A detailed description of the CentralOK!go workgroups and other public outreach activities is provided in Chapter 7.

The North Corridor Workgroup meeting was held on April 29, 2014. Detailed evaluation results, including estimated ridership and costs, were presented and Alternative N1 (BNSF rail ROW), using commuter rail technology, was the highest rated alignment and mode by the workgroup.

The South Corridor Workgroup meeting was held on April 30, 2014. Alternative S1 (BNSF rail ROW) and commuter rail technology were the highest rated alignment and mode among that workgroup as well.

The East Corridor Workgroup meeting was held on May 21, 2014. Alternative E1 (using UP rail ROW and state-owned abandoned rail ROW) was the highest rated alignment by the workgroup, but by a smaller margin than in the other corridors. Further, rail was preferred over bus technologies but workgroup members were divided on the specific type of rail technology. Results from the workgroup meetings are presented in Figure 5-1.

As a reminder, the locations of the preliminary alignments for each study corridor are reflected on the following pages in Figure 5-1 for the North Corridor, Figure 5-2 for the East Corridor, and Figure 5-3 for the South Corridor.

Figure 5-1: North Corridor Alternatives

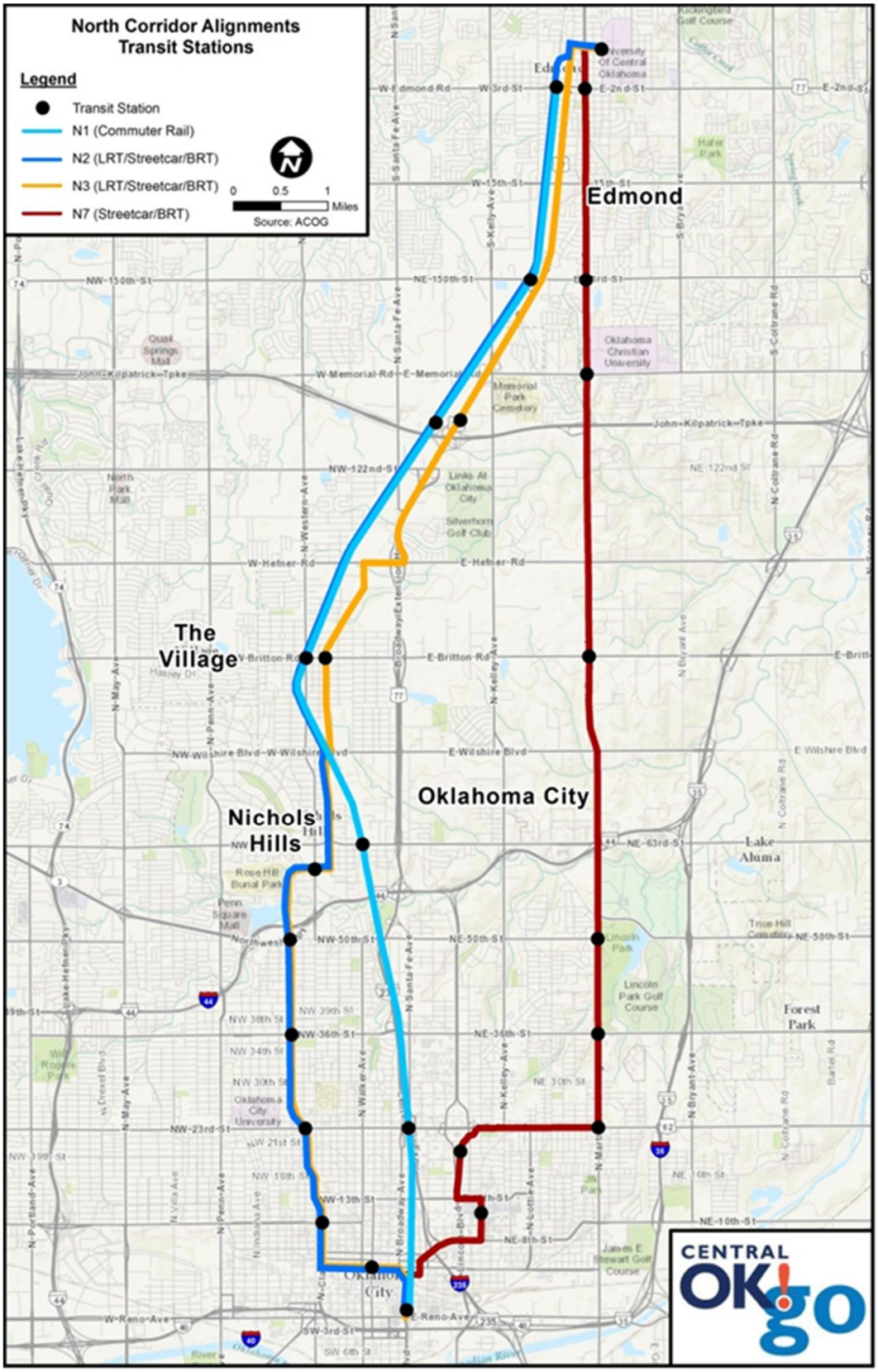


Figure 5-2: East Corridor Alternatives

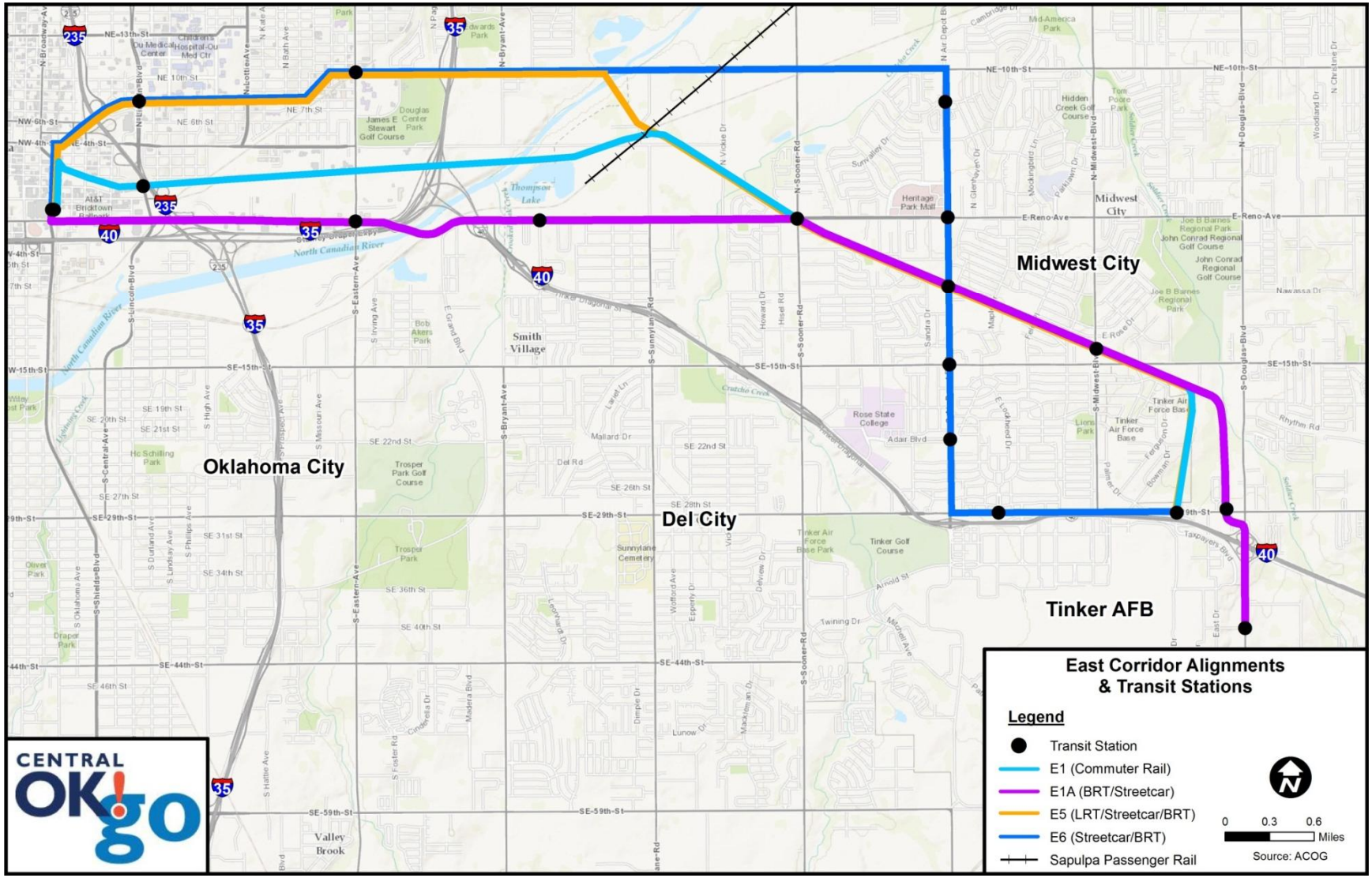


Figure 5-3: South Corridor Alternatives

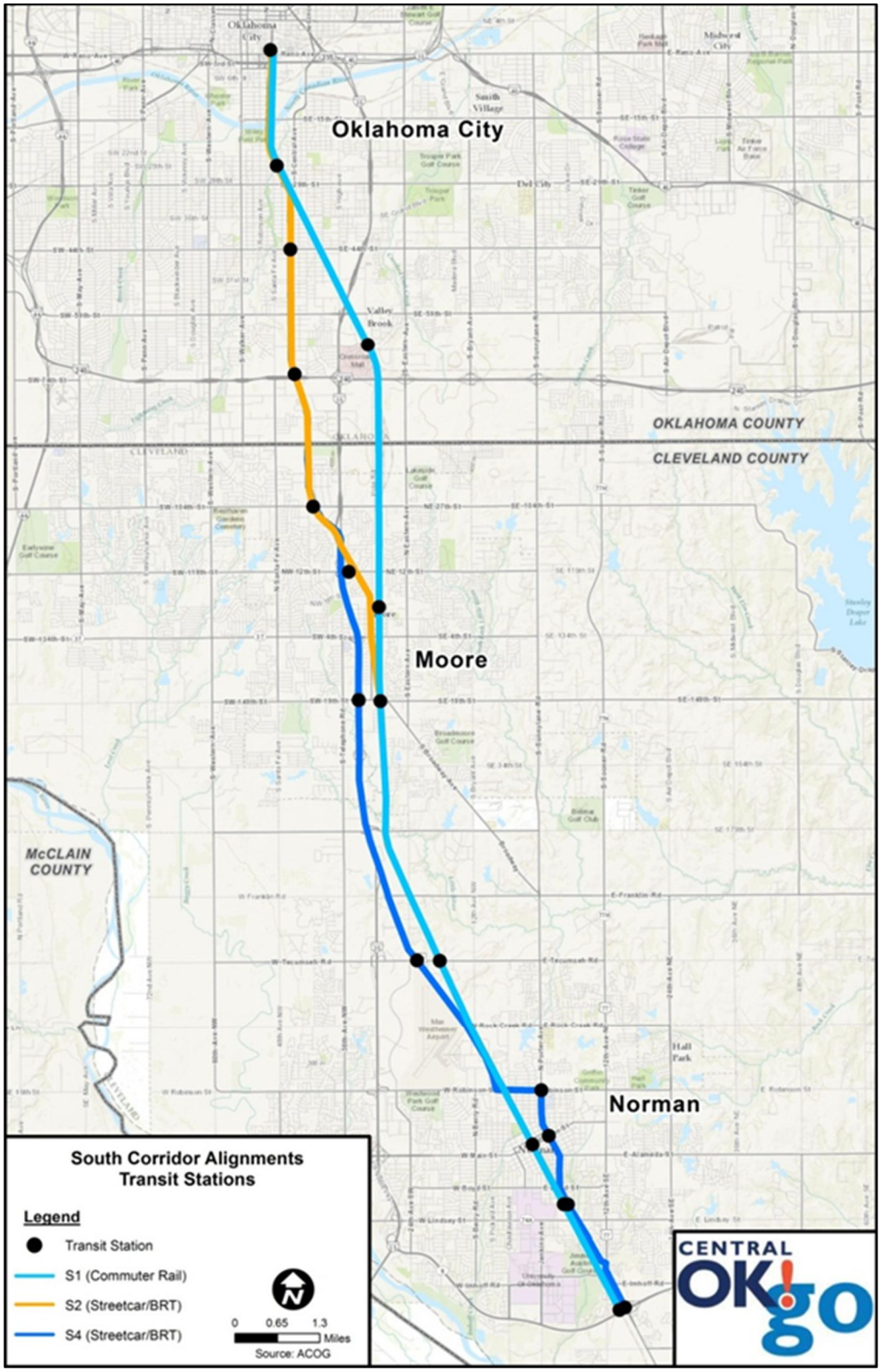
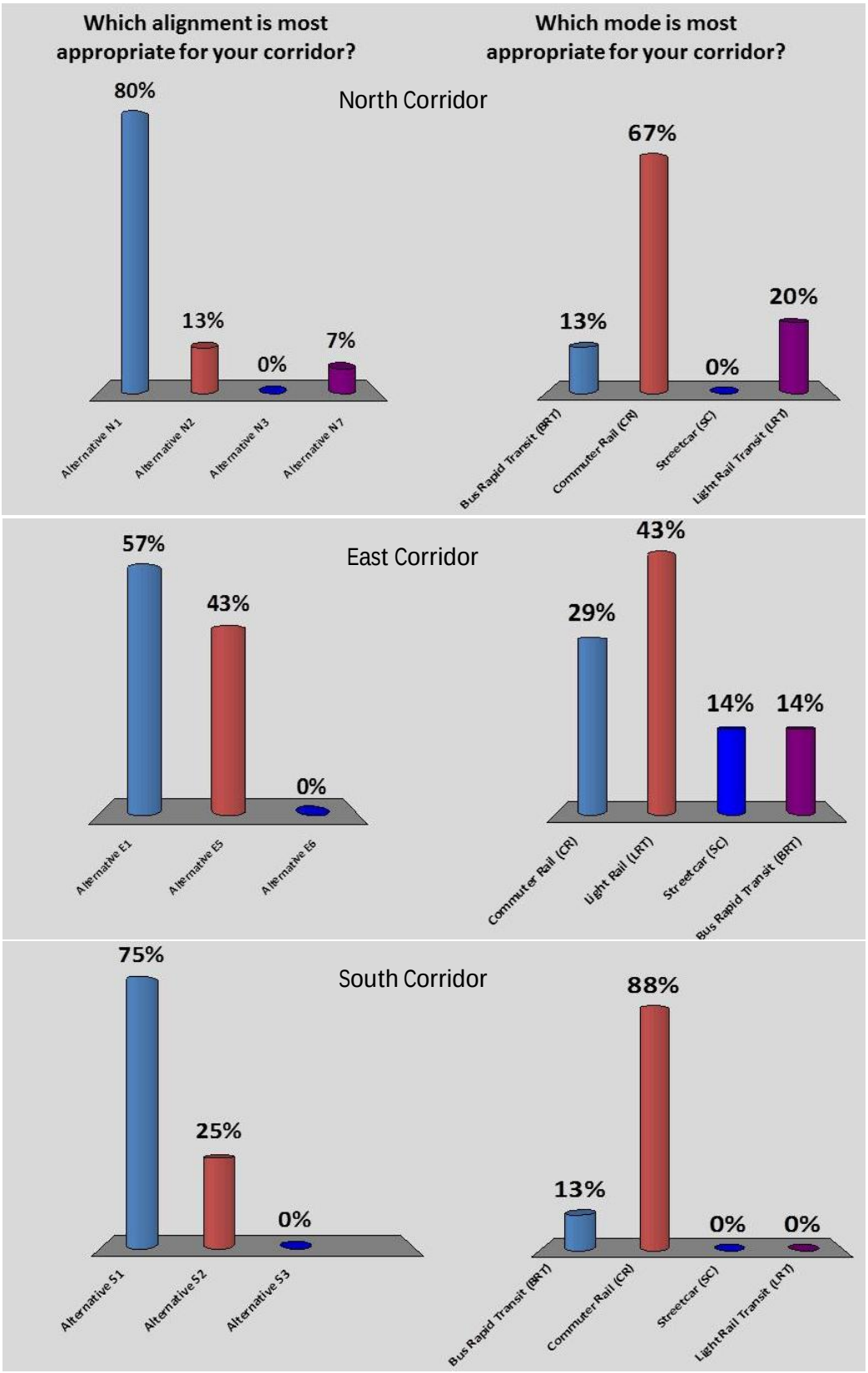


Figure 5-4: Community & Stakeholder Workgroup Survey Results



Public Outreach (Road Shows)

In an attempt to reach a broader audience during the final phase of the study, project representatives reached out to interested citizens at outdoor and family-focused events that occurred throughout May 2014 in the three corridors. Citizens were asked to complete a brief survey to provide comments on their preferred alignment and mode. Road shows were set up at the following locations, along with a second webinar in late May, with nearly 200 surveys completed in total:

- Urban Land Institute (ULI Members) – Oklahoma City (May 1, 2014)
- May Fair Arts Festival – Norman (May 3, 2014)
- University of Central Oklahoma – Edmond (May 6, 2014)
- University of Oklahoma – Norman (May 7, 2014)
- Rose State College – Midwest City (May 14, 2014)
- Premiere on Film Row – Oklahoma City (May 16, 2014)
- Touch-a-Truck – Edmond (May 17, 2014)
- Old Town Farmers Market – Moore (May 22, 2014)
- Edmond Jazz and Blues Festival – Edmond (May 24, 2014)
- Made in Oklahoma Wine, Beer, and Food Festival – Midwest City (May 31, 2014)
- Webinar #2 (May 28, 2014)

North Corridor

In the North Corridor, 65 surveys were completed at the four road shows. The surveys resulted in the following figures when participants were asked about their preferred alignment: Alternative N1 (64%); Alternative N2 (24%); Alternative N7 (8%); and Alternative N3 (5%). When respondents were asked about their preferred mode, rail alternatives received 84% support, while bus received 16%. While the percentages were different, the webinar also revealed the same results regarding preferred alignments and modes.

East Corridor

Two Road shows were held in the East Corridor, garnering survey responses from approximately 60 citizens who live or work in the corridor. When respondents were asked about their preferred alignment, Alternative E1/E1A received 38% support, Alternative E5 received 30% support, and Alternative E6 received 32% support. When asked about their preferred mode to serve the East Corridor, rail came in at 80%, while bus was preferred by 20% of respondents. The webinar revealed similar results for both alignments and modes, although with slightly different percentages.

As described in the previous chapter (Sec. 4.1.2), the project team determined that a variation on Alternative E1, termed Alternative E1A, should be considered due to the fact that the Transportation Demand Modeling (TDM) results pointed to travel time between downtown Oklahoma City and Tinker AFB being the most important factor in estimated ridership.

South Corridor

Four Road shows in the South Corridor accounted for nearly 60 surveys being collected. The surveys showed citizen support for the preferred alignment in the following distribution: Alternative S1 (82%); Alternative S2 (15%); and Alternative S4 (3%). Rail was the preferred mode by a large margin (93%) compared to the bus alternatives (7%), when citizens were asked about their choice of mode. The webinar also revealed similar results, focusing on Alternative S1, using a rail technology.

5.2.2 Steering Committee

The detailed evaluation, cost estimates, and workgroup and public survey results were presented to the Steering Committee at a workshop on May 30, 2014. This allowed the committee to review detailed information, discuss the alternatives and analysis results, and consider the public feedback in their deliberations. The committee then voted on the preferred alignment and mode in each corridor. The committee reached preliminary agreement on the North and South Corridor LPAs at the workshop, but requested additional information and coordination for the East Corridor.

The committee asked the project team to solicit additional feedback from leaders in the East Corridor in order to more definitively understand their alignment and mode preferences. Activities included meetings with Tinker AFB officials and with project partners Del City and Midwest City, as described below. The results were provided at the Steering Committee meeting in July 2014, at which time the committee reached consensus on the LPA for the East Corridor. Results of the additional East Corridor stakeholder outreach are discussed below. As was noted previously, Alternative E1A was developed after much of the analysis was completed, as an attempt to improve upon Alternative E1.

East Corridor Stakeholder Meetings

Tinker Air Force Base – June 16, 2014
The project team met with officials from Tinker AFB on June 16, 2014. In general, leadership from the base was supportive of offering transit service to the base, and did not have a strong opinion on the specific transit technology. Security at Tinker AFB will need further evaluation, and internal circulation is a vital aspect of the project.

While other locations could be served, Tinker officials believe that service to Buildings 3001 and 9001 are the most important stops on the base. Building 3001 has a high concentration of Tinker "shift-work" employees. Enhanced access to regional activity centers and events are important for on-base personnel and their families. Tinker officials noted that internal circulator buses would have to be housed on-base, and believed that offering a transit circulator has the potential to alleviate current and future parking issues on the base.

Tinker AFB had previously requested that a transit questionnaire be completed by base personnel. The Tinker Mass Transit Questionnaire was distributed and about 3,400 questionnaires were completed. Of those who returned the questionnaire, 78% said that they would commute via transit if available, with 54% saying that they would use transit five or more times per week. Currently, the base sees about 15% of the respondents carpooling at least once per week. Stop locations and round trip costs are seen as the most important aspects in terms of encouraging ridership. Tinker officials also noted the existing "Transit Benefit Program", where federal employees receive $130 per month if they agree to ride transit or vanpool at least three times per week. Providing a regional transit link to the base supports this effort as well.

Midwest City Council – July 8, 2014
The project team provided an overview of CentralOK!go and answered questions from Midwest City Council members on July 8, 2014. At that time, city staff provided a new variation on Alternative E5.

Del City – July 10, 2014
On July 10, 2014, the project team met with the mayor, city manager, and planning staff of Del City. The team provided an overview of the East Corridor alternatives that were under consideration. Del City leadership favored a rail alternative, specifically the E1A (Streetcar), as this would provide the best frontage for Del City and the best economic development potential.

Meeting with Midwest City – July 14, 2014
The project team met with the Midwest City Community Development Director on July 14, 2014 to discuss the East Corridor alternatives under consideration. The director supported a rail alternative, and noted that direct connections to the Health Sciences Center and Tinker AFB would be important. As discussed above, this information was presented to the Steering Committee during its July meeting.

5.3 Regional Transit System

On July 17, 2014, the CentralOK!go Steering Committee formalized its consensus on the LPAs, shown in Figure 5-5. These alignments are the favored transit routes and modes per corridor stemming from the study analysis, public input, and community preferences for the Central Oklahoma region.

The system comprised of the North, South, and East Corridors, will focus on north-south Commuter Rail service extending between Edmond and Norman with intermediate stops in Oklahoma City and Moore and east-west streetcar service between Oklahoma City, Del City, Midwest City, and Tinker AFB. As part of the LPAs, two streetcar corridors (North and East) are recommended as extensions of the downtown Oklahoma City streetcar. All planned service will connect to the future downtown Santa Fe Intermodal Hub, which will also be served by a modern streetcar circulator and bus, providing a distribution network in downtown Oklahoma City.

While all three corridors were evaluated independently, the focus was to develop a regional system that could provide a single-seat ride for both north-south and east-west travel. This approach will help make the system understandable and user friendly for transit riders.

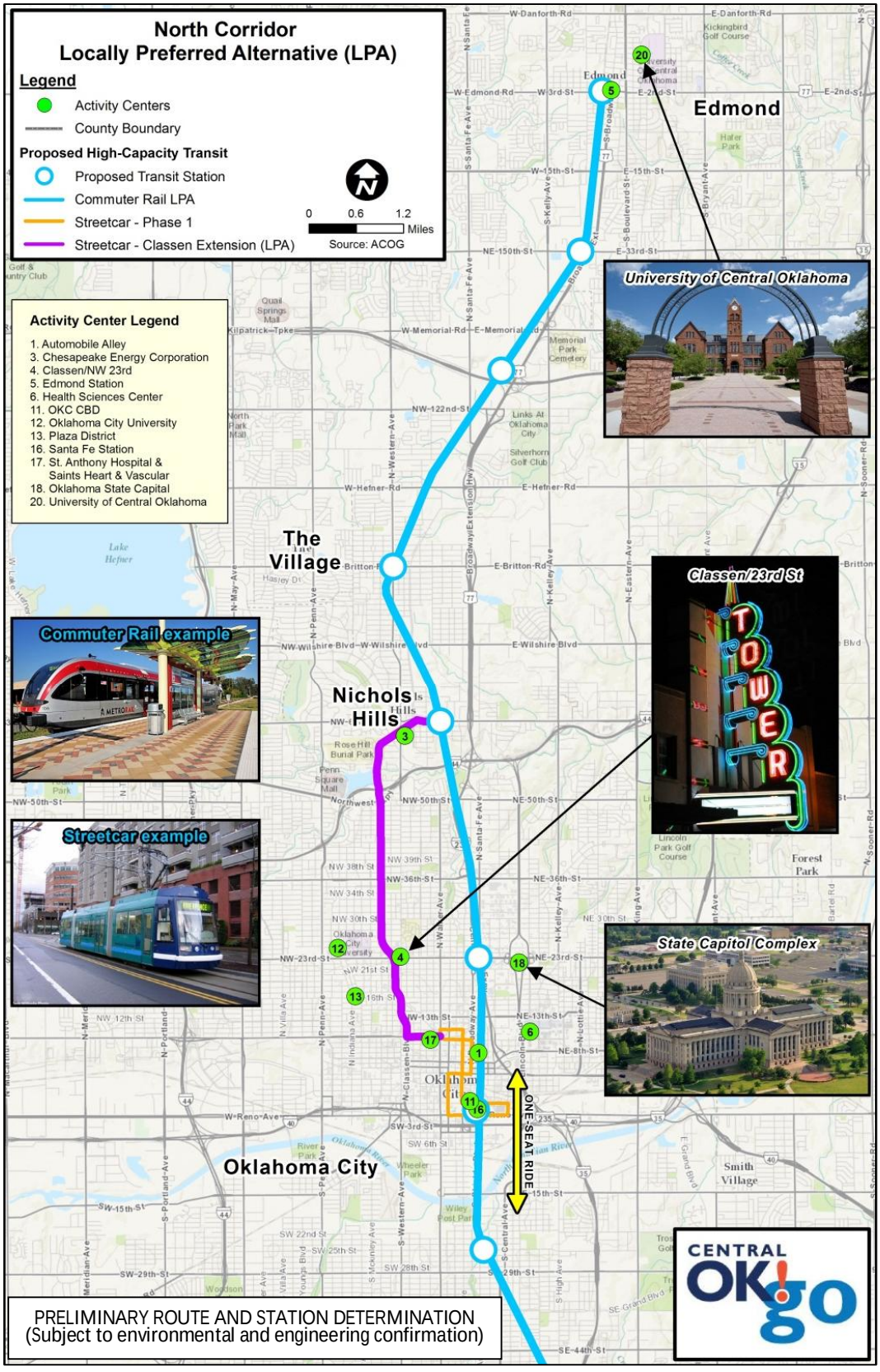
5.4 North Corridor LPA

The North Corridor, providing a one-seat ride between downtown Edmond and Norman, with service to the Intermodal Hub, was recommended to be served by commuter rail, as illustrated in Figure 5-6. The existing Burlington Northern Santa Fe (BNSF) Railroad right-of-way would be utilized wherever possible along the 14-mile alignment. Additionally, a five-mile extension of the downtown Oklahoma City streetcar is recommended to run along Classen Boulevard between NW 10th Street and Walker Avenue to NW 63rd Street to provide a connection to a future commuter rail station near the Chesapeake Energy campus. Using 2013 dollars, capital costs for commuter rail are estimated between $260 million and $360 million, with the streetcar route expansion estimated between $270 million and $370 million. Ongoing operating and maintenance costs are estimated at $5 million per year for the commuter rail and $2.5 million per year for the streetcar extension. For the forecast year 2035, commuter rail ridership for the North/South Corridor (between Edmond and Norman) is projected to reach approximately 5,700 daily riders. For the extension of streetcar service to the rail station near the Chesapeake Energy campus, daily ridership is expected to reach about 2,100.

More detailed information concerning projected ridership and estimated costs is provided in Appendix A and Appendix B, respectively, to this Central Oklahoma Community Corridors Study Report.

Figure 5-5: ACOG Commuter Corridors LPAs

Figure 5-6: North Corridor LPA



5.5 East Corridor LPA

The East Corridor recommendation, shown in Figure 5-7, would connect Tinker Air Force Base, Midwest City and Del City to the downtown Intermodal Hub via streetcar. Also recommended, is an internal circulator on Tinker Air Force Base that would be operated by the base. Capital costs for this 9-mile streetcar are estimated between $320 million and $440 million in 2013 dollars, with an estimated operating and maintenance cost of $2.5 million per year. Streetcar ridership is estimated at 2,300 per day by 2035. This alignment would use abandoned railroad right-of-way in Midwest City and Reno Avenue to provide direct access to the Intermodal Hub for connections to the Oklahoma City streetcar and future commuter rail services to Edmond and Norman.

5.6 South Corridor LPA

The South Corridor recommendation would connect the downtown Intermodal Hub and Norman extending to State Highway 9 via commuter rail, illustrated in Figure 5-8. Existing BNSF right-of-way would be used as available along the 17-mile route. The combined alignments of the North and South Corridors would allow for a one-seat ride between Norman and Edmond. Capital costs for commuter rail between Norman and Oklahoma City are estimated between $310 million and $410 million, with an estimated operating and maintenance cost of $5.5 million per year, all using 2013 dollars. Commuter rail ridership for the entire North/South Corridor (between Edmond and Norman) is projected to reach approximately 5,700 daily riders by 2035.

Figure 5-7: East Corridor LPA

Figure 5-8: South Corridor LPA

6.0 Funding

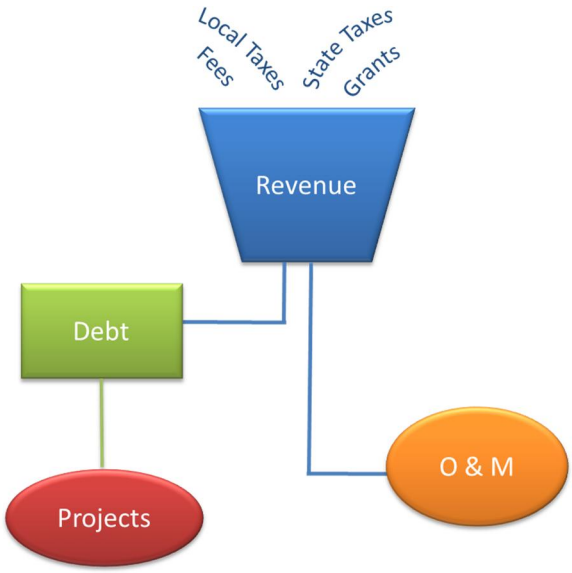
6.1 Introduction

This chapter presents the funding strategies that could be implemented to advance the Locally Preferred Alternatives (LPAs) identified during this study as a system in conjunction with other transit improvements in the region. As the projects in each corridor are advanced and integrated into an overall transit system with enhanced bus service and investments in the downtown Oklahoma City streetcar, the cumulative benefit and utility generated will be critical to the process of identifying funding options for the system. Discussions about funding occurred throughout the project during meetings of the Steering Committee and the Governance Subcommittee, and will continue. The funding review describes potential revenue sources for the Central Oklahoma regional transit system, contains information about how some peer systems were established and funded, and provides additional information on specific funding sources that were discussed during the project.

The list of revenue sources included in this report is not intended to be exhaustive. It was generated based on sources utilized for transit in other regions and includes some other sources that are enabled in Oklahoma but not necessarily used for transit or transportation. During the course of CentralOK!go, additional data such as yield or current funding levels was developed for certain revenue sources and has been included in this report for information purposes only. There is no intent to endorse one revenue source over another at this point in system development.

6.2 Transit Funding Needs

When considering funding sources, it is important to understand transit system capital and operating needs. There are no public transit systems in the U.S. that generate a profit. Therefore, operations and capital expenditures for transit systems must be funded publicly, although there have been instances where the private sector has participated in the funding of transit.



Capital funding needs are periodic and can be accomplished through pay-as-you-go programs or through bonding with debt service payments. While there are pay as you go programs in the U.S., most major metropolitan areas have utilized bonds or other loan mechanisms to initiate and expand their fixed guideway transit systems. Bonds require a dedicated funding source that is enabled over many years (15 or more, typically).

Capital needs include:

- New Investments/Expansion – Fixed guideway systems have funding packages very similar to roadway programs. The Federal Transit Administration (FTA) has a number of major investment

funding and loan programs designed to assist regional/local transit investments. In FY 2011, FTA provided about 41% of the funding for transit investments in the U.S. Because of competition and limited funds, this participation level continues to decline.

- Vehicles – Rolling stock to provide capacity on transit systems is purchased with the implementation of new service. However, the life cycle of vehicles is considerably shorter than the infrastructure built to support them and, therefore, must be refurbished and/or replaced on an ongoing basis. The typical railcar for instance, has a useful life of 25 years, while buses last 12 years.
- Stations/Stops – Providing access to transit requires the development of safe and secure places for passengers to wait for the next train or bus. Stations must have amenities for passengers to sit, pay their fare and make connections to other modes.
- Maintenance and other Support Facilities – Buildings for administration, operation and maintenance of the system are required if the system is to operate effectively and efficiently.
- State of Good Repair/Life Cycle Costs – There are expenses related to upkeep and enhancements to transit systems that go beyond the annual maintenance activities. Replacing obsolete technology or certain elements (railroad ties, lighting, signal systems, etc.) are considered capital expenditures.
- Debt Service – If bonding is utilized to make the initial investments then paying off the bond with interest is an ongoing expense for the transit system.

Operating needs include:

- Service Delivery – A transit system needs operators, mechanics, hostlers, supervisors, safety officers, training specialists, dispatchers, schedulers, customer service representatives and a number of other employees in order to operate effectively.
- Maintenance – The vehicles and system elements must be cleaned and maintained on a regular basis.
- Administration – In addition to managing the system, transit administration includes customer service, government relations, grant writing and planning for the system.
- Police/Security – Safety and security are critical to maintaining and improving ridership on a transit system.

During CentralOK!go, the project team was asked to provide a high level, rough order-of-magnitude assessment of the financial need for a Central Oklahoma regional transit system. The assessment included long-term (50 years) capital, operating and maintenance costs for a system that would include the LPAs from the Commuter Corridors Study, the downtown Oklahoma City streetcar, potential BRT improvements, and expanded local bus service to better serve the region and to feed and support the fixed guideway improvements. The regional transit system would likely need in the range of $75-$100 million of regional funding on an annual basis, based on the following assumptions:

- Steady but moderate growth in revenue stream over time
- Revenue from federal sources as well as fares for all services in the system – each mode could generate a different level of farebox return with a cumulative average of 20% of operating costs.
- Service levels of the three bus systems currently operating in Central Oklahoma will be increased by 50% over current levels. New bus routes would also be developed to serve areas that currently have no bus service. Costs reflect capital requirements and operations for this proposed bus expansion.
- Operation of the MAPS 3 streetcar and future expansion
- Capital and operating expenses for the three LPA's defined by CentralOK!go

- Investment in high capacity transit to the west, including the airport
- Annual capital maintenance of the system based on 1.5% of the original investment in each corridor
- Annual fleet replacement of rolling stock for all modes, as warranted
- Expansion of the existing paratransit system commensurate with system growth

The region's next step will be the development of a System Plan that would include a more defined financing plan based on any new information regarding dedicated revenue streams and more detailed cost information for the system. The System Plan should lay out a project development schedule with cash flows.

6.3 Revenue, Financing and Funding Definition

The definitions of revenue, financing, and funding are important to consider as the information included in this report is reviewed and utilized. *Revenue* is defined as the income generated from taxes, fees, grants or other sources. *Financing* relates to the use of bonding and loan mechanisms to generate large amounts of revenue, but must be paid back with dedicated revenue streams. The term "*funding source*" is sometimes used interchangeably with revenue, but for the purposes of this report, the term *funding* refers to the packaging of revenue sources and financing mechanisms used to create sufficient cash flow for a program of projects. A funding plan (that specifies funding sources and projects) has not been developed for CentralOK!go, but a review of potential revenue sources and financing options has been prepared and included in the following sections.

6.4 Traditional Revenue Sources for Transit

Traditional transit funding sources are commonly used by transit agencies, municipalities, and other entities to help fund capital improvement projects or system operations. One of the primary sources of both capital and operating funds are federal grant programs administered by the FTA. In addition to federal grants, a number of bond programs are also available. These sources are summarized below. Revenue sources are summarized in Table 6-3 with detail of how they are used in Oklahoma. During the course of this project, yields for some of the revenue sources were estimated and provided as additional information.

6.4.1 Federal Transit Administration (FTA) Programs

FTA New Starts/Small Starts/Core Capacity Program (§5309)

New Starts funds are for the construction of new fixed guideway systems or extensions to existing systems. Small starts are for capital projects less than $75 million and total capital costs less than $250 million. These funds can be used for expenditures related to capital costs only. They are distributed to recipients via a full funding grant agreement (FFGA) in annual payments that typically extend beyond the construction period for major projects. The New Starts funding is competitively awarded and federal participation in an awarded project is typically less than 50% of the total project cost. Federal participation has decreased over the years, primarily because of the increase in the number of projects nationally. Moving Ahead for Progress in the 21st Century (MAP-21), the federal transportation authorization bill enacted in 2012, added core capacity projects to the list of eligible projects under the New Starts Program. Existing fixed guideway systems can access program dollars for projects that increase system capacity by 10% or more. Congress did not add additional funding to the program for core capacity, so the new provision increased the competition for funding.

FTA Urbanized Area Formula Program (§5307)

The urbanized formula funding provides dollars for capital and operating assistance in urbanized areas (UZA) as well as transportation-related planning. The formula is based on the UZA's population, population density and transit service statistics. Based on the formula, the revenue coming to the region should increase as more service is introduced to the region and as the population continues to grow. It is difficult to estimate the future §5307 revenue because it is highly dependent on the amount authorized at the federal level. Currently, the Oklahoma City region receives about $9 million in §5307 funds. The urbanized formula is also broken down into three categories based on population that have different regulations governing eligible expenditures and the formula itself. The City of Norman is considered a small urban program (population between 50,000 and 200,000) and receives its revenue through the State. The other categories are for cities with population over 1 million and cities with populations between 200,000 and 1 million (Oklahoma City and Tulsa).

FTA Bus and Bus Facilities (§5309)

There is a small portion of 5309 funding that is set aside for bus and bus facility purchases. This is a discretionary program where dollars are made available to transit systems based on need and the availability of 20% local match. It is typically reserved for small to mid-sized systems. Larger systems can access this source but at a lower percentage of federal participation. In the past, FTA has accepted coordinated proposals for bus purchases from multiple systems.

FTA State of Good Repair (§5337)/Fixed Guideway Modernization (§5309)

A percentage of §5309 funds was partitioned away from New Starts and the Bus/Bus Facilities program for the modernization of existing rail systems and new fixed guideway systems. This was a formula-based program that was activated once a fixed guideway facility had been in operation for seven years. Under MAP-21, however, the Fixed Guideway Modernization Program was removed and a new formula program focused on core capacity and state of good repair was added to the FTA program under §5337.

Other FTA Programs

There are several smaller formula funding programs offered by FTA for transit support activities such as planning, training, research, drug testing programs and system oversight. Other discretionary programs include transit oriented development (a pilot program authorized in 2014) and ferry operations. FTA will also be introducing a discretionary program to support projects that enhance system safety and security.

6.4.2 Federal Highway Administration (FHWA) Flexible Programs

The National Highway Performance Program (NHPP), the Surface Transportation Program (STP) and the Transportation Alternatives Program (TAP) are formula programs provided by FHWA that can be used for transit projects. The decision to "flex" dollars from these programs to transit must be vetted through the State and the MPO and there are specific regulations for the type of transit projects eligible.

Transportation Investment Generating Economic Recovery (TIGER)

Under the current administration, USDOT has released several rounds of grant programs for "shovel-ready" transportation projects through the Transportation Investment Generating Economic Recovery (TIGER) program. TIGER projects must have demonstrable transportation and economic benefit. It is unclear how many more rounds of funding will be released.

Rail Line Relocation & Improvement Capital Grant Program (RLR)

The Federal Railroad Administration (FRA) maintains the Rail Line Relocation & Improvements Capital Grant Program (RLR) to assist state and local governments in mitigating the adverse effects created by the presence of rail infrastructure. The program, first funded in 2008, is part of a number of programs supported by FRA to promote safety, research and disaster assistance related to railroads.

6.4.3 Fare Revenue

Fare revenue includes farebox revenue, bus and rail passes, and rideshare revenue from vanpool programs. While most agencies dedicate these revenues to transit operations and maintenance costs, a few agencies, including New York MTA and Chicago Metra Rail, have used this revenue stream to support capital programs. Based on national averages, fare revenues range from 15% to 40% of system operating expenses depending on mode of service. Typically, commuter based systems that generally provide longer trips generate a higher percentage of operating revenue from the farebox. Regional policy has an enormous impact on fare revenue generation. There have been a number of systems with lower than average farebox recovery rates primarily because they set fares low to maximize ridership and locally dedicated taxes were in place.

Sales and Property Taxes

The two most common revenue streams for generating local funding for transit are sales and property taxes. Sales tax revenues support 60% (*TCRP 129, 2009*) of all local investment for transit in the U.S.; while property taxes generate 29%. Sales and property taxes are typically a very stable form of revenue although they can be impacted negatively by economic downturns.

Sales taxes have a better nexus with transit because a significant portion of the revenue can be generated by visitors. Property taxes are typically used for city services like fire, police, etc. and generally have limited capacity to fund major transit systems. There are many mid-sized systems that depend on local general funds for operations and must continually navigate the local budgeting process year to year. This is a very limiting factor for transit, because planning is typically restricted to the short-term future. Without some reasonable expectation of long-term revenue streams, transit systems cannot reasonably react to changing transportation demands.

Legislation in Oklahoma authorizes the establishment of regional transit authorities and allows them to levy a sales tax up to 2% within their service area. A 1% (penny) sales tax would generate between $180 and $200 million in revenue annually in Central Oklahoma depending on the limits of the jurisdiction in which the tax was collected.

6.5 Non-Traditional Revenue Sources for Transit

A number of taxes and fees are relatively commonplace at the state and regional level across the United States, but are not frequently used for transit. These include various user fees, motor vehicle registration fees, truck registration and use taxes, and parking fees. User fees are collected from users and include tolls and congestion pricing. Revenues from tolling and congestion pricing can be applied to finance transit improvements for services that provide alternative transportation to and within the priced area. Motor vehicle registration fees and truck registration and use taxes may also be categorized as a type of indirect user fee, not associated with an actual trip. More information about non-traditional revenue sources for transit is provided in this section.

6.5.1 Hotel/Lodging Tax

Most cities have taxes and/or fees imposed on lodging within their jurisdictions from which revenue is used for a number of purposes related to chambers of commerce, tourism boards and as a general fund source. Oklahoma City directs 5.5% of hotel/motel room rentals toward its convention center and other tourism development purposes, as shown in Table 6-1.

Table 6-1: Hotel Tax Yields in Central Oklahoma (FY 13)

Jurisdiction	Hotel Tax Rate	Annual Revenue	Room Sales	Estimated Revenue		
				0.50%	1.00%	1.50%
Del City	3.5%	$55,000	$1,570,000	$7,850	$15,700	$23,550
Edmond	4.0%	$378,000	$9,450,000	$47,000	$95,000	$142,000
Oklahoma City	5.5%	$13,000,000	$236,360,000	$1,182,000	$2,364,000	$3,545,000
Midwest City	5.0%	$582,000	$11,640,000	$58,000	$116,000	$175,000
Norman	5.0%	$1,550,000	$31,000,000	$155,000	$310,000	$465,000
Moore	5.0%	$300,000	$6,000,000	$30,000	$60,000	$90,000
Totals		$15,865,000	$296,020,000	$1,479,850	$2,960,700	$4,440,550

Source: City budgets, EPS; 2014.

6.5.2 Transportation Development Districts/Tax Increment Financing (TIFs)/ Special Assessment Districts

Transportation Development Districts (TDDs) create a beneficiary-based revenue source for developing communities to help raise funds for transportation improvements. Special Assessment Districts generate revenue by ensuring compensation for governmental units for public projects that create a benefit within the district.

Similarly, tax increment financing (TIF) is a type of special assessment district that focuses on capturing the increase in property value as a result of redevelopment attracted by infrastructure improvements. The tax increment is typically used to repay bonds that were dedicated to fund capital improvements, leading to an increase in value and tax returns. Urban renewal projects are a specific type of TIF used to pay off general obligation bonds for specific improvement projects.

Improvement districts are enabled in Oklahoma and the term “special assessment district” specifically connotes a private sector assessment that is agreed to by property owners within the district.

6.5.3 Real Estate Transfer Tax (Stamp or Document Tax)

Real estate transfer taxes can be imposed by states, counties, or cities on the sale of new houses. They vary greatly by state and city from 0.01% in Colorado to 4.0% in Pittsburgh, PA and typically roll into the general fund of the jurisdiction implementing the tax. Commonly called document or stamp tax, Oklahoma has a real estate transfer tax of $0.75 per $500 of value. The data in Table 6-2 represent a simplified estimate for yield based on set transaction fee. Oklahoma’s rate would translate to $375 for the sale of a home worth $250,000.

Table 6-2: Estimated Yields for Real Estate Transfer Tax in Central Oklahoma (FY 13)

	Housing Units	Annual Turnover 5.0%	Transfer Fee – Revenue					
			$100	$200	$300	$400	$500	$600
Edmond	32,386	1,600	$160,000	$320,000	$480,000	$640,000	$800,000	$960,000
Oklahoma City	257,492	12,900	$1,290,000	$2,580,000	$3,870,000	$5,160,000	$6,450,000	$7,740,000
Midwest City	25,388	1,300	$130,000	$260,000	$390,000	$520,000	$650,000	$780,000
Norman	49,137	2,500	$250,000	$500,000	$750,000	$1,000,000	$1,250,000	$1,500,000
Moore	21,828	1,100	$110,000	$220,000	$330,000	$446,000	$550,000	$660,000
Totals	386,231	19,400	$1,940,000	$3,880,000	$5,820,000	$7,760,000	$9,700,000	$11,640,000

Note: Del City data was not available.
Source: Trulia, EPS; 2014.

6.5.4 Motor Fuel Tax

All states have a motor fuel tax that generates revenue for transportation purposes. With very few exceptions, these funds are used only for projects to construct, rehabilitate, or maintain roadways and bridges. There are some states that allow the revenue generated from their fuel tax to be spent on transit projects. The State of Oklahoma collects 16 cents per gallon on gasoline (13 cents per gallon on diesel fuel) and generates 6% of its overall budget through motor fuel taxes. Oklahoma has also imposed a motor fuel special assessment fee of 1 cent per gallon to fund projects that remove or clean up underground storage tanks.

6.5.5 Parking Fees

Revenues from parking fees are generally associated with metered parking and fees for parking in publically owned parking lots. Parking fees are typically implemented by local governments, especially in areas where parking supply is limited. These types of revenue have a good nexus with urban core transit facilities like streetcar and other circulator services because the higher parking fee can encourage transit use.

6.5.6 Vehicle Registration Fees

New motor vehicle registration fees are also in place in most states. Oklahomans pay $21-$91 per vehicle depending on age and value of the automobile/truck. These funds are often used to fund automobile related services like the Department of Motor Vehicles and in some cases the state police. There are instances, where a regional registration fee has been tacked on to the state fee for transportation purposes.

6.5.7 Car Rental Receipts Tax/Fee

A gross rental receipt tax on motor vehicle rentals is in place in Oklahoma at 6% of the rental fee. This type of revenue source is typically used to fund airport development since many car rentals occur at airports. There are two regional transit systems in North Carolina (Triangle Transit and Piedmont Area Regional Transit) that use this revenue stream for transit. The vast majority of car rentals occur at Will Rogers World Airport and would generate $3.5 million per year from an increase of $5.00 on the fee.

6.5.8 "Sin" Taxes

There are a number of taxing mechanisms grouped under the heading of "sin" taxes that have existed at the state level for some time. The revenue sources are often used to fund public health programs, education and public information campaigns. While rarely used for transit investment, the City of Portland, Oregon, and the Commonwealth of Pennsylvania have used "sin" tax revenues to fund transit projects. Tobacco taxes, alcohol and other beverage taxes, and gaming taxes all fall under this category. Oklahoma imposes $1.06 per pack tax on cigarettes and has standard taxes and fees (Tribal Gaming Act) in place for gaming facilities. Oklahoma imposes an 18% tax on all pari-mutuel wages.

Oklahoma also participates in national lotteries as well as operates a lottery within the state. The proceeds are funneled to public education.

More detail on many of these revenue sources are included in Table 6-3.

Table 6-3: Funding Sources

	Source	In Use in Oklahoma	Rate in Oklahoma	Application	Comments
	City				
1	Sales Tax	Yes	3.5 to 4%	General or Specific	OKC 3.875%, Midwest City 3.85%, Edmond 3.75%, Norman 3.5%, Del City 3.5%, Moore 4%. Cities rely on sales tax for general operations. No statutory maximum total sales tax rate. State receives 4.5% in addition to the local rates.
2	OKC Metropolitan Area Projects (MAPS)	Yes	1.00%	Specific	OKC has 1% of current rate dedicated to MAPS 3 program projects. MAPS 3 is dedicated 1% of total City 3.875% rate. Funds $777M of infrastructure including a downtown area streetcar. Expires in 2017.
3	Property Tax	Yes	0-16.00 mils	Specific	Edmond 0 mils, OKC 16.00 mils, Midwest City 6.09 mils, Norman 9.47 mils. Cannot be used for general fund purposes. All dedicated to Sinking Fund.
4	OKC Hotel Tax	Yes	5.50%	Specific	Revenues are specified for convention and/or tourism development.
5	Special Assessment District	Yes	Varies	Specific	City initiated improvement district. Requires approval of property owners.
6	Tax Increment Finance (TIF) District	Yes	Varies	Specific	Established under OK Local Development Act. Oklahoma City has 8 existing districts, 6 property tax and 2 sales tax districts. Not limited to URA defined areas of blight.
7	Urban Renewal Projects	Yes	TIF	Specific	Tax increment financing (TIF) to pay for general obligation (GO) or revenue bonds for specific area improvements.
	County				
1	Sales Tax	Yes	0 to 0.25%	General or Specific	Maximum total county rate is 2%. Cleveland County has 0.25% rate. Oklahoma County does not have a sales tax.
2	Property Tax	Yes	23.97 mils	General	Primary county revenue source. Requires a county wide vote to increase.
3	Business License Fee	Yes	$20	General	Fee for sales tax license. Fees for liquor related businesses higher.
	Regional or State				
1	EMBARK	Yes	Parking fees, bus fares, and transit grants	Specific	COPTA runs EMBARK and manages 5 downtown garages and 3 surface lots.

Table 6-3: Funding Sources

	Source	In Use in Oklahoma	Rate in Oklahoma	Application	Comments
2	Regional Transportation Authority	No	up to 2%	Specific	Can be multiple cities or counties or defined subareas of either. Requires a majority vote. Can levy sales tax.
3	Real Estate Transfer Tax	Yes	0.15%	General	Commonly called doc or stamp tax. Rate is $0.75 per $500 of value. Can be imposed by states, counties, or cities. Vary greatly by state and city from $0.1 in CO to 4% in Pittsburgh, PA.
4	Motor Fuel Tax	Yes	$0.16 per gallon ($0.13 per gal. for diesel)	General	Rate established in 1987. Accounts for 3% of total tax revenue in the State. Tax rate is $0.13 per gallon for diesel. Government and Tribes are exempt and fuel tax paid on farm equipment can be refunded.
5	Motor Fuel Special Assessment Fee	Yes	$0.01 per gallon	Specific	In addition to motor fuel tax. Primarily used for underground storage unit removal and other environmental mitigation related to fuel storage.
6	Motor Vehicle Registration Fee	Yes	$21 to $91/year	General	Strong nexus. Not likely to generate enough funding for major capital investment
7	Motor Vehicle Excise Tax	Yes	3.25%	General	8% of total State tax revenue
8	Pari-Mutuel Tax	Yes	18.00%	General	18% of all race track wagers.
9	Rental Car Tax	Yes	6.00%	General	State revenue source. In addition to sales tax rate
10	Tobacco Tax	Yes	$1.03 per pack	General	4% of total state tax revenue. State revenue source.
11	Tribal Gaming Act	Yes	4-6% of AGR	General	4% on annual gross revenues (AGR) less than $10 M, 5% on $10 to $20 M, 6% over $20 M on electronic games. 10% on table games. State received $122 M in 2011.
12	State Lottery	Yes	Profits	Specific	Raises $70 M per year dedicated to public education. Not meeting expected $150 M per year projections.
13	Regional Highway Flexible Funds	Yes	State Allocation	General	Federal highway funds allocated for MPO projects by ACOG through the TIP funding process – includes STP, TAP and CMAQ
14	Public Private Partnership (P-3)	No	Lease	Specific	Long term contract to finance, build and operate a transit line or system under a long term lease. Also includes joint development, site specific shuttles and employee/student pass programs

Table 6-3: Funding Sources

	Source	In Use in Oklahoma	Rate in Oklahoma	Application	Comments
			Federal		
1	FTA Section 5305 – Metropolitan Planning Transit; and Section 5513 – Statewide Transit Planning	No	Planning Grants	Specific	Planning grants only. Maximum 80% federal funds.
2	FTA Section 5307 – Urban Area Formula Program	Yes	State Allocation	Specific	When FHWA funds are flexed to transit technology, become 5307 funds and follow those grant rules and regulations. Includes activities permitted under the former Job Access and Reverse Commute (JARC) program.
3	FTA Section 5310 – Capital Grants Program for Elderly	Yes	State Allocation	Specific	Annual allocation of federal funds to large urban, small urban and rural areas of the State. Can be used for capital and operating funds for transit programs to assist primarily elderly and disabled persons. Includes activities permitted under the former New Freedom Program that go beyond ADA requirements.
4	FTA Section 5309 – New Starts/Small Starts/Core Capacity	No	Grants	Specific	Funding for major investments and requires a full-funding grant agreement (FFGA) with FTA. Core capacity grants require 10% increase in capacity of an existing system.
5	FTA Section 5309 – Bus and Bus Facilities	Yes	Grants	Specific	Funding for major bus or bus facility purchases.

6.6 Additional Revenue Streams

Other revenue options involve creating additional revenue streams through lease agreements, advertising, concessions, and other non-transportation activities. Transit agencies often provide services in addition to their regularly scheduled services. These are most often provided to governmental entities, businesses, health and social service agencies, and educational institutions. Transit agencies are also known to generate revenue through leasing portions of their physical facilities. Revenue is frequently collected through vehicle and facility advertising agreements, concessions with commercial and retail enterprises to operate at transit facilities, and revenue collected from freight rail operators operating on publicly owned track. These types of funding sources do not typically have high yields although there are exceptions.

6.6.1 Motor Vehicle Emissions Tax

Emission taxes are fees based on engine size paid by automobile owners at the time of registration or state inspection. Texas has a similar program only for trucks called the Texas Emission Reduction Plan (TERP). This is a surcharge on the purchase of diesel-powered, on-road motor vehicles with a gross vehicle registered weight exceeding 14,000 lbs. and can applied to both new and used vehicles purchased inside or outside the state. Emission taxes are not currently authorized in Oklahoma and may not be appropriate since Oklahoma is currently in attainment under federal Ambient Air Quality Standards.

6.6.2 Mobility Tax

Some regions in the U.S., primarily in the Pacific Northwest, have experimented with the use of a mobility tax to generate revenue for transportation projects including transit. Mobility taxes can be considered a type of user fee because they are based on the mileage of an automobile. Collections are typically made at the time of a safety inspection. Yields can be quite variable, depending on how they are structured, but they generate revenue from heavy users of the transportation system. Mobility taxes have a good nexus with transit because the revenues can go toward “congestion proof” alternatives. Conceptually, the average automobile owner would pay for miles over a designated annual amount. Then a fee is charged for every 1,000 miles over that threshold.

6.6.3 Payroll Taxes

Payroll taxes are typically imposed directly on the employer for the amount of gross payroll paid for services performed within the transit district. They can be administered by the state revenue agency on behalf of transit agencies or jurisdictions authorized to raise and expend the revenue.

6.6.4 Private Sector Participation

There are several ways that the private sector has participated in funding transit projects but almost all require that the company makes a profit. Common methods for private participation are operating agreements for shuttles and other services, employee/student pass programs, shared parking and joint development. The private sector also participates on a much larger scale through project delivery which is described in the next section.

6.7 Financing Mechanisms

The programs outlined in this section are methods for creating cash flow for major investments and are commonly used for transit projects. They typically require a dedicated revenue source to ensure payback. Project sponsors must have a credit rating commensurate with the size and type of financing instrument.

6.7.1 Transportation Infrastructure Finance and Innovation Act (TIFIA)

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides Federal credit assistance to major transportation investments in the form of direct loans, loan guarantees, and lines of credit. It is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital and credit rather than grants. Eligible applicants include state and local governments, transit agencies, railroad companies, special authorities, special districts, and private entities. Projects with dependable revenue streams are best suited for TIFIA loans. Other regions have received TIFIA funding for transit, including the Washington Metropolitan Area Transit Authority (WMATA) for their capital improvement program and the Transbay Joint Powers Authority (San Francisco, California) for construction of a new multi-modal transportation center. The Project Connect Financial Plan in Austin, Texas incorporates the use of a "TIFIA-like" bond to finance a portion of its Vision Plan. It assumes the influx of cash for major investments with similar repayment terms typically required in a TIFIA loan.

6.7.2 Railroad Rehabilitation & Improvement Financing (RRIF/RIF)

The Federal Railroad Administration and some states have financing programs, like Railroad Rehabilitation & Improvement Financing (RRIF/RIF), specifically designed to assist project sponsors with financing major railroad improvement projects. These programs operate much like the TIFIA program.

6.7.3 Bonds

Other notable financing instruments frequently used throughout the country include bond programs administered at both the federal and local levels. Grant Anticipation Notes (GANs) are revenue bonds that are backed by anticipated grant receipts. They typically do not count against a jurisdiction's local debt limitations. General Obligation (GO) Bonds are issued by municipalities, counties, states, and special districts and are generally long-term and repaid along with tax-exempt interest from general revenues of the issuing jurisdiction. These bonds are secured by "full faith and credit" of the issuing jurisdiction and not a specific tax or revenue source. This commitment mandates repayments of the debt with interest regardless of the source of funds.

6.7.4 Public-Private Partnerships

For very large projects, public-private partnerships (PPP or P3) can be critical to creating the cash flow needed for the project. The most common PPP in transit is through design-build contracting or taking it several steps further, design-build-operate-maintain-finance (DBOM-F). Neither of these arrangements is currently authorized in Oklahoma; but they represent private sector support in project delivery with project risks being shifted to the private sector. They can expedite project construction and reduce cost; however, must be paid back with public funds.

6.7.5 State Infrastructure Banks (SIB)

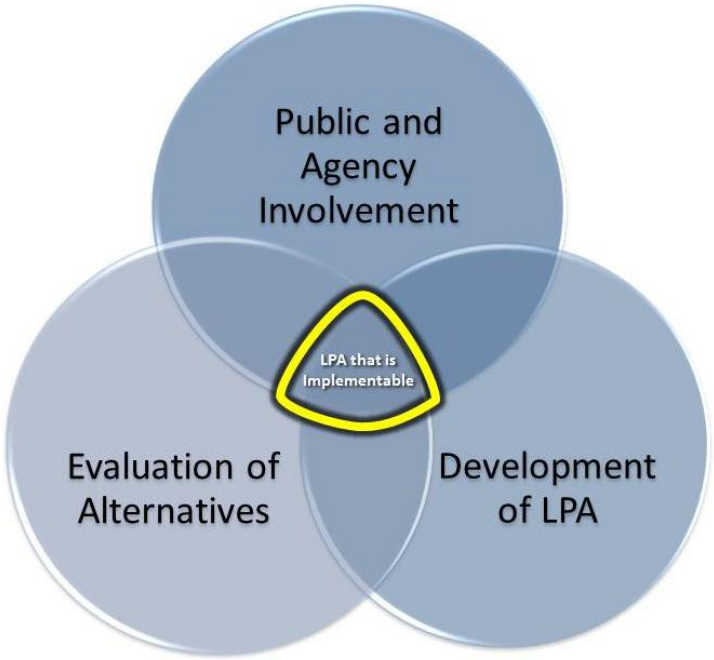
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorized every state to set up a State Infrastructure Bank (SIB) that can manage a revolving loan fund, provide credit enhancements, or issue bonds capitalized with seed money from federal and state sources. SIB loans represent a means by which transit agencies can exercise leverage in attracting and using the full range of local and regional funding sources available. Ohio's SIB program consists of separate federally-funded and state-funded accounts, providing assistance to highway, transit, freight rail, aviation, and bike projects. The program has made two transit loans totaling $7.4 million. Oklahoma established a federally-capitalized SIB in 1995 as a pilot program. However, no projects took advantage of the SIB primarily because interest rates at the time very reasonable (Brookings Institute, Banking on Infrastructure, 2012). MAP-21 does not impact this provision.

7.0 Public and Stakeholder Involvement

7.1 Introduction

The public involvement component of CentralOK!go was designed to engage both the community and stakeholders regarding high-capacity transit in the region and in particular the North, East, and South Corridors. With the input of individuals and groups, the Locally Preferred Alternatives (LPAs) for each corridor reflect community sentiment. ACOG's goals for the public involvement effort were as follows:

- Build awareness of the reasons for and benefits of conducting the Commuter Corridors Study
- Provide education on the study process itself and how it differs from previous studies
- Encourage early and continuous engagement of project stakeholders and the public
- Listen to the public and stakeholders and utilize their input in the study for collaborative results
- Build trust by proactively sharing project information
- Seek collaborative input on study alternatives and the criteria used to measure and evaluate the alternatives
- Provide stakeholders with clear, concise information about the proposed alternatives and the LPAs



Stakeholders for this project were defined as groups, organizations, and individuals who are affected by or have a direct interest in improving transportation in the three CentralOK!go commuter corridors. In general, these stakeholders included business groups, major employers, developers, students and administrators from the universities in the study area, professional and civic organizations, transit providers, and elected and appointed officials at all levels of government. In addition, it was important to communicate with and hear from the general public, neighborhood associations, and others who live and work within the corridors and have a general interest in transportation and transit in their community.

7.2 Approach

A variety of public involvement and outreach activities were conducted to solicit project input and keep stakeholders and the community actively engaged in the project. Due to the regional and diverse nature

of the study, several different approaches were used and three rounds of outreach were conducted, as described below. At the highest level, the overall study was guided by the Steering Committee, comprised of locally elected officials and private sector leaders within the three study corridors, as well as in downtown Oklahoma City where the corridors converge. Over the course of the study, the Steering Committee met ten times, including a half-day work session to review detailed evaluation results prior to selection of the LPAs.

Stakeholder and public outreach efforts included:

- Community and stakeholder workgroup meetings in North, East, and South Corridors and downtown Oklahoma City
  - ✓ Round 1: July 2013 (six meetings)
  - ✓ Round 2: November 2013 (three meetings)
  - ✓ Round 3: April/May 2014 (three meetings)
- Public Open Houses/Outreach
  - ✓ Round 1: November 2013 (four open houses)
  - ✓ Round 2: May 2014 (ten "road shows")
- Webinars
  - ✓ Webinar 1: January 2014
  - ✓ Webinar 2: May 2014
- Newsletters
  - ✓ Issue 1: January 2014
  - ✓ Issue 2: April 2014
- Executive Summary – January 2015

Workgroup activities closely tracked the milestones of CentralOK!go and included:

- Setting the study's goals and objectives;
- Identifying, screening, and selecting alignments and modes for more detailed analysis; and
- Reviewing the detailed analysis of each preliminary alternative and recommending an LPA for each corridor.

The study goals and objectives were developed by the Steering Committee and workgroups, and were presented at the public open houses and webinars, along with the identification, initial screening, and detailed evaluation of alignments and modes under consideration.

7.3 Public Involvement Round 1

Public involvement activities were used to convey information and to obtain feedback from Steering Committee, stakeholder and community members on the study process, potential commuter corridor alternatives, and ultimately the LPA for each corridor. During the first round of public involvement, CentralOK!go included the activities described below.

7.3.1 Study Start-Up Activities

A Public Involvement Plan (PIP) was developed early in the study to outline, describe, and provide a schedule for the upcoming public involvement activities. A project name and logo (CentralOK!go) was developed to help with project recognition and used to brand the website and all communication and materials shared with the public and stakeholders.

A project website (www.centralokgo.org) was established and linked to ACOG's website (www.acogok.org). The website was used as the primary portal to create awareness of the project, share information from the Steering Committee and workgroup meetings, and to advertise public open houses, webinars, newsletters, and other opportunities for public input. The first webinar, held in January 2014, was recorded and uploaded to the website along with a questionnaire that participants were encouraged to complete. ACOG's social media suite (blog, Facebook, Twitter) and newsletter (Momentum) were used to enhance the outreach of the project website.

7.3.2 Steering Committee Meetings

The Regional Transit Dialogue (RTD) was established by ACOG in 2009 to engage locally elected officials, policy stakeholders, private sector leaders, and the general public in a discussion about how the region could develop a more comprehensive public transportation system in the years to come. Specifically, the RTD was designed to address a number of key themes/concepts including:

- Development of a seamless regional transit system
- Exploration of dedicated funding sources and strategies
- Provision for more effective coordination and integration of regional transit services
- Improved integration between transit and land use

The RTD is managed by a Steering Committee (and subcommittees, as appointed). The Steering Committee advocates, guides and directs the RTD process and seeks to build consensus on opportunities for expanding regional transit services. Its recommendations are forwarded to the ACOG Board of Directors. The members of the RTD Steering Committee served as the CentralOK!go Steering Committee and its membership during the Central Oklahoma Commuter Corridors Study process are listed in Table 7-1.

Table 7-1: RTD Steering Committee Members

City/Organization	Members	Job Title
City of Del City	Hon. Brian Linley	Mayor
	Hon. Ken Bartlett	Councilmember
City of Edmond	Hon. Victoria Caldwell	Councilmember
	Hon. Elizabeth Waner	Councilmember
City of Midwest City	Hon. Jack Fry	Mayor
	Hon. Rick Dawkins	Councilmember
City of Moore	Hon. Jason Blair	Vice-Mayor
	Vacant	
City of Norman	Hon. Cindy Rosenthal	Mayor
	Hon. Tom Kovach	Councilmember
City of Oklahoma City	Hon. Mick Cornett (RTD Chair)	Mayor
	Hon. Pete White	Councilmember
Cleveland County	Hon. Rod Cleveland	Commissioner
Oklahoma County	Hon. Willa Johnson	Commissioner
Association of Central Oklahoma Governments (ACOG)	John G. Johnson	Executive Director
American Fidelity Foundation	Tom J. McDaniel	President
BancFirst	Jay Hannah	Executive Vice President-Financial Services

City/Organization	Members	Job Title
COTPA Board	Kay Bickham	Trustee
Chesapeake Energy Corporation	Vacant	
Devon Energy Corporation	Klaholt Kimker	Vice President–Administration
Greater OKC Chamber of Commerce	Roy Williams	President
The Humphreys Company	Blair Humphreys	Developer
KME Traffic and Transportation	Ken Morris	President
NewView Oklahoma	Lauren Branch	President/CEO
Norman Chamber of Commerce	Tom Sherman	Past Chairman
OKC Mayor's Committee on Disability Concerns	Pam Henry	Chair
Oklahoma City University	Craig Knutson	Chief of Staff/Office of the President
Oklahoma Health Center Foundation	Terry Taylor	Director of Planning and Operations
Oklahoma House of Representatives	Hon. Charlie Joyner	Representative District 95
Oklahoma State University-OKC	Natalie Shirley	President
Oklahomans for the Arts	Jennifer McCollum	Executive Director
OnTrac	Marion Hutchison	Chair, Executive Committee
Sandridge Energy, Inc.	Justin Byrne	Associate General Counsel
Saxum Strategies	Renzi Stone	President/CEO
Sonic Corporation	Cliff Hudson	CEO
Tinker AFB	Vacant	
University of Central Oklahoma	Tim Tillman	Sustainability Coordinator
University of Oklahoma	Danny Hilliard	Vice President – Government Relations

The RTD/CentralOK!go Steering Committee set the overall direction of the study, beginning with establishment of regional goals and objectives. Since this committee is comprised of public and private sector leaders, different perspectives on the benefits that a regional transit system could provide to the citizens and businesses of Central Oklahoma was a key asset. Steering Committee meeting dates are shown in Table 7-2.

Table 7-2: Steering Committee Meetings

Meeting Date	Primary Topic
Round One	
October 31, 2012	Organization and Vision; Committee Reports
January 23, 2013	OnTrac Rail Transit Presentation
March 14, 2013	Commuter Corridors Study Overview
June 5, 2013	Identification of Corridor Goals and Objectives; Summary of Findings on Potential Governance Structures
July 18, 2013	Review of Workgroup Findings; Introduction to Funding
Round Two	
October 10, 2013	Alignment Analysis and Screening Results
February 19, 2014	Public Involvement Recap and RTA Funding Options
Round Three	
April 23, 2014	Detailed Evaluation Results for the North Corridor
May 30, 3014	Work Session – Review of the North Corridor Results and Detailed Evaluation Results for South and East Corridors
July 17, 2014	Formalization of LPAs

The Steering Committee met in June 2013 to establish the goals for the study. At this meeting, the steering committee was divided into groups and asked to discuss and develop a list of goals for the study, which were subsequently shared with the full committee for further discussion and ranking. The results of the exercise and the resulting refined goals are shown in Figure 7-1 and Figure 7-2, respectively.

Figure 7-1: Results of the Steering Committee Goal Exercise

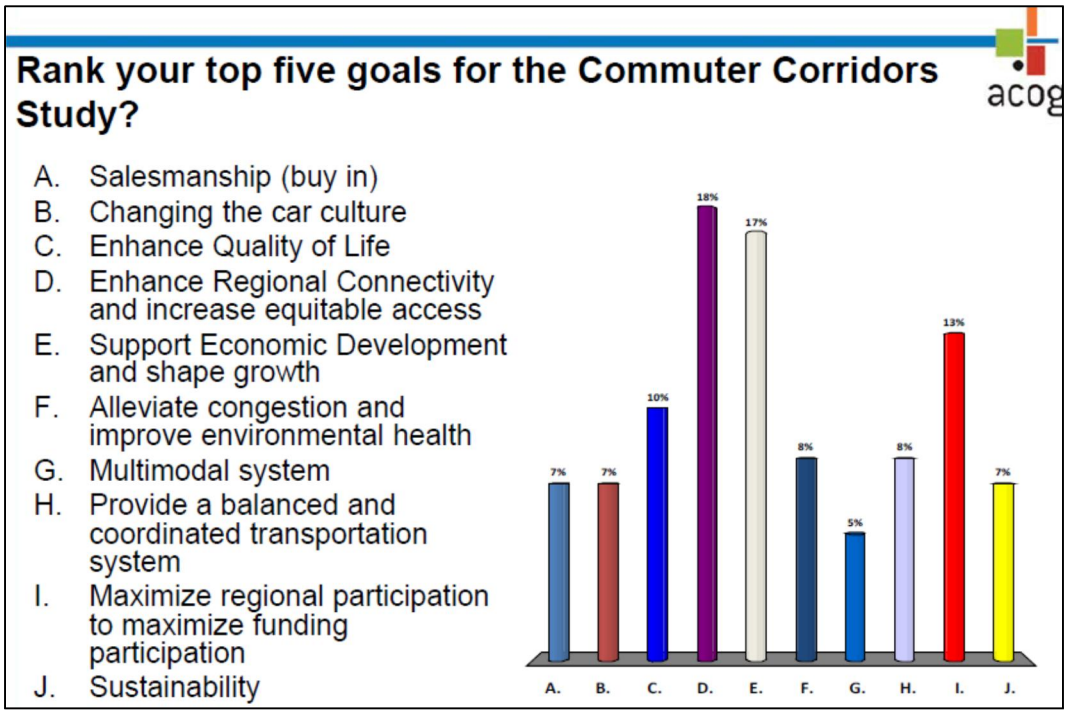
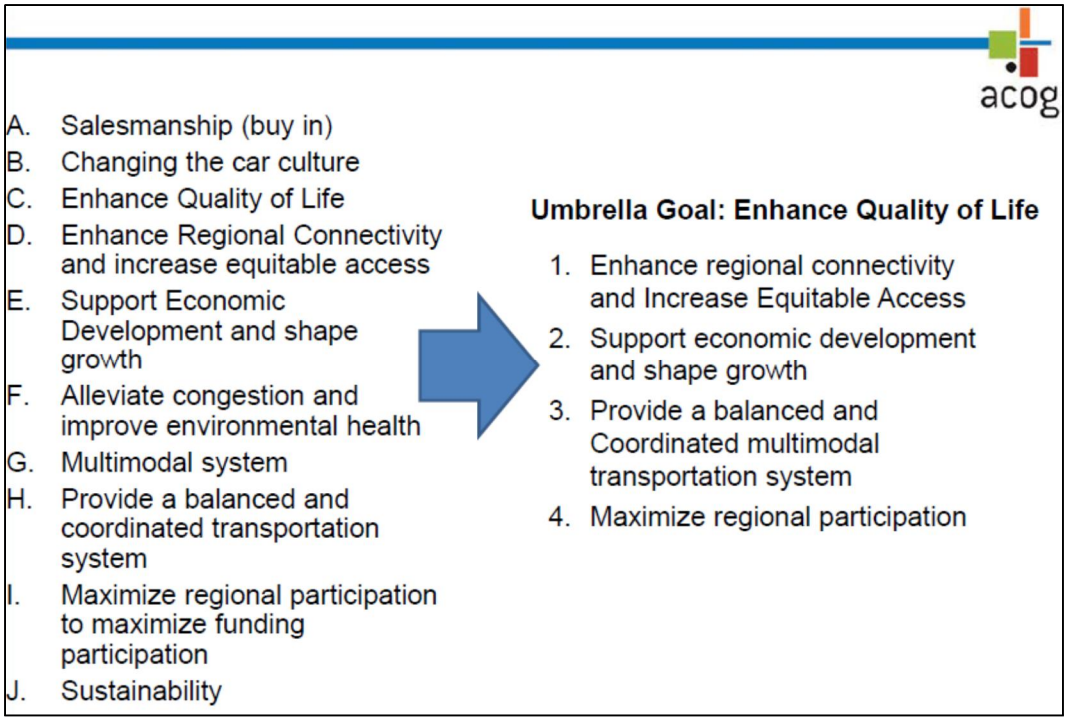


Figure 7-2: Refined Study Goals Based on the Steering Committee Goal Exercise



7.3.3 Stakeholder and Community Workgroups

In the summer of 2013, six meetings were held with stakeholders and members of the public who had agreed to serve on either a community or stakeholder workgroup. Community workgroup members were generally neighborhood residents and citizens. Stakeholder workgroup members included individuals representing businesses, agencies, civic organizations, local governments and other groups active in a particular corridor, as shown in Figure 7-3. In addition to the corridor workgroups, a downtown Oklahoma City workgroup was initially established to represent the interests of downtown businesses and residents where the three corridors overlap.

The first round of workgroup meeting dates and locations are summarized in Table 7-3. Both the Stakeholder and community workgroups were given information about CentralOK!go and were asked to review the corridor goals and objectives identified by the Steering Committee. Their role was to ensure that the overarching goals and objectives also applied to their respective corridors.

Table 7-3: Round 1 – Workgroup Meetings

Workgroup	Meeting Date/Location	Number in Attendance
South Corridor Stakeholder Workgroup	July 11, 2013 (2:30 to 4:15 PM)/City of Norman, Multi-Purpose Room, Norman, OK	25
South Corridor Community Workgroup	July 11, 2013 (6:30 to 8:15 PM)/City of Norman, Multi-Purpose Room, Norman, OK	10
North Corridor Stakeholder Workgroup	July 15, 2013 (2:30 to 4:15 PM)/Edmond Chamber of Commerce, Edmond, OK	12
North Corridor Community Workgroup	July 15, 2013 (6:30 to 8:15 PM)/Edmond Chamber of Commerce, Edmond, OK	8
East Corridor Stakeholder Workgroup	July 16, 2013 (2:30 to 4:15 PM)/The Reed Center, Midwest City, OK	13
East Corridor Community Workgroup	July 16, 2013 (6:30 to 8:15 PM)/The Reed Center, Midwest City, OK (Meeting was cancelled due to weather)	3
Downtown Oklahoma City Stakeholder and Community Workgroup	July 17, 2013 (11:30 AM to 1:15 PM)/ACOG, Oklahoma City, OK	15

Figure 7-3: South Corridor Workgroup (left) and Downtown Oklahoma City Workgroup (right)


Source: URS, July 2013.

The workgroups were also asked to review and rank the goals identified by the Steering Committee, and to identify any additional goals for consideration for their specific corridor. Within all of the workgroup sessions, the members ranked the Steering Committee's goals relatively evenly resulting in only a one percentage point difference among the goals. The workgroups were also asked to identify objectives for each goal. Finally, the workgroups were asked to identify additional goals and objectives specific to the corridor they represented to ensure that the alternatives would work both at the corridor level and system wide. Below are the additional corridor goals and the objectives identified by the workgroups.

Additional Goals Identified by Workgroups

- North Corridor Additional Goals
  - ✓ Provide an easy to use service with a focus on multimodal connections

- ✓ Maximize the ability to access local, regional, and federal funding to build and operate the service

- East Corridor Additional Goals
  - ✓ Provide for future transit growth through the preservation of existing freight rail corridors
  - ✓ Provide travel options to major activity centers, including "last mile" connections within the East Corridor and the region
- South Corridor Additional Goals
  - ✓ Provide a reliable and convenient transit service
  - ✓ Enhance the transit and land use nexus
- Downtown Oklahoma City Additional Goals
  - ✓ Promote regional awareness and partnerships
  - ✓ Service should be accessible, convenient, efficient, empower communities

Objectives Identified by the Workgroups for the Overall Study Goals

- Enhance Regional Connectivity and Increase Equitable Access
  - ✓ Maximize connection of major activity centers in the region
  - ✓ Provide a seamless connection to central Oklahoma City
  - ✓ Provide access to limited mobility (i.e., low-income and zero-car) populations
  - ✓ Maximize the use of dedicated ROW
- Support Economic Development and Shape Growth
  - ✓ Serve areas with highest projected population and employment densities
  - ✓ Maximize development and redevelopment opportunities
  - ✓ Serve areas slated for transit-friendly development (i.e., mixed use or transit-oriented development)
  - ✓ Ensure compatibility with current and future land use plans
- Provide a Balanced and Coordinated Multimodal Transportation System
  - ✓ Maximize ridership potential and frequency of service
  - ✓ Maximize opportunities for multi-modal connections (i.e., connections with major roadways, bike lanes, and bike/pedestrian facilities)
  - ✓ Provide transit service in the areas with the worst congestion
  - ✓ Reduce dependencies on the interstate highway system
- Maximize Regional Participation
  - ✓ Provide access and connections to a variety of jurisdictions in order to increase the number of potential funding sources available to the project
  - ✓ Ensure consistency with local comprehensive plans and the regional transportation plan (Encompass 2035)

During their July 2013 meeting, the Steering Committee received and accepted the additional goals identified by the workgroups for each corridor and the recommended objectives for the overall study goals.

7.4 Public Involvement Round 2

During Round 2 of the public involvement process, the focus was on communicating with and receiving input from the stakeholders and community about the alternative alignments and transit modes being considered for each of the commuter corridors. During the second round of public involvement, CentralOK!go included the following activities.

7.4.1 Project Website

The project website continued to be updated with new activities and information as it became available. The website was used to publicize the public open houses, workgroup meetings, webinar, and to share the presentations from the Steering Committee and workgroup meetings.

7.4.2 Steering Committee Meetings

In October 2013, the Steering Committee met to review the potential high capacity transit alignments identified by the project team in each corridor. The Steering Committee received maps of the potential alignments, the criteria used to analyze them based on the established goals and objectives, and the initial results of the analysis. The results of the Steering Committee's discussions on these topics were shared with the community and stakeholder workgroups and the public (during the public open houses and first webinar).

7.4.3 Stakeholder and Community Workgroup Meetings

A second round of workgroup meetings was held to gather input on the initial corridor alignment analysis and screening results, as well as the Steering Committee's recommendations for the detailed evaluation. The stakeholder and community workgroups were combined in each corridor (the Downtown Oklahoma City Workgroup met with the north corridor workgroup for this round), and meetings were held as shown in Table 7-4.

Table 7-4: Round 2 – Workgroup Meetings

Workgroup	Meeting Date /Location	Number in Attendance
South Corridor Stakeholder and Community Workgroup	November 5, 2013/JD McCarty Center, Norman, OK	16
East Corridor Stakeholder and Community Workgroup	November 6, 2013/The Reed Center, Midwest City, OK	14
North Corridor/Oklahoma City Stakeholder and Community Workgroup	November 7, 2013/Edmond Chamber of Commerce, Edmond, OK	12

Group discussions among workgroup members in the three workgroups resulted in the preferences for alignments in the three commuter corridors, as included in Table 7-5.

Table 7-5: Stakeholder and Community Workgroup Alignment and Mode Preferences

Alignment	Mode	Preference*
North Corridor		
N1 (BNSF)	Commuter Rail	80%
N2 (NW 4th, Classen, BNSF, and Ayers)	Light Rail/Streetcar	13%
N3 (NW 4th, Classen, Interurban, Hefner, Kelly, 2nd and Ayers)	Light Rail/Streetcar	0%
N7 (Reno, Lincoln, NE 36th, Springdale, MLK and Ayers)	Light Rail/Streetcar	7%
East Corridor		
E1 (UP)	Commuter Rail	36%
E5 (NE 8th, NE 10th, UP)	Light Rail/Streetcar/BRT	14% (Light Rail/Streetcar)
E6 (NE 8th, NE 10th, Air Depot, SE 29th)	Streetcar/BRT	29% (BRT) 21% (Streetcar)
South Corridor		
S1 (BNSF)	Commuter Rail	38%
S2 (Shields and BNSF)	Light Rail/Streetcar	38%
S4 (Shields, I-35, Flood, Robinson, Porter and Classen)	Light Rail/Streetcar	19% (LRT/SC) 6% (BRT)

*Percentages recorded on Turning Point instantaneous polling technology; rounding causes results over 100%

7.4.4 Public Open Houses

Public open houses (one in each of the three corridors and another in downtown Oklahoma City) were held to give the public an opportunity for input on the corridor goals and objectives, as well as potential alignments and modes of transit within the three corridors. The screening process for the alternatives in each corridor was explained. Open houses were publicized through the project website, a media advisory, and ACOG's contact list, social media sites, and newsletter. Open house dates, locations, and number attendees are shown in Table 7-6.

Table 7-6: Round 2 – Public Open House Dates and Locations

Open House Meeting	Meeting Date/Location	Number in Attendance
South Corridor Public Open House	November 18, 2013/Moore-Norman Technology Center, Norman OK	22
East Corridor Public Open House	November 19, 2013/Nick Harroz Community Center, Midwest City, OK	18
Central Public Open House	November 20, 2013/ACOG, Oklahoma City, OK	18
North Public Open House	November 21, 2013/Downtown Community Center, Edmond, OK (inclement weather)	8

At the open houses, the project team provided a brief presentation on the CentralOK!go study process and members were available to answer questions about the exhibits and maps on display. Participants were asked to complete a survey indicating their opinions on corridor goals and objectives, as well as potential alignments and mode of transit.

Fifty surveys were completed by all open house participants, indicating that 98% believed that high-capacity transit can be an effective transportation solution in Central Oklahoma. In general, participants preferred commuter rail alignments for all corridors, with BRT coming in second. The following is a summary of the public open house survey results:

- 50 surveys completed; 80% completion rate
- 98%: high-capacity transit can be an effective solution
- 100%: understand differences between modes
- 96%: alignment identification approach was appropriate
- 98%: open house was useful
- Commuter Rail Alignments (N1, E1, S1) preferred
- BRT second most popular mode

7.4.5 Project Newsletter

The first project newsletter was prepared in electronic and hard copy formats and distributed in January 2014. The purpose of this newsletter was to update readers on the activities conducted thus far in the CentralOK!go study, including the goals and objectives, steering committee and workgroup meetings, public open house results, and an upcoming webinar. The e-newsletter was prepared in Constant Contact and distributed electronically to ACOG's list of stakeholders and interested parties. The electronic version of the first newsletter had approximately 1,900 recipients. It had an open rate of about 30% and a click-through rate of nearly 11%. Hard copies of the newsletter were also made available at ACOG meetings, on local buses, and at libraries.

January 2014
http://centralokgo.org

Identifying Transportation Options
Steering Committee Reflects Community Preferences for Future Transit Options
Workgroups Offer Local Perspectives
Public Open Houses Offer Opportunities to Weigh in on Transit Possibilities

CENTRAL OK!go
CENTRAL OKLAHOMA COMMUTER CORRIDORS STUDY

CentralOK!go: Identifying Transportation Options for Central Oklahoma

Tim lives in Moore, drops his wife off in downtown Oklahoma City and then drives to work at Tinker Air Force Base every day. Melinda, a busy mother of three, commutes from Edmond to downtown Oklahoma City for her job at a local non-profit agency. Adam, a resident of Warr Acres, teaches at OU. Although these three individuals do not know each other, they have something important in common. They are all seeking options for their daily commute that might take them out of their cars and onto public transportation to save money, time, and the aggravation of driving on congested roadways.

The quest to identify options for moving large numbers of people between areas where they live and work is something that ACOG has been working on for some time. In December 2005, the region completed the Fixed Guideway Study, a long-range plan that identified transportation solutions to improve connections among Central Oklahoma's growth centers (e.g., Oklahoma City, Edmond, Norman, Moore, Midwest City) as well to enhance economic development opportunities and offer more transportation options to the public. The study resulted in a 2030 System Plan for Central Oklahoma that recommended corridors for further investigation of commuter rail, bus rapid transit, a downtown Oklahoma City streetcar system and an expanded bus system that would improve connections in public transportation throughout Central Oklahoma.

In 2013, ACOG began a new effort along the same lines: the Central Oklahoma Commuter Corridors Study, known as CentralOK!go. Building on the Fixed Guideway Study, CentralOK!go is an in-depth look at transit options for three major commuter corridors: a 14-mile corridor between downtown Oklahoma City and Edmond; a 10-mile corridor connecting downtown Oklahoma City to Del City, Midwest City and Tinker Air Force Base; and a 17-mile corridor connecting downtown Oklahoma City

Corridors Identified in the 2005 Fixed Guideway Study

and Norman through Moore. This study will provide more detailed analysis and information on an alignment (route for transit), technology (e.g., transit mode such as bus rapid transit, light rail, commuter rail), ridership forecasts, estimated costs, and potential funding sources for each corridor.

continued on page 2

7.4.6 Webinar

On January 21, 2014, an online webinar detailing CentralOK!go was offered to the community. The webinar covered the same information that was presented at the public open houses. Approximately 40 people participated in the live webinar and another 75 viewed the webinar after its initial airing. Webinar participants were asked to complete a brief survey and 31 completed surveys were recorded. Survey responses received as a result of the webinar generally were in agreement with those received during the open houses. The link to the recording of the webinar is located at https://www.youtube.com/watch?v=I3iHWr7NX94. Additional details on webinar survey results are summarized in Table 7-7.

Table 7-7: Webinar Survey Results – January 2014

Alignment	Total Votes	Vote by Mode
North Corridor Preferred Alternatives		
N2	15 votes	10 LRT; 5 BRT
N7	14 votes	7 Streetcar; 7 BRT
N1	12 votes	10 Commuter Rail; 2 Other
N3	11 votes	4 LRT; 1 Streetcar; 5 BRT; 1 Other
East Corridor Preferred Alternatives		
E6	14 votes	7 Streetcar; 7 BRT
E5	13 votes	9 LRT; 1 Streetcar; 3 BRT
E1	11 votes	10 Commuter Rail; 1 Other
South Corridor Preferred Alternatives		
S1	16 votes	15 Commuter Rail; 1 Other
S4	14 votes	4 Streetcar; 8 BRT; 2 Other
S2	10 votes	3 Streetcar; 5 BRT; 2 Other

7.4.7 Preliminary Alternatives Selected for Detailed Evaluation

In February 2014, the Steering Committee received feedback from the workgroup meetings and the public regarding their preferred alignments and modes. Table 7-8 presents the alignments and modes selected by the Steering Committee for detailed evaluation.

Table 7-8: Preliminary Alternatives Recommended for Detailed Evaluation

Alignment	Mode
North Corridor	
N1 (BNSF)	Commuter Rail
N2 (NW 4th, Classen, BNSF, and Ayers)	Light Rail/Streetcar
N3 (NW 4th, Classen, Interurban, Hefner, Kelly, 2nd and Ayers)	Light Rail/Streetcar
N7 (Reno, Lincoln, NE 36th, Springdale, MLK and Ayers)	Light Rail/Streetcar
East Corridor	
E1 (UP)	Commuter Rail
E5 (NE 8th, NE 10th, UP)	Light Rail/Streetcar/BRT
E6 (NE 8th, NE 10th, Air Depot, SE 29th)	Streetcar/BRT
South Corridor	
S1 (BNSF)	Commuter Rail
S2 (Shields and BNSF)	Light Rail/Streetcar
S4 (Shields, I-35, Flood, Robinson, Porter and Classen	Light Rail/Streetcar

7.5 Public Involvement Round 3

During Round 3 of the public involvement process, the results of the detailed evaluation of the preliminary alternatives were presented to the Steering Committee, the workgroups, and the larger community for feedback and guidance. The culmination of this process was the selection of LPAs for each commuter corridor. The Round 3 activities are described in the following sections.

7.5.1 Project Website

The project website was used to keep stakeholders and the general public up to date on the study's progress. In April 2014, the third round of workgroup meetings was announced, a series of community road shows was publicized, a second webinar was publicized and its recording posted, and the announcement of the recommended LPAs was made in July.

7.5.2 Steering Committee Meetings

In the final months of the study, the project team provided the Steering Committee with an in-depth review of the alternative alignments and modes for each of the three corridors, considering technical input and analyses, estimated costs, and public sentiment. Prior to selection of the LPAs in July 2014, the committee considered input received from the corridor workgroups, as well as surveys gathered from the community road shows and the April 2014 webinar.

7.5.3 Community and Stakeholder Workgroups

The third and final round of community and stakeholder workgroup meetings was held in late April and May 2014. Workgroup members were provided with the results of the detailed evaluation (including projected ridership and cost estimates) for the preliminary alternatives in each corridor and were asked for their input on a recommended LPA for their respective corridor. The workgroup meetings were held at the dates and locations shown in Table 7-9 below.

Table 7-9: Round 3 – Workgroup Meetings

Workgroup	Meeting Date /Location	Number in Attendance
North Corridor Stakeholder and Community Workgroup	April 29, 2014/Edmond Chamber of Commerce, Edmond, OK	15
South Corridor Stakeholder and Community Workgroup	April 30, 2014/City of Norman Multi-Purpose Room, Norman, OK	9
East Corridor Stakeholder and Community Workgroup	May 21, 2014/The Reed Center, Midwest City, OK	9

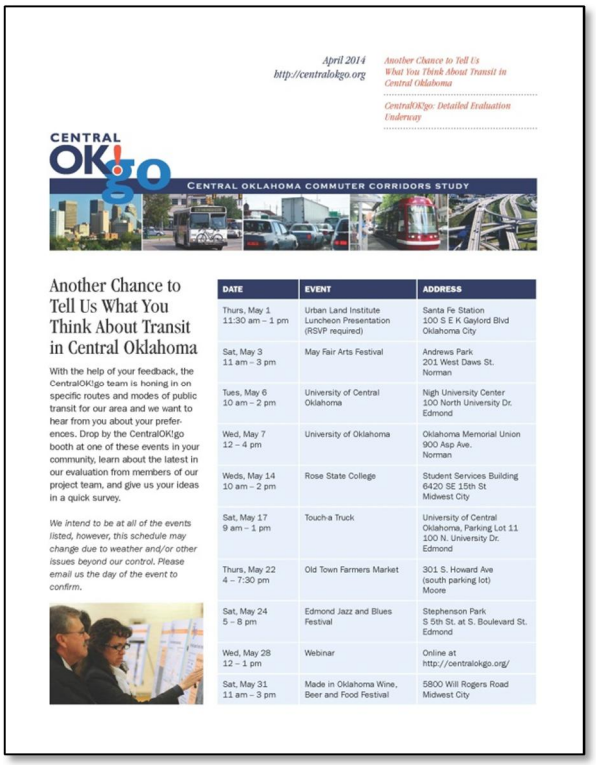
After reviewing the detailed evaluation results presented by the project team, workgroup members identified their preferred alignments and modes, as summarized in Table 7-10. Preference for the rail corridor and commuter rail mode was stronger in the North and South Corridors than in the East Corridor.

Table 7-10: Workgroup Preferences on Alignment and Mode

Preferred Alignment	Preferred Mode
North Corridor	
N1 (80%)	Commuter Rail (67%)
N2 (13%)	Light Rail (20%)
N7 (7%)	BRT (13%)
East Corridor	
E1 (57%)	Light rail (43%)
E5 (43%)	Commuter Rail (29%)
	Streetcar (14%)
	BRT (14%)
South Corridor	
S1 (75%)	Commuter Rail (88%)
S2 (25%)	BRT (12%)

7.5.4 Project Newsletter

The second project newsletter was prepared in electronic and hard copy formats, and distributed in April 2014. The purpose of this newsletter was to update readers on the detailed analysis of alternatives underway and announce the dates and locations of the May community road shows to gather additional public input. The e-newsletter was prepared in Constant Contact and distributed electronically to ACOG's list of stakeholders and interested parties. The electronic version of the second newsletter had approximately 1,900 recipients. It had an open rate of about 30% and a click-through rate of nearly 14%. Hard copies of the newsletter were also made available at ACOG meetings, on local buses, and at libraries.



April 2014
http://centralokgo.org

Another Chance to Tell Us What You Think About Transit in Central Oklahoma

CentralOK!go: Detailed Evaluation Underway

CENTRAL OK!go

CENTRAL OKLAHOMA COMMUTER CORRIDORS STUDY

Another Chance to Tell Us What You Think About Transit in Central Oklahoma

With the help of your feedback, the CentralOK!go team is honing in on specific routes and modes of public transit for our area and we want to hear from you about your preferences. Drop by the CentralOK!go booth at one of these events in your community, learn about the latest in our evaluation from members of our project team, and give us your ideas in a quick survey.

We intend to be at all of the events listed, however, this schedule may change due to weather and/or other issues beyond our control. Please email us the day of the event to confirm.

DATE	EVENT	ADDRESS
Thurs, May 1 11:30 am – 1 pm	Urban Land Institute Luncheon Presentation (RSVP required)	Santa Fe Station 100 S E K Gaylord Blvd Oklahoma City
Sat, May 3 11 am – 3 pm	May Fair Arts Festival	Andrews Park 201 West Daws St. Norman
Tues, May 6 10 am – 2 pm	University of Central Oklahoma	Nigh University Center 100 North University Dr. Edmond
Wed, May 7 12 – 4 pm	University of Oklahoma	Oklahoma Memorial Union 900 Asp Ave. Norman
Weds, May 14 10 am – 2 pm	Rose State College	Student Services Building 6420 SE 15th St Midwest City
Sat, May 17 9 am – 1 pm	Touch-a Truck	University of Central Oklahoma, Parking Lot 11 100 N. University Dr. Edmond
Thurs, May 22 4 – 7:30 pm	Old Town Farmers Market	301 S. Howard Ave (south parking lot) Moore
Sat, May 24 5 – 8 pm	Edmond Jazz and Blues Festival	Stephenson Park S 5th St. at S. Boulevard St. Edmond
Wed, May 28 12 – 1 pm	Webinar	Online at http://centralokgo.org/
Sat, May 31 11 am – 3 pm	Made in Oklahoma Wine, Beer and Food Festival	5800 Will Rogers Road Midwest City

7.5.5 Road Shows

A different approach from the public open houses was utilized during the second phase of public outreach in an attempt to reach a broader audience. This approach consisted of a CentralOK!go booth, staffed by members of the consultant team and ACOG, at a variety of events that were already scheduled to take place within the three corridors, as illustrated in Figure 7-4. Those who visited the booth learned about the preliminary alignments and high-capacity transit modes under consideration for their corridor and were asked to fill out a brief survey. Overall, approximately 200 surveys were received and participants generally expressed a preference for the rail alignments and the commuter rail mode in each corridor. The dates and locations of the "road shows" are provided in Table 7-11 below.

Table 7-11: Road Show Dates and Locations

Date	Event	Location
Thursday, May 1, 2014	Urban Land Institute Luncheon	Santa Fe Station, Oklahoma City, OK
Saturday, May 3, 2014	May Fair Arts Festival	Andrews Park, Norman, OK
Tuesday, May 6, 2014	University of Central Oklahoma	Nigh University Center, Edmond, OK
Wednesday, May 7, 2014	University of Oklahoma	Oklahoma Memorial Union, Norman, OK
Wednesday, May 14, 2014	Rose State College	Student Services Building, Midwest City, OK
Friday, May 16, 2014	Premiere on Film Row	Film Row, Oklahoma City, OK
Saturday, May 17, 2014	Touch-a-Truck	University of Central Oklahoma, Edmond, OK
Thursday, May 22, 2014	Old Town Farmers Market	301 S Howard Avenue, Moore, OK
Saturday, May 24, 2014	Edmond Jazz and Blues Festival	Stephenson Park, Edmond, OK
Saturday, May 31, 2014	Made in Oklahoma Wine, Beer, and Food Festival	Rose State College Performing Arts Center 5800 Will Rogers Road, Midwest City, OK

Figure 7-4: Road Show at Oklahoma Wine, Beer, and Food Festival (Midwest City, OK)

Survey data from the road shows indicated a clear preference for the BNSF rail alignments (N1 and S1) in the North and South Corridors, but no clear frontrunner in the East Corridor, where the preferences were split nearly equally among three alignments. Rail was the clear preference for mode. Survey responses are summarized in Table 7-12.

Table 7-12: Survey Results, Road Shows – May 2014

Preferred Alignment	Preferred Mode
North Corridor	
N1 (64%)	Rail (84%)
N2 (24%)	Bus (16%)
N7 (8%)	
N3 (5%)	
East Corridor	
E1/E1A (38%)	Rail (93%)
E5 (30%)	Bus (7)
E6 (32%)	
South Corridor	
S1 (82%)	Rail (93%)
S2 (15%)	Bus (7%)
S3 (3%)	

Note: After completion of the detailed evaluation, the project team determined that a variation on Alternative E1, termed Alternative E1A, should be considered as well due to the fact that the Transportation Demand Modeling (TDM) results pointed to travel time between downtown Oklahoma City and Tinker AFB being the most important factor in estimated ridership.

7.5.6 Webinar

On May 28, 2014, a second CentralOK!go webinar was presented to the community, similar to the information provided at the road shows. This included the results of the detailed analysis, estimated costs, and projected ridership for each alternative under consideration in the three corridors. Approximately 44 people participated in the live webinar, and participants were encouraged to complete a brief survey to determine their opinions on the preliminary alternatives. Eight completed surveys were received. A link to the recorded webinar is located at https://www.youtube.com/watch?v=vXd2g2a0H88.

Survey data collected from the webinars is summarized in Table 7-13. Rail was the clear preference of transit mode in all three corridors. Preference for the BNSF rail (S1) alignment was strong in the South Corridor, whereas the preferred alignments in the North and East Corridors were more mixed.

Table 7-13: Survey Results, Webinar – May 2014

Preferred Alignment	Preferred Mode
North Corridor	
N1 (39%)	Rail (84%)
N2 (22%)	Bus (16%)
N3 (22%)	
N7 (17%)	
East Corridor	
E1/E1A (47%)	Rail (79%)
E5 (32%)	Bus (21%)
E6 (20%)	
South Corridor	
S1 (60%)	Rail (81%)
S2 (20%)	BRT (19%)
S4 (20%)	

7.5.7 Additional Stakeholder Meetings

In addition to the public involvement activities described above, the project team met with the following representatives to gather input on their preferred alignment and mode for the East Corridor at the request of the Steering Committee during its May 30 special work session:

- Meeting with Tinker AFB senior staff – June 16, 2014
- Presentation to Midwest City Council – July 8, 2014
- Meeting with Del City mayor, city manager, and planners – July 10, 2014
- Meeting with Midwest City planner – July 14, 2014

7.5.8 Public Involvement Next Steps

The LPAs recommended by the Steering Committee in July 2014 were presented to and approved by the ACOG Board of Directors in October 2014. The next phase in project development is more detailed environmental review and preliminary engineering on one or more of the LPAs in order to determine their feasibility. ACOG will continue to explore regional governance and financing options for transit investments, as well as public opinion and desire for high-capacity regional transit in Central Oklahoma.

This page intentionally left blank.

8.0 Economic Development Summary

8.1 Introduction

This chapter provides the recommendations for planning future development around the stations identified for the Locally Preferred Alternatives (LPAs) in CentralOK!go. This chapter contains the following information:

- Defining transit oriented development (TOD) and the market and physical factors required for implementation
- Recommending initial station area development concepts and typologies, initial implementation steps, and other planning considerations for key station areas

Appendix C includes an assessment of economic and real estate trends, local economic development objectives, and station area land use and development conditions. In preparing this information, several data collection activities and analyses were undertaken including:

- Site visits along each LPA
- City staff interviews on economic and community development objectives for key station areas
- Analysis of employment, demographic, and real estate trends (also included in Appendix C)

8.2 Development Concepts and Recommendations

This section proposes development concepts and implementation steps to attract transit oriented development (TOD) at key stations along the LPA alignments. The first section presents the concept of station development typologies. Station typologies provide a conceptual framework for initial station area development planning that reflects the station's location, market conditions, anticipated transit service characteristics, existing land use and infrastructure, and community aspirations. Next, the station typologies are applied to each key station and initial development concepts are proposed, along with the major planning and implementation actions needed to achieve TOD. In some cases, city representatives interviewed had not yet formed ideas for specific stations that weren't already addressed in other formal plans or policy documents. In these cases, a future vision for the area is proposed.

8.2.1 Station Typologies

Station typologies were created for each station area after evaluating the existing land use conditions surrounding them, the potential type of station (neighborhood walk up vs. park-and-ride), their economic function along each corridor, roadway connections and other access, available land, and each jurisdiction's planning objectives for the station areas. The typologies contain a range of development intensities and densities based on these site characteristics. A benefit of creating station typologies is that it helps establish unique market positions for each station so that they are not all competing for the same types of development. Eight station typologies were proposed for the LPAs and are described below and summarized in Table 8-1.

- Downtown/Central Business District – This station type has the largest amount of development and supports the highest development densities. A downtown station is located in a region's economic center– downtown Oklahoma City in this case–that has some of the highest land and real estate values, thus the highest development densities. Downtown Oklahoma City contains a full mix of housing, employment, restaurants and bars, and some retail.
- Employment Activity Center – This station type is a regional activity center in which employment is the major economic or market driver. The presence of a large number of employees and relatively high employment densities, supports retail and services, and in some cases housing (apartments, condominiums, and townhomes). The NW 63rd Station in the North Corridor adjacent to the Chesapeake Energy Campus is an example.
- Commercial Activity Center – This is also a major regional destination, but the market driver or anchor is weighted more towards retail development (and its employees and destination shoppers) than office employment. The Crossroads Mall Station (near Plaza Mayor) in the South Corridor is an example.
- Commuter Center and Park-n-Ride – This station type is primarily a transportation hub and emphasizes bus connections and commuter parking over TOD. This emphasis is due to a combination of factors, particularly the surrounding development context which is less supportive of TOD than other station typologies, and its location near major road arteries and highways. The Kilpatrick Turnpike Station in the North Corridor and SH-9 Station in the South Corridor fall into this typology, as well as two stations in the East Corridor (SE 29th Street and Tinker AFB).
- Main Street – A Main Street station is adjacent to or embedded in a traditional downtown Main Street setting. It may have limited parking due to land constraints around existing development, with many riders either

Downtown Portland, OR

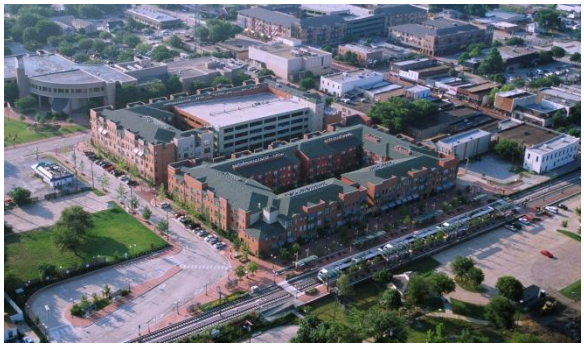
Office buildings served by DART light rail at Galatyn Park Station

Lakeline Metrorail Station, Austin, TX

Downtown Carrollton, TX on DART light rail line

walking or cycling to the station, or riding a feeder or circulator bus. Stations in downtown Edmond (W 2nd Street) and Norman (Main Street) are envisioned as Main Street Stations.

- Residential Commuter Center – This station typology is a residential village or community organized around a transit station. In suburban communities with undeveloped land, it presents an opportunity to create a new development type that may not already exist and can differentiate the community as a result. Located on a major arterial, the station may have a large park-and-ride. However, if carefully planned, residential development and neighborhood retail (or larger) can be integrated into a development around the station and station parking. Residential development would follow the principles of New Urbanism and Traditional Neighborhood Design (TND), which emphasizes smaller lot sizes, a variety of housing types, walkability, and amenities such as parks, trails, gathering places, and a modest amount of mixed use development (according to local market demand). In order to be successful, TOD in this context requires a vision and leadership, advanced planning, and collaboration among property owners and the local jurisdiction. The stations at S 2nd Street in Moore and Tecumseh Road in Norman are proposed as residential commuter centers.

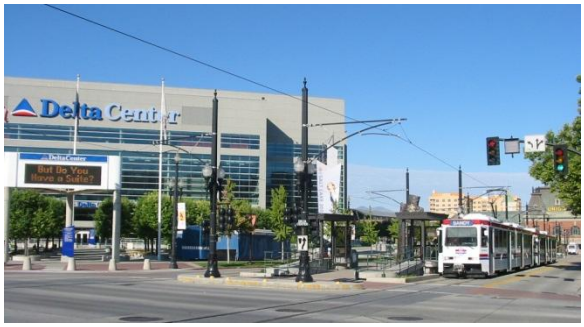


Downtown Plano, TX on DART light rail line

- Urban Neighborhood – Similar to a Main Street Station, an Urban Neighborhood station is integrated into an existing development context. As a result, there may be land constraints for parking and new development and TOD is in the form of infill and redevelopment. The difference between an Urban Neighborhood station and a Main Street station is that the Urban Neighborhood may have more housing than retail or commercial development, although it is a continuum with no clear dividing line. The N 23rd Street Station in the North Corridor, and the MLK, Sooner Road, and Midwest Boulevard Stations in the East Corridor fall under this typology.

Development at Baylor University Medical Center Station on DART light rail

- Campus or Special Events Station – This station type serves a large institutional campus or facility such as a concert venue, stadium, or entertainment district. The OU campus in Norman is such an example, as OU sporting events draw large numbers of attendees from throughout the region. The station may only have transit service for special events and therefore little utilization from daily commuters. The amount of TOD supported depends on the frequency of events and other economic drivers surrounding the station, and land or site availability and may be small.



Light Rail station adjacent to Delta Center in Salt Lake City, UT

Table 8-1: Commuter Rail Station Typologies

	Station Type	Development Potential		Scale	Transit System Function	Corridor Example
		Residential	Commercial/Employment			
More Commercial/ Employment ↑	Downtown/ Central Business District	Urban multifamily and loft	• Major regional employment center • Office, retail, entertainment, and services	High rise: 5 stories and above	• Regional destination for employment, shopping, and entertainment. • Numerous and frequent multimodal connections (bus, light rail, streetcar)	• Santa Fe Station
	Employment Activity Center	Multifamily and townhome	• Employment emphasis • More office than retail	5 stories and above	• Sub-regional destination. • Park-n-ride • District circulator transit and express feeder bus	• NW 63rd Station
	Commercial Activity Center	Multifamily and townhome	• Predominately commercial. More than 100,000 sq. ft. of retail. More retail than office.	Less than 4-5 stories	• Sub-regional destination • Park-n-ride • District circulator transit and express feeder bus	• Crossroads Mall • Sooner Road • Midwest Boulevard
	Commuter Center and Park-n-Ride	Limited	• Office, flex, research and development may be possible	Less than 4 stories	• Large park-n-ride catchment area • Express and local bus • Development limited by adjacent land use and connectivity conditions	• Kilpatrick Turnpike • SH-9 • Tinker AFB
↓ More Residential	Main Street	Multifamily	• Main street retail/mixed use infill	Less than 4 stories	• Limited transit parking due to land constraints • District circulator bus connections • Bus or streetcar corridors. Walk-up stops. Limited transit parking.	• W 2nd Street (Edmond) • Main Street (Norman)
	Commuter Center – Residential Emphasis	Small lot single family, multifamily, townhome; May be more than quarter-mile from station.	• Significant retail possible depending on trade area size	Less than 4 stories	• Large park-n-ride • May have feeder bus and express bus connections	• Tecumseh Road • S 2nd Street (Moore) • Reno and MLK
	Urban Neighborhood	Multifamily, townhome, small lot single-family	• Neighborhood serving commercial (less than 50,000 sq. ft.)	Less than 4 stories	• Neighborhood walk-up station. Small or no park-n-ride. Local bus connections.	• N 23rd Street (OKC)

	Station Type	Development Potential		Scale	Transit System Function	Corridor Example
		Residential	Commercial/Employment			
Special Uses	Campus/ Special Events Station/ Regional Activity Center	Limited multifamily	• Institutional and entertainment • Limited office and retail	Varies	• Large commuter destination • Large parking reservoirs to serve activities, not necessarily for transit.	• Brooks Street (OU in Norman)

8.2.2 North Corridor Development Recommendations

Stations described below are illustrated in Figure 8-1 and described in Table 8-2.

W 2nd Street Station

The development concept for the W 2nd Street station in downtown Edmond is to reinforce the existing downtown and to utilize the commuter rail station to support additional revitalization and redevelopment. The W 2nd Street station area context already supports TOD as there is a surrounding small block grid roadway structure that is walkable. As described in detail in Appendix C, there are numerous opportunities for infill and redevelopment in the downtown area. Locations fronting Broadway could support additional retail, small professional offices, and services in a mixed use format with apartments above them. The properties west of Broadway and west of BNSF could be planned for a variety of retail, restaurant, residential, office, or light manufacturing or artisan spaces in a manner that reflects the railroad depot heritage.

The following actions by the City would enhance successful TOD around this station:

- Depending on the parking demand with commuter rail service, the City should consider if it can contribute to the cost of structured parking to free up land for development. Careful attention to parking is critical to successful TOD.
- Ensure that development policies support TOD and downtown style development as described in the Edmond Downtown Plan (2014).
- Once a station location is identified with more specificity, more detailed site and access planning should occur to ensure safe and convenient access to the station for pedestrians and cyclists that minimizes the need for parking and integrates the station with downtown.

Memorial Road Station

This station area will not likely support TOD in the foreseeable future. The existing development pattern contains many viable industrial businesses that are not economically viable to redevelop, and the cost to create a walkable environment in this area is likely prohibitive due to the large suburban block pattern. These factors suggest that this station will function as a park-and-ride until a time when residential or employment demand in this location makes an economic case for redevelopment. Even without TOD, station planning and design should still accommodate access by all modes of transportation.

NW 63rd Street Station

This station area has the strongest market conditions in the North Corridor, with demand driven by the Chesapeake Energy Campus and the community of Nichols Hills to the west. This location can support additional housing, retail, and employment development over a long term planning timeframe. Implementation in this area should focus on improving pedestrian and bicycle connectivity among the major employment and retail centers, as the large block pattern is an impediment to non-automobile access. It is recommended that the City create and adopt a subarea or TOD plan for this area to address these connectivity issues, as well as urban design standards and future land use to support TOD.

N 23rd Street Station

The neighborhoods and business districts in this area are in transition and undergoing reinvestment. There are several under-developed sites and aging commercial buildings near the BNSF ROW that could be candidates for redevelopment as residential and mixed use projects with a nearby commuter rail station as an amenity. The commuter rail station would not be the primary market driver here though. Rather, the revival of the N 23rd Street commercial district, proximity to downtown Oklahoma City and

the State Capitol (major employment centers), as well as the appeal of this traditional, centrally located neighborhood will be the main drivers of redevelopment. The City of Oklahoma City could consider updating the N 23rd Street Corridor Plan to anticipate a commuter rail station, further refine a location, and address access, circulation, and infrastructure needs to support additional revitalization and TOD.

Figure 8-1: North Corridor Development Recommendations
(Stations described above shown in Red)

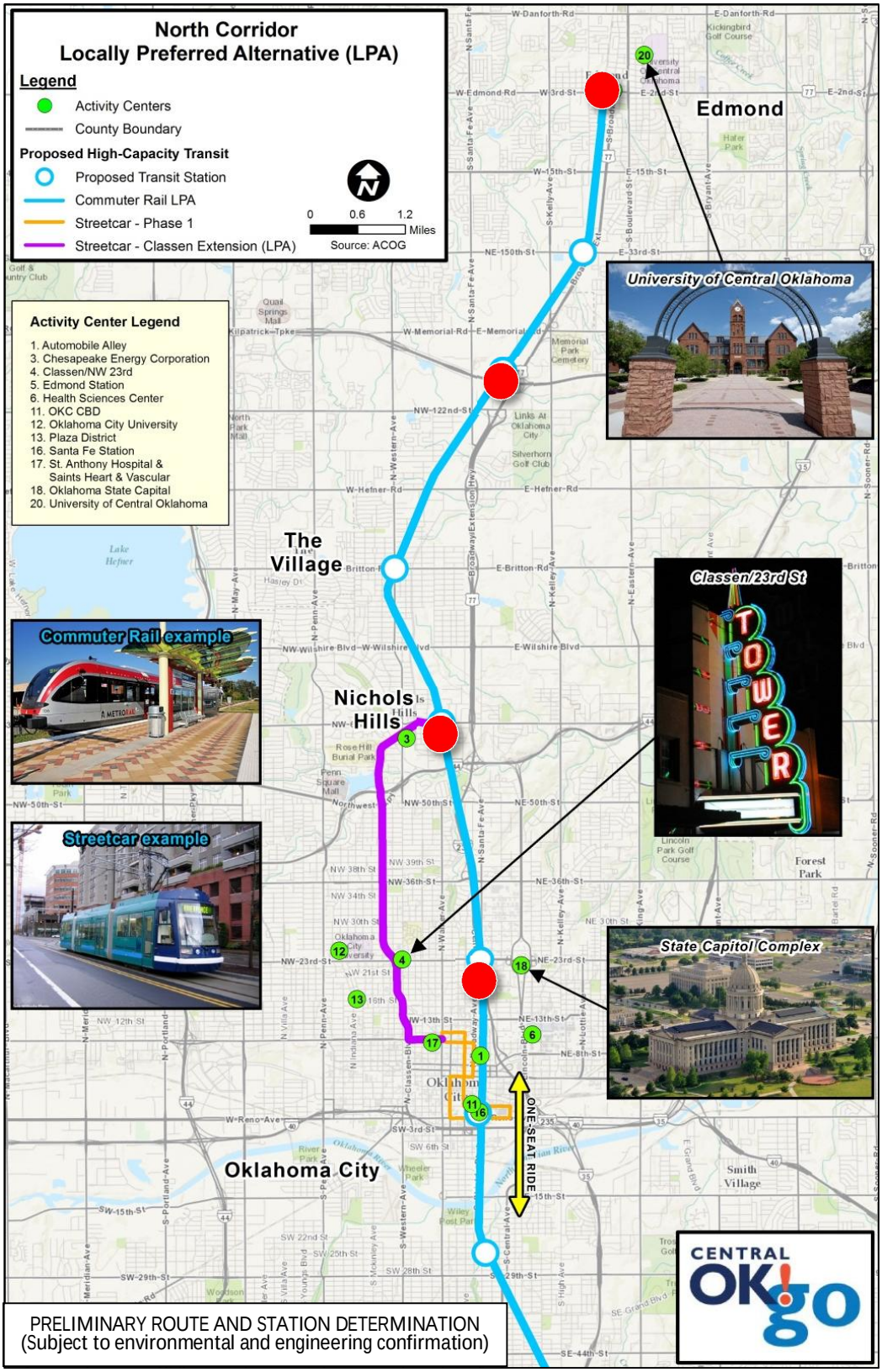


Table 8-2: Development Concepts – North Corridor

Station	Typology	Location Context: Existing	Location Context: Aspirational	½ Mile Connectivity	Market Drivers/Anchors	Future Development Potential
W2nd Street	• Main Street	• Traditional downtown	• Enhanced vibrant downtown • Small scale infill/ redevelopment	• 400' x 300' blocks • Good	• Downtown Edmond • Univ. of Central OK	• 2-4 story multifamily and townhome • Retail and mixed use
Memorial Road	• Commuter Center • Park-N-Ride	• Highway and arterial • Large parcel commercial and industrial	• Higher value commercial • More employment	• ½ to 1 mile blocks • Poor	• Low density employment	• TBD • Requires redevelopment of existing industrial and car dealership uses
NW 63rd Street	• Employment Commercial Center	• 2nd Ring Suburb • Suburban office • Arterial commercial	• Enhanced employment and commercial	• 400 x 300 blocks, varies • Moderate • Topographic constraints	• Chesapeake Energy campus • Classen Curve commercial • Penn Square Mall	• Corporate and professional office • Residential, multifamily • Commercial/mixed use
N 23rd Street	• Urban Neighborhood	• 1st Ring suburb • Pre-war commercial • Small lot single family	• 23rd Commercial Revitalization District • Improve access to State Capitol • Link to neighborhoods	• 350' x 400' blocks west • Highway and rail barrier east-west • Moderate	• Mesta Park & Paseo neighborhoods (west) • 23rd Street Commercial Corridor • State Capitol (east)	• Infill residential/loft • Commercial mixed use
Santa Fe Station	• Downtown/ Central Business District	• Downtown OKC • Bricktown Neighborhood	• Continued revitalization of Bricktown	• 400' x 500' blocks • Good	• Downtown employment • Chesapeake Arena • Convention Center • Bricktown	• Continuation of downtown and Bricktown revitalization

8.2.3 East Corridor Development Recommendations

Stations described below are illustrated in Figure 8-2 and described in Table 8-3.

Reno and MLK Station

Given the challenging industrial context and disinvestment surrounding this station area, the recommended approach for this station area is for a long term and large scale redevelopment effort. It could involve a public-private partnership with the City, the Urban Renewal and Housing Authorities, and a private developer. Rather than trying to change the industrial context of this area to a mixed use TOD, a more jobs based project could be envisioned. This would involve creating sites for industrial and middle skill/living wage businesses. The plan could leverage the existing assets – highway and rail access – and target manufacturing, building trades/services, and other firms that look for centrally located sites. Housing could also be integrated into the plan to increase access to jobs within the plan area and in the region by transit, and to provide additional mixed income housing opportunities in the region.

Del City/Midwest City Stations (Sooner Road, Air Depot Boulevard, and Midwest Boulevard)

The proposed locations for the Sooner Road, Air Depot Boulevard, and Midwest Boulevard stations are in similar development contexts and are addressed together in this section because they share a similar set of implementation strategies. Each one-quarter to one-half of a mile radius around potential station locations encompasses arterial roads with commercial buildings of varying quality and economic viability, vacant infill parcels, and in some areas the edges of single family neighborhoods. In order for TOD to occur in these locations, property needs to be assembled to create large enough sites to allow for a development size that can achieve economies of scale. The Cities should continue to encourage the redevelopment or renovation of outmoded commercial space, and could consider expanding its Special Planning Areas to proposed station areas, or creating new subarea plans or policies to encourage TOD. Development incentives including gap financing may also be needed for project feasibility. The Cities of Del City and Midwest City will need to coordinate on a joint TOD plan for the Sooner Road station in order to create a shared development vision around the final station location.

The types of development estimated to be possible on these sites includes multifamily housing, senior housing, and updated mixed use commercial space including retail and restaurant space, and medical and professional office space. A large development may be able to recruit anchor retailers, such as a grocer, to locate or relocate in such a development.

SE 29th Street and Tinker AFB Stations

The stations proposed just outside Tinker AFB have constraints that limit the opportunity for TOD. The primary function of these stations will be to serve commuters to the Base and inbound park and ride users. Land around the SE 29th Street station area is constrained by floodplain and property that is located within the Accident Potential Zone (APZ) of the runway flight path. The land along Douglas Boulevard is in Oklahoma City's Airport Environs (AE1 and AE2) zoning overlays which heavily restricts development near the Base. This area also lacks basic public services to serve urban development; it is not a priority development area for Oklahoma City.

Figure 8-2: East Corridor Development Recommendations
(Stations described above shown in Red)

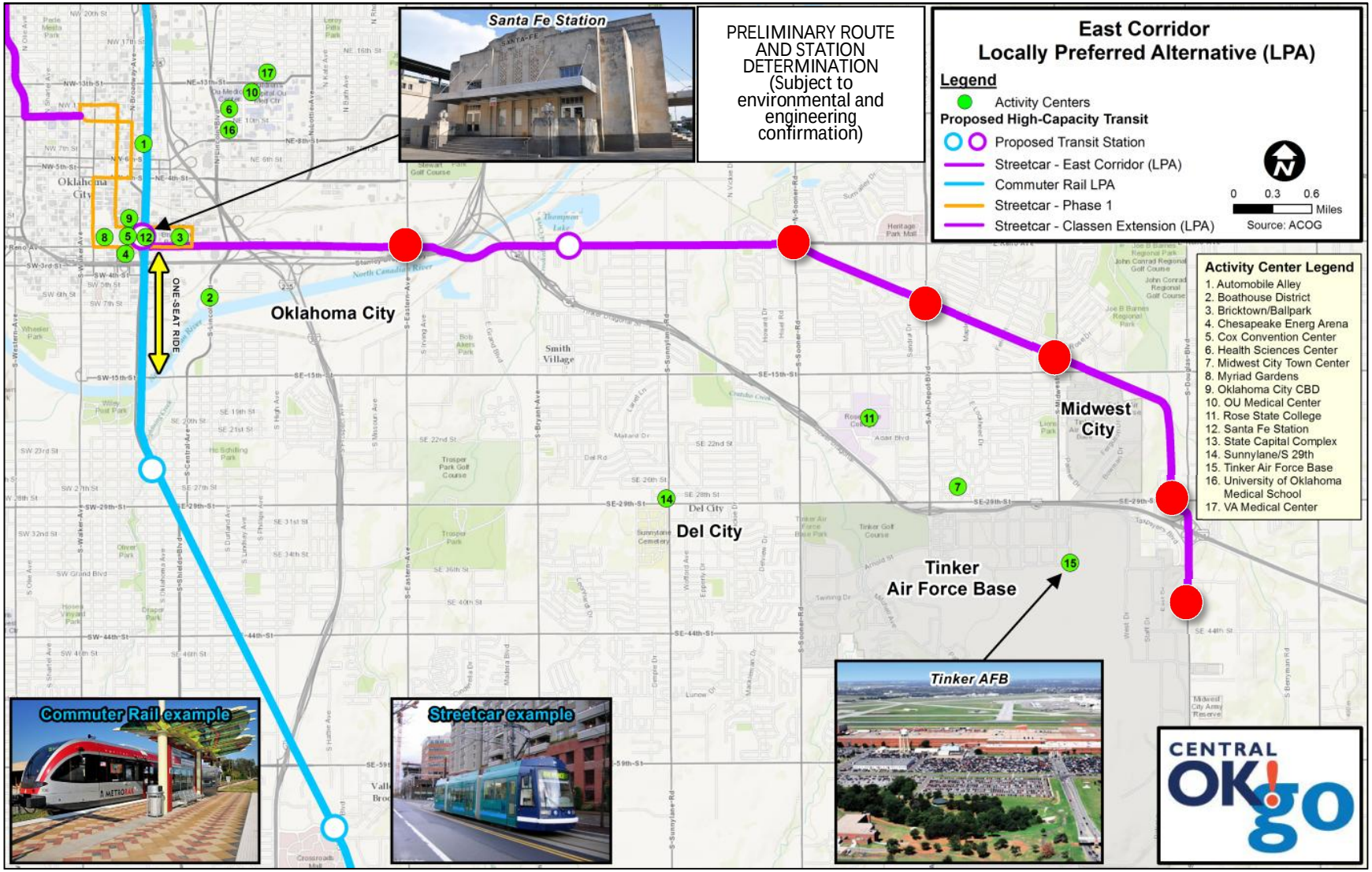


Table 8-3: Development Concepts – East Corridor

Station	Typology	Location Context: Existing	Location Context: Aspirational	½ Mile Connectivity	Market Drivers/Anchors	Future Development Potential
Reno and MLK	• Commuter Center – Residential Emphasis	• Industrial/brownfields • Single family • Regional park • High school	• Mixed income village • Improve food access • Improve jobs/ training access	• ¼ to ½ mile and larger blocks • Moderate	• Regional park • High school • Katy Trail • Proximity to Downtown	• Residential village • Single family • Multifamily
Sooner Road Air Depot Boulevard	• Commercial Activity Center	• Arterial commercial	• Revitalized commercial • Residential infill	• 700'-1,000' blocks • Poor	• Established neighborhoods	• Revitalized commercial • Residential infill
Midwest Boulevard	• Commercial Activity Center	• Arterial commercial • Underdeveloped sites • Low value industrial	• Revitalized commercial • Residential infill	• 1,000' blocks • Cul de Sacs • Poor to Moderate	• Established neighborhoods	• AFB flight path limits SE quadrant of ½ mile
SE 29th Street Tinker AFB	• Employment Activity Center • Park-n-Ride	• Highway and arterial location • Low density industrial and commercial	• Tinker AFB commuter hub	• 1 mile section line arterials • Interstate 40 • Poor	• SE 29th Retail • Tinker AFB	• Commuter and services hub for Tinker AFB • Off base contractor offices • Single and multifamily residential • Park-n-Ride

8.2.4 South Corridor Development Recommendations

Stations described below are illustrated in Figure 8-3 and described in Table 8-4.

Crossroads Mall Station

This is a challenging station area due to the mix of large retail and industrial land uses, and large roadway and parcel configurations. Nevertheless there are significant areas of undeveloped land surrounding the former Crossroads Mall (now Plaza Mayor) that have the potential to become a major regional destination pending its successful renovation and re-tenanting. The City of Oklahoma City should begin dialogues with the major property owners to begin establishing a vision for future development and to determine if additional planning for the surrounding area is warranted in the near future. One potential concept that could be explored would be a mixed income village with housing, employment, and retail. Excess surface parking at the mall could be considered for conversion to development sites or for inclusion with the proposed commuter rail station.

S 19th Street Station

The City of Moore has broken ground on its 60-acre signature park, Central Park. This likely precludes TOD on the majority of the vacant land between SE 4th Street and SE 19th Street along Broadway and the BNSF. There is additional industrial, storage, commercial, and vacant land properties on the east side of the BNSF, and along SE 4th Street and SE 19th Street that could eventually accommodate a redevelopment tied to a transit station. However, it will likely take more than one market cycle for any redevelopment to be feasible. Residential development is the most likely development type that can be supported in this location, although sites with frontage along the arterials could also support retail and commercial development.

The City of Moore can begin planning by identifying vacant properties, and properties with buildings that may be reaching the end of their economic life to identify future development areas, and to determine how or if they could be integrated with a transit station once a more precise location is selected. The City can also begin examining how to improve connections (non-automobile) from existing neighborhoods to a station location (and to Central Park), and to improve connections across infrastructure barriers such as the BNSF, I-35, and the wide cross sections of SE 4th Street and SE 19th Street.

Tecumseh Road Station

This station's proposed typology is a commuter town center. There are at least three quarter sections (approximately 150 acres each) of largely undeveloped land around the proposed station location at Tecumseh Road. Norman is an attractive community for commuters and has a generally strong residential market. There is also new housing being built near the proposed station location. The recommended development concept here is to create a new residential community that combines single family housing and medium density attached housing with a commuter rail station, and potentially neighborhood commercial development, thus integrating transit oriented development (TOD) with traditional neighborhood design (TND).

This is a major opportunity to create a more sustainable form of residential development that is also marketable because of the amenities and quality of life it offers. Creating this type of development will require a developer with a long term vision and patience, and advanced planning, leadership, vision, and flexibility from the City. Once a station location is identified, the City of Norman should establish a TOD

plan and the appropriate zoning to allow the desired type of development in order to get ahead of the market.

Main Street Station

Like other stations in places that are embedded in established business districts or neighborhoods, TOD and redevelopment here will depend on site availability and individual land owner decisions. Site assemblage will be needed to accommodate developments of any scale. As the commuter rail line moves from vision to implementation, the City should more closely examine potential station locations, including the area around the existing Amtrak station. If there are other locations deemed to have better redevelopment potential, they should be considered. There are numerous low density properties and surface parking lots surrounding the Amtrak station. A commuter rail station could help energize this area, and further contribute to revitalization in downtown Norman. The City of Norman can still be proactive by identifying potential redevelopment sites and beginning conversations with property owners and developers at an appropriate time.

Brooks Street Station

There may or may not be the potential for TOD at an OU campus station; it will depend on the exact location of the station and the level of transit service provided. If service is only for special events, the station will not be a major enhancement to the location. If a higher level of service is provided, the City and University can examine opportunities for additional campus development, or surrounding infill and redevelopment that complements the station.

Figure 8-3: South Corridor Development Recommendations
(Stations described above shown in Red)

Table 8-4: Development Concepts – South Corridor

Station	Typology	Location Context: Existing	Location Context: Aspirational	½ Mile Connectivity	Market Drivers/Anchors	Future Development Potential
Crossroads Mall	• Commercial Activity Center	• Regional mall • Industrial • Arterial and highway access	• Renovated/ repositioned mall • Mixed use mixed income village	• ½ to 1 mile blocks • Poor	• Plaza Mayor (former Crossroads Mall)	• Mixed income housing • Multifamily and single family • Supporting mixed use services • Requires redevelopment of industrial uses
S 19th Street (Moore)	• Commuter Center – Residential Emphasis	• Vacant land • Adjacent to post-war downtown • Suburban residential	• Signature Central Park • Community Recreation Center • Increase housing and commercial diversity	• ¼ to ½ mile and larger blocks • Moderate	• Downtown Moore • Residential market and strong school district • Planned Central Park	• Central Park and Commuter Hub • Infill housing redevelopment on adjacent industrial properties • Modest amount of mixed use
Tecumseh Road	• Commuter Center – Residential Emphasis	• Undeveloped agricultural and industrial • Adjacent recent single family residential	• Transit supportive residential	• ½ to 1 mile or more • Poor	• Residential market	• Small lot single family • Multifamily • Supporting retail/commercial center • Oriented around commuter rail station
Main Street (Norman)	• Main Street	• Traditional downtown depot	• Enhanced vibrant downtown • Small scale infill/ redevelopment	• 400’ x 300’ blocks • Good	• Downtown Edmond • University of Central OK	• 2-4 story multifamily and townhome • Retail and mixed use
Brooks Street	• Campus/ Special Events	• OU Campus	• OU Campus	• 500 to 1,500’, varies • Moderate	• OU Stadium and campus	• Campus station for commuting faculty and staff • Serve athletic and other large events

9.0 Next Steps

9.1 Regional Planning

The results of this study support the ACOG long-range transportation planning process and the adopted regional plan. The locally preferred alternatives (LPAs) for the three corridors, along with the downtown streetcar, are the building blocks of a regional transit system.

A regional system plan will identify existing and future elements needed to establish a regional public transportation system for Central Oklahoma. This system plan process can identify the next corridors for further study and should be updated every five years to accompany ACOG Plan updates.

9.2 CentralOK!go

9.2.1 Phasing

While CentralOK!go presents the vision for transit service in three of the region's corridors, constructing the system will require a phased approach that includes expansion of the bus network. The system will be implemented in segments based on regional needs, desires, and available funding.

9.2.2 Additional Steps

Environmental assessment/clearance and engineering design are the next study steps following the selection of LPAs. If any of the LPAs are identified for federal funding, the investment must comply with the requirements of the National Environmental Policy Act (NEPA). Under NEPA, greater engineering detail will be assessed for potential beneficial and/or detrimental impacts to the physical and natural environment.

9.3 Future Corridor Studies

Additional corridors in Central Oklahoma could be identified for more detailed study to determine their feasibility for high-capacity transit. The North, East, and South Corridors studied under CentralOK!go were the initial corridors identified in the 2005 Regional Fixed Guideway Study that might be feasible for rail. Once additional corridors are determined to be potentially viable for enhanced transit, they will undergo a similar corridor study process.

9.4 Governance and Funding

CentralOK!go provides the groundwork for establishing a governing structure, funding mechanisms, and phasing opportunities for the implementation of a regional transit system in Central Oklahoma. Funding sources have yet to be identified to build and operate the LPAs, and the region will need to form a regional transit authority to oversee the system. A regional transit authority can be created under the framework provided by House Bill 2480, signed into law by Governor Fallin on May 22, 2014. The law allows any combination of cities, towns, and counties, or their agencies, by resolution of their governing boards, to jointly create a transportation authority and a regional district for the purpose of planning, financing, constructing, maintaining, and operating transportation projects located within the boundaries of the district.

This page intentionally left blank.

Association of Central Oklahoma Governments
21 E. Main Street, Suite 100
Oklahoma City, OK 73104-2405
www.acogok.org
Phone: (405) 234-2264
Fax: (405) 234-2200