

Northside Study Final Report

October 10, 2008

Volume 1 of 2

Northside Study



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Acronym List

AA	Alternative Analysis
ACS	American Community Survey
ADA	Americans with Disabilities Act
ADP	Average Daily Passengers
ADT	Average Daily Traffic
AQCR	Air Quality Control Region
ARRF	Aggregate Rail Ridership Forecasting
BID	Business Improvement District
BIDA	Business/Industrial Development Area
BJC	Barnes Jewish Christian
BRT	Bus Rapid Transit
CAAA	Clean Air Act Amendments
CBD	Central Business District
CCTV	Closed Circuit Television
CDBG	Community Development Block Grant
CMAQ	Congestion Mitigation and Air Quality
CO	Carbon Monoxide
CSI	Construction Specifications Institute
CWA	Clean Water Act
CWE	Central West End
dBA	Decibel (A weighted)
DEIS	Draft Environmental Impact Statement
DOT	Department of Transportation
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EWGCOG	East-West Gateway Council of Governments
EZ	Empowerment Zones
FAR	Floor Area Ratio
FEMA	Federal Emergency Management Agency
FFGA	Full Funding Grant Agreement
FMGP	Former Manufactured Gas Plant
FTA	Federal Transportation Authority
FY	Fiscal Year
GRG	Great Rivers Greenway
H ₂ S	Hydrogen Sulfide
H ₂ SO ₄	Sulfuric Acid
HC	Hydrocarbons
HHS	Health and Human Services
HOV	High-Occupancy Vehicle
JJK	Jackie Joyner-Kersey
JTW	Journey To Work
LAUS	Local Area Unemployment Statistics
LCRA	Land Clearance and Redevelopment Authority
L _{dn}	Day-Night Noise Level

Acronym List

L _{eq}	Energy Equivalent Noise Level
LPA	Locally Preferred Alternatives
LRT	Light Rail Transit
LRV	Light-Rail Vehicles
LWCF	Land and Water Conservation Fund
MMTC	Multimodal Transit Center
MoDNR	Missouri Department of Natural Resources
MoDOT	Missouri Department of Transportation
MOS	Minimum Operating Segments
MPO	Metropolitan Planning Organization
MTIA	Major Transportation Investment Analyses
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxide
NRCA	Neighborhood and Regional Commercial Areas
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O ₃	Ozone
OA	Opportunity Area
OCS	Overhead Contact System
ORAP	Outdoor Recreation Assistance Program
PAC	Policy Advisory Committee
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PE	Preliminary Engineering
PGMN	Primary Goods Movement Network
PGMN	Primary Goods Movement Network
PM ₁₀	Particulates (10 microns and smaller)
PM _{2.5}	Particulates (2.5 microns and smaller)
PMP	Project Management Plan
RMS	Root Mean Square
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SCADA	Supervisory Control And Data Acquisition
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLAAP	St. Louis Army Ammunition Plant
SLDCCC	St. Louis Democratic City Central Committee
SLU	St. Louis University
SMUA	Specialty Mixed Use Areas
SO ₂	Sulfur Dioxide
STL	St. Louis
TAC	Technical Advisory Committee

Acronym List

TAZ	Traffic Analysis Zone
TCIG	Transportation Corridor Improvement Group
TIF	Tax Increment Finance
TIP	Transportation Improvement Program
TMA	Transportation Management Association
TOD	Transit Oriented Development
TSM	Transportation Systems Management
UE	Union Electric
UP	Union Pacific
UPRR	Union Pacific Railroad
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program
VdB	Velocity Decibels
VOC	Volatile Organic Compounds

Executive Summary

Chapter 1.0

Northside Study



Chapter 1.1: Introduction

The *Northside and Southside Major Transit Improvements Study* (Northside-Southside Study) is both a continuation of Major Transportation Investment Analyses (MTIAs) completed in 2000 and a study that will result in recommendations to be advanced through the established regional project development process.

1.1.1 PREVIOUS STUDY

The MTIAs completed in July 2000 were commissioned by the East-West Gateway Council of Governments (EWGCOG) in cooperation with the Missouri Department of Transportation (MoDOT) and Metro, formerly known as the Bi-State Development Agency. These studies served to provide local decision-makers and the public with necessary information to determine transportation alternatives within designated areas. The studies identified locally-preferred alternatives (LPAs) for the Northside, Southside, and Daniel Boone study areas. Of these, those for the Northside and Southside are relevant to this analysis. The Northside LPA featured light-rail transit (LRT) options along Natural Bridge and a downtown loop. Two Southside LPAs, both terminating at the forementioned downtown loop, included an LRT route along Chouteau and the Union Pacific Railroad (UPRR) right-of-way and a bus rapid-transit (BRT) route along the same corridor.

In late 2005, EWGCOG continued technical analyses to establish minimum operating segments (MOSs) of the Northside and Southside LPAs identified in the 2000 MTIAs. Doing this served the dual purpose of restricting the LPAs to areas within the City of St. Louis, which is eligible for funding as a distressed community, and of reducing total community funding needs, thereby maximizing cost-effectiveness and potential community support. These analyses identified a Northside MOS routed from downtown to a terminal park-and-ride facility near Interstate-70 and Goodfellow Boulevard. The determined Southside MOS extended from downtown to a terminal park-and-ride facility near Interstate-55 and Loughborough Avenue.

1.1.2 CURRENT STUDY

In late 2005, EWGCOG initiated the current Alternatives Analysis (AA) of both the Northside and Southside study areas. Its methodology and implementation are designed to conform to all relevant guidelines designated by the Federal Transportation Administration's (FTA) New Starts process, which regulates federal funding of transit projects.

Background

The City of St. Louis has averaged a 12% decline in population between 1990 and 2000. Similar to other cities that have experienced population decline within their urban cores, the City of St. Louis has a disproportionate number of residents in poverty, a higher minority population, and more zero- and one-car households. As a result, residents of the City of St. Louis are typically more transit-dependent. Public transit needs in St. Louis are served by Metro, which operates MetroBus and MetroLink. Implementation of additional LRT would serve the city's transit-dependent population, as well as better connect city and county residents to the area's employment and cultural centers. This report assesses the validity and feasibility of potential LRT alignment alternatives.

Northside Study

Study Area

The current study areas are refined and reduced from those of the 2000 MTIAs. Boundaries were chosen to extend slightly beyond the MOSs to effectively capture all identified transit markets. The revised Northside study area, as defined for this AA, is bounded roughly by the city limits near Halls Ferry Circle on the north, Chouteau Avenue on the south, the Mississippi River on the east, and Lucas and Hunt Road and Union Boulevard on the west, covering approximately 36 square miles. Note that this area includes downtown St. Louis. This area includes most of the Northside of the City of St. Louis and all or portions of the communities of Jennings, Northwoods, Pine Lawn, Flordell Hills, Velda City, Hillsdale, Country Club Hills, Uplands Park, Velda Village Hills, and Wellston. The updated Southside study area is bounded roughly by the Mississippi River on the east, Chouteau Avenue on the north, Gravois Road and Hampton Avenue on the west, and Reavis Barracks Road on the south, covering approximately 36 square miles. This area includes most of the Southside of the City of St. Louis and all or portions of Affton, Lemay, Bella Villa, and unincorporated St. Louis County.

Goals and Objectives

Goals and objectives of this AA were created to help guide the development and evaluation of alignment alternatives. Goals include enhancement of neighborhoods and local sustainable development, preservation of existing communities and neighborhoods, improvement of access to opportunity within the study area, and development of cost-effective transportation improvements.

Assessment of Alignment Alternatives

The current study's evaluation process builds upon the assessment and screening methodology of the prior MTIAs and anticipates the requirements of subsequent decision-making at both regional and federal levels. The FTA requires alignment alternatives to be evaluated based on effectiveness, impact, cost-effectiveness, financial feasibility, and equity. It is anticipated that federal funding would be used in the implementation of any transit improvement recommended by this study. As a result, these FTA requirements form the foundation for evaluation and screening. Assessment in this report is also informed by the prior MTIA evaluation framework, focus areas identified in EWGCOG's *Legacy 2030*, problem evaluation contained in the study's purpose and need statement, and extensive community engagement.

Northside Study



Chapter 1.2: Report Structure

This AA report is organized in eight chapters, each of which addresses predetermined tasks of the project scope. Each is intended to present research and information, factors identified and methodology used in decision-making, and any conclusions reached.

1.2.1 CHAPTER 1: EXECUTIVE SUMMARY

An AA is the first planning step in the FTAs New Starts process for the purpose of pursuing federal funding for a transit project. This study examines available transit options and determines a LPA, which will be recommended to EWGCOG for further study. This AA for the Northside-Southside Study has been prepared to conform to guidelines and regulations issued by the FTA.

This chapter provides a brief background of the study, explains the relationship among various agencies, and presents the process by which the study was conducted and reviewed. It also describes the organization of the AA, references documents used to support the information presented in this report, explains various conventions adopted for purposes of the study, and discusses further steps in the environmental analysis and project development process.

1.2.2 CHAPTER 2: PURPOSE AND NEED

The project scope of work details the documentation of purpose and need for this transit study. Goals specified include:

- To establish the justifiable need for the study.
- To establish project goals and evaluation methodology.

This chapter provides additional general introduction to the AA by providing background on the Northside-Southside Study and by describing the study area and existing transportation system. It identifies the previous planning and analysis steps that have occurred to shape this study and move it forward as a priority corridor. It then describes the transportation problems and issues found in the corridor and presents a concise statement of the objectives of the study, the “Purpose and Need” statement. Finally, it identifies goals and objectives for the study, as well as evaluation methodology and criteria.

1.2.3 CHAPTER 3: EXISTING CONDITIONS

The project scope of work details the assessment and documentation of conditions existing within the study area. Goals specified include:

- To survey existing conditions within the study area.
- To consider demographics, land use and redevelopment opportunities, socioeconomics, the physical, and natural environment, and transportation network/facilities.

This chapter provides an overview and description of existing conditions throughout the Northside study area. Such descriptions are intended to provide baseline information and a

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general understanding of potential impacts that might be associated with any major transit initiative within the study area.

1.2.4 CHAPTER 4: PUBLIC INVOLVEMENT

The project scope of work details continued involvement of the public throughout the study. Goals specified include:

- To effectively inform and engage the community through a variety of media, including stakeholder interviews, focus groups, presentations, open-houses, workshops, newsletters, and a web-site.
- To interact with area political, business, and neighborhood leaders.
- To inform and educate the local media of the study and transit issues.

This chapter describes the various means and processes by which the public has been engaged with the Northside-Southside study. Meetings, workshops, presentations, communications, and additional interactions are documented. Public opinion is surveyed and recognized, and team response is recorded.

1.2.5 CHAPTER 5: ALTERNATIVES DEVELOPMENT AND SCREENING

The project scope of work details the screening of initial alternatives. Goals specified include:

- To establish design standards and criteria.
- To develop preliminary alignment corridors, in consideration of land-use patterns, economic development, transit-oriented development potential, travel times, potential ridership, multi-modal connectivity, and other factors.
- To analyze and screen these preliminary alternatives.

This chapter describes the processes leading to the selection of the initial sets of alternatives, as well as the evaluation and screening resulting in the selection of the final set of alternatives to be subjected to conceptual engineering and more detailed comparative assessment. This includes review of policies, corridor analyses, and evaluation criteria.

1.2.6 CHAPTER 6: DETAILED DEFINITION OF ALTERNATIVES

The project scope of work details the further assessment and definition of the remaining alternatives. Goals specified include:

- To consider conceptual engineering of alternatives.
- To consider station site planning and design, as well as operating plans for alignments.
- To consider conceptual corridor land-use and development plans.
- To consider analysis of transit-supportive policy.
- To consider capital, operating, and life cycle cost impacts.

This chapter describes the remaining alternatives in greater detail. Alternatives are assessed in terms of land use and transit-oriented development potential, transit-supportive policy, conceptual engineering, and station planning and site design.

Chapter 1.2: Report Structure

1.2.7 CHAPTER 7: IMPACT ASSESSMENT

The project scope of work details the evaluation of the remaining alternatives in terms of potential environmental, economic, and social impacts. Goals specified include:

- To inventory, assess, and analyze potential social, economic, and environmental impacts of the alternatives.
- To consider environmental justice, policy, and transportation impact concerns.

This chapter presents a description of the potential environmental and societal impacts of each of the alternatives. This analysis considers impacts on both the human (or built) environment and the natural environment. Discussion focuses on those impacts that will allow decision makers to differentiate among the alternatives.

1.2.8 CHAPTER 8: REFINEMENT OF LOCALLY-PREFERRED ALTERNATIVE

The project scope of work details the final refinement and assessment of alternatives and the recommendation of a locally-preferred alignment. Goals specified include:

- To review study data and detailed results to provide support as needed through the selection of a locally-preferred alternative.
- To document and guide selection of a locally-preferred alternative to be recommended for further analysis.

This chapter reviews previous analysis and findings of this AA. As guided by results of the AA research and public engagement, a locally-preferred alignment through the Northside, downtown, and Southside study areas is defined. This alignment will be recommended to the EWGCOG board for approval further, more detailed, project development.

Purpose and Need

Chapter 2.0

Northside Study



Chapter 2.1: Introduction

For the past several decades, the population of the City of St. Louis has steadily declined, while that of St. Louis County and outlying suburban areas has experienced significant growth and development. The creation of interstate highways and interconnected roadways over the past fifty years and the availability of land and affordable housing have enabled the outward migration of jobs and population from the central City. This shifting of population has resulted in a number of social and economic consequences and challenges.

The City has a disproportionate share of residents in poverty. Twenty-nine percent of households in the City earned less than \$15,000 per year in 1999, compared with 10% in St. Louis County. The City also has a higher minority population, 56%, compared to 23% in the county. According to census estimates prepared by the City of St. Louis, the City is beginning to regain some of the population that it lost between 1950 and 2000. This could be due, in part, to downtown redevelopment efforts, federal and state rehabilitation tax incentives, and an increasing immigrant population. Downtown is expected to continue growing, but official 2030 forecasts predict that the remainder of the City will continue to lose population, which will further aggravate these economic conditions.

At the same time, the City remains a major employment and cultural center, offering nearly 280,000 jobs, as well as multiple institutions such as universities, medical centers, and cultural venues. Employment is expected to remain relatively stable, despite employment growth in suburban areas.

Recognizing the role that transportation plays in land-use development and sustainability, the East-West Gateway Council of Governments (EWGCOG) prepared the *St. Louis Systems Analysis for Major Transit Capital Investments* in 1991. The analysis identified three second-tier priority corridors for MetroLink light-rail expansion, including the Northside, Southside, and Daniel Boone corridors (Figure 2.1-1). EWGCOG then completed Major Transportation Investment Analyses (MTIAs) in 2000, which resulted in the selection of locally-preferred alternatives (LPAs) for each of the three study areas. For the Northside area, the LPA was identified as light-rail transit (LRT) along Natural Bridge Avenue and terminating with a downtown loop (Figure 2.1-2). On the Southside, the LPA included either an LRT or bus rapid transit (BRT) within the existing Union Pacific Railroad right-of-way, also terminating at a downtown loop.

In late 2005, EWGCOG continued technical analyses for Minimal Operating Segments (MOSs) for initial phases of the LPAs in the Northside and Southside areas. The Northside MOS terminates at a park-and-ride lot at I-70 near Goodfellow Boulevard, while the Southside MOS terminates at a similar facility at I-55 near Loughborough Avenue.

Two factors influenced this decision to study only the MOSs in each corridor. First, funding for additional analysis of the LPAs was available via tax credits issued by the Missouri Department of Economic Development. This funding is limited to use in areas classified as distressed communities, which includes the City of St. Louis and all of the current MOSs. Second, concerns about the community's ability and willingness to fund major MetroLink extensions

Northside Study

suggest that short-term attention should focus on shorter, more realistic initial phases of the LPAs, while not abandoning those long-term objectives.

It is important to emphasize that the MOS endpoints are – from a transportation-planning standpoint – logical termini, selected for and expected to result in favorable cost-effectiveness measures, as well as to achieve strong community support. No shorter segment of either LPA would meet those criteria. The termini for the Northside are downtown St. Louis and the I-70 park-and-ride, which is intended to attract riders from the highway. Likewise, on the Southside, the termini are downtown St. Louis and the I-55 park-and-ride, also intended to attract riders from that facility.

It is possible, as the study progresses, that for operational or other reasons, the MOSs could be extended for short distances. For example, if there is no suitable site for a park-and-ride lot at I-70 and Goodfellow Boulevard, the line could be extended northwest to the location of a suitable parking site.

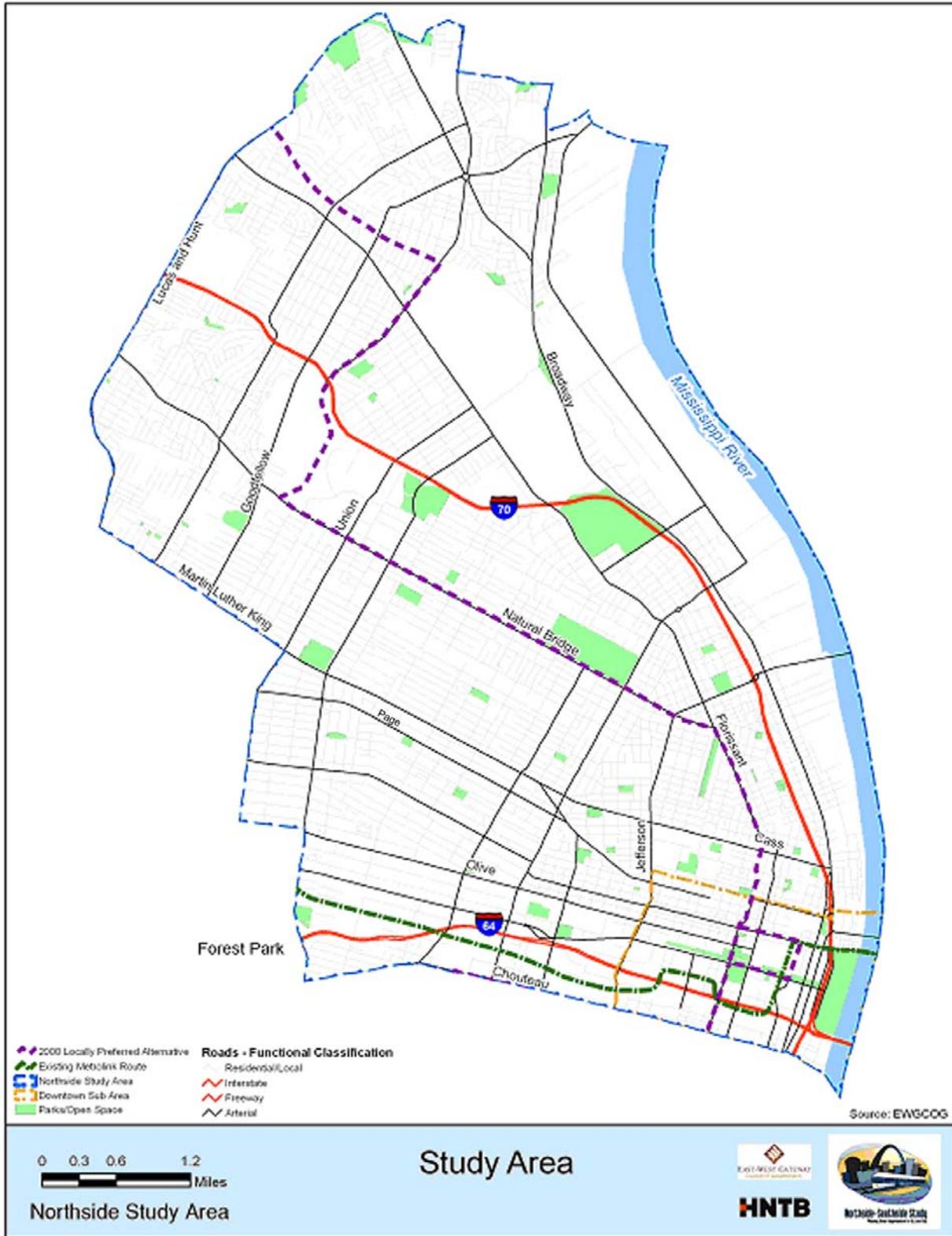
For the current Northside-Southside Study, the two study areas are defined as they were in the MTIAs. The 2000 MTIA Northside study area is shown in Figure 2.1-2, which includes both the LPA and the MOS. However, for purposes of analysis in the current study, the focus will be on the more concentrated markets that will largely determine the effectiveness (ridership and development) of the MOSs. These analysis areas are smaller, more focused areas of the 2000 MTIA study areas and extend approximately two miles beyond the termini at the interstate park-and-rides. Figure 2.1-3 reflects the concentrated area for the Northside MOS, called the “Northside study area.”

This document will focus on the characteristics, problems, and needs of the Northside study area (Figure 2.1-3). A separate report has been prepared for the Southside study area.

FIGURE 2.1-1: METROLINK ALIGNMENTS



FIGURE 2.1-3: STUDY AREA, 2006



Note: "Natural Bridge Rd. becomes Natural Bridge Avenue within St.Louis City limits."

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Chapter 2.2: Purpose and Need

This section describes existing demographic and socio-economic characteristics of the project area, as well as the existing transportation system. It also identifies the planning and analysis that has occurred to shape this project and move it forward as a priority corridor. Further, it describes transportation problems and issues found in the corridor and presents a concise statement of the project objectives and the “Purpose and Need Statement.”

2.2.1 STUDY AREA CHARACTERISTICS

The Northside study area encompasses 36 square miles, predominantly within the City of St. Louis. It extends approximately two miles north of I-70 and Goodfellow Boulevard (Figure 2.1-3).

The study area is bounded roughly by the City limits near Halls Ferry Circle on the north; Chouteau Avenue on the south; the Mississippi River on the east; and Lucas and Hunt Road and Union Boulevard on the west. The area covers most of the north side of the City of St. Louis, including downtown, and extends slightly beyond the MOS limits to effectively capture the transit marketshed. As shown in Figure 2.2-1, almost all Northside neighborhoods in the City of St. Louis are included in the study area, from North Point, Baden and North Riverfront down to Central West End and Midtown, as well as portions of the communities of Jennings, Northwoods, Pine Lawn, Flordell Hills, Velda City, Hillsdale, Country Club Hills, Uplands Park, Velda Village Hills, and Wellston. While downtown St. Louis is shown on the various figures throughout the report, it is a separate and distinct area for which data have been gathered and analyzed.

St. Louis’ downtown area is of particular interest in this study, especially given the City’s recent efforts to revitalize the central area and encourage redevelopment. It is therefore necessary to have a full understanding of the social and economic conditions of this area when identifying and evaluating transit alternatives. For purposes of this study, the rough boundaries of Downtown are Cole Street on the north, Chouteau Avenue on the south, the Mississippi River on the east, and Jefferson Avenue on the west. This roughly corresponds with the boundaries of the City’s Downtown and Downtown West neighborhoods, a total of 2.4 square miles.

Population Characteristics

Table 2.2-1 displays the total population of the Northside and Downtown study areas, the City of St. Louis, and St. Louis County for 1990 and 2000, and projections for 2030. Data for 1990 and 2000 are from the U.S. Census Bureau. Data for 2030 are based on population estimates and projections by EWGCOG.

The City of St. Louis has experienced a decline in population over the last several decades. The Northside has lost at a greater rate than the City as a whole, but the rate of loss Downtown was less than that of the entire City. However, between 2000 and 2030, projections indicate that Downtown is expected to grow significantly, more than doubling in population. Also, the rate of loss in the Northside appears to be slowing, from an annual rate of loss of 1.8% between 1990 and 2000, to less than 0.3% between 2000 and 2030.

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Since 2000, the City of St. Louis has been implementing programs to draw population back to the City, and especially Downtown. Programs such as the Missouri Historic Tax Credit, the Empowerment Zone designation, the City's Strategic Land Use Plan, and the Downtown Redevelopment Plan have fostered an attractive environment for residential development, resulting in population increases. The City was successful in challenging the 2005 population estimates prepared by the U.S. Census Bureau. Year 2005 estimates prepared by the City show a gain in population for the City of St. Louis since 2000, compared to a loss in population as estimated by the Census Bureau.¹

TABLE 2.2-1: TOTAL POPULATION

YEAR	NORTHSIDE		DOWNTOWN		ST. LOUIS CITY		ST. LOUIS COUNTY	
	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	203,568	--	3,299	--	396,685	--	993,529	--
2000	166,468	-18%	3,021	- 8%	348,189	-12%	1,016,315	2%
2030	152,754	- 8%	7,037	133%	327,400	- 6%	1,004,200	- 1%

*Percent change is from 1990 to 2000, and 2000 to 2030.

Source: 1990: census Traffic Analysis Zone (TAZ) data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

Transit services in the St. Louis metropolitan area are provided by the Bi-State Development Agency hereafter referred to as Metro. Metro has developed a methodology to quantify and locate the areas of greatest need for transit service in the region. The Transit Need Index was designed to summarize the demographic census tract data for population density, minority population, median household income, automobile availability, population over age 65, and work force disability. These are characteristics for which the need for transit is traditionally greater. Figure 2.2-2 shows the census tracts and their rankings of very low to very high in terms of transit need. Many Northside areas qualify as “high” or “very high” need, with the highest needs between I-70 and Martin Luther King Drive. There are also sections of Downtown which qualify as “high transit need.”

The study area has a high percentage of people whose mobility is impaired. Sixteen percent of Northside households and 29% of Downtown households do not have access to any vehicle, which is much higher than that in the County (6%). Twenty percent of the population in many census tracts within the study area uses transit, which is high by national standards. Almost 40% of the study area population is either younger than 16 or older than 65, and 23% of workforce-age residents are considered disabled. These groups are traditionally considered more transit-dependent.

Employment Characteristics

Table 2.2-2 displays the total employment for 1990 and 2000, and projections for 2030. Data for 1990 and 2000 are from the U.S. Census Bureau. Data for 2030 are based on employment estimates and projections by EWGCOG.

¹ U.S. Census Bureau: Accepted Challenges to Vintage 2005 Population Estimates. (Accepted March 16, 2006)

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Employment decreased everywhere except the County during the past decade, primarily due to the outward migration of jobs to suburban county locations. Projections indicate that employment in the City of St. Louis and the study area is not expected to change greatly between 2000 and 2030, although Downtown will gain 3,000 jobs. It is expected that the County will continue to gain employment, but at a slower pace. There have been, and will continue to be, gains and losses in employment centers that basically cancel each other out. In addition, various types of redevelopment of previous industrial or commercial uses into residential uses, especially Downtown, will affect overall employment.

TABLE 2.2-2: TOTAL EMPLOYMENT

YEAR	NORTHSIDE		DOWNTOWN		ST. LOUIS CITY		ST. LOUIS COUNTY	
	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	98,183	--	109,265	--	317,198	--	518,137	--
2000	91,506	-7%	93,289	-15%	278,500	- 12%	621,000	20%
2030	89,451	-2%	96,692	4%	277,800	- 3%	693,200	14%

*Percent change is from 1990 to 2000, and 2000 to 2030.

Source: 1990: census TAZ data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

Major employment and activity centers within or adjacent to the study area include the St. Louis Central Business District, Barnes-Jewish Hospital, Washington University Medical School, St. Louis University, and the Grand Center Arts and Entertainment District.

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FIGURE 2.2-1: CITY NEIGHBORHOODS, NORTHSIDE

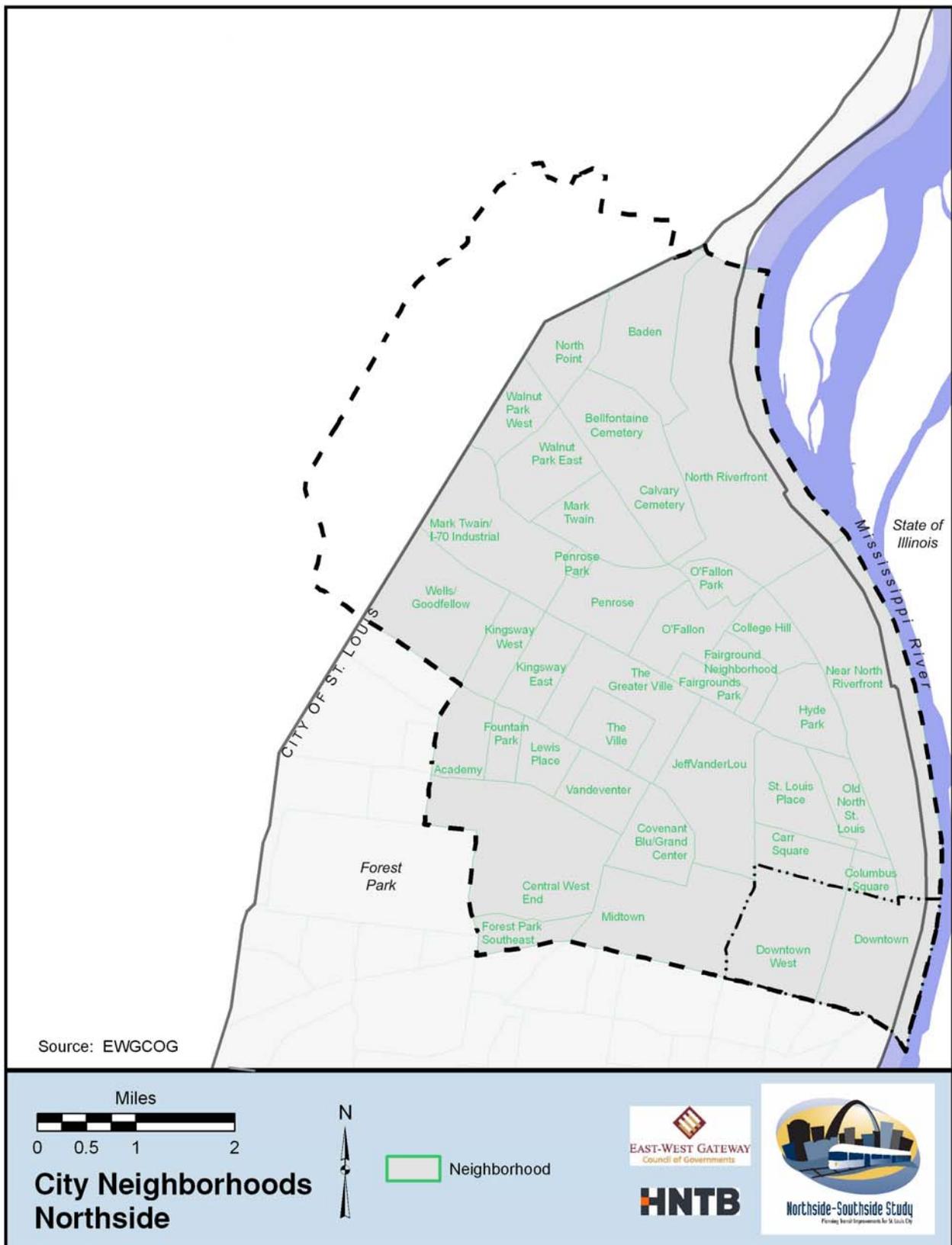
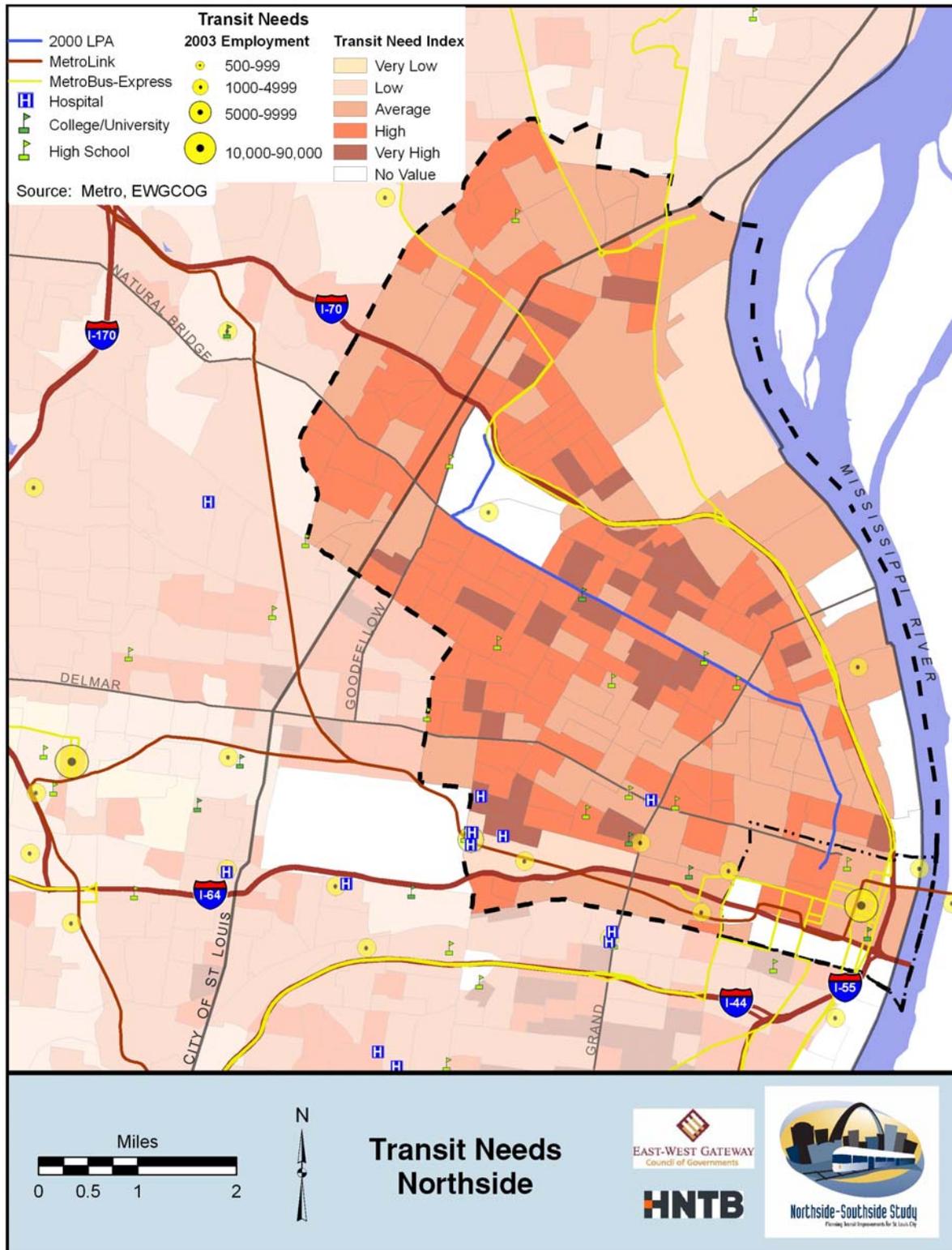


FIGURE 2.2-2: TRANSIT NEEDS, NORTHSIDE



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

2.2.2 EXISTING TRANSPORTATION NETWORK AND FACILITIES

Roadways

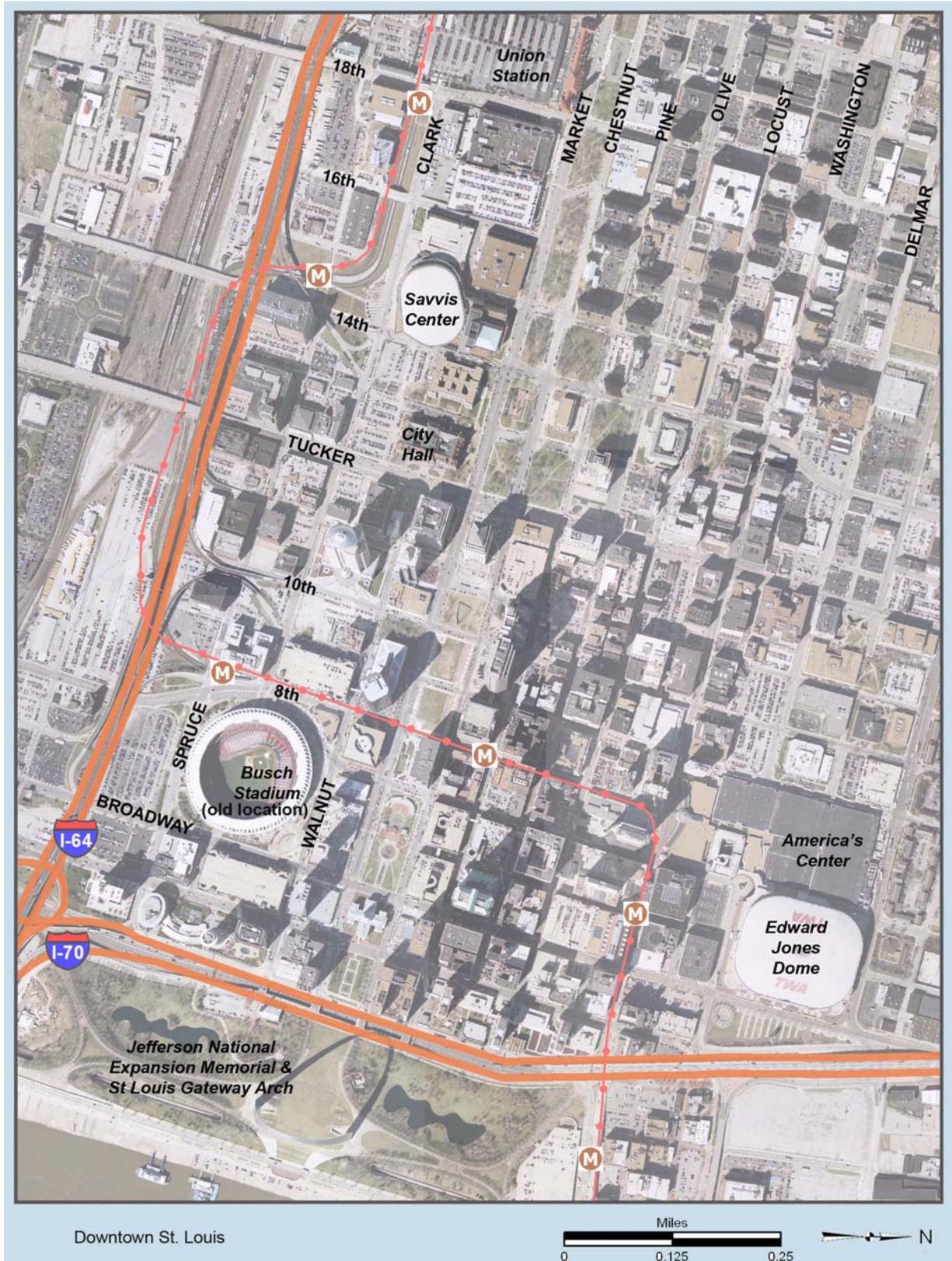
Two interstates bisect the study area. Interstate 70 (I-70), runs diagonally from downtown St. Louis to the northwest. Interstate 64 (I-64, US Highway 40/61) runs east-west through the most southern portion of the study area.

In addition to the interstate highways, several arterials and other major roadways serve the study area. Local collector and feeder roadways, most of which are maintained by their respective municipalities, comprise the remainder of the roadway network. Listed below are the arterials that are maintained by the Missouri Department of Transportation (MoDOT). Common names are given in parentheses. Refer to Figures 2.1-2 and 2.1-3.

- Highway AC (New Halls Ferry Road).
- Route 115 (Natural Bridge Avenue).
- Route 180 (Dr. Martin Luther King Drive).
- Highway U (Lucas-Hunt Road).
- Highway D (Page Avenue).
- Route 100 (Chouteau Avenue).
- Highway H (Riverview Boulevard).

Several other major arterials serve the Central Business District within the study area, including Memorial Drive, Broadway, Market Street, Tucker Boulevard, and Washington Avenue (Figure 2.2-3).

FIGURE 2.2-3: MAJOR ARTERIALS – CENTRAL BUSINESS DISTRICT



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Transit

Public transit operations have been a part of St. Louis for over a century. Operations began in the late 1800's with a steam line railroad. By the early 1900's, a citywide electrified transit system operated. In the early 1920's, streetcar lines covered the City, with extensions to Berkeley, Creve Coeur Lake, and Kirkwood. However, the development of the highway system and reliance on the automobile lead to the demise of the streetcar system, and the last streetcar line was abandoned in 1966.

Today, public transportation is provided by Metro. The Metro system includes MetroBus, the region's bus system; Metro Call-A-Ride, a paratransit van system; and MetroLink, the region's LRT system. Metro carried over 46.5 million passengers in Fiscal Year (FY) 2005, and operations are subsidized by sales taxes from St. Louis City; St. Louis County; the St. Clair County, Illinois Transit District; federal and state grants and subsidies; and customer fares.²

MetroBus

Metro has a fleet of 433 buses. Thirteen local fixed routes provide regular service to the study area. The local routes that serve the study area tie into Metro's regional transit network. Typical weekday headways during the peak periods are between 15 and 30 minutes, with off-peak service about every 30 minutes.

In August 2006, Metro implemented improvements to the MetroBus system as part of "Metro Redefined 2006" program. This transitioned the system from the more traditional radial configuration of fixed-route bus services to a transit-center-based system. This is driven, in part, by the need to better serve changes in regional travel patterns resulting from nationwide shifts in population and employment. The purpose of these transit centers is to facilitate intermodal transfers between bus and light-rail riders, as well as bus-to-bus transfers.

Existing transit ridership is heaviest on those routes that cut through the urban core of the study area. These routes include Grand (No. 70), Kingshighway (No. 95), Natural Bridge (No. 4), and Delmar (No. 97).

In addition to the local bus routes, five bus routes provide express or limited stop service. These express routes primarily serve commuter trips destined for downtown St. Louis, and they provide limited stop service in the peak periods along selected arterials in the northern portions of the study area. These routes use I-70 to complete their trips. Express routes operate in the peak direction, traveling southbound-eastbound in the A.M. peak, and northbound-westbound in the P.M. peak. These routes connect Northside residential areas with employment sites in downtown St. Louis and other destinations in the region.

Demand Response Services

In addition to bus service, Metro operates two demand response programs in the St. Louis region: Call-A-Ride and Call-A-Ride Plus. These programs provide curb-to-curb van service in St. Louis City and St. Louis County with advance reservations.

MetroLink LRT

The current MetroLink LRT system consists of approximately 40 miles of double-track, running from its western terminus at Lambert Airport station to the Shiloh-Scott station east of the Mississippi River in Illinois, with 19 stations. Within the study area, the line runs from downtown St. Louis west to Forest Park, with eight stations in the study area. A fleet of 77 vehicles

² <http://www.metrostlouis.org/>

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operates in trains made up of one or two vehicles. Trains operate on 10-minute headways during peak weekday hours, and on 15-minute headways during off-peak hours and on weekends.

The Cross County Extension opened in August 2006. It branches from the existing LRT line at the Forest Park station, runs west through Clayton, and turns south to a terminal station at Shrewsbury and I-44. There are nine stations and three park-and-ride facilities within walking distance of approximately 30,000 jobs and 100,000 residents. The Cross County line also added 22 new light rail vehicles to the LRT fleet.

2.2.3 PLANNING CONTEXT

The Federal Transit Administration (FTA) *Fiscal Year 2009 New Starts and Small Starts Evaluation and Rating Process*, July 20, 2007, provides the methodology FTA will use to evaluate, rate, and recommend funding for the proposed Northside and Southside projects. In response to the provisions stipulated in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), FTA will use an evaluation and rating system to recommend funding for candidate New Starts projects. Candidate projects must receive FTA approval to advance from Alternatives Analysis (AA) to preliminary engineering (PE) and on to final design.

FTA assigns a summary project justification rating of *High*, *Medium-High*, *Medium*, *Medium-Low*, or *Low* to each project based on consideration of the ratings applied to the project justification criteria. The criteria include:

- Cost Effectiveness
 - Incremental Cost per Hour of Transportation System User Benefit.
- Transit Supportive Land Use and Future Patterns
 - Existing Land Use.
 - Transit Supportive Plans.
 - Policies, Performance and Impacts of Policies.
- Mobility Improvements
 - User Benefits per Passenger Mile.
 - Number of Transit Dependents Using the Project.
 - Transit Dependent User Benefits per Passenger Mile.
 - Share of User Benefits Received by Transit Dependents Compared to Share of Transit Dependents in the Region.
- Environmental Benefits
 - EPA Air Quality Designation.

It is important to note that the FTA project evaluation process is on-going throughout the planning process. FTA evaluation and rating occurs annually in support of budget recommendations presented in the *Annual Report on Funding Recommendations* and when a project sponsor requests FTA approval to advance their proposed New Starts project into preliminary engineering and final design.

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In addition to project performance criteria identified above, FTA also evaluates the stability and dependability of local funding contributions to construct, maintain and operate the transit system. The project is then rated by averaging the rating for project justification and local financial commitment. FTA will consider proposed New Start projects for Full Funding Grant Agreements only if the project receives a *Medium*, *Medium-High*, or *High* overall project rating. Favorable FTA ratings do not guarantee funding as the ratings only reflect project worthiness not project readiness as other Federal planning, technical, operational and funding requirements factor into the decision to receive FTA funding.

The Northside-Southside study relied upon these FTA evaluation criteria identified above as benchmarks from which the alternatives have been quantitatively measured. The criteria have served as a guide to the alternative evaluation process and will be referenced through this AA. In addition to these FTA criteria, short- and long-range transportation planning goals of the EWGCOG and the City of St. Louis have also been considered when assessing the viability and functionality of the proposed alternatives.

EWGCOG is the region's federally designated Metropolitan Planning Organization (MPO). It is responsible for developing the short-range and long-range transportation plans for the region, and for selecting capital projects and initiatives that will qualify for federal funds to best carry out the adopted goals and objectives of these plans. The region's transportation plan provides a framework for how decisions are made about the region's surface transportation system.

Regional Transportation Goals and Objectives

EWGCOG's approach to regional transportation planning and decision-making in the metropolitan St. Louis area is defined in its March 2005 plan, *Legacy 2030: The Transportation Plan for the Gateway Region*. *Legacy 2030* is an update of previous regional plans, and it provides a guide for investing public funds through 2030. The plan re-emphasizes six focus areas that serve as the evaluative framework for identifying and defining problems, developing and evaluating options, and selecting preferred alternatives in long- and short-range transportation planning studies. These focus areas also are used by EWGCOG to establish priorities in selecting projects for programming in the Transportation Improvement Program (TIP), and they provide reference points to ensure consistency in EWGCOG's planning programs. Regional transportation goals and objectives are a foundation for the development of goals and objectives for the Northside study. However, they will not be evaluated as part of the study.

The six focus areas include:

1. **Preservation of existing infrastructure.** This area emphasizes maintaining current road, bridge, transit, and intermodal assets in good condition.
2. **Safety and security in travel.** This area emphasizes decreasing the risk of personal injury, fatalities, and property damage on, in, and around transportation facilities. Investing in new transportation services also can contribute to enhancing quality of life and personal safety in declining neighborhoods.
3. **Congestion.** This area emphasizes ensuring that congestion on the region's roadways does not reach levels that compromise productivity and quality of life.

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4. **Access to opportunity.** This area emphasizes addressing the complex mobility needs of persons living in the area, including those living in low-income communities and persons with disabilities.
5. **Sustainable development.** This area emphasizes coordinating land use, transportation, economic development, environmental quality, energy conservation, and community aesthetics. Sustainability involves making responsible use of natural and built resources, ensuring that future generations can share in their benefits, and ensuring that all people, regardless of income or minority status, are involved in decisions that affect their lives.
6. **Efficient movement of goods.** This area emphasizes improving the movement of freight within and through the region by rail, water, air, and highway. (Since the existing infrastructure currently accommodates the movement of goods through the study area, this particular focus area does not apply to possible future transit improvements in the area.)

Based upon these six focus areas, *Legacy 2030* outlines regional goals as described below. Responsible planning practices and federal law require that transportation investment decisions align with these goals.

- A strong position in the national and global marketplace, ensured through strategic economic development, competitive employment opportunities, a well-trained work force, and responsible asset management.
- A sustainable and growing economy grounded in the wise and coordinated use of physical, environmental, social, and agricultural resources.
- Safe neighborhoods, communities, and thoroughfares.
- Resources for learning and personal development, accessible at every point of the life cycle.
- Varied and valued outlets for recreation and cultural expression.
- A growing diversified population, with equity, choice, and opportunity for all citizens.
- Efficient and balanced patterns of growth and development that respect the land, citizenry, history, and strategic location of the St. Louis region.

Gateway Blueprint

EWGCOG is also developing the *Gateway Blueprint* to assist local governments in illustrating and evaluating the effects of transportation decisions on land use, and vice versa. The program is based on three core objectives and four guiding principles that complement the goals of *Legacy 2030*:

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Core Objectives:

1. **Improving Efficiencies of Public Investment.** Reducing environmental impact of the transportation system; minimizing the need for new, costly infrastructure investment; and improving access to jobs, services, and centers of trade.
2. **Supporting Individual Choices.** Providing residents with choices in homes, schools, jobs, recreation, and transportation within safe, quality cities, towns, and neighborhoods, creating a basis for equality of opportunities throughout the region.
3. **Strengthening Communities.** Nurturing interaction, involvement, and responsibility, and providing opportunities for citizens to come together informally in safe, strong, stable, and healthy communities of place and communities of interest.

Guiding Principles:

1. **Encouraging Energy and Resource Efficiency.** Implementing efficient use of resources and utilizing savings as investments in the community.
2. **Promoting Accessibility.** Improving transportation alternatives and assessing development centers in relationship to transportation in order to improve access to jobs, education, and services.
3. **Valuing Natural Resources.** Protecting and restoring air and water quality; recognizing the natural landscape as a valuable resource; providing access to parks and open space; sustaining use of land for agriculture; creating and supporting tourism and local recreational opportunities.
4. **Building Collaboration.** Generating intergovernmental collaboration to improve regional economic and social equity and regional security.

City of St. Louis Strategic Plan

The City of St. Louis' Planning Commission adopted its *Strategic Land Use Plan* in January 2005, as replacement of and revision to the last City-wide plan of 1947. This new *Strategic Land Use Plan*, a dynamic foundation for positive change within St. Louis, provides a cohesive, holistic development approach for the City's anticipated growth. The plan's objective is twofold: to provide direction for those who wish to make new investments in the City, and to provide stability and opportunity for those who already live, work, and build businesses there. Further goals include the following:

- Providing stability and an improved quality of life for current residents, workers, and businesses.
- Preserving high-quality sites for identified best future uses.
- Providing a framework for future City initiatives.
- Encouraging appropriate preservation and/or market-driven development in defined locations, while providing direction for those seeking new investment opportunities.

The plan was developed by the City's Planning and Urban Design Agency and reflects the resources and collaboration of the Mayor's office, St. Louis' 28 aldermen, City and State agencies, developers, and other stakeholders involved in the City's built environment. These

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participants methodically surveyed existing conditions within the City; identified land use categories, into which all blocks were classified; overlaid recommended future land uses onto existing uses; and drafted multiple revisions to the current map. As identified by this careful process, the plan recognizes a series of strategic land use categories:

- Residential (neighborhood preservation and neighborhood development areas).
- Commercial (neighborhood and regional areas).
- Business/industrial (preservation and development areas).
- Recreational/open space.
- Institutional.
- Specialty mixed use.
- Opportunity area.

While the delineation of these areas may evolve to suit the City's changing needs, it provides a basis for enhanced decision-making. The Strategic Land Use Plan, via provision of such a framework, seeks to solidify district identity, solicit and secure resources for improvement, and offer a guide for investment and development inquiry response.

St. Louis Downtown Development Action Plan

The *St. Louis Downtown Development Action Plan* is focused on four downtown districts that have a high level of pedestrian and vehicular traffic, have strong existing assets and significant development potential. More than \$3 billion in investments in the downtown has occurred since 2000, and these investments have attracted new residents, businesses, and entertainment areas to the City.

Other Transportation/Land-use Studies

Several additional planning efforts are related to and have influenced this study. These include the following:

- **Northside and Southside MTIAs.** In 2000, multimodal MTIAs of the Northside, Southside, and Daniel Boone (West County) study areas were completed. They recommended MetroLink extensions and other transit improvements in all three areas. The 2000 Northside MTIA study area, as defined in the 2000 MTIA, is located in the north and northeast portion of the City of St. Louis and St. Louis County (Figure 2.1-2). It is roughly bounded by the Mississippi River on the east, Lindbergh Boulevard on the north, North Florissant Road and Union Boulevard on the west and Chouteau Avenue on the south. The 2000 Southside MTIA study area is located in the south and southeast portion of the City of St. Louis and St. Louis County, and it is roughly bounded by the Mississippi River on the east, I-64 on the north, Gravois and Hampton Roads on the west, and the Meramec River on the south.
- **Southside Transit Study.** As described previously, the Southside study area defined in the 2000 MTIA now has been reduced to boundaries that coincide with the current MOS. The Southside Study is being conducted in tandem with the Northside Study.
- **Cross County MTIA (1995-1997).** The Cross County Corridor consisted of two linear corridors that intersected to form a cross-shaped study area. The north-south corridor extended from the I-270/I-170 interchange on the north to the general vicinity of the I-270/I-55 interchange on the south in the south County area. The east-west corridor extended from east of the I-64/I-270 interchange in St. Louis County to the general

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vicinity of the I-64/Tower Grove interchange in the City of St. Louis. Subsequent studies focused on the expansion of MetroLink to the west and south, from Forest Park to Shrewsbury.

Results of Public Outreach

In late 2005 and early 2006, study team members conducted more than 70 stakeholder briefings with residents, business owners, and elected officials. The briefings explained the study's goals and objectives, addressed key issues, and allowed the study team to gather stakeholders' input. The results of these meetings are presented in the *Public Scoping Comment Report*, published separately. The most commonly identified issues and needs were:

- Improving access to key activity and employment centers.
- Promoting economic development.
- Preserving existing neighborhoods and communities.

Project Development Process

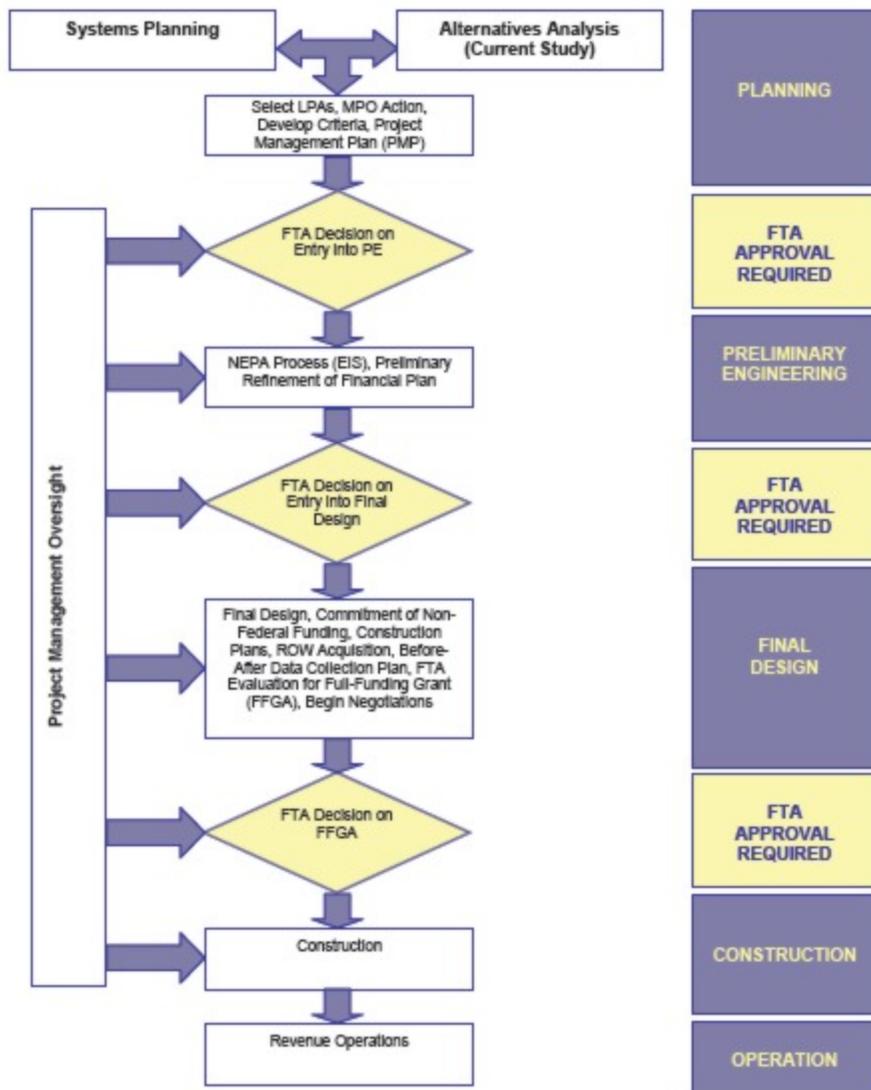
An Alternative Analysis (AA) is both a planning tool and an evaluative process. It is a step for any major transportation project that may require significant capital investment of federal funds.

The overall transportation-project development process is illustrated in Figure 2.2-4. The purpose of this study is to re-examine and refine the Northside and Southside MTIA's preferred transit alternatives by carrying out further conceptual engineering and environmental analysis in accordance with federal and state regulations.

During this stage, assumptions made in the MTIAs are reassessed and validated based on updated existing and projected future conditions in the Northside study area. A key element of the validation is the clear definition of the area's transportation problems in order to firmly establish the purpose and need for a proposed transit improvement. Detailed analyses of the viable alternatives are conducted using the evaluation criteria developed in the MTIAs. These analyses and evaluations may lead to the identification a locally-preferred alternative (LPA), which may be the LPA identified in the MTIA or a modified version of that LPA.

After completion of this study, the next step will be a Draft Environmental Impact Statement (DEIS). The publication and review of a DEIS is the final step in the AA/DEIS phase of project development.

FIGURE 2.2-4: TRANSPORTATION PROJECT DEVELOPMENT PROCESS



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2.2.4 STATEMENT OF PURPOSE AND NEED

Problems and Opportunities

Problem: Sustainable Development

As stated previously, virtually all Northside neighborhoods and all or portions of many nearby suburbs are included in the study area. The Northside study area includes more than 160,000 people, and Downtown is home to approximately 3,000 people. The City of St. Louis, and especially the Northside study area, has experienced decades of population loss. Many residential units have been abandoned, and many commercial businesses have also failed or left. While the downtown continues to remain strong, the economic viability of many areas on the Northside is challenged. Much of the study area is located in a federally designated “Empowerment Zone” (Figure 2.2-5). Empowerment Zones, or EZs, are areas with high rates of poverty, crime, and other conditions of distress. The designation as an EZ allows for infusions of federal money, leveraged with public and private investment, and regulatory relief and tax breaks to help local businesses provide jobs and revitalize distressed communities. The goal is to stabilize distressed areas by attracting new jobs and affordable housing, improving neighborhood aesthetics, and providing workforce training and other resources to residents of these areas.

The following needs for sustainable development emerged from the review of local plans, the examination of existing conditions, and stakeholders’ comments:

- Supporting stabilization, revitalization, and redevelopment in the study area.
- Increasing personal safety in areas of decreased commercial and residential development.
- Capitalizing on recent or planned investments.
- Preserving the character of existing stable residential areas.

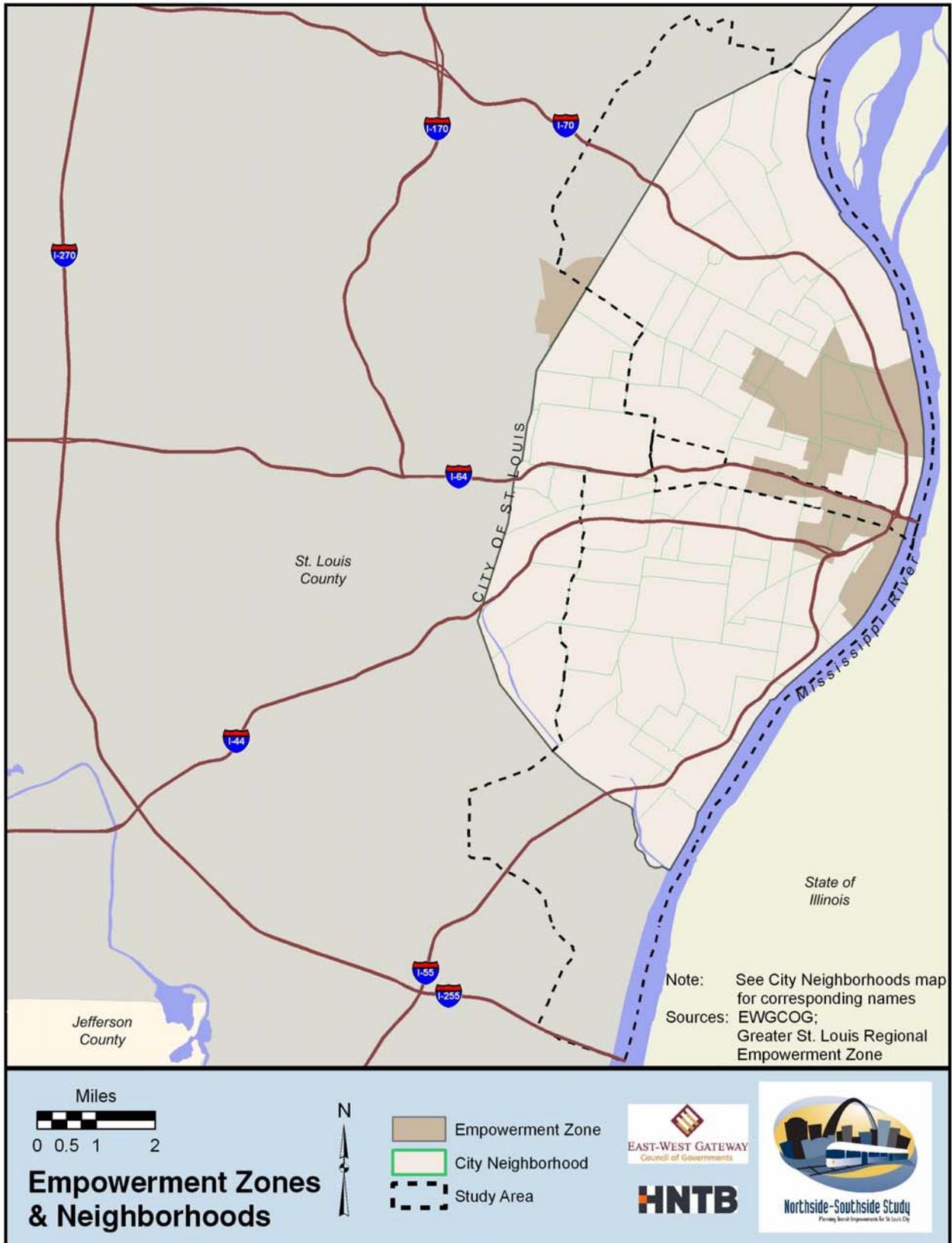
Opportunity: Stabilization, Revitalization, and Redevelopment of Key Areas

A nonprofit economic-development entity has been created to facilitate, expand, and promote sustainable economic development in the EZ. The EZ designation has influenced some successful revitalization efforts, such as the North Market Place residential redevelopment and infill and the Mary One Johnson developments on 21st Street near St. Louis Place Park. However, the Northside area needs additional stimuli for its long-term viability.

The population loss of the City of St. Louis is beginning to reverse as redevelopment breathes new life into the City, especially downtown. Spurred by the implementation of the *Downtown Development Action Plan*, many of the City’s older buildings that are located within walking distance of MetroLink stations are being converted into loft condominiums. The City has experienced revitalization as the population returns to the central core, and residents enjoy amenities that living in an urban environment provides.

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FIGURE 2.2-5: EMPOWERMENT ZONES & NEIGHBORHOODS



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One area outside of downtown in which transit has played a role in development is Central West End. This neighborhood is located just east of Forest Park, near the Washington University Medical Center, and it is home to many of the City's cultural landmarks. The Central West End MetroLink station is among the most used stations on the system, having more than 4,500 boardings on a typical weekday. Older homes have been transformed into multi-residential units, while restaurants, art galleries, and specialty shops have emerged. More than \$300 million in development has occurred since the opening of the MetroLink station, including a major expansion of Washington University Medical Center, a new hotel, and loft condominiums.

Transit-oriented development, or TOD, is mixed-use development that encourages people to live near transit and decrease their dependence on automobiles. TOD components include, among other things, moderate-density housing, pedestrian-friendly development, and retail and entertainment establishments all located within walking distance of the transit station. TOD has proven to be successful in other cities similar to St. Louis, including Denver and Minneapolis.

Incorporating transit into the St. Louis community can have positive effects on development. Many distressed areas of the City can benefit from safe, attractive, thriving, urban environments that are created by being located near transit. Examples in the study area include the Goodfellow/I-70 interchange area; the Natural Bridge Avenue and Union Boulevard intersection; and the North Florissant Avenue and Mullanphy Street intersection on the near north side.

TOD at MetroLink stations can help promote the stabilization or redevelopment of those neighborhoods, commercial corridors, and employment centers that are located near them. To fully realize this potential, strategic station-area land-use plans should, in time, become integrated into more comprehensive local land-use plans (such as future updates of the City's Strategic Plan). Station-area planning should emphasize adding currently missing land uses and community amenities aimed at meeting specific local community needs, such as adding retail where it is missing and broadening housing choices for potential new residents. Some opportunities for "brownfield" redevelopment also are apparent, especially at the north end of the corridor near I-70.

Through careful planning and design, TOD can produce a more sustainable community by creating a high-quality urban environment that is more attractive and marketable for residents and tenants. The mix of uses provided by TOD promotes activity from early in the morning to late in the evening, thereby enhancing the safety of the overall community area. TOD also creates more "walkable" communities and safer access for pedestrians and bicyclists, encouraging the choice of transit over private automobile use. The degree to which a candidate alignment can support TOD opportunities around candidate stations will be one test used to evaluate and compare the alternatives.

While the idea of TOD is appealing, it will not automatically occur around stations. Because there are few mixed-use areas on the Northside, targeted public sector intervention likely will be needed to make even modestly scaled TOD plans feasible. This is especially crucial for redevelopment situations in which the necessary market interest in choosing Northside locations over competing regional sites will need to be nurtured. Thus, public-private partnerships can present opportunities to develop an effective balance of incentives and requirements. For example, a developer can be encouraged to provide a desirable land-use mix and community amenities in return for fewer parking requirements, or density bonuses; less public assumption of infrastructure expenses; or tax rebates.

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Development incentives are not always monetary. More streamlined approval processes, fewer conditional approvals, and zoning that allows more transit-supportive land uses — while restricting those uses not appropriate for meeting TOD goals — also can offer developers reasons to pursue TOD. Existing development codes, especially zoning regulations, will need to become more supportive of TOD if transit implementation is to be an effective instrument of land-use change and sustainable development. Local land-use policies that encourage transit-supportive development patterns also may improve the prospects for federal funding of rail transit projects in the corridor. The project justification criteria used by the FTA to evaluate projects competing for federal funds place specific emphasis on such land-use policies.

Problem: Access to Opportunity

The City of St. Louis also has experienced losses in jobs, as employers have chosen to locate, or relocate, in suburban areas. There is a growing mismatch of job location and residences, especially for people with low incomes. Access to jobs is a critical social and economic issue. Most jobs in the greater St. Louis region are accessible by automobile within 45 minutes; however, for those who are dependent on transit, most jobs are not as accessible. Even when jobs are within reach, commutes often are very long. Within the study area, only between 20 percent and 39 percent of jobs are accessible by transit within 60 minutes.³ The problem is compounded when multiple trips must be made via transit — such as trips to child care facilities, schools, and shopping areas — in addition to the work commute.

This issue affects not only the incomes of the transit-dependent households, but also the region's economy. Companies located in suburban areas find it difficult to employ the workforce needed to sustain their businesses. EWGCOG's research shows that lack of transportation is a main impediment to employing low-income workers, and its "Bridges to Work" program coordinates several reverse-commute transportation projects that begin and end at light-rail stations.

In addition to the traditional home-to-work commute, the ability to access other activity centers, such as shopping centers, medical centers, educational institutions, or entertainment venues, is hampered by the lack of an automobile. Many of the activity centers are only reasonably accessible during peak hours. Others entail transfers and long commutes, making the trip itself unattractive.

The following needs for access to opportunity emerged from the review of local plans, the examination of existing conditions, and stakeholder comments:

- Improve access to jobs, especially for the mobility-impaired.
- Improve transit travel times.
- Provide attractive transportation alternatives that are comparable to the automobile.

Opportunity: Provide Access to Jobs and Activity Centers

EWGCOG's "Bridges to Work" program can be enhanced with an improved transit system, helping to achieve EWGCOG's established goals. The high percentage of low-income households and households without access to an automobile within the study area makes the Northside an ideal location in which to improve transit. Transit enhancements also can lead to new economic development opportunities at and near proposed stations, as previously discussed. These jobs would be within walking distance for residents of the communities in which they are located.

³ U.S. Census Bureau

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Access to St. Louis' educational, cultural, and recreational opportunities can also be enhanced through transit, especially for those who have disabilities or low incomes.

Transit times can be improved by providing more direct-transit services to employment and activity centers and locating stations near residences. This would also make transit a more attractive alternative to commuters who have a choice in transportation (e.g., those with access to an automobile).

Goals and Objectives

The problems and opportunities have been translated into goals to be achieved by the implementation of a transit alternative in the study area. The objectives of each goal are intended to guide the development, evaluation, and ultimate selection of the transit alternative that will best serve the study area and achieve the best results in addressing the transportation problems. Fulfilling the objectives will help to reach the goals.

Goal: Enhance Neighborhoods and Foster Sustainable Development

This goal encompasses a wide range of development and redevelopment objectives that are intended to ensure that the study area can attract and retain population and evolve into a more economically balanced and stable area.

Objectives:

- Use transit accessibility at stations as a marketing tool to promote economic development or redevelopment by attracting a broader range of employment categories, especially office and professional jobs. This approach includes transforming existing, largely commercial centers into more mixed-use activity centers.
- Use transit accessibility to attract population back to the study area. This can be accomplished by fostering development of high-quality, high-density housing near stations. This includes renovating suitable older buildings into multi-family units; developing new townhomes, condominiums, or apartments, and incorporating retail uses nearby.
- Wherever compatible with the existing communities, and the engineering and operational needs of the system, locate stations where concerted land-use planning can employ a range of TOD principles to promote high-quality, mixed-use and “walkable” development or redevelopment focused around the stations.
- Preserve affordable housing opportunities by integrating them into new housing developments. This can be accomplished through appropriate regulations that require some percentage of affordable housing, and implementing creative financing mechanisms to help residents purchase these homes.
- Create opportunities and mechanisms for public-private development partnerships, especially where these partnerships can overcome a lack of market interest in locations within the study area that need revitalization. Transit could serve as a possible mechanism to create opportunities for these partnerships.

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- Develop strong local policies that support the partnership between Metro, the City of St. Louis, and the development community in order to foster TOD.
- Use transit and TOD to enhance the quality of life and personal safety in declining neighborhoods. The mix of uses provided by TOD promotes activity from early in the morning to late in the evening, thereby enhancing the safety of the overall community area.

Goal: Sustain Existing Communities and Neighborhoods

This goal addresses the need to continue to improve generally stable areas within the study area by protecting and increasing their livability and attractiveness.

Objectives:

- Encourage convenient corridor transit services to residents within the study area by improving feeder bus routes to existing and proposed transit stations, and by expanding and improving parking facilities at transit stations and other park-and-ride facilities.
- Increase the desirability of older neighborhoods by creating mixed-use retail developments, retain and rehabilitate older buildings, preserve local landmarks and historic character, and retain open space.
- Coordinate transit-planning and station-area development activities with the City's *Strategic Plan* priorities, especially those focusing on preserving existing neighborhoods.
- Coordinate transit planning with public and private investments already occurring in the study area.
- Maintain or enhance the quality of life through station-area policies and requirements that improve the overall quality of the public realm (urban design and environmental protection), promote health and well-being (e.g., walkability), and support and complement residents' and business operators' investments and efforts to improve their surroundings.
- Safely integrate new transit improvements into the existing roadway network by maintaining the quality of the street and the fabric of the communities served.
- Whenever possible, maintain existing automobile and pedestrian circulation patterns to reduce conflicts between transit and automobiles and pedestrians.

Goal: Improve Access to Opportunity for Northside Study Area

This goal is to improve transportation service for all portions of the population in the area.

Objectives:

- Provide residents with a reasonable alternative to automobile use by improving bicycle and pedestrian access to transit, and by creating safety and urban design amenities that make cycling and walking more appealing.
- Provide convenient, reliable, high-frequency public transit to better link the study area with downtown and other activity centers throughout the region.

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- Increase opportunities to access employment, education, medical, shopping, and other services. Expanded transit can increase access to these opportunities, not only within the study area, but also to the rest of the City and the region.
- Reduce transit travel times. A mix of transit modes (for example, LRT operating in exclusive right-of-way; shared in-street operations; enhanced bus, and feeder bus networks) could provide an opportunity to achieve this objective.

Goal: Develop a Cost-Effective Transportation System Improvement

This goal seeks to develop transit improvements that attain the goals stated above, while staying within the financial constraints of the region.

Objectives:

- Achieve public and institutional support for the preferred transportation investment strategy.
- Design a system that provides overall benefits — including those difficult to quantify — that warrant its overall cost.
- Include an evaluation of all costs and benefits, both quantifiable and non-quantifiable.
- Ensure that the costs and benefits are shared equitably among citizens and governmental entities.
- Ensure that transit-supportive land use policies are included in any investment strategy.

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Chapter 2.3: Evaluation

The *Northside and Southside Major Transit Improvements Study* (Northside-Southside Study) is both a continuation of MTIAs completed in 2000 and a study that will result in recommendations that could be advanced through the St. Louis region's established project development process. Consequently, the current study's evaluation process builds upon the evaluation and screening methodology of the MTIAs, and anticipates the requirements of subsequent decision-making at both regional and federal levels. These include the refinement of previous transit LPAs by the EWGCOG, as well as the satisfaction of requirements for a possible Environmental Impact Statement (EIS) and the submittal of a New Starts application to receive federal funding for preliminary engineering.

The following paragraphs outline the comprehensive decision-making process, including steps before and after the Northside-Southside Study, focusing on decisions made at each step and on the evaluation criteria used to date or anticipated to be used in the future. Most emphasis is placed on the sequential alternatives analysis and screening decisions in the current study, and on the increasing level of detail required as the study advances. This will include a discussion of evaluation criteria and their application.

2.3.1 DECISION REQUIREMENTS

The Northside-Southside Study will produce information to support two interrelated decisions: the refinement of LPAs for the Northside, Southside, and downtown St. Louis – each the result of a multi-stage process – and the designation of one or more preferred alternatives as an investment priority in EWGCOG's long-range transportation plan. For the first set of decisions, alternatives in each of the three areas will be assessed in the context of the evaluation criteria discussed below. (Although downtown alignments are evaluated separately from the Northside and Southside alternatives, a preferred downtown option would be part of northern and/or southern routes.) Specific decision points include the selection of the initial set or range of preliminary alternatives, the screening of those to a narrow range of final alternatives in each area for more detailed analysis, and the refinement of LPAs from those.

For the decision to include recommended strategies in the regional long-range plan, the merits of an investment on the Northside could be weighed against those for a Southside project, with one being selected over the other, or they could be adopted as a single investment package.

In addition, since the study is considering fixed guideway transit alternatives such as light rail, it would probably require Federal Transit Administration (FTA) funds from the agency's New Starts program. Therefore, the evaluation methodology anticipates the need to meet FTA's New Starts requirements, and includes such criteria in its evaluation methodology.

2.3.2 EVALUATION METHODOLOGY AND CRITERIA

The evaluation of alternatives in the Northside-Southside Study is built on the FTA's recommended framework, and on the process developed for and used in the 2000 Northside and Southside MTIAs.

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The FTA requires that alternatives be evaluated from five perspectives:

- **Effectiveness.** The extent to which alternatives solve the stated transportation problems in the corridor.
- **Impacts.** The extent to which alternatives support economic development, environmental or local policy goals and minimize adverse impacts.
- **Cost effectiveness.** The degree to which costs are commensurate with benefits.
- **Financial feasibility.** The ability of a region to obtain the non-federal financial resources to build and operate alternatives.
- **Equity.** The fair distribution of costs and benefits among different populations.

The current study will use this framework for its evaluation and screening as discussed below.

The study will also refine the goals, objectives, and evaluation criteria used in the 2000 MTIAs. These were developed in the context of FTA's evaluation framework (since modified), EWGCOG's previous set of focus areas, and goals and objectives that have been modified for the current study. (Note that the previous studies encompassed more extensive study areas, and they analyzed both transit and highway options. The Northside-Southside Study is considering only transit options, so some elements in the MTIA evaluation methodology are not relevant.) Since the existing light rail system does not provide direct access to the Northside or Southside, improvements to the existing system will not eliminate the need for the proposed service area expansion.

Finally, as noted above, it is assumed that federal support for capital costs will be required if any project is to advance into engineering, design and construction. This would require the satisfaction of requirements for the FTA's New Starts program. Project justification criteria include measures of cost effectiveness, transit-supportive land use, mobility improvements, operating efficiencies, and environmental benefits. Specific measures of these criteria are included in this evaluation process and are highlighted in the matrix of performance measures. In addition, the FTA includes a financial rating in its project assessment, essentially an assessment of a region's ability and willingness to provide necessary local support for both the new project and existing service.

The actual goals, objectives, and evaluation criteria for the Northside-Southside alternatives are displayed in Tables 2.3-1 and 2.3-2. As noted, they build upon the FTA and MTIA evaluation frameworks, and on focus areas from EWGCOG's *Legacy 2030: The Transportation Plan for the Gateway Region*. However, they flow most directly from the problem evaluation contained in the Statement of Purpose and Need.

In addition, the development of alternatives and their evaluation was, and will continue to be, informed by an extensive community engagement program, including interviews with a wide range of community leaders and stakeholders, as well as the deliberations of the study's two advisory committees: the Technical Advisory Committee and the Policy Advisory Committee.

The development of the initial range of conceptual alternatives began with a review of the LPAs for the Northside, Southside, and downtown that were recommended in the MTIAs. Based on

Chapter 2.3: Evaluation

review of those analyses, extensive field work, input from key community stakeholders, and land-use and downtown workshops, additional alternatives were added to the 2000 LPAs. The resulting set of preliminary alternatives was subjected to a primarily qualitative assessment based on the goals, objectives, and evaluation criteria for Northside and Southside alternatives, and for sets of downtown concepts. That exercise resulted in a final set of alternatives to be analyzed in greater detail. This analysis will include detailed capital and operating costs, ridership forecasts, and assessment of economic development opportunities. This data will, in turn, be part of another round of evaluations, both quantitative and qualitative, that will result in the recommendation of one or more LPAs.

TABLE 2.3-1: EVALUATION FRAMEWORK (NORTHSIDE AND SOUTHSIDE)

Evaluation Framework	Legacy 2030 Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Effectiveness	<ul style="list-style-type: none"> • Access to Opportunity • Preserve Existing Infrastructure • Sustainable Development • Safety and Security 	<ul style="list-style-type: none"> • Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services • Reduce transit travel time • Promote economic development and redevelopment near proposed stations • Promote relatively dense housing near stations for a range of incomes • Locate stations where transit-oriented development principles can be employed • Encourage public-private development partnerships • Coordinate transit and land use planning and development • Increase desirability of older neighborhoods through preservation and revitalization • Make best use of the existing transportation infrastructure • Ensure future connectivity into County • Safely integrate new transit into existing roadway network • Maintain existing automobile and pedestrian circulation patterns • Enhance neighborhood safety through transit-oriented development that promotes pedestrian activity for more “eyes on the street” 	<ul style="list-style-type: none"> Major travel markets Employment, population concentrations Sustainable development opportunities Transportation system connectivity and multi-modal interface Physical feasibility

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Evaluation Framework	Legacy 2030 Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Economic, Environmental & Local policy impacts	<ul style="list-style-type: none"> • Access to Opportunity • Preserve Existing Infrastructure • Sustainable Development 	<ul style="list-style-type: none"> • Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services • Promote economic development and redevelopment near proposed stations • Promote relatively dense housing near stations for a range of incomes • Locate stations where transit-oriented development principles can be employed • Encourage public-private development partnerships • Coordinate transit and land use planning and development • Increase desirability of older neighborhoods through preservation and revitalization 	<ul style="list-style-type: none"> Major travel markets Employment, population concentrations Sustainable development opportunities Right-of-way impacts Parking impacts Traffic impacts Environmental impacts Utility impacts
Cost Effectiveness		<ul style="list-style-type: none"> • Develop a cost-effective transportation system improvement 	<ul style="list-style-type: none"> • Achieve public consensus and institutional support • Encourage strong local policies that foster TOD and enhance quality of life 	Capital Costs
Financial Feasibility		<ul style="list-style-type: none"> • Develop a cost-effective transportation system improvement 	<ul style="list-style-type: none"> • Achieve public consensus and institutional support • Encourage strong local policies that foster TOD and enhance quality of life 	Capital Costs
Equity	<ul style="list-style-type: none"> • Access to Opportunity • Sustainable Development • Safety and Security 	<ul style="list-style-type: none"> • Improve transportation service for all populations • Sustain existing neighborhoods • Enhance neighborhoods and foster sustainable development 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services • Reduce transit travel time • Promote economic development and redevelopment near proposed stations • Promote relatively dense housing near stations for a range of incomes • Locate stations where transit-oriented development principles can be employed • Encourage public-private development partnerships • Coordinate transit and land use planning and development • Increase desirability of older neighborhoods through preservation and revitalization • Safely integrate new transit into existing roadway network • Maintain existing automobile and pedestrian circulation patterns • Enhance neighborhood safety through transit-oriented development 	<ul style="list-style-type: none"> Major travel markets Transportation system connectivity and multi-modal interface Transit-dependent population Sustainable development opportunities Physical feasibility

Chapter 2.3: Evaluation

TABLE 2.3-2: EVALUATION FRAMEWORK (DOWNTOWN)

Objective	Evaluation Criteria
Ridership	<ul style="list-style-type: none">• Employment Centers• Activity Centers• Special Events• Directness• Speed• Proximity
Development	<ul style="list-style-type: none">• Existing• Potential
Costs	<ul style="list-style-type: none">• Capital• Operation & Maintenance
Impacts	<ul style="list-style-type: none">• Traffic• Parking• Safety• Existing MetroLink• Construction

Existing Conditions

Chapter 3.0

Northside Study



Chapter 3.1: Introduction

In 2000, the East-West Gateway Council of Governments (EWGCOG) completed Major Transportation Investment Analyses (MTIAs) that resulted in the selection of Locally Preferred Alternatives (LPAs) for three study areas: Northside, Southside, and Daniel Boone. For the Northside area, the LPA was identified as light-rail transit (LRT) along Natural Bridge Avenue and a downtown loop (Figure 3.1-1). On the Southside, the LPA included either an LRT or bus rapid transit (BRT) within the existing Union Pacific Railroad right-of-way, also terminating at a downtown loop.

In late 2005, EWGCOG began technical analyses for Minimal Operating Segments (MOSs) of the LPAs in the Northside and Southside areas. The results of those analyses showed the Northside MOS terminating at a park-and-ride lot at I-70, near Goodfellow Boulevard. The Southside MOS terminates at a similar facility near I-55 and Loughborough Avenue. Details regarding the decision to study MOSs in each corridor are explained in the Purpose and Need for this project.

For the current Northside/Southside Study, the two study areas are defined as they were in the MTIAs. The 2000 MTIA Northside study area is reflected in Figure 3.1-1, which includes both the LPA and the MOS. However, for purposes of analysis in the current study, the focus will be on the more concentrated markets that will largely determine the effectiveness (ridership and development) of the MOSs. These analysis areas are smaller, more focused areas of the 2000 MTIA study areas and extend approximately two miles beyond the proposed termini at the interstate park-and-rides. Figure 3.1-2 reflects the concentrated study area for the Northside MOS, called the “Northside Study Area.”

For purposes of this study, the rough boundaries of downtown are Cole Street on the north, Chouteau Avenue on the south, the Mississippi River on the east, and Jefferson Avenue on the west. This roughly corresponds with the boundaries of the City’s Downtown and Downtown West neighborhoods, a total of 2.4 square miles.

This Existing and Future Conditions Inventory provides information about conditions in the study area for both the recent past, as well as projections for the year 2030. Information is organized into sections covering land use, demographics, travel patterns, the environment, and characteristics of the surface transportation system. This information will be used to assist in the development of a detailed understanding of transportation-related issues in the study area through 2030, the planning horizon for this study. Understanding these issues will help define the problem statement and develop the Purpose and Need. It will also be used to screen alternatives to best meet stated goals and objectives, and minimize social and environmental impacts.

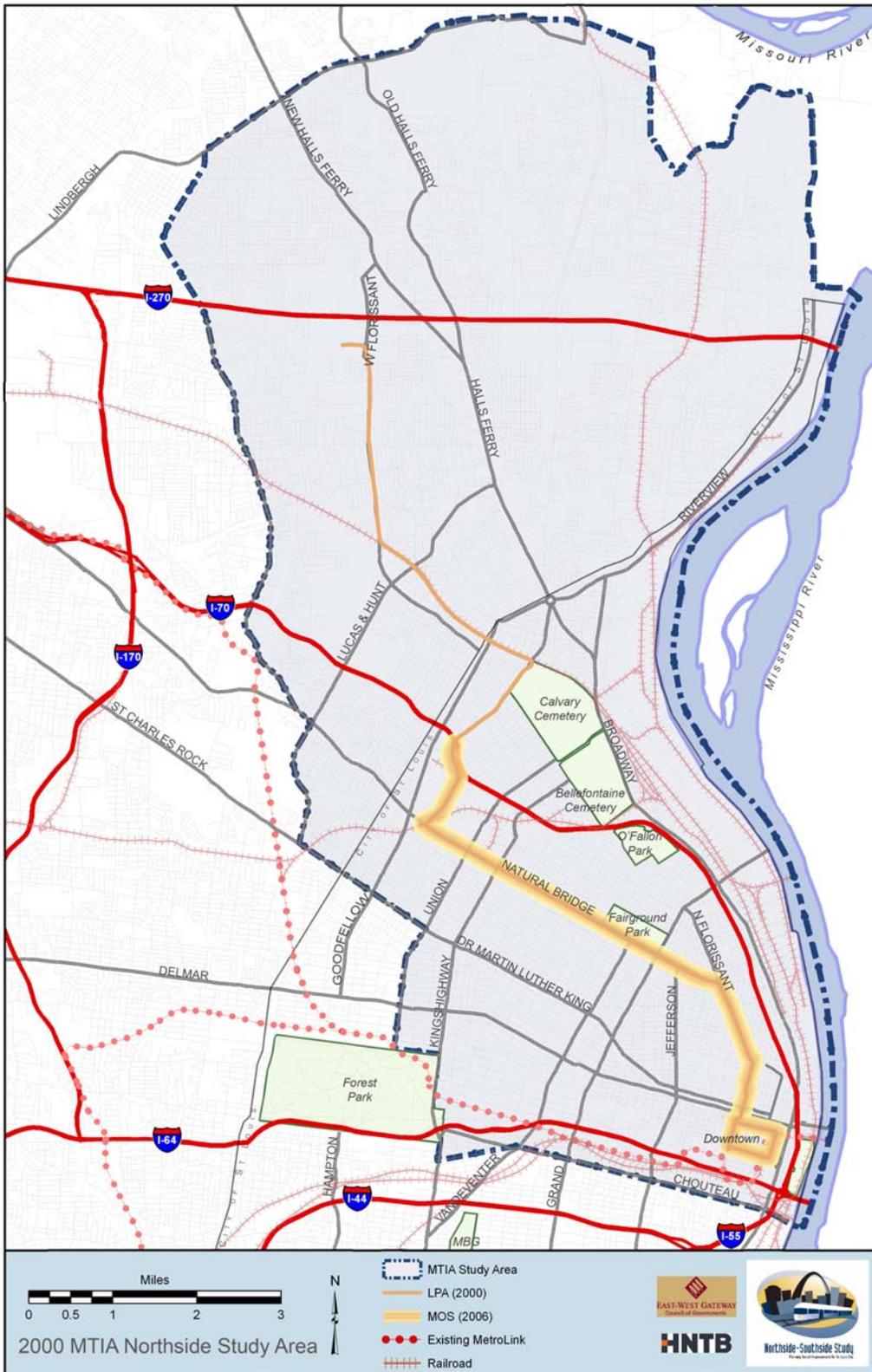
The overall study area, as defined in the 2000 MTIA, is located in the north and northeast portion of the City of St. Louis and St. Louis County (Figure 3.1-1). It is bounded roughly by the Mississippi River on the east; Lindbergh Boulevard on the north; Florissant Road, Union Boulevard, Martin Luther King Drive, and Lucas and Hunt Road on the west; and Chouteau Avenue on the south, comprising an area of approximately 75 square miles. Twenty-six

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municipalities lie wholly, or in part, within the 2000 MTIA Northside study area as well as a portion of unincorporated St. Louis County, and over 40% is located within the City of St. Louis.

The concentrated Northside study area that is the subject of this study is bounded roughly by the City limits near Halls Ferry Circle on the north, Chouteau Avenue on the south, the Mississippi River on the east, and Lucas and Hunt Road and Union Boulevard on the west, covering approximately 36 square miles (Figure 3.1-2). These boundaries cover most of the Northside of the City of St. Louis, extending slightly beyond the MOS limits to effectively capture the transit marketshed. It also includes all or portions of the communities of Jennings, Northwoods, Pine Lawn, Flordell Hills, Velda City, Hillsdale, Country Club Hills, Uplands Park, Velda Village Hills, and Wellston.

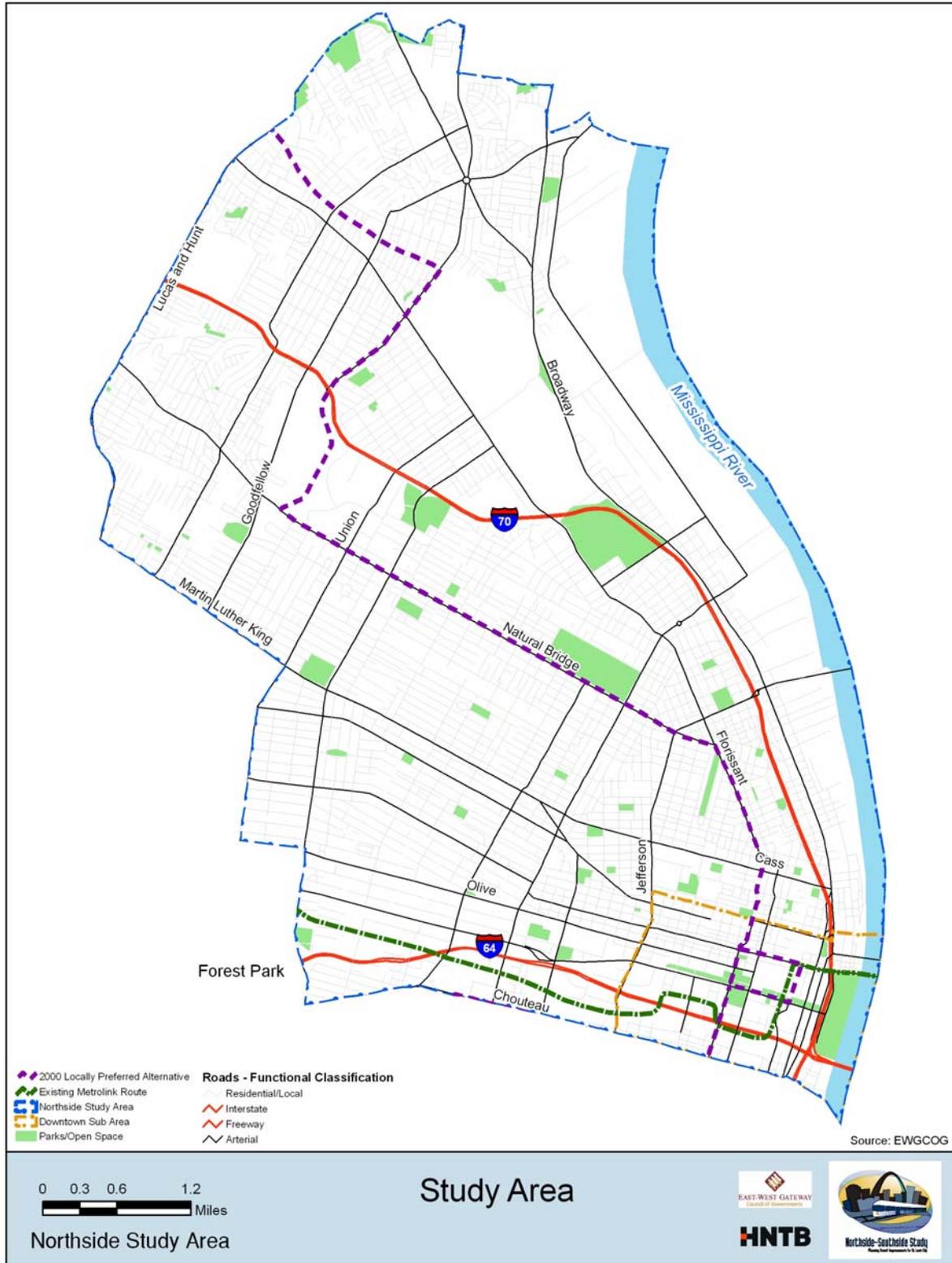
FIGURE 3.1-1: MTIA STUDY AREA, 2000



Note: "Natural Bridge Rd. becomes Natural Bridge Avenue within St.Louis City limits."

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FIGURE 3.1-2: STUDY AREA



Note: "Natural Bridge Rd. becomes Natural Bridge Avenue within St.Louis City limits."

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Chapter 3.2: Land Use Characteristics

This section describes land use characteristics within the Northside study area, including downtown. The City of St. Louis' Strategic Land Use Plan anticipates future growth and identifies recommended future land uses. It thereby plans for stability and opportunity for people and businesses in the City, as well as directs new investment. Land uses identified by the Strategic Land Use Plan will guide all phases of this study and report.

Current planning studies are surveyed, and new and planned developments are identified. Existing land use, inventoried at the parcel level, is described. Public spaces (institutions and park/open/recreation areas) are particularly identified and considered, as these are vital attractions and destinations for potential light-rail riders. Vacant parcels are also identified; these properties could offer redevelopment potential. Character of existing neighborhoods is noted, as well as any additional development opportunities.

3.2.1 STRATEGIC LAND USE PLAN

The City of St. Louis' Planning Commission adopted its Strategic Land Use Plan (Figure 3.2-1) in January 2005, as replacement of and revision to the last City-wide plan adopted in 1947. This new Strategic Land Use Plan provides a cohesive, holistic development approach for the City's anticipated growth. The Plan's objective is twofold: to provide direction for those who wish to make new investments in the City, and to provide stability and opportunity for those who already live, work, and build businesses there. Goals include the following:

- To provide stability and an improved quality of life for current residents, workers, and businesses.
- To preserve high-quality sites for identified best future uses.
- To provide a framework for future City initiatives.
- To encourage appropriate preservation and/or market-driven development in defined locations, while providing direction for those seeking new investment opportunities.

The Plan was developed under management by the City's Planning and Urban Design Agency and reflects the resources and collaboration of the City of St. Louis Mayor's office, St. Louis' 28 aldermen, City and state agencies, developers, and other stakeholders involved in the City's built environment. These participants methodically surveyed existing conditions within the City; identified land use categories, into which all blocks were classified; overlaid recommended future land uses onto existing uses; and drafted multiple revisions to the current land use map. As identified by this careful process, the Plan recognizes a series of land use categories:

- Residential (neighborhood preservation and neighborhood development areas).
- Commercial (neighborhood and regional areas).
- Business/industrial (preservation and development areas).
- Recreational/open space.
- Institutional.
- Specialty mixed use.
- Opportunity area.

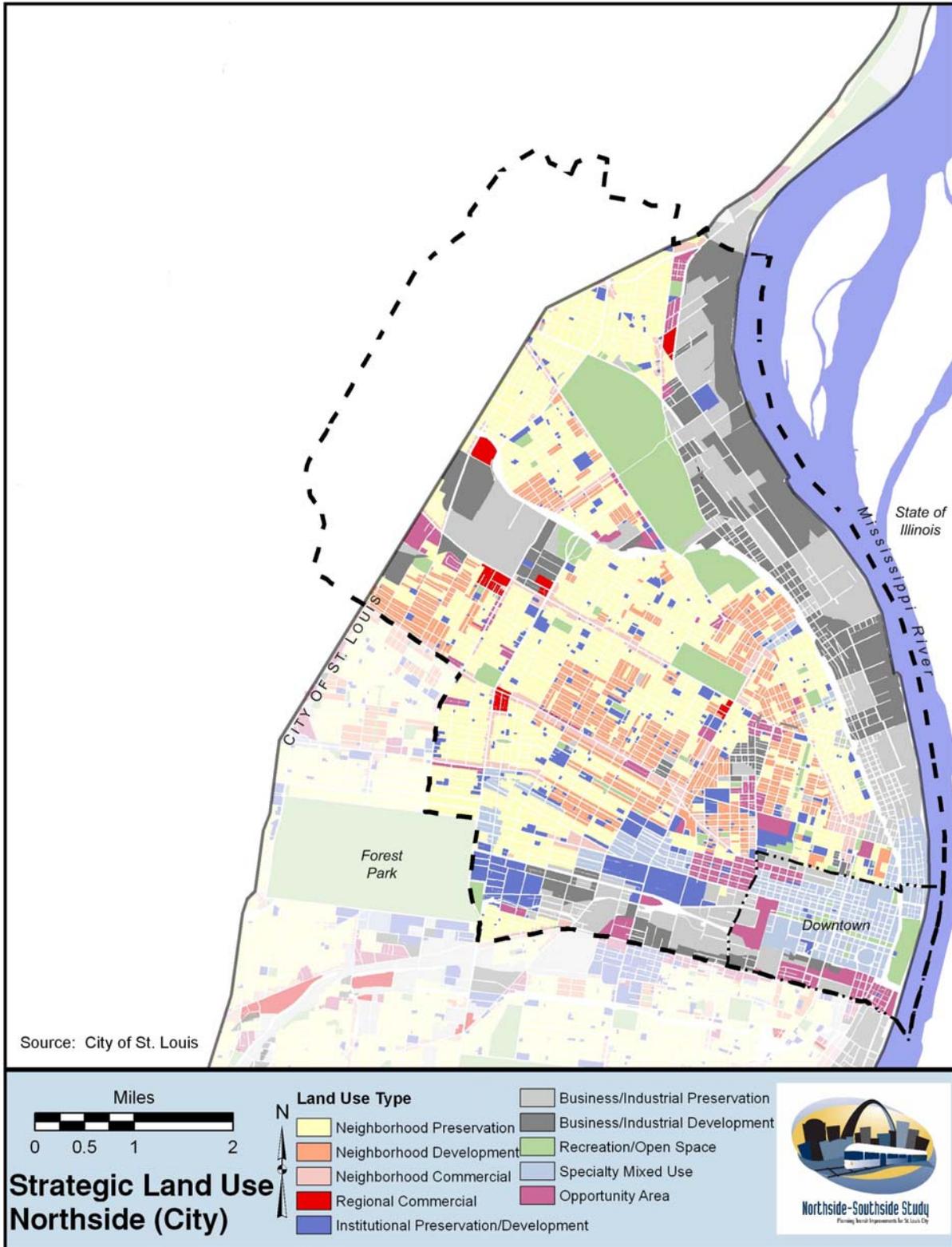
Northside Study

While the delineation of these areas may evolve to suit the City's changing needs, it provides a basis for enhanced decision-making. The Strategic Land Use Plan, by provision of such a framework, seeks to solidify district identity, solicit and secure resources for improvement, and offer a guide for investment and development inquiry response.

Within the City of St. Louis, the Northside study area is primarily composed of Neighborhood Preservation Areas. Because of the area's high vacancy rate, however, many sections are designated Neighborhood Development Areas. Additional strategic land use designations within the area include Neighborhood and Regional Commercial Areas, Business/Industrial Preservation and Development Areas, Institutional Development and Preservation Areas, and Recreational/Open Space Preservation and Development Areas. Specialty Mixed Use and Opportunity Area designations are also significant in the Northside, particularly in and around downtown.

Chapter 3.2: Land Use Characteristics

FIGURE 3.2-1: STRATEGIC LAND USE



Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

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3.2.2 CURRENT PLANNING STUDIES

Like many of the nation's major urban centers, the St. Louis area has been experiencing increased infill and redevelopment. This trend will likely continue as suburbs develop their remaining buildable acreage and more of the region's population resettles the City proper and its satellite urban centers. Urban enhancement, reuse, and restructuring typically include planning for residential, commercial, office, entertainment, and/or mixed uses. Geographic foci for such development are often selected upon consideration of both current and potential conditions including, but not limited to, existing features and assets, visibility, accessibility and transit options, and ability to sustain new growth. Among these, the issues of pedestrian accessibility and safety and mass transit availability are vital to long-term project success.

Downtown Development

St. Louis' *Downtown Development Action Plan*, adopted in 1998 to promote and track healthy growth, seeks to "create a vibrant, 24-hour downtown with shops, cafes, restaurants, residential life and people." Over the six-year period of 1999 through 2004, more than 1.5 billion dollars (at 1998 values) in private and civic investments funded Phase One implementation, along with Cupples Station and the St. Louis Convention Headquarters Hotel. Four designated districts form the Plan's core:

- Washington Avenue (and its surrounding area) features a high concentration of late 1800 to early 1900, multi-floor structures. By 1998, however, the district was underutilized. Current redevelopment focuses on establishing an urban loft district: creating more than 1000 residential units – mostly lofts, providing services and parking for residents, improving public perception via streetscape enhancement and special programming, and promoting the area as a regional retail destination. Worth noting is Washington Avenue's wide right-of-way, which could be amenable to additional public mass transit and, thereby, better serve the area's projected regrowth.
- The Old Post Office district is located in the geographical center of the City and features historic buildings and a narrow right-of-way, which helps maintain a pedestrian aesthetic. The area had been severely under-utilized and largely vacated by the 1990's. Revitalization efforts now include a transition to mixed use that will support students, office workers, and residents. The Old Post Office itself will be reused as an educational facility. This is a major use. However, other uses are planned as well. The area, being promoted as the heart of downtown, is receiving extensive streetscaping and improvements to enhance its walkability.
- Laclede's Landing, located along the Mississippi River, is an historic niche neighborhood with restaurants, clubs, small retail shops, offices, a hotel, tourist attractions, and some residences. It also has the largest expanse of open, developable land along the urban St. Louis riverfront and features easy MetroLink access. Redevelopment focuses on increasing entertainment, residential, and mixed uses and on establishing the district as the "premier downtown riverside living opportunity."
- The Gateway Mall and Arch Grounds, while major regional and tourist attractions, are disconnected and underused. Plans focus on reconnecting downtown and the Mall to the Arch and riverfront. Additional opportunities include enhancing the Mall to serve as the primary downtown axis, providing for spin-off investment, continuing to provide a venue for festivals and parades, and developing an improved bike/pedestrian system.

Chapter 3.2: Land Use Characteristics

Significant redevelopment has also been occurring beyond the scope of the *Downtown Development Action Plan*. 2006 will mark completion of the new, \$365-million Busch Stadium, which opened April 4, 2006. There are plans for Ballpark Village, a 12.5-acre mixed-use development site adjacent to the new stadium. Cupples Station, a series of massive, red brick warehouses built in the late 1800s on the southern edge of downtown near Mill Creek Valley, was added to the National Register of Historic Places in 1998 and is now under extensive redevelopment. Of the 18 original structures, 11 remain and are proving highly popular, due in part to their proximity to the Stadium and to convenient access of public mass transit, including light rail. Five of these buildings were renovated for use as the Westin Hotel. An additional two have been converted to lofts, which opened April 1, 2006, renting 60% at market rate and 40% at low- to moderate-income rates. The last four structures are under negotiation. With the Westin Hotel and the Sheraton Civic Center and MetroLink station anchoring either end of these loft redevelopment sites, the new mixed use area near the ballpark creates a stable core on the edge of downtown. Further, this area exemplifies the potential of transit-oriented development (TOD).

Other Development

Additional planned developments (Figure 3.2-2) fall within this study area and may play greater or lesser roles in the implementation of a future light rail line. Highlights include:

- A Koman Properties planned Home Depot retail center near Interstate 70 and Goodfellow may provide parking for a Northside transit station/terminus, thereby further anchoring TOD in the surrounding community.
- The Chouteau Greenway plan projects a 20- to 30-year vision of redevelopment in and around Mill Creek Valley. Plans include parks and open space, particularly a corridor for pedestrian and bicycle use, research and development centers, and a terminus at the CORTEX site.
- Planned development of the CORTEX site around Grand Boulevard and Chouteau Avenue focuses on furthering St. Louis' role in the "BioBelt," with plant and medical science industry incubators, research and development, and services. The site is currently a 353 Blighting Area; redevelopment will enhance not only the site, but also the surrounding area. Key stakeholders in the project are Saint Louis University, Washington University, and the Missouri Botanical Garden.
- The North Market Place residential redevelopment and infill, located off of North Florissant, is currently under construction. Within 10 years, this project may serve as a model for similar renovations.
- Additional residential developments include Salisbury Park, near Hyde Park and the Mary One Johnson developments on 21st Street near St. Louis Place Park.
- Industrial development, particularly at Union/I-70 Business Park and North Riverfront Industrial are emerging employment centers.
- Expanding institutions, including Barnes-Jewish-Children's Hospitals and Saint Louis University are growing activity centers.

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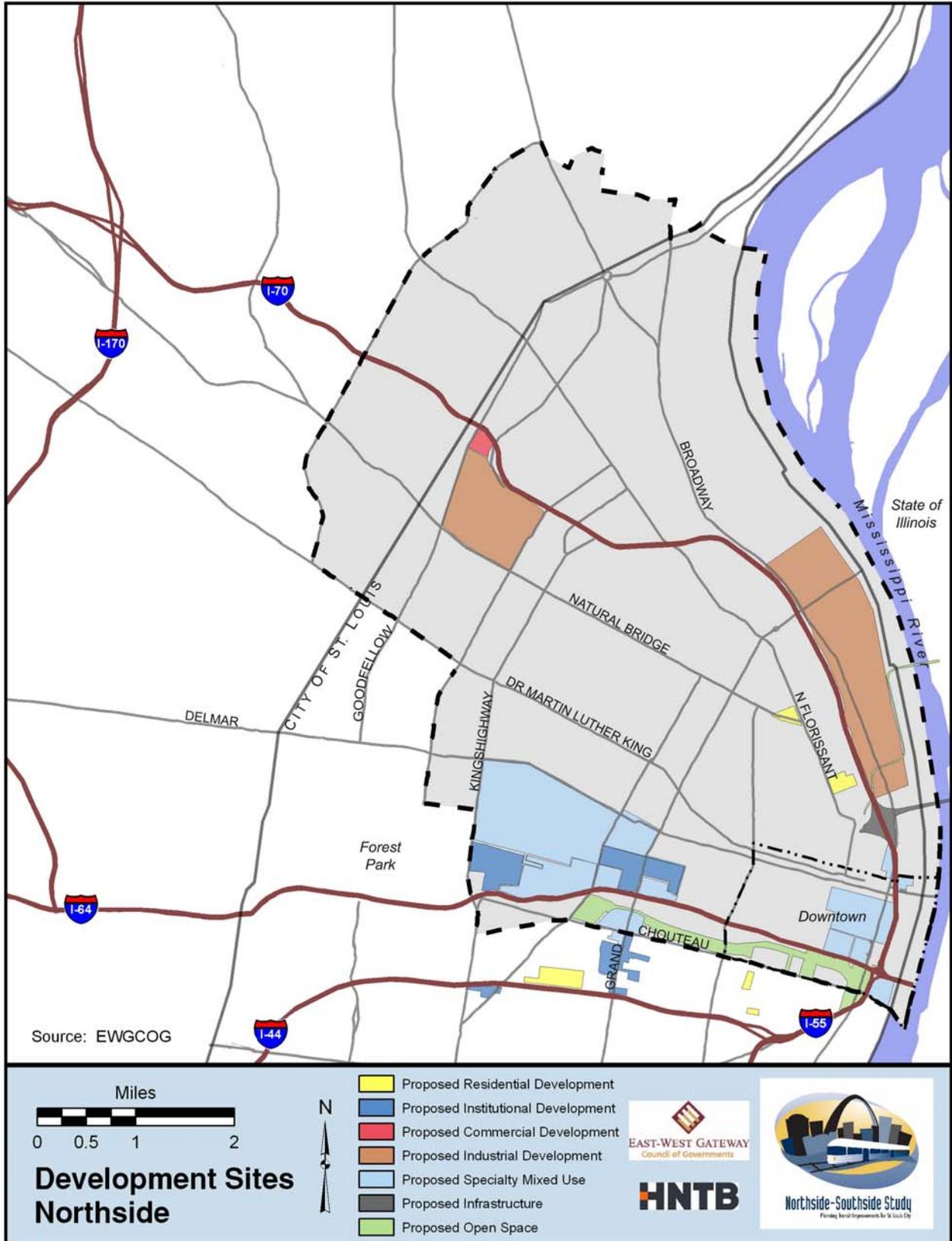
- Specialty mixed use sites, such as Midtown Development, the Bottle District, Pinnacle Casino, and Chouteau Landing, will provide concentrated mixtures of residences, employment, and other destinations.

Legacy 2030

Legacy 2030, managed by EWGCOG, is a transportation plan covering the bi-state St. Louis region. Initially adopted in 1994 and now in its third revision, it structures a long-range, 25-year vision of St. Louis' transportation development. The plan's six foci include preservation of existing infrastructure, provision of safety and security in travel, congestion management, access to opportunity, sustainable development, and efficient movement of goods. Among particular action items are goals to encourage alternate and public mass transit and to link land development to transit planning, such as to MetroBus and MetroLink stations. The full Northside LPA light rail route was included in the Legacy 2030 list of illustrative projects, with a projected cost of \$620 million in 2007 dollars.

Chapter 3.2: Land Use Characteristics

FIGURE 3.2-2: DEVELOPMENT SITES



Northside Study

3.2.3 STUDY AREA AND SIZE

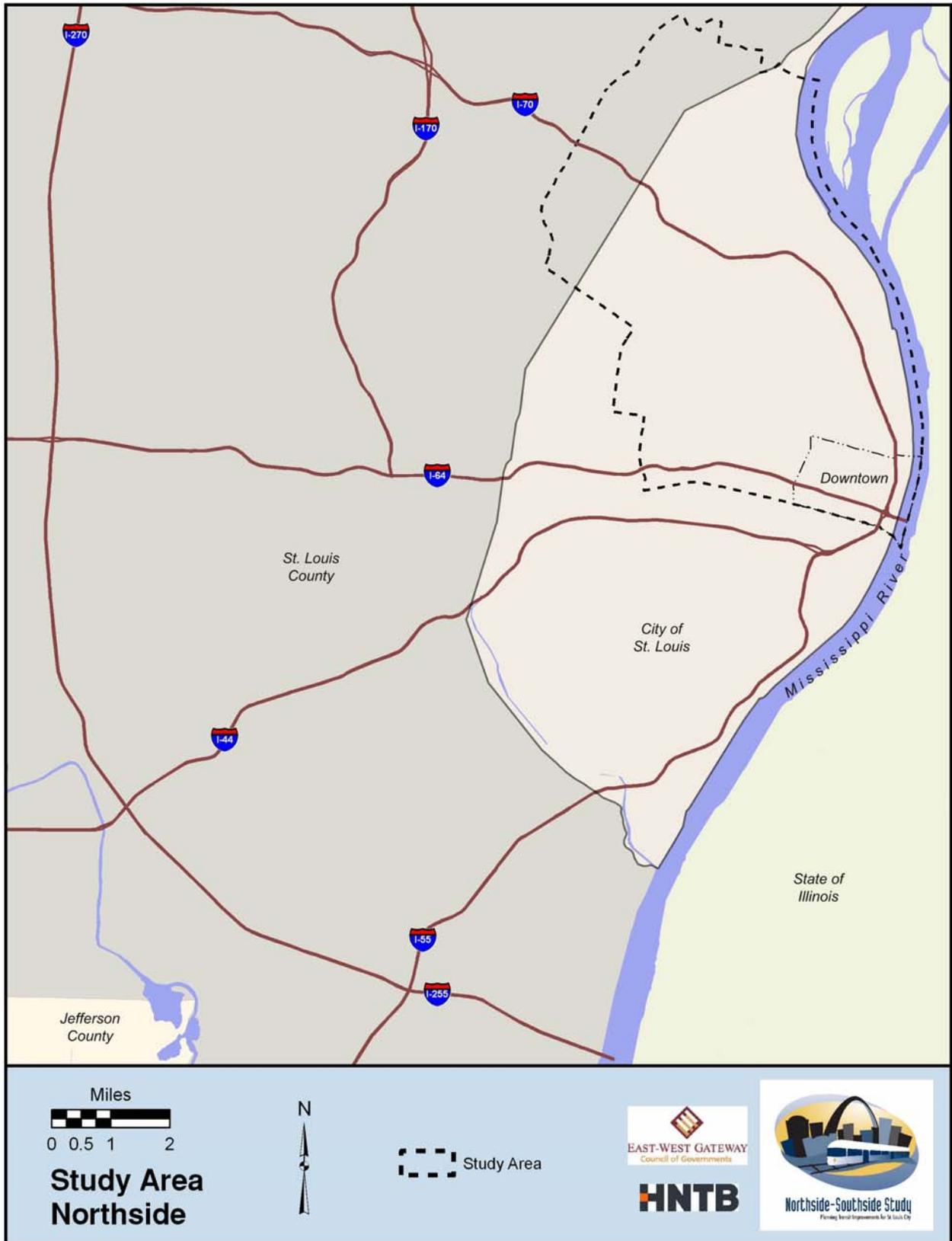
The 2000 MTIA considered a total area of approximately 160 square miles, of which about 75 comprised the Northside, including downtown. This land falls within the boundaries of both the City of St. Louis and St. Louis County. As described in Section 3.1, the Northside MTIA study area is roughly bounded by the Mississippi River on the east; Lindbergh Boulevard on the north; Florissant Road, Union Boulevard, Martin Luther King Drive, and Lucas and Hunt Road on the west; and Chouteau Avenue on the south.

The 2006 study area (Figure 3.2-3), however, is reduced from the original MTIA bounds: The area in its entirety covers approximately 64 square miles, of which about 33 comprise the current Northside study area (Figure 3.2-4). This Northside area extends from near Halls Ferry Circle on the north to Chouteau Avenue on the south, and from the Mississippi River on the east to Lucas and Hunt Road and Union Boulevard on the west. Nearly 170,000 residents, or 11.5% of the combined St. Louis City and county populations, occupied this area in 2000. As previously discussed, the vast majority of these residents (approximately 94%) are within the St. Louis City limits. The City itself is divided into various neighborhoods (Figure 3.2.5), each with distinguishing features.

Study area boundaries, both those of the 2000 MTIA and the current area, are derived primarily from Traffic Analysis Zone (TAZ) limits (Figure 3.2-6). TAZ units are defined geographies for which socio-economic data are collected and input into computer models to project future travel demand. As such, they provide a standardized set of boundaries for this study.

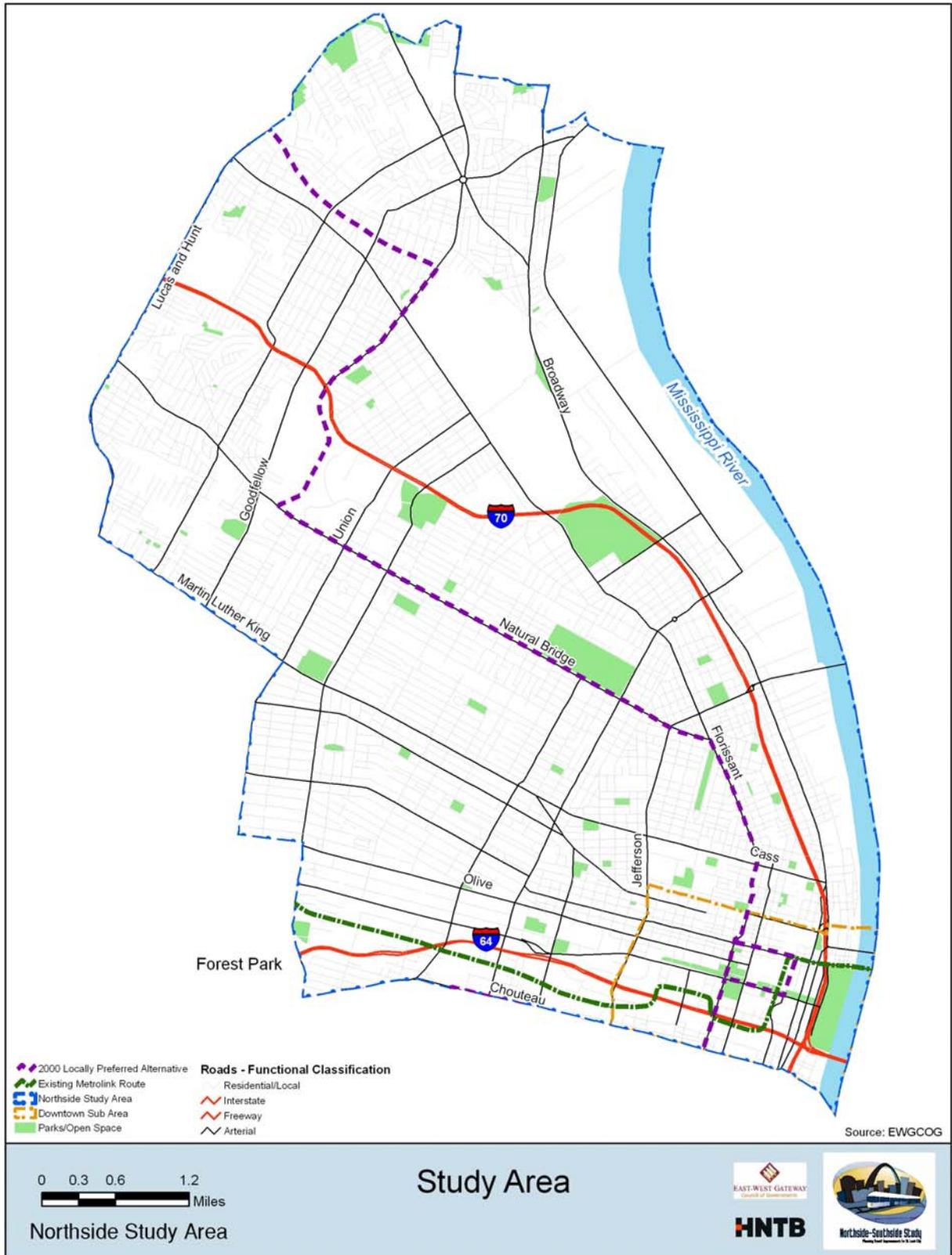
Chapter 3.2: Land Use Characteristics

FIGURE 3.2-3: STUDY AREA COMPOSITE



Northside Study

FIGURE 3.2-4: STUDY AREA



Chapter 3.2: Land Use Characteristics

FIGURE 3.2-5: CITY NEIGHBORHOODS

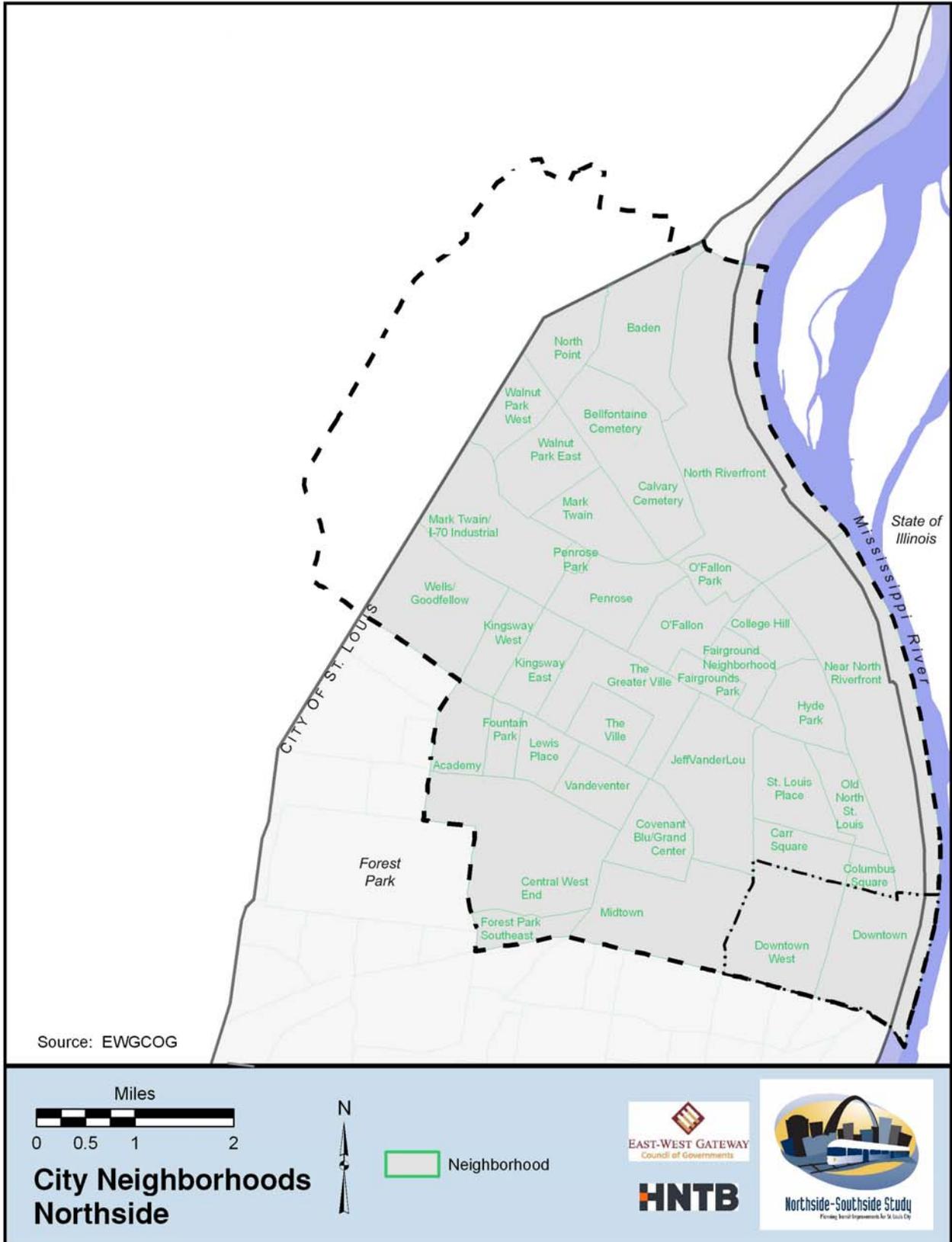
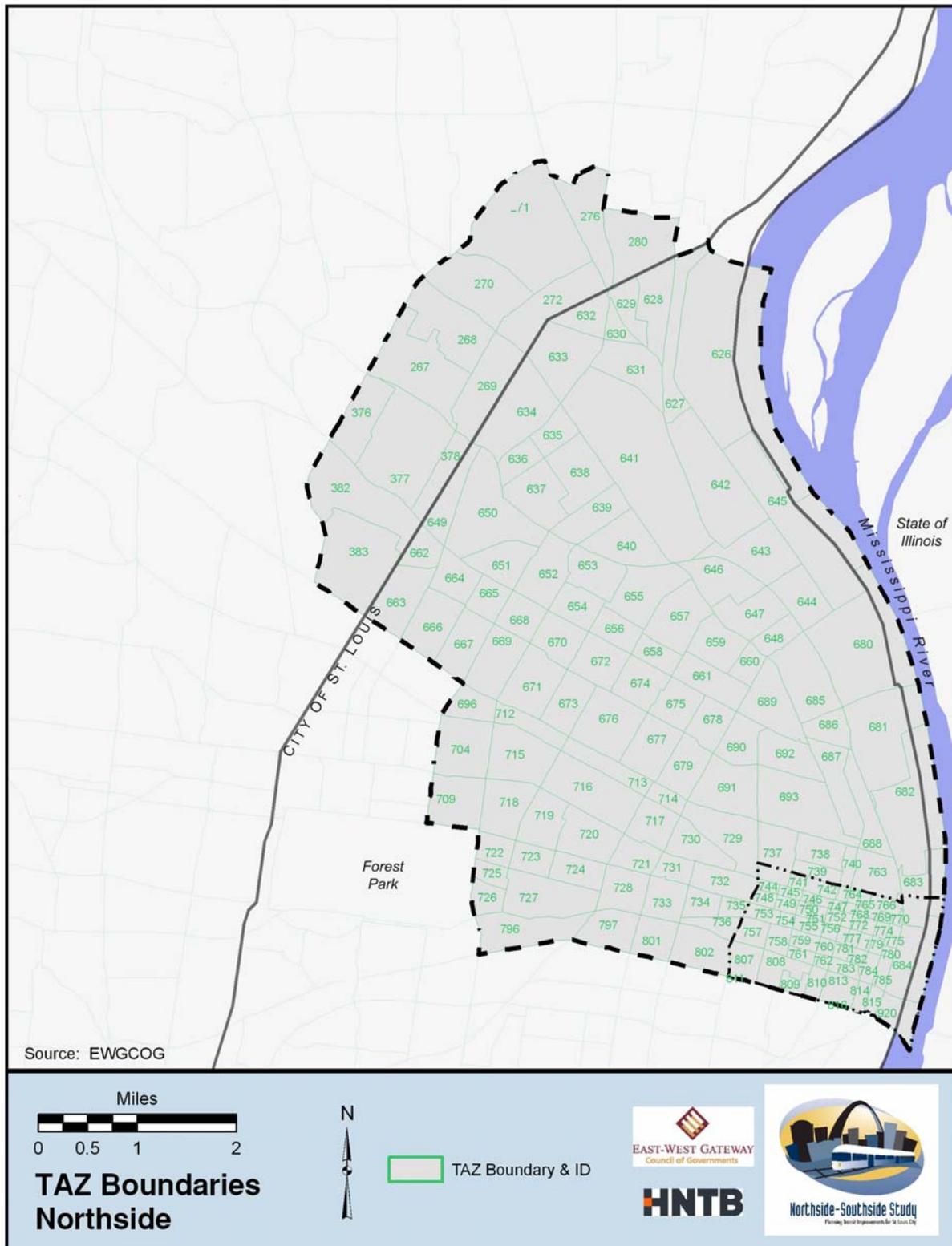


FIGURE 3.2-6: TAZ BOUNDARIES



Chapter 3.2: Land Use Characteristics

3.2.4 EXISTING LAND USE

Existing land use throughout the Northside study area is classed as residential, institutional, commercial, industrial/utility, open space, or vacant/undeveloped (Figure 3.2-7). Virtually the entire area is developed and covers more than 17,000 acres.

Land use in acreage and percentage is outlined in Table 3.2-1.

TABLE 3.2-1: LAND USE BY TYPE

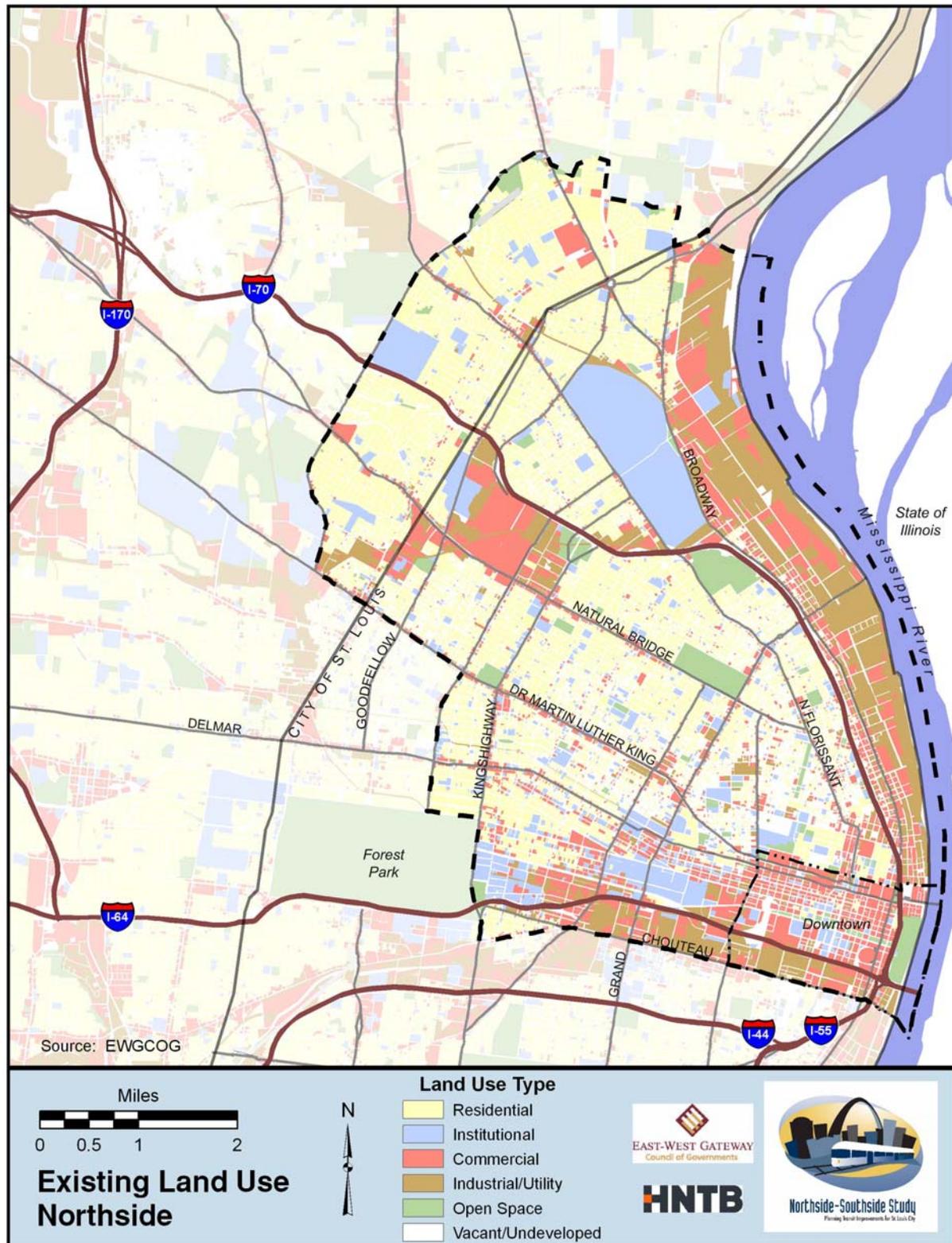
LAND USE	NORTHSIDE		CITY OF ST LOUIS	
	ACREAGE	SHARE OF TOTAL ACREAGE	ACREAGE	SHARE OF TOTAL ACREAGE
Residential	5490.04	31.91%	4979.09	28.03%
Institutional	2452.33	14.25%	1632.85	9.19%
Commercial	2948.82	17.14%	3335.77	18.78%
Industrial/Utility	2803.69	16.30%	3869.74	21.78%
Open Space	1968.45	11.44%	2553.00	14.37%
Vacant/Undeveloped	1540.58	8.95%	1394.42	7.85%
TOTAL	17,203.91	99.99%	17,764.87	100%

Source: City of St Louis 2003 Parcel Base; St Louis County 2002 Parcel Base (both provided by EWGCOG, 12/2005)

Note: A significant percent of the Northside and Southside Study Areas lie within St. Louis County, rather than within St. Louis City limits. This table is intended for use in comparing relative percentages of land use types. It is not intended for use in comparing acreage of the study area to that of the City.

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FIGURE 3.2-7: EXISTING LAND USE



Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

Chapter 3.2: Land Use Characteristics

Residential Neighborhoods

Residential development, covering 5490 acres or 32% of the area, is the dominant land use within the Northside study area. This percentage is slightly higher than the City's average of 28%. Nearly all of Northside residential development is west of Broadway. Particularly high residential concentrations occur north of Interstate 70, west of the City of St. Louis boundary, and between Natural Bridge Avenue and Interstate 70 to the east of Kingshighway.

Non-Residential Neighborhoods

Commercial land uses occupy approximately 17% of the Northside study area. This number is near the City of St. Louis' average of almost 19%. Other than within and directly west of the downtown area, where commercial use is much higher and more widespread, commercial land tends to congregate along key roads, such as Natural Bridge, Grand, and Dr. Martin Luther King. These commercial corridors are typically one or two parcels deep; parcels further than this from the supporting roads are more often residential. Additional commercial concentrations occur between Broadway and the Mississippi River and at the intersection of Goodfellow and Natural Bridge.

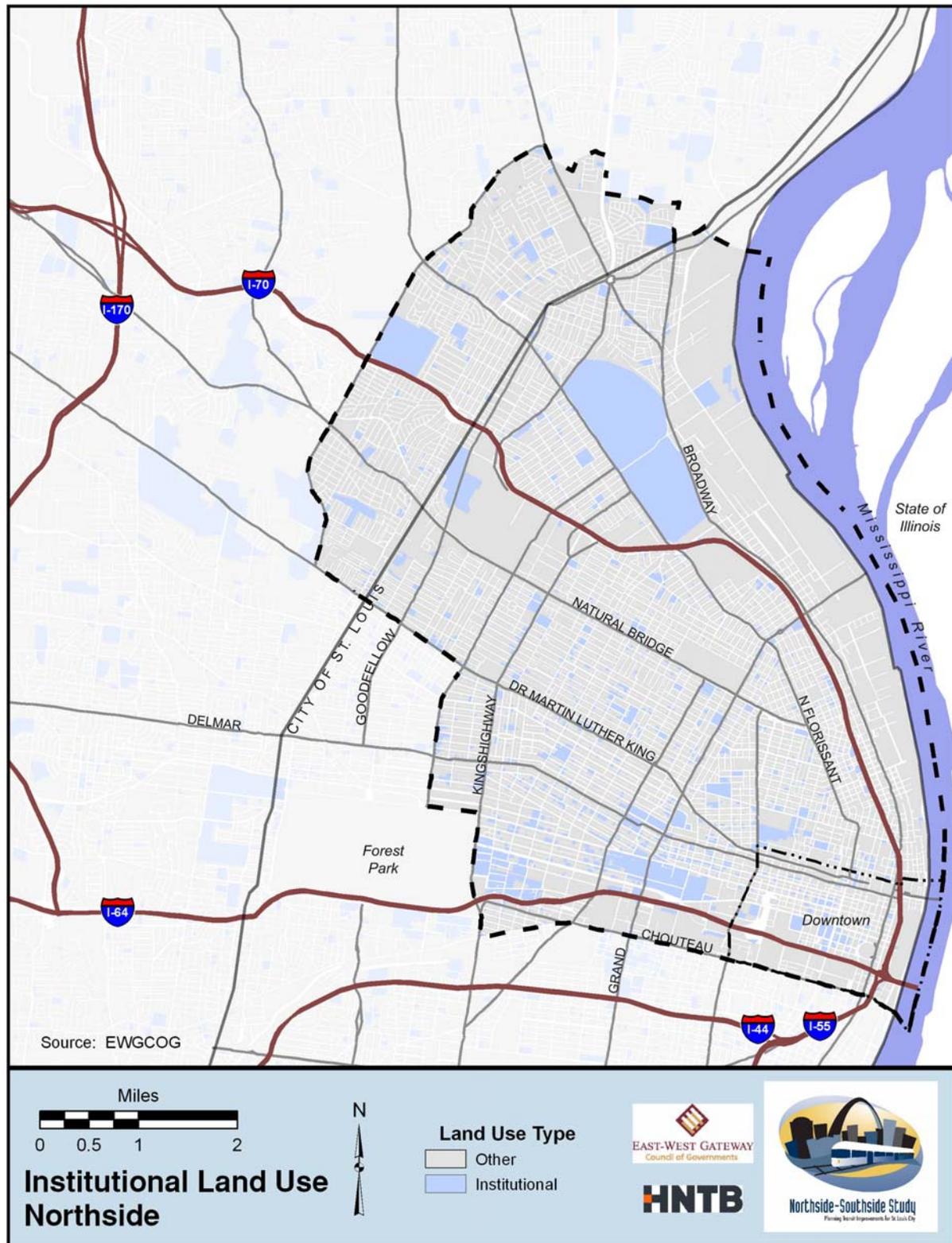
Institutional uses, which occupy slightly more than 14% of the Northside study area, follow a pattern similar to commercial but are distributed more evenly throughout the study area (Figure 3.2-8). This use is considerably higher than the City's average of just over 9%.

Industrial and utility land uses cover more than 16% of the study area, as compared to the City-wide average of almost 22%. These uses are mostly concentrated in corridors along the Mississippi River east of Broadway, through Mill Creek Valley north of Chouteau Avenue, and along railroad right-of-ways. There is also significant industrial land use near the intersection of Natural Bridge and Goodfellow. While a few industrial and utility sites are distributed in other areas, they are typically much smaller and more isolated from other industrial parcels.

Open space (Figure 3.2-9) covers about 11% of the study area, which is less than the City's average of over 14%. Sites are fairly well distributed and are primarily parks and recreation open space.

Vacant and undeveloped uses (Figure 3.2-10) are fairly high within the Northside study area, covering roughly 9% of the land, as opposed to the City's average of less than 8%. Higher concentrations occur between Natural Bridge and Delmar to the east of Kingshighway, around the intersection of Grand Avenue and North Florissant, and in the area east of Goodfellow and south of Natural Bridge. Most vacant and undeveloped parcels are small and likely represent vacated residences. Some vacant lands, particularly closer to downtown and along the Mississippi River, however, are considerably larger.

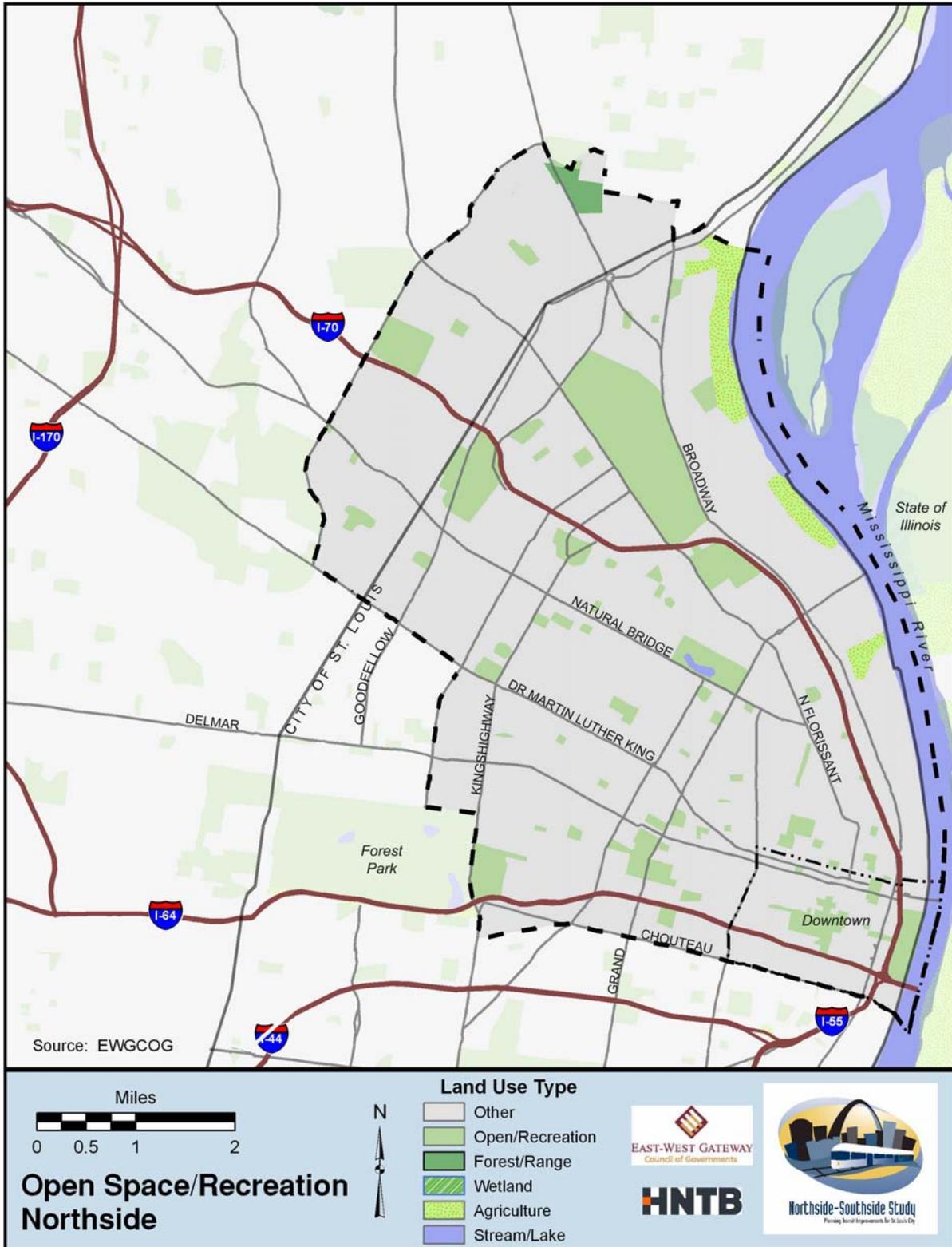
FIGURE 3.2-8: INSTITUTIONAL LAND USE



Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

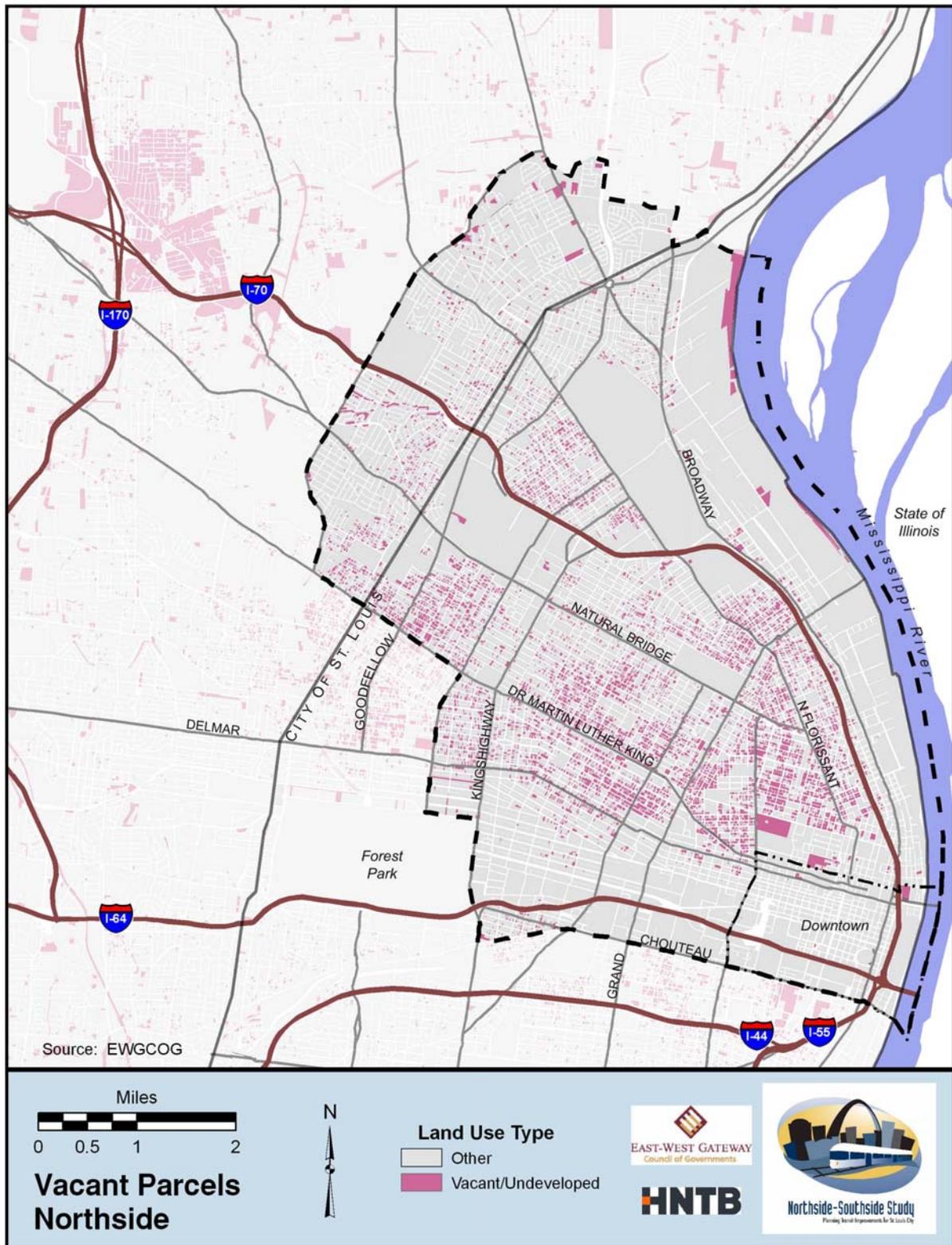
Chapter 3.2: Land Use Characteristics

FIGURE 3.2-9: OPEN SPACE/ RECREATIONAL LAND USE



Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

FIGURE 3.2-10: VACANT PARCELS



Note: Files from the City of St. Louis and EWGCOG classify the land use of some parcels differently. These conflicting data are maintained here in order to preserve the integrity of all referenced source files.

Chapter 3.2: Land Use Characteristics

3.2.5 DEVELOPMENT CHARACTER

Throughout the study, increasing understanding of land use patterns and characteristics will likely affect location and definition of alignment alternatives, stations, and supported uses. This section assesses development character within the Northside study area, including downtown.

Residential Areas: Development Character

Residential land use is a dominant feature of the Northside study area. The character of Northside residential areas varies in housing type and density. Many areas face challenges associated with nearby vacated parcels, however. Most residential areas within the study area were developed on either the St. Louis urban street grid or the old Bremen street grid. As a result, neighborhoods are connected by networks of streets and sidewalks to major arterials such as Natural Bridge Avenue, Grand Boulevard, and Kingshighway.

In general, vacant properties found throughout the area cause many holes in the residential fabric. This is particularly apparent in the old Bremen area directly north of downtown. This area, which dates to the late 1800's and has many historic structures in various phases of repair and disrepair, is currently being redeveloped with projects such as North Market. The area between Dr. Martin Luther King and Natural Bridge also has many vacant parcels, though more cohesive, stable sections appear around Kingshighway and other anchors. The area north of Natural Bridge features many bungalow style houses dating from the 1920s and 1930s. There are also many two and four family flats. The area around Goodfellow and to its west also features several residential areas. These are more sporadic and divided, however, due to major road crossings and industrial and institutional land uses.

Commercial Corridors

The downtown area has a very strong commercial presence as part of its typical mixed land use. There are numerous restaurants, clothing and accessory shops, and specialty stores, as well as occasional convenience stores. Most of these commercial uses are located on the ground level of multi-floor structures and have pedestrian access via sidewalks. Many also have available on-street parking. Few include dedicated parking lots.

Exclusive of downtown, the Northside study area has few highly commercial areas. Those that do occur are typically found in narrow corridors along key roads and at major intersections. Grand Boulevard, Natural Bridge Avenue, Kingshighway, North Florissant Road, and Dr. Martin Luther King support such commercial uses. Typical types of commerce in these locations include small restaurants or fast food, convenience stores, small car repair and resale shops, and hair and nail salons. Particular commercial anchors feature some banks and larger grocery stores, like Schnucks on Natural Bridge Avenue. Most Northside commercial areas outside of downtown are accessed via curb cuts into dedicated drives and parking, though some share lots, from which shoppers walk.

Redevelopment Opportunities

The Northside study area has many areas with redevelopment potential. The City's Strategic Land Use plan identifies properties for redevelopment located throughout the Northside Study Area (Figure 3.2-11). A summary of these potential redevelopment sites is listed below:

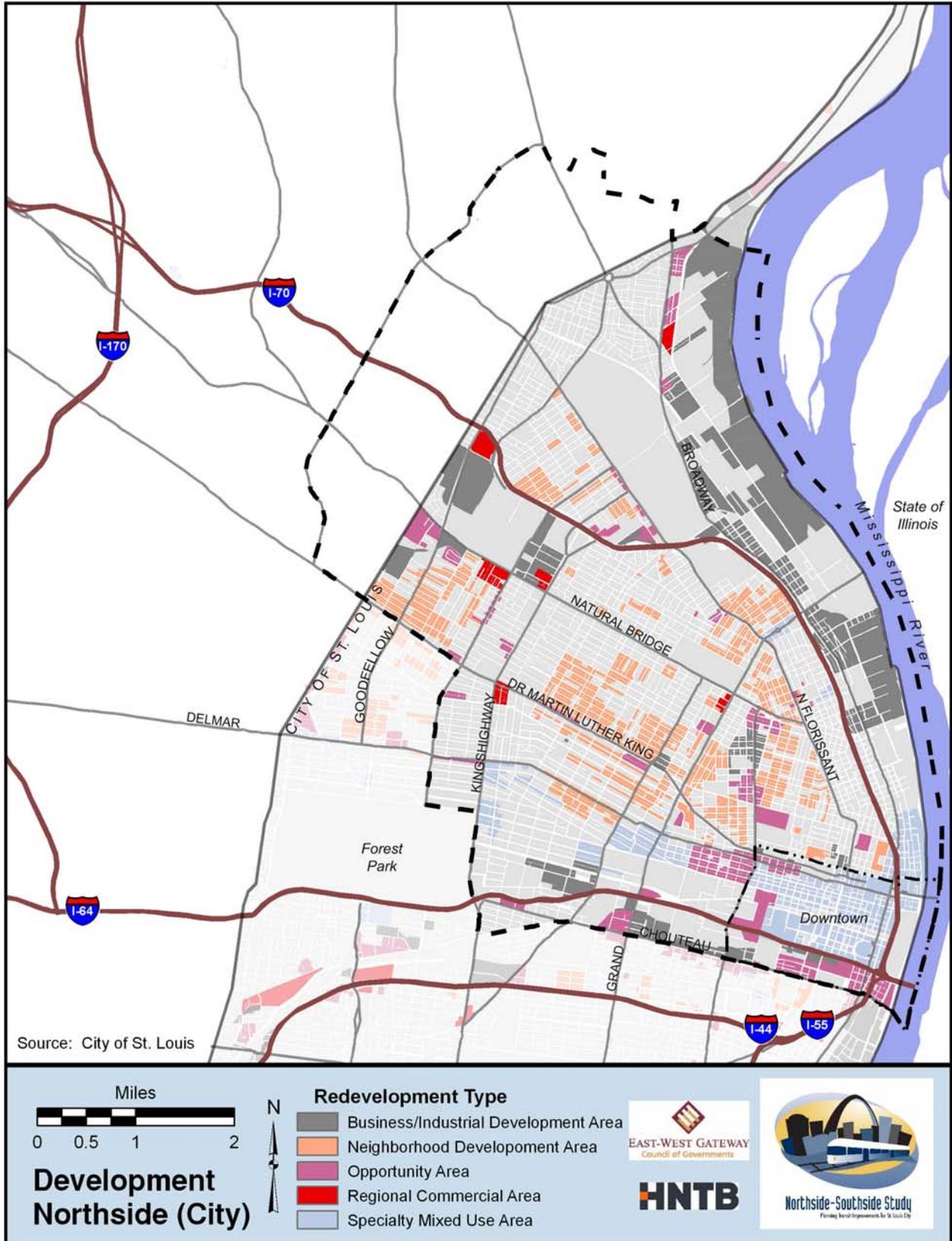
- Downtown – The downtown area features extensive redevelopment opportunities, as elucidated in the City of St. Louis Strategic Land Use Plan and Downtown Development Action Plan. These include specialty mixed use, residential – particularly loft, institutional, parking, and commercial uses.

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- Riverfront Industrial Corridor – Many of the current industrial land uses along the Mississippi Riverfront are slated for business/industrial development, as noted in the Strategic Land Use Plan.
- Many Residential Areas – A large portion of the Northside’s residential areas are considered Neighborhood Development Areas. Such redevelopment may include renovation or rebuilding on vacant parcels and solidification of neighborhoods.

Chapter 3.2: Land Use Characteristics

FIGURE 3.2-11: STRATEGIC DEVELOPMENT AREAS



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Chapter 3.3: Demographics

This section describes past and current, as well as future, projections of demographic information for the Northside study area, including downtown. For comparison purposes, information for the City of St. Louis and St. Louis County is also included. The section presents population, age, race, income distribution, housing, vehicle ownership, and employment. An analysis of this information provides a basis for determining trends and factors which influence the need for transportation improvements.

St. Louis' downtown area is of particular interest in this study, especially given the City's recent efforts to revitalize the central area and encourage redevelopment. It is therefore necessary to have a full understanding of the social and economic conditions of this area when identifying and evaluating transit alternatives. For purposes of this study, the rough boundaries of downtown are Cole Street on the north, Chouteau Avenue on the south, the Mississippi River on the east, and Jefferson Avenue on the west. This roughly corresponds with the boundaries of the City's Downtown and Downtown West neighborhoods, a total of 2.4 square miles. The boundaries were chosen to correspond with those identified in the City's Downtown Redevelopment Plan.

3.3.1 POPULATION

Table 3.3-1 displays the total population of the Northside and downtown study areas, the City of St. Louis, and St. Louis County for 1990 and 2000, and projections for 2030. Data for 1990 and 2000 are from the U.S. Census Bureau. Data for 2030 are based on population estimates and projections by EWGCOG.

The City of St. Louis has experienced a decline in population over the last several decades. The Northside has lost at a greater rate than the City as a whole, but the rate of loss downtown was less than that of the entire City.

However, between 2000 and 2030, projections indicate that downtown is expected to grow significantly, more than doubling in population. Also, the rate of loss in the Northside appears to be slowing, from an annual rate of loss of -1.8% between 1990 and 2000, to less than -0.3% between 2000 and 2030.

Since 2000, the City of St. Louis has been implementing programs to draw population back to the City, and especially downtown. Programs such as the Missouri Historic Tax Credit, the Empowerment Zone designation, the City's Strategic Land Use Plan, and the Downtown Redevelopment Plan have fostered an attractive environment for residential development, resulting in population increases. The City was successful in challenging the 2005 population estimates prepared by the U.S. Census Bureau. Year 2005 estimates prepared by the City show a gain in population for the City of St. Louis since 2000, compared to a loss in population as estimated by the Census Bureau.¹

More information about the development characteristics and the redevelopment programs can be found in Section 3.2.

¹ U.S. Census Bureau: Accepted Challenges to Vintage 2005 Population Estimates. (Accepted March 16, 2006)

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TABLE 3.3-1: TOTAL POPULATION

YEAR	NORTHSIDE		DOWNTOWN		ST. LOUIS CITY		ST. LOUIS COUNTY	
	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	203,568	--	3,299	--	396,685	--	993,529	--
2000	166,468	-18%	3,021	-8%	348,189	-12%	1,016,315	2%
2030	152,754	-8%	7,037	133%	327,400	-6%	1,004,200	-1%

*Percent change is from 1990 to 2000, and 2000 to 2030.

Source: 1990: census TAZ data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

Table 3.3-2 displays 1990, 2000, and 2030 population density in persons per square mile for the study areas, the city, and the county. Year 2000 densities are higher than some similar Midwestern cities like Indianapolis (2,163 persons per square mile) and Cincinnati (4,249 persons per square mile), but lower than others like Milwaukee (6,214 persons per square mile) and Minneapolis (6,970 persons per square mile).²

Higher population densities tend to result in higher transit use, as more people live within walking distance of transit stops. Overall, population density is forecast to decline by 2030 within the Northside and the City as a whole, but downtown density is expected to increase as population increases. 2000 and 2030 population density is shown in Figures 3.3-1 and 3.3-2, respectively.

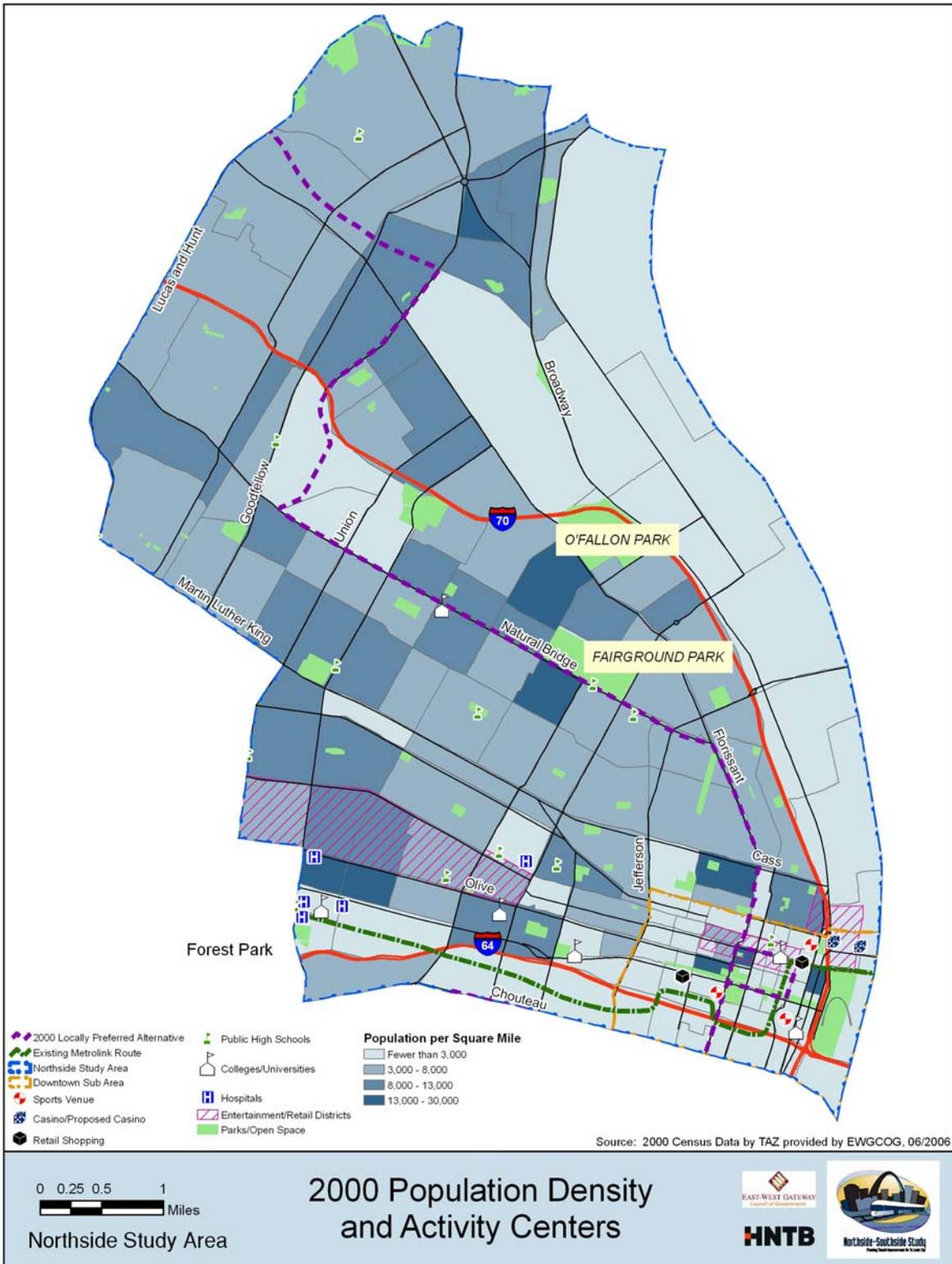
TABLE 3.3-2: POPULATION DENSITY (PERSONS PER SQUARE MILE)

YEAR	NORTHSIDE	DOWNTOWN	ST. LOUIS CITY	ST. LOUIS COUNTY
1990	5,718	1,380	6,010	1,897
2000	4,676	1,264	5,275	1,941
2030	4,290	2,944	4,960	1,918

Source: 1990: census TAZ data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections, provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

² 2000 U.S. Census

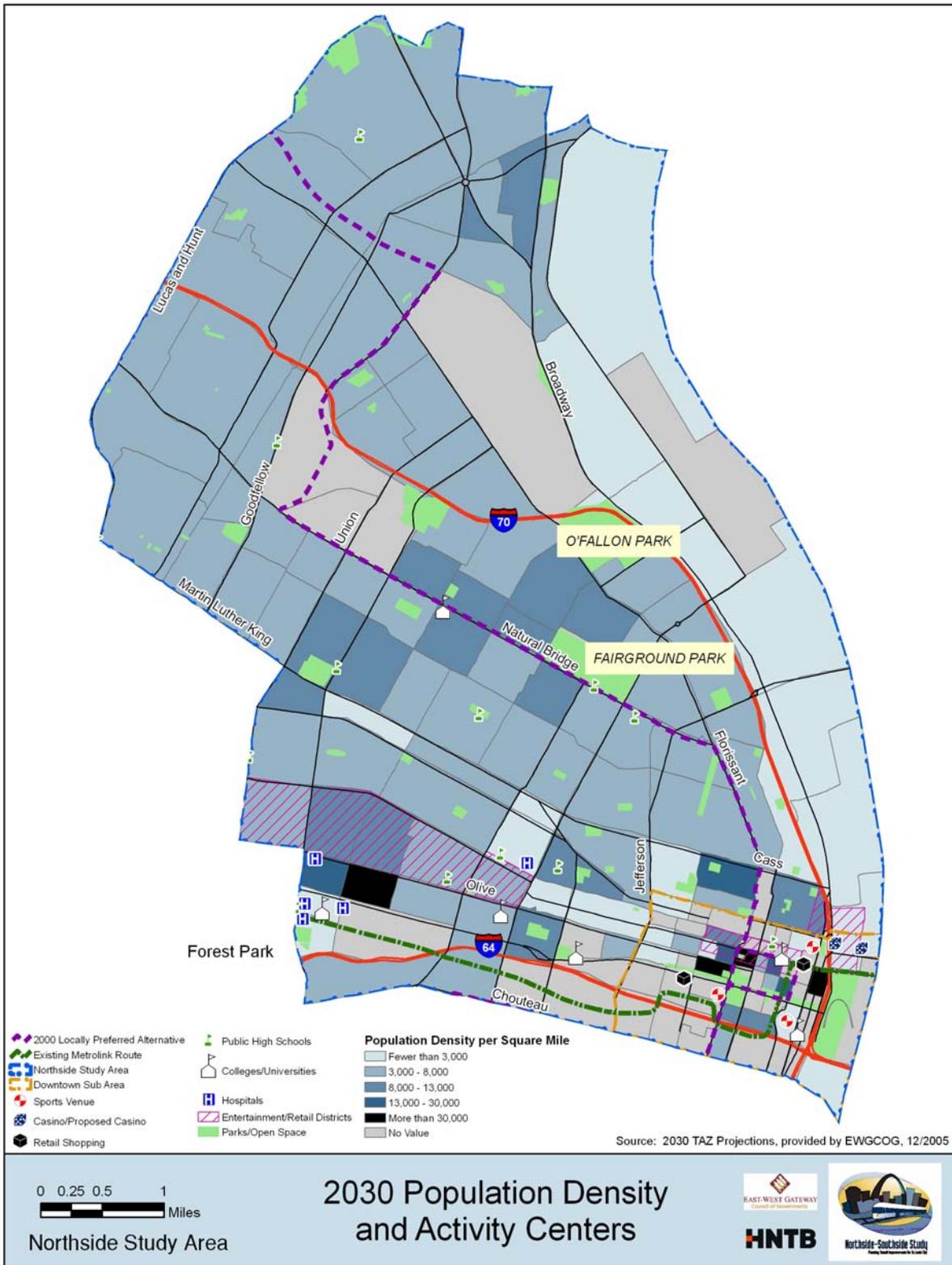
FIGURE 3.3-1: POPULATION DENSITY AND ACTIVITY CENTERS, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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FIGURE 3.3-2: POPULATION DENSITY AND ACTIVITY CENTERS, 2030



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

3.3.2 AGE AND DISABLED POPULATION

Table 3.3-3 shows the percentage distribution of the population by age group based on 2000 census data. This information is important because it identifies the level of need for transportation options for potentially mobility-deficient age groups, namely the young (under 16) and the elderly (over 65). Twenty-five percent of the population in the study area was under the age of 16, which is slightly higher than the City as a whole or the county.

Figure 3.3-3 shows that higher concentrations of the elderly population were located in the western and northwestern portions of the study area. In 2000, most of the downtown population was between the ages of 21 and 55, and nearly one-third was age 65 or older. The elderly population is expected to continue increasing, as the baby boomer generation reaches ages 66-84 by 2030³.

TABLE 3.3-3: PERCENT POPULATION BY AGE GROUP

AGE GROUP	NORTHSIDE STUDY AREA	DOWNTOWN ST. LOUIS	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Under 16	25%	1%	23%	22%
16-20	8%	2%	7%	7%
21-24	6%	8%	6%	5%
25-34	12%	15%	15%	13%
35-44	14%	19%	16%	17%
45-54	12%	16%	12%	14%
55-64	8%	10%	7%	9%
65+	14%	29%	14%	14%

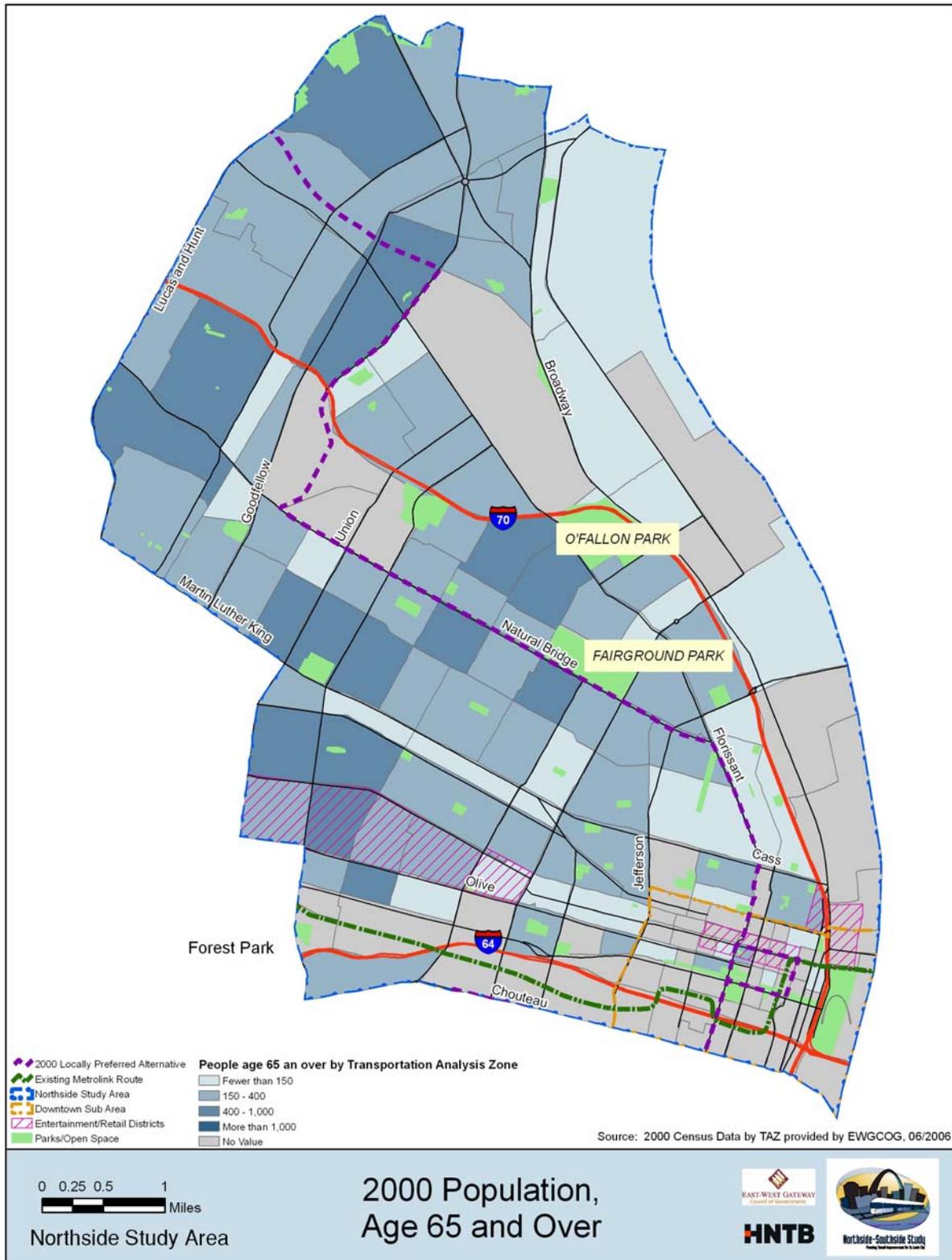
Source: 2000: census data by TAZ provided by EWGCOG, 06/2006

It is also important to recognize the disabled workforce population, as it is another group that is traditionally more dependent on transit. The City has 19% of residents over 16 years old that are disabled, compared to 11% in the county. This number is even greater in the Northside study area, where 23% are considered disabled, and 17% downtown (Figure 3.3-4).

³ Long-Range Population and Employment Projections, East West Gateway Council of Governments, June 2004.

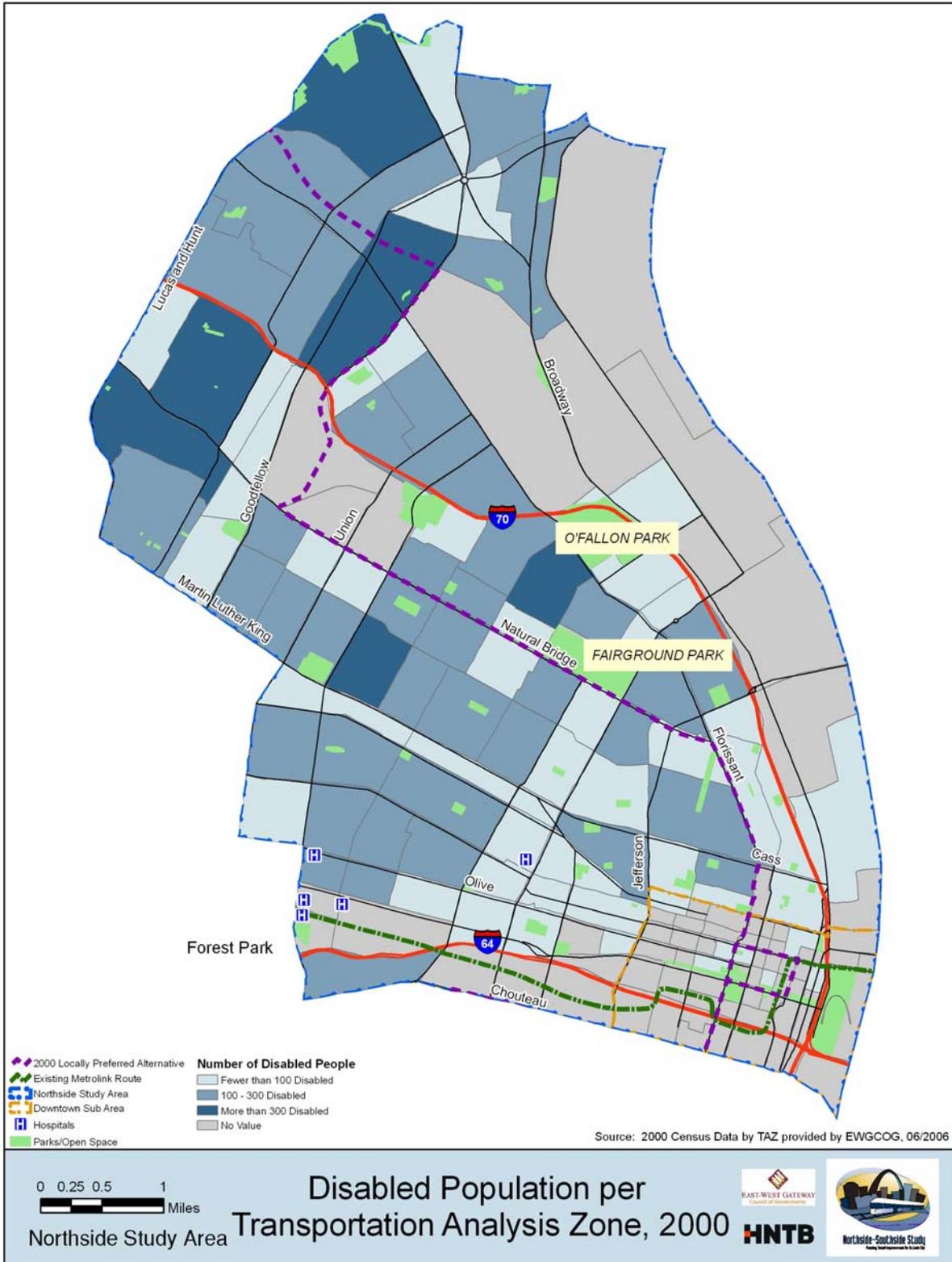
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FIGURE 3.3-3: POPULATION AGE 65 AND OVER, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

FIGURE 3.3-4: DISABLED POPULATION PER TAZ, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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3.3.3 RACE AND ETHNICITY

Table 3.3-4 illustrates the racial breakdown within the study areas, the city, and the county. The Northside is predominantly African-American, and whites make up the majority of residents downtown.

The Hispanic population in St. Louis City increased by 37% between 1990 and 2000, and now makes up 2% of the City’s population⁴. Similarly, the City of St. Louis has experienced an influx of immigrants between 2000 and 2004. The net international immigration rate was 5.1 per 1,000 people, more than any county in the state and more than twice the rate in St. Louis County.⁵

TABLE 3.3-4: RACIAL BREAKDOWN

RACE	NORTHSIDE STUDY AREA	DOWNTOWN ST. LOUIS	CITY OF ST. LOUIS TOTAL	ST. LOUIS COUNTY TOTAL
White/Caucasian	17%	56%	44%	77%
African-American	81%	36%	51%	19%
Asian	1%	3%	3%	2%
Hispanic or Latino*	0.8%	2%	2%	1%
Other	1%	3%	0.8%	0.5%

*Note: The Hispanic or Latino population may be of any race and should not be considered separate from White/Caucasian, African-American, Asian, or Other races
 Source: Study Area and Downtown: 2000: census data by TAZ provided by EWGCOG, 06/2006
 City and County: U.S. Census Bureau, 2000 Summary File

3.3.4 INCOME DISTRIBUTION

Table 3.3-5 presents the percentage distribution of population by 1999 household income. This is the latest official data that is available at the TAZ level. In 1999, household income of \$16,700 was considered poverty level for a family of four.⁶ The 1999 income levels in the City were significantly below those in the county, with 29% of households in the City earning less than \$15,000 per year in 1999, compared with 10% in the county. Within the study area, the number of low income households was even greater, with 38% earning less than \$15,000. Twenty-five percent of downtown households earned less than \$15,000.

Generally speaking, households with lower incomes have less ability to own a vehicle and therefore are more dependent on transit. The fact that so many households in the study area earn less than \$15,000 indicates that residents within the study area are likely to have fewer transportation options than the rest of the City or the county.

The City’s median income was \$27,276. Median household income for the study area was much less at \$21,175 and downtown’s median household income was \$26,370. Figure 3.3-5

⁴http://www.oseda.missouri.edu/regional_profiles/hispanic_pop_2000_popchg_1990_2000.html (Prepared by University of Missouri; Outreach and Extension - Office of Social and Economic Data Analysis)
⁵ Population Division, U.S. Census Bureau. “Table 6: Estimates of Average Annual Rates of the Components of Population Change for Counties of Missouri: April 1, 2000 to July 1, 2004 (CO-EST2004-06-29).” April 14, 2005
⁶ 1999 HHS poverty guidelines (Department of Health and Human Services)

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shows the percentage of the City's median income, by TAZ zone, which shows areas that are higher and lower than the City's median income. The lower-income areas dominate the study area, with most areas higher than the City's median located on the western fringes of the City and downtown. The 1999 median annual household income for the county was \$50,532, 46% higher than in St. Louis City.

As stated previously, the City has been changing since 2000, as redevelopment has attracted population back to the City. The 2004 American Community Survey (ACS) conducted by the U.S. Census Bureau provides income information for the City of St. Louis and St. Louis County. Official census information for areas smaller than these, such as the study area or downtown, is not available. Still, it is important to recognize the changes that are occurring in the City due to the redevelopment that has taken place over the last few years.

The 2004 ACS indicates that between 1999 and 2004, the City's median household income rose by 12% to \$30,389. In that same time period, the county's median income decreased slightly to \$50,084. The percentage of low income households in the City decreased by 3% between 1999 and 2004, and rose by 1% in the county. Seventeen percent of City families were below the poverty level of \$18,850⁷ in 2004, compared to 7% in the county.

TABLE 3.3-5: HOUSEHOLD INCOME

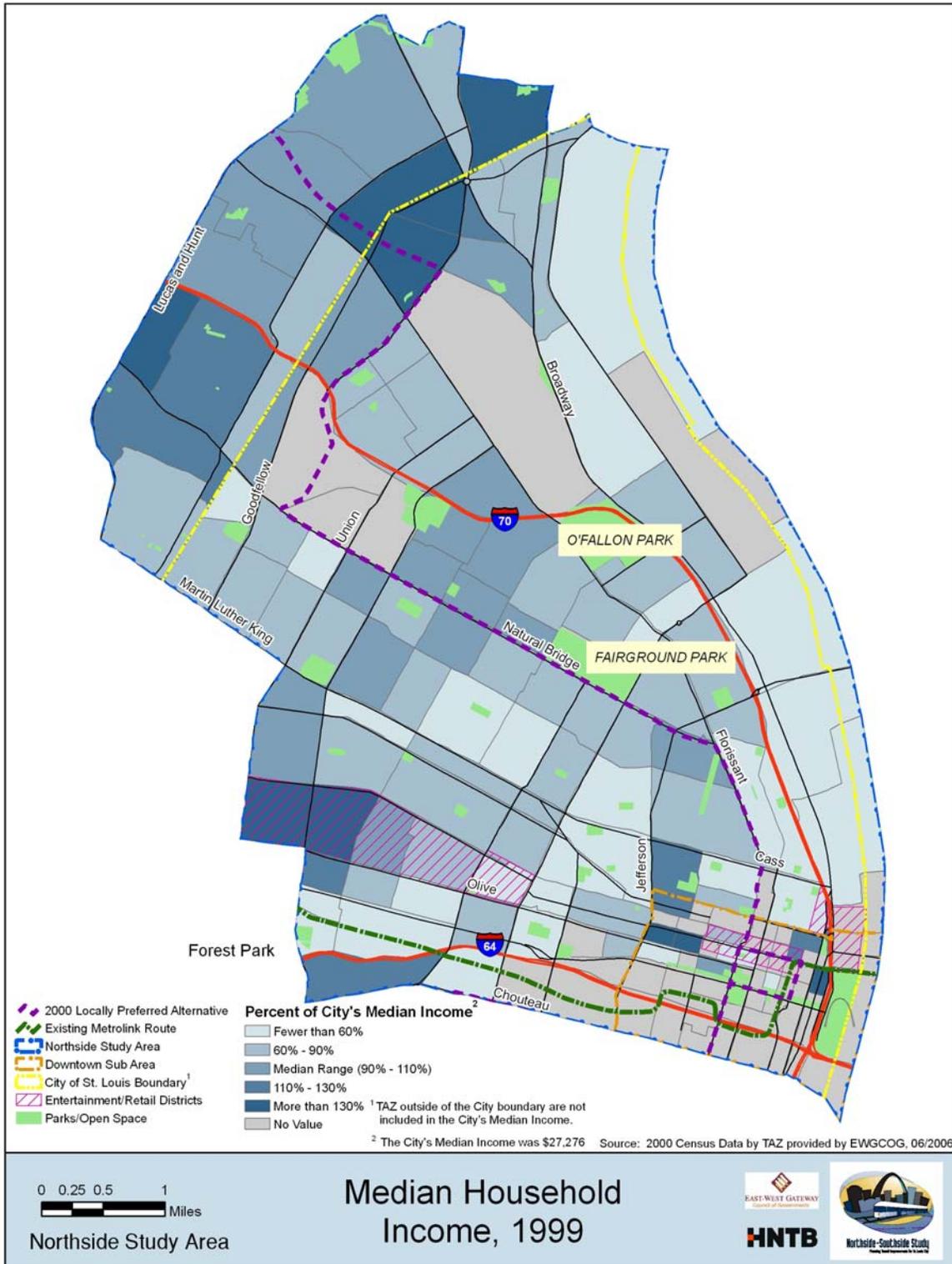
ANNUAL INCOME	NORTHSIDE STUDY AREA (1999)	DOWNTOWN ST. LOUIS (1999)	CITY OF ST. LOUIS (1999)	CITY OF ST. LOUIS (2004)	ST. LOUIS COUNTY (1999)	ST. LOUIS COUNTY (2004)
0-\$15,000	38%	25%	29%	26%	10%	11%
\$15,000-\$35,000	43%	42%	32%	30%	23%	21%
\$35,000-\$50,000	12%	20%	16%	15%	16%	17%
\$50,000-\$75,000	6%	8%	13%	13%	21%	19%
\$75,000+	3%	6%	10%	16%	30%	32%
Median Household Income	\$21,175	\$26,370	\$27,276	\$30,389	\$50,532	\$50,084

Source: Study Area and Downtown: 2000: census data by TAZ provided by EWGCOG, 06/2006
 City and County: U.S. Census Bureau, 2000 Summary File
 2004 American Community Survey for St. Louis City and St. Louis County.

⁷ 2004 HHS poverty guidelines (Department of Health and Human Services)

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FIGURE 3.3-5: MEDIAN HOUSEHOLD INCOME, 1999



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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3.3.5 HOUSING

Table 3.3-6 displays the number of households in 1990 and 2000, and projections for 2030. Data for 1990 and 2000 are from the U.S. Census Bureau. Data for 2030 are based on estimates and projections developed by EWGCOG.

The number of households decreased in all areas of the City between 1990 and 2000, consistent with the decrease in population. The rate of decrease in the study area and downtown was greater than that of the entire City (-11%). However, between 2000 and 2030, projections indicate that the Northside is expected to have a modest gain in total households, even though population will continue decreasing at a slow rate. This could be indicative of a decrease in household size. The downtown area is expected to grow significantly, which is consistent with the growth in population that is expected.

TABLE 3.3-6: TOTAL HOUSEHOLDS

YEAR	NORTHSIDE		DOWNTOWN		ST. LOUIS CITY		ST. LOUIS COUNTY	
	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	76,383	--	2,169	--	164,931	--	380,110	--
2000	55,132	-28%	1,240	-43%	146,969	-11%	404,225	6%
2030	58,862	7%	3,298	166%	128,185	-13%	442,124	9%

*Percent change is from 1990 to 2000, and 2000 to 2030.

Source: 1990: census TAZ data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

Table 3.3-7 shows the 2000 housing statistics for the study areas as well as the City of St. Louis and St. Louis County. Occupancy rates are higher in the county compared to the City or the study areas. This pattern is consistent with housing trends observed throughout the St. Louis region. In 2000, housing in the study area was evenly-split between owning and renting, and virtually all of the downtown units were occupied by renters.

TABLE 3.3-7: 2000 HOUSING STATISTICS

	NORTHSIDE STUDY AREA	DOWNTOWN ST. LOUIS	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Housing Units	79,824	2,314	176,354	423,749
Percent Occupied	81%	76%	83%	95%
Percent Vacant	19%	24%	17%	5%
Percent Owner-Occupied	50%	0.2%	47%	74%
Percent Renter-Occupied	50%	99.8%	53%	26%

Source: Study Area and Downtown: 2000: census data by TAZ provided by EWGCOG, 06/2006
City and County: U.S. Census Bureau, 2000 Summary File

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3.3.6 VEHICLE OWNERSHIP AND TRANSIT DEPENDENCY

A major factor in the choice of travel mode, especially for transit, is the availability of private vehicles. Ownership of fewer vehicles generally indicates higher dependency on public or alternate transit. Table 3.3-8 presents the 2000 distribution of households by number of vehicles owned/operated by members of the household.

The majority of households in the study area have access to at least one vehicle. Sixteen percent of Northside households and 29% of downtown households do not have access to any vehicle, which is much higher than that in the county (6%). Most households in the county have two or more vehicles, allowing for greater mobility than their City counterparts. Downtown households are most dependent on alternate modes of transportation. Figure 3.3-6 shows the geographical location of the TAZ zones where the majority of households have zero, one, or two or more vehicles. Most zero-car households are located near Natural Bridge Avenue.

Eleven percent of St. Louis workers use public transportation to get to work, compared to less than 2% in the county. There are several Northside areas where more than 20% of workers use public transportation.⁸ This percentage is high when compared to the City as a whole, or other metropolitan areas. More information about transit usage can be found in Section 3.7.

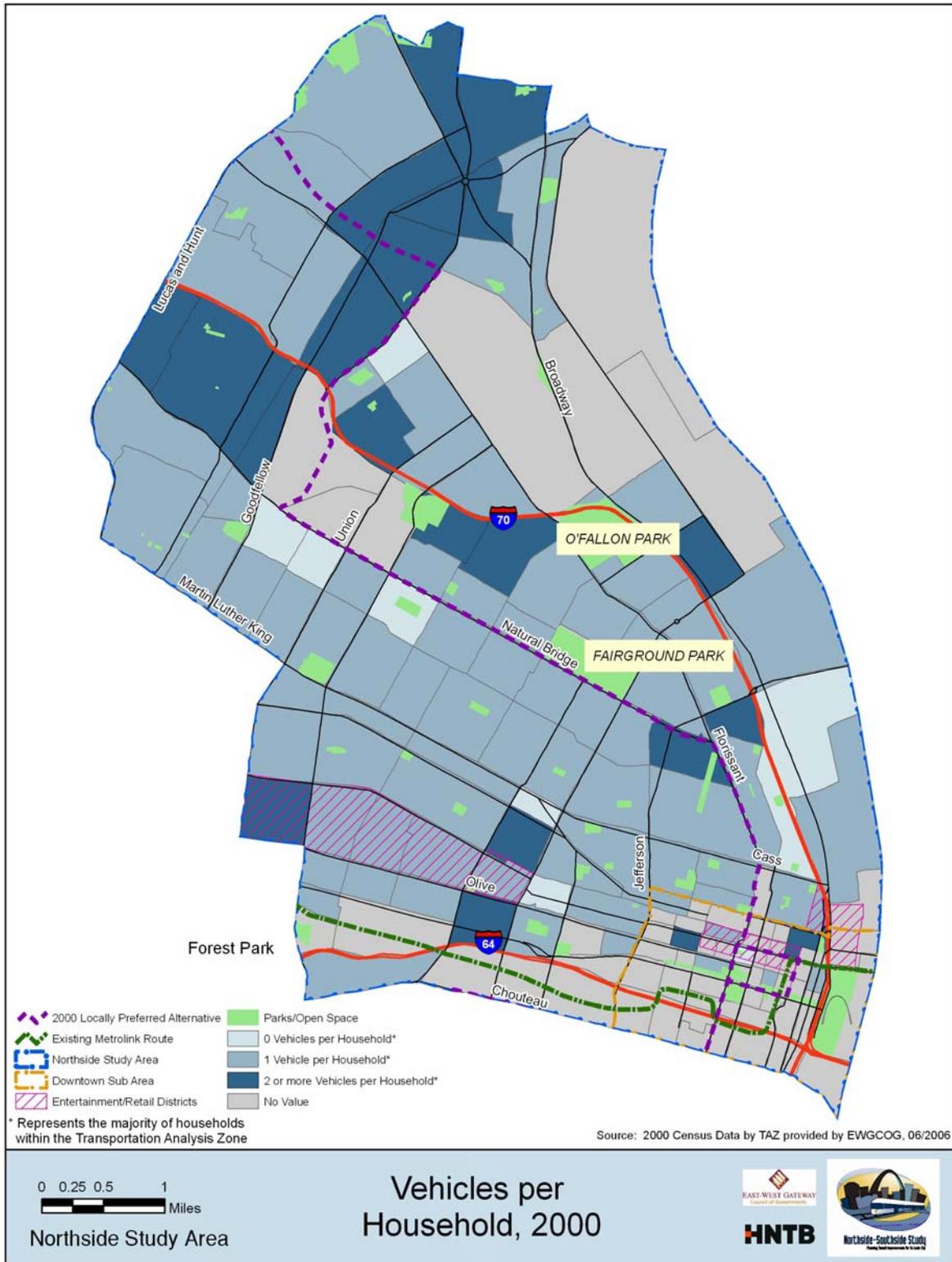
TABLE 3.3-8: DISTRIBUTION OF VEHICLES PER HOUSEHOLD

NUMBER OF VEHICLES PER HOUSEHOLD	NORTHSIDE STUDY AREA	DOWNTOWN ST. LOUIS	CITY OF ST. LOUIS	ST. LOUIS COUNTY
0	16%	29%	25%	6%
1	41%	62%	46%	36%
2+	43%	9%	29%	58%

Source: Study Area and Downtown: 2000: census data by TAZ provided by EWGCOG, 06/2006
 City and County: U.S. Census Bureau, 2000 Summary File 3

⁸ U.S. Census 2000 Summary File 3

FIGURE 3.3-6: VEHICLES PER HOUSEHOLD, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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3.3.7 TRANSIT NEED INDEX

Metro has developed a methodology to quantify and locate the areas of greatest need for transit service in the region. The Transit Need Index was designed to summarize the demographic data for population density, minority population, median household income, automobile availability, population over age 65, and work force disability. As stated previously, these are characteristics for which the need for transit is traditionally greater.

Ranking characteristics are used to rank census tracts for transit need. The characteristics are each assigned a ranking weight, which corresponds to the relative importance of the different types of need attributes based upon accepted standards of the transit industry. The total ranking weights for all transit need characteristics is 10.0. Table 3.3-9 lists transit need index categories, their transit need ranking characteristics, and their ranking weights.

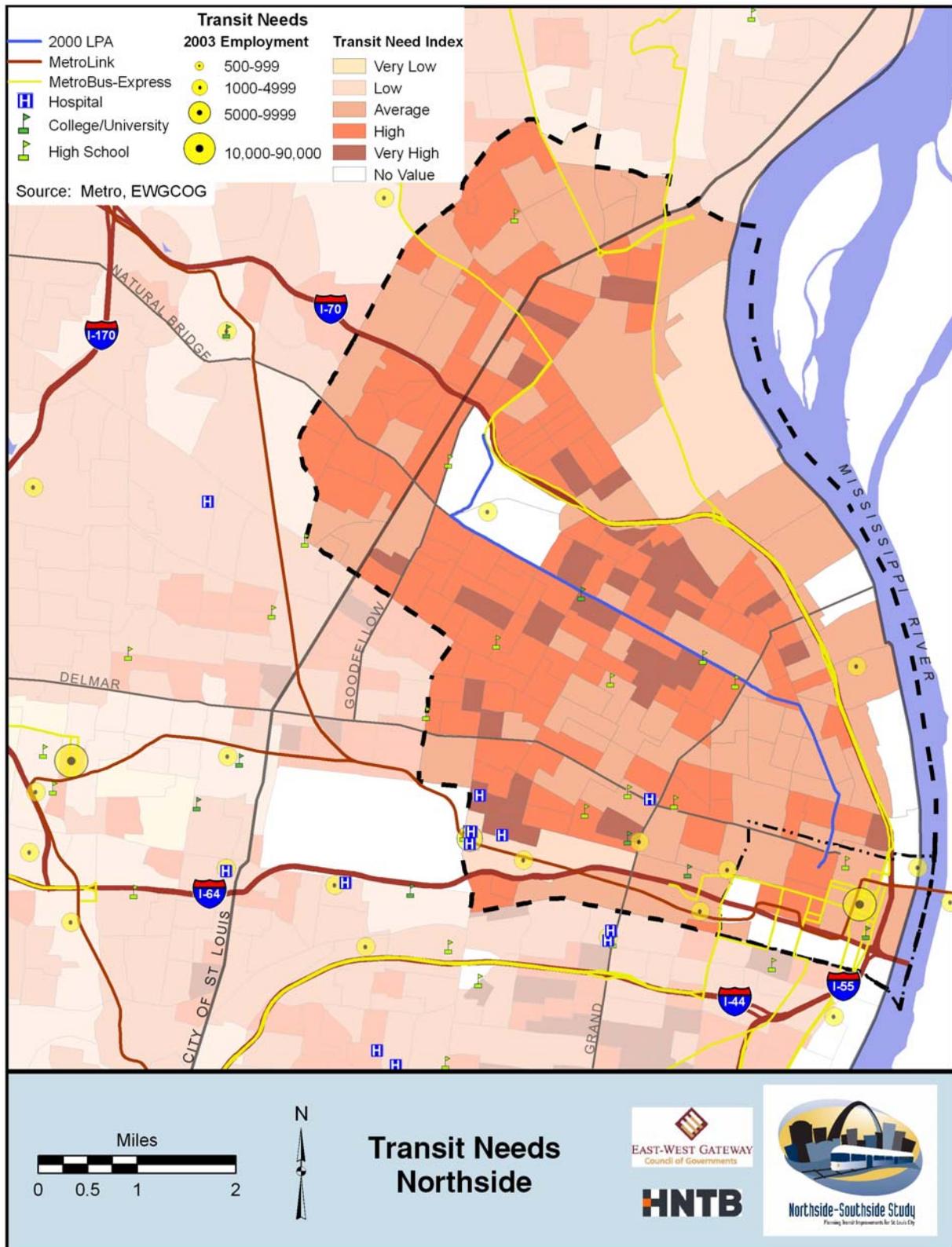
TABLE 3.3-9: TRANSIT NEED INDEX

CATEGORY	CHARACTERISTICS	RANKING WEIGHT
Population Density	High population density	2
Minority Population	High concentrations of minority populations	1
Median Household Income	Low median household income	3.5
Automobile Availability	One or zero cars available	1.5
Population over 65	High concentrations of people over 65	1
Workforce Disability	High concentrations of disabled persons	1

Source: Metro, Transit Need Index

Figure 3.3-7 shows the census tracts and their rankings of very low to very high in terms of transit need. The highest needs tend to be located in the center of the Northside, between I-70 and Martin Luther King Drive. There are also sections of downtown which qualify as “high transit need.”

FIGURE 3.3-7: TRANSIT NEEDS



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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3.3.8 EMPLOYMENT

Table 3.3-10 displays the total employment of the study area, downtown, the City of St. Louis, and St. Louis County for 1990 and 2000, and projections for 2030. Data for 1990 and 2000 are from the U.S. Census Bureau. Data for 2030 are based on employment estimates and projections by EWGCOG.

Employment decreased everywhere except the county during the past decade, primarily due to the outward migration of jobs and people to suburban county locations. Projections indicate that employment in the City of St. Louis is not expected to change greatly between 2000 and 2030, although downtown will gain 3,000 jobs. It is expected that the county will continue to gain employment, but at a slower pace. There have been, and will continue to be, gains and losses in employment centers that basically cancel each other out. In addition, various types of redevelopment of previous industrial or commercial uses into residential uses, especially downtown, will affect overall employment.

TABLE 3.3-10: TOTAL EMPLOYMENT

YEAR	NORTHSIDE		DOWNTOWN		ST. LOUIS CITY		ST. LOUIS COUNTY	
	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*	TOTAL	PERCENT CHANGE*
1990	98,183	--	109,265	--	317,198	--	518,137	--
2000	91,506	-7%	93,289	-15%	278,500	- 12%	621,000	20%
2030	89,451	-2%	96,692	4%	277,800	- 3%	693,200	14%

*Percent change is from 1990 to 2000, and 2000 to 2030.

Source: 1990: census TAZ data provided by EWGCOG, 12/2005; 2000: census data by TAZ provided by EWGCOG, 06/2006; 2030: TAZ Projections provided by EWGCOG, 12/2005; Population and Employment Projections, EWGCOG, June 2004.

Table 3.3-11 displays the distribution of employment by type. The percentages of all categories are similar between the study area, city, and county. “White collar” employment categories made up 51% of the total Northside employment and 56% downtown, with the largest percentage in educational, health and social services. This is consistent with the fact that there are numerous schools, universities and healthcare facilities in or adjacent to the study area.

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TABLE 3.3-11: 2000 EMPLOYMENT BY TYPE

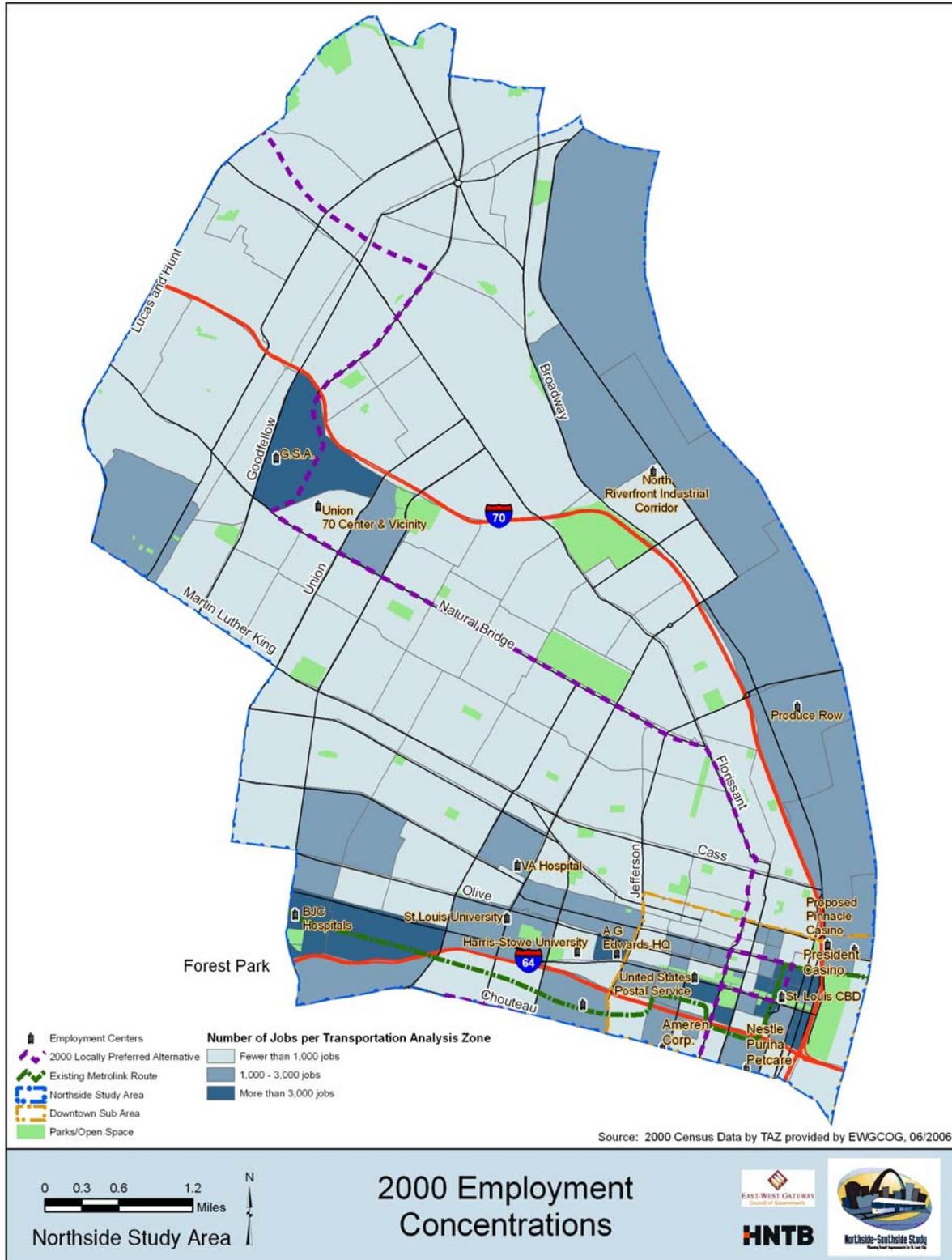
TYPE OF EMPLOYMENT	NORTHSIDE STUDY AREA	DOWNTOWN ST. LOUIS	CITY OF ST. LOUIS	ST. LOUIS COUNTY
Management and professional	9%	12%	10%	11%
Educational, health, and social services	27%	18%	24%	21%
Finance, insurance, real estate, and rental and leasing	6%	15%	7%	9%
Public administration	6%	7%	6%	3%
Information	3%	4%	3%	4%
Arts, entertainment, recreation, accommodation and food service	10%	10%	11%	8%
Construction, manufacturing	14%	12%	16%	18%
Wholesale and retail trade	11%	8%	13%	16%
Transportation and warehousing, utilities	7%	7%	6%	5%
Agriculture, forestry, fishing and hunting, and mining	0.1%	0.8%	0.3%	0.2%
Other services (except public administration)	6%	6%	6%	5%

Source: Study Area and Downtown: 2000: census data by TAZ provided by EWGCOG, 06/2006
 City and County: U.S. Census Bureau, 2000 Summary File

2000 and 2030 employment concentrations are displayed in Figures 3.3-8 and 3.3-9. The highest employment concentrations are generally found along the Mississippi River and in the southern portion of the study area. They include the St. Louis Central Business District (CBD), the BJC Medical Complex, and the Olive Street/Lindell Boulevard corridor between A.G. Edwards and St. Louis University.

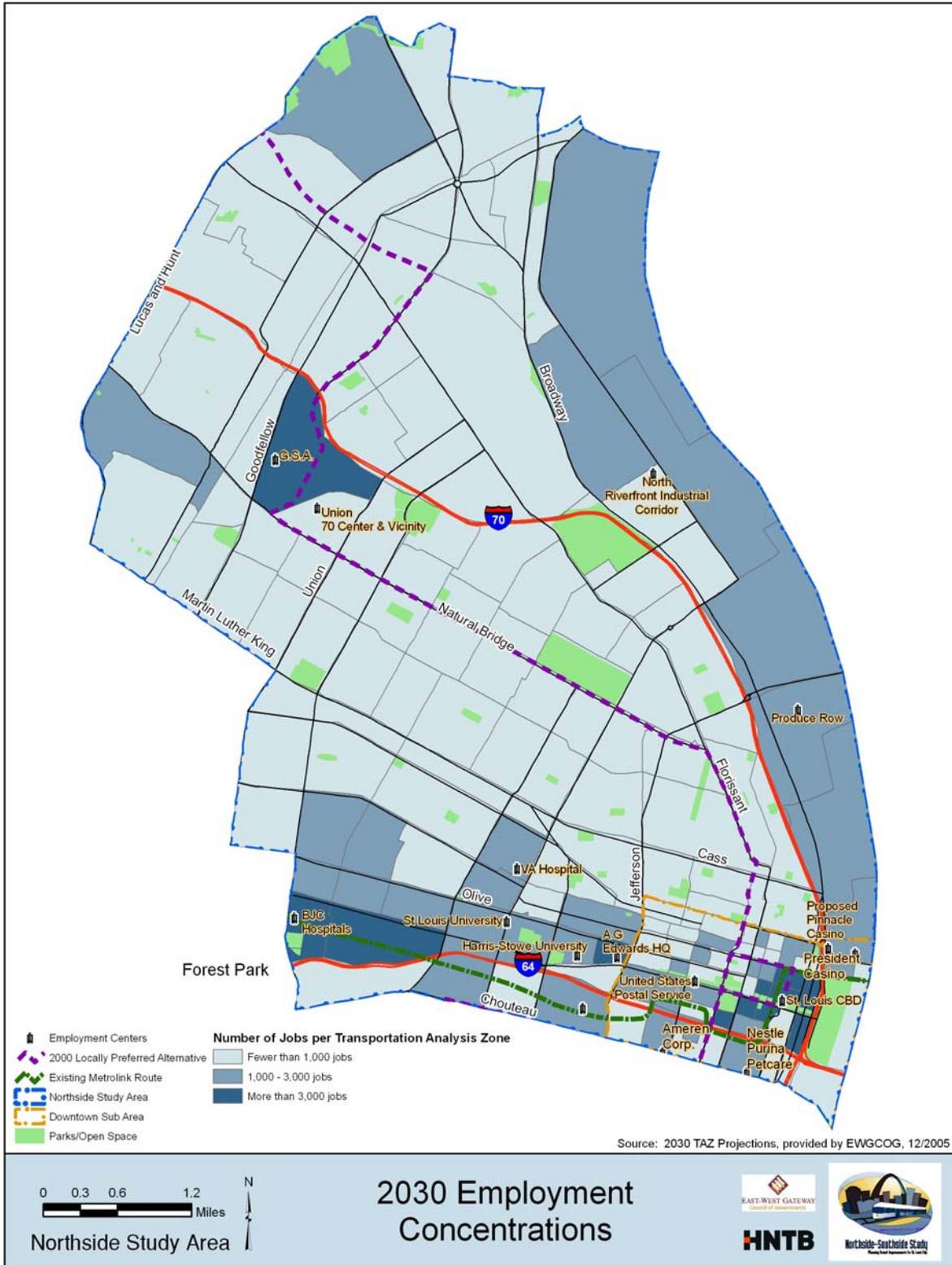
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FIGURE 3.3-8: EMPLOYMENT CONCENTRATIONS, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

FIGURE 3.3-9: EMPLOYMENT CONCENTRATIONS, 2030



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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3.3.9 CONCLUSION

St. Louis has experienced decades of population and employment loss, and the Northside has seen the greatest decline. 2030 population projections indicate that downtown will more than double its current level and increase in density, even though the rest of the City will continue to lose people. It is important to note that 2005 population estimates prepared by the City, and accepted by the U.S. Census, indicate that the City is, in fact, beginning to reverse the trend of population loss. Since 2000, the City of St. Louis has been implementing programs to draw population back to the City, and especially downtown. Programs such as the Missouri Historic Tax Credit, Empowerment Zone designation, the Downtown Redevelopment Plan, and the City's Strategic Land Use Plan have fostered an attractive environment for residential development, resulting in population increases and higher densities. This trend is expected to continue, as the City continues to implement its progressive programs. Higher population densities tend to result in higher transit use, as more people live within walking distance of transit stops.

No significant changes in employment are expected, although downtown is expected to gain approximately 3,000 jobs by 2030. Employment will continue to increase in the county, but at a slower rate than in previous decades.

The Northside has high percentages of minority and low-income residents, higher than in any other sections of the City or St. Louis County. Many of the residents are traditionally more transit dependent, including the young, the elderly, the disabled, and those that do not have a vehicle. Almost one-third of the households downtown do not have access to any vehicle. There are also many areas where more than 20% of workers use transit to get to work, which is significantly high when compared to the national average of 5%. Finally, and most telling, is the fact that Metro's Transit Need Index indicates that most of the Northside has high or very high needs for transit, based on their socio-economic status.

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Chapter 3.4: Travel Patterns

This section presents work travel patterns for the Northside and Southside sections of the study area. Travel to work is frequently the focus of travel pattern analysis, because it tends to be concentrated in the morning (AM) and afternoon (PM) peak periods and usually forms the basis for determining the required transportation capacity. Moreover, work and school trips are considered to be non-discretionary, because they have specific destinations and arrival time requirements. Although the Census Journey-to-Work (JTW) database differs from model estimates of work travel, the JTW data provide valuable insights for identifying major travel flows and establishing a reliable benchmark for both intra- and inter-regional work-related travel behavior.

Analysis of the 2000 Census JTW data is presented. Census JTW data are analyzed at two distinct levels: county and study area. Analysis at the county level provides insights into the relative magnitudes of work-related travel among counties in the St. Louis area. The study area-level analysis focuses on those parts of the study area that are most likely to be served by the proposed transit service. These analyses provide macroscopic travel flow patterns and travel flow estimates in the vicinity of possible stations.

3.4.1 COUNTY-LEVEL JOURNEY TO WORK PATTERNS

The Census JTW analysis reveals that there are a little over 1.12 million workers in the eight-county EWGCOG region (Table 3.4-1). Key travel patterns include:

- More than 790,000 workers are destined either to the City of St. Louis or to St. Louis County. This translates to 70% of the total JTW flows in the entire eight-county region.
- Worker origins are heavily concentrated in St. Louis County, with over 475,000 workers in residence.
- Over 100,000 workers reside in each of St. Charles County, the City of St. Louis, Madison County, and St. Clair County.
- Approximately 80,000 workers commute within the City of St. Louis.
- Approximately 155,000 workers commute between the City of St. Louis and St. Louis County.

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TABLE 3.4-1: COUNTY-LEVEL JTW TRAVEL PATTERNS

Origin Location	Destination Location								
	Franklin	Jefferson	St. Charles	St. Louis Co	City of St. Louis	Madison	Monroe	St. Clair	All
Franklin Co. MO	25,652	780	766	11,842	2,253	145	12	239	41,690
Jefferson Co. MO	1,013	32,249	1,291	42,180	15,946	489	134	857	94,159
St. Charles Co. MO	555	380	65,503	62,353	10,930	735	21	884	141,362
St. Louis Co. MO	1,752	5,463	12,859	342,663	105,203	3,801	264	4,342	476,346
City of St. Louis	291	1,180	1,439	50,994	80,015	1,253	50	1,449	136,671
Madison Co. IL	136	288	1,051	16,779	14,499	72,528	70	9,316	114,667
Monroe Co. IL	23	205	84	3,333	2,376	421	4,864	1,730	13,035
St. Clair Co. IL	130	304	640	12,582	18,250	7,044	916	67,445	107,310
All	29,552	40,849	83,633	542,727	249,472	86,415	6,330	86,261	1,125,240

3.4.2 STUDY AREA-LEVEL JOURNEY TO WORK PATTERNS

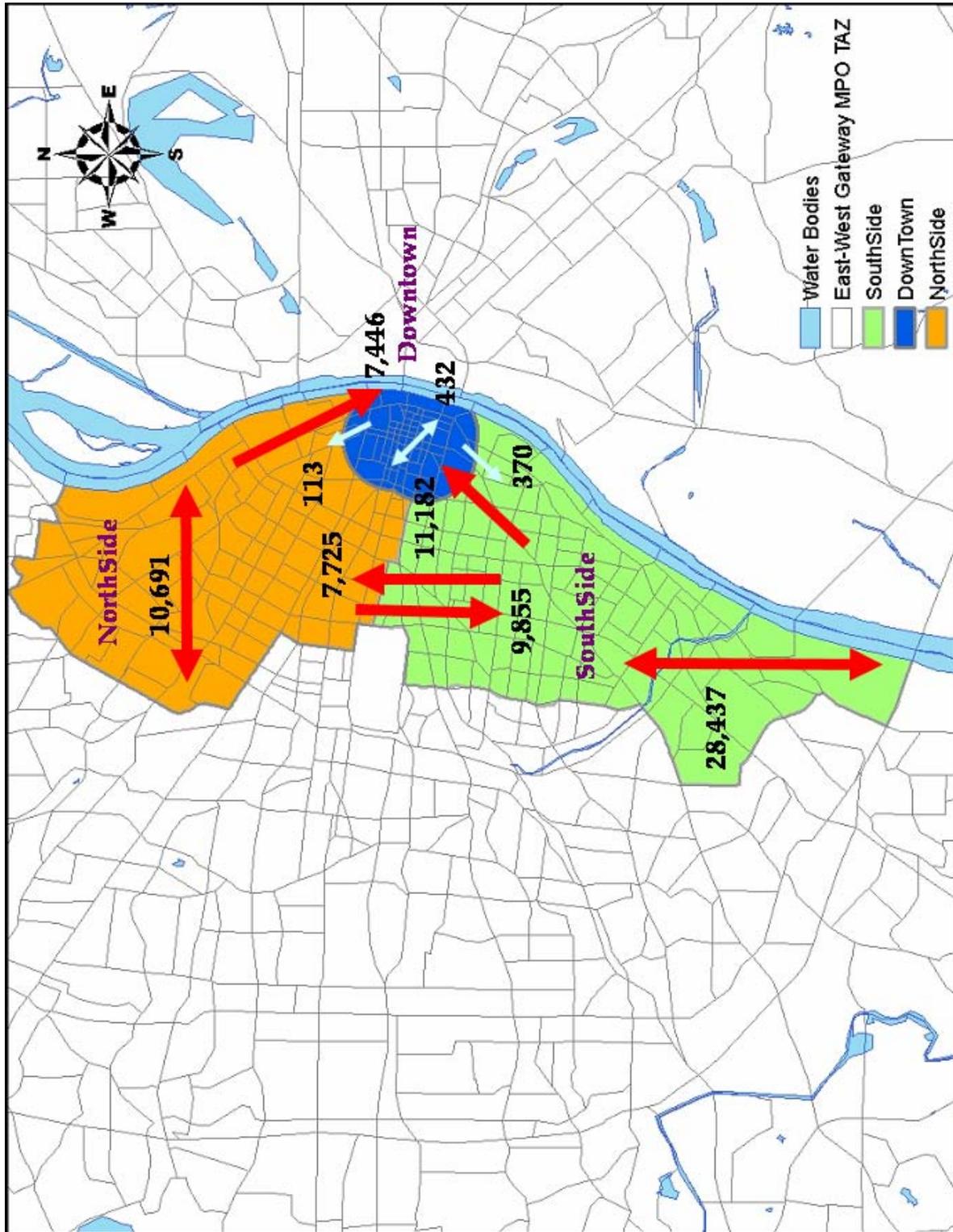
Census JTW travel patterns are also analyzed for the areas that are most likely to be affected by the proposed transit service (Figure 3.4-1). The Northside-Southside study area includes most of the City of St. Louis and some parts of St. Louis County. The most important findings include the following flows of workers shown in Table 3.4-2:

- More than 76,000 workers commute within the Northside-Southside study area.
- Of the more than 38,000 workers attracted to the Southside, about 28,000 also reside within the Southside study area.
- The Northside serves as a destination for about 18,500 workers, roughly half as many attracted to the Southside. Approximately 10,000 of these workers also reside within the Northside study area.
- Downtown is an important destination, attracting over 19,000 workers. These workers come primarily from the Southside.
- About 17,500 workers travel between the Northside and Southside areas.

TABLE 3.4-2: STUDY AREA JTW TRAVEL PATTERNS

Origin Location	Destination Location			
	Northside	Downtown	Southside	Total
Northside	10,691	7,446	9,855	27,992
Downtown	113	432	370	915
Southside	7,725	11,182	28,437	47,344
Total	18,529	19,059	38,662	76,250

FIGURE 3.4-1: STUDY AREA JTW TRAVEL PATTERNS



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Chapter 3.5: Activity Centers

Activity centers in the Northside study area, including downtown, are organized into the following categories: recreational/entertainment/cultural/parks; major employers/employment centers; retail shopping; educational institutions; and healthcare facilities. While all major activity centers are identified below, a brief description is provided for only the more significant ones. Knowledge of these centers is important because, either individually or in combination, they can have a significant impact on both local and regional transportation networks.

3.5.1 RECREATIONAL/CULTURAL/PARKS

Many of the region's recreational and cultural facilities are located within the City of St. Louis. Forest Park, for example, though just outside of the study area, is one of the area's more significant resources. The park is easily accessible to most of the region's residents, as it is served by MetroLink, MetroBus, and is adjacent to Interstate 64. The park has neighborhood, community and area-wide significance. More than 12 million people come to the park each year to visit major cultural institutions, participate in active recreational pursuits or enjoy passive recreation, and attend special events.

Just as Forest Park is the most widely recognized of the region's cultural and recreational centers, downtown St. Louis is viewed as the business, financial, and professional sports center of the region. More than 22 million people visit the area each year, and over 300 conventions are held annually. The St. Louis Central Business District (CBD) hosts a wide variety of professional, regional and national collegiate sporting events at Busch Stadium, Edward Jones Dome, Savvis Center, and on the various university campuses. Attractions such as the Jefferson National Expansion Memorial (Gateway Arch), America's Center, Laclede's Landing and the City Museum annually draws millions of visitors to the St. Louis CBD.

Downtown St. Louis has experienced significant investment over the past few years. The City's Downtown Now! Plan was developed in 1997 to implement fast-track, five-to ten-year strategies. This, in addition to adoption of the Missouri Historic Tax Credit, has been the catalyst for a wide array of revitalization efforts in downtown St. Louis. Since 1999, the City has benefited from more than \$3 billion in investments, including renovation of the civil courts, major hotel renovations and expansions, and the conversion of obsolete office and industrial buildings into loft residential condominiums.¹ The City has identified focus areas for redevelopment, including the Laclede's Landing/Riverfront District, the Washington Avenue Loft District, the Old Post Office District, the Gateway Mall and Arch Grounds, and the Bottle District.

Recreational/Entertainment

Recreational activity centers located within the study areas include several professional sports arenas, a national landmark park, locally funded public facilities such as the City Museum, a casino, and privately owned golf clubs. The St. Louis CBD houses several major facilities and venues. Those activity centers and their 2005 reported attendance are shown in Table 3.5-1. Section 3.8 for source information.

¹ www.Downtownstlouis.org: Downtown St. Louis Investment Chart (1999-2005 year to date)

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TABLE 3.5-1: MAJOR ACTIVITY CENTERS, DOWNTOWN ST. LOUIS

ACTIVITY CENTER	2005 ATTENDANCE
Union Station	7,000,000
Jefferson National Expansion Memorial	4,100,000
Busch Stadium (St. Louis Cardinals)	3,492,000
America's Center/Edward Jones Dome	1,615,000
Savvis Center (St. Louis Blues)	2,000,000
President Casino on the Admiral	3,700,000
City Museum	600,000
Total	22,507,000

The City is also home to numerous established and developing entertainment districts. The Laclede's Landing/Riverside North District is located on the northern edge of downtown along the Mississippi River and north of the Jefferson National Expansion Memorial. The District is bounded by Washington Avenue to the south, O'Fallon Street to the north, Interstate 70 to the west, and the Mississippi River to the east. The Laclede's Landing Historic District is located in the southern portion of this area. There are restaurants, clubs, retail, institutions, and businesses as well as a hotel and casino.² A new casino located near I-70 and Carr Street is under construction and is expected to be opened by 2007.

The Bottle District is a new development located just north of downtown. The property is bounded by Cole Street to the south, Broadway to the east, 7th Street to the west and Interstate Highway 70 to the north, near the Edward Jones Dome and America's Center. This \$280-million development will house more than 900,000 square feet of entertainment, dining, shopping, hotel rooms, luxury lofts, office space, and pedestrian courtyards. It is currently under construction and is scheduled to open in 2007.³

A new Busch Stadium has been constructed on a site adjacent to the old stadium. Portions of the land formerly occupied by that stadium will be transformed into Ballpark Village, a \$750-million mixed-use development. Proposed ideas for Ballpark Village include offices, residential units, a Cardinals museum, and possibly an aquarium. Full development of the entire 12-acre site is expected to be completed by 2011.⁴

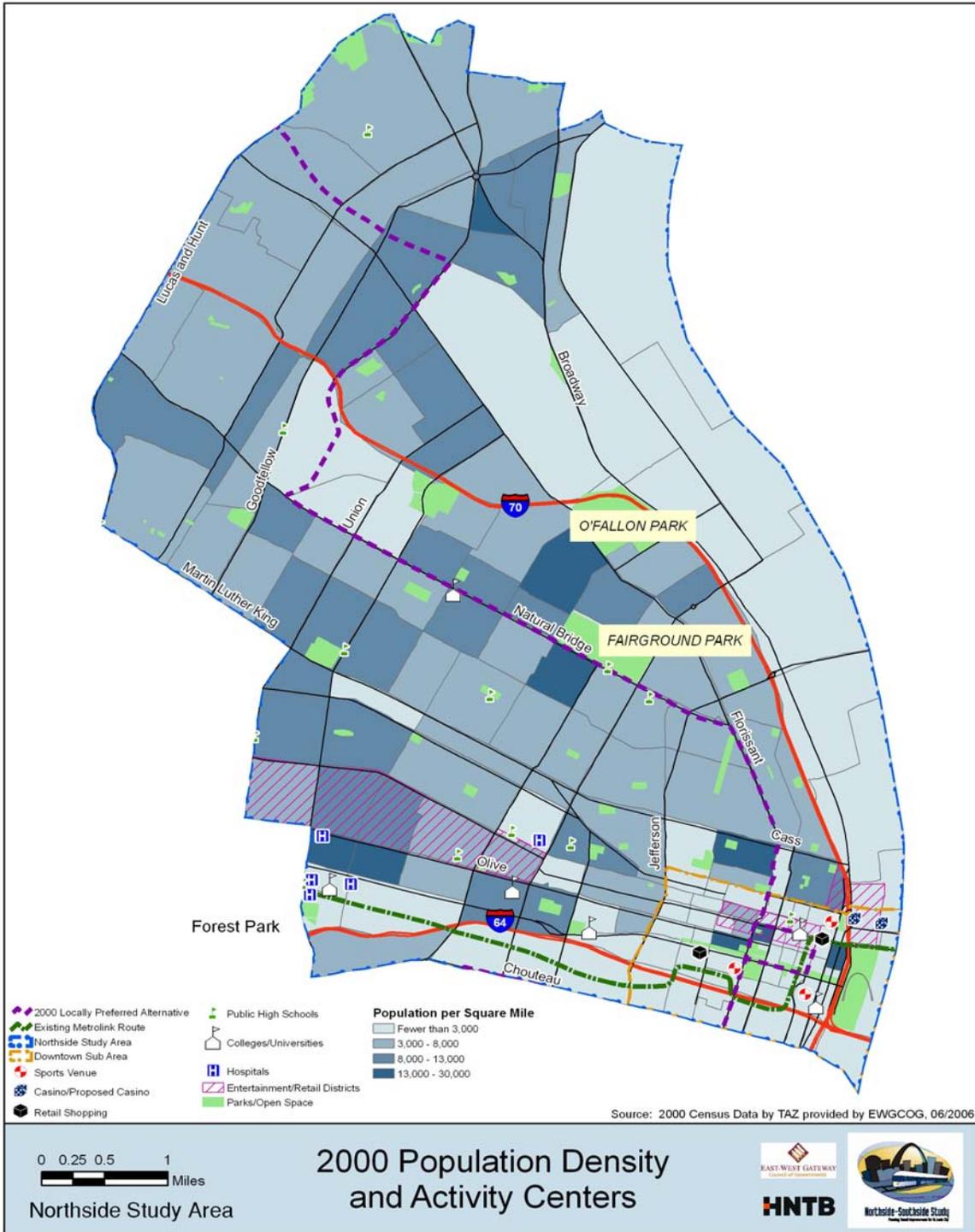
² www.stlouis.missouri.org

³ www.bottledistrict.com

⁴ <http://stlc.in.missouri.org/devprojects/>

Chapter 3.5: Activity Centers

FIGURE 3.5-1: POPULATION DENSITY AND ACTIVITY CENTERS, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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Cultural

Two dominant centers for cultural activities within the St. Louis Metropolitan Area are the Grand Center Arts and Entertainment District (which is located just to the north of St. Louis University) and Forest Park, which are described below. Prominent cemeteries and cathedrals include Bellefontaine and Calvary Cemeteries; Memorial Park Cemetery, and St. Louis Cathedral.

Grand Center Arts and Entertainment District

Grand Center is located adjacent to St. Louis University. It is a 10-square block area roughly bounded by Lindell Boulevard to the south, Vandeventer Avenue to the west, Compton Avenue to the east, and Delmar Boulevard to the north. It is home to over 30 art organizations, including the Fox Theatre, Dance St. Louis, St. Louis Symphony Orchestra at Powell Hall, St. Louis Black Repertory Company, and the Sheldon Concert Hall & Ballroom.

Forest Park

Although Forest Park only abuts the southwestern edge of the study area, it is a major attraction that influences traffic and transit travel within the corridor. It is served by the existing Forest Park Metro Station, and will also be served by the new Cross County extension. More than five million people attended the major venues located within Forest Park in 2005 (Table 3.5-2). Section 3.8 for source information.

TABLE 3.5-2: FOREST PARK ATTRACTIONS

FACILITY	2005 ATTENDANCE
St. Louis Zoo	3,025,000
St. Louis Science Center	973,000
St. Louis Art Museum	480,600
St. Louis Municipal Opera (The Muny)	422,000
Missouri History Museum	327,500
Total	5,228,100

Parks

The study areas have an established system of parks, including Forest Park (described above), municipal and county facilities, a national park, and a system of regional greenways and trails. Major parks (over 20 acres in size) are listed below, followed by a description of the Jefferson National Expansion Memorial and Gateway Mall and the regional greenway system. Many other parks are located throughout the study areas, as shown in Figures 3.5-1, 3.5-2, and 3.6-1.

- Jefferson National Expansion Memorial (94 acres)
- Forest Park (1,293 acres) (adjacent to study area)
- Fairgrounds Park (131 acres)
- O'Fallon Park (127 acres)
- Penrose Park (51 acres)
- Sherman Park (22 acres)

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Jefferson National Expansion Memorial and Gateway Mall

The Jefferson National Expansion Memorial is a 94-acre national park along the riverfront in downtown St. Louis. The park's Gateway Arch is an internationally recognized symbol of St. Louis. Two theaters and the Museum of Westward Expansion are features that attract nearly four million visitors annually. In addition, the National Park Service annually opens the park for Fair St. Louis, a three-day Independence Day celebration of national interest. The event draws between 600,000 and 800,000 people from throughout the region and beyond. The chain of parks from the Jefferson Memorial to Union Station-- between Market and Chestnut streets from Memorial Drive to 20th Street-- are known collectively as "The Gateway Mall." The Gateway Mall contains green space in the heart of downtown St. Louis and is used for rallies, concerts, award ceremonies, festivals, parades, and other special events. A map showing the location of downtown parks, including Gateway Mall, is shown in Figure 3.5-3.

Regional Greenway System

In addition to the individual parks listed above, there are many existing and proposed regional greenways and trails in the study area. The Great Rivers Greenway District (GRG) was formed in 2000 as a result of the passage of "Clean Water, Safe Parks and Community Trails Initiative (Proposition C)" in St. Louis City, St. Louis County, and St. Charles County. The GRG has led the development of 'The River Ring,' an interconnected system of greenways, parks and trails that will encircle the St. Louis region.

GRG projects within the study areas include the restoration of the Chouteau Greenway, the Confluence Greenway and Riverfront Trail, the McKinley Bridge and Branch Street Connector, and the acquisition of abandoned rail corridor from the Mississippi River into downtown St. Louis.

The **Chouteau Greenway** concept includes the preparation of a master plan of a 195-acre area south of I-64/US-40 between 7th Street and 18th Street. The plan centers on a modern re-creation of historic Chouteau's Pond. Phase III of the Chouteau Greenway development, which secured funds from the Department of Housing and Urban Development to design and engineer detailed plans for railroad coordination, land ownership, and railroad re-alignment, is currently underway.

The **Confluence Greenway** will link the confluence of the Mississippi and Missouri rivers to the riverfront in downtown St. Louis. The "Riverfront Trail" is part of the Confluence Greenway. It runs approximately eleven miles, from the Gateway Arch to Riverfront Park in North St. Louis, which is just outside the study area. Planning for extension of the trail from the Arch to Soulard is currently underway, in connection with the Downtown Riverfront Master Plan.

The **Mississippi River Trail** is part of the Millennium Trail network, a federally-designated system of trails that cross the nation. It passes through ten states, traversing over 2,000 miles between the headwaters in Minnesota down to the Gulf of Mexico. Within the study areas, portions of the trail have been completed. A signed trail begins at Biddle Street, traveling south along the river into South County.

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FIGURE 3.5-2: DOWNTOWN PARKS



Chapter 3.5: Activity Centers

3.5.2 MAJOR EMPLOYERS/EMPLOYMENT CENTERS

Major employers located within or adjacent to the study area are listed in Table 3.5-3 and shown in Figure 3.5-3.

TABLE 3.5-3: MAJOR EMPLOYERS IN NORTHSIDE STUDY AREA, 2005

COMPANY	NUMBER OF EMPLOYEES IN ST. LOUIS METRO AREA	TYPE OF BUSINESS
BJC Health Systems 444 Forest Park Avenue	21,468 (9,200 at Barnes-Jewish Hospital)	Health Care
Washington University* 1 Brookings Drive	12,324	Higher Education
United States Postal Service 1720 Market Street	11,447	Government Services
SBC Communications 1 SBC Center	9,250	Telecommunications
City of St. Louis 1200 Market Street	7,895	Government Services
St. Louis University 221 North Grand Boulevard	7,268	Higher Education
The May Department Stores Co. 611 Olive Street	6,000	Retail
A.G. Edwards & Sons Inc. 1 North Jefferson Street	5,029	Financial
U.S. Bancorp 7 th Street and Washington Avenue	3,850	Financial
Ameren Corp. 1901 Chouteau Avenue	3,831	Energy utility
Emerson* 8000 West Florissant Avenue	2,400	Electronics Manufacturing
Laclede Group 720 Olive Street	1,996	Natural Gas
Pulitzer 900 North Tucker Boulevard	1,828	Newspaper & Media
Sigma Aldrich 3050 Spruce Street	1,766	Life sciences, technology

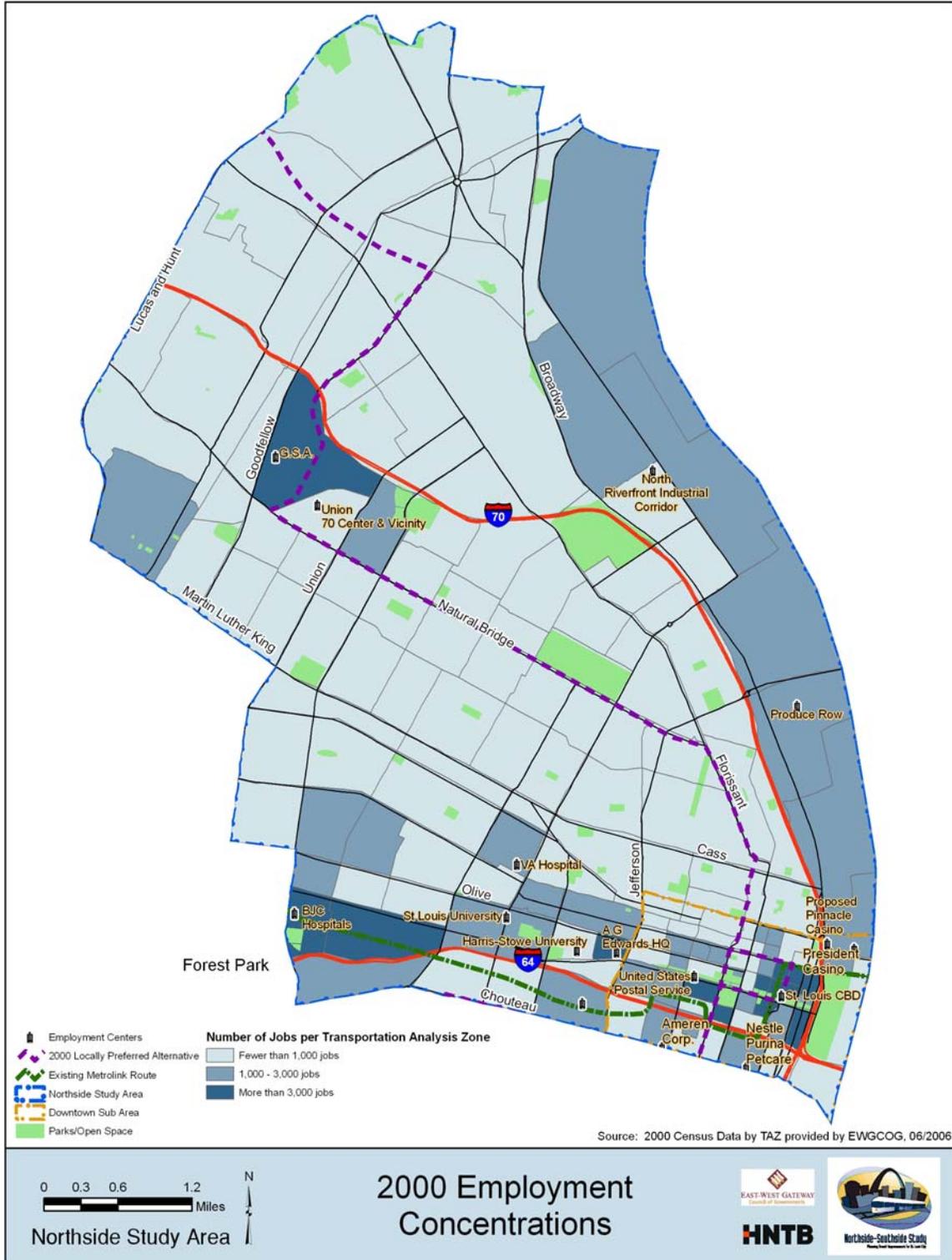
*Adjacent to study area

Source: St. Louis Business Journal, Book of Lists, 2005.

Many of these employers are located in the St. Louis CBD. Other employment centers include the Riverfront Industrial Area, Produce Row, and the Union-Seventy Business Park. Two casinos near Laclede's Landing (one existing and one under construction) will soon employ nearly 3,000 people.

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FIGURE 3.5-3: EMPLOYMENT CONCENTRATIONS, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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St. Louis Central Business District

The St. Louis CBD is located downtown, and is a major employment center of the region with over 90,000 jobs. CBD employment has been declining for the last several decades, but is projected to increase slightly by the year 2030. This could be due, in part, to the revitalization efforts that St. Louis has recently undertaken.

According to market reports published by Colliers International⁵, job loss continues to negatively affect the downtown office market. Downtown Class A occupancy (characterized by excellent location, access and professional management⁶), has declined by over one million square feet since the end of 2000, and the vacancy rate has increased from 10% to 18%. Vacancy rates were even higher in 2004 before the conversion of office space to other uses. The vacancy rate for Class B office space (characterized as having a good location, management and construction⁷) was 26%.

The inventory of downtown office buildings has decreased in recent years, as over 3.5 million square feet of office space have been converted to other uses, mostly residential. While these conversions often have a positive effect on vacancy rates, sometimes it follows the exit of significant number of employees from downtown, resulting in higher vacancy rates.

In 2004, occupied space in Class A buildings actually increased by 117,000 square feet, but then declined by 52,000 square feet in 2005. Some of this decline is attributable to job reductions by major employers, and some is due to the conversion of office space into other, non-commercial space. Class B office space recorded increases in occupied space of 126,000 square feet in 2004 and 122,000 square feet in 2005. The year-to-date net change in downtown occupied space was positive, at 69,000 square feet.

Riverfront Business Corridor Industrial Areas

The Riverfront Business Corridor extends for seven miles along the Mississippi River immediately north of the Central Business District. From downtown north to Carrie Street, the area is bounded by Interstate 70 to the west and by the Mississippi River to the east, both of which serve as important transportation routes to the area. The area contains more than 1,400 parcels of land, and approximately 300 businesses employing about 9,000 people. The Land Clearance for Redevelopment Authority (LCRA) has developed plans for new 50-70 acre business parks which will provide sites for companies displaced by the new Mississippi River Bridge, as well as business wishing to expand or locate in the Corridor.⁸

These industrial areas are among the oldest in the City and are located north of downtown St. Louis along the Mississippi River. The area is home to several large employers including Crown Cork & Seal, Dial Corporation, Kennedy Trucking, North St. Louis Plywood and Lumber, Metro Manufacturing and Company, and Browning-Ferris Industries.

Union-Seventy Center

Union Seventy Center is located near the terminus of the proposed 2000 LPA, north of Natural Bridge Avenue, south of I-70, and west of Union Boulevard. Union Seventy Center is a modern 161-acre industrial warehouse and distribution campus created by reconfiguring a former General Motors assembly plant. Today, the old GM manufacturing plant is home to numerous office and warehouse/distribution tenants, and new facilities have been constructed by Pepsi-

⁵ Colliers International, Turley Martin Tucker Commercial Real Estate Report: St. Louis, January 2006.

⁶ Urban Land Institute, Office Development Handbook, 1998.

⁷ Ibid.

⁸ <http://stlcin.missouri.org/devprojects/>

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Cola, Smurfit-Stone, Save-A-Lot and others. Approximately 1,600 people are employed in this location.

3.5.3 RETAIL SHOPPING

Union Station, located at 18th Street and Market Street, is a major retail center located within the study area. At 950,000 total square feet, it includes a hotel, restaurants, entertainment, and public space, in addition to retail.

Other shopping centers include the Northlands Shopping Center, located at the very northern end of the study area at Lucas & Hunt Road and West Florissant Avenue; City Plaza at Union Boulevard/Natural Bridge Avenue; the Central West End shopping and restaurant district along Euclid Avenue; and the Lindell Marketplace at Lindell and Sarah Avenues.

3.5.4 EDUCATIONAL INSTITUTIONS

Institutions of higher education are concentrated in the central corridor, west of downtown. The names of these institutions and enrollment are provided below. In addition to colleges and universities, there are numerous public and private elementary and high schools.

Colleges and Universities

St. Louis University
Harris-Stowe State College
Washington University Medical School
St. Louis College of Pharmacy

High Schools

Vashon
Beaumont
Sumner
Soldan International Studies
Visual & Performing Arts
Miller Career Academy
Rosati-Kain
Cardinal Ritter College Prep
Lutheran North

3.5.5 HOSPITALS

There are a number of hospitals located in or adjacent to the study areas. The largest of these hospitals is Barnes-Jewish Hospital, located just east of Forest Park. Barnes-Jewish Hospital at Washington University Medical Center is the largest hospital in Missouri and the largest private employer in the St. Louis region. The hospital has 962 beds and employs over 9,200 people.⁹

St. Louis Children's Hospital is located adjacent to Barnes-Jewish Hospital and is also affiliated with the Washington University School of Medicine. The hospital provides a full range of pediatric services to the St. Louis metropolitan area and a primary service region covering six states. The hospital has 250 beds and employs 2,000 people.¹⁰

Just southwest of the Northside study area, at Hampton Avenue and I-64, is Forest Park Hospital. This hospital has 450 beds and employs over 1,000 people. Located on the hospital campus are the Deaconess College of Nursing, a physicians' medical office center, and the

⁹ <http://www.barnesjewish.org/>

¹⁰ <http://www.stlouischildrens.org/>

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Centennial Pavilion, which provides some of the college's classrooms, an event center, and other facilities.¹¹

The U.S. Veterans Medical Center, John Cochran Division, is located on Grand Boulevard, north of Delmar Boulevard. This hospital provides all types of medical services to U.S. veterans. The medical center has 116 beds and over 1,200 employees.

3.5.6 CONCLUSION

The location and nature of major activity and employment centers is essential to determine travel patterns and the potential for transit demand. They are the major destination points that people access for work, pleasure, shopping, or necessary services. Most are clustered downtown or in the central corridor, but there are pockets of activity near Fairgrounds Park and along Natural Bridge Avenue.

The CBD continues to be a major employment center in the region, providing over 90,000 jobs, although it has suffered from job loss as employers relocate to suburban areas. This trend may be beginning to show signs of reversal, as 2030 employment projections indicate that downtown will have a slight gain in employment. Other major employment centers are located in the central corridor at Barnes-Jewish Hospital and St. Louis University; in the industrial areas along the Mississippi River; and at the Union Seventy Center near I-70.

¹¹ <http://www.forestparkhospital.com/>

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Chapter 3.6: Environmental Considerations

This section describes the types of environmental concerns that may be encountered within the study area. This level of analysis will identify environmental constraints within the study area. A greater depth of environmental analysis is presented in Chapter 7 of this document, as the detailed alternatives are assessed. The sources of information for this section are general data readily available to the public.

3.6.1 WATER RESOURCES, FLOODPLAINS AND WETLANDS

The Northside study area, including downtown, is located within the Cahokia-Joachim watershed of the Mississippi River. The major water body is the Mississippi River, extending along the entire length of the eastern boundary and beyond. None of the tributaries of the Mississippi River are located within the study area.

One-hundred-year and 500-year floodplains are identified in Figure 3.6-1. The Federal Emergency Management Agency (FEMA) requires each community to designate floodplains to avoid the possibility of significantly increasing upstream flood elevations. Federal regulations require that facilities constructed within the 100-year floodplain not increase flood levels by more than one foot.

According to the National Wetland Inventory Maps (NWI), 90 acres of wetlands are scattered throughout the study area, as shown in Figure 3.6-2. Most are located near the Mississippi River or are ponds in parks or cemeteries. The NWI maps identify the wetlands as palustrine, which are associated with ponds (less than 20 acres), marshes, depressions and other areas which hold or trap water or have a high water table.

The different types of palustrine systems found within the study areas include forested wetlands, scrub shrub wetlands, emergent wetlands, and unconsolidated bottom. Some forested and scrub shrub wetlands are located in the northeast portion of the Northside study area, near the Mississippi River.

The U.S. Army Corps of Engineers (USACE) and the Natural Resource Conservation Service (NRCS) make determinations as to whether a potential wetland is a jurisdictional, or federally-regulated, wetland. The USACE regulates impacts to jurisdictional wetlands under Section 404 of the Clean Water Act (CWA). The Missouri Department of Natural Resources regulates impacts to isolated wetlands, or those not hydrologically connected to waters of the United States. No jurisdictional determinations have been made at this time.

In addition to the requirements of the CWA, the USACE must also comply with other federal laws in the evaluation of an application. These include the following:

- The Fish and Wildlife Coordination Act requires federal agencies to coordinate with the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) and the appropriate state wildlife resource agencies.

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- The Endangered Species Act requires federal agencies to coordinate with the USFWS or NMFS to insure that the federal action does not jeopardize any threatened or endangered species.
- The National Historic Preservation Act of 1966 requires coordination with the State Historic Preservation Office regarding eligible resources for listing on the National Register of Historic Places.
- Section 401 of the Clean Water Act requires a state certification of water quality.

Most of the identified potential wetlands are located within parks or cemeteries or near the Mississippi River. Impacts to these potentially jurisdictional wetlands are not anticipated. Similarly, impacts to waterways are not expected. They will be considered during the development of alternatives, where necessary.

Chapter 3.6: Environmental Considerations

FIGURE 3.6-1: POTENTIAL ENVIRONMENTAL CONCERNS



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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3.6.2 HAZARDOUS MATERIALS AND WASTE

A review of the Missouri Department of Natural Resources' database was conducted to identify properties containing hazardous materials, hazardous waste, and solid waste. The database identified 33 properties containing hazardous materials, with clusters located in the northwestern section of the Northside study area near Union-Seventy Center, between Union and Goodfellow Boulevards; in the northeastern section between Broadway Avenue and the Mississippi River (Riverfront Industrial Area); and at the southern end in Mill Creek Valley (Figure 3.6-2). According to the MoDNR website, there are 14 sites or properties in the study areas that are enrolled in a Brownfields/Voluntary cleanup program. Eleven sites are listed as remediation sites, two sites are presently under further investigation status and exhibit some level of contamination, and one property does not exhibit contamination above standard criteria or has been remediated to acceptable standards. It is important to note that the database review does not represent a Phase I – Environmental Assessment; therefore, the status or level of risk associated with each of these sites is unknown at this time.

During the evaluation of detailed alternatives, additional investigations will be undertaken along proposed alignments and station locations. This will include site reconnaissance to identify properties with potential hazardous material concerns and searching federal and state environmental databases to better ascertain potential risks. The size of the sites will also be included in the site summary.

3.6.3 THREATENED AND ENDANGERED SPECIES

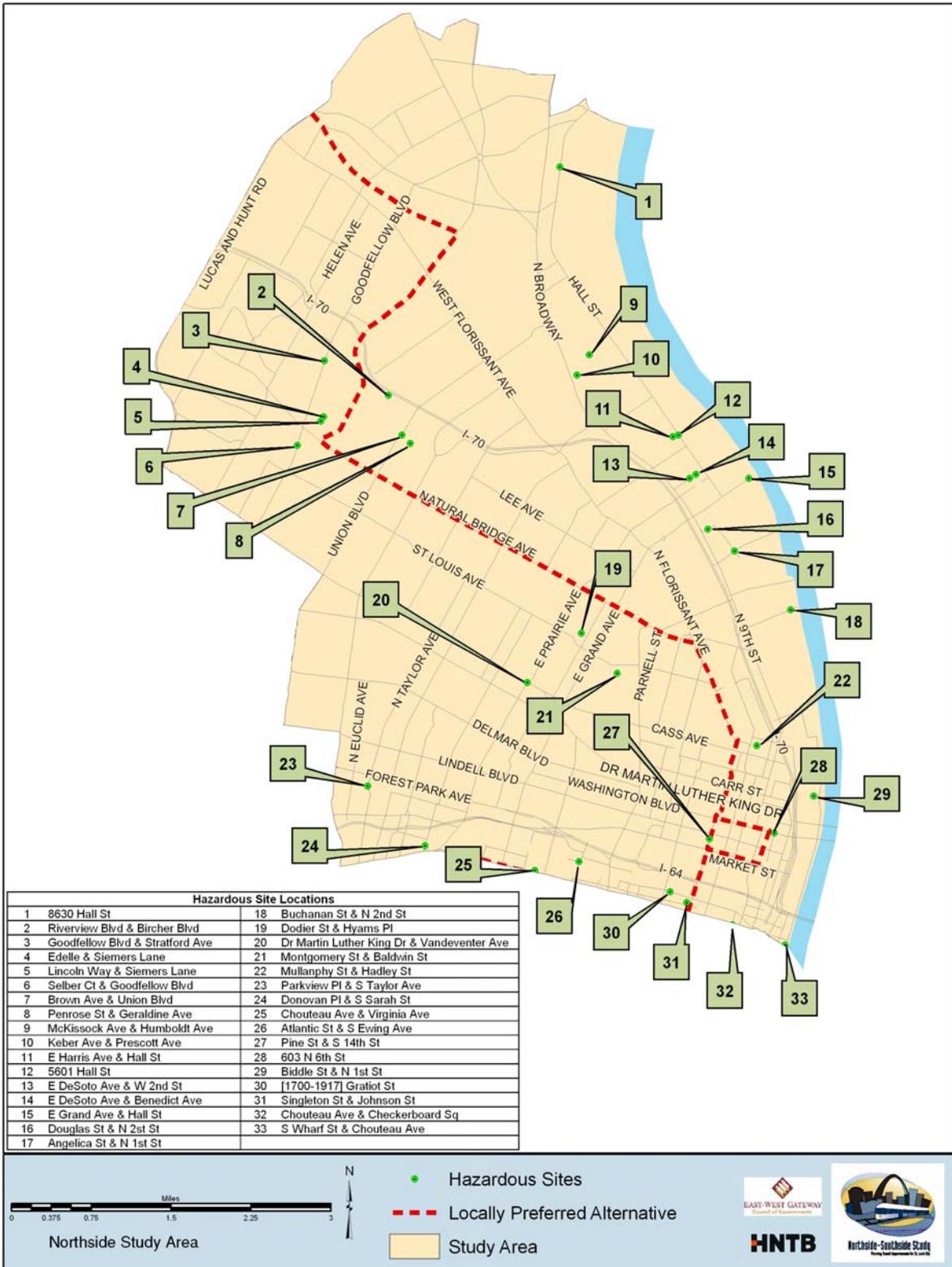
Natural heritage resources are defined as the habitat of rare, threatened or endangered species, unique or exemplary natural communities and significant geologic formations. Avoiding the disturbance of threatened or endangered species and natural areas is necessary in the development of transportation improvements.

According to the Missouri Natural Heritage Database, only one species, the Peregrine Falcon, is listed as state-endangered in the City of St. Louis. While they normally nest atop tall buildings, they are known to occasionally nest on bridges.¹ Only an on-site inspection can verify the absence or existence of this species. No protected federal species or natural heritage sites have been identified within the study area.

¹ According to conversation with Mr. Mike Arduser, Missouri Department of Conservation, on 1/24/06.

Chapter 3.6: Environmental Considerations

FIGURE 3.6-2: HAZARDOUS MATERIALS SITES



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NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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3.6.4 AIR QUALITY

The Federal Clean Air Act Amendments (CAAA) of 1970 required the adoption of air quality standards. These were established to protect public health, safety and welfare from known or anticipated effects of sulfur dioxide (SO₂), particulates (PM₁₀, 10 microns and smaller; PM_{2.5}, 2.5 microns and smaller), carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), and lead (Pb). In addition to these pollutants, the State of Missouri has established additional criteria for hydrogen sulfide (H₂S) and sulfuric acid (H₂SO₄). The Missouri and National Ambient Air Quality Standards (NAAQS) for these pollutants are listed in Table 3.6-1.

The primary pollutants from transportation sources are unburned hydrocarbons, NO_x, CO, and particulates. Hydrocarbons (HC) and Nitrogen oxides (NO_x) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO₂. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. These pollutants are therefore regional issues rather than localized issues.

Carbon monoxide is a colorless and odorless gas, which is the product of incomplete combustion, and is the major pollutant from gasoline fueled motor vehicles. CO is a localized air quality issue.

Particulate matter includes both airborne solid particles and liquid droplets. These liquid particles occur in a wide range of sizes. PM₁₀ particulates are coarse particles, such as windblown dust from fields and unpaved roads. PM_{2.5} particulates are fine particles generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. The U.S. Environmental Protection Agency (USEPA) has recently determined that these may be local as well as regional issues, especially if a significant amount of diesel emissions are expected from a project. Such projects may require further analysis to determine if air quality standards are violated.

The CAAA of 1977 required all states to submit to the USEPA a list identifying those air quality control regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions that are shown, by monitored data or air quality modeling, to exceed the NAAQS for any criteria pollutant are designated "non-attainment" areas for that pollutant.

The 1990 CAAA established procedures for determining the conformity of state implementation plans with the requirements of the federal regulations. These procedures are published in 40 CFR Parts 51 and 93.

The study area is located within the Metropolitan St. Louis Interstate Air Quality Control Region (AQCR #070), which is currently in attainment of the standards for six of the eight criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, sulfuric acid, and lead. St. Louis is classified as being in moderate non-attainment for the 8-hour ozone standard and non-attainment for the PM-2.5 standard.

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TABLE 3.6-1: MISSOURI AND NATIONAL AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING TIME	STANDARD VALUE	STANDARD TYPE
Ozone (O₃)	Eight Hour ⁽¹⁾	0.08 ppm (157 µg/m ³)	Primary, Secondary
Carbon Monoxide (CO)	One Hour ⁽²⁾	9 ppm (10 mg/m ³)	Primary
	Eight Hour ⁽²⁾	35 ppm (40 mg/m ³)	Primary
Nitrogen Dioxide (NO₂)	Annual Arithmetic Mean	0.053 ppm (100 µg/m ³)	Primary, Secondary
Particulate (PM₁₀)	Annual Arithmetic Mean	50 µg/m ³	Primary, Secondary
	24-hour average	150 µg/m ³	Primary, Secondary
Particulate (PM_{2.5})	Annual Arithmetic Mean	15 µg/m ³	Primary, Secondary
	24-hour average ⁽³⁾	65 µg/m ³	Primary, Secondary
Lead (Pb)	Quarterly average	1.5 µg/m ³	Primary, Secondary
Sulfur Dioxide (SO₂)	Annual Arithmetic Mean	0.03 ppm (80 µg/m ³)	Primary Primary Secondary
	24-hour average ⁽²⁾	0.14 ppm (365 µg/m ³)	
	3-hour average ⁽²⁾	0.50 ppm (1300 µg/m ³)	
Hydrogen Sulfide (H₂S)⁽⁴⁾	One-half Hour ⁽⁵⁾	70 µg/m ³ (0.05 ppm)	
	One-half Hour ⁽⁶⁾	42 µg/m ³ (0.03 ppm)	
Sulfuric Acid (H₂SO₄)⁽⁴⁾	Twenty-four Hour ⁽⁷⁾	10 µg/m ³	
	One Hour ⁽⁸⁾	30 µg/m ³	

Source: Code of Federal Regulations; Title 40 Part 50: Revised July 2004 and Missouri 10 CSR 10 – 6.010 Ambient Air Quality Standards

- (1) The 8-hour primary and secondary standards are met when the 3-year average of the 4th highest average concentration is less than or equal to 0.085 ppm.
- (2) Not to be exceeded more than once per year.
- (3) Statistically estimated number of days with exceedances is not to be more than 1 per year.
- (4) Missouri Air Quality Standards.
- (5) Not to be exceeded more than twice per year.
- (6) Not to be exceeded more than twice in any five consecutive days.
- (7) Not to be exceeded more than once in any ninety consecutive days.
- (8) Not to be exceeded more than once in any two consecutive days.

ppm – parts per million parts of air (by volume) at 25°C

µg/m³ – micrograms of pollutant per cubic meter of air

mg/m³ – milligrams of pollutant per cubic meter of air

Legacy 2030: The Transportation Plan for the Gateway Region, was prepared by EWGCOG in March 2005. The “Northside LRT” is included as an “illustrative project” in this plan. Based on the conformity analysis conducted as part of the long-range plan development, the projects and programs included in *Legacy 2030* are found to be in conformity with the requirements of the CAAA of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93, and the Missouri State Conformity Regulations 10 CSR 10-5.480.

In addition, states that have non-attainment areas are required to prepare State Implementation Plans (SIP) that lay out a strategy on how the state will improve the air quality to attain the NAAQS. Transit projects, both new and improvement projects, must be contained in the area’s Transportation Improvement Program (TIP). The modeling procedures for ozone and particulate matter require long-term meteorological data and detailed area wide emission rates for all existing and potential sources. This modeling is performed by the Metropolitan Planning Organization (MPO) for the region to show that regional emissions plus projects in the TIP are in conformance with the SIP and the CAA amendments. EWGCOG, as the MPO for this region,

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performs regional modeling analysis. Once the detailed alternatives have been established and the regional traffic network has been modified based upon the detailed alternatives, EWGCOG may include the project in a future TIP. Once EWGCOG has completed their analysis, it is forwarded to the EPA for final ruling on the TIP’s conformance with the SIP and the CAA and its amendments. Without a conformity determination, the project cannot be implemented.

3.6.5 NOISE

In accordance with FTA guidelines, consideration must be given to minimizing the noise impact of a transportation project. FTA criteria for whether the increase in noise levels is objectionable depends on the level of projected transit noise as compared to existing noise levels, and on the noise sensitivity of the land uses near the project site. FTA has established three land use categories, identified as Category 1, 2, and 3, as described in Table 3.6-2.

TABLE 3.6-2: LAND USE CATEGORIES AND METRICS FOR TRANSIT NOISE IMPACT CRITERIA

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq}(h)^*$	Tracts of land where quiet is an essential element in the intended purpose, e.g., outdoor amphitheaters, concert pavilions, and National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and building where people normally sleep, e.g. homes, hospitals, and hotels.
3	Outdoor $L_{eq}(h)^*$	Institutional land uses with primarily daytime and evening use, e.g., schools, libraries, churches, buildings with medical offices, conference rooms, recording studios, concert halls, meditation areas, certain historical sites, parks and recreation facilities.

* L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: Transit Noise and Vibration Impact Assessment, Harris Miller Miller & Hanson, Inc., Federal Transit Administration, DOT-T-95-16, April 1995.

The mixture of land uses in the study areas is typical of those commonly found in urban areas. There are two interstates that transverse the area, I-64 and I-70, as well as numerous freight railroad tracks and an existing MetroLink light rail transit line. The Northside is primarily residential with scattered commercial, industrial, and recreational land uses. Downtown has mostly office and commercial uses, with some residential.

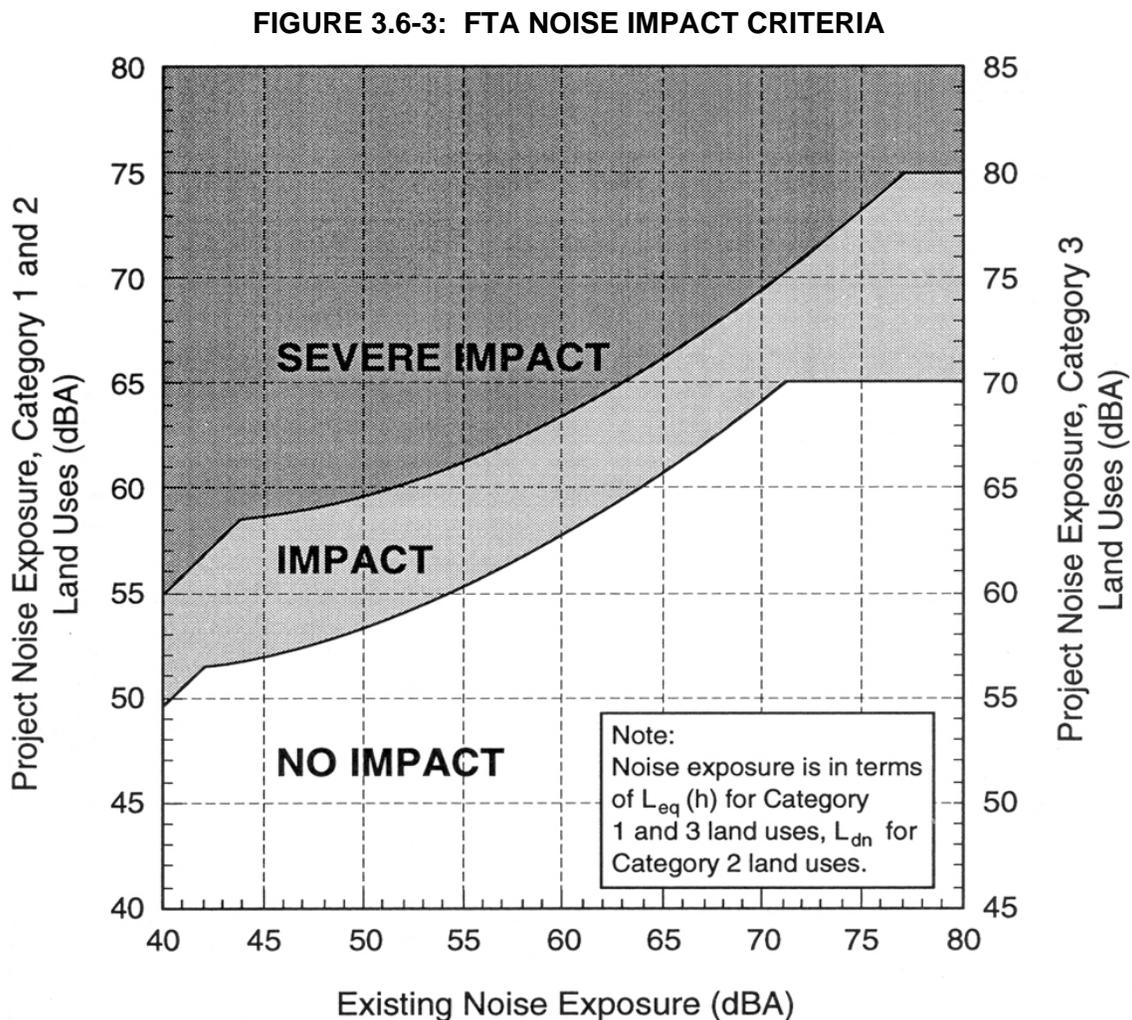
Existing noise levels were developed according to the FTA’s procedures for estimating the existing L_{dn} noise exposure based upon the population density (people per square mile) and the distance from major noise sources (feet). Within the study area, the population density ranges from 1,800 to 15,000 people per square mile. The L_{dn} in such areas typically ranges from 50 – 60 dBA.

In the areas adjacent to railroads, noise levels are in the range of 45 – 75 dBA depending on the distance to the railroad tracks. In the areas where an interstate is present, noise would range from 50 – 75 dBA based upon the distance to the highway. In the vicinity of other roadways, noise would range from 50 – 70 dBA depending on the distance to the roadways.

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For the study areas, the noise level in residential areas not adjacent to a major thoroughfare is generally in the low 50 dBA range. Noise levels for residences and office buildings along major roadways are in the 60 to 70 dBA range.

The FTA's noise impact criteria are based on a comparison of existing and future outdoor noise levels. The criteria were developed to address potential annoyance in an urban environment using either L_{eq} or L_{dn} as the noise descriptor. Noise mitigation is to be considered when measures are necessary to mitigate adverse impacts. A graphical representation of the FTA criteria is presented in Figure 3.6-3. Land use categories 1 and 2 are on the left Y axis and Category 3 is on the right Y axis. Once the detailed alternatives are defined, a general noise assessment will be performed according to FTA procedures to identify potential impacts and possible mitigation measures.



Source: Transit Noise and Vibration Impact Assessment, Harris Miller Miller & Hanson, Inc., Federal Transit Administration, DOT-T-95-16, April 1995.

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3.6.6 VIBRATION

FTA guidelines require that potential vibration impacts be identified and that mitigation of these impacts be considered. Ground-borne vibration and noise are not every day experiences to most people. Smooth roadways create hardly any noticeable vibration velocity levels. Most perceptible indoor vibration velocity levels are created by normal human activities in the building. Construction activities, rough roads, and passenger and freight trains are the source of most perceptible outdoor ground-borne vibration velocity levels. Typical background vibration velocity levels in residential neighborhoods are usually 50 VdB or lower. The human threshold is 65 VdB².

Ground-borne vibration and noise are caused by vibration originating at the wheel/rail interface and propagating from the track bed through the intervening soil and rock to nearby buildings. The resulting vibration may be perceptible as mechanical motion (ground-borne vibration), and the acoustic radiation by the building components may cause an audible low frequency rumble (ground-borne noise).

Airborne noise from transit systems on at-grade or aerial structures generally overpowers the ground-borne noise and vibration. However, the impacts of ground-borne noise and vibration cannot be ignored.

Ground-borne vibration can be described in terms of the displacement, velocity or acceleration of a vibrating surface. The peak velocity of a vibration is used to assess building damage. However, it is not appropriate for human response to vibration. One single number descriptor, VdB, is used to assess transit vibration. Vibration velocity in decibels is the ratio of the root mean square (rms) velocity amplitude to the reference velocity amplitude. All the vibration levels in this section will be referenced to 1×10^{-6} in./sec.

Ground-borne noise is the rumbling sound created by the vibration of a room's surfaces. The descriptor used is the A-weighted sound level, dBA. Ground-borne noise from rail facilities has a significant low frequency component. Therefore, the rumbling noise created by ground-borne noise sounds louder than broadband noise with the same dBA level. The FTA criteria for ground-borne vibration and noise² are presented in Table 3.6-3.

² High-Speed Ground Transportation Noise and Vibration Impact Assessment, Harris Miller Miller & Hanson, Inc., U.S. Department of Transportation Federal Railroad Administration, Office of Railroad Development, Washington, D.C., DTFR53-94-A-00056, December 1998.

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TABLE 3.6-3: GROUND-BORNE VIBRATION AND NOISE IMPACT CRITERIA

Land Use Category	Ground-Borne Vibration Impact Levels		Ground-Borne Noise Impact Levels	
	(VdB re 1 micro inch/sec)		(dB re 20 micro Pascals)	
	Frequent Events ¹	Infrequent Events ²	Frequent Events ¹	Infrequent Events ²
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB	65 VdB	4	4
Category 2: Residences and buildings where people normally sleep.	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	83 VdB	40 dBA	48 dBA

Notes:

1. "Frequent Events" is defined as more than 70 vibration events per day.
2. "Infrequent Events" is defined as fewer than 70 vibration events per day.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.

Source: FTA, April 1995.

The FTA's ground-borne vibration impact criteria are based on land use and train frequency as shown in Table 3.6-3. There are some buildings, such as concert halls and theaters, which can be very sensitive to vibration but do not fit into any of the three categories, and therefore usually warrant special attention during the evaluation of a project. The impact criteria for such buildings are listed in Table 3.6-4.

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TABLE 3.6-4: GROUND-BORNE VIBRATION AND NOISE IMPACT CRITERIA FOR SPECIAL BUILDINGS

Type of Building or Room	Ground-Borne Vibration Impact Levels		Ground-Borne Noise Impact Levels	
	(VdB re 1 micro inch/sec)		(dB re 20 micro Pascals)	
	Frequent Events ¹	Infrequent Events ²	Frequent Events ¹	Infrequent Events ²
Concert Halls, TV studios, recording studios	65 VdB	65 VdB	25 dBA	25 dBA
Auditoriums	72 VdB	80 VdB	30 dBA	38 dBA
Theaters	72VdB	80VdB	35 dBA	43 dBA

Notes:

1. “Frequent Events” is defined as more than 70 vibration events per day.
2. “Infrequent Events” is defined as fewer than 70 vibration events per day.
3. If the building will rarely be occupied when the trains are operating, there is no need to consider impact.

Source: FTA, April 1995.

Existing vibration levels in the study area were developed based upon information presented in FTA’s General Transit Noise and Vibration Assessment manual³. In the areas adjacent to railroads, existing vibration levels are typically in the range of 80 – 90 VdB range at 50 feet. In the areas where an interstate or major thoroughfare is present, existing vibration levels adjacent to smooth pavement would range from 60 – 65 VdB at 50 feet. These levels would increase to 70 – 75 VdB in the presence of irregular pavement.

Existing vibration levels in residential areas not adjacent to a major thoroughfare would be in the low 50 VdB range adjacent to very smooth pavement and 55 – 60 VdB at 50 feet adjacent to irregular pavement.

Once the detailed alternatives are defined, a vibration analysis using the FTA general assessment procedure will be completed. This analysis will use the known input force characteristics of the St. Louis Metro LRT vehicle, and general information regarding the propagation characteristics of ground in the project area to develop a vibration impact contour in order to determine potential impacts of the various alternatives. If necessary, potential mitigation options would also be discussed.

3.6.7 GEOLOGY AND LANDFORM

The study area consists of mostly urban-developed flat land, with some gently rolling hills. Soils are identified as mostly Urban Land Complex or Urban Land Harvester Complex, with some exceptions. The Harvester soil series consists of very deep, moderately well drained soils formed in less than 40 inches of disturbed material over truncated loess soils. Permeability is moderately slow. These upland soils have slopes up to 20%.

³ Transit Noise and Vibration Impact Assessment, Harris Miller Miller & Hanson, Inc., Federal Transit Administration, DOT-T-95-16, April 1995.

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In the northern section of the study area, the soil is characterized as Fishpot-Urban Land Complex. This series consists of very deep, somewhat poorly drained soils formed in silty and loamy material that has been disturbed to a depth greater than thirty inches over alluvial or terrace soils. Permeability is moderately low. Slope gradients range from 0 to 5%.

In the northeastern section of the study area, near the Mississippi River, the soil is classified as Blake-Eudora-Waldron Complex. The Blake series consists of very deep, somewhat poorly drained soils on floodplains. These soils formed in recently deposited calcareous, silty alluvium. Permeability is moderate in the upper part and moderate or moderately rapid in the lower part. Slopes range from 0 to 2%.

Near Natural Bridge Avenue, the soil is Urban Land Upland and Nevin-Urban Land Complex. The Nevin series consists of very deep, somewhat poorly drained soils that formed in silty alluvium. Nevin soils are on low stream terraces or second bottoms, and slopes range from 0 to 5%.

Most of the City is built upon sandstone and limestone. Limestone formations generally extend from the Mississippi River bluffs west to Kingshighway Boulevard. In the majority of the study area, the geologic formation consists of Paleozoic Era-Mississippian System-Meramecian Series Limestone. West of Union Boulevard, the geology consists of Paleozoic Era-Pennsylvanian System-Desmoinesian Series Limestone.

Because limestone is permeable and susceptible to dissolution when weathered by water, much of the topography in the area is karst. Karst topography is characterized by the presence of caves, springs, sinkholes and losing streams, created as groundwater dissolves the soluble rock.

Sinkholes are depressed areas usually formed by the weathering of surficial bedrock or collapse of underlying caves. Sinkholes are places where there is rapid recharge (replenishing) of groundwater from the surface and, therefore, are areas of potential groundwater contamination. For this reason, managing surface water and waste disposal in sinkhole-prone areas are important to maintaining good groundwater quality.⁴ There are numerous sinkholes in the study area (as shown in Figure 3.6-1), and many near Natural Bridge Avenue.

The karst topography and sinkholes must be considered in the development and evaluation of alignment and station location alternatives. Building on karst topography can have environmental as well as construction consequences, all of which must be considered. Additionally, future phases of the study will need to consider the management of stormwater runoff in order to maintain groundwater quality and minimize the risk of contamination.

3.6.8 HISTORICAL/CULTURAL AND ARCHAEOLOGICAL

There are many statutes that govern the preservation of historic, cultural, and archaeological resources. Section 106 of the National Historic Preservation Act of 1966 requires that a federal agency consider the effect of a federally-assisted project on any district, site, building, structure or object listed on, in, or eligible for the National Register of Historic Places. The Criteria of Effect and Adverse Effect were established in 36 CFR 800.9. In Missouri, the Missouri

⁴ http://www.dnr.mo.gov/geology/geosrv/gdam/sinkhole_formation.htm

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Department of Natural Resources, State Historic Preservation Office is responsible for administering the Section 106 process.

An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling or association. Adverse effects on historic properties include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property.
- Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualifications for the National Register.
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.
- Neglect of a property resulting in its deterioration or destruction.
- Transfer, lease, or sale of the property.

Section 4(f) of the Department of Transportation Act of 1966 requires that no federally-assisted transportation program or project use land from a significant publicly owned public park, recreation area or wildlife and waterfowl refuge, or any significant historic site, unless a determination is made that (1) there is no feasible and prudent alternative to using that land, and (2) such program or project includes all possible planning to minimize harm to the property resulting from such use.

The St. Louis area is rich in history, dating back as far as 700 A.D., when Indians of the Late Woodland culture began living in villages in what is now the St. Louis area. Several Indian burial mounds were located all over the City, giving the City its popular name, "Mound City." One of the most prominent was located at the northeast corner of Broadway and Mound Street. Big Mound, as it is known, was the largest of about a dozen mounds in a riverfront area extending southward to Biddle Street.⁵ According to the State Historic Preservation Office, remnants of mounds may still exist, and the potential for historic and archaeological resources cannot be discounted.

There are also numerous historic buildings located in the City, many of which are being rehabilitated under the Missouri Historic Tax Credit program. Within the study areas, there are 20 historic districts, 116 historic buildings, and five historic structures currently listed on the NRHP⁶ (Figure 3.6-6 and Table 3.6-5). In addition, the City of St. Louis has designated six Certified Local Historic Districts, one local historic district (The Ville), and numerous city landmarks. Many are located downtown, with other clusters in The Ville and in the central corridor.

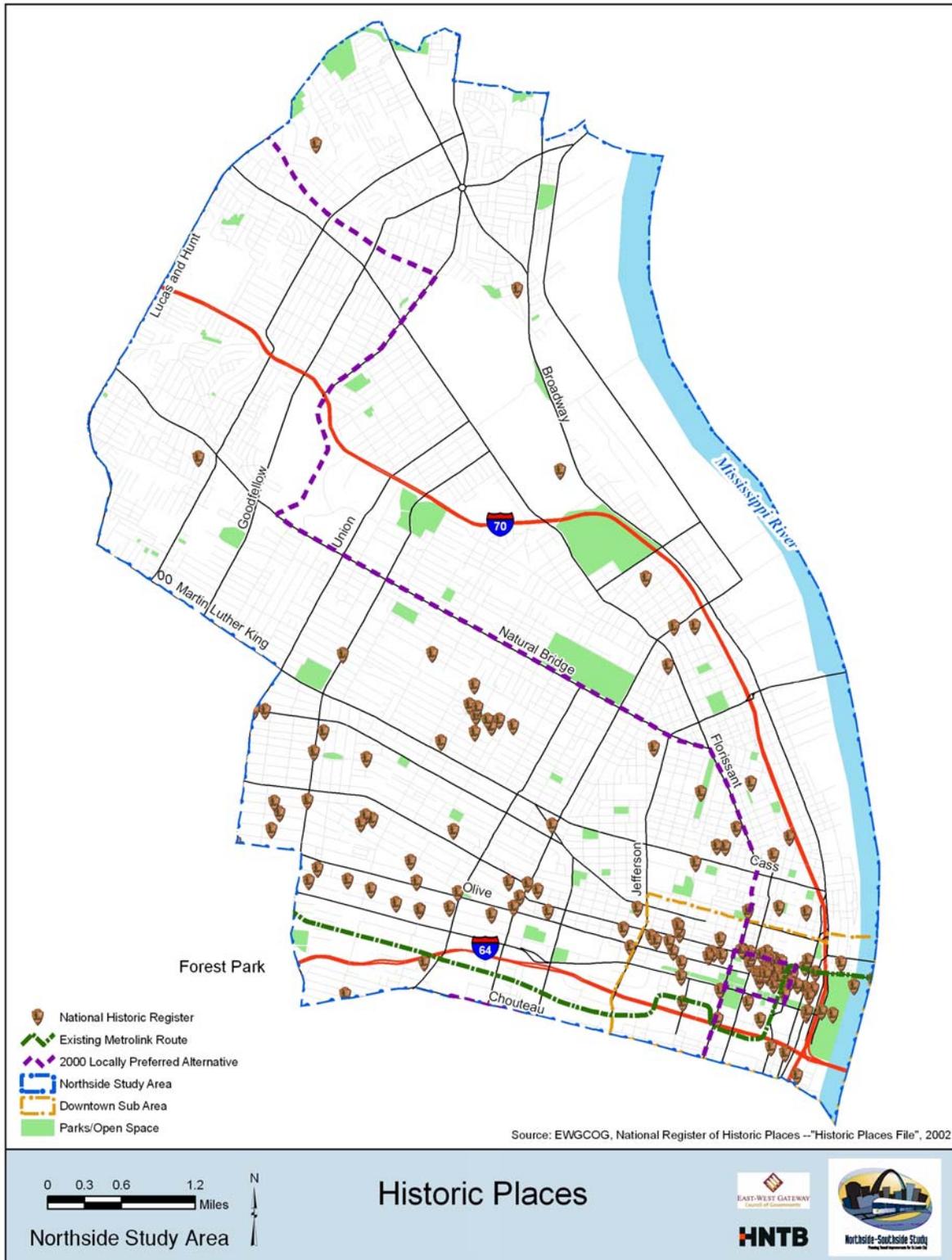
Coordination with the State Historic Preservation Office will take place in future phases of the study to more precisely determine potential impacts to historic, cultural, and archaeological resources. In the event a property determined to be eligible for the National Register of Historic Places is affected by the proposed alternatives, a 4(f) evaluation will be required.

⁵ "History of St. Louis Neighborhoods: Old St. Louis." City of St. Louis. www.stlouis.missouri.org

⁶ National Register of Historic Places (NRHP) point file (8/6/02M); provided by East West Gateway Council of Governments, 2005.

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FIGURE 3.6- 4: HISTORIC PLACES



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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TABLE 3.6-5: HISTORIC REGISTER SITES & DISTRICTS, NORTHSIDE

NAME	ADDRESS
1907 Dorris Motor Car Company Building	4063-65 Forest Park Avenue.
A. D. Brown Building	1136 Washington Street
Advertising Building	1627-29 Locust Street
Ambassador Theater Building	411 N 7th Street
American Theater	416 N 9th Street.
American Zinc, Lead and Smelting Company Building	20 S Fourth Street
Antioch Baptist Church	4213 N Market Street
Aubert Place	Fountain Avenue between Walton Avenue and Kingshighway Boulevard
Balmer & Weber Music House Co. Building	1004 Olive Street.
Beaumont Medical Building	3714-26 Washington Avenue.
Beethoven Conservatory	2301 Locust Street
Bell Telephone Building	920 Olive Street
Bissell Street Water Tower	Bissell Street at Blair Avenue
Blackwell-Wielandy Building	1601-09 Locust Street
Blind Girl's Home	5235 Page Boulevard
Block Unit #1 Historic District	4100-4191 Enright Avenue
Boatman's Bank Building	300 N Broadway Street
Building at 1300 Washington Avenue	1300-1310 Washington Avenue
Butler House	4484 West Pine Boulevard
Carr School	1419 Carr Street.
Centenary Methodist Episcopal Church, South	55 Plaza Square
Charles Sumner High School	4248 W Cottage Avenue
Charles Turner Open Air School	4235 W Kennerly Avenue
Chemical Building	721 Olive Street
Chouteau Apartments/Parkway Dwellings	4937-43 Laclede Avenue
Christ Church Cathedral	1210 Locust Street
City Club Building	1012-1024 Locust Street
Clemens House-Columbia Brewery District	Bounded roughly by Maiden Lane, Cass Avenue, 21 st Street, Helen Street, and Howard Street
Cupples Warehouse District	Bounded roughly by Spruce and Clark Streets, between 7th and 11th Streets
Delaney Building	1000-1006 Locust Street
DePaul Hospital	2415 N Kingshighway Boulevard
Dorris Motor Car Company Building	4100 Laclede Avenue
Eastman Kodak Building	1009 Olive Street
Eliot School	4242 Grove Street
Emerson Electric Company Building	2012-2018 Washington Avenue
Eugene Field House	634 S Broadway Street
Fashion Square Building	1307 Washington Avenue
Forest Park Hotel	4910 West Pine Boulevard
Forest Park Southeast Historic District	Bounded by I-44, Kingshighway Boulevard, I-64 and Vandeventer Avenue
Fox Theater	527 N Grand Boulevard
Frank P. Blair School	2707 Rauscherbach Street
Frisco Building	906 Olive Street

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NAME	ADDRESS
Fullerton's Westminster Place	Westminster Place
Fulton Bag Company Building	612-618 S 7th Street
Gateway Arch	Mississippi River at Market Street
Grand Avenue Water Tower (#1)	Grand Avenue at 20th Street
Hadley-Dean Glass Company	701-705 N 11th Street
Hamilton-Brown Shoe Factory	2031 Olive Street
Hargadine-McKittrick Dry Goods Building	911 Washington Avenue
Holy Corners Historic District	Both sides of Kingshighway Boulevard, between and including Westminster Place and Washington Avenue
Holy Cross Parish District	8115 Church Road
Homer G. Phillips Hospital	2601 Whittier Street
Hotel Statler	822 Washington Avenue
International Fur Exchange Building	2-14 S 4th Street
J. Kennard and Sons Carpet Company Building	400 Washington Avenue
J.C. Penney Co. Warehouse Building	400 S 14th Street
Jackson School	1632 Hogan Street
Jefferson National Expansion Memorial NHS	Mississippi River between Washington Avenue & Poplar Street
Joseph Erlanger House	5127 Waterman Boulevard
Kate Chopin House	4232 McPherson Avenue
Kiel Opera House	1400 Market Street
Kulage House	1904 College Avenue
Laclede Building	408 Olive Street
Laclede's Landing	Bounded roughly by Washington Avenue, N. 3 rd Street, Dr. Martin Luther King Drive, and the Mississippi River
Lambert Building	2101-07 Locust Street
Lambert-Deacon-Hull Printing Co. Building	2100 Locust Street
Lambskin Temple	1054 S Kingshighway Boulevard
Lennox Hotel	823-827 Washington Avenue
Leonardo	4166 Lindell Boulevard
Lesan-Gould Building	1320-1324 Washington Avenue
Lewis Place Historic District	Lewis Place
Liggett & Myers (Rice-Stix) Building	1000 Washington Avenue
Liggett & Myers Tobacco Company Building	1900-12 Pine Street
Lindell Read Estate Company Building	1015 Washington Avenue
Lister Building	4500 Olive Street
Loretto Academy	address restricted
Louderman Building	317 North Eleventh Street
Louise Apartments	3900 Lindell Boulevard and Vandeventer Avenue
Lucas Avenue Industrial Historic District	Bounded by Washington Avenue, Delmar Street, 20th & 21 Streets
Majestic Hotel	1017-23 Pine Street and 200-10 N 11th Street
Majestic Manufacturing Company Buildings	2014 Delmar Boulevard and 2011-2017 Lucas Avenue
Maryland Hotel	205 N Ninth Street
May Company Department Store Building	509-23 Washington Avenue
Mayfair Hotel	806 St. Charles Avenue
Midtown Historic District	Lindell Boulevard and Grand Boulevard
Mississippi Valley Trust Company Building	401 N. Pine Street

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NAME	ADDRESS
Mullanphy Historic District	North 14th Street between Mullanphy & Howard Streets, and North 13th Street between Howard & Tyler Streets
Murphy-Blair District	Bounded roughly by I-70, Florissant Avenue, Chambers Street and Branch Street
Negro Masonic Hall	3615-3619 Dr. Martin Luther King Boulevard
Neighborhood Gardens Apartments	1205 N 7th Street
Old Laclede Gas & Light Co.	1017 Olive Street (NE corner 11th)
Olive Street Terra Cotta District	600-622 Olive Street
Page Boulevard Police Station	Page & Union Boulevards
Peters Shoe Company Building	1232-36 Washington Avenue
Phipps-Wallace Store Building	312-316 North Eighth Street
Phyllis Wheatley Branch YWCA	2709 Locust Street
Pine Lawn Carriage House	6292-94 Stillwell Drive
Plaza Hotel Complex	307 N Leonard Street, 3301-3321 Olive Street, 3300-3322 and 3301-3339 Lindell Boulevard, 3322-3334 Locust Street
Portland & Westmoreland Places	NE corner of Forest Park
President (River Steamboat)	500 N Leonor K. Sullivan Boulevard
Robert G. Campbell House	1508 Locust Street
Robert Henry Stockton House	3508 Samuel Shepard Drive
Rock Spring School	3974 Sarpy Avenue
SS Cyril and Methodius Historic District	Bounded roughly by N. 11 th Street, Chambers Street, Tyler Street and Hadley Streets
Samuel Cupples House	3673 W Pine Boulevard
Sanitol Building	4252-4264 Laclede Avenue
Scott Joplin House SHS	2658 Delmar Boulevard
Scruggs-Vandervoort-Barney-Warehouse	917 Locust Street
Second Presbyterian Church	4501 Westminster Place
Security Building	319 N 4th Street
Shelley House	4600 Labadie Avenue
Silk Exchange Building	501-511 Tucker Boulevard
Simmons Colored School	4306-4318 St. Louis Avenue
St. Augustine's Roman Catholic Church	3114 Lismore Street
St. Joseph's Roman Catholic Church	1220 N 11th Street
St. Liborius Church and Buildings	1835 N 18th Street
St. Louis Colored Orphans Home	2612 Annie Malone Drive
St. Louis Post-Dispatch Building	1139 Olive Street
St. Louis Post-Dispatch Printing Building	1111 Olive Street
St. Louis Provident Association Building	2221 Locust Street
St. Louis Theatre Building	718 North Grand Boulevard
St. Louis Union Station	18th and Market Streets
St. Mary of Victories Church	744 S Third Street
St. Stanislaus Kostka Church	1413 N 20th Street
Stowe Teachers College	2615 Billups Street
Tandy Community Center	4206 W Kennerly Avenue
U.S. Customhouse & Post Office	8th & Olive Streets
Union Market	Broadway Street & Lucas Avenue
Union Station Post Office Annex	329 S 18th Street
Union Trust Company Building	705 Olive Street

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NAME	ADDRESS
Vesper-Buick Auto Company Building	3900-3912 West Pine
Wainwright Building	709 Chestnut Street
Wainwright Tomb	Bellefontaine Cemetery
Washington Avenue Historic District	Bounded roughly by Delmar Avenue, Tucker Boulevard, St. Charles Avenue, N. 15 th Street, Olive Street, N 18 th Street and Washington Avenue
Washington Avenue: E of Tucker District	Bounded roughly by Lucas Street, N. 9 th Street, St. Charles Avenue, Locust Street and Tucker Boulevard
West Pine-Laclede Historic District	Bounded by Lindell Street, Euclid Street, Sarah Street & Forest Park Parkway
Willys-Overland Building	2300 Locust Street
Winkelmeyer Building	11th & Walnut Streets

Source: National Register of Historic Places (NRHP) point file (8/6/02M); provided by East West Gateway Council of Governments, 2005

3.6.9 SECTION 4(f) AND 6(f) EVALUATIONS

Two similar regulatory initiatives have been developed to protect public parks, recreational areas, wildlife refuges and historic places prior to a conversion of land use. In accordance with 23 CFR Part 771, the requirements of Section 4(f) must be satisfied prior to the conversion of any of the above mentioned resources by a project sponsor. In accordance with Section 6(f) of the Land and Water Conservation Fund (LWCF) Act any public land acquired through LWCF monies must adhere to certain property management and land use stipulations. Driven by two separate regulatory requirements, both Section 4(f) and 6(f) requirements must be satisfied for this study.

Section 4(f) was enacted as Section 4(f) of the DOT Act of 1966. The intent of the law is to preserve parkland, recreation areas, refuges, and historic sites by limiting the circumstances under which such land can be used for transportation programs or projects. Section 4(f) permits the use of land for a transportation project from a significant publicly owned public park, recreational area, wildlife or waterfowl refuge, or any significant historic site only when the administration has determined that (1) there is no feasible and prudent alternative to such use, and (2) the project includes all possible planning to minimize harm to the property resulting from such use. In order to demonstrate that there is no feasible and prudent alternative to the use of Sections 4(f) land, the evaluation must include a specific purpose and need for the project, address location alternatives and design shifts that avoid the Section 4(f) land and “unique problems” associated with these design shifts.

Section 6(f) (3) refers to the manner in which open space or public recreation areas have been acquired. The LWCF Act requires that property acquired or developed with LWCF assistance, regardless of the extent of that assistance, and be retained and used for public outdoor recreation in perpetuity. Such property may not be converted to any other use without prior approval of the Secretary of the U. S. Department of the Interior, working through the Outdoor Recreation Assistance Program (ORAP), Missouri Department of Natural Resources. To obtain this approval, a written conversion request and justification of need for such an action must be submitted to ORAP with appropriate documentation. If approval is granted, the property that is converted must be replaced with land and/or facilities of at least equal value and use.

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The study areas contain approximately 718 acres of federal, state, county, and/or city parks, as shown in Figure 3.6-1 (and Figure 3.2-8 in previous section). Of particular importance is Fairgrounds Park, a 132-acre park located adjacent to Natural Bridge Avenue at Grand Boulevard; O'Fallon Park, a 126-acre park located at Florissant Avenue and Harris Street; and the number of parks in downtown St. Louis, including the Jefferson National Expansion Memorial (the Arch), Gateway Mall, and those located between Market Street and Union Station (Figure 3.5-3 in previous section). The necessity for 4(f) and 6(f) evaluations will be determined as detailed evaluations are performed.

3.6.10 PRIME FARMLAND

There is no prime farmland in the study area. It is within an urban developed area with minimal agricultural land use, and there are no protected agricultural areas as defined by Section 1540 (c) (1) of the Farmland Protection Act.

3.6.11 CONCLUSION

Within the study area, there are environmental concerns that must be considered and addressed during the development and evaluation of alternatives. These include impacts to hazardous material; the presence of karst topography and sinkholes, especially in the area near Natural Bridge Avenue; noise and vibration impacts; impacts to Section 106 (historic) properties, especially downtown; and impacts to 4(f) and 6(f) properties, especially at Fairgrounds Park and the numerous parks located downtown. The study will include agency coordination regarding these potential impacts, as well as potential mitigation measures.

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Chapter 3.7: Transportation Facilities/Services

This section provides an overview of the transportation facilities in the study area. It begins with a discussion of the roadways, including existing conditions and planned improvements, operating conditions and safety. This section also reviews transit facilities, including system description, ridership, planned changes, the Paratransit/Demand Responsive System and MetroLink LRT. The section concludes with a description of bicycle/pedestrian facilities and the movement of goods in the region.

3.7.1 ROADWAYS

Interstate System

Existing Characteristics

Two interstates bisect the study area. The first, Interstate 70 (I-70), runs diagonally from downtown St. Louis to the northwest. This facility generally provides an east-west movement to the region. Interstate 64 (I-64) runs east-west through the very southern portion of the study area. These facilities and the general roadway classifications for roads within the study area are shown in Figure 3.7-1. The state-maintained facilities are shown in Figure 3.7-2.

Interstate 70 is a six-lane facility for a majority of its length within the study area. Full or partial access is provided at interchanges with Lucas-Hunt Road, Jennings Station Road, Goodfellow Boulevard, Riverview Boulevard, Kingshighway Boulevard, West Florissant Avenue, Adelaide Avenue and Grand Boulevard. Full or partial diamond interchanges comprise the remaining interchanges. Several sections of the facility have outer roads with slip ramps providing access. In the downtown portion of the facility, full access to the major Mississippi River bridges is available, as well as slip ramp access to collector-distributor roadways serving the St. Louis CBD.

There is also a two-lane reversible section from east of Union Boulevard to downtown, a length of approximately six miles. These two lanes are located in the median of the facility. Directional control is provided to assure access for the peak direction of flow. There is no intermediate access to or from this section. It is intended to provide additional capacity during peak travel periods.

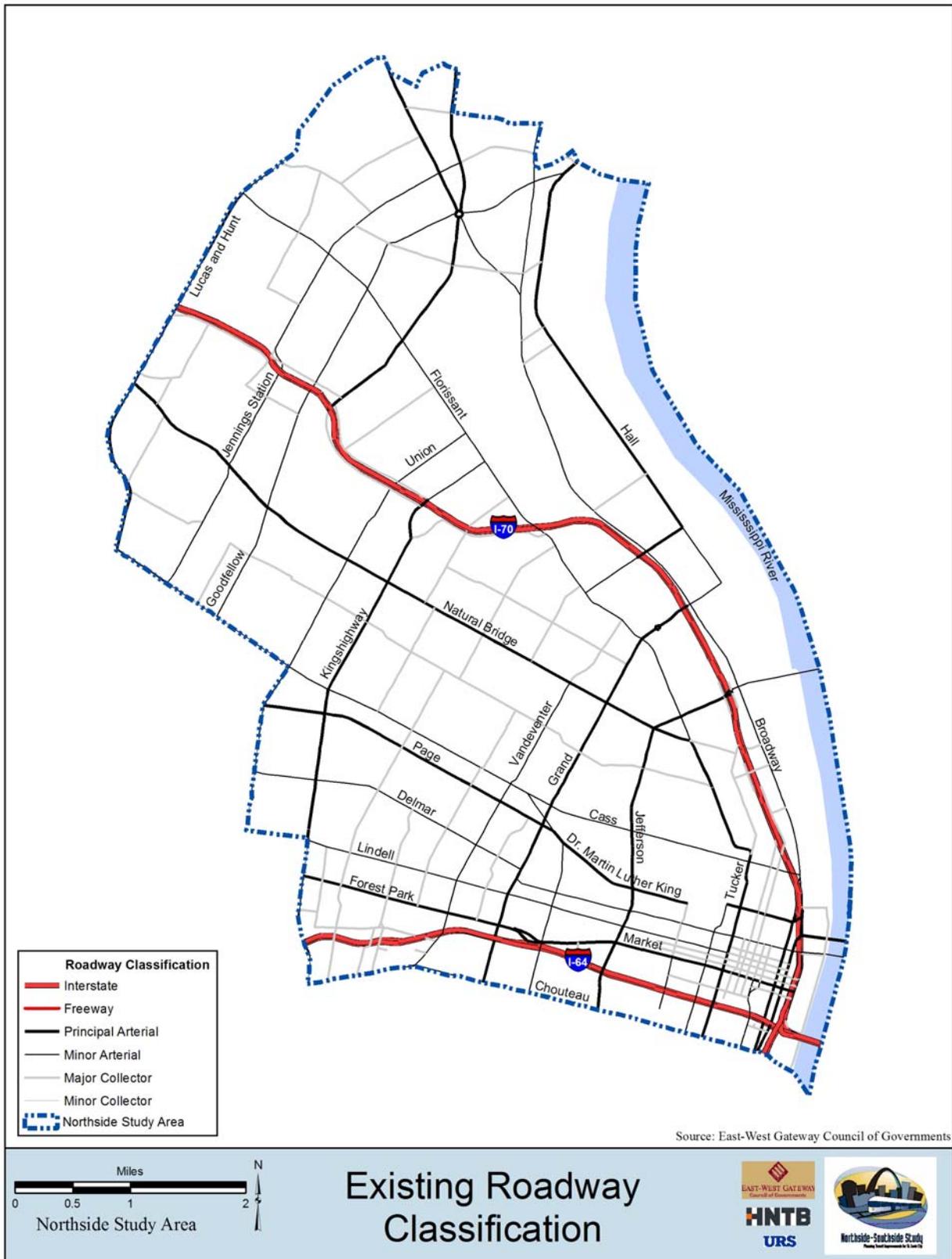
Interstate 64 runs for five miles along the southern boundary of the study area. Within this section it provides six lanes with full or partial interchanges located at I-70/I-55/Memorial Drive, 9TH/10th Streets, 14th Street, Chestnut Street/Market Street, Jefferson Avenue, Laclede Avenue, Forest Park Avenue, Grand Boulevard, Vandeventer Avenue/Boyle Avenue, Kingshighway Boulevard and Hampton Avenue.

Planned Improvements

A list of planned improvements to I-70 and I-64 are shown in Figure 3.7-3. The I-64 major reconstruction project from I-270 to Kingshighway is currently underway. Major projects for I-70 include the new Mississippi River Bridge and associated improvements.

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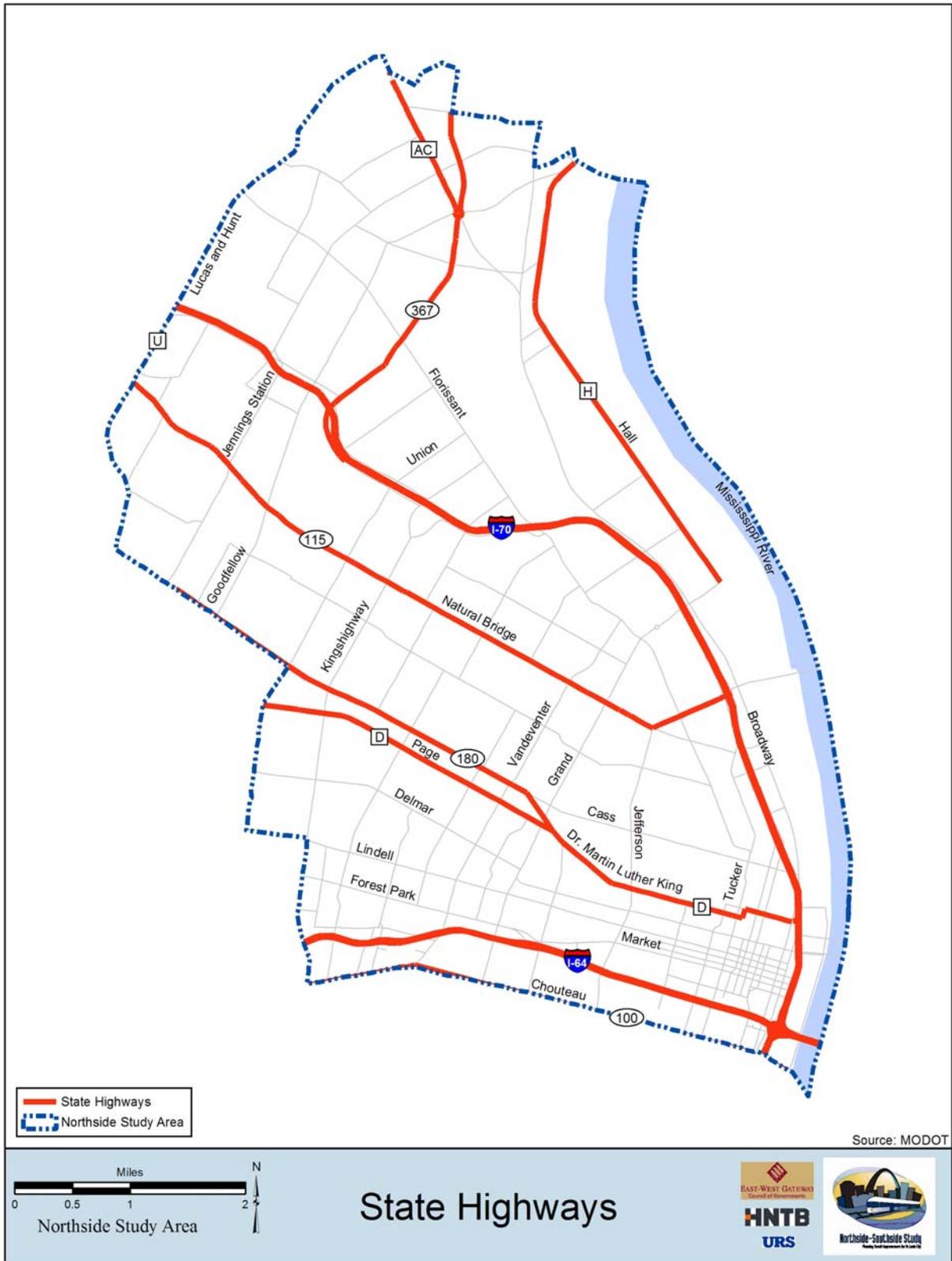
FIGURE 3.7-1: EXISTING ROADWAY CLASSIFICATION



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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FIGURE 3.7-2: STATE HIGHWAYS

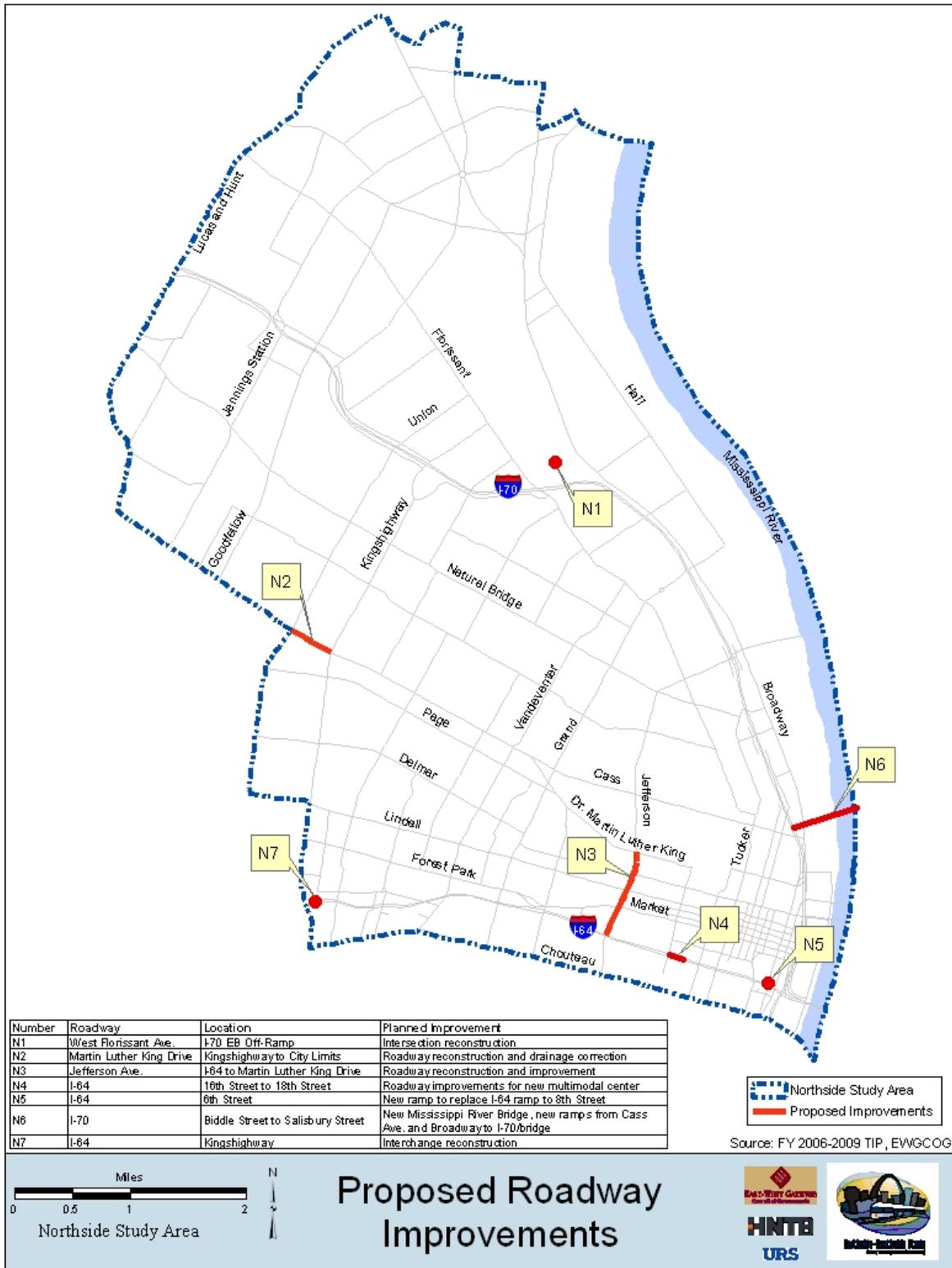


Source: MODOT

NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

Northside Study

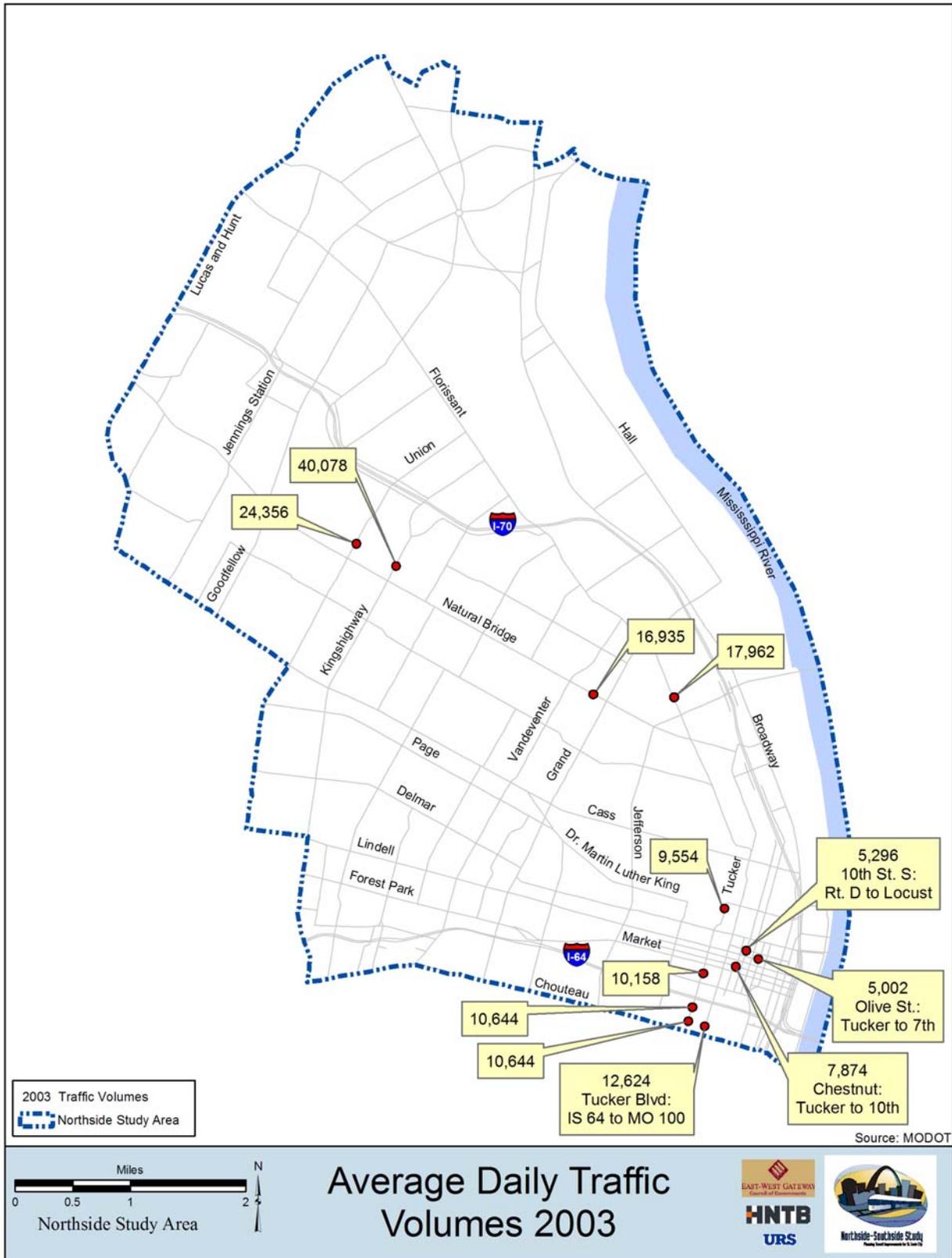
FIGURE 3.7-3: PROPOSED ROADWAY IMPROVEMENTS



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS
Average Daily Traffic (ADT)
 The existing average daily traffic throughout the Northside study area is illustrated in Figure 3.7-4. The existing roadway network currently operates at an acceptable level of service and does not experience unacceptable delays, congestion, or safety issues.

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FIGURE 3.7-4: AVERAGE DAILY TRAFFIC VOLUMES, 2003



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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Safety Issues

2004 accident data obtained from the MoDOT for the study area is summarized in Table 3.7-1. This data illustrates the accident rate (accidents per million vehicle miles traveled) for interstate roadway segments within the study area. The 2004 statewide rate is also shown for comparison.

As alternatives are developed and screened in future tasks, further analysis will be done for impacted routes. This analysis will include review of additional years of accident data, along with cause and conditions of the accidents, to ensure that any recommended transit improvements would not negatively impact safety in the study area.

TABLE 3.7-1: 2004 ACCIDENT RATES

Roadway	Segment	Accident Rate	Statewide Accident Rate
I-64 Eastbound	Kingshighway Boulevard to I-55	265.08	110.20
I-64 Westbound	Kingshighway Boulevard to I-55	125.72	110.20
I-70 Eastbound	Lucas-Hunt to Mississippi River	316.72	110.20
I-70 Westbound	Lucas-Hunt to Mississippi River	250.45	110.20

Source: Missouri Department of Transportation, 2006

Note: Number of accidents per million vehicle miles traveled

Commuter Carpool Lots

The study area does not contain any MoDOT-designated parking lots for carpooling commuters. However, there are two such lots in the vicinity which serve the study area. One is located at I-270 and Hanley Road, northwest of the study area. The second is located at Lilac and I-270, north of the study area. Commuter parking also occurs at the Northland Shopping Center. Similarly, no MetroLink park and ride facilities are currently located in the study area. However, commuter parking is known to occur along some public streets adjacent to MetroLink facilities, particularly near the Central West End and Grand Stations.

Major Arterials/ Principal Roadways

Existing Characteristics

In addition to the interstate highways, several arterials and other major roadways serve the study area, as shown in Figure 3.7-2. Included in this list are state routes (maintained by MoDOT) and arterial roadways (maintained by St. Louis County Department of Highways and Traffic and/or the City of St. Louis). Local collector and feeder roads comprise the remaining roadway network.

MoDOT maintains the following routes that lie partially or wholly within the study area:

- Highway AC (New Halls Ferry Road).
- Route 115 (Natural Bridge Avenue).
- Route 180 (Dr. Martin Luther King Drive).
- Highway U (Lucas-Hunt Road).
- Highway D (Page Avenue).

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- Route 100 (Chouteau Avenue).
- Highway H (Riverview Boulevard).
- I-70 (Interstate 70).
- I-64 (Interstate 64).

These roadways vary in the number of lanes they provide and the type of access control in place. For example, Natural Bridge Avenue and Dr. Martin Luther King Drive provide up to four travel lanes with minimal access control. In most cases these facilities also provide a median turn lane.

In addition, several major arterials serve the Central Business District within the study area, including:

- Memorial Drive – two-way traffic, three lanes in each direction separated by depressed section of I-70.
- Broadway Avenue– one-way traffic, four lanes with sporadic, metered parking along both sides.
- Market Street – one-way westbound traffic, three lanes from Memorial Drive to 4th Street.
 - Two-way traffic, three lanes in each direction with center median from Broadway Street to 4th Street.
 - Two-way traffic, three lanes in each direction with center striped median and turn lanes from 4th Street to 16th Street, metered parking on both sides.
- Tucker Boulevard – two-way traffic, three lanes northbound, four lanes southbound, center median with turn lanes at intersections.
- Washington Avenue – two-way traffic, two lanes in each direction with a center turn-lane.

Planned Improvements

Improvements are planned for the West Florissant Avenue/I-70 ramp, Dr. Martin Luther King Drive, North Grand Avenue, Jefferson Avenue and the Grand Boulevard viaduct near I-64. The City of St. Louis is also planning to integrate the traffic signal system. Figure 3.7-3 for additional illustrative planned projects within the study area.

Truck Percentages

The 2006 percentages of trucks vary between 5% and 11% along Natural Bridge Avenue, North Florissant Avenue, and North 14th Street. The northbound truck percentage on Goodfellow Boulevard increases to 25%, which is to be expected, since there is access to I-70 at Goodfellow. The southbound truck percentage on Goodfellow is 9%.

Level of Service

The 2006 level of service throughout the Northside study area is acceptable for both a.m. and p.m. peak traffic periods. The level of service was calculated based on the number of lanes, traffic volumes, and truck percentages.

3.7.2 TRANSIT

Public transit operations have been a part of St. Louis for over a century. Operations began in the late 1800s with a steam line railroad. By the early 1900s, a citywide electrified transit system operated. In the early 1920s, streetcar lines covered the City, with extensions to Berkeley, Creve Coeur Lake and Kirkwood. However, the development of the highway system and reliance on the automobile lead to the demise of the streetcar system, and the last streetcar line

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was abandoned in 1966. Today, public transportation is provided by Bi-State Development Agency (Metro).

Intraregional Bus Services

Local Routes

Approximately 23 local fixed routes provide regular service to the Northside study area. Existing local route coverage is shown in Figure 3.7-5. The local routes that serve the Northside study area tie into Metro's regional transit network as shown in Figure 3.7-6.

Fixed route service in the Northside is more concentrated in the southern portions of the study area, due to higher population and employment densities as well as lack of other transportation alternatives for residents of this area (Chapter 3.6). This is evidenced by the high proportion of zero and one-car households within the Study area as described in Section 3.6 of this report. (Maps of both population and employment characteristics within the Northside study area are also shown in Chapter 3.3.) Much of St. Louis's central business district lies within the Northside Study area, which is a primary attractor of transit trips in the region. Consequently, the Northside has a well-developed transit service base. As seen in Figure 3.7-6, the transit network in the Northside exhibits a compact grid pattern throughout most of the southern half of its study area.

According to interviews conducted with community representatives, Northside residents rely on public transportation as a primary form of transportation for a variety of trip purposes in addition to the home-to-work commute.

Although service frequency varies throughout the Northside study area (Tables 3.7-2 – 3.7-4), typical weekday headways during the peak periods are between 15 and 20 minutes. Off-peak buses tend to run about every 20 or 30 minutes. On Saturdays, headways are generally 30 minutes, whereas on Sundays and Holidays, headways range between 30 and 60 minutes.

Hours of operation vary by route. On Saturdays and weekdays, buses generally run from about 5:00 a.m. to 1:00 a.m. On Sundays and holidays, buses typically operate from about 5:00 a.m. to 11:00 p.m.

Existing ridership correlates strongly with the level of transit service provided. "Revenue hours of service," as listed in Tables 3.7-2 – 3.7-4, measures the total amount of time per day that buses on the route are providing service to passengers. Revenue hours are a function of the frequency of service, the length of the route (total run time), and the span of service (hours of operation). The high frequency routes with peak hour headways of 5 to 15 minutes tend to exhibit the highest numbers of average daily passengers compared to routes with headways of 30 minutes or more. For example, the Grand route (#70) has a peak headway of seven minutes, and the number of riders on that route averaged over 11,700 per day in 2005.

Existing transit ridership is heaviest on those routes that cut across the urban core of the study area. These routes include Grand (#70), Kingshighway (#95), Natural Bridge (#4), and Delmar (#97).

In Fall 2006, Metro will use the opening of the Cross County MetroLink extension to implement improvements to the MetroBus system throughout the City of St. Louis. These improvements will take place under Metro's "Metro Redefined 2006" program. The Redefined 2006 goals are, among others:

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- The creation “of a bus network that complements rather than competes with MetroLink.”
- The pursuit “of Metro’s strategic plan for a multi-centered, hub based bus route network rather than a radial network emphasizing the downtown Central Business District.”
- The reduction of “travel time for inner city reverse commuters destined for South, West, and North County.”

The Metro Redefined 2006 program affected several of the local bus routes located within the Northside study area. These changes are most notably applicable to the following routes:

- 52-Clayton South County – This route was eliminated. The portion of the route between Bellevue (St. Mary’s Hospital), Forest Park Community College, BJC Medical Center, St. Louis University, St. Louis University Hospital (Grand Avenue), and the Thurman Loop is served by the 52-Forest Park Route.
- 90-Hampton – This route was extended north to the Riverview Transit Center via Riverview Boulevard. Service on Halls Ferry from McLaran to Broadway and along Baden Street, Gimblin Street, and Muriel Street was eliminated.
- 42-Sarah – The new route operates without any change from Broadway and Taylor southbound to Sarah and Forest Park. New routing from Sarah and Forest Park includes operating over Forest Park, Vandeventer, Market, and Prospect to the Grand Station and the Metro Main Shop Facility at Compton and Spruce. Service on Sarah, Chouteau, and Duncan south of Forest Park was eliminated.

Express Routes

Within the Northside study area, ten bus routes provide express or limited stop service. These routes are summarized in Table 3.7-6 and are also mapped in Figure 3.7-7.

These express routes primarily serve commuter trips destined to downtown St. Louis and provide limited stop service in the peak periods along selected arterials in the northern portions of the study area. All of these routes use I-70 or I-64 to complete their trip. Express routes operate in the peak direction, traveling in the southbound/eastbound direction in the a.m. peak and the northbound/westbound direction in the p.m. peak.

Demand Response Services

Metro operates two demand response programs in the St. Louis region, Call-A-Ride and Call-A-Ride Plus. For the demand response program, riders must call in to make an appointment for curb-to-curb van service. Call-A-Ride is open to the general public in St. Louis City and County, whereas Call-A-Ride Plus is provided only to the disabled community in both the County and the City of St. Louis. Call-A-Ride is used for a variety of trip purposes, while Call-A-Ride Plus is mostly used for medical appointments.

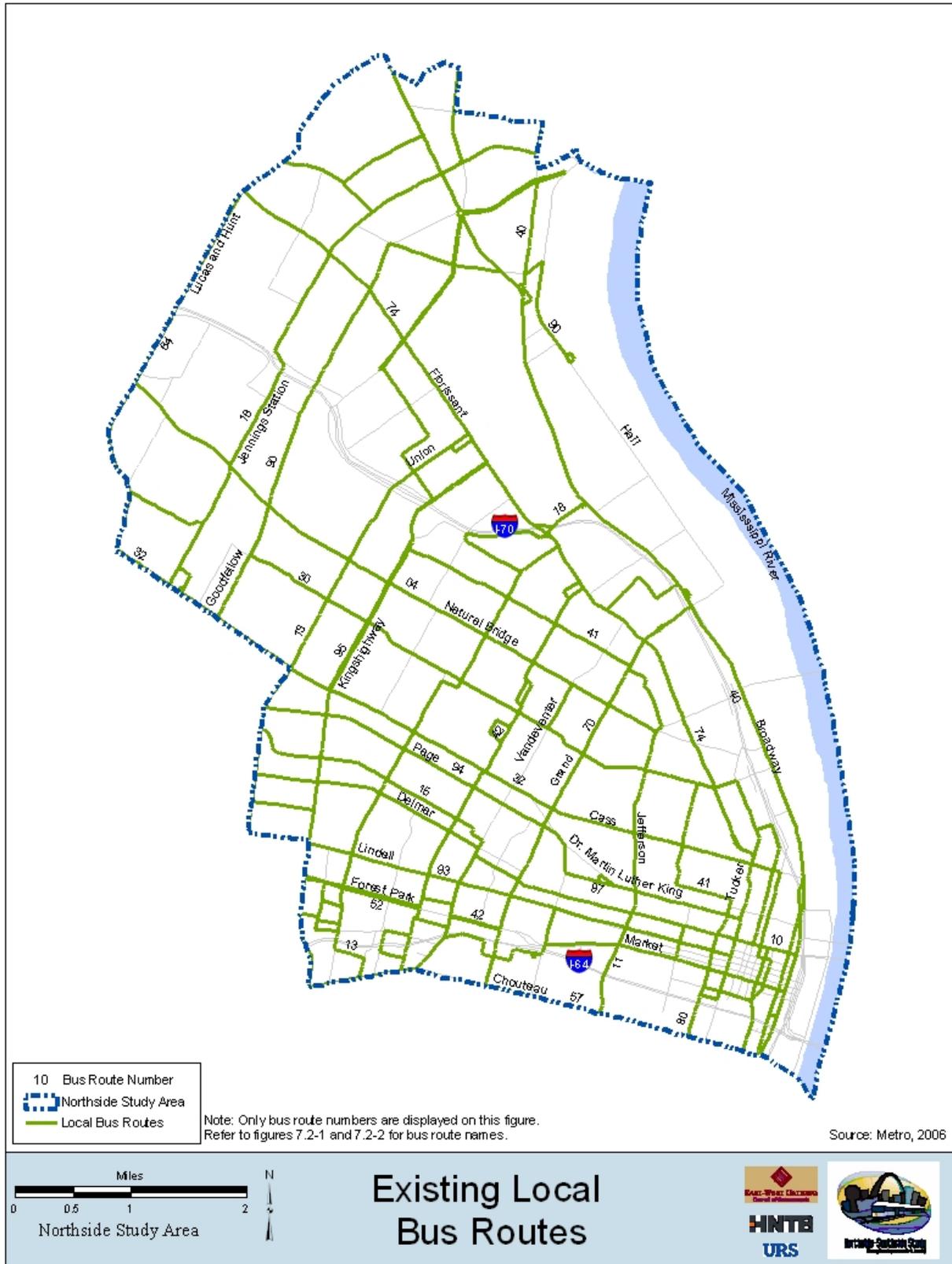
Metro has developed a Transportation Management Association (TMA) to advance demand response services in the St. Louis Metropolitan region. To date, the TMA consists of 29 member agencies, including social service agencies, funding agencies and transportation service providers. The TMA provides coordinated communications, vehicle routing, scheduling, dispatching, and customer service enhancements among its association members and is geared towards furnishing a “one stop” transportation solution for transit passengers. Transportation providers are linked through the use of “real time” routing and scheduling

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computer terminals within the vehicles through a unified system of Call Centers. These features allow for rapid response trip dispatching for unscheduled or emergency trips and for vehicle deployment in the event of a vehicle breakdown or unanticipated incident.

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FIGURE 3.7-5: EXISTING LOCAL BUS ROUTES



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

FIGURE 3.7-6: EXISTING REGIONAL BUS TRANSIT NETWORK



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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TABLE 3.7-2: SERVICE FREQUENCY – ALL LOCAL ROUTES, WEEKDAYS

Route #	Route Name	Weekday				
		Headways (minutes)		Revenue Hours	Average Trips	ADP
		Peak	Non-Peak			
70	Grand	7	12	210	226	11,705
95	Kingshighway	10	15	132	122	5,890
04	Natural Bridge	15	30	91	85	4,055
32	Wellston-M.L.King	30	30	133	87	4,547
11	Chippewa	15	20	137	109	5,082
90	Hampton	15	30	114	112	3,732
18	Taylor	20	30	43	80	1,430
97	Delmar	15	15	151	140	4,514
16	City Limits	20	30	73	77	2,460
94	Page	20	30	113	86	3,439
74	Florissant	20	20	109	78	3,118
41	Lee	20	30	81	84	2,255
93	Lindell	30	30	74	84	1,862
64	Lucas Hunt	30	30	63	64	1,514
10	Gravois	8	15	120	127	3,239
52	Clayton South County	30	30	214	123	5,216
30	Soulard	20	30	139	79	3,358
40	Broadway	30	30	102	67	2,632
13	Union Garden	30	30	53	59	1,169
42	Sarah	20	30	57	81	1,256
57	Manchester	30	30	105	84	2,173
80	Shaw-Southampton	30	30	118	66	1,776
15	Hodiamont	30	30	33	48	401

Source: Metro, 2006

Note: ADP = Average Daily Passengers

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TABLE 3.7-3: SERVICE FREQUENCY – LOCAL ROUTES, WEEKENDS

Route #	Route Name	Saturday					Sunday				
		Headways (minutes)		Revenue Hours	Average Trips	ADP	Headways		Revenue Hours	Average Trips	ADP
		Peak	Non-Peak				Peak	Non-Peak			
70	Grand	7	12	117	126	6,520	7	12	86	94	4,051
95	Kingshighway	10	15	102	93	3,378	10	15	67	68	2,064
04	Natural Bridge	15	30	70	60	2,348	15	30	52	48	1,296
32	Wellston-M.L.King	30	30	118	74	3,150	30	30	107	68	1,785
11	Chippewa	15	20	109	88	3,899	15	20	76	63	2,109
90	Hampton	15	30	78	77	1,967	15	30	74	72	1,228
18	Taylor	20	30	32	66	575	20	30	18	36	506
97	Delmar	15	15	106	108	2,427	15	15	72	74	1,356
16	City Limits	20	30	60	63	1,308	20	30	30	32	705
94	Page	20	30	78	61	1,449	20	30	72	52	1,025
74	Florissant	20	20	99	73	1,885	20	20	55	48	951
41	Lee	20	30	69	72	1,106	20	30	43	46	683
93	Lindell	45	45	64	66	1,075	60	60	31	34	650
64	Lucas Hunt	30	30	25	30	523	30	30	11	22	239
10	Gravois	8	15	79	110	1,830	8	15	46	66	1,009
52	Clayton S. County	30	30	168	74	3,332	30	30	171	74	2,390
30	Soulard	20	30	111	68	1,753	20	30	106	64	1,246
40	Broadway	30	30	90	61	1,270	30	30	45	32	651
13	Union Garden	30	30	25	51	389	60	60	13	26	207
42	Sarah	20	30	33	48	548	20	30	33	48	361
57	Manchester	30	30	88	65	1,277	30	30	52	34	657
80	Shaw-Southampton	30	30	114	64	928	30	30	58	33	497
15	Hodiamont	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Metro, 2006

Note: ADP = Average Daily Passengers

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TABLE 3.7-4: SERVICE FREQUENCY – EXPRESS ROUTES

Route #	Route Name	Weekday				
		Headways		Revenue Hours	Average Daily Trips	ADP
		Peak	Non-Peak			
241X	Bissell Hills Express	30		13	11	256
141X	New Halls Ferry Express	30		10	10	153
10X	South Grand Express	30		10	9	181
274X	Paddock Hills Express	30		11	9	125
41X	Northside Express	30		10	8	124
410X	Eureka Express	30		11	9	160
11X	Shrewsbury Express	30		12	9	132
152X	Hwy.40-Clayton Rd. Express	30		13	10	147
240X	Oakville Express	30		7	7	76
357X	Twin Oaks Express	30		15	10	141

Source: Metro, 2006

Note: ADP = Average Daily Passengers

TABLE 3.7-5: ALL EXPRESS ROUTES

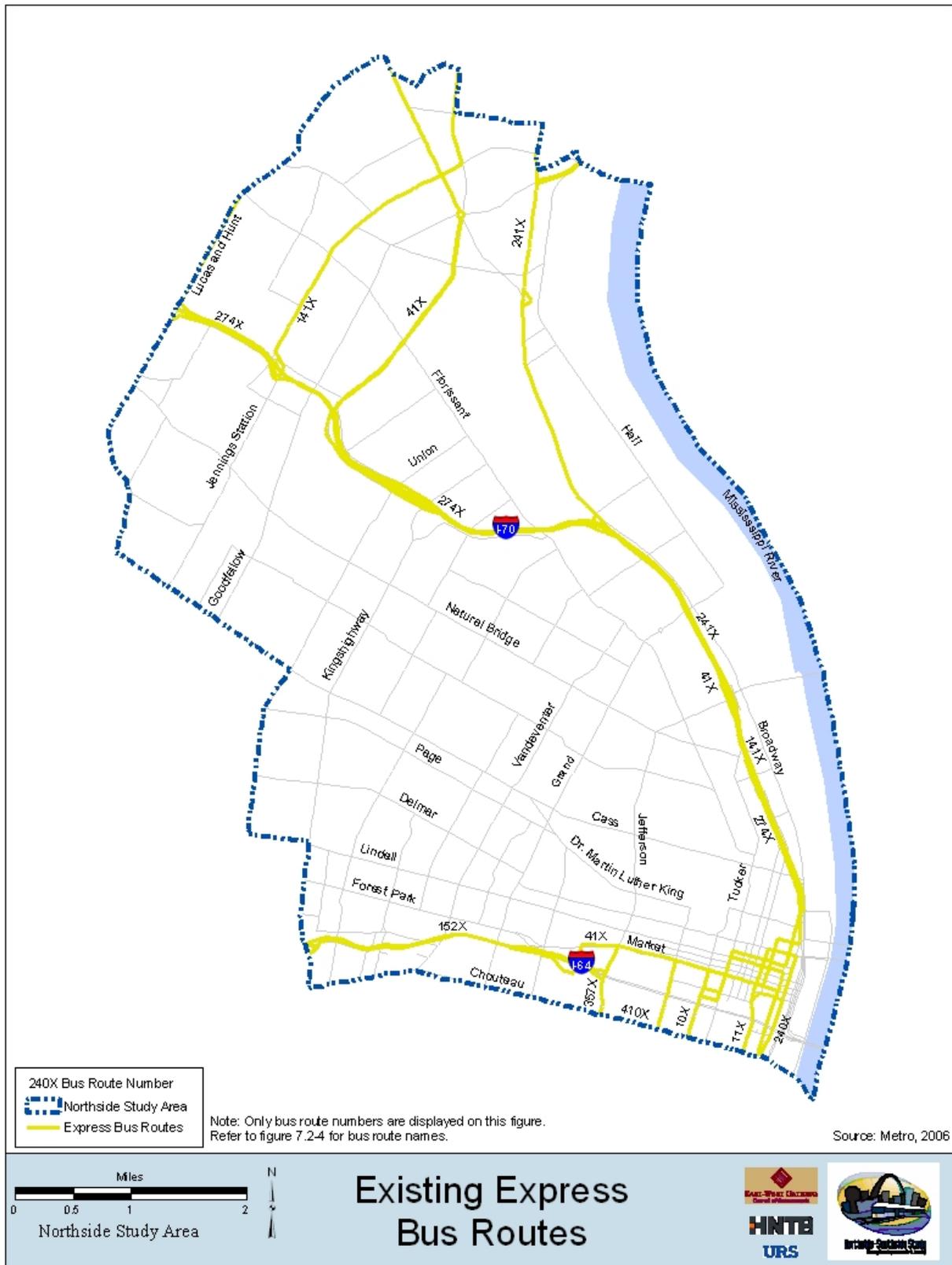
Route No.	Route Name	Average Daily Trips	ADP
241X	Bissell Hills Express	11	256
141X	New Halls Ferry Express	10	153
10X	South Grand Express	9	181
274X	Paddock Hills Express	9	125
41X	Northside Express	8	124
410X	Eureka Express	9	160
11X	Shrewsbury Express	9	132
152X	Hwy.40-Clayton Rd. Express	10	147
240X	Oakville Express	7	76
357X	Twin Oaks Express	10	141

Source: Metro, 2006

Note: ADP = Average Daily Passengers

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FIGURE 3.7-7: EXISTING EXPRESS BUS ROUTES



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS

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MetroLink Light Rail Transit (LRT)

The existing MetroLink LRT between Lambert International Airport and Scott Air Force Base in Illinois, transverses the Northside Study area near its southern border as it approaches downtown St. Louis from the west. Eight of the system's 19 MetroLink stations fall directly within the Study area. From west to east, these include:

- Central West End.
- Grand Boulevard.
- Union Station.
- Kiel Center.
- Busch Stadium.
- 8th and Pine.
- Convention Center.
- Laclede's Landing.

During a typical weekday, MetroLink runs at seven to eight-minute headways during the peak periods (both a.m. and p.m.) and at ten-minute headways, off-peak. On Saturdays, typical headways are about ten minutes and on Sundays and holidays, trains run about every 15 minutes. The span of operation for MetroLink service is from 5:00 a.m. to 12:00 a.m. on Saturdays and weekdays and from 5:30 a.m. to 11:00 p.m. on Sundays and holidays.

Table 3.7-6 presents ridership statistics for existing MetroLink Missouri service based upon data provided in Spring 2006. The table shows the average daily passengers (boardings by station) for weekdays, Saturdays, and Sundays.

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TABLE 3.7-6: METROLINK RIDERSHIP

MetroLink Station	Average Daily Passengers		
	Weekday	Saturday	Sunday
Laclede's Landing	1,150	1,734	1,303
Convention Center	1,935	1,404	1,068
8 th and Pine	2,348	1,951	922
Busch Stadium	3,527	3,171	3,104
Civic Center	1,161	1,621	1,207
Union Station	2,152	2,469	1,940
Grand	2,219	1,478	1,555
Central West End	2,646	1,598	1,576
Forest Park	1,252	1,394	1,131
Delmar	1,738	1,601	1,203
Wellston	921	577	564
Rock Road	1,259	1,013	916
UMSL South	970	789	600
UMSL North	532	320	224
North Hanley	1,691	2,032	1,148
Lambert Airport	1,791	1,816	2,419
Total	29,216	24,969	20,880

Source: Metro, 2006

MetroLink indirectly serves portions of the Northside Study area via feeder bus service. Table 3.7-7 lists the local routes in the Northside Study area that provide direct connections with MetroLink rail stations outside downtown St. Louis.

In addition, EWGCOG, in cooperation with Metro and MoDOT, has considered extensions of MetroLink that would provide for rail service for north-south travel movements parallel to and west of the Northside Study area. Figure 3.7-8 shows the existing MetroLink system, planned extensions identified by the EWGCOG, and the Cross County MetroLink Line running from the Forest Park MetroLink Station through Clayton to Shrewsbury. The Cross County line opened in Fall 2006.

Transit Facilities

As previously discussed, Metro will implement its Redefined 2006 plan to transition from the more traditional radial configuration of fixed route bus services to a transit center-based system. This was driven, in part, by the need to better serve changes in regional travel patterns resulting

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from shifts in population and employment throughout the region (Chapters 3.3 and 3.5). General locations for transit centers included in Redefined 2006 are shown in Figure 3.7-9.

Six of the transit centers serve the Northside study area:

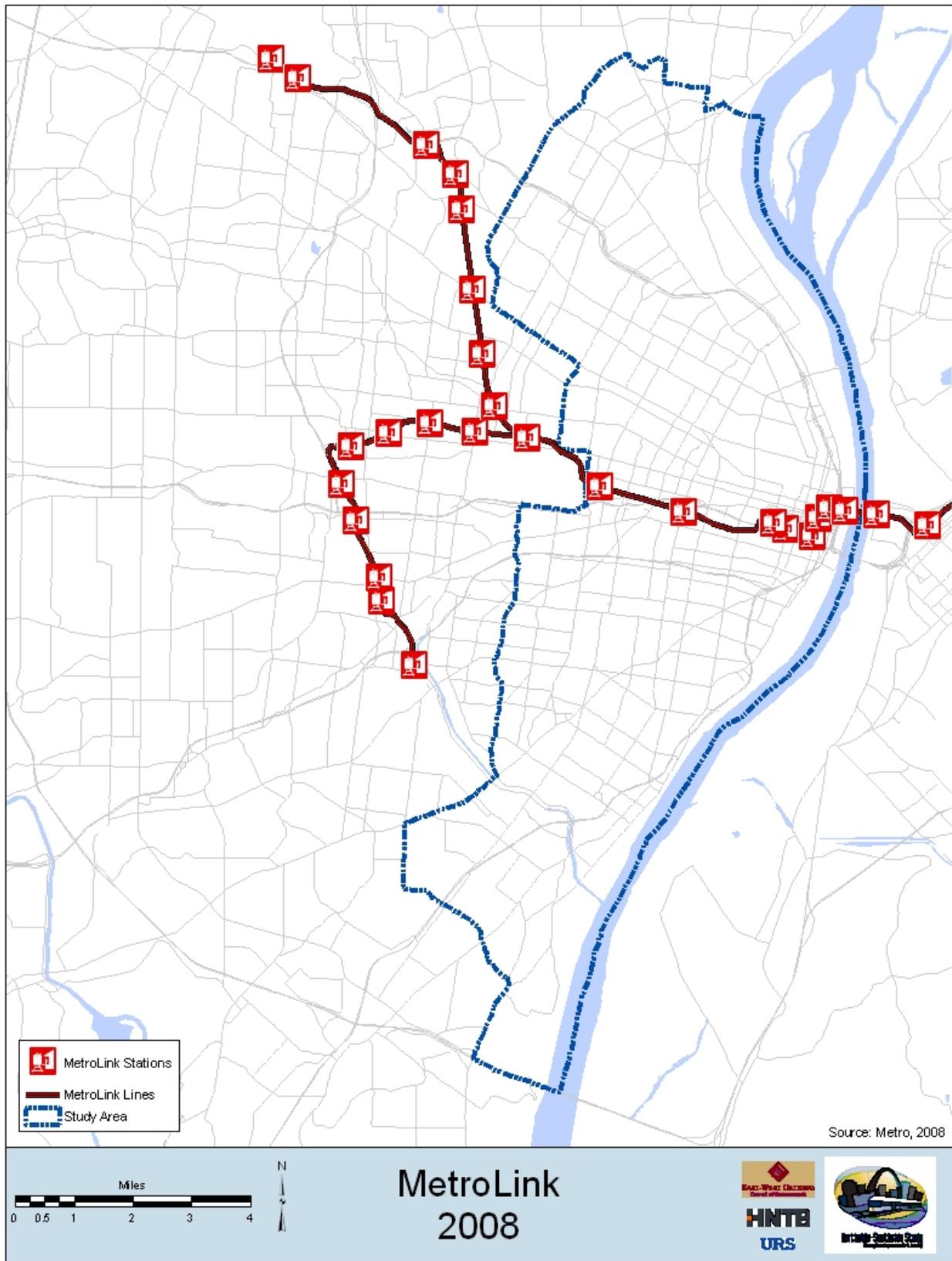
- North Hanley Station.
- Central West End Station.
- Riverview MetroBus Center.
- North Broadway MetroBus Center.
- Civic Center Station (14th Street).
- Downtown Multimodal Center.

Four of these transit centers, North Broadway MetroBus Center, Central West End Station, Civic Center Station (14th Street), and the Downtown Multimodal Center, are located in the Northside Study area. The Central West End Station is located on the MetroLink line and serves as a transfer point between bus and rail. These transit centers help facilitate intermodal transfers between MetroBus and MetroLink riders, as well as direct transfers for bus patrons in the urbanized portions of the study area. In these three transfer centers, urban transit riders can also be collected in the City for trips to destinations in the suburbs and other major activity centers in the region primarily to the west (i.e., the “reverse commute”).

Although proposed transfer facilities at Riverview MetroBus Center and North Hanley Station are not located within the Northside Study area, these two transit centers could also serve Northside residents. In addition, Call-A-Ride and Call-A-Ride Plus vehicles could also serve the proposed transit centers to facilitate transfers between fixed route services and Call-A-Ride.

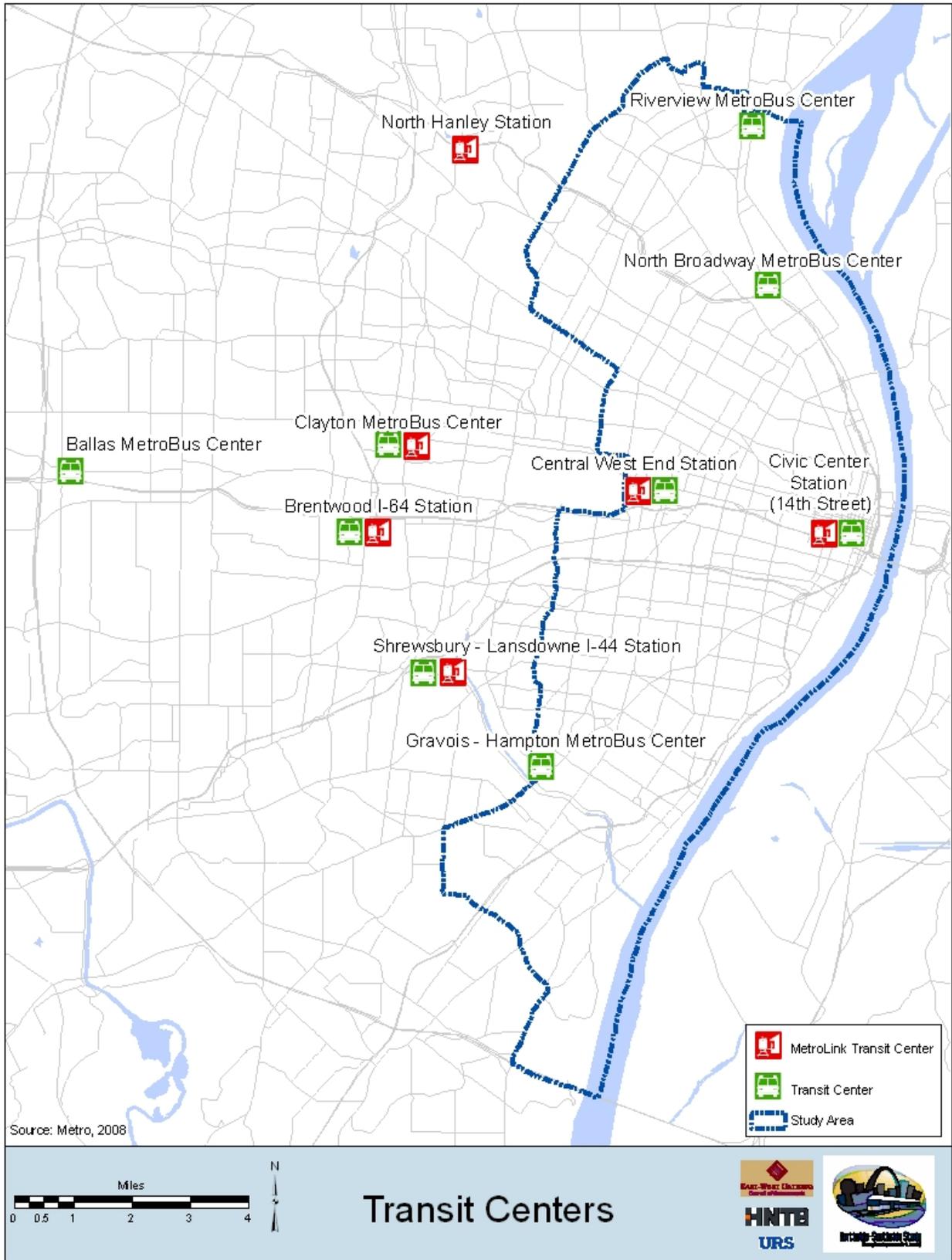
The City of St. Louis is constructing the Downtown Multimodal Center that will connect airport users with downtown transportation modes: Amtrak, Greyhound, and MetroLink. The station will be able to accommodate future high-speed rail. It is located at 14th and Spruce Streets and will be located just north of the Mill Creek Valley and south of Savvis Center. The project will consist of a terminal building, railroad and bus staging areas, pedestrian connection to the Savvis MetroLink Station, Savvis Triangle Park, and related street improvements. Construction of the terminal is underway.

FIGURE 3.7-8: METROLINK, EXISTING AND FUTURE



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FIGURE 3.7-9: EXISTING AND PROPOSED TRANSIT CENTERS



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TABLE 3.7-7: FEEDER BUS ROUTES

Route No.	Route Name	MetroLink Station(s) Served
70	Grand	Grand Station
95	Kingshighway	Central West End
04	Natural Bridge	Convention Center
32	Wellston-M.L.King	8 th & Pine, Stadium, Civic Center
11	Chippewa	Civic Center
18	Taylor	Central West End Station
97	Delmar	Convention Center
94	Page	8 th & Pine, Stadium, Civic Center
74	Florissant	8 th & Pine, Civic Center
41	Lee	Convention Center, Civic Center
93	Lindell	Convention Center
10	Gravois	Convention Center, Civic Center
52	Clayton South County	Convention Center, Civic Center, Central West End
30	Soulard	8 th & Pine, Stadium
13	Union Garden	Central West End
42	Sarah	Grand Station
57	Manchester	Grand Station
80	Shaw-Southampton	Convention Center, Civic Center
15	Hodiamont	Civic Center

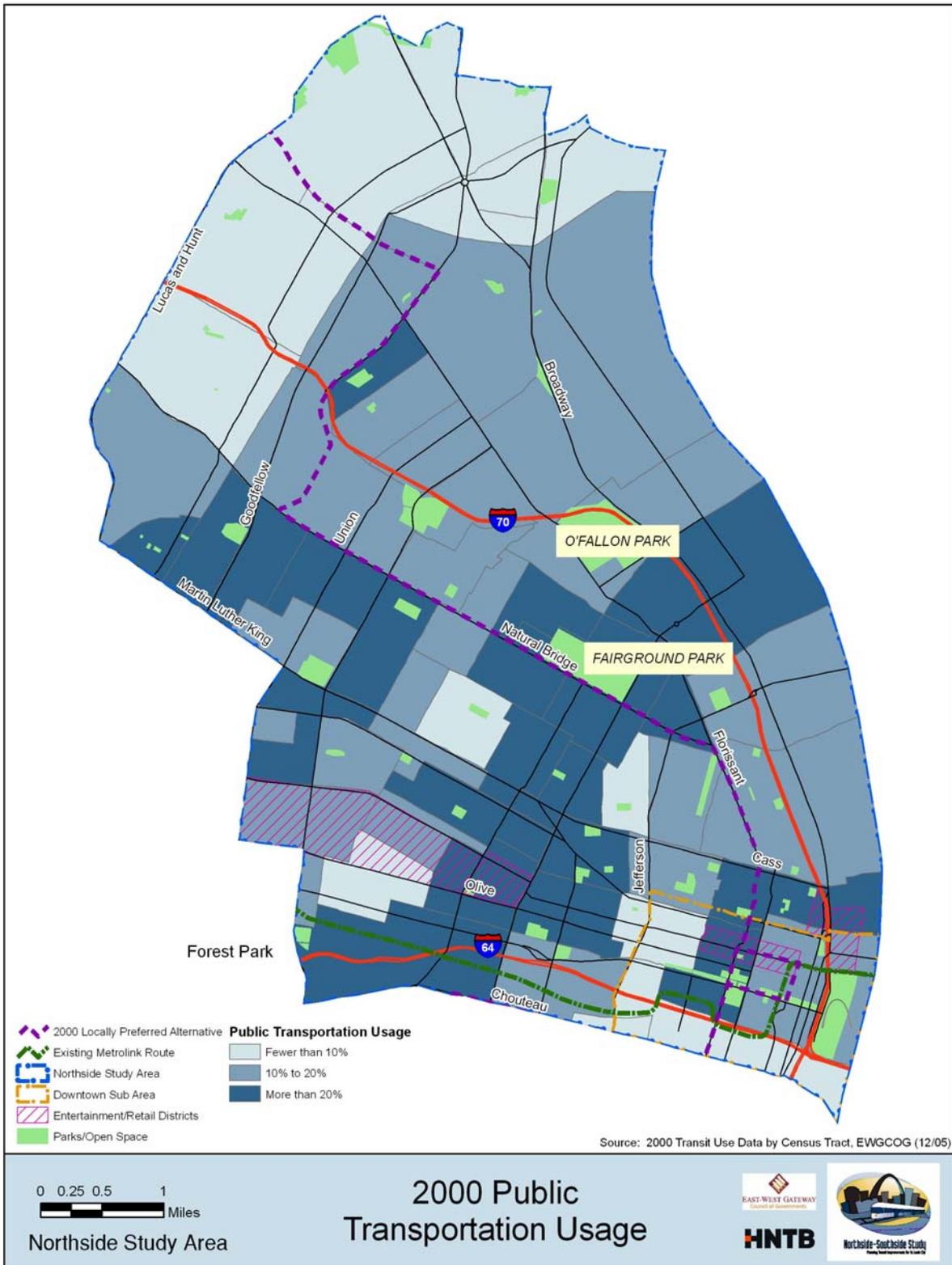
Source: METRO, 2006

Public Transportation Usage

Figure 3.7-10 shows the usage of public transportation in the Study area based on Year 2000 Census Journey to Work data. Approximately 11% of St. Louis workers use public transportation as their means to work, and there are several census tracts in the Northside Study area where greater than 20% of workers use public transportation. Table 3.7-8 provides a comparison of public transportation usage between St. Louis and other similar Midwestern cities.

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FIGURE 3.7-10: PUBLIC TRANSPORTATION USAGE, 2000



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

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TABLE 3.7-8: PUBLIC TRANSPORTATION USAGE

Place	# Workers Age 16+	# Using Public Transportation	% Using Public Transportation
St. Louis City, MO	140,707	15,074	10.7%
Indianapolis, IN	385,208	9,260	2.4%
Kansas City, MO	208,554	7,960	3.8%
Cincinnati, OH	147,616	14,882	10.1%
Milwaukee, WI	249,889	25,634	10.3%
Minneapolis, MN	203,951	29,681	14.6%
Pittsburgh, PA	141,844	29,062	20.5%
United States	128,279,228	6,067,703	4.7%

Source: 2000 Census

Additionally, Metro has pointed to additional night and weekend service on MetroBus as a significant factor in the increase in Metropolitan St. Louis area residents which use public transportation. According to a Metro news release dated February 28, 2006,

“Nearly 2.7 million passengers (2,697,149) rode the bus in January 2006. The number of MetroBus rides taken last month was more than 13% higher than in January 2005.

MetroLink, the region’s light rail system, boarded 1.1 million riders in January 2006, representing a near 16% (15.67%) ridership increase over the number of passengers just one year ago.”

3.7.3 BICYCLE/PEDESTRIAN FACILITIES

The *St. Louis Regional Bicycling and Walking Transportation Plan* (2004) recognizes the growth of bicycling as a transportation alternative in the St. Louis region. Similarly, EWGCOG’s *Legacy 2030: The Transportation Plan for the Gateway Region* listed cycling and walking as “crucial to providing a balanced transportation system that addresses all user needs.” It goes on to further laud the transportation system which “accommodates these basic means of travel.” These two publications lend credence to the St. Louis metropolitan area’s desire to include bicycle and pedestrian facilities as vital components of the regional transportation system.

The purpose of the *St. Louis Regional Bicycling and Walking Transportation Plan* (2004) is to place “emphasis on defining the nature of bicycling and walking environments and [provide]

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guidance on the elements common to model bicycling and walking facilities.” With input from the public and technical advisors, existing routes and facilities were identified, current trends were analyzed, and specific routes were identified.

An important proponent of bicycle trails in the St. Louis Metropolitan area has been the GRG District. Formed in 2000 as a result of the passage of “Clean Water, Safe Parks and Community Trails Initiative (Proposition C)” in St. Louis City, St. Louis County, and St. Charles County, the GRG has led the development of ‘The River Ring,’ an interconnected system of greenways, parks and trails that will encircle the St. Louis region. Specifically, the GRG has provided funding for Bike St. Louis – Phase I, which saw the development of 20 miles of on-street bicycle routes in the City of St. Louis completed in Winter 2004. A portion of Phase I is located within the study area, as detailed in Figure 3.7-11. Bicycle routes also exist along Olive Street from 20th Street to Boyle Avenue in the Central West End, along Washington Avenue and along Chestnut Street.

Other GRG projects include the restoration of the Chouteau Greenway, the Confluence Greenway/Riverfront Trail, the McKinley Bridge and Branch Street Connector, and the acquisition of abandoned rail corridor from the Mississippi River to downtown St. Louis.

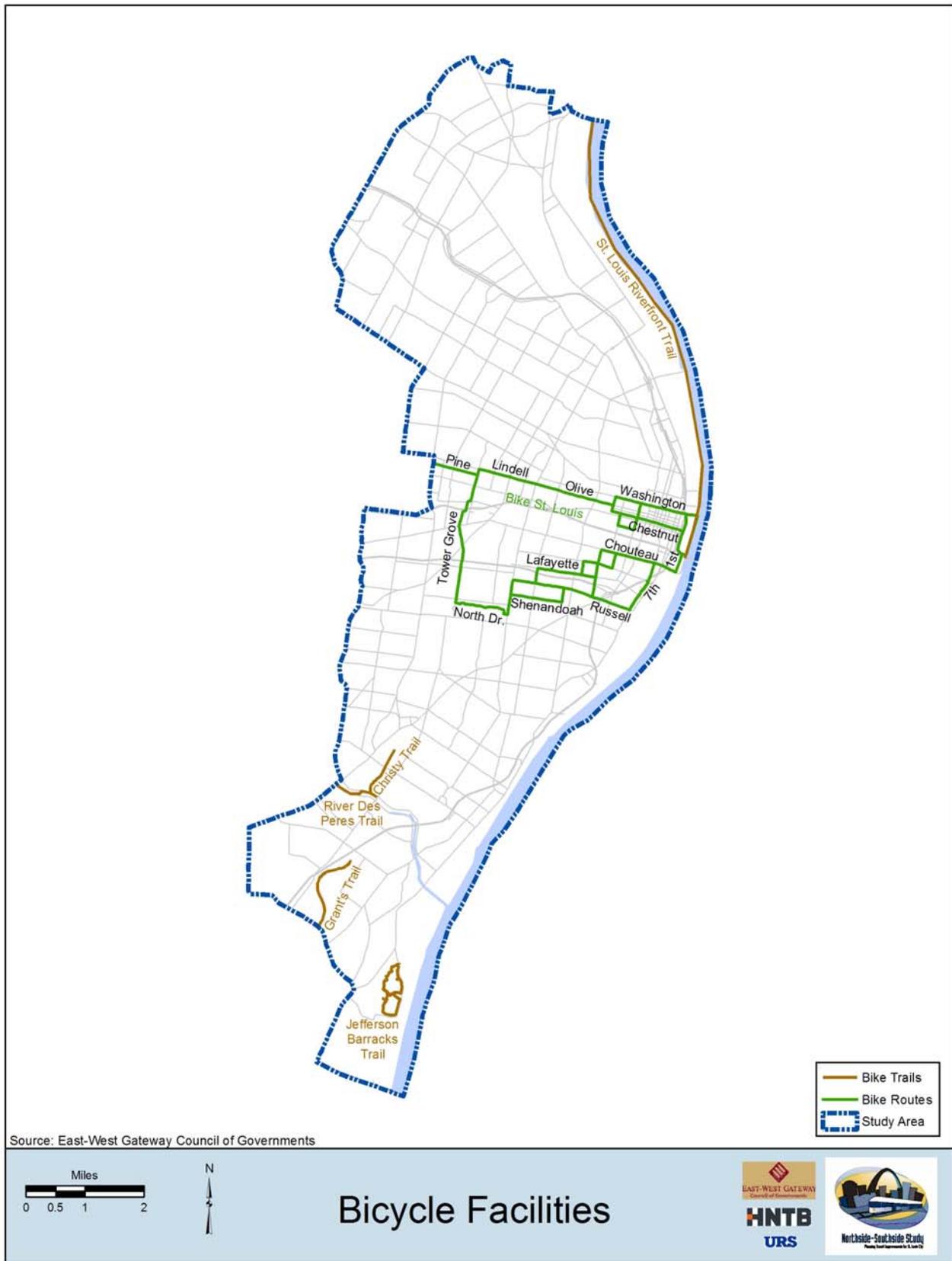
The Chouteau Greenway concept includes the preparation of a master plan of a 195-acre area south of I-64/US-40 between 7th Street and 18th Street. The plan centers on a modern recreation of historic Chouteau’s Pond. Phase III of the Chouteau Greenway development, which secured funds from the Department of Housing and Urban Development to design and engineer detailed plans for railroad coordination, land ownership, and railroad re-alignment, is currently underway.

The Confluence Greenway will link the confluence of the Mississippi and Missouri rivers to the riverfront in downtown St. Louis. The “Riverfront Trail” will extend the Confluence Greenway from the Gateway Arch to Soulard. The projects are being pursued in connection with the Downtown Riverfront Master Plan, which is currently in development (Section 3.2 for more information).

McKinley Bridge is located at Salisbury Street, spanning the Mississippi River into Illinois. The historic bridge previously accommodated automobiles as well as trains. Improvements to the bridge are currently under construction, and the bridge will soon accommodate bicycles and pedestrians, as well as automobiles. The bridge will be connected to downtown St. Louis and the Riverfront Trail via the Branch Street Connector and a two-mile abandoned rail corridor, which has been acquired by the GRG.

The St. Louis Riverfront Bike Trail is a part of the Mississippi River Trail, a National Millennium Trail that travels from the headwaters of the Mississippi River at Lake Itasca, Minnesota to the Delta at the Gulf of Mexico in Louisiana. Within the study areas, portions of the trail have been completed. A signed trail begins at Biddle Street, traveling north along the Riverfront Trail within the Northside study area.

FIGURE 3.7-11: BICYCLE FACILITIES



Chapter 3.7: Transportation Facilities/Services

3.7.4 FREIGHT/INTERMODAL

The Primary Goods Movement Network (PGMN) has been identified by the EWGCOG as a framework for evaluating goods movement. The PGMN includes all highway, rail, water and air facilities that are essential to the efficient movement of freight in the region.

Legacy 2030 states, “the efficient movement of freight, intermodal connections, and the reliability of the transportation network and infrastructure have a profound effect on the region’s economy.” Some of the measures in evaluating system performance include the amount of freight moved, average travel time, cost and ease of access to terminal facilities. These measures are important to a transit study to ensure coordination among modes and identify potential conflicts.

The EWGCOG report, *Industry Perspectives and Recommendations for a Regional Freight Planning Process* (1997), studied the movement of goods in the region. Substantial input from the region’s shippers and carriers was received through numerous meetings and surveys. The St. Louis region historically has held a vital role in the country’s transportation system, particularly with the movement of freight due to its central location, the confluence of major river systems, its extensive railroad network, a strong international airport, and major interstate highway system. Next to Kansas City and Chicago, St. Louis is the 3rd largest rail hub in the country.

Table 3.7-9 shows the mode use for commodity flow to/from the St. Louis metropolitan area. The highways located within the study area used for goods movement are I-64, I-44, and I-55. There are no airports located within the study area. There are also active and abandoned rail facilities and rights of way within the study area (Figure 3.7-12).

St. Louis is the second largest freight hub in the Midwest, and the I-70 corridor is one of the primary east-west interstate routes for the United States.

TABLE 3.7-9: COMMODITY FLOWS BY MODE

Mode	Percent
Truck	76
Water	11
Rail	5
Air	2

Source: *Industry Perspectives and Recommendations for a Regional Freight Planning Process*, 1997.

Northside Study

TABLE 3.7-10: RAIL FACILITY TYPES AND LOCATIONS FOR ST. LOUIS REGION

Company	Facility Name	Facility Type¹
Burlington Northern	North St. Louis Yard	Classification Yard
Norfolk Southern	Luther Yard	Intermodal & Classification

Source: Industry Perspectives and Recommendations for a Regional Freight Planning Process, 1997.
Note:¹A classification yard is a rail facility that only receives incoming trains for switching of cars as needed for various outbound rail shipments whereas an intermodal yard not only switches rail cars for various shipments but also provides access for other modes of freight shipment (i.e., truck trailers) to unload cargo onto outgoing trains.

The Burlington Northern and the Norfolk Southern are both active functional lines in good working condition and are major railroad facilities in St. Louis.

3.7.5 PORTS

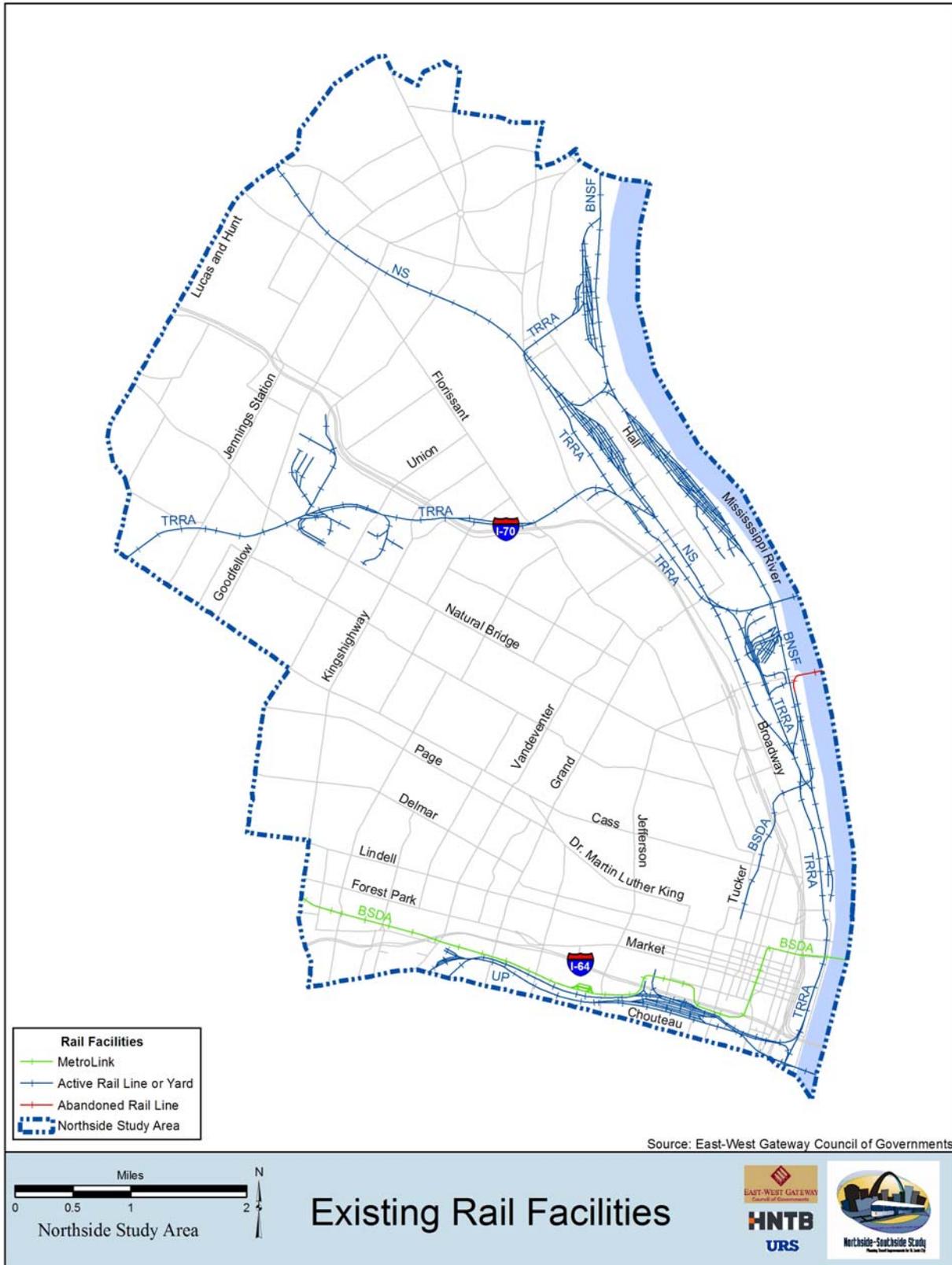
The Port of St. Louis is located at the confluence of the Mississippi, Missouri and Illinois Rivers and provides a national and international transportation link for the region. According to Legacy 2030, "the Port of St. Louis is the second most active inland port behind Pittsburgh and the northernmost port on the Mississippi prior to accessing the locks and dam."

The Port moved over 33 million tons in 2004, according to the U.S. Army Corps of Engineers (EWGCOG data center). The tonnage includes both originating and terminating cargo. The primary commodity handled is coal, followed by food and farm products, and petroleum and petroleum products.

The Port includes a total of 134 piers, wharfs and docks, and more than 55 fleeting areas. The Port runs from the southern boundary of Jefferson County to the northern boundary of Madison County, extending 70 miles along the Mississippi.

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FIGURE 3.7-12: EXISTING RAIL FACILITIES



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

Public Involvement

Chapter 4.0

Northside Study



Chapter 4.1: Introduction

The Northside-Southside public involvement program was designed to generate interest in the study, to explain relevant issues and design concepts so participants could give informed input, and to then garner support for the recommended locally-preferred alternative (LPA). This chapter documents the various approaches and tools used to integrate public involvement efforts throughout the planning process.

To engage the public in all aspects of the Northside-Southside Major Transit Improvements Study, the public involvement program was initiated at the inception of the project. The program focused on three target audiences: government officials, business owners/developers, and the general public. All public involvement activities were designed to be proactive, inclusive, and ongoing. Throughout the study, team members were actively involved in engaging corridor stakeholders, key elected officials, and the general public. A continuous feedback mechanism was critical to each phase of the planning process. In some instances, new ideas and perspectives resulted in revisions to alignment alternatives and plans. This process also helped the study team gauge how well the public understood specific concepts and issues, and where additional information was needed.

When the Northside-Southside Study began, the community already had some interest in and knowledge of the alternatives from the Major Transportation Investment Analyses (MTIA) that were conducted in the same area in the late 1990's. To capitalize on the lessons learned from the MTIAs, City officials were engaged first. St. Louis Mayor Francis Slay's team, including the Board of Public Service and City Planning officials, along with members of the Board of Aldermen, were briefed on the study's purpose, timeline, in-street running light rail and transit-oriented development. Throughout the study, these officials were involved in meetings – formal and informal – to focus on specific elements, hear what citizens were saying and to be updated on the study's progress. These meetings provided opportunities for two-way communication allowing for discussion of issues and viewpoints.

Northside Study



Chapter 4.2: Public Involvement

The study team was able to effectively reach many people and diverse organizations, particularly those from ethnic neighborhoods and businesses. From the study's beginning, the team undertook a public involvement program that was multi-faceted, multi-cultural, and multi-lingual. Special effort was made to reach out to St. Louis' growing immigrant and New American populations. Understanding that people learn and participate in different ways and in different styles, the study team developed its public engagement program to provide several ways for people to participate.

The public involvement program's cornerstones featured:

- Guidance on technical and community issues through two advisory committees.
- Providing multiple opportunities for understanding the study's purpose and process and for giving input through numerous neighborhood presentations and public meetings.
- Offering a variety of ways to obtain study information and to encourage the public's involvement.

Program outreach tools included:

- Hotline.
- Website.
- Study brochure.
- Newsletters.
- Information sites.

In addition to the above tools, the study team also created and implemented a media relations plan to help ensure that reporters and editors understood the study's process and received factual information.

4.2.1 COMMUNICATION TOOLS

The study team understood that proactively making people aware of the study was key to their engagement and to gaining acceptance for the LPA. Making sure there was a continuous feedback loop to show citizens how the study team heard them and incorporated their input was vital to maintaining their involvement.

Web-Site

A Northside-Southside Study web-site, www.northsouthstudy.org (Figure 4.2-1), was created at the start of the study and updated throughout. All study information, including the boards displayed at the public meetings and alternative design maps were housed on the web-site. Downloadable files of the technical reports developed throughout the study were also available online. Visitors to the web-site could also use it to send comments, questions, and requests to join the mailing list. Over the course of the study, the web site averaged 44 visitors per day and had a total of 29,350 visitors. *Appendix A for the e-mail contact database.*

Northside Study

Mailing Database

A general mailing list consisting of area residents, key stakeholders, and public officials was maintained throughout the duration of the study. Organizations such as the Downtown St. Louis Partnership shared their mailing lists with the team to ensure their constituent groups and members had an opportunity to participate in the process. In addition, attendees at all study briefings, presentations, and open houses were encouraged to join the mailing list. At the study's completion, the mailing database included 1,644 listings, and the email database included 630. *Appendix B for the mail contact database.*

Hotline and Correspondence

A telephone hotline was established to provide opportunity for the public to ask questions and share comments. The hotline number was listed on all communications materials. A recorded message informed callers to expect a response within two business days. Calls received totaled 34. Most callers requested information regarding public meetings; others left comments about the alignment alternatives. *Appendix C for the hotline message log.*

The study team also provided the public with a project mailing address and an email address on all communications materials. To ensure all correspondence received a prompt response, a detailed communications protocol was developed. It included a communications record template that team members were required to complete after corresponding with any citizen or group outside of a public meeting. Filling out such a record allowed the study team to make sure that no citizen's concerns went unanswered. More than 85 emails and 23 letters were received. The emails covered a wide range of topics, but most were requests for inclusion in the study's mailing list. Others commented on the study or suggested variations of proposed alignment alternatives. Most of the letters received were specifically directed to the study's advisory committees or to the East-West Gateway Council of Governments' (EWGCOG) Board of Directors. A group representing Southside institutions and neighborhood associations conducted a mailing campaign supporting alternatives serving their areas.

Logo and Study Brochure

A study logo was created to brand the study and give it an identity so it would be easier for people to recognize and remember. All materials produced carried this logo. The study brochure debuted the logo. The brochure was developed to announce the study, the areas under analysis, and the purpose and goals. *Appendix D for a copy of the brochure.*

Newsletters

During the study, four newsletters were designed and written to keep citizens informed on study milestones and final outcome. These newsletters were distributed prior to public meetings and during particular phases, when it was important to educate the public about certain aspects of the study. In total, 4,750 newsletters were printed and distributed for this study. *Appendix E for copies of each newsletter.*

- The first newsletter announced the study, its purpose and goals, and the first round of public meetings. It also introduced the concept of "street-running" trains – where light rail vehicles run on tracks in a separate right-of-way within city streets. This newsletter was key to developing public understanding of this design concept, a first in St. Louis. In addition to illustrating how LRT vehicles could operate in city streets, this newsletter was used to garner involvement; 1,026 copies were distributed to residents during outreach presentations.

Chapter 4.2: Public Involvement

- The second newsletter highlighted the preliminary alignment alternatives. It also included announcements about upcoming station planning workshops, maps, and articles on land-use planning, and the public's involvement including the special meetings for immigrants and New Americans.
- In addition to announcing upcoming open house meetings, the third newsletter included an article about evaluation measures and next steps.
- The final newsletter presented the LPA recommended by the study team and adopted by the EWGCOG Board of Directors.

Information Sites

Copies of technical documents developed during the study, such as the *Purpose and Need* and *Existing Conditions* chapters of this report, were placed at public-access sites in neighborhoods throughout the Northside (including downtown) and Southside study areas. This enabled people without Internet access to view these documents. In addition, it allowed access for people who wanted to view such technical documents firsthand. Public-access sites were listed on all outreach materials. Sites included:

- Citizens for Modern Transit.
- Downtown St. Louis Partnership, Inc.
- St. Louis Regional Chamber & Growth Association.
- The reference desks at several St. Louis Public Library branches:
 - Central Library.
 - Cabanne.
 - Carondelet.
 - Carpenter.
 - Julia Davis.
 - Kingshighway.
 - Walnut Park.

FIGURE 4.2-1: STUDY WEB-SITE

CONTACT US
Home

Northside-Southside Study

Planning Transit Improvements for St. Louis City

OVERVIEW MAPS TIMELINE TRANSIT PLANNING REPORTS GET INVOLVED LINKS

WELCOME

Search:

Thank you for visiting the web site for the Northside-Southside Transit Improvements Study. From January 2006 for the next 18 months, this is where you will find the latest information on planning MetroLink and other major transit improvements for the [City of St. Louis](#), Missouri.

The Northside-Southside Study is being sponsored by [East-West Gateway Council of Governments](#), along with [Metro](#) and the [Missouri Department of Transportation](#). The purpose of this study is to build upon previous planning efforts that recommended light rail and other transit improvements for St. Louis City. To learn more, visit our [overview](#) page. Thank you for your interest in the Northside-Southside Study.

STUDY AREA MAPS

[CLICK HERE TO VIEW MAPS OF THE STUDY AREA.](#)

Latest News and Events

September 24, 2007

Open House Summary, Sep. 18-20, 2007

Want to be a part of transit improvements for the city of St. Louis but missed the final round of public open houses held September 18-20, 2007? Find out how the detailed alternatives were evaluated by viewing the information presented at the public meetings. [Click here](#) to review the material covered at the open house.

[Download the Open House Boards - Part 1](#) (8.6 MB PDF)
[Download the Open House Boards - Part 2](#) (3.2 MB PDF)

The newsletter for the final series of open houses has been added to the [Get Involved](#) page.

August 27, 2007

We need your opinion! Come to the final round of public open houses and let us know which new MetroLink route would be best for St. Louis City. Three public open houses will be held for your convenience. The same information will be available at each meeting including a presentation to update you on the latest study information. You will learn how the alternatives were evaluated and the outcome of feedback from previous public meetings. Come be a part of transit improvements for the city of St. Louis on September 18, 19, & 20. [Click here to download the public meeting announcement.](#)

Comments

Throughout this study, we will need your input. One way to give us your comments is via this web site, where you can also sign up to join our mailing list. [Click here](#) to fill out a form. You can also call our study hotline at 314-621-3365 and leave a verbal comment and/or question.

Northside-Southside Study c/o Vector Communications | 701 N. 15th St. | Mailbox 43 | St. Louis, MO 63103 | (314) 621-3365

Chapter 4.2: Public Involvement

4.2.2 COMMUNICATION APPROACH

Giving people information about the study was a fundamental step toward getting their informed feedback. Realizing how busy people's schedules are and understanding that a planning study does not compete well with more pressing day-to-day matters, the study team conducted briefings at scheduled community meetings. In essence, the team took the study on the road. This approach formed the cornerstone of the public involvement plan. However, engaging the public within the different study areas required somewhat different approaches, since these stakeholders vary in how they obtain information and get involved in issues.

Northside Approach

For Northside residents, the study team used the St. Louis Democratic City Central Committee (SLDCCC) and the Urban League Area Council-Federation of Block Units as the primary vehicles for reaching residents and generating participation. The SLDCCC group is composed of the city's 56 ward committee people. Because they conduct the groundwork for major issues affecting their neighborhood, they have the ear of the people and they handle the grassroots work for their respective alderpersons. The Urban League's individual block units operate as cooperative, self-help organizations working to improve neighborhoods, educate residents, and enhance cooperation among citizens and government.

The study team conducted 28 outreach presentations at ward and unit meetings over the course of the project, especially at major planning milestones and decision points. Other presentations were made at meetings of Northside neighborhood and civic organizations, such as the NAACP. Below is a list of ward groups for whom presentations were made, the neighborhoods they serve, and their respective alderpersons:

- **1st Ward** –Wells/Goodfellow, Kingsway East & West, Penrose, Mark Twain, Walnut Park East (Charles Quincy Troupe).
- **2nd Ward** –Near North Riverfront, College Hill, O'Fallon, North Pointe, Baden, Riverview, North Riverfront (Dionne Flowers).
- **3rd Ward** –Jeff VanderLou, St. Louis Place, Hyde Park, College Hill, Fairground Neighborhood, O'Fallon (Freeman Bosley).
- **4th Ward** – Lewis Place, Kingsway East, The Greater Ville, Vandeventer (Samuel L. Moore).
- **5th Ward** – Downtown West, Jeff VanderLou, St. Louis Place, Carr Square, Columbus Square, Old North St. Louis, Near North Riverfront, Hyde Park (April Ford-Griffith).
- **6th Ward**– Fox Park, Tower Grove East, Compton Heights, The Gate District, Lafayette Square, Peabody/Darst/ Webbe, Downtown West, Midtown, Jeff VanderLou (Kacie Starr Triplett).
- **7th Ward** – Downtown, Downtown West, Near North Riverfront (Phyllis Young).
- **21st Ward** – Kingsway East, The Greater Ville, O'Fallon, Penrose, Mark Twain (Bennice Jones King).
- **22nd Ward** – West End, Wells/Goodfellow, Mark Twain/I-70 Industrial, Hamilton Heights (Jeffrey Boyd).
- **27th Ward** – Walnut Park East & West, North Point, Baden (Gregory Carter).

Northside Study

Downtown Approach

While downtown is considered part of the Northside area for purposes of this study, its target audience differed from those of the larger Northside and Southside areas. The downtown residential population has been increasing, but the area still primarily functions as an employment center. Many downtown residents and employees are served by the area's extensive public transportation system, including both MetroBus and MetroLink. In order to maximize participation of residents, commuters, and other employees, the study team facilitated public meetings in the late afternoon/early evening. Team members also manned booths at three major downtown places of employment.

At the study's inception, stakeholder interviews were conducted with members of the Downtown St. Louis Partnership, business owners, developers, and elected officials. Early in the study, business owners and developers were invited to participate in a transit workshop to re-examine and refine the route for downtown service. In addition, they were educated on in-street running LRT and transit-oriented development (TOD). A second luncheon workshop was held to focus on TOD. Subsequent meetings with city officials and developers helped ensure that the transit strategy for the downtown area addressed the concerns of those directly affected.

Southside Approach

Unlike the Northside, the Southside is more constituent-driven than politically driven. In addition to relying on their aldermen for information, the Southside neighborhood associations have developed into a driving force. They are active and well-organized, with many supporting their own newsletters and most having their own web-sites. The study team used the neighborhood associations and business districts, along with their communications vehicles, to engage and encourage participation among residents on the Southside. Forty-one presentations were conducted in 23 identified neighborhood organizations:

- Benton Park.
- Benton Park West.
- Buder.
- Carondelet.
- Chippewa.
- Dutchtown.
- Eads.
- Forest Park Southeast.
- Fox Park.
- Grace Hill.
- Grand Oak.
- Gravois Park.
- Holly Hills.
- Lafayette Square.
- Marine Villa.
- McKinley Heights.
- McRee Town.
- Morganford.
- Shaw.
- Soulard.
- St. Vincent.
- The Hill.
- Tower Grove East.

Because of the high concentration of ethnic populations in the Southside study area, additional effort was made to ensure the public involvement program was multi-cultural and multi-lingual. The International Institute, recognized for helping move refugees from dependency to productivity and self-sufficiency, is often the first stop for immigrants and New Americans arriving in St. Louis. The study team partnered with the Institute to bridge a relationship with leaders of the Hispanic, African, Bosnian, and Vietnamese communities.

Chapter 4.2: Public Involvement

4.2.3 COMMUNITY ENGAGEMENT TECHNIQUES

While the study team's outreach efforts were intended to raise public awareness of the need for transit improvements, its community engagement techniques focused on the development of meaningful relationships with key stakeholders, residents, and business owners so they could give informed input. Such strategy allowed the team to ensure that those most impacted by the proposed transit improvements were given multiple opportunities to learn about the study and to offer their input on the alternatives. The study team sought input from the public by employing various activities:

- Stakeholder interviews.
- Technical Advisory Committee meetings.
- Policy Advisory Committee meetings.
- Resource Agencies Committee meetings.
- Officials' briefings.
- Outreach presentations.
- Planning workshops.
- Public meetings.

Stakeholder Interviews

The first task toward generating understanding of and involvement in the Northside-Southside Study was conducting stakeholder interviews; 74 were held between November 2005 and March 2006. The interview process involved at least two study team members, who talked with individuals and groups of stakeholders. Interviews with government officials and community and business leaders were conducted at their offices. These interviews afforded team members the opportunity to explain the study's goals and objectives, as well as key design concepts like street-running LRT. They also provided a mechanism to obtain initial stakeholder thoughts regarding city transit and to learn how members of the public would want to be engaged during the study process. The study team initially identified only participants with a stake in transportation, but additional stakeholders were identified during the interview process. The stakeholders represented various groups:

- Area hospitals.
- Board of Aldermen.
- Business community.
- Chambers of Commerce.
- City of St. Louis.
- Colleges and universities.
- Congressional offices.
- Developers.
- Metro.
- Missouri Department of Transportation.
- St. Louis County.
- State legislators.
- Utility companies.

Nearly 300 stakeholder comments were documented during the interviews. Key comments are summarized in Table 4.2-1:

TABLE 4.2-1: STAKEHOLDER COMMENTS

Impact Category	Stakeholder Interview
	Comments
Development/ Economic Development	<ul style="list-style-type: none"> • Light rail will enhance development. • Connect light rail to developments: <ul style="list-style-type: none"> ○ Greenways (Chouteau, Dr. King, Great Rivers, St. Vincent). ○ Loughborough Commons and bikeway. ○ St. Louis University. ○ Benton Park neighborhood. ○ Rehabbed multi-family homes along Natural Bridge . • Could negatively impact Northside small businesses and residences.
Street/Road Key Issues	<ul style="list-style-type: none"> • Concern about cutting off streets and parking. • Washington Avenue now too developed. • Tucker could be better choice for Downtown route. • SLDC studying changing downtown two-way streets to one-way. • Grand near hospitals to undergo upgrading. • South Grand too narrow.
Downtown Loop	<ul style="list-style-type: none"> • Most controversial part of study, current loop detrimental to present development. • Connect either entertainment areas or residential areas. • Prefer old-fashioned streetcars. • Want people, not traffic. • Do not eliminate downtown parking and revenue.
Cost/Funding Issues	<ul style="list-style-type: none"> • City does not have money for more MetroLink. • No money to operate MetroLink. • Project needs to be funded at regional and federal levels. • Federal officials support study and will help secure funding.
Employment Issues	<ul style="list-style-type: none"> • Northside light rail needed to connect to West County jobs. • Chouteau Greenway to generate 35,000 jobs within 30 years. • Downtown employees coming from the Southside and Illinois.
Street Running Issues	<ul style="list-style-type: none"> • Could be development incentive especially for Northside. • Educating public on benefits of street running important. • Equity issue between Northside and Clayton (like I-64). • MoDOT not against but must maintain capacity for vehicular traffic.
Ridership	<ul style="list-style-type: none"> • Medical complexes provide riders. • Southside has more prospective riders. • MRB toll will increase MetroLink riders.
Other Comments	<ul style="list-style-type: none"> • Pleased with early inclusion. • Northside residents perceive Metro as unfair. • Northside residents believe light rail will replace buses. • Northside aldermen will work to have a Northside alignment built first. • Coordination: <ul style="list-style-type: none"> ○ Study and city's land use plan and development. ○ Study and downtown traffic study. ○ EWGCOG and Metro.

Chapter 4.2: Public Involvement

Dominant themes identified by stakeholders included the need of improved access to jobs and other opportunities and the importance of promoting economic development. The most commonly identified issues and needs included:

- Improving access to key activity and employment centers.
- Promoting economic development.
- Preserving existing neighborhoods and communities.

The stakeholder interviews were productive in that they provided useful information on what issues and concerns the study team needed to address proactively during the study. After conducting the interviews and analyzing the information, strategies and approaches were further developed for involving the public and presenting the type of information that would solicit the most meaningful feedback.

Technical Advisory Committee

A critical component of the public involvement program was the formation of the Technical Advisory Committee (TAC). Sixteen study area planning and engineering professionals, community leaders, and key stakeholders were invited to serve on the TAC. To ensure the committee's success, the study team advised potential members of their role and responsibility and outlined the length of their commitment. *Appendix F for a list of TAC members.*

The TAC met five times in the EWGCOG boardroom. All meetings were open to the public. However, no one outside of the committee attended. The first meeting was held on April 12, 2006 and established the tone for the committee. The TAC previewed the transportation-related problems identified through the scoping process and the subsequent goals and objectives developed by the study team for each corridor.

After the initial TAC meeting, subsequent meetings were used to k members' technical assistance and to preview public meeting presentations. These TAC meetings included:

- **June 1, 2006** – Previewed all the alternatives that would be presented to the public at the first round of open house meetings and the screening of the Preliminary Alternatives.
- **August 10, 2006** – Discussed the preliminary alternatives, particularly the changes on the Southside to include the Jefferson alternative and design issues relating to the alternatives in the downtown area.
- **April 24, 2007** – Reviewed maps of the detailed alternatives focusing on the strengths and weaknesses of the Gravois Southside alternative and the Downtown Olive Loop.
- **August 22, 2007** – Previewed the evaluation results of the final detailed alternatives and the study team's recommendation of an LPA.

Although TAC members were initially advised that theirs was an advisory role, participants at the final TAC meeting placed a motion on the floor to indicate their support of the team's LPA recommendation. *Appendix F for minutes of all TAC meetings.*

Policy Advisory Committee

In addition to the TAC, a Policy Advisory Committee (PAC) was formed. PAC members represented the wards directly affected along the Major Transportation Investment Analysis'

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(MTIAs) LPAs, the Aldermanic Black Caucus, Southside neighborhood groups, and downtown developers. Members were selected by Mayor Slay's office, EWGCOG, and the study team. Similar to the TAC, the PAC was given specific roles and responsibilities:

- Disseminate study information.
- Inform the study team of public sentiment (issues and concerns).
- Give input on key study issues.

PAC members were also reminded that they were advisors to the study team and that while EWGCOG and its partners, Metro and the Missouri Department of Transportation (MoDOT), would consider citizen input, EWGCOG's Board of Directors was ultimately responsible for final study decisions. *Appendix G for a list of PAC members and meeting minutes.*

The PAC met prior to each round of public meetings. All meetings were open to the public. However, no one outside of the committee attended. At their first meeting on May 4, 2006, the study team previewed all the alternatives that would be presented to the public at the first round of open houses, as well as screening criteria. The second meeting on August 31, 2006 allowed PAC members to preview the preliminary alternatives, particularly changes on the Southside to add the Jefferson alternative, and design issues relating to the alternatives in the downtown area. The final meeting on August 22, 2007 included a presentation on the evaluation of the final detailed alternatives and the study team's recommended LPA.

Resource Agencies Committee

In addition to the TAC and PAC, there was a third group, called the Resource Agencies Committee (RAC). The RAC consisted of representatives for the Missouri Department of Transportation (MoDOT), United States Environmental Protection Agency (USEPA), Missouri Department of Natural Resources (MoDNR), and National Park Service (NPS), among other agencies. This group was involved in two meetings over the course of the study, held June 26, 2006 and September 25, 2007. Attendees participated in two informational sessions, designed to familiarize them with the study's goals and objectives, its progression, and its resulting locally-preferred alternative (LPA). *Appendix H for a list of RAC members and meeting minutes.*

Officials Briefing

In addition to stakeholder interviews, the study team conducted briefings with city, state, and congressional officials throughout the study's duration. These briefings allowed the study team to get their input and address their concerns, as well as keep them apprised of the study's progress. These briefings were completed in a variety of ways. Members of Mayor Slay's administration participated in the advisory committees. The Board of Alderman President was briefed periodically. The study team held open house meetings in the Board of Alderman chambers to allow alderpersons to view study maps, alternative routes, and design plans at their leisure and to talk one-on-one with study team members. Informal aldermanic briefings were conducted on Friday mornings after their regularly scheduled board meetings. Briefings with Congressman Lacy Clay and Congressman Russ Carnahan's staffs were conducted early in the study. Near the end of the study, team members briefed the Congressmen themselves. This was key, because these officials will be important in any future effort to secure the federal funding required to advance the LPA through project development and to the Environmental Impact Statement (EIS) process.

Outreach Presentations

Much of the community engagement focused on going to residents instead of having them

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come to the study team's public events. During the study, 96 presentations were made to more than 600 people. Presentations were given to ward and neighborhood associations in the Northside (and downtown) and Southside study areas.

At various study milestones, members of the study team's public involvement staff and the Transportation Corridor Improvement Group (TCIG) conducted brief presentations. After a 10- to 15-minute presentation, meeting attendees were able to ask questions and share comments. Public feedback was documented and shared with the study team. Groups were targeted based on their proximity to the areas being served by the proposed alternatives. Consequently, some groups received study update presentations three and four times. Groups were added or dropped as alternatives moved through the evaluation process and were narrowed. For this reason, each presentation was tailored to its specific audience, thereby ensuring that key points were made within predetermined time allocations. Handouts, including the study brochure, the most current study newsletters, and fliers announcing the public meetings were left behind to further encourage public involvement.

On several occasions, there were more residents in attendance at neighborhood meetings than at the public meetings. This indicated that when engaging the public, it is important to go where and when residents meet, rather than expect them to come to a separate event. It also suggested that bringing information to residents decreased attendance at study-wide events. However, it should be noted that only the information previously presented at public meetings was shared at these meetings, involvement in upcoming public events was encouraged, and residents were appreciative of the team's efforts to brief them on the study. In addition, many meeting participants indicated that they found out about the public meetings via the newsletters. Many of the names on the mailing list were the result of the sign-in sheets from outreach presentations. Considering the number of people engaged at the outreach level versus public meetings, the study team more than doubled the number of people who were involved. *Appendix I for a complete listing of the Northside-Southside outreach presentations.*

Workshops

During the study, six workshops were conducted. Team members presented a workshop, "How Public Transit Can Spur Neighborhood Economic Development," at the St. Louis Area Community Organization's Neighborhood Conference on February 14, 2007. In addition to study team members, a representative from Emerson Park Development Corporation was available to share experience as a neighborhood leader, who encouraged transit officials to build a MetroLink station near Emerson Park (East St. Louis, IL), thereby facilitating revitalization of the area.

A transit/land use workshop was held at EWGCOG office on February 24, 2006 for stakeholders representing Metro, MoDOT, and St. Louis City and County. The purpose of the workshop was to have a group discussion of transit and land use alternatives.

On May 4, 2006, the study team held a downtown alternatives development workshop at the Downtown St. Louis Partnership. Study team members presented proposed downtown alternatives to representatives of major downtown employers, developers, and transportation providers.

A series of public station planning workshops were held October 27-29, 2006. More than 80 people attended the three workshops, which focused on the alternatives in each of the study areas. Attendees viewed project information and heard a presentation on station design and land use before breaking into working groups. Study team members led the work group

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discussions, where attendees participated in station planning. After that activity, representative attendees gave brief summaries of their groups' discussions.

Public Meetings

Three rounds of public meetings, including the station planning workshops, were held during the study. These public events were scheduled as part of the development of the *Purpose and Need* statement that serves as Chapter 2 of this report, the development, and screening of the preliminary alternatives, and the evaluation of detailed alternatives. The study team selected public meeting facilities in each study area that were well-known locations and wheelchair accessible. In addition, meeting exhibits and boards, sign-in sheets, welcome handouts describing what attendees would find at each station, comment forms, and other information materials were created. To make sure the team provided correct information to attendees, talking points and potential questions were created and distributed to all members prior to each public meeting. After each public meeting, all written comments were documented in a report. After each round of meetings, all prepared displays were put on the study's web-site, so those who were unable to attend still had the opportunity to review and comment.

At each public meeting, study information was placed on foam core boards on easels and displayed throughout the meeting room at stations divided by topic. Study team members manned each station, giving attendees the opportunity to ask one-on-one questions and to view boards at their leisure.

- **Purpose and Need Open House** – Two sets of meetings were held in June 2006, with a total of 198 attendees. These meetings shared the goal of presenting the eight preliminary alternatives identified to best meet the City of St. Louis' transit needs. They also provided the opportunity to collect information on public perception of why transit improvements are needed and what criteria are most important in evaluating preliminary alternatives.
 - General Public Meetings – Three meetings were offered on three consecutive days (June 16-18) at three different locations (the Herbert Hoover Boys and Girls Club, the Missouri Botanical Garden, and the Downtown St. Louis Partnership). Preliminary alternatives with the most positive support were the Natural Bridge alignment on the Northside, the Olive/Chestnut Loop downtown, and the Chouteau/Grand alignment on the Southside; respondents felt these alternatives provided the greatest development opportunities and served the most people. Alternatives with the least support were the West Florissant alignment on the Northside and the Chouteau/UPRR bus rapid transit (BRT) alignment on the Southside; concerns included dividing the Northside community, not serving populated Northside areas, and using bus instead of light-rail. The remaining alternatives received mixed responses; questions regarding these included location, potential ridership, and availability of existing service. Eighty-five percent of respondents identified sustainable development, access to opportunity, and safety and security as reasons for transit improvements. Attendees prioritized criteria for screening alternatives as sustainable development opportunities and population considerations (Northside and Southside) and ridership and development (downtown).
 - Limited-English Speaking Meetings – Additional meetings were offered for the limited-English speaking community. Materials were translated for African, Bosnian, Hispanic, and Vietnamese attendees, and interpreters were available throughout the process. The Southside Chouteau/Grand alternative received the most positive support; its close proximity to St. Louis University, places of employment, and area grocery stores made it appealing. Respondents identified reasons for transit improvement as sustainable

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development, access to opportunity, and safety and security. The top criteria for screening alternatives selected included employment and population considerations (Northside and Southside) and development and ridership (downtown).

- **Preliminary Alternatives Station Planning Workshop** – A total of 82 people attended meetings held October 24-26, 2006 at the Fifth Missionary Baptist Church on the Northside, Lift for Life Academy on the Southside, and the Regional Collaboration Center downtown. Interpreters were available to the limited-English speaking community at the Southside meeting; these accommodated African, Bosnian, Hispanic, and Vietnamese attendees. Workshop objectives focused on learning public perception of the final detailed alternatives, land-use planning principles and practices, and proposed station locations and area plans. Discussions resulted in a series of observations:
 - Station Locations:
 - Consider station locations in the median and at curbside.
 - Consistently place stations ¼- to ½-mile apart.
 - Place stations closer to existing MetroLink in the downtown area.
 - Locate stations near bus stops and street parking in the Northside and Southside areas.
 - Consider stations on the Northside at Natural Bridge/Shreve, 14th/Cass, and Natural Bridge/Vandeventer and on the Southside at UPRR/Kingshighway, Chouteau/Compton, Gravois/Jefferson, and near South Grand.
 - Consider stations near hospitals and Saint Louis University.
 - Station Design:
 - Stations should be transparent for safety.
 - Concerned about the safety of children and seniors crossing the street to access stations.
 - Concerned about the safety of vehicles making left turns.
 - Concerned about emergency vehicle accessibility, signalization, and the speed of trains.
 - Station Appearance:
 - Make stations context-sensitive so they do not overshadow existing structures.
 - Provide protection from the elements.
 - Land Use:
 - Prefer mixed-use, high density land uses in all corridors.
 - Desire pedestrian- and neighborhood-friendly development.
 - Prefer more service-oriented and commercial development.
 - Prefer parking/park-and-ride lots at appropriate locations.
 - Alignments:
 - Prefer larger east-west loop in downtown.
 - Like the alignments that use the Union Pacific Railroad (UPRR) although there is concern about use of its right-of-way.
 - Like street running on wide streets that connect to vital neighborhoods.

Conclusions were also drawn from the 38 comment forms completed at the workshops:

- Two-thirds of the attendees (66%) said the stations are correctly located.

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- More than half the attendees (60%) felt the station designs (in terms of sidewalk access, safety, and traffic) worked for their neighborhoods.
- Many noted they liked the glass and steel look of the transit shelter examples because it is consistent with the existing system, modern, transparent, and much easier to keep clean.
- There was the feeling that stations should not distract from the neighborhoods but instead “fit in” with the existing look.
- Most attendees expressed a need for higher density and mixed-use development in all three corridors – Northside, Southside, and downtown.
- Several downtown attendees suggested limiting additional parking.
- In both the Northside and Southside meetings, comments for residential services and community-oriented businesses were noted.
- **Detailed Alternatives Evaluation Open House** – Two sets of meetings, one for the general public and one for the limited-English speaking community, were held in September and October 2007.
 - General Public Meetings – Three meetings on three consecutive days (September 18-20) at three locations (Fifth Missionary Baptist Church on the Northside, Meramec Elementary School on the Southside, and the Regional Collaboration Center downtown) presented material to a total of 124 attendees. Most participants were local residents, who had learned of the meetings through the project newsletter, web-site, and/or e-mail announcement. Attendees indicated their residences and places of employment on a map; 65 residences and 50 employment locations were identified. Five information stations manned by study team members presented the Northside-Southside Study overview, alignment alternatives, station land use and street design, detailed evaluation results, and public involvement/next steps. Participants completed a total of 53 comment forms, with a total of 66 comments; 63% of attendees who provided comments agreed with the study results, and 60% supported the study team’s selected LPA.
 - Limited-English Speaking Meetings – Two additional meetings were held on two consecutive days (October 27-28) at two locations (the International Institute and St. Cecilia’s Catholic Church). These meetings provided materials and comment forms translated for African, Bosnian, Hispanic, and Vietnamese attendees. Interpreters for each immigrant group worked with the study team during the meetings, translating the information and questions, answers, and comments. Most attendees were local residents and had learned of the meetings through community organizations. All attendees who commented agreed with the evaluation results, and 92% supported the selected LPA. Respondents noted that these meetings were generally very useful, very organized, and well worth attending.

Public Meeting Evaluation

Participants in the public open house meetings were surveyed and given the opportunity to share feedback. Factors evaluated included attendee profile, meeting notification, meeting information, study team helpfulness, meeting organization, and meeting worth. *Appendix J for comment summary reports for all meetings.*

- **Attendee Profile** – Public open house meeting attendees represented city residents, property and business owners, and frequent users of public transit. More than two-thirds of all attendees reside within the project study area. Additionally, 13% of the participants own property, while another 9% are business owners. Frequent transit riders represented 7% of attendees (Figure 4.2-2).

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- **Meeting Notification** – To determine the most effective method of notification for the public events, attendees were asked how they found out about the meetings (Figure 4.2-3). Flyers (21%), email (17%), community organization (14%), newsletter (12%), and web-site (12%) were the primary sources of notification. Under the “other” option, attendees wrote they had attended other open house meetings, heard of it through their church, or in a newspaper ad.
- **Meeting Information** – A lot of information was covered at each open house meeting. As illustrated in Figure 4.2-4, most attendees indicated the information provided was either useful (42%) or very useful (57%). Only 1% noted the information provided was not very useful.
- **Study Team** – Members of the study team were available to answer questions, take notes, and facilitate working groups as appropriate. As shown in Figure 4.2-5, all respondents rated the study team as either helpful (34%) or very helpful (66%).
- **Meeting Organization and Worth** – Attendees also rated the meetings for their level of organization and overall worth (Figures 4.2-6 and 4.2-7). More than half of all participants indicated the meetings were well-organized (71%) and well worth attending (63%).

FIGURE 4.2-2: ATTENDEE PROFILE

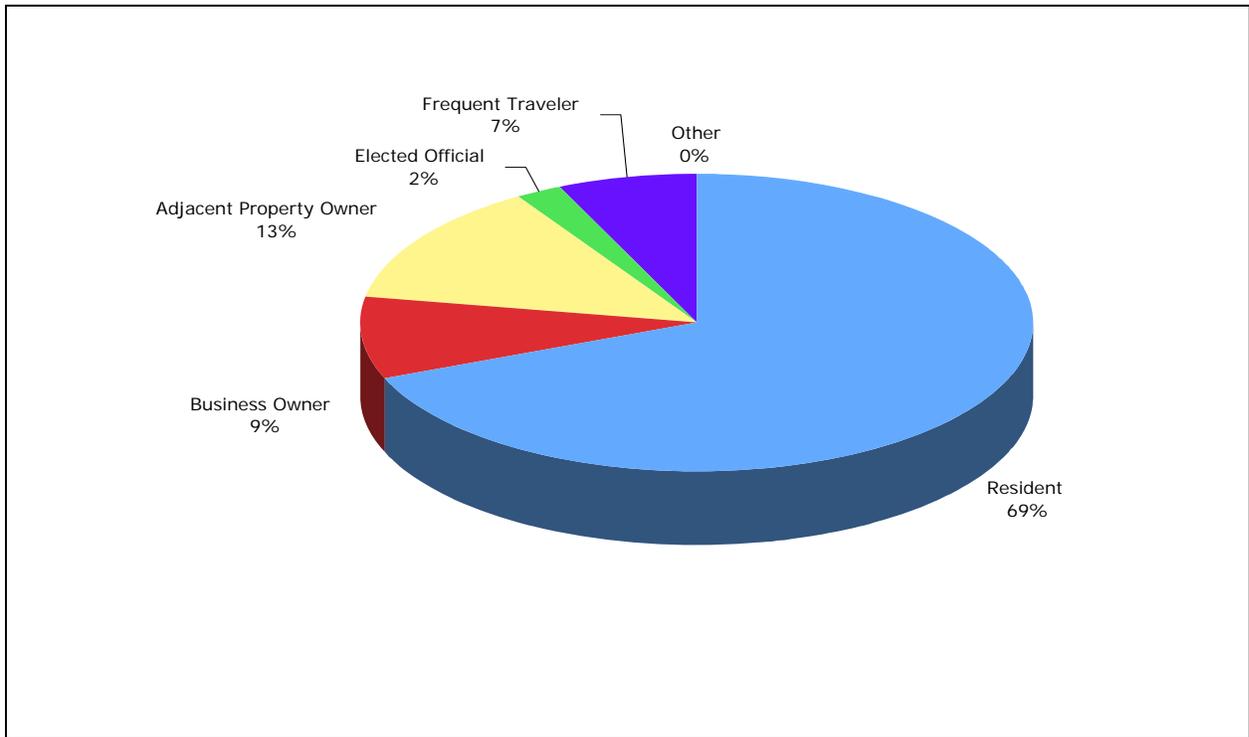


FIGURE 4.2-3: MEETING NOTIFICATION

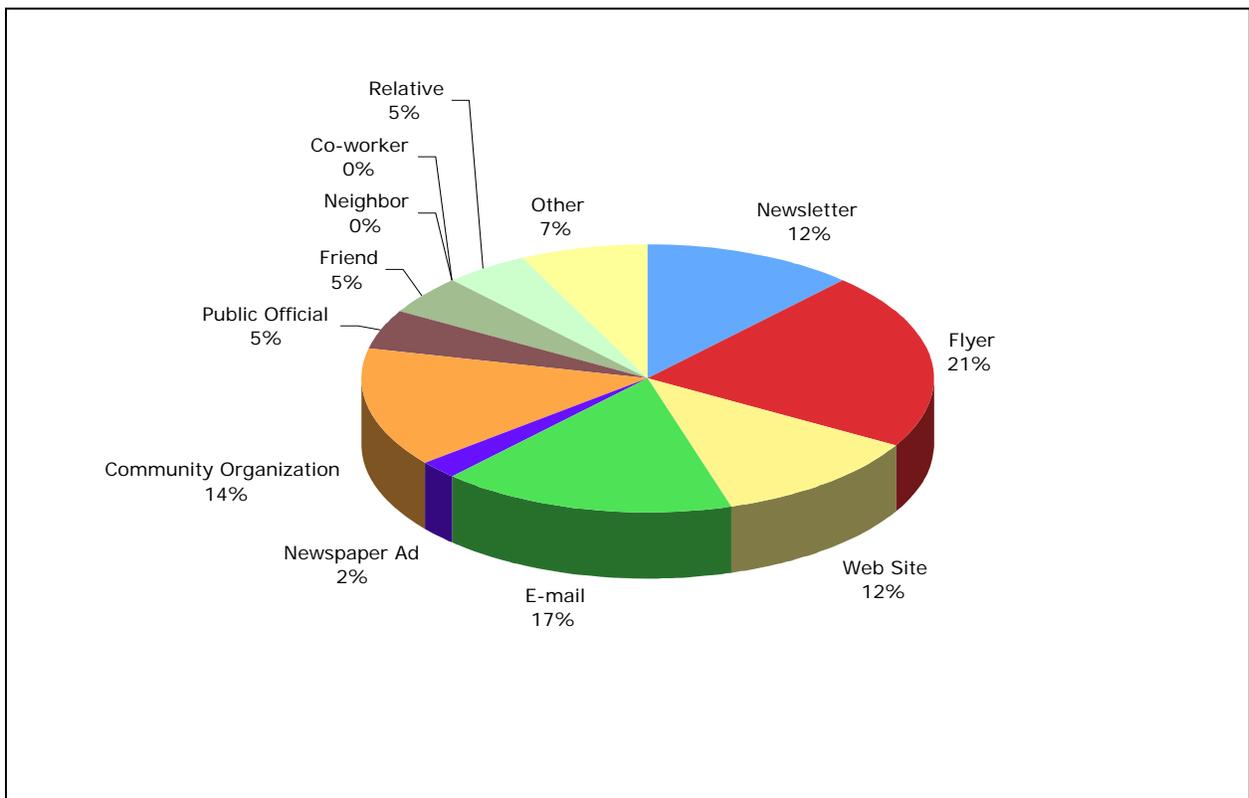


FIGURE 4.2-4: MEETING INFORMATION

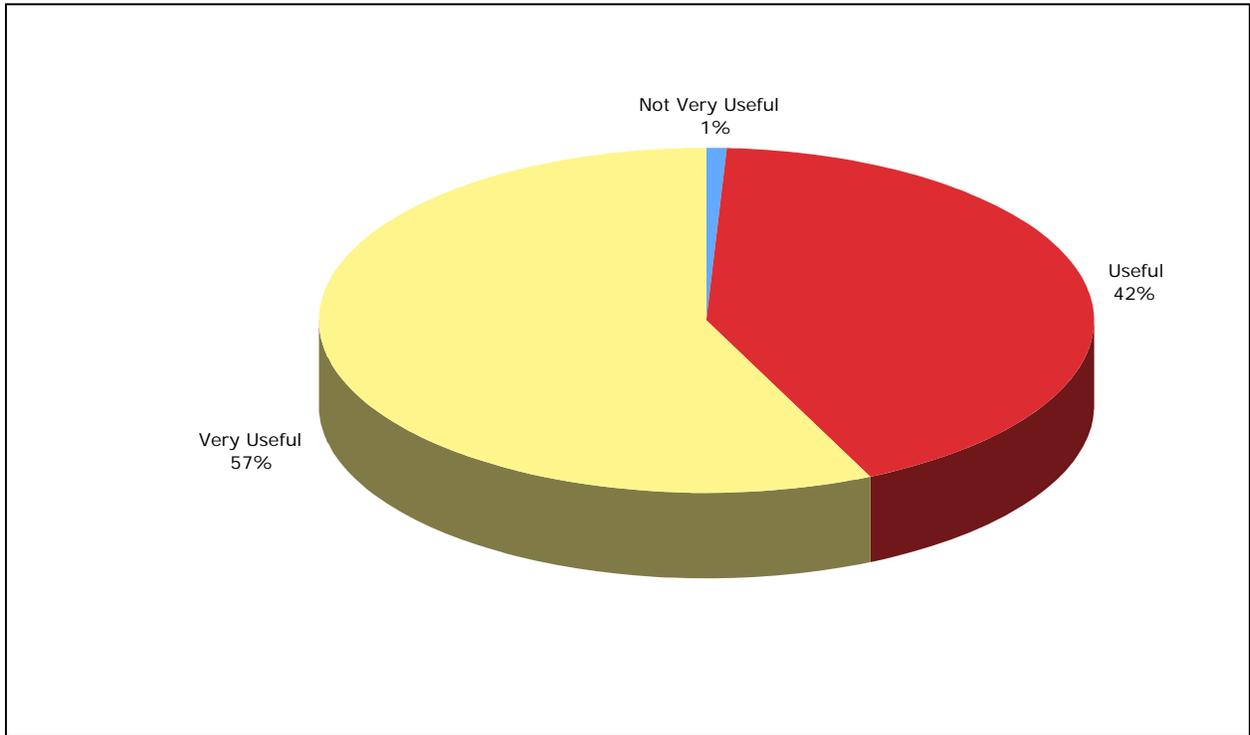


FIGURE 4.2-5: STUDY TEAM HELPFULNESS

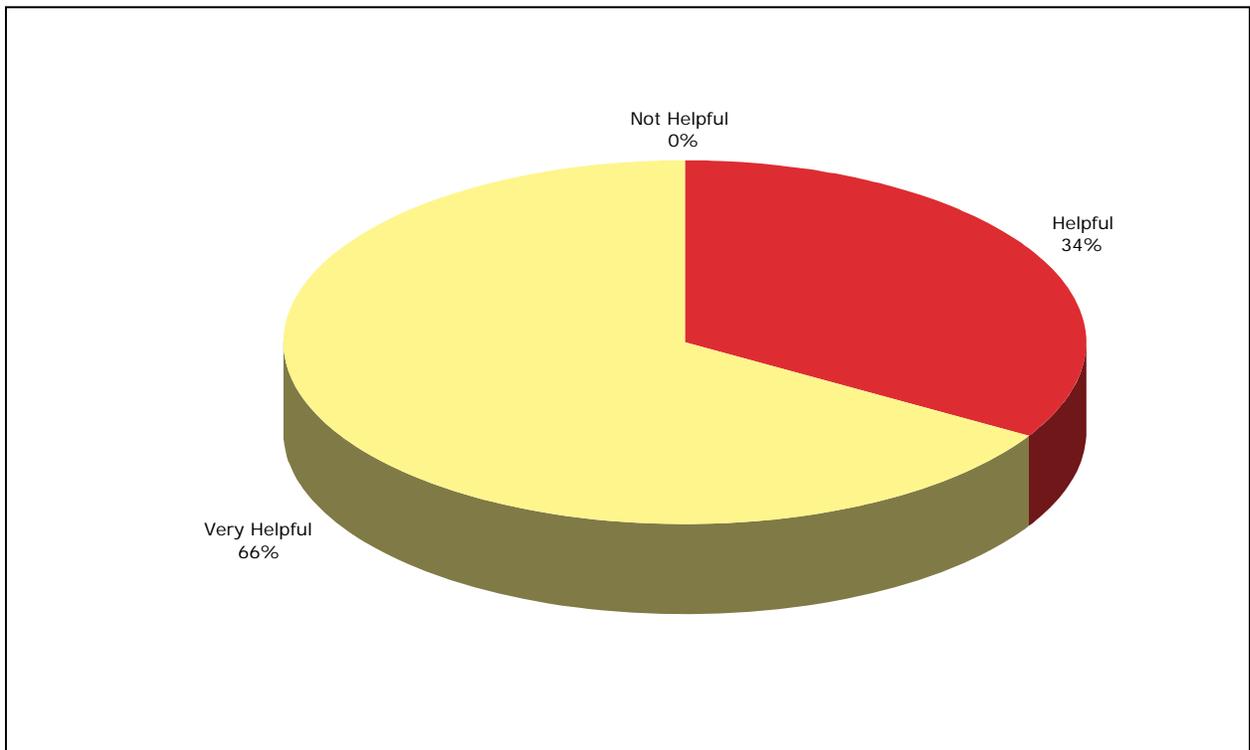


FIGURE 4.2-6: WORKSHOP ORGANIZATION

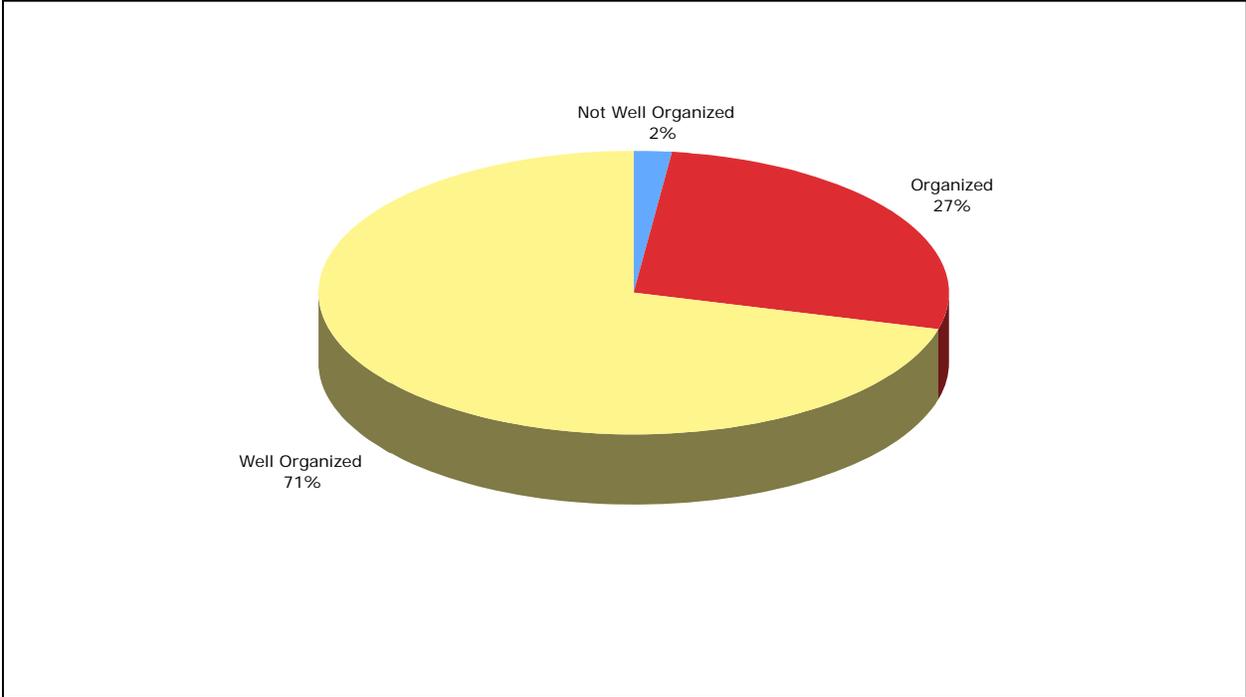
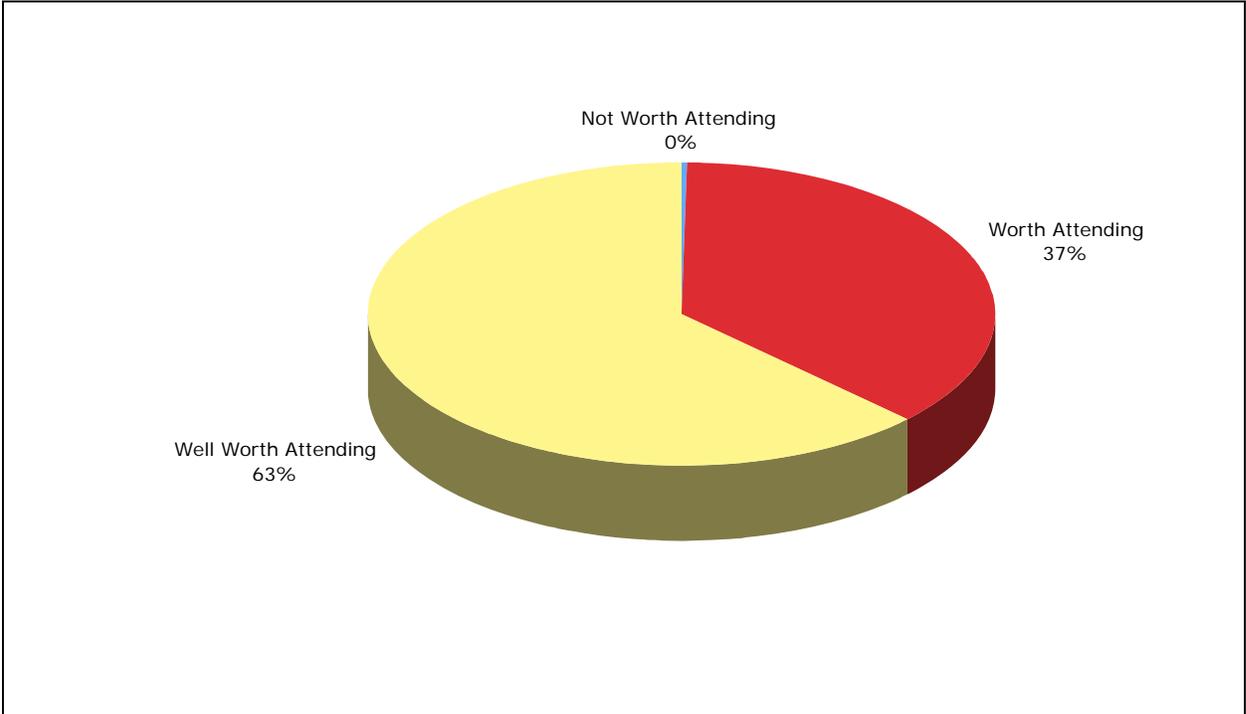


FIGURE 4.2-7: WORKSHOP WORTH



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4.2.4 MEDIA RELATIONS APPROACH

The purpose of the media relations campaign for the Northside-Southside Study was to supplement outreach strategies to reach a wider audience. During the study, most of the media attention on MetroLink focused on the final construction and opening of the Cross County extension that travels from Forest Park to Shrewsbury, Missouri. Thus, to generate initial media coverage for the Northside-Southside Study, several strategies were implemented.

The primary strategy was to conduct editorial briefings approximately a month before the first round of public open houses scheduled for June 2006. The briefings were held with the following media organizations: the *St. Louis Post-Dispatch*; *St. Louis American*; *St. Louis Argus*; *Suburban Journals*; and the *Arch City Chronicle*. Prior to the briefings, the study team decided on the key messages that should be conveyed to reporters. The messages were:

- The goal of light rail planning in the St. Louis metropolitan area is to build a system, not just one route.
- If St. Louis is to remain competitive with other cities in attracting new businesses, a good transit system is key.
- Light rail helps spur development more so than buses.
- St. Louisans want to a plan before agreeing to support more funding for MetroLink.
- It will take at least 10-15 years to implement any of the alternatives that will come out of this study.
- Currently, there is no funding available to build any new light rail extensions in the St. Louis area.
- This study will consider street-running trains for the first time to reach neighborhoods better and thus riders. There are no more abandoned rail lines available.

The editorial briefings were successful. The *St. Louis Post-Dispatch* and several *Suburban Journal* papers, including the *North County Journal*, *Northside Journal*, and *South County Journal* ran stories explaining the study and listing the dates, times and locations of the first round of public open houses.

In addition to the editorial briefings, a press advisory about the first round of public open houses was written and distributed to both print and broadcast outlets, as well as bloggers, such as Urban Review STL, that focus on St. Louis city issues. Distributing the advisory was followed by telephone pitching highlighting the importance of the study to the City of St. Louis and the region. As a result, Project Manager Donna Day was interviewed prior to the open houses on KMOX Radio (1120 AM) and Metro Network News, which feed news stories to 30 area radio stations. Two television stations, KTVI-TV/Channel 2 and KMOV-TV/Channel 4 also ran stories promoting the open houses. Following the open houses where reporters received a press kit that included a press release and corridor map, stories were published in the *St. Louis Argus*, the *St. Louis Post-Dispatch*, KTVI-TV, KMOV-TV, and Urban Review STL.

Prior to the June 2006 initial public open houses, two special meetings presenting the same information were held for immigrants and New Americans with limited proficiency in the English language. These meetings were pitched to media outlets serving these audiences. Project Manager Day was interviewed on two radio programs on WEW 770 AM that broadcast to the Bosnian community. In addition, she was interviewed on Vietnamese Public Radio. During these interviews, Day explained the study and encouraged listeners to attend the open houses.

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Prior to the second round of public open houses in October 2006, which focused on station planning, a press advisory announcing the meetings was distributed to media outlets. Again the meetings were promoted in print, on radio and television and on blogs.

The final round of open houses, held in September 2007, was promoted on some television stations and on blogs. Following the meetings, the St. Louis Post-Dispatch published a lengthy article on the study and the possibility of street-running trains coming to St. Louis.

4.2.5 SUMMARY

The public involvement program for the Northside-Southside Major Transit Improvements Study involved a variety of tools in a comprehensive process which informed and educated the public and civic officials on light rail transit. The process produced support for the light rail expansion of MetroLink in the City of St. Louis. The public involvement program was an integral component of the study informing the public on technical planning and providing opportunities for two-way communication.

The primary purpose of the public involvement program was to inform the public, explain the issues, and document public comment on the potential light rail expansion. The goal of the process was to provide information on light rail issues, to the public and civic officials, which resulted in support of the recommended locally preferred alternative.

The target audience of the public involvement program was the general public, government officials, and business owners/developers. A variety of outreach tools were utilized to communicate with this audience including a telephone hotline, internet website, study brochure, and newsletters. In addition to these resources, a media relations plan was developed to communicate the study process and facts with the local media.

The public involvement program also included numerous meetings with key stakeholders in the study area on the Northside, the Southside and in Downtown St. Louis. The program allowed for distinct approaches in each area of the city. On the Northside, the study team communicated the project information and milestones, through the various ward committees of the aldermanic wards. The communications with the Southside utilized neighborhood associations for meeting and presenting information on the project. In downtown St. Louis, the primary audience were downtown workers and commuters. Solicitation of public input was achieved via direct contact with employers and public meetings. The study team was able to effectively reach many people and diverse organizations, including those from ethnic neighborhoods and businesses.

The Northside-Southside Study maintained communication with the Resource Agencies Committee and solicited technical assistance and advice on detail issues and various alternatives through the use of Technical and Policy Advisory Committees. These civic and community leaders provided input to the study team on specific issues including alignments, community impacts and station locations. Furthermore, the public involvement process solicited direct input from the general public by the use of public workshops and public meetings, over a two year period. The process allowed for direct communication and dialogue with the public to inform the citizens on the light rail issues and it gave the citizens an opportunity to respond to the various proposals of alignments, station locations, and station designs. These meetings gave the public a forum to give informed input whether it be a planning workshop evaluating transit station design or a public meeting to review light rail alignments with interconnecting bus routes.

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The meetings, workshops, and stakeholder briefings allowed for meaningful dialogue between the study team and the public. The process ensured that the communities most impacted by a light rail expansion were given numerous opportunities to learn the issues and respond as informed citizens. Throughout the process, educating the public and civic officials on the benefits of light rail transit and the expansion of the Metro system (light rail and bus), resulted in a more informed constituency and a more meaningful discussion regarding potential impacts on the City of St. Louis. The process concluded with strong support for the proposed alternative alignments for Northside, Southside and downtown.

Alternatives Development and Screening

Chapter 5.0

Northside Study



Chapter 5.1: Introduction

This chapter describes processes leading to the selection of the initial sets of alternatives – for the Northside and downtown alignments. Also herein described are the evaluation and screening resulting in selection of the final set of alternatives to be subjected to conceptual engineering in Chapter 6 and more detailed comparative assessment in Chapter 7. These processes and analyses will result in the recommendation of a locally-preferred alternative (LPA), which will be submitted to the East-West Gateway Council of Governments (EWGCOG) Board of Directors for approval and inclusion in the region’s long-range plan.

The Northside alternatives development and screening process referenced multiple policies and plans in selection of the alternatives. These policies of EWGCOG and the City of St. Louis are discussed in detail. The long-range rail transit plan for the St. Louis region also helped guide alternatives selection and screening. This rail transit plan, authored by EWGCOG, serves as the master plan for the entire MetroLink system, both existing and proposed. The plan was most recently updated in 2005, as part of EWGCOG’s Major Transportation Improvement Analysis (MTIA).

The initial set of alternatives flowed from the regional transportation/land-use policies that have evolved in the EWGCOG planning process and from the transit analysis that moved from the regional long-range system plan through individual corridor studies. This process concluded with the Northside MTIA that recommended LPA’s in 2000.

This analysis begins with reviews of those policies and corridor analyses, leading to the selection of the initial range of alternatives for this study, which are then defined. It then details the evaluation and screening processes, including goals, objectives, and evaluation criteria. The alternatives screening considered numerous criteria; major differentiators included ridership potential, development impacts (both existing and potential), and right-of-way impacts. The potential for integration of the various alternatives with the MetroBus system was also evaluated and documented as part of the screening process.

Use of the various criteria described above resulted in the addition to and deletion of alternatives during this alternatives screening process which, in turn, produced a final set of alternatives to be further refined and assessed. Those final alternatives are defined in detail in *Chapter 6: Detailed Definition of Alternatives*.

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Chapter 5.2: Development and Screening

This section provides relevant policy review and corridor analysis. Northside and downtown alternative alignments are defined, evaluated, and screened. Criteria for assessment include ridership potential, development potential, right-of-way impacts, population served, and integration with existing MetroBus service. After assessment, alternatives are narrowed to a screened selection that will be further evaluated in Chapters 6 and 7 of this report.

5.2.1 POLICY CONTEXT

Three policy documents guided the selection and evaluation of preliminary alternatives: EWGCOG's *Legacy 2030: The Transportation Plan for the Gateway Region* and *Gateway Blueprint* and the City of St. Louis *Strategic Land Use Plan*, each of which is discussed below.

REGIONAL TRANSPORTATION GOALS AND OBJECTIVES

EWGCOG's approach to regional transportation planning and decision-making in the metropolitan St. Louis area is defined in its March 2005 plan, *Legacy 2030: The Transportation Plan for the Gateway Region*. *Legacy 2030* is an update of previous regional plans, and it provides a guide for investing public funds through 2030. The plan re-emphasizes six focus areas that serve as the evaluation framework for identifying and defining problems, developing and evaluating options, and selecting preferred alternatives in long- and short-range transportation planning studies. These focus areas also are used by EWGCOG to establish priorities in selecting projects for programming in the Transportation Improvement Program (TIP), and they provide reference points to ensure consistency in EWGCOG's planning programs.

The six focus areas are:

1. **Preservation of existing infrastructure.** This area emphasizes maintaining current road, bridge, transit, and intermodal assets in good condition.
2. **Safety and security in travel.** This area emphasizes decreasing the risk of personal injury, fatalities, and property damage on, in, and around transportation facilities. Investing in new transportation services also can contribute to enhancing quality of life and personal safety in declining neighborhoods.
3. **Congestion.** This area emphasizes ensuring that congestion on the region's roadways does not reach levels that compromise productivity and quality of life.
4. **Access to opportunity.** This area emphasizes addressing the complex mobility needs of persons living in the area, including those living in low-income communities and persons with disabilities.
5. **Sustainable development.** This area emphasizes coordinating land use, transportation, economic development, environmental quality, energy conservation, and community aesthetics. Sustainability involves making responsible use of natural and built resources, ensuring that future generations can share in their benefits, and ensuring that all people, regardless of income or minority status, are involved in decisions that affect their lives.
6. **Efficient movement of goods.** This area emphasizes improving the movement of freight within and through the region by rail, water, air, and highway. (Since the existing infrastructure currently accommodates the movement of goods through the study area, this particular focus area does not apply to possible future transit improvements in the area.)

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Based upon these six focus areas, *Legacy 2030* outlined the regional goals described below. Responsible planning practices and federal law require that transportation investment decisions align with these goals.

- A strong position in the national and global marketplace, ensured through strategic economic development, competitive employment opportunities, a well-trained work force, and responsible asset management.
- A sustainable and growing economy grounded in the wise and coordinated use of physical, environmental, social, and agricultural resources.
- Safe neighborhoods, communities, and thoroughfares.
- Resources for learning and personal development, accessible at every point of the life cycle.
- Varied and valued outlets for recreation and cultural expression.
- A growing diversified population, with equity, choice, and opportunity for all citizens.
- Efficient and balanced patterns of growth and development that respect the land, citizenry, history, and strategic location of the St. Louis region.

GATEWAY BLUEPRINT

EWGCOG is also developing the *Gateway Blueprint* to assist local governments in illustrating and evaluating the effects of transportation decisions on land use, and vice versa. The program is based on three core objectives and four guiding principles that complement the goals of *Legacy 2030*:

Core Objectives:

1. *Improving Efficiencies of Public Investment.* Reducing environmental impact of the transportation system; minimizing the need for new, costly infrastructure investment; and improving access to jobs, services, and centers of trade.
2. *Supporting Individual Choices.* Providing residents with choices in homes, schools, jobs, recreation, and transportation within safe, quality cities, towns, and neighborhoods, creating a basis for equality of opportunities throughout the region.
3. *Strengthening Communities.* Nurturing interaction, involvement, and responsibility, and providing opportunities for citizens to come together informally in safe, strong, stable, and healthy communities of place and communities of interest.

Guiding Principles:

1. *Encouraging Energy and Resource Efficiency.* Implementing efficient use of resources and utilizing savings as investments in the community.
2. *Promoting Accessibility.* Improving transportation alternatives and assessing development centers in relationship to transportation in order to improve access to jobs, education, and services.
3. *Valuing Natural Resources.* Protecting and restoring air and water quality; recognizing the natural landscape as a valuable resource; providing access to parks and open space; sustaining use of land for agriculture; creating and supporting tourism and local recreational opportunities.
4. *Building Collaboration.* Generating intergovernmental collaboration to improve regional economic and social equity and regional security.

Chapter 5.2: Development and Screening

CITY OF ST. LOUIS STRATEGIC LAND USE PLAN

The City of St. Louis' Planning Commission adopted its Strategic Land Use Plan in January 2005, as replacement of and revision to the last city-wide plan of 1947. This new Strategic Land Use Plan, a foundation for positive change within St. Louis, provides a cohesive, holistic development approach for the City's anticipated growth. The Plan's objective is twofold: to provide direction for those who wish to make new investments in the City, and to provide stability and opportunity for those who already live, work, and build businesses there. Other goals include the following:

- Providing stability and an improved quality of life for current residents, workers, and businesses.
- Preserving high-quality sites for identified best future uses.
- Providing a framework for future City initiatives.
- Encouraging appropriate preservation and/or market-driven development in defined locations, while providing direction for those seeking new investment opportunities.

The Plan was developed by the City's Planning and Urban Design Agency and reflects the resources and collaboration of the Mayor's office, St. Louis' 28 aldermen, City and State agencies, developers, and other stakeholders involved in the City's built environment. These participants methodically surveyed existing conditions within the City; identified land use categories, into which all blocks were classified; overlaid recommended future land uses onto existing uses; and drafted multiple revisions to the current map. As identified by this careful process, the Plan recognizes a series of strategic land use categories:

- Residential (neighborhood preservation and neighborhood development areas).
- Commercial (neighborhood and regional areas).
- Business/industrial (preservation and development areas).
- Recreational/open space.
- Institutional.
- Specialty mixed use.
- Opportunity area.

5.2.2 PLANNING CONTEXT

EWGCOG's long-range rail transit plan, most recently updated in 2005, is shown in Figure 5.2-1. This "vision" for a regional rail system includes the original MetroLink line between the airport and East St. Louis, the extensions into St. Clair County and to Shrewsbury, and a network of potential rail extensions throughout the region. This network includes Northside and Southside routes, parts of which are included in the current study. Both Northside and Southside corridors were the subject of MTIAs that concluded with the selection of LPAs for those corridors and for downtown St. Louis in 2000. Those LPAs served as the starting point for alternatives definition and evaluation in the Northside-Southside Study.

The Northside MTIA identified and evaluated transit *and* highway alternatives in the study area depicted in Figure 5.2-2. (Note that this area is considerably larger than that in the current Northside-Southside study. See discussion below.) The alternatives were developed in the context of a purpose and need statement consisting of the following elements:

- Access to Opportunity: Improve access for travel within the Northside Study Area as well as travel to other areas within the region.

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- **Safety:** Use transportation improvements on roadways to reduce the existing accident rate. Also direct transportation improvements to enhance neighborhood vitality, thereby improving personal safety.
- **Neighborhood Revitalization/Sustainable Development:** Use new transportation infrastructure to maintain and/or enhance quality of life in neighborhoods, with a focus on areas of declining population and employment.
- **Connectivity of the Transportation System:** Build on the existing transportation system by seeking opportunities to improve connections between roadways and/or transit in the existing system.

Within that framework, and as a result of technical analysis and public input, twelve initial alternatives were developed. These include light rail transit (LRT), bus rapid transit (BRT) and roadway alternatives. A screening process was used to reduce that set of alternatives to a smaller set for more detailed evaluation. Screening criteria included:

- Ability to serve major travel markets within the Northside Study Area.
- Accessibility to concentrations of population and employment.
- Accessibility to people without cars.
- Relative ease of transportation system connectivity.
- Potential to foster sustainable economic development opportunities.
- Right-of-way impacts.
- Physical feasibility.
- Capital costs.

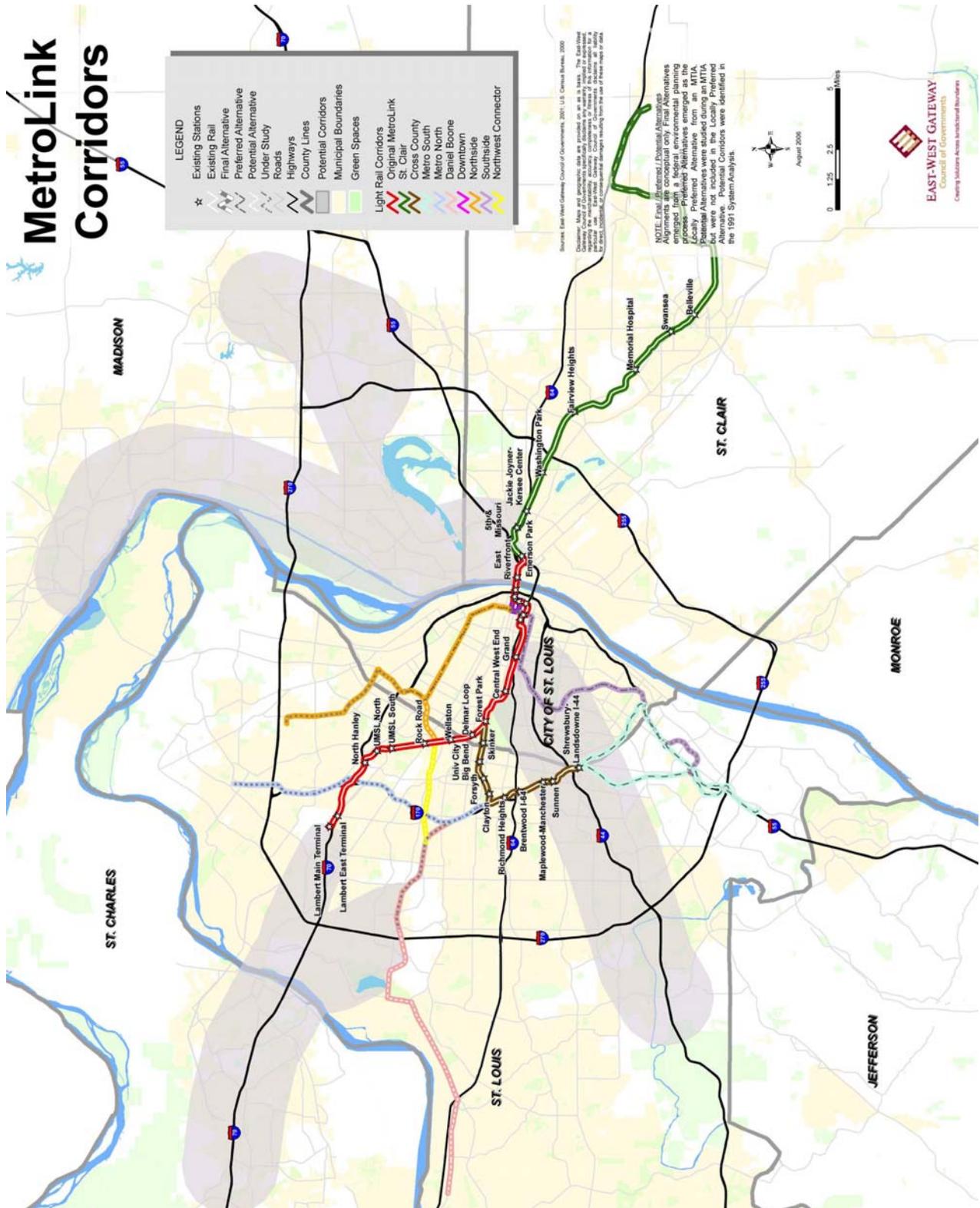
As a result of the screening process, six alternatives were carried into more detailed definition and evaluation. In addition to the No-Build, Transportation Systems Management (TSM, a relatively low-cost set of highway and bus system improvements), and two highway Build alternatives, two LRT alternatives were advanced. Both connect downtown St. Louis to I-270 in the vicinity of Florissant Valley Community College. The alignments for both are depicted in Figures 5.2-3 and 5.2-4.

Those final alternatives were then assessed using evaluation measures related to the study's purpose and need statement. These included travel demand (ridership), travel benefits (accessibility, travel times, safety), environmental impacts (natural, social and economic), and capital and operating costs. That evaluation resulted in the selection of LRT Alternative 3 as the Northside LPA. This recommendation was adopted by the EWGCOG Board of Directors on May 31, 2000. The LPA, as modified to conform to the reduced study area, served as a starting point for the current Northside Study. (Since Northside and downtown LPAs were both carried into the Northside Study, they are described in detail in the discussion below of initial alternatives for this study.)

Both Northside and Southside LRT LPAs shared a downtown loop, a street-running one-way loop along Market, North 7th, and North 14th Streets and Washington Avenue, as depicted in Figure 5.2-5, including its connection to the Northside LPA.

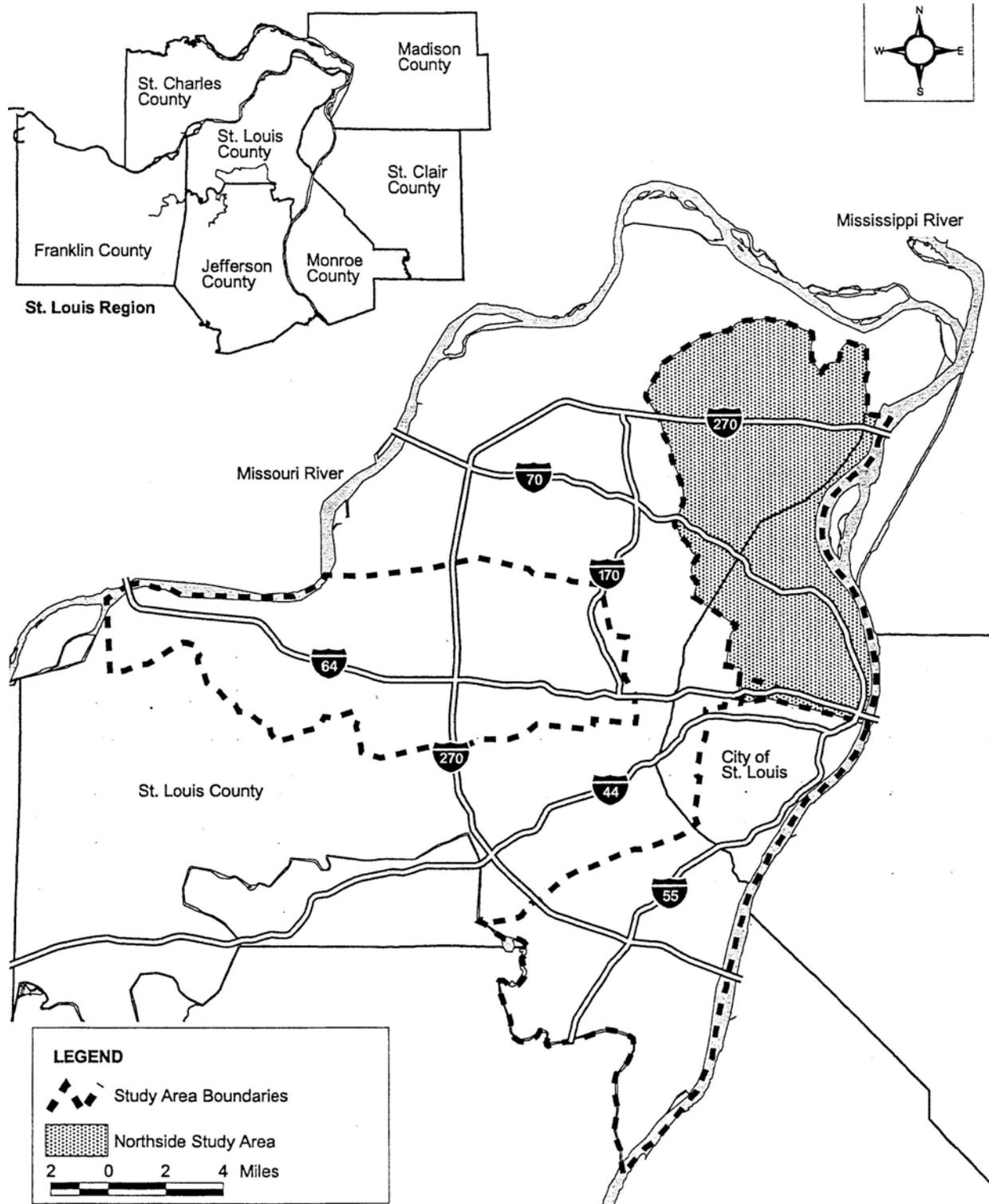
Chapter 5.2: Development and Screening

FIGURE 5.2-1: LONG-RANGE RAIL TRANSIT PLAN



Northside Study

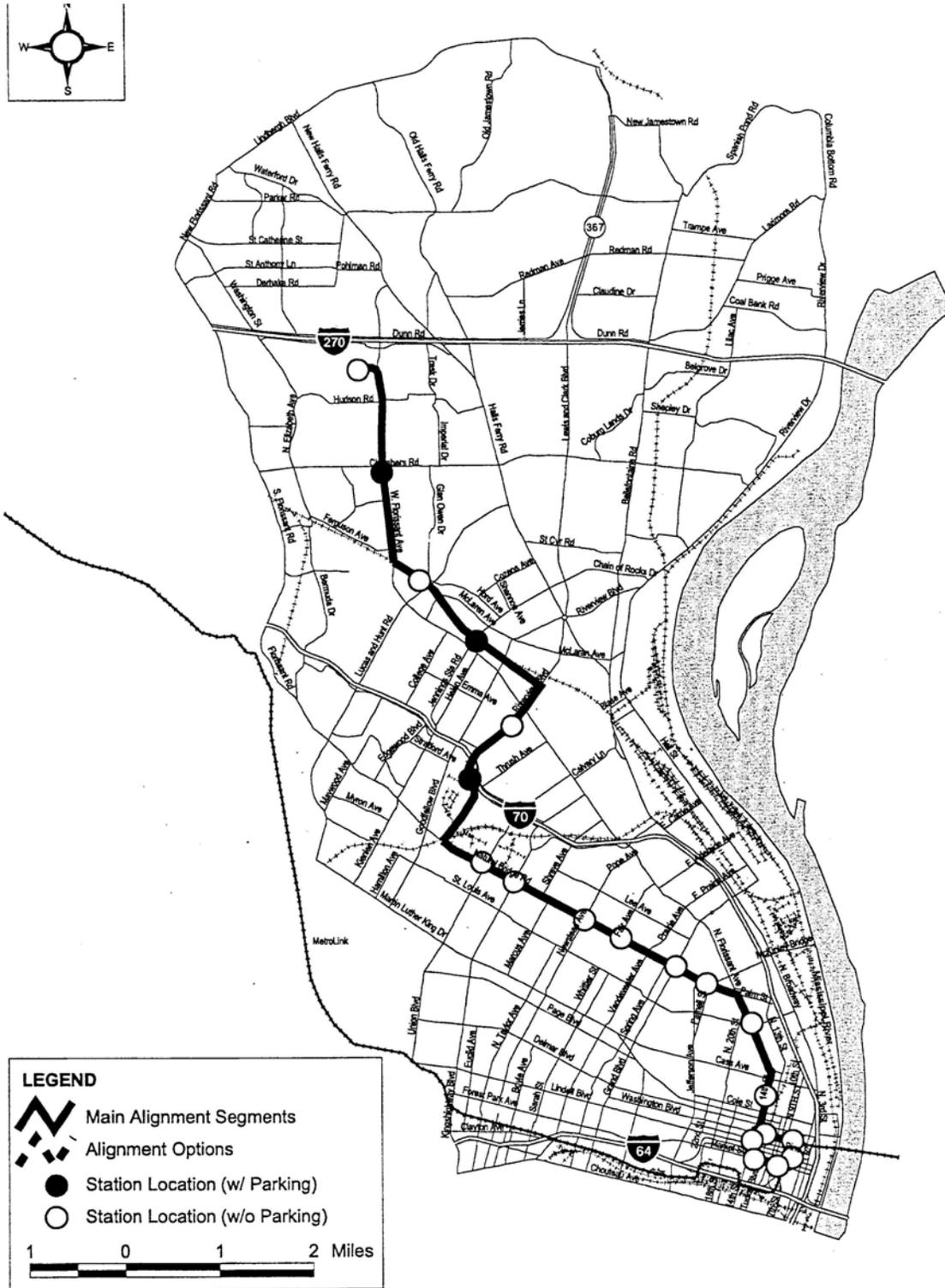
FIGURE 5.2-2: NORTHSIDE MTIA STUDY AREA (2000)



Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

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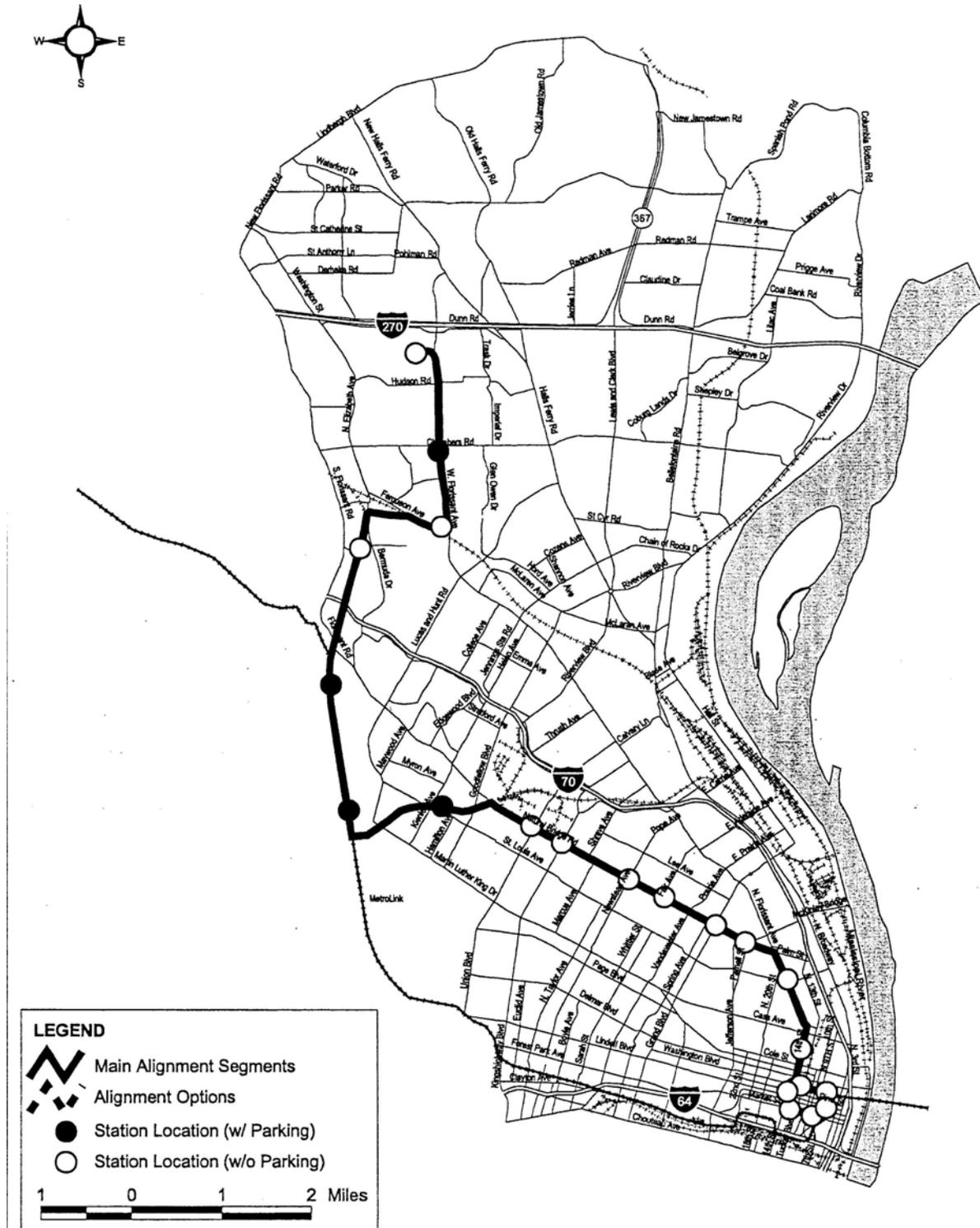
FIGURE 5.2-3: NORTHSIDE MTIA LRT ALTERNATIVE (2000)



Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

Northside Study

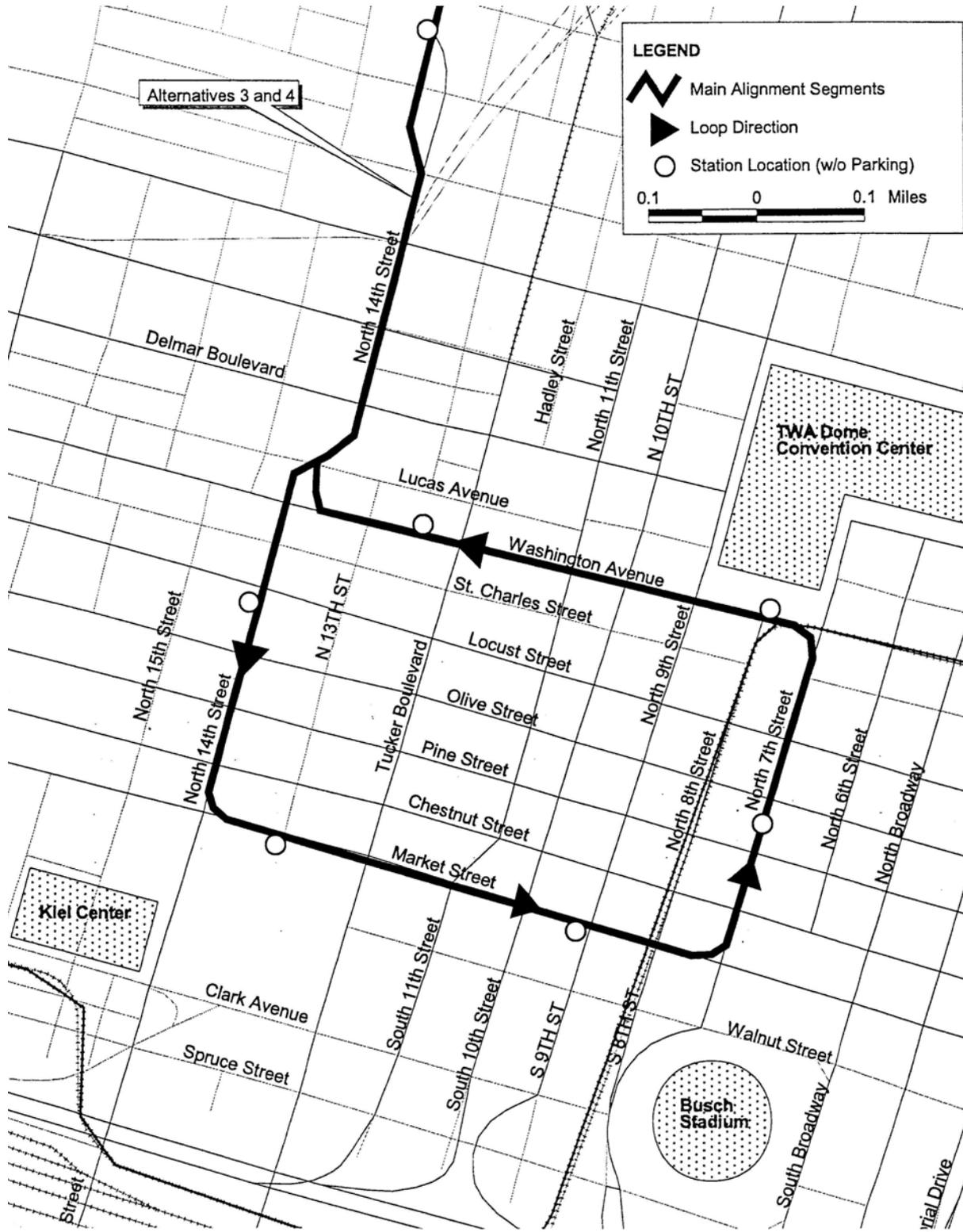
FIGURE 5.2-4: NORTHSIDE MTIA LRT ALTERNATIVE (2000)



Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

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FIGURE 5.2-5: DOWNTOWN MTIA LRT LOOP (2000)



Source: Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

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5.2.3 NORTHSIDE ALTERNATIVES

The alternatives provide better access to a number of destinations. All of the alternatives provide access to downtown St. Louis, which is the primary central business district of the region, with a weekday workforce of approximately 100,000 people. The downtown area is also the location for a number of special event venues including three major professional sporting stadiums/arenas; entertainment districts; and the Jefferson National Expansion Memorial on the Mississippi Riverfront. The alternatives also provide increased mobility options for low-income residents in the Carr Square-Murphy Park neighborhood on the near north side and the King Louie Square/Darst Webbe Housing Project on the near south side. Also, access to numerous destinations would be improved because the alternatives connect with the existing Metro Link alignments. Destinations include: employment centers in Clayton; Lambert International Airport and Scott Air Force Base in the Metro East; recreation and entertainment centers in Forest Park; and healthcare centers in the Central West End. The increased mobility and connectivity would serve numerous markets including students, shoppers, the elderly and low income residents.

In the Northside-Southside Study, which started in late 2005, EWGCOG continues technical analyses for Minimal Operating Segments (MOSs) for initial phases of the LPAs in the Northside and Southside areas. The Northside MOS terminates at a park-and-ride lot near I-70 and Goodfellow Boulevard.

Two factors influenced this decision to study only the MOSs in each corridor. First, funding for additional analysis of the LPAs was available via tax credits issued by the Missouri Department of Economic Development. This funding is limited to use in areas classified as distressed communities, which includes the City of St. Louis and all of the current MOSs. Second, concerns about the community's ability and willingness to fund major MetroLink extensions suggest that short-term attention should focus on shorter, more realistic initial phases of the LPAs, while not abandoning those long-term objectives.

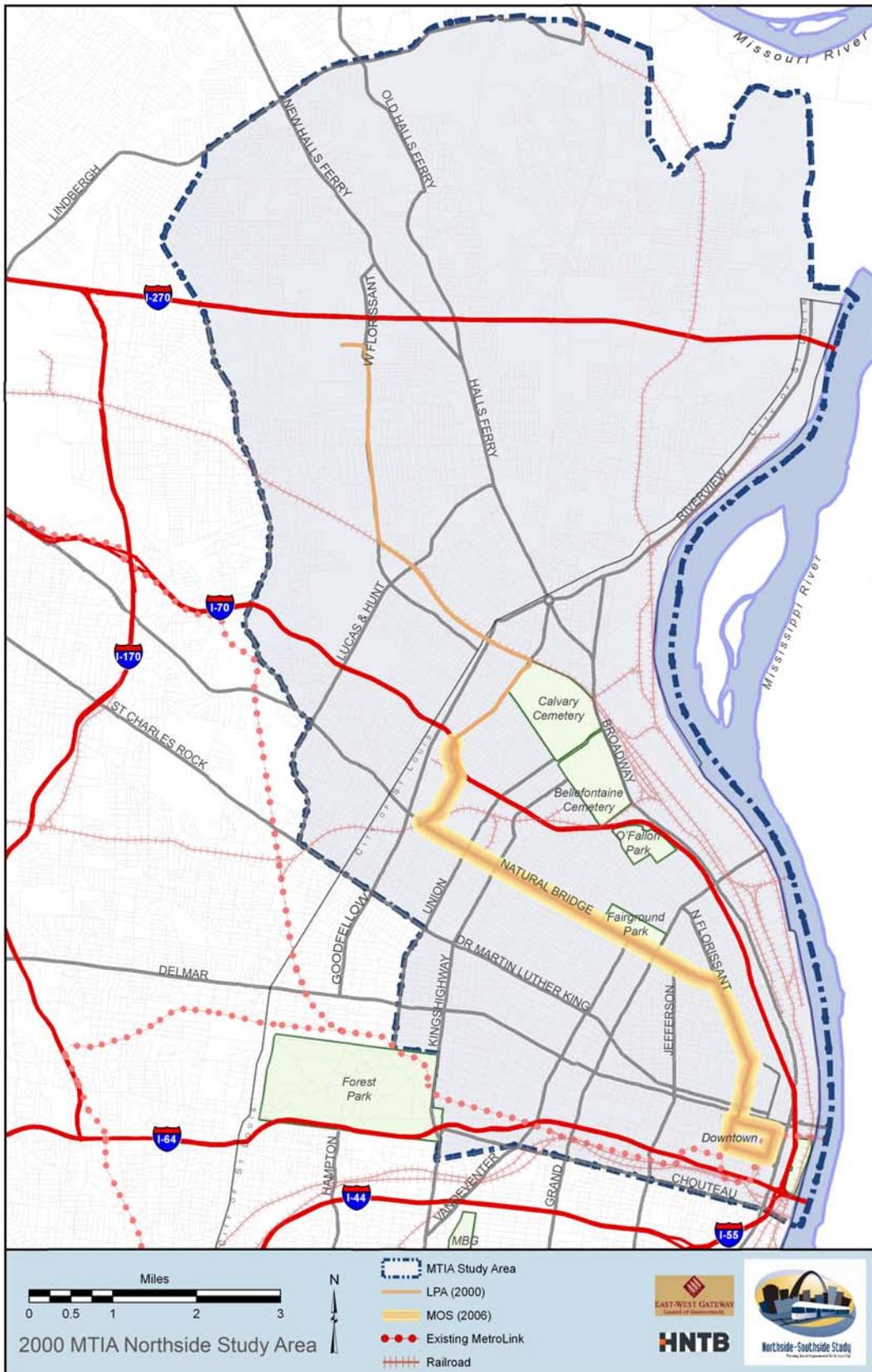
It is important to emphasize that the MOS endpoints are — from a transportation-planning standpoint — logical termini, selected for and expected to result in favorable cost-effectiveness measures, as well as to achieve strong community support. No shorter segment of either LPA would meet those criteria. The termini for the Northside are downtown St. Louis and the I-70 park-and-ride, which is intended to attract riders from the highway. Likewise, on the Southside, the termini are downtown St. Louis and the I-55 park-and-ride, also intended to attract riders from that facility.

It is possible, as the study progresses, that for operational or other reasons the MOSs could be extended for short distances. For example, if there is no suitable site for a park-and-ride lot at I-70 and Goodfellow Boulevard, the line could be extended northwest to the location of a suitable parking site.

For the current Northside-Southside Study, the two study areas are defined as they were in the MTIAs. The 2000 MTIA Northside study area is reflected in Figure 5.2-6, which includes both the LPA and the MOS. However, for purposes of analysis in the current study, the focus will be on the more concentrated markets that will largely determine the effectiveness (ridership and development) of the MOSs. These analysis areas are smaller, more focused areas of the 2000 MTIA study areas and extend approximately two miles beyond the termini at the interstate park-and-rides. Figure 5.2-7: Study Area reflects the concentrated area for the Northside MOS, called the “Northside Study Area.”

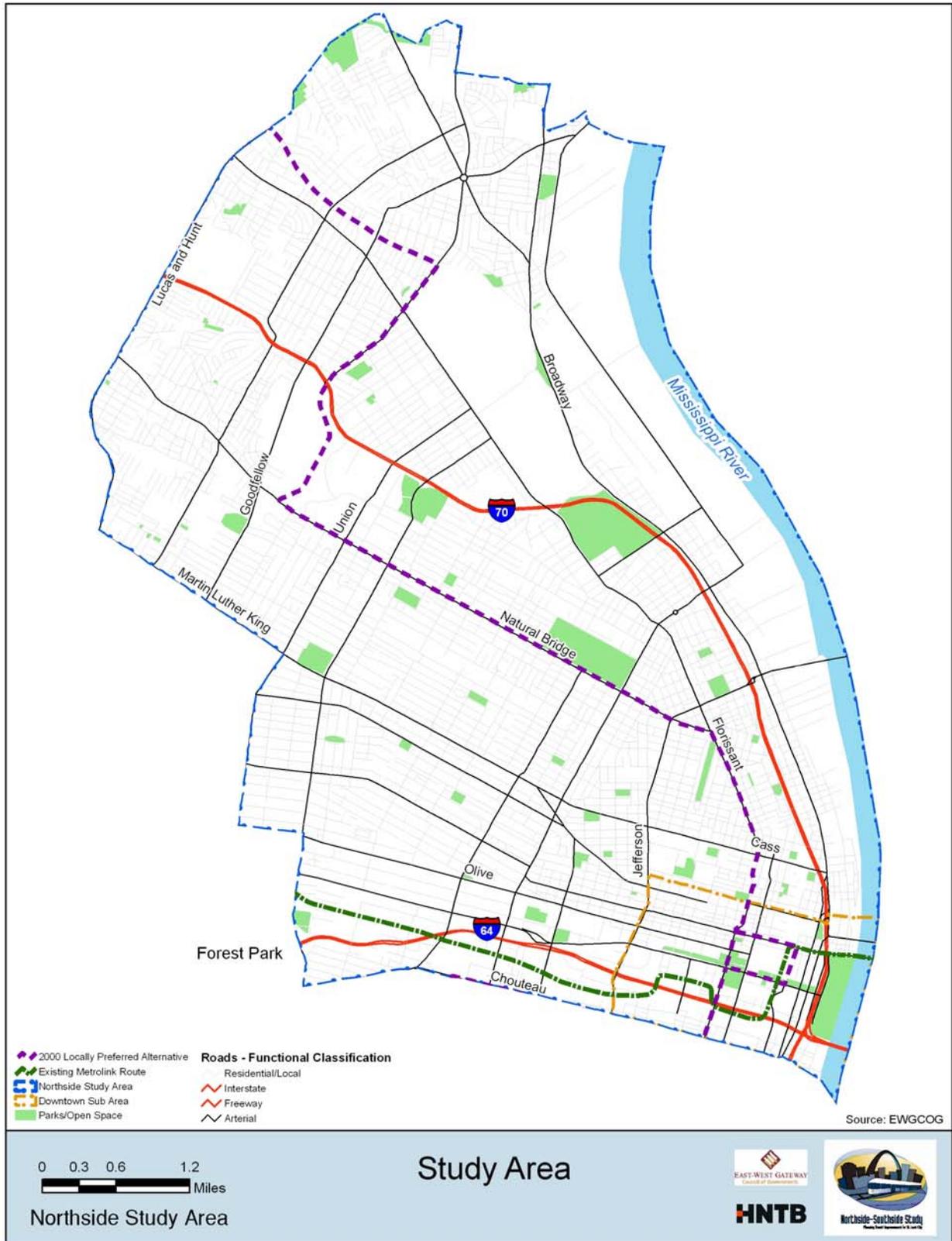
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FIGURE 5.2-6: NORTHSIDE MTIA STUDY AREA W/ LPA (2000)



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FIGURE 5.2-7: NORTHSIDE STUDY AREA, REVISED (2005)



Chapter 5.2: Development and Screening

Chapter 2 of this report discusses problems and opportunities, focusing on the following points:

- Problem: Sustainable Development
- Opportunity: Stabilization, Revitalization, and Redevelopment of Key Areas
- Problem: Access to Opportunity
- Opportunity: Provide Access to Jobs and Activity Centers

A set of goals and objectives were then developed. These have been and will continue to be used to evaluate and screen alternatives. The goals and objectives include:

Goal: Enhance Neighborhoods and Foster Sustainable Development

This goal encompasses a wide range of development and redevelopment objectives that are intended to ensure that the study area can attract and retain population and evolve into a more economically balanced and stable area.

Objectives:

- Use transit accessibility at stations as a marketing tool to promote economic development or redevelopment by attracting a broader range of employment categories, especially office and professional jobs. This approach includes transforming existing, largely commercial centers into more mixed-use activity centers.
- Use transit accessibility to attract population back to the study area. This can be accomplished by fostering development of high-quality, high-density housing near stations. This includes renovating suitable older buildings into multi-family units; developing new townhomes, condominiums, or apartments, and incorporating retail uses nearby.
- Wherever compatible with the existing communities, and the engineering and operational needs of the system, locate stations where concerted land-use planning can employ a range of TOD principles to promote high-quality, mixed-use and “walkable” development or redevelopment focused around the stations.
- Preserve affordable housing opportunities by integrating them into new housing developments. This can be accomplished through appropriate regulations that require some percentage of affordable housing, and implementing creative financing mechanisms to help residents purchase these homes.
- Create opportunities and mechanisms for public-private development partnerships, especially where these partnerships can overcome a lack of market interest in locations within the study area that need revitalization. Transit could serve as a possible mechanism to create opportunities for these partnerships.
- Develop strong local policies that support the partnership between Metro, the City of St. Louis, and the development community in order to foster TOD.
- Use transit and TOD to enhance the quality of life and personal safety in declining neighborhoods. The mix of uses provided by TOD promotes activity from early in the morning to late in the evening, thereby enhancing overall safety of these neighborhoods.

Goal: Sustain Existing Communities and Neighborhoods

This goal addresses the need to continue to improve generally stable areas within the study area by protecting and increasing their livability and attractiveness.

Northside Study

Objectives:

- Encourage convenient corridor transit services to residents within the study area by improving feeder bus routes to existing and proposed transit stations, and by expanding and improving parking facilities at transit stations and other park-and-ride facilities.
- Increase the desirability of older neighborhoods by creating mixed-use retail developments, retain and rehabilitate older buildings, preserve local landmarks and historic character, and retain open space.
- Coordinate transit-planning and station-area development activities with the City's *Strategic Plan* priorities, especially those focusing on preserving existing neighborhoods.
- Coordinate transit planning with public and private investments already occurring in the study area.
- Maintain or enhance the quality of life through station-area policies and requirements that improve the overall quality of the public realm (urban design and environmental protection), promote health and well-being (e.g., walkability), and support and complement residents' and business operators' investments and efforts to improve their surroundings.
- Safely integrate new transit improvements into the existing roadway network by maintaining the quality of the street and the fabric of the communities served.
- Whenever possible, maintain existing automobile and pedestrian circulation patterns to reduce conflicts between transit and automobiles and pedestrians.

Goal: Improve Access to Opportunity for Northside Study Area

This goal is to improve transportation service for all portions of the population in the area.

Objectives:

- Provide residents with a reasonable alternative to automobile use by improving bicycle and pedestrian access to transit, and by creating safety and urban design amenities that make cycling and walking more appealing.
- Provide convenient, reliable, high-frequency public transit to better link the study area with downtown and other activity centers throughout the region.
- Increase opportunities to access employment, education, medical, shopping, and other services. Expanded transit could increase access to these opportunities, not only within the study area, but also to the rest of the City and the region.
- Reduce transit travel times. A mix of transit modes (for example, LRT operating in exclusive right-of-way; shared in-street operations; enhanced bus, and feeder bus networks) could provide an opportunity to achieve this objective.

Goal: Develop a Cost-Effective Transportation System Improvement

This goal seeks to develop transit improvements that attain the goals stated above, while staying within the financial constraints of the region.

Objectives:

- Achieve public and institutional support for the preferred transportation investment strategy.
- Design a system that provides overall benefits — including those difficult to quantify — that warrant its overall cost.
- Include an evaluation of all costs and benefits, both quantifiable and non-quantifiable.
- Ensure that the costs and benefits are shared equitably among citizens and governmental entities.
- Ensure that transit-supportive land use policies are included in any investment strategy.

Chapter 5.2: Development and Screening

Finally, an evaluation framework was developed that included the *Federal Transit Administration's (FTA's) New Starts and Small Starts Evaluation and Rating Process* evaluation framework, EWGCOG's *Legacy 2030* focus areas, Northside-Southside goals and objectives, and evaluation criteria derived from those guidelines. That framework is summarized in Table 5.2-1.

The LPA from the Northside MTIA was used as a starting point for alternatives evaluation, though modified at its north terminus. As shown in Figure 5.2-8, the Natural Bridge alignment is a double-track LRT running entirely on city streets (though on a separate right-of-way not shared with motor vehicles). The alignment leaves downtown heading north on North 14th Street, then turns northwest onto North Florissant Avenue and then northwest on Palm Street and Natural Bridge Avenue. It turns north on Goodfellow Boulevard, terminating at a park-and-ride lot south of I-70.

During study public involvement activities and at stakeholder interviews, the study team was frequently asked to consider an LRT option that ran on or used West Florissant Avenue instead of Natural Bridge. As a result, such an alignment, which terminates at West Florissant, was added to the analysis (Figure 5.2-9).

Similarly, in order to more directly serve the downtown loft district that is gradually being enlarged to the west, the team was asked by key stakeholders to consider an LRT alignment that went west from downtown on Olive Street and then turned north to reach Natural Bridge. The team responded by developing an alignment that turned north from Olive along Jefferson Boulevard and Parnell Street, returning to the Natural Bridge alignment at Parnell and Palm (Figure 5.2-10).

The comparative analysis focused on major differentiators, including potential fatal flaws, as listed below.

Natural Bridge/14th

- Extending through core of Northside residential, commercial development.
- Existing new development and LRT can work together to catalyze future activity.
- Serves only significant Northside employment center, Union 70.
- Provides good connectivity to future western extension.
- Relatively moderate development opportunity.
- Relatively moderate ridership potential.
- Limited right-of-way constraints.

West Florissant/14th

- At northern edge of Northside residential, commercial development.
- West Florissant bordered by major cemeteries, park.
- Seriously constrained right-of-way Palm to Warne.
- Poor connectivity to future western extension.
- Low development opportunity.
- Low ridership potential.
- Severe right-of way impacts.

Natural Bridge/Parnell & Jefferson/Olive

- Some employment, residential centers, especially along Olive.

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- Limited development activity on Parnell, Jefferson.
- Does not take advantage of recent, current development east of Parnell.
- Relatively low/moderate development opportunity.
- Relatively low/moderate ridership potential.
- Limited right-of-way constraints.

Based on that evaluation, which focused on ridership potential, development impact (both existing and potential), and right-of-way impacts, as detailed in Table 5.2-1, it was determined to carry only the Natural Bridge alignment forward into detailed definition and assessment. (A more detailed definition of this alternative is included below in the discussion of the entire set of final alternatives.) The West Florrisant/14th alignment was eliminated because of severe right-of-way impacts on adjacent property and on traffic, lower ridership potential and lower development and redevelopment impact.

TABLE 5.2-1: EVALUATION FRAMEWORK

FTA Evaluation Framework	Legacy 2030 Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Effectiveness	<ul style="list-style-type: none"> • Access to Opportunity. • Preserve Existing Infrastructure. • Sustainable Development. • Safety and Security. 	<ul style="list-style-type: none"> • Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development. 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services. • Reduce transit travel time. • Promote economic development and redevelopment near proposed stations. • Promote relatively dense housing near stations for a range of incomes. • Locate stations where transit-oriented development principles can be employed. • Encourage public-private development partnerships. • Coordinate transit and land use planning and development. • Increase desirability of older neighborhoods through preservation and revitalization. • Make best use of the existing transportation infrastructure. • Ensure future connectivity into County. • Safely integrate new transit into existing roadway network. • Maintain existing automobile and pedestrian circulation patterns. • Enhance neighborhood safety through transit-oriented development that promotes pedestrian activity. 	<ul style="list-style-type: none"> Major travel markets. Employment, population concentrations. Sustainable development opportunities. Transportation system connectivity and multi-modal interface. Physical feasibility.

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FTA Evaluation Framework	Legacy 2030 Focus Areas	Northside/Southside Goals	Northside/Southside Objectives	Evaluation Criteria
Economic, Environmental & Local policy impacts	<ul style="list-style-type: none"> • Access to Opportunity. • Preserve Existing Infrastructure. • Sustainable Development. 	<ul style="list-style-type: none"> • Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development. 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services. • Promote economic development and redevelopment near proposed stations. • Promote relatively dense housing near stations for a range of incomes. • Locate stations where transit-oriented development principles can be employed. • Encourage public-private development partnerships. • Coordinate transit and land use planning and development. • Increase desirability of older neighborhoods through preservation and revitalization. 	<p>Major travel markets.</p> <p>Employment, population concentrations.</p> <p>Sustainable development opportunities.</p> <p>Right-of-way impacts.</p> <p>Parking impacts.</p> <p>Traffic impacts.</p> <p>Environmental impacts.</p>
Cost Effectiveness		<ul style="list-style-type: none"> • Develop a cost-effective transportation system improvement. 	<ul style="list-style-type: none"> • Achieve public consensus and institutional support. • Encourage strong local policies that foster TOD and enhance quality of life. 	Capital Costs.
Financial Feasibility		<ul style="list-style-type: none"> • Develop a cost-effective transportation system improvement. 	<ul style="list-style-type: none"> • Achieve public consensus and institutional support. • Encourage strong local policies that foster TOD and enhance quality of life. 	Capital Costs.
Equity	<ul style="list-style-type: none"> • Access to Opportunity. • Sustainable Development. • Safety and Security. 	<ul style="list-style-type: none"> • Improve transportation service for all populations. • Sustain existing neighborhoods. • Enhance neighborhoods and foster sustainable development. 	<ul style="list-style-type: none"> • Improve public transportation choices and increase access to jobs and services. • Reduce transit travel time. • Promote economic development and redevelopment near proposed stations. • Promote relatively dense housing near stations for a range of incomes. • Locate stations where transit-oriented development principles can be employed. • Encourage public-private development partnerships. • Coordinate transit and land use planning and development. • Increase desirability of older neighborhoods through preservation and revitalization. • Safely integrate new transit into existing roadway network. Maintain existing automobile and pedestrian circulation patterns. Enhance neighborhood safety through transit-oriented development 	<p>Major travel markets.</p> <p>Transportation system connectivity and multi-modal interface.</p> <p>Transit-dependent population.</p> <p>Sustainable development opportunities.</p> <p>Physical feasibility.</p>

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FIGURE 5.2-8: NORTHSIDE, NATURAL BRIDGE ALTERNATIVE

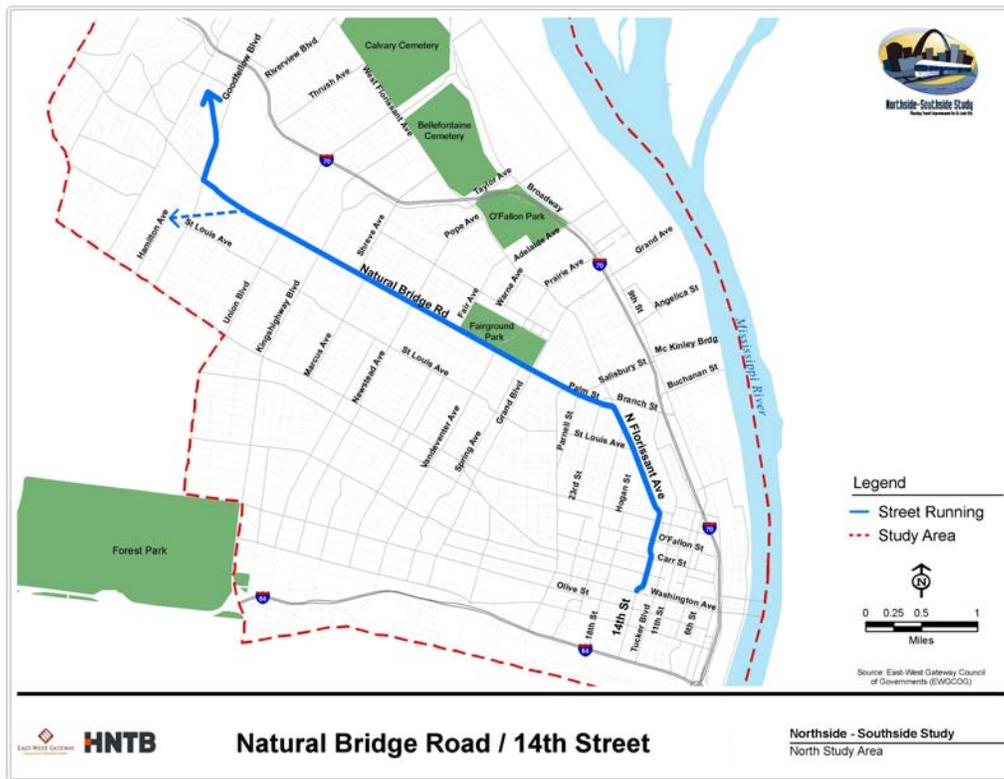
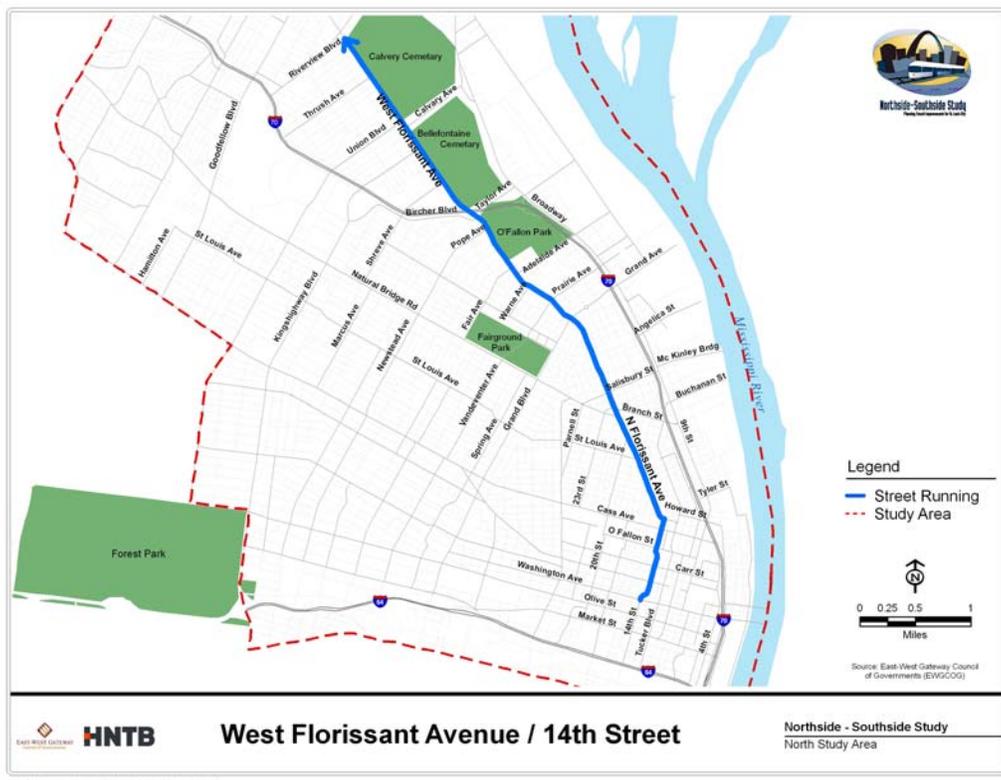
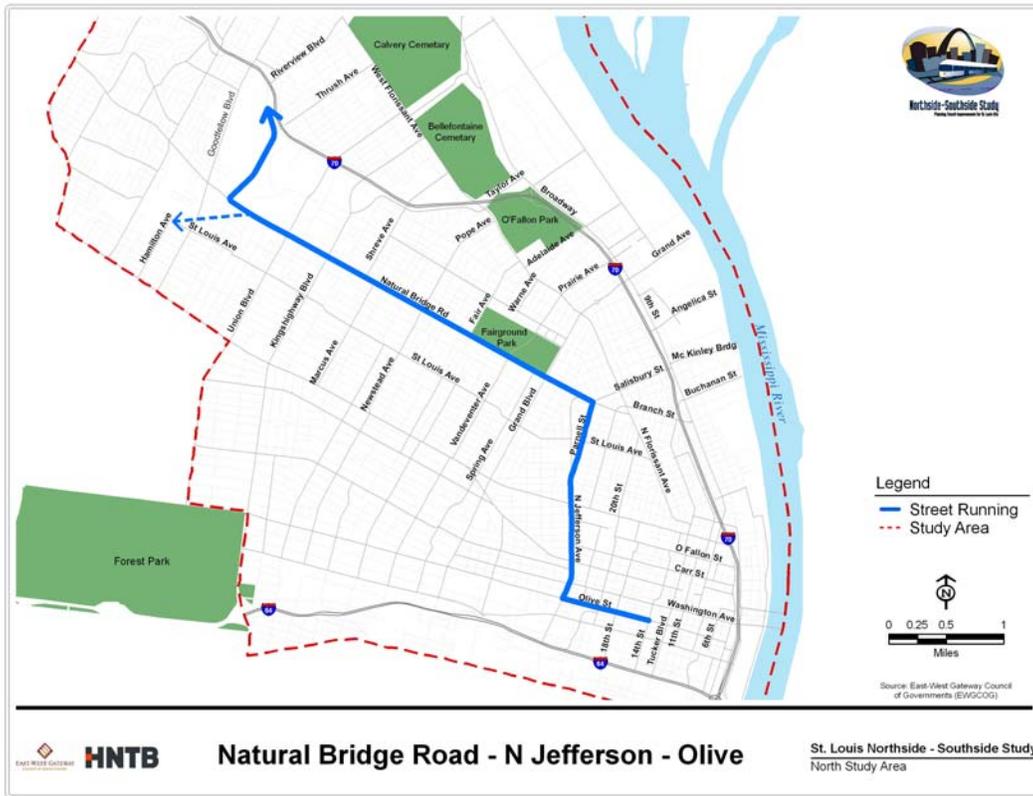


FIGURE 5.2-9: NORTHSIDE, WEST FLORISSANT ALTERNATIVE



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FIGURE 5.2-10: NORTHSIDE, PARNELL ALTERNATIVE



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5.2.4 DOWNTOWN ALTERNATIVES

At the outset of the consideration of downtown alternatives, which would be used by both Northside and Southside LRT alignments, the study team established a series of evaluation criteria to be used in first-phase qualitative screening. These included:

Ridership. The most important factor here is service to major employment centers. This includes proximity and speed of service, which depends upon direct (non-circuitous) routes. In addition, the relative attractiveness for special events, such as sporting events and conventions, service is considered.

Development. This factor includes an alignment's potential for positively impacting existing and potential development in the downtown.

Cost. This includes both capital and operating costs, both of which are largely a function of route length and complexity.

Impacts. These include an alignment's relative impact on traffic, parking and pedestrian and vehicular safety. In addition, consideration is given to impacts to nearby property and vehicles and pedestrians during construction. And finally, the impacts to the existing MetroLink service, during construction and operationally, are weighed.

These guided the development of two new downtown LRT options, in addition to the loop that came out of the MTIAs (Figure 5.2-11). The first (Figure 5.2-12) enters the downtown from north on North 14th Street and then turns east on Convention Plaza. The alignment then traverses the downtown on a one-way pair of streets, north on 9th Street and south on 10th Street, with a single track on each. It then heads west on Clark Street, turning south on 14th Street past the new intermodal transportation center.

The second option (Figure 5.2-13) has an east-west orientation. It comes into the downtown on 14th Street and uses a one-way, single-track loop consisting of 14th, Olive, 6th and Chestnut Streets.

As with analysis of the Northside alternatives, comparative analysis of these two downtown alignments focused on major differentiators, including potential fatal flaws, as listed below.

9th Street/10th Street Couplet

- Serves existing businesses and residential developments in downtown.
- Provides transit users with strong access to activity and employment centers.
- Provides most direct north-south travel in downtown.
- Provides transit access to developments south of Market.
- Avoids serious property impacts.
- Impacts access to parking garages on 10th.

Chestnut/Olive Loop

- Serves existing businesses and residential developments in downtown.
- Provides transit users with strong access to activity and employment centers.
- Provides most direct east-west travel in downtown.
- Impacts access to parking garages on Olive and Chestnut.
- Impacts existing MetroLink tunnel under Olive and Chestnut.

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Using the evaluation criteria listed above, the study team determined that both new alignments outperform the loop that came from the previous MTIA study; this previous loop LPA was, therefore, screened from further consideration.

Northside Study

FIGURE 5.2-11: DOWNTOWN MTIA LOOP

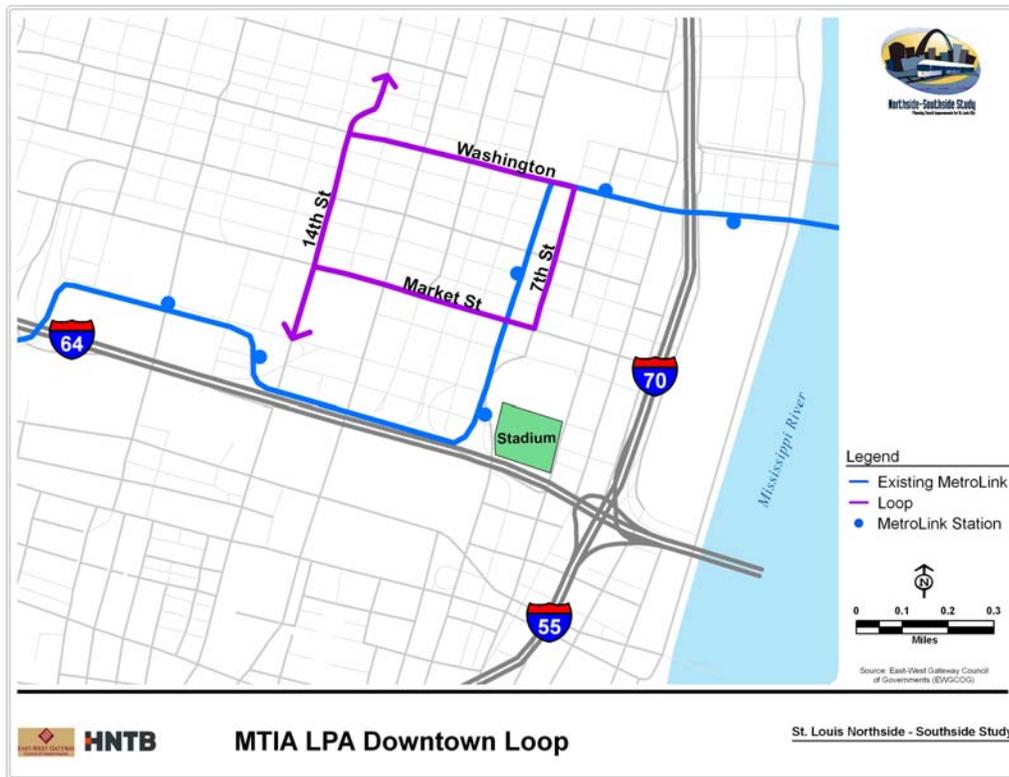
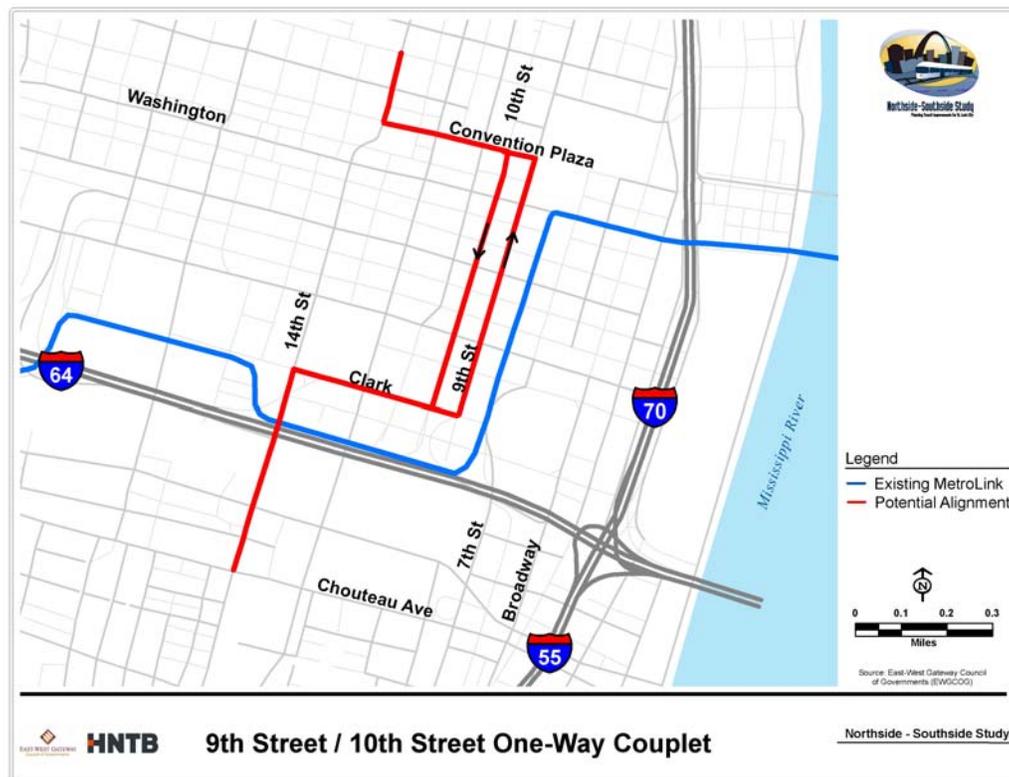
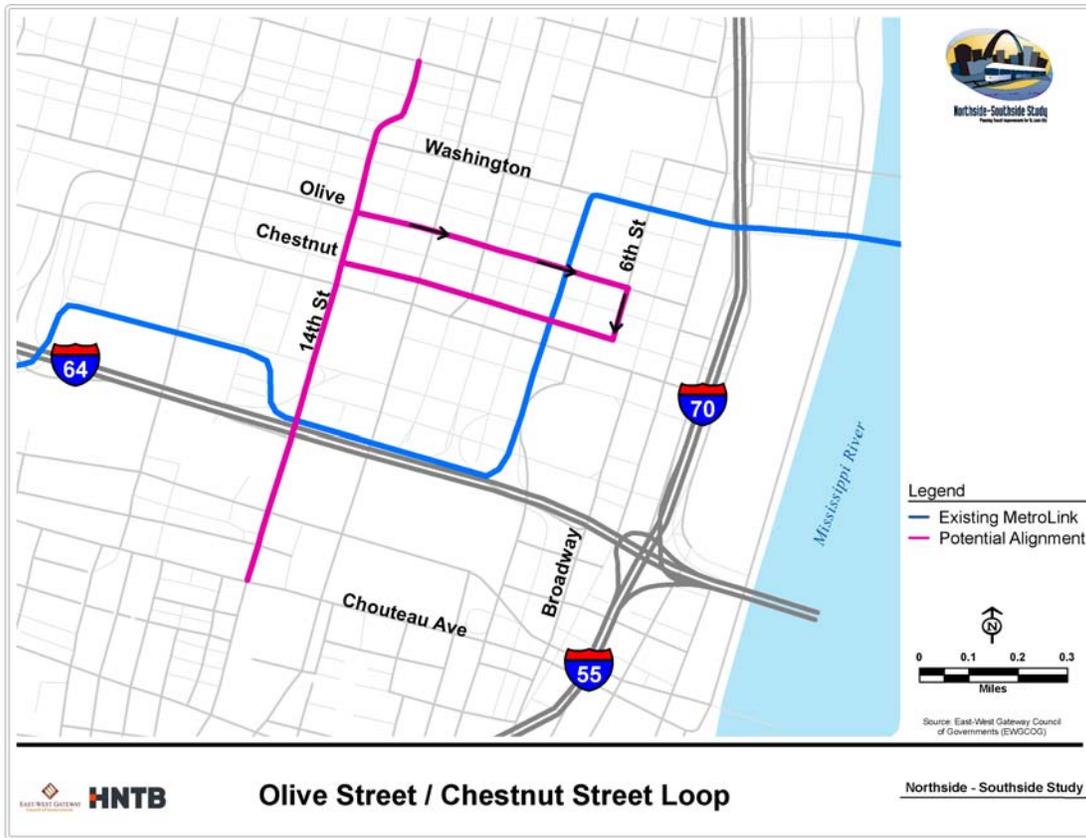


FIGURE 5.2-12: DOWNTOWN, COUPLET ALTERNATIVE



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FIGURE 5.2-13: DOWNTOWN, LOOP ALTERNATIVE



Northside Study

5.2.5 SUPPORTING BUS OPERATIONS

In the fall of 2006, Metro redesigned its bus system in conjunction with the opening of the Cross County rail extension. This feeder bus plan utilizes the guiding principals of *Metro Redefined 2006* to restructure the bus operations for this study and assumes that the operating budget will be constrained. Consequently, bus service in the area would be reconfigured to feed the rail line and new service provided only in limited areas. The bus routes were realigned to avoid duplication and to redistribute resources more efficiently. All alternatives contain a downtown shuttle route to increase accessibility to the eastern core of the central business district and express routes truncated at terminal stations.

Natural Bridge Alternative

Table 5.2-2 lists all of the bus routes in the study area and describes any proposed changes from the No Build Alternative. The table also lists proposed peak and off-peak headways, and lists the rail station(s) that each route would feed.

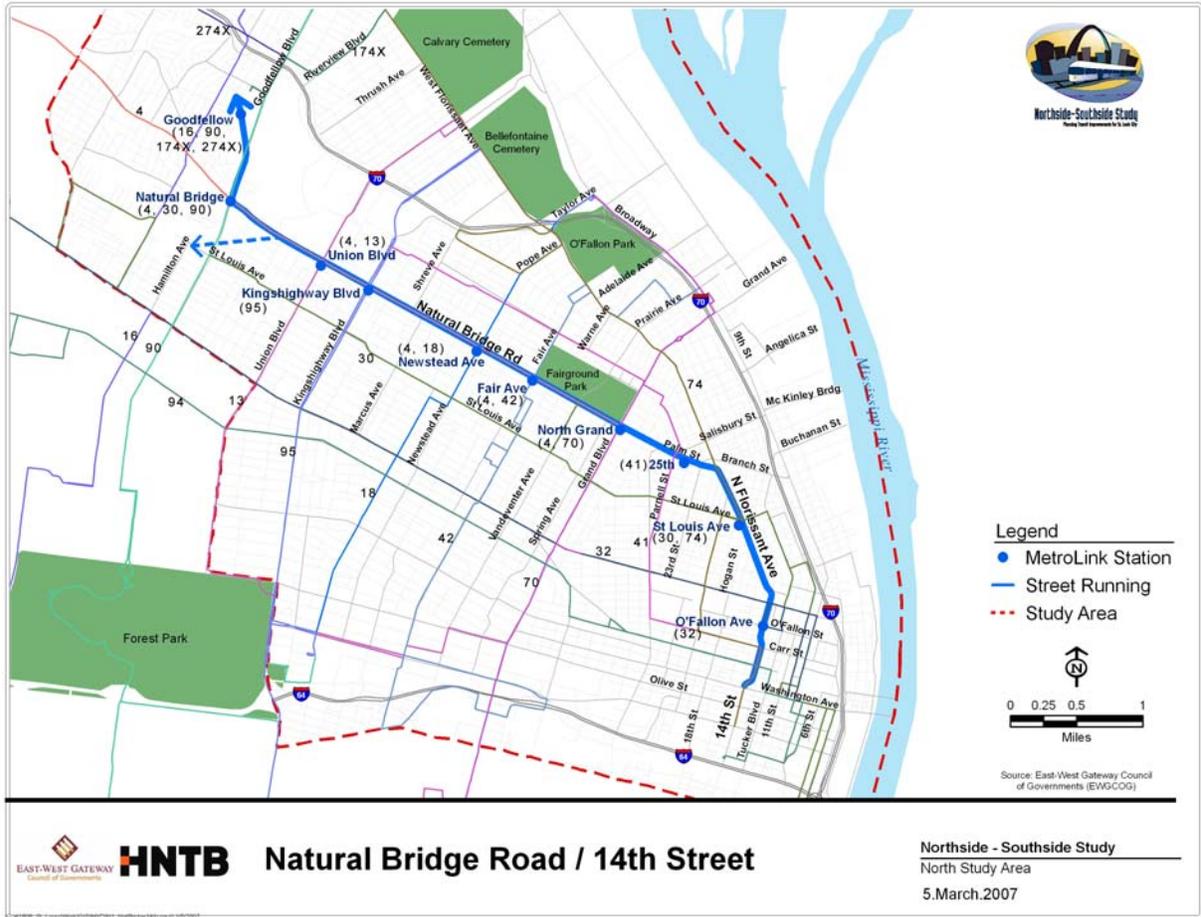
TABLE 5.2-2: BUS ROUTES, NATURAL BRIDGE ALTERNATIVE

Route #	Name	Description of Change	Headway (min)		LRT Stations & Transit Centers Served
			Peak	Off-Peak	
4	Natural Bridge Shuttle	between Grand & N. Hanley station	30	60	All along NB.
13	Union	extend via Union	30	30	Union/NB.
16	City Limits	add station stop	20	30	Goodfellow/I-70.
18	Taylor	connect to Newstead Station	20	30	Newstead, CWE.
30	Soulard	deviate via Goodfellow/NB station; reroute via Kienlen, St. Louis, Lucas Hunt to Rock Road station	30	30	Goodfellow/NB, St. Louis Ave.
32	Wellston-MLKing	station stop	30	30	O'Fallon.
41	Lee	reroute via Jefferson to Civic Center station	20	30	Union/NB, Parnell.
42	Sarah	add station stop	20	30	Grand, Fair Ave.
70	Grand	add station stop	7	12	Grand, Natural Bridge/Grand.
74	Florissant	re-routed St.Louis Ave, 20th to Carr to 14th	20	20	St. Louis Ave., CBD.
90	Hampton	deviate via Stratford to Goodfellow/I-70 Station	15	30	Goodfellow/NB, Goodfellow/I-70.
95	Kingshighway	via Kingshighway/NB Station	10	15	CWE, Kingshighway/NB.
174X	New Halls Ferry	Riverview to Lillian to Goodfellow		X	Goodfellow/I-70.
274X	Paddock Hills	Lucas & Hunt Lillian to Goodfellow terminate at station		X	Goodfellow/I-70.

The proposed feeder bus plan for the Natural Bridge Alternative is shown in Figure 5.2-14.

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FIGURE 5.2-14: BUS PLAN, NATURAL BRIDGE ALTERNATIVE



Northside Study

Table 5.2-3 is a listing of all stations showing the bus routes that connect to each station. The most significant service changes include:

- *Convention Plaza Station.* Proposed to be a large transit center so that Northside buses will terminate and use MetroLink as a feeder system in downtown.
- *St. Louis Avenue Station.* Will be served by the #30 and #74 routes.
- *Grand Station.* Will be a focal point for two routes (#4, #70). The #4 Natural Bridge Shuttle will provide service from Grand to North Hanley along Natural Bridge Avenue. The #70 Grand will be a station stop and continue on Grand Avenue.
- *I-70/Goodfellow Station.* Will have parking and a transit center with 4 to 6 bus bays depending on land availability and site access. It will be served by four routes (#16, #90, and #174 X, #274 X). Several express routes (174X, #274X) to downtown will be converted to feeder routes since the rail line would provide replacement service.

TABLE 5.2-3: CONNECTING STATIONS, NATURAL BRIDGE ALTERNATIVE

Station	Route #	Route Name	Terminate or Thru?	Notes
<i>O' Fallon</i>	32	M.L. King	thru	Station stop.
<i>St. Louis Ave</i>	30	Soulard	thru	Reroute via Kienlen, St. Louis, Lucas Hunt to Rock Road station.
	74	Florissant	thru	Via 20th to Carr to 14th to Convention Plaza.
<i>Parnell</i>	41	Lee	thru	Via Parnell to Jefferson to 14th St. TC.
<i>Grand</i>	4	Natural Bridge Shuttle	thru	Shuttle between Grand & N. Hanley station.
	70	Grand	thru	Via Grand.
<i>Fair</i>	4	Natural Bridge Shuttle	thru	Shuttle between Grand & N. Hanley station.
	42	Sarah	thru	Station stop.
<i>Newstead</i>	4	Natural Bridge Shuttle	thru	Shuttle between Grand & N. Hanley station.
<i>(Park-n-Ride)</i>	18	Taylor	thru	Station stop.
<i>Kingshighway</i>	95	Kingshighway	thru	Via Kingshighway.
<i>Union</i>	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	13	Union	thru	
<i>Goodfellow/NB</i>	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	30	Soulard	thru	Reroute via Kienlen, St. Louis, Lucas Hunt to Rock Road station.
<i>Goodfellow/I-70</i>	90	Hampton	thru	Station stop.
	16	City Limits	thru	Via Stratford.
<i>(Park-n-Ride)</i>	90	Hampton	thru	Deviate via Stratford to Goodfellow/I-70 Station.
<i>Transit Center</i>	174X	Halls Ferry X	term	At transit center.
	274X	Paddock Hills X	term	At transit center.

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5.2.6 FINAL ALTERNATIVES

As a result of application of the screening framework, the following alternatives will be advanced into detailed definition and subsequent detailed evaluation, leading to the selection of LPAs for each area:

Northside

- Natural Bridge LRT.

Downtown

- 9th Street/10th Street one-way pair.
- Olive/Chestnut loop.

The accompanying maps (Figures 5.2-15 through 5.2-17) depict each of the alternatives, with station sites identified. In addition, illustrations (Figures 5.2-18 through 5.2-22) portray selected station sites and station-area plans for selected stations.

For all LRT alternatives, low-floor light-rail vehicles (LRVs) would be used, enabling the use of low platforms in all locations, as illustrated in Figure 5.2-23. This is in contrast to existing MetroLink practice of using high-floor LRVs and high platforms.

Operating plans for each alternative will be developed during the detailed definition of alternatives.

5.2.7 CONCLUSION

Subsequent chapters describe conceptual engineering used to further define physical characteristics of each alternative, which allows more accurate cost estimates. In addition, operating plans for each final alternative are developed and discussed. These include times of operation, frequencies, and travel times.

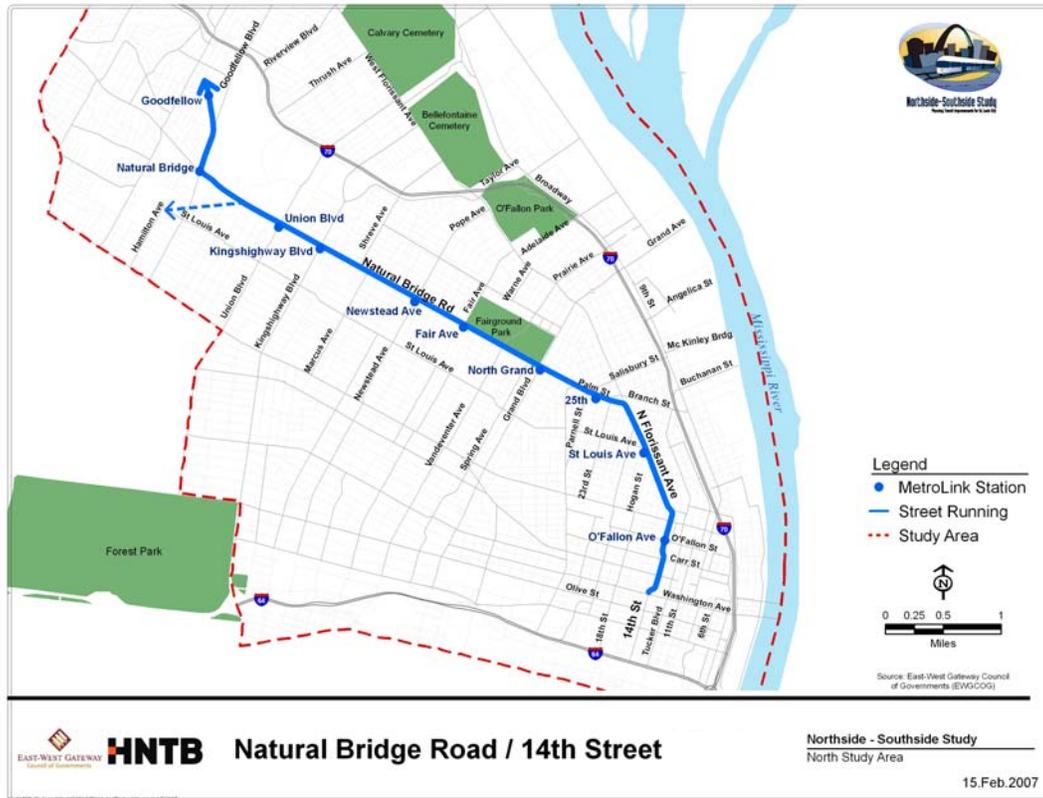
Then, the final alternatives are evaluated on the basis of:

- Ridership.
- Costs: capital and operating.
- Environmental impacts.
- Land-use impacts.
- Social impacts, including potential relocations.
- Economic impacts.
- Urban design impacts.
- Traffic impacts.

Finally, those evaluations are used to guide the selection of an LPA by the EWGCOG Board.

Northside Study

FIGURE 5.2-15: NORTHSIDE, NATURAL BRIDGE LRT

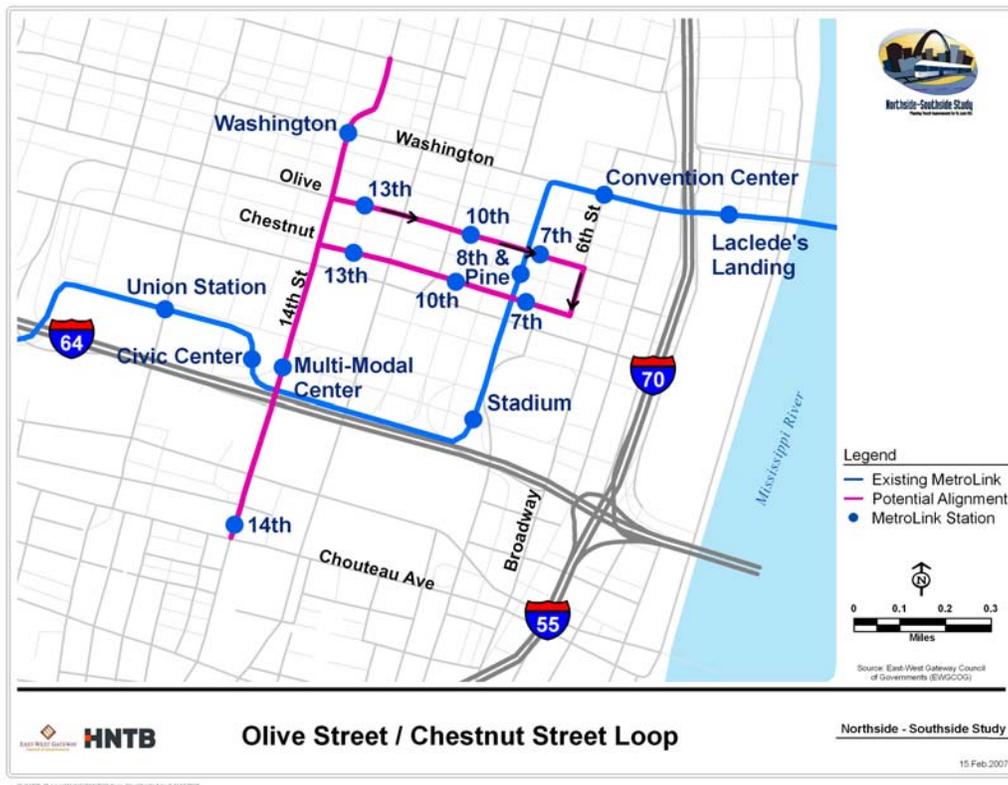


Chapter 5.2: Development and Screening

FIGURE 5.2-16: DOWNTOWN, 9TH/10TH COUPLER LRT



FIGURE 5.2-17: DOWNTOWN, OLIVE/ CHESTNUT LOOP LRT



Northside Study

FIGURE 5.2-18: NORTHSIDE, GOODFELLOW/ STRATFORD TERMINUS



Chapter 5.2: Development and Screening

FIGURE 5.2-19: NORTHSIDE, GOODFELLOW/ STRATFORD TERMINUS

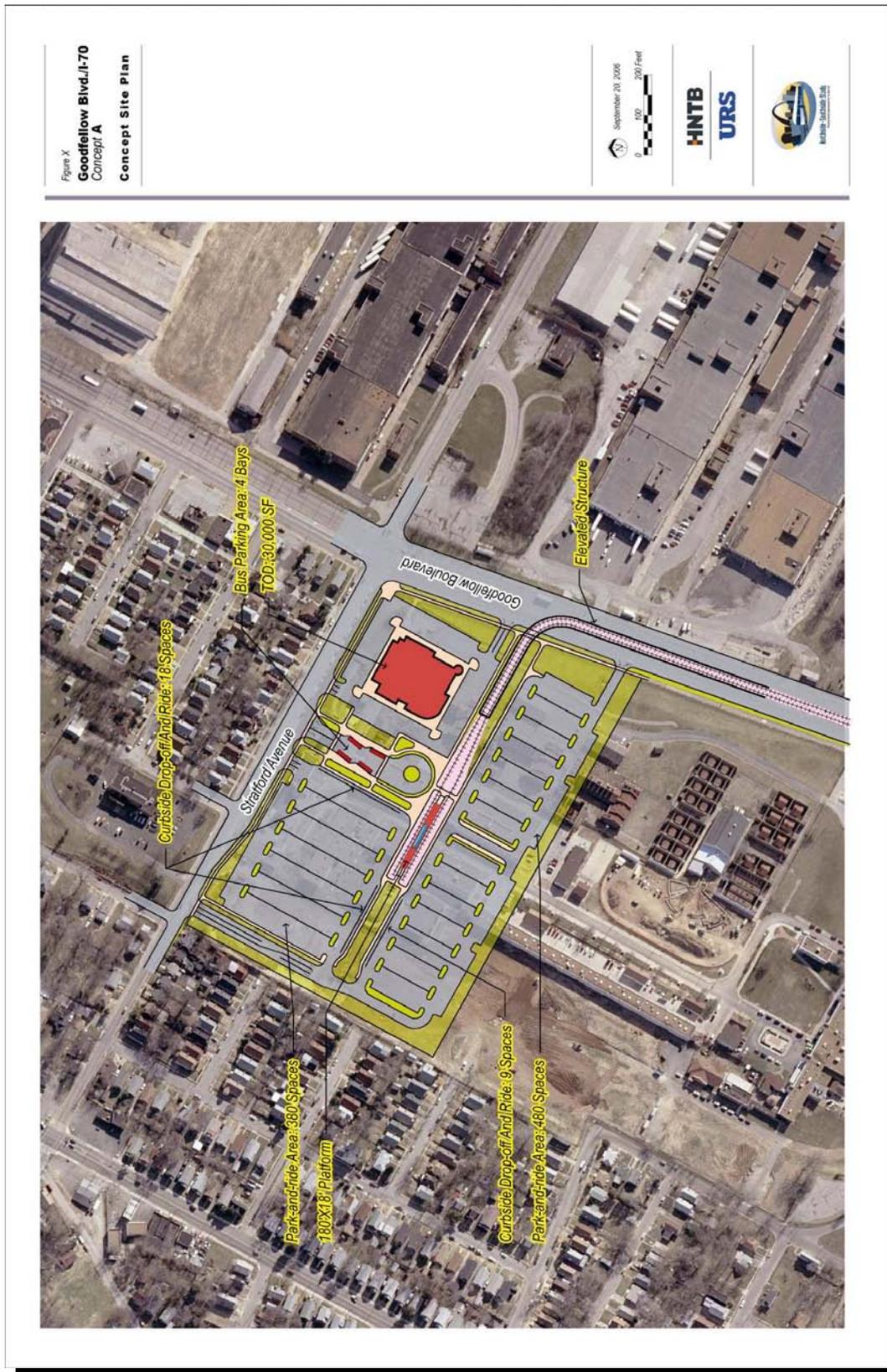


FIGURE 5.2-20: NORTHSIDE, NEWSTEAD STATION

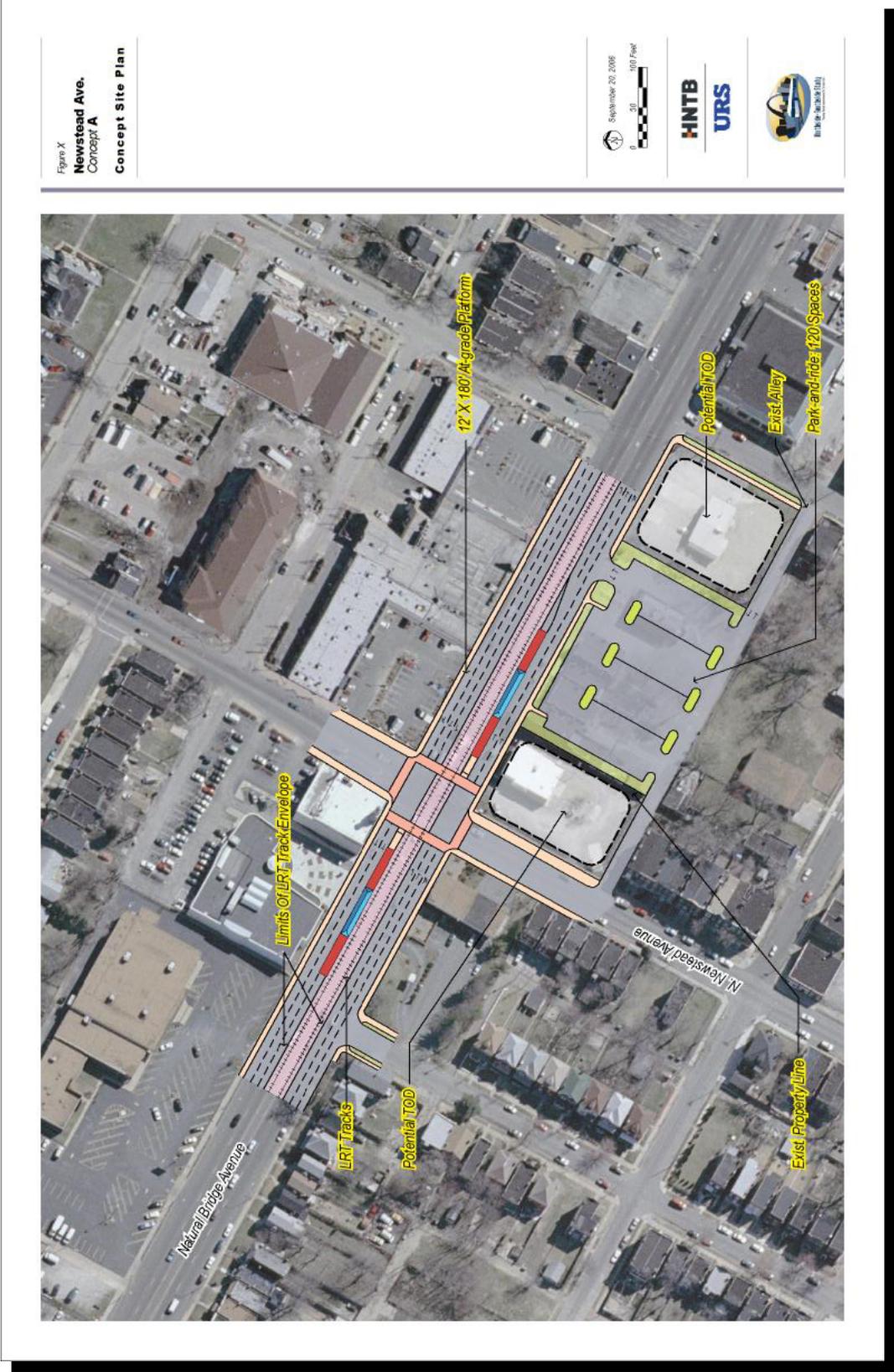
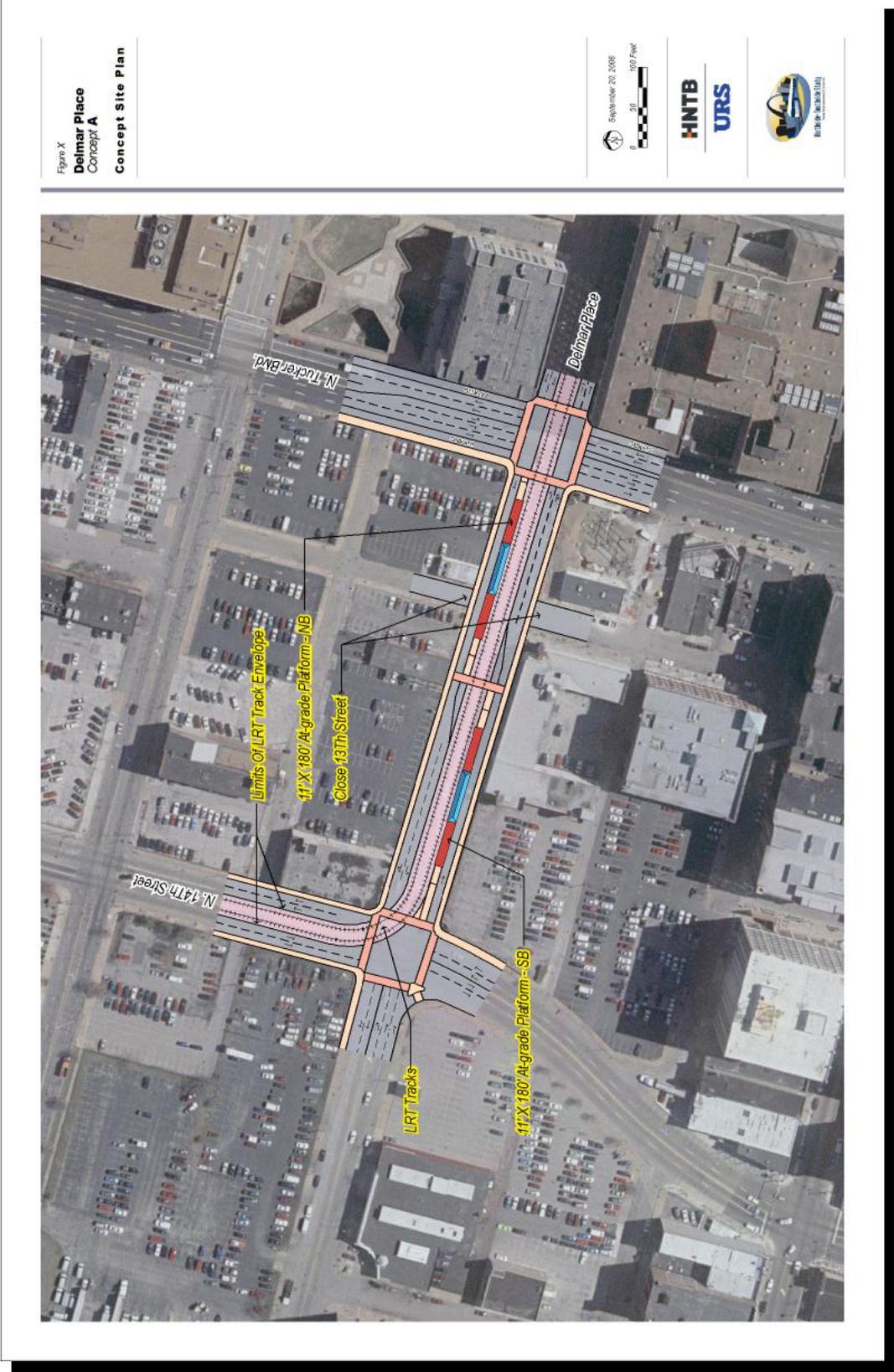


FIGURE 5.2-22: DOWNTOWN COUPLET, CONVENTION PLAZA STATION



Chapter 5.2: Development and Screening

FIGURE 5.2-23: LOW-FLOOR LIGHT-RAIL VEHICLE



Detailed Definition of Alternatives

Chapter 6.0

Northside Study



Chapter 6.1: Introduction

To further the process of selecting the most appropriate alternative alignments to comprise a locally-preferred alternative (LPA), this chapter provides more detailed definition and closer examination of the various alternatives.

Section 6.2 of this chapter describes proposed alignments and assesses transit-oriented development (TOD) opportunities along these alignments for the Northside study area, including downtown. Methodology applied in assessment of existing land use, corridor analysis, and station area analysis are also described. Results of TOD analysis will inform selection of a final LPA.

Section 6.3 focuses on the potential of MetroLink to expand within the City's Northside and Southside areas, with extensions into St. Louis County. The FTA *FY 2009 New Starts and Small Starts Evaluation and Rating Process, July 20, 2007* is used to evaluate transit improvement projects to demonstrate land use, development planning, and policy commitment to transit. Described are existing transit-supportive plans and policies, performance and impacts of these policies, and their implementation on development of six station area prototypes to address the improvement potential of different types of transit-supportive environments.

Section 6.4 examines transit station planning and site design. Consideration of identification, planning, and preliminary design processes led to development of recommendations for proposed stations within the Northside and Southside study areas.

Section 6.5 presents conceptual design engineering. Alternatives are subjected to design analysis, including development of plan/profile drawings. These analyses provided information for development of conceptual design cost estimates. General and alignment-specific design considerations, detailed alignment descriptions, and design elements for future examination are identified.

Section 6.6 discusses ridership estimates, as developed through application of the Federal Transit Administration's (FTA) Aggregate Rail Ridership Forecasting (ARRF) sketch forecast tool. Individual alignments are assessed; results will help selection of the LPA.

Northside Study



Chapter 6.2: Opportunities for Transit-Oriented Development

Transit-oriented development (TOD) has tremendous potential to impact the land use of St. Louis City and County. It is therefore vital to consider TOD among other major deciding factors in choosing light-rail routes, as well as to maximize its potential. This section describes the process of evaluation and assessment for TOD opportunities along each proposed transit line for the Northside study area, including downtown. One representative corridor within the Northside study area is examined for TOD potential. Alignments are also considered based on their existing land use characteristics and projected strategic land uses within selected prototypical station areas. From these data, future land use and development plans are recommended for the alignments, as well as their station areas. Areas with TOD potential are thereby identified. Results of this process will inform choices of a final locally-preferred alternative (LPA) in Chapter 8 of this study.

6.2.1 PROPOSED ALIGNMENTS

Two alignments have been carried forward from the alternatives development and screening process. A third alignment, the Olive Street/Chestnut Street Loop, is also considered here because its analysis lends further validity to screening decisions in *Chapter 5: Alternatives Development and Screening*. Any figures and tables relevant to this alignment are excluded, however, because the alignment itself was eliminated during the screening process. Development opportunities are assessed along these alignments (Figures 6.2-1 and 6.2-2), as well as selected stations along them. Those stations are chosen as prototypical examples representative of various station types and are divided among their respective light-rail routes. Selected stations are identified below in italics following their corresponding alignments:

Northside:

- Natural Bridge Avenue/14th Street – *St. Louis Ave., Newstead Ave., Goodfellow Blvd.*

Downtown:

- Olive Street/Chestnut Street Loop – *Washington Ave. at 14th St.*
- 9th Street/10th Street Couplet – *Convention Plaza between 14th St. and Tucker Blvd.*

Northside Study

FIGURE 6.2-1: NORTHSIDE, NATURAL BRIDGE ALTERNATIVE

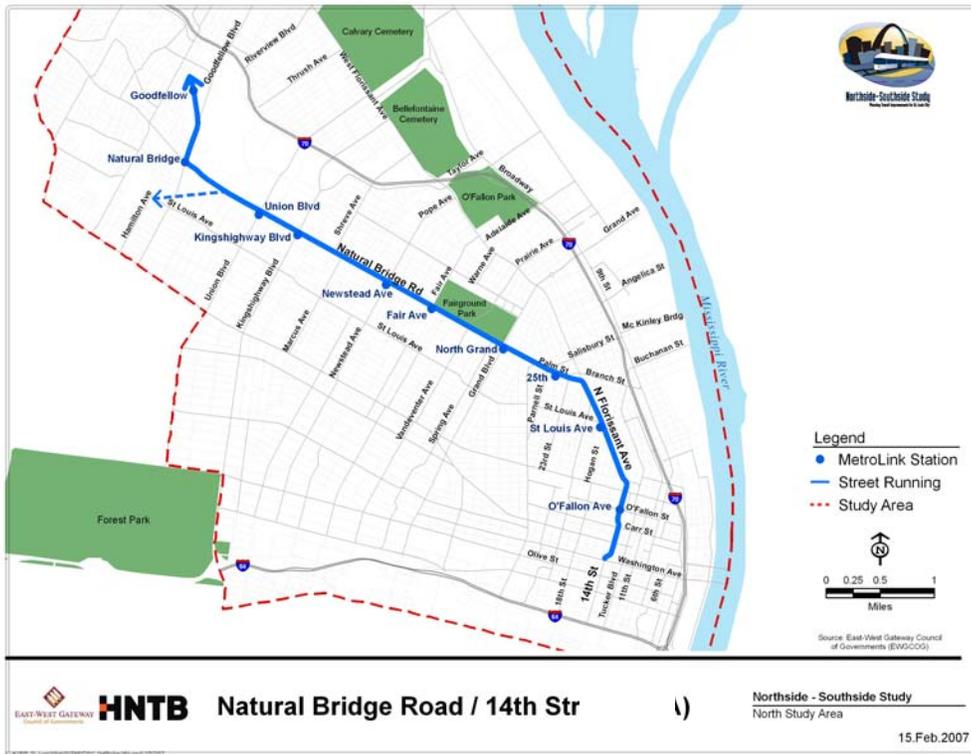


FIGURE 6.2-2: DOWNTOWN, COUPLET ALTERNATIVE



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS"

Chapter 6.2: Opportunities for TOD

6.2.2 METHODOLOGY

Alignments and their proposed station locations are examined in the following sub-sections in terms of existing and potential future land use. These factors inform assessment of TOD potential within a given area. Study of existing land use seeks to identify current conditions, issues, opportunities, and constraints along light-rail alignments, as well as the selected station areas. Features noted include neighborhood structure, circulation and transit connectivity, community resources, and retail and industry centers. Such features are studied both via City of St. Louis and St. Louis County parcel base files, which record existing uses of individual properties (classed as residential, institutional, commercial, industrial/utility, open space, or vacant/ undeveloped), and field reconnaissance, which seeks to verify particular parcel use and area character and connectivity. Resulting inventory, particularly within station areas, focuses on several characteristics:

- **Key issues.** Existing land use analysis and data.
- **Walkability and urban design issues.** Existing pedestrian and urban environment.
- **Key public features.** Listing of existing parks, schools, institutions, and destination centers.
- **Development potential.** Opportunities for new development and redevelopment.

Future land use along alignments and within station areas is also analyzed. Particular considerations include:

- Impact to vehicular and pedestrian circulation in neighborhoods.
- Impact to continuity of neighborhoods and land parcels.
- Impact to parks, open space, and trails.
- Impact to historic districts and neighborhood institutions.
- Opportunity for multi-modal access for neighborhood residents.

Such future use is determined primarily through analysis of the City of St. Louis Planning Commission's *Strategic Land Use Plan*, which the Commission adopted in January 2005. As explained in *Chapter 3.2: Land Use Characteristics* of this document, it provides a cohesive, holistic development approach for the City's anticipated growth. This plan is a highly-researched, City-endorsed document and reflects input of not only the City's Planning and Urban Design Agency, but also the City Mayor's office, St. Louis' 28 aldermen, City and State agencies, developers, and other stakeholders. Rare deviations from the Strategic Plan are validated by factors such as knowledge of pending development expected to alter an area's potential use and neighborhood and/or transit configurations that either limit or offer greater opportunity than earlier projected. Such variations have been previewed by City Planning staff.

Additional references in developing recommendations for future land use include St. Louis' *Downtown Development Action Plan*, which seeks to promote and track healthy downtown growth, and awareness of already planned development, such as the Chouteau Greenway, CORTEX, and North Market Place. These factors, the Strategic Land Use Plan, and fieldwork inform the study team's analysis of alignments and station areas, resulting in land use recommendations, identification of areas prime for redevelopment, and recognition of such redevelopment as could be shaped and promoted by the presence of supportive transit.

Northside Study

6.2.3 CORRIDOR ANALYSIS

Two corridors, one each within the Northside and Southside study areas, are studied and assessed for future land use possibilities and TOD potential. Both corridors comprise sections of regionally important roadways wide enough to accommodate light rail transit. Further, both are Missouri state highways. These corridors are examined via use of parcel data and field reconnaissance. Such information is then compared with the Strategic Land Use Plan and any other relevant plans to develop a set of recommendations for future land use. From this, TOD opportunities are identified. This section, directed strictly toward analysis of Northside and downtown, assesses only the Northside study area corridor. See the parallel section of the Southside study for information on its respective corridor.

The 2006 Northside study area covers approximately 33 square miles, extending from near Halls Ferry Circle on the north to Chouteau Avenue on the south, and from the Mississippi River on the east to Lucas and Hunt Road and Union Boulevard on the west. Nearly 170,000 residents, or 11.5% of the combined St. Louis City and County populations, occupied this area in 2000. Within this area, as can be expected, lies great diversity of land use. From data provided by the City of St. Louis (2003) and St. Louis County (2002) parcel bases, such land use is broken into the following categories by approximate percentage of the total Northside study area acreage:

- Residential – 31.91%
- Institutional – 14.25%
- Commercial – 17.14%
- Industrial/Utility – 16.30%
- Open Space – 11.44%
- Vacant/Undeveloped – 8.95%

Due to the size and diversity of the study area, selection of a representative corridor could have proved difficult. Among options for Northside light-rail transit (LRT) alignments, though, the 2000 MTIA Study resulted in selection of the Natural Bridge route as its locally preferred alternative (LPA). This LPA selection, as carried forward into the present study, highlights Natural Bridge Avenue as a good option for further study. Because a route along West Florissant was also temporarily considered (*Chapter 5: Alternatives Development and Screening*), that could also have been an informed corridor selection. Ultimately, though, the Natural Bridge corridor is assessed for reasons including its status as the 2000 LPA, its potential for redevelopment, and its wide right-of-way which provides accommodation for in-street running LRT. The corridor selected runs along and extends approximately a quarter-mile on either side of Natural Bridge from Fair Avenue to Goodfellow Boulevard.

Existing conditions within the corridor include diverse land uses with destination centers, parks, and institutions (Figures 6.2-3 through 6.2-6), as well as residences and neighborhood and regional commerce. There are also many underutilized properties, though the area is experiencing some limited new development. Access is good to Interstate-70 and to major arterials, such as Union Boulevard, Kingshighway, and Grand Boulevard.

Property fronting Natural Bridge features mixed use with residential, institutional, commercial, industrial, park, and vacant parcels. Residential parcels are both single- and multi-family. Institutions include schools and a public branch library. Commercial uses range from gas stations and convenience stores to rental centers to grocery and smaller department stores.

Chapter 6.2: Opportunities for TOD

Industrial uses focus primarily on large business parks with light industry and warehouse purposes, as well as some smaller warehouses. On the eastern side of the corridor is open space in the form of Fairground Park, one of the larger parks in the City of St. Louis. Vacant parcels are dispersed along the road and include abandoned homes and closed business properties.

Properties one or two parcels away from Natural Bridge are primarily residential, with some other uses dispersed throughout and concentrated along lesser arterials. Features include schools, small open spaces and parks, neighborhood commerce, senior living facilities, and several churches. Parcels on the north side of Natural Bridge feature a higher percentage of industrial and warehouse uses, particularly near Union Boulevard. A higher concentration of properties are vacant there than along Natural Bridge itself.

Examination and comparison of the Strategic Land Use Plan to the corridor's existing land use presents several opportunities for redevelopment (Figure 6.2-7). Detailed development schemes are shown throughout the corridor and along Natural Bridge in the vicinity of proposed LRT stations. Recommended land uses include areas of neighborhood preservation and development with residential infill such as townhomes, strengthening of and addition to areas of regional and neighborhood commerce, and the redevelopment of some business/industrial areas. Of this redevelopment, any within close walking proximity (typically a quarter- to half-mile radius) could be at least partially supported by TOD.

FIGURE 6.2-4: EXISTING CONDITIONS AERIAL, KINGSHIGHWAY TO FAIR



**NATURAL BRIDGE CORRIDOR PLAN
EXISTING CONDITIONS PLAN**

Northside Study

FIGURE 6.2-5: EXISTING CONDITIONS PHOTO KEY, GOODFELLOW TO CORA



FIGURE 6.2-6: EXISTING CONDITIONS PHOTO KEY, UNION TO FAIR

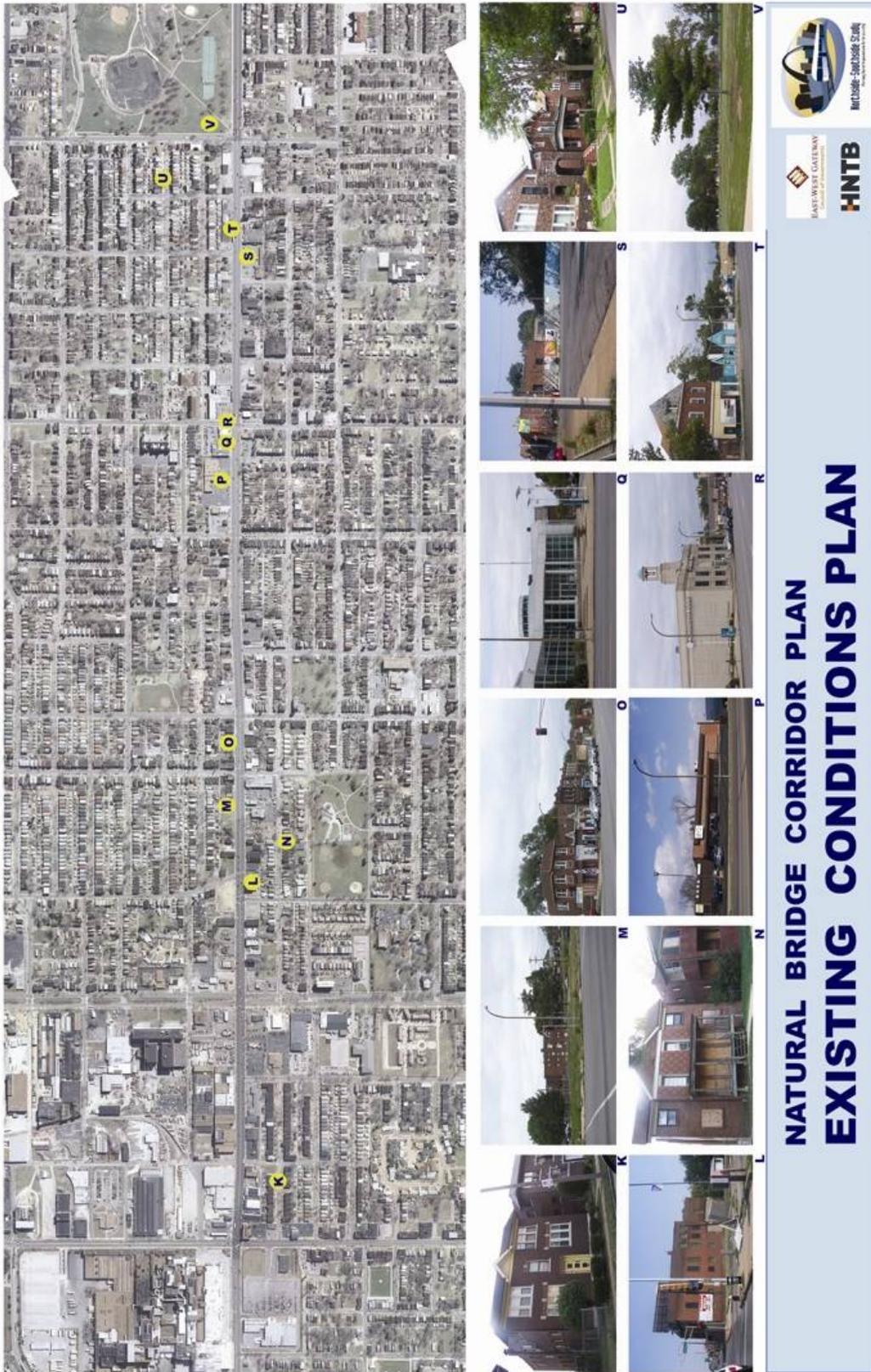
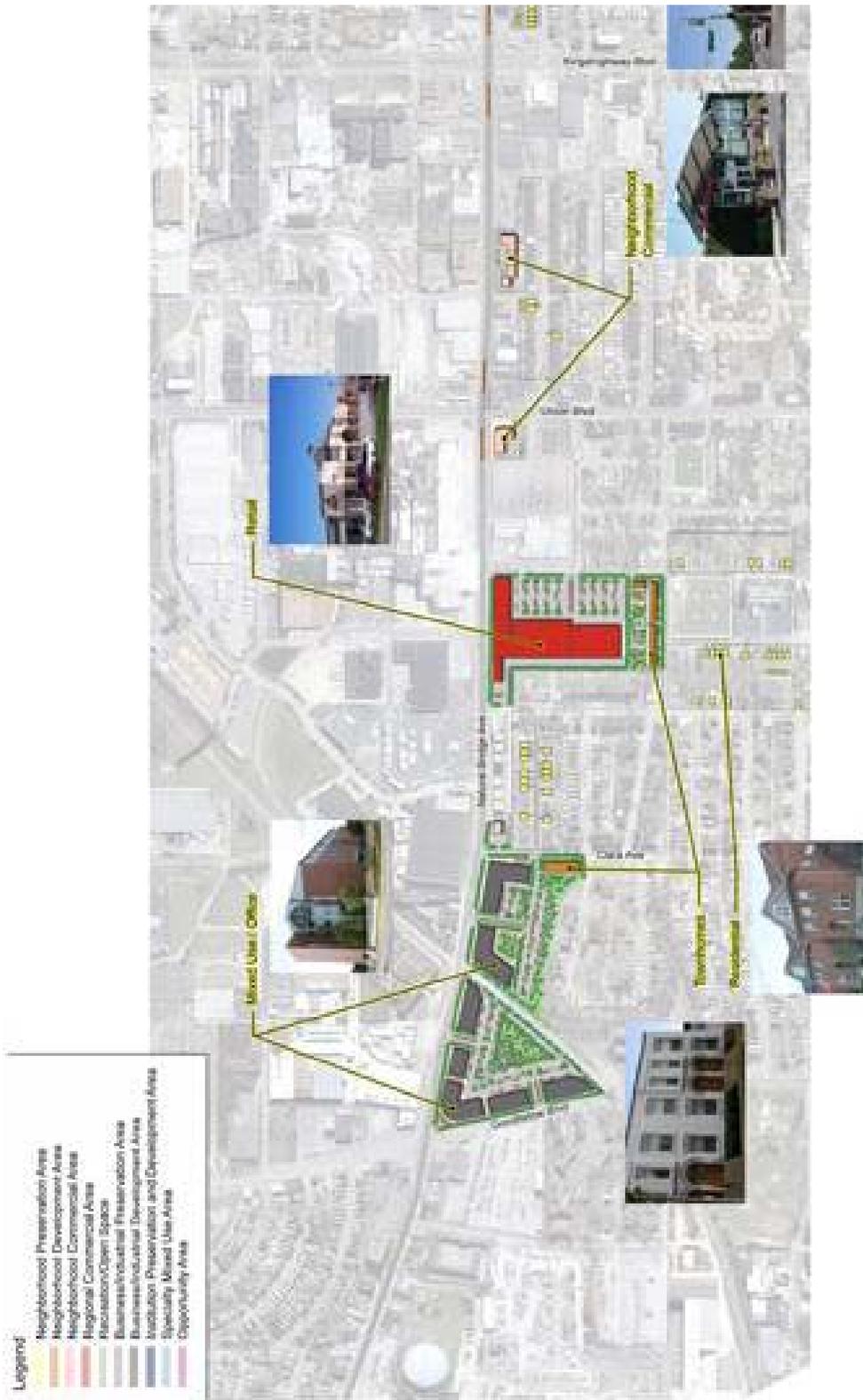
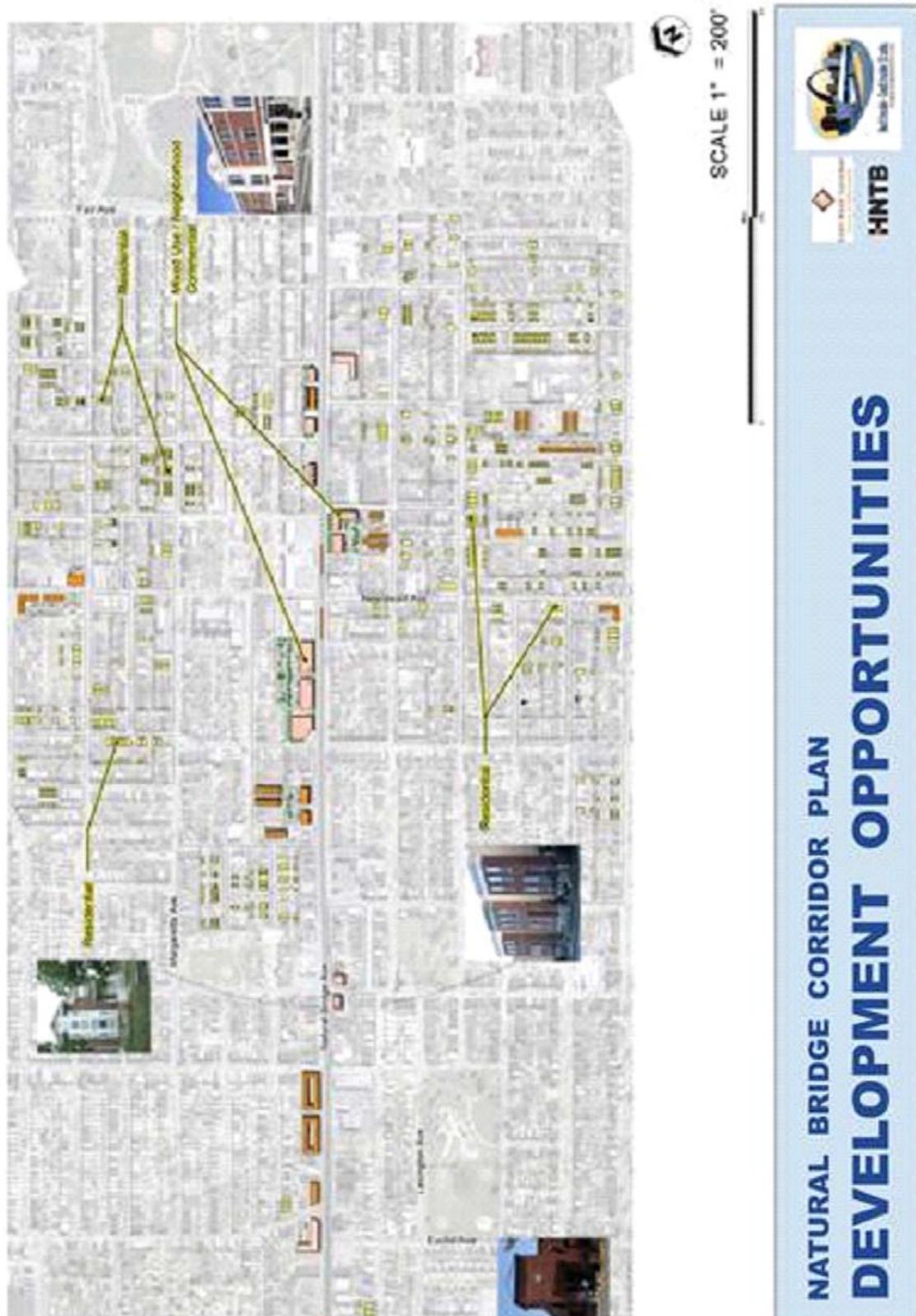


FIGURE 6.2-7: DEVELOPMENT OPPORTUNITIES (PART 1)



**NATURAL BRIDGE CORRIDOR PLAN
DEVELOPMENT OPPORTUNITIES**

FIGURE 6.2-7: DEVELOPMENT OPPORTUNITIES (PART 2)



Northside Study

6.2.4 STATION AREA ANALYSIS

In addition to the Northside corridor, several stations and the areas within a half-mile radius of them are also assessed for future land use and TOD potential. As previously explained, selected stations are treated as prototypical examples of various station types and land use mixes. Note that station locations as illustrated are approximate and subject to adjustments and refinements. The station shown in at the intersection of Branch and Palm, for example, has now shifted to Parnelle at Natural Bridge as a result of advanced engineering analysis.

Station areas are examined via use of parcel data and field reconnaissance. Such existing land use information is then compared with the City's Strategic Land Use Plan and any other relevant development plans to assemble recommendations for future land use. Areas exhibiting particular potential are illustrated with development plans. From these plans, TOD opportunities are identified. Several areas with high TOD potential are also modeled for an idea of how redevelopment may sculpt those areas. Development shown reflects projected market needs and attempts to illustrate realistic goals for each area. Redevelopment plans should change relative to any shift in market forces, though. Assessment of existing and potential conditions for each selected station area follow.

St. Louis Avenue Station and Half-Mile Radius Area (Figures 6.2-8 through 6.2-10)

- **Key Issues.** There are numerous vacant lots and buildings, as well as current investments involving rehabilitating properties in the vicinity of the proposed station, indicating tremendous redevelopment opportunity. Redevelopment may find a center in the vicinity of North Market Street and along St. Louis Avenue near the proposed station. North Florissant's wide right-of-way is conducive to LRT.
- **Walkability and Urban Design Issues.** While I-70 is a major east-west barrier and Florissant Avenue a moderate barrier in this area, overall walkability is fair. Vacant lots contribute to a decreased sense of pedestrian safety, though.
- **Key Public Features.** Community resources and destination centers include Jackson Place Park, St. Louis Place Park, Webster Middle School, Ames Elementary School, and Crown Candy Kitchen (a popular restaurant that attracts clients from throughout the St. Louis region).
- **Development Potential.** There is potential to leverage and expand opportunities along 14th Street and the North Market redevelopment. Mixed-use and commercial land uses could provide infill along North Florissant Avenue. Existing vacant parcels will allow for assembly of critical mass for development.

Proposed development includes approximately 296,000 square feet of mixed-use and neighborhood commercial space fronting North Florissant Avenue; this square footage is total for a series of three-story structures. Approximately 68,000 square feet of multi-family residential structures (which includes 12 townhomes) and about 65 single-family houses will provide for population infill in the area. A parking structure with around 22,000 square feet per level, at an assumed three levels, will provide parking for LRT commuters and neighborhood shoppers and residents on its upper two levels, as well as office and retail space on its lower level. Such redevelopment offers high TOD potential and could restore vibrancy to this area.

Chapter 6.2: Opportunities for TOD

Newstead Station and Half-Mile Radius Area (Figures 6.2-11 and 6.2-12)

- **Key Issues.** Though there are many vacant properties, some areas feature high-density residential neighborhoods. Redevelopment opportunities particularly exist along Natural Bridge Avenue to the west of the proposed station. Proposed LRT must coordinate with existing bus routes to connect without impacting existing businesses.
- **Walkability and Urban Design Issues.** Natural Bridge Avenue creates a moderate barrier to pedestrian traffic. Overall walkability throughout the area is fair. The existing neighborhood sidewalk system, which is on a grid, provides good connectivity. There is opportunity for streetscape enhancement along Natural Bridge Avenue and at the intersection with Newstead Avenue.
- **Key Public Features.** The area offers numerous community resources and destination centers. Parks, many of which are along Natural Bridge Avenue, include Fairground Park, Tink Bradley Park and Handy Park. Public schools include Bunch Middle School, Simmons Elementary School, Hickey Elementary School, and Ashland Elementary School. The Julia Davis branch of the St. Louis library is located on Natural Bridge Avenue at Newstead Avenue, and there is a fire station/engine house.
- **Development Potential.** There is good potential for mixed-use and neighborhood commercial infill along Natural Bridge Avenue, particularly at the intersection with Newstead Avenue. In areas one or more parcels away from Natural Bridge, there is also potential for residential infill.

Redevelopment recommendations for this station area feature residential infill in both neighborhood preservation and neighborhood development areas identified in the Strategic Land Use Plan. This includes approximately 440 single-family homes and about 102,000 square feet of multi-family residences, primarily townhomes. Approximately 384,000 square feet of mixed-use and neighborhood commercial land use will support the restored population, as well as any LRT commuters. Such redevelopment will build upon stable existing properties, such as the bank, library and retail center along Natural Bridge Avenue.

Goodfellow Station and Half-Mile Radius Area (Figures 6.2-13 and 6.2-14)

- **Key Issues.** Land within this station area is used primarily for industrial and warehouse purposes. There are projected opportunities for development of further industry/warehouse structures and redevelopment of the former St. Louis Ordinance Plant. The future of the Army Reserve property is unknown, but it offers the potential for redevelopment. Residential neighborhoods lie primarily north of Interstate-70 and west of Goodfellow Boulevard. Goodfellow offers a particularly wide right-of-way, making it more conducive to LRT.
- **Walkability and Urban Design Issues.** Overall walkability in the area is poor, with Interstate-70 and the many industrial parks creating barriers for pedestrian circulation. Residential areas do provide better pedestrian accessibility. Goodfellow Boulevard lacks pedestrian scale, with a wide right-of-way and relatively large building setbacks. Residences in the western portion of the station area lack pedestrian connections to Goodfellow.

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- **Key Public Features.** Community resources and destination centers within the station area include Kenawah Park, Northwest Middle School, the United States St. Louis Ordinance Plant, the St. Louis Job Corps Center, a United States Army Reserve Center, and Council Grove Heights.
- **Development Potential.** The area to the south of the station could support mixed-use/office development. Existing neighborhoods through the station area would be well-served by investment in residential infill. There are also opportunities for regional commercial development at the former SLAAP plant site.

Redevelopment recommendations for this area feature some limited multi-family residential development, including about 74 townhomes to the southwest of the station. Larger properties, such as the former St. Louis Army Ammunition Plant, will support approximately 1,075,000 square feet of mixed use and larger regional commercial land uses. An additional 476,000 square feet of office space will provide further stability and employment opportunity to the area. Two multi-level parking structures, with a total of about 150,000 square feet of retail space on their lower levels, will provide approximately 602,000 square feet of parking for LRT commuters and shoppers.

Downtown Stations and their Half-Mile Radii (Figures 6.2-15 through 6.2-18)

Two LRT alternatives are proposed to serve the downtown area. The first is a single-track loop traveling Olive and Chestnut Streets. The second is a couplet along 9th and 10th Streets. Existing conditions of the couplet are illustrated in a photo key (Figure 6.2-15). The stations selected to represent these alignments (Washington Avenue for the loop and Convention Plaza for the couplet) are located very near each other and present nearly identical redevelopment opportunities. Because of this overlap, they share some of the same features.

- **Key Issues.** The wide right-of-way along 14th Street is conducive to LRT. This area serves downtown businesses and residential communities, including the numerous destination centers, neighborhoods, and entertainment districts that exist adjacent to the proposed stations. Accessibility to and visibility of these many destination centers must be maintained. There is current investment in area redevelopment; potential for additional redevelopment is high.
- **Walkability and Urban Design Issues.** Overall walkability of the area is good. As mentioned, access to and view of local businesses must be maintained. One-way streets limit some accessibility, but the established urban street grid provides good connectivity.
- **Key Public Features.** Community resources and destination centers feature the main branch of the St. Louis Public Library, Lucas Park, Carr Square Park, Soldiers Memorial, Federal and Civil Courts, St. Louis City Hall, the City Museum, Kiel Opera House, a local YMCA, the Washington Avenue Loft District, the Convention Center, and numerous shops, restaurants, and hotels.
- **Development Potential.** There is tremendous potential for additional Specialty Mixed Use Areas (SMUA), as detailed in the City's Strategic Land Use Plan. Such mixed-use, infill-scale development should be similar to and maintain the pattern of existing structures, as well as recent and current projects. There is also opportunity for rehabilitation and/or adaptive reuse of existing, sound structures. Sites with existing,

Chapter 6.2: Opportunities for TOD

unsound structures can support new construction. Some infill development of vacant lots or blocks could support residential land use.

Particular redevelopment recommendations for these station areas comprise primarily SMUAs. Areas also feature approximately 90,000 square feet of multi-story mixed-use and retail land use. Repopulation and revitalization of the area will also support the addition of approximately 514,000 square feet of multi-family units, mostly apartments and condominiums.

FIGURE 6.2-8: ST LOUIS AVE, EXISTING LAND USE

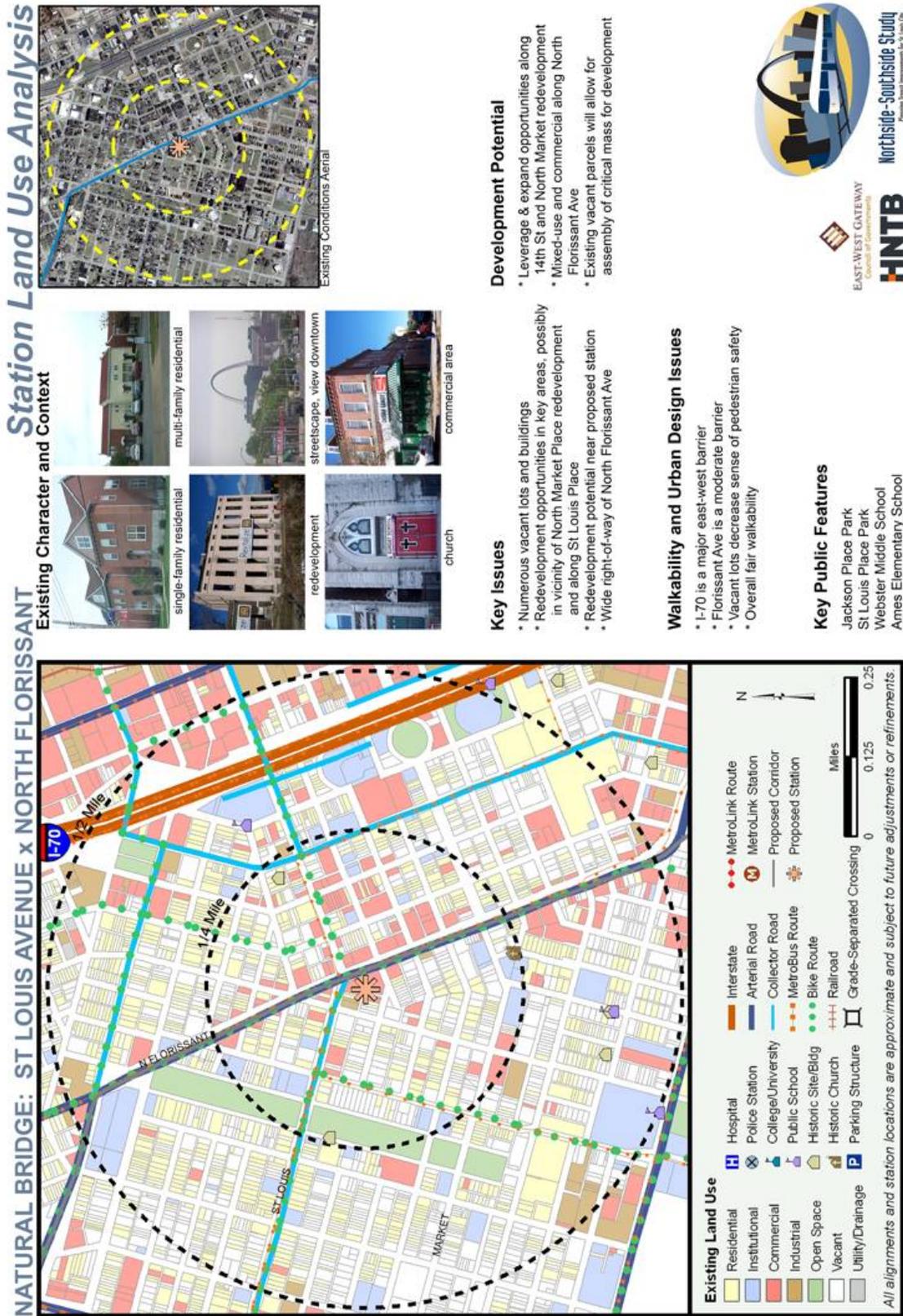
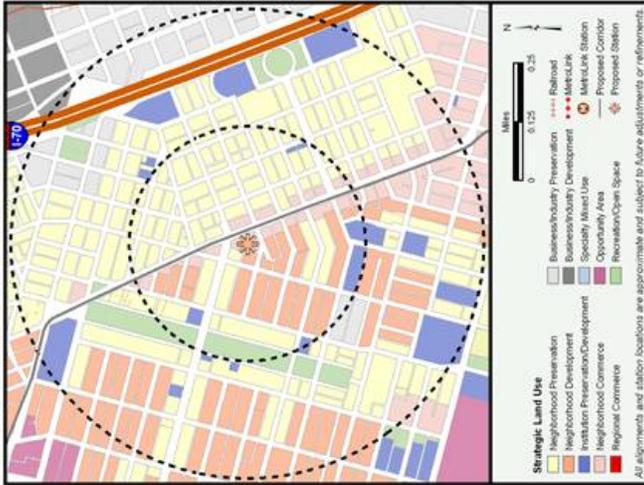


FIGURE 6.2-9: ST LOUIS AVE, DEVELOPMENT POTENTIAL

Station Land Use Potential



NATURAL BRIDGE: ST LOUIS AVENUE x NORTH FLORISSANT



FIGURE 6.2-10: ST LOUIS AVE, POTENTIAL LAND USE DEVELOPMENT



FIGURE 6.2-11: NEWSTEAD AVE, EXISTING LAND USE



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FIGURE 6.2-12: NEWSTEAD AVE, DEVELOPMENT POTENTIAL

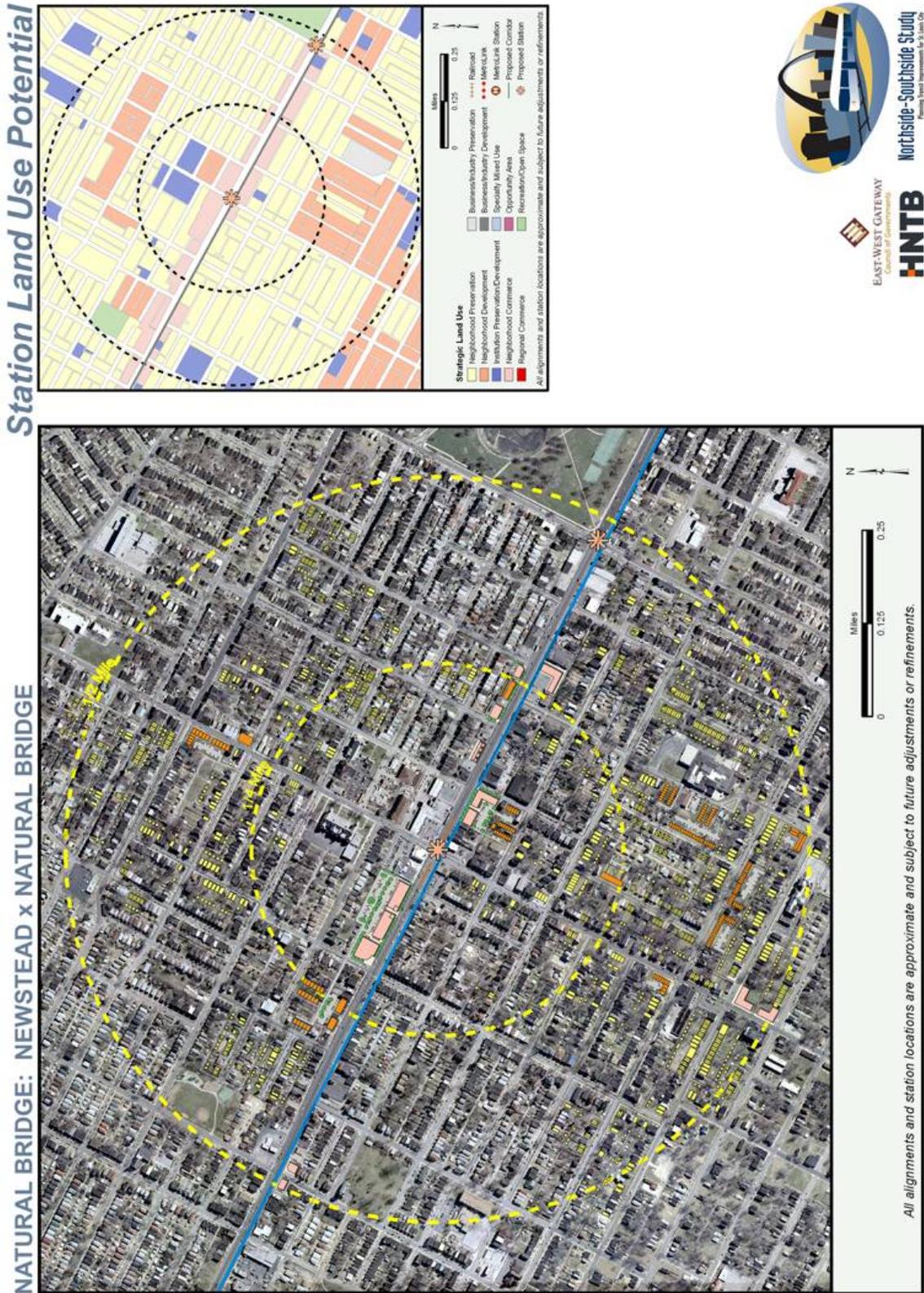
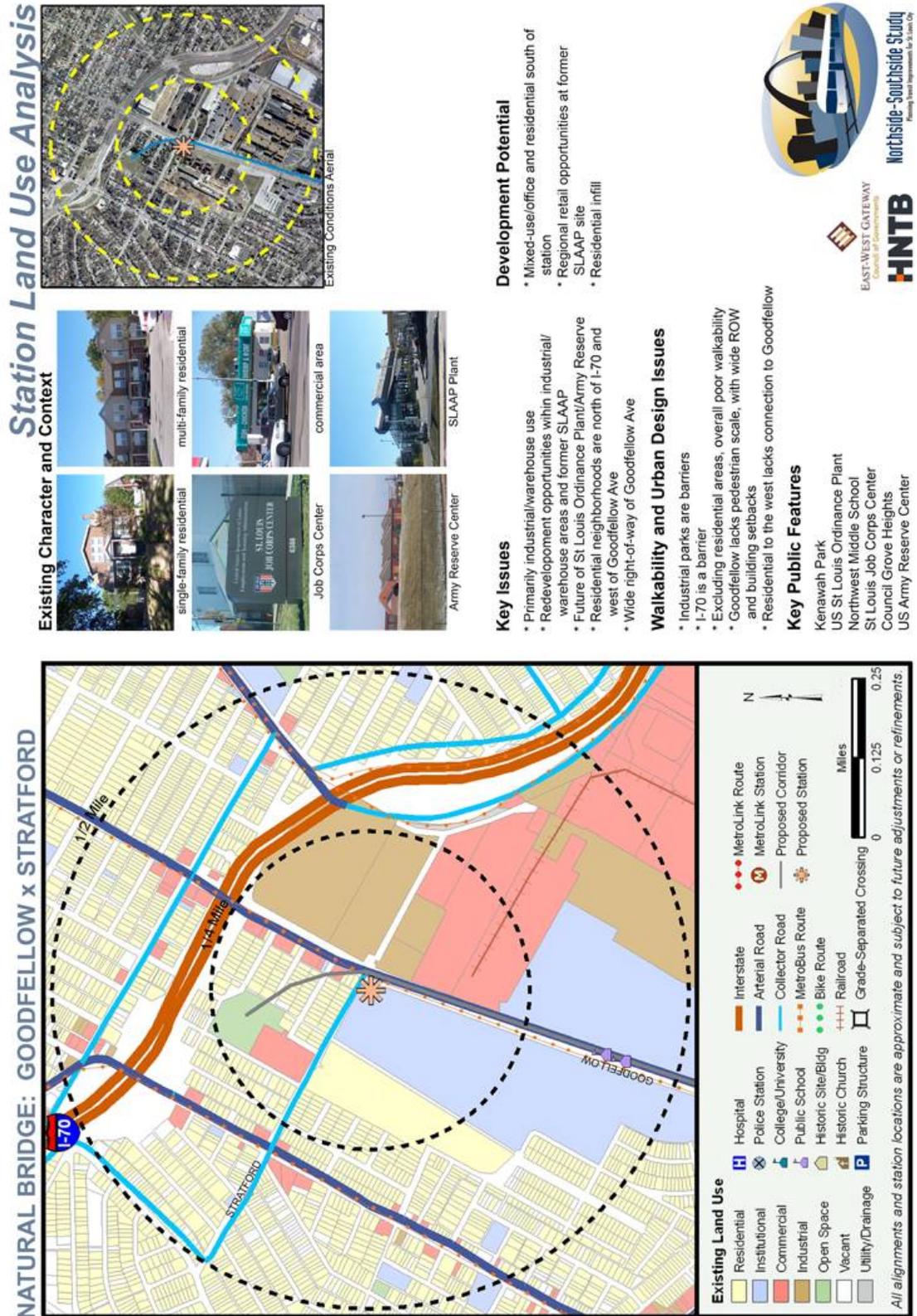


FIGURE 6.2-13: GOODFELLOW BLVD, EXISTING LAND USE

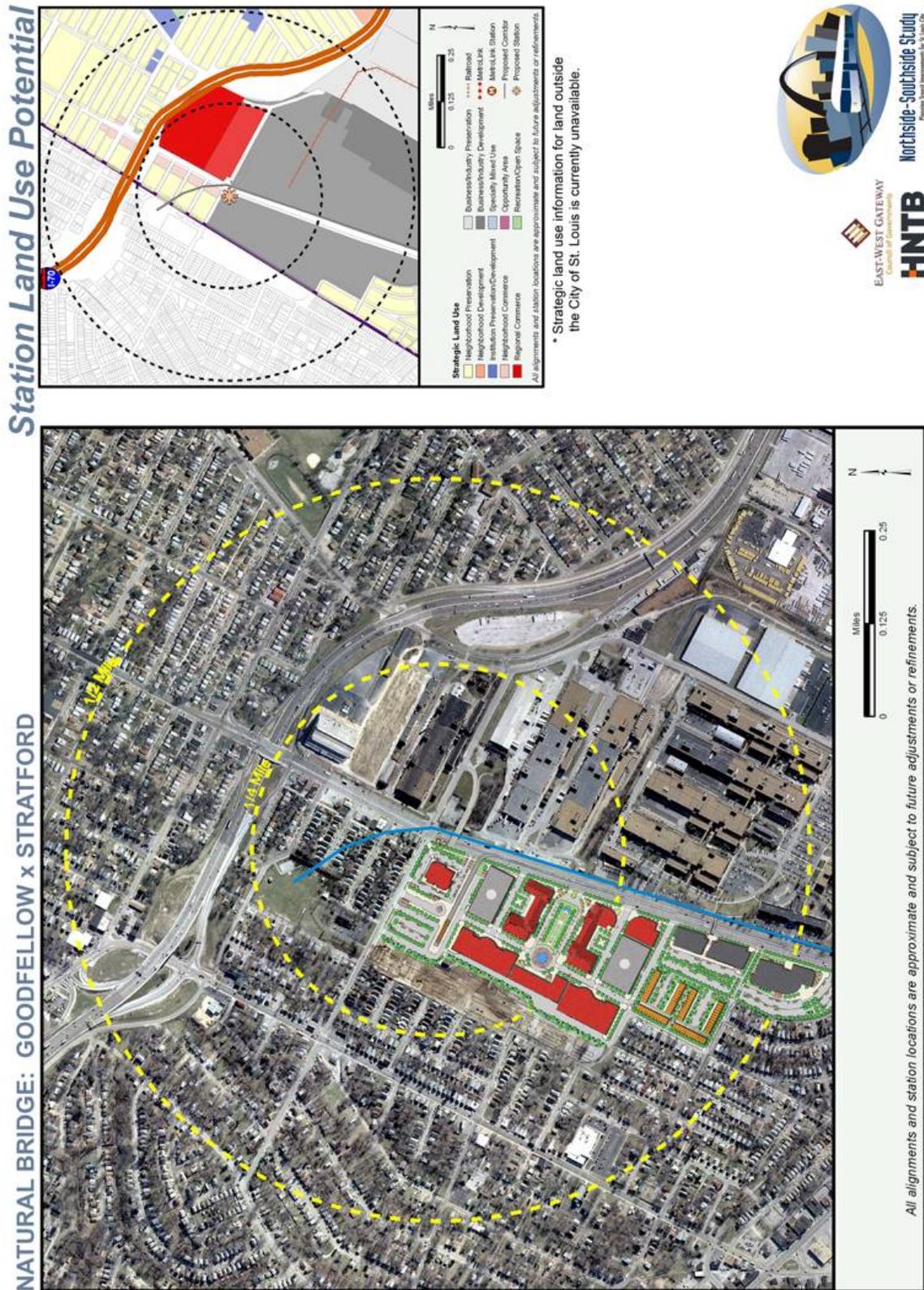


NATURAL BRIDGE: GOODFELLOW x STRATFORD

All alignments and station locations are approximate and subject to future adjustments or refinements.

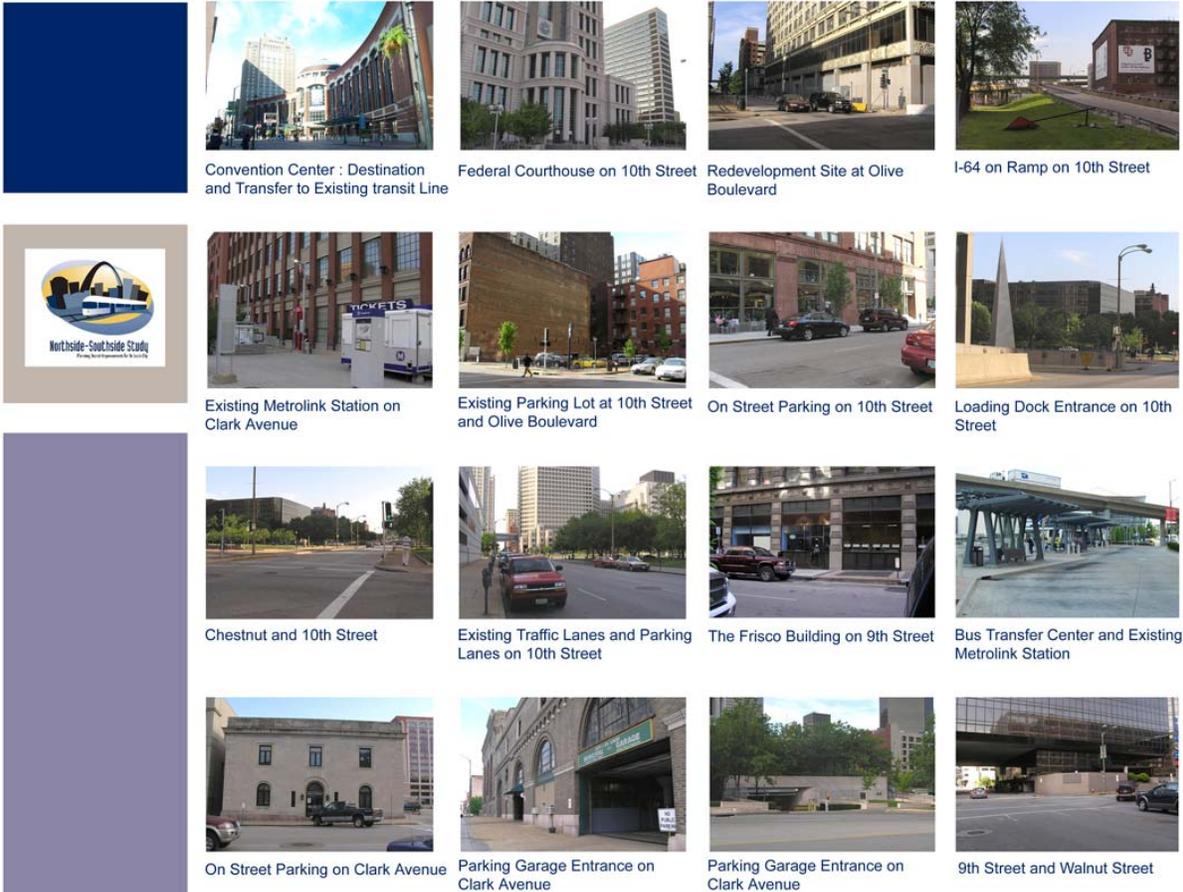
Northside Study

FIGURE 6.2-14: GOODFELLOW BLVD, DEVELOPMENT POTENTIAL



Chapter 6.2: Opportunities for TOD

FIGURE 6.2-15: DOWNTOWN COUPLET, EXISTING CONDITIONS PHOTOS



9th STREET / 10th STREET ONE-WAY COUPLET EXISTING CONDITIONS AND ISSUES

Northside Study

FIGURE 6.2-16: CONVENTION PLAZA (COUPLET), EXISTING LAND USE



FIGURE 6.2-17: CONVENTION PLAZA (COUPLET), DEVELOPMENT POTENTIAL

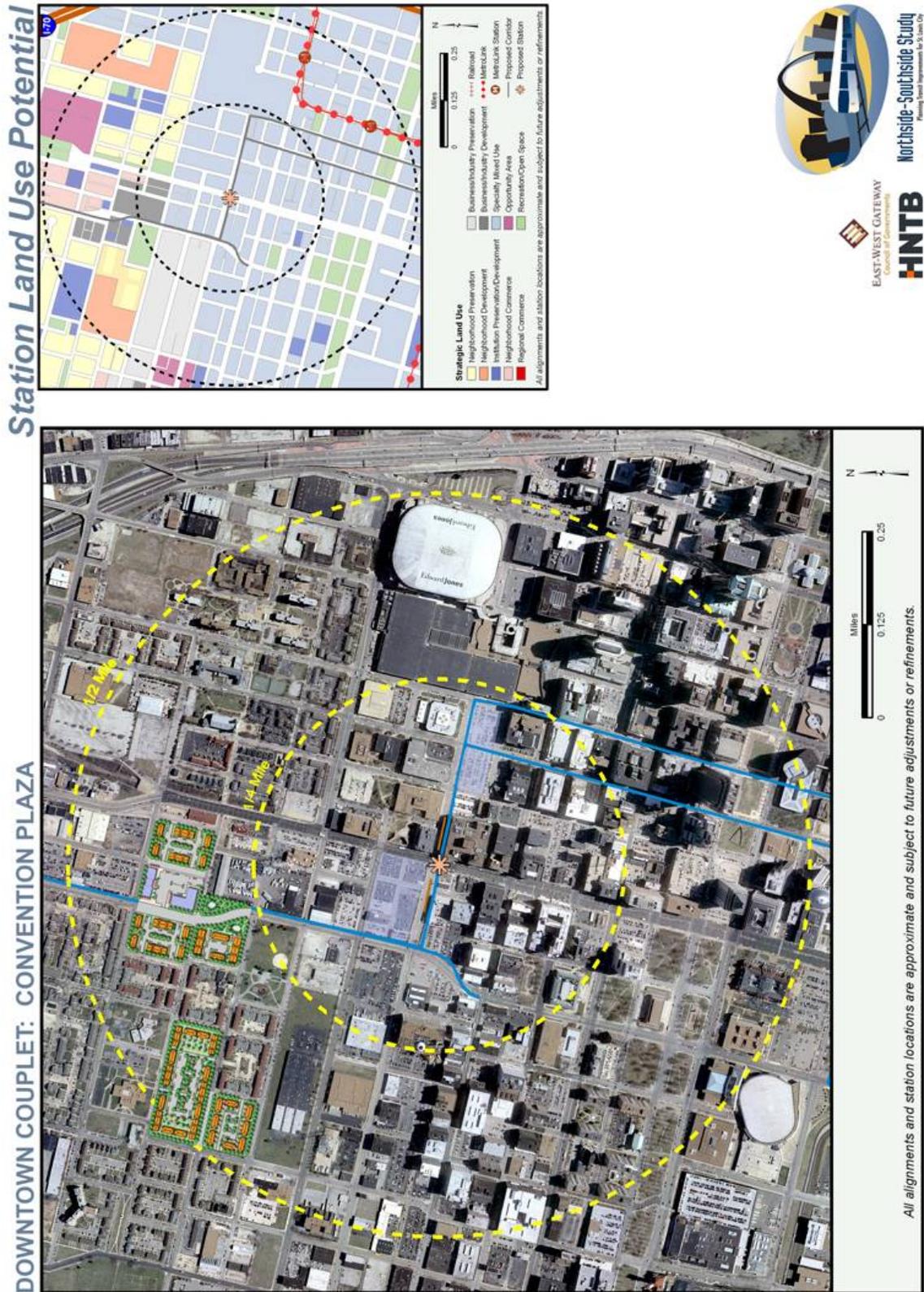
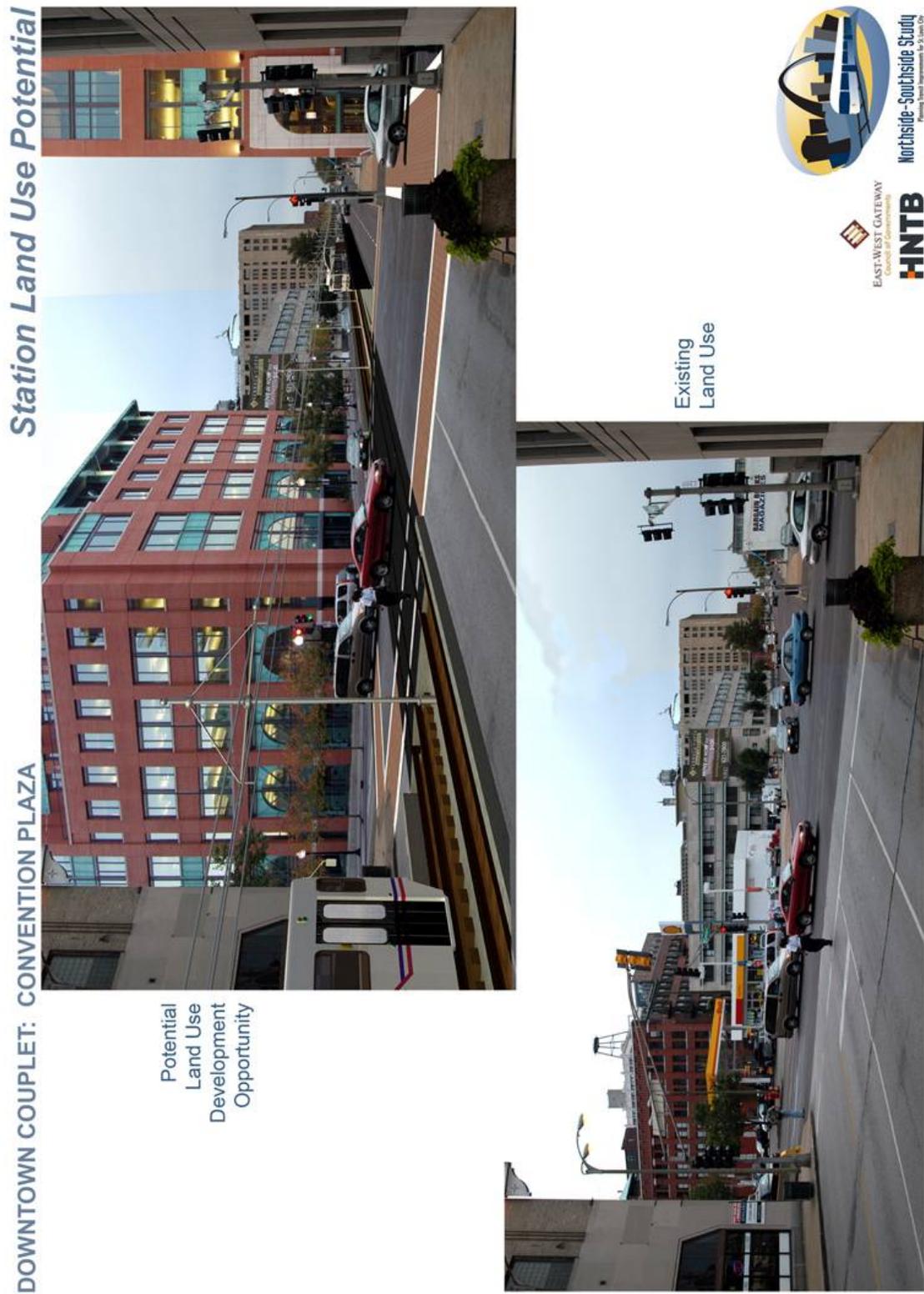


FIGURE 6.2-18: CONVENTION PLAZA (COUPLET), POTENTIAL LAND USE DEVELOPMENT



Chapter 6.2: Opportunities for TOD

6.2.5 CONCLUSION

This section of the chapter identifies TOD opportunities throughout the Northside study corridor, as well as each selected station area. TOD will most influence areas in proximity to the transit stations. These areas are most accessible to commuters and other travelers boarding and exiting from the LRT. Consequently, TOD also has the most potential effect along easily accessible main roads along the LRT lines. The corridor plan effectively illustrates this development scenario of concentrated development along alignment streets and less development further away from the street with the LRT alignment. The corridor plan for Natural Bridge illustrates opportunity for redevelopment, while roads further from the alignment offer less. This corridor has the infrastructure and mixture of land use to incorporate light rail transit as a catalyst for development.

Downtown St. Louis is currently experiencing an increase in redevelopment and development of residential, retail, hospitality, and mixed use land uses. Favorable local and state development policies should help to continue the development in the next five to ten years. Such time frame would favor the creation of a public policy focusing on TOD. The public policy, at local or state levels, would help to sustain the growth in downtown St. Louis as street-running transit is implemented. A public development policy which leverages federal policies towards transit would help to sustain development in active neighborhoods and could be the catalyst for areas struggling for new investment.

The city's Strategic Land Use Plan is utilized as the basis for identified future land use along the alignments. The land use plan is considered in all development scenarios, with some scenarios offering a variance from the plan, as based on station locations, current development markets, and proposed plans for respective areas. Development markets may include neighborhood, institutional, neighborhood and regional commercial, and industry development, as well as support for recreational spaces and other community/public features. Plans and recommendations from this chapter will be considered throughout subsequent portions of this report and will inform the selection of an LPA in Chapter 8.

Northside Study



Chapter 6.3: Transit-Supportive Land Use Assessment

Since 1993, the City of St. Louis has been developing a light rail line, MetroLink, which connects Lambert International Airport on the west, downtown St. Louis, and Scott Air Force Base in Illinois on the east. MetroLink is one of the most successful light rail lines in the country, with an average of 46,000 passengers per weekday in 2005. In particular, downtown St. Louis has been the focus of planning and redevelopment efforts and has witnessed a renaissance as the region's employment, entertainment, and cultural center. Due to the success and popularity of MetroLink, the East-West Gateway Council of Governments (EWGCOG) has been studying the potential expansion of MetroLink within the city's Northside and Southside areas with extensions into St. Louis County. In 2000, EWGCOG completed Major Transportation Investment Analyses (MTIAs) that resulted in the selection of locally preferred alternatives (LPAs) for the Northside and Southside study areas. Now, an Alternatives Analysis study is being conducted to refine the potential commuter alternatives, ridership and cost estimates, and land use and environmental effects. This section of the Alternatives Analysis addresses the existing and future transit-supportive land use policy programs that would support the potential expansion of MetroLink, as well as the Federal Transit Administration's (FTA) *FY 2009 New Starts and Small Starts Evaluation and Rating Process*, July 20, 2007 to secure federal funding for project implementation.

6.3.1 NEW STARTS CRITERIA

The FTA applies the *FY 2009 New Starts and Small Starts Evaluation and Rating Process* to evaluate candidate transit improvement projects seeking federal capital or operating funding assistance. Obtaining New Starts funding is a nationally competitive process. The degree to which a project can demonstrate land use and development planning and policy commitment to transit, the greater the chances for funding support. The criteria by which transit-supportive land use and future development patterns are evaluated include existing land use, plans and policies, and performance and impacts of policies. More specifically, the following New Starts criteria are addressed in this analysis of St. Louis' transit-supportive land use policy program:

- Existing land use and development character along the proposed alignments.
- Regional and community growth management, such as the concentration of development around established centers and regional transit.
- Transit-supportive corridor policies, such as those which encourage higher density development patterns and enhance pedestrian access.
- Supportive zoning regulations near transit stations, such as increased density, appropriate building placement, and reduced off-street parking requirements.
- Performance of land use policies, such as demonstrated cases of development and current development proposals within station areas.
- Potential impacts of a transit investment on overall land use, such as the adaptability of station area land for development or redevelopment.

It is important to point out that not all of these policies need to be operating and in place at this time, but a commitment and progress towards implementing them should be shown as the potential transit service evolves through the project development process. However, any early policy initiatives that can be undertaken consistent with the *FTA FY 2009 New Starts and Small*

Northside Study

Starts Evaluation and Rating Process would enhance the project's overall competitiveness and future funding potential.

6.3.2 EXISTING LAND USE AND DEVELOPMENT CHARACTER

An analysis of the existing land use and development pattern is necessary to determine the extent to which land uses would support future transit. More importantly, this analysis may indicate potential opportunities for infill development and redevelopment and the appropriate future land uses for supporting transit ridership. This section contains a summary analysis of the existing land uses for the proposed transit alternatives and station areas in the Northside study area, including downtown.

Two alignments have been carried forward from the alternatives development and screening process. A third alignment, the Olive Street/Chestnut Street Loop, is also considered here because its analysis lends further validity to screening decisions in *Chapter 5: Alternatives Development and Screening*. Any figures and tables relevant to this alignment are omitted, however, because the alignment was eliminated. The Northside locally-preferred alternative (LPA), as identified in the 2000 MTIA, is the 14th Street/ Natural Bridge Avenue alignment. This alternative travels from downtown St. Louis at 14th Street and Washington Avenue, along Tucker Boulevard and North Florissant, along Natural Bridge to Goodfellow Boulevard, and along Goodfellow. The downtown alternative carried forward from the development and screening process is the 9th Street/10th Street One-Way Couplet, running north and south from Cole Street to Clark Street, and connecting with 14th Street to link the Northside and Southside alignments. As mentioned, the second downtown alternative considered is the Olive Street/Chestnut Street Loop, running east and west from 14th Street and 6th Street, and connecting the Northside and Southside alignments via 14th Street.

Existing Land Use and Development

A transit supportive land use and development pattern is typically defined as a moderate- to high-density mix of uses including residential, retail, service, office, civic, and entertainment located within one-half mile of a transit station and in a pattern that supports walking and transit use. The existing land use and development pattern along the Northside alignment is illustrated in Figure 6.3-1 and briefly described below for each of the proposed one-half mile station areas.

O'Fallon Street

The station is proposed at O'Fallon Street and Tucker Boulevard. New and established multi-family public housing exists immediately to the west. The older public housing resembles three-story apartment buildings, while the new public housing resembles townhouses. The majority of the existing commercial and industrial uses along Tucker Boulevard appear to be vacant, aging, or underutilized. Similar conditions exist south of Cole Street. North of Cass Avenue, there is a significant level of new public housing that was appropriately built within the existing street and block pattern.

St. Louis Avenue

The station is proposed at St. Louis and North Florissant Avenues. There are auto-oriented commercial uses and vacant lots along North Florissant Avenue. The station area also contains a significant amount of vacant residential lots and buildings. Nevertheless, new residential and commercial development is occurring, such as the "North Market Place" rehabilitation and infill development that will eventually consist of over 100 homes in the Old North St. Louis Historic

Chapter 6.3: Transit-Supportive Land Use

District. In addition, rehabilitated historic mansions and new residential infill development are evident along St. Louis Avenue.

25th Street

The station is proposed at 25th and Palm Streets. There is a significant amount of vacant residential, commercial, and industrial lots and buildings in the station area. However, there is evidence of small-scale residential rehabilitation along Palm Street. A prominent land use is the mid-rise public housing building at the intersection of Palm Street and North Florissant, which is uncharacteristically out-of-scale within the existing single-family residential development pattern.

North Grand Boulevard

The station is proposed at North Grand Boulevard and Natural Bridge Avenue. North Grand Boulevard is the traditional mixed-use neighborhood commercial district, but contains some vacant lots and buildings. In addition, there are a few modern auto-oriented commercial uses. Northeast of the proposed station, there are many vacant residential lots and buildings. Significantly, Fairground Park is a prominent community open space and appears to be a stabilizing amenity within the area. There are relatively well-maintained, single-family and multi-family residential uses along and south of Fairground Park. Beaumont High School is also a significant public use.

Fair Avenue

The station is proposed at Fair Avenue and Natural Bridge Avenue. Fairground Park is also located within this station area and appears to be a stabilizing amenity for the surrounding residential neighborhoods. The residential neighborhoods contain relatively well-maintained homes; however, there are still a few vacant residential lots and buildings present in the station area. West of Fair Avenue, Natural Bridge Avenue is a struggling commercial corridor of auto-oriented uses and traditional mixed uses.

Newstead Avenue

The station is proposed at Newstead Avenue and Natural Bridge Avenue, which is the location of a community-scaled strip commercial center and adjacent supermarket. Consequently, the mixed-use commercial corridor along Natural Bridge Avenue appears to be more vibrant and successful within this station area. The residential neighborhoods contain well-maintained homes, as well as some vacant homes and lots. There is a larger concentration of vacant properties along the station area's southern perimeter.

Kingshighway Boulevard

The station is proposed at Kingshighway Boulevard and Natural Bridge Avenue. The intersection of these arterials contains national chain restaurants, a drugstore, and a general merchandise store. Beyond the intersection, Natural Bridge Avenue is a struggling commercial corridor of marginal auto-oriented uses and traditional mixed-uses. The northwest quadrant of the station area contains a mix of well-utilized, under-utilized, and vacant industrial and commercial employment uses. The remainder of the station area contains relatively stable residential neighborhoods, as well as a large community park and several institutions.

Union Boulevard

The station is proposed at the intersection of Union Boulevard and Natural Bridge Avenue, which contains a newly-constructed commercial strip center with several national chain retailers and a regional chain supermarket. The northwest quadrant of the station area contains the Union 70 Center Business Park, a successful mix of large-scale light industrial, commercial, and

Northside Study

warehouse uses. The northeast quadrant overlaps the preceding station area's mix of industrial and commercial employment uses, as well as its stable residential neighborhood. The southeast quadrant contains numerous vacant residential lots and buildings.

Natural Bridge Avenue

The station is proposed at Goodfellow Boulevard and Natural Bridge Avenue, an intersection of disparate and marginal auto-oriented commercial uses. There is a significant amount of industrial and commercial employment uses in the northeast quadrant, as well as marginal industrial and commercial uses in the southwest quadrant. The station area also contains stable residential neighborhoods and a large community park, and only a minimal level of residential vacancies.

Goodfellow Boulevard

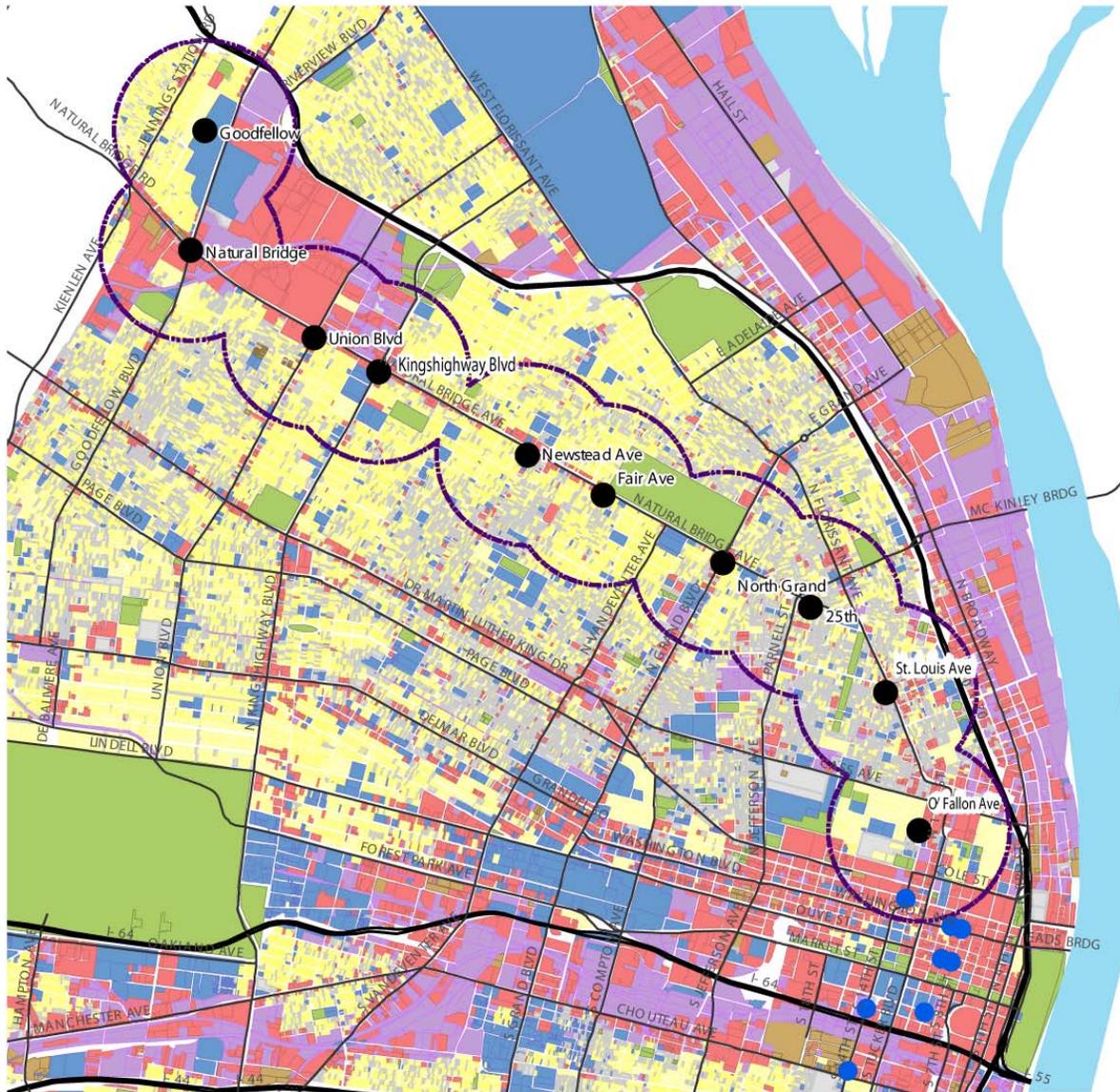
The station is proposed along Goodfellow Boulevard, at a midway point between Natural Bridge and Interstate 70 (I-70). The most significant land use is the former U.S. Army Reserve Center, which contains a mix of under-utilized and vacant office, industrial, and warehouse uses on both sides of Goodfellow Boulevard. In addition, there is a large under-utilized industrial property near the I-70 interchange, and some auto-oriented commercial uses. West of Goodfellow Boulevard, there are stable residential neighborhoods within the City and the County of St. Louis.

Downtown St. Louis

The general boundaries for downtown St. Louis are Cole Street on the north, Chouteau Avenue on the south, Jefferson Avenue on the west, and the Mississippi River on the east. There are numerous stations proposed within the downtown; however, the existing land uses and development patterns are similar for both alternatives. Downtown St. Louis is the region's Central Business District and contains many of its major employers, public institutions, sporting arenas, and tourist attractions. Over the last ten years, the city has focused on downtown redevelopment and witnessed significant reinvestment as a result of its efforts. The downtown is characterized by historic and modern buildings within a traditional street grid pattern, which is being maintained as part of the overall redevelopment efforts.

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FIGURE 6.3-1: EXISTING LAND USE



Source: EWGCOG

- | | | | |
|---|--------------|-------------------|---------------------|
| ● Natural Bridge/ 14th Station | Roadways | Existing Land Use | Recreational |
| ● 9th/ 10th Couplet Station | — Interstate | Residential | Utility |
| | — Arterial | Commercial | Drainage |
| ⬜ Natural Bridge/ 14th Half-Mile Station Buffer | | Institutional | Streambed |
| | | Industrial | Vacant/ Undeveloped |

0 0.3 0.6 1.2
Miles

Existing Land Use

Northside LPA and Downtown Alternatives

NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

6.3.3 EXISTING TRANSIT-SUPPORTIVE PLANS AND POLICIES

The FTA evaluates four primary factors related to existing land use plans and policies, including:

- Growth management.
- Transit-supportive corridor policies.
- Supportive zoning regulations near transit stations.
- Tools to implement land use policies.

This section analyzes the existing transit-supportive plans and policies for the proposed transit alignment alternatives and station areas in the Northside study area, including downtown.

Growth Management

FTA guidelines define growth management in two ways: the concentration of development around established activity centers and regional transit and land conservation and management. Regional policies and agreements are necessary to coordinate development, with local plans and zoning. Capital improvement programs are needed to support this objective. Land conservation means limiting development in certain areas, and may include open space, farmland, and natural resource preservation. The St. Louis region has adopted policies and plans to promote redevelopment in existing neighborhoods and around public transit, which are briefly summarized below.

Legacy 2030

In 1994, the East-West Gateway Council of Governments (EWGCOG), the metropolitan planning organization for the bi-state St. Louis region, adopted the first version of its long-range regional transportation plan called Legacy 2030. Now in its third revision, Legacy 2030 encourages the coordination of transit planning and land development, particularly at MetroBus and MetroLink stations. After the completion of a Major Transportation Investment Analysis in 2000, the light rail LPA and estimated costs for the Northside study area were included within an updated version of Legacy 2030.

St. Louis Downtown Development Action Plan

Adopted in 1998, the Downtown Development Action Plan seeks to create a vibrant, 24-hour downtown with a significant residential base, regional retail, shops, cafes, restaurants, and expanded employment options. As a result of the City's targeted efforts between 1999 and 2004, more than \$1.5 billion dollars in private and civic investments have occurred within its downtown.

Major Transportation Investment Analyses

In 2000, the East-West Gateway Council of Governments (EWGCOG) completed Major Transportation Investment Analyses (MTIAs) for the proposed light rail extensions of MetroLink. Once system-wide regional planning is complete, an MTIA is the first step in the project development process for new transportation infrastructure. The MTIA evaluates a series of potential alternatives and determines basic costs and environmental effects at a perfunctory level. The 2000 MTIAs identified light-rail transit along Natural Bridge Avenue and a downtown loop as LPAs.

St. Louis Strategic Land Use Plan

Adopted by the City of St. Louis in January 2005, the Strategic Land Use Plan provides an overall framework for guiding future development in the city. The strategic plan has a strong preservation and redevelopment focus. It identifies stable, vibrant areas that need to be

Chapter 6.3: Transit-Supportive Land Use

preserved, as well as areas targeted for new development and redevelopment. The plan aims to improve the overall quality of life within the city in order to attract continued investment in its existing neighborhoods.

Current Transit-Supportive Corridor Policies

Local comprehensive and capital improvement plans should contain transit-supportive corridor policies that are aimed at increasing development within the proposed transit corridors and the station areas and improving their transit-friendly and pedestrian-friendly character. For the City of St. Louis, the Strategic Land Use Plan provides an overall future development plan for the entire city while sub-area plans including the Downtown Plan, the Fifth Ward Plan and the Chouteau Greenway Plan provide more detailed future recommendations for smaller areas within the proposed transit corridors.

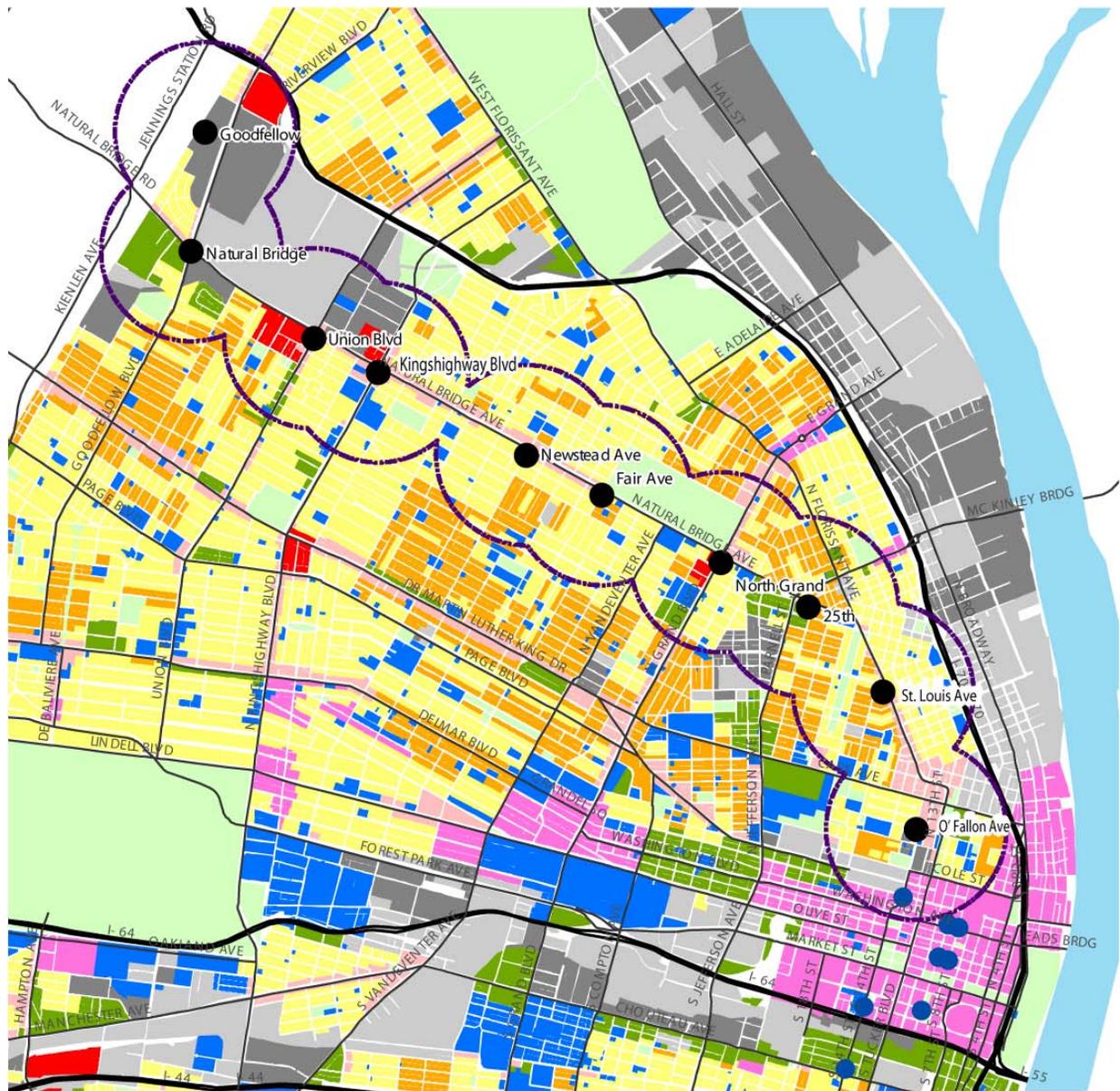
St. Louis Strategic Land Use Plan

The Strategic Land Use Plan aims at improving the overall quality of life for the city's residents by encouraging appropriate development and preservation in clearly defined locations within the city. The plan has two significant goals: to provide direction for potential investors in the city and to provide stability and opportunity for its current residents. To achieve this, the Plan identifies the established neighborhoods and business districts that the city is committed to preserving and enhancing and the areas where new development and redevelopment within the city is encouraged. The future land use designations presented in the Strategic Land Use Plan map reflect existing development and the future development potential of parcels throughout the city (Figure 6.3-2).

A significant portion of the Northside LPA which is currently either vacant and/or underutilized is designated for redevelopment in the Strategic Land Use Plan. The St. Louis Avenue, 25th Street and Newstead Avenue station areas contain large areas designated as "Neighborhood Redevelopment Areas," encouraging new residential development and rehabilitation in these disinvested neighborhoods. Regional commercial areas are proposed in the western station areas along Goodfellow, Union and Kingshighway Boulevards because of their excellent regional access. Large sections of the 25th Street and the station areas west of Kingshighway Boulevard which were previously occupied by office/industrial uses are designated as "Business/Industrial Development Areas." The city is encouraging the development of employment uses on these sites. In addition, several "Opportunity Areas," or areas in transition recommended for innovative new development, are identified in the O'Fallon Street, 25th Street and Natural Bridge Avenue station areas. These redevelopment areas offer an opportunity to develop the Natural Bridge Avenue area as a vibrant, transit-supportive corridor in the future.

Northside Study

FIGURE 6.3-2: STRATEGIC LAND USE PLAN, NORTHSIDE



Source: EWGCOG

- | | | |
|--|---|---|
| ● Natural Bridge/14th Station | Strategic Land Use Categories | ■ Business/ Industrial Preservation Area |
| ● 9th/10th Couplet Station | ■ Neighborhood Preservation Area | ■ Business/ Industrial Development Area |
| ▭ Natural Bridge/14th Half-Mile Station Buffer | ■ Neighborhood Development Area | ■ Institutional Preservation and Dev Area |
| — Interstate | ■ Neighborhood Commercial Area | ■ Specialty Mixed Use Area |
| — Arterial | ■ Regional Commercial Area | ■ Opportunity Area |
| | ■ Recreational & Open Space Preservation and Dev Area | |



0 0.3 0.6 1.2 Miles

Strategic Land Use Plan

Northside LPA and Downtown Alternatives




HNTB

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Downtown Development Action Plan

The City of St. Louis adopted its Downtown Development Action Plan in 1998 to encourage growth in its downtown and promote it as a “round the clock” activity center containing a mix of residential, employment, shopping and entertainment uses. The Plan focuses on four designated growth districts to encourage development and redevelopment:

- Washington Avenue. This district is located along the northern edge of downtown and is emerging as a regional retail destination and urban loft district.
- Old Post Office District. This district, located at the heart of downtown, contains many historic buildings and narrow streets, creating an interesting urban environment. The Old Post Office is proposed for reuse as a mixed-use facility containing some education uses.
- Laclede’s Landing. Located along the Mississippi River, this is a historic neighborhood with residences, restaurants, clubs, small shops, offices, and tourist attractions. Current redevelopment efforts are focused on creating a riverside residential district.
- Gateway Mall and Arch Grounds. These are major regional tourist attractions located along the Mississippi River. Current plans focus on reconnecting downtown with the linear open space Gateway Mall to the Arch and riverfront.

Fifth Ward Plan

The Fifth Ward Plan, which encompasses parts of the O’Fallon Street, St. Louis Avenue and 25th Street stations in the Northside study area, is a community-driven plan to guide future development in the Fifth Ward area. The plan is supportive of the proposed MetroLink extension into the Fifth Ward and views it as an opportunity to revitalize the Northside neighborhoods. The Plan includes several recommendations for future development in the station areas:

- New infill housing and mixed uses are recommended for the vacant areas in the neighborhoods surrounding the St. Louis Avenue station;
- North Florissant Avenue is recommended to be redeveloped as a retail corridor in the St. Louis Avenue station area;
- Townhomes are recommended as infill residential development in the Carr Square neighborhood within the O’Fallon Street station area; and,
- Boulevard and streetscape improvements are recommended along all major streets in the Fifth Ward to create an attractive, walkable environment and a positive impression.

Chouteau Greenway Plan

The Chouteau Greenway Plan is a 30-year redevelopment vision for a 195-acre area south of I-64 between 7th and 18th Streets. The Plan involves a modern re-creation of historic Chouteau’s Pond, and includes parks, open space, and bicycle and pedestrian paths. Furthermore, the Plan is meant to create a more positive development framework for future investment by major universities in creating a bio-tech center.

Supportive Zoning Regulations near Transit Stations

Zoning regulations determine future land uses and development patterns, as it relates to: types of uses and allowable densities, parking regulations, pedestrian access provisions, and development incentives. Zoning for all the station areas, except for the southern terminal station of Bayless (Southside study area) and portions of the western terminal station of Goodfellow and Natural Bridge (Northside study area) is regulated by the City of St. Louis’s zoning code.

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The Northside study area includes the entire range of residential, commercial and industrial zones present in the city’s zoning code. The most widespread zone in the Northside area is the Two-Family Dwelling District (District B), present in the North Grand to Kingshighway Boulevard station areas. It allows up to four-flat dwellings at a maximum density of 17.42 dwelling units/acre, the maximum density for single-family homes is lower at 10.89 dwelling units/acre. Commercial uses or mixed-uses (except bed and breakfast inns) are not allowed in this zone. East of North Grand, the station areas have a mix of higher density, multi-family residential zones (Zones C and D) and an area of single-family residential zone (Zone A).

The residential zones generally allow for transit-supportive densities that meet at least the “medium” density threshold specified by FTA (Table 6.3-1). However, except for Zone D, which allows neighborhood commercial zones as a conditional use, commercial uses are not allowed in the other residential zones limiting the potential for new mixed-use developments.

TABLE 6.3-1: FTA CRITERIA

Rating	Corridor Policies and Station Area Zoning				
	Station Area Development			Parking Supply	
	CBD Comm. FAR	Other Comm. FAR	Residential DU/acre	CBD spaces /1,000 sq. ft.	Other spaces /1,000 sq. ft.
High (5)	> 10.0	> 2.5	> 25	< 1	< 1.5
Medium-High (4)	8.0-10.0	1.75-2.5	15-25	1.1-1.75	1.5-2.25
Medium (3)	6.0-8.0	1.0-1.75	10-15	1.75-2.5	2.25-3.0
Low-Medium (2)	4.0-6.0	0.5-1.0	5-10	2.5-3.25	3.0-3.75
Low (1)	< 4.0	< 0.5	< 5	> 3.25	> 3.75

Source: Table 5: Quantitative Element Rating Guide in the FTA publication titled "Guidelines and Standards for Assessing Transit Supportive Land Use", May 2004

Commercial zoning is present along all major roadways within the station areas including Natural Bridge, Cass, and North Florissant Avenues and Grand, Kingshighway, and Union Boulevards. Most of these corridors are zoned F, Neighborhood Commercial District. North Florissant Avenue, Cass Avenue, Palm Street, and Natural Bridge Avenue east of Kingshighway are zoned Local Commercial (Zone G). N. Grand Boulevard south of Natural Bridge Avenue is zoned Area Commercial District (Zone H). The southern edge of the O’Fallon Street station located close to the downtown is zoned as I, Central Business District. The commercial zones allow multi-family residential and mixed-use developments in addition to commercial developments. The maximum permissible Floor Area Ratio (FAR) is 1.5 for Zone F (which corresponds to a “Medium” ranking as per FTA criteria). Zones G and H do not have FAR restrictions, although building heights are limited to 3 stories and 8 stories, respectively.

Considerable portions of the station areas in the Northside LPA west of Kingshighway Boulevard and parts of the O’Fallon Street station area are zoned J, Industrial District and K, Unrestricted District. Zone J allows residential uses and permits buildings over eight stories in height with density limitations similar to that of the least restrictive residential district. Zone K does not permit residential uses.

Parking Regulations

The current low parking requirement (1 space per 700 square feet for commercial and 1 space per 1,250 square feet of office/bank space) should be maintained within mixed-use and commercial areas. Based on FTA criteria, the current parking requirement translates to a "High" ranking for non-CBD areas. Parking should be provided in structures within mixed-use buildings

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(when possible), or provided at the rear or side of buildings.

According to statistics maintained by the St. Louis Downtown Partnership, the cost for parking (2007 dollars) in downtown is as follows:

- Garage: \$83.29/monthly and \$9.54/daily
- Surface: \$55.58/monthly and \$4.25/daily
- Combined: \$64.45/monthly and \$6.77/daily
- Special Event: \$4 - \$20/special event

The boundary for these statistics is for a downtown area defined as follows: the Mississippi River on the east; Chouteau Avenue on the south; Jefferson Avenue on the west; and Cass Avenue on the north.

6.3.4 PERFORMANCE AND IMPACTS OF POLICIES

Redevelopment initiatives are well under way within the City of St. Louis. Its older neighborhoods that had faced years of decline and population loss are again becoming desirable places to live. Public and private investment in these areas is on the rise resulting in improved infrastructure and a variety of attractive housing options. The addition of light rail transit service, which will improve accessibility to and from these neighborhoods, has the potential of further enhancing the desirability of these neighborhoods resulting in increased development activity.

Adaptability of Station Area Property for Development

Most of the station areas within the Northside LPA under consideration have significant amounts of property available for redevelopment. In addition, the St. Louis Strategic Land Use Plan (Figure 6.3-2) identifies several redevelopment areas. These include:

- **Neighborhood Development Areas.** These are defined as residential and non-residential areas with several vacant lots and abandoned buildings that are suitable for redevelopment.
- **Business/Industrial Development Areas.** New business/industrial uses are recommended for these areas which were previously occupied by industrial uses.
- **Opportunity Areas.** These are defined as areas in transition. No specific land uses are recommended for the future to keep redevelopment proposals for these areas flexible.
- **Regional Commercial Areas.** These sites have regional access and visibility, and therefore are proposed to be developed with commercial uses to serve a regional clientele. While a few of these sites have existing commercial uses, new regional commercial uses are proposed for the others.

It is important to note that all the redevelopment areas identified in the Strategic Land Use Plan are not currently vacant. Many of them include inappropriate land uses or underutilized property. Many others are occupied by obsolete building types that are appropriate for redevelopment. In order to assess the overall development potential of station areas, the areas identified as vacant/undeveloped in the existing land use in conjunction with the redevelopment areas identified in the Strategic Land Use Plan are considered as “subject to change.”

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Development Prototypes

A palette of six station area prototypes was developed to address the variety of station area development and improvement potentials likely along the alternatives. These prototypes broadly represent the different types of transit-supportive environments that should be encouraged in terms of mix of land uses and densities that can be developed in the future in each station area. These prototypes, along with the corresponding stations in which their application was most consistent for area conditions, are presented in Table 6.3-2.

The land uses, building densities and heights in the various prototype station areas will achieve walkable environments with a variety of uses in close proximity to station facilities creating a transit-supportive environment. Existing land use and development conditions were examined to ensure that the new development would be compatible in scale with the existing neighborhood fabric. In addition to building height and density, maintaining a “streetwall” by placing buildings close to the sidewalk is especially important for the mixed-use and commercial areas within the station areas. In residential areas, new and infill development should maintain existing building frontage lines to retain the traditional, walkable character.

These station area prototypes represent a vision for desirable future development patterns in the proposed station areas. The policy recommendations, presented in Section 6.5, provide tools and strategies that can help in achieving this desired development and promoting a transit-supportive environment in the station areas.

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TABLE 6.3-2: DEVELOPMENT PROTOTYPES

		Characteristics		
Prototype	Northside Stations (including Downtown Stations)	Land Use Mix	Density/FAR	Building Height
Neighborhood Residential Center	O'Fallon Ave., Fair Avenue and 25 th Street	Single-family and smaller scale multi-family residential (duplexes, four flats etc.) as infill development in existing residential neighborhoods and neighborhood scale commercial/mixed use concentrated along major roadways.	Residential density is 10-18 dwelling units/acre. FAR for commercial/mixed-uses is 1.0-1.5.	Up to 3 stories
Neighborhood Scale Mixed Use Center	St. Louis Avenue	Small scale mixed use buildings with ground level storefronts and service uses are present in traditional neighborhood shopping districts (at major intersections and roadways) surrounded by neighborhood scale residential development.	FAR for mixed uses varies from 1.5-2.0 with residential density varying between 10-18 dwelling units/acre.	3 - 4 stories
Community Scale Mixed Use Center	Newstead	Mixed use buildings with ground-level retail and service uses and residential above are centered around the station and surrounded by high density residential uses (rowhouses, condominiums and apartment buildings).	FAR for mixed uses is minimum 2.0 with residential density varying between 20-40 dwelling units/acre.	4 to 6 stories
Commercial Center	Union Boulevard, North Grand and Kingshighway	Large community scale commercial uses (grocery stores, department stores, etc.) serve as anchors for these station areas which also include a range of residential and other supporting uses.	FAR for commercial uses is 0.7-1.5, residential density is 10-18 dwelling units/acre.	Commercial buildings can be single-story but should be designed keeping pedestrian access in mind, residential buildings are up to 3 stories
Employment Center	Goodfellow, Natural Bridge	One or more large employment uses/areas serve as anchors for these station areas. The employment uses may include institutional, office and compatible industrial uses. Residential uses of varying densities (depending on nature of the employment use) are also typically present.	FAR for employment uses varies from 0.5 (industrial uses) to 3.0 for office/research buildings.	Varies from single story industrial uses to multi-story office/research buildings
Downtown	Downtown Stations	The downtown area is characterized by a high density of mixed-uses in a highly walkable environment.	Density/FARs should be market-driven with appropriate design controls.	Building heights should be market-driven with appropriate design contracts based on use mix.

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Future Development Potential

The overall development potential for the station areas is based on the development capacity of the areas identified as “subject to change” in the station areas. The future land use for the areas subject to change has been proposed to create a transit-supportive environment in the future and is based on the existing surrounding development pattern, the recommendations of the Strategic Land Use Plan, and sub-area plans, where available. The development potential of these sites, in terms of number of residential units and amount of commercial, office and industrial space, has been calculated based on the average residential density and intensity of commercial/employment development considered appropriate for the station area as outlined in the “Prototype Matrix.” For example, for the Fair Avenue station area, which is classified as a “Neighborhood-Residential Center,” an average residential density of 14 dwelling units per acre was used for the ¼-mile radius around the proposed station while an average density of 10 dwelling units per acre was used for the area between the ¼-mile and ½-mile radius.

The Northside alternative, which is centered on North Florissant Avenue and Natural Bridge Avenue, has a large amount of area subject to change (Figure 6.3-3). At full build-out, the station areas along the Northside alternative, through new development and rehabilitation of existing structures, have the potential for supporting significant new development (Table 6.3-3).

TABLE 6.3-3: FUTURE DEVELOPMENT POTENTIAL, NORTHSIDE

	Dwelling Units (number of units)	Office (square feet)	Commercial* (square feet)	Industrial (square feet)
Natural Bridge	8,700	2,500,000	3,900,000	3,800,000

* Commercial includes retail and service uses.

This level of change would result in housing for approximately 20,500 people and approximately 18,900 jobs¹ (in addition to current population and employment).

It is important to note that this level of development is based on a long term horizon, and its level of success will be greatly influenced by the long investment climate and appropriate policies and incentives adopted by the City to encourage investment in the Northside study area.

¹ Population and employment estimates are based on the following assumptions: Household size = 2.36 (Average household size for the City of St. Louis as per U.S. Census 2000), Retail employment = 500 square feet/employee, Office employment = 325 square feet/employee and Industrial employment = 0.12 acres land area/employee. For commercial uses, which are a combination of retail and service uses, an average of retail and office employment was used assuming one-half of the space is devoted to retail uses and the other half to service/office uses.

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FIGURE 6.3-3: AREAS SUBJECT TO CHANGE, NORTHSIDE



Source: EWGCOG

- Natural Bridge/ 14th Station
- 9th/10th Couplet Station
- Areas Subject to Change
- Natural Bridge/14th Half-Mile Station Buffer
- Interstate
- Arterial



Areas Subject to Change
Northside LPA

0 0.3 0.6 1.2
Miles





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6.3.5 PRELIMINARY OBSERVATIONS

The Northside area displays varying land uses and development characteristics that influence and shape the transit-supportive framework. The Northside alignment contains a significant amount of land subject to change, so future transit service would provide a transformative catalyst for change. Future transit service in these areas would provide an opportunity for decreasing automobile use and increasing current levels of reinvestment activity. This section highlights preliminary observations for the Northside study area, including downtown, based on the transit-supportive framework and potential for change.

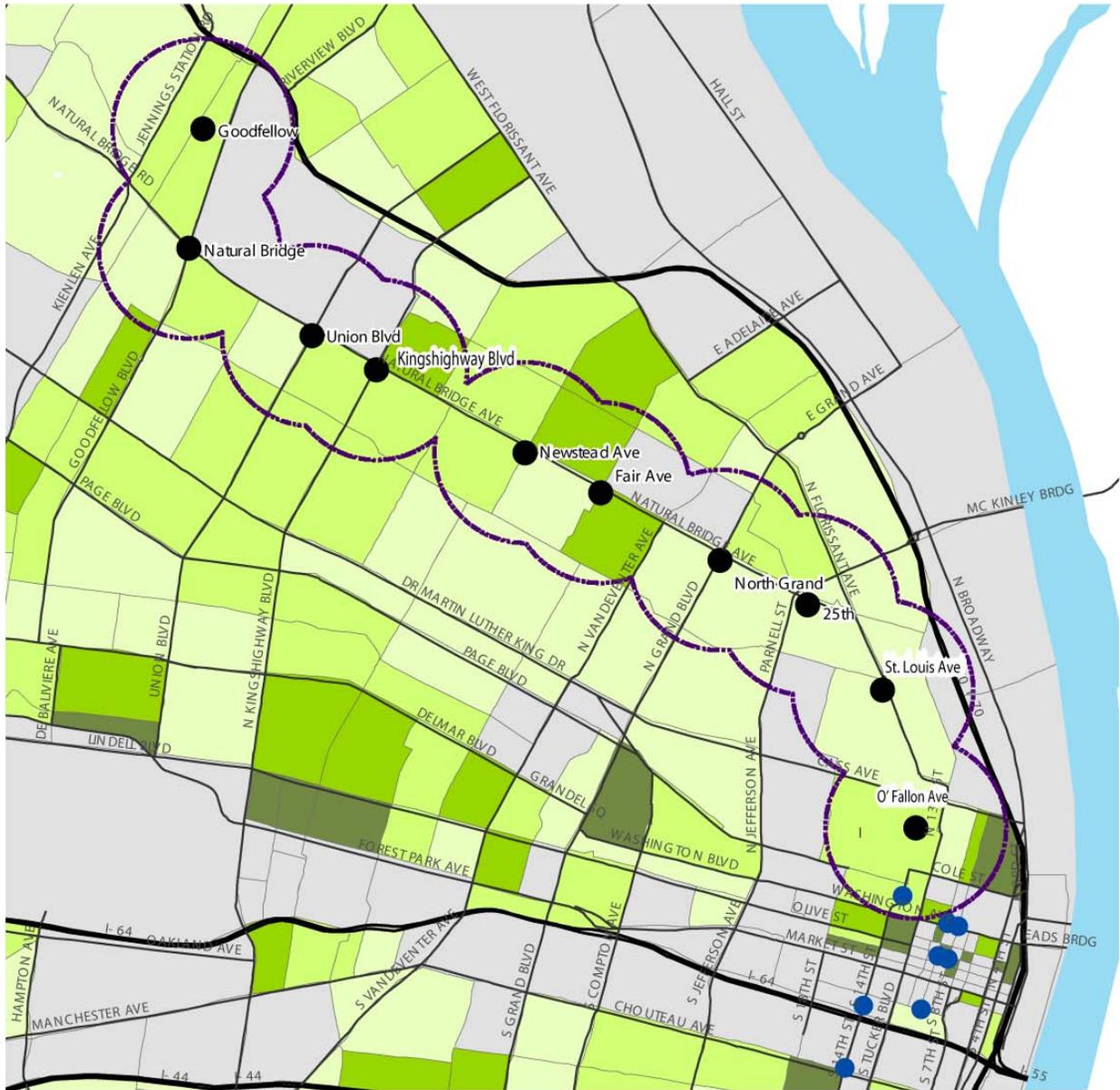
Although characterized by significant vacancies and underutilized properties, the Northside area has strong potential to become a more transit-supportive environment through additional public policies to induce future investment and development. Based on population projections developed for the Year 2030 by the EWGCOG (Figure 6.3-4), a significant part of the area along the Natural Bridge/North 14th alternative could develop population densities in the “medium” ranking range of the FTA *FY 2009 New Starts and Small Starts Evaluation and Rating Process*. East of Vandeventer Avenue, the area is projected to have mostly “low-medium” population densities, reflecting vacancies that currently exist and the probable long-term redevelopment horizon for the area. Areas under employment uses and open spaces will continue to have “low” population densities, but serve as destinations along the proposed transit alignment.

The two downtown alternatives are relatively similar in terms of land use and development character in the station areas. Engineering and operational considerations are likely to be the deciding factors in the selection of a preferred alternative for the downtown. Population densities for 2030 for the downtown area are presented in Figure 6.3-4. Several parts of the downtown station areas are projected to contain “low” population densities because of the predominance of employment and institutional uses, while other station areas range from “medium-high” to “high,” reflecting the intensity of residential development in the downtown.

Ultimately, the extent of new development and change along the Northside alternative depends on public policies to create more transit-supportive frameworks. The area has future development potential, so public policies could be altered to induce higher density development and mixed uses within proposed station areas. As detailed in Chapter 5 of this report, the Northside and downtown alignments are already identified. Transit-supportive policies should also be explored by the city as another means of testing the suitability of the alternatives.

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FIGURE 6.3-4: 2030 PROJECTED POPULATION DENSITY, NORTHSIDE



Source: EWGCOG

● Natural Bridge/14th Station	● 9th/10th Couplet Station	■ Natural Bridge/14th Half-Mile Station Buffer	— Interstate	— Arterial
2030 Population Density (People/ Square Mile) < than 3,333 (Low) 3,333-6,667 (Low-Medium) 6,667-10,000 (Medium) 10,000-15,000 (Medium-High) > than 15,000 (High)				

* Rankings are based on criteria specified by the FTA.



0 0.3 0.6 1.2 Miles

Year 2030 Projected Population Density
Northside LPA and Downtown Alternatives





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6.3.6 RECOMMENDATIONS TO IMPROVE TRANSIT-SUPPORTIVE LAND USES

The City of St. Louis has already experienced the land use and transportation benefits of having MetroLink service and witnessed some sporadic new development and redevelopment near stations, particularly on the new Cross County Extension line. Given the fact that new light rail service on the Northside/Southside alignment is several years away, the city should consider additional policy and planning initiatives to help encourage transit-supportive land use and development within the proposed transit alignments. It is fully recognized that the City's existing land use and transportation plans will evolve over time, especially as plans for new transit are refined. However, basic acceptance and support of additional policy and planning initiatives is important now for securing a more competitive position in the future when applying for FTA's New Starts funding. The following planning and policy initiatives are recommended to create a more transit-supportive development framework within the proposed alignments.

Multi-Modal Transportation Infrastructure

Mass transit stations typically attract additional commuters and adjacent development when a station is "multi-modal" or accessible by multiple modes of transportation, such as cars, bus, bike, or on foot. The following recommendations could improve the transportation infrastructure within the proposed alignments.

- Metro may be in a position to assume additional roles in a transit-supportive planning process, such as facilitator, educator, funder, development partner, and advocate. For example, Metro could partner with the city and EWGCOG and encourage local transit-oriented plans around future stations that provide more detailed transportation improvements.
- Metro could develop multi-media based transit-supportive planning tools to provide guidance for future station prototypes that highlight necessary improvements for multi-modal access, such as commuter parking, bus drop-off areas, kiss-and-ride areas, bike routes and amenities, and streetscape and sidewalk amenities. These tools could then be used to assist in developing local district or neighborhood plans around future stations.
- In support of a selected LPA, the city could seek funding for new streetscape improvements for the primary arterial and/or commercial district within the proposed station area. Working with neighborhood and community groups, concepts for improvement, aligned with station design and access, should be prepared. Physical improvements to a station area often signal a long-term public commitment and encourage investment from private developers and property owners.

Planning Initiatives

The City, Metro, and EWGCOG have all been proactive in the transit planning process with the completion of various district plans, strategic plans, and transportation studies. These public agencies could promote the creation of more specific station area land use plans at the district or neighborhood level within an approved transit alignment.

- The City could consider the designation of "top priority" catalyst projects within transit-oriented development plans, district plans, or neighborhood plans. A catalyst project could involve a major residential, commercial, or institutional investment within a station area. The project would then receive special attention from the city's administrative and

Chapter 6.3: Transit-Supportive Land Use

- The City's Land Clearance and Redevelopment Authority (LCRA) could acquire vacant and/or underutilized properties within the proposed station areas through a redevelopment planning process. The LCRA Redevelopment Authority could then issue a Request-for-Developers for City-owned property to facilitate new transit-oriented developments.
- Metro could coordinate transit planning with major employers, institutions, universities, and tourist organizations to enlist sponsors that would provide frequent shuttle bus service between transit stations and key destinations.

Zoning and Development Review

Developers typically cite due diligence requirements as key obstacles due to time-sensitive financing, construction, and market demand conditions. Any improvements to the City's development review process could help attract new development within targeted areas.

- The City could consider the use of station area zoning overlay districts to provide new transit-oriented development regulations without having to amend its entire zoning code. The overlay districts could be tailored to specify densities, building heights and setbacks, floor/area ratios, and parking requirements for different station area prototypes, such as: neighborhood residential center; neighborhood scale mixed-use center; community scale mixed-use center; commercial center; and employment center.
- The City could consider the adoption of commercial design guidelines to ensure high quality development within station areas. The commercial design guidelines could include: building material requirements; front build-to lines; minimum levels of building façade recess and/or projection; and minimum levels of building façade ornamentation and articulation.
- The City could consider the adoption of residential design guidelines to encourage high quality development within station areas and compatibility of new homes within older neighborhoods. The residential design guidelines could include: building material requirements; front build-to lines; primary entrance and windows on street-facing facades; porches/front stoops; and recessed garage requirements.
- The City could consider the use of a streamlined review process for development proposals within future station areas. The City could set a maximum review period of 30-60 days for any development proposals that adhere to transit-oriented development regulations.

Financing Tools

Fiscal resources for implementation are always an issue in large-scale infrastructure and redevelopment programs. Although difficult at times, public funding sources could be used as an incentive and/or negotiating tool to encourage new quality development.

- The most-frequently utilized funding source for transportation improvements is the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which is the federal act that allocates transportation funds through

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MoDOT and EWGCOG. Beyond FTA “New Starts” funding, the program funds that are applicable to the proposed station areas include FHWA Transportation Enhancement and Congestion Mitigation Air Quality (CMAQ) programs, which fund new parking, bicycle, and pedestrian improvements.

- The City could implement a streetscape improvement program for station areas that is integrated with its annual capital improvement budget process. Major streetscape improvements could include: new sidewalks and street trees, pedestrian-scaled lighting, and curb ramps and crosswalks.
- The City could create tax-increment finance (TIF) districts to attract new development in proposed station areas that contain significant amount of vacant, aging, and underutilized properties. TIF funds could be used in assembling properties for development, upgrading basic infrastructure, and constructing multi-modal transportation improvements.
- The City could create a Business Improvement District (BID) to finance improvements within successful downtown and neighborhood commercial districts that will contain a future transit station. The property owners agree to tax themselves to fund specific improvements, such as new streetscapes, parking lots, and façade improvements.
- The City could create a density bonus incentive within its zoning code or through a zoning overlay within appropriate station area prototypes, such as the community scale mixed use center, commercial center, and employment center. In exchange for the density bonus, a developer could be required to provide new streetscapes, open space, or other necessary public improvements related to a development site.
- The City could utilize Community Development Block Grant (CDBG) funds to improve properties and encourage business development within station areas. Specifically, a zero-interest or low-interest revolving loan fund could be established to provide an incentive to encourage reinvestment.

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Chapter 6.4: Station Planning & Site Design

This section presents an overview of the identification, planning, and preliminary design processes utilized to develop recommendations for transit stations within the Northside study area, including downtown. Material is presented in five major sub-sections:

- 6.4.1 outlines the general design process and project approach.
- 6.4.2 describes general LRT station characteristics.
- 6.4.3 establishes station design parameters.
- 6.4.4 illustrates prototypical station designs.
- 6.4.5 summarizes proposed LRT station designs.

Both potential LRT alignments (North 14th/Natural Bridge and the 9th/10th Couplet) and stations along each alternative are discussed, starting at the north end of the study area (at the Goodfellow/Stratford station) and continuing south (down North 14th Street to downtown).

6.4.1 LRT STATION DESIGN PROCESS AND PROJECT APPROACH

The station selection and design process, as used for purposes of this study, considers a number of alignment and station location options. The design process started with the identification and selection of potential alignments and station locations. This was followed by evaluations, adjustments, and concept-level design refinements of each site to address particular functional requirements, as well as urban setting and location.

In addition to site selection, a comprehensive station configuration and design process resulted in the identification of a set of prototypical station designs. These prototypical LRT station designs were then customized and applied to each station location. All prototypes include accessibility requirements of the American with Disabilities Act, revised July 1, 1994. The LRT station designs illustrated here represent preliminary station concepts for the Northside and downtown alignments under consideration.

As previously mentioned, the first step in the design process was to identify and select potential alignments and station locations. For LRT systems, recommended transit station spacing typically ranges between one and two miles. In highly urbanized areas, this spacing is typically reduced to one-quarter to one-half mile or less, depending upon local conditions and the density of surrounding developments. There are three key planning and design principles, comprising this first step, considered in locating and configuring transit stations, as discussed below and illustrated in Figure 6.4-1.

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FIGURE 6.4-1: KEY PRINCIPLES OF TRANSIT STATION DESIGN



Chapter 6.4: Station Planning & Site Design

Corridor Fit

The first principle of transit station design is the fit of a station into its surrounding community fabric. Transit stations should be located so as to both optimize service to the community and minimize disruption to or negative impacts on surrounding uses and facilities.

Transit stations should be located to optimize the following:

- Service to the maximum number of users, including major activity nodes, employment centers, and housing concentrations.
- Available right-of-way and transit station sites.
- Compatibility with adjoining land uses and major existing or proposed developments.
- Consideration for sensitive land uses and facilities such as parks, open space, wetlands, and other natural environments.
- Minimum disruption to existing major utilities.

Transit Station Function

The second principle in transit station planning is the ability of proposed station sites to meet the transit facility's functional requirements. Station sites should accommodate all required transit functions identified.

Functional requirements for transit stations may include several of the following:

- Bus circulation, bus turn-arounds, and bus bays for inter-modal transfers.
- Convenient vehicular, bicyclist, and pedestrian access to station sites, with minimum disruption to traffic circulation patterns.
- Pedestrian and bicycle access, paths, and bicycle storage.
- Drop-off-and-ride facilities.
- Park-and-ride lots.
- Ticketing, validating, and security equipment.
- Transit shelters and site amenities, including landscaping, furniture, and lighting.

In addition, all transit facilities should meet special local or neighborhood needs and conditions. All stations and associated transit facilities will comply with the provisions of the Americans with Disabilities Act (ADA). Planning and design efforts will include the consideration of visual, auditory, material texture, maneuverability, and access elements that meet or exceed the requirements of ADA. ADA design requirements will be reviewed as part of the ongoing Quality Assurance and Quality Control design reviews.

Transit Station Area Development

The third principle considered in locating transit stations is the potential to generate transit-oriented development (TOD) in the surrounding community. Stations should be located so as to maximize opportunities for creation of new TOD that, in turn, supports and complements the transit facilities.

Well-designed TOD can:

- Increase a neighborhood's population base and, thus, transit system patronage.
- Attract new retail, service, and office developments.
- Further local planning and redevelopment goals and objectives.

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Primary considerations in selecting potential transit station locations should, therefore, include the following:

- Potential to develop undeveloped or underutilized parcels around station areas.
- Potential to increase densities in surrounding developments.
- Potential for multi- and/or mixed-use developments that offer a variety of living, working, shopping, and entertainment opportunities.

The first two planning principles, corridor fit and transit station function, are addressed in this section of the Northside study. The third principle, “transit station area development,” is discussed in other sections of this report.

Based upon the above criteria and local conditions, a range of alternative alignments and station locations were considered and evaluated. Figures 6.4-15 through 6.4-35, at the end of this section, illustrate general LRT station characteristics, prototypical station designs, and potential concept-level LRT alignment and station location concepts. Remaining steps in the design process are discussed below.

6.4.2 GENERAL LRT STATION CHARACTERISTICS

LRT stations may take many forms and shapes and can be configured in a great number of ways. Generally, the characteristics of LRT systems fall somewhere between commuter rail facilities, which tend to have relatively large facilities, and bus rapid transit (BRT) facilities, which typically tend to be smaller than LRT facilities, though some can be quite elaborate and extensive.

Three primary features of LRT systems represent the most highly visible elements to the general population:

- Guide ways, or train tracks.
- Overhead contact system (OCS), which includes electrification and support wires and support poles.
- LRT Stations.

In addition, all LRT systems require auxiliary facilities, such as traction power substations and vehicle storage and maintenance facilities.

LRT Station Examples

Stations are vital to LRT system development; they are the contact points, or gateways, between transit users and transit facilities. Figure 6.4-2 illustrates representative LRT stations that have been implemented around the country. A local example of a LRT facility is the existing MetroLink east-west line (Figure 6.4-3). However, there are some key differences between the existing MetroLink line and the proposed Northside-Southside LRT system, which are discussed in following sub-sections.

LRT Station Components

LRT stations typically include a number of key components, which are either essential to the safety and security of transit users or amenities that make using the system more comfortable and enjoyable and, thus, encourage more ridership. Figures 6.4-4 and 6.4-5 illustrate some of the major components of LRT stations.

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- **LRT Vehicles.** Although not directly part of the stations, design characteristics of LRT vehicles dictate station configuration and comprise a formidable feature in the visual environment. Figure 6.4-4a illustrates the type of vehicle proposed for use in the Northside-Southside LRT system.

While the vehicles used with the existing MetroLink system and those proposed for the Northside-Southside project are quite similar in most respects, their floor heights differ. The existing system has high-floor vehicles, whereas the new system will have low-floor vehicles. Because of this floor height difference, vehicles of the two systems will not be interchangeable, requiring separate fleets and separate maintenance facilities. Vehicle floor height is further discussed in Section 6.4.3.

- **Station Platforms.** LRT station platforms typically form the largest physical component of station areas. Their height, length, and width can vary considerably, depending upon the characteristics of the planned system, and they can be constructed of various materials and with a wide range of finishes. An important feature of station platforms is the installation of tactile edge strips, which are usually two feet wide, have a textured surface to mark platform edges, and are brightly colored.
- **Station Shelters.** Shelters can be designed in various ways and frequently are the 'signature statements' of transit systems. They serve to protect waiting passengers from the elements, and they can include special features, such as passenger information displays, sound systems, lighting, and heating elements. Figure 6.4-4b illustrates a typical shelter on the recently extended MetroLink east-west line.
- **Station Furniture.** Station furniture for LRT systems typically includes items such as benches, litter receptacles, information cases, and railings. Ideally, these are designed to coordinate with and match the overall station design theme. Items such as benches need to be carefully designed to discourage vagrancy and loitering.
- **Ticket Vending and Validating Equipment.** Each platform needs access to at least one ticket vending and validating machine, and each station area should have a minimum of two machines, in case one of them breaks down. Typically, this means that for stations with two separate platforms, a ticket vending and validating machine is provided for each platform; for stations with a single platform, two ticket vending machines are provided. In some transit systems, the ticket vending and validating machines are located off the platforms, while on others they are both located on the platforms. Ideally, they should be placed under some kind of cover or canopy.
- **Security Equipment.** Where necessary, security equipment, such as loudspeakers and video cameras (Figure 6.4-4e) must be provided.
- **Schedule and Area Information Cases.** A schedule case should be provided that includes information about transit routes, transit fare structure, and safety procedures. Some transit systems also provide information regarding area businesses and attractions.
- **Bicycle Storage.** When feasible, a few bicycle racks or loops should be provided at transit stations. A set of bicycle lockers is another option that offers greater safety and security and encourages more bicycle use. Some transit systems, especially in Europe, include very

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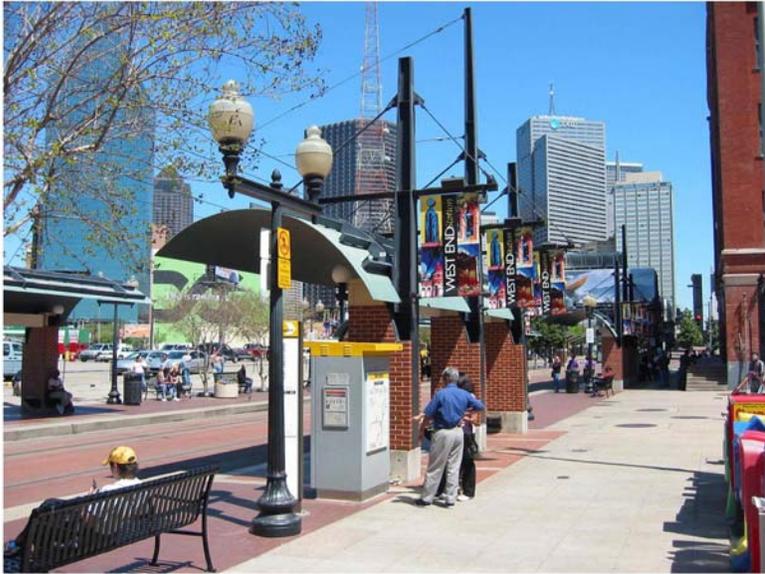
extensive bicycle storage facilities. Each proposed transit station should be evaluated to determine what bicycle usage might be expected and how large the bicycle storage facilities should be. Storage facilities are typically located off the station platforms.

- **Lighting.** Good lighting is essential for the comfort and security of transit users. Lighting can include built-in fixtures in the shelters, as well as free-standing units.
- **Signs.** Signs are vital for identifying transit stations and for providing directions and information regarding permissible activities in the station areas. Options can include electronic signs, audible signs, and real-time information displays.
- **Vertical Circulation.** For stations which are grade-separated from the surrounding streets and neighborhoods, vertical circulation may be required. Unless grade differences are not too great and there is sufficient room for pedestrian ramps, the vertical circulation components may need to include a staircase and an elevator. Figure 6.4-5b illustrates a vertical circulation core on the Hiawatha LRT system in Minneapolis, which in this case also acts as a landmark and marquee for the station. For some transit stations with high volumes of pedestrian traffic, escalators may also be a desirable amenity.
- **Park-and-Ride Sites.** Some transit stations, particularly those that serve as route termini, may require large park-and-ride facilities (Figure 6.4-5c) to accommodate transit users arriving by car. These stations typically also include feeder bus bays, bus turn-around areas, and drop-off and pick-up areas. Some park-and-ride sites are relatively small, with 50 to 200 parking spaces, while others may have a few thousand spaces.

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FIGURE 6.4-2: LRT STATION EXAMPLES

Dallas, TX >



^
Houston, TX



^
San Francisco, CA

Minneapolis, MN >



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FIGURE 6.4-3: LOCAL LRT FACILITY (METROLINK)



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FIGURE 6.4-4: LRT STATION COMPONENTS



a. Low-Floor LRT Trains



b. Shelters



c. Station Furniture



d. Ticket Vending and Validating



e. Security Equipment



f. Schedules and Area Information



g. Bicycle Storage



h. Lighting

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FIGURE 6.4-5: LRT STATION COMPONENTS



a. Station Signs



b. Vertical Circulation



c. Park-and-Ride Lots with Feeder Bus Bays and Drop-Off Areas

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6.4.3 NORTHSIDE LRT STATION DESIGN PARAMETERS

The Northside-Southside LRT system will be similar in many respects to the existing east-west MetroLink line, with a few major differences or exceptions. Following is a description of the major differences between the two systems, as well as other key design parameters and criteria for the proposed Northside LRT line.

Low-Floor Platforms

The existing MetroLink LRT system uses high-floor vehicles which, for level boarding, require station platforms 30" higher than the tracks. The proposed system will have low-floor vehicles, which require only 14" high platforms, only 8" higher than typical 6" curb heights.

Figure 6.4-6 provides illustrative examples of the two types of platform height. Figure 6.4-6a shows a high-floor platform in the existing MetroLink system; Figure 6.4-6b shows a low-floor platform in the Hiawatha LRT system in downtown Minneapolis. Low-floor vehicles and lower platforms make this type of LRT system much more adaptable and easier to integrate into urban street environments, such as downtown St. Louis.

City Street Alignments

With the exception of short underground segments through downtown St. Louis, the existing MetroLink system is located almost exclusively in railroad or highway right-of-way, which makes it easier to accommodate its high-platform stations.

Because of the limited availability of railroad and highway corridors, however, much of the proposed Northside-Southside alignment will be located in existing street right-of-way. This is particularly true of the Northside and downtown alignments. The new, in-street running LRT system will require different types of station configurations to accommodate various traffic conditions and needs in the various roadway corridors.

180' Long Platforms

For LRT systems, platform length is based on LRT vehicle length and available station space. Most LRT vehicles are approximately 90' long, which means that, since platforms typically equal the length of the vehicles, the platforms can be 90', 180', or 270' long for one-car, two-car, or three-car trains, respectively.

In addition to the platforms themselves, the stations also need to include access ramps to the platforms. Since a 5% slope is the ideal grade for access ramps, ramps for the proposed 14" high platforms will need to be approximately 24' long. In cases where platforms are accessed from sidewalks, such as in the downtown area, where the elevation difference is only 8", ramps will need to be approximately 14' long. In addition, a 6'-wide landing is desirable at the end of each ramp for total ramp and landing length of 20' for the 8" rise and 30' for the 14" rise conditions.

The lengths of LRT trains and platforms are dictated by the most restrictive available length for any station in the system. Within the overall Northside-Southside study area, the most restrictive sites are downtown city blocks, which average approximately 230' long. Therefore, the system will be able to accommodate only 180'-long platforms for two-car trains. That means there are four potential platform and ramp configurations and lengths for the system:

- 240' long stations for access from track level (14" rise) with two ramps.
- 210' long stations for access from track level (14" rise) with one ramp.

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- 220' long stations for access from sidewalk level (8" rise) with two ramps.
- 200' long stations for access from sidewalk level (8" rise) with one ramp.

Based upon site conditions and station configurations in the Northside alignment, most stations would have a single ramp, with a rise of 14", for a total platform/ramp/landing length of 210'. Downtown stations would have two ramps, with a rise of 8", for a total platform/ramp/landing length of 220'. Prototypical station layouts that illustrate these conditions are provided in Section 6.4.4.

Varying Platform Widths

Platform widths will vary depending upon station configuration and site constraints. Double-sided platforms, where loading occurs on both sides, ideally should be between 20' and 24' wide. For end-of-line stations, which are expected to have high passenger loading requirements, and other stations with high loading demands, platforms should be 24' wide. Where site conditions are constrained, the double-sided platforms can be as narrow as 16'. For single-sided platforms, where loading occurs on only one side, the ideal platform width is 12'. In constrained conditions, however, single-sided platform width can be reduced to as little as 10'.

Platform Access

LRT station platform access will vary based upon site conditions and traffic requirements. Ideally, station access should be as direct and convenient as possible. This means that access to both ends of the station platforms would be preferred, in order to optimize access to the stations from all directions. However, since many of the stations would be located in the middle of busy roadways, safe station access would be available only at signalized intersections or via specially-controlled pedestrian crossings. Since special pedestrian crossings may impact traffic flow, only one access may be feasible for most LRT stations.

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FIGURE 6.4-6: COMPARISON OF LRT PLATFORM HEIGHTS



a. Existing MetroLink High Platform LRT Stations



b. Proposed Low Platform LRT Stations (Hiawatha Line Minneapolis, MN)

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6.4.4 PROTOTYPICAL LRT STATION DESIGNS

Station location environments within the Northside study area include the high-density streets of the downtown urban core area, major roadway corridors, and other connecting city streets. Each environment requires special consideration, and LRT stations need to be appropriately fitted within each of them.

Station Configuration Prototypes

Seven basic LRT station prototypes have been identified for the alignments within the Northside study area. These prototypes fall into two major classifications: center-platform stations and side-platform stations. Table 6.4-1 identifies and describes each station type. Table 6.4-2 (at the end of Section 6.4.5 of this chapter) identifies all potential stations and prototypes that apply to each station. Figures 6.4-7 through 6.4-13 provide illustrative plans and sections for each of the LRT station prototypes.

TABLE 6.4-1: LRT STATION PROTOTYPES

Station Type	Description
C	Center-Platform Stations
1. C-DS	Center ¹ , Double-Sided platform, in a large park-and-ride station, along RR or freeway corridors, or in the medians of roadways.
2. C-VC	Center ¹ , double-sided platform in grade-separated stations with Vertical Circulation .
3. C-SS-AI	Center ¹ , Single-Sided platforms, Across Intersection .
4. C-SS-IL	Center ¹ , Single-Sided, In-Line platforms between intersections.
S	Side-Platform Stations
5. S-FS	Side ² , Far-Side ³ platforms, in median, in line with the left-turn lanes.
6. S-SbS	Side ² , Side-by-Side platforms.
7. S-SP	Side ² , Single Platform , along the curb, for one-way LRT alignments.

¹ 'Center' means that the station platform is in the middle, between the tracks

² 'Side' means that the station platform is along the side of the tracks

³ 'Far-Side' means that, in the direction of travel, the station platform is on the far side of an intersection

Following is a brief description of each LRT station prototype:

Prototype 1: Center, Double-Sided Platform (C-DS)

This station prototype represents a basic, double-sided platform (plan in Figure 6.4-7, section in Figure 6.4-9). Because it is double-sided, it needs to be located in the middle, between the LRT tracks, so that it can serve both tracks. This prototype could apply to a station in the middle of a roadway. Another application would be in the large, end-of-line park-and-ride station. There are four potential LRT stations in the Northside and downtown alignments where this particular prototype could be used:

- Natural Bridge/North 14th Alternative
 - Goodfellow Blvd. at Stratford Ave.
 - Natural Bridge Ave. at Goodfellow Blvd.

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9th/10th Couplet Alternative

- Delmar Blvd. at N. 14th St.
- Multi-Modal Transit Center

Prototype 2: Center, Double-Sided Platform with Vertical Circulation (C-VC)

This prototype (plan in Figure 6.4-7) is similar to Prototype 1, except that it applies to grade-separated stations, where the surrounding street systems and neighborhoods are either above or below the LRT tracks and station. No stations along the Northside or downtown alignments are expected to utilize this prototype.

Prototype 3: Center, Single-Sided Platforms across Intersection (C-SS-AI)

This station prototype (plans in Figure 6.4-8, sections in Figure 6.4-9) is intended to primarily apply to situations where there is a limited right-of-way. This prototype attempts to meet program needs and accommodate four traffic lanes in peak traffic hours, despite a narrow right-of-way. It requires the least width of all prototypes detailed here. The plan on the left side of Figure 6.4-8 illustrates a typical single-loaded platform configuration, and the middle plan shows how the two far-side platforms would fit across an intersection. There are currently no applications of this prototype within the Northside study area, though it may be required if any potential right-of way acquisition becomes an issue.

Prototype 4: Center, Single-Sided, In-Line Platforms between Intersections (C-SS-IL)

This station prototype (plan on right side of Figure 6.4-8) is similar to Prototype 3, except that the platforms are arranged in-line, on one side of the intersection. Because the second platform does not connect directly to the signalized intersection, a secondary access crosswalk should be provided. No potential LRT stations within the Northside study area require application of this prototype.

Prototype 5: Side, Far-Side Platforms in Median, in Line with Left-Turn Lanes (S-FS)

This station prototype (plans in Figure 6.4-10, sections in Figure 6.4-11) would be the most used option throughout the Northside study area. It is a compact station configuration that, by locating the platforms on the far sides of an intersection, permits the inclusion of left-turn lanes opposite the platform locations. As illustrated in the top section of Figure 6.4-11, stations allow room for four traffic lanes and a left-turn lane. Between the stations, as shown in the middle section of Figure 6.4-11, the LRT tracks converge to accommodate the inclusion of parking lanes.

In some areas of the Natural Bridge alignment, where the right-of-way narrows to 96 feet, some traffic lane and LRT platform widths would need to be reduced to accommodate all program requirements (bottom of Figure 6.4-11). Seven potential LRT stations within the Northside study area could utilize this prototype:

Natural Bridge/North 14th Alternative

- Natural Bridge Ave. at Union Blvd.
- Natural Bridge Ave. at Kingshighway Blvd.
- Natural Bridge Ave. at Newstead Ave.
- Natural Bridge Ave. at Fair Ave.
- Natural Bridge Ave. at Grand Blvd.
- Natural Bridge Ave. at Parnell St.
- North Florissant Ave. at St. Louis Ave.

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Prototype 6: Side, Side-by-Side Platforms (S-SbS)

This station prototype (plan in Figure 6.4-12, section in Figure 6.4-13) is similar to Prototype 5, except that both platforms are on one side of the intersection. One Northside LRT station requires application of this prototype:

- Natural Bridge/North 14th Alternative
 - North 14th St. at Biddle St.

Prototype 7: Side, Single Platform, along Curb, for One-Way Alignment (S-SP)

This station prototype (plan in Figure 6.4-12 and the two bottom sections of Figure 6.4-13) applies primarily to the downtown stations, where the LRT is split into a one-way couplet on 9th and 10th Streets. The middle section of Figure 6.4-13 illustrates the constrained conditions at the station with the station platform width at a minimum of 10 feet. Between the stations (bottom section of Figure 6.4-13), traffic lanes could be slightly widened, and a street furniture/buffer zone could be created between the sidewalk and LRT tracks.

This prototype applies to the six platforms of the three split LRT stations (stations are opposite each other) in the downtown area:

- 9th /10th Couplet Alternative
 - 9th St. and 10th St. at Washington Ave.
 - 9th St. and 10th St. at Olive St. to Pine St.
 - Clark Ave. and 10th St. at Clark Ave.

Other LRT Station Program Requirements

In addition to LRT platform configurations, key elements of transit station design also include park-and-ride lots and feeder bus systems.

Aside from walking and riding a bicycle, feeder buses are the main mode by which transit users access transit stations. Although the overall feeder bus system is discussed elsewhere in this report, feeder bus accommodations need to be provided at the LRT stations. Feeder buses typically provide service to park-and-ride stations, as well as most other stations along the alignments. At park-and-ride stations, feeder buses usually have designated bus bays. Feeder bus facilities at these larger stations are illustrated in Figure 6.4-14.

In the rest of the LRT alignment, most of the feeder buses would cross the LRT alignment and stop at the intersections. A good pedestrian environment and direct access to the LRT stations from these bus stops is essential. Figure 6.4-14 illustrates typical configurations for accommodating feeder buses along the LRT alignments. Figure 6.4-14a represents a typical far-side bus stop configuration for most LRT station locations. Depending upon the number of feeder buses that would serve each LRT station, the bus stop length may vary. Where only one bus route connects with the LRT system, a single bus bay (Figure 6.4-14b) for a 40-foot or 60-foot-long articulated bus may be required. Where more than one bus route feeds the LRT system, a longer bus bay may be desirable that could accommodate two 40-foot-long buses (Figure 6.4-14c).

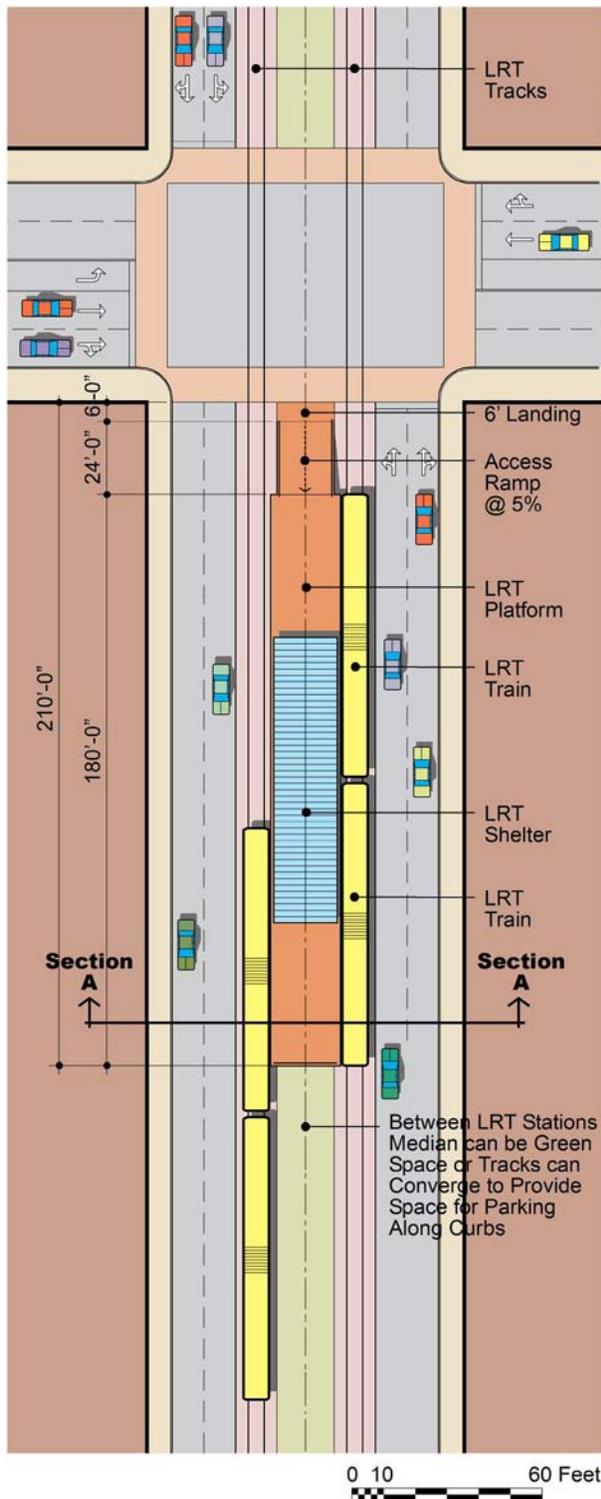
Bus stops should include, at a minimum:

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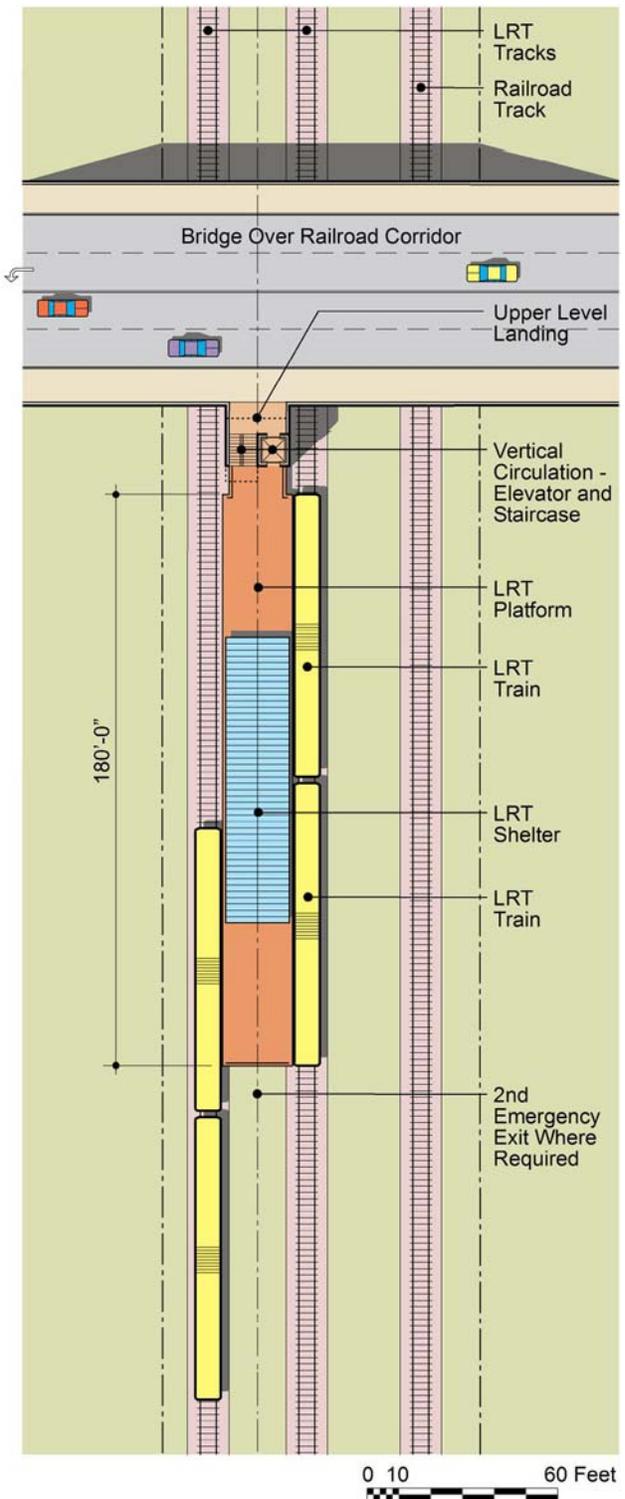
- A walkway in sound condition between the bus stop and the LRT station.
- A bus shelter, including lighting.
- Some seating.
- A litter receptacle.
- Bus schedules and safety information.
- Other optional items (especially for some of the more heavily used bus stops) could include:
 - Real-time passenger information displays.
 - Bicycle storage facilities.
 - Public art.

Northside Study

FIGURE 6.4-7: PROTOTYPES 1 AND 2 - PLANS
LRT Station Prototypes



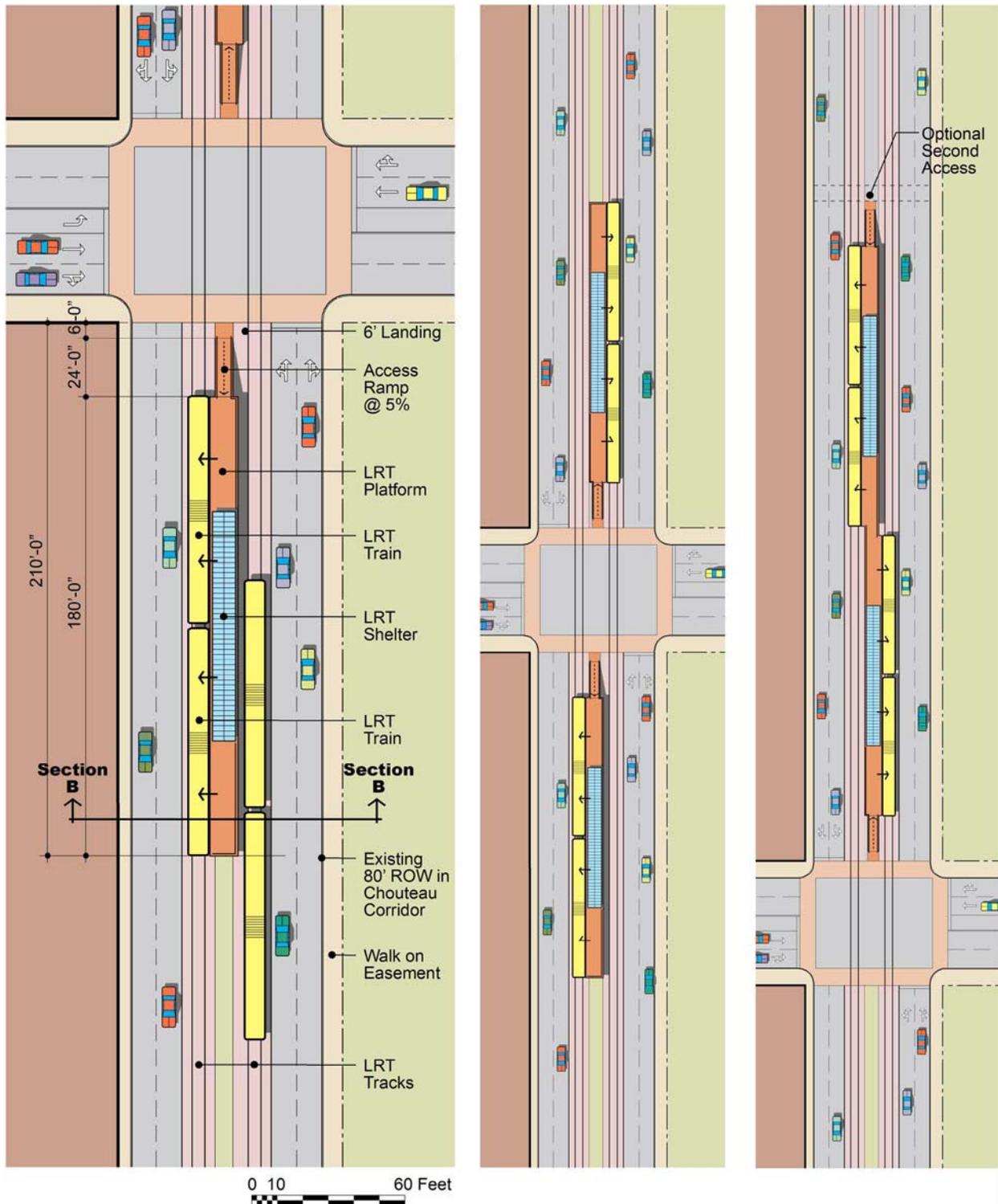
a. Station Type 1. C-DS Plans
Center, Double-Sided Platform
Example Shown in a Roadway Median



b. Station Type 2. C-VC Plan
Center Platform with Vertical Circulation
Example Shown in Railroad Corridor

Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-8: PROTOTYPES 3 AND 4 - PLANS
LRT Station Prototypes



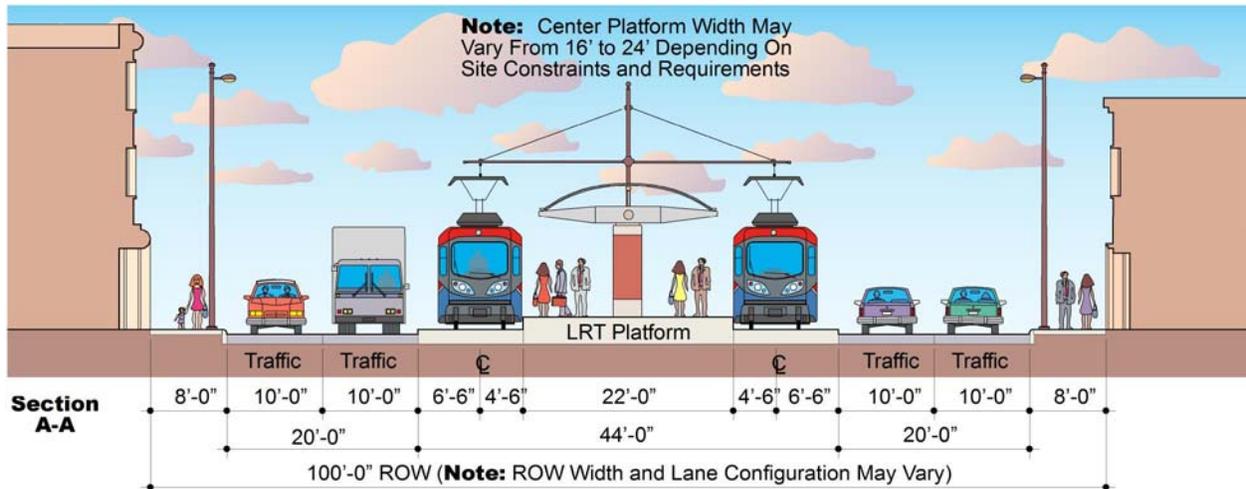
a. Station Type 3 & 4 Plans
Center, Single-Sided Platforms
Example Shown Across an Intersection

b. Type 3. C-SS-AI
Platforms Across an
Intersection

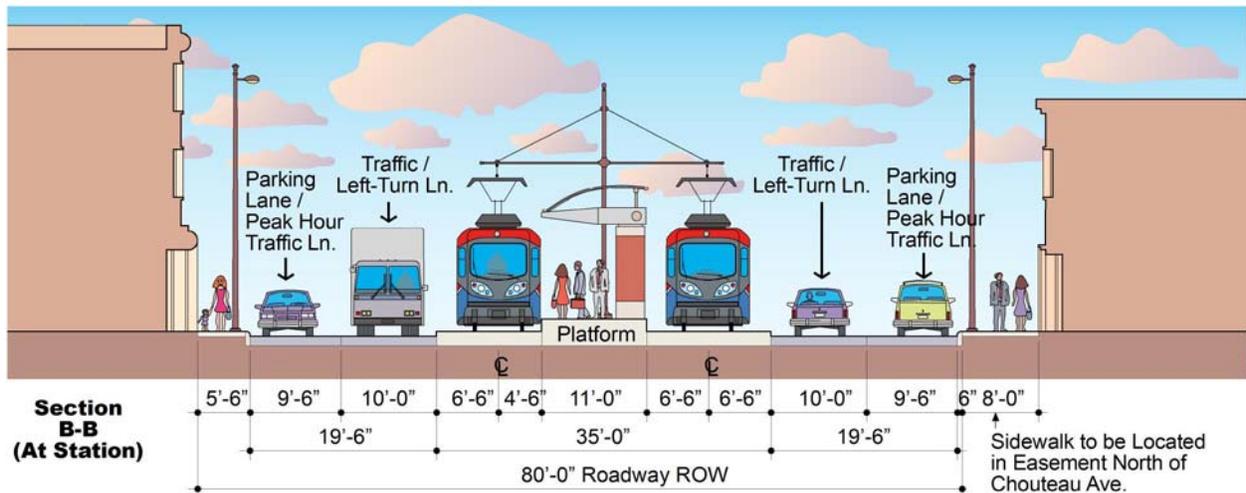
c. Type 4. C-SS-IL
Platforms In-Line

Northside Study

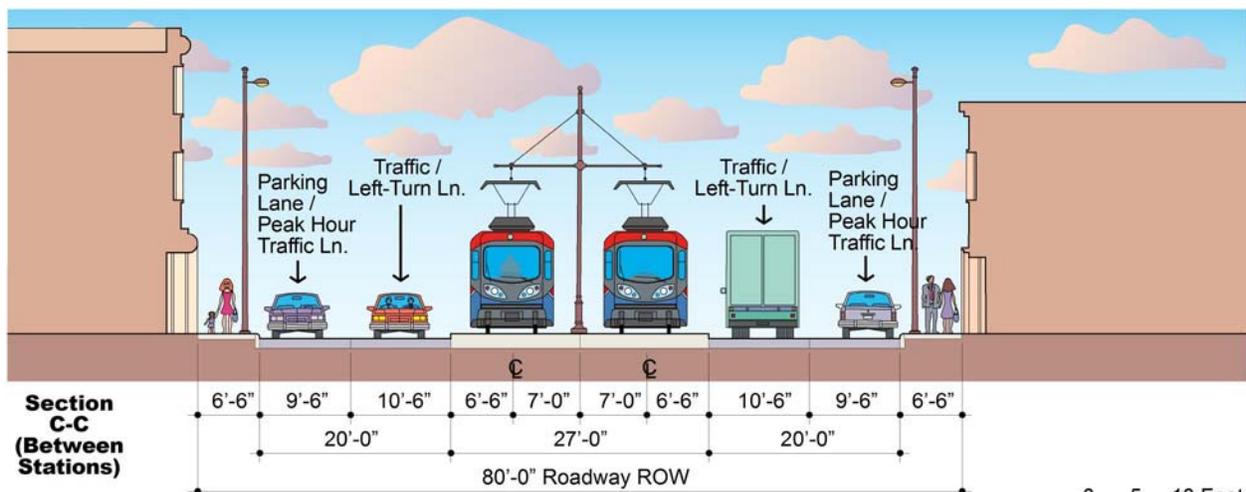
FIGURE 6.4-9: PROTOTYPES 1 THROUGH 4 - SECTIONS
LRT Station Prototypes



a. **Station Type 1. C-DS** - Center, Double-Sided Platform, Example Shown in Roadway with 4 Traffic Lanes



b. **Station Type 3. C-SS-AI and Type 4. C-SS-IL** - Center, Single-Sided Platform (Primarily Chouteau Avenue)

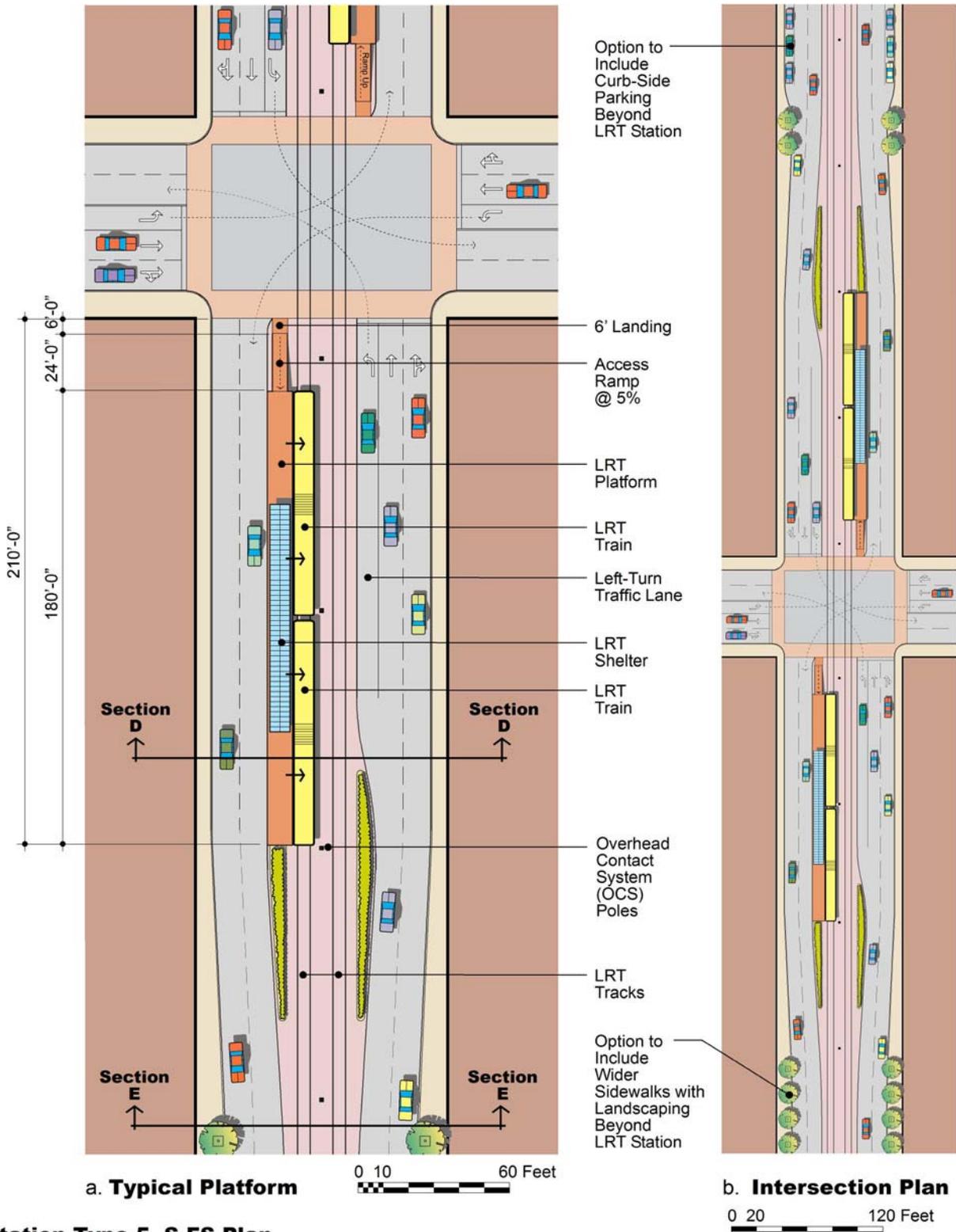


c. **Station Type 3. C-SS-AI and Type 4. C-SS-IL** - Roadway Section Between Stations



Chapter 6.4: Station Planning & Site Design

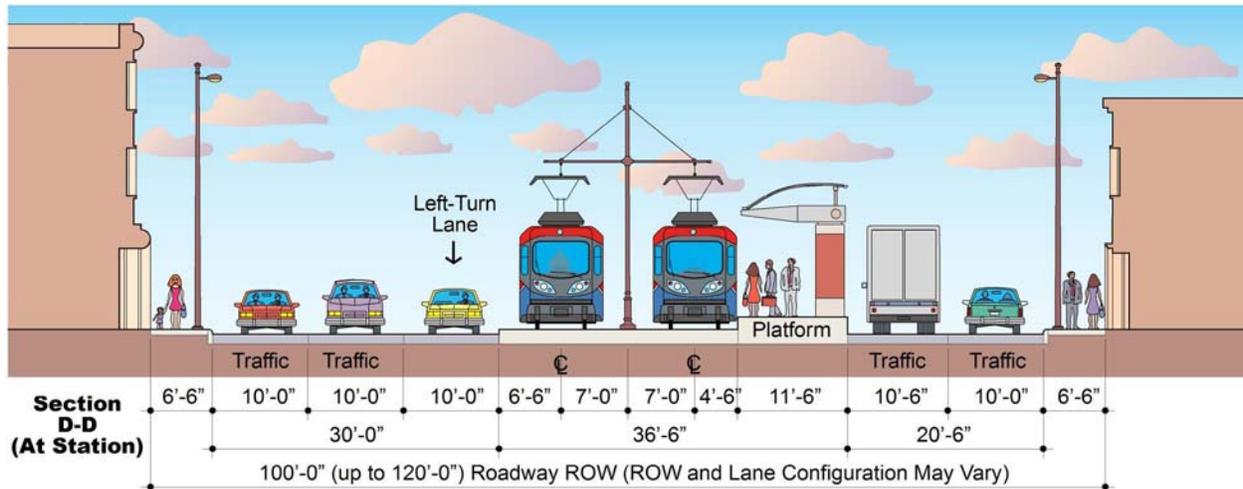
FIGURE 6.4-10: PROTOTYPE 5 – PLANS
LRT Station Prototypes



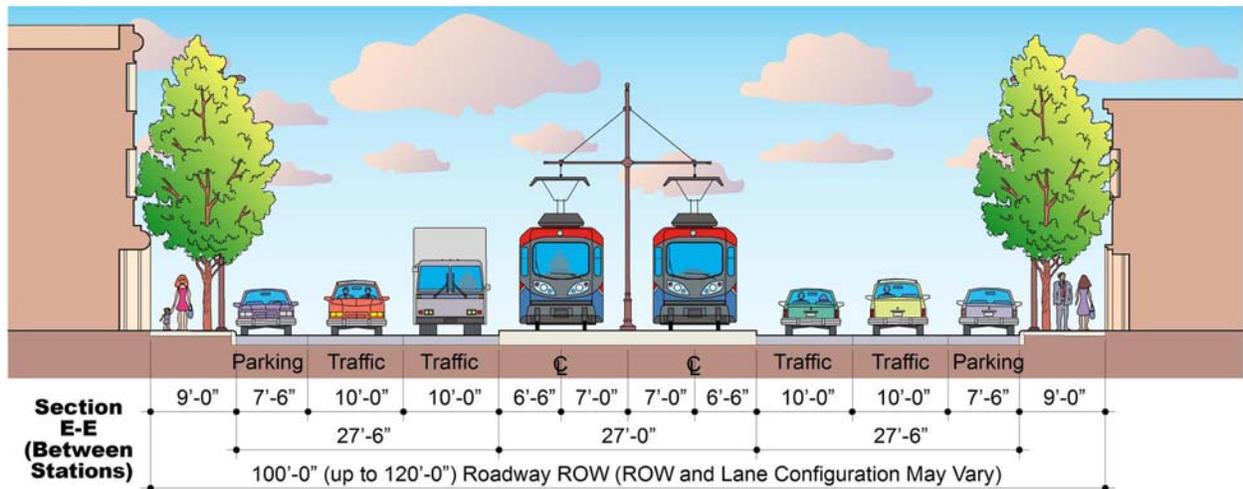
Station Type 5. S-FS Plan
Side, Staggered, Far-Side, Side-Loading Platforms

Northside Study

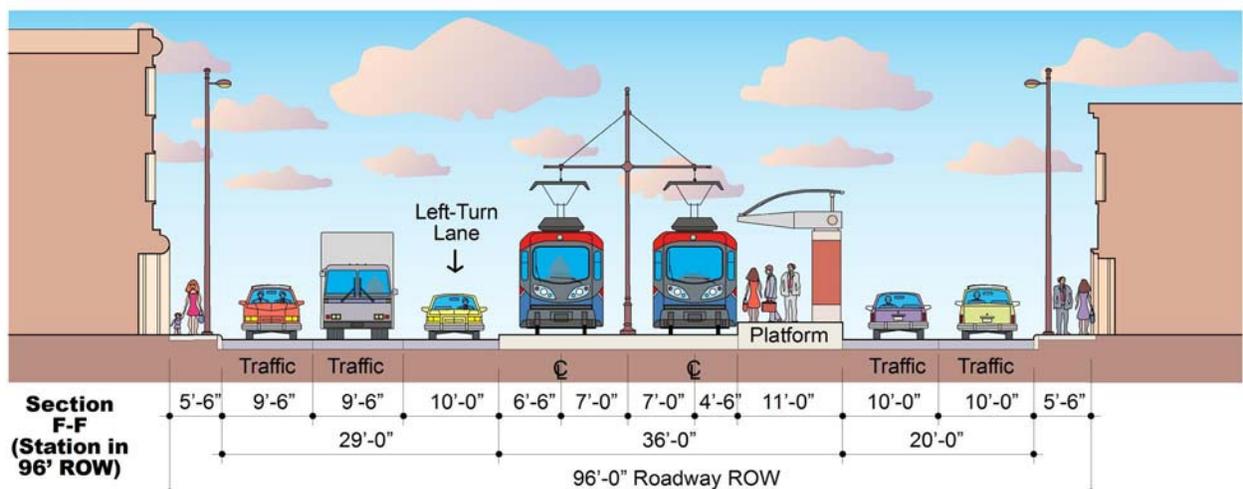
FIGURE 6.4-11: PROTOTYPE 5 - SECTIONS
LRT Station Prototypes



a. **Station Type 5. S-FS** - Side, Far-Side Platforms, with 4 Traffic Lanes and Left-Turn Lanes



b. **Station Type 5. S-FS** - Between LRT Stations - 4 Traffic Lanes with Parking Lanes

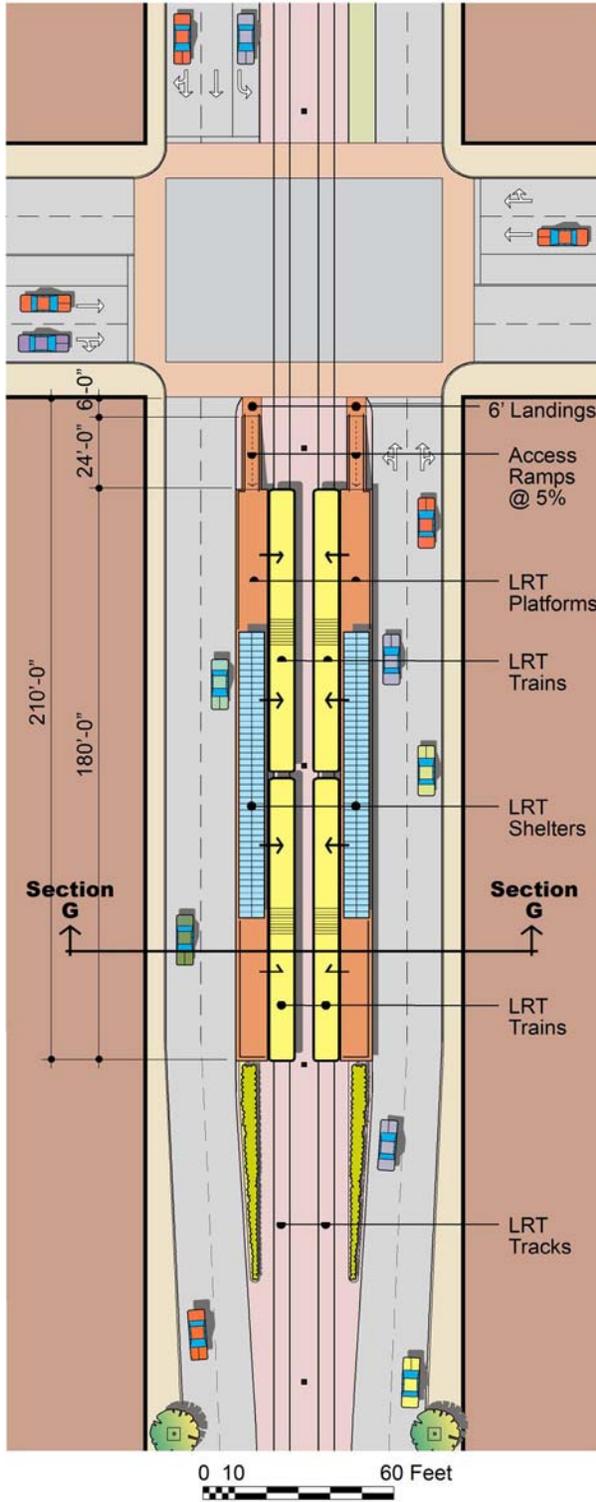


c. **Station Type 5. S-FS @ 96' ROW** - Side, Far-Side Platforms, with 4 Traffic Lanes and Left-Turn Lanes

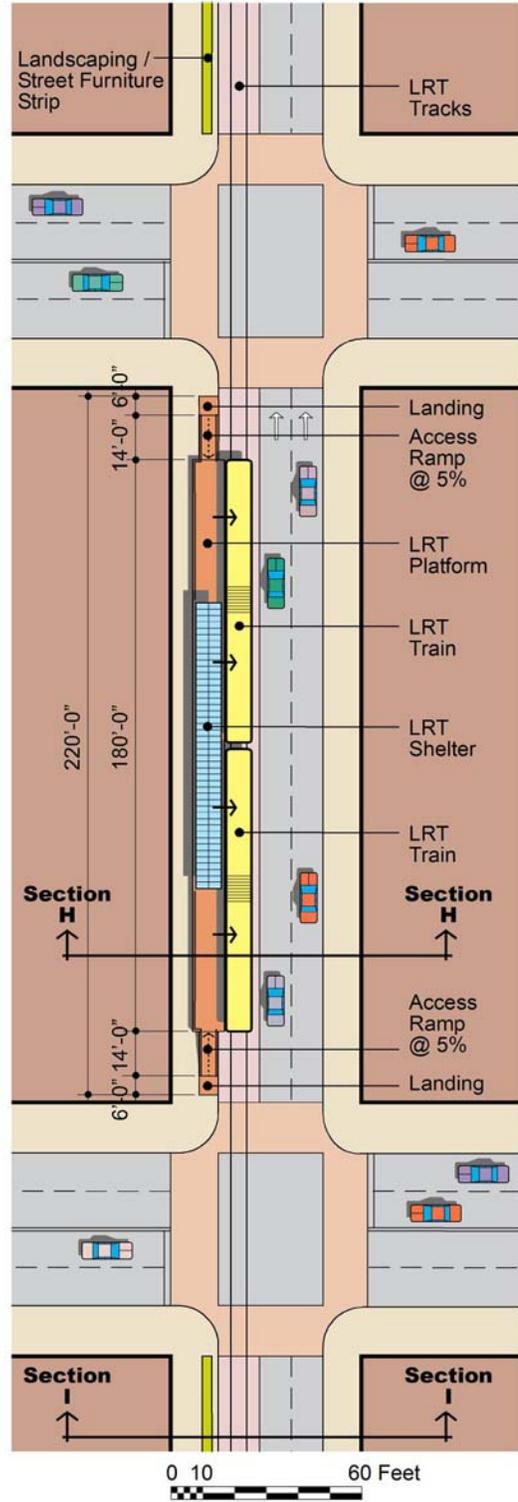


Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-12: PROTOTYPES 6 AND 7 - PLANS
LRT Station Prototypes



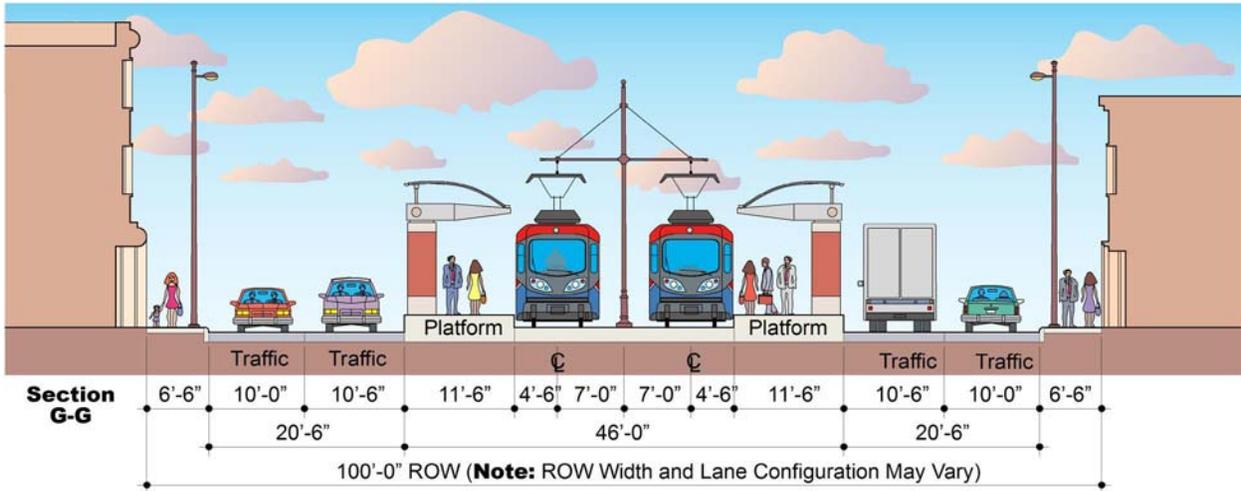
a. Station Type 6. S-SbS Plan
Side, Single-Sided, Side-by-Side Platforms



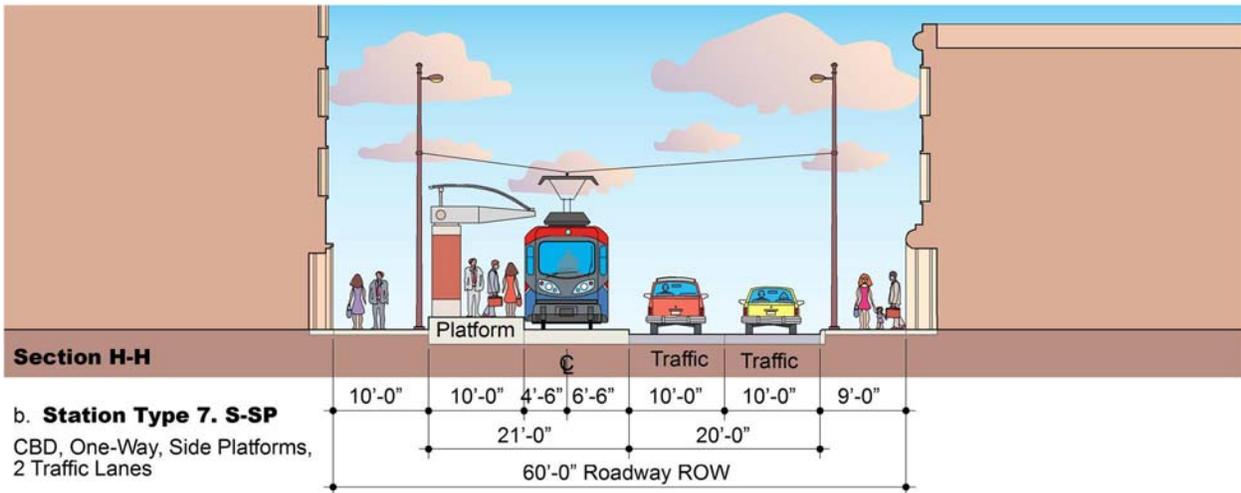
b. Station Type 7. S-SP Plan
CBD, One-Way, Side Platforms

Northside Study

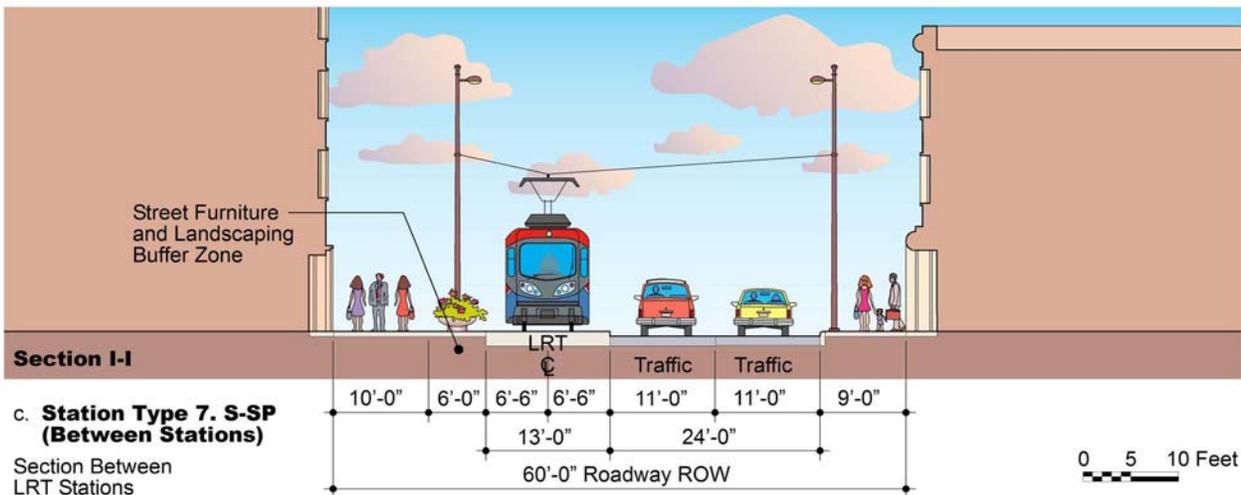
FIGURE 6.4-13: PROTOTYPES 6 AND 7 - SECTIONS
LRT Station Prototypes



a. **Station Type 6. S-SbS** - Side Platforms with 4 Traffic Lanes

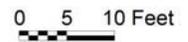


b. **Station Type 7. S-SP**
CBD, One-Way, Side Platforms,
2 Traffic Lanes



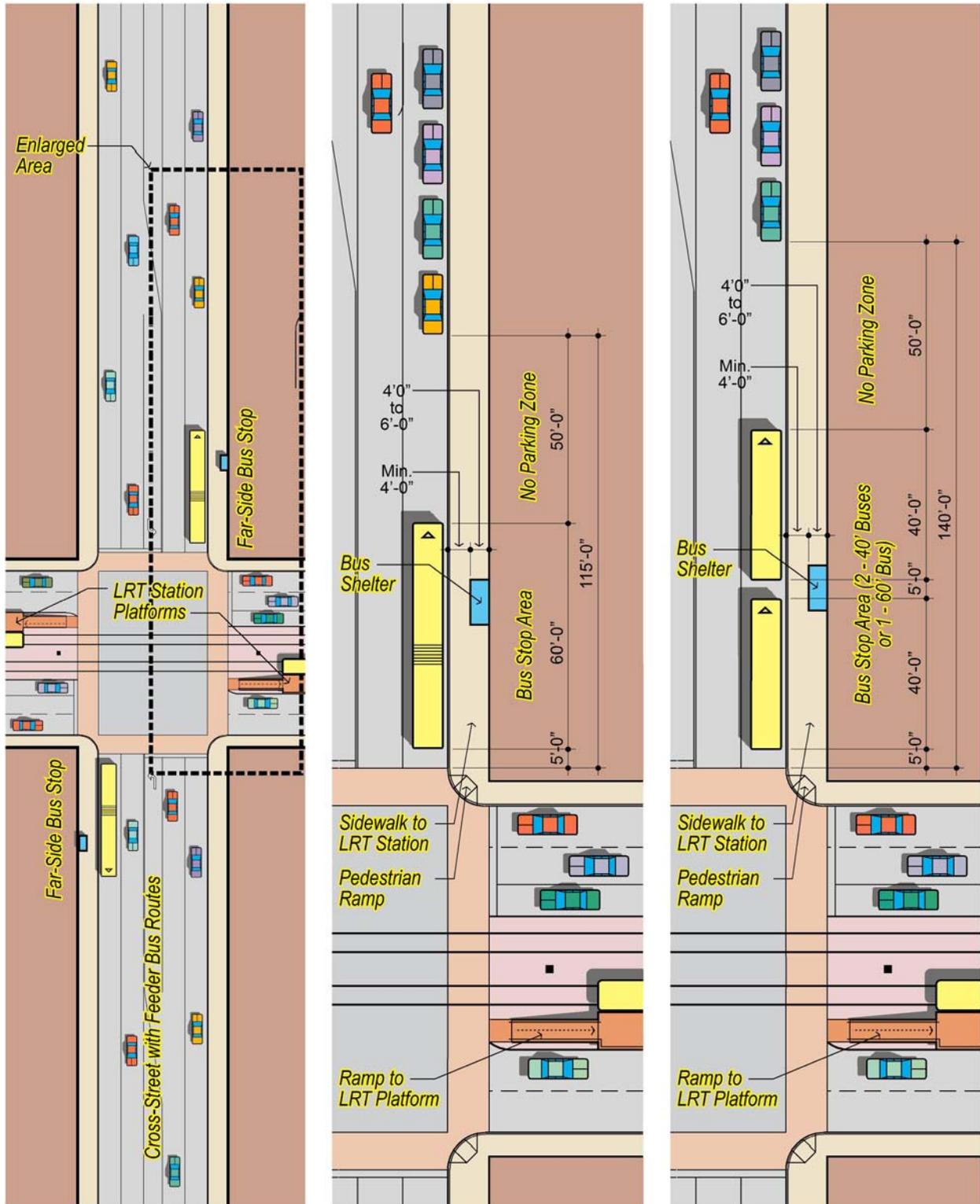
c. **Station Type 7. S-SP (Between Stations)**

Section Between LRT Stations



Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-14: FEEDER BUS STOP DIAGRAMS



a. **Far-Side Bus Stop Locations**
Prototypical Example Condition

b. **Bus Stop for Single Bus**
Accommodates 40' or 60' Buses

c. **Bus Stop for Multiple Buses**
Two 40' Buses or One 60' Bus

Northside Study

6.4.5 SUMMARY OF PROPOSED LRT STATION DESIGN

This subsection summarizes the proposed LRT station concept designs and includes a summary table and graphics. As previously mentioned, all potential alignments and stations within the Northside study area (including downtown) are discussed starting at the north end of the study area and continuing south.

Table 6.4-2 lists all potential LRT stations within the Northside study area (including downtown) and also includes the following information:

- Alternative and LRT station names.
- The number of the figure(s) that illustrates each alternative and station.
- General features and characteristics of each station.
- Applicable station prototype design.
- Special program requirements, such as park-and-ride spaces and feeder bus bays.

Figures that accompany the table include alignment maps and station overview pages. Alignment maps delineate:

- General existing land uses in each of the potential LRT alternative areas.
- Proposed LRT alignments.
- LRT station locations.
- A half-mile radius zone around each station that represents a 10-minute walking distance, which is considered the maximum distance for optimal pedestrian access. The downtown alignment map utilizes a quarter-mile radius, or 5-minute walk.

Individual station graphics include:

- A thumbnail plan of the city indicating the location of the alignment segment.
- An alignment plan that shows the location of each station.
- An aerial photograph of the station area.
- Image photos of the station site.
- Concept plans for each station location.
- For selected typical stations, illustrative plans and computer sketches demonstrate what the proposed LRT system and stations would look like.

Concept plans included here represent and illustrate basic station facilities. At many of the proposed stations, there is considerable potential for complementary TOD that would enhance those areas and create higher-density, mixed-use environments in the immediate vicinity. Land use and TOD potential are discussed in Sections 6. 2 and 6. 3 of this chapter and may vary somewhat from the plans presented here.

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TABLE 6.4-2: SUMMARY OF POTENTIAL LRT STATION DATA

	Alignment / Station Name	Station Type / Special Program Requirements
A.	Natural Bridge/North 14 th – Figure 6.4-15	
1.	<p>Goodfellow Blvd. at Stratford Ave. Station Figures 6.4-16 and 6.4-17</p> <ul style="list-style-type: none"> ▪ The station would be located in the large park-and-ride site west of Goodfellow Blvd. ▪ Serves as an end-of-line station located near I-70 for easy access, as well as the adjoining residential neighborhoods. ▪ Utilizes former underutilized military property. ▪ Great potential for TOD – a small TOD development is shown on the corner of Goodfellow Blvd. and Stratford Ave. 	<p>1. C-DS (Center, Double-Sided Platform) Large Park-and-Ride Lot</p> <ul style="list-style-type: none"> ▪ 800+ Parking Spaces ▪ 4 Bus Bays ▪ Drop-Off Area
2.	<p>Natural Bridge Ave. at Goodfellow Blvd. Station Figure 6.4-18</p> <ul style="list-style-type: none"> ▪ The station would be located in the median of Natural Bridge Ave. southeast of the intersection with Goodfellow Blvd. ▪ Serves the industrial area and residential neighborhoods to the northwest. ▪ Great potential for TOD. ▪ Accommodates potential future western extension of the LRT system along Goodfellow Blvd. to the south. 	<p>1. C-DS (Center, Double-Sided Platform)</p>
3.	<p>Natural Bridge Ave. at Union Blvd. Station Figure 6.4-19</p> <ul style="list-style-type: none"> ▪ The station would be located in the median of Natural Bridge Ave. ▪ Serves the commercial uses around the intersection, the industrial area to the north, and residential uses to the south. ▪ A relatively new commercial center is located in the southwest quadrant with potential for additional development near the corner. 	<p>5. S-FS (Side, Far-Side Platforms)</p>
4.	<p>Natural Bridge Ave. at Kingshighway Blvd. Station Figure 6.4-20</p> <ul style="list-style-type: none"> ▪ The station would be located in the median of Natural Bridge Ave. ▪ Serves a multi-use district, including a commercial node around the intersection. 	<p>5. S-FS (Side, Far-Side Platforms)</p>
5.	<p>Natural Bridge Ave. at Newstead Ave. Station Figures 6.4-21 and 6.4-22</p> <ul style="list-style-type: none"> ▪ The station would be located in the median of Natural Bridge Ave. ▪ Serves a multi-use district, including a commercial node around the intersection. ▪ A small park-and-ride lot is shown in the southeast quadrant – this is meant to be an illustrative example and to represent the need for small park-and-ride lots along the LRT alternatives. Further, more detailed studies need to be conducted to establish an exact site for the park-and-ride facility. ▪ The two computer images in Figure 6.4-22 are a good representation of typical side-platform, far-side stations. 	<p>5. S-FS (Side, Far-Side Platforms) Small Park-and-Ride Lot</p> <ul style="list-style-type: none"> ▪ 120 Parking Spaces

Northside Study

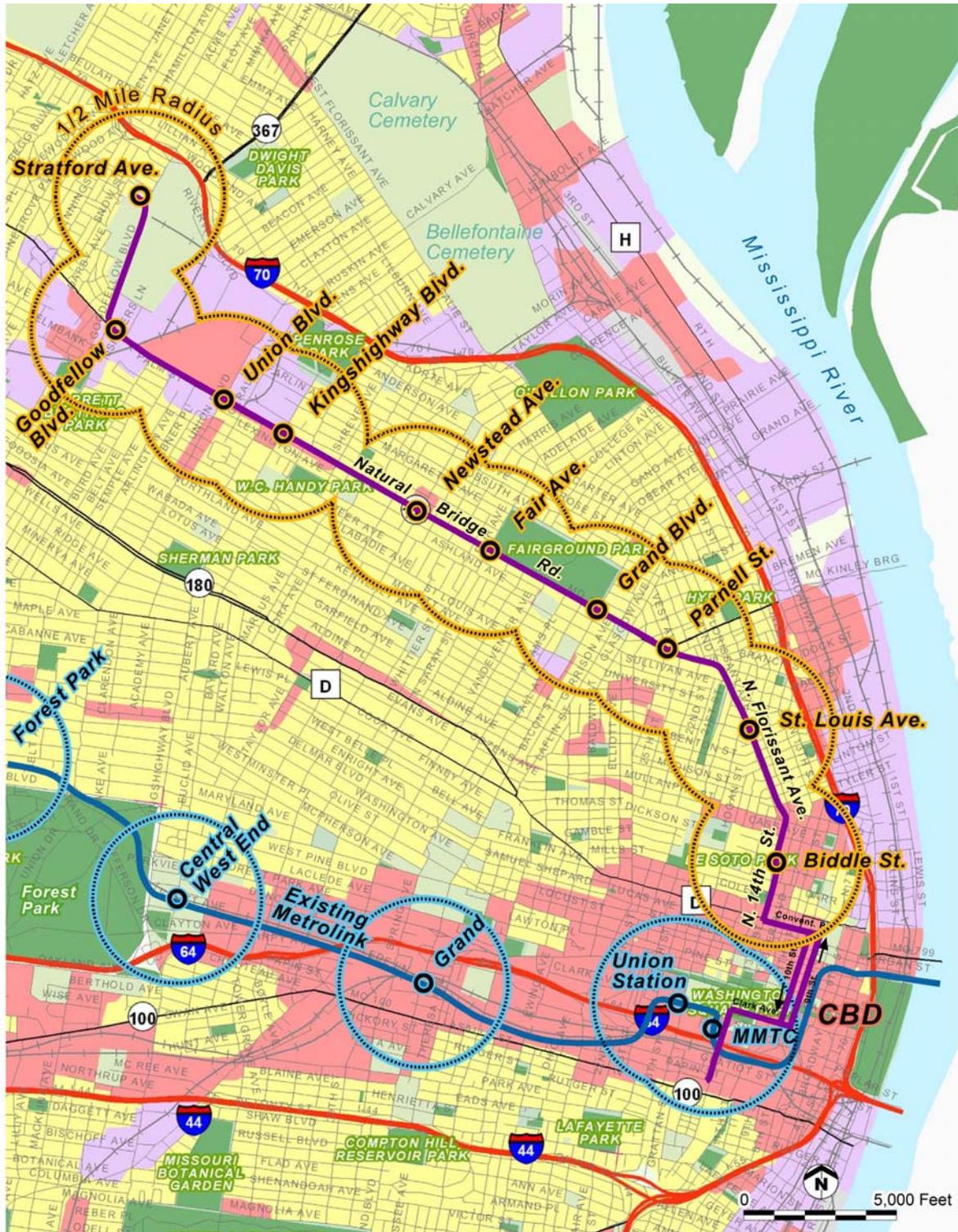
	Alignment / Station Name	Station Type / Special Program Requirements
6.	<p>Natural Bridge Ave. at Fair Ave. Station Figure 6.4-23</p> <ul style="list-style-type: none"> The station would be located in the median of Natural Bridge Ave. Serves the residential neighborhoods and the west half of Fair-ground Park. 	<p>5. S-FS (Side, Far-Side Plat- forms)</p>
7.	<p>Natural Bridge Ave. at Grand Blvd. Station Figure 6.4-24</p> <ul style="list-style-type: none"> The station would be located in the median of Natural Bridge Ave. Serves the residential neighborhoods and the east half of Fair-ground Park. 	<p>5. S-FS (Side, Far-Side Plat- forms)</p>
8.	<p>Natural Bridge Ave. at Parnell St. Station Figure 6.4-25</p> <ul style="list-style-type: none"> The station would be located in the median of Natural Bridge Ave. Serves the residential neighborhoods around the station. Potential for redevelopment of some of the vacant and underuti-lized properties to higher-density residential. 	<p>5. S-FS (Side, Far-Side Plat- forms)</p>
9.	<p>N. Florissant Ave. at St. Louis Ave. Station Figures 6.4-26 and 6.4-27</p> <ul style="list-style-type: none"> The station would be located in the median of N. Florissant Ave. Serves the residential neighborhoods and the commercial district to the east. Potential for redevelopment of some of the vacant and underuti-lized properties to higher-density residential. 	<p>5. S-FS (Side, Far-Side Plat- forms)</p>
10.	<p>N. 14th St. at Biddle St. Station Figure 6.4-28</p> <ul style="list-style-type: none"> The station would be sited in the median of a realigned N. 14th St. Serves the higher-density residential development to the north-west. Great potential for TOD due to the underutilized and industrial properties in the area. 	<p>6. S-SbS (Side, Side-by-Side Platforms)</p>
B.	9 th / 10 th Couplet – Figure 6.4-29	
1.	<p>Delmar Blvd. at N. 14th St. Station Figure 6.4-30</p> <ul style="list-style-type: none"> The station would be located in the median of Delmar Blvd. Serves the northwest quadrant of the downtown area. Some redevelopment has already occurred in this area, but there is great potential for additional mixed-use developments. A small transit center for accommodating eight buses needs to be provided somewhere in this area. 	<p>1. C-DS (Center, Double-Sided Platform) Transit Center</p> <ul style="list-style-type: none"> 8 Bus Bays
2.	<p>9th St. and 10th St. at Washington Ave. Stations Figures 6.4-31 and 6.4-32</p> <ul style="list-style-type: none"> The one-way pair of LRT stations would be located on the west side of 9th St. and the east side of 10th St. Serves the northeast quadrant of downtown, as well as the Amer-ica's Center. 	<p>7. S-SP (Side, Single Plat- forms)</p>

Chapter 6.4: Station Planning & Site Design

	Alignment / Station Name	Station Type / Special Program Requirements
	<ul style="list-style-type: none"> ▪ The computer image in Figure 6.4-32 is a good representation of a typical downtown side platform station. 	
3.	<p>9th St. and 10th St. at Olive St. to Pine St. Stations Figure 6.4-33</p> <ul style="list-style-type: none"> ▪ The one-way pair of LRT stations would be located on the west side of 9th St. and the east side of 10th St. ▪ Serves the central core area of downtown. ▪ The stations would require the closing of the alley in this block. The alley appears to be used primarily for storage and has a gate on the 9th St. side. 	<p>7. S-SP (Side, Single Platforms)</p>
4.	<p>Clark Ave. and 10th St. at Clark Ave. Stations Figure 6.4-34</p> <ul style="list-style-type: none"> ▪ The northbound station platform would be located on the north side of Clark Ave. ▪ The southbound station would be located on the east side of 10th Street. ▪ Serves the southeast quadrant of downtown, Busch Stadium, and surrounding uses. 	<p>7. S-SP (Side, Single Platforms)</p>
5.	<p>Multi-Modal Transit Center Station Figure 6.4-35</p> <ul style="list-style-type: none"> ▪ The new LRT station would be located between the bus bay area, which would be moved slightly to the north, and the existing east-west MetroLink station, which is located at a lower elevation. Vertical circulation elements, including ramps, staircases, elevators, and escalators would interconnect the two stations and the surrounding street system. ▪ Serves primarily the southwest quadrant of downtown, as well as the main interface point with the existing east-west MetroLink line and the other transit modes that serve this area. 	<p>1. C-DS (Center, Double-Sided Platform) Primary interface with east-west MetroLink line and other transit modes</p>

Northside Study

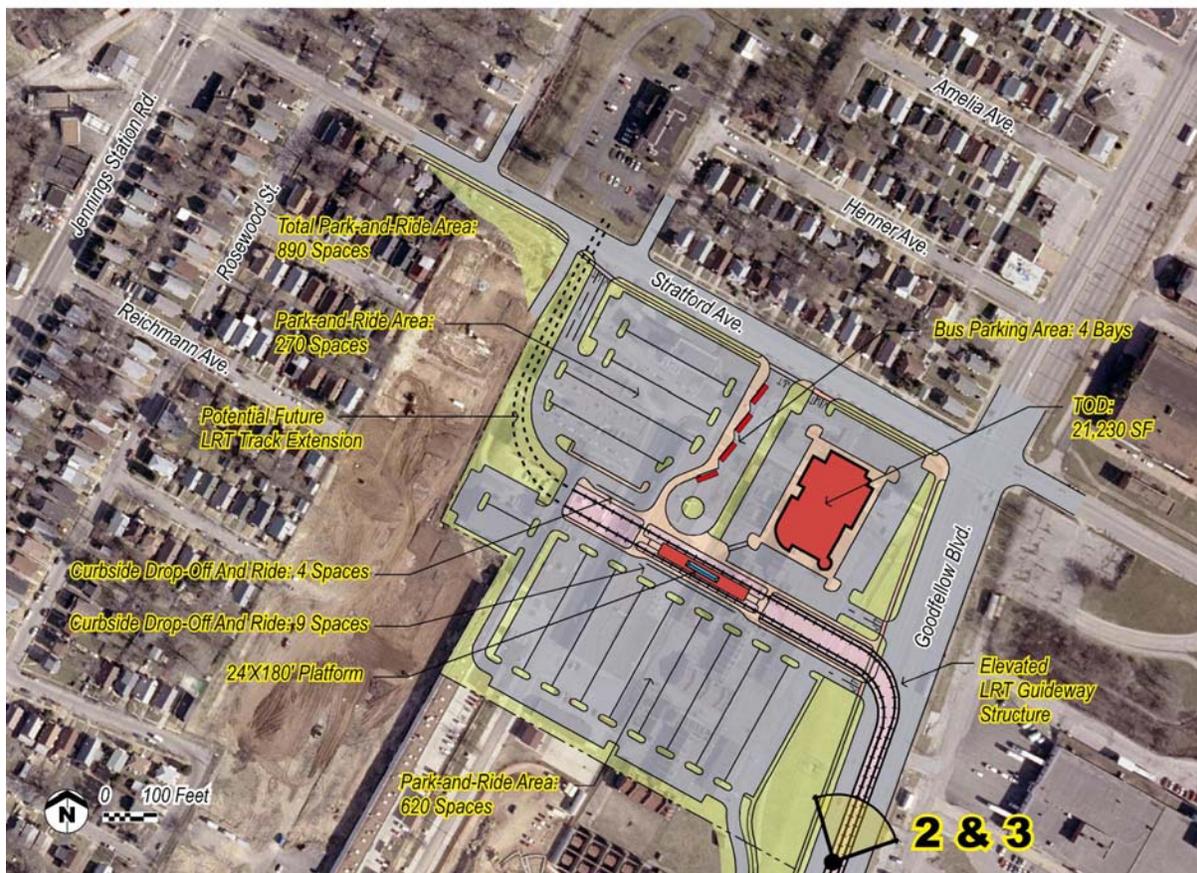
FIGURE 6.4-15: LRT ALIGNMENT AND STATION LOCATIONS
 Natural Bridge/North 14th Alternative



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-16: GOODFELLOW AT STRATFORD STATION - PLAN
Natural Bridge/North 14th Alternative



d. Illustrative Station Site Plan

c. Views 2 & 3: Looking North Along Goodfellow



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-17: GOODFELLOW AT STRATFORD STATION - IMAGE
Natural Bridge/North 14th Alternative



a. Existing Station Area Looking North



b. Proposed LRT Station Image Looking North

NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

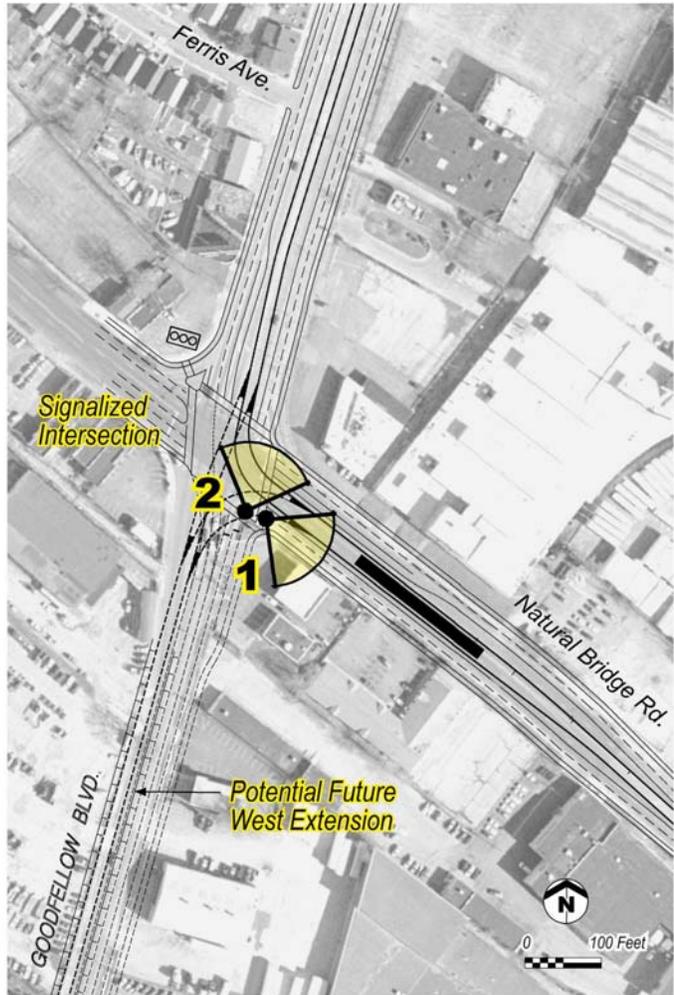
Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-18: NATURAL BRIDGE AT GOODFELLOW STATION - PLAN
 Natural Bridge/North 14th Alternative



a. Station Location

c. Station Configuration Site Plan



b. Existing Conditions



d. View 1: Station Area Looking Southeast

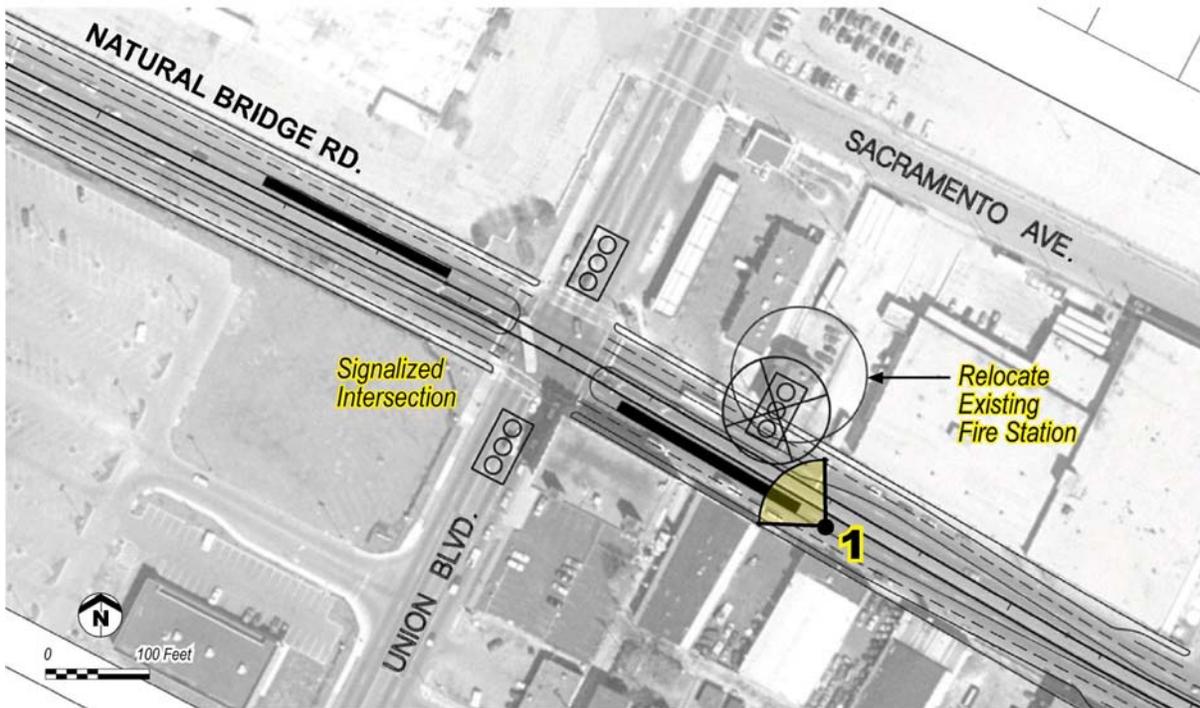
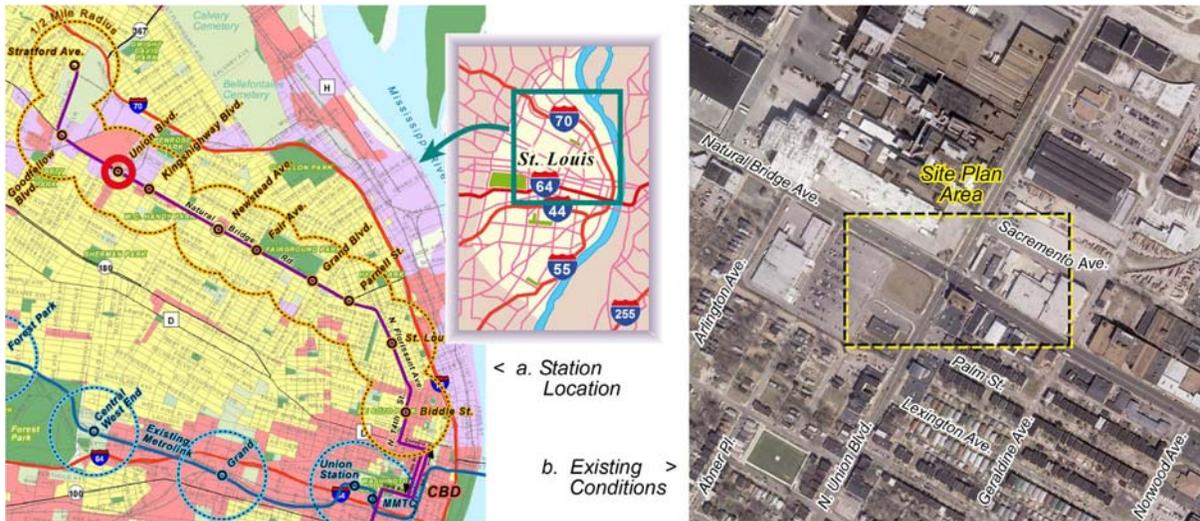
e. View 2: Station Area Looking North



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-19: NATURAL BRIDGE AT UNION STATION - PLAN
 Natural Bridge/North 14th Alternative



A
c. Station Configuration Site Plan

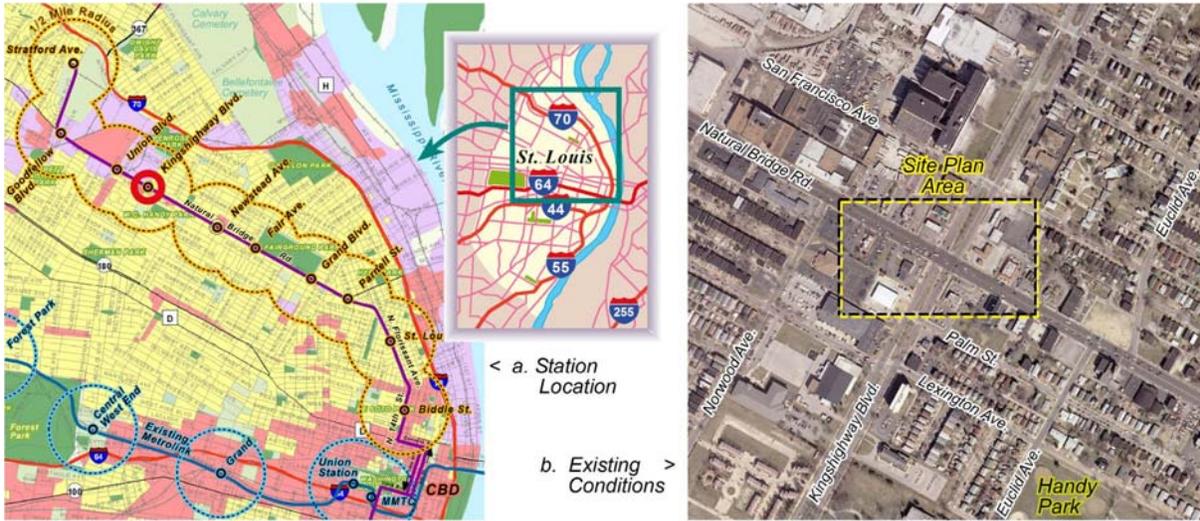
d. View 1: Station Area Looking Northwest



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-20: NATURAL BRIDGE AT KINGSHIGHWAY STATION - PLAN
 Natural Bridge/North 14th Alternative



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

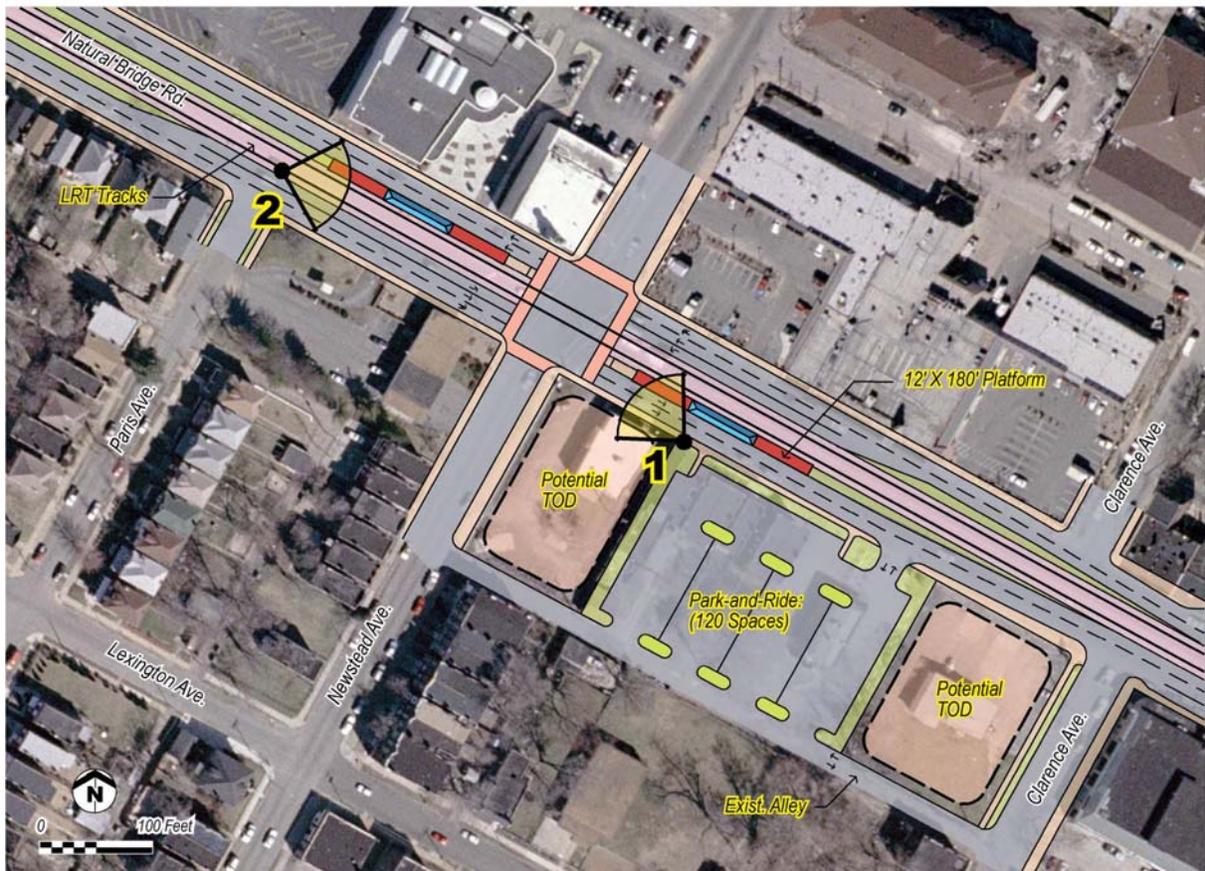
FIGURE 6.4-21: NATURAL BRIDGE AT NEWSTEAD STATION - PLAN
 Natural Bridge/North 14th Alternative



a. Station Location



b. View 1: Station Area Looking Northwest



d. Illustrative Station Site Plan

c. View 2: Station Area Looking Southeast



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-22: NATURAL BRIDGE AT NEWSTEAD STATION - IMAGES
Natural Bridge/North 14th Alternative



a. Existing Station Area Looking Northwest



b. Proposed LRT Station Image Looking Northwest



c. Existing Station Area Looking Southeast

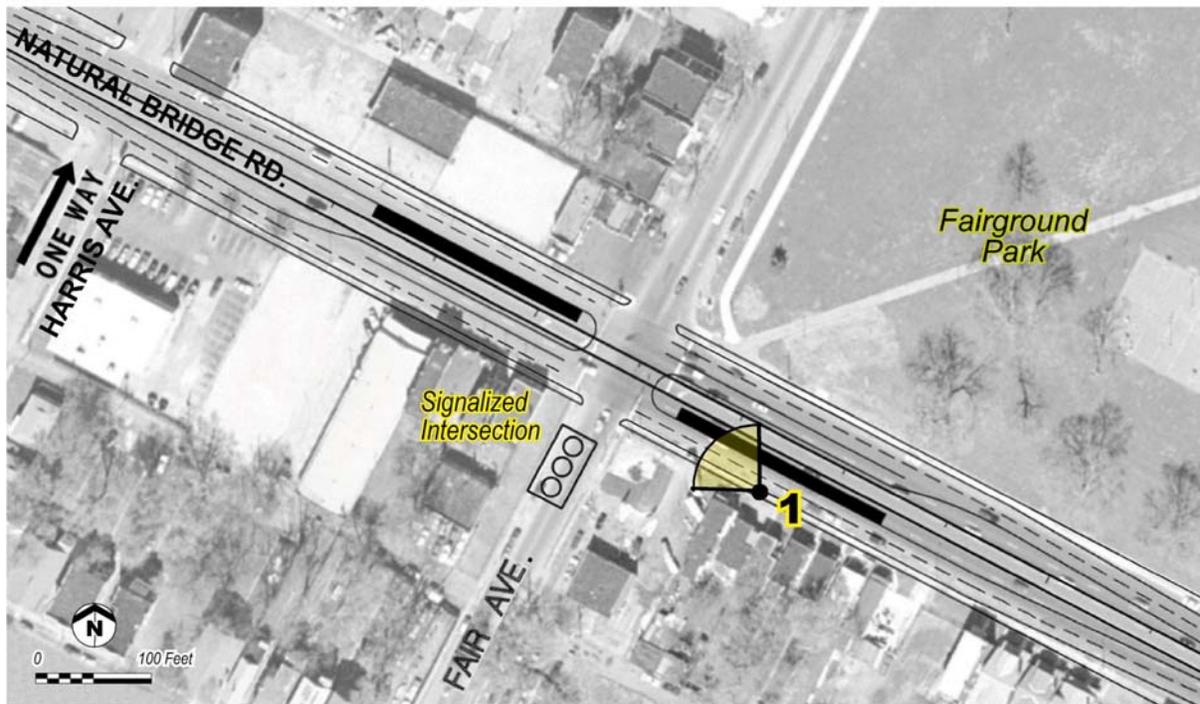


d. Proposed LRT Station Image Looking Southeast

NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-23: NATURAL BRIDGE AT FAIR STATION - PLAN
Natural Bridge/North 14th Alternative



A
c. Station Configuration Site Plan

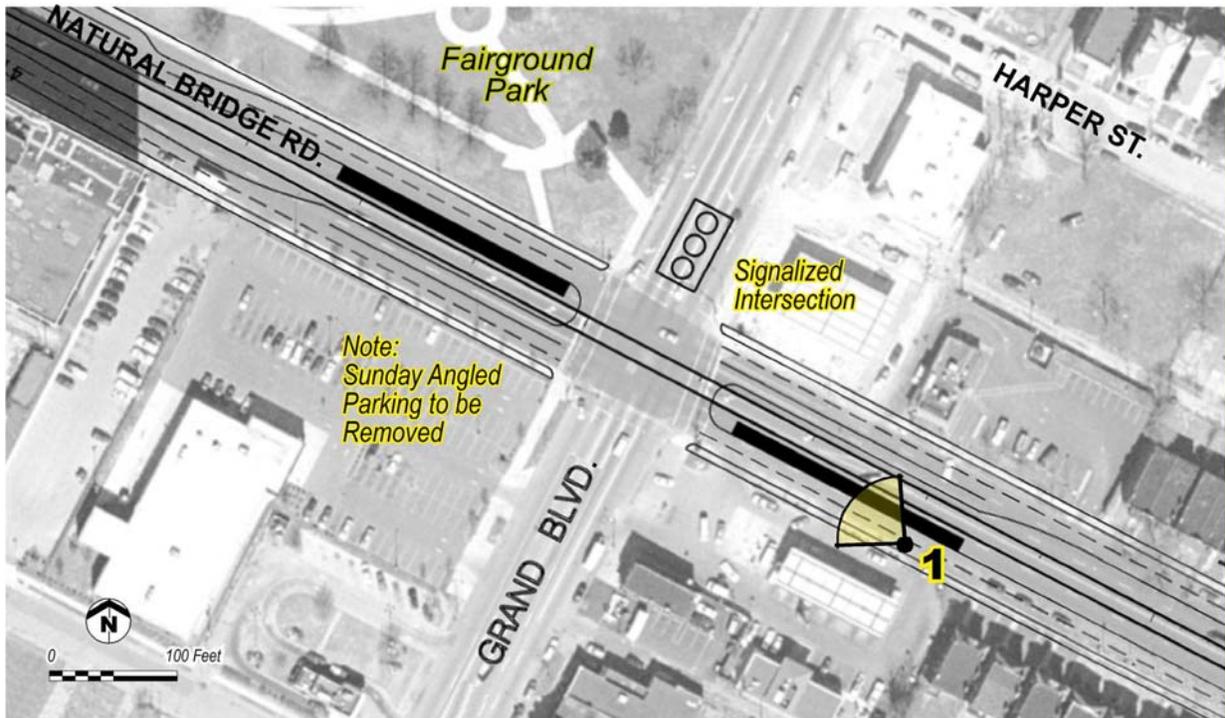
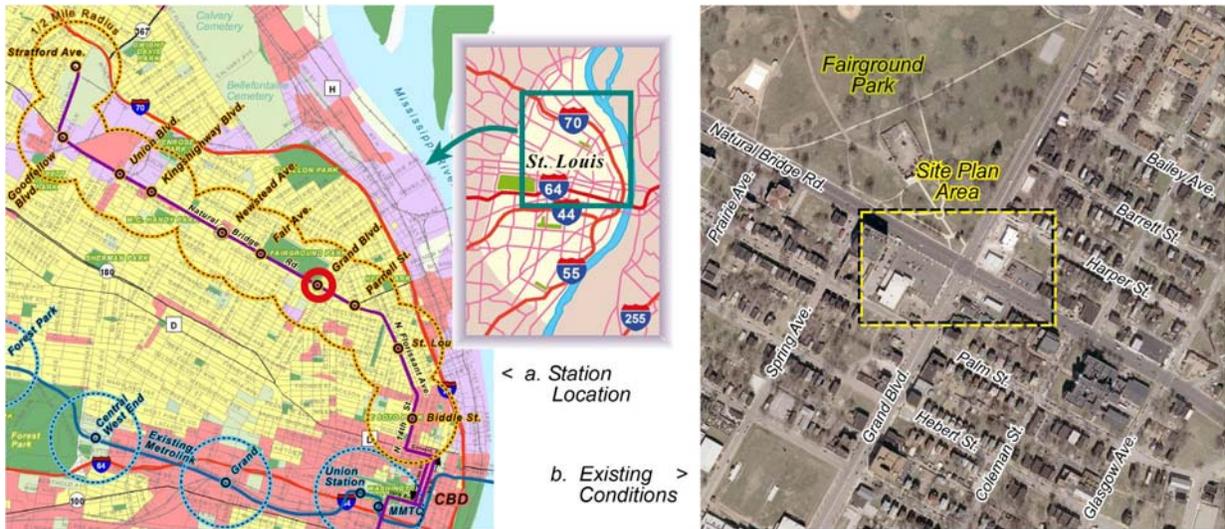
d. View 1: Station Area Looking Northwest



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-24: NATURAL BRIDGE AT GRAND STATION - PLAN
 Natural Bridge/North 14th Alternative



c. Station Configuration Site Plan

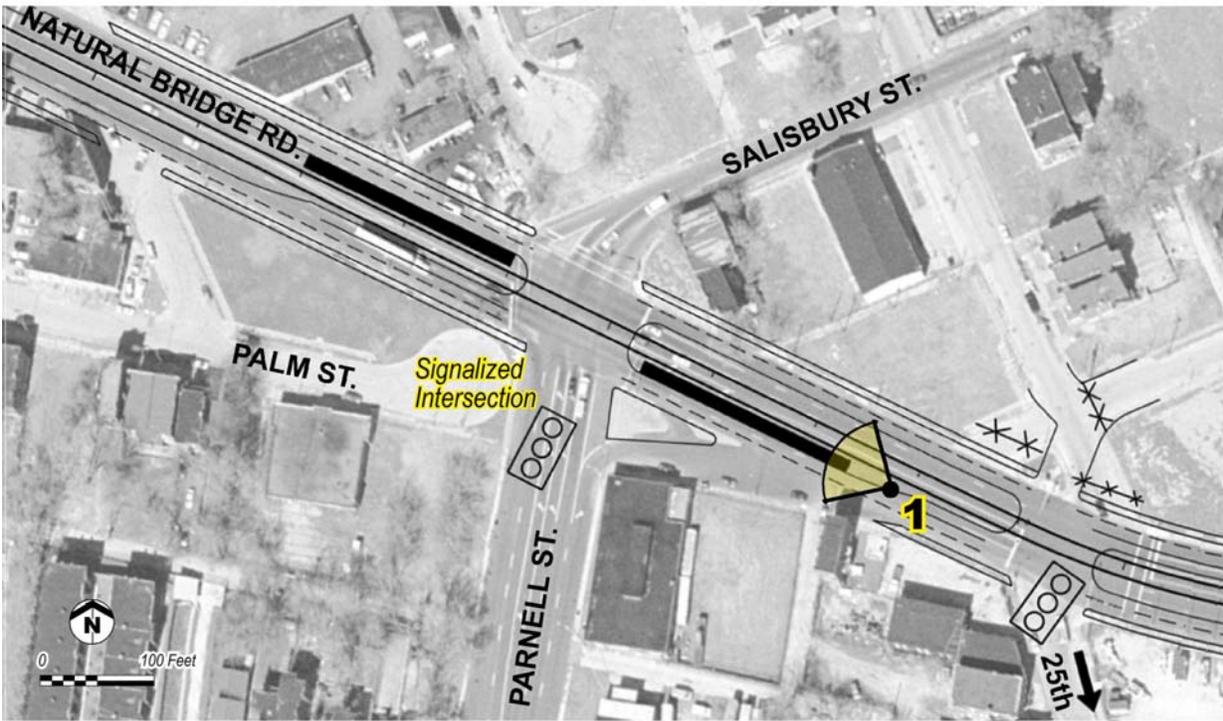
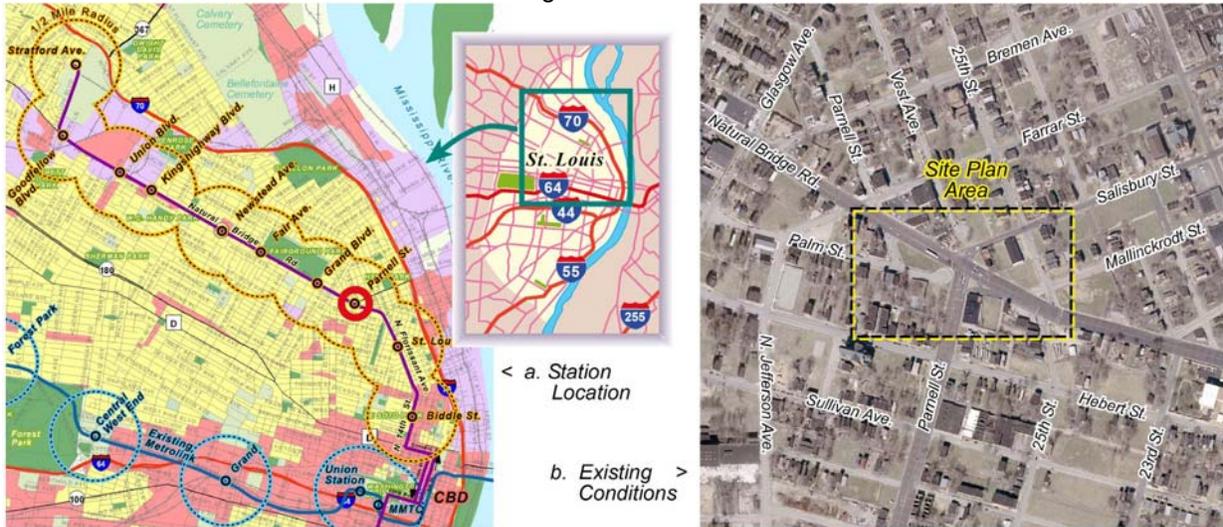
d. View 1: Station Area Looking Northwest



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-25: NATURAL BRIDGE AT PARNELL STATION - PLAN
 Natural Bridge/North 14th Alternative



c. Station Configuration Site Plan



d. View 1: Station Area Looking Northwest

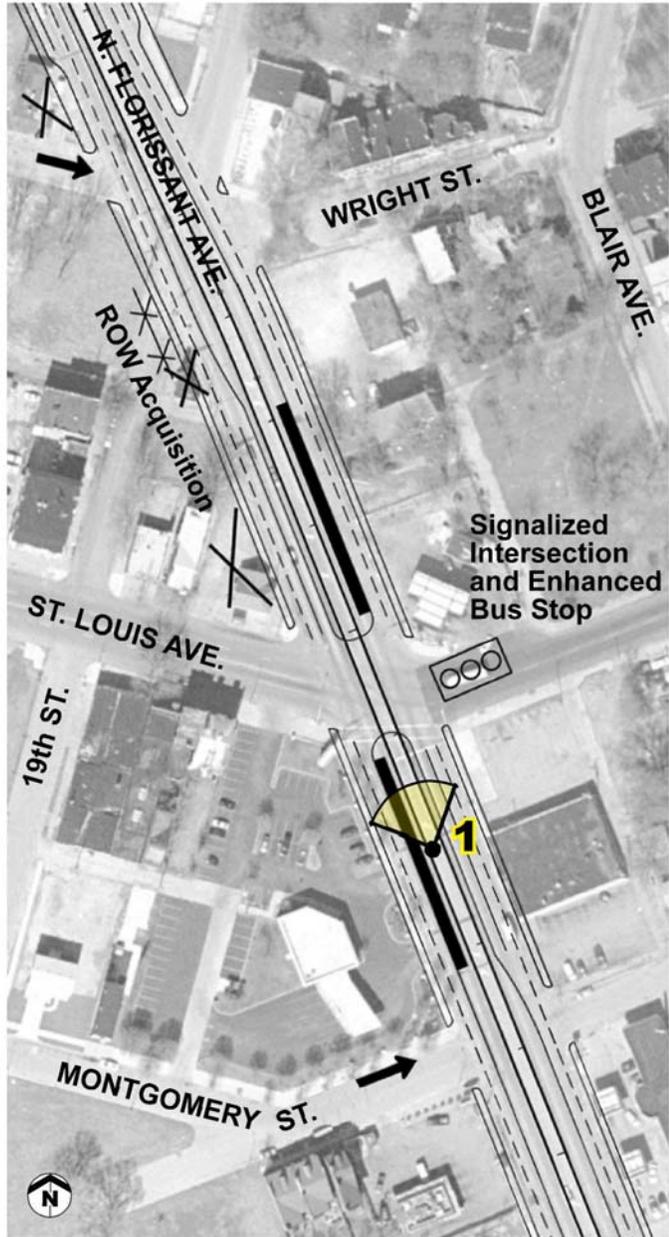
NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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FIGURE 6.4-26: N. FLORISSANT AT ST. LOUIS STATION - PLAN
Natural Bridge/North 14th Alternative



a. Station Location
c. Station Configuration Site Plan



b. Existing Conditions

d. View 1: Station Area Looking Northwest



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-27: N. FLORISSANT AT ST. LOUIS STATION - IMAGE
Natural Bridge/North 14th Alternative



a. Existing Station Area Looking Northwest



b. Proposed LRT Station Image Looking Northwest
NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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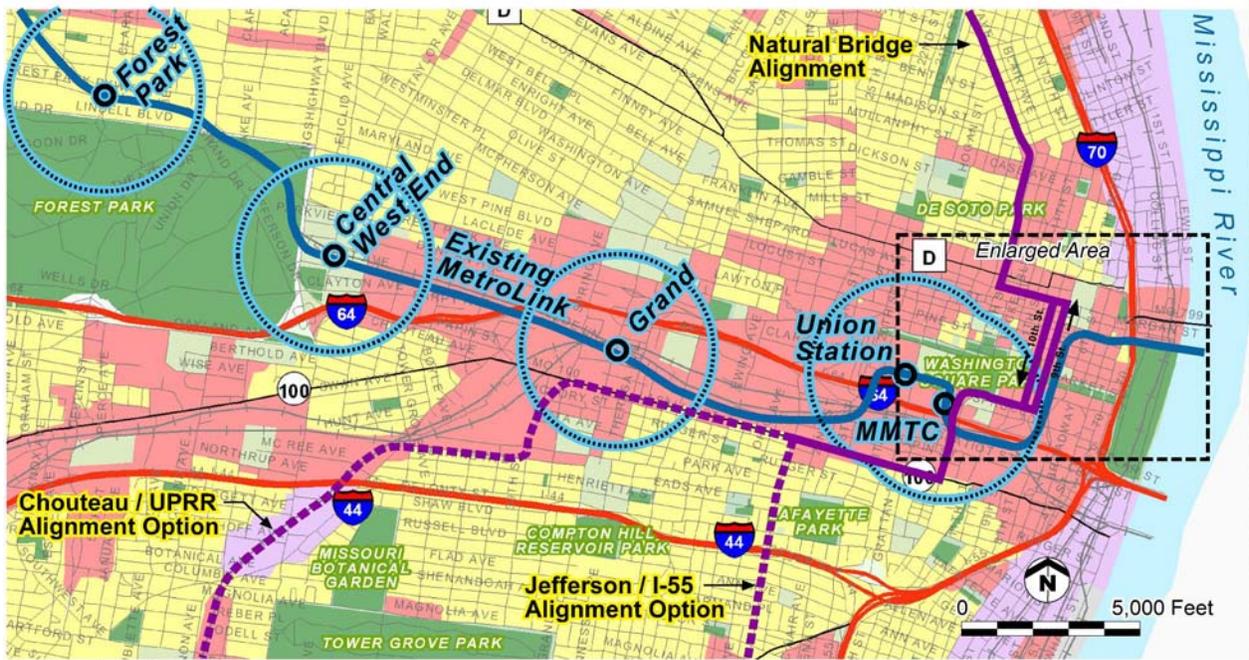
FIGURE 6.4-28: N. 14TH AT BIDDLE STATION - PLAN
 Natural Bridge/North 14th Alternative



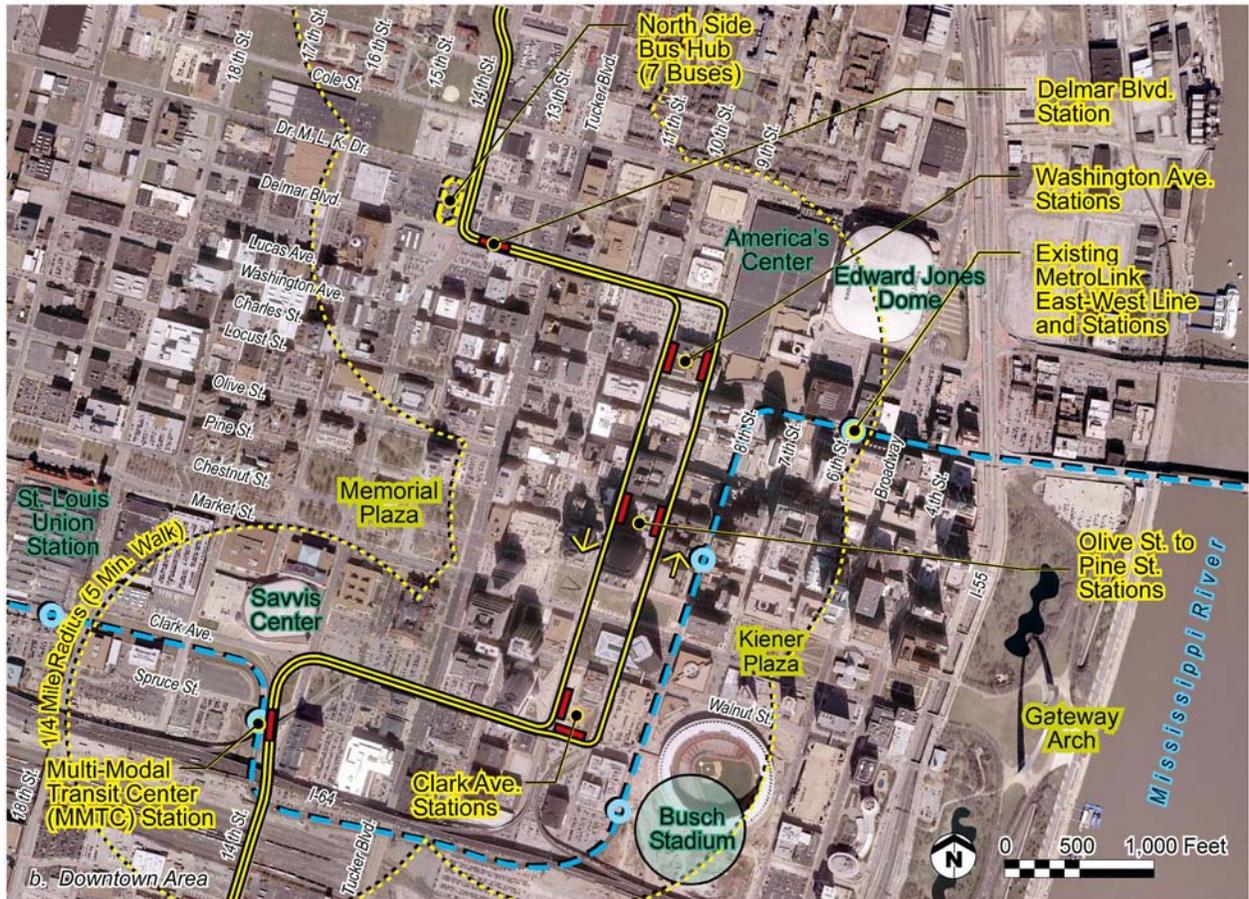
NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Northside Study

FIGURE 6.4-29: LRT ALIGNMENT AND STATION LOCATIONS
 9th St. / 10th St. Couplet Alternative



a. Downtown Area Context



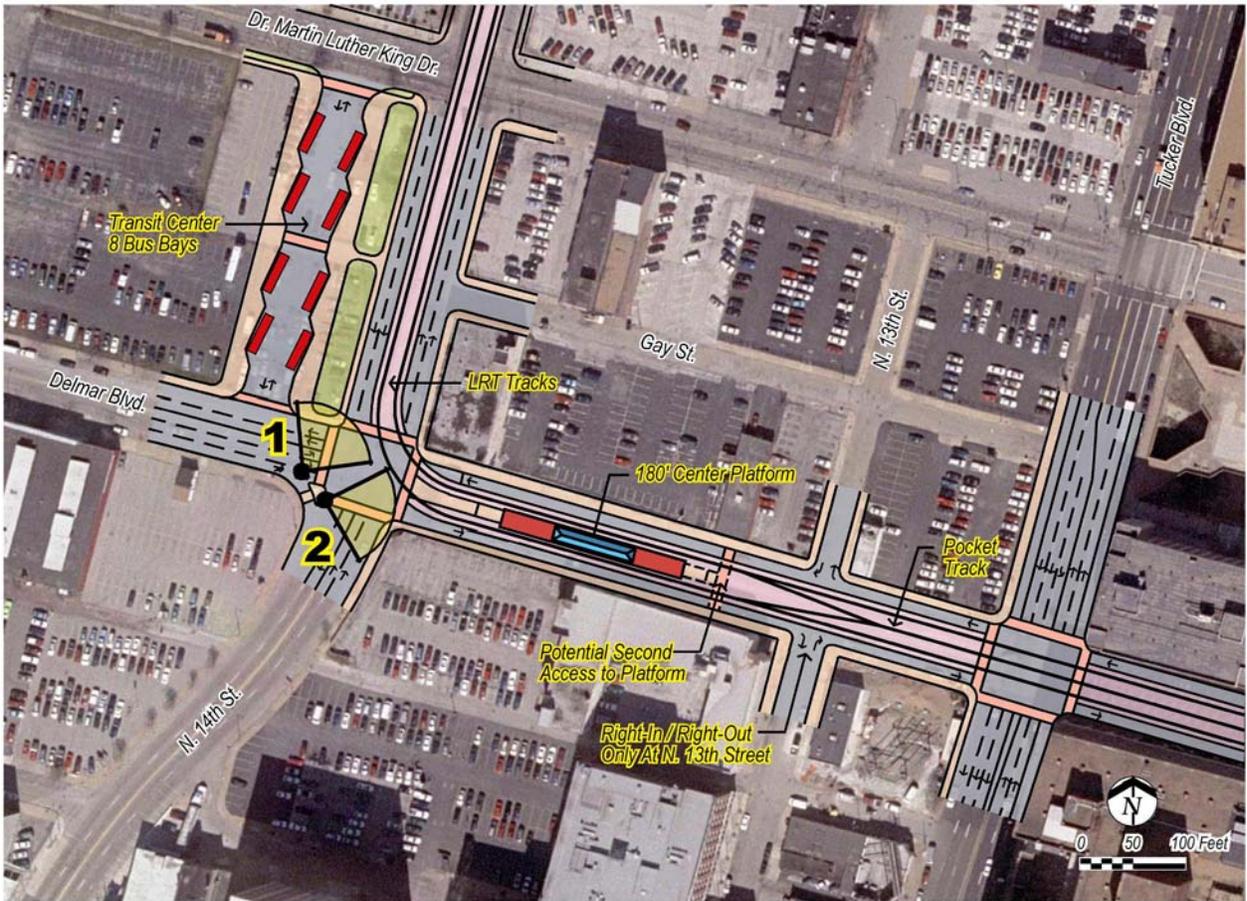
b. Downtown Area

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FIGURE 6.4-30: DELMAR AT N. 14TH STATION - PLAN
9th St. / 10th St. Couplet Alternative



b. View 1: N. 14th St. Looking Northeast



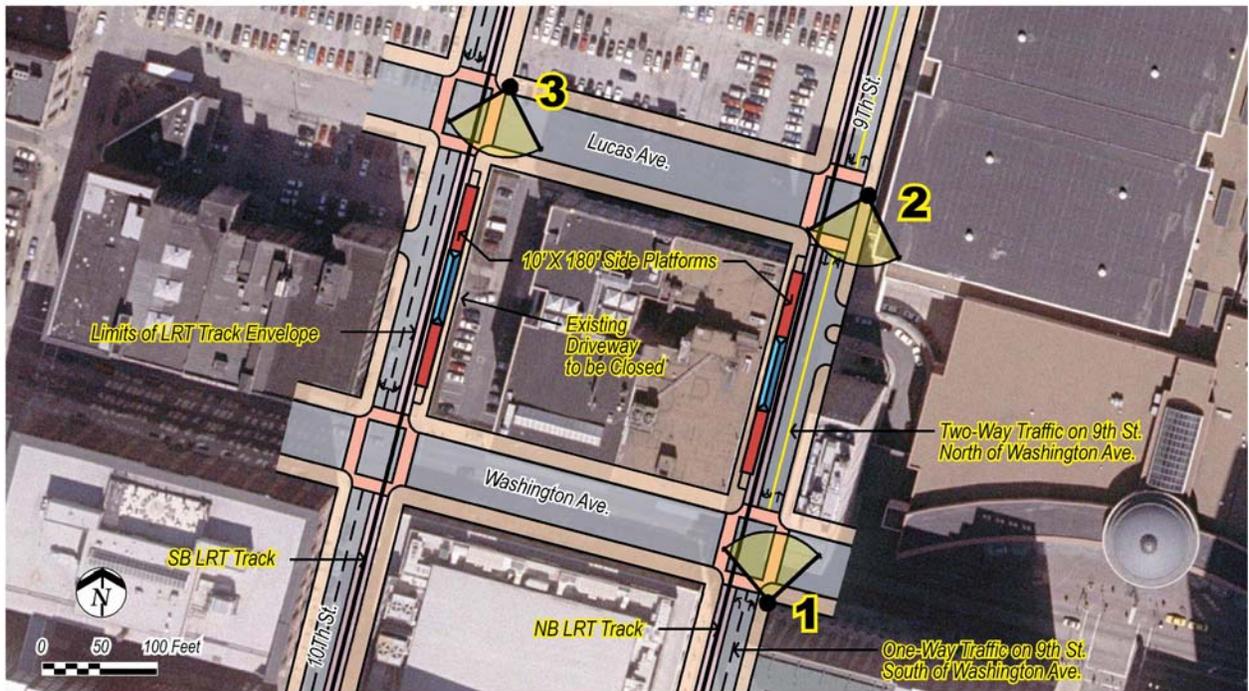
d. Illustrative Station Site Plan



c. View 2: Station Area Looking East

Northside Study

FIGURE 6.4-31: 9TH AND 10TH AT WASHINGTON STATIONS - PLAN
 9th St. / 10th St. Couplet Alternative



^ e. Illustrative Station Site Plan

c. View 2: Station Area on 9th St. Looking South



d. View 3: Station Area on 10th St. Looking South



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FIGURE 6.4-32: 9TH AT WASHINGTON STATION - IMAGE
9th St. / 10th St. Couplet Alternative



^A
a. Existing
Station Area
Looking South

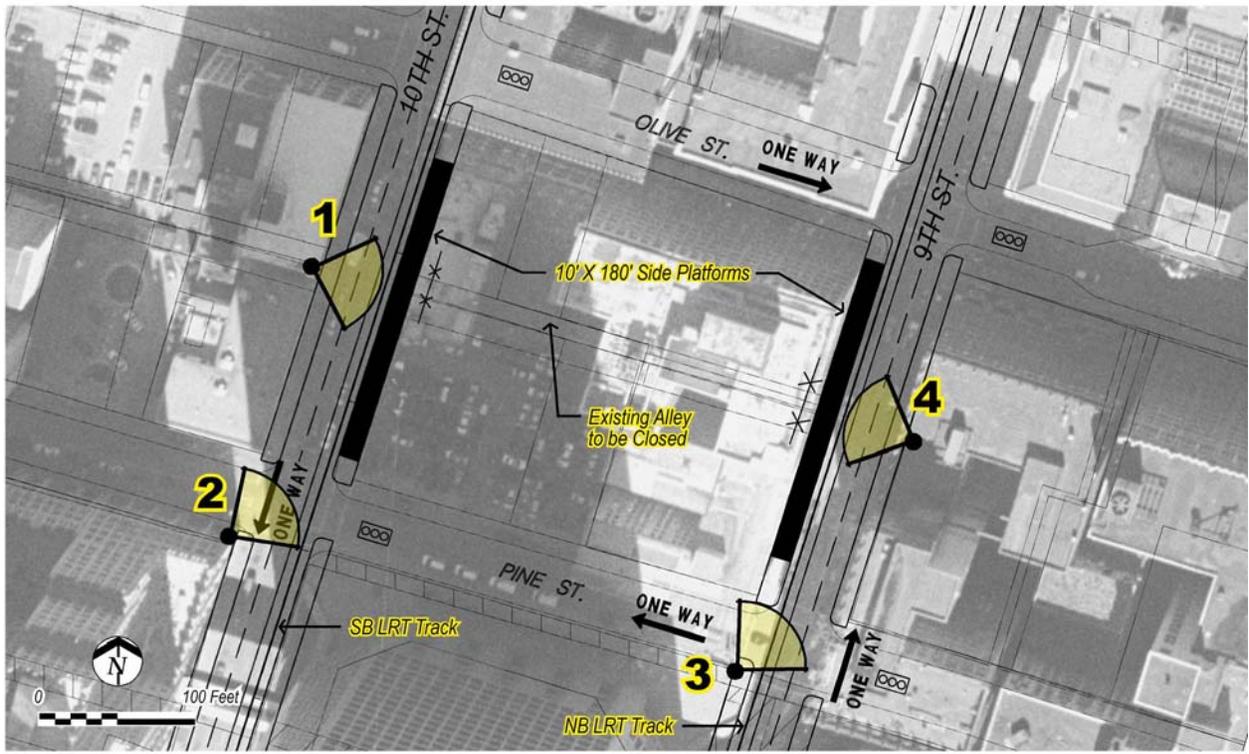


^A
b. Proposed
LRT Station
Image
Looking South

Note:
9th St., north of Washington Ave., will have two-way traffic, as shown in the illustration. All other blocks of 9th St. and 10th St. will have two traffic lanes each and will be one way. On 9th St. traffic and the LRT will be north-bound. On 10th St. traffic and the LRT will be south-bound.

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FIGURE 6.4-33: 9TH AND 10TH AT OLIVE TO PINE STATIONS - PLAN
 9th St. / 10th St. Couplet Alternative



^ f. Illustrative Station Site Plan



^ e. View 4: Alley Looking West

c. View 2: Station Area on 10th St. Looking Northeast

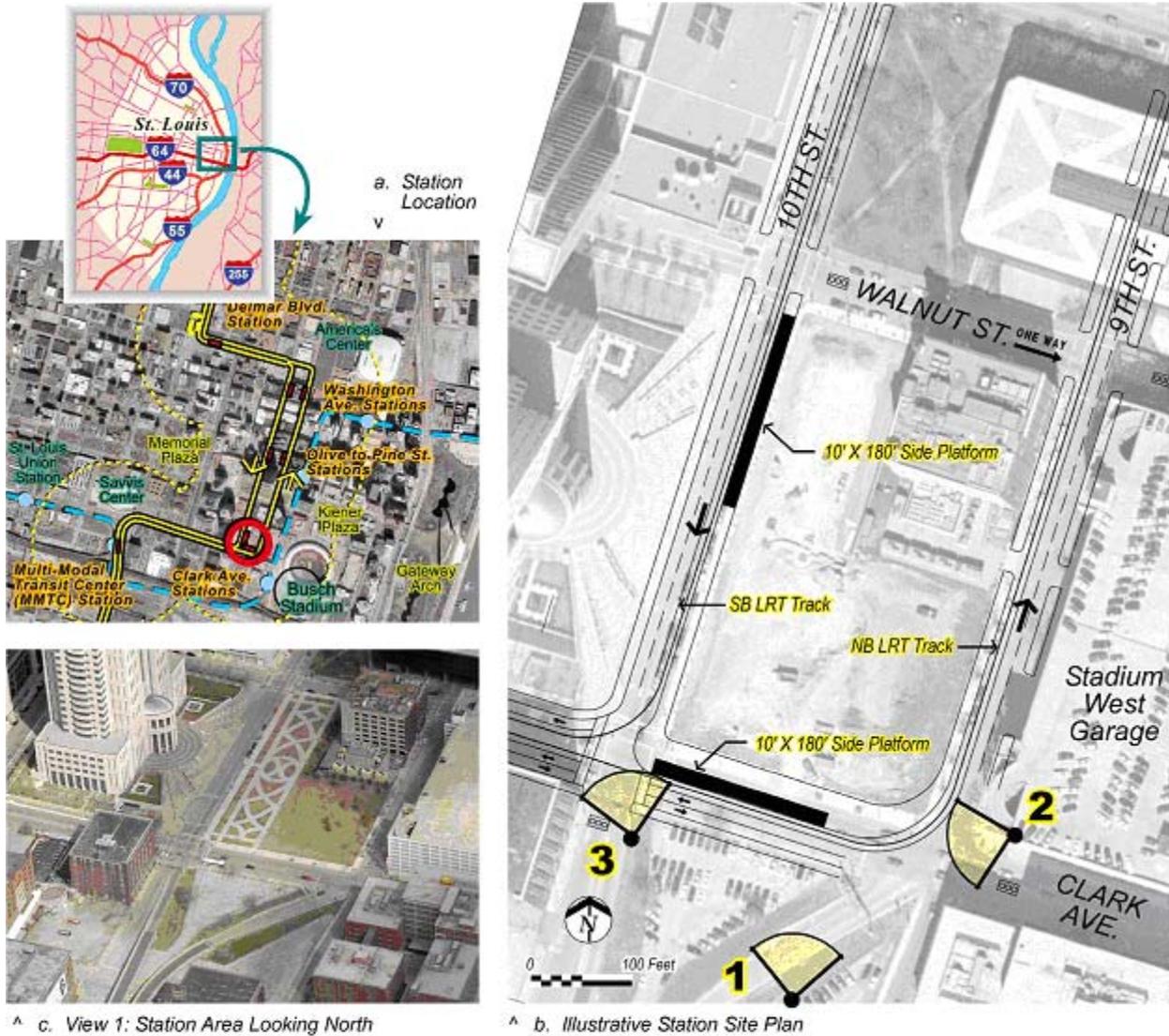


d. View 3: Station Area on 9th St. Looking Northeast



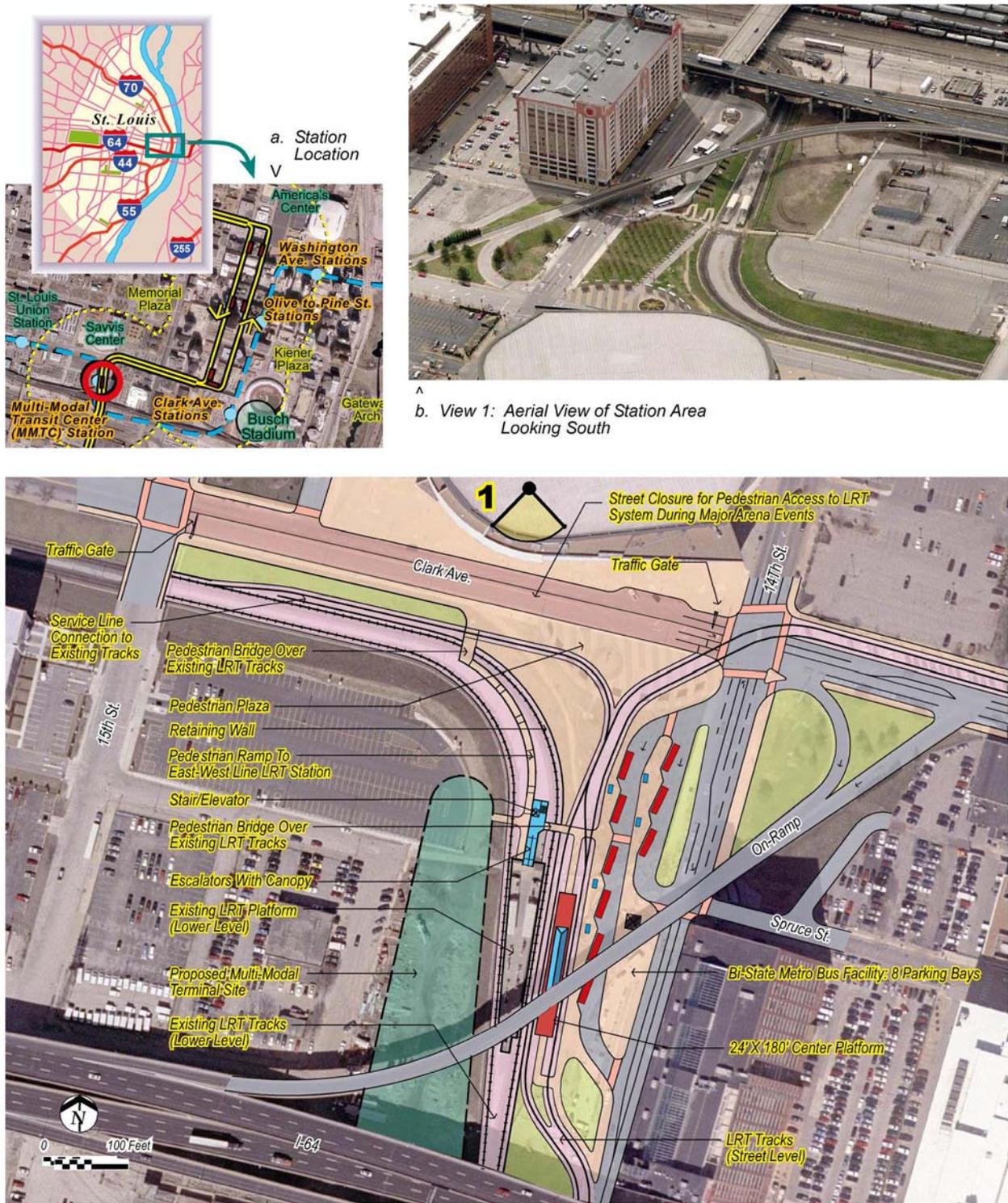
Chapter 6.4: Station Planning & Site Design

FIGURE 6.4-34: 9TH AND 10TH AT CLARK STATIONS - PLAN
 9th St. / 10th St. Couplet Alternative



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FIGURE 6.4-35: MULTI-MODAL TRANSIT CENTER STATION - PLAN
9th St. / 10th St. Couplet Alternative



c. Illustrative Station Site Plan

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Chapter 6.5: Conceptual Design Analysis

This section provides design analysis of the final Northside and downtown LRT alternative alignments developed over the course of this Northside study. Included in Independent Document 1 are conceptual design drawings (plan/profile sheets) for these alternatives. Conceptual design cost estimates (Chapter 6.5.4 and Independent Document 4) were developed from these plans.

This section identifies general and alignment-specific design considerations, detailed alignment descriptions, and design elements that should be addressed during the next phase of the project. Analysis of alignment alternatives, as summarized here, supplements the conceptual plans mentioned above.

6.5.1 GENERAL DESIGN CONSIDERATIONS

Conceptual design and analysis of the envisioned street-running LRT system was based on Metro's current design criteria, as well as supplemental design guidelines established by the Northside-Southside study management team. Guidelines for a street-running LRT system were initially suggested by Metro in a memo to East-West Gateway Council of Governments (EWGCOG) dated July 29, 2003. Through a series of meetings with Metro and EWGCOG, these supplemental guidelines were refined to establish project assumptions for a typical light rail vehicle (LRV) and its performance capabilities. These guidelines, summarized in Table 6.5-1, include the following:

- **Horizontal Curvature.** Metro's criteria specify a desired minimum radius of 300 feet for horizontal curves. At downtown intersections where 90-degree turns are required, a 300-foot radius curve results in undesirable geometric and traffic alterations. Proper separation between LRV dynamic envelopes and traffic lanes at intersections must be maintained. The larger-radius curves encroach on parallel traffic lanes, thereby requiring stop bars to be located farther from intersections, making them less effective. For the purposes of this study, it was assumed that a modern LRV, similar to those in Portland, Oregon and Minneapolis, Minnesota, would be used. These modern vehicles are capable of negotiating an 82-foot radius horizontal curve. Figure 6.5-1 illustrates a 90-degree turn at an intersection and the impacts of a large-radius curve.
- **Track System.** Metro's criteria specify ballasted track as the preferred track system. Ballasted track has been used for street-running LRT in some locations. Denver's LRT system, for example, uses street-running segments that generally consist of ballasted track covered with concrete pavement. Most other LRT systems, though, use an embedded track system where rails are fastened to a continuous concrete slab, electrically isolated, and embedded in concrete pavement. As this embedded track system has advantages over conventional ballasted tracks in an urban environment, including aesthetics and construction, this study assumes that an embedded track system would be more appropriate for application in this MetroLink project. A typical embedded track section is illustrated in Figure 6.5-2. Options for embedded track should be evaluated during preliminary engineering to identify an appropriate street-running track system. Additional trackwork and system considerations are discussed later in this section.

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- Station Platforms.** The existing MetroLink LRT system uses high platforms with level boarding. This study assumes that low platforms with level boarding would be used for LRT alternatives proposed here. Low platforms are more appropriate for street-running systems, as they better accommodate pedestrian access and are less intrusive in an urban environment. Existing MetroLink LRVs would likely be unable to operate on the new LRT extensions. Based on discussions with Metro and EWGCOG, it is likely that the proposed Northside LRT lines would utilize new, low-floor LRVs.

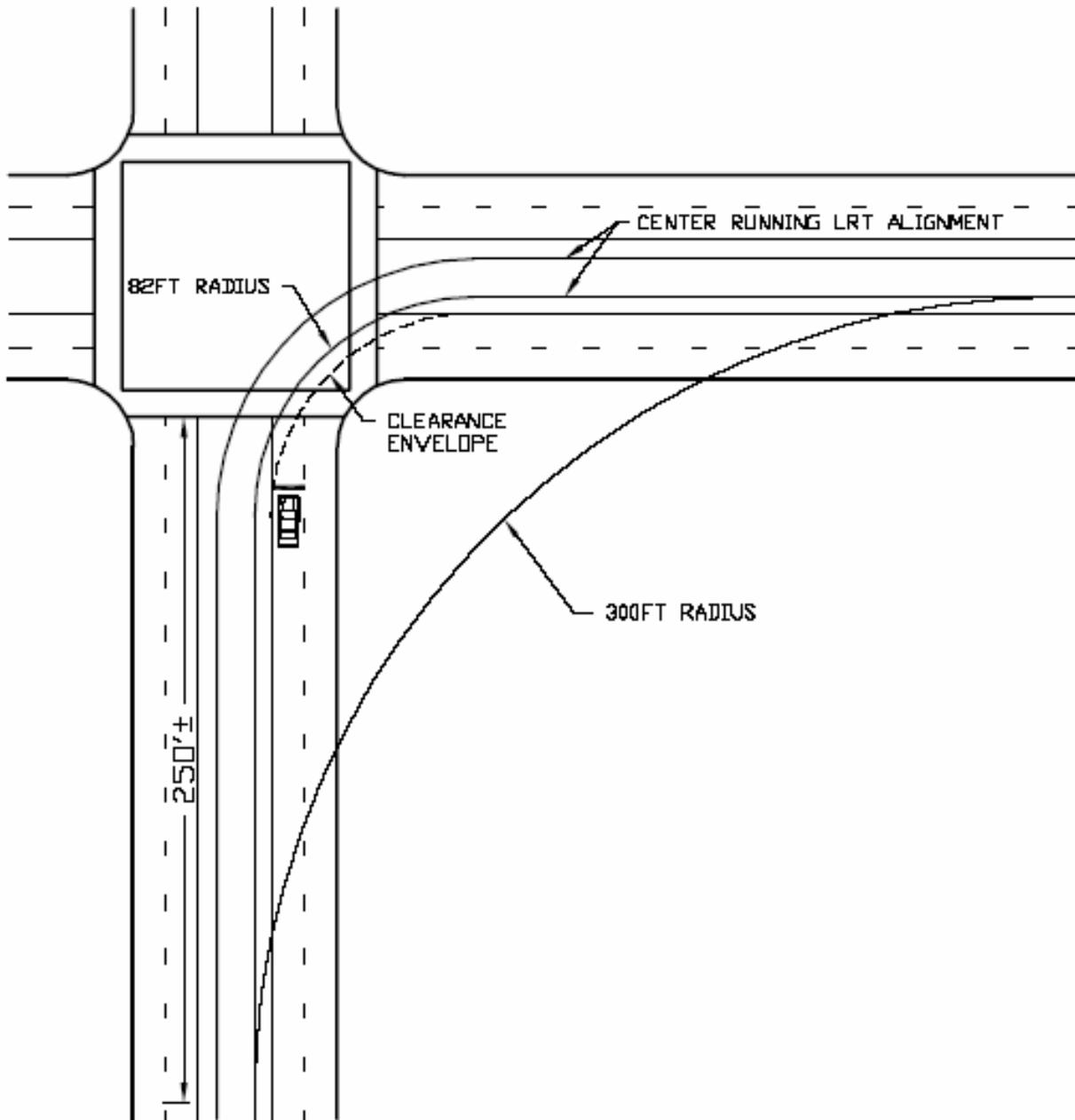
TABLE 6.5-1: DESIGN GUIDELINES AND ASSUMPTIONS FOR STREET-RUNNING LRT

Design Element	MetroLink Guidelines*	Study Assumptions	Comments
Typical Section			
Location	Center-running	Same	None.
Right-of-way	Exclusive	Semi-exclusive	Allows access for emergency vehicles.
Track	Ballast	Embedded	Easier to construct in existing roadway.
Traffic separation	8" barrier curb	Raised median	Typical for embedded track.
Alignment			
Maximum design speed	35 miles per hour	Same	None.
Minimum horizontal radius	300'	82'	Modern LRVs can negotiate a tighter radius.
Maximum grade	6%	Same	None.
Signals (Train Control)			
Line-of-sight	Line-of-sight	Same	None.
Operator equipment	Special cab signals	Separate aspect signal at intersections	No cab signals with line-of-sight operation.
Operations	Pre-emption	Same	Discuss with city Traffic engineer.
Stations			
Platform height	High platforms	Low platforms	System will use low-floor LRVs.
Platform location	Not in median	Typically in median	Necessary for center-running system.
Platform location	Outside of roadway	Inside of roadway	Necessary for center-running system.

* Metro's Design Guidelines are outlined in a memo to East-West Gateway dated 7/29/2003

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FIGURE 6.5-1: MINIMUM RADIUS AT INTERSECTION



Source: URS Corporation 2007

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LRT Guideway

Street-running segments will generally lie within semi-exclusive right-of-way and use embedded tracks with a minimum trackway width of 27 feet (Figure 6.5-2). Tracks will be in a raised median except at grade crossings, where the street surface will transition up to the same level as the tracks. Median height will be established during the future preliminary engineering phase. The downtown alignment will have a dedicated LRV lane where tracks will be level with the street, and an edge treatment will be provided to warn drivers who encroach into the LRV lane (Figure 6.5-3).

There are a number of design considerations that should be further evaluated during preliminary engineering for street-running segments. These include existing and future utility crossings, road crossings, stray current isolation, maintenance, ease of construction, aesthetics, and cost.

Special Trackwork

Special trackwork at guideway termini and emergency crossover locations are important elements to consider but are not established at this stage. For the purposes of this study, it was assumed that emergency crossovers would be required at approximately one-mile intervals and that double crossovers would be required at each terminus. It was also assumed that a pocket track would be required in the downtown area to provide LRV staging for revenue service and special events. Further operational analysis will be required during preliminary engineering to determine the exact number and location of emergency crossovers and other special trackwork requirements.

Grade Crossings and Traffic Signals

In semi-exclusive right-of-way with street-running LRT operating at speeds of 35 miles per hour or slower, LRVs are operated by line-of-sight, and grade crossings are controlled by traffic signals. New traffic signals would be required at all intersections where a crossing of LRT tracks occurs. The traffic signal system would include a separate train signal, interconnected to the traffic signal lights, for the LRV operator's use in line-of-sight operations.

For this study, existing intersections were evaluated to determine which should allow full traffic movements and which should be closed to cross traffic. Grade crossings were limited to intersections that are major collectors or arterials. All non-critical intersections that are closed to cross traffic will become right-in/right-out only intersections. This will alter current traffic circulation patterns, as well as impact access to existing properties along the alignments. Additional traffic analysis will be required during preliminary engineering to further evaluate the impacts to property access and traffic circulation.

The typical signalized intersection will provide a left-turn lane with a protected left-turn phase. Depending on operational requirements, traffic signals may or may not require pre-emption and/or prioritization. Further analysis during preliminary engineering will identify what signal prioritization is warranted for each traffic signal along the alignments.

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FIGURE 6.5-2: TYPICAL EMBEDDED TRACK SECTION

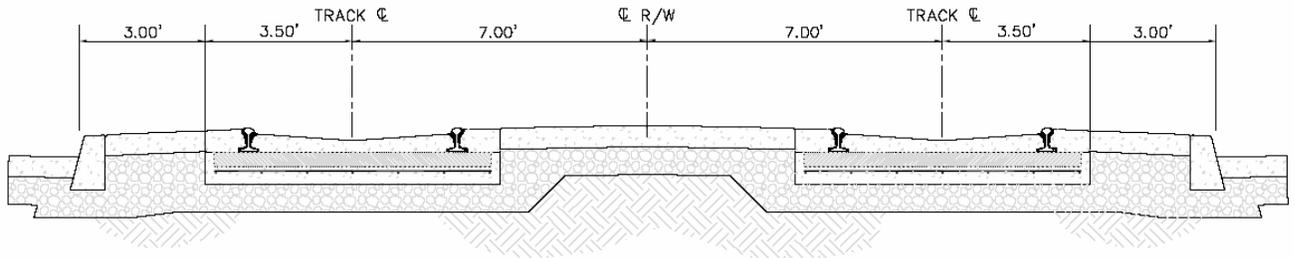
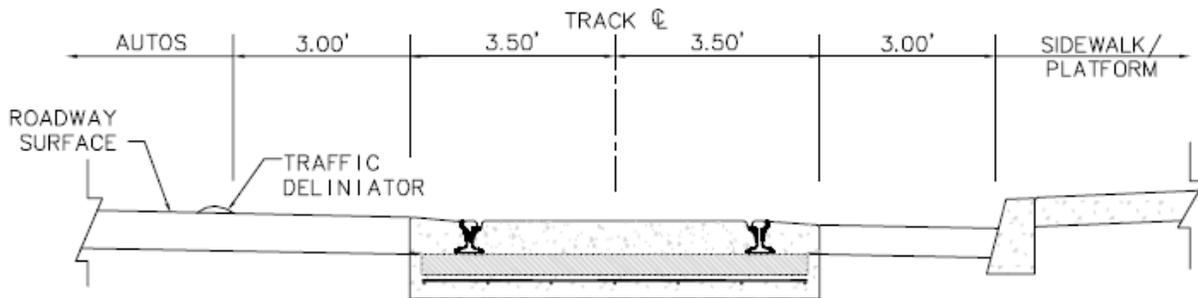


FIGURE 6.5-3: TYPICAL EMBEDDED TRACK SECTION, DOWNTOWN



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Structures

The Northside alternative will require construction of a new LRT structure over Goodfellow Boulevard to access the proposed station terminus at Stratford Avenue. Also required will be a retrofit or reconstruction of an existing structure on Natural Bridge over the Terminal Railroad tracks.

For purposes of this study and cost comparisons, it has been assumed that all structures will utilize a direct fixation track system. Specific structure types and track interface will be determined during preliminary engineering.

It is assumed that the existing structure can be retrofitted to accommodate the track section and LRV load. Detailed analysis of the existing structure is not included in this study. Generally, if a bridge is designed to handle permit truck loading, it can also handle LRV loading. During preliminary engineering, a detailed evaluation will need to be performed to determine the structural capacity of the structure and the extent of modifications required for the track system and LRV loading.

Utilities

A separate utility report (Independent Document 3) was developed for this study and provides a more detailed analysis of existing utilities and potential impacts for each alternative.

The utility report discusses Metro's design criteria and requirements for a utility free zone. Given the limited ROW, less restrictive criteria may need to be developed for street-running track. Project stakeholders will need to establish project-specific criteria for utility relocations in segments of street-running LRT. This should occur during preliminary engineering. At a minimum, the existing underground utilities parallel to the alignment and within the limits of the track structure will need to be relocated and protected to provide adequate maintenance access and stray current protection.

All crossings of overhead utility/electrical lines, light poles, and traffic signals will need to be evaluated for clearance with the overhead contact system (OCS) for traction power and ensure all applicable regulatory codes are satisfied.

Stations

The station selection and design process for this study considered a number of alignment and station location options. The design process started with identification and selection of potential candidate alignments and station sites. This was followed by evaluations, adjustments, and conceptual design refinements of each site to fit each particular site's functional requirements and urban setting and location. *Chapter 6.4* of this report explains the design process, station characteristics, and project approach.

Street Improvements

In street-running segments, it is assumed that the existing street will be reconstructed within existing right-of-way limits. Reconstruction typically includes sidewalks, curbs and gutters, pavement, street lighting, and landscaping. Design standards for these elements will be established during preliminary engineering.

Right-of-Way

For street-running segments where existing right-of-way is less than 100 feet, additional right-of-way may be required to accommodate proposed LRT improvements. Existing street right-of-way dimensions were obtained from the City of St. Louis and used to establish typical design

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sections for the different alignment alternatives. Because right-of-way information was not verified, actual widths may be more restrictive than assumed for this analysis.

Areas that are anticipated to require right-of-way have been identified for each alternative. Information presented here should not be considered complete, however, since actual right-of-way impacts will require further analysis when more reliable right-of-way information is available.

Systems

Systems needs are detailed as follows:

- **Signaling.** In street-running LRT segments, LRV movements will be governed by line-of-sight operations with grade crossings controlled by traffic signals. At these intersections a separate signal head will be provided for train control. The train control signal will be interconnected to traffic signals and provide the LRV operator an indication of when the LRV is either clear to move or required to stop. In areas of exclusive right-of-way, where LRVs operate on dedicated trackway, vehicle operations will be governed by a cab signal system.
- **Communications.** A communications system will be employed to ensure safe and effective operations. This system will incorporate supervisory control and data acquisition (SCADA), closed circuit television (CCTV), public address and reader boards, radio and telephone, communication transmission, and an operations control center.

The operations control center will coordinate and control train operations, systems operation and maintenance, security, and administration. A communication network will be required to link the operations center to all LRT stations and facilities. A fiber optic cable installed along the trackway will provide the backbone for the communications network, and communication terminal equipment will connect equipment to the fiber optic backbone. Data circuits will provide connections to signal instrument houses, traction power substations, and other system equipment.

- **Traction Power.** The LRVs will be powered by a traction electrification system. Power will be supplied by traction power substations. Package-type substations will generally be used, with each substation being pre-assembled, wired, and tested. Where site constraints or special conditions apply, discrete component substations will be used.

Power will be distributed by an overhead contact wire system. The overhead system will be designed to be environmentally acceptable.

- **Fare Collection.** Fare collection will be by means of a standard proof-of-payment system with ticket vending machines and validators for previously purchased tickets. Data circuits will connect the system to the operations control center.
- **Maintenance.** With the assumption that new low-floor LRVs would need to be procured, a central storage and maintenance site with sufficient space to accommodate all vehicles would also be required. Several options exist for meeting the operations and maintenance requirements for the proposed LRT system. These focus on either expanding existing MetroLink maintenance facilities or acquiring a site and building a new facility. Some cost savings may be had if existing shop facilities can be remodeled to handle the maintenance requirements of the low-floor vehicles. A connection between the new LRT system and the existing system would be required. Further analysis, considering both capital and

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Chapter sections 6.5.2 and 6.5.3 provide a more specific discussion of the characteristics and project elements associated with the Northside and downtown alternatives, respectively.

6.5.2 NORTHSIDE ALTERNATIVE: NATURAL BRIDGE AVENUE/NORTH 14TH STREET

The Natural Bridge Avenue LRT alignment connects downtown St. Louis to Interstate-70 at Goodfellow Boulevard and is approximately 6.8 miles in length. The alignment will be a double-track system that begins on the north end of downtown St. Louis at the intersection of Convention Plaza and North 14th Street and proceeds north in the center of North 14th to the intersection with North Florissant Avenue. The alignment then turns and proceeds northwest in the center median of North Florissant to the intersection with Palm Street. The alignment again turns and proceeds west in the center of Palm to Parnell Street, where Palm becomes Natural Bridge Avenue. The alignment continues west in the center of Natural Bridge to the intersection with Goodfellow Boulevard. The alignment then turns and proceeds north in the center of Goodfellow. Prior to Stratford Avenue, the alignment elevates on retained fill, turns west on elevated structure, and terminates with a station and park-and-ride lot located near the intersection of Goodfellow and Stratford.

Civil/Alignment Characteristics

Civil and alignment characteristics vary with location as follows:

- **14th Street.** The existing North 14th Street right-of-way is approximately 80 feet wide and consists of two travel lanes in each direction and on-street parking on both sides. Because of the limited right-of-way in this segment, to maintain four travel lanes, no left-turn lanes will be provided or allowed. Existing signalized intersections will be eliminated, and side street access to North 14th Street will be limited to right-in right-out. One exception occurs at Biddle Street, where a pedestrian signal will be added to provide access to proposed station platforms. Without compromising other elements (e.g. sidewalk/traffic lane width, etc.), additional right-of-way will be required at this station to accommodate the proposed platforms.
- **North Florissant Avenue, Palm Street, and Natural Bridge Avenue.** This segment comprises the majority of the alignment and has an existing right-of-way of approximately 100 feet wide with four to six travel lanes, left-turn lanes, and on-street parking. To accommodate LRT, this segment will be modified to include four travel lanes, left-turn lanes as required, and intermittent on-street parking.

On-street parking currently exists along much of this segment and can be maintained where no left turn lanes or LRT stations are proposed. It may not be practical to fit parking between all left-turn lanes and stations, because traffic lanes will need to shift at either end of the parking limits.

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- Goodfellow Boulevard.** Goodfellow Boulevard comprises the last segment of the alignment and has an existing right-of-way approximately 120 feet wide with six travel lanes, left-turn lanes, and on-street parking. The proposed section is similar to that described for Natural Bridge Avenue. However, depending on demand and user needs, the additional right-of-way available in this segment allows for another travel/turn lane, bike lanes, wider sidewalks, or a combination of the above.

Structures

The North 14th/Natural Bridge alignment will utilize an existing bridge structure over the St. Louis Belt and Terminal railroad tracks. Further analysis will be required during preliminary engineering to determine any modifications necessary to retrofit the existing structure to accommodate LRT tracks. A new aerial structure with a long segment of retained fill is proposed at the Goodfellow terminus. This structure will elevate the tracks to cross over the west-bound lanes of Goodfellow Boulevard and enter the proposed Goodfellow station at grade.

Stations

Proposed station locations are discussed in detail in *Chapter 6.4* of this report. Table 6.5-2 summarizes station locations.

TABLE 6.5-2: STATION SUMMARY, NORTH 14TH/ NATURAL BRIDGE

Track Station	Cross Streets	Station Type	Comments
4015	North 14 th Street and Biddle Street	Dual side	Connects with bus #32.
4065	North Florissant Avenue and St. Louis Avenue	Split side	Connects with bus #30, #74.
4105	Parnell Street and Natural Bridge Avenue	Split side	Connects with bus #41.
4130	Grand Boulevard and Natural Bridge Avenue	Split side	Connects with bus #4, #70.
4170	Fair Avenue and Natural Bridge Avenue	Split side	Connects with bus #4, #42.
4195	Newstead Avenue and Natural Bridge Avenue	Split side	Connects with bus #4, #18, Proposed 120 stall park-and-ride.
4245	Kingshighway and Natural Bridge Avenue	Split side	Connects with bus #95.
4265	Union Boulevard and Natural Bridge Avenue	Split side	Connects with bus #4, #13.
4305	Goodfellow Boulevard and Natural Bridge Avenue	Center	Connects with bus #4, #30, #90, and potential future west LRT extension.
4350	Goodfellow Boulevard and Stratford Avenue	Center	Terminus - connects with bus #16, #90, #174, #274x, and proposed park-and-ride.

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Right-Of-Way

Additional right-of-way is anticipated at the following locations:

- **North 14th Street and Biddle Street.** Additional right-of-way will be required to construct the station platforms.
- **St. Louis Avenue.** Additional right-of-way will be required to construct the station platforms.

Special Conditions

Due to access restrictions, an existing fire station at the intersection of Natural Bridge Avenue and Union Boulevard will need to be relocated.

Future West Extension on the Rock Island Railroad Branch

A future LRT extension to the west could be accommodated. This extension would turn south from Natural Bridge Avenue to the north side of Goodfellow Boulevard and proceed south on a structure that would elevate the LRT tracks and turn north onto grade and into the Rock Island railroad corridor.

6.5.3 DOWNTOWN ALTERNATIVE: 9TH STREET/10TH STREET ONE-WAY COUPLET

This downtown alternative connects Convention Plaza along the Northside alignment with the Multimodal Transit Center (MMTC) of the Southside. The alignment begins as a double-track center-running system at the intersection of Convention Plaza and North 14th Street and proceeds east in the center of Convention Plaza to 9th and 10th Streets. At this point, it splits into a one-way couplet with a single track southbound on 10th and northbound on 9th. At Clark Street, the tracks rejoin into a double-track system that proceeds west on Clark to 14th Street. At 14th, the alignment crosses the intersection and turns south into the MMTC and a proposed new platform.

Civil/Alignment Characteristics

Civil and alignment characteristics vary with location as follows:

- **Convention Plaza.** Convention Plaza has an existing right-of-way width of approximately 80 feet, with four travel lanes and a turning median. The proposed street section will consist of center-running double-track LRT with one travel lane in each direction and no left turns allowed. Along the Convention Plaza segment, a center platform and pocket track are proposed. The pocket track would be capable of storing two, two-car trains between Tucker Boulevard and 11th Street.
- **10th Street.** 10th Street has an existing right-of-way of approximately 60 feet, with two southbound travel lanes and parking lanes on both sides. The proposed section would have a single track running southbound on the east side of the street, with two southbound travel lanes and no parking lanes. Parking entrances and alleys exist on the east side of 10th Street and will need to be closed or protected by part-time signage that provides advance warning of approaching trains. All major cross streets will remain open and controlled by traffic signals. A total of three stations would be located along 10th Street.
- **9th Street.** Existing conditions on 9th Street are very similar to those along 10th Street. The proposed section would have a single track running northbound on the west side of the street, with two northbound lanes and no parking lanes. Parking entrances and alleys also

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- Clark Street.** Clark Street has an existing right-of-way width of 80 to 90 feet. The existing street section has two travel lanes in each direction, with single or double left-turn lanes and parking lanes on both sides. The proposed street section will be center-running LRT tracks between 10th and 11th Streets. A single access lane will be provided between the LRT and sidewalk for right-in/right-out access to the south parking entrance of the Federal Court House. The proposed road section will maintain two travel lanes and left-turn pockets at the intersections west of 11th Street. The LRT tracks would shift to side-running as they cross 11th Street. Existing angled parking between Tucker Boulevard and 14th Street would be eliminated. On-street parallel parking would still be provided, but only on the south side of Clark. The south entrance to the City Hall parking lot would be closed and the parking lot reconfigured as needed.
- Multi-Modal Transit Center.** At the MMTC, the existing bus facility would be removed to provide room for a new LRT platform. A new eight-bay bus facility would be constructed north of the current location. The new LRT platform would parallel the existing MetroLink platform, with a pedestrian plaza connecting them. A non-revenue service line would be installed between the new LRT alignment and the existing MetroLink alignment to provide a connection to the existing MetroLink maintenance facility.

Structures

There will be a grade difference between the existing MetroLink alignment and the proposed LRT alignment at the MMTC, requiring construction of a retaining wall between them. A pedestrian structure, elevator, and stairs will also be required to connect the existing MetroLink platform to the proposed platform.

Stations

Preliminary station locations have been identified and are discussed in detail in *Chapter 6.4* of this report. Table 6.5-3 summarizes station locations.

TABLE 6.5-3: DOWNTOWN STATION SUMMARY

Track Station	Cross Streets	Station Type	Comments
5003	North 14 th Street and Convention Plaza	Center	Adjacent to pocket track.
5020	9 th Street and 10 th Street/ Washington Avenue	Side	Couplet.
5030	9 th Street and 10 th /Pine Streets	Side	Couplet.
5045	10 th Street and Clark Street	Side	Couplet.
5067	Multimodal Transit Center	Center	Connects to existing LRT.

Right-of-Way

No right-of-way acquisitions are anticipated for the downtown alternative.

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6.5.4 COST COMPARISON METHODOLOGY

This section describes the methodology used in this study to develop capital cost estimates for use in comparative assessment of LRT alternatives. Cost estimates were developed using a modified Construction Specifications Institute (CSI) format that can be ordered and summarized into the Standard Cost Categories required by FTA *FY 2009 New Starts and Small Starts Evaluation and Rating Process*, July 20, 2007.

Estimate Development

Estimates of project capital costs were developed in three general steps under this methodology. First, alignment alternatives were sufficiently defined in conceptual engineering drawings for cost estimation purposes. Second, project components consistent with the application of unit costs and appropriate to the level of definition were identified, and quantities and unit cost data were developed. Third, quantities were assembled, and selective unit costs were applied and summed into major cost categories, as defined below.

Unit Costs

Unit costs appropriate to the level of alignment definition were developed from selected historical data, including final engineering estimates, completed projects, standard estimating manuals, and standard estimating practices. Unit costs include allowances for contractor margins (profit, overhead, etc.) and insurance costs. Unit costs were developed in current year (2007) dollars.

Cost Categories

Cost categories were used to summarize project component costs into a comprehensive total estimate for each alternative. Total estimated costs for each alignment are summarized in Table 6.5-4.

TABLE 6.5-4: CAPITAL COST SUMMARY

Segment	Order of Magnitude	Length	Cost/Mile (2007)
North 14 th /Natural Bridge	\$311.5 Mil	6.77 Route-Mile	\$46.0 Mil/Mile
Downtown Couplet	\$122.1 Mil	1.26 Route-Mile	\$89.5 Mil/Mile

There are seven fixed facilities cost categories, five system-wide cost categories, two dependent cost categories, and a right-of-way cost category. Major cost categories include the following:

- Civil Construction.
- Utilities.
- Trackwork.
- Structures.
- Stations.
- Park-and-Rides.
- Fare Collection.
- Maintenance Facility.
- Traction Power.

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- Signal System.
- Communications.
- Vehicles.
- Right-of-Way.
- Professional Services.
- Contingency.

Fixed facility categories encompass site-specific project component costs. Capital costs for these categories were typically calculated by using known unit costs and measured quantities for each component.

System-wide costs were calculated over the length of each alignment, not from measured quantities. A per route-foot unit cost, based on historical data, was developed for each section.

Professional services categories are dependent on the first 12 categories and will be calculated as percentages of the subtotal of facility and system-wide cost categories.

Costs of procuring right-of-way are difficult to assess at this level of design, so a cost allowance was determined and assigned to this category.

The sum of these 15 cost categories comprises the total capital cost estimate for each alignment segment.

Civil Construction

This category includes capital costs for basic infrastructure improvements, including mobilization, clearing and grubbing, pavement removal and replacement, excavation and embankment, minor concrete work, walls and foundations, traffic control, streetlights, drainage, landscaping, fences, sub-grade preparation, and sub-ballast. Also included are traction power pole foundations, corrosion control, ductbank, and manholes for LRT systems-related components. Measurement is by unit cost or the route-foot, depending on the type of civil construction.

Utility Relocation

This category includes capital costs for the relocation, upgrade, or adjustment of all public or private utilities that may become the responsibility of the project during construction. It is assumed that all utilities within the immediate trackway envelope will be relocated.

In general, three levels of utility relocations are measured in this methodology: high (urban), medium (suburban), and low (rural). Measurement is on a route-foot basis.

If there are major impacts to a utility facility or extraordinary costs associated with a particular alignment, a special line item is developed to identify and separate this cost.

Trackwork

This category includes capital costs for procurement and installation of light rail tracks, including rail, fasteners, special trackwork, ties, crossovers, turnouts, track crossings, welding, ballast, and miscellaneous track items. Relocation of freight rail tracks is also included in this category.

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Three types of trackwork are assumed:

- Standard concrete ties and ballast.
- Embedded trackwork with electrically isolated rails fastened to a concrete slab and embedded in concrete between raised curbs.
- Direct fixation trackwork on aerial structures longer than 350 feet.

Measurement is by the track-foot and does not include costs for sub-ballast, crossing panels, or railroad demolition.

Structures

This category includes capital costs for major structures, including bridges, retaining walls, major culverts, and over- or under-passes. Capital costs for structures include temporary support, structural excavation, formwork, structural materials, installation, and finishes. It includes any temporary structures to maintain traffic during construction. Retained fill and associated earthwork are included in this category. Major structures are estimated on either a unit cost or lump sum basis, depending on the nature of the structure. Retaining walls are measured on a square-foot of face area.

Stations

This category includes capital costs for fixed facilities and amenities for transit stations. Capital costs for stations include platforms, shelters, lighting, signage, landscaping, furnishings, and sidewalks for pedestrian access.

Three types of light rail stations are measured:

- Center platform stations.
- Side platform stations.
- Split-side platform stations.

Bus transit centers are also considered here. Two basic bus transit centers are measured in this methodology. A small bus transit center is defined as having six or fewer bays. A large bus transit facility is defined as having more than six bays. Bus transit center expenses include the costs of vehicle access needed for facility function. Measurement is the count of each type of station or transit center.

Significant grading or retaining walls are not included in station costs but are estimated separately under other categories. Park-and-ride lots are also not included in this category.

Park-and-Rides

This category includes capital costs for park-and-ride lots bus berthing areas, including curbs, sidewalks, paving, grading, drainage, storm water detention and treatment, lighting, striping, landscaping, and the amenities associated with them. This category includes adjacent street and access improvements. Unit cost and measurement is by the parking space.

The costs for right-of-way and special mitigation are not included in this category. These costs are estimated separately under other categories.

Fare Collection

This category includes capital costs for fare collection equipment for each station, including

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structural and electrical provisions, equipment, and installation. It is assumed that the fare collection system would be a self-service, proof-of-payment system similar to that currently in operation at existing MetroLink facilities. Measurement is by the quantity of fare-vending equipment proposed for each station.

Maintenance Facility

This category includes capital costs for maintenance facilities and equipment needed to support project operation. This category includes buildings, equipment, trackwork, traction power systems, signals, and civil construction as needed. Non-revenue and maintenance vehicles are also included.

Traction Power

This category includes capital costs for the system to supply electrical power to the vehicles. The system consists of traction power substations and the associated overhead contact system (OCS). This category includes installation and testing of system equipment. Measurement is by the route-foot.

This category does not include pole foundations, conduit, or corrosion protection. These costs are contained in the Civil Construction category.

Signal System

This category includes capital costs for the wayside signal and train control system. This system consists of track switch control equipment, signal poles, cables, train detection equipment, and signal buildings. Measurement is by the route-foot.

This category does not include pole foundations or conduit. These costs are contained in the Civil Construction category. Grade crossing protection equipment is also not included in this category. These costs are contained in the Civil Construction category under road crossings.

Communications

This category includes capital costs for the communication system. This system consists of fiber optic cable and field and central control equipment to remotely monitor and control track switches, signals, traction power substations, fare collection, and other systems equipment. Measurement is by the route-foot.

Professional Services

This category includes costs for engineering, administration, and construction management services. Costs for these services are based on a percentage of the total cost of all direct capital cost elements. Cost items for this category include the following:

- **Grantee Administration.** Cost of administration, management, design oversight, control, support, implementation, and start-up of the project.
- **Design Services.** Cost of professional service consultants for preliminary and final design. Includes civil facilities design, systems facilities design, surveying, geo-technical investigations, and design services during construction.
- **Project Control Services.** Cost of professional service consultants for project control and construction management. Includes development and maintenance of procedures, schedule, budget, cost estimating and cost tracking, inspection and testing services.

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- **Other Services.** Costs of professional service consultants for legal assistance, financial advice, audits, permitting, safety/quality assurance assistance, public and community relations, training, and insurance brokerage services. Interim financing, to offset annual funding allocation shortfalls, is included in this item.
- **Intergovernmental Agreements.** Costs for permits and agreed local jurisdiction involvement in design and construction in accordance with any formal interagency agreements.

To estimate the Professional Service Cost for this project, 32% was applied to all capital cost categories except contingencies and vehicles.

Contingencies

A contingency is added to project costs as a percentage of all direct cost categories to account for uncertainties due to the level of project definition and design detail. A contingency of 20% was allocated to all capital costs categories. Contingency reflects the degree of risk associated with the level of design detail available and the characteristics of the design component. Contingency is reduced in future project phases where the level of design detail progresses.

Vehicles

This category includes capital costs for procuring LRVs, including spare parts and non-recurring costs. The number of vehicles is based on an assumption of 15-minute headways.

Right-of-Way

This category includes capital costs for securing and providing all real property rights required for project implementation. These include acquisition of property in fee or easement, temporary easements, site clearing, building demolition, minimum environmental cleanup, and relocation costs.

Right-of-way is measured by the area or at a parcel-by-parcel level as appropriate. Rates for right-of-way costs are based on the best available local data. Services to secure the right-of-way are included in this category.

Special conditions or mitigation measures are also included in this category. Measurement and costs for these items are developed as appropriate for the known need, type, and extent of mitigation.

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Chapter 6.6: Preliminary Ridership Modeling

This section discusses ridership estimates obtained through application of the FTAs Aggregate Rail Ridership Forecasting (ARRF) sketch forecast tool.

Census Journey to Work (JTW) data were analyzed at the county and corridor levels. Analysis at the county level provides insights into the relative magnitudes of work-related travel among counties in the St. Louis area. The corridor-level analysis focuses on those parts of the study area that are most likely to be served by the proposed transit service.

The ARRF model uses the Census data flows to provide an additional data point that can serve as a rough estimate of the ridership for the proposed Northside-Southside light-rail service.

6.6.1 AGGREGATE RAIL RIDERSHIP FORECASTING

The ARRF sketch model estimates total unlinked rail transit trips for proposed light-rail systems by applying a series of expected rail market share estimates to the total travel to work flows that occur within specified buffer areas within the rail corridor. The ARRF module for light-rail uses the Census 2000 JTW data as an input of worker flows to provide an estimate of rail ridership.

Although the ARRF light-rail module uses Census JTW travel patterns to estimate rail ridership, it does not account for several factors:

- Number and level of service of competing bus routes that might affect ridership.
- Level of highway congestion in the region and the corridor.
- Level of service characteristics for the proposed rail line.
- Proximity of the proposed rail line to non-work activity centers.

An advantage of applying ARRF analysis to proposed Northside-Southside alternative alignments is that the existing St. Louis MetroLink system was used to calibrate the models. Proposed rail alignments are studied as incremental versions of the existing rail service. This allows use of the observed ridership data for the existing rail line, and the ARRF results put in context the estimates for the proposed Northside-Southside corridor.

6.6.2 STUDY AREA AND ALIGNMENTS

The eight counties in the EWGCOG region form an extended study area (Figure 6.6-1). The corridor under study for the ARRF Model is the six-mile buffer region around the proposed and existing alignment stations. This study area encompasses all of the City of St. Louis; extends to the boundaries of St. Louis, St. Charles, Franklin, and Jefferson counties in Missouri; and includes portions of Monroe, Madison, and St. Clair counties in Illinois.

For the ARRF model, concentric buffers of one-, two-, and six- mile radii are created around each of the proposed rail station locations and existing rail stations:

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- The one-mile buffer represents walk egress from rail stations. According to the ARRF documentation, all TAZs that lie within the one-mile buffer of a station are potential destinations that may be accessed by exiting the rail station.
- The two-mile buffer represents walk access to rail stations. All TAZs that lie within the two-mile buffer of a station provide opportunities for walking to that station.
- Level of service characteristics for the proposed rail line. The six-mile buffer represents drive access to rail stations. All TAZs that lie within the six-mile buffer of a station provide opportunities for driving to that rail station. Only those stations with park-and-ride facilities have an origin buffer of six miles. All other stations have an origin buffer of two miles.

The existing MetroLink service consists of two east-west alignments. The Lambert line operates between Lambert International Airport and the Shiloh–Scott station in Illinois. The recent Shrewsbury line operates between the Shrewsbury station and the Jackie Joyner-Kersey (JJK) station in Illinois. All the stations between the Central West End station in Missouri and the JJK station in Illinois are served by both the Lambert and Shrewsbury lines.

The proposed Northside-Southside alternative alignments connect downtown St. Louis with north and south city areas at proposed stations (Figure 6.6-2). Three alternatives, one through the Northside and two through the Southside study area, have been studied for the ARRF model and are described below:

- The proposed Northside alignment alternative, including downtown (Figure 6.6-3), is approximately 8.5 miles long and features 17 stations. Of the proposed stations, only the Goodfellow terminus provides park-and-ride capacity.
- The proposed Jefferson/I-55 alternative alignment on the Southside (Figure 6.6-4) is approximately 11 miles long and features 12 stations. Of the proposed stations, only the Bayless terminus provides park-and-ride capacity.
- The proposed Chouteau/UPRR alternative alignment on the Southside (Figure 6.6-5) is approximately 8.5 miles long and features 9 stations. Of the proposed stations, only the Bayless terminus provides park-and-ride capacity.

Chapter 6.6: Preliminary Ridership Modeling

FIGURE 6.6-1: ALIGNMENTS RELATIVE TO EWGCOG MPO COUNTIES

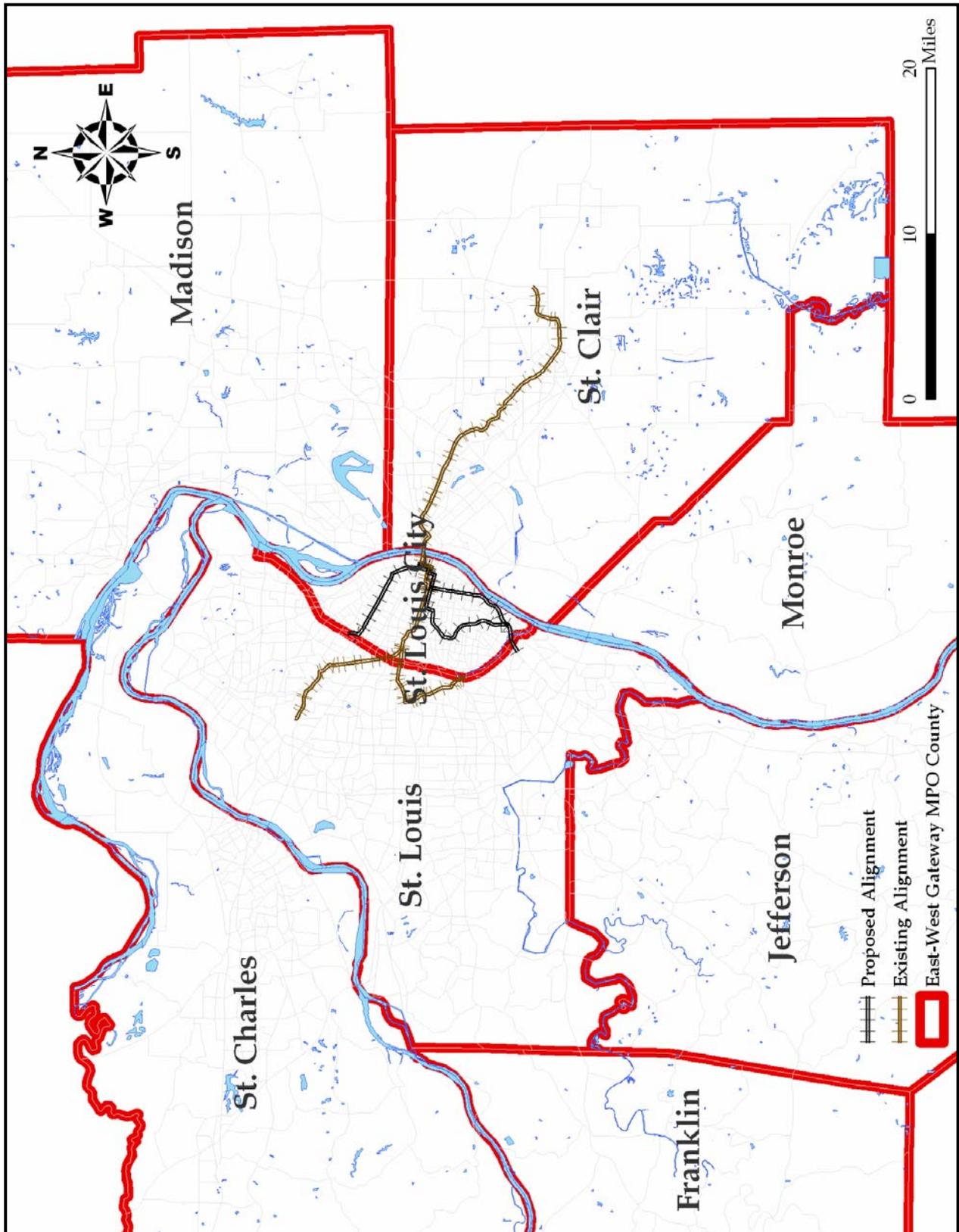
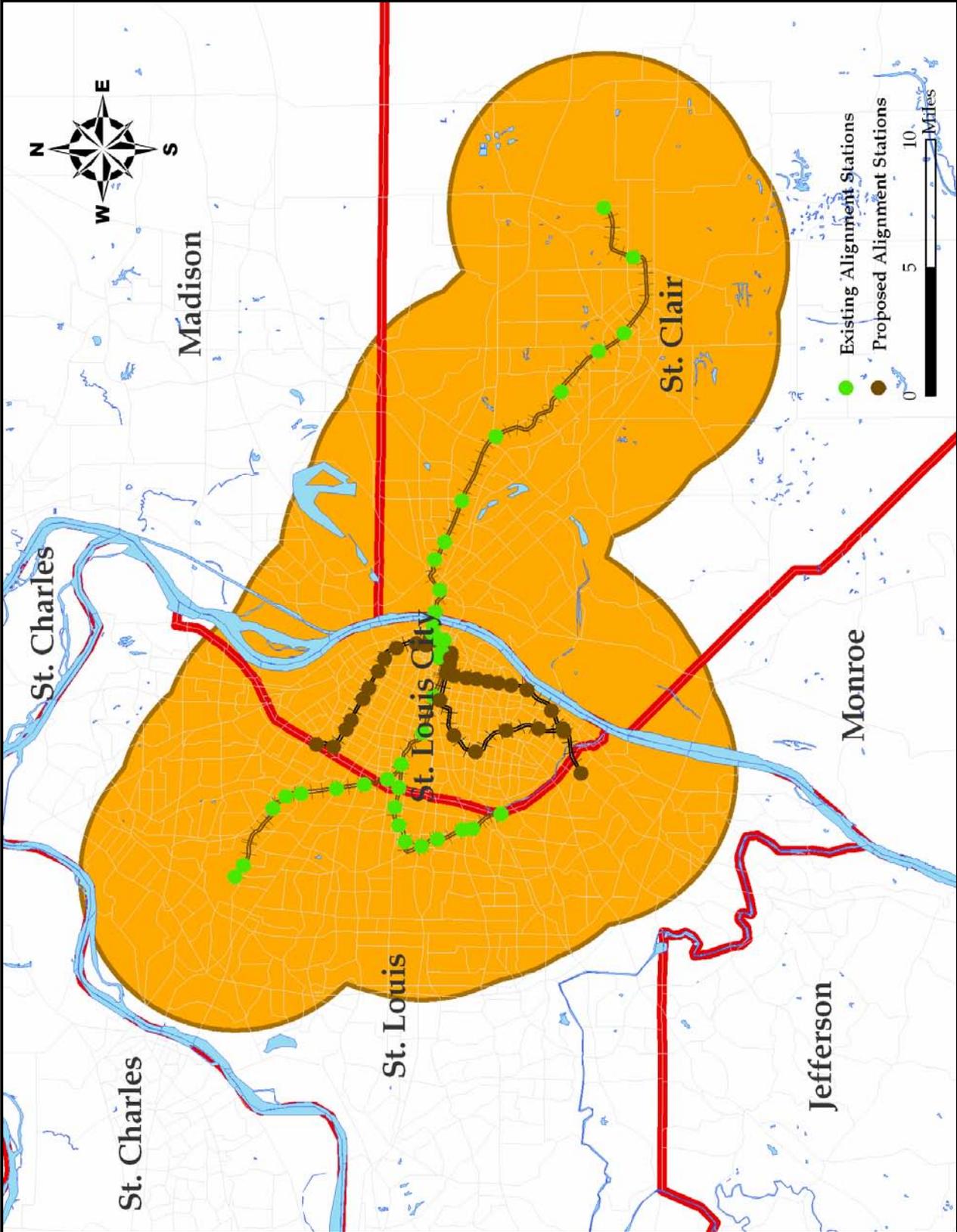
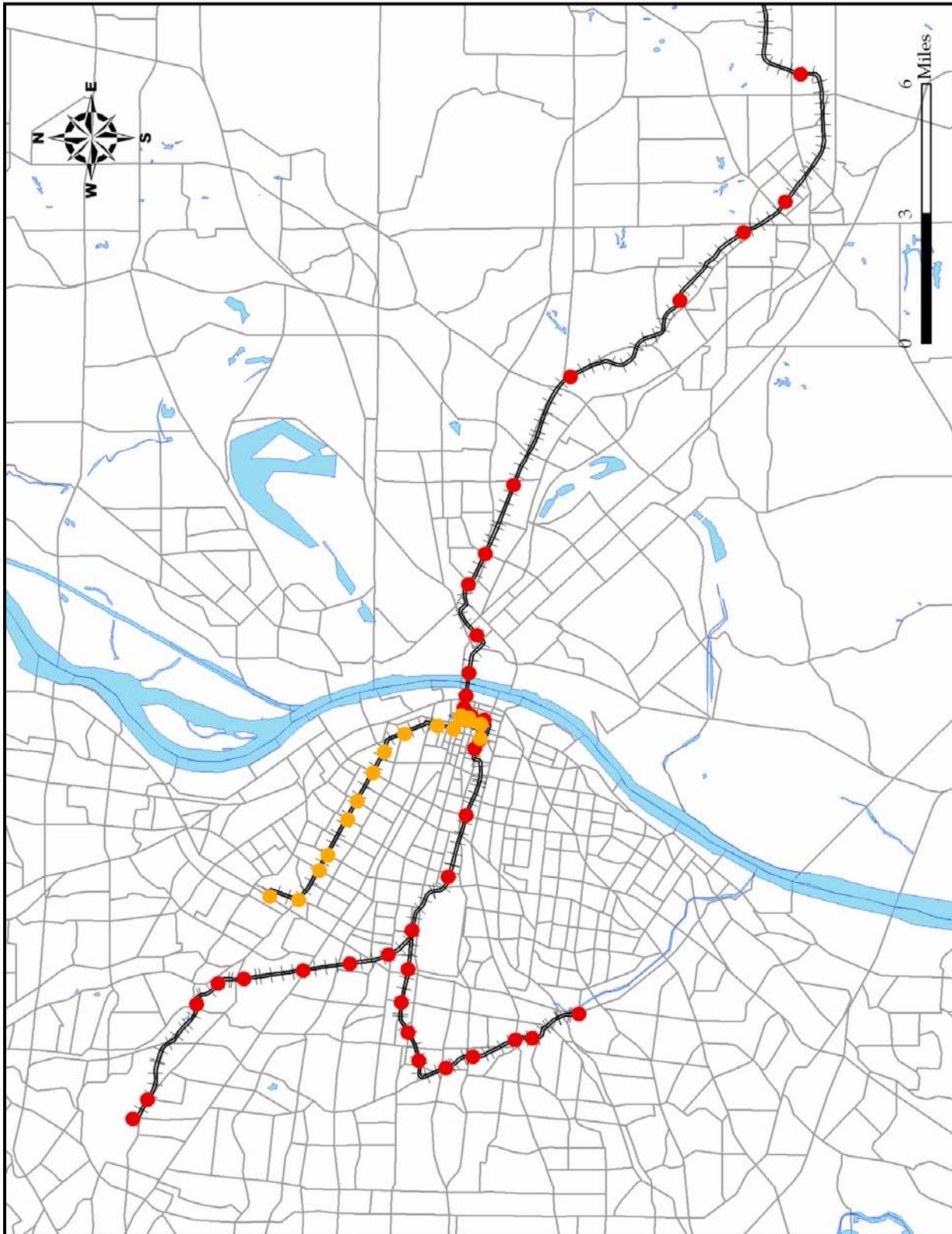


FIGURE 6.6-2: STUDY AREA



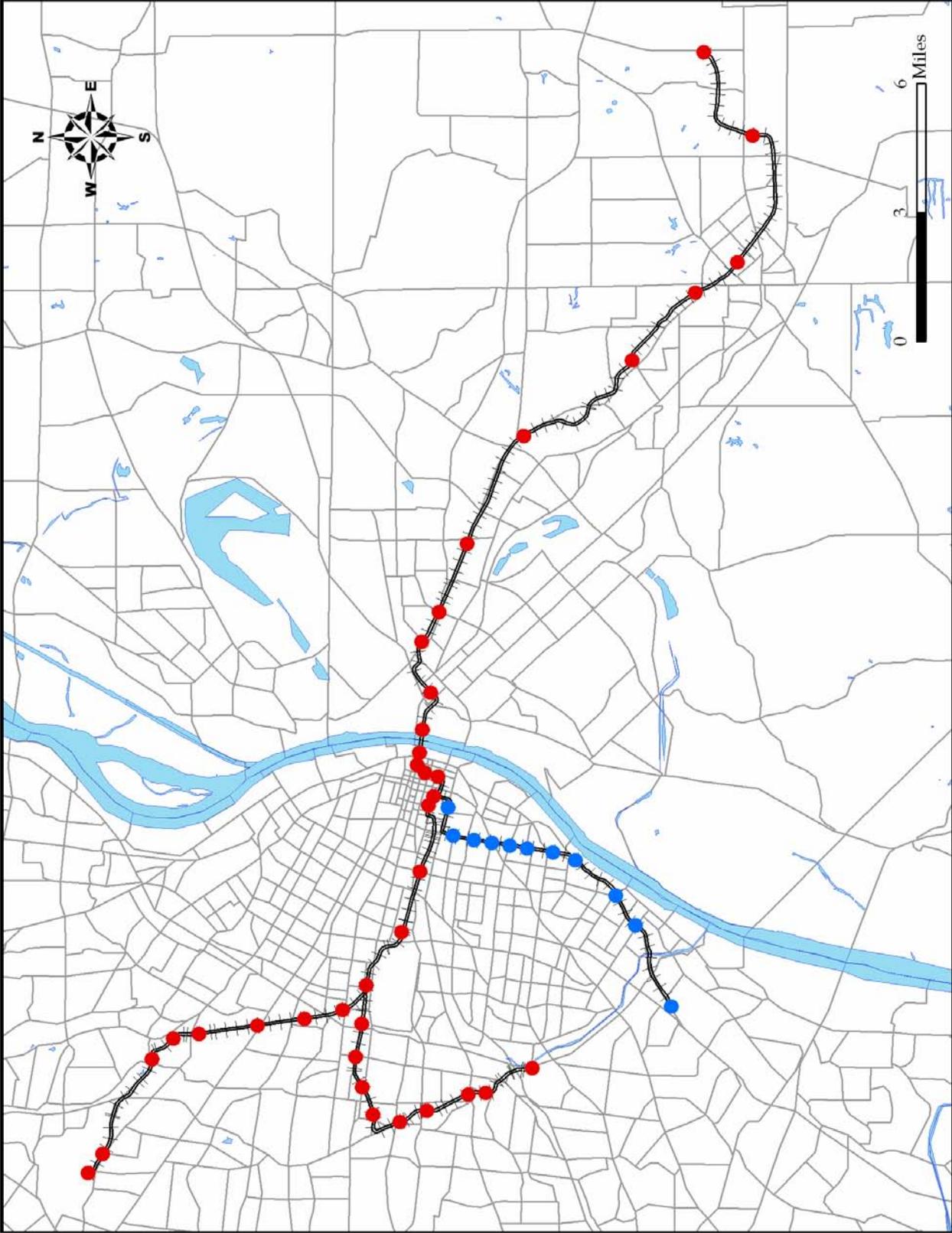
Chapter 6.6: Preliminary Ridership Modeling

FIGURE 6.6-3: NORTHSIDE ALIGNMENT – NATURAL BRIDGE



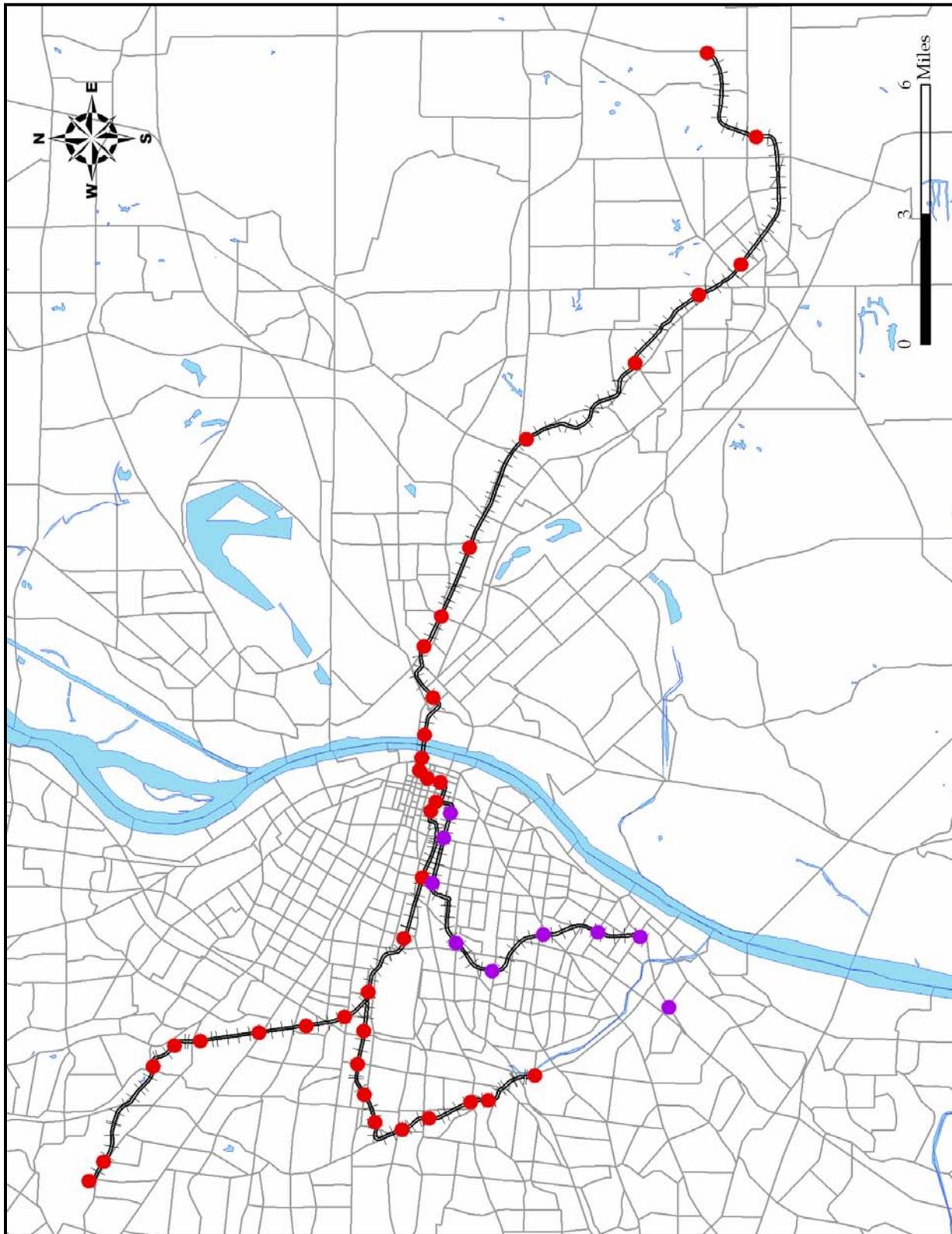
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FIGURE 6.6-4: SOUTHSIDE ALIGNMENT – JEFFERSON/I-55



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FIGURE 6.6-5: CHOUTEAU/UPRR SOUTHSIDE EXTENSION



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6.6.3 AGGREGATE RAIL RIDERSHIP FORECAST FOR LIGHT-RAIL TRANSIT

The ARRF sketch models use the 2000 Census Journey to Work data to predict rail ridership for the proposed rail lines. Data related to land area at a TAZ level are obtained from the regional land use data. Using this information, ridership can be estimated using four different ARRF models which are described here for completeness.¹

Model 1: Distance Based Method

This simplified model estimates ridership based on route length as follows:

- Daily Unlinked Rail Trips = $772.07 * \text{Directional Route Length}$
- Weekday Unlinked Home-Work Rail Trips = $461.41 * \text{Directional Route Length}$

Model 2: JTW Walk Access Method

This method uses CTPP JTW flows originating within 2 miles of each station and destined to one-mile buffers around each LRT station. There are two different versions of the model. Model 2A estimates the total rail ridership, while Model 2B estimates the “work trips using rail” ridership, which comes to approximately 60% of the total rail ridership.

- Model 2A: Weekday Unlinked Rail All-Purpose Trips = $0.53 * 2\text{-to-1 Mile JTW Flows}$
- Model 2B: Weekday Unlinked Work-Purpose Trips = $0.32 * 2\text{-to-1 Mile JTW Flows}$

Model 3: JTW Drive Access Method

This method estimates the ridership on rail which has a drive access component. The model suggests that more than 7% of all workers living within 6 miles of a rail station with park-and-ride capacity will drive to a rail station to access rail.

- Weekday Unlinked Drive Access to Work Rail Trips = $0.074 * \text{“PNR” 6-to-1 Mile JTW Flows}$

Model 4: JTW Method Using Employment Density

This model uses the JTW flows that originate within 2 or 6 miles from each station and are destined to locations within a one-mile buffer around each LRT station. The model uses two classifying features:

(A) Mode of Access: A 6-mile origin buffer is used if the station is a Park-&-Ride and a 2-mile buffer is used otherwise.

(B) Employment Density: Two categories are used to classify attraction zones around each station: zones with less than or equal to 50,000 employees per square mile, and zones with more than 50,000 employees per square mile.

- Model 4A: Weekday Unlinked Drive Access to Work Rail Trips = $0.030 * \text{CTPP Park-and-Ride 6-to-1 Mile JTW Flows (<50K Density)} + 0.202 * \text{CTPP Park-and-Ride 6-to-1 Mile JTW Flows (>50K Density)}$

¹ CTPP-Based Aggregate Rail Ridership Forecasting Model, Part I: Model Application Guide, prepared for Federal Transit Administration by AECOM Consult, Inc., February 8, 2006.

Chapter 6.6: Preliminary Ridership Modeling

- Model 4B: Weekday Unlinked Other Rail Trips =
0.395 * CTPP 2-to-1 Mile JTW Flows (<50K Density) +
0.449 * CTPP 2-to-1 Mile JTW Flows (>50K Density)
- Total Weekday Unlinked Rail Trips = Model 4A + Model 4B

6.6.4 WORKER FLOWS

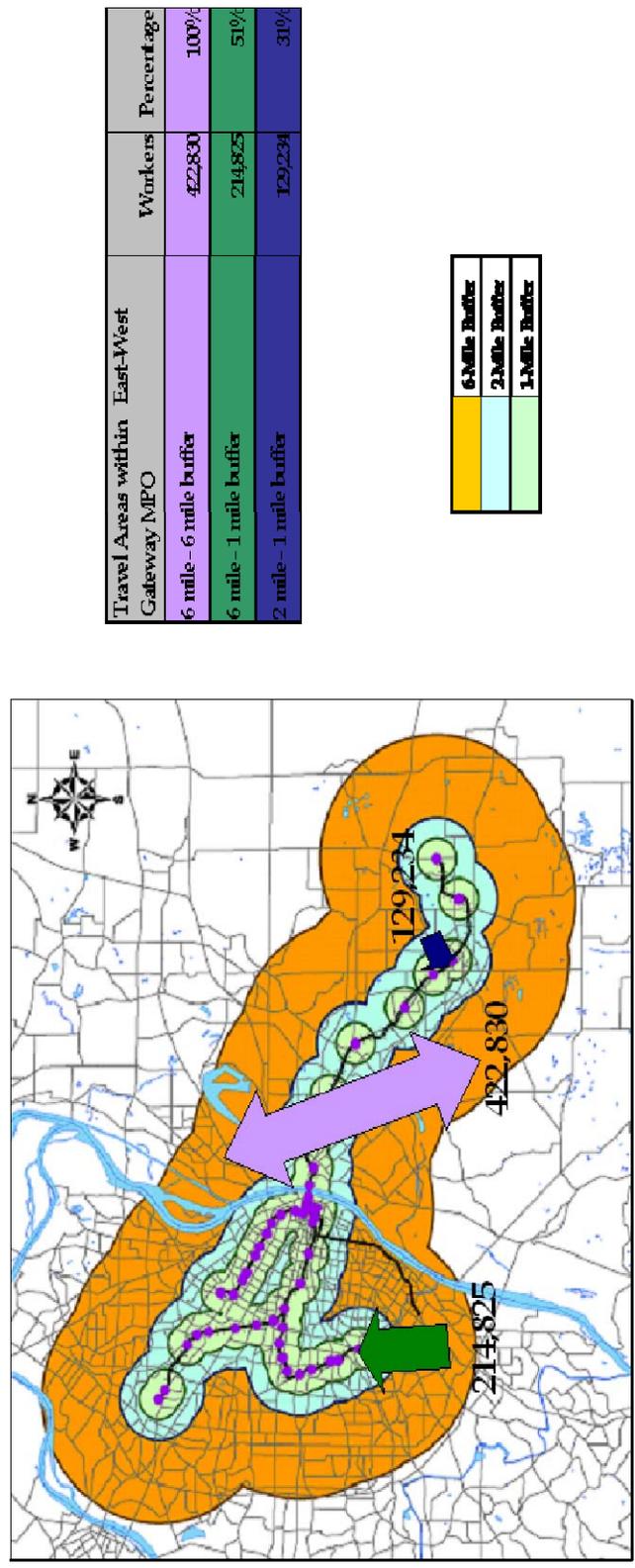
There are three approximations of worker flows that serve as indicators for the ARRF ridership estimates presented in the next section. The six-mile to six-mile flow represents the workers who live within a six-mile buffer of each station and are attracted within a six-mile buffer of each station. The six-mile to one-mile worker flows represent workers who have drive access to transit and who can walk to their work destination which is within one mile from each station. Finally, the two-mile to one-mile worker flows represent workers who have walk access to transit at both ends of their travel.

Figures 6.6-6 through 6.6-8 display the worker flows for the Northside extension and the two Southside extensions. The Southside extensions reach a larger potential pool of workers in each of the three categories of coverage. Furthermore, the Chouteau extension also reaches a slightly larger number of workers compared to the Jefferson extension.

Another critical input for the ARRF sketch model is employment density. Figure 6.6-9 shows TAZs with employment densities greater than 50,000 employees per square mile. All zones in the EWGCOG region with such a high employment density are located within the one-mile buffer of existing and proposed MetroLink service. It should be noted, however, that although St. Louis University Hospital and Cardinal Glennon Children's Hospital, both major employers, are in the Southside study area, they are located outside the one-mile destination buffer and are not reflected in the total worker flow estimates of the ARRF model.

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FIGURE 6.6-6: NORTHSIDE EXTENSION – WORKER FLOWS

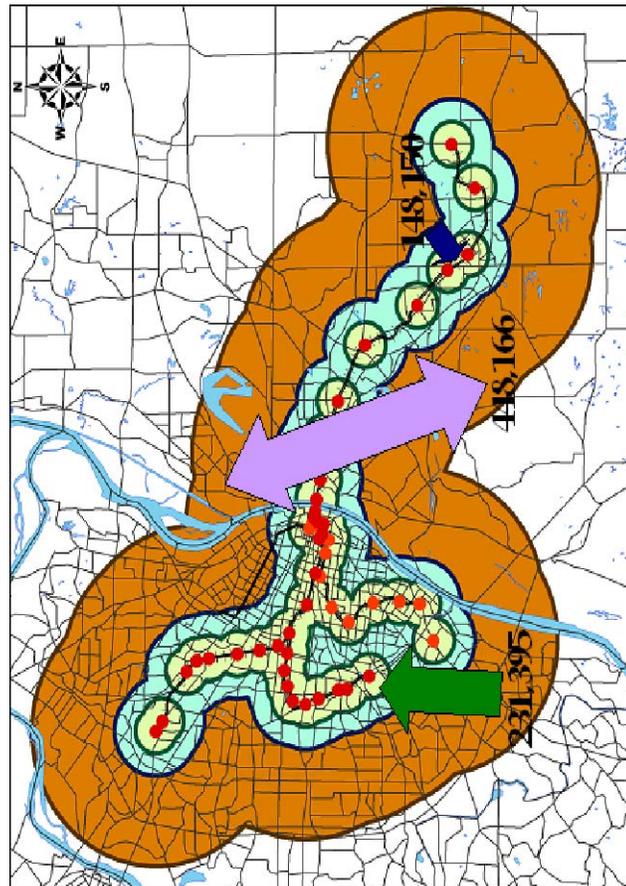


Chapter 6.6: Preliminary Ridership Modeling

FIGURE 6.6-7: SOUTHSIDE JEFFERSON – WORKER FLOWS

Travel Areas within Gateway MPO	East-West	Workers	Percentage
6 mile - 6 mile buffer		448,166	100%
6 mile - 1 mile buffer		231,395	52%
2 mile - 1 mile buffer		148,150	33%

6-Mile Buffer
2-Mile Buffer
1-Mile Buffer

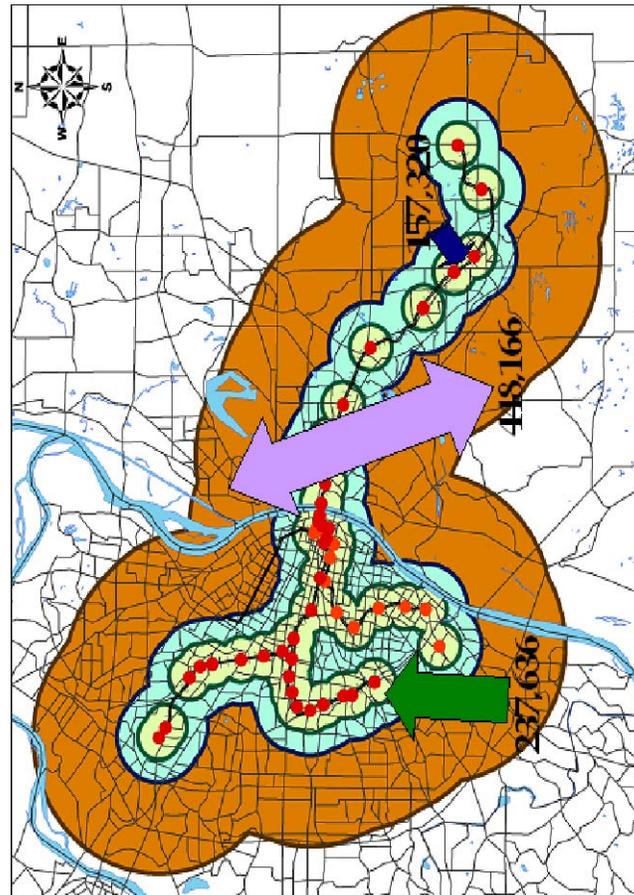


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FIGURE 6.6-8: CHOUTEAU UPRR – WORKER FLOWS

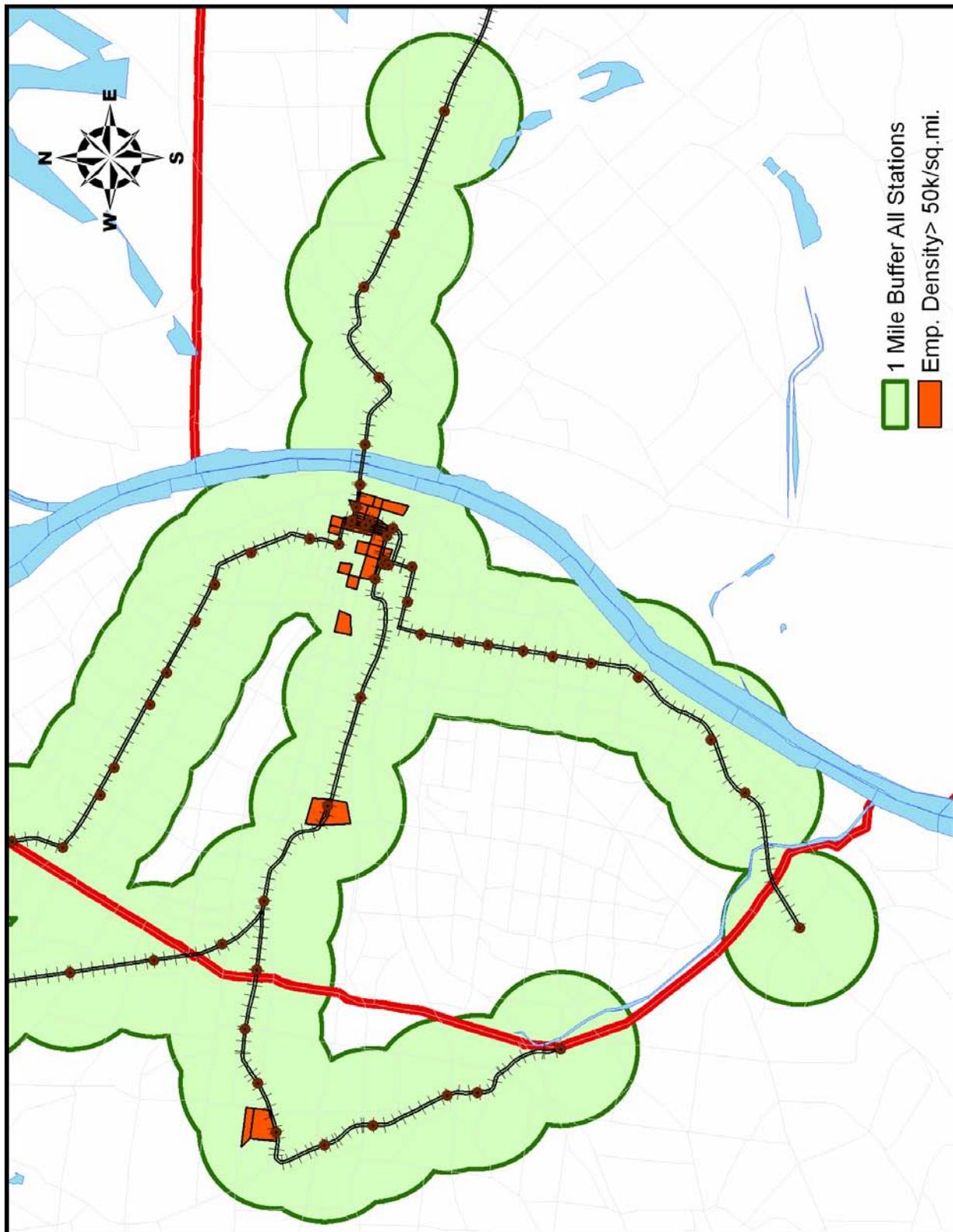
Travel Areas within Gateway MPO	Workers	Percentage
6 mile - 6 mile buffer	448,166	100%
6 mile - 1 mile buffer	237,636	53%
2 mile - 1 mile buffer	157,320	35%

6 Mile Buffer
2 Mile Buffer
1 Mile Buffer



Chapter 6.6: Preliminary Ridership Modeling

FIGURE 6.6-9: EMPLOYMENT DENSITY MAP



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6.6.5 RESULTS FROM THE ARRF MODEL

The ARRF sketch forecast tool was applied to obtain first-cut estimates of ridership for the Northside-Southside alignment alternatives. ARRF input variables reflect several assumptions:

- **Drive Access:** A 6-mile buffer is used for stations with park-and-ride lots to account for the number of workers who live within driving access of a rail station.
- **Walk Access:** For stations without a park-and-ride lot, a 2-mile buffer is used to calculate the number of workers who live within walking access of a rail station.
- **Walk Egress:** For all stations, a one-mile buffer is used to calculate the number of workers who can walk to their final destination.
- **Employment Density:** Destinations are classified as having population densities either higher or lower than 50,000 employees per square mile.

Earlier in the study, the ARRF sketch planning tool was applied to evaluate the alignment alternatives. These sketch forecasts assumed that each alignment could be implemented only by itself. The coverage for each of the three alignments and the ARRF ridership estimates (Table 6.6-1) can be summarized as follows:

- The Southside Chouteau alignment captures the largest amount of worker flows with 238,000 workers in the “drive access to rail” and about 157,000 workers in the “walk access to rail” markets.
- The Southside Jefferson alignment performs at a similar level but reaches somewhat fewer workers (231,000 “drive access” and 148,000 “walk access” workers respectively).
- Although both Southside alignments reach the same amount of workers in high density employment zones, the Chouteau alignment reaches more workers who work in zones with lower employment density.
- Both Southside alternatives reach more workers with origins and destinations in each of the buffer categories when compared to the Northside alignment.
- ARRF results suggest that the Southside Chouteau alignment could add as many as 22,400 boardings compared to 18,000 for the Southside Jefferson alignment.
- Either Southside alternative would add considerably more riders than the 9,600 riders projected for the Northside alignment.

Chapter 6.6: Preliminary Ridership Modeling

TABLE 6.6-1: ESTIMATES OF WORKERS TRAVELING WITHIN EACH BUFFER AREA

	Northside	Southside Jefferson	Southside Chouteau
Six to One mile Workers - Low Density (Emp. Den < 50k/sq.mi.)	153,163	166,645	172,886
Six to One mile Workers - High Density (Emp. Den > 50k/sq.mi.)	61,662	64,750	64,750
Two to One mile Workers - Low Density (Emp. Den < 50k/sq.mi.)	93,754	108,282	116,349
Two to One mile Workers - High Density (Emp. Den > 50k/sq.mi.)	35,480	39,868	40,972
Number of Workers - Six miles to One mile radius	214,825	231,395	237,636
Number of Workers - Two miles to One mile radius	129,234	148,150	157,320

Source: CS Analysis of the 2000 US Census Journey to Work Database at the TAZ Level

Impact Assessment

Chapter 7.0

Northside Study



Chapter 7.1: Introduction

The National Environmental Policy Act (NEPA) of 1969, as amended, requires federal agencies to assess the potential impacts of their actions on the human and natural environment. A certain level of impact to the environment is expected to result from the implementation of improved transit service. A preliminary evaluation of such impact was undertaken to identify potential issues of concern. This report comparatively evaluates potential impacts for the Northside and downtown alignments that have been selected for detailed study. Findings herein will be among factors considered in the recommendation of locally preferred alternatives (LPAs). LPA recommendations will be submitted to the East-West Gateway Council of Governments (EWGCOG) Board of Directors for their approval and subsequent addition to the region's long-range transportation plan.

A broader initial set of alternatives, based on the regional transportation/land-use policies, evolved through EWGCOG's planning process. From this transit analysis, the study moved from the regional long-range system plan through individual corridor studies. This process concluded with the *Northside Major Transportation Improvement Analysis (MTIA)* that recommended LPAs in 2000.

This chapter of the Northside study contains a preliminary analysis and summary of expected project effects and impacts. Analysis is based on readily available information and limited field reviews. This report discusses predictable, potential effects of light-rail transit (LRT) implementation along selected alignments. Such effects along an LPA (which is to be recommended in Chapter 8 of this report) may be considered at greater, more site-specific detail in the future, when work to complete an Environmental Impact Statement (EIS) is undertaken.

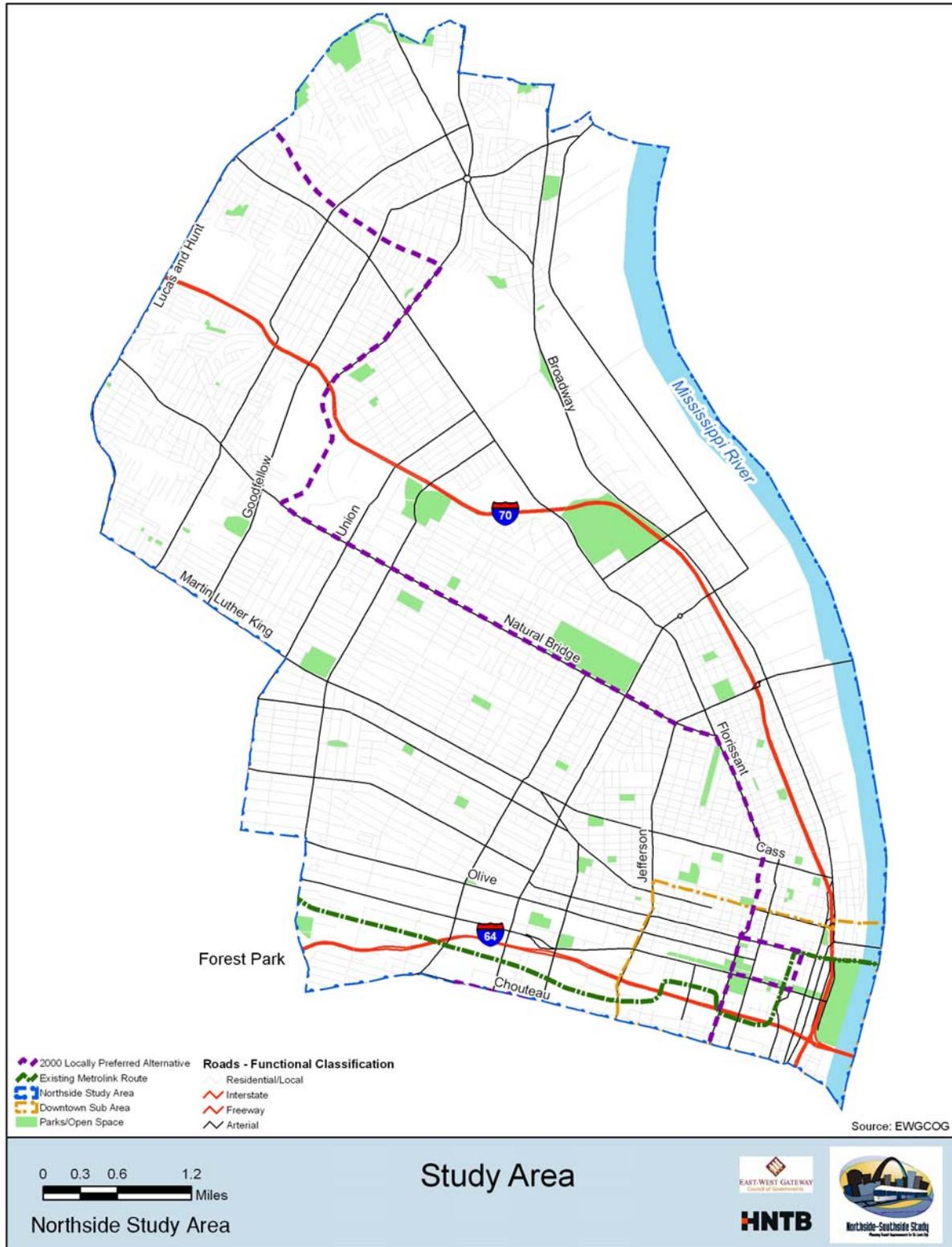
Factors reviewed in this chapter include the following:

- Social impacts, including discussion of environmental justice issues, relocation impacts, and land use and economic effects.
- Expected land use and urban design effects.
- Impacts associated with noise and vibration from trains.
- Natural resource impacts, including floodplains, wetlands, and habitat.
- Potential effects of hazardous materials that may be present within the area.

Within the Northside study area (Figure 7.1-1), two alignments have been selected for further analysis. These include the Northside LPA from the 2000 MTIA study: an LRT line that travels along North 14th Street to North Florissant Avenue to Natural Bridge Avenue to a terminus on Goodfellow Boulevard (Figure 7.1-2). Also included is a downtown LRT couplet (Figure 7.1-3) that follows 9th and 10th Streets between Convention Plaza and Clark Avenue.

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FIGURE 7.1-1: NORTHSIDE STUDY AREA



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

FIGURE 7.1-2: NATURAL BRIDGE ALIGNMENT

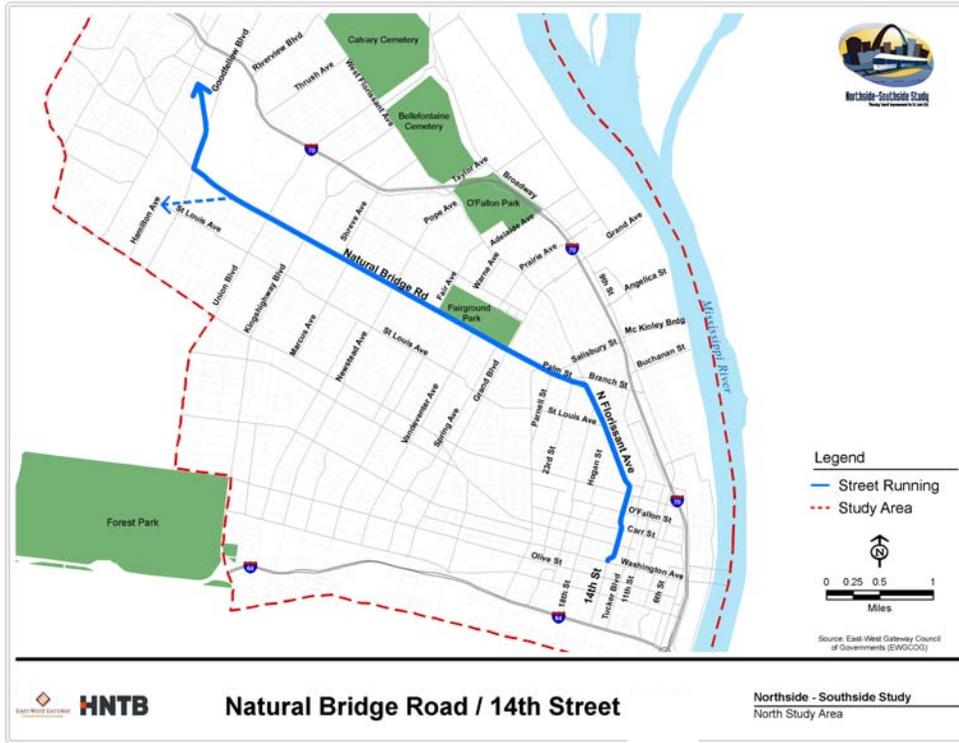
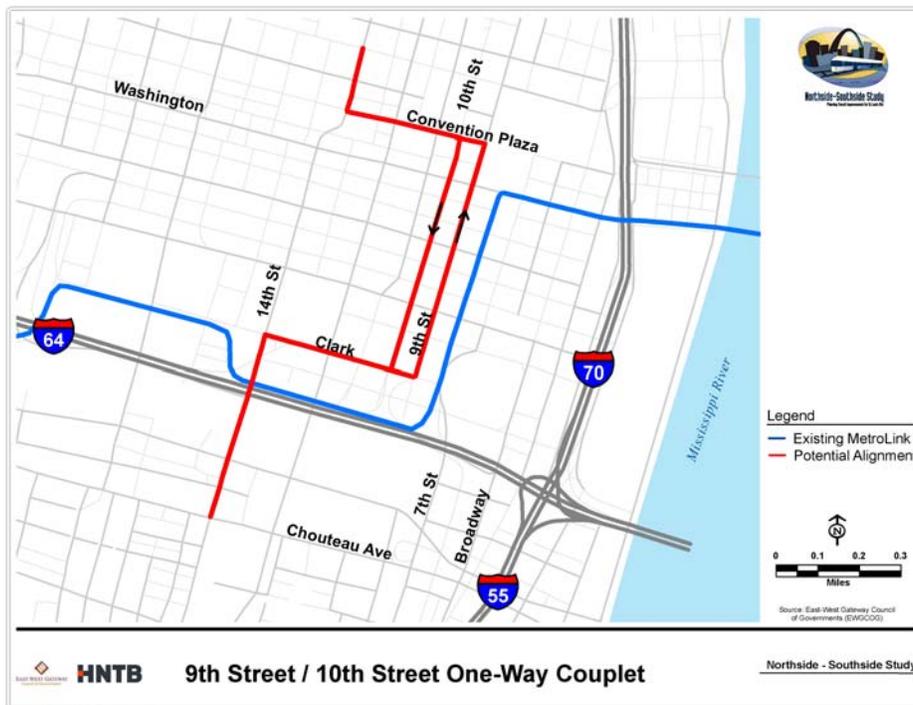


FIGURE 7.1-3: DOWNTOWN COUPLET



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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The proposed LRT alignments would be built and operated within existing right-of-way. For the most part, roadways used for the Northside alternative are very wide and can accommodate the in-street running LRT. City streets used for the downtown alignment are narrower but can still sustain LRT. No additional right-of-way is proposed for transit corridors, with the possible exception of small segments or strips as needed to provide sufficient width. Primary issues and impacts that could be expected from LRT implementation are summarized in Table 7.1-1. As previously mentioned, completion of a future EIS would more rigorously study these potential impacts. Such study would further explore the significance of impacts and propose avoidance or mitigation measures to minimize negative effects. In addition, benefits of the project would be maximized through operational and engineering planning and design. Planned additional public input could also contribute to maximizing benefits and identifying and minimizing negative impacts.

The remainder of this chapter more fully discusses the impacts listed in Table 7.1-1. For each potential impact, existing conditions are briefly summarized. More complete details regarding existing conditions can be found in *Chapter 3: Existing Conditions* of this study.

Chapter 7.1: Introduction

TABLE 7.1-1: POTENTIAL IMPACT SUMMARY

Impact Category	Impact Potential	
	Northside	Downtown
Land Use	Creates the potential for land use changes resulting from TOD and redevelopment.	Supports recent population growth trends through the provision of an additional transportation mode choice for residents and workers.
Demographics	Demographic changes could be realized through indirect land use changes that may be spurred by project.	Demographic changes could be seen in increases in residents and workers.
Travel Patterns	Impact will be related to the introduction of a median, which will limit turning movements at intersections. Closure of some roads will also be necessary.	Introduction of LRT vehicles into existing streets will affect existing traffic movement. Parking will be impacted. Some alleyways will require closure.
Access to Activity Centers	Creates additional opportunities for transit access to jobs, recreation, and cultural sites within Northside area and downtown. This will especially increase access for low-income individuals and minorities living in Northside communities.	Creates additional opportunities for transit access to activity centers downtown.
Water/Wetlands	Potential for impacts related to karst geology and risk of groundwater contamination.	Potential for impacts low.
Hazardous Materials and Waste	Ten identified sites.	Four identified sites.
Threatened and Endangered Species	Potential to impact species is low due to urban landscape.	Potential to impact species is low due to urban landscape.
Air Quality	Impact likely low.	Impact likely low.
Noise and Vibration	Impacts likely due to proximity of LRT vehicles to residential areas.	Potential for impacts to historic structures due to proximity of LRT vehicles and associated vibration.
Geology and Landform	Potential for impacts primarily during construction stage due to presence of karst geology.	Low impact potential.
Historic and Archaeological	Low potential for adverse effects due to low number of sites and their proximity to LRT.	High impact potential due to large number of sites and districts. Impacts could be related to vibration or to aesthetics when catenary is introduced. Comparably large number of historic sites.
Parks	Low impact potential to parks.	Could create aesthetic and noise impacts associated with LRT vehicles and catenary.

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Chapter 7.2: Societal Impacts

The demographic and socio-economic character of the Northside study area, including downtown, is summarized in *Chapter 3: Existing Conditions* of this report. Below is a more in-depth discussion of socio-economic impacts.

The City of St. Louis has experienced decades of population and employment loss, of which the Northside has seen the greatest decline. Year 2030 projections indicate that downtown St. Louis will more than double its current population and increase in density. Over the same period, though, population throughout the rest of the city is expected to continue to decrease. It is important to note that 2005 population estimates prepared by the city (and accepted by the U.S. Census Bureau) indicate that the city is, in fact, slowly reversing its trend of population loss. Since 2000, St. Louis has been implementing programs to draw population back to the city, particularly downtown. Programs and policies such as the Missouri Historic Tax Credit, Empowerment Zone designations, the Downtown Redevelopment Plan, and the city's Strategic Land Use Plan have fostered an attractive environment for residential development, resulting in population increases and higher densities. This positive trend is expected to continue as the city further implements such programs. These trends are of significance to the successful implementation of additional LRT within the City: higher population densities tend to result in higher transit use, as more people live within walking distance of transit stops.

As the entire Northside study area is located within an urbanized, built environment, the examination and, ultimately, the mitigation of social impacts will be important to the success of the project. Each component of the study area is distinct in its demographic characteristics and related concerns and issues.

Impacts of transit projects on neighborhoods can be both direct and indirect. Direct impacts to populations result from the trains themselves and can include noise and vibration, access and travel pattern changes, and temporary effects during construction such as dust and traffic detours. Indirect effects are also expected. One of the primary objectives of potential LRT implementation is to improve public transportation choices and increase access to jobs and services. This in turn is expected to promote redevelopment of strategic areas and improve the current economic and demographic trends.

7.2.1 LAND USE IMPACTS

Transit projects bring a potential for changes in neighborhoods or community cohesion. *Chapter 6: Detailed Definition of Alternatives, Section 2: Opportunities for Transit-Oriented Development* of this report identifies transit-oriented development (TOD) opportunities throughout the Northside and downtown study areas, as well as selected station areas. TOD will most influence areas in proximity to the transit stations; these areas are most accessible to commuters and other travelers boarding and exiting from the transit vehicle. TOD also has potential along easily accessible main roads along the transit lines.

The corridor plan for Natural Bridge Avenue, as described in Chapter 6.2, identifies opportunities for redevelopment within the Northside study area. Properties adjacent to the proposed LRT alignment offer great potential for TOD, while roads further from the alignment

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offer less. This corridor along Natural Bridge Avenue has infrastructure and an appropriate mixture of land use to incorporate light rail transit as a catalyst for development.

Downtown St. Louis is currently experiencing an increase in redevelopment, as well as new residential, retail, hospitality, and mixed use development. Favorable local and state development policies should help to continue this development over the next five to ten years and could favor the creation of a public policy focusing on TOD. Such public policy, at local or state levels, would help sustain growth in downtown St. Louis as in-street running LRT is implemented. A public development policy leveraging federal policies toward transit could also help sustain development in active neighborhoods and catalyze new development within areas that are struggling.

The City's Strategic Land Use Plan is the primary influence of future land use identified along the alignments. It is considered in all development scenarios, though some scenarios deviate because of station locations, current development markets, and proposed plans. Development markets may include neighborhood, institutional, neighborhood and regional commercial, and industry development, as well as support for recreational spaces and other community/public features. Plans and recommendations from this chapter will be considered throughout subsequent portions of this report and will inform selection of an LPA.

7.2.2 URBAN DESIGN AND COMMUNITY COHESION IMPACTS

During the development of LRT alternatives, potential impacts to communities and neighborhoods have been minimized through the use of evaluation criteria consistent with plans for future redevelopment. These are analyzed in the TOD discussion in *Chapter 6: Detailed Definition of Alternatives* of this study. The evaluation framework incorporates goals from the Gateway region's transportation plan,¹ as well as neighborhood plans. If necessary, additional mitigation of potential impacts can be provided through consultation with neighborhood residents and application of design features that are consistent with community goals.

The introduction of in-street running LRT along the alternatives is not expected to negatively affect community cohesion, unity, or structure. In fact, a goal of the project is to enhance the quality of life in the affected neighborhoods.

The LRT alternatives will not create significant physical barriers between neighborhoods or prevent access to community facilities if design considerations are made to enable pedestrians to cross safely. Section 7.2.8 provides a discussion of potential safety measures. Associated streetscape improvements can also improve a neighborhood's visual character, making it more attractive to pedestrians and improving the sense of place.

The expected benefits of rail transit include creating transportation convenience resulting in improved accessibility. Rail can link people to a wider choice of jobs, shopping, and entertainment not only in other locales along the rail line, but also within the neighborhoods where transit oriented development opportunities are realized. Properly implemented, TOD can spur revitalization by promoting efficient transportation and by supporting a range of housing types. TOD can reduce reliance on cars by creating walkable communities. These effects are expected to increase the quality of life. Investment in rail commonly creates an incentive for property owners in the adjacent neighborhoods to capitalize on their investments by making individual home and business owner improvements and revitalizing neighborhoods.

¹ EWGCOG *Legacy 2030: The Transportation Plan for the Gateway Region*. March 2005.

Chapter 7.2: Societal Impacts

7.2.3 ECONOMIC IMPACTS

A major transportation investment such as this proposed LRT addition will have many financial and economic implications. Impacts could affect the ability of homeowners to sell their homes or make investments in their property. Changes in commercial property values, which could result from LRT implementation, will also impact redevelopment, rehabilitation, and even the types of businesses that locate near transit. Many transit systems elsewhere in the country have had great success in spurring additional development, while others have not. Studies indicate that a wide array of contributing factors influence how a transit system affects land values.

Improved accessibility will make regional transportation less costly and more convenient for those who choose to use it. It will also provide accessibility to the transit-dependent segment of the population. Success (at least partially) depends on the quality of service and how well stations integrate into their surrounding neighborhoods.

The assessment of TOD opportunities in *Chapter 6: Detailed Definition of Alternatives* of this study shows that there is good potential for TOD within the proposed station areas examined. This assessment is based upon existing land use and the availability of developable or redevelopable sites. Station area design will also prove to be important in spurring land use development for maximum positive effect on the economy. Station area land values are expected to increase, and land uses are expected to intensify.

To be successful, the LRT must provide reliable and frequent service. Speed and convenience are essential features.

To boost the project's potential, transit corridors were chosen based upon serving large market areas. Real estate markets need to be strong regionally. Neighborhood residents and decision-makers also must be supportive of increased density and redevelopment. Local government support is also an important factor. Development incentives, site design guidelines and the allowance for appropriate zoning are all necessary to encourage development. Having a redevelopment agency is also important.

Economic indicators show both positive and negative economic trends in the study area. St. Louis has seen continuing positive growth in employment over the past years, although job losses suffered in 2001 have yet to be recovered in both number and quality. St. Louis has one of the most affordable housing markets in the U.S. with a median sale price of homes at \$141,000 in 2005.

At the same time, the city of St. Louis ranks below the U.S. average on housing development while also ranking poorly in vacancy rates for office (16.0%) and rental residential (15.5%). St. Louis's unemployment statistics for the past several years follow the same pattern as the state of Missouri, but they are consistently nearly three percentage points on average higher than the rest of the state (Table 7.2-1).

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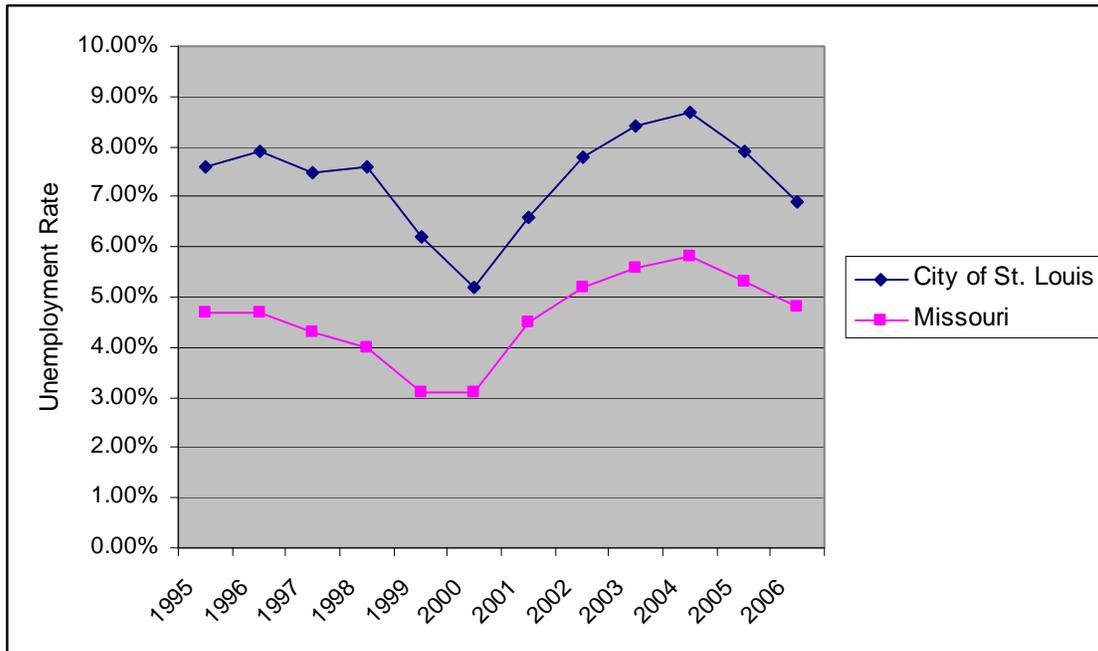
TABLE 7.2-1: MISSOURI LOCAL AREA UNEMPLOYMENT STATISTICS (LAUS)

City of St. Louis

Year	Labor Force	Employment	Unemployment	Rate
1995	167,848	155,122	12,726	7.6%
1996	165,231	152,171	13,060	7.9%
1997	160,281	148,269	12,012	7.5%
1998	158,376	146,403	11,973	7.6%
1999	154,153	144,612	9,541	6.2%
2000	163,490	155,011	8,479	5.2%
2001	165,139	154,167	10,972	6.6%
2002	165,079	152,279	12,800	7.8%
2003	163,242	149,527	13,715	8.4%
2004	162,947	148,746	14,201	8.7%
2005	159,172	146,572	12,600	7.9%
2006	158,275	147,428	10,847	6.9%

State of Missouri

Year	Labor Force	Employment	Unemployment	Rate
1995	2,822,199	2,690,210	131,989	4.7%
1996	2,869,405	2,734,860	134,546	4.7%
1997	2,904,214	2,780,185	124,029	4.3%
1998	2,910,871	2,794,869	116,002	4%
1999	2,911,190	2,819,853	91,337	3.1%
2000	2,911,190	2,819,853	91,337	3.1%
2001	3,002,714	2,867,853	134,861	4.5%
2002	2,985,932	2,829,985	155,947	5.2%
2003	2,986,047	2,819,935	166,112	5.6%
2004	2,993,978	2,821,802	172,176	5.8%
2005	3,008,146	2,847,758	160,388	5.3%
2006	3,032,434	2,885,857	146,577	4.8%



Source: Produced by Missouri Economic Research and Information Center in cooperation with U.S. Department of Labor, Bureau of Labor Statistics. Obtained online www.missourieconomy.org

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7.2.4 CHANGES IN TRAVEL PATTERNS AND ACCESSIBILITY

Roadways

The Northside alternative's transit vehicles would be placed in a new, raised median within existing street right-of-way, including Goodfellow Boulevard, Natural Bridge Avenue, North Florissant Avenue, Palm Street, and North 14th Street. Medians do not currently exist on any streets except for a small segment along North Florissant Avenue from Blair Street to Madison Street, where there is a grassy median, and portions of Goodfellow Boulevard, where there is a narrow raised median. Most roadway sections currently contain two-way left turn lanes or dedicated left turn lanes at intersections. As such, all cross traffic would be affected by the introduction of medians, such as the rendered conceptual example in Figure 7.2-1. These medians would require the elimination of some traffic movements through existing intersections. Any significant changes that seriously impede or misdirect traffic or that close access to adjacent businesses may impact those businesses, places of employment, or other activity centers. Mitigation should be provided in such instances.

Response times of the existing firehouse on Natural Bridge Avenue near the proposed station at Union Boulevard may be slightly impacted, since fire engines would no longer be able to make left turns from the firehouse to southbound Natural Bridge Avenue. The site is near enough to the Union Boulevard intersection, which will remain signalized and open to all traffic movements. Mitigation could be developed in cooperation with the Fire Department to ensure response times are not hindered. Possible mitigation measures and solutions may include relocation of the firehouse.

Right-in, right-out only traffic movements would be permitted at the following intersections that would be closed to through movements:

23 rd Street	Harris Avenue
Benton Street	Jefferson Avenue
Biddle Street	Lincoln Way
Bishop PL Scott Avenue	Monroe Street
Branch Street	Montgomery Street
Carr Street	North 19 th Street
Chambers Street	North 20 th Street
Clarence Avenue	North 21 st Street
Clay Avenue	Norwood Avenue
Clinton Street	O'Fallon Street
Cole Street	Palm Street
Cora Avenue	Paris Avenue
Dodier Street	Parnell Street
Dressel Avenue	Red Bud Avenue
Edelle Avenue	Spring Avenue
Euclid Avenue	Sullivan Avenue
Farrar Street	Turner Street
Ferris Avenue	Warren Street
Geraldine Avenue	Wright Street

The introduction of medians often has beneficial effects. Medians provide a traffic-calming effect, as well as improve safety because they separate opposing traffic movements. Also, pedestrians experience easier crossings of wide streets at intersections because of the

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provision of a place of refuge half-way across. This is particularly important for disabled and elderly people.

Details regarding closure of or changes to driveways may be examined more closely in later, more detailed study, when LRT design is advanced enough to comprehend such level of impact or change.

Signal prioritization or preemption will be implemented for proposed LRT. This means that signals will change in favor of the train when it is present. This can impact cross traffic by making drivers wait longer for green time and by periodically making green time shorter.

Table 7.2-2 itemizes currently proposed changes to roadway geometries. These changes include street closures, elimination of signals, and others. It should be noted that at this stage in planning, details are not yet fully developed and may change as public input is gathered and designs are further examined. Changes identified, however, give a preliminary idea of potential impacts to the study area.

TABLE 7.2-2: POTENTIAL CHANGES TO ROADWAYS AND ACCESS

Location	Potential Changes
Dr. MLK, Jr. Dr./ N. 14 th St.	Remove designated turn lane.
N. 14 th St. between Biddle St. and O'Fallon St.	Street closure.
Biddle St. / N. 14 th St.	Add pedestrian signals.
O'Fallon St. / N. 14 th St.	Add pedestrian signals.
Cass Ave. /N. 14 th St.	Designated left-turn lane.
N. 14 th St. at Mullanphy St.	Street closure, causing misdirection.
N. 15 th St. at Mullanphy St.	Street closure.
19 th St. at N. Florissant Ave.	Street closure.
Road near N. 20 th St. and N. Florissant Ave.	Street closure.
N 20 th St. and N. Florissant Ave.	Street closure.
N 21 st St. and N. Florissant Ave.	Street closure, affecting St. Louis Place Park and Jeanne Jugan Square.
Rauschenbach Ave.	Street closure, affecting St. Louis Place Park and Jeanne Jugan Square.
22 nd St. and Palm St.	Street closure, not closing private access.
25 th St./Mallinckrodt St. and Natural Bridge Ave./Palm St.	Consolidating intersection, eliminating small island, improvements to geometrics and safety.
Bremen Ave. at Natural Bridge Ave.	Street closure.
Euclid Ave. (2 intersections) at Natural Bridge Ave.	Remove signals and crosswalks at both intersections.

FIGURE 7.2-1: POTENTIAL MEDIAN CONFIGURATION, CONCEPTUAL RENDERING



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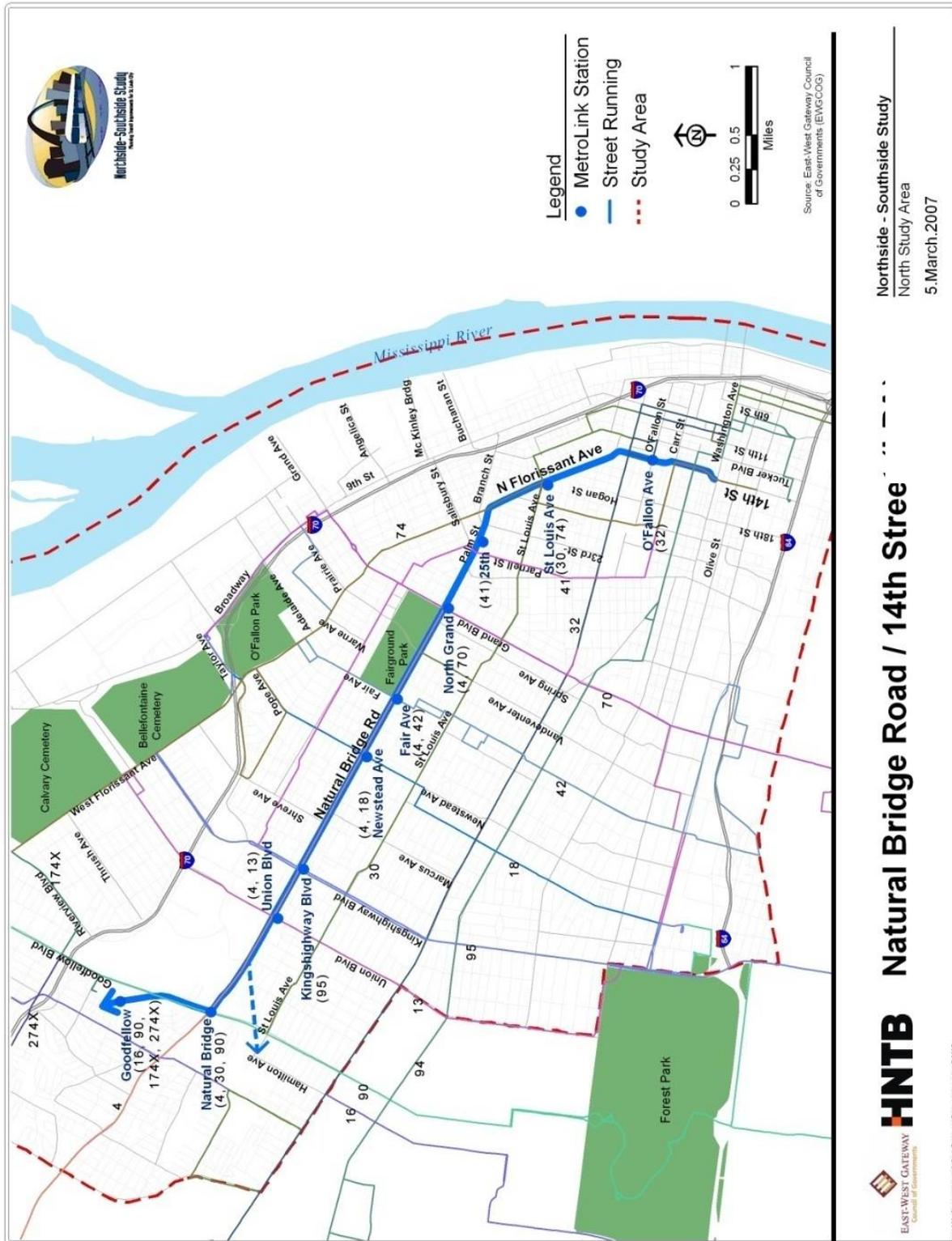
Transit

The intent of proposed MetroLink expansions, as examined in this study, is to enhance existing transit. Table 7.2-3 lists bus routes in the study area and describes any proposed changes. Also listed are proposed peak and off-peak headways, as well as rail station(s) that each route would feed. A proposed feeder bus plan is shown in Figure 7.2-2.

TABLE 7.2-3: NORTHSIDE BUS ROUTES

Route #	Name	Description of Change	Headway (in minutes)		LRT Stations & Transit Centers Served
			Peak	Off-Peak	
4	Natural Bridge Shuttle	Between Grand & N. Hanley station.	30	60	All along Natural Bridge.
13	Union	Extend via Union.	30	30	Union/Natural Bridge.
16	City Limits	Add station stop.	20	30	Goodfellow/I-70.
18	Taylor	Connect to Newstead station.	20	30	Newstead, Central West End.
30	Soulard	Deviate via Goodfellow/Natural Bridge station; reroute via Kienlen, St. Louis, Lucas and Hunt, to Rock Road station.	30	30	Goodfellow/Natural Bridge, St. Louis Ave.
32	Wellston-MLKing	Station stop.	30	30	O' Fallon.
41	Lee	Reroute via Jefferson to Civic Center station.	20	30	Union/NB, Parnell.
42	Sarah	Add station stop.	20	30	Grand, Fair Ave.
70	Grand	Add station stop.	7	12	Grand, Natural Bridge/Grand.
74	Florissant	Reroute St. Louis Ave, 20th to Carr to 14 th .	20	20	St. Louis Ave., CBD.
90	Hampton	Deviate via Stratford to Goodfellow/I-70 Station.	15	30	Goodfellow/Natural Bridge, Goodfellow/ I-70.
95	Kingshighway	Via Kingshighway/Natural Bridge station.	10	15	Central West End, Kingshighway/Natural Bridge.
174X	New Halls Ferry	Riverview to Lillian to Goodfellow.		X	Goodfellow/I-70.
274X	Paddock Hills	Lucas and Hunt, Lillian, to Goodfellow; terminate at station.		X	Goodfellow/I-70.

FIGURE 7.2-2: PROPOSED BUS PLAN



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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Table 7.2-4 lists proposed LRT stations and their potential connections to bus routes. The most significant service changes include:

- *Convention Plaza Station.* Proposed to be a large transit center so that Northside buses will terminate and use MetroLink as a feeder system in downtown.
- *St. Louis Avenue Station.* Would be served by the #30 and #74 routes.
- *Grand Station.* Would be a focal point for two routes (#4, #70). The #4 Natural Bridge Shuttle would provide service from Grand to North Hanley along Natural Bridge Avenue. The #70 Grand would be a station stop and continue on Grand Avenue.
- *I-70/Goodfellow Station.* Would have parking and a transit center with 4 to 6 bus bays depending on land availability and site access. It would be served by four routes (#16, #90, and #174 X, #274 X). Several express routes (174X, #274X) to downtown will be converted to feeder routes since the rail line would provide replacement service.

TABLE 7.2-4: CONNECTING STATIONS, NATURAL BRIDGE ALTERNATIVE

Station	Route #	Route Name	Terminate or Thru?	Notes
O' Fallon	32	M.L. King	thru	Station stop.
St. Louis Ave.	30	Soulard	thru	Reroute via Kienlen, St. Louis, Lucas and Hunt, to Rock Road station.
	74	Florissant	thru	Via 20th to Carr to 14th to Convention Plaza.
Parnell	41	Lee	thru	Via Parnell to Jefferson to 14th transit center.
Grand	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	70	Grand	thru	Via Grand.
Fair	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	42	Sarah	thru	Station stop.
Newstead (Park-and-Ride)	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	18	Taylor	thru	Station stop.
Kingshighway	95	Kingshighway	thru	Via Kingshighway.
Union	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	13	Union	thru	
Goodfellow/Natural Bridge	4	Natural Bridge Shuttle	thru	Shuttle between Grand and N. Hanley station.
	30	Soulard	thru	Reroute via Kienlen, St. Louis, Lucas and Hunt to Rock Road station.
Goodfellow/I-70 (Park-and-Ride)	90	Hampton	thru	Station stop.
	16	City Limits	thru	Via Stratford.
Transit Center	90	Hampton	thru	Deviate via Stratford to Goodfellow/I-70 station.
	174X	Halls Ferry X	terminate	At transit center.
	274X	Paddock Hills X	terminate	At transit center.

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7.2.5 RELOCATION IMPACTS

Because the project is located within existing transportation corridors, very few displacements are expected. There are two small structures near the intersection of St. Louis Avenue and North Florissant Avenue that are close to the roadway and may need to be acquired for additional right-of-way width. This is in the area of the St. Louis Avenue station location. As design is further refined, the number of properties that cannot be avoided will be fully understood. At this time, it is not expected that any occupied buildings or businesses would be required for the project.

The assessment of relocation impacts created by a transportation project is mandated by federal and state statutes. Procedures for the acquisition and condemnation of property for streets, highways, airports, mass transit facilities, and other public projects are set forth in law. Occupants cannot be removed from a property until a relocation site has been made available. The intent of these statutes is to ensure that any person displaced by a public project receives fair compensation for the property required, as well as a place to relocate to. Under current regulations, displaced landowners would be compensated for the fair market value of their acquired property.

7.2.6 ACTIVITY CENTERS

Chapter 3: Existing Conditions of this report identifies and describes in detail the activity centers within the Northside and downtown study areas. They are broken into several categories: recreational/entertainment/cultural/parks, major employers/employment centers, retail shopping, educational institutions, and healthcare facilities. These centers are important both individually and collectively because they can significantly impact both local and regional transportation networks. Awareness of the location and nature of major activity and employment centers is essential to determine travel patterns and potential transit demand. These centers are the major destination points that people access for work, pleasure, shopping, or necessary services.

Most Northside activity centers (Figure 7.2-3) are clustered downtown or in a central corridor, but there are also pockets of activity near Fairground Park and along Natural Bridge Avenue.

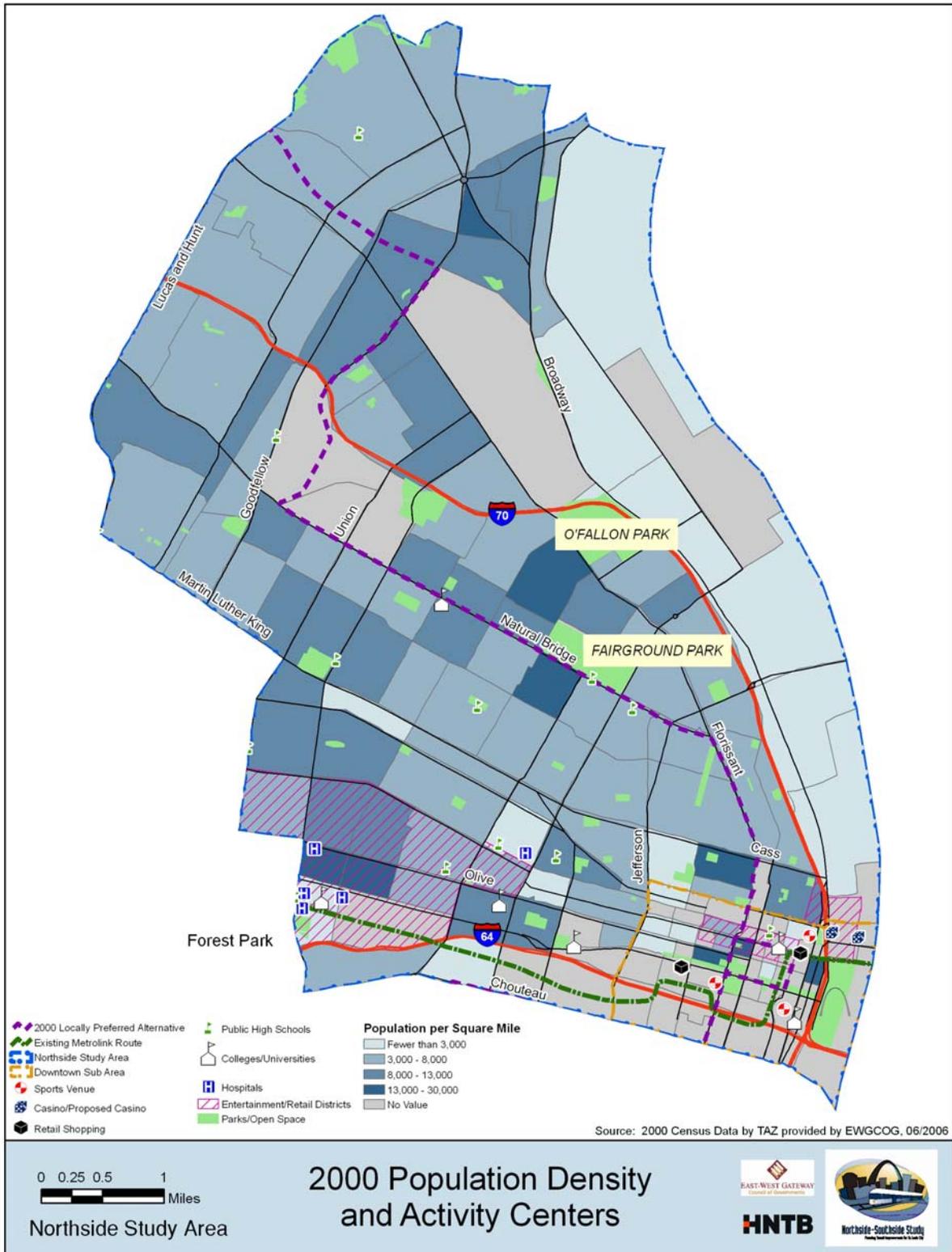
The city's central business district (CBD) continues to be a major employment center in the region, with over 90,000 jobs, although it has suffered from job loss as employers relocate to suburban areas. This trend appears to be reversing, as 2030 employment projections indicate that downtown will have a slight employment increase. Other major employment centers are located in the central corridor at Barnes-Jewish Hospital and St. Louis University, in the industrial areas along the Mississippi River, and at the Union-Seventy Center near Interstate-70.

Locating a transit corridor in proximity of major activity centers is imperative to gaining the necessary ridership to make LRT successful and to serve the largest number of people possible. Benefits of LRT to these activity centers can include and be measured by increased accessibility for workers, tourists, and shoppers. LRT can also provide an additional means of access to jobs for transit-dependent people.

No physical impacts to community facilities, recreation areas, churches, or other social-related facilities have been identified to this point. Future design should avoid or minimize impacts to these facilities. Any potential impacts to such facilities should be investigated and identified in consultation with neighborhood residents.

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FIGURE 7.2-3: POPULATION DENSITY AND ACTIVITY CENTERS



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

Chapter 7.2: Societal Impacts

7.2.7 ENVIRONMENTAL JUSTICE

Executive Order 12898: *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations* directs each Federal agency to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Similarly, recipients of Federal aid are also required to certify to the above, and the U.S. DOT must ensure nondiscrimination under Title VI of the Civil Rights Act of 1964. The Northside Study aims to accomplish the goals of environmental justice and Title VI by involving the potentially affected public in planning and development of the project.

The Federal Transit Administration (FTA) encourages transit providers to offer mobility to all citizens, whether they own a vehicle or not. Its goal is to have transit providers offer an essential service for many low-income and minority populations who have no other way to travel to work, shopping, child care, medical appointments, recreation, or other destinations. This project will support Title VI and environmental justice principles by ensuring that equitable levels of service and benefits are delivered to minority and low-income populations within the study area. Enhanced public involvement has been integral to the study’s progress and will continue into future stages of planning and development. This public involvement will assist in identifying and addressing the needs of minority and low-income populations as transportation decisions are studied and made. The outcome will be avoidance, minimization, and mitigation of any identified disproportionately high and adverse effects on minority and low-income populations.

The Northside study area has high percentages of minority and low-income residents – higher than any other sections of the City or St. Louis County. Many residents are traditionally more transit dependent, including the young, the elderly, the disabled, and those who do not have access to a vehicle. Almost one-third of the downtown households do not have access to a personal vehicle. There are also many areas where more than 20% of workers use transit to travel to work, which is significantly high when compared to the national average of 5%. Finally, Metro’s Transit Needs Index indicates that most of the Northside study area has high or very high needs for transit, based on their socio-economic status.

While Northside residents would realize the benefits of TOD (including increased access to jobs and potential land value increases and redevelopment), they would also bear any negative physical impacts of the project. Numerous community meetings with local aldermen and residents have been conducted for this and previous studies. Residents, public officials, and other stakeholders have been afforded the opportunity to discuss issues related to this Northside study and to share input on the planning process (*Chapter 4: Public Involvement*). During future phases, public outreach should be continued to further identify and minimize concerns of people who live and work within the area. Based on input received thus far, it is expected that concerns will be primarily related to noise, vibration, and safety impacts.

7.2.8 SAFETY

Two primary safety concerns for this project include pedestrian and vehicular safety related to the introduction of the train into the road right-of-way as well as personal safety at the transit stops.

The built environment can either help or hinder criminals and so needs to be considered in the design of transit facilities. As important as actual crime, the fear of crime has an impact on

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citizens and their sense of community. It is generally believed that spaces providing visibility that are well lit are less likely to attract criminals and can make people feel safer. Indeed public participants in the planning process have asked that the transit shelters be transparent and well lit. This would be an appropriate measure to take for this project and should be considered when final designs are developed.

Traffic safety is another concern that can be addressed through design elements as well as through citizen education. Safety measures should be implemented, including the installation of traffic control devices and systems that direct pedestrians safely across and along the corridor and clearly direct the operations of motor vehicles. Designing these elements into the project early is ideal and should be considered in preliminary engineering.

Outreach programs to schools and community groups such as those sponsored by "Operation Lifesaver"² can also be implemented to help educate pedestrians and drivers and reduce collisions, deaths, and injuries at rail crossings and rights-of-way. Operation Lifesaver programs are sponsored cooperatively by federal, state, and local government agencies, as well as highway safety organizations and the nation's railroads.

Safety issues related to construction operations are also a potential impact of the project. During construction, appropriate measures should be implemented to promote safety, including construction and detour traffic management, dust control measures, and any necessary hazardous materials handling.

² <http://www.oli.org/>

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Chapter 7.3: Environmental Impacts

Within the Northside study area, there are various environmental considerations (Figure 7.3-1) that must be addressed during the development and evaluation of alternatives. These include, but are not limited to, impacts to hazardous waste sites, noise and vibration impacts, the presence of karst topography and sinkholes, impacts to historic properties, and Section 4(f) impacts to parks and historic sites. These are detailed in this section.

7.3.1 WATER RESOURCES, FLOODPLAINS AND WETLANDS

The U.S. Army Corps of Engineers (USACE) and the Natural Resource Conservation Service (NRCS) determine whether a potential wetland is jurisdictional or federally-regulated. The USACE regulates impacts to jurisdictional wetlands under Section 404 of the Clean Water Act (CWA). The Missouri Department of Natural Resources regulates impacts to isolated wetlands, or those not hydrologically connected to waters of the United States. No jurisdictional determinations have been made at this time.

In addition to the requirements of the CWA, the USACE must also comply with other federal laws in the evaluation of an application. These include:

- The Fish and Wildlife Coordination Act requires federal agencies to coordinate with the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) and the appropriate state wildlife resource agencies.
- The Endangered Species Act (ESA) requires federal agencies to coordinate with the USFWS or NMFS to insure that the federal action does not jeopardize any threatened or endangered species.
- The National Historic Preservation Act of 1966 requires coordination with the State Historic Preservation Office regarding eligible resources for listing on the National Register of Historic Places.
- Section 401 of the CWA requires state certification of water quality.

Given that most wetlands identified in the region are located within parks and cemeteries or near the Mississippi River and that no potential LRT construction areas lie within floodplains or wetlands, impacts are not anticipated. Similarly, impacts to waterways are not expected. The presence of sinkholes is of concern for groundwater impacts during construction. If sinkholes are encountered, the potential to contaminate groundwater exists. Impacts can be mitigated through proper erosion control measures and construction techniques. Details would need to be specified during design and engineering.

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FIGURE 7.3-1: ENVIRONMENTAL CONSIDERATIONS



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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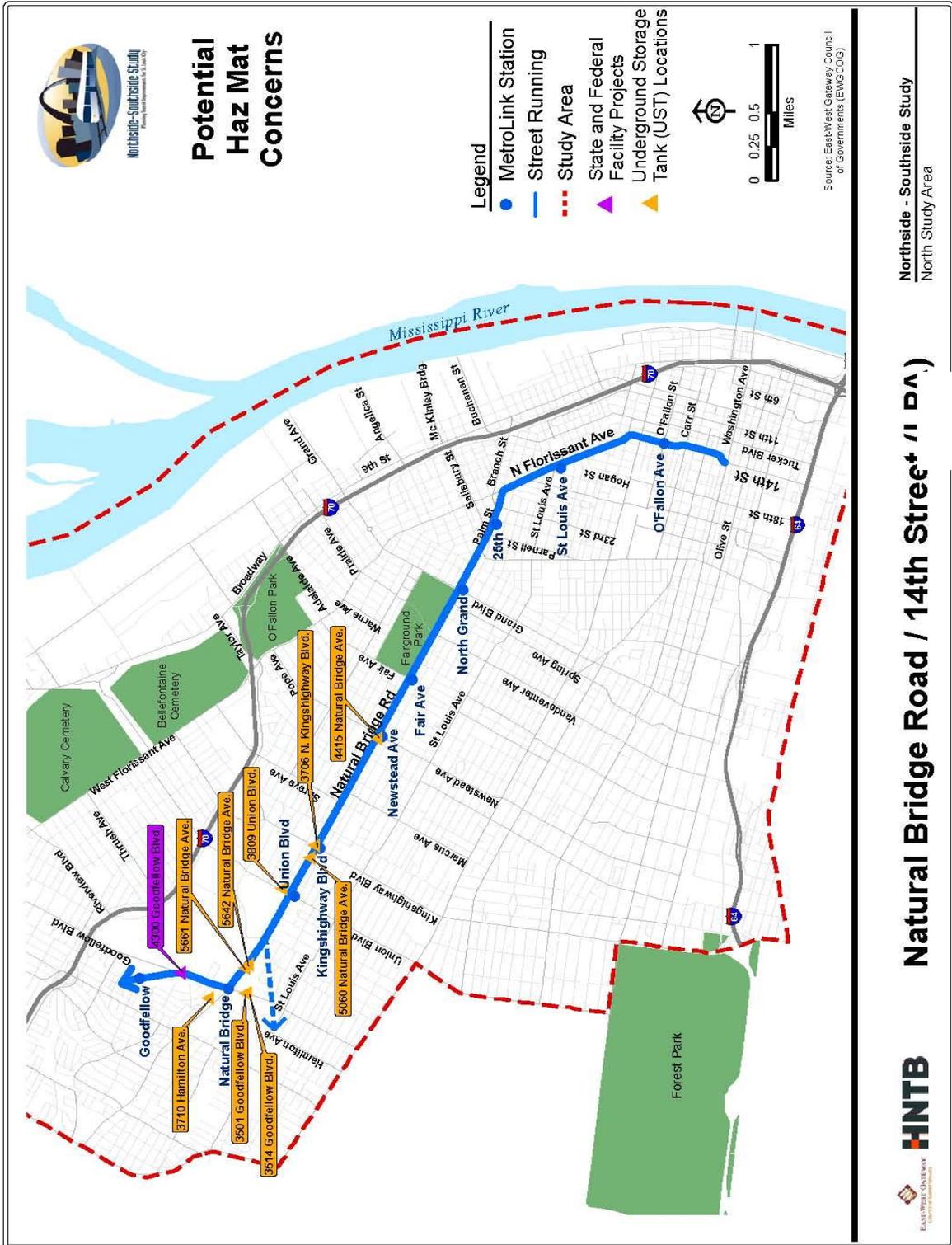
7.3.2 EFFECTS OF HAZARDOUS MATERIALS

Review of the Missouri Department of Natural Resources (MDNR) Hazardous Waste Map Gallery databases (<http://www.dun.mo.gov/env/hwp/geo/mapgallery.htm>) identified properties within the Northside area, including downtown, with potential hazardous material concerns. Databases reviewed include entries for former manufactured gas plant sites, sites managed under the brownfields/voluntary cleanup program (VCP), state and federal facilities, petroleum brownfield cleanup sites, and petroleum underground storage tank (UST) sites. This database review does not represent a Phase I Environmental Assessment in accordance with the American Society of Testing and Materials. The status or level of environmental significance and risk associated with each identified site is based on information provided in the MDNR databases reviewed. Site reconnaissance was not performed as part of this study but should be included in any future EIS, as well as completion of an electronic database report, review of historical information including aerial photography and Sanborn Fire Insurance maps, and review of available regulatory agency case files.

The database review identified 21 potential hazardous material sites within an approximate one-block radius of proposed Northside (and downtown) MetroLink station locations, as illustrated in Figures 7.3-2 and 7.3-3. These 21 sites include two former manufactured gas plants, two brownfields/VCP sites, one state and federal facility project, and 16 USTs. Results of database reviews and detailed information on each site are presented in Table 7.3.-1. The qualitative significance for potential impact from the four types of sites is noted according to the following: high for state/federal facility projects and former manufactured gas plants, medium for brownfields/VCP sites, and low for USTs. From a quantitative perspective, there are 10 potential hazardous material sites along the Natural Bridge/14th Street alignment and four sites along the 9th Street/10th Street One-Way Couplet.

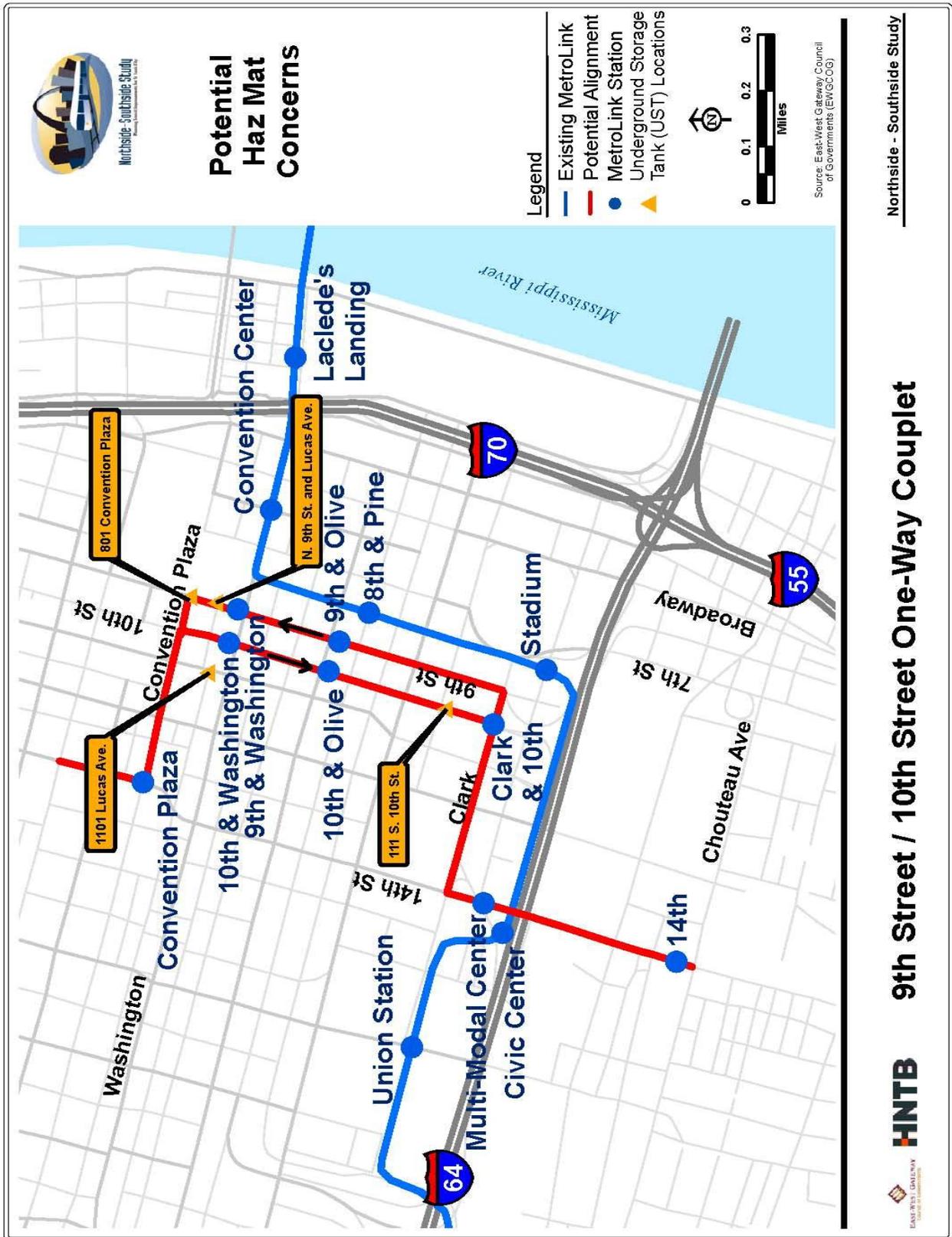
Of the two alignments, Natural Bridge Avenue/14th Street has both the highest qualitative and quantitative hazardous material rankings. This is due to the large state/federal facility noted along Goodfellow Boulevard. The 9th Street/10th Street One-Way Couplet has sites with lower hazardous material significance rankings and fewer total sites.

FIGURE 7.3-2: HAZARDOUS MATERIALS, NATURAL BRIDGE/14th



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

FIGURE 7.3-3: HAZARDOUS MATERIALS, 9TH/10TH COUPLET



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TABLE 7.3-1: POTENTIAL HAZARDOUS MATERIALS SITES

Site Name	Site Address	Database	Site Detail Information Provided
St. Louis FMGP #15	15th St. and Gratiot St. St. Louis, MO 63103	FMGP	Historically, many municipal and industrial gas plants manufactured gas from coal. Today these sites are known as FMGPs. The coal-gas production process generated many wastes. The potential primary contaminants of concern at these sites are carcinogenic polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). Other contaminants commonly encountered at FMGP sites include cyanide and several metals.
St. Louis FMGP #10	603 6th St. St. Louis, MO 63101	FMGP	Historically, many municipal and industrial gas plants manufactured gas from coal. Today these sites are known as FMGPs. The coal-gas production process generated many wastes. The potential primary contaminants of concern at these sites are carcinogenic polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). Other contaminants commonly encountered at FMGP sites include cyanide and several metals.
Paul Brown Building	881 Olive St. St. Louis, MO 63101	Brownfield	No information available.
South Downtown Remediation Site	300 Stadium Plaza St. Louis, MO 63102	Brownfield	No information available.
St. Louis Army Ammunition Plant & St. Louis Ordnance Plant Mark Twain Industrial Park	4300 Goodfellow Blvd. St. Louis, MO 63120	State/ Federal	Site is located in the northwestern section of St. Louis, bordered on the west by Goodfellow Blvd. and on the north and east by Interstate 70. The site is comprised of 21 acres. In 1944, production operations were converted from small arms to 105 mm. Contaminants of concern include polychlorinated biphenyls (PCBs) and petroleum and chlorinated solvents.
Hertz Rent-a-Car	400 Tucker Blvd. St. Louis, MO 63101	UST	Three gasoline UST removals (2,000-5,000-gallon and 1,000-6,000-gallon). Tank closure dates were 5/1/1987 and 12/8/1997. Free product recovery and groundwater monitoring has been conducted.
Southwest Electric Co.	3501 Goodfellow Blvd. St. Louis, MO 63120	UST	3,000-gallon UST containing kerosene was removed on 12/28/1989. Excavation of impacted soil was conducted.
Sportsplay Equipment	5642 Natural Bridge Ave. St. Louis, MO 63120	UST	10,000-gallon UST containing diesel fuel was removed on 12/20/1999.
Truck & Bus Group - St. Louis Plant	3802 Union Blvd. St. Louis, MO 63115	UST	2,000-gallon UST containing gasoline was removed on 2/15/1991. Soil remediation was conducted.
Transport One Inc.	3514 Goodfellow Blvd. St. Louis, MO 63120	UST	8,000-gallon UST containing diesel fuel is listed as "currently in use." Tank installation was on 1/1/1968.
City of St. Louis	9th St. and Lucas Ave St. Louis, MO 63101	UST	6,000-gallon UST containing an unknown substance was listed as removed.
National Venders	5661 Natural Bridge Ave. St. Louis, MO 63120	UST	220-gallon UST containing kerosene was removed in 9/2/1992. Excavation of impacted area was conducted and a release reported on 12/30/1991.
Southwestern Bell/Evergreen Central	3710 Hamilton Ave. St. Louis, MO 63120	UST	2,500-gallon UST containing diesel fuel is listed as "currently in use." UST was installed on 10/29/1992.

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Cervantes Convention Center	801 Convention Plaza St. Louis, MO 63101	UST	1,000-gallon UST containing diesel fuel was removed on 12/29/1993. Notification of a release was reported on 6/25/1992. Excavation and clean-up were conducted on 6/25/1992.
Sinclair Retail #24084	3706 Kingshighway St. Louis, MO 63115	UST	560-gallon UST containing used oil was removed on 5/16/1996. A release notification was submitted to MoDNR on 6/28/1997. Release notification indicates that soil and groundwater were impacted.
Vacant Property	5060 Natural Bridge Ave. St. Louis, MO 63115	UST	UST containing gasoline fuel was "closed in place."
General Service Administration	111 10th St. St. Louis, MO	UST	A release notification was submitted on 1/1/1994. Clean-up activities were shown to be conducted from 10/11/1994 to 2/25/1999.
Union Electric Plaza Substation	1401 Clark St. St. Louis, MO 63103	UST	A release notification was submitted on 2/4/1993. Records show that an excavation was conducted.
Quality Hill - Block 54	1101 Lucas Ave, St. Louis, MO 63101	UST	Records indicate a release notification of an unknown substance was submitted to MoDNR on 10/27/1992. Records also indicate that an excavation occurred at the site.
Bi-State Development	Clark Ave. and 15th St. St. Louis, MO 63103	UST	Records indicate notification of a release was reported on 5/18/1992. An excavation was conducted at the site.
Julian Anderson Library	4415 Natural Bridge Ave. St. Louis, MO 63115	UST	Notification of a release was reported on 10/11/1991. An excavation was conducted at the site.

Notes:

State/Federal - State and Federal Facility Project
 Brownfield - Petroleum Brownfield Cleanup
 FMGP - Former Manufactured Gas Plant
 UST - Underground Storage Tank

7.3.3 THREATENED AND ENDANGERED SPECIES

Natural heritage resources are defined as the habitat of rare, threatened, or endangered species; unique or exemplary natural communities; or significant geologic formations. Avoiding the disturbance of threatened or endangered species and natural areas is necessary in the development of transportation improvements.

According to the Missouri Natural Heritage Database, the City of St. Louis harbors only one state-endangered species, the peregrine falcon (*Falco peregrinus*). While these falcons normally nest atop tall buildings, they are also known to occasionally nest on bridges.¹ Only an on-site inspection can verify the absence or existence of this species. Missouri's endangered species law (Missouri Rev. Stats. Sec. 252.240) protects listed species but does not regulate habitat. This differs from the federal ESA, which protects both endangered species and their habitats.

¹ According to conversation with Mr. Mike Arduser, Missouri Department of Conservation, on 1/24/06.

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No federally protected species or natural heritage sites have been identified within the study area. Formerly under federal protection, the peregrine falcon is currently a “delisted” federal species and only undergoing monitoring.

Because there is minimal, if any, habitat within the study area, and no existing bridges are expected to be demolished, the likelihood of the project impacting the peregrine falcon or its habitat is slight. If desired, coordination with the Missouri Department of Conservation, Missouri Department of Natural Resources, the US Army Corps of Engineers, and the US Fish & Wildlife Service could develop effective avoidance or mitigation measures during construction. Any required future study could include inspections of bridges within 1,500 meters of construction activities. If nest sites are located, potential mitigation measures could include avoiding the nesting season (April 15 through July 15) or limiting project activities within 1,500 meters of active nesting sites.

7.3.4 AIR QUALITY

The study area is located within the Metropolitan St. Louis Interstate Air Quality Control Region (AQCR #070), which is currently in attainment of the standards for six of the eight criteria pollutants: carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, sulfuric acid, and lead. St. Louis is classified as being in moderate non-attainment for the 8-hour ozone standard and non-attainment for the PM-2.5 standard.

Legacy 2030: The Transportation Plan for the Gateway Region was prepared by EWGCOG in March 2005. The “Northside LRT” is included as an illustrative project in this plan. Based on the conformity analysis conducted as part of the long-range plan development, the projects and programs included in Legacy 2030 are found to be in conformity with the requirements of the CAAA of 1990, the relevant sections of the Final Conformity Rule 40 CFR Part 93, and the Missouri State Conformity Regulations 10 CSR 10-5.480.

In addition, states that have non-attainment areas are required to prepare State Implementation Plans (SIP) that lay out a strategy on how the state will improve air quality to attain National Ambient Air Quality Standards (NAAQS). Transit projects, both new and improvement projects, must be contained in the area’s Transportation Improvement Program (TIP). Modeling procedures for ozone and particulate matter require long-term meteorological data and detailed area-wide emission rates for all existing and potential sources. This modeling is performed by the Metropolitan Planning Organization (MPO) for the region to show that regional emissions plus projects in the TIP are in conformance with the SIP and the CAA amendments. EWGCOG, as the MPO for this region, performs regional modeling analysis. Once the detailed alternatives have been established and the regional traffic network has been appropriately modified, EWGCOG may include the project in a future TIP. Once EWGCOG completes the analysis, it is forwarded to the EPA for final ruling on the TIP’s conformance with the SIP and the CAA and its amendments. Without a conformity determination, the project cannot be implemented.

7.3.5 NOISE AND VIBRATION IMPACTS

It is widely agreed that the noise and vibration effects of transit projects on the surrounding community are a major concern. A transit system is, by its nature, situated in areas where it can serve the population. It must be placed near residential uses in order to operate effectively. As such, mitigation measures must be applied as is practical to minimize noise and vibration impacts that can be expected by nearby residents and other sensitive receptors.

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Detailed noise and vibration assessments are not typically done at this stage since the proposed infrastructure improvements lack the necessary detail. Once a preferred alternative is selected, however, a noise assessment will be performed according to FTA procedures to identify potential impacts and possible mitigation measures for that alternative. The noise impacts will be studied in greater detail in the EIS and will comply with requirements set forth by FTA.

A detailed analysis will quantify impacts through in-depth analysis (usually) performed for a single alternative. Site-specific impacts and mitigation measures will be delineated for the preferred alternative during preliminary engineering.

To this point, no potentially severe impacts due to close proximity of sensitive land uses to the proposed Northside and downtown alignments have been identified.

Vibration impacts to older buildings could be an issue for this project. Historic buildings, primarily adjacent to the downtown alignment, could be affected. Damage to old, fragile buildings can occur at levels above 95 VdB. Mitigation can be applied to dampen vibrations where vibration impacts are anticipated. Further study should be done to determine potential impacts to these sensitive uses.

Noise impacts to residential uses may also be of concern. However, the project is proposed within highly traveled areas that already experience noise effects of traffic. The noise increase will be studied to understand the level of noise increase that can be expected.

Where the noise impact assessment shows “Extreme Impacts” or “Moderate Impacts,” mitigation will be proposed consistent with the FTA’s *Transit Noise and Vibration Impact Assessment* guidance. As stated in the guidance, mitigation may involve treatments (1) at the noise source, (2) along the source-to-receiver propagation path or (3) at the receiver. Table 7.3-2 shows typical mitigation measures for transit projects. The type and level of mitigation would need to be determined through detailed noise studies at the draft EIS stage.

Mitigation can also be applied to minimize the adverse effects ground-borne vibration may have on sensitive land uses. Adequate maintenance of vehicle wheels and the rails can help control levels of ground-borne vibration. If further reductions in vibration levels are deemed necessary, though, the following items could be considered:

- Maintenance procedures.
- Location and design of special trackwork.
- Vehicle modifications.
- Changes in the track support system.
- Building modifications.
- Adjustments to the vibration transmission path.
- Operational changes.

TABLE 7.3-2: TYPICAL TRANSIT NOISE MITIGATION MEASURES

Application	Mitigation Measure	Effectiveness	
SOURCE	Stringent Vehicle & Equipment Noise Specifications	Varied	
	Operational Restrictions	Varied	
	Resilient or Damped Wheels*	For Rolling Noise on Tangent Track:	2 dB
		For Wheel Squeal on Curved Track:	10-20 dB
	Vehicle Skirts*		6-10 dB
	Undercar Absorption*		5 dB
	Spin-slide control (prevents flats)*		**
	Wheel Truing (eliminates wheel flats)*		**
	Rail Grinding (eliminates corrugations)*		**
	Turn Radii greater than 1000 ft*		(Avoids Squeal)
	Rail Lubrication on Sharp Curves*		(Reduces Squeal)
	Movable-Point Frogs (reduce rail gaps at crossovers)*		(Reduces Impact Noise)
	Engine Compartment Treatments (Buses)		6-10 dB
PATH	Sound Barriers close to Vehicles	6-15 dB	
	Sound Barriers at ROW Line	3-10 dB	
	Alteration of Horiz. & Vert. Alignments	Varied	
	Acquisition of Buffer Zones	Varied	
	Ballast on At-Grade Guideway*		3 dB
	Ballast on Aerial Guideway*		5 dB
	Resilient Track Support on Aerial Guideway		Varied
RECEIVER	Acquisition of Property Rights for Construction of Sound Barriers	5-10 dB	
	Building Noise Insulation	5-20 dB	
* Applies to rail projects only			
** These mitigation measures work to maintain a rail system in its as-new condition. Without incorporating them into the system, noise levels could increase up to 10 dB.			

Source: Federal Transit Administration Office of Planning and Environment. *Transit Noise and Vibration Impact Assessment*. FTA-VA-90-1003-06. May 2006.

7.3.6 GEOLOGIC IMPACT ASSESSMENT

The area's many sinkholes and the related karst geology must be considered in the development and evaluation of alignment and station location alternatives. Building on karst topography can have environmental consequences and can create hazards during construction. Additionally, future phases of the study will need to consider the management of stormwater runoff in order to maintain groundwater quality and minimize the risk of contamination.

As identified in Figure 7.3-1, there are sinkholes within the proposed area; these will require geotechnical studies, typically completed for construction engineering. Mitigation and construction best practices should be developed to address potential hazards presented. Hazardous materials mitigation and abatement activities should also protect against release of materials that could migrate to karst features and easily flow into groundwater.

7.3.7 IMPACTS TO CULTURAL RESOURCES

The St. Louis area has an extremely rich history, dating back as far as 700 A.D., when Indians of the Late Woodland culture began living in villages in the region. Several Indian burial mounds were located all over the city, giving it the popular name, "Mound City." One of the

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most prominent was located at the northeast corner of Broadway and Mound Street. Big Mound, as it is known, was the largest of about a dozen mounds in a riverfront area extending southward to Biddle Street.² According to the State Historic Preservation Office, remnants of mounds may still exist.

The city also has numerous historic buildings, many of which are being rehabilitated under the Missouri Historic Tax Credit program. The Northside study area has 20 historic districts, 116 historic buildings, and five historic structures currently listed on the NRHP³ (Figure 7.3-5 and Table 7.3-3). The City of St. Louis has also designated six Certified Local Historic Districts, one local historic district (The Ville), and numerous city landmarks throughout the study area. Many are located downtown, with other clusters in The Ville and in the central corridor.

A project is considered to have an “adverse effect” on a historic property when its impact may diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.

Adverse effects on historic properties include, but are not limited to:

- Physical destruction, damage, or alteration of all or part of the property. Potential impacts to historic structures for this project will include the effects of added ground-borne vibration. Damage to old, fragile buildings may occur at levels above 95 VdB. Mitigation can be applied to dampen vibrations where vibration impacts occur.
- Isolation of the property from or alteration of the character of the property’s setting when that character contributes to the property’s qualifications for the National Register. For this project, this type of impact to individual structures of districts could come in the form of redevelopment pressure. TOD is common around station locations. This effect, however, is sought by the project as a positive benefit to economic development for the City of St. Louis and its individual neighborhoods.
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.
- Neglect of a property resulting in its deterioration or destruction.
- Transfer, lease, or sale of the property.

Coordination with the State Historic Preservation Office will take place in future phases of the study to more precisely determine potential impacts to historic, cultural, and archaeological resources. It is expected that many of the sites listed in Table 7.3-3 will not be impacted if they are not within the extents of construction or directly adjacent to the rail lines. This determination of adverse effect, however, would be made by qualified historians and in consultation with SHPO. For purposes of this study, alignments can be compared based on the number of sites that could potentially be impacted.

The primary area of concern is the downtown area where there exist numerous listed individual sites, as well as the Cupples Warehouse and Washington Avenue Historic Districts. The downtown alignment affects a large number of individual historic sites. It runs along the

² “History of St. Louis Neighborhoods: Old St. Louis.” City of St. Louis. www.stlouis.missouri.org

³ National Register of Historic Places (NRHP) point file (8/6/02M); provided by East West Gateway Council of Governments, 2005.

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northern boundaries of both the Washington Avenue and Cupples Warehouse Historic Districts.

Along the Northside alignment, few of the individual listed properties are directly adjacent to the roadway. Carr School on North 14th Street between Biddle and Cole Streets (Figure 7.3-4) is listed for its architectural significance. It is currently vacant and in disrepair. Also the Mullanphy Historic District and the Murphy Blair Historic District are both located along North Florissant Avenue. Many buildings within the Northside study area are deteriorating and being lost to demolition. Neighborhood groups such as the Old St. Louis Restoration Group and others are campaigning and working to save these unique brick building neighborhoods.

For affected sites that are listed or eligible for listing on the National Register of Historic Places, the Section 106 process will require consultation with representative historic societies, the State Historic Preservation Office, and other affected parties, collectively known as “consulting parties.” Section 106 of the National Historic Preservation Act requires that prior to approving an undertaking, the Federal Agency, here the FTA, must take into account the effects of the undertaking on historic properties. This includes identifying and evaluating the properties and the effects. This study would be done by qualified historians and archaeologists. If it is determined that the project will have adverse effects on eligible cultural resources, agreements must be drawn up between the affected consulting parties and the developer of the project on how to address the effects. This is all done in consultation with the SHPOs and the other consulting parties.

In addition, a “Section 4(f)” evaluation will be required if historic properties will be adversely affected. This process, which is established to protect parks and historic sites, is discussed under *Section 7.3.9: Section 4(f) and Section 6(f)* of this chapter.

TABLE 7.3-3: HISTORIC REGISTER SITES AND DISTRICTS

Name	Address	Affected Area (Northside or Downtown)
1907 Dorris Motor Car Company Building	4063-65 Forest Park Avenue	None
A. D. Brown Building	1136 Washington Street	None
Advertising Building	1627-29 Locust Street	Downtown
Ambassador Theater Building	411 7th Street	Downtown
American Theater	416 9th Street	Downtown
American Zinc, Lead and Smelting Company Building	20 4th Street	Downtown
Antioch Baptist Church	4213 North Market Street	None
Aubert Place	Fountain Avenue between Walton Avenue and Kingshighway	None
Balmer and Weber Music House Company Building	1004 Olive Street	Downtown
Beaumont Medical Building	3714-26 Washington Avenue	None
Beethoven Conservatory	2301 Locust Street	None
Bell Telephone Building	920 Olive Street	Downtown
Bissell Street Water Tower	Bissell Street at Blair Avenue	None
Blackwell-Wielandy Building	1601-09 Locust Street	Downtown
Blind Girl's Home	5235 Page Boulevard	None
Block Unit #1 Historic District	4100-4191 Enright Avenue	None
Boatman's Bank Building	300 Broadway Street	Downtown
Building at 1300 Washington Avenue	1300-1310 Washington Avenue	Downtown
Butler House	4484 West Pine Boulevard	None
Carr School	1419 Carr Street	Northside
Centenary Methodist Episcopal Church, South	55 Plaza Square	None

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Name	Address	Affected Area (Northside or Downtown)
Charles Sumner High School	4248 West Cottage Avenue	None
Charles Turner Open Air School	4235 West Kennerly Avenue	None
Chemical Building	721 Olive Street	Downtown
Chouteau Apartments/Parkway Dwellings	4937-43 Laclede Avenue	None
Christ Church Cathedral	1210 Locust Street	Downtown
City Club Building	1012-1024 Locust Street	Downtown
Clemens House-Columbia Brewery District	Bounded roughly by Maiden Lane, Cass Avenue, 21st Street, Helen Street, and Howard Street	Northside
Cupples Warehouse District	Bounded roughly by Spruce and Clark Streets, between 7th and 11th Streets	Downtown
Delaney Building	1000-1006 Locust Street	Downtown
DePaul Hospital	2415 Kingshighway	None
Dorris Motor Car Company Building	4100 Laclede Avenue	None
Eastman Kodak Building	1009 Olive Street	Downtown
Eliot Scholl	4242 Grove Street	None
Emerson Electric Company Building	2012-2018 Washington Avenue	None
Eugene Field House	634 Broadway Street	None
Fashion Square Building	1307 Washington Avenue	Downtown
Forest Park Hotel	4910 West Pine Boulevard	None
Forest Park Southeast Historic District	Bounded by I-44, Kingshighway, I-64 and Vandeventer Avenue	None
Fox Theater	527 Grand Boulevard	None
Frank P. Blair School	2707 Rauschenbach Street	Northside
Frisco Building	906 Olive Street	Downtown
Fullerton's Westminster Place	Westminster Place	None
Fulton Bag Company Building	612-618 7th Street	None
Gateway Arch	Mississippi River at Market Street	None
Grand Boulevard Water Tower (#1)	Grand Boulevard at 20th Street	None
Hadley-Dean Glass Company	701-705 11th Street	Downtown
Hamilton-Brown Shoe Factory	2031 Olive Street	None
Hargadine-McKittrick Dry Goods Building	911 Washington Avenue	Downtown
Holy Corners Historic District	Both sides of Kingshighway, between and including Westminster Place and Washington Avenue	None
Holy Cross Parish District	8115 Church Road	None
Homer G. Phillips Hospital	2601 Whittier Street	None
Hotel Statler	822 Washington Avenue	Downtown
International Fur Exchange Building	2-14 4th Street	Downtown
J. Kennard and Sons Carpet Company Building	400 Washington Avenue	Downtown
J.C. Penney Company Warehouse Building	400 14th Street	Downtown
Jackson School	1632 Hogan Street	Northside
Jefferson National Expansion Memorial National Historic Site	Mississippi River between Washington Avenue and Poplar Street	Downtown
Joseph Erlanger House	5127 Waterman Boulevard	None
Kate Chopin House	4232 McPherson Avenue	None
Kiel Opera House	1400 Market Street	Downtown
Kulage House	1904 College Avenue	None
Laclede Building	408 Olive Street	Downtown
Laclede's Landing	Bounded roughly by Washington Avenue, 3rd Street, Dr. Martin Luther King Drive, and the Mississippi River	Downtown
Lambert Building	2101-07 Locust Street	None

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Name	Address	Affected Area (Northside or Downtown)
Lambert-Deacon-Hull Printing Company Building	2100 Locust Street	None
Lambskin Temple	1054 S Kingshighway	None
Lennox Hotel	823-827 Washington Avenue	Downtown
Leonardo	4166 Lindell Boulevard	None
Lesan-Gould Building	1320-1324 Washington Avenue	Downtown
Lewis Place Historic District	Lewis Place	Northside
Liggett and Myers (Rice-Stix) Building	1000 Washington Avenue	Downtown
Liggett and Myers Tobacco Company Building	1900-12 Pine Street	None
Lindell Read Estate Company Building	1015 Washington Avenue	Downtown
Lister Building	4500 Olive Street	None
Loretto Academy	address restricted	?
Louderman Building	317 North 11th Street	Downtown
Louise Apartments	3900 Lindell Boulevard and Vandeventer Avenue	None
Lucas Avenue Industrial Historic District	Bounded by Washington Avenue, Delmar Boulevard, 20th and 21st Streets	None
Majestic Hotel	1017-23 Pine Street and 200-10 11th Street	Downtown
Majestic Manufacturing Company Buildings	2014 Delmar Boulevard and 2011-2017 Lucas Avenue	None
Maryland Hotel	205 9th Street	Downtown
May Company Department Store Building	509-23 Washington Avenue	Downtown
Mayfair Hotel	806 St. Charles Avenue	Downtown
Midtown Historic District	Lindell Boulevard and Grand Boulevard	None
Mississippi Valley Trust Company Building	401 Pine Street	None
Mullanphy Historic District	North 14th Street between Mullanphy and Howard Streets, and North 13th Street between Howard and Tyler Streets	Northside
Murphy-Blair District	Bounded roughly by I-70, North Florissant Avenue, Chambers Street, and Branch Street Olive Street Terra Cotta District 600-622 Olive Street Portland & Westmoreland Places northeast corner of Forest Park	Northside
Negro Masonic Hall	3615-3619 Dr. Martin Luther King Boulevard	None
Neighborhood Gardens Apartments	1205 7th Street	None
Old Laclede Gas & Light Company	1017 Olive Street at northeast corner of 11th Street)	Downtown
Page Boulevard Police Station	Page and Union Boulevards	Northside
Peters Shoe Company Building	1232-36 Washington Avenue	Downtown
Phipps-Wallace Store Building	312-316 North Eighth Street	Downtown
Phyllis Wheatley Branch YWCA	2709 Locust Street	None
Pine Lawn Carriage House	6292-94 Stillwell Drive	None
Plaza Hotel Complex	307 North Leonard Street, 3301-3321 Olive Street, 3300-3322 and 3301-3339 Lindell Boulevard, 3322-3334 Locust Street	None
President (River Steamboat)	500 N Leonor K. Sullivan Boulevard	None
Robert G. Campbell House	1508 Locust Street	Downtown
Robert Henry Stockton House	3508 Samuel Shepard Drive	None
Rock Spring School	3974 Sarpy Avenue	None

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Name	Address	Affected Area (Northside or Downtown)
SS Cyril and Methodius Historic District	Bounded roughly by 11th Street, Chambers Street, Tyler Street, and Hadley Streets	Northside
Samuel Cupples House	3673 W Pine Boulevard	None
Sanitol Building	4252-4264 Laclede Avenue	None
Scott Joplin House Historic Site	2658 Delmar Boulevard	None
Scruggs-Vandervoort-Barney-Warehouse	917 Locust Street	Downtown
Second Presbyterian Church	4501 Westminster Place	None
Security Building	319 4th Street	Downtown
Shelley House	4600 Labadie Avenue	None
Silk Exchange Building	501-511 Tucker Boulevard	Downtown
Simmons Colored School	4306-4318 St. Louis Avenue	None
St. Augustine's Roman Catholic Church	3114 Lismore Street	Northside
St. Joseph's Roman Catholic Church	1220 11th Street	Northside
St. Liborius Church and Buildings	1835 18th Street	Northside
St. Louis Colored Orphans Home	2612 Annie Malone Drive	None
St. Louis Post-Dispatch Building	1139 Olive Street	Downtown
St. Louis Post-Dispatch Printing Building	1111 Olive Street	Downtown
St. Louis Provident Association Building	2221 Locust Street	None
St. Louis Theatre Building	718 Grand Boulevard	None
St. Louis Union Station	18th and Market Streets	Northside
St. Mary of Victories Church	744 3rd Street	None
St. Stanislaus Kostka Church	1413 20th Street	None
Stowe Teachers College	2615 Billups Street	None
Tandy Community Center	4206 West Kennerly Avenue	None
U.S. Customhouse & Post Office	8th and Olive Streets	Downtown
Union Market	Broadway Street and Lucas Avenue	Downtown
Union Station Post Office Annex	329 18th Street	Downtown
Union Trust Company Building	705 Olive Street	Downtown
Vesper-Buick Auto Company Building	3900-3912 West Pine	None
Wainwright Building	709 Chestnut Street	Downtown
Wainwright Tomb	Bellefontaine Cemetery	None
Washington Avenue Historic District	Bounded roughly by Delmar Boulevard, Tucker Boulevard, St. Charles Avenue, 15th Street, Olive Street, 18th Street, and Washington Avenue	Downtown
Washington Avenue East of Tucker District	Bounded roughly by Lucas Street, 9th Street, St. Charles Avenue, Locust Street, and Tucker Boulevard	Downtown
Willys-Overland Building	2300 Locust Street	None
Winkelmeyer Building	11th and Walnut Streets	Downtown

Source: National Register of Historic Places (NRHP) point file (8/6/02M); provided by East West Gateway Council of Governments, 2005

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FIGURE 7.3-4: EXAMPLES, HISTORIC STRUCTURES

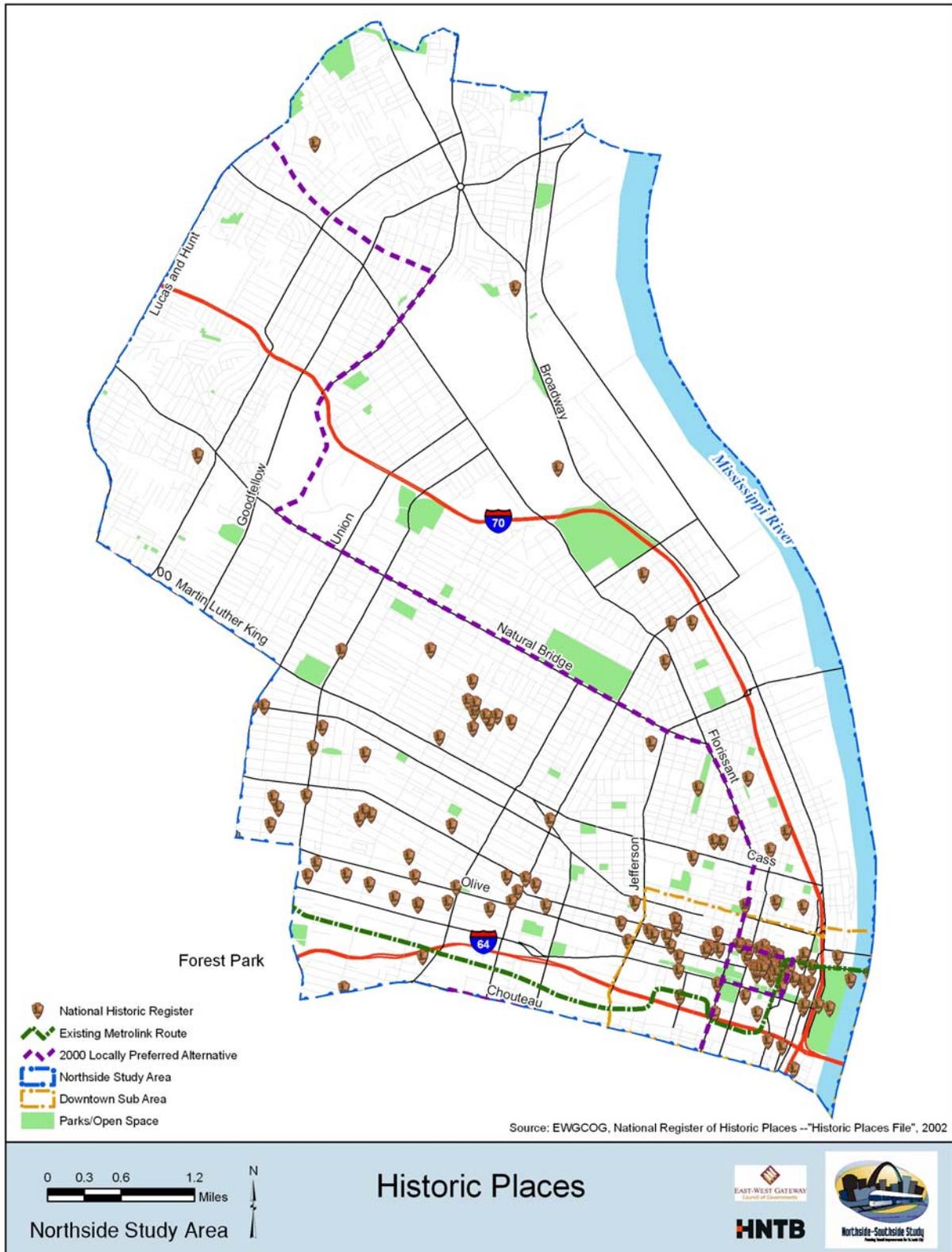


Crown Candy Kitchen in the Murphy Blair Historic District



Carr School

FIGURE 7.3-5: PARKS AND HISTORIC PLACES



NOTE: "NATURAL BRIDGE ROAD BECOMES NATURAL BRIDGE AVENUE WITHIN ST. LOUIS CITY LIMITS."

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7.3.8 IMPACTS TO PARKS

St. Louis has an established system of parks, including a number of municipal and county facilities, a national park, and a system of regional greenways and trails. Many other local parks and open spaces are located throughout the study areas, as shown in Figure 7.3-5.

Parks can be impacted by transit projects either through acquisition of land for right-of-way or through temporary impacts suffered during construction, such as access limitations. Parks can also be impacted when access is permanently changed or hindered. Parks can also suffer proximity impacts that impair their activities, features, or attributes.

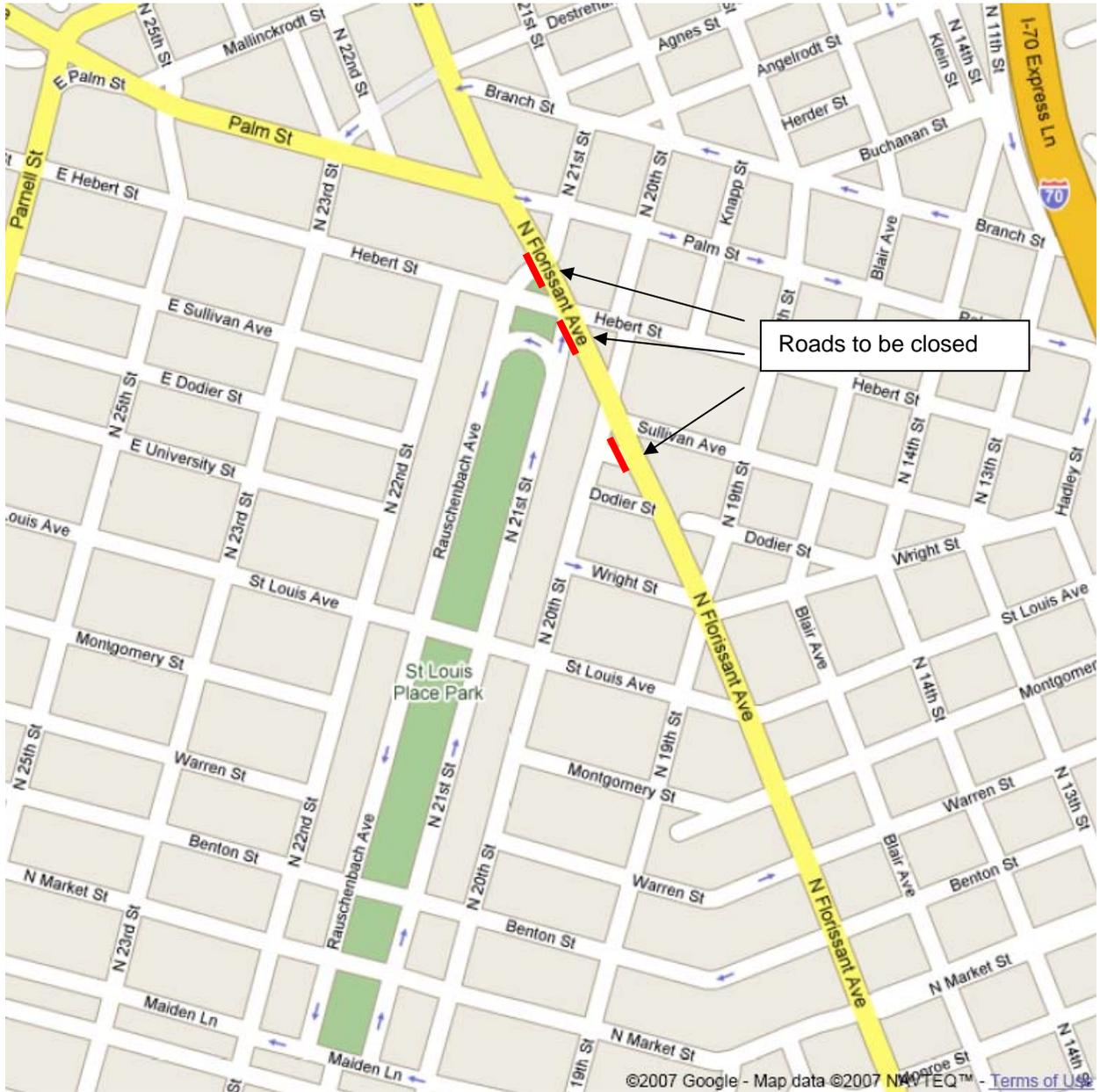
In addition to NEPA review, impacts to parks are regulated under Section 4(f) of the Department of Transportation Act of 1966. These requirements are discussed in greater detail in Section 7.3.9 of this chapter.

Northside parks that abut the project include Fairgrounds Park, and two minor parks, Carr Square Park and St. Louis Place Park/Jeanne Jugan Square. Carr Square Park will see changes in access when medians are installed along 14th Street from Martin Luther King, Jr. Drive to Cass Avenue. This will limit movements to right-in, right-out only at these intersections.

Current plans also show the closure of three roads near St. Louis Place Park and Jeanne Jugan Square, as shown in Figure 7.3-6. Traffic entering and exiting the park will be redirected to other streets. None of these proposed changes are expected to eliminate or significantly impair access to the point of affecting park use. The significance of these impacts will be determined in consultation with the St. Louis Parks Division and the FTA.

The downtown alignment runs adjacent to the Gateway Mall and Serra Sculpture Park (Figure 7.3-7). Should these parks be affected by this project, it would most likely be during construction or if any additional right-of-way is required to accommodate street-running LRT.

FIGURE 7.3-6: ROAD CLOSURES AT ST. LOUIS PLACE PARK



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FIGURE 7.3-7: MAJOR ADJACENT PARKS



Kiener Plaza



Serra Sculpture Park



Fairgrounds Park

Source: City Parks Division website

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7.3.9 SECTION 4(f) AND SECTION 6(f)

Two similar regulatory initiatives have been developed to protect public parks, recreational areas, wildlife refuges, and historic places prior to a conversion of land use. In accordance with 23 CFR Part 771, the requirements of Section 4(f) must be satisfied prior to the conversion of any of the above mentioned resources by a project sponsor. In accordance with Section 6(f) of the Land and Water Conservation Fund (LWCF) Act, any public land acquired through LWCF monies must adhere to certain property management and land use stipulations. Driven by two separate regulatory requirements, both Section 4(f) and 6(f) requirements must be satisfied for this study.

Section 4(f) was enacted as Section 4(f) of the Department of Transportation Act of 1966. The intent of the law is to preserve parkland, recreation areas, refuges, and historic sites by limiting the circumstances under which such land can be used for transportation programs or projects. Section 4(f) permits the use of land for a transportation project from a significant publicly owned public park, recreational area, wildlife or waterfowl refuge, or any significant historic site only when the administration has determined that (1) there is no feasible and prudent alternative to such use, and (2) the project includes all possible planning to minimize harm to the property resulting from such use. In order to demonstrate that there is no feasible and prudent alternative to the use of Section 4(f) land, the evaluation must include a specific purpose and need for the project, address location alternatives, and design shifts that avoid the Section 4(f) land and “unique problems” associated with these design shifts.

Section 6(f) (3) refers to the manner in which open space and public recreation areas are acquired. The LWCF Act requires that property acquired or developed with LWCF assistance, regardless of the extent of that assistance, be retained and used for public outdoor recreation in perpetuity. Such property may not be converted to any other use without prior approval of the Secretary of the U. S. Department of the Interior, working through the Outdoor Recreation Assistance Program (ORAP), Missouri Department of Natural Resources. To obtain this approval, a written conversion request and justification of need for such an action must be submitted to ORAP with appropriate documentation. If approval is granted, all converted property must be replaced with land and/or facilities of at least equal value and use. No Section 6(f) properties have been identified within the area of potential effect of the study corridors. The City of St. Louis has utilized LWCF funds for a number of city park improvements. LWCF funds have been granted to fund improvements at Fairground Park. However, no right-of-way is expected to be needed from that park. The City of St. Louis has utilized LWCF funds for a number of other park improvements. Further coordination with City Parks will be necessary to determine the extent of Section 6(f) property takes for right-of-way in the downtown area.

The study area contains approximately 718 acres of federal, state, county and/or city parks. Potential applications of 4(f) and/or 6(f) towards these sites, as well as downtown historic properties, are listed in Table 7.3-4. Of particular importance on the Northside is Fairgrounds Park, a 132-acre park located adjacent to Natural Bridge Avenue at Grand Boulevard and a number of parks in downtown St. Louis, including the Jefferson National Expansion Memorial (the Arch), Gateway Mall, and those located between Market Street and Union Station.

The necessity for 4(f) evaluations will be determined as detailed evaluations are performed in future engineering phases. Preliminary investigations indicate potential impacts that should be explored further to determine compliance with Section 4(f). Avoidance of these sites in project design should also be considered where feasible.

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TABLE 7.3-4: POTENTIAL SECTION 4(f)/6(f) USES

Property	Alternative	Potential Impacts	4(f)/6(f) "use"
Fairgrounds Park	Northside	Transit vehicles would run in centerline of Natural Bridge Ave., which runs along the southerly boundary of the park.	Not likely a Section 4(f) or 6(f) use since no right of way acquisition.
St. Louis Place Park/Jeanne Jugan Square	Northside	Closure of Rauschenbach Avenue and 21 st Street at N. Florissant Avenue would eliminate direct access to the parks from N. Florissant Avenue.	Reduction in access could possibly be considered a 4(f) constructive use.
Carr Square Park	Northside	A new median on 14 th Street will create a right-in, right-out situation for vehicles at Cole Street and Carr Street, which abut the park.	Reduction in access could possibly be considered a 4(f) constructive use.
Downtown historic properties	Downtown Couplet	Construction and vibration impacts could affect buildings.	Determination of adverse effect needs to be made in consultation with SHPO and consulting parties (Section 106 process).

7.3.10 CONSTRUCTION IMPACTS

Unavoidable temporary impacts are expected during the construction period for this project. Construction creates dust, noise and vibration. As with any transportation construction project, impacts would need to be minimized through the application of best management practices. Businesses will need to be consulted and provisions made to ensure that access is kept open during construction. Coordination with utility companies, such as sewer, water, electric power, and gas providers will also be necessary to ensure service interruptions are minimized.

Refinement of Locally-Preferred Alternative

Chapter 8.0

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Chapter 8.1: Introduction

The Northside-Southside Major Transit Improvements Study concludes with a recommendation to the East-West Gateway Council of Governments (EWGCOG) Board of Directors for the approval of a single, locally-preferred alternative (LPA), to be included in the region's long-range transportation plan. Should the Northside-Southside corridor be selected for further transit development, the LPA would be the alternative to be advanced into the project development process (discussed below).

The LPA recommendation results from technical evaluation conducted by the study team and from input from the study's extensive community and stakeholder outreach program, which included more than 40 stakeholder interviews, over 100 outreach presentations, three rounds of public open houses, four newsletters, and more than 300 written comments. The study team is composed of representatives of EWGCOG, Metro, the Missouri Department of Transportation (MoDOT), and the technical consultant team. In addition, for purposes of alternative assessment and selection, the team added representatives from two City of St. Louis agencies - the Planning Department and the Board of Public Service - and Citizens for Modern Transit. The study's Technical Advisory Committee (TAC), which includes officials from the City of St. Louis, St. Louis County, Metro, and MoDOT, formally approved the LPA on August 22, 2007.

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Chapter 8.2: Locally-Preferred Alternative Recommendation

A preferred alignment within the Northside (with downtown) and Southside study corridors was selected. Together, the preferred alignments comprise the Northside-Southside LPA.

8.2.1 NORTHSIDE SEGMENT

The preferred alternative for the Northside (Figure 8.2-1) includes street-running light-rail transit (LRT) extending from downtown on 14th Street and continuing north in the median of North Florissant Avenue, west on Natural Bridge Avenue, and north in Goodfellow Boulevard. It terminates at a park-and-ride lot on Goodfellow south of I-70.

This alignment was recommended for several reasons:

- The alignment travels through and serves the core – rather than the periphery – of Northside residential and commercial development.
- The alignment will help connect existing new development in the corridor with areas still to experience such activity.
- The alignment serves the Union-70 Business Park, which is the only significant Northside employment center.
- The alignment provides good connectivity to future potential LRT extensions to the west and north.
- The alignment has no major adverse impacts on adjacent property.

The estimated cost for the Natural Bridge/North 14th alignment is \$311.5 million (in 2007 dollars) or approximately \$46 million per mile, for the 6.8-mile alignment.

8.2.2 DOWNTOWN SEGMENT

Two downtown alignment alternatives, both street-running LRT, were evaluated. The first (Figure 8.2-2) begins north of downtown on 14th Street and extends east to Convention Plaza utilizing double-tracks. Between Convention Plaza and Clark Street the alignment extends to 9th and 10th Streets, with a single track, in curb lanes, on each street. The alignment then turns west on Clark, with double tracks in the median, and south on 14th Street past the new Gateway Multimodal Transportation Center.

The second downtown alternative (Figure 8.2-3) includes street-running LRT, with double tracks on 14th Street and a single-track, one-way loop, in curb lanes on Chestnut Street, Olive Street, and 6th Street. Both northbound and southbound trains would use the loop extending east on Chestnut Street and west on Olive Street.

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The first alignment, (the 9th/10th Couplet), was recommended for the downtown segment of the Northside-Southside LPA for several reasons:

- The alignment provides a more direct north-south route, the main focus of travel in the overall corridor, through the downtown.
- The alignment avoids track and operation complexity at the western end of the loop, which would increase costs and the likelihood of delays.
- The alignment serves the center of the downtown employment concentration.
- The alignment provides transit access to developments south of Market Street.
- The alignment avoids major or significant property impacts.

The cost of the 9th/10th Couplet alternative is estimated at \$122.1 million (in 2007 dollars) for the 1.4-mile alignment or \$87.2 million per mile.

8.2.3 SOUTHSIDE SEGMENT

For the Southside study area, there were also two final alignment alternatives. (The process leading to their selection is discussed in Chapter 5 of this report.) The first (Figure 8.2-4) extends from downtown with street-running LRT in the median on the 14th Street bridge, over the Mill Creek Valley. It then continues west in the median of Chouteau Avenue to the Union Pacific Railroad (UPRR) freight railroad right-of-way, which is shared with the UPRR until the southern edge of Carondelet Park. At that point, the alignment runs in the I-55 right-of-way, but not in the median. The alternative terminates at a park-and-ride lot at the Bayless Avenue interchange of I-55. It is important to note that the UPRR is willing to share its right-of-way with LRT but requires a separation of 50 feet between railroad and LRT tracks. The estimated cost for this alternative is \$678 million (in 2007 dollars), at 11.05 miles in length, this amounts to approximately \$61.4 million per mile. *These costs do not include the additional cost, primarily in terms of additional right-of-way acquisition, that would result from adhering to the UPRR's 50-foot separation requirement.*

The second Southside alternative (Figure 8.2-5) also extends from downtown on the 14th Street bridge and continues west on Chouteau Avenue. At Jefferson Avenue it turns south, with double tracks in the center of the street. At I-55, it joins the highway right-of-way, continuing south to the park-and-ride lot at Bayless. This alternative has a cost of \$537.4 million (in 2007 dollars). The alternative is 8.6 miles in length, which totals approximately \$62 million per mile.

The study team selected the Jefferson/I-55 alternative for inclusion in the LPA. In addition to cost, other factors influencing the team's decision include:

- The alignment serves high-density residential and commercial development that is already strongly transit-supportive.
- The alignment serves neighborhoods in which major transit-supportive development projects are planned or under construction.
- The alignment serves heavily transit-dependent markets.

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- The alignment provides the more direct north-south route.
- The alignment allows for higher-speed service in the I-55 right-of-way.

8.2.4 RIDERSHIP PROJECTIONS

Ridership projections were prepared using EWGCOG's TransEval Model. Development of this model was initiated in 2004, using the 2002 Household Interview Survey and the 2002 Transit Onboard Passenger Survey. Objectives of the model included satisfaction of federal mandates, support of transportation improvement programs and long-range transportation plans, enabling of analysis (air quality, corridor, and sub-area), and assessment of the impact of transit alternatives.

The TransEval Model has been subjected to multiple revisions since its initial review in December 2006. These revisions have been implemented, and others are still needed, in order to address inconsistencies and to match existing conditions as closely as possible. For example, the model displayed very low rail ridership for year 2007 when in reality, ridership had increased between years 2002 and 2007. The model required changes to ensure base year conditions were more accurately represented. Detailed measures used to address such concerns include:

- The model framework for future year runs was adjusted and modified. Changes to the bus and rail networks included extending and truncating bus lines that served as feeder routes to rail, modifying transit service levels to reflect existing schedules, modifying transit fares for the future year runs, representing park-and-ride lots accurately, coding proposed rail alternatives, and modeling accurate speed of existing and proposed rail service. School and university enrollments and airport enplanements for 2007 were also revised. These changes were executed between May and June 2007.
- Future year socio-economic files initially represented income categories in the corresponding year's dollars, instead of year 2002 dollars. This caused inaccuracies in model results, such as very few lower-income households and persons for year 2007. This problem was amplified, manifesting an even more acute representation in year 2030 model runs. Subsequently, socio-economic files were revised in August 2007.
- An adjustment factor of 1.37 was applied to non-home-based trips in order to account for an under-representation of that trip type. This was uniformly applied to the non-home-trip table in September 2007. Revision of the model followed.
- Analysis of modeled bus speeds revealed that buses in the base year were represented as traveling much faster than their posted schedules. A spreadsheet analysis tool was developed to address this problem and adjust bus speeds. This change was incorporated into all future model runs. A subsequently revised version of the model, which also reflected revised walk-to-rail access links, was used in October 2007.
- The number of bus stops that each zone (5 through 15) could connect to was adjusted based on conversations with the client. Further, the model framework was revised – the frequencies of bus routes serving the same trip ends were combined, thereby

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representing reduced wait times at transit stops. This recalibration was incorporated into the model in October 2007.

- The airport trip generation module was adjusted per recommendation of Cambridge Systematics. Previous to this revision, the model represented a higher propensity for air travel among low-income households, as opposed to high-income households. This recalibration was incorporated in October 2007.
- The trip generation module for university on-campus trips was adjusted in November 2007.
- Following a meeting with Federal Transit Administration (FTA) staff in December 2007, the model was recalibrated in order to bring rail and other transit constants within reasonable limits.
- Access, egress, and transfer conditions for transit were revised. Adjustments included preclusion of movements such as walk access to transit followed by walk egress from transit and inclusion of transfer between bus and rail when the line haul mode was drive, among other conditions. The model was subsequently fully recalibrated in March 2008.
- Due to the steep increase in fuel prices between 2002 and 2007, automobile operating costs also increased. The model accounted for the consequential increase in transit fares, but it failed to account for the increase in automobile operating costs for year 2007. Analysis of AAA car operating costs led to an adjusted 2007 model automobile operating cost. Further changes were made to transit fares to depict prevailing use of transit and university discounts in the region. Multiple calibration rounds led to a revised model in July 2008.
- Two possible means of increasing the 2007 modeled rail ridership were explored – increasing the rail constant for future year runs, and increasing drive access range to rail while decreasing drive access to bus. Both modifications produced an increase in rail ridership. The second option was selected for implementation in the model, in order to maintain consistency across model years. This recalibration was completed in October 2008.

It is important to note that, at the time of the final LPA selection in October 2007, the study team realized further revisions to the model were required to ensure higher accuracy. The team therefore progressed with selection, with the understanding that future model revisions would likely support their result. These model revisions continued for an additional year, and further recalibrations will be required for any future research or pursuit.

In order to maintain the integrity of the LPA selection process and to also reflect the progression of the ridership projection model, two datasets are presented here: that available at the time of the LPA selection and the most current, which reflects work through October 2008. These later data may be interpreted in the context of continuing model updates and progress towards more accurate capture of travel patterns and transit usage in the St. Louis region.

Model Assumptions

The 2030 no-build scenario assumes modest growth in employment and population throughout the St. Louis region. Additional model assumptions include:

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- Continued operation of all existing MetroLink lines.
- MetroLink operating frequencies of 10 minutes during the peak period and 15 minutes during the off-peak period.
- MetroBus service inclusive of 227 local and 35 express buses during the peak period and 198 local and 4 express buses during the off-peak period.
- Maintenance of the 2007 fare structure, and incorporation of all 2007 changes to drive-access to transit.

September 2007 Model Results

The 2030 build scenario for was considered for two potential LRT routes: one connecting downtown to the Northside via the Natural Bridge alignment alternative and to the Southside via the Chouteau/UPRR alignment alternative, and one connecting downtown to the Northside via the Natural Bridge alignment and to the Southside via the Jefferson alignment. The route including the Chouteau/UPRR alternative was projected to provide service daily to approximately 2,800 Northside riders, 2,500 downtown riders, and 6,600 Southside riders – a total of 11,900 daily riders along the entire alignment. The route including the Jefferson alternative was projected to provide service daily to approximately 3,000 Northside riders, 2,300 downtown riders, and 4,000 Southside riders – a total of 9,300 daily riders along the entire alignment.

October 2008 Model Results

The no-build scenario shows a modest increase in rail ridership between 2007 and 2030, with total projected 2030 boardings approaching 72,000 – a growth of nearly 6%. This rail ridership growth is approximately 1% less than overall transit ridership increase.

The 2030 build scenario for the LPA incorporates the no-build assumptions, as well as the addition of the Northside-Southside alignment to the region's transit network, a slight decrease in bus service (218 local and 35 express during peak, 192 local and 4 express during off-peak), modification of some bus routes to better connect transit users with the LPA, and construction of four park-and-ride facilities. As such, the Northside alignment is projected to provide service to 5023 daily riders, the Southside to 7312, and downtown to 2578 – a total of 14,913 daily riders over the entire LPA. This is an increase of nearly 14,600 rail boards, and 6500 transit users overall, over the no-build scenario, thereby implying both capture of new rail riders and a shift among transit users toward the improved rail service.

8.2.5 RECOMMENDED LOCALLY-PREFERRED ALTERNATIVE

As noted above, the recommended LPA is a single alignment composed of Northside, Downtown, and Southside segments (Figure 8.2-6). Total capital cost for the LPA is estimated at \$971 million. That is an average of approximately \$58 million per mile for the 17-mile alignment.

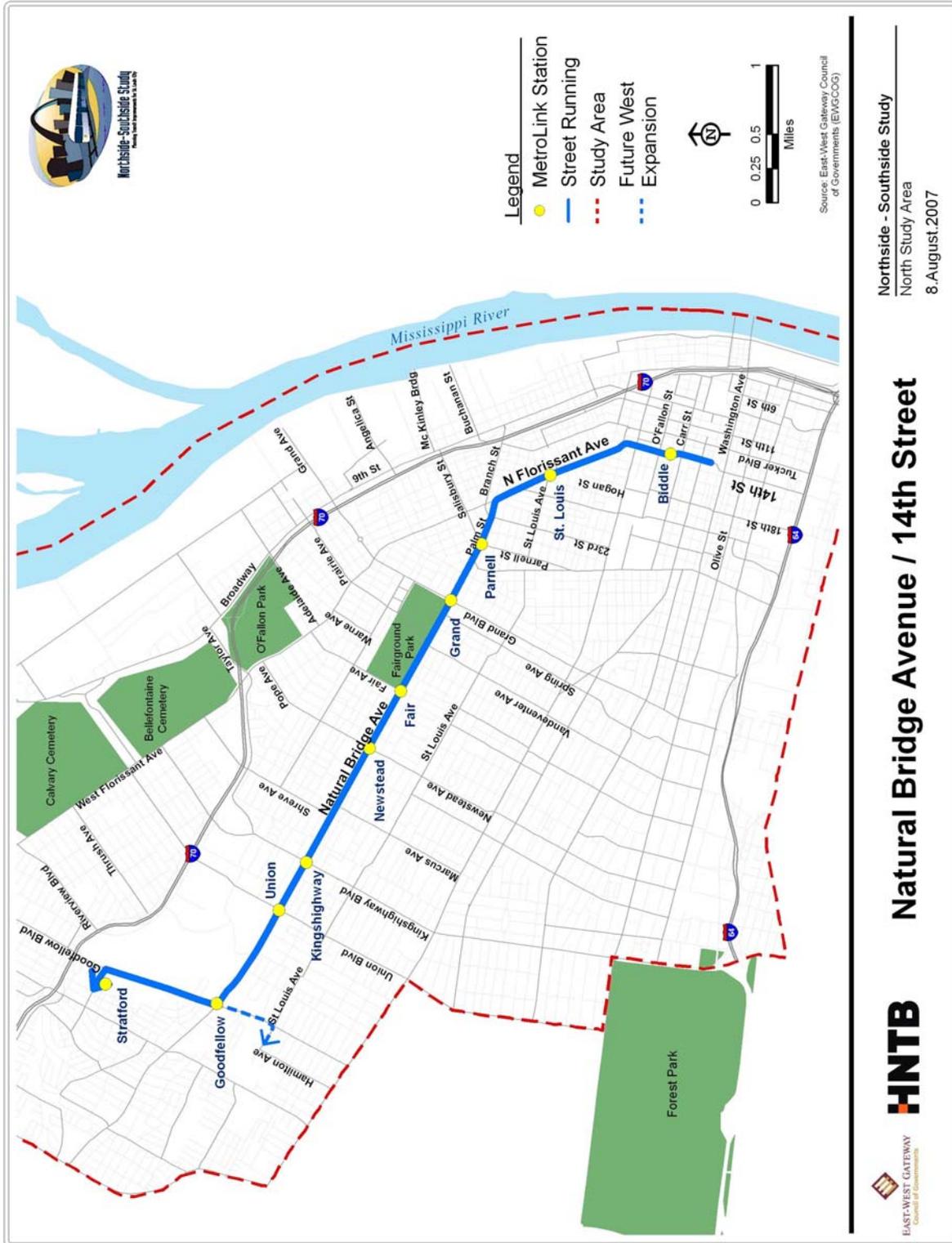
On October 31, 2007, the EWGCOG Board of directors adopted the recommended LPA for inclusion in their regional long-range plan.

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EWGCOG's Board of Directors' adoption of the LPA for inclusion in the regional long-range plan allows for the next phase of study for the Northside-Southside corridor. The next phase would be the completion of a Draft Environmental Impact Statement (DEIS) under the guidelines of the National Environment Policy Act (NEPA), together with a New Starts application for Federal Transit Administration (FTA) approval. Should the application be approved for funding, preliminary engineering and the completion of the DEIS would then move forward. A DEIS would again evaluate alternatives and the potential impacts on the neighborhoods, traffic, development opportunities and transit service. The DEIS allows for a more detailed study of the transit expansion issues which results in a preferred alternative. If selected, the preferred alternative would advance to preliminary engineering.

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FIGURE 8.2-1: NATURAL BRIDGE/NORTH 14TH STREET ALIGNMENT ALTERNATIVE



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FIGURE 8.2-2: 9TH and 10TH STREETS COUPLET ALIGNMENT ALTERNATIVE

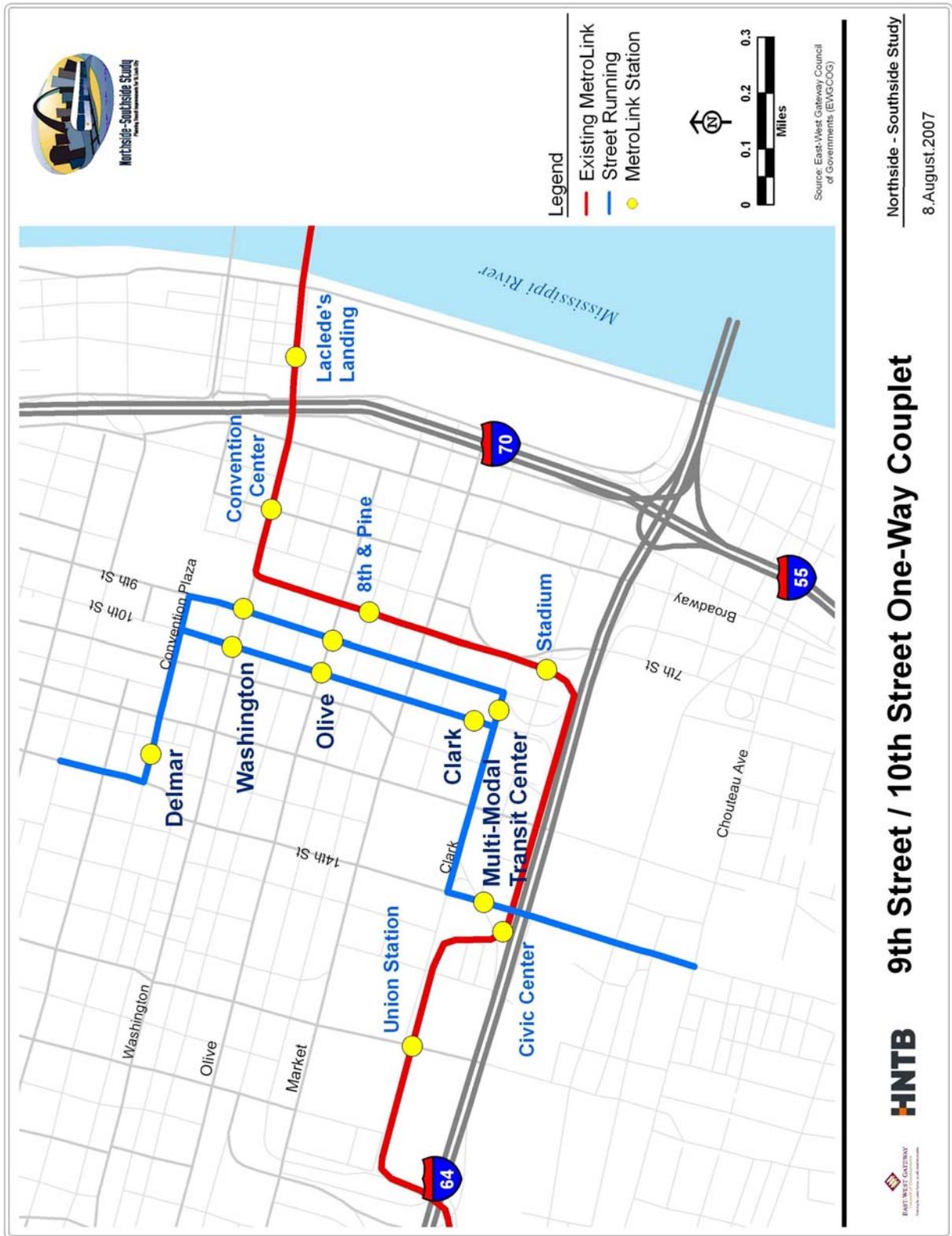
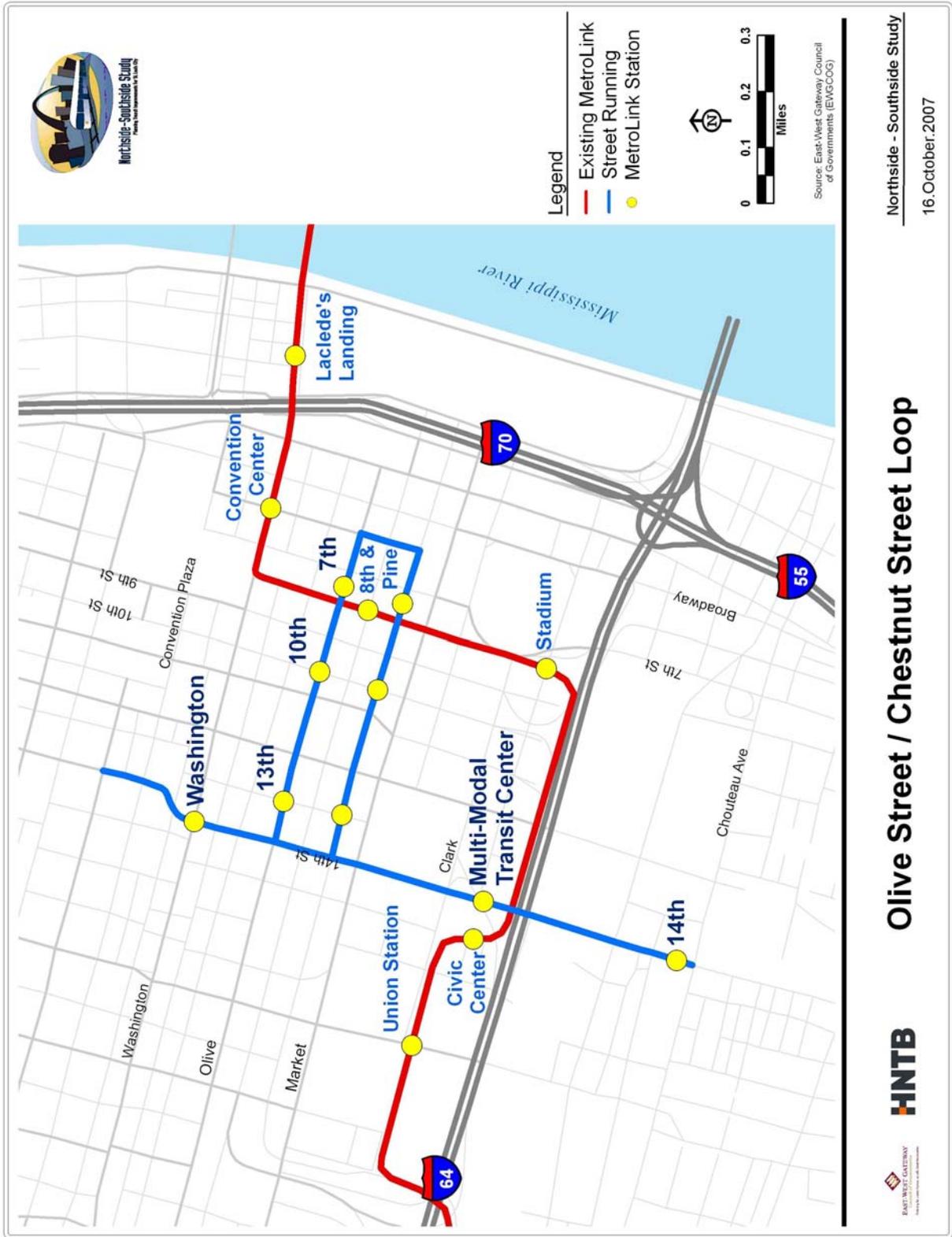


FIGURE 8.2-3: OLIVE/ CHESTNUT LOOP ALIGNMENT ALTERNATIVE



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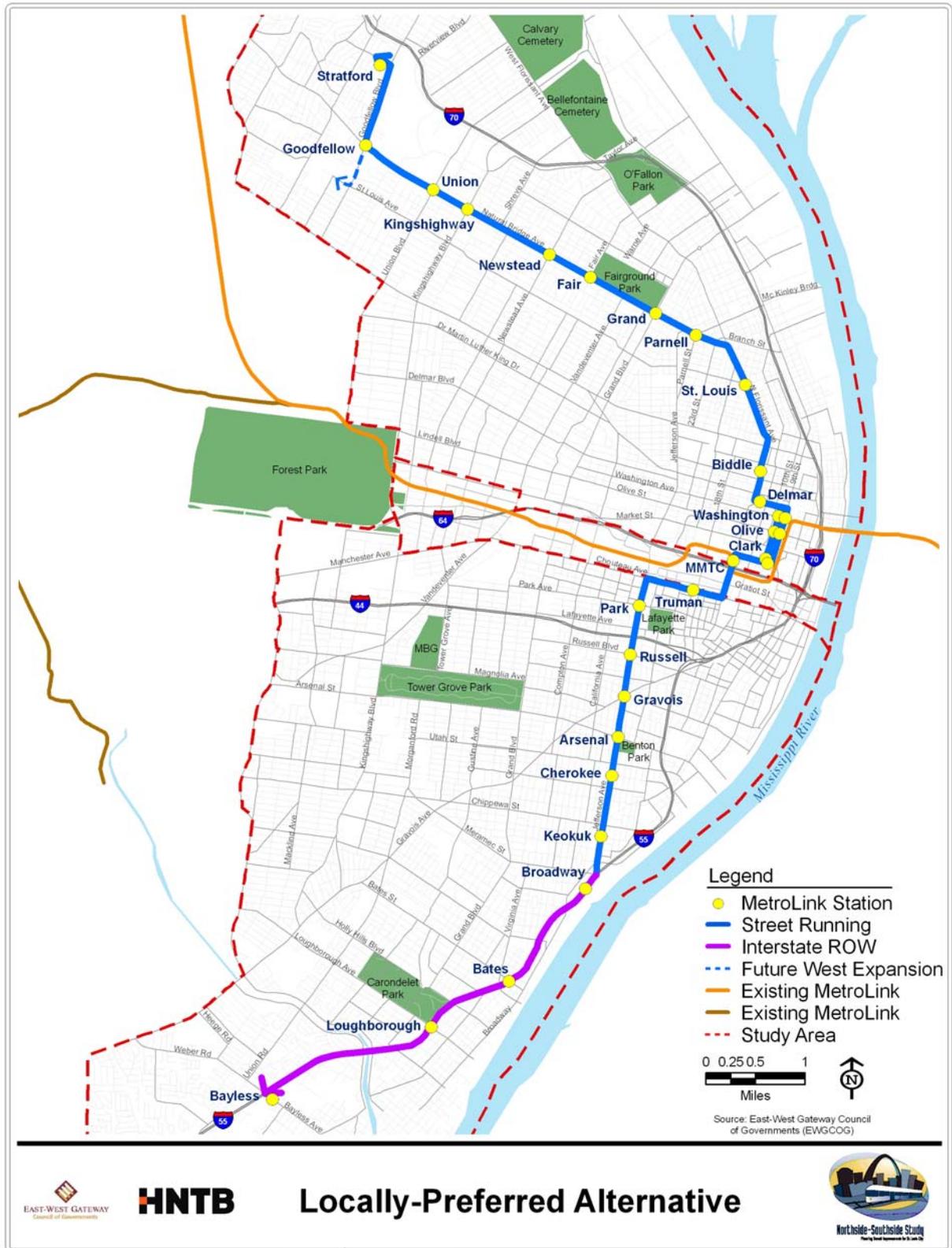
FIGURE 8.2-4: CHOUTEAU/ UPRR ALIGNMENT ALTERNATIVE



FIGURE 8.2-5: JEFFERSON / I-55 ALIGNMENT ALTERNATIVE



FIGURE 8.2-6: LOCALLY-PREFERRED ALTERNATIVE



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